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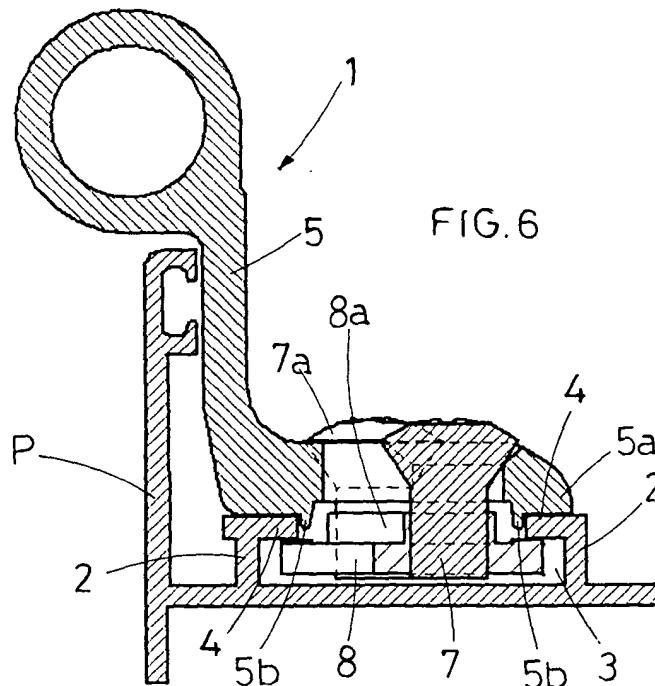
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(54) **Hinge for metal window frames**

(57) The present invention refers to a hinge for metal window frames adapted to be fixed between the two traditional longitudinal ribs that define a longitudinal channel in the metal section because of the co-operation between a flat wing and a special plate that engages with the aforementioned channel; it being provided that the

wing of the hinge is provided with a pair of bean-shaped slots for the insertion of corresponding screws that engage with the threaded holes of the plate, which is firmly fixed inside the metal frame channel following to oscillation caused by the sliding of the two screws into the bean-shaped slots.



Description

[0001] The present patent application for industrial invention refers to a hinge for metal window frames.

[0002] The hinge of the invention falls within a technological environment that has been a field of investigation for companies operating in the specific sector for many years.

[0003] In particular, the purpose of the present invention is to devise a hinge to connect the two uprights of metal window frames; more precisely, the upright of the fixed frame and the upright of the mobile shutter are connected.

[0004] As it is known, the said uprights are made with metal sections whose frontal wall is provided at least with a parallel pair of longitudinal ribs that define a channel with opening bordered by two wings, with opposite orientation, obtained on the free border of the said ribs.

[0005] Corresponding undercuts are formed on the back of the wings and advantageously used to block a hinge element inside the longitudinal channel of the window frame.

[0006] In particular, in order to connect the channel to the upright, the hinge element uses a special plate that engages with the ribs and is blocked on the back of the undercuts, held by suitable fixing screws.

[0007] The two hinge elements, of which one is fixed to the upright of the fixed frame and the other one is fixed to the upright of the mobile shutter, are adapted to co-operate mutually.

[0008] The known technique comprises two different types of hinge that differ in the insertion mode of the fixing plates inside the ribs.

[0009] The first type of hinge makes use of an anchoring plate inserted into one end of the channel used to fix the window frame and brought in the desired position by means of longitudinal sliding, being guided and contained by the ribs that border the said channel.

[0010] The only drawback of this type of hinge consists in the fact that the anchoring plate must be assembled before installing the frame of the window frame.

[0011] To eliminate the said limitation, a second type of hinge has been devised, which is provided with a frontally inserted plate, which is directly inserted in the desired section of the ribs by means of an "external-internal" translation towards the bottom of the ribs.

[0012] In order to permit frontal insertion, the plate must be exactly inserted into the longitudinal opening of the fixing channel.

[0013] Once the plate has been inserted between the ribs that border the opening, the plate must be translated laterally in order to engage (thus being blocked firmly) on the back of one undercut provided in lateral position on the opening.

