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(54) Shutter

(57) In a shutter (1) comprising a frame (20) and slats (80) embedded in side elements of the frame (2), the frame (2) is formed from first profiles (10, 19) and second profiles (18, 20) made of plastic with longitudinal spaces and/or internal chambers limited with walls, while the first profiles (10, 19) and the second profiles (18, 20) are joined together at ends by means of corner joints (5, 7), and the side elements being the second profiles (18, 20) in their internal walls located at the vicinity of the frame inside have openings (128), which with their outline correspond to the cross section of the slats (80) whose ends are embedded therein.

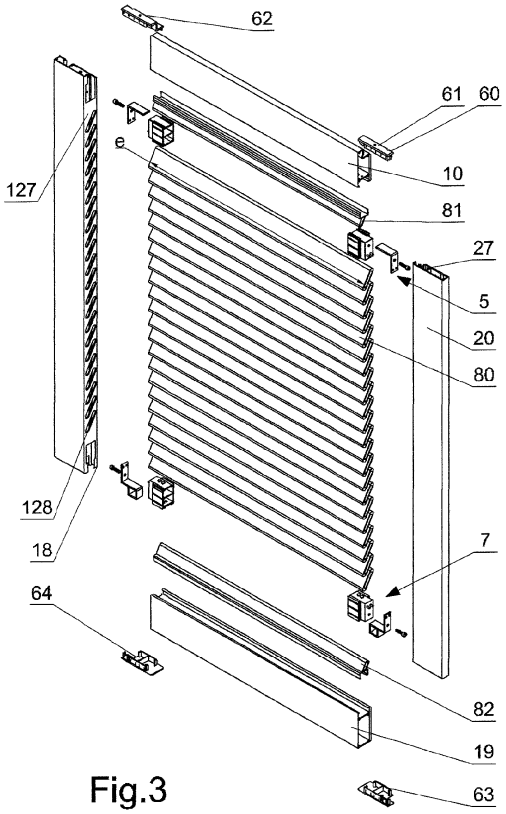

Fig.3

EP 2 672 056 A1

Description

[0001] The subject matter of the invention is a shutter, in particular made of plastic elements and used to cover and/or protect the window openings.

[0002] Shutters have been known for hundreds of years, and their structure, consisting of a frame with slats placed therein, basically stays the same. The most frequently used material for shutters is wood, which, however, has the disadvantage of being very sensitive to atmospheric conditions. Wooden shutters, which in majority of cases are elements placed outside, require renovation every several years, which considerably increases the cost of their use.

[0003] A non-wooden shutter is known from the patent description of US 5,778,958 A entitled: *"Window shutter and method therefor."* The shutter is made of a one-piece, moulded plastic insulating material which has strengthening in the form of square-sawn timbers. Between the square-sawn timbers, in the form of rectangular prisms, there is an internal element moulded together with the square-sawn timbers, which has a surface with recesses. The internal element, thanks to the recesses, imitates wooden slats being in the closed position and stretched horizontally between vertical square-sawn timbers. Along vertical sides the shutter has grooves in which hinges are installed, used to join one-element panels together or to the edges of window openings.

[0004] As it has been mentioned above, shutters most frequently contain a frame and slats which are positioned horizontally with the bottom edge gets out of plumb outside. Typical frames of windows, doors and shutters, made of plastic profiles, e.g. PVC, consist of four members cut at a specific angle and welded together.

[0005] In other solutions, profiles are connected together by means of corners. For example, from the patent description of PL 193379 B1 entitled: "Kit for an angle joint of plastic hollow sections" a kit is known for angle connection of plastic hollow profiles, which are ended at least partially with a cant situated in the cant plane and contain adhesive and plastic inserts in the form of bodies for joining hollow profiles in their cant. Plastic inserts are embedded at least partially in metal chambers. On the insert member, recesses in the form of pockets are formed for adhesive which is introduced there and after hardening binds the insert to the profiles.

[0006] From publication CA 2561334 A1 entitled *"A joint frame for the frames* of *doors and windows"* an L-shaped element is known for joining profiles placed at a 90° angle in relation to each other.

[0007] Additionally, from publication TWM 316305 U entitled *"Joint angle block structure of window frame"* an insert is known, which is embedded in profiles which are ended with a cant.

[0008] From publication US 2008/060314 A1 entitled *"Corner joint for pultruded window frame"* a corner element is known having legs located at an angle in relation to each other of which each is embedded in chambers of various profiles. Surfaces of legs are covered with adhesive layers, which enable durable connection of various profiles together by means of the corner element.

[0009] The purpose of the present invention is to create a shutter resistant to atmospheric conditions and of the appearance similar to the shutters used for centuries.

[0010] The subject matter of the invention is the shutter comprising a frame and slats embedded in side elements of the frame, while the frame is formed from first profiles and second profiles made of plastic with longitudinal spaces and/or internal chambers limited by walls, while the first profiles and the second profiles are joined together at ends by means of corner joints, and the side elements being the second profiles in their internal walls located at vicinity of frame inside have openings, which with their outline correspond to the cross section of the slats whose ends are embedded therein.

