

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 December 2007 (06.12.2007)

PCT

(10) International Publication Number
WO 2007/139410 A2

(51) International Patent Classification: **Not classified**

(21) International Application Number:
PCT/PL2007/000033

(22) International Filing Date: 29 May 2007 (29.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
P379798 29 May 2006 (29.05.2006) PL

(71) Applicant (for all designated States except US): **FAKRO
PP SPOLKA Z.O.O.** [PL/PL]; ul. Wegierska 144a,
PL-33-300 Nowy Sacz (PL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **SWIERK, Piotr**
[PL/PL]; ul. Krakowska 28, PL-37-730 Mszana Dolna
(PL).

(74) Agent: **KACPERSKI, Andrzej**; P.O. Box 822,
PL-30-960 Krakow 1 (PL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

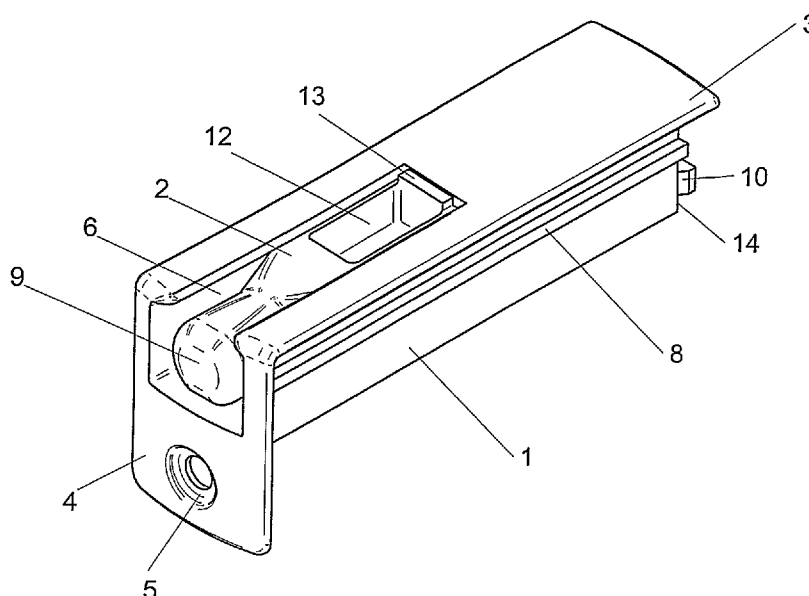
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SLIP BOLT, ESPECIALLY FOR ROTATING ROOF WINDOWS MADE OF MULTI-CHAMBER ELEMENTS



(57) Abstract: The slip bolt, especially for rotating roof windows made of multi-chamber elements, consists of a guide (1) in form of a short sleeve, advantageously with a rectangular cross-section, and a locking element (2) sliding in it within a limited range, having a stopping end-piece (9). The slip bolt is provided with braking and catching elements (10), which prevent self-acting sliding of the locking element. The guide (1) has a longitudinal abutment flange (3) and a transversal abutment flange (4), and the side walls of the guide (1) are fitted with fixing elements (8) arranged below the longitudinal flange (3), which together with the longitudinal flanges (3) and the transversal flange (4) provide stable location of the slip bolt in a multi-chamber window sash frame.

WO 2007/139410 A2

**Slip bolt, especially for rotating roof windows
made of multi-chamber elements**

The subject of the invention is a slip bolt, especially for rotating roof windows made of multi-chamber elements, fixing in the window frame the window sash raised by about 150°.

There is a known slip bolt applied in wooden VELUX roof windows. This slip bolt consists of a guide and a locking element sliding in it. The guide has the form of a much elongated metal tube with a rectangular cross section. At one end of the guide, in its upper wall, is a crosswise stamped recess at the side of which is a rectangular hole the width of which is equal to the width of the wall and the length close to half of the length of the guide. At the opposite end of the guide, in its upper wall, is an oval opening. In the bottom wall of the guide, close to its both ends, there are two circular holes for the fixing screws; these holes are accessible through the upper wall, by the rectangular and the oval hole respectively.

The locking element consists of a square rod made of plastics, which at one end is fitted with an elastic fastener and an operating element consisting of a pin serving to slide the locking element, while at the opposite end it has a locking end-piece. The fastener operates in conjunction with the crosswise stamped recess in the guide, and the locking end-piece, upon sliding it out of the guide, fits into a corresponding hole in the window frame.

The locking element is sliding in the guide so, that the pin protrudes out of the rectangular opening in the upper wall of the guide, which limits the travel of the pin and by the same the range of the stroke of the locking element. When the pin finds itself at the edge of the rectangular hole close to the stamped recess, then the locking end-piece is inside the guide and the catch is in the stamped recess, preventing free movement of the locking element. When the pin is being moved to the opposite edge of the hole in the guide,

then the catch is outside the stamped recess and the locking end-piece protrudes out of the guide.

