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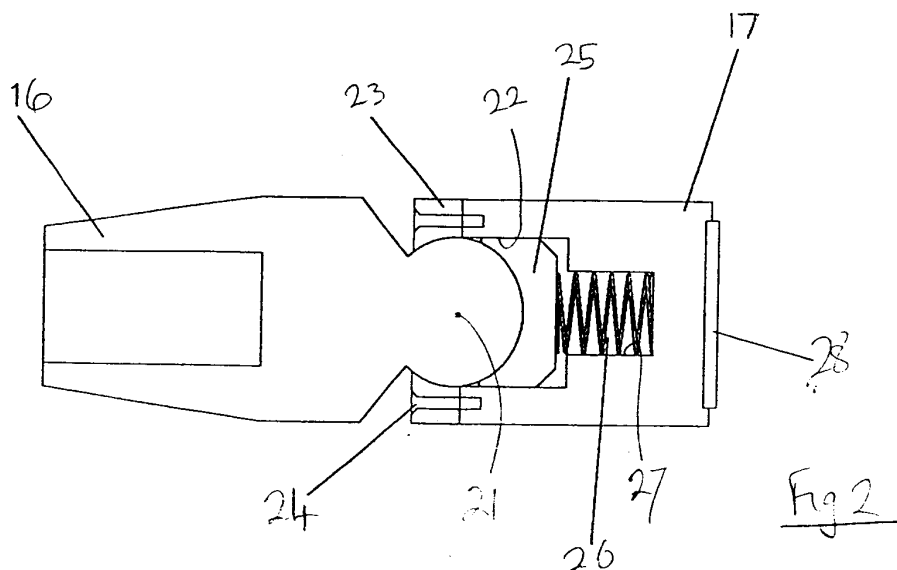
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(54) **Walking aid device**

(57) The invention proposes a foot-like device for a crutch or cane that provides the required degree of usefulness and simplicity at an economic outlay. More specifically, the invention suggests, for use with a walking aid, a ground-engaging device which is like a shin-ankle-foot combination; it has a shin-like mounting member (16), to be carried by or adapted to be mounted on the shank (11) of the aid, and a terminal ground-engaging

foot-like member (17) connected to the shin (16) by a ball-and-socket coupling (21,22) that will permit a limited degree of flexing of the foot (17) about the axis of the shank (11), the coupling's ball (21) being fixedly secured to the shin (16) and being retained within a socket (22) in the foot (17) in which there is a ball-supporting plunger (25) resiliently biased (26) towards the ball (21) so as to provide a degree of shock absorbency.



Description

[0001] This invention is concerned with a walking aid device, and relates in particular to a foot-like object that can be mounted at the end of a walking stick or crutch, or the like, so as to provide the User with greater stability and security.

[0002] In its most basic form a walking aid such as a walking stick or a crutch is merely an elongate stick-like body with a pad or ring-like support at the upper, or proximal, end, to fit under the arm, and perhaps some sort of tip at the lower, or distal, end. Even a walking frame - a Zimmer frame - is in essence much the same. Such aids can be made of a variety of materials - wood or aluminium sticks with rubber tips are common - but a favourite combination for a crutch/stick is a rigid aluminium tube with a rubber grommet on the ground-engaging end and a fixed hand grip up towards the opposite end (which is usually either bifurcated to provide support for a pad that fits into the armpit or has a semi-ring at the top which fits around the User's upper arm).

[0003] The basic type of stick or crutch walking aid is not always easy for its User to utilise, particularly when travelling over ground that is rough, with a surface at any one of a number of angles other than horizontal. Unless wielded with care and skill, it is all too easy for the tip of the crutch or stick to skid across the ground, the User perhaps falling over. This problem has been recognised by many people in the past, for there are a large number of earlier Patent Specifications that describe devices, rather like a combination of shin, angle joint and foot, that can be secured to the distal end of the crutch or stick to provide a more secure footing. These earlier efforts to solve the problem have not been entirely satisfactory-often they are complicated to make, and are not very good from either an engineering or a use point of view-and the present invention proposes a new, and much simpler, foot-like device that provides the required degree of usefulness and simplicity at an economic outlay. More specifically, the invention suggests, for use with a walking aid, a ground-engaging device which is like a shin-ankle-foot combination; it has a shin-like mounting member (to be carried by or adapted to be mounted on the shank of the aid) and a terminal ground-engaging foot-like member connected to the shin by a ball-and-socket coupling that will permit a limited degree of flexing of the foot about the axis of the shank, the coupling's ball being fixedly secured to the shin and being retained within a socket in the foot in which there is a ball-supporting plunger resiliently biased towards the ball so as to provide a degree of shock absorbency.

