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(54) **A window sash, in particular a roof window sash**

(57) The invention relates to a window sash, in particular a roof window sash, comprising a frame, in particular of a wooden construction, having side members (1) and a window pane (2), in particular a compact window pane comprising at least two sheets of glass, disposed in longitudinal recessed portions of the sash frame members and fixed to the sash frame by means of tightening bars that are fixed to the sash frame by means of fasteners, in particular by means of screws. The tightening bar (5) of the window pane (2) is protected from being dismounted from the sash in its closed position by means of a cover (14) that covers at least one threaded fastener fixing the tightening bar (5) located in the vicinity of a plate (9) of a hinge (7) anchored to the sash frame. The cover (14) is fixed to the plate (9) of the hinge by means of a screw (15) located in such a manner that an access to its head for dismounting thereof in the sash closed position is covered by other elements of the hinge, for example by slider (10). The tightening bar (5) may also be provided with additional securing elements protecting from dismounting thereof from the inner side of the closed window, and securing elements are mounted from this side of the sash frame which in the sash closed position are covered by a window frame.

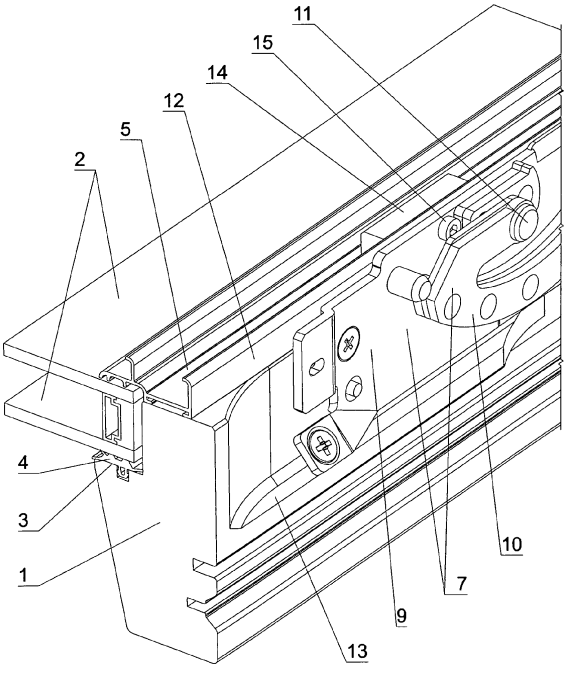

Fig. 1

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Description

[0001] The present invention relates to a window sash with a window pane fixed to the sash by means of tightening bars arranged at the outside of the window. The invention is particularly applicable to roof windows.

BACKGROUND OF THE INVENTION

[0002] Various roof windows are known from the state of art that are constructed to be opened pivotally or pivotally-deflectable and comprise a sash having a frame, in particular of a wooden construction, and a compact glass pane mounted inside the sash in recessed portions milled in side members of the sash frame. The glass pane is fixed to the sash frame by means of tightening bars located along the frame members. Tightening bars are in turn fixed to the sash frame by means of screws that after removing the covers, that ensure the leakproofness of the window, are available at the outside of the window. Unfortunately such constructions are relatively easy to be sprained by unauthorized persons since one may easily dismount the covers and the bars in order to remove the window pane from the sash and to enter inside a building. Additionally, later on one may easy assemble the window not even leaving a trace of the previous intrusion.

SUMMARY OF THE INVENTION

[0003] The window sash, in particular a roof window sash, according to the present invention comprises a frame and a window pane fixed to the frame by means of tightening bars and is provided with protections of tightening bars that disallow dismounting of these tightening bars by unauthorised persons, while the window is closed. The securing members that secure tightening bars are fixed to the sash frame by means of fasteners that are available for dismounting only at this side of the sash frame that in the sash closed position is covered by other window members and preferably by a window frame. The window pane, in particular a compact window pane comprising at least two sheets of glass, is disposed along with a set of gaskets in longitudinal recessed portions of the sash frame members. Tightening bars are fixed to the frame, in particular of a wooden construction, by means of fasteners, in particular by means of screws, arranged substantially in parallel relative to the window pane main surface.

[0004] The window sash is apt to be at least pivotally openable around an axis, in particular a horizontal axis, located above the middle point of the window sash, on hinge components fixed to side members of the sash frame at the outside thereof. A window sash according to the present invention may also feature a dual-purpose opening functionality, i.e. it may furthermore be divertable on hinges located at the top part of a window sash.

[0005] In one embodiment of the present invention the heads of the fasteners, preferably screws, fixing the tightening bar to the sash frame, are covered by short covers, preferably comprising not more than two neighbouring fasteners of the tightening bars. The covers of the heads of the fasteners are fixed to window elements by means of fasteners, preferably threaded fasteners, oriented substantially in parallel relative to the window pane main surface.

[0006] The covers that cover the heads of the fasteners fixing the tightening bar to the sash frame and located in the vicinity of window hinges, are fixed to a plate of a hinge adhering to a side surface of the sash frame by means of fasteners, preferably threaded fasteners, passing through openings in this hinge plate. An access to the covering fasteners, which enable dismounting of these fasteners, is covered in the sash closed position by other components of the hinge, such as for example the hinge plate adhering to side member of a window frame at its inner side, or an arched slider of a hinge cooperating with a guide located in a subset of a hinge fixed to a window frame. Preferably threaded fasteners of such covers have circular heads with hexagonal sockets disabling for screwing them out using a flat wrench inserted from an outside side of a window.

[0007] In a window sash variant having a simplified construction of covers of the heads of the fasteners fixing the tightening bar to the sash frame, covering elements are directly threaded pins of covering fasteners, passing through openings in hinge plate. Such a covering fastener has a head other than a polygonal head, and preferably has a circular head with a hexagonal socket, located at the outer side of a hinge plate. A thread of such a fastener is driven in an opening in a plate adhering to a rib of a tightening bar which adheres to a hinge plate from the side of a sash frame. The covers that cover heads of fasteners fixing the tightening bar located at the outside of a window hinges, are fixed by means of threaded fasteners with clampers embedded on a surface of the sash frame which in the sash closed position constitutes an outer surface of the window. The tightening bar has a form of a structural section having a longitudinal rib perpendicular relative to a wall of this bar adhering to the sash frame and directed to the outside relative to the sash frame surface, wherein the covers that cover the heads of the fasteners fixing tightening bar and the clamper fixed thereto are located the opposite side of the tightening bar rib: covers are situated from the side of the pane, whereas clampers are situated on the outer side of the sash frame. Each of the clampers is tightened to this outer surface of the sash frame by means of a catch fixed to a surface of the sash frame which in the sash closed position is covered by a window frame.

[0008] In one variant of this invention embodiment, the heads of threaded fasteners are covered by uniform covers wherein each of these covers substitutes separate clamper and catch. Uniform covers are fixed to this surface of the sash frame which in the sash closed position is covered. In points of fixture of the uniform covers, the

rib of the tightening bar has cutouts through which are passed sections of the uniform covers which cover fasteners of the tightening bar.

