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(54) **BURGLAR PROOF ROOF WINDOW**

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(56) References cited:
EP-A- 1 193 360 EP-A1- 0 969 178
WO-A1-90/04078 GB-A- 2 005 759
US-A- 5 867 871

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Description

[0001] The present invention relates to a pivot window, especially, but not exclusively, a pivot window for installation on an inclined roof comprising a sash accommodated by two hinge devices in a frame structure.

BACKGROUND ART

[0002] Roof windows of this type are well known and are widely used for providing admittance of daylight in ceilings of buildings. A locking mechanism arranged at the upper or lower end of the sash prevents the sash from being opened unintentionally. The use of such windows in exposed places, e.g. in relatively flat roof structures or close to landings or similar building parts, where the window is easily accessible from the outside may be problematic due to the risk of burglary.

[0003] Attempts have been made to render these type of windows more burglar proof. EP 0 969 178 discloses a roof window with a pivotable sash arranged in a main frame and being provided with an adjustable ventilation cover for providing ventilation in a closed position of the sash through a ventilation passage between opposed members of the sash and the main frame and sash locking means connected with the ventilation cover, one or more burglary preventing members are arranged in the ventilation passage to prevent manual access to the ventilation cover and/or the locking means from the external side of the window.

[0004] A non protected part in the construction of this type of windows remains though the connection between the hinge device and the wooden window frame. Usually, the base plate of a hinge part is secured to a side member of the window frame by screws extending through holes in the base plate and screwed into the wooden side member. A hinge device secured in this way to the window frame is e.g. known from WO90/04078. It has been shown possible to force the hinge member in a destructive manner from the side member by e.g. using a crowbar placed between the base plate and the side member, and thus, force the screws out of engagement with the wood.

[0005] US5103603 and GB223083 disclose a different type of roof window with a sash and a frame. The hinges are secured to the top of the frame and the of the sash respectively. Hereby the hinges provide an axis of rotation about the top of the roof window whereby the sash may be opened by moving the sash above the frame.

[0006] DE2970977U, EP1193360, DE4319422, US4122581, US5867871, GB2005759, US1640525 disclose a type of hinges for swinging wings. These hinges have double leaves which hold the wing on both sides. The hinges are designed to be attached to the end of the wing and provide an axis of rotation about the end of the wing.

DISCLOSURE OF THE INVENTION

[0007] On this background, it is an object of the present invention to provide a roof window of the kind referred to above, with improved burglary preventing characteristics. This object is achieved in accordance with claim 1 by providing

A roof window with a pane supporting sash a structure comprising horizontal top and bottom members connected by parallel side members, which are at least partially wooden profiles, said sash structure being accommodated by two hinge devices as a pivot sash in a frame structure with top and bottom members connected by side members at least partially made of wood profiles, the sash structure is pivotally journaled in the frame structure with an axis of rotation parallel with the top and bottom members and substantially halfway between them and

each of said hinge devices comprising a first part having a base plate to be secured to the frame structure, a second part having a base plate to be secured to the sash structure and first securing means for securing said first base plate to the inward facing side of one the first base plate to the inward facing side of one the side members, said first securing means comprises at least one transversely extending member connecting the first base plate to at least one transverse force spreading element.

Thus, the transverse forces that could be applied by forcing a crowbar between the base plate and the side member of the window frame are distributed over a large area of the side member and the effort required to separate the base plate from the side member is thus significantly increased.

[0008] The transverse force spreading element may be a reinforcing plate arranged on the outward facing side of the side member of the window frame. This reinforcing plate could be a metal plate or a fiber reinforced plastic plate.

[0009] The transversely extending member connecting the base plate to the reinforcing plate may be a bolt protruding through a bore in the reinforcing plate and in threaded engagement with a threaded bore in the base plate.

[0010] Alternatively, the transverse member may be formed by a rod or strip in rigid connection with the base plate and the reinforcing plate.

[0011] In another variation, the transversely extending member may be formed by an integral part of the base plate, preferably in the form of a lip or a protrusion received in a corresponding recess in the side member of the window frame.

[0012] The lip and/or the protrusion are preferably provided with at least one through-going aperture for receiving the transverse force spreading element. The transverse force spreading element may be formed by a rod, a strip or a bolt, preferably received in a bore or slot in the side member of the window frame.

[0013] The roof window may further comprise a locking

means for locking the sash structure to the frame structure, and preferably further comprising an auxiliary locking means for locking the sash structure to the frame structure.

[0014] The roof window may also comprise a cover plate extending over top of the side member, this cover plate preferably being integral with the reinforcing plate or the base plate.

