



(11) **EP 0 942 137 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
08.07.2009 Bulletin 2009/28

(51) Int Cl.:
E05D 15/30 ^(2006.01) **E05D 15/44** ^(2006.01)
E06B 3/50 ^(2006.01) **E05D 3/06** ^(2006.01)
E05D 11/08 ^(2006.01)

(21) Application number: **99610017.8**

(22) Date of filing: **05.03.1999**

(54) **Hinge assembly for a reversible window or door**

Scharnierzusammenbau für Umkehrfenster oder -tür

Ensemble de charnière pour fenêtre ou porte réversible

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**

(30) Priority: **09.03.1998 DK 32098**

(43) Date of publication of application:
15.09.1999 Bulletin 1999/37

(73) Proprietor: **VKR Holding A/S
2970 Hørsholm (DK)**

(72) Inventors:
• **Jepsen, Lars Houmann
DK-6800 Varde (DK)**

• **Smedegaard, Kaj
DK-6950 RINGKOBING (DK)**

(74) Representative: **Münzer, Marc Eric et al
Zacco Denmark A/S
Hans Bekkevolds Allé 7
2900 Hellerup (DK)**

(56) References cited:
US-A- 1 106 791 US-A- 1 648 331
US-A- 4 226 002

EP 0 942 137 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a hinge assembly for connecting a displaceable and turnable sash member with respect to a main frame member of a reversible window or door, said hinge assembly comprising a guide member adapted to be secured to the sash member at a sash corner for displaceable connection with said main frame member, a first arm adapted for pivotal connection at one end with a main frame corner at said main frame, which in a closed position of the window or door is opposite said sash corner, and at the other end with said sash member in a first pivot point displaced from said sash corner, and a second arm adapted for displaceable and pivotal connection at one end with said main frame member and for pivotal connection at the other end with said sash member in a second pivot point displaced from said sash corner, and further comprising friction means for controlling the motion of the sash member with respect to the main frame member.

[0002] From US-A-1,106 791 a swinging sash connection is known comprising a hinge assembly of this type, by means of which a window sash by sliding and pivoting motion with respect to the main frame can be turned around a horizontal axis between a closed position and an open position, in which the sash extends in a plane substantially at right angles to the main frame.

[0003] In this prior art structure frictional control of the sash motion is effected by friction means provided in connection with slide shoes, by which the guide member at the sash corner and one end of the second arm engage a vertical guide plate or rail alongside the vertical main frame member. This arrangement of friction means has the disadvantage that it is almost impossible to provide a frictional force, by which the sash can be held safely in any position without imposing a significant resistance to the sash movement during certain phases of the movement, in particular in the beginning of the opening movement from the closed position, where there is only a slight displacement of the guide member and said one end of the second arm with respect to the main frame member.

[0004] Moreover, whereas the first and second arm in this prior art structure form a unitary hinge device, the guide member at each upper sash corner is a separate member secured to the sash structure.

[0005] In WO 96/17 151 a window is disclosed, in which the sash by means of separate first and second arms disposed as described above can be turned about a horizontal axis without frictional control from its normal closed position to a substantially inverted closed position, in which the sash is turned upside down, to allow cleaning of the external side of the pane from the inside.

[0006] Compared to these prior art structures, which are usable only with reversing windows turning about a horizontal axis, it is the object of the invention to provide a hinge assembly as defined, which is useful also in connection with windows and doors turning about a vertical axis, and in which all parts to be connected with the sash

form a unitary hinge structure with integrated friction means.

[0007] According to the invention this object is achieved by a hinge assembly of the kind set forth, which is **characterized in that** said guide pin and first and second arms are interconnected in a unitary hinge structure by means of a third arm adapted to be secured to the sash member over a part of its length from said sash corner comprising said first and second pivot points, said friction means being integrated in the pivotal connection of said second arm with said third arm at said second pivot point, wherein said friction means is adjustable, and said friction means comprises a bolt-nut connection between said second arm and a bent-off flange part of said third arm, said bolt-nut connection incorporating at least one friction disc member, said flange part forms an abutment for said second arm in a position generally parallel to said third arm during a part of the motion of the sash member with respect to the main frame member towards a reversed or nearly reversed position of the window or door.