The slip bolt is being set into the upper corners of the window frame in a special recess. Upon turning the window by about 150°, the locking end-piece protruding out of the guide enters into a hole in the side element of the window frame, locking the window sash in respect to the window frame.

The slip bolt described above is being applied in wooden windows, in which it is possible to machine an adequately long recess constituting a support for the slip bolt, and is being fixed by screws to bottom of the recess.

The construction of the slip bolt, its required strength, and also the way of its fitting and fixing in the frame of the sash determine its length. Such a slip bolt is not proper, e.g., for windows made of multi-chamber sections, in which there are no supporting surfaces for the bottom wall of the slip bolt, required also to fix it with screws. Cutting such a long recess in the external surface of a multi-chamber element of a sash frame would also disadvantageously affect the strength of the frame and would be conducive to deformation of its elements.

The slip bolt according the invention consists of a guide in form of a short sleeve, advantageously of rectangular cross-section, and of locking element sliding in it within a short stroke. The slip bolt is provided with braking and snapping elements, which prevent spontaneous shifting of the locking element.

The guide, with a longitudinal cut-out in the upper wall, has a longitudinal abutment flange, advantageously arranged in the plane of the upper wall, which protrudes outside the side walls at both sides of the guide and on one end of it, while at the opposite end of the guide there is a transversal abutment flange, integral with side walls and the bottom wall of the guide.

The side walls of the guide are provided with fixing elements located below the longitudinal flange, which together with the longitudinal flange provide stable fitting of the slip bolt in the external wall of the multi-chamber element of the sash window frame.

The locking element has in its cross-section the shape and dimensions representing the inner cross-section of the guide and is provided at one end with a locking end-piece, while at its upper wall has an operating element serving to shift it.

The locking element is sliding in the guide, so that the operating element fits into the longitudinal cut-out in the upper wall of the guide, and the locking end-piece is pointing in the direction of the transverse flange.

The slip bolt according to the invention is depicted in examples of execution in the drawing, in which Fig. 1, 2, 6, and 7 show the guide and the locking element in two versions of execution, Fig. 3, 4, 8, and 9 show the top view and the bottom view in both versions of execution, and Fig. 5, and 10 show the assembly of the slip bolt in the window sash frame made of multi-chamber elements.

Example I

The slip bolt consists of the guide 1 and the locking element 2, sliding in the guide 1.

The guide 1 has the form of a short sleeve with rectangular cross section, the upper wall of which is longer than the other walls and wider than the bottom wall, so that it protrudes on both sides outside the side walls and on one end of the guide 1, constituting the longitudinal abutment flange 3. At the other end of the guide 1 there is the transversal abutment flange 4, which is integral with the side walls and the bottom wall of the guide 1 and the longitudinal flange 3, to which it is perpendicular. The transversal abutment

flange 4, in its part connected with the bottom flange of the guide 1, has a hole 5 for the for the fixing screw.

In the upper wall of the guide 1 there is a rectangular longitudinal cut-out 6, the length of which is about half the length of the guide 1 and the width less than the distance between the inner surfaces of the side walls, which is on one end open at the side of the transversal abutment flange 4. On the opposite end of the guide 1, in the w bottom wall, there is a longitudinal cut-out 7, which is a mirror reflection of the cut-out 6. Along the external surfaces of the side walls of the guide 1, below the longitudinal abutment flange 3, are located the longitudinal guiding and fixing strips 8.

The locking element 2 is a rectangular rod the external dimensions of which correspond to the internal dimensions of the guide 1, having on end the stopping end-piece 9, and on the other end two catches 10 and the end-stop 11 located between the catches 10, which are springing and are arranged along the back edge of the bottom wall. In the central part of the upper surface of the locking element 2, there is the operating element consisting of the recess 12 with the stop 13 at that transverse edge of the recess 12, which is closer to the stop 11.

The locking element 2 is being lengthwise inserted into the guide 1 from the side of the transversal abutment flange 4, upon elastic flexing of the catches 10 and the end-stop 11. The stopping end-piece 9 is facing towards the transverse abutment flange 4, the recess 12 is accessible through the cut-out 6 in the upper wall of the guide 1, and the end-stop 11 is located in the cut-out 7 in the bottom wall of the guide 1. The catches 10 operate in conjunction with the inner surfaces of the side walls of the guide 1 and their edges 14.

The shifting range of the locking element 2 towards the transverse abutment flange 4 is limited by the length of the cut-out 7 and the end-stop 11, while in

the opposite direction it is limited by the length of the cut-out 6 and the recess 12 with the stop 13.

The slip bolt is being located in the edge recess of the upper multi-chamber element of the frame of the window sash. The slip bolt is inserted so that edge of the recess in the external wall of the window sash frame slides between the longitudinal abutment flange 3 and the longitudinal guiding and fixing strips 8 of the guide 1, until the transverse abutment flange 4 rests on the wall of the side element of the frame. The longitudinal abutment flange 3 and the longitudinal guiding and fixing strips 8 stabilize the position of the locking bolt in respect of the external surface of the frame. Screwing down the transverse abutment flange 4 through the fixing screw hole 5 secures the slip bolt from sliding out of the recess in the sash frame.

