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(54) **Mounting arrangement for wheel of a wheelchair**

Montageanordnung eines Rads für einen Rollstuhl

Dispositif de montage de roue pour chaise roulante

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Description

[0001] This invention relates to a mounting arrangement for carrying a wheel of a wheelchair relative to a frame of the wheelchair, in order to provide for adjustment of the attitude of the axis about which the wheel rotates, relative to the frame of the wheelchair.

[0002] In a wheelchair which has a pair of main wheels of relatively large diameter which support the majority of the weight of the wheelchair and its occupant, and provide for propulsion of the wheelchair (either by manual propulsion or power drive), as well as castors forwardly or rearwardly of the main wheels, it is known to provide for adjustment of the camber of the main wheels, i.e. inclination of the axis about which each wheel rotates relative to the horizontal. It is known that this can be achieved by adjusting the orientation of respective support members, such as axle-support plates, for the wheels, relative to the frame of the wheelchair, by use of an appropriate number of packing washers in bolted connections of the support members to the frame. However, this gives the possibility that the packing washers can be misplaced, and possibly different numbers of the washers used at the two sides of the wheelchair so that the wheels are set to different camber angles. Clearly this is undesirable.

[0003] It has also been proposed that specially-shaped packing or spacing members can be used where wheel-carrying members are secured to the support members of the wheelchair, but again these have given the possibility of incorrect camber setting through incorrect assembly.

[0004] It is broadly the object of the present invention to provide a mounting arrangement for a wheel of a wheelchair which enables adjustment of the attitude preferably the camber thereof while overcoming or reducing the above-mentioned problems associated with known camber adjustment arrangements.

[0005] According to one aspect of the invention, we provide a mounting for a wheel of a wheelchair, comprising:

a carrier member adapted to extend through a formation in a support member and to carry the wheel for rotation about an axis extending longitudinally of the carrier member;

fastening means on the carrier member and operable to secure the carrier member to the support member, with the support member held between respective abutment surfaces provided on the fastening means and/or the carrier member;

respective spacing members for disposition between each of said abutment surfaces and the support member, each spacing member having opposed faces which face the respective abutment surface and the support member and which faces are non-parallel to each other;

the spacing members having formations which are

adapted to cooperate with the support member to permit the spacing members to be positioned in predetermined orientations only, relative to at least the support member, so that the axis of the carrier member extends in predetermined orientations relative to the support member.

[0006] The formations may permit the spacing members to be oriented only at an angular displacement of 180° relative to each other, about the axis extending longitudinally of the carrier member.

[0007] The formations may permit the spacing members to be positioned in two orientations only relative to the support member, the two orientations being angularly displaced 180° from each other about the axis.

[0008] The formations may comprise a projection extending from each spacing member, engageable in respective recess formations in the support member.

[0009] The recess formations in the support member may comprise apertures extending through the support member, generally parallel to the axis of the carrier member.

[0010] Preferably the projection on each spacing member extends substantially all the way through the aperture in the support member.

[0011] The support member may comprise a support plate, fitted to a frame part of a wheelchair.

[0012] The carrier member may comprise a sleeve adapted to receive an axle on which the wheel is rotatably supported. The axle may be retained in the sleeve by a quickly-detachable retaining device, enabling ready removal of the wheel from the wheelchair for transport and storage, in known manner.

[0013] The invention also provides a wheelchair having a mounting according to the invention for a wheel at each side of the wheelchair, preferably providing for predetermined camber settings of the wheel.

[0014] The invention will now be described by way of example with reference to the accompanying drawings, of which

FIGURE 1 is a diagrammatic side elevation of part of a frame of a wheelchair, having a wheel mounting assembly in accordance with the invention;

FIGURE 2 is a diagrammatic section on the line 2-2 of Figure 1;

FIGURE 3 is an enlargement of part of Figure 2.

[0015] Referring firstly to Figures 1 and 2 of the drawings, this shows part of a side frame structure of a wheelchair. It shows part of upper and lower rail members 10, 11 joined by a vertically extending part 12. The illustrated frame part is disposed generally at or towards the rear end of the wheelchair, and the rail members 10, 11 are further connected to one another at their front ends. The illustrated frame part is provided at one side of the wheelchair and a corresponding frame part is at the other side of the wheelchair, the two parts being connected to one

another by cross-bracing members whose end parts are indicated diagrammatically in outline at 13, 14 in Figure 2, extending transversely of the wheelchair and crossing one another. They are connected to the frame structures at the two sides of the wheelchair by suitable pivotal connections enabling the wheelchair to be folded for storage with the frame structures at each side of the wheelchair being moved close to one another so that the space occupied by the folded wheelchair is substantially smaller than that occupied by the wheelchair when it is in its condition for use.