[0008] By the described interconnection of the guide member and the first and second arms in a unitary hinge structure the manufacture is simplified and the mounting of hinge assemblies according to the invention at each of two opposite sash members is facilitated. The integration of frictional control means in the hinge structure itself provides a safe and reliable control of the sash movement in all positions of the sash with respect to the main frame without any requirement of excessive force to manipulate the sash.

[0009] The hinge assembly of the invention is useful equally for windows turning about a horizontal axis in the same way as the prior art structures described above and for windows or doors turning about a vertical axis.

[0010] The invention will now be described in further detail with reference to the accompanying schematical drawing, in which

[0011] Figs. 1 to 3 are partially sectional views of an embodiment of a reversible side-hung window according to the invention seen in different positions of the sash with respect to the main frame, and

[0012] Figs. 4 and 5 show a preferred embodiment of the hinge assembly according to the invention in assembled and exploded views, respectively.

[0013] Figs. 1 to 3 show generally a sectional view of a reversible window in its closed position with two intersected frame side members 21 and 22 of a main frame 20 and a sash side member 30 disposed at right angles to the frame side members 21 and 22 and movable relative thereto. The sash is supported and carried by the main frame by hinge assemblies 40 to be further described below, which are connected between each of the opposite top and bottom members of the sash, such as member 30 and the corresponding top and bottom members of the main frame, such as member 31 shown in figs 2 and 3.

[0014] In the closed position of the window depicted in

fig. 1 each hinge assembly 40 assumes a folded condition.

[0015] In fig. 2 the sash member 30 is shown turned to an open position, in which the plane of the sash forms an opening angle of 90° with respect to the main frame 20. The hinge assembly 40 comprises a guide member 1 provided at an end portion 12 of an arm 11, which is secured to the sash side member 30 in engagement with the side edge thereof. The guide member 1 is disposed at a sash corner 13, at which the side member 30 joins a sash side member, not illustrated, and comprises a pin pivotally connected with a shoe 18, which displaceably engages a guide track 2 extending alongside the frame member 31, whereby the sash as a whole is turnable with respect to the main frame and may be displaced in the longitudinal direction of the frame member 31 through the engagement of the slide shoe 18 with the guide track 2.

[0016] The hinge assembly further comprises a first arm 3, one end 6 of which is pivotally connected with the main frame at a pivot point 14 located at the corner 23 between main frame members 30 and 31, which in the closed window position in fig. 1 is opposite the sash corner 13, whereas the opposite end 4 of arm 3 is pivotally connected with the arm 11 secured to the sash member 30 in a pivot point 5 displaced with respect to the sash corner 13 by a distance allowing displacement and turning of the sash with respect to the main frame.

[0017] A second arm 7 of the hinge assembly 40 is connected at one end 15 by a pivot 9 with a slide shoe 16, which in the embodiment shown engages the same guide track 2 at the main frame member 30 as the slide shoe 18 of the guide member 1. At the opposite end 17 the second arm 7 is pivotally connected with the arm 11 secured to the sash member 30 in a pivot point 10, which is displaced from the sash corner 13 by a distance slightly shorter than the displacement of pivot point 5 of the first arm 3 with respect to the sash corner 13.

[0018] In the embodiment shown the pivot point 10 of the second arm 7 is disposed in a bent-off flange part 24 of the arm 11 secured to the sash member 30, which as shown in fig. 3 forms an abutment 25 for the second arm 7 in a position generally parallel to the arm 11 during the part of the movement of the sash with respect to the main frame closest to the reversed or nearly reversed position of the window.