When the end-stop 13 rests on the transverse edge of the cut-out 6, the stopping end-piece 9 is located inside the guide 1, and the two catches 10 resiliently deflect out sidewise and catch the edges 14 of the side walls guide 1, preventing spontaneous outward movement of the locking element 2. The window sash can be rotated freely in the window frame.

In order to stop the window sash turned about 150° one has to shift the recess 12 towards the transverse abutment flange 4. The end-stop 11 comes up to the transverse edge of the cut-out 7 in the bottom wall of the guide 1, the catches 10 slide on the edge 14 of the side walls of the guide 1, and the stopping end-piece 9 protrudes out of the guide 1, entering into the hole in the side element of the window frame. The window sash is then fully stopped.

Example II

The slip bolt consists of the guide 1 and the locking element 2, sliding in the guide 1.

The guide 1 has the form of a short sleeve with a rectangular cross section, the upper wall of which is longer than the other walls and wider than the bottom wall, so that it protrudes on both sides outside the side walls and on one end of the guide 1, forming the longitudinal abutment flange 3. At the other end of the guide 1 there is the transverse abutment flange 4, which is integral with the side walls and the bottom wall of the guide 1, and the longitudinal flange 3, to which it is perpendicular. The transversal abutment flange 4, in its part connected with the bottom flange of the guide 1, has a hole 5 for the for a fixing screw.

In the upper wall of the guide 1 there is a rectangular longitudinal cut-out 6, the length of which is about half the length of the guide 1 and the width less than the distance between the inner surfaces of the side walls, which is on one end open at the side of the transversal abutment flange 4. On the opposite end of the guide 1, at the prolongation of the side walls, slightly below the longitudinal flange 3, are located the fixing elements 8, and in the bottom wall there is a longitudinal cut-out 7, which mirrors the cut-out 6.

The locking element 2 is a rectangular rod the external dimensions of which correspond to the internal dimensions of the guide 1, having on one end the stopping end-piece 9 and on the other end two catches 10 and the end-stop 11 between the catches 10, which are springing and are arranged at the back of the bottom wall. In the central part of the upper surface of the locking element 2, there is an operating element consisting of the boss 12.

The locking element 2 is being inserted lengthwise into the guide 1 from the side of the transversal abutment flange 4, upon having deflected the catches 10 and the end-stop 11. The stopping end-piece 9 faces the transverse abutment flange 4, the boss 12 is being slid into the cut-out 6 in the upper wall of the guide 1, and the end-stop 11 into the cut-out 7 in the bottom wall of the guide 1. The catches 10 operate in conjunction with the inner surfaces of the guide 1 and their edges 14.

The sliding range of the locking element 2 in direction of the transverse abutment flange 4 is limited by the length of the cut-out 7 and the end-stop 11, and in the opposite direction by the length of the cut-out 6 and the boss 12.

The slip bolt is being located in the edge recess of the upper multi-chamber element of the frame of the window sash. The longitudinal abutment flange 3 constitutes the resting surface which slides along the cut-out on the external surface of the frame of the sash, until the fixing strips 8 of the guide 1 get under the transverse edge of the cut-out in frame of the sash, fixing the locking bolt from that side, and at the same time the transverse abutment flange 4 rests on the wall of the side element of the sash. Screwing down the transverse abutment flange 4, through the fixing screw hole 5, secures the slip bolt from sliding out of the recess in the sash frame.

When the boss 12 is most distant from the transverse abutment flange 4, the stopping end-piece 9 is inside the guide 1, and the two catches 10 spring aside and catch the edges 14 of the side walls of the guide 1, preventing spontaneous shifting of the locking element 2. The window sash can be rotated freely in the window frame.

In order to stop the turned window sash one has to slide the boss 12 towards the transverse abutment flange 4. The end-stop 11 comes up to the transverse edge of the cut-out 7 in the bottom wall of the guide 1, the catches 10 slide on the edge 14 of the side walls of the guide 1, and the stopping end-piece 9 protrudes out of the z guide 1, entering into the hole in the side element of the window frame. The window sash is then fully stopped.

Patent claims

1. Slip bolt, especially for rotating roof windows made of multi-chamber elements, consisting of a guide and a locking element fitted inside it having a limited sliding range, which is protected against spontaneous coming out of its blocking end-piece from the guide, **characterized in that** the guide /1/ has a longitudinal abutment flange /3/, advantageously lying in the plane of the upper wall, and the side walls of the guide /1/ are fitted with fixing elements /8/.
2. Slip bolt according to claim 1, **characterized in that** at the end of the guide /1/ out of which the stopping end-piece /9/ of the locking element /2/ slides out, has a transversal abutment flange /4/ connected with the side walls and the bottom wall of the guide /1/ and the longitudinal flange /3/.
3. Slip bolt according to claim 2, **characterized in that** the transversal abutment flange /4/, in its part connected with the bottom part of the guide /1/, has a hole /5/.
4. Slip bolt according to claim 1, **characterized in that** the along the external surfaces of the side walls of the guide /1/, below the longitudinal flange /3/, are arranged the guiding and fixing strips /8/.
5. Slip bolt according to claim 1, **characterized in that** on the extension of the side walls of the guide /1/, below the longitudinal flange /3/, at the end opposite to the end out which the stopping end-piece /9/ slides out, are arranged the fixing elements /8/.