[0014] The accidental extraction of the plate from the channel bordered by the ribs is prevented by the insertion of a suitably-shaped appendix on the back of the opposite undercut on the longitudinal border of the wing

of the hinge element. A hinge of this type is devised in the Italian patent application BO91A000070 filed on 12 March 1991. This type of frontally inserted hinge requires compliance with strict dimensional tolerance values and perfectly shaped components, in order to place the plate with the shaped appendix inside the fixing channel and fit them inside the corresponding undercuts.

[0015] The fixing screws of the plate must be inserted through suitably-shaped slots to cause the gradual translation of the plate under the undercuts because of interference of suitable matching means.

[0016] The purpose of the present invention is to devise a new model of frontally inserted hinge for window frames, characterized by simple, and therefore inexpensive, structural configuration and easy fast installation and fixing.

[0017] Both in the male version, that is to say with pin, and female version, that is to say with housing for the pin, the hinge of the invention comprises an L-shaped body, in which the wing to be fixed to the metal section is basically flat and suitably dimensioned in order to rest on the borders of the ribs that laterally border the longitudinal channel in which the plate is inserted to fix the hinge to the support upright.

[0018] It must be noted that the hinge of the invention uses a simple metal plug with basically rectangular shape and lower width than the channel as fixing plate, which is easily and rapidly inserted in the channel in frontal flat position.

[0019] The plug is interconnected with the flat wing by means of two screws that engage within two corresponding holes at the two ends of the plug in diagonally opposite position.

[0020] The screws are inserted into corresponding slots on the flat wing shaped like a "bean" in order to allow a small oscillation of the plate, which permits the plate to penetrate with the borders under the undercuts on the lateral sides that border the longitudinal channel where the plug is engaged.

[0021] Once the plug has been inserted in flat position between the borders and once it has been aligned with the borders, the screws slide inside the bean-shaped slots to bring the plate in edgewise tilted position with respect to the bean-shaped slot to prevent accidental extraction from the channel, where it is firmly fitted by tightening the screws.

[0022] For major clarity the description of the hinge according to the present invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting sense, whereby:

- Fig. 1 is an axonometric view of the hinge of the invention in female version, that is to say provided with a housing for the pin and designed to be fixed on the shutter upright.
- Figs. 2 and 3 illustrate two subsequent operations

for the positioning and fixing of the hinge of Fig. 1 to the shutter upright.

- Figs. 4 and 5 illustrate the different position of the fixing plate of the hinge with respect to the shutter upright during the positioning of the hinge on the upright and the subsequent fixing of the hinge to the upright, respectively.
- Fig. 6 is a cross-sectional view of Fig. 3 with plane VI-VI.

[0023] With reference to the aforementioned figures, the hinge (1) of the invention is designed to be fitted on metal window frames, with frame formed of sections (P) with at least a parallel pair of longitudinal ribs (2) on the frontal wall that define a channel (3) with opening bordered by two wings (4) in opposite position on the free border of the ribs (2).

[0024] Corresponding undercuts are formed on the back of the wings (4) and advantageously used to block a hinge element inside the longitudinal channel (3) of the window frame.

[0025] The hinge (1) of the invention has an L-shaped body (5) where the wing (5a) to be fixed to the metal section (P) is basically situated in flat position and dimensioned in such a way that it can simply rest above the two wings (4).

[0026] To prevent the wing (5a) from sliding freely diagonally over the wings (4), the internal side of the wing (5a) is provided with a parallel pair of thin ribs (5b) adapted to be exactly inserted inside the opening of the channel (3).

[0027] In other words, it can be said that the thin ribs (5b) are designed to exactly centre and guide the longitudinal positioning of the wing (5a) along the channel (3). The wing (5a) is provided with a pair of bean-shaped slots (6) with opposite concave side; in particular, the slots (6) end from opposite sides with a circular housing (6a) adapted to house the head (7a) of ordinary tightening screws (7), whose stems engage with corresponding threaded holes (8a) in diagonally opposite position at the two ends of the plug (8) used to fix the hinge (1) to the section (P).

[0028] The plug (8) consists in a basically rectangular plate with two diagonally opposite corners cut in such a way as to create an opposite parallel pair of rectilinear borders (8b) in tilted position with respect to the longitudinal symmetrical axis of the plate (8).