[0019] As best seen in fig. 2 the first and second arms 3 and 7 are disposed such as to extend on either side of the sash plane during the displaceable and turning movement of the sash with respect to the main frame from the closed position in fig. 1 through the maximum open position in fig. 2 towards the reversed or nearly reversed position in fig. 3, in which the sash has been turned through an angle of 135°, and vice versa.

[0020] Thus, by the described geometry the slide shoe 16 connected with the end 15 of the second arm 7 will during the opening movement from the position in fig. 1 to the position in fig. 2 move in the longitudinal direction

of the main frame member 31 from a position closer to the left hand side member 22 towards a position substantially midway between frame side members 22 and 21. By continued turning of the sash in the same direction as shown by the arrow 26 in figs. 2 and 3 the slide shoe 16 will move back towards its start position, whereas the guide member 1 will move in one direction only from a start position close to the side member 21 towards an end position at the side member 22.

[0021] Movement in the opposite direction back to the closed position shown in fig. 1 is effected by pushing the sash along the frame member 31 with the slide shoes 16 and 18 in engagement with the guide track 2, whereby the slide shoe 16 will first move to the intermediate position shown in fig. 2 and then back to the position shown in fig. 1.

[0022] The range of movement of the sash with respect to the main frame from the position shown in fig. 1 to the position shown in fig. 3 will mainly be determined by the relative dimensions of the first and second arms 3 and 7 and the displacement of pivot points 9 and 10 from the guide member 1 at the sash corner 13. As shown in figs. 2 and 3 a stop member 27 may be arranged in the track 2 for limitation of the movement of the slide shoe 16 towards the frame side member 22, so that the range of movement may be adjusted by adjustment of the position of such a stop member in the track.

[0023] As shown in fig. 4 all parts of the hinge assembly 40 adapted for connection with the sash side member 31, i.e. the guide member 1 and the first and second arms 3 and 7 are incorporated in a unitary hinge assembly by means the third arm 11, which extends from the sash corner 13 through a part of the length of the sash side member 31 comprising the pivot points 5 and 10 of the first and second arms 3 and 7.

[0024] A frictional control of the sash movement throughout the range from the closed position in fig. 1 to the reversed position in fig. 3 is provided according to the invention by friction means integrated in the hinge assembly at the pivot point 10 between the second arm 7 and the arm 11.

[0025] As shown in the exploded view in fig. 4 the friction means may be implemented in a simple manner by means of a bolt-nut connection comprising a bolt 50 passed through a hole 51 in the end 17 of arm 7 and through the bent-off flange part 24 integrally connected with the arm 11, which as shown may have an L-shape for safely securing the arm 11 to the sash side member 31 by screws, not illustrated, through a number of screw holes 19. On the other side of the flange part 24 the bolt 50 is engaged by a nut 54. Friction disc members 52 and 53 are interposed between the arm 7 and the flange part 24 as well as between the latter and the nut 54 to provide adjustable friction to the sash movement.

[0026] By this friction means integrated in the hinge assembly 40 a smooth and uniform movement of the sash with respect to the main frame is obtained.

[0027] The invention is not limited to the illustrated em-

bodiment of a window turning about a vertical axis, but is equally useful for reversing windows, in which the sash turns about a horizontal axis. Other variations from the described and illustrated features may be envisaged. Thus the slide shoe 16 of the second arm 7 is not bound to engage the same guide track on the frame member as the guide member 1, but may cooperate with a separate track.

[0028] Releasable arresting means permitting safely parking of the window in one or more open positions, i.e. a slightly open ventilation position, may be incorporated e.g. in the guide track on the frame.