[0016] The complete frame structure of the wheelchair carries a seat and any or all other components as are conventional for wheelchairs. As well as the wheels carried one at each side of the wheelchair by mounting arrangements as described hereafter, the frame structures also carry additional wheels for supporting the wheelchair, eg. front castor wheels.

[0017] The respective main wheels of the wheelchair on each side thereof are mounted relative to the frame of the wheelchair by support members which are connected to side frame parts. The drawings show a support member in the form of a support plate having an upwardly extending main portion 15 at whose upper end there is a generally horizontally extending portion 16. The lowermost end of the portion 15 is bolted to the member 12 where the rail member 11 extends into it while the free end of the portion 16 is bolted to the rail member 10. The bolted connections are provided by a lower transversely extending bolt 17 which extends through an aperture in the support plate portion 15 and through the member 12, and it will be noted from Figure 2 of the drawings that a relatively thick spacing washer 18 is interposed between the plate portion 15 and member 12. At the upper part of the support plate, a bolt 19 extends through an aperture in its portion 16 and through the upper rail member 10. No spacing washer is interposed between these parts, so if the member 12 is vertically oriented, the support plate portion 15 is slightly inclined to the vertical.

[0018] The portion 15 of the mounting plate is provided with a number of upwardly spaced relatively large diameter apertures 22. Between the apertures 22, and above and below the uppermost and lowermost ones thereof, there are relatively small diameter apertures 23. These provide for mounting of the wheel to the mounting plate in a number of different positions as required, and in Figures 1 and 2 a wheel mounting assembly is indicated generally at 25, utilising the mid-positioned one of the apertures 22.

[0019] Figure 3 shows the wheel mounting assembly 25 in greater detail. It comprises a carrier member in the form of a cylindrical sleeve 30 whose interior opening 31 is able to receive a wheel-carrying axle. The central axis of the opening 31 through the sleeve is indicated at 32, and this is the axis of rotation of a wheel rotatably carried by the axle on suitable bearings. In known manner, the axle would be able to be retained in the sleeve 30 by a quickly-detachable fastening device. Adjacent one end,

which is its outermost end when in situ on a wheelchair, the sleeve 30 has an abutment collar 33, and at its opposite end a portion of the external surface 34 of the sleeve is screw threaded for engagement by a nut 35. Between face 33a of the collar 33 and the support plate portion 15 there is a washer 36 and a spacing member 37 and between face 35a of the nut 35 and the support plate portion 15 there is a washer 38 and a further spacing member 39 which is the same as the spacing member 37. On spacing member 37 it is shown that it has an internal aperture 40 through which the sleeve extends, and on its exterior it has a lobe portion 41 provided with a locating formation in the form of a projecting pin or peg 42 which extends nearly all the way through the respective aperture 23 in the support plate portion 15, beneath the aperture 22 therein in which the sleeve 30 is received. Similarly, the spacing member 39 has a corresponding pin 43 received in the aperture 23 above the aperture 22 through which the sleeve 30 passes.

[0020] The opposed side faces of each of the spacing members 37, 39, which face generally along the axis 32, are not parallel to one another, so the spacing members are thicker in their lobe portions as 41 than at their opposite parts. Hence, when the spacing members are assembled as shown in Figure 3, oriented at an angular displacement of 180° relative to one another about the axis 32, and are held firmly between the abutment surfaces 33a, 35a of the sleeve 30 afforded by the collar 33 and nut 35 (with interposed washers 36, 38), the axis 32 is caused to be inclined relative to the general plane of the support plate portion 15. It will be apparent that if the orientation of the spacing members 37, 39 is changed by 180° about the axis 32, so that the pin 42 of spacing member 37 engages in the aperture 23 above the aperture 22 while the corresponding pin of spacing member 39 engages in the aperture 23 below the aperture 22, the axis 32 will be inclined in the opposite sense relative to the general plane of the support plate portion 15.

[0021] By way of example only, the oppositely-facing sides of each of the spacing members 37, 39 may be inclined to one another at an angle of about 1.5°, so the axis 32 can be inclined at 1.5° in either sense relative to the support plate portion 15. If the support plate portion 15 is itself inclined at about 1.5° to the vertical, the inclination of the axis 32 to the support plate can either add to or subtract from that inclination, so that the axis 32 can lie either horizontal or inclined at about 3° to the horizontal. Thus the wheel rotatable about the axis 32 can have a zero camber, ie. be upright, or a 3° negative camber.

