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(54) **Adjustable hinge for refrigerator doors**

Verstellbares Scharnier für Kühlschranktüren

Charnière réglable pour portes d'armoires frigorifiques

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Description

[0001] The present invention relates to a removable adjustable hinge for refrigerator doors, and to the refrigerator provided with the hinge.

[0002] Large capacity refrigerators comprise two adjacent doors hinged to opposite sides of the refrigerator cabinet. The cabinet presents a vertical dividing wall which divides its interior substantially into two compartments, each closed by a door. One of these compartments forms the freezing compartment, the other the preservation compartment for fresh foods.

[0003] The lower hinges generally consist of an inverted L-shaped bracket, a first arm of which is fixed to the refrigerator cabinet by screws, whereas the other arm, which projects, carries an upwardly directed pin perpendicular to the other arm. The pins are received in seats present in the bottom of the door. Height adjustment is not provided. Moreover when an extremely bulky refrigerator of this type is to be transferred, the doors have mostly to be removed in order to reduce its overall size to an extent enabling it to pass through doors and corridors. When the refrigerator has reached its destination the doors are remounted. However the extending parts of the hinge project to a considerable extent and can cause damage to objects and persons during transportation. To remedy this the bracket also has to be removed and then remounted. As the bracket is fixed by a plurality of firmly tightened screws to enable it to support the door for the rather lengthy time during which the door is open, the removal and assembly process is tedious and tiring.

[0004] To remedy these negative aspects of common hinges, US-6,030,064 provides a hinge comprising an inverted L-shaped bracket with one arm provided with a perpendicular pin and with its other arm insertable into a channel-shaped or tubular part of rectangular cross-section securely fixed to the cabinet by screws.

[0005] The channel-shaped part has a base provided with two threaded holes for connecting the screws which, by bearing against the lower face of the inserted arm, enable the hinge to be vertically adjusted. In the base there is also provided a guide slot for a corresponding appendix of the inserted arm of the bracket. The channel-shaped part is also provided with a transverse baffle which eliminates slack between the L-shaped bracket and the channel-shaped part. To mount the screws which fix the channel-shaped part to the cabinet, apertures are provided in the front wall of the channel-shaped part for passage of the screws. The drawbacks of the hinge include the precision with which the components (i.e. bracket and channel-shaped part) have to be constructed in order to prevent play, i.e. relative movement between the two which can lead to door unbalance, and the use of two adjustment screws, plus the overall constructional complexity of this known hinge.

[0006] Document US-4,070,728, which is considered as being the closest state of the art, discloses a vertically adjustable lower hinge assembly for use on a refrigerator or freezer.

[0007] A main object of the present invention is to provide a vertically adjustable lower hinge for refrigerator doors, especially for refrigerators with side-by-side doors, which is of simple and not necessarily high-precision construction, which uses only one adjustment screw for the height adjustment, and which is easily demountable when the doors are removed to reduce the overall dimensions of the refrigerator for transport purposes.

[0008] A further important object of the present invention is to ensure verticality of the door rotation axis by means of an upper hinge which is also adjustable.

[0009] A further object of the present invention is provide a refrigerator incorporating one or more adjustable lower hinges provided with the aforestated advantageous aspects, preferably in combination with upper hinges which are also adjustment. These and further objects which will be more apparent from the ensuing detailed description are attained by lower hinge in accordance with the teachings of the accompanying independent claim 1, by an upper hinge in accordance with the teachings of the accompanying claim 2, and by a refrigerator in accordance with the teachings of the accompanying independent claim 3.

[0010] The invention will be better understood from the detailed description of some preferred embodiments thereof given hereinafter by way of non-limiting example and illustrated in the accompanying drawings, in which:

Figure 1 is a front view of a refrigerator with two side-by-side doors, one of which is open;
Figure 2 is a perspective view of a lower hinge for refrigerator doors;
Figure 3 is a perspective view of the lower hinge of Figure 2 taken from a different angle;
Figure 4 is a perspective view of an upper hinge for refrigerator doors.