[0009] The elements fixed to a surface of a sash frame which in the sash closed position is covered by a window sash, i.e. either catches cooperating with clampers for fasteners of covers, or uniform covers fixed to a sash frame by means of threaded fasteners, preferably by means of woodscrews, having heads other than polygonal heads. It is possible to use fasteners having heads with a groove or with a cross-shaped recess or heads with a hexagonal socket. Using heads other than polygonal heads disables for screwing out fasteners using a flat wrench inserted into a slot between a window frame and a sash frame.

[0010] According to another preferred embodiment of the present invention, the heads of the fasteners, preferably screws, fixing the tightening bar to the sash frame, are covered by means of a covering strip extending over a longer section of a sash frame, for example a section from a hinge to the bottom or the top corner of a sash frame, or over the whole length of the top or the bottom member of a sash frame. The tightening bar has form of a structural section the elements of which form a guide in which a covering strip is inserted. Preferably, such a guide is formed combinedly by a longitudinal rib perpendicular relative to the base of the tightening bar formed from a bend of a free edge directed toward a pane, and a groyne projected from the base of the tightening bar. For protecting a window from dismounting of a pane by unauthorized persons, the covering strip is protected from putting out from the tightening bar by means of a blocking fastener, embedded in the covering strip, preferably by means of a threaded fastener driven in this strip.

[0011] The covering strip situated on side member of a sash frame is blocked by means of a threaded fastener passing through an opening in a plate of a rotational hinge, adhering and fixed to a side surface the sash frame. An access to the blocking fastener passing through the hinge plate, for dismounting of the fastener, is in the sash closed position covered by other components of the rotational hinge, for example by the hinge plate adhering to a window frame from the inner side thereof. The blocking fasteners are preferably screws having heads with hexagonal sockets disabling for dismounting thereof using a flat wrench inserted from the outer side of a window. The covering strip may be protected from its putting out in a one-point manner, i.e. by means of a single blocking fastener passing through an opening in a rotational hinge plate, and additionally may also by protected in other points/places on its length.

[0012] Blocking fasteners of the tightening bars situated at the outside of an area of anchoring of side hinges, are connected with clampers each of which is tightened to an outer surface of a sash frame by means of a catch fixed to a surface of a sash frame which in the sash closed position is covered by a window frame. The clampers are situated at the outer side of the longitudinal rib of the tightening bar, and adhere to this rib, whereas blocking fasteners are passed through this rib by its through opening and are embedded in the covering strip. Such a blockage of the covering strip is employed mainly in cases of strips located on a horizontal top member of a sash frame. However it may also be used in a covering strip on side member of a sash frame, being blocked in a hinge plate, for blocking the end of the strip.

[0013] Elements fixed to a surface of a sash frame which in the sash closed position is covered by a window frame, i.e. either catches cooperating with clampers for fasteners fixing covers, or uniform covers are fixed to a sash frame by means of threaded fasteners, preferably by means of woodscrews, having heads other than hexagonal heads. For example screws with heads having a groove for a screwdriver or a cross-shaped recess or screws with hexagonal sockets may be used. Using heads other than hexagonal heads disables for screwing out of these fasteners using a flat wrench inserted in a slot between a window frame and a sash frame.

[0014] According to third preferred embodiment of the present invention, a window sash frame is provided with a catches protecting tightening bars from dismounting thereof from a sash in its closed position, wherein the catches are fixed to the sash frame by means of securing fasteners that are available for dismounting thereof only from this side of the sash frame which in the sash closed position is covered by a window frame. Securing catches of tightening bars are inner ribs, running in longitudinal slots formed in the sash frame, recessed in this surface of the sash frame which in the sash closed position is at its outer side. The inner ribs of the tightening bar are oriented perpendicularly relative to the pane main surface. The inner ribs of the tightening bar are preferably of a T-shaped cross-section, formed by a shelf located at the outside of the tightening bar and a web passing through a longitudinal slot in the bar, wherein the rib shelf is connected to the tightening bar by joints formed by welding technology. The inner ribs of the tightening bars are fixed in the sash frame be means of fasteners, preferably woodscrews, embedded in the sash frame and passing through the ribs.

[0015] In one variant of this embodiment of the present invention, the inner ribs of the tightening bar projecting out of the tightening bar, constitute a monolithic element with a wall of the tightening bar that adheres to outer surface of a window frame and a pane.

[0016] According to fourth preferred embodiment of the invention, a window sash has also catches protecting tightening bars from dismounting thereof from a closed window, wherein the catches are preferably formed as a hooked catches tightening the tightening bar from the outer side of a window. The catches are fixed to a surface of the sash frame which in the sash closed position is covered by a window frame. The catches are fixed to the sash frame by means of threaded fasteners, preferably woodscrews, having heads other that hexagonal heads. For example screws with heads having a groove for a

screwdriver or a cross-shaped recess or screws with hexagonal sockets may be used. Using heads other than hexagonal heads disables for screwing out of these fasteners using a flat wrench inserted in a slot between a window frame and a sash frame.

[0017] According to fifth embodiment of the present invention, the tightening bar are fixed at least at their ends to the sash frame by means of fasteners oriented substantially perpendicularly relative to the pane main surface and hidden inside the sash frame. Elements of such fasteners that tighten the tightening bar to the sash frame and to the pane are available for dismounting thereof only from the side of the sash frame which in the sash closed position is covered by a window frame. In particular the tightening bars are fixed to the sash frame by means of pins oriented perpendicularly relative to the pane main surface, wherein each of the pins ends with a washer face, preferably a circumferential washer face, with which cooperates a fastening element fixing the tightening bar and tightening this bar to the window pane and embedded in the sash frame and available from this side of the sash frame that in the sash closed position is covered by a window frame. It is preferable that with the washer face of the pin an eccentric bolt embedded in a circular seat cooperates. At its opposite end the pin is provided with a lenticular head located on the inner side of the tightening bar, and a cylindrical section of the pin directly neighboring with its head is passed through an opening in the tightening bar.

[0018] The above indicated preferred embodiments of the present invention do not limit a number of their various variants as for a skilled technician any arbitrary combinations of the above presented securing means of tightening bars, located in the vicinity of hinges as well as at the outside of hinges, is obvious modification. For example one tightening bar may be protected at one end by means of an eccentric while at the other side it is protected by means of a cover connected with a clamper (the first variant). In particular a tightening bar may be protected only in the vicinity of hinges.