[0022] Because the pins 42 extend nearly all the way through the apertures 23 in the support plate portion 15, incorrect assembly in which the pins 42 enter the same aperture 23 is not possible. Hence the invention provides a way of ensuring that the wheel mounting assembly is correctly fitted, with easy selection of the required wheel camber.

[0023] When used in this specification and claims, the terms "comprises" and "comprising" and variations there-

of mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

[0024] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A mounting for a wheel of a wheelchair, comprising:

a carrier member (30) adapted to extend through a formation in a support member (15) and to carry the wheel for rotation about an axis (32) extending longitudinally of the carrier member; fastening means (35) on the carrier member and operable to secure the carrier member to the support member, with the support member held between respective abutment surfaces (33a, 35a) provided on the fastening means and/or the carrier member; respective spacing members (37, 39) for disposition between each of said abutment surfaces and the support member, each spacing member having opposed faces which face the respective abutment surface and the support member and which faces are non-parallel to each other; the spacing members (37, 39) having formations (42, 43) which are adapted to cooperate with the support member to permit the spacing members to be positioned in predetermined orientations only, relative to at least the support member, so that the axis of the carrier member can extend in predetermined orientations relative to the support member.

2. A mounting according to Claim 1 further **characterised in that** the formations permit the spacing members to be oriented only at an angular displacement of 180° relative to each other, about the axis extending longitudinally of the carrier member.

3. A mounting according to Claim 1 or Claim 2 in combination with a support member, through an aperture in which the carrier member extends, and which is held between the abutment surfaces.

4. A mounting according to Claim 3 further **characterised in that** the formations permit the spacing members to be positioned in two orientations only relative to the support member, the two orientations being angularly displaced at 180° from each other about

the axis.

5. A mounting according to Claim 4 further **characterised in that** the formations comprise a respective projection extending from each spacing member, engageable in respective recess formations in the support member.

6. A mounting according to Claim 5 further **characterised in that** the recess formations in the support member comprise apertures extending therethrough, generally parallel to the axis of the carrier member.

7. A mounting according to Claim 6 further **characterised in that** the projection on each spacing member extends substantially all the way through the respective aperture in the support member.

8. A mounting according to any one of the preceding claims further **characterised in that** the carrier member comprises a sleeve adapted to receive an axle on which the wheel is rotatably supported.

9. A mounting according to Claim 3 or any claim appendant thereto further **characterised in that** the support member comprises a support plate, fitted to a frame part of the wheelchair.

10. A wheelchair comprising a frame having a respective frame part at each side of the wheelchair and **characterised by** a mounting according to Claim 9 for a wheel at each side of the wheelchair.

11. A wheelchair according to claim 10 further **characterised in that** the mounting provides for predetermined camber settings of the wheel.

Patentansprüche

1. Halterung für ein Rad eines Rollstuhls, umfassend:

ein Trägerelement (30), das so angepasst ist, dass es sich durch ein Gebilde in einem Stützelement (15) erstreckt und das Rad zwecks Drehung um eine Achse (32) trägt, die sich längs zum Trägerelement erstreckt, Befestigungsmittel (35) am Trägerelement, wirksam um das Trägerelement am Stützelement zu befestigen, wobei das Stützelement zwischen jeweiligen Anlageflächen (33a, 35a) gehalten wird, die an den Befestigungsmitteln und/oder dem Trägerelement vorgesehen sind, jeweilige Beabstandungselemente (37, 39) zur Anordnung zwischen jeder der Anlageflächen und dem Stützelement, wobei jedes Beabstandungselement entgegengesetzte Seiten auf-

weist, die zur jeweiligen Anlagefläche und dem Stützelement weisen, wobei die Seiten nicht parallel zueinander sind,

wobei die Beabstandungselemente (37, 39) Gebilde (42, 43) aufweisen, die so angepasst sind, dass sie mit den Stützelementen zusammenwirken, so dass sich die Beabstandungselemente nur mit vorab festgelegten Ausrichtungen positionieren lassen, zumindest bezogen auf das Stützelement, so dass sich die Achse des Trägerelements mit vorab festgelegten Ausrichtungen bezogen auf das Stützelement erstrecken kann.