[0011] With reference to the figures, the reference numeral 1 indicates overall a conventional refrigerator of the type comprising two side-by-side doors 2 and 3, of which that indicated by 2, and shown closed, closes a freezer compartment, whereas the other door 3, shown open, closes a refrigerated preservation compartment for fresh foods. A partition 5 separates the two compartments, the partition and compartments being contained within the refrigerator cabinet 6.

[0012] Each of the doors is hinged both upperly and lowerly to the cabinet 6 by a respective upper hinge 7 and lower hinge 8.

[0013] The lower hinge 8 (Figures 2 and 3) comprises a substantially inverted L-shaped bracket element 9 presenting a first side 9a for fixing to the cabinet 6 and a second side 9b (perpendicular to the fixing side) which projects outwards. The fixing side 9a presents three slotted holes 9c in carefully chosen positions. Screws

10 inserted through the slotted holes fix the bracket element 9 to the cabinet 6. The two sides 9a, 9b are joined together laterally by strengthening parts 9d.

[0014] On the second side 9b there is mounted in known manner a conventional pin 11 intended to be inserted into a conventional seat, not shown, present in the lower edge of the door concerned, to hence form a hinge.

[0015] The first side 9a lowerly presents, formed from the material (sheet metal) of the bracket element 9, a flange 9e perpendicular to the first side 9a and hence slightly projecting from it. This flange therefore leaves a free space in the region 20 of the side 9a. Against this flange 9a there can act a screw 21 which is used to adjust the height of the bracket element 9 and hence of the lower hinge concerned.

[0016] The screw 21 is screwed into a projecting arm 12a of a separate component 12 of the lower hinge. This component 12 is of inverted L-shape and is inserted by means of its other arm 12b into the space 20 left free by the projecting flange 9e. The component 12 is fixed to the refrigerator cabinet by screws 22 passing through holes present in the arm 12b.

[0017] The lower hinge is mounted on the refrigerator cabinet in the following manner: The component 12 is fixed to cabinet by its screws 22. The screws 10 are only partially screwed down (and hence not tightened) onto the refrigerator cabinet. The bracket element 9 is then passed over the screws 10 by virtue of the slotted configuration of the holes 9c and lowered, after which the vertical position of the bracket element 9 is adjusted by acting on the adjustment screw 21, and when the required position for the bracket element 9 has been attained the screws are screwed tightly down to lock it.

[0018] When the doors and the projecting bracket element 9 need to be removed for the space restriction reasons stated in the introduction, the screws 10 need merely to be slackened (without removing them), so that by utilizing the slotted arrangement of the holes 9c the element 9 can be removed, and then replaced in position (together with the door) as indicated hereinbefore.

[0019] The upper hinge 7 presents a component 30 to be fixed by screws 31 a, b, c to the upper part of the refrigerator cabinet 6. In the example the screws are three in number.

[0020] The component 30 presents a flat part 30a to which, via a step or transition region 30b, there is connected a curved flat arm 30c which when in use projects above the door (for example the door 3). The arm 30c carries, extending downwards, a conventional hinge pin 32 intended to penetrate in known manner into an appropriate seat present in the upper edge of the door.

[0021] From that end of the flat part 30a opposite the arm 30c there extends perpendicularly upwards a flange 30d against which there bears an adjustment screw 33 screwed into an arm 34a of a right-angled bracket 34, the other arm 34b of which is fixed to the top of the refrigerator cabinet by screws. The arm 34a faces the flange 30d.

[0022] The hole through which the screw 31a passes can be circular, whereas the holes through which the other two screws 31b, 31c pass are slightly elongate and preferably arched such that their centre line lies along circular arcs having their centre at the centre of the hole through which the screw 31 a passes.