[0029] According to the preferred embodiment of the plate (8), the tilted borders (8b) have a superficially serrated profile to guarantee anti-slip properties.

[0030] As illustrated in Figs. 2 and 4, when the hinge (1) is positioned above the channel (3) to engage the plug (8), the plug (8) is perfectly aligned with the longitudinal sides (8c) with the two ribs (2) that border the channel (3); in this condition the head (7a) of the screws (7) is positioned at the opposite end of the slot (6) with respect to the hollow housing (6a).

[0031] When the screws (7) slide inside the slots (6),

the plug (8) is dragged into oscillation and is placed in tilted edgewise position, in which the serrated borders (8c) are aligned and engaged against the ribs (2) and under the wings (4), as illustrated in Figs. 3 and 5.

[0032] When the screws (7) are tightened, the wing (5a) is compressed above the wings (4) of the section, and the plug (8) engages with the serrated borders (8c) under with wings (4).

[0033] Attention is drawn to the dual function of the circular housing (6a) situated at one end of the two bean-shaped slots (6) and provided with truncated-conical profile that corresponds to the head (7a) of the screws (7).

[0034] The first function is to favor self-centering of the screws (7) during tightening, forcing the screws (7) to slide towards the bottom of the slot (6) in order to give the maximum correct inclination to the plate (8).

[0035] The second function is to prevent the screws (7) from sliding freely along the slots (6) away from the correct position in case of slight accidental loosening of the screws (7).

[0036] It must be noted that the hinge of the invention is highly reliable, being provided with two fastening and fixing points to the section (P) that coincide with the two serrated borders (8b) of each plate (8). In view of the above, the accidental loosening or breakage of one screw (7) does not cause immediate detachment of the hinge, which is held firmly by the other screw (7).

Claims

1. Hinge for metal window frames of the type consisting in sections (P) whose frontal wall is provided at least with a parallel pair of longitudinal ribs (2) that define a channel (3) with opening bordered by two wings (4) with opposite orientation, obtained on the free border of the ribs (2), hinge (1) being **characterized in that** it has an L-shaped body (5) in which the wing (5a) to be fixed to the metal section (P) is basically flat and provided with a pair of bean-shaped slots (6) with opposite concave side that house tightening screws (7) whose stems engage with corresponding threaded holes (8a) in diagonally opposite position at the two ends of a plug (8) consisting in a basically rectangular plate with two diagonally opposite corners cut in such a way as to create an opposite parallel pair of rectilinear borders (8b) in tilted position with respect to the longitudinal symmetrical axis of the plate (8) with lower width than the channel (3).
2. Hinge as defined in claim 1, **characterized in that** the borders (8b) have a superficially serrated profile.
3. Hinge as defined in one or more of above claims, **characterized in that** the slots (6) end at opposite

sides with a circular housing (6a) adapted to house the head (7a) of the tightening screws (7).

4. Hinge as defined in one or more of above claims, **characterized in that** the internal side of the wing (5a) has a parallel pair of thin ribs (5b) adapted to exactly engage with the opening of the channel (3).