6. Slip bolt according to claim 1, **characterized in that** the locking element /2/ in its upper wall has an operating element in form of a recess /12/, which is accessible through the cut-out in the upper wall of the guide /1/.
7. Slip bolt according to claim 1, **characterized in that** the locking element /2/ in the upper wall has an operating element in form of a boss /12/, which operates in conjunction with the cut-out /6/ in the upper wall of the guide /1/.
8. Slip bolt according to claim 1 **characterized in that** the locking element /2/ has elastic catches /10/ connected with the back wall, which operate in conjunction with the inner surfaces of the side walls of the guide /1/ and their transverse edges /14/.
9. Slip bolt according to claim 1, or 2, or 3, or 4, or 5, or 6, or 7, or 8 **characterized in that** the guide /1/ has a longitudinal cut-out /6/ in its upper wall the length of which is close to half the length of the guide /1/ and the width is smaller than the spacing between the inner surfaces of the side walls, which cut-out is open on one side at the end from which the stopping end-piece /9/ is sliding out, and a longitudinal cut-out /7/ in the bottom wall of the guide /1/, advantageously being a mirror reflection of the cut-out /6/, which is open on one side at the opposite end of the guide /1/, and the locking element /2/ has on one end the stopping end-piece /9/ and at the other end the end-stop /11/, which operates in conjunction with the cut-out /7/ in the bottom wall of the guide /1/, and in the central part of the upper wall of the locking element /2/ there is the operating element /12/, which operates in conjunction with the cut-out /6/ in the upper wall of the guide /1/.