[0011] Preferably, each of the first profiles has an internal wall and a middle chamber adjoining the internal wall, and each of the second profiles has a middle wall separating the internal chamber, while each of corner joints for joining profiles comprises a corner element, which has a shape of a joining block, which, with one end, is embedded in the middle chamber of the first profile and with the other end is placed in a cut-out made in the internal wall of the second profile and is in touch with the middle wall of the second profile with the front surface, while the middle wall of the second profile is pressed to the front surface of the joining block by means of the first joining element determining the position of the joining block in relation to the second profile, and the position of the joining block in relation to the first profile is determined by means of the second joining member.

[0012] Preferably, the first joining element is a screw which goes through a through hole made in the middle wall and which is screwed into the threaded opening made in the joining block in the front surface side, and the second joining element is a screwable element which is screwed into a threaded opening made in the joining block in the side of the surface adjoining the internal wall of the first profile.

[0013] Preferably, the joining block is embedded in the internal chamber of the first profile together with the first arm of the stiffening element, whose other arm located at an angle in relation to the first arm is located in the middle chamber of the second profile and is adjoining, from the middle chamber side, the middle wall of the second profile, which is enclosed from both sides by a joining block and the other arm of the stiffening element.

[0014] Preferably, the joining block has cylindrical pins protruding from the front surface, which are inserted into openings of the middle wall of the second profile and into openings of the second arm of the stiffening element.

[0015] Preferably, the stiffening element is in a shape of a bent flat bar with two arms, of which the first arm is placed horizontally, and the other arm is a vertical arm.

[0016] Preferably, the stiffening element is in a shape of a bent flat bar with two arms, of which the first arm is

placed horizontally and has additional stiffening containing a vertical external part, a top horizontal part bent towards the other arm and a vertical internal part bent towards a horizontal part of the first arm.

[0017] Preferably, the joining block is made of metal or plastic.

[0018] Preferably, the stiffening element is made of metal.

[0019] The object of the invention has been presented in the accompanying drawing in which:

Fig. 1 is an axonometric view of a frame of a shutter with slats inside the frame and embedded in side elements formed from profiles;
Fig. 2 shows detail "A" indicated in Fig. 1;
Fig. 3 is an exploded axonometric view of elements of the shutter shown in Fig.1;
Fig. 4 is a view of a corner of a window with a partially removed cap to show a corner joint;
Fig. 5 is an exploded axonometric view of elements of the corner joint for joining profiles;
Fig. 6 is an axonometric view of the horizontal profile with a joining block;
Fig. 7 is an axonometric view of the vertical profile end;
Fig. 8 is an axonometric view of the joining block;
Fig. 9 is an axonometric view of the first embodiment of the stiffening element;
Fig. 10 is an axonometric view of the second embodiment of the stiffening element; and
Fig. 11 shows an axonometric view of another embodiment of the shutter.

[0020] A shutter 1 according to the invention and elements thereof are shown in Fig 1, 2 and 3. The shutter comprises a frame 2, which has a top element, bottom element and side elements. The top element and the bottom element in this embodiment are horizontal profiles 10 and 19, and the side elements are vertical profiles 18 and 20. The horizontal profiles 10 and 19 and the vertical profiles 18 and 20 are profiles which are similar in shape to profiles of windows, doors and glazed external facades. Usually such profiles have a rectangular cross section, in which some walls may have offsets forming steps. Inside the profile there may be longitudinal walls, dividing the profile's internal space into chambers. Profiles may have protruding elements, which, with some walls, may create chambers or one-side open spaces, in which filling may be placed, such as glazing or other elements which fill the entire interior of the window frame or the shutter frame. In the event of the shutter shape other than rectangular, the shutter may have a form of other polygon, a triangle for example, and the number of frame elements may change, and whose side elements may be get out of plumb at an angle dependent upon the shutter dimensions. Inside the frame 2, shown in Fig. 1, 2 and 3, slats 80 are placed, which are internal filling of the shutter 1. The slats 80 are embedded with their ends in openings 128 made in perforated wall 127 of side elements, which in this solution are the vertical profiles 18, 20. The vertical profiles 18, 20 shown in Fig. 4, 5, 6 and 7, which are side elements, in this solution apart from the perforated wall 127 have a middle wall 27, which divides the internal space of the profile into an internal chamber 21 and a middle chamber 22, and an external wall of the vertical profiles has an offset due to which an internal chamber 23 is created. The perforated wall 127 is an internal wall of the vertical profiles 18, 20, located in vicinity of the slats 80 and the inside of the frame 2, and has openings 128, which with their outline correspond to the cross section of the slats and which are big enough for the slats 80 to be inserted with their ends into the said openings 128. The top profile 10 and the bottom profile 19 have elements protruding from the internal wall 115 which together with the internal wall 115, create space or an internal chamber open from one side. In the vicinity of the top profile 10 above the top slat 80, a top sealing member 81 is located, partially embedded in the internal open chamber of the top horizontal profile 10, and in the vicinity of the bottom profile 19 below the bottom slat 80, a bottom sealing member 82 is placed, partially embedded in the internal open chamber of the bottom horizontal profile 19. The top sealing member 81 and the bottom sealing member 82 enable to drain water outside the shutter 1. The horizontal profiles 10,19 are connected at their ends with ends of the vertical profiles by means of corner joints 5 and 7, and each of the installation openings in shutter corners is closed by means of a cap 60, and in particular with protective caps 61, 62, 63, 64, whose shape and dimensions are adapted to the dimensions and shapes of the installation openings.