[0019] An advantageous effect of the present invention, especially in a roof window, is an increase of resistance against spraining a window by unauthorized persons (burglars), obtained in a result of introducing (in a window sash closed position) a considerable difficulty for dismounting tightening bars, and in consequence for dismounting a pane out of a window sash frame. Only in a window sash closed position securing fasteners protecting from dismounting of a pane are not available at the outer side of a window, whereas after opening a window by a user, these fasteners may be dismounted, for example when replacement of a pane is required.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention is illustrated below with reference to the preferred embodiments thereof that should not be considered in any way as limitative and with reference to the attached drawings on which:

Fig. 1 shows an axonometric view of a protection of a fastening screw of a tightening bar realized by means of a short cover at a hinge plate,

Fig. 2 presents a cross-sectional view of a sash frame showing a fastening screw protected by means of a cover (as shown in Fig. 1) located in the vicinity of a hinge plate,

Fig. 3 presents a cross-sectional view of a sash frame showing a fastening screw covered by means of a fastener embedded in a hinge plate,

Fig. 4 shows an axonometric view of a protection of a fastening screw of a tightening bar realized by means of a short cover located at the outside of an are of a hinge,

Fig. 5 presents a cross-sectional view of a sash frame showing the protection of Fig. 6 and a window frame,

Fig. 6 shows an axonometric view of a protection of a tightening bar realized by means of a direct catch located at the outside of an area of a hinge,

Fig. 7 presents a cross-sectional view of a sash frame with a protection of a tightening bar (at the outside of a hinge) realized by means of a rib plunged inside the sash frame,

Fig. 8 shows an axonometric view of a protection of a tightening bar realized by means of a covering strip blocked by means of a fastener cooperating with a hinge plate,

Fig. 9 shows a cross-sectional view of a window sash frame with the protection of
Fig. 8,

Fig. 10 shows a cross-sectional view of a window sash frame provided with a pin fastened by means of an eccentric,

Fig. 11 shows a view of a seat of the eccentric (of Fig. 9) seen from the side of a sash frame,

Fig. 12 shows a cross sectional view of the eccentric of Fig. 9.

[0021] The drawings present embodiments of a window sash according to the present invention provided with securing elements protecting a window pane from dismounting thereof wherein securing elements are individually located in the vicinity of hinges, and with additional securing elements located at the outside of an area of these hinges.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0022] Embodiment 1. A window sash shown in Figs. 1 and 2 comprise a sash frame, including its side members 1, and a compact window pane 2 comprising two sheets of glass embedded in longitudinal recessed portions 3 of the sash frame side members. The compact pane 2 abuts on a resisting surface of the recessed portion 3 by means of a gasket 4, and is fastened by tight-

ening its rim area by means of tightening bars 5 which are fixed to the sash frame side member by means of fastening screws 6. The top edge of the window pane is embedded and mounted in the top horizontal sash frame side member in an analogous manner although it has not been shown on the drawings. The sash frame side member 1 is connected to a window frame (not shown) by means of a hinge of a known construction. A hinge component 7, fixed to the sash frame side member 1, is anchored to the sash frame side member 1 by a hinge plate 9 and is provided with an arched slider 10 cooperating with an arched guide of the second component of the hinge fixed to a window frame. While opening such a window firstly the arched slider 10 projects out from the guide of the hinge component fixed to a window frame, and when maximum projection of the slider 10 is reached the window sash can be rotated around an axis 11 of the hinge.

[0023] The tightening bar 5 is provided with a longitudinal rib 12 perpendicular to the tightening bar base and ended with a bend oriented toward the pane. The tightening bar 5 is located on an outer surface of the side member 1 of the sash frame in a distance from the outer edge of this member that is equal to the depth of a recess 13 for a hinge component 7 formed in this member of the sash frame, so that the rib 12 of the tightening bar adheres to the hinge plate 9. A number of fastening screws 6 of a tightening bar 5 is chosen taking into account the length of the side member 1 of the sash frame. One of the screws 6 of the tightening bar 5 is located next to the plate 9 of the hinge component 7, wherein the head of the fastening screw 6 is covered by a cover 14 fixed to the plate 9 of the hinge component 7 by means of a screw 15. The cover 14 is of a cuboidal shape and is provided with a threaded opening for the screw 15 and a recess for the head of the fastening screw 6 that it covers. The screw 15 having a circular head with a hexagonal socket passes in openings through the hinge plate 9 and the rib 12 of the tightening bar. Such a construction is as a whole covered by longitudinal covers 16, wherein one of these covers, running from a rotary hinge to the bottom corner of a window, is fixed to the window sash, whereas the second cover running from the hinge to the top corner of the window is fixed to the window frame (not shown). The covers protect against penetration of a space between a window frame and the sash frame by rainwater.

[0024] The screw 15 is arranged in such a manner that in the sash closed position an access to the hexagonal socket in its head is covered by the arched slider 10 of the hinge component 7. In order to gain an access to the socket of the screw 15 head in order to unscrew it out from the cover 14, one needs first to open the window sash projecting the slider 10 out of its hinge guide to the maximum extent and then additionally rotate the window sash around the axis 11 relative to the hinge slider 10.

[0025] Embodiment 2. A window sash shown in Figs. 1 and 3 differs from the window sash according to the Embodiment 1 in that an element covering an access to a fastening screw 7 is in this embodiment directly a screw 15, which passes through the hinge plate 9 and the rib 12 of the tightening bar running in through openings. The screw 15 is fixedly locked inside a threaded opening formed in the plate 17 adhering to a rib 12 of a tightening bar at the opposite side relative to the hinge plate 9. In this embodiment, the covered screw 7 is located precisely over the screw 15.

[0026] The remaining components of the window sash are identical as in Embodiment 1. Operations that are necessary to dismount the screw 15 and subsequently to dismount the pane 2 from the window sash are also identical as in the sash according to Embodiment 1.

[0027] Embodiment 3. Protection of a tightening bar located at the outside of an area of hinges as presented in Figs. 4 and 5 is a supplementary protection in relation to protections employed in Embodiments 1 and 2. A side member 1 of the sash frame with its recess 3 and a compact pane 2 with a gasket 4 embedded in the member as well as a tightening bar are these components of the sash which are located in the area of hinges. A fastening screw 6 of a tightening bar 5 is covered by means of a cover 14 which is identical as the cover in Embodiment 1. The cover 14 is fixed by means of a screw 15 driven in this cover with a clamper 18 situated at the opposite side of a rib 12 of the tightening bar 5.

[0028] The clamper 18 is tightened by means of a catch 19 to the outer surface of the side member 1 of the sash frame. The catch 19 by its biforked hook 20 tightens the outer bent off sections 21 of the clamper 18, and is fixed to the sash frame by means of a screw 22 having cross-shaped recess in its head and embedded in side surface of the side member 1 of the sash frame. In the sash closed position, an access to the screw 22 is covered by the window frame (not shown) and thus it is obtained a protection from dismounting of the catch 19, the clamper 18 and the cover 14, and in a result protection from dismounting the fastening screw 6 of the tightening bar 5.

[0029] The protection according to Embodiment 3 is shown as cooperating with a side member of the sash frame but it may also be employed in the top member of a sash frame in an identical manner.

[0030] Embodiment 4. A protection of a tightening bar located at the outside of an area of hinges as shown in Fig. 6 is a supplementary protection in relation to protections employed in Embodiments 1 and 2. The protection of the tightening bar has a form of a direct catch 23 fixed to the sash frame by means of a screw 22 having cross-shaped recess in its head and embedded in side surface of the side member 1 of the sash frame. The side member 1 of the sash frame with its recess 3 and a compact pane 2 with a gasket 4 embedded in the member as well as a tightening bar 5 are these components of the sash which are located in the area of hinges. The direct catch has a bend 24 abutting an outer surface of the side member 1 of the sash frame and further has a hook 25 catched on a rib 12 of the tightening bar 5 running through the rib and reaching on the outer side to the base of the tight-

ening bar. For enabling the direct catch 23 to pass through the rib 12, the rib is provided on its edge with a cutout (not visible on Fig. 6 in a result of covering by the hook 25) of dimensions matching a cross-section of the hook 25 in the direct catch.