[0023] The aforedescribed upper hinge 7 enables its pin 32 to be vertically aligned with that 11 of the lower hinge. For this purpose the three screws 31a, b, c are only loosely screwed down (i.e. not completely tightened). On rotating the adjustment screw 33, it thrusts against the flange 30d to swivel the pin 32, which can thus be brought into vertical alignment with the lower pin 11. The screws 31a, b, c are then completely tightened.

Claims

1. An adjustment hinge for refrigerator doors, to be positioned at the bottom of the door to connect the door to the refrigerator cabinet, and comprising a bracket element (9) carrying a hinge pin (11), said bracket element (9) presenting a side (9a) for its fixing to the refrigerator cabinet by screws (10), and said side having slotted holes (9c) for said screws (10), **characterised in that** said side (9a) presents a projecting part (9e) on which there acts an adjustment screw (21) mounted in a separate hinge component (12) fixed to the refrigerator cabinet.

2. An adjustment hinge for refrigerator doors, to be positioned at the top of the door to connect the door to the refrigerator cabinet and carrying a hinge pin (32) for the door, **characterised in that** the pin (32) is carried by a component (30), both fixable to the refrigerator and able to be moved angularly by an adjustment screw means (33).

3. A refrigerator, preferably with two side-by-side doors, each provided with a lower hinge and upper hinge provided with hinge pins, **characterised by** comprising: a) a lower hinge according to claim 1;
   and/or
   b) an upper hinge according to claim 2.

4. A hinge as claimed in claim 1, wherein the projecting part (9e) is a flange forming part of the bracket element (9), the adjustment screw (21) being carried in said separate hinge component (12), which is a right-angled bracket.

5. A hinge as claimed in claims 1 and 4, wherein the flange (9e) leaves a free space (20) into which the right-angled bracket (12) at least partially extends.

6. A hinge as claimed in claim 2, wherein the component (30) presents a substantially flat part (30a) pro-

vided, for the passage of screws (31a, b, c), with holes shaped to enable the component (30) to undergo angular movement.

7. A hinge as claimed in claims 2 and 6, wherein the flat part (30a) presents a perpendicularly projecting flange (30d) on which there operates the adjustment screw means (33) disposed in a right-angled bracket (34b) fixable to the refrigerator.

Patentansprüche

1. Verstellscharnier für Kühlschranktüren, zu Positionieren am unteren Bereich der Tür, um die Tür mit dem Kühlschrankgehäuse zu verbinden, und das ein einen Scharnierstift (11) tragendes Auslegerelement (9) umfasst, wobei dieses Auslegerelement (9) eine Seite (9a) zu deren Befestigung an dem Kühlschrankgehäuse mittels Schrauben (10) vorsieht und diese Seite geschlitzte Löcher (9c) für die Schrauben (10) aufweist, **dadurch gekennzeichnet, dass** diese Seite (9a) einen überstehenden Abschnitt (9e) vorsieht, auf den eine Verstellschraube (21), die in einem separaten Scharnierelement (12), welches an dem Kühlschrankgehäuse fixiert ist, befestigt ist, wirkt.

2. Verstellscharnier für Kühlschranktüren, zu Positionieren am oberen Bereich der Tür, um die Tür mit dem Kühlschrankgehäuse zu verbinden, und das einen Scharnierstift (32) für die Tür trägt, **dadurch gekennzeichnet, dass** der Stift (32) durch eine Komponente (30) getragen wird, die sowohl an dem Kühlschrank befestigt werden kann als auch in der Lage ist, schräg durch ein Verstellschraubenelement (33) entfernt zu werden.

3. Kühlschrank, vorzugsweise mit zwei Türen Seite-an-Seite, die jede mit einem unteren und oberen mit Scharnierstiften ausgestatteten Scharnier versehen ist, **gekennzeichnet durch** ein unteres Scharnier gemäß Anspruch 1 und/oder ein oberes Scharnier gemäß Anspruch 2.

