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(54) **ROOF WINDOW WITH AN IMPROVED SECURING DEVICE**

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TABATIERE EQUIPEE D'UN DISPOSITIF DE FIXATION AMELIORE

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Description

FIELD OF THE INVENTION

[0001] This invention relates to skylights or roof windows comprising a main frame structure for stationary connection with supporting means of a roof structure, and a window frame structure carrying a glazing element, the main frame and window frame structures having respectively a plurality of members, each of which members extends in a longitudinal direction between a first and a second end; in which said window frame structure is connected with the main frame structure by means of at least one hinge connection at a respective first member of the main frame and window frame structures to allow the window frame structure to be pivoted about a pivot axis parallel with the longitudinal direction of said first members with respect to the main frame structure to an opening angle, said hinge connection being disengageable to allow the window frame structure to be removed from the main frame structure, said at least one connection including at least one pair of first and second connecting members connected with the main frame and window frame structure, respectively, a securing device being provided for maintaining the engagement between the connecting members of said pairs within a predetermined range of the opening angle of the window frame structure.

BACKGROUND OF THE INVENTION.

[0002] For reasons of installation conditions, it is often desirable to install such windows in an inclined roof surface by initial securing of the main frame of the window, from which the glass-carrying window frame has been detached, to the roof supporting structure. Following this operation the window frame structure is hatched on to the main frame structure by bringing the connecting members of the window frame into engagement with the connecting members of the main frame. Evidently, it is essential that the window frame structure is properly secured against unintentional removal from the main frame structure.

[0003] In its most simple form such securing may be achieved by making the connection between the connecting members of the main frame structure and the window frame structure permanent following the initial engagement operation.

[0004] However, it is often desirable to retain the possibility of disengaging the connection between the window frame and the main frame, eg. for maintenance purposes.

[0005] WO 93/11332 discloses a window, in which securing means are provided for retaining the engagement between the connecting members of the window frame and the main frame, said means comprising a block which may be displaced in a groove in a side member of the window frame and which may serve partly as an anchor-

ing element for a locking member fastened in the main frame structure of a fixed window, partly for releasable coupling with an operating member of a window operator in the case of an openable window. This solution suffers from the drawback that the securing means are dependent on a particular design of the operator in order to provide proper functioning.

[0006] In the window disclosed in WO 98/22685 the securing means are constituted by holding means fastened to the side members of the window frame structure at a comparatively short distance from the pivot axis. The holding means include blocks with part-cylindrical guide surfaces having an axis in the pivot axis of the hinge. Due to the position close to the pivot axis, these blocks are subjected to rather heavy load during opening of the window frame.

BRIEF SUMMARY OF THE INVENTION.

[0007] It is an object of the invention to provide a roof window in which the conditions with respect to initial mounting and subsequent dismounting of the window frame structure are improved even further.

[0008] It is a further object of the invention to provide a roof window which has a less complex design compared to prior art window designs.

[0009] These objects are met by the provision of a roof window of the initially stated kind, in which said securing device includes at least one torsion member positioned at a respective end of said first members of the main frame and window frame structures, said at least one torsion member being torsionally biased in the opening direction of the window frame structure with respect to the main frame structure, and that said securing device includes releasable engagement means for engagement with corresponding engagement means positioned at a distance from said pivot axis along a second window frame member adjacent said first member of the window frame structure within said predetermined range of the opening angle.

[0010] By the incorporation of a torsion member which follows the movement of the window frame structure during opening of the window within the predetermined range of the opening angle, in which the securing device is active, the activation and deactivation of the securing device is effected automatically. In addition to providing security against unintentional removal of the window frame, the torsion member assists the pivotal movement of the window frame structure from the closed position to a ventilating position.

[0011] In another aspect of the invention a securing device according to claim 16 is provided.

[0012] Further details and advantages will readily be appreciated from the appended drawings and the detailed description to follow.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING.

[0013] Embodiments of the invention will now be described in more detail with reference to the schematic drawings, in which

Fig. 1 shows a perspective view of an embodiment of a roof window according to the invention;
 Fig. 2 shows a cross-sectional view along the line II-II in Fig. 1;
 Fig. 3 shows a cross-sectional view along the line III-III in Fig. 1;
 Fig. 4 shows an exploded perspective view of a detail of an embodiment of the roof window according to the invention;
 Fig. 5 shows a perspective view of a detail of an embodiment of the roof window according to the invention;
 Fig. 6 shows a side view, partially sectioned, of an embodiment of the roof window;
 Fig. 7 shows a side view, partially sectioned, of the roof window of Fig. 6 in a ventilating position within the predetermined range of opening angle;
 Fig. 8 is a view corresponding to Fig. 7 of an alternative embodiment of the roof window; and

[0014] Fig. 9 is a view corresponding to Fig. 7 of a further alternative embodiment of the roof window.

DETAILED DESCRIPTION OF THE INVENTION.

[0015] The roof window illustrated in the Figures comprises a main frame structure generally designated 1 and having in the embodiment shown a top member 2, a bottom member 3 and two side members 4, 5. The roof window is intended to be installed in a roof surface, in a manner known per se, by stationarily connecting the main frame structure 1 to the roof structure by means of any suitable supporting means, eg. mounting brackets secured to the main frame side members 4, 5.

[0016] A window frame structure generally designated 6 and having a top member 7, a bottom member 8 and side members 9, 10 encasing a glazing element 11 is in the embodiment shown connected with the main frame structure 1 at the respective top members 7 and 2 by means of a hinge connection which in the embodiment shown comprises two pairs of first and second connecting members 12, 13 shown in Fig. 3. In the following description, the elements of one of the pairs only will be referred to. It should be remarked that the elements of the other pair are designed in substantially corresponding manner. The first connecting member 12 is secured in a transverse groove-like depression of the main frame top member 2 by means of an elongate flange part 12a formed integrally with a projecting elongate engagement part 12b which is received in a corresponding engagement part in the form of a substantially V-shaped track

13b of the second connecting member 13 which in turn is secured to the window frame top member 7 by a flange portion 13a. The engagement parts 12b, 13b are formed with a respective part-cylindrical engagement surface to define a pivot axis of the window frame structure 6 with respect to the main frame structure 1. The V-shaped track 13b is formed with an included angle in the range from 20° to 30° corresponding to the desired range of opening angle in which the window is operative.

[0017] In order to maintain the engagement between the connecting members 12, 13 during opening of the window frame structure 6 with respect to the main frame structure 1, a securing device is provided. The securing device comprises a torsion member 14 positioned at a respective end of the top members 2, 7 of the main frame and window frame structures 1, 6. Means are provided at a distance from the pivot axis defined by the engagement surfaces of the connecting members 12, 13 along each side of the window frame for keeping the window frame structure 6 in releasable engagement with the torsion member 14 within said predetermined range of the opening angle, which torsion member 14 is in turn secured to the main frame structure. In the embodiment shown, the torsion member 14 includes a first arm 15 and a second arm 16 extending substantially perpendicularly to each other originating from a connecting point 17. For reasons set forth in the following, it is preferred that the connecting point 17 is positioned substantially on the pivot axis of the window.