Claims

1. A hinge assembly for connecting a displaceable and turnable sash member (30) with respect to a main frame member (31) of a reversible window or door, said hinge assembly (40) comprising a guide member (1) adapted to be secured to the sash member (30) at a sash corner (13) for displaceable connection with said main frame member (31), a first arm (3) adapted for pivotal connection at one end (14) with a main frame corner (23) at said main frame, which in a closed position of the window or door is opposite said sash corner (13), and at the other end (4) with said sash member in a first pivot point (5) displaced from said sash corner (13), and a second arm (7) adapted for displaceable and pivotal connection at one end (15) with said main frame member (31) and for pivotal connection at the other end (17) with said sash member (30) in a second pivot point (10) displaced from said sash corner (13), and further comprising friction means (52, 53) for controlling the motion of the sash member (30) with respect to the main frame member (31) **characterized in that** said guide pin (1) and first and second arms (3, 7) are interconnected in a unitary hinge structure by means of a third arm (11) adapted to be secured to the sash member (30) over a part of its length from said sash corner (13) comprising said first and second pivot points (5, 10), said friction means being integrated in the pivotal connection of said second arm (7) with said third arm (11) at said second pivot point (10), wherein said friction means is adjustable, and said friction means comprises a bolt-nut connection (51 - 54) between said second arm (7) and a bent-off flange part (24) of said third arm (11), said bolt-nut connection incorporating at least one friction disc member (52, 53), said flange part (24) forms an abutment (25) for said second arm (7) in a position generally parallel to said third arm (11) during a part of the motion of the sash member (30) with respect to the main frame member (31) towards a reversed or nearly reversed position of the window or door.

Patentansprüche

1. Scharnierzusammenbau zur Verbindung eines verstellbaren und drehbaren Flügelrahmenelements (30) im Verhältnis zu einem Hauptrahmenelement (31) eines Umkehrfensters oder einer Umkehrtür, der Scharnierzusammenbau (40), umfassend ein Führungselement (1), welches dazu eingerichtet ist, am Flügelrahmenelement (30) an einer Flügelrahmenecke (13) zur verstellbaren Verbindung mit dem Hauptrahmenelement (31) fixiert zu werden, einen ersten Arm (3), der zur drehbaren Verbindung an einem Ende (14) mit einer Hauptrahmenecke (23) am Hauptrahmen eingerichtet ist, der in einer geschlossenen Position des Fensters oder der Tür der Flügelrahmenecke (13) entgegengesetzt ist, und am anderen Ende (4) mit dem Flügelrahmenelement in einem ersten Drehpunkt (5), von der Flügelrahmenecke (13) verschoben, und einen zweiten Arm (7), der zur verstellbaren und drehbaren Verbindung an einem Ende (15) mit dem Hauptrahmenelement (31) und zur drehbaren Verbindung am anderen Ende (17) mit dem Flügelrahmenelement (30) in einem zweiten Drehpunkt (10), von der Flügelrahmenecke (13) verschoben, eingerichtet ist, und außerdem umfassend Friktionsmittel (52, 53) zur Steuerung der Bewegung des Flügelrahmenelements (30) im Verhältnis zum Hauptrahmenelement (31), **dadurch gekennzeichnet, dass** der Führungspin (1) und der erste und zweite Arm (3, 7) mittels eines dritten Arms (11), der dazu eingerichtet ist, am Flügelrahmenelement (30) über einen Teil seiner Länge von der Flügelrahmenecke (13), umfassend den ersten und zweiten Drehpunkt (5, 10), fixiert zu werden, in einer einheitlichen Scharnierstruktur miteinander verbunden sind, wobei das Friktionsmittel in die drehbare Verbindung des zweiten Arms (7) mit dem dritten Arm (11) am zweiten Drehpunkt (10) integriert ist, wobei das Friktionsmittel justierbar ist, und das Friktionsmittel eine Schraubenmutterverbindung (51 - 54) zwischen dem zweiten Arm (7) und einem abgebogenen Flanschteil (24) des dritten Arms (11) umfasst, wobei die Schraubenmutterverbindung zumindest ein Friktionsscheibenelement (52, 53) enthält, wobei der Flanschteil (24) eine Stütze (25) für den zweiten Arm (7) in einer Position bildet, die generell parallel zum dritten Arm (11) während eines Teils der Bewegung des Flügelrahmenelements (30) im Verhältnis zum Hauptrahmenelement (31) in Richtung einer umgekehrten oder fast umgekehrten Position des Fensters oder der Tür ist.

Revendications

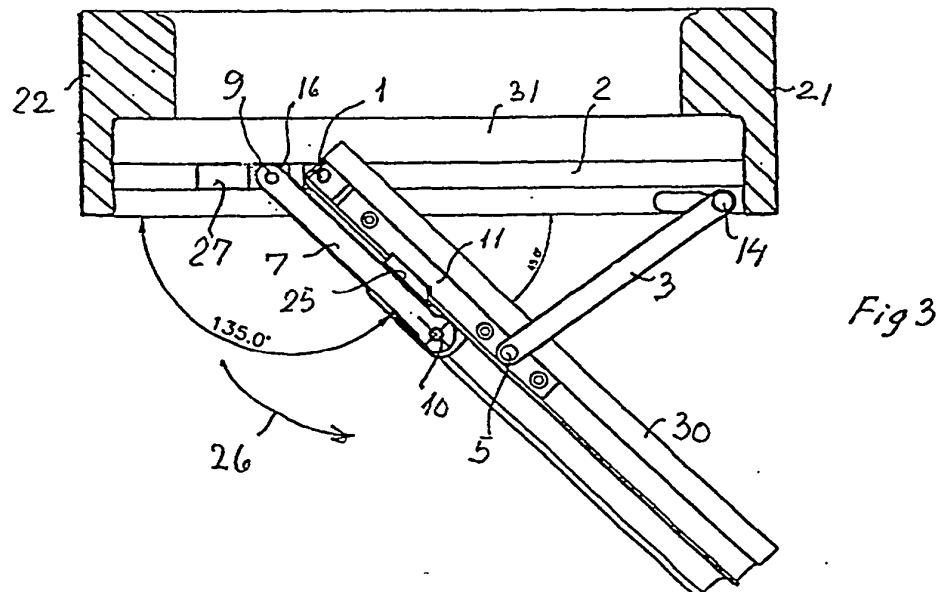
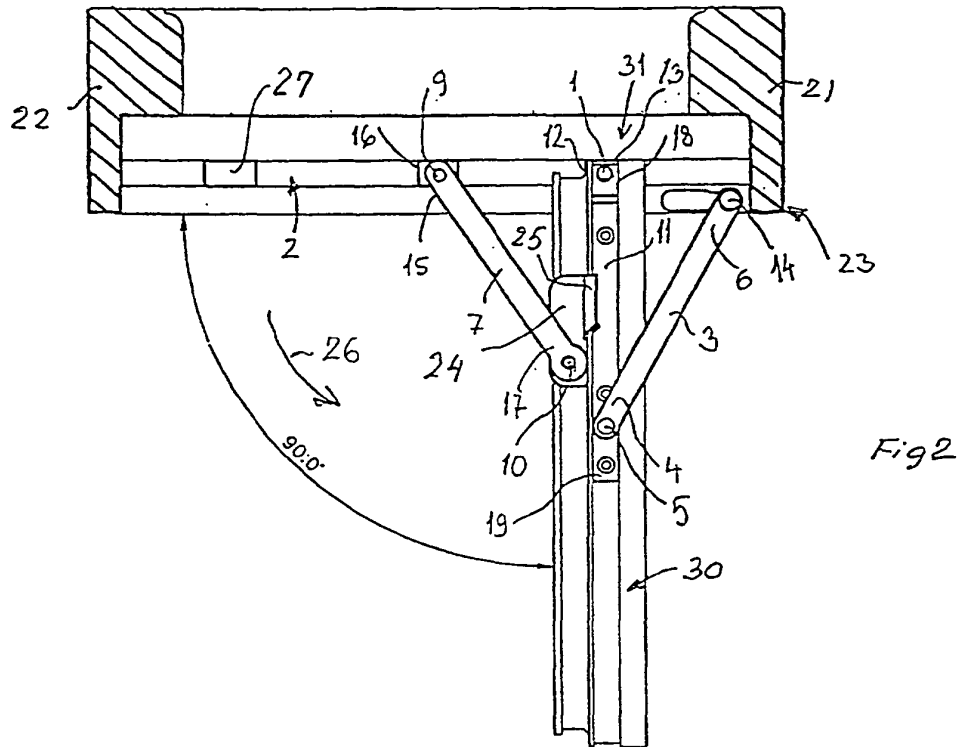
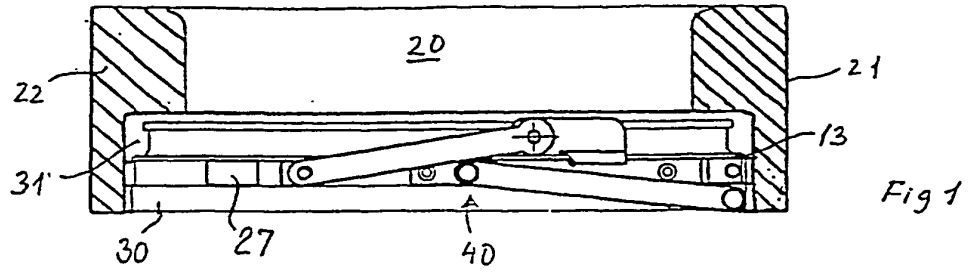
1. Ensemble charnière pour relier un élément châssis déplaçable et tournable (30) relativement à un élément cadre principal (31) d'une fenêtre ou d'une por-