4. Scharnier wie in Anspruch 1 beansprucht, wobei der überstehende Abschnitt (9e) ein Flansch ist, der einen Teil des Auslegerelements (9) ausbildet, und die Verstellschraube (21) in einer separaten Scharnierkomponente (12), die ein rechtwinkliger Ausleger ist, getragen wird.

5. Scharnier wie in den Ansprüchen 1 und 4 beansprucht, wobei der Flansch (9e) einen freien Raum (20), in den sich der rechtwinklige Ausleger (12) zumindest teilweise erstreckt, lässt.

6. Scharnier wie in Anspruch 2 beansprucht, wobei die Komponente (30) einen im Wesentlichen flachen Abschnitt (30a) vorsieht, der für die Durchführung der Schrauben (31a, b, c) mit Löchern, die so ausgeformt sind, dass sie der Komponente (30) ermöglichen, sich einer winkligen Bewegung zu unterziehen, versehen ist.

7. Scharnier wie in den Ansprüchen 2 und 6 beansprucht, wobei der flache Abschnitt (30a) einen überstehenden senkrechten Flansch (30d) aufweist, auf den die Verstellschraube (33), die in einem an einer Kühlschrank befestigbaren rechtwinkligen Ausleger (34b) angeordnet ist, wirkt.

Revendications

1. Charnière de réglage pour portes d'armoires frigorifiques, à positionner au bas de la porte pour connecter la porte à l'armoire frigorifique, et comprenant un élément faisant support (9) portant un axe de charnière (11), ledit élément faisant support (9) présentant un côté (9a) pour sa fixation sur l'armoire frigorifique par des vis (10) et ledit côté ayant des trous fendus (9c) pour lesdites vis (10), **caractérisée en ce que** ledit côté (9a) présente une partie en projection (9e) sur laquelle agit une vis de réglage (21) montée dans un composant de charnière séparé (12) fixé à l'armoire frigorifique.

2. Charnière de réglage pour portes d'armoires frigorifiques, à positionner sur le dessus de la porte pour connecter la porte à l'armoire frigorifique et portant un axe de charnière (32) pour la porte, **caractérisée en ce que** l'axe (32) est porté par un composant (30), qui peut aussi bien être fixé sur l'armoire frigorifique qu'être déplacé de façon angulaire par un moyen à vis de réglage (33).

3. Armoire frigorifique, de préférence avec deux portes côte à côte, munies chacune d'une charnière inférieure et d'une charnière supérieure munies d'axes de charnière, **caractérisée en ce qu'**elle comprend : a) une charnière inférieure selon la revendication 1 ;

et/ou

b) une charnière supérieure selon la revendication 2.

4. Charnière selon la revendication 1, dans laquelle la partie en projection (9e) est une bride faisant partie de l'élément faisant support (9), la vis de réglage (21) étant portée dans ledit composant de charnière séparé (12) qui est un support à angle droit.

5. Charnière selon les revendications 1 et 4, dans laquelle la bride (9e) laisse un espace libre (20) dans lequel le support à angle droit (12) s'étend au moins

partiellement.

6. Charnière selon la revendication 2, dans laquelle le composant (30) présente une partie sensiblement plate (30a) munie, pour le passage des vis (31a, b, c), de trous dotés d'une forme permettant au composant (30) de subir un mouvement angulaire.

7. Charnière selon les revendications 2 et 6, dans laquelle la partie plate (30a) présente une bride (30d) se projetant perpendiculairement, sur laquelle opère le moyen à vis de réglage (33) disposé dans un support à angle droit (34b) pouvant être fixé sur l'armoire frigorifique.