1/6

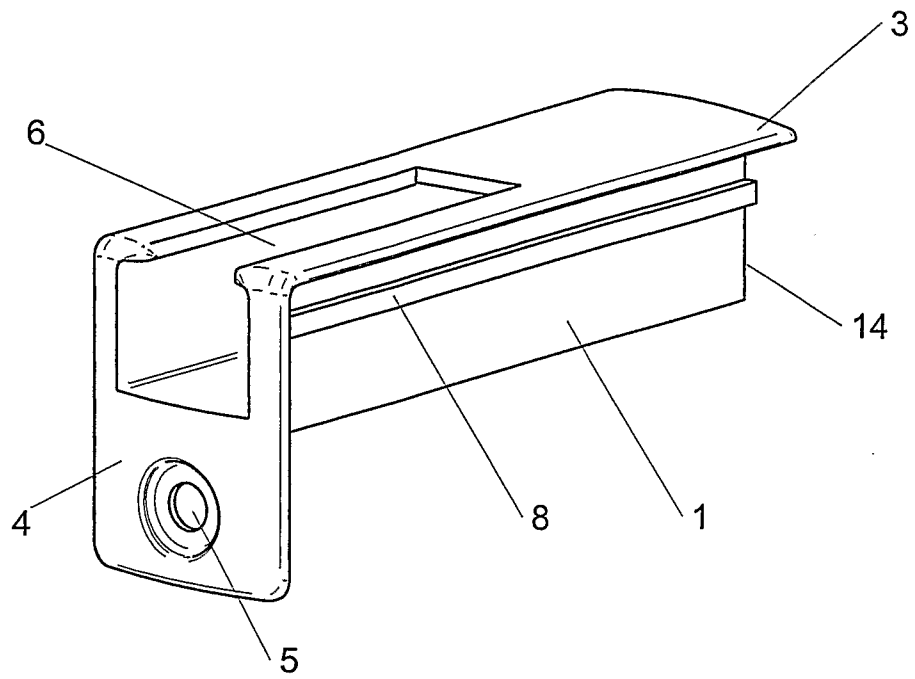


Fig. 1

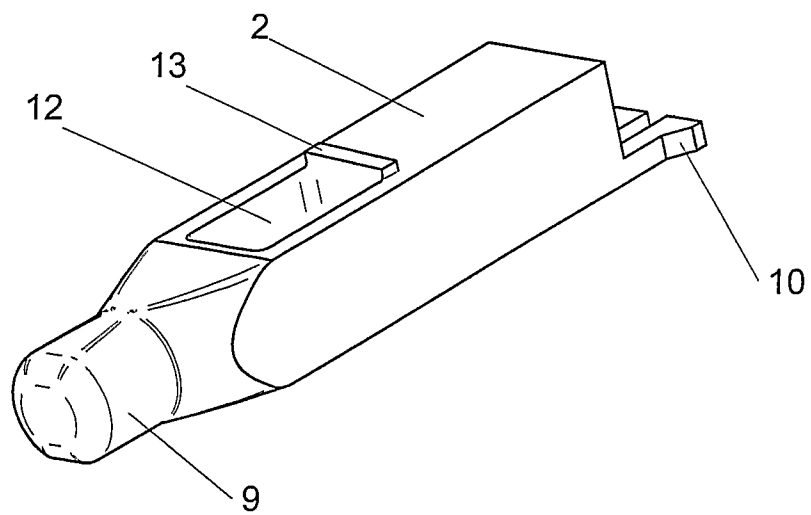


Fig. 2

2/6

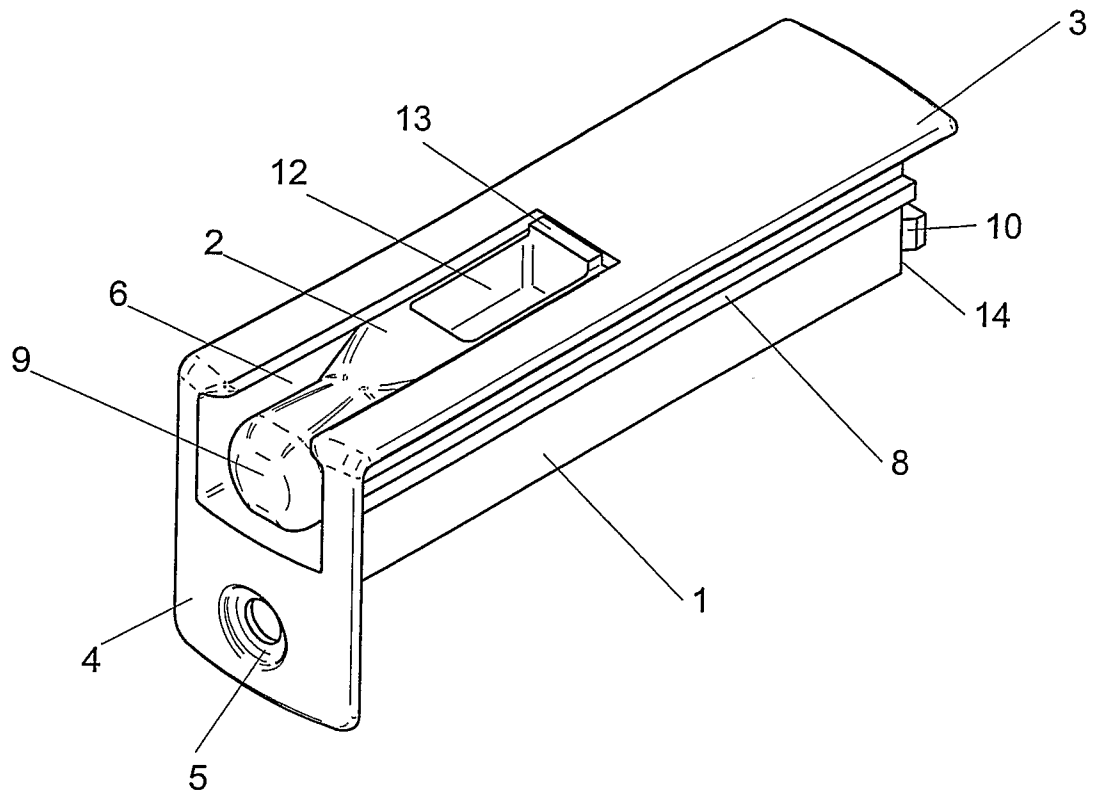