2. Halterung nach Anspruch 1, ferner **dadurch gekennzeichnet, dass** die Gebilde bewirken, dass sich die Beabstandungselemente nur mit einem Winkelversatz von 180° bezogen aufeinander um die sich längs zum Trägerelement erstreckende Achse ausrichten lassen.
3. Halterung nach Anspruch 1 oder Anspruch 2 in Kombination mit einem Stützelement mit einer Öffnung, durch die sich das Trägerelement erstreckt, und das zwischen den Anlageflächen gehalten wird.
4. Halterung nach Anspruch 3, ferner **dadurch gekennzeichnet, dass** die Gebilde bewirken, dass sich die Beabstandungselemente nur mit zwei Ausrichtungen bezogen auf das Stützelement positionieren lassen, wobei die zwei Ausrichtungen um 180° voneinander um die Achse winkelfersetzt sind.
5. Halterung nach Anspruch 4, ferner **dadurch gekennzeichnet, dass** die Gebilde einen sich von jedem Beabstandungselement erstreckenden jeweiligen Vorsprung umfassen, der mit jeweiligen Aussparungsgebilden im Stützelement in Eingriff bringbar ist.
6. Halterung nach Anspruch 5, ferner **dadurch gekennzeichnet, dass** die Aussparungsgebilde im Stützelement Öffnungen umfassen, die sich durch dasselbe hindurch, im Allgemeinen parallel zur Achse des Trägerelements erstrecken.
7. Halterung nach Anspruch 6, ferner **dadurch gekennzeichnet, dass** der Vorsprung an jedem Beabstandungselement sich im Wesentlichen durchgängig durch die jeweilige Öffnung im Stützelement erstreckt.
8. Halterung nach einem der vorangehenden Ansprüche, ferner **dadurch gekennzeichnet, dass** das Trägerelement eine Hülse umfasst, die so angepasst ist, dass sie eine Achse aufnimmt, auf der das Rad drehbar gehalten wird.

9. Halterung nach Anspruch 3 oder einem diesem zugehörigen Anspruch, ferner **dadurch gekennzeichnet, dass** das Stützelement eine Stützplatte umfasst, die an einem Rahmenteil des Rollstuhls angebracht ist.

10. Rollstuhl, der einen Rahmen mit einem jeweiligen Rahmenteil auf jeder Seite des Rollstuhls umfasst und durch eine Halterung nach Anspruch 9 für ein Rad auf jeder Seite des Rollstuhls **gekennzeichnet** ist.

11. Rollstuhl nach Anspruch 10, ferner **dadurch gekennzeichnet, dass** die Halterung vorab festgelegte Sturzeinstellungen des Rades erlaubt.

Revendications

1. Dispositif de montage de roue d'un fauteuil roulant, comprenant :

un élément porteur (30) adapté pour s'étendre à travers une formation dans un élément de support (15) et pour supporter la roue en rotation autour d'un axe (32) s'étendant dans la longueur de l'élément porteur ;

des moyens de fixation (35) sur l'élément porteur et utilisables pour fixer l'élément porteur sur l'élément de support, l'élément de support étant maintenu entre les surfaces de butée respectives (33a, 35a) agencées sur les moyens de fixation et/ou l'élément porteur ;

des éléments d'écartement respectifs (37, 39) disposés entre chacune desdites surfaces de butée et l'élément de support, chaque élément d'écartement ayant des faces opposées qui font face à la surface de butée respective et à l'élément de support et qui font face non parallèlement les uns aux autres ;