[0018] In the embodiment shown in Figs. 2 to 7, the first arm 15 comprises two mutually spaced and substantially parallel limbs 15a, 15b forming at the end opposite said connecting point 17 a narrow elongated U and is received in a longitudinal channel 12c of elongate cross-section formed in the engagement part 12b of the first connecting member 12. At the end of the second arm 16 opposite said connecting point 17 engagement means in the form of an upstanding pin 18 are provided. The upstanding pin 18 is releasably connected with corresponding engagement means positioned on the adjacent window frame side member 9, 10 and comprising a block 19 having a recess 19a.

[0019] In the alternative embodiment of the engagement means of the torsion member 14 and of the window frame structure, respectively, shown in Fig. 8, the engagement means of the second arm 16 of the torsion member 14 includes a fork portion 20 and the corresponding engagement means of the window frame side member 9, 10 includes a protruding pin 21 which is received in the fork portion 20 within said predetermined range of the opening angle.

[0020] In each of the above cases, the torsion member 14 is torsionally biased in the opening direction of the window frame structure 6 with respect to the main frame structure 1. Within the predetermined opening angle of the window frame structure, the upstanding pin 18 is thus received in the recess 19a in the block 19 on the window frame side member 9, or, in the alternative embodiment

of Fig. 8, the protruding pin 21 abuts the fork portion 20. Consequently, by turning about the connecting point 17, the second arm 16 of the torsion member 14 follows the pivoting movement of the window frame structure during opening of the window until the torsion member 14 reaches its relaxed condition which may be chosen according to the desired predetermined range of the opening angle. The spring bias is illustrated in Fig. 5, the second arm 16 in the absence of physical load thus assuming the position indicated by the dot-and-dash line, in which the second arm 16 extends in a direction forming an angle with the plane defined by the first arm 15.

[0021] Other designs of the torsion member are of course conceivable, including the further alternative embodiment shown in Fig. 9, in which a torsion member comprising a coil spring 25 is connected with the main frame structure. The coil spring 25 acts on a lever 26 in a point of action, preferably situated on the pivot axis of the window frame structure, at one end of the lever and engagement means are provided at the opposite end. The engagement means may as shown be designed as in the embodiment of Fig. 7, or, alternatively, as in the Fig. 8 embodiment.

[0022] It is preferred that one torsion member is positioned at a respective end of the top members of the main frame and window frame structures. However, it is conceivable that only one torsion member is utilized.

[0023] Installation of a roof window according to the invention may thus be performed in the following manner:

The main frame structure 1 is secured to the roof surface by appropriate supporting means. Following this operation, the window frame structure 6 is positioned in such a way that the window frame top member 7 is positioned above the main frame top member 2 so that the window frame structure 6 rests on the first connecting member 12 by its glazing element 11, the window frame structure forming an angle with the main frame structure. The connecting members 12, 13 of each of the pairs forming the hinge connection are brought into mutual engagement by pulling the window frame structure 6 in the direction of the main frame bottom member 3, the window frame structure 1 now sliding on the first connecting member 12 by a guide member 22 (shown in Fig. 3) provided in the window frame top member 7. As soon as the contact between the engagement surfaces of the connecting members 12, 13 has been established, the window frame structure 6 is turned in the closing direction about the pivot axis at the top members 2, 7, and the securing device is automatically activated, as illustrated in Fig. 7, as the upstanding pin 18 is received in the recess 19a in the block 19, alternatively as the protruding pin 21 is engaged in the fork portion 20.

[0024] The installation process is facilitated by the feature indicated in Fig. 5, from which it appears that the

spring bias of the torsion member 14 is dimensioned such that in the absence of physical load, the second arm 16 will form an angle δ with the first arm 15, which is slightly bigger than 90° . In result, by turning the window frame 6 beyond the range of ventilating positions, ie. to a position as shown in Fig. 6, the second arm 16 will project outwards below the lower edges of the side members 9, 10 of the window frame 6.

[0025] In view of the fact that the engagement between connecting members 12 and 13 of the main frame and window frame structures is open-ended at either end, the torsion member 14 thus provides a useful guide means assisting to secure accurate positioning of the window frame structure 6 with respect to the main frame structure 1 when the window frame structure is pivoted into a position within the predetermined ventilating range.

[0026] Correspondingly, the lever 26 of the embodiment of Fig. 9 may be directed slightly outwards with respect to the longitudinal direction of the adjacent window frame side members.

[0027] The window frame structure 6 may now be brought to its closed position without any risk of disengaging the connecting members 12, 13 from each other.

Operation of the window, ie. opening the window frame structure to a ventilating position, may be carried out by means of a window operator 23 mounted at the bottom member 3 of the main frame structure. Preferably, the window operator is an electrically operated chain operator including an operating chain 24 detachably connected with the bottom member 8 of the window frame structure. The operative length of the operating chain 24 is chosen such that it is only possible to open the window by means of the operator to a maximum ventilating position falling within the predetermined range of the opening angle, in which the securing device is active. In order to remove the window frame structure 6 from the main frame structure 1, the operating chain 24 is released from the window frame bottom member 8 and the window frame structure 6 is pivoted further about its pivot axis, whereby the engagement means on the torsion member, as shown in Fig. 6, are released from the engagement with the corresponding engagement means on the window frame structure.

[0028] The invention should not be regarded as being limited to the embodiments described in the above but various modifications and combinations of the shown embodiments may be carried out without departing from the scope of the following claims.

[0029] For instance, other geometrical configurations of the main frame and window frame structures than the rectangular shape shown and described in the above are conceivable. Furthermore, the hinge connection may be positioned arbitrarily in the skylight or roof window to provide a pivot axis at eg. a bottom or side member.

Claims

1. A roof window comprising:

a main frame structure (1) for stationary connection with supporting means of a roof structure, and
 a window frame structure (6) carrying a glazing element (11),
 the main frame and window frame structures having respectively a plurality of members (2-5,7-10), each of which members extends in a longitudinal direction between a first and a second end; in which
 said window frame structure (6) is connected with the main frame structure (1) by means of at least one hinge connection at a respective first member of the main frame and window frame structures to allow the window frame structure to be pivoted about a pivot axis parallel with the longitudinal direction of said first members with respect to the main frame structure to an opening angle, said hinge connection being disengageable to allow the window frame structure to be removed from the main frame structure, said at least one connection including at least one pair of first and second connecting members (12,13) connected with the main frame and window frame structure, respectively, a securing device being provided for maintaining the engagement between the connecting members (12,13) of said pairs within a predetermined range of the opening angle of the window frame structure;
characterized in that
 said securing device includes at least one torsion member (14;25) positioned at a respective end of said first members of the main frame and window frame structures, said at least one torsion member being torsionally biased in the opening direction of the window frame structure (6) with respect to the main frame structure (1), and that
 said securing device includes releasable engagement means (18;20) for engagement with corresponding engagement means (19,19a;21) positioned at a distance from said pivot axis along a second window frame member (9) adjacent said first member (7) of the window frame structure within said predetermined range of the opening angle.