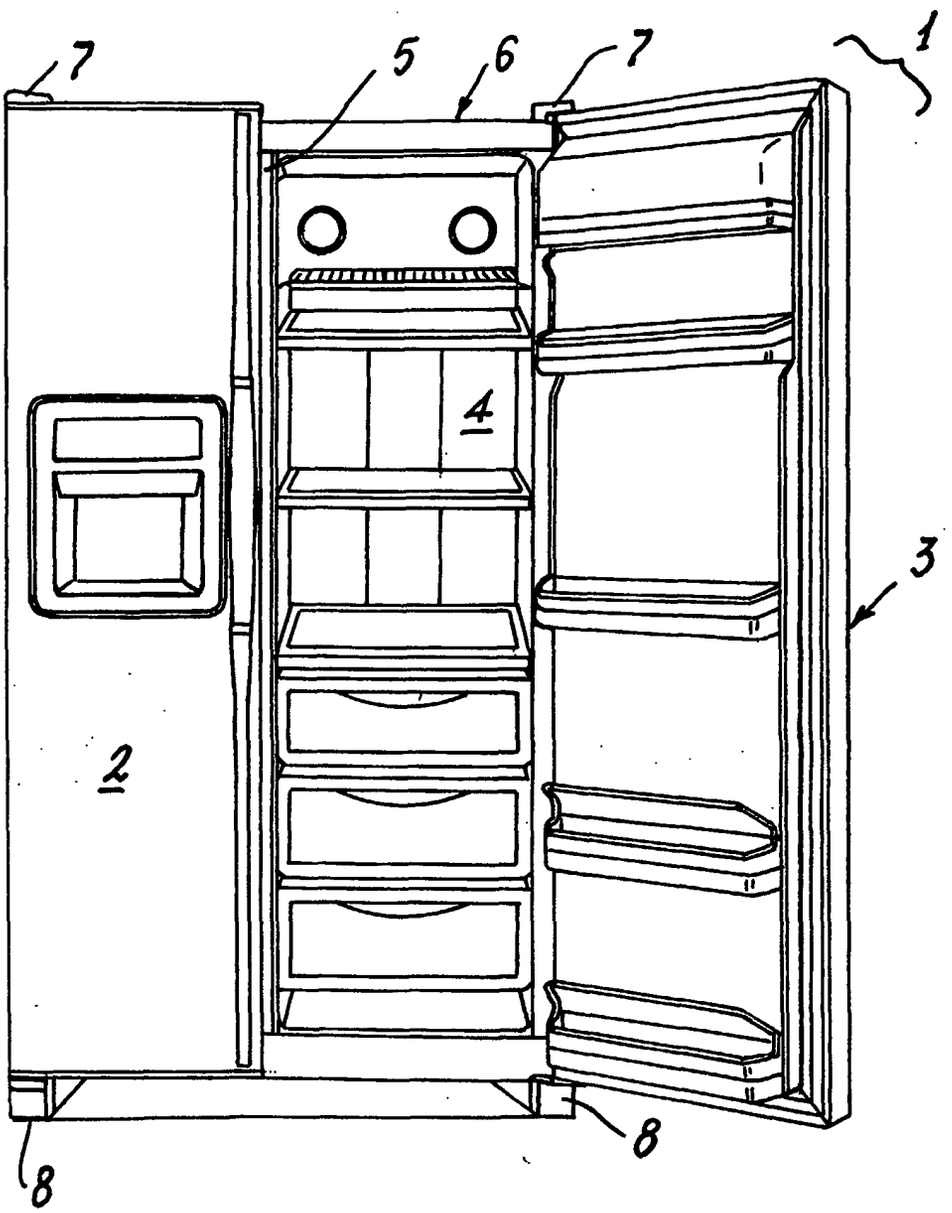

FIG. 1

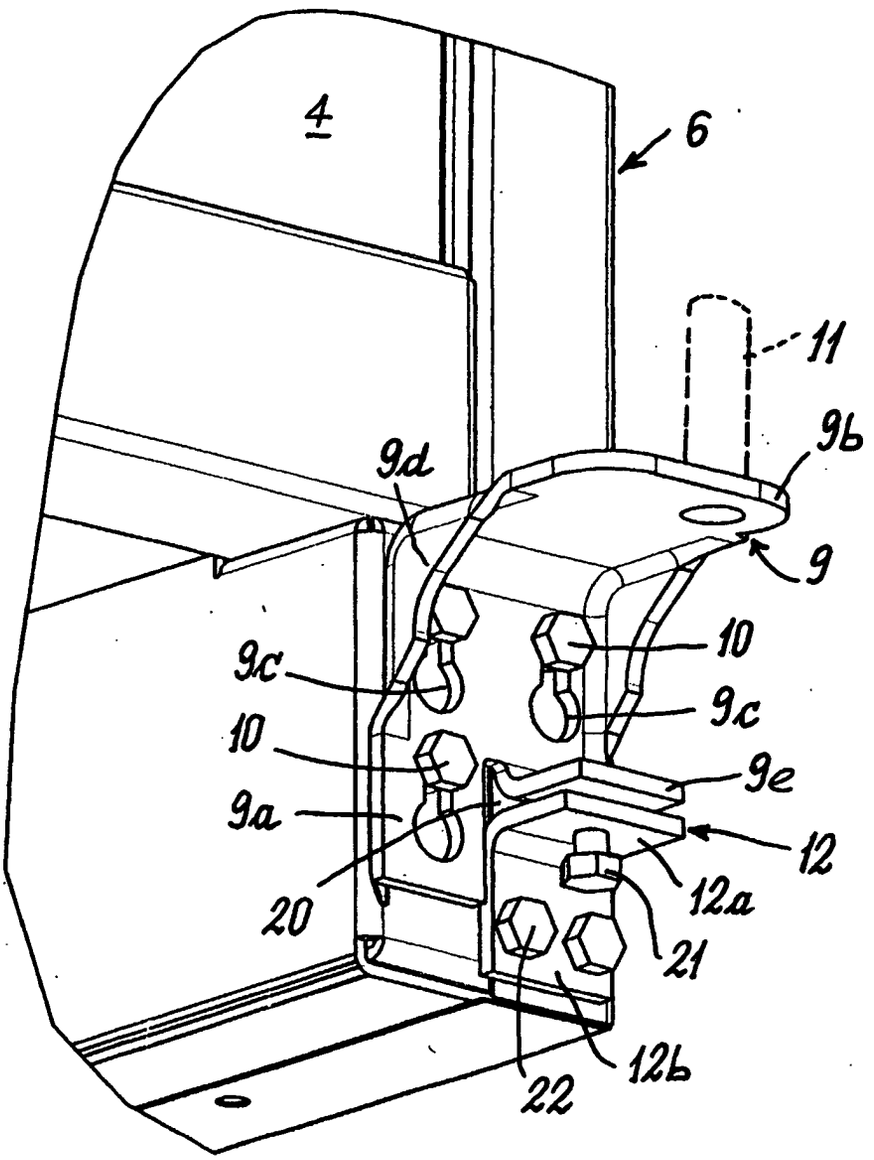

FIG. 2