[0031] In the sash closed position, an access to the screw 22 is covered by a window frame (not shown in Fig. 6) with effects identical to the effects resulting from the construction according to Embodiment 3. Furthermore similarly to Embodiment 3, the protection according to this Embodiment 4 may be employed in a side member as well as in a top member of a sash frame.

[0032] Embodiment 5. A window sash shown in Figs. 8 and 9 has a frame with its side members 1 and a component window pane 2 embedded by means of a gasket 4 in longitudinal recessed portions 3 of the sash frame. The sash is also provided with hinges 7 with an arched slider 10 anchored to the window sash frame by means of a plate 9. The assembly of these elements is identical as in Embodiments 1 and 2. The compact pane 2 is mounted in the sash frame by tightening its rim area by tightening bars 26 which are fixed to a side member 1 of the sash frame by means of fastening screws 6. The top edge of the compact pane is embedded and fixed in identical manner in the top member of the sash frame (not shown in the drawings). The tightening bar 26 is provided with a longitudinal rib 12 (as in the preceding Embodiments), and furthermore has a groove 27 forming together with the rib 12 a guide into which a covering strip 28 is inserted covering fastening screws 6 of the tightening bar 26. From the side adhering to the tightening bar 26, the covering strip 28 is provided with a recess 29 in which heads of consecutive fastening screws 6 are located being covered by this covering strip 28 during inserting this strip into the tightening bar 26. On the section of the covering strip 28 located at the hinge 7, the strip is protected from projecting thereof out from the tightening bar 26 by means of a screw 15 having circular head with a hexagon socket and passing through a hinge plate 9 and the rib 12 of the tightening bar running in their through openings. The screw 15 driven in an opening in the covering strip 28 is situated in such a manner that in the sash closed position an access to its hexagon socket in its head is covered by an arched slider 10 of a hinge. In order to make the socket in the head of the screw 15 available, in order to unscrew this screw 15 out from the cover 14, the window sash has to be opened (in a manner according to Embodiment 1) together with a rotation of the window sash about an axis 11, relative to the slider 10 of this hinge.

[0033] Furthermore the covering strip may be blocked by means of a fastener located at the outside of an area of hinges. In such a case a threaded fastener driven in the strip cooperates with a clamper and a catch similarly as in Embodiment 3.

[0034] Embodiment 6. A protection of a tightening bar located at the outside of an area of hinges as shown in Fig. 7 constitutes a supplementary solution in relation to protections according to Embodiments 1, 2 or 5. A tightening bar 5 (it equally applies to a tightening bar 26) has at least one inner rib 30, which is inserted into a longitudinal slot, milled in a side member 1 of the sash frame, from the outer side of a window. The inner rib 30 has a form of a short T-shaped bar, the shelf 31 of which is located on the outer side of a tightening bar and is welded on this bar, whereas its web passes through a longitudinal slot in the tightening bar. The inner rib 30 fixed by means of a wood screw 32 embedded in the side member 1 of the sash frame from this side of the frame which in the sash frame closed position is covered by a window frame (similarly as in Fig. 5).

[0035] Embodiment 7. A window sash frame has a tightening bar 5 (it equally applies to a tightening bar 26), which in particular at its end, is fixed by means of an eccentric joint as shown in Figs. 10, 11 and 12. This connection comprises a pin 33 running through an opening in the tightening bar 5 (or 26) with which cooperates a rotatable eccentric bolt 34 embedded in a circular seat 35 in a side member 1 of the sash frame. The pin 33 near its end has a decreased cross-section forming at the end of the pin a cylindrical circumferential washer face 36, on which are catched working surfaces 37 of the eccentric bolt which is rotatable for connecting or disconnecting by means of a screwdriver introduced into a groove 38 in this bolt. In the sash closed position the seat 35 is covered by a window frame (not shown) thus rotating of the eccentric bolt 37 is possible only in the sash opened position. Eccentric connections are used on the ends of the tightening bar wherein between these eccentric connections the tightening bar is fixed to the sash frame by means of the fastening screws.

[0036] The protection of Embodiment 6 as well as the fastening according to Embodiment 7 may also be employed for a tightening bar located on a horizontal top member of a window sash frame.

Claims

1. A window sash, in particular a roof window sash, comprising a frame, in particular of a wooden construction, and a window pane, in particular a compact window pane comprising at least two sheets of glass, disposed in longitudinal recessed portions of the sash frame members and fixed to the sash frame by means of tightening bars that are fixed to the sash frame by means of fasteners, in particular by means of screws, said window sash apt to be at least pivotally openable around an axis, in particular a horizontal axis located above the middle point of the window sash, on hinge components fixed to the side members of the sash frame at the outside thereof, **characterized in that**, tightening bars (5, 26) of the window pane (2) are protected from being dismounted from the sash in its closed position and the securing members that protect tightening bars (5, 26)

are fixed to the sash frame by means of fasteners (15, 22, 32) that are available for dismounting only at this side of the sash frame that in the sash closed position is covered by other window members and preferably by the window frame.

2. The window sash according to Claim 1, **characterized in that**, said securing members comprise threaded fasteners (6) fixing the tightening bar (5, 26) to the window sash and having heads covered by covers (14, 28) fixed to the window sash members by fasteners, preferably threaded fasteners (15), arranged substantially in parallel relative to the window pane (2) main surface.

3. The window sash according to Claim 1, **characterized in that** it is provided with catching securing members (23, 30) that protect the tightening bars (5, 26) from being dismounted from the sash in its closed position, wherein said catching securing members (23, 30) are fixed to the sash frame by means of fasteners (22, 32) that are available for dismounting only at this side of the sash frame that in the sash closed position is covered by other window members and preferably the window frame.

4. The window sash according to Claim 1, **characterized in that** tightening bars (5, 26) are, at least at their ends, fixed to the sash frame by means of fasteners (33) that are substantially parallel relative to the window pane (2) main surface and are hidden inside the sash frame, wherein elements of these fasteners tightening the tightening bar (5, 26) against a window pane (2) are available for their dismounting only at the side of the sash frame which in the sash closed position is covered by the window frame.

5. The window sash according to Claim 1, **characterized in that** the heads of the fasteners (6) fixing the tightening bar (5) to the sash frame and being arranged in the vicinity of hinge members (7), are covered by short covers (14), preferably comprising not more than two neighbouring fasteners (6), fixed by means of fasteners, preferably threaded fasteners (15), to a plate (9) of a hinge adhering to a side surface of the sash frame, wherein in the sash closed position an access to fasteners (15) fixing covers (14) is covered by other components (10) of this hinge.