Fig. 3

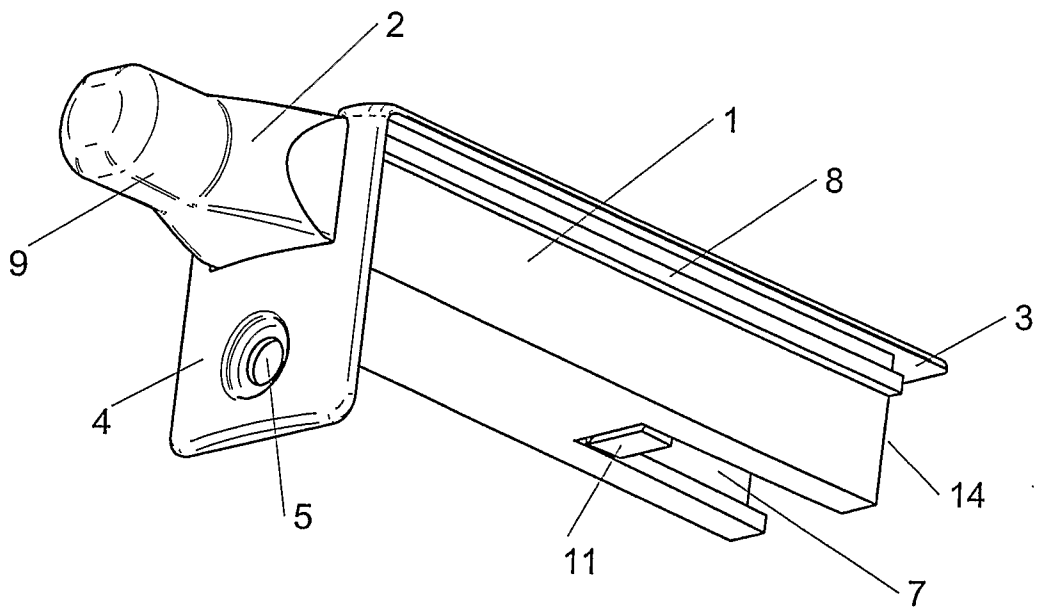


Fig. 4

3/6

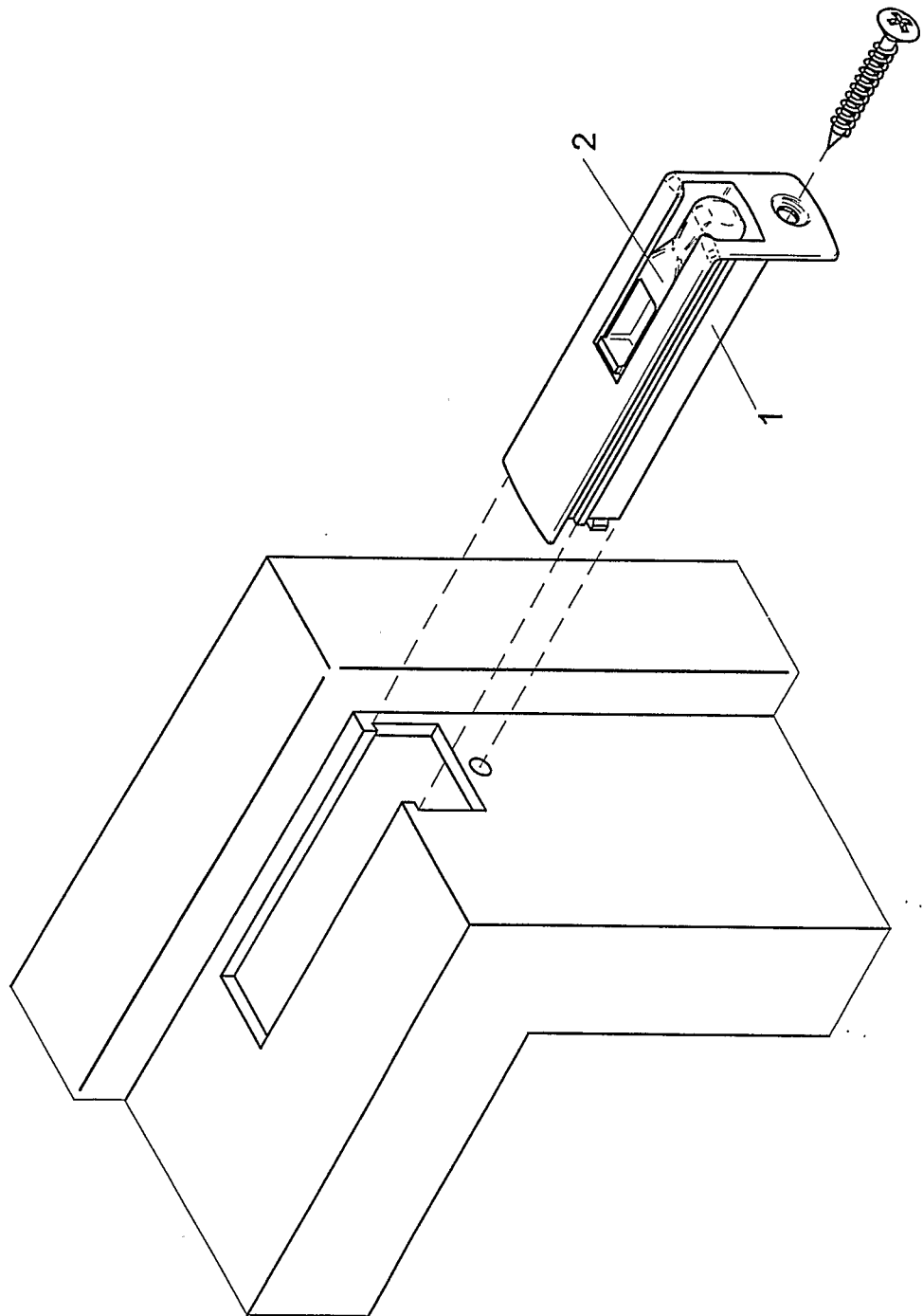


Fig. 5