[0021] The slats 80 being the filling of the inside of the frame 2 of the shatter 1 in the embodiment shown in Fig. 1, 2 and 3 have a cross section in the form of a rectangle with rounded corners or of a rectangle whose shorter sides are fragments of a circle or are semicircles. In a different embodiments slats may have a form of a flattened ellipse. The slats may be made as a solid element or an element hollow inside, whose inside may be filled with an insulating material. The slats 80 in the embodiment shown in Fig 1, 2 and 3 have the length e, smaller than the distance d between the middle walls of the vertical profiles, and greater than the distance between the perforated internal walls of the vertical profiles 18, 20, which prevents the slats 80 from falling out of the openings 128.

[0022] The corner joint 5 for connecting profiles shown in Fig. 4 and 5 comprises a corner element which has a shape of a joining block 30, which in this embodiment, is partially embedded in the middle chamber of the horizontal profile 10. Together with a part of the joining block 30, in the middle chamber or the middle space of the first profile 10, a horizontal arm 43 of the stiffening element 40 may be embedded. The part of the joining block that protrudes beyond the first profile's front surface, which may be the horizontal profile 10, is embedded in a cut-

out 121 shown in Fig. 7 and made in the internal wall 127 and goes crosswise through the first, internal chamber 21 of the second profile, which may be the vertical profile 20, and is adjoining the middle wall 27 of the vertical profile 20. The internal walls of profiles, in the meaning of the invention, are walls of profiles which are adjoining the inside of the frame formed from profiles or a corner area adjoining the profiles, which will be hereinafter referred to as the inside or interior. The arm 44, which may be a vertical arm of the stiffening element 40, is placed in the middle chamber of the vertical profile 20 and, from the side of the middle chamber 22, is adjoining the middle wall 27 of the vertical profile 20 in the manner that the middle wall 27 of the vertical profile 20 is enclosed from both sides by the joining block 30 and the vertical arm 44 of the stiffening element 40. The vertical arm 44 is pressed to the middle wall 27 of the vertical profile 20 by means of a set screw 50 with a head 51, which is screwed in the threaded opening of the joining block 30 and goes through the through hole 25 of the middle wall 27. The vertical profile 20 is plugged by means of a cap 60 which covers also the joining block 30 and a bent stiffening element 40, for example in the form of a flat bar. It must be remembered that in the event when the mutual location of profiles being connected changes, for example after turning the set of profiles by an angle of 90°, the first profile may be a vertical profile, the other profile may be a horizontal profile. Similarly, the arm of the stiffening element 40, which in the presented solution is a vertical arm, may be, after changing the location of the profiles and the stiffening element, a horizontal arm, as well as the arm of the stiffening element 40, which in the presented solution is a horizontal arm, may be, after changing the location of the profiles and the stiffening element, a vertical arm.

[0023] In the embodiment presented in Fig. 4, 5, 6, 7 and 8 which show also component elements of the set or of the corner joint 5 for connecting profiles, the horizontal profile 10 has a front surface 16, which is perpendicular to the longitudinal axis 17 of the horizontal profile 10, and the joining block 30 is embedded in the middle chamber 12, which is adjacent to the external chamber 11 and the internal chamber 13. In other encountered examples of embodiments, there is no external chamber, and the middle chamber comprises a space of the external chamber 11 and of the middle chamber 12. The length of the protruding part of the joining block 30 is selected in such a manner so that after the contact of the front surface 16 of the vertical profile 10 with the vertical profile 20, the front surface 33 of the joining block 30 is in touch with the middle wall 27 of the vertical profile 20 from the side of the internal chamber 21, which is a chamber open from one side, in order to place filling therein, for example the slats 80. From the side of the internal chamber 13, a screw 70 or a flat head bolt is screwed in the joining block 30, which goes through a through hole 14 made in the internal wall 115 of the horizontal profile 10, which in Fig. 6 is shown in a position in which the internal wall 115 is located at the top. In the same internal wall an additional opening 15 is made, which may be a venting or draining opening.

[0024] The vertical profile 20 has a recess 24, which includes the internal chamber 21 and the middle chamber 22, and the lower surface 29 of the vertical profile 20 lies in the plane above the top surface of the joining block 30 after pressing the horizontal profile 10 to the vertical profile 20. In turn, the top surface 28 of the vertical profile 20 is located at such a level that after pressing the horizontal profile 10 and the vertical profile 20 with the chamber 23 together, it is located below the upper edge of the horizontal profile 10, so that after installing cap 60 the surfaces of the horizontal profile 10 face the external surfaces of the cap 60.