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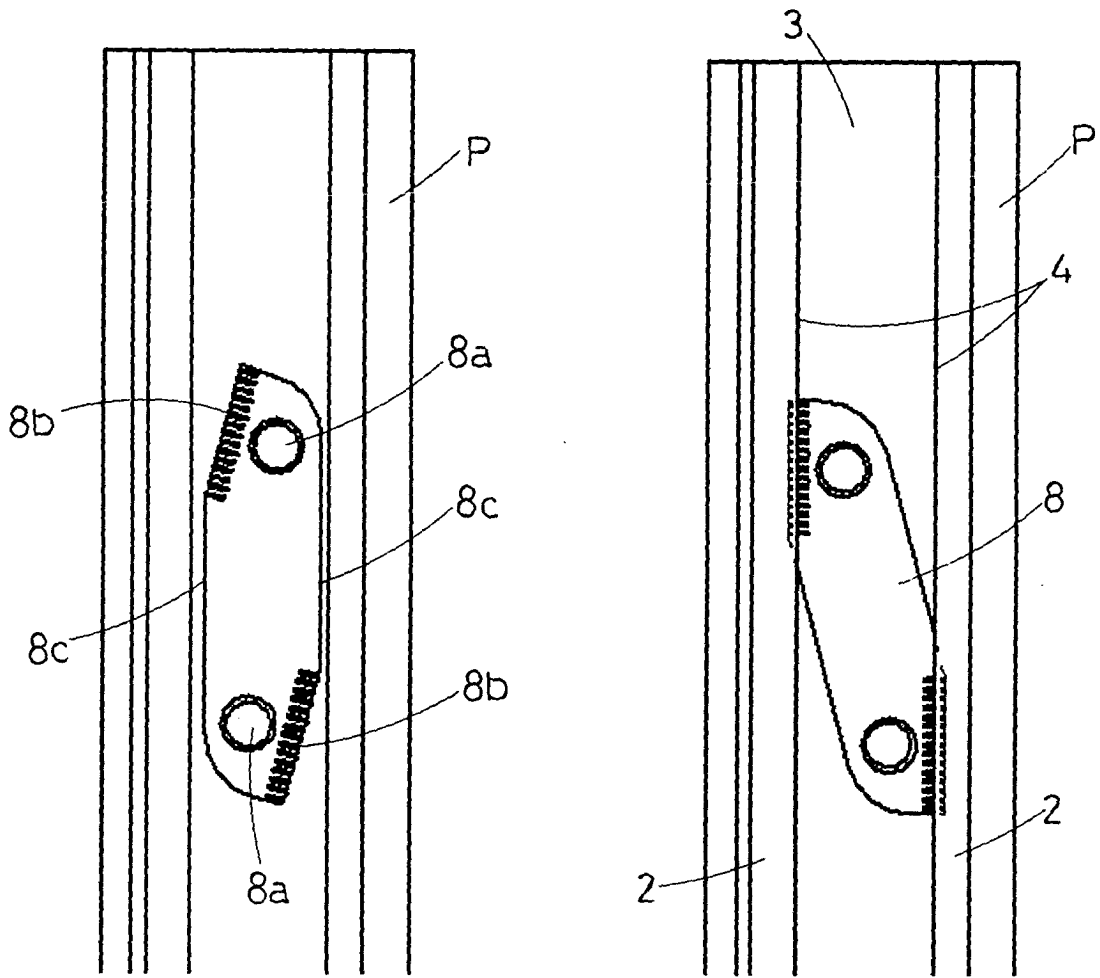