4/6

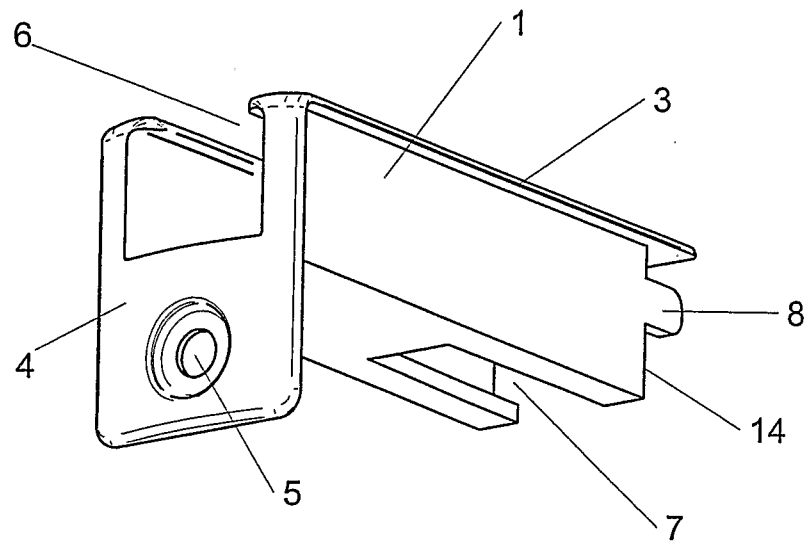


Fig. 6

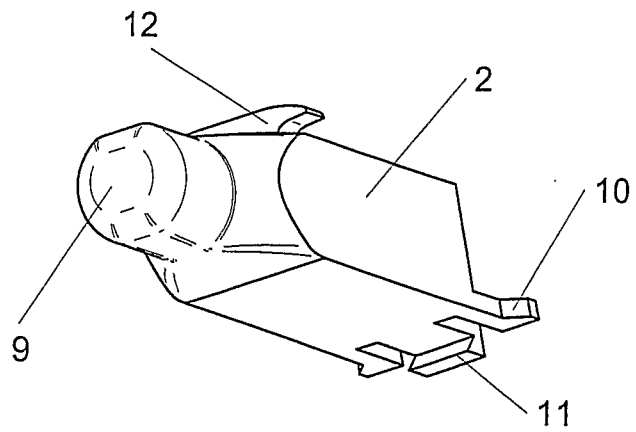


Fig. 7

5/6

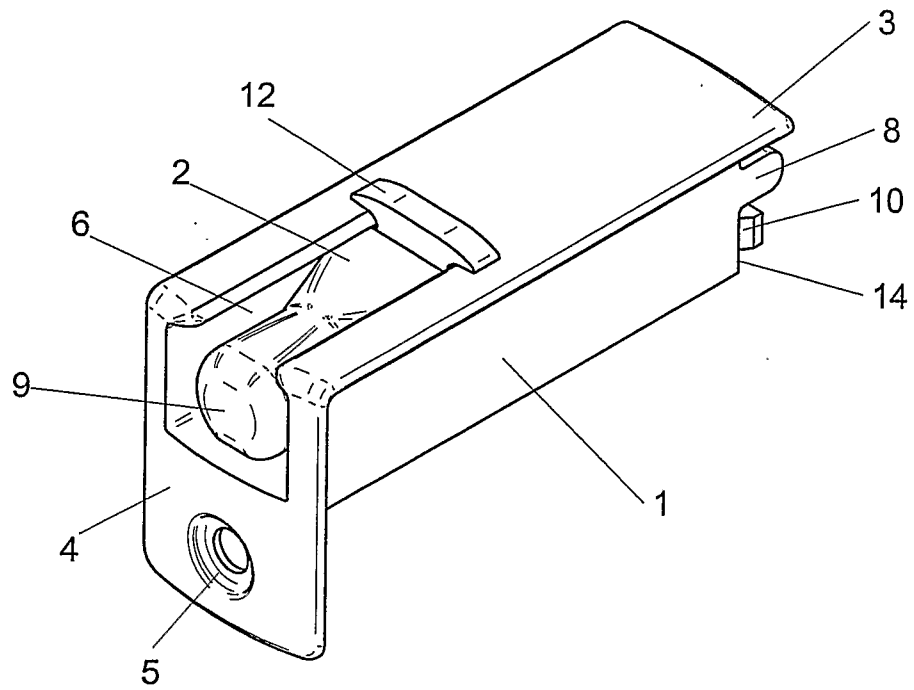