[0025] In the middle wall 27 of the vertical profile 20 there is a through hole 25, through which a set screw 50 goes, and two through holes 26, in which cylindrical pins 32 of the joining block 30 are embedded after pressing profiles to each other and the vertical arm 44 to the middle wall 27 of the vertical profile 20. The length of the cylindrical pins 32 is selected in such a way that the length is greater than the total of thickness b of the middle wall 27 and thickness c of the stiffening element 40, which makes the cylindrical pins 32 protrude beyond the external surface of the vertical arm 44 of the stiffening element 40 after pressing it to the middle wall 27. Dimension a, in turn, being the distance of the front surface 33 of the joining block 30 from the vertical arm 44 of the stiffening element 40 is greater than thickness of the vertical middle wall 27 of the vertical profile 20, which makes it possible insert the wall 27 between the front surface 33 of the joining block 30 and the vertical arm 44 of the stiffening element 40 while joining the profiles.

[0026] The joining block 30, presented in an axonometric view in Fig. 8, may be made of metal and may have a shape of a rectangular prism with rounded corners. The block may be also made of plastic. The joining block 30 may have concavities or convexities on its surfaces adapted by shape to the shape of profiles or other elements of the joint. A threaded opening 31 and the cylindrical pins 32 are placed from the front surface 33 and are located in such a way and have such dimensions that the cylindrical pins may be inserted into two openings 26 in the middle wall 27 of the vertical profile 20 and into two openings 41 in the vertical arm 44 of the stiffening element 40, with a simultaneous possibility of screwing the screw 50 into the threaded opening 31, which goes through a top opening 25 in the middle wall 27 of the vertical profile 20 and through a top opening 42 in the vertical arm 44 of the stiffening element 40, shown in Fig. 5. A top surface 34 of the joining block 30 may be flat, but may also have a recess with a flat surface to which the vertical arm of the arm 43 of the stiffening element 40 is adjoining. The bottom surface 35 of the joining block 30 in the presented embodiment is flat, which enables easy inserting the joining block 30 into an opening of the vertical profile 20. Height h of the joining block 30 after

being added to thickness c of the arm of the stiffening element 40 may not be greater than height of the middle chamber 12 of the horizontal profile 10 so that it is possible to insert the joining block 30 and the arm of the stiffening element 40 into the chamber of the horizontal profile 10.

[0027] Fig. 9 shows the stiffening element 40 in a shape of a bent flat bar with two arms, of which the first arm 43 is horizontal. The other arm 44, which in this solution is a vertical arm, has a top through hole 42 and two through holes 41, whose diameters are smaller than the diameter of the top through hole 42.

[0028] Fig. 10 shows another form or another embodiment of a stiffening element 140 which, likewise in the event of the stiffening element 40 shown in Fig. 9 has a shape of a bent flat bar with two arms, of which a first arm 143 is horizontal, and which additionally has strengthening. A part 145 of the horizontal arm 143 passes into a vertical external part 146, which is the first element of strengthening, and then into a top horizontal part 147 and a vertical internal part 148. The vertical internal part 146, the top horizontal part 147 and the vertical internal part 148 form additional strengthening of the stiffening element 140. The other arm 144, which in this solution is also a vertical arm, has a top through hole 142 and two through holes 141, whose diameters are smaller than the diameter of the top through hole 142. The stiffening element 140 with strengthening is used to join profiles, particularly when the chamber of the horizontal profile is higher than the block's height.

[0029] In Fig. 11 another example of the shutter embodiment is shown. A shutter 100 is similar to the shutter shown in Fig. 1 and has a frame comprising horizontal profiles 110, 119 and vertical profiles 118, 120, and slats 180 forming the inner frame filling. Additionally, between elements there is a strengthening transverse element 115. In the event of a high shutter, a number of strengthening transverse elements may be greater than in the solution shown in Fig. 11. The shutter 100 is equipped with hinges 190, which enable its mounting to the edges of the window opening.

Claims

1. A shutter (1) comprising a frame (20) and slats (80) embedded in side elements of the frame (2), **characterized in that** the frame (2) is formed from first profiles (10, 19) and second profiles (18, 20) made of plastic with longitudinal spaces and/or internal chambers limited by walls, while the first profiles (10, 19) and the second profiles (18, 20) are joined together at ends by means of corner joints (5, 7), and the side elements being the second profiles (18, 20) in their internal walls located at vicinity of frame inside have openings (128), which with their outline correspond to the cross section of the slats (80) whose ends are embedded therein.

2. The shutter according to claim 1, **characterized in that** each of the first profiles (10, 19) has an internal wall and a middle chamber adjoining the internal wall, and each of the second profiles (18,20) has a middle wall (27) separating the internal chamber, while each of corner joints (5, 7) for joining profiles (10, 18, 19, 20) comprises a corner element, which has a shape of a joining block (30), which, with one end, is embedded in the middle chamber (12) of the first profile (10) and with the other end is placed in a cut-out (121) made in the internal wall (127) of the second profile (20) and is in touch with the middle wall (27) of the second profile (20) with the front surface (33), while the middle wall (27) of the second profile (20) is pressed to the front surface (33) of the joining block (30) by means of the first joining element determining the position of the joining block (30) in relation to the second profile (20), and the position of the joining block (30) in relation to the first profile (10) is determined by means of the second joining element.