FIG. 4

FIG. 5

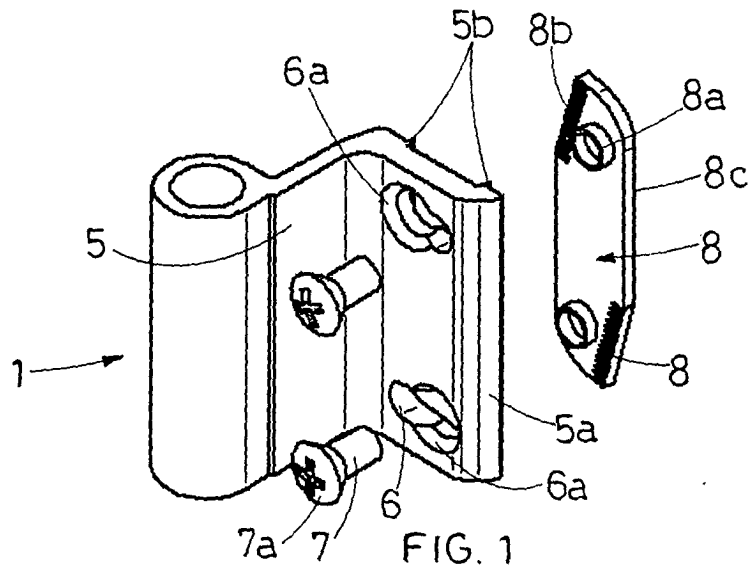


FIG. 1

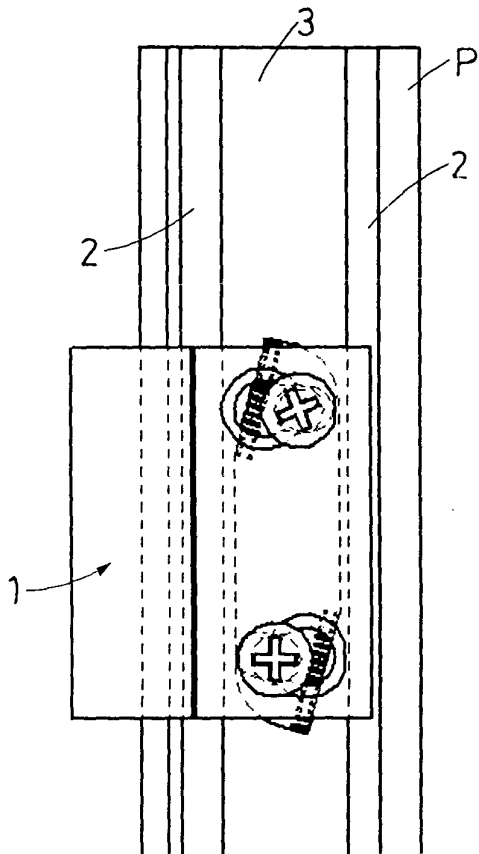


FIG. 2

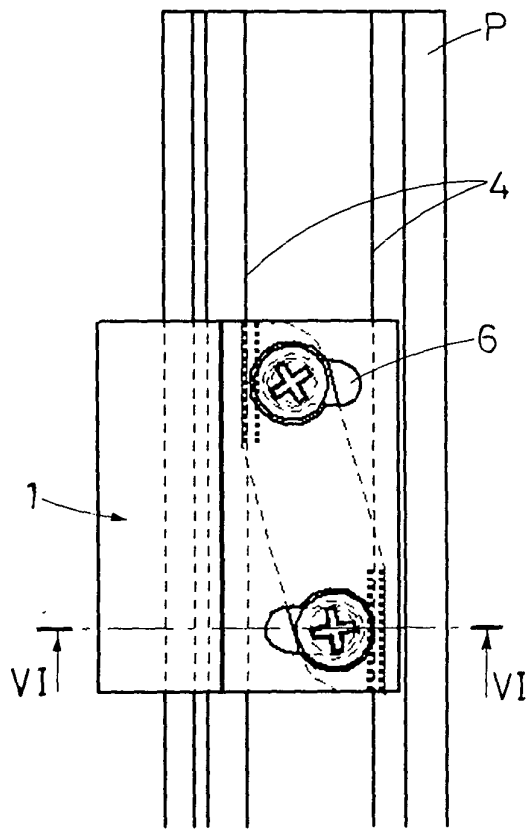


FIG. 3

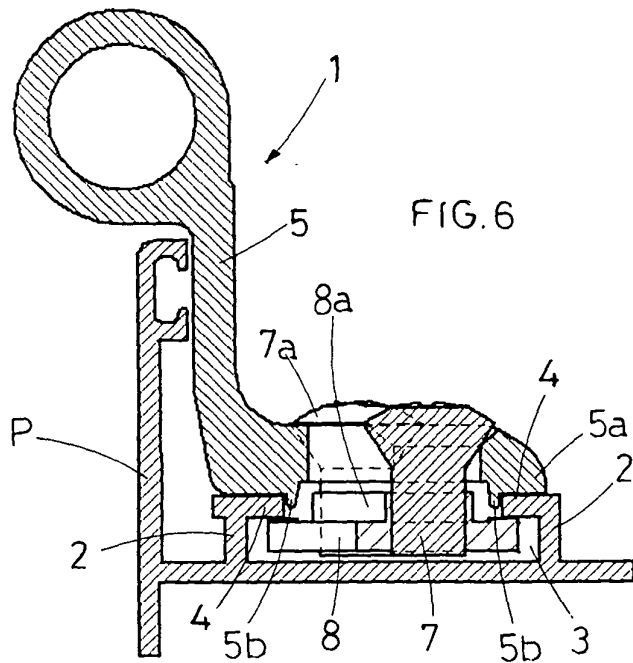


FIG. 6