[0004] In one aspect, therefore, the present invention provides a ground-engaging device to be attached to the end of a crutch or other walking aid for a disabled person, the crutch or other aid being of the type having a longitudinally-extended shank onto the distal end of which the ground-engaging device can be mounted,

which device comprises:

a mounting member mountable on the shank, and a ground-engaging member connected to the mounting member by a coupling means that in use permits flexing of the ground-engaging member about the longitudinal axis of the shank; and

wherein:

the ground-engaging member incorporates a socket, and the coupling means is a ball joint the ball of which is fixedly attached to the mounting member and is rotatably retained within the socket in the ground-engaging member; resilient biasing means is disposed within the socket so as to engage with the ball and provide a measure of shock absorbency; and the ground-engaging member and/or the mounting member is/are provided with means for limiting the extent of flexing of the ground-engaging member relative to the mounting member.

[0005] The invention relates to a ground-engaging device to be attached to the end of a crutch or other walking aid for a disabled person. This walking aid can be of any sort provided it has a longitudinally-extended shank onto the distal end of which the ground-engaging device can be mounted, but for the most part it will be a stick or a crutch.

[0006] The ground-engaging device of the invention includes a mounting member mountable on the shank of the walking aid. The like ground-engaging members known in the Art can be affixed in a number of ways - as a sleeve fitting outside the end of the shank, or as a rod fitting inside the shank end; for the invention, the mounting member preferably comprises a sleeve member, and while this sleeve member can be a screw or other fit on the shank most preferably it is a push fit - that is to say, a "friction" fit.

[0007] In the device of the invention the mounting member carries coupling means in the form of a ball joint the ball of which is fixedly attached to the mounting member and is rotatably retained within the socket in the ground-engaging member - that is to say, the mounting member carries a distally-projecting ball which engages as a captive fit within a corresponding socket in the proximal end of the ground engaging member. One way of retaining the ball within the socket is by means of a split retaining cap, which may be attached to the ground engaging member by any suitable means, such as retaining screws or bolts. A more convenient way, however, is to form the entire ground-engaging member as two suitably-shaped halves - the member being "split" from top to bottom (longitudinally) - which are then put together to hold the ball captive therebetween. The

two halves desirably each have location means (such as projecting pins in one mating with corresponding recesses in the other) whereby they can be correctly positioned with respect to each other, and can be glued, screwed or - and preferably - welded together (most suitable plastics, such as nylon [NYLON is a Registered Trademark], can be welded as here required). Alternatively, the two halves can be held together with one or more small circlip device.

[0008] The ground-engaging member of the invention's device contains - within the ball-retaining socket - bias means - typically a spring co-operating with a plunger/piston in actual contact with the ball - for ensuring a frictional engagement of the ball in the socket. This bias means also provides a measure of shock absorbency when the ground-engaging member strikes the ground.

[0009] Although the ground-engaging member does in fact directly engage the ground, most preferably its distal end carries a rubber or similar pad to provide a friction surface for secure ground engagement.

[0010] In the invention's device one or other - or both - of the ground-engaging member and the mounting member provided with means for limiting the extent of flexing of the one member relative to the other. The means for limiting the extent of relative flexing or pivoting can take one or other of several forms. For example, it can take the form of inter-engaging chamfers or tapers on the opposed faces of the mounting member and ground-engaging member. Alternatively, the opposed faces of these members may carry axially-projecting stocks against which the other member bears as the ground engaging member pivots or flexes. In a further alternate, the ground-engaging member can be provided with a sleeve which extends axially to encompass at least part of the mounting member and/or the shank, and the clearance between the inner wall of the sleeve and the outer wall of the shank or mounting member permits flexing or pivoting of the ground engaging member until the sleeve engages the shank or mounting member.

[0011] The device of the invention preferably has radial symmetry, and the ground engaging member can flex or pivot through an angle of 5 to 20 degrees about the longitudinal axis of the shank in all directions.

[0012] It will be seen that the ground-engaging device of the invention is one which, by virtue of its ball-joint flexible coupling always sits flat to the engaging ground surface even on a compound angle, and which, because of its spring loading, has and an inbuilt shock-absorbing feature.

[0013] An embodiment of the invention is now described, though by way of illustration only, with reference to the accompanying diagrammatic Drawings in which:

Figure 1 shows in side view an example of a walking aid incorporating a ground-engaging device of the invention;

Figure 2 shows a cross-section through the device itself; and

Figure 3 shows a cross-section through an alternative ground-engaging member for use in the invention.

[0014] The walking aid of Figure 1 is a crutch of the type having an elongate shank (11) at the top - proximal - end is a half-ring arm support (12) below which is a fixed handle (13), and having at the bottom - distal - end a ground-engaging device (generally 14) of the invention.

[0015] The shank is "telescopic" - it is in two parts (upper: 11u, and lower: 11l) mounted with the lower inside the upper and fixable therein using pins (not shown) through corresponding holes (as 15).

[0016] The ground-engaging device 14 - shown in detail in Figure 2 - has a sleeve-like mounting member (16) mounted onto a ground-engaging member (17) by way of a ball joint flexible coupling (see Figure 2).

[0017] The walking aid is shown in engagement with the ground (18: at an angle), with the dashed view (19) indicating how far the crutch may lean and yet still have complete ground contact.

[0018] Figure 2 shows the details of the ground-engaging device of the invention.

[0019] The device has a sleeve-like mounting member 16 within which can be received the distal end of the walking aid's shank (not shown), and at the distal end of which sleeve is the ball (21) of a ball joint. The ball fits into a socket (22) in the proximal end of a ground-engaging member 17, and is held therein by a split retaining cap (23) secured in place by screws (as 24).

[0020] Within the socket is a shaped plunger/piston (25) that is urged into frictional engagement with the ball 21 by a spring (26) located in an extension (27) of the socket 22. As can be seen, the plunger 25 can be pushed down against the spring 26, so providing the required degree of resilience and shock absorbency.

[0021] On the actual distal end of the ground-engaging member 17 is a non-slip ground-engaging pad (28).

[0022] Figure 3 shows the details of an alternative form of ground-engaging member for use in the device of the invention.

[0023] The ground-engaging member (37) is "split" from top to bottom (horizontally, as actually depicted here) into two like parts (37u, 37l), which fit together using a number of locating pins/recesses (as 39) to define a ball-retaining socket (22) in the proximal end. The two halves are here welded together.

[0024] As in the version of Figure 2, within the socket 22 is a shaped plunger/piston 25 that is urged into frictional engagement with the ball 21 (not shown in Figure 3) by a spring 26 located in an extension 27 of the socket 22, and on the actual distal end of the ground-engaging member 17 is a non-slip ground-engaging pad 28.

Claims

1. A ground-engaging device to be attached to the end of a crutch or other walking aid for a disabled person, the crutch or other aid being of the type having a longitudinally-extended shank (11) onto the distal end of which the ground-engaging device (14) can be mounted, which device comprises:

a mounting member (16) mountable on the shank (11), and
a ground-engaging member (17) connected to the mounting member by a coupling means (21) that in use permits flexing of the ground-engaging member about the longitudinal axis of the shank (11); and

characterised in that:

the ground-engaging member (17) incorporates a socket (22), and
the coupling means (21) is a ball joint the ball (21) of which is fixedly attached to the mounting member (16) and is rotatably retained within the socket (22) in the ground-engaging member (17);
resilient biasing means (25,26) is disposed within the socket (22,27) so as to engage with the ball (21) and provide a measure of shock absorbency; and
the ground-engaging member (17) and/or the mounting member (16) is/are provided with means for limiting the extent of flexing of the ground-engaging member relative to the mounting member.

2. A ground-engaging device as claimed in Claim 1, wherein the mounting member (16) comprises a sleeve member.

3. A ground-engaging device as claimed in Claim 2, wherein the sleeve member (16) is a push fit on the shank (11).

4. A ground-engaging device as claimed in any of the preceding Claims, wherein the ground-engaging member (17,37) is formed as two suitably-shaped longitudinal halves (37u,37l) which are then put together to hold the ball (22) captive therebetween.