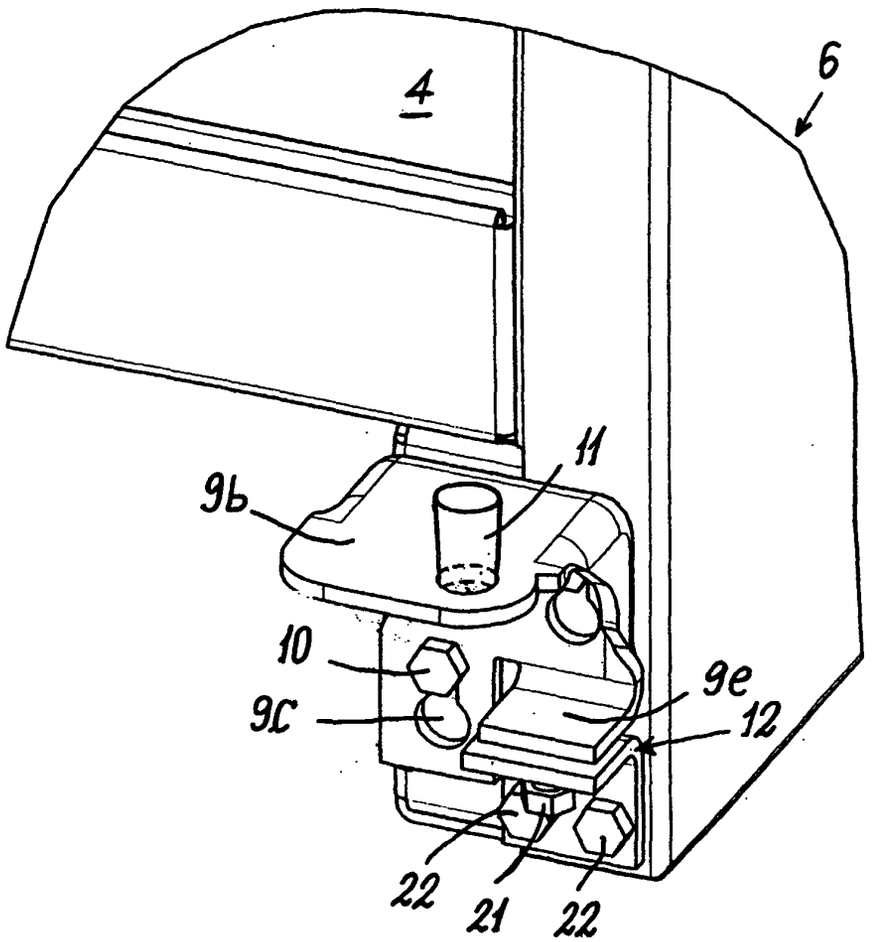
4
6
11
9b
10
9c
9e
12
22
21
22

FIG. 3