[0015] Further objects, features, advantages and properties of the pivot window according to the invention will become apparent from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] In the following detailed portion of the present description, the invention will be explained in more detail with reference to the preferred embodiments shown in the drawings, in which

Fig. 1 is a perspective view of an embodiment of a roof window according to the invention,
 Fig. 2a is a sectional view through the sash and the frame along the pivot line in Fig. 1 in accordance with a first embodiment of the invention,
 Fig. 2b is a sectional view through the sash and the frame along the pivot line in Fig. 1 in accordance with a variation of first embodiment of the invention,
 Fig. 3 is a sectional view through the sash and the frame along the pivot line in Fig. 1 in accordance with a second embodiment of the invention,
 Fig. 4 is a view on the inner side of the pivot window showing means to lock the window, and
 Fig. 5 is a third embodiment of the invention.

DETAILED DESCRIPTION

[0017] In the embodiment shown in Fig 1, the roof window according to the invention is an openable window with a frame structure comprising a top member 5, a bottom member 6, and side members 7 and 8, and an openable sash structure with a top member 1, a bottom member 2, and side members 3 and 4.

[0018] By means of pivotal hinges 9, known per se, between the frame and sash side members 3,4 and 7,8. The sash structure is pivotally journaled in the frame structure with an axis of rotation parallel with the top and bottom members and substantially halfway between them.

[0019] The top, bottom and side members of the frame and sash structures are for the major part built up by wood. These profiles are usually provided on all surfaces that are exposed to the weather with covering members which are constituted of comparatively thin metal sheet profiles, for instance of aluminium, and which together provide a completely weather-shielding enclosure of the window (not shown).

[0020] In a first preferred embodiment, best shown in Fig. 2a, each hinge 9 comprises a hinge part belonging

to the window frame and a hinge part belonging to the sash. The hinge part belonging to the sash includes a base plate 11. The base plate 11 is provided with holes for mounting screws (not shown) for securing it to the side member of the sash. The hinge part belonging to the window frame includes a base plate 10 secured to the inside facing surface of a side member 7 of the window frame. A reinforcing plate 15 is provided on the outside facing surface of the side member 7. The reinforcing plate 15, is preferably a metal plate, such as a zinc coated steel plate, or a fiber reinforced plastic plate.

The reinforcing plate is provided with through going bores that receive bolts 14, which extend through bores in the side member 7 into threaded bores provided in the base plate 10.

[0021] The bolts 14 transmit the transverse forces applied to the base plate 10 to the reinforcing plate 15. The reinforcing plate 15 spreads the transverse forces over a larger surface area of the side member 7,8. The wood of the side member 7,8 is able to resist the thus applied pressures caused by attempts to separate the base plate 10 with a crowbar or the like, and breaking into a building provided with this improved roof window is made more difficult.

[0022] A cover plate 12, is provided over the top of the side member 7 and the base plate 10 to make it more difficult to place a crowbar or the like between the side member 7 and the base plate 10.

[0023] The base plate 10 is provided with two raised walls constituting a part circular guide channel. A correspondingly shaped curved slide member is received within this channel. The curved slide member is pivotally connected to the base plate 11 of the hinge part belonging to the sash. This mechanism connecting the two hinge parts in a pivotal manner to one another is well known in the art and therefore not described in further detail here.

[0024] In a variation of the first embodiment, shown in Fig. 2b, the cover plate is integral with the reinforcement plate 15 for simplifying and reinforcing the overall construction.

[0025] In a second preferred embodiment, best shown in Fig. 3, each hinge 9 also comprises a hinge part belonging to the window frame and a hinge part belonging to the sash. The hinge part belonging to the sash includes a base plate 11 provided with a lip 18 extending into a slot in the side member 3 of the window sash. The lip is formed in a well known member by forming a U-shaped slit in the base plate 11 and bending thus created lip approximately 90° so that it extends transversely from the base plate 11. The lip 18 is provided with a through-going-bore. A rod 19, received in a blind bore arranged in the side member 3 extends through the bore in the lip 18. The base plate may be provided with more than one lip 18, and even more rods 19, depending on the size of the window and the size of the base plate. The rods 19 have the same function as the reinforcing plate 15 in the first embodiment, i.e. to transform the transverse forces applied in attempts to separate the base plate 10,11 from

the side member 3,4,7,8 into relatively low pressures to the wooden structure.

[0026] The base plate 10 is secured to the side member 7 in a similar manner by a lip 16 having a bore receiving a rod 17 that extends in a blind bore in the side member 7.

[0027] The rods 17 and 19 may be replaced by strips or the like, with the aperture in the lips 16, 18 being shaped correspondingly.

[0028] Preferably the hinge 9 and its securing means are made from metal, such as steel or strong plastic materials, such as fiber reinforced plastics or combinations thereof.