3. The shutter according to claim 1 or 2, **characterized in that** the first joining element is a screw (50) which goes through a through hole (25) made in the middle wall (27), and which is screwed into the threaded opening (31) made in the joining block (30) in the front surface side (33), and the second joining element is a screwable element which is screwed into a threaded opening made in the joining block (30) in the side of the surface adjoining the internal wall (115) of the first profile (10).

4. The shutter according to claim 2 or 3, **characterized in that** the joining block (30) is embedded in the internal chamber (12) of the first profile (10) together with the first arm (43) of the stiffening element (40), whose other arm (44) located at an angle in relation to the first arm (43) is located in the middle chamber of the second profile (20) and is adjoining, from the middle chamber side (22), the middle wall (27) of the second profile (20), which is enclosed from both sides by a joining block (30) and the other arm (44) of the stiffening element (40).

5. The shutter according to claim 2 or 3 or 4, **characterized in that** the joining block (30) has cylindrical pins (32) protruding from the front surface (33), which are inserted into openings (26) of the middle wall (27) of the second profile (20) and openings (41) of the second arm (44) of the stiffening element (40).

6. The shutter according to claim 2 or 3 or 4 or 5, **characterized in that** the stiffening element (40) has a shape of a bent flat bar with two arms (43, 44), of which the first arm (43) is placed horizontally, and the other arm (44) is a vertical arm.

7. The shutter according to claim 2 or 3 or 4 or 5, **characterized in that** the stiffening element (140) has a shape of a bent flat bar with two arms (143, 144), of which the first arm (143) is placed horizontally and has additional strengthening containing a vertical internal part (146), a top horizontal part (147) bent towards the other arm (144) and a vertical internal part (148) bent towards the horizontal part of the first arm (143).

8. The shutter according to one of the claims from 2 to 7, **characterized in that** the joining block (30) is made of metal or plastic.

9. The shutter according to one of the claims from 2 to 8, **characterized in that** the stiffening element (40, 140) is made of metal.

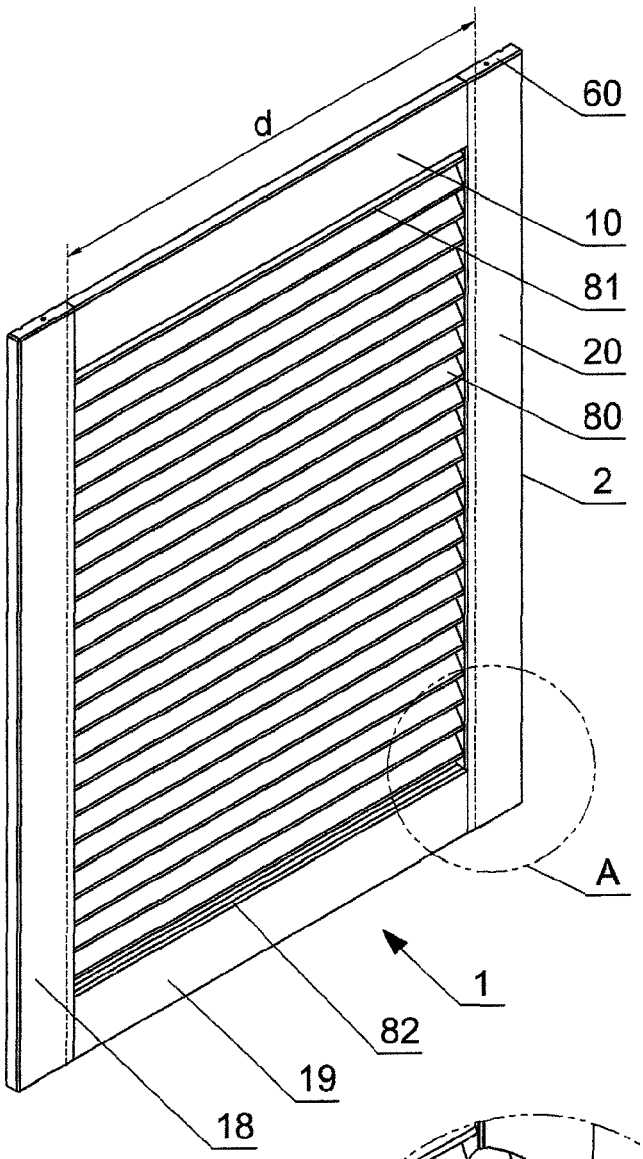

Fig.1

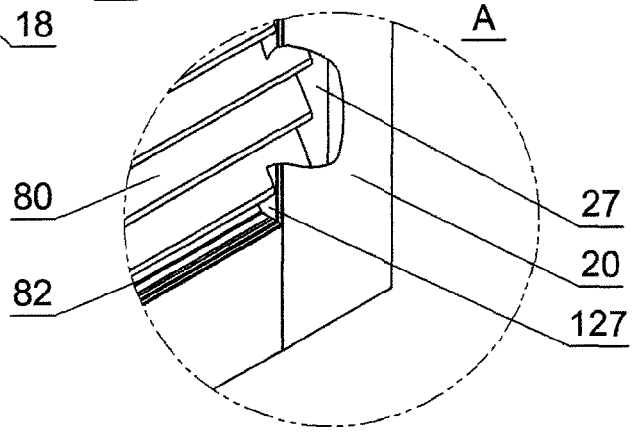

Fig.2

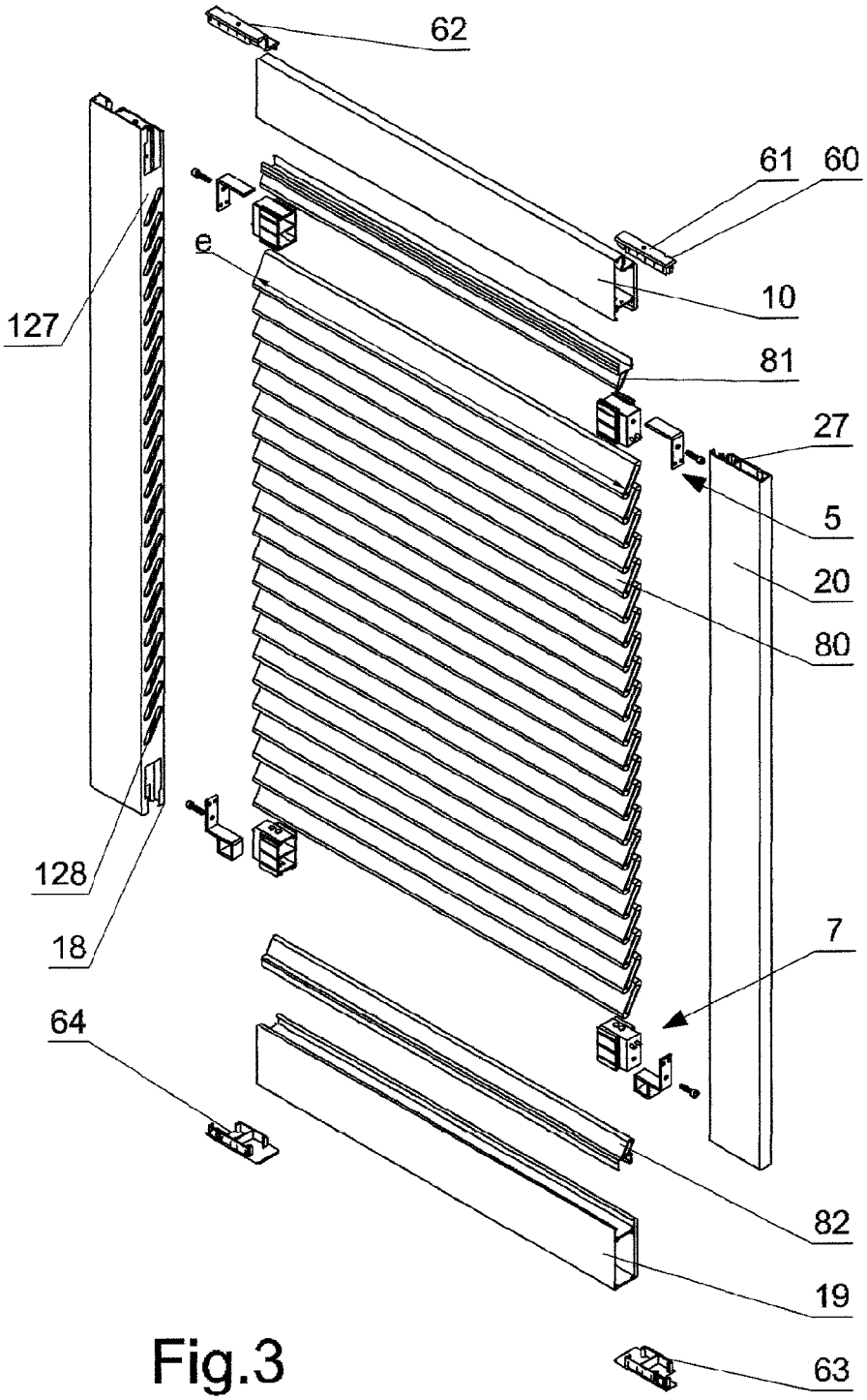

Fig.3

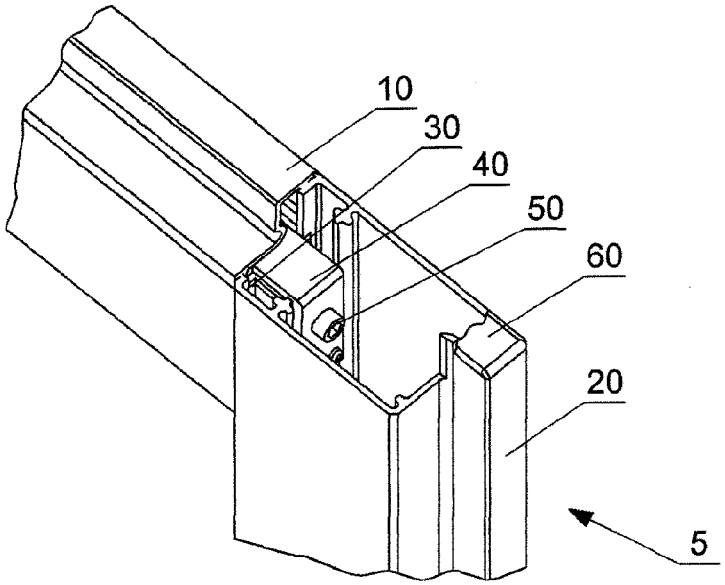
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Fig.4

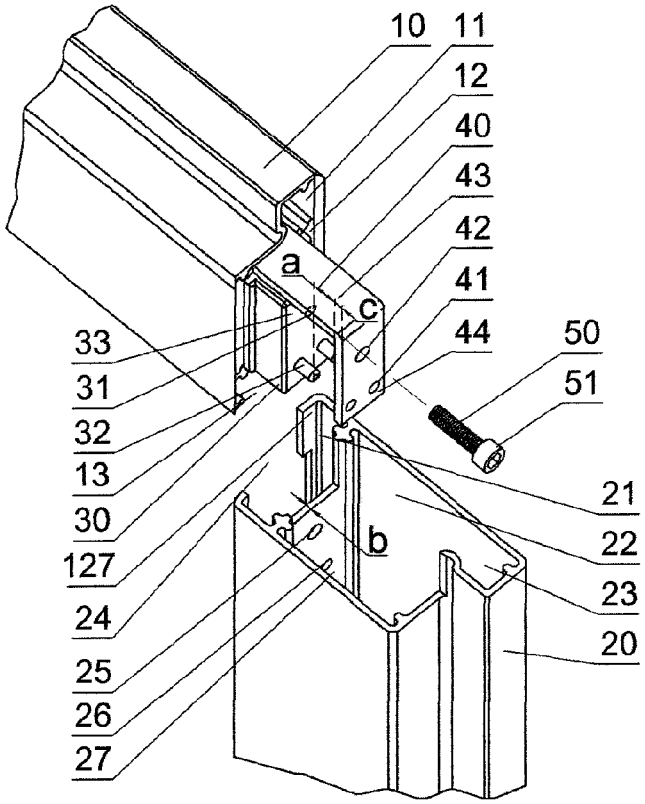
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Fig.5