6. The window sash according to Claim 2, **characterized in that** the head of the threaded fastener (6) fixing the tightening bar (5) to the sash frame and being arranged in the vicinity of hinge components (7), is covered by a fastener pin, preferably threaded fastener pin (15), passed through an opening in a plate (9) of the hinge, adhering to a side surface of the sash frame, wherein in the sash closed position an access to this fastener is covered by other component of this hinge.

7. The window sash according to Claim 2 or 5 or 6, **characterized in that** the heads of the threaded fasteners (6) fixing the tightening bar (5) to the sash frame and being arranged at the outside of an area of anchoring of side hinges, are covered by means of short covers (14), preferably comprising not more than two neighbouring fasteners, wherein each cover is connected with a clamper (18) tightened to an outer surface of the sash frame, by means of a catch (19) fixed to a surface of the sash frame which in the sash closed position is covered by a window frame.

8. The window sash according to Claim 2 or 5 or 6, **characterized in that** the heads of the threaded fasteners (6) fixing the tightening bar (5) to the sash frame and being arranged at the outside of an area of anchoring of side hinges, are covered by means of uniform covers which are preferably fixed by means of threaded fasteners, in particular screws, to a surface of the sash frame which in the sash closed position is covered by a window frame.

9. The window sash according to Claim 2, **characterized in that** the tightening bar (26) has a form of a structural section having longitudinal guide (12, 27) in which a covering strip (28) that covers the heads of several threaded fasteners (6) fixing a tightening bar (6) to a window sash frame, is inserted, wherein said securing strip is blocked against slipping thereof from a tightening bar by means of a blocking fastener, preferable threaded blocking fastener (15), embedded in the securing strip.

10. The window sash according to Claim 9, **characterized in that** the covering strip (26) arranged on a side member of the sash frame is blocked by means of a threaded fastener (15), embedded on this strip and passed through an opening in a plate (9) of a hinge (7) adhering to a side surface of the sash frame, wherein an access to the blocking fastener (15) for its demounting in the sash closed position is covered by other components (10) of this hinge.

11. The window sash according to Claim 9 or 10, **characterized in that** at the outside of an area of anchoring of side hinges of the sash the blocking fastener of the covering strip is connected with a clamper tightened to an outer surface of the sash frame by means of a catch fixed to a surface of the sash frame which in the sash closed position is covered by a window frame.

12. The window sash according to Claim 3, **characterized in that** the catching securing members of the tightening bar (5, 26) are inner ribs (30) entering into

longitudinal slots in the sash frame, whereas the securing fasteners (32) are passed through the sash frame and through the inner rib (30) of the tightening bar.

13. The window sash according to Claim 12, **characterized in that** said inner ribs (30) of the tightening bar (5, 26) have a T-shaped cross-section, preferable formed by a shelf (31) located at the outside of the tightening bar and a web passing through a longitudinal slot in the bar.

14. The window sash according to Claim 3 or 12 or 13, **characterized in that** the tightening bars (5, 26) of the window pane (2) are secured by means of direct catches (30), preferably by mean of hooked direct catches, fixed to a surface of the sash frame which in the sash closed position is covered by a window frame.

15. The window sash according to Claim 7 or 8 or 11 or 14, **characterized in that** the elements (19, 30) fixed to a surface of the sash frame which in the sash closed position is covered by a window frame, are fastened to the sash frame by means of threaded fasteners, preferably wood screws (20, 32), having heads other than polygonal heads.

16. The window sash according to Claim 4, **characterized in that** the tightening bars (5, 26) are fixed to the sash frame by means of pins (33) arranged perpendicularly relative to the window pane (2) main surface and ended with a washer face (36), preferably a circumferential washer face, with which cooperates a fastening element fixing the tightening bar and tightening this bar to the window pane, embedded in the sash frame and available at this side of the sash frame that in the sash closed position is covered by a window frame.

17. The window sash according to Claim 16, **characterized in that** an eccentric bolt (34) embedded in a circular seat (35) cooperates with an end of said pin.