5. A ground-engaging device as claimed in Claim 4, wherein the two halves (37u,37l) are welded together.

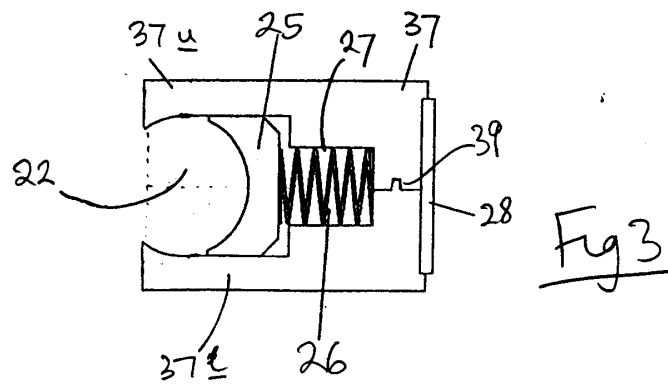
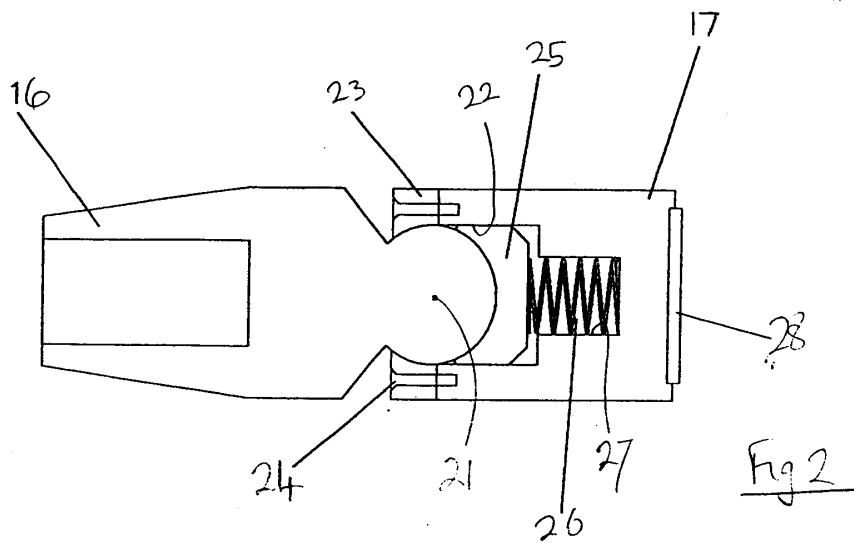
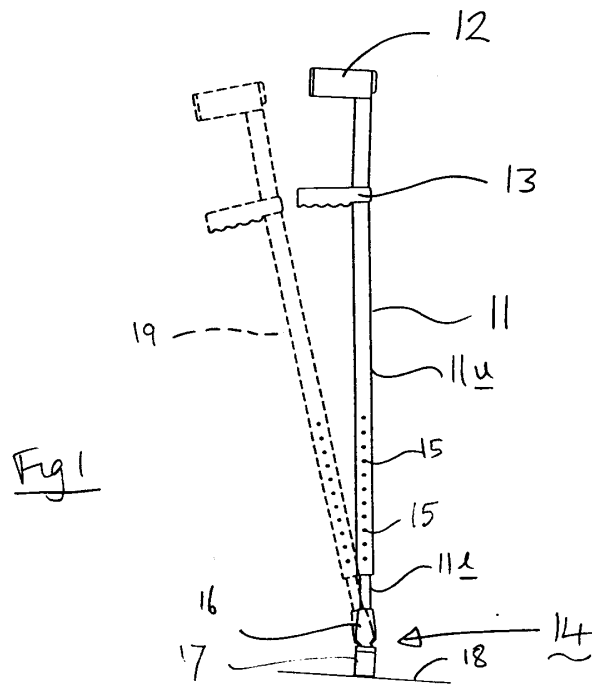
6. A ground-engaging device as claimed in any of the preceding Claims, wherein the bias means (25,26) in the ball-retaining socket (22) is a spring (26) co-operating with a plunger/piston (25) in actual con-

tact with the ball (21).

7. A ground-engaging device as claimed in any of the preceding Claims, wherein the ground-engaging member (17) carries a rubber or similar pad (28) to provide a friction surface for secure ground engagement.

8. A ground-engaging device as claimed in Claim 1, wherein the means for limiting the extent of relative flexing of the ground-engaging member (17) and the mounting member (16) takes the form of inter-engaging chamfers or tapers on the opposed faces of the mounting member and ground-engaging member.

9. A ground-engaging device as claimed in any of the preceding Claims, wherein the ground-engaging member (17) can flex or pivot through an angle of 5 to 20 degrees about the longitudinal axis of the shank (11) in all directions.





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 30 8853

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
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| Place of search MUNICH | | Date of completion of the search 11 July 2000 | Examiner Georgiou, Z |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | |

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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