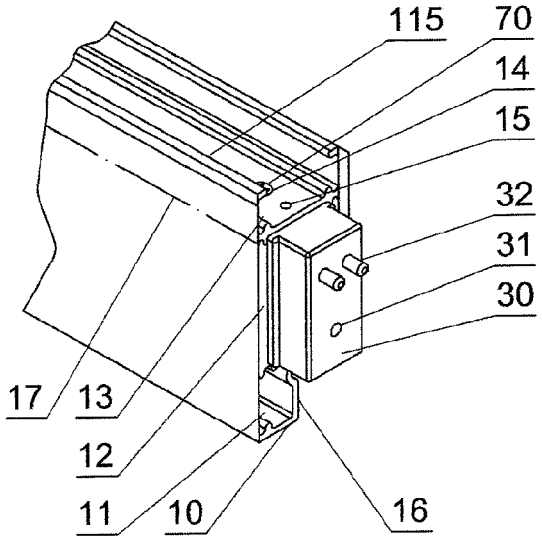

Fig.6

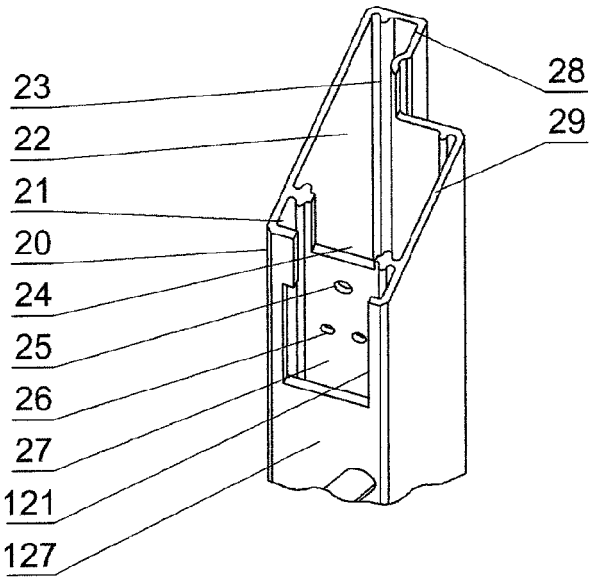

Fig.7

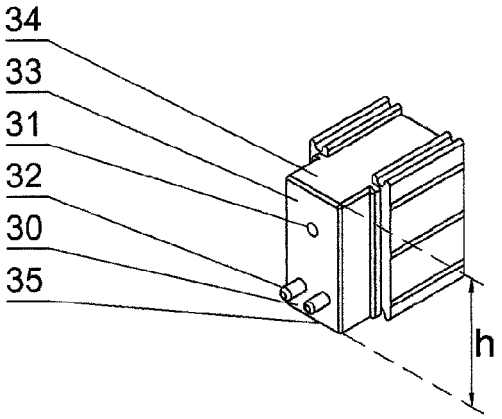

Fig.8

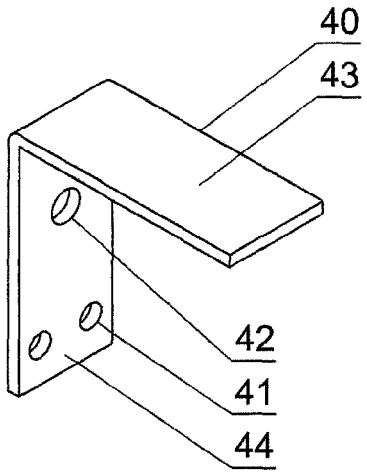

Fig.9

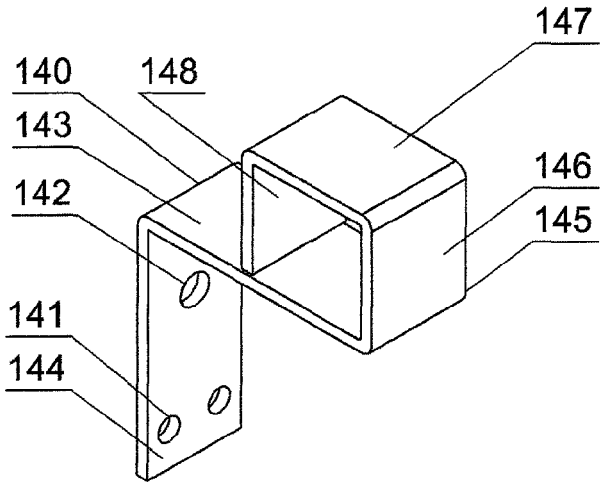

Fig.10

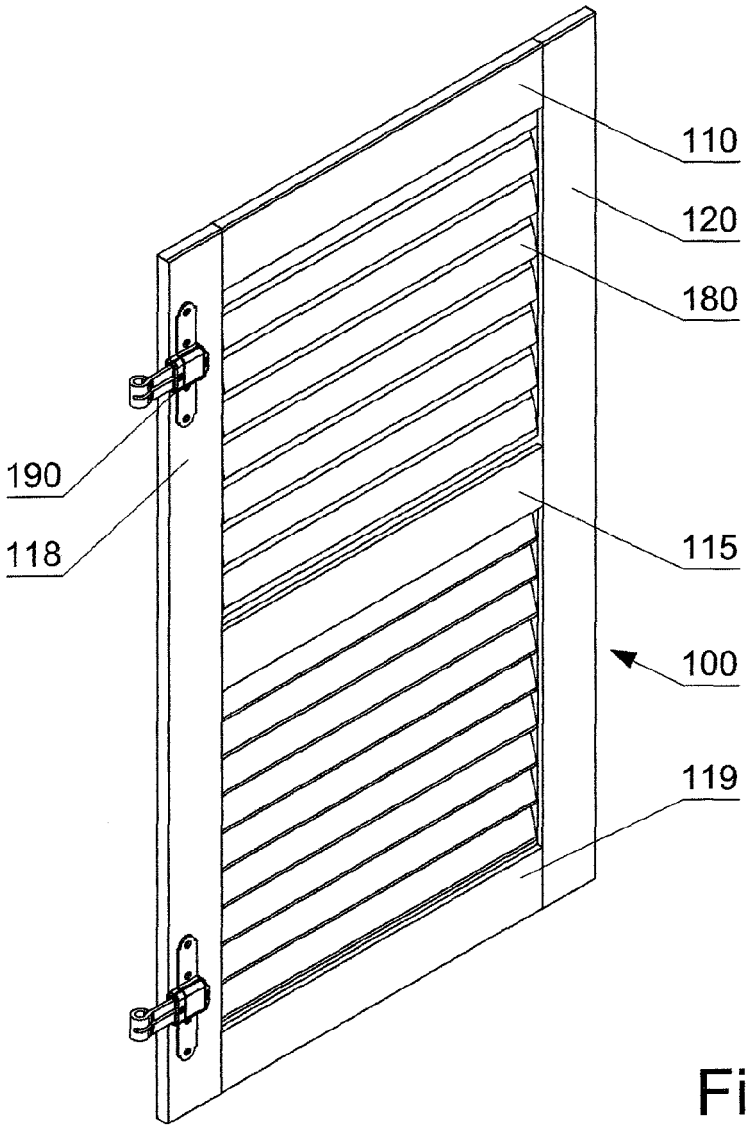

Fig.11

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EUROPEAN SEARCH REPORT

Application Number
EP 12 46 1521

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 91 15 464 U1 (PROTECH AG [CH]) 4 February 1993 (1993-02-04)	1	INV. E06B7/082
A	* figures 1,3,5,6 * * page 9 - page 12 * -----	2-9	E06B9/04
X	GB 2 237 317 A (P & H ENTERPRISES LIMITED [GB]) 1 May 1991 (1991-05-01)	1	
A	* figures 1-4,7,10-17 * * page 10, line 3 - line 4 * * page 10, line 21 - page 11, line 2 * * page 14, line 15 - line 33 * -----	2-9	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 November 2012	Tänzler, Ansgar

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 46 1521

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-11-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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