Fig. 8

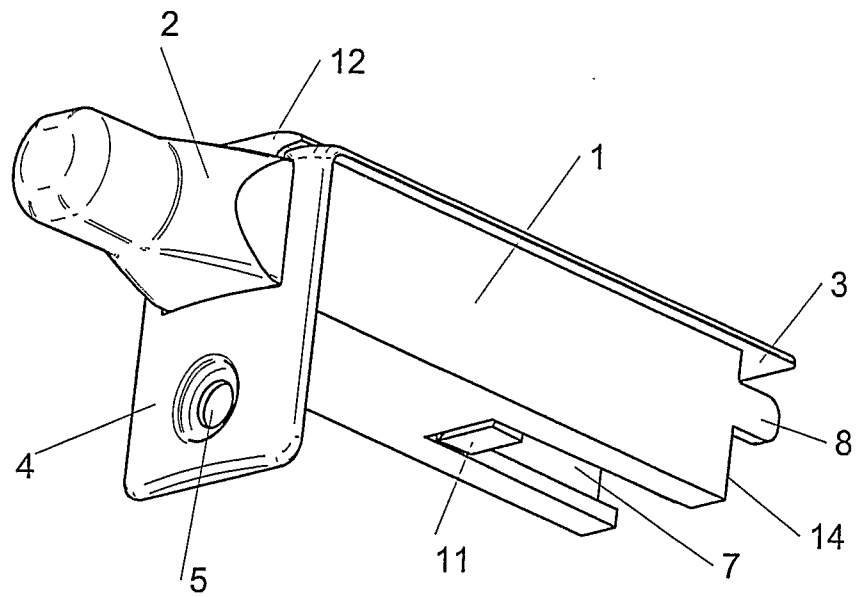


Fig. 9

6/6

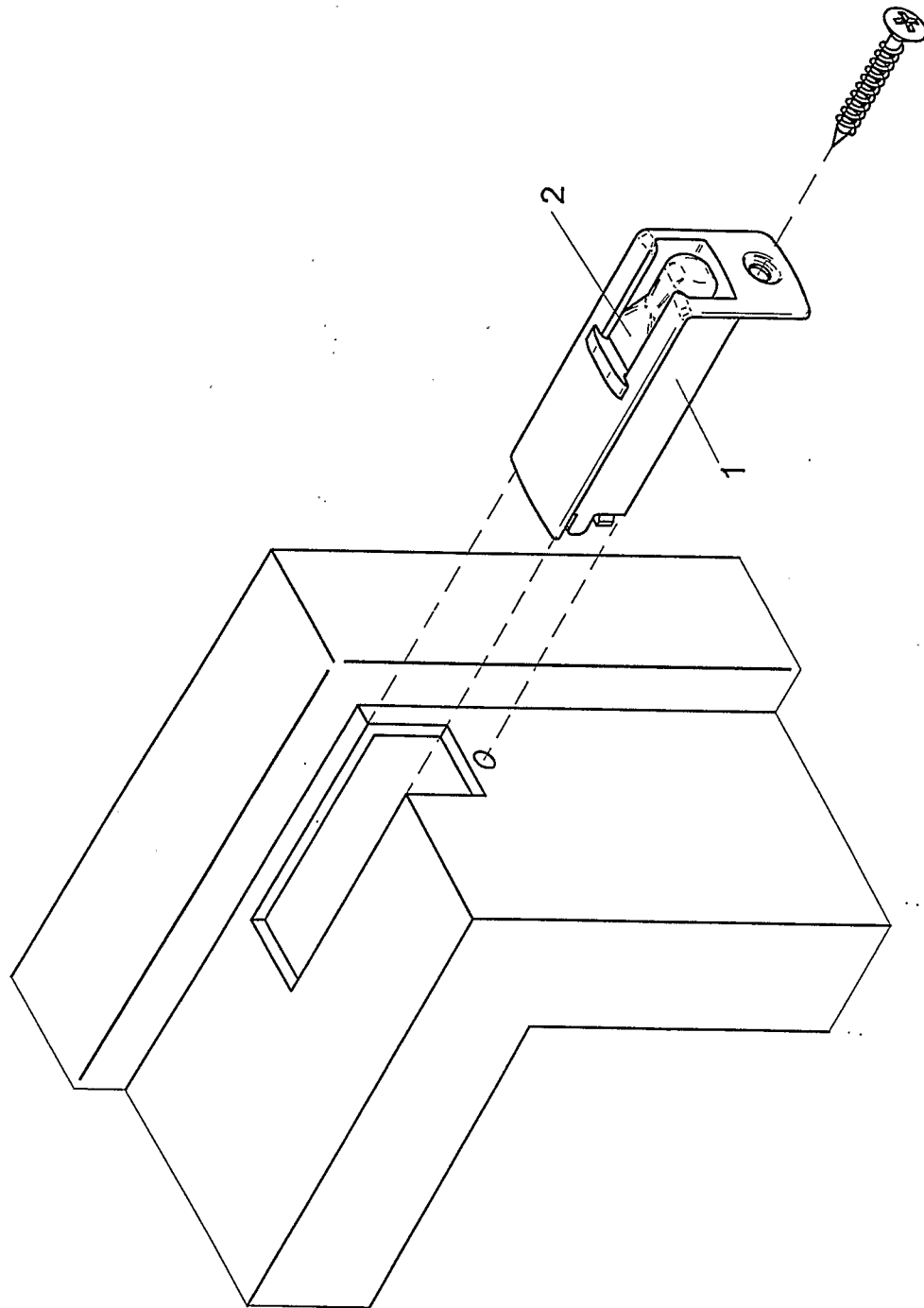


Fig. 10