2. A roof window as claimed in claim 1, **characterized in that** said at least one torsion member (14) includes a first and a second arm (15,16) extending substantially perpendicularly to each other originating from a connecting point (17), the first arm (15) being secured to said first main frame member (2)

and extending along the longitudinal direction thereof, and said engagement means (18;20) being provided at the end of the second arm (16) opposite said connecting point (17) for releasable connection with the corresponding engagement means (19,19a;21) positioned on said second window frame member (9) within said predetermined range of the opening angle.

3. A roof window as claimed in claim 2, **characterized in that** said first arm (15) comprises two mutually spaced and substantially parallel limbs (15a,15b) forming at the end opposite said connecting point (17) a narrow elongated U.

4. A roof window as claimed in claim 2 or 3, **characterized in that** the engagement means of the second arm (16) of said torsion member (14) includes an upstanding pin (18) and the corresponding engagement means of said second window frame member (9) includes a block (19) having a recess (19a), said upstanding pin being received in said recess within said predetermined range of the opening angle.

5. A roof window as claimed in claim 2 or 3, **characterized in that** the engagement means of the second arm (16) of said torsion member (14) includes a fork portion (20) and the corresponding engagement means of said second window frame member includes a protruding pin (21), said protruding pin being received in said fork portion within said predetermined range of the opening angle.

6. A roof window as claimed in claim 1, **characterized in that** said at least one torsion member comprises a coil spring (25) connected with the main frame structure (1) and a lever (26) having two ends, said coil spring acting on said lever in a point of action situated at one end and said engagement means being provided at the opposite end.

7. A roof window as claimed in any one of claims 1-6, **characterized in that** said first connecting member (12) of each of said pairs comprises an elongate flange part (12a) for securing to the first main frame member (2) and a projecting elongate engagement part (12b) engageable with a substantially V-shaped track (13b) formed in said second connecting member (13) of the same pair.

8. A roof window as claimed in claim 7, **characterized in that** said engagement part (12b) of the first connecting member (12) and said track (13b) in the second connecting member (13) are formed with substantially part-cylindrical engagement surfaces to define the pivot axis of the window frame structure (6) with respect to the main frame structure (1).

9. A roof window as claimed in claim 7 or 8, **characterized in that** said V-shaped track (13b) is formed with an included angle in the range from 20° to 30° to define a correspondingly limited range of ventilation positions of said window frame structure with respect to said main frame structure.
10. A roof window as claimed in claim 2 and any one of claims 7-9, **characterized in that** said engagement part (12b) of the first connecting member (12) is formed with a longitudinal channel (12c) of elongate cross-section corresponding to the dimensions of the first arm (15) of the torsion member for receiving said first arm (15).
11. A roof window as claimed in any one of claims 2-10, **characterized in that** the connecting point (17) of the arms (15,16) of the torsion member (14) or the point of action of the coil spring (25) is positioned substantially on the pivot axis of the window frame structure.
12. A roof window as claimed in any one of claims 1-11, **characterized in that** the window frame structure comprises at least one guide member (22) engaging an edge zone of the glazing element (11) and being formed with a retaining part engaging a respective second connecting member in each of said pairs.
13. A roof window as claimed in any one of claims 1-12, **characterized in** including a window operator (23) for opening the window frame structure (6) to a ventilating position
14. A roof window as claimed in claim 13, **characterized in that** said window operator (23) is an electrically operated chain operator secured to a member of the main frame structure distant from said first member and including an operating chain (24) detachably connected with a corresponding member of the window frame structure.
15. A roof window as claimed in any one of claims 1-14, **characterized in** including two pairs of first and second connecting members (12,13) positioned at a distance from each other in the longitudinal direction of the first main frame and window frame members (2,7), respectively.
16. A securing device for maintaining the engagement between connecting members (12,13) of a main frame structure (1) and a window frame structure (6) of an openable roof window within a predetermined range of the opening angle of the window frame structure, said securing device including at least one torsion member (14;25) to be connected with the window, said at least one torsion member being torsionally biased in the opening direction of the window frame structure (6) with respect to the main frame structure (1) **characterized in that** said securing device includes releasable engagement means (18;20) for engagement with corresponding engagement means (19,19a;21) to be positioned on the window frame structure (6).
17. A securing device as claimed in claim 16, **characterized in that** said at least one torsion member (14) includes a first and a second arm (15,16) extending substantially perpendicularly to each other originating from a connecting point (17), the first arm (15) being intended to be secured to the main frame structure (1), and said engagement means (18;20) being provided at the end of the second arm (16) opposite said connecting point (17) for releasable connection with the corresponding engagement means (19,19a;21) to be positioned on an adjacent window frame member.
18. A securing device as claimed in claim 17, **characterized in that** said first arm (15) comprises two mutually spaced and substantially parallel limbs (15a, 15b) forming at the end opposite said connecting point (17) a narrow elongated U.
19. A securing device as claimed in claim 17 or 18, **characterized in that** the engagement means of the second arm (16) of said torsion member (14) includes an upstanding pin (18) and the corresponding engagement means to be positioned on the window frame includes a block (19) having a recess (19a), said upstanding pin being received in said recess within said predetermined range of the opening angle.
20. A securing device as claimed in claim 17 or 18, **characterized in that** the engagement means of the second arm (16) of said torsion member (14) includes a fork portion (20) and the corresponding engagement means to be positioned on the window frame includes a protruding pin (21), said protruding pin being received in said fork portion within said predetermined range of the opening angle.
21. A securing device as claimed in claim 16, **characterized in that** said at least one torsion member (14) comprises a coil spring (25) connected with the main frame structure (1) and a lever (26) having two ends, said coil spring acting on said lever in a point of action situated at one end and said engagement means being provided at the opposite end.