[0029] As best seen in Fig. 4, two cylinder locks 20 are secured to the sash proximate to its upper member 1. The cylinder lock 20 comprises a latch 21 controlled by a cylinder 23 that can extend into a recess in the side member 7 or 8 to secure the sash against undesired opening. An auxiliary locking device is arranged on the opposite side of the sash, in the bottom member 2. The locking mechanism (not shown), that can engage with the window frame is operated by a handle 24.

[0030] Fig. 5 shows a third embodiment of the invention in which the base plate (10) is integral with the cover plate (12) which is in turn integral with the reinforcing plate (15). In this embodiment the transverse forces are transported from the base plate (10) to the reinforcing plate (15) via the cover plate (12) which has thus a double function.

Claims

1. A roof window with a pane supporting sash structure comprising horizontal top and bottom members (1,2) connected by parallel side members (3,4), which are at least partially wooden profiles, said sash structure being accommodated by two hinge devices (9) as a pivot sash in a frame structure with top and bottom members (5,6) connected by side members (7,8) at least partially made of wood profiles, the sash structure is pivotally journaled in the frame structure with an axis of rotation parallel with the top and bottom members and substantially halfway between them and each of said hinge devices (9) comprising a first part having a base plate (10) to be secured to the frame structure, a second part having a base plate (11) to be secured to the sash structure and first securing means for securing said first base plate (10) to the inward facing side of one the side members (7,8), **characterized in that** said first securing means comprises at least one transversely extending member (14,16) connecting the first base plate (10) to at least one transverse force spreading element (15,17).

2. A roof window according to claim 1, **characterized**

in that said transverse force spreading element comprises a reinforcing plate (15) arranged on the outward facing side of said one of the side members (7,8).

3. A roof window according to claim 1, **characterized in that** reinforcing plate (15) is a metal plate or a fiber reinforced plastic plate.

4. A roof window according to claim 2 or 3, **characterized in that** said transversely extending member is a bolt, preferably protruding through a bore in said reinforcing plate (15) and in threaded engagement with a threaded bore in said base plate (10).

5. A roof window according to claim 2 or 3, **characterized in that** said transversely extending member is a rod or strip in rigid connection with said base plate (10) and said reinforcing plate (15).

6. A roof window according to claim 1, **characterized in that** said transversely extending member is an integral part of the base plate (10,11), preferably in the form of a lip (16,18) or a protrusion.

7. A roof window according to claim 6, **characterized in that** said lip (16,18) or said protrusion are provided with at least one through going aperture for receiving said transverse force spreading element (17,19).

8. A roof window according to claim 7, **characterized in that** said transverse force spreading element is a rod (17,19), a strip or a bolt, preferably received in a bore or slot in said one the side members (3,4,7,8).

9. A roof window according to any of claims 1 to 8, **characterized by** further comprising a locking means (20,21,23) for locking the sash structure to the frame structure, and preferably further comprising an auxiliary locking means (24) for locking the sash structure to the frame structure.

10. A roof window according to any of claims 1 to 9, **characterized by** comprising a cover plate (12), extending over top of the side member (7), said cover plate (12) preferably being integral with the reinforcing plate (15) or the base plate (10).

Patentansprüche

1. Dachfenster mit einem scheibenhaltenden Flügel Aufbau, umfassend ein oberes und ein unteres Element (1, 2) die durch parallele Seitenelemente (3, 4) verbunden sind, wobei es sich zumindest teilweise um hölzerne Profile handelt, wobei der Flügel Aufbau durch zwei Scharniervorrichtungen (9) als Schwenkflügel in einem zumindest teilweise aus Holz beste-

henden Rahmenaufbau mit einem oberen und einem unteren Element (5, 6), die durch Seitenelemente (7, 8) verbunden sind, untergebracht ist, wobei der Flügelaufbau mit einer Drehachse parallel zum oberen und unteren Element und im Wesentlichen auf halbem Weg dazwischen drehgelagert ist, und

jede der Scharniervorrichtungen (9) einen ersten Teil mit einer Basisplatte (10) zur Befestigung am Rahmenaufbau, einen zweiten Teil mit einer Basisplatte (11) zur Befestigung am Flügelaufbau und ein erstes Befestigungsmittel zum Befestigen der ersten Basisplatte (10) an der einwärts gerichteten Seite eines der Seitenelemente (7, 8) umfasst,

dadurch gekennzeichnet, dass

das erste Befestigungsmittel zumindest ein sich quer erstreckendes Element (14, 16) umfasst, das die erste Basisplatte (10) mit zumindest einem Querkraftverteilungselement (15, 17) verbindet.

2. Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** das Querkraftverteilungselement eine Verstärkungsplatte (15) umfasst, die an der auswärts gerichteten Seite eines der Seitenelemente (7, 8) angeordnet ist.
3. Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verstärkungsplatte (15) eine Metallplatte oder eine faserverstärkte Kunststoffplatte ist.
4. Dachfenster nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das sich quer erstreckende Element ein Bolzen ist, der vorzugsweise durch eine Bohrung in der Verstärkungsplatte (15) ragt und in einem Gewindeeingriff mit einer Gewindebohrung in der Basisplatte (10) steht.
5. Dachfenster nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das sich quer erstreckende Element ein Stift oder Streifen ist, der starr mit der Basisplatte (10) und der Verstärkungsplatte (15) verbunden ist.
6. Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** das sich quer erstreckende Element ein fest zugehöriger Teil der Basisplatte (10, 11) vorzugsweise in der Form einer Lippe (16, 18) oder eines Vorsprungs ist.
7. Dachfenster nach Anspruch 6, **dadurch gekennzeichnet, dass** die Lippe (16, 18) oder der Vorsprung mit zumindest einer durchgehenden Öffnung zur Aufnahme des Querkraftverteilungselements (17, 19) versehen ist.
8. Dachfenster nach Anspruch 7, **dadurch gekennzeichnet, dass** das Querkraftverteilungselement

ein Stift (17, 19), ein Streifen oder ein Bolzen ist, der vorzugsweise in einer Bohrung oder in einem Schlitz in einem der Seitenelemente (3, 4, 7, 8) aufgenommen ist.

9. Dachfenster nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** es ferner ein Sperrmittel (20, 21, 23) umfasst, um den Flügelaufbau an den Rahmenaufbau zu sperren, und vorzugsweise ferner ein Hilfssperrmittel (24) umfasst, um den Flügelaufbau an den Rahmenaufbau zu sperren.

10. Dachfenster nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** es eine Abdeckplatte (12) umfasst, die sich über die Oberseite des Seitenelements (7) erstreckt, wobei die Abdeckplatte (12) vorzugsweise einstückig mit der Verstärkungsplatte (15) oder der Basisplatte (10) ausgeführt ist.

Revendications

1. Fenêtre de toit avec une structure de châssis de support de vitre, comprenant des éléments supérieurs et inférieurs horizontaux (1, 2) reliés par des éléments latéraux parallèles (3, 4), au moins partiellement constitués de profilés en bois, ladite structure de châssis étant logée par deux dispositifs de charnière (9), comme un châssis pivotant dans une structure de cadre, avec des éléments supérieurs et inférieurs (5, 6) reliés par des éléments latéraux (7, 8) au moins partiellement constitués de profilés en bois, la structure de châssis est montée sur palier de façon pivotante dans la structure de cadre, avec un axe de rotation parallèle aux éléments supérieurs et inférieurs, situé substantiellement à mi-chemin entre ceux-ci, et chacun desdits dispositifs de charnière (9) comprend une première partie possédant une plaque de base (10) à fixer à la structure de cadre, une deuxième partie possédant une base plate (11) à fixer à la structure de châssis, et un premier moyen de fixation destiné à fixer ladite première plaque de base (10) au côté tourné vers l'intérieur de l'un des éléments latéraux (7, 8),
caractérisée en ce que
ledit premier moyen de fixation comprend au moins un élément s'étendant transversalement (14, 16), reliant la première plaque de base (10) à au moins un élément de répartition de force transversale (15, 17).
2. Fenêtre de toit selon la revendication 1, **caractérisée en ce que** ledit élément de répartition de force transversale comprend une plaque de renfort (15) disposée du côté tourné vers l'extérieur dudit un des éléments latéraux (7, 8).
3. Fenêtre de toit selon la revendication 1, **caractéri-**

sée en ce que la plaque de renfort (15) est une plaque métallique ou une plaque en plastique renforcée par des fibres.