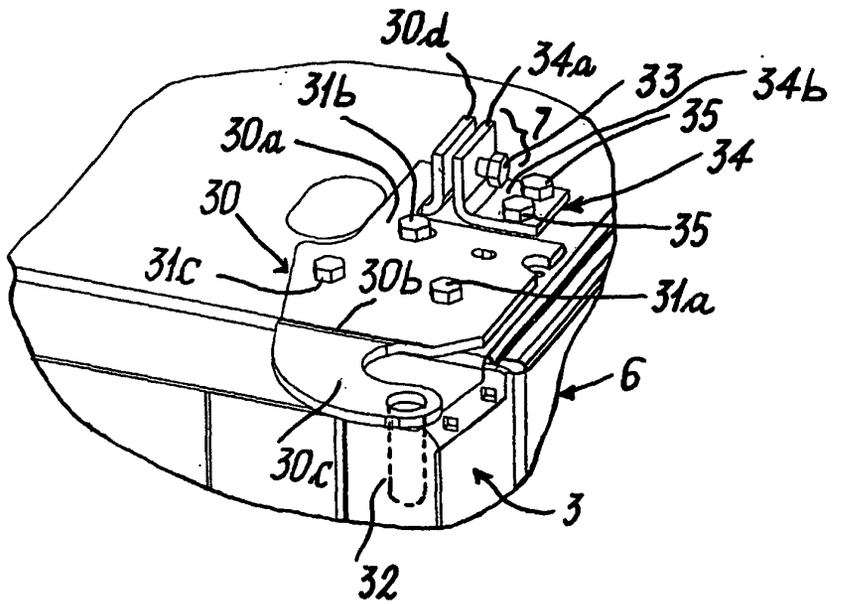
30d
34a
33
34b
31b
7
35
30a
34
30
35
31c
30b
31a
6
30c
3
32

FIG. 4