Patentansprüche

1. Dachfenster umfassend:

eine Hauptrahmenanordnung (1) zur ortsfesten Verbindung mit einer Stützeinrichtung eines Dachaufbaus und

eine Fensterrahmenanordnung (6), die ein verglastes Element (11) hält,

wobei die Hauptrahmen- und die Fensterrahmenanordnung jeweils eine Vielzahl von Elementen (2-5, 7-10) aufweisen, die sich jeweils in einer Längsrichtung zwischen einem ersten und einem zweiten Ende erstrecken, wobei die Fensterrahmenanordnung (6) mit dem Hauptrahmenanordnung (1) mittels wenigstens einer Gelenkverbindung an einem entsprechenden ersten Element der Hauptrahmen- und der Fensterrahmenanordnung verbunden ist, um der Fensterrahmenanordnung zu ermöglichen, um eine Schwenkachse parallel zu der Längsrichtung der ersten Elemente in Bezug auf die Hauptrahmenanordnung bis zu einem Öffnungswinkel verschwenkt zu werden, wobei die Gelenkverbindung lösbar ist, um der Fensterrahmenanordnung zu ermöglichen, von der Hauptrahmenanordnung entfernt zu werden, wobei die wenigstens eine Verbindung wenigstens ein Paar aus ersten und zweiten Verbindungselementen (12, 13) umfasst, die mit der Hauptrahmen- bzw. der Fensterrahmenanordnung verbunden sind,

eine Sicherungseinrichtung, die zum Beibehalten des Eingriffs zwischen den Verbindungselementen (12, 13) der Paare innerhalb eines vorgegebenen Öffnungswinkelbereichs der Fensterrahmenanordnung vorgesehen ist,

dadurch gekennzeichnet, dass

die Sicherungseinrichtung wenigstens ein Torsionselement (14; 25) umfasst, das an einem entsprechenden Ende des ersten Elements der Hauptrahmen- und der Fensterrahmenanordnung angeordnet ist, wobei das wenigstens eine Torsionselement torsionsmäßig in die Öffnungsrichtung der Fensterrahmenanordnung (6) in Bezug auf die Hauptrahmenanordnung (1) vorgespannt ist, und dass

die Sicherungseinrichtung eine lösbare Eingriffselement (18; 20) zum Eingriff mit einem entsprechenden Eingriffselement (19, 19a; 21), das innerhalb des vorgegebenen Öffnungswinkelbereichs in einem Abstand von der Schwenkachse entlang eines zweiten Fensterrahmenelements (9) benachbart zu dem ersten Element (7) der Fensterrahmenanordnung angeordnet ist, umfasst.

2. Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** das wenigstens eine Torsionselement (14) einen ersten und einen zweiten Arm (15, 16) umfasst, die sich im Wesentlichen senkrecht zueinander ausgehend von einem Verbindungspunkt

(17) erstrecken, wobei der erste Arm (15) an dem ersten Hauptrahmenelement (2) befestigt ist und sich entlang der Längsrichtung davon erstreckt und wobei das Eingriffselement (18; 20) an dem Ende des zweiten Arms (16) gegenüber dem Verbindungspunkt (17) für eine lösbare Verbindung mit dem entsprechenden Eingriffselement (19, 19a; 21), das in dem vorgegebenen Öffnungswinkelbereich an dem zweiten Fensterrahmenelement (9) angeordnet ist, vorgesehen ist.

3. Dachfenster nach Anspruch 2, **dadurch gekennzeichnet, dass** der erste Arm (15) zwei voneinander beabstandete und im Wesentlichen parallele Streben (15a, 15b) aufweist, die an dem Ende gegenüber dem Verbindungspunkt (17) ein enges längliches U bilden.

4. Dachfenster nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das Eingriffselement des zweiten Arms (16) des Torsionselements (14) einen hochstehenden Stift (18) umfasst und das entsprechende Eingriffselement des zweiten Fensterrahmenelements (9) einen Block (19) mit einer Aussparung (19a) umfasst, wobei der hochstehende Stift innerhalb des vorgegebenen Öffnungswinkelbereichs in der Aussparung aufgenommen wird.

5. Dachfenster nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das Eingriffselement des zweiten Arms (16) des Torsionselements (14) einen Gabelabschnitt (20) umfasst und dass das entsprechende Eingriffselement des zweiten Fensterrahmenelements einen vorstehenden Stift (21) umfasst, wobei der vorstehende Stift innerhalb des vorgegebenen Öffnungswinkelbereichs in dem Gabelabschnitt aufgenommen wird.

6. Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** das wenigstens eine Torsionselement eine Schraubenfeder (25) umfasst, die mit der Hauptrahmenanordnung (1) und einem Hebel (26) mit zwei Enden verbunden ist, wobei die Schraubenfeder auf den Hebel an einem Angriffspunkt wirkt, der an einem Ende angeordnet ist, und wobei das Eingriffselement an dem gegenüberliegenden Ende vorgesehen ist.

7. Dachfenster nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** das erste Verbindungselement (12) von jedem der Paare einen länglichen Flanschabschnitt (12a) zum Befestigen an dem ersten Hauptrahmenelement (2) und einen vorstehenden länglichen Eingriffsabschnitt (12b) umfasst, der mit einer im Wesentlichen V-förmigen Bahn (13b) eingreifen kann, die in dem zweiten Verbindungselement (13) desselben Paares ausgebildet ist.