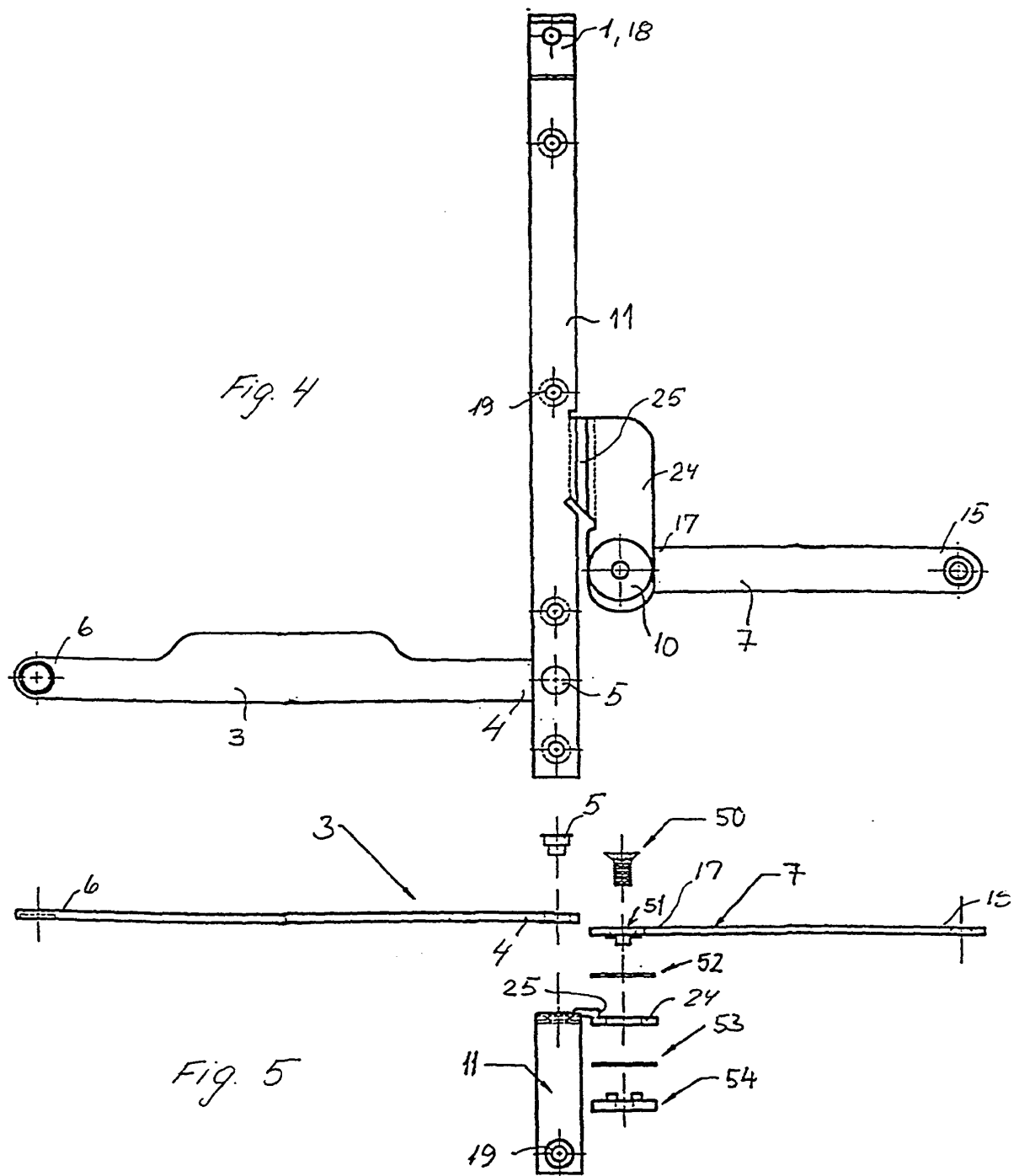
te réversible, ledit ensemble charnière (40) comprenant un élément de guidage (1) adapté de façon à être fixé à l'élément châssis (30) à un coin du châssis (13) pour obtenir une liaison déplaçable avec ledit élément cadre principal (31), un premier bras (3) adapté pour une liaison pivotante à une extrémité (14) avec un coin du cadre principal (23) au niveau dudit cadre principal, qui, dans une position fermée de la fenêtre ou de la porte, est en face dudit coin du châssis (13), et à l'autre extrémité (4) avec ledit élément châssis dans un premier point de pivotement (5) déplacé dudit coin du châssis (13), et un deuxième bras (7) adapté pour une liaison déplaçable et pivotante à une extrémité (15) avec ledit élément cadre principal (31) et pour une liaison pivotante à l'autre extrémité (17) avec ledit élément châssis (30) dans un deuxième point de pivotement (10) déplacé dudit coin du châssis (13), et comprenant en outre des moyens de friction (52, 53) pour contrôler le mouvement de l'élément châssis (30) relativement à l'élément cadre principal (31), **caractérisé en ce que** ladite cheville de guidage (1) et le premier et le deuxième bras (3, 7) sont interconnectés dans une structure de charnière unitaire au moyen d'un troisième bras (11) adapté de façon à être fixé à l'élément châssis (30) sur une partie de sa longueur à partir dudit coin du châssis (13) comprenant lesdits premier et deuxième points de pivotement (5, 10), lesdits moyens de friction étant intégrés dans la liaison pivotante dudit deuxième bras (7) avec ledit troisième bras (11) audit deuxième point de pivotement (10), ledit moyen de friction étant réglable, et ledit moyen de friction comprenant une liaison boulon-écrou (51-54) entre ledit deuxième bras (7) et une partie bride coudée (24) dudit troisième bras (11), ladite liaison boulon-écrou incorporant au moins un élément disque de friction (52, 53), **en ce que** ladite partie bride (24) forme une butée (25) pour ledit deuxième bras (7) dans une position généralement parallèle audit troisième bras (11) pendant une partie du mouvement dudit élément châssis (30) relativement audit élément cadre principal (31) vers une position inversée ou presque inversée de la fenêtre ou de la porte.

45

50

55





REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 1106791 A [0002]
- WO 9617151 A [0005]