4. Fenêtre de toit selon la revendication 2 ou 3, **caractérisée en ce que** ledit élément s'étendant transversalement est un boulon, faisant de préférence saillie à travers un alésage dans ladite plaque de renfort (15) et engagé par filetage avec un alésage fileté dans ladite plaque de base (10). 5
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5. Fenêtre de toit selon la revendication 2 ou 3, **caractérisée en ce que** ledit élément s'étendant transversalement est une tige ou une bande en connexion rigide avec ladite plaque de base (10) et ladite plaque de renfort (15). 15
6. Fenêtre de toit selon la revendication 1, **caractérisée en ce que** l'élément s'étendant transversalement est une partie intégrale de la plaque de base (10, 11), de préférence sous le forme d'une lèvre (16, 18) ou d'une saillie. 20
7. Fenêtre de toit selon la revendication 6, **caractérisée en ce que** ladite lèvre (16, 18) ou ladite saillie sont pourvues d'au moins une ouverture traversante, destinée à recevoir ledit élément de répartition de force transversale (17, 19). 25
8. Fenêtre de toit selon la revendication 7, **caractérisée en ce que** ledit élément de répartition de force transversale est une tige (17, 19), une bande ou un boulon, de préférence reçu dans un alésage ou une fente dans ledit un des éléments latéraux (3, 4, 7, 8). 30
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9. Fenêtre de toit selon l'une quelconque des revendications 1 à 8, **caractérisée en ce qu'elle** comprend en outre des moyens de verrouillage (20, 21, 23) pour verrouiller la structure de châssis avec la structure de cadre, et **en ce qu'elle** comprend de préférence également un moyen de verrouillage auxiliaire (24) pour verrouiller ladite structure de châssis avec la structure de cadre. 40
10. Fenêtre de toit selon l'une quelconque des revendications 1 à 9, **caractérisée en ce qu'elle** comprend une plaque couvrante (12) s'étendant pardessus le haut de l'élément latéral (7), ladite plaque couvrante (12) étant de préférence intégrale avec la plaque de renfort (15) ou la plaque de base (10). 45
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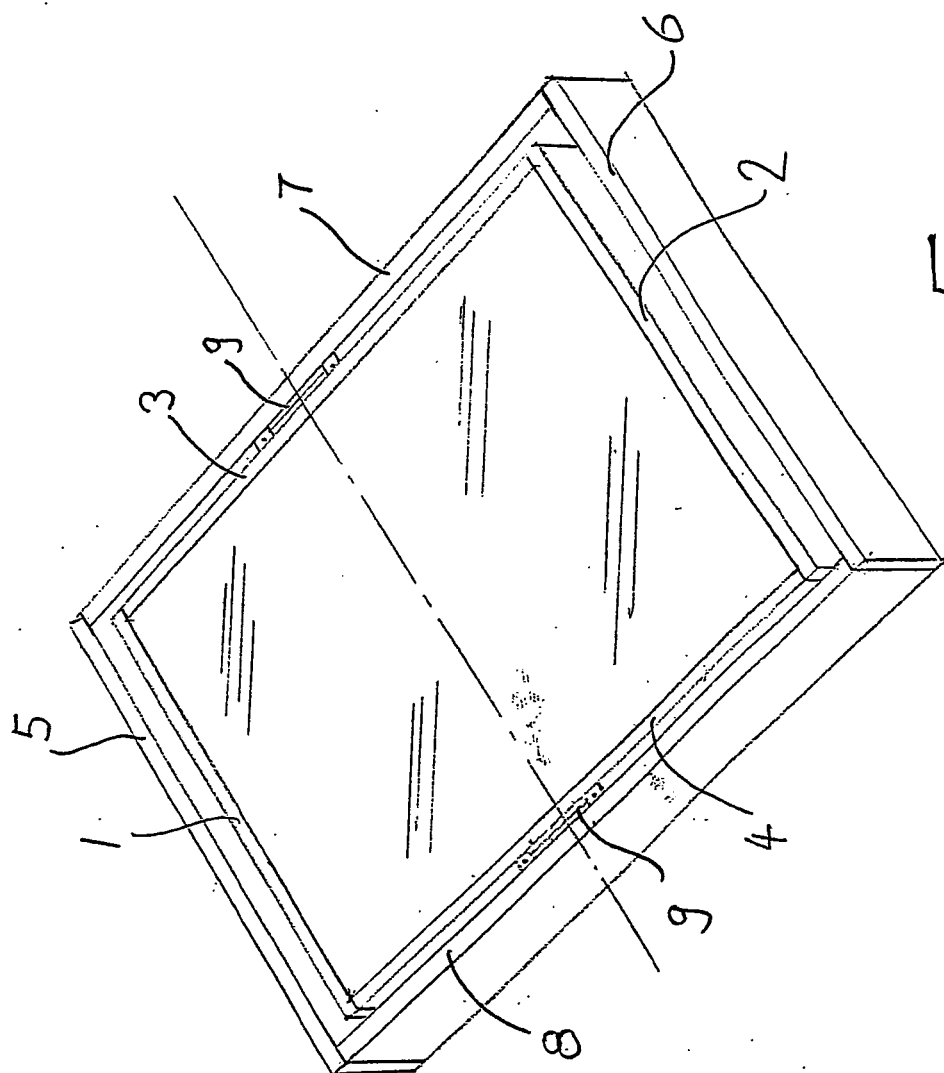