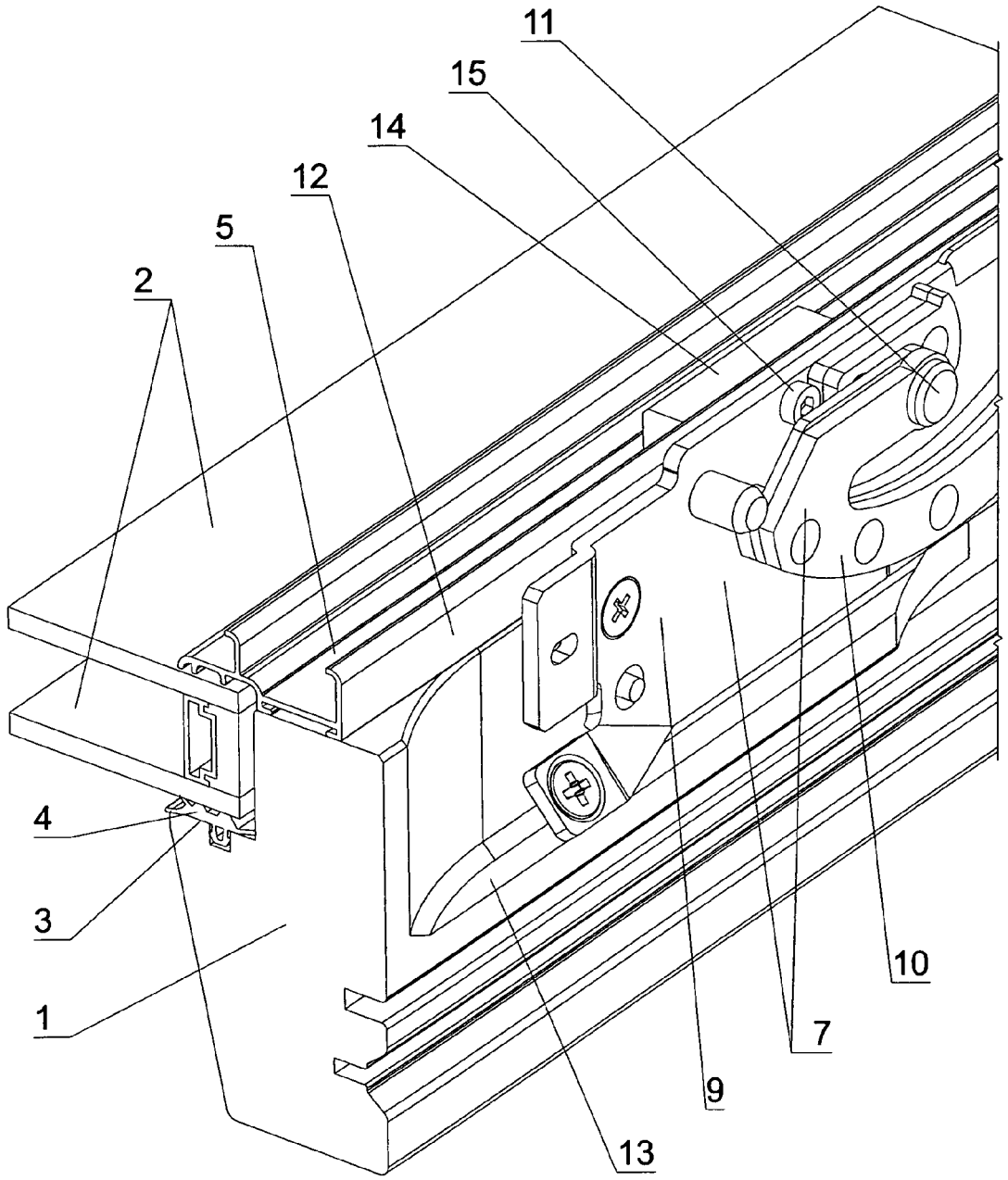

Fig. 1

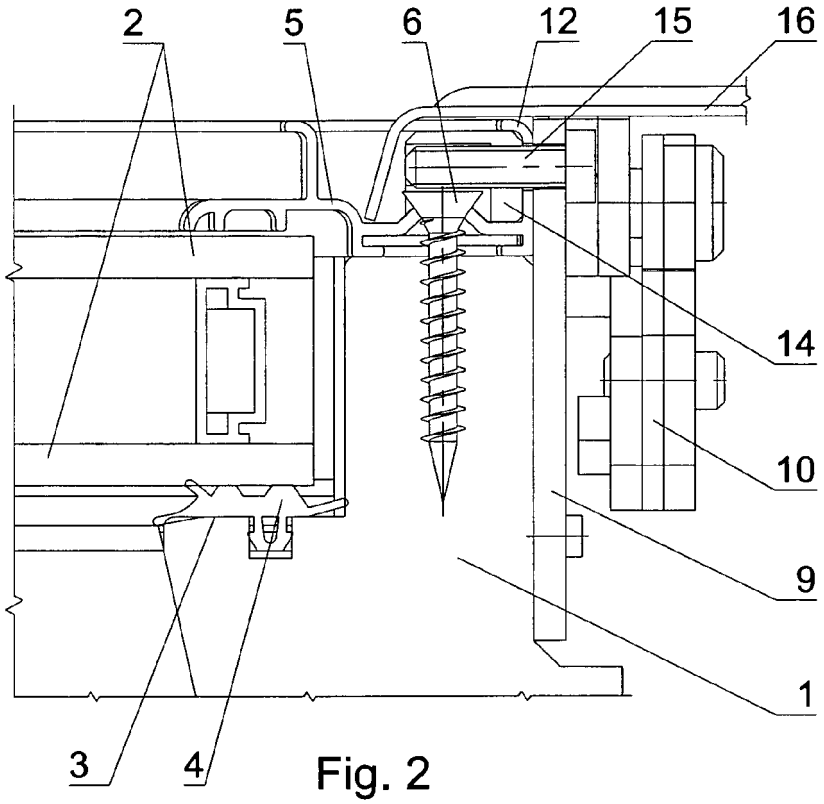

Fig. 2

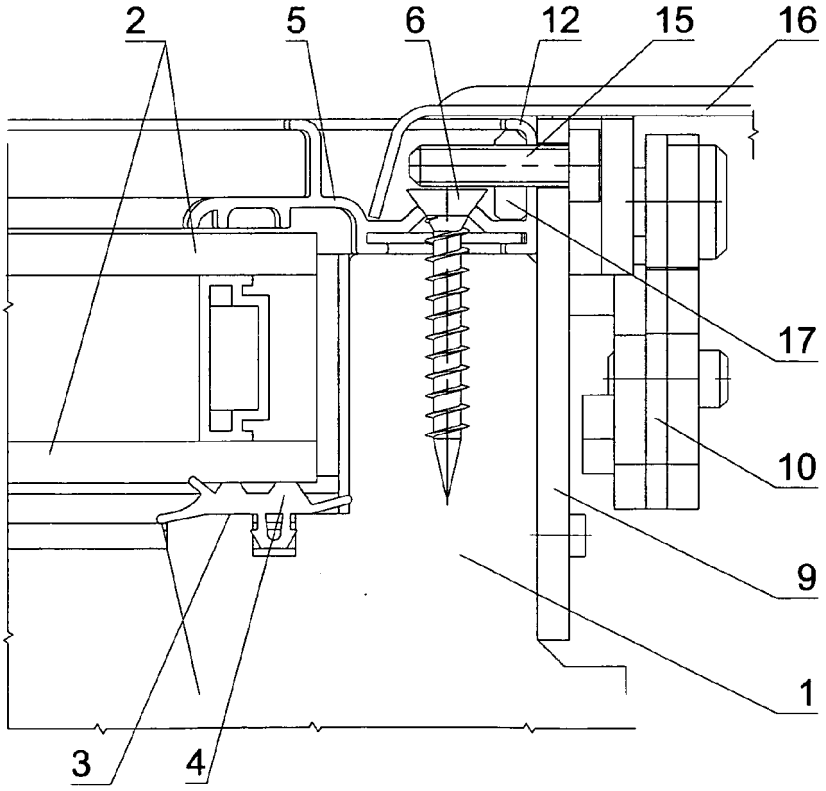

Fig. 3

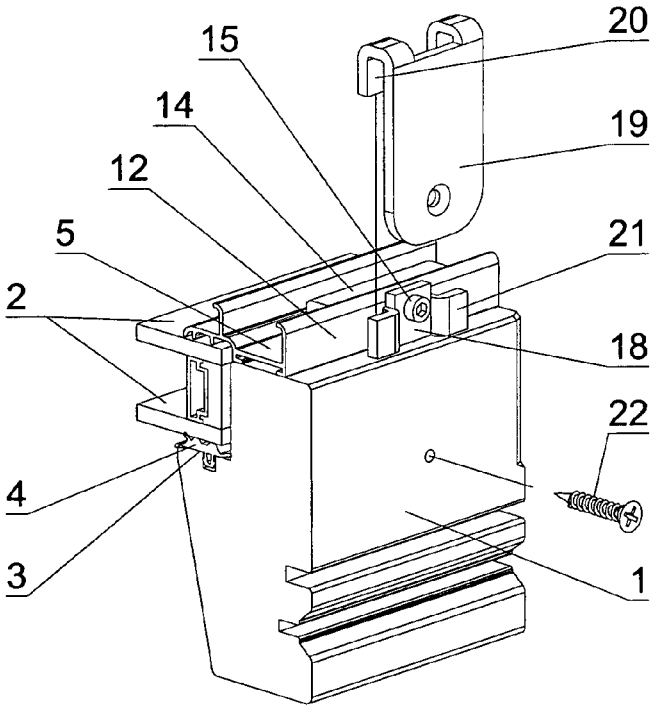

Fig. 4

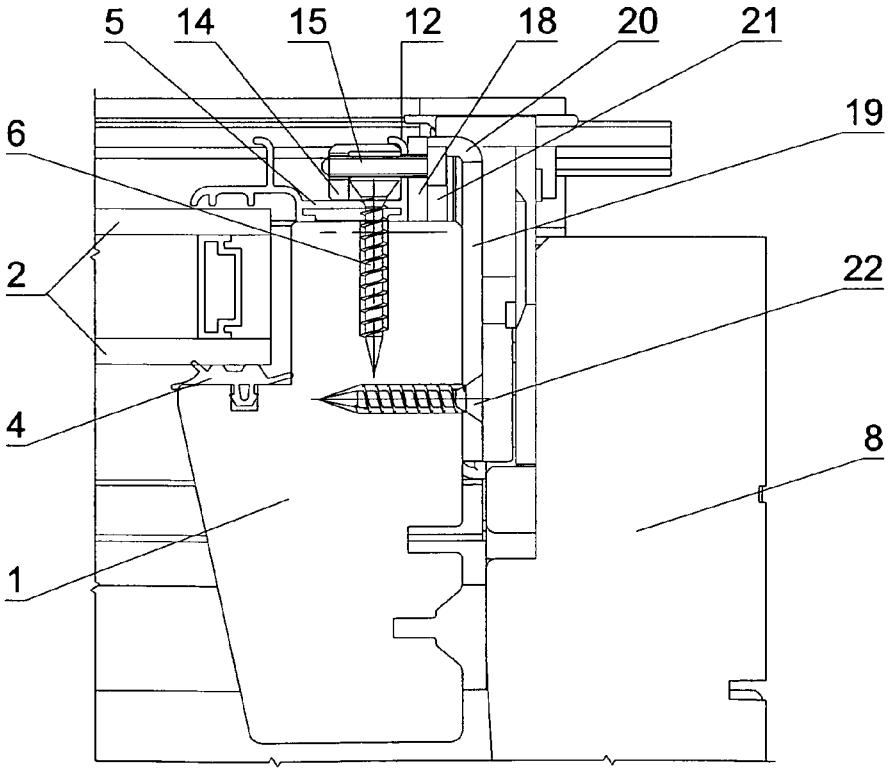

Fig. 5

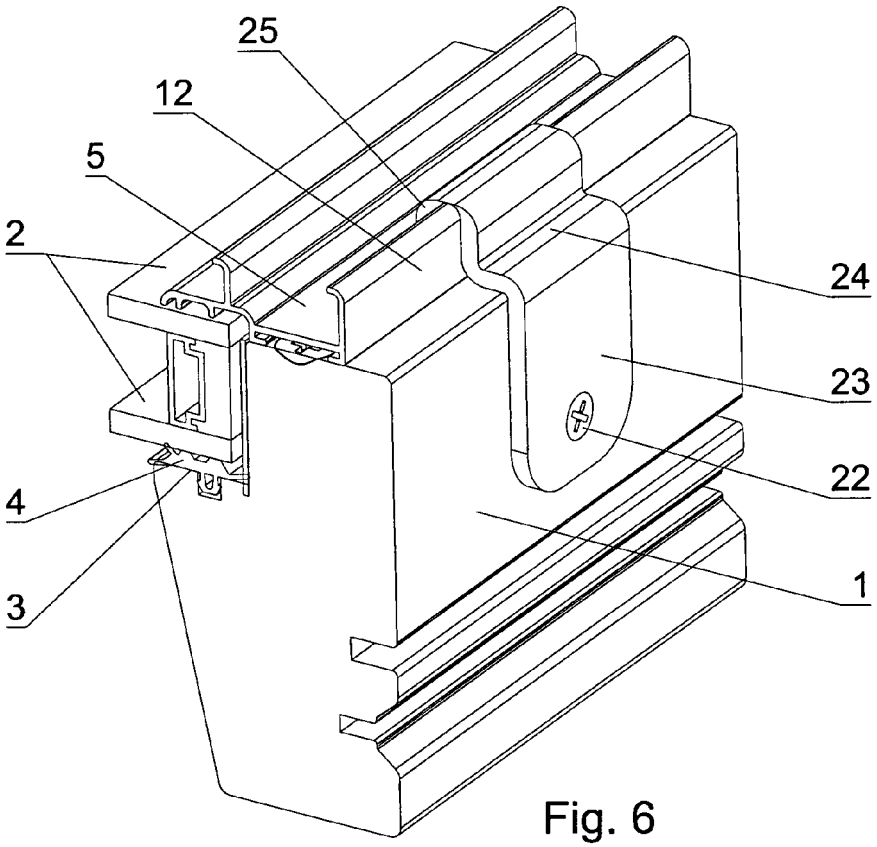

Fig. 6

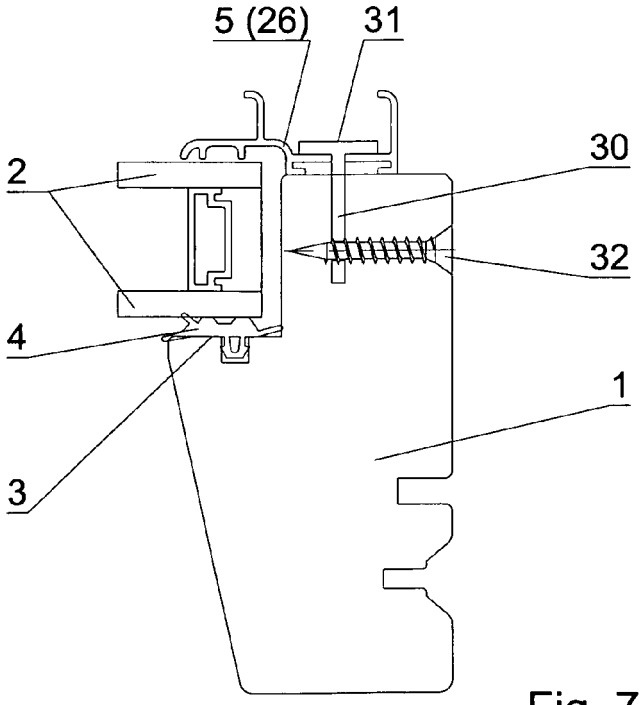

Fig. 7

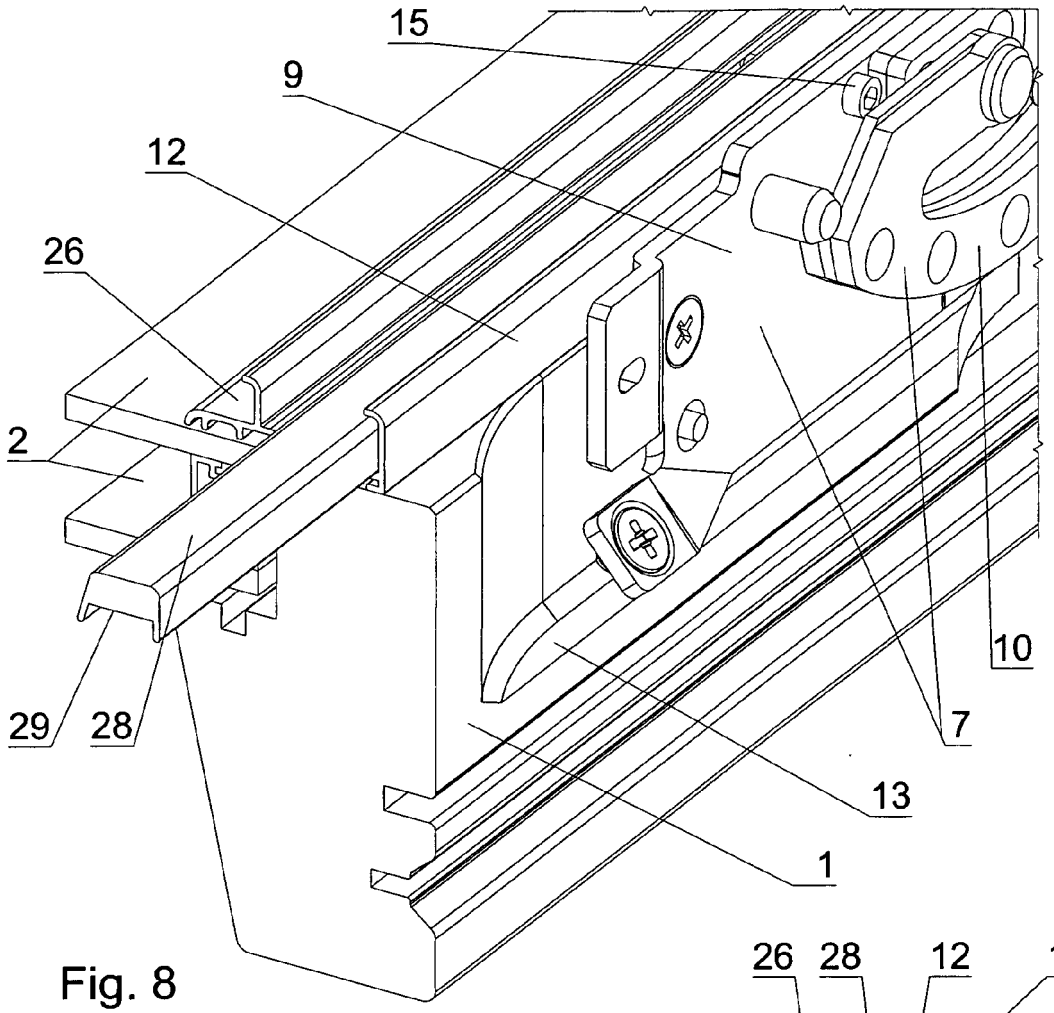

Fig. 8

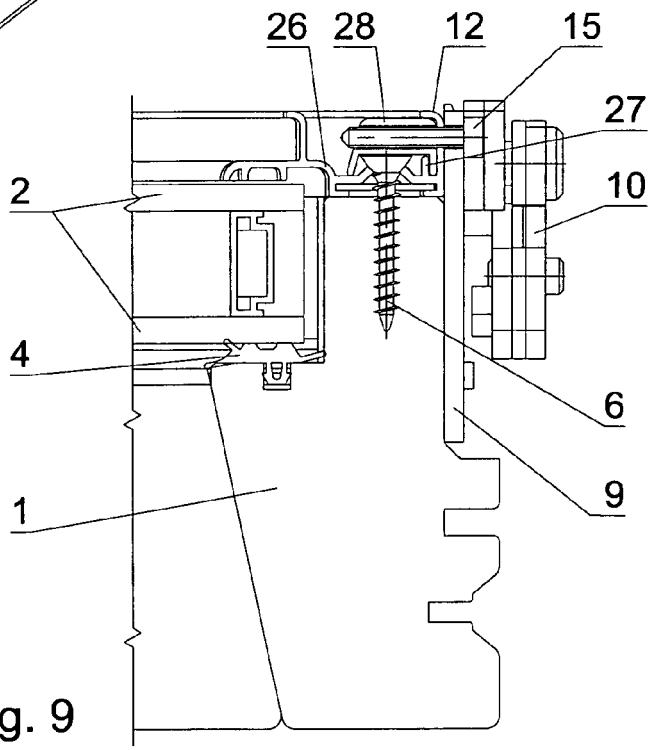

Fig. 9

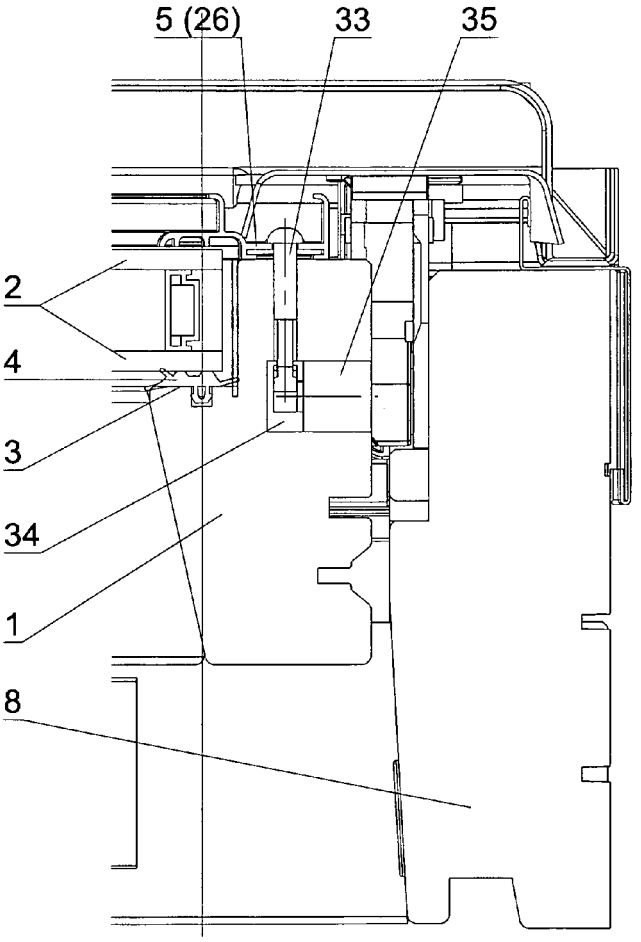

Fig. 10

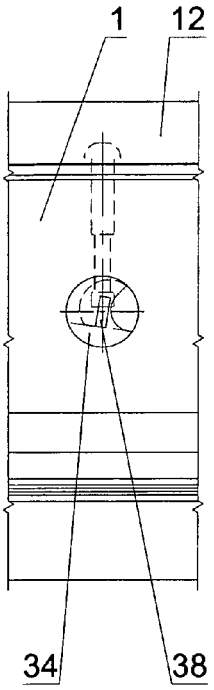

Fig. 11

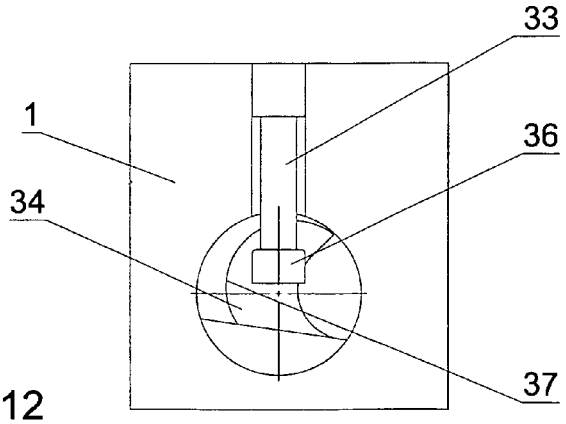

Fig. 12