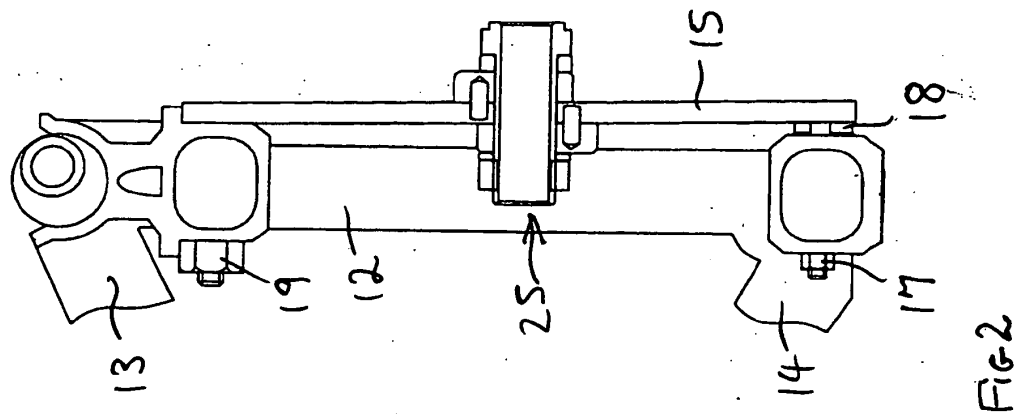
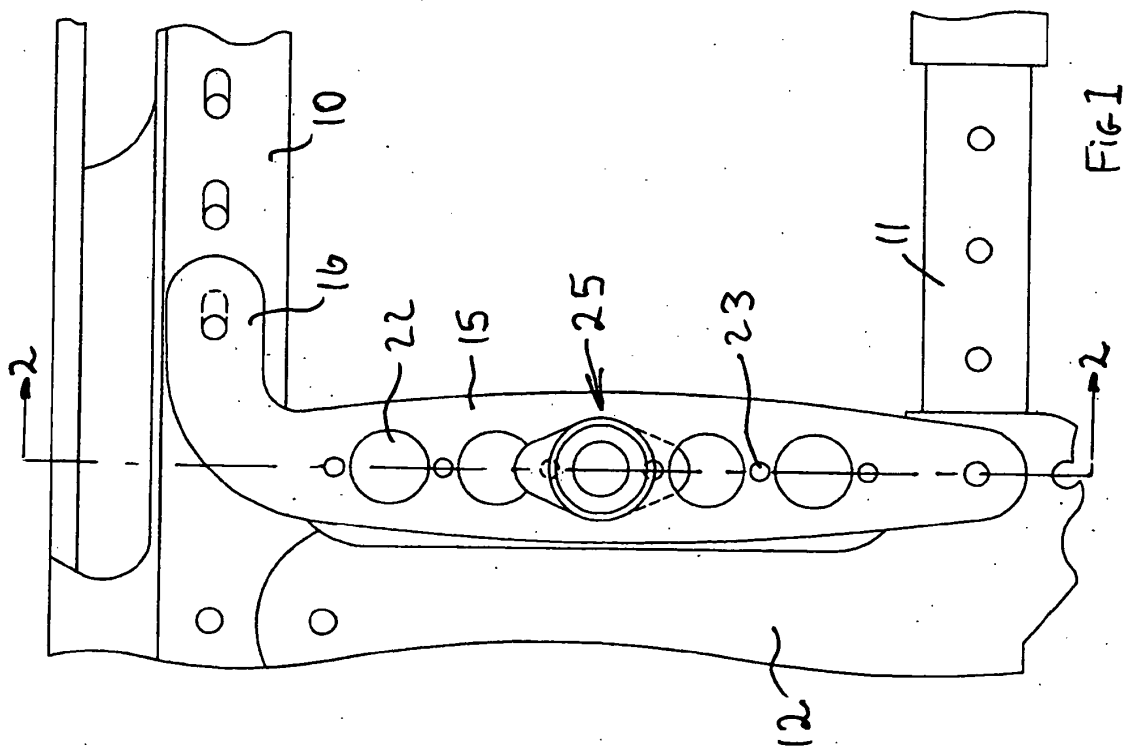
les éléments d'écartement (37, 39) ayant des formations (42, 43) qui sont adaptées pour coopérer avec l'élément de support afin de permettre aux éléments d'écartement d'être positionnés dans des orientations prédéterminées seulement, par rapport à au moins l'élément de support, de sorte que l'axe de l'élément porteur puisse s'étendre dans des orientations prédéterminées par rapport à l'élément de support.

2. Dispositif de montage selon la revendication 1, **caractérisé en outre en ce que** les formations permettent aux éléments d'écartement d'être orientés uniquement à un déplacement angulaire de 180° les uns par rapport aux autres, autour de l'axe s'étendant longitudinalement de l'élément porteur.
3. Dispositif de montage selon la revendication 1 ou la

revendication 2, en combinaison avec un élément de support, à travers une ouverture dans laquelle l'élément support s'étend, et qui est maintenu entre les surfaces de butée.

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4. Dispositif de montage selon la revendication 3 **caractérisé en outre en ce que** les formations permettent aux éléments de séparation d'être positionnés dans deux orientations seulement par rapport à l'élément de support, les deux orientations étant décalées angulairement de 180° l'une par rapport à l'autre autour de l'axe. 10
5. Dispositif de montage selon la revendication 4, **caractérisé en outre en ce que** les formations comprennent une saillie respective s'étendant à partir de chaque élément d'écartement, pouvant être mise en prise dans des formations d'évidement respectives dans l'élément de support. 15
6. Dispositif de montage selon la revendication 5, **caractérisé en outre en ce que** les formations d'évidement dans l'élément de support comprennent des ouvertures s'étendant à travers celui-ci, parallèles généralement à l'axe de l'élément porteur. 20 25
7. Dispositif de montage selon la revendication 6, **caractérisé en outre en ce que** la saillie sur chaque élément d'écartement s'étend essentiellement tout le long de l'ouverture respective dans l'élément de support. 30
8. Dispositif de montage selon l'une quelconque des revendications précédentes, **caractérisé en outre en ce que** l'élément porteur comprend un manchon adapté pour recevoir un essieu sur lequel la roue est supportée de manière rotative. 35
9. Dispositif de montage selon la revendication 3 ou l'une quelconque des revendications annexées, **caractérisé en outre en ce que** l'élément de support comprend une plaque de support, ajustée à une partie de châssis du fauteuil roulant. 40
10. Fauteuil roulant comprenant un châssis ayant une partie de châssis respective de chaque côté du fauteuil roulant et **caractérisé par** un dispositif de montage selon la revendication 9 pour une roue de chaque côté du fauteuil roulant. 45
11. Fauteuil roulant selon la revendication 10, **caractérisée en outre en ce que** le dispositif de montage fournit des réglages de carrossage prédéterminés à la roue. 50 55



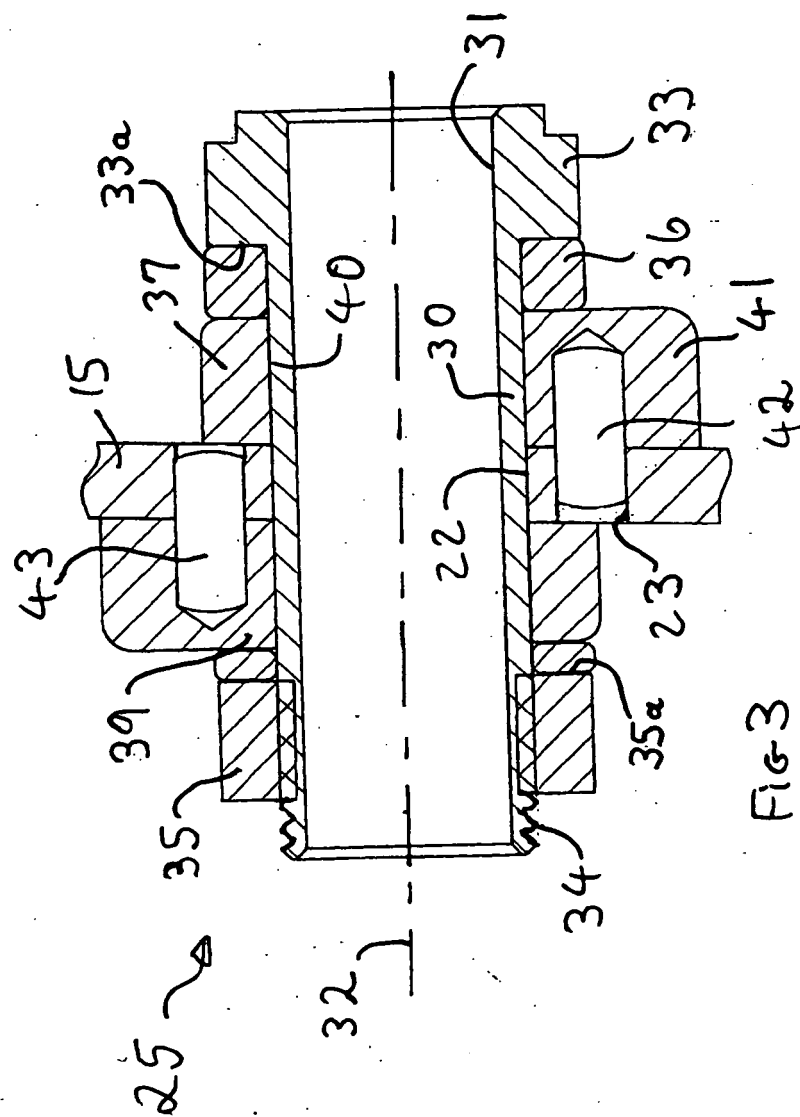


Fig. 3