Fig. 1

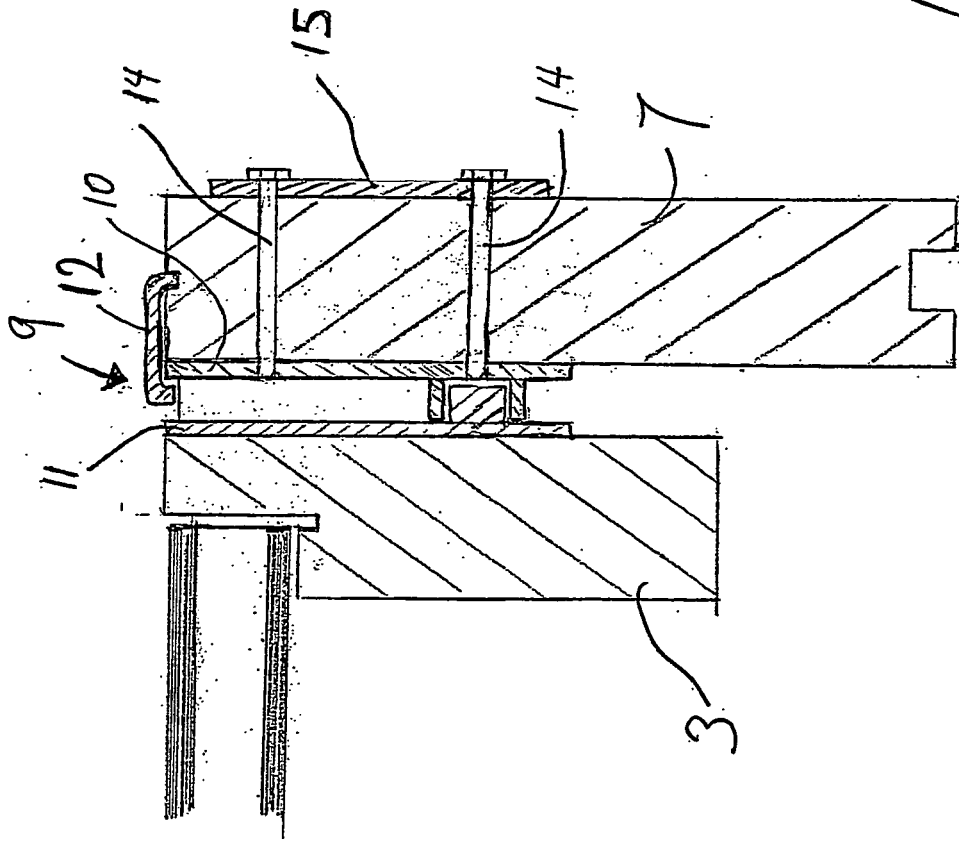


Fig. 2a

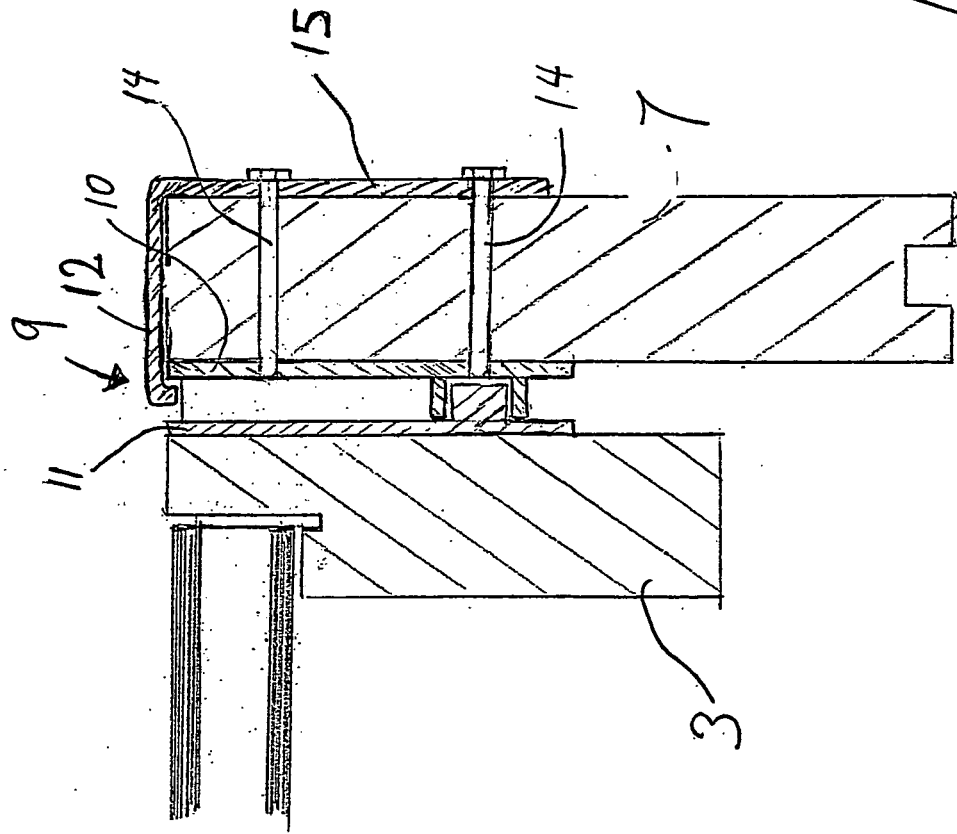
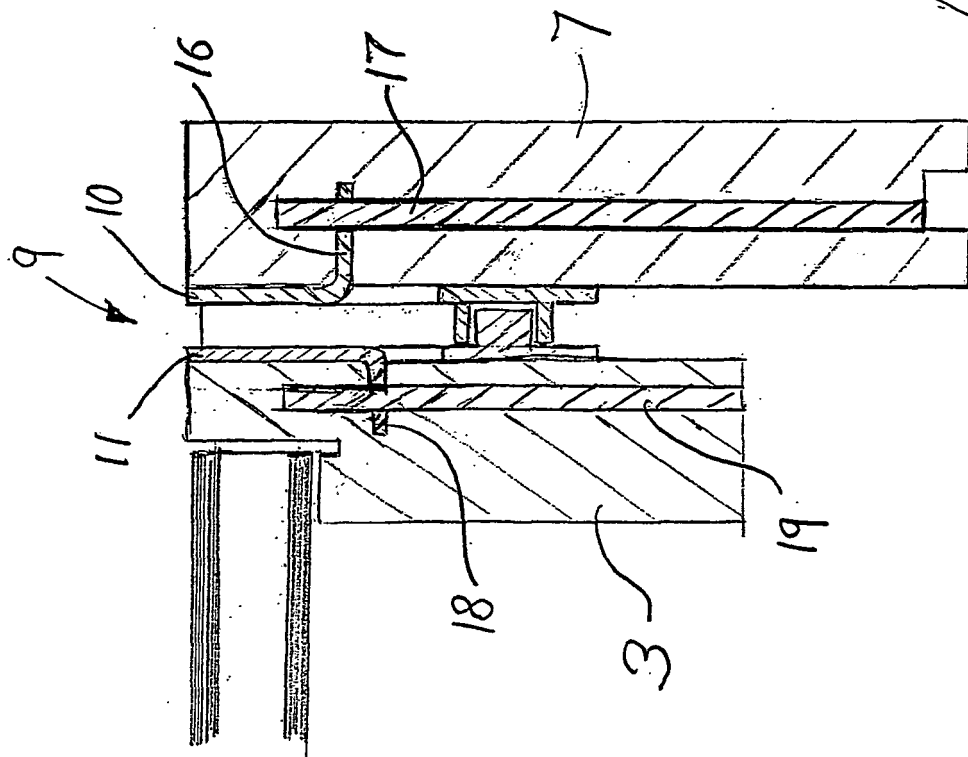


Fig. 26



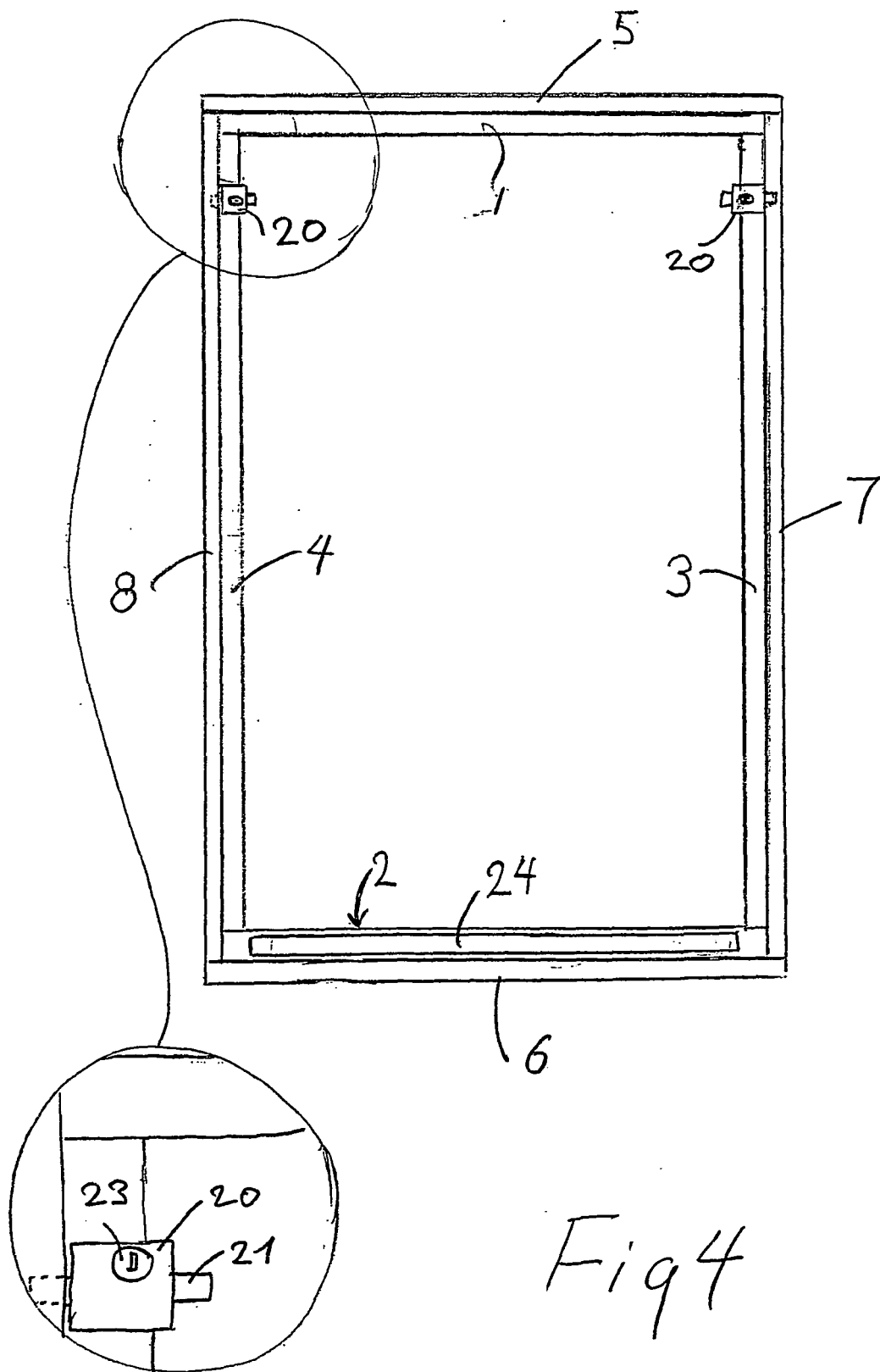
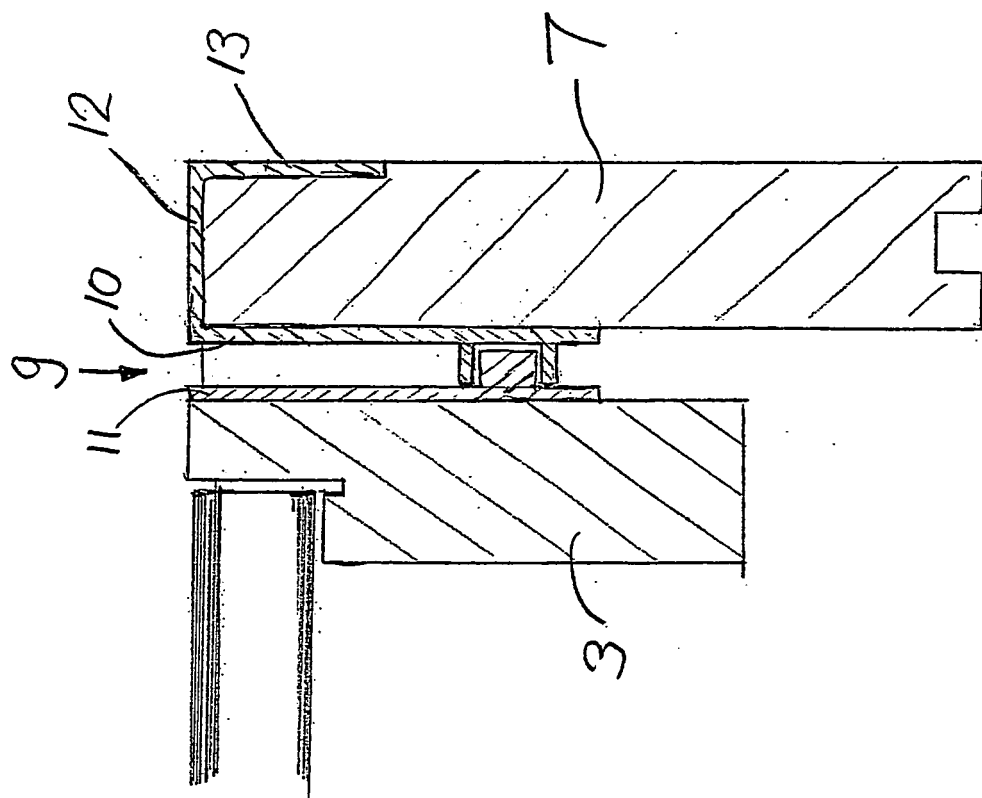


Fig 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0969178 A [0003]
- WO 9004078 A [0004]
- US 5103603 A [0005]
- GB 223083 A [0005]
- DE 2970977 U [0006]
- EP 1193360 A [0006]
- DE 4319422 [0006]
- US 4122581 A [0006]
- US 5867871 A [0006]
- GB 2005759 A [0006]
- US 1640525 A [0006]