8. Dachfenster nach Anspruch 7, **dadurch gekennzeichnet, dass** der Eingriffsabschnitt (12b) des ersten Verbindungselements (12) und die Bahn (13b) in dem zweiten Verbindungselement (13) mit im Wesentlichen teilzylindrischen Eingriffsflächen ausgebildet sind, um die Schwenkachse der Fensterrahmenanordnung (6) in Bezug auf die Hauptrahmenanordnung (1) zu bilden. 5
9. Dachfenster nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** die V-förmige Bahn (13b) mit einem eingeschlossenen Winkel im Bereich zwischen 20° und 30° ausgebildet ist, um einen entsprechend begrenzten Bereich von Lüftungsstellungen der Fensterrahmenanordnung in Bezug auf die Hauptrahmenanordnung vorzusehen. 10 15
10. Dachfenster nach Anspruch 2 oder einem der Ansprüche 7 bis 9, **dadurch gekennzeichnet, dass** der Eingriffsabschnitt (12b) des ersten Verbindungselements (12) mit einer in Längsrichtung verlaufenden Bahn (12c) mit länglichem Querschnitt ausgebildet ist, der den Abmessungen des ersten Arms (15) des Torsionselements entspricht, um den ersten Arm (15) aufzunehmen. 20 25
11. Dachfenster nach einem der Ansprüche 2 bis 10, **dadurch gekennzeichnet, dass** der Verbindungspunkt (17) der Arme (15, 16) des Torsionselements (14) oder der Angriffspunkt der Schraubenfeder (15) im Wesentlichen auf der Schwenkachse der Fensterrahmenanordnung angeordnet ist. 30
12. Dachfenster nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** die Fensterrahmenanordnung wenigstens ein Führungselement (22) aufweist, das mit einem Kantenbereich des verglasten Elements (11) eingreift und mit einem Halteabschnitt, der mit einem entsprechenden zweiten Verbindungselement in jedem von den Paaren eingreift, ausgebildet ist. 35 40
13. Dachfenster nach einem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** ein Fensteröffner (23) zum Öffnen der Fensterrahmenanordnung (6) in eine Öffnungsstellung vorgesehen ist. 45
14. Dachfenster nach Anspruch 13, **dadurch gekennzeichnet, dass** der Fensteröffner (23) ein elektrisch betriebener Kettenbetätiger ist, der an einem Element der Hauptrahmenanordnung im Abstand von dem ersten Element befestigt ist und eine Betätigungskette (24) umfasst, die lösbar mit einem entsprechenden Element der Fensterrahmenanordnung verbunden ist. 50 55
15. Dachfenster nach einem der Ansprüche 1 bis 14, **dadurch gekennzeichnet, dass** zwei Paare von ersten und zweiten Verbindungselementen (12, 13) vorgesehen sind, die in einem Abstand voneinander in der Längsrichtung des ersten Hauptrahmen- bzw. Fensterrahmenelements (2, 7) angeordnet sind.
16. Sicherungseinrichtung zum Beibehalten des Eingriffs zwischen Verbindungselementen (12, 13) einer Hauptrahmenanordnung (1) und einer Fensterrahmenanordnung (6) eines in einem vorgegebenen Öffnungswinkelbereich der Fensterrahmenanordnung zu öffnenden Dachfensters, wobei die Sicherungseinrichtung wenigstens ein Torsionselement (14; 25) zur Verbindung mit dem Fenster aufweist, wobei das wenigstens eine Torsionselement torsionsmäßig in die Öffnungsrichtung der Fensterrahmenanordnung (6) in Bezug auf die Hauptrahmenanordnung (1) vorgespannt ist, **dadurch gekennzeichnet, dass** die Sicherungseinrichtung ein lösbares Eingriffselement (18; 20) zum Eingriff mit einem entsprechenden Eingriffselement (19, 19a; 21) zum Anordnen an der Fensterrahmenanordnung (6) aufweist.
17. Sicherungseinrichtung nach Anspruch 16, **dadurch gekennzeichnet, dass** das wenigstens einen Torsionselement (14) einen ersten und einen zweiten Arm (15, 16) aufweist, die sich im Wesentlichen senkrecht zueinander ausgehend von einem Verbindungspunkt (17) erstrecken, wobei der erste Arm (15) vorgesehen ist, um an der Hauptrahmenanordnung (1) befestigt zu werden, und wobei das Eingriffselement (18; 20) an dem Ende des zweiten Arms (16) gegenüber dem Verbindungspunkt (17) vorgesehen ist für eine lösbare Verbindung mit dem entsprechenden Eingriffselement (19, 19a; 21) zur Anordnung an einem benachbarten Fensterrahmenelement.
18. Sicherungseinrichtung nach Anspruch 17, **dadurch gekennzeichnet, dass** der erste Arm (15) zwei voneinander beabstandete und im Wesentlichen parallel verlaufende Streben (15a, 15b) umfasst, die an dem Ende gegenüber dem Verbindungspunkt (17) ein enges längliches U bilden.
19. Sicherungseinrichtung nach Anspruch 17 oder 18, **dadurch gekennzeichnet, dass** das Eingriffselement des zweiten Arms (16) des Torsionselements (14) einen hochstehenden Stift (18) und das entsprechende Eingriffselement zur Anordnung an dem Fensterrahmen einen Block (19) mit einer Aussparung (19a) umfasst, wobei der hochstehende Stift innerhalb des vorgegebenen Öffnungswinkelbereichs in der Aussparung aufgenommen wird.
20. Sicherungseinrichtung nach Anspruch 17 oder 18, **dadurch gekennzeichnet, dass** das Eingriffselement des zweiten Arms (16) des Torsionselements

(14) einen Gabelabschnitt (20) umfasst und das entsprechende Eingriffselement zur Anordnung an dem Fensterrahmen einen vorstehenden Stift (21) umfasst, wobei der vorstehende Stift innerhalb des vorgegebenen Öffnungswinkelbereichs in dem Gabelabschnitt aufgenommen wird.

21. Sicherungseinrichtung nach Anspruch 16, **dadurch gekennzeichnet, dass** das wenigstens eine Torsionselement (14) eine Schraubenfeder (25) umfasst, die mit der Hauptrahmenanordnung (1) verbunden ist, und einen Hebel (26) mit zwei Enden, wobei die Schraubenfeder auf den Hebel an einem Angriffspunkt wirkt, der an einem Ende angeordnet ist, und wobei das Eingriffselement an dem gegenüberliegenden Ende angeordnet ist.

Revendications

1. Fenêtre à tabatière comprenant :

une structure de châssis principal (1) permettant un raccordement fixe avec des moyens de support d'une structure de toit, et
une structure de châssis de fenêtre (6) supportant un élément de vitrage (11),
les structures de châssis principal et de châssis de fenêtre comportant, respectivement, une pluralité d'éléments (2-5, 7-10) dont chacun s'étend dans une direction longitudinale entre une première et une seconde extrémités ; dans laquelle ladite structure de châssis de fenêtre (6) est raccordée à la structure de châssis principal (1) au moyen d'au moins un raccordement par charnière au niveau d'un premier élément respectif des structures de châssis principal et de châssis de fenêtre afin de permettre à la structure de châssis de fenêtre de pivoter autour d'un axe de pivotement parallèle à la direction longitudinale desdits premiers éléments par rapport à la structure de châssis principal pour un angle d'ouverture, ledit raccordement par charnière pouvant se désengager afin de permettre à la structure de châssis de fenêtre d'être retirée de la structure de châssis principal, ledit au moins un raccordement comprenant au moins une paire de premiers et deuxièmes éléments de raccordement (12, 13) connectés à la structure de châssis principal et à la structure de châssis de fenêtre, respectivement,
un dispositif de fixation étant prévu pour maintenir l'engagement entre les éléments de raccordement (12, 13) desdites paires dans les limites d'une plage prédéterminée de l'angle d'ouverture de la structure de châssis de fenêtre ;
caractérisée en ce que

ledit dispositif de fixation comporte au moins un élément de torsion (14 ; 25) positionné au niveau d'une extrémité respective desdits premiers éléments des structures de châssis principal et de châssis de fenêtre, ledit au moins un élément de torsion étant rappelé par torsion dans la direction d'ouverture de la structure de châssis de fenêtre (6) par rapport à la structure de châssis principal (1), et **en ce que**
ledit dispositif de fixation comporte des moyens d'engagement libérables (18 ; 20) permettant un engagement avec des moyens d'engagement correspondants (19, 19a ; 21) positionnés à une distance dudit axe de pivotement le long d'un second élément de châssis de fenêtre (9) adjacent au dit premier élément (7) de la structure de châssis de fenêtre dans les limites de ladite plage prédéterminée de l'angle d'ouverture.

2. Fenêtre à tabatière selon la revendication 1, **caractérisée en ce que** ledit au moins un élément de torsion (14) comporte un premier et un second bras (15, 16) s'étendant de façon essentiellement perpendiculaire l'un par rapport à l'autre en commençant à partir d'un point de raccordement (17), le premier bras (15) étant fixé au dit premier élément de châssis principal (2) et s'étendant le long de la direction longitudinale de celui-ci, et lesdits moyens d'engagement (18 ; 20) étant prévus au niveau de l'extrémité du second bras (16) opposé au dit point de raccordement (17) en vue d'un raccordement libérable avec les moyens d'engagement correspondants (19, 19a ; 21) positionnés sur ledit second élément de châssis de fenêtre (9) dans les limites de ladite plage prédéterminée de l'angle d'ouverture.
3. Fenêtre à tabatière selon la revendication 2, **caractérisée en ce que** ledit premier bras (15) comporte deux branches mutuellement espacées et essentiellement parallèles (15a, 15b) formant au niveau de l'extrémité opposée ledit point de raccordement (17) un U étroit de forme allongée.
4. Fenêtre à tabatière selon la revendication 2 ou 3, **caractérisée en ce que** les moyens d'engagement du second bras (16) dudit élément de torsion (14) comportent une broche verticale (18) et **en ce que** les moyens d'engagement correspondants dudit second élément de châssis de fenêtre (9) comportent un bloc (19) présentant un évidement (19a), ladite broche verticale étant reçue dans ledit évidement dans les limites de ladite plage prédéterminée de l'angle d'ouverture.
5. Fenêtre à tabatière selon la revendication 2 ou 3, **caractérisée en ce que** les moyens d'engagement du second bras (16) dudit élément de torsion (14) comportent une partie en forme de fourche (20) et

- en ce que** les moyens d'engagement correspondants dudit second élément de châssis de fenêtre comportent une broche en saillie (21), ladite broche en saillie étant reçue dans ladite partie en forme de fourche dans les limites de ladite plage prédéterminée de l'angle d'ouverture.
- 5
6. Fenêtre à tabatière selon la revendication 1, **caractérisée en ce que** ledit au moins un élément de torsion comprend un ressort à boudin (25) raccordé à la structure de châssis principal (1) et un levier (26) comportant deux extrémités, ledit ressort à boudin agissant sur ledit levier en un point d'action situé au niveau d'une extrémité et lesdits moyens d'engagement étant prévus au niveau de l'extrémité opposée.
- 10
7. Fenêtre à tabatière selon l'une quelconque des revendications 1 à 6, **caractérisée en ce que** ledit premier élément de raccordement (12) de chacune desdites paires comprend une partie de rebord de forme allongée (12a) permettant de le fixer au premier élément de châssis principal (2) et une partie d'engagement de forme allongée, en saillie (12b) pouvant s'engager avec une piste configurée essentiellement en forme de V (13b) formée dans ledit second élément de raccordement (13) de la même paire.
- 15
8. Fenêtre à tabatière selon la revendication 7, **caractérisée en ce que** ladite partie d'engagement (12b) du premier élément de raccordement (12) et ladite piste (13b) du second élément de raccordement (13) sont formées avec des surfaces d'engagement essentiellement en partie cylindriques afin de définir l'axe de pivotement de la structure de châssis de fenêtre (6) par rapport à la structure de châssis principal (1).
- 20
9. Fenêtre à tabatière selon la revendication 7 ou 8, **caractérisée en ce que** ladite piste configurée en V (13b) est formée avec un angle d'ouverture se situant dans la plage allant de 20° à 30° en vue de définir une plage limitée de façon correspondante de positions d'aération de ladite structure de châssis de fenêtre par rapport à ladite structure de châssis principal.
- 25
10. Fenêtre à tabatière selon la revendication 2 et selon l'une quelconque des revendications 7 à 9, **caractérisée en ce que** ladite partie d'engagement (12b) du premier élément de raccordement (12) est formée avec une gorge longitudinale (12c) présentant une section transversale de forme allongée correspondant aux dimensions du premier bras (15) de l'élément de torsion en vue de recevoir ledit premier bras (15).
- 30
11. Fenêtre à tabatière selon l'une quelconque des revendications 2 à 10, **caractérisée en ce que** le point de raccordement (17) des bras (15, 16) de l'élément de torsion (14) ou le point de travail du ressort à boudin (25) est positionné essentiellement sur l'axe de pivotement de la structure de châssis de fenêtre.
- 35
12. Fenêtre à tabatière selon l'une quelconque des revendications 1 à 11, **caractérisée en ce que** la structure de châssis de fenêtre comporte au moins un élément de guidage (22) s'engageant avec une zone de bordure de l'élément de vitrage (11) et qui est formé avec une partie de retenue s'engageant avec un second élément de raccordement respectif dans chacune desdites paires.
- 40
13. Fenêtre à tabatière selon l'une quelconque des revendications 1 à 12, **caractérisée par** le fait de comporter un dispositif d'actionnement de fenêtre (23) permettant d'ouvrir la structure de châssis de fenêtre (6) vers une position d'aération.
- 45
14. Fenêtre à tabatière selon la revendication 13, **caractérisée en ce que** ledit dispositif d'actionnement de fenêtre (23) est un dispositif d'actionnement à chaîne actionné électriquement fixé à un élément de la structure de châssis principal éloignée dudit premier élément et comportant une chaîne d'actionnement (24) raccordée de façon libérable à un élément correspondant de la structure de châssis de fenêtre.
- 50
15. Fenêtre à tabatière selon l'une quelconque des revendications 1 à 14, **caractérisée par** le fait de comporter deux paires de premiers et seconds éléments de raccordement (12, 13) positionnées à distance l'une de l'autre dans la direction longitudinale des premiers éléments de châssis principal et de châssis de fenêtre (2, 7), respectivement.
- 55
16. Dispositif de fixation servant à maintenir l'engagement entre des éléments de raccordement (12, 13) d'une structure de châssis principal (1) et d'une structure de châssis de fenêtre (6) d'une fenêtre à tabatière pouvant s'ouvrir dans les limites d'une plage prédéterminée de l'angle d'ouverture de la structure de châssis de fenêtre, ledit dispositif de fixation comprenant au moins un élément de torsion (14 ; 25) à connecter avec la fenêtre, ledit au moins un élément de torsion étant rappelé par torsion dans la direction d'ouverture de la structure de châssis de fenêtre (6) par rapport à la structure de châssis principal (1), **caractérisé en ce que** ledit dispositif de fixation comprend des moyens d'engagement libérables (18 ; 20) permettant un engagement avec des moyens d'engagement correspondants (19, 19a ; 21) à positionner sur la structure de châssis de fenêtre (6).
17. Dispositif de fixation selon la revendication 16, **ca-**

ractérisé en ce que ledit au moins un élément de torsion (14) comporte un premier et un second bras (15, 16) s'étendant de façon essentiellement perpendiculaire l'un à l'autre à partir d'un point de raccordement (17), le premier bras (15) étant conçu en vue d'être fixé à la structure de châssis principal (1), et lesdits moyens d'engagement (18 ; 20) étant prévus au niveau de l'extrémité du second bras (16) opposé au dit point de raccordement (17) en vue d'un raccordement libérable avec les moyens d'engagement correspondants (19, 19a ; 21) à positionner sur un élément de châssis de fenêtre adjacent.

18. Dispositif de fixation selon la revendication 17, **caractérisé en ce que** ledit premier bras (15) comprend deux branches mutuellement espacées et essentiellement parallèles (15a, 15b) formant, au niveau de l'extrémité opposée audit point de raccordement (17), un U étroit de forme allongée.

19. Dispositif de fixation selon la revendication 17 ou 18, **caractérisé en ce que** les moyens d'engagement du second bras (16) dudit élément de torsion (14) comporte une broche verticale (18) et **en ce que** les moyens d'engagement correspondants à positionner sur le châssis de fenêtre comportent un bloc (19) présentant un évidement (19a), ladite broche verticale étant reçue dans ledit évidement dans les limites de ladite plage prédéterminée de l'angle d'ouverture.

20. Dispositif de fixation selon la revendication 17 ou 18, **caractérisé en ce que** les moyens d'engagement du second bras (16) dudit élément de torsion (14) comportent une partie en forme de fourche (20) et **en ce que** les moyens d'engagement correspondants à positionner sur le châssis de fenêtre comportent une broche en saillie (21), ladite broche en saillie étant reçue dans ladite partie en forme de fourche dans les limites de ladite plage prédéterminée de l'angle d'ouverture.

21. Dispositif de fixation selon la revendication 16, **caractérisé en ce que** ledit au moins un élément de torsion (14) comprend un ressort à boudin (25) raccordé à la structure de châssis principal (1) et un levier (26) présentant deux extrémités, ledit ressort à boudin agissant sur ledit levier en un point de travail situé au niveau d'une extrémité et lesdits moyens d'engagement étant fournis au niveau de l'extrémité opposée.

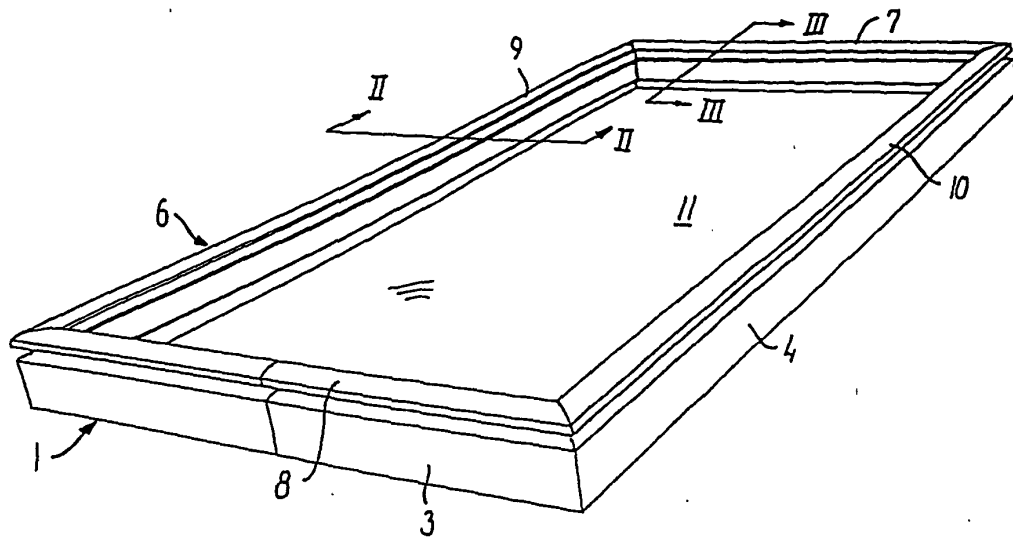


FIG. 1

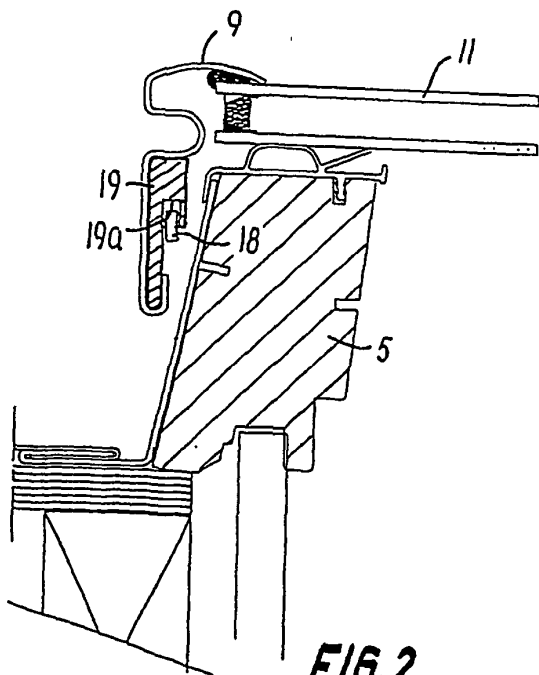


FIG. 2

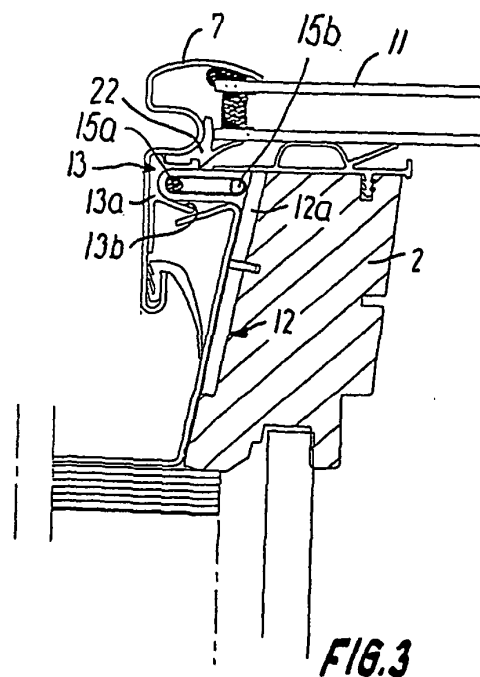
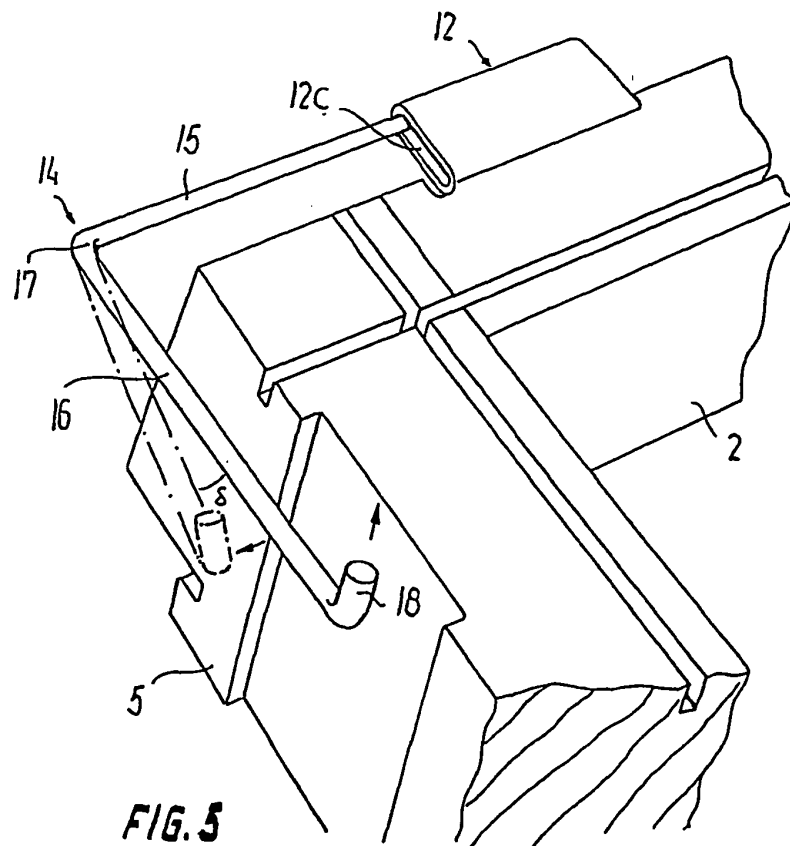
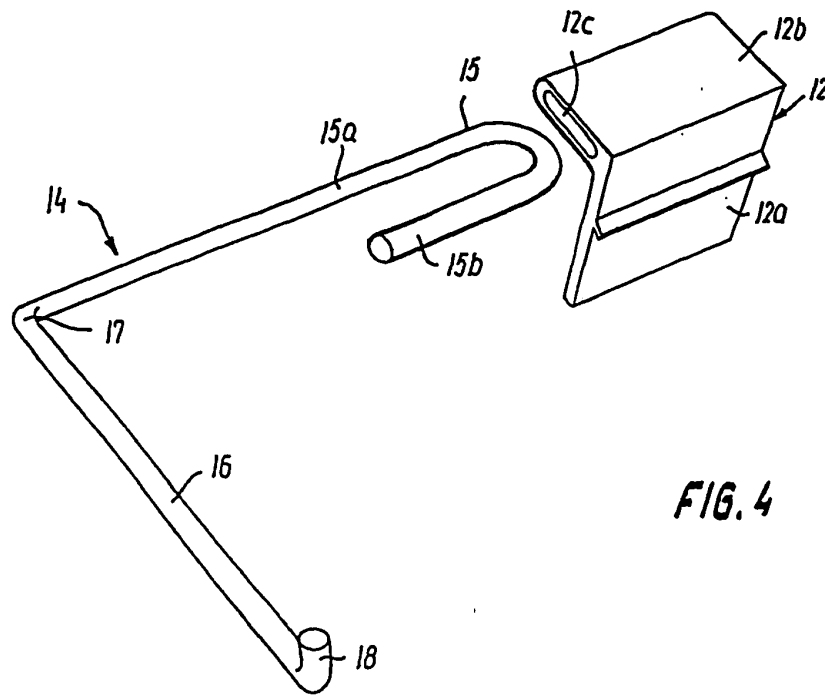


FIG. 3



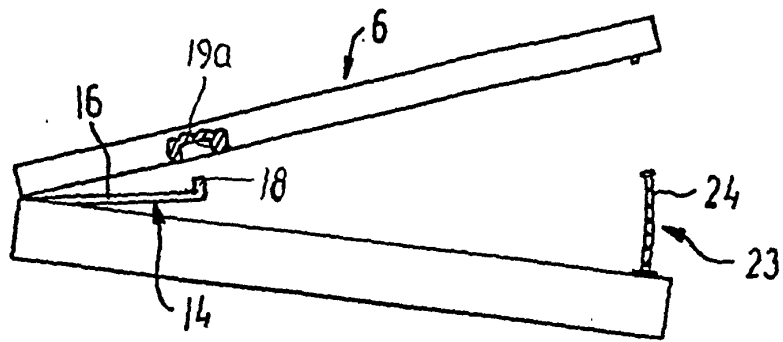


FIG. 6

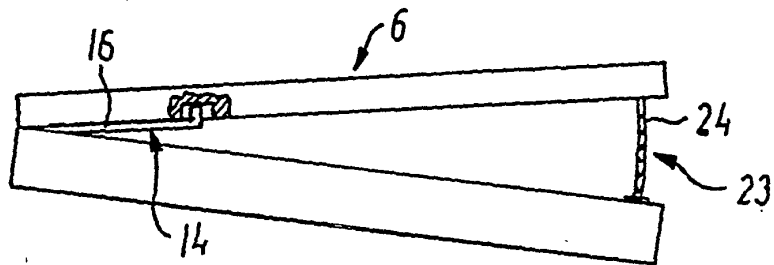


FIG. 7

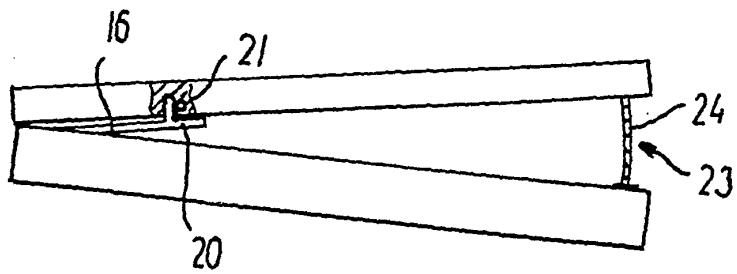


FIG. 8

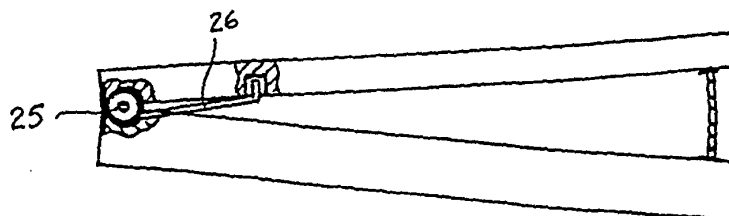


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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