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(54) **Set of elements for forming corner joints for joining profiles, a corner joint for joining profiles and a shutter**

(57) A set of elements for forming corners joining profiles comprising flat elements insertable into chambers of profiles, wherein the set has at least one pair of flat elements (10, 20) of two arms, of which one is a basic flat element (10), and the other is an auxiliary flat element (20), which are setable up into two types of corner joints, wherein the pair of flat elements (10, 20) is connected together by means of at least one strutting element (30, 40, 50), whose tongues are inserted in mounting openings of the basic flat element (10) and openings of the auxiliary flat element (20), whereas spacing and size of the mounting openings of the basic flat element (10) and the auxiliary flat element (20), in which the tongues of the strutting elements (30, 40, 50) are inserted on a right surface of the basic flat element (10) and the auxiliary flat element (20) are mirror reflection of spacing and size of the mounting openings in which the tongues of the strutting elements (30, 40, 50) are placed on a left surface of the basic flat element (10) and the auxiliary flat element (20).

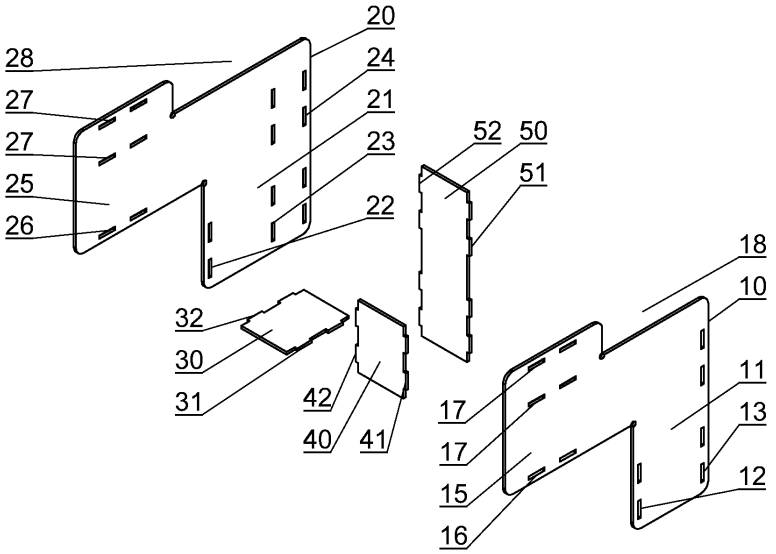


Fig.1

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## Description

**[0001]** The object of the present invention is a set of elements for forming corner joints for joining profiles from which windows, doors, shutters and facade structures are made, as well as a corner joint for joining profiles and a shutter.

**[0002]** Typical window and door frames made of plastic profiles, e.g. PVC, consist of four elements cut at a specific angle and connected together. Plastic profiles may be strengthened with metal elements.

**[0003]** Plastic members are often connected together by welding. In other embodiments, 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 section"* a kit is known for angle connection of plastic hollow profiles, which are ended at least partially with a bevel situated in the cant plane and contain adhesive and plastic inserts in the form of bodies for joining hollow profiles in their bevels. 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.

**[0004]** 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.

**[0005]** 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 bevel.

**[0006]** 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.

**[0007]** The purpose of the present invention is to create a joint of great strength for joining profiles from which windows, doors, shutters and facade structures are made.

**[0008]** The object of the present invention is a set of elements for forming corner joints joining profiles containing flat elements insertable into chambers of profiles, from which at least one pair of flat elements with two arms is created, of which one is a basic flat element, and the other one is an auxiliary flat element, which are setable up into two types of corner joints joining profiles, and are connected together by means of at least one strutting element, whose integral keys or tongues are inserted in mounting openings of the basic flat element and openings of the auxiliary flat element, whereas spacing and size of the mounting openings of the basic flat element and the auxiliary flat element, in which the tongues of the strutting elements are inserted in the right surface of the basic flat element and the auxiliary flat element are mirror reflection of the spacing and the size of the mounting openings, in which the tongues of the strutting elements are inserted in the left surface of the basic flat element and the auxiliary flat element and when one tongues of the strutting elements from a side of the left surface of the basic flat element and other tongues from a side of the right surface of the auxiliary flat element are inserted, a corner joint of a first type is formed, and when one tongues of the strutting elements from the side of the right surface of the basic flat element and other tongues from the side of the left surface of the auxiliary flat element are inserted, a corner joint of a second type is formed.

**[0009]** In one of the embodiments, one of arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, but the horizontal arm of the basic flat element is narrower than the horizontal arm of the auxiliary flat element, and the strutting elements are of the same width.

**[0010]** In another embodiment, one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, but the horizontal arm of the basic flat element is of the same width as the horizontal arm of the auxiliary flat element, and the strutting elements are of the same width.

**[0011]** In still another embodiment, one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, but the vertical arm of the basic flat element is narrower than the vertical arm of the auxiliary flat element of the corner, and the strutting elements are of the same width.

**[0012]** In yet another embodiment, one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, but the vertical arm of the basic flat element is of the same width as the vertical arm of the auxiliary flat member, and the strutting elements are of the same width.

**[0013]** The flat element and the auxiliary flat element may be made of metal sheets.

**[0014]** Another object of the invention is a corner, which is formed of a set of elements for forming corners for joining profiles.

**[0015]** Yet still another object of the invention is a shutter containing a frame made of profiles, with slats embedded inside, but the frame profiles are connected by means of corners made of flat elements and strutting elements belonging to the set of elements for forming corners joining profiles.

**[0016]** The frame profiles may be made of plastic.

**[0017]** The object of the invention has been presented in the accompanying drawing in which:

Fig. 1 shows a set of elements for forming corners joining profiles according to the first embodiment;
Fig. 2 shows a corner of the first type for joining profiles;
Fig. 3 shows the right surface of basic flat element;
Fig. 4 shows the left surface of basic flat element;
Fig. 5 shows the right surface of auxiliary flat ele-

ment;

Fig. 6 shows the left surface of auxiliary flat element;

Figs. 7A, 7B, 7C and 7D show the method of making the second type of corner from the set shown in Fig. 1;

Figs. 8, 9 and 10 show others embodiments of corners;

Fig. 11 is an exploded axonometric view of elements of a shutter;

Figs. 12 and 13 show, in enlargement, the connection of an upper horizontal profile with a vertical profile of the shutter, as seen from the inside;

Figs. 14 and 15 show a double-leaf shutter; and

Fig. 16 is an exploded axonometric view of another form of the shutter.

**[0018]** A set of elements suitable for forming corners insertable into chambers of profiles and joining profiles according to the first embodiment, shown in Fig. 1, comprises flat elements 10, 20, in a shape of L letter, with arms 11 and 15, 21 and 25, and strutting elements 30, 40, 50, which, with their integral keys or tongues 31 and 32, 41 and 42 and 51 and 52, are embedded in through-holes or openings 12 and 22, 13 and 23, 16 and 26, but the least numerous set comprises two flat elements and at least one strutting element. The openings 12 and 22, 13 and 23, 16 and 26 of the flat elements form first joining means, and the tongues 31 and 32, 41 and 42 and 51 and 52 are second joining means. The phrase "flat elements" in the meaning of the present invention refers to elements whose one of three external dimensions specifying thickness, length and width is at least over a dozen times smaller than the others. In the presented embodiments, thickness of the flat elements is at least several times smaller than their length and width, and ranges from 1.0 mm to 2.0 mm, 1.5 mm in particular. On the contrary, the greatest external length and width of the flat elements ranges from 100.0 mm to 200.0 mm, which corresponds to the dimensions of a rectangle in which the flat element may be inscribed.

**[0019]** In order to differentiate the flat elements from one another, one of the elements of the set is, in a contractual manner, called the basic flat element 10, and the other from the elements of the set is called the auxiliary flat element 20. Both, the basic flat element 10 and the auxiliary flat element 20 have recesses, 18 and 28, respectively, and technological base or additional openings 17, 27, which, for example, facilitate to hold the flat elements during the assembly of the set. The width of arms 11 and 15, 21 and 25 of the basic flat element 10 and the auxiliary flat element 20 are selected to or answer the height of internal chambers of the profiles being connected and are not greater than the height or width of internal chambers of the profiles being connected as to make it possible to insert the flat elements into the chambers of the profiles. In the embodiment shown in Fig. 1, a vertical arm 21 of the auxiliary flat element 20 is wider than a vertical arm 11 of the basic flat element 10 and has additional mounting openings 24.

**[0020]** From the set of the elements shown in Fig. 1, a corner joint 5 of a first type may be formed, which is shown in Fig. 2, in which numbers of the elements correspond to numbers of the elements from Fig. 1. To prevent tongues of the strutting elements from sliding out of the openings of the flat elements, the ends of the tongues, after being embedded in the openings, are crumpled or flattened, pointwise for example, as a result of which a spot joint 9 is obtained. The corner shown in Fig. 2 has a horizontal arm of the basic flat element 10 of the same width as a horizontal arm of the auxiliary flat element 20, and the vertical arm of the basic flat element 10, which has smaller width than the vertical arm of the auxiliary flat element 20.

**[0021]** In Fig. 3, a right surface 19 of the basic flat element 10 has been shown, and in Fig. 4, a left surface 119 of the basic flat element 10 has been shown. In turn, in Fig. 5, a right surface 29 of the auxiliary flat element 20 has been shown, and in Fig. 6, a left surface 129 of the auxiliary flat element 20 has been shown. The phrases "right surface" and "left surface" are contractual terms and were adopted by the manner of inserting the corner into the chambers of the profiles, the horizontal profiles in this case, into which the corner, shown for example in Fig. 2 is inserted with a front surface of the corner. Due to the fact that the surface 119 of the basic flat element 10, looking from the front of the corner and a horizontal arm 15, is on a left side of the basic flat element, it is therefore the left surface 119 of the basic flat element 10, and since a surface 19 of the basic flat element 10, looking from the front of the corner and the horizontal arm 15, is located on a right side of the basic flat element, it is therefore a right surface 19 of the basic flat element 10. Similarly, due to the fact that the surface 129 of the auxiliary flat element 20, looking from the front of the corner and a horizontal arm 25, is on a left side of the auxiliary flat element, it is therefore the left surface 129 of the auxiliary flat element 20, and since the surface 29 of the auxiliary flat element 20, looking from the front of the corner and the horizontal arm 25, is located on a right side of the auxiliary flat element, it is therefore the right surface 29 of the auxiliary flat element 20. As it was shown in Figs. 1, 2, 3, 4, 5 and 6, the spacing and the size of mounting openings 12, 13, 16 and 22, 23, 26 of the basic flat element 10 and the auxiliary flat element 20, in which the tongues of the strutting elements 30, 40, 50 are embedded or inserted in the right surface 19, 29 of the basic flat element 10 and the auxiliary flat element 20, are mirror reflection of the spacing and the size of the mounting openings 12, 13, 16 and 22, 23, 26, in which the tongues of the strutting elements 30, 40, 50 are embedded, in the left surface 119, 129 of the basic flat element 10 and the auxiliary flat element 20.

**[0022]** In Figs. 7A, 7B and 7C is shown a method of forming a corner joint 105 of a second type shown in Fig. 7D, from the set shown in Fig. 1, from which the corner joint 5 of a first type was formed, shown in Figs. 2 and

7A. The elements 10, 20, 30, 40, 50 of the corner joint 5 of the first type are the same elements 110, 120 130, 140, 150 of the corner joint 105 of the second type, but when embedding or inserting the tongues of the strutting elements 30, 40, 50 from the left surface of the basic flat element 10 and from the right surface of the auxiliary flat element 20, the corner joint 5 of the first type is created, and when integral keys of strutting elements 130, 140, 150 identical with the strutting elements 30, 40, 50, from a right surface of a basic flat element 110, identical with the basic flat element 10, and from a left surface of an auxiliary flat element 120, identical with the auxiliary flat element 20, with mounting openings 123, 124 and 126, identical with the openings 23, 24 and 26 of the auxiliary flat element 20, the joint corner of the second type is formed, which is shown in Fig. 7C. In Figs. 7B and 7C straight lines 102, 103 and 106 are shown, marked with a broken line, which are perpendicular to the left and right surfaces of the basic and auxiliary flat element and go through the symmetry centers of the mounting openings of the flat elements, from which both the corner joint 5 of the first type and the corner joint 105 of the second type have been formed. Adopting, as reference planes, the planes in which the bottom edges of horizontal arms lie, and crossing them front edges of vertical arms both of the corner joint 5 of the first type and the corner joint 105 of the second type, one can notice that, regardless whether it is the corner joint 5 of the first type or the corner joint 105 of the second type, the mounting openings are in the same distance from reference planes. One pair of the flat elements 10 and 20 of two arms, of which one is the basic flat element 10, and the other is the auxiliary flat element 20, makes it possible to set two types of the corner joints 5, 105 joining profiles. The flat elements 10, 20, being a part of the set of the elements, are joint together by means of at least one strutting element 30, 40, 50, whose the tongues 31 and 32, 41 and 42, 51 and 52 are embedded in the mounting openings 16, 12, 13 of the flat element 10 and in openings 26, 22, 23 of the auxiliary flat element 20.

**[0023]** In Figs. 8, 9 and 10 are shown other embodiments of corner joints. A horizontal arm of a basic flat element 210 has smaller width than a horizontal arm of an auxiliary flat element 220 of the corner joint shown in Fig. 8, likewise a vertical arm of the basic flat element 210 has smaller width than a vertical arm of the auxiliary flat element 220 of the corner joint, which may be defined as the corner joint of the first type. Strutting elements 230, 240 and 250 have the same width. Following the embodiment of presenting the auxiliary flat element and the strutting elements in relation to the basic flat element, as shown in Figs. 7A, 7B, 7C and 7D, one can notice that after moving the auxiliary flat element 220 and the strutting elements 230, 240, 250 in relation to the basic flat element 210, from the same elements belonging to the set of elements for forming corner joints, one can obtain the corner joint of the second type. In turn, in Fig. 9, is shown a corner joint whose horizontal arm of a basic flat element 310, although has width smaller than a horizontal arm of an auxiliary flat element 320, but a vertical arm of the basic flat element 310 has greater width than a vertical arm of the auxiliary flat element 320, which may be specified as the corner joint of the first type. Strutting elements 330, 340 and 350 have the same width. In this case too, following the embodiment of presenting the auxiliary flat element and the strutting elements in relation to the basic flat element, as shown in Figs. 7A, 7B, 7C and 7D, one can notice that after moving the auxiliary flat element 320 and the strutting elements 330, 340, 350 in relation to the basic flat element 310, from the same elements belonging to the set of elements for forming corners, one can obtain the corner joint of the second type. While in Fig. 10 is shown a corner joint whose vertical and horizontal arms of a basic flat element 410 have the same width as vertical and horizontal arms of an auxiliary flat element 420 of the corner joint, which may be found as the corner joint of the first type. In the event of presenting the auxiliary flat element 420 and the strutting elements 430, 440, 450 in relation to the basic flat element 410, as shown in Figs. 7A, 7B, 7C and 7D, the corner joint of the second type may be obtained, however, in this embodiment the corner joint of the first type will be identical to the corner joint of the second type. Considering the corner joint shown in Fig. 2 and the corner joints shown in Figs. 8 and 9, which have various flat elements, from the set composed of four flat members 10, 20, 210 and 310 and the strutting elements, for example 30, 40, 50, belonging, for example, to one set of elements for forming corner joints, it is possible to obtain six corner joints with two different flat elements with the strutting elements placed between them, and four corner joints, whose two flat elements will be identical, unless the spacing and dimensions of the mounting openings will fit respectively.

**[0024]** A shutter 500, shown in Fig. 11 and fragmentarily in Figs. 12 and 13, comprises a frame, which has a top element, a bottom element and side elements. The bottom element and the top element in this embodiment are horizontal profiles 571, 573, and the side elements are vertical profiles 561, 562. The horizontal profiles 571, 573 and the vertical profiles 561, 562 are profiles which are identical in terms of shape to profiles of windows, doors and glazed external facades or are similar to them in terms of shape. Usually such profiles have a rectangular cross section, in which some walls may have offsets forming steps of which rebates of the shutter frame are formed. 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 shutter 500, that is in area surrounded by the shutter frame, there are slats 579, which are internal filling of the shutter 500. The slats 579 are embedded or inserted with their ends in openings 563 made in a perforated wall of the vertical profiles 561, 562. The vertical profiles 561, 562 have an offset forming a rebate, marked in the case of both profiles 561, 562 as 564, with rebate chamber 566, to which the main chamber 565 is adjacent. In the similar manner the top profile 573 has an offset forming a rebate 574 with the a rebate chamber 575, with the main chamber 576 adjacent to it. The perforated wall, which is a wall with openings, is an internal wall of the vertical profiles 561, 562, located in vicinity of the slats 579 and the inside of the frame, and has the openings 563, which, with their outline correspond to the cross section of the slats and which are big enough for the slats 579 to be inserted with their ends into the said openings 563. In vicinity of the top horizontal profile 573 above a top slat 579, a top sealing element 517 is located, partially embedded in the horizontal profile 573, and in vicinity of the bottom profile 571 below the lowest slat 579, a bottom sealing element 572 is placed, partially embedded in the horizontal profile 571. The top sealing element 517 and the bottom sealing element 572 enable to drain water outside the shutter. The top horizontal profile 573 is connected at its ends with ends of the vertical profiles 561, 562 by means of corner joints 505 and 506, while the bottom profile 571 is connected at its ends with lower ends of the vertical profiles 561, 562 by means of corner joints 507, 508, and each of mounting openings in shutter corners is closed with protective caps 501, 502, 503, 504, whose shape and dimensions are adapted to the dimensions and shapes of the mounting openings. In Figs. 12 and 13 is shown, in enlargement, a connection of the top horizontal profile 573 with the vertical profile 561 of the shutter, seen from the inside, by means of a corner joint 506, which is the corner joint of the second type formed of the elements 210, 220, 230, 240, 250, of which the corner joint of the first type was formed, shown in Fig. 8, by means of which the profiles were connected, shown in Fig. 11, on a top right side. Horizontal arms of the flat elements of the corner 506 are inserted into the chambers of the top profile 573, but the horizontal arm of one flat element with greater width is inserted into the main chamber 576 and into the rebate chamber 575, while the horizontal arm of the other flat element, which is narrower, is inserted only into the main chamber 576. In turn vertical arms of the flat elements of the corner joint 506 are inserted into chambers of the side profile 561, but the vertical arm of one flat element with greater width is inserted into the main chamber 565 and into the rebate chamber 566, while the vertical arm of the other flat element, which is narrower, is inserted only into the main chamber 565, as shown in Figs. 12 and 13. In a similar manner the horizontal arms of flat elements 510, 520 of the corner joint 506 with strutting elements 530, 540, 550 are inserted into the chambers of the top profile 573, but the horizontal arm of one flat element 520 with greater width is inserted into the main chamber 576 and into the rebate chamber 575, while the horizontal arm of the other flat element 510, which is narrower, is inserted only into the main chamber 576. In turn vertical arms of the flat elements 510, 520 of the corner joint 505 are inserted into the chambers of the side profile 561, but the vertical arm of one flat element 520 with greater width is inserted into the main chamber 565 and into the rebate chamber 566, while the vertical arm of the other flat element 510, which is narrower, is inserted only into the main chamber 565. Arms of corner joints 505, 506, 507, 508 may be inserted with force or push fit into the chambers of profiles 561, 562, 571, 573. Additionally, corner joints may be stabilized by means of screws or self-drilling screws 509, which may be screwed into the strutting elements, for example the strutting elements 530, 540, as it is resulted from Fig. 13. The joint shown in Figs. 12, 13, in Fig. 11 is located on the top right side, but the shutter shown in Fig. 11 is a shutter seen from the outside, for example from the outside of the building.

**[0025]** The slats 579 being a filling of the inside of the shutter 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 embodiment, the slats may have a form of a flattened ellipse. The slats may be made as a solid element or an element which is hollow inside, whose inside may be filled with an insulating material. The slats have the length smaller than the distance between middle walls (shown fragmentarily) of the vertical profiles, and greater than the distance between the perforated walls of vertical profiles 561, 562, which prevents slats 579 from falling out of the openings 563.

**[0026]** Figs. 14 and 15 show a double-leaf shutter 600 comprising leaves 601, 602 which are mounted to a wall or a frame by hinges 603 and mounting element 604.

**[0027]** In Fig. 16 is shown another embodiment of a shutter. The shutter 700 has a frame 701 comprising horizontal profiles 771, 791 and vertical profiles 772, 773, and slats 779 being a filling of the frame. Additionally, between the horizontal profiles 771, 791 there is a strengthening transverse element 781. In the event of a high shutter, a number of the strengthening transverse elements may be greater than in the embodiment shown in Fig. 16. The shutter 700 is equipped with hinges 703, which enable its mounting to frames or edges of a window opening.

## Claims

1. A set of elements suitable for forming corner joints joining profiles comprising flat elements insertable into chambers of profile **characterized in that** it comprises at least one pair of flat elements (10 and 20, 110 and 120, 210 and 220, 310 and 320, 410

and 420, 510 and 520) of two arms, of which one is a basic flat element (10), and the other is an auxiliary flat element (20), which are setable up into two types of corner joints (5, 105) joining profiles, and are connected together by means of at least one strutting element (30, 40, 50), whose tongues (31 and 32, 41 and 42, 51 and 52) are embedded or inserted in mounting openings (16, 12, 13) of the basic flat element (10), and openings (26, 22, 23) of the auxiliary flat element (20), whereas spacing and size of the mounting openings of the basic flat element (10) and the auxiliary flat element (20), in which the tongues of the strutting elements (30, 40, 50) are embedded on a right surface (19, 29) of the basic flat element (10) and the auxiliary flat element (20) are mirror reflection of spacing and size of mounting openings in which the tongues of the strutting elements (30, 40, 50) are inserted on a left surface (119, 129) of the basic flat element (10) and the auxiliary flat element (20) and by embedding the tongues (31, 41, 51) of the strutting elements (30, 40, 50) from the side of the left surface (119) of the basic flat element (10) and the tongues (32, 42, 52) from the side of the right surface (29) of the auxiliary flat element (20) a corner joint (5) of a first type is formed, and by embedding the tongues (32, 42, 52) of the strutting elements (30, 40, 50) from the side of the right surface of the basic flat element (10) and the integral keys (31, 41, 51) from the side of the left surface (129) of the auxiliary flat element (20), a corner joint (105) of a second type is formed.

2. The set according to claim 1 **characterized in that** one of arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, whereas the horizontal arm of the basic flat element (210) is narrower than the horizontal arm of the auxiliary flat element (220), and the strutting elements (230, 240 and 250) are of the same width.

3. The set according to claim 1 **characterized in that** one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, whereas the horizontal arm of the basic flat element (10) is of the same width as the horizontal arm of the auxiliary flat element (20), and the strutting elements (30, 40, 50) are of the same width.

4. The set according to claim 1 **characterized in that** one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, whereas the vertical arm of the basic flat element (210) is narrower than the vertical arm of the auxiliary flat element (220) of the corner, and the strutting elements (230, 240 and 250) are of the same width.

5. The set according to claim 1 **characterized in that** one of the arms of the flat elements is a horizontal arm, and the other arm of the flat elements is a vertical arm, whereas the vertical arm of the basic flat element (410) is of the same width as the vertical arm of the auxiliary flat element (420) of the corner joint, and the strutting elements (230, 240 and 250) are of the same width.

6. The set according to claim 1 or 2 or 3 or 4 or 5 **characterized in that** the basic flat element (10) and the auxiliary flat element (20) are made of metal sheet.

7. A corner joint suitable for joining profiles according to one of the claims from 1 to 6 **characterized in that** it is formed from flat the elements (10 and 20, 110 and 120, 210 and 220, 310 and 320, 410 and 420, 510 and 520) and the strutting elements (30, 40, 50) of the set of elements suitable for forming corner joints joining profiles.

8. A shutter comprising a frame made of profiles, inside of which slats (579) are embedded, according to one of the claims from 1 to 7, **characterized in that** the profiles of the frame are connected by means of corner joints made of the flat elements (10 and 20, 110 and 120, 210 and 220, 310 and 320, 410 and 420, 510 and 520) and the strutting elements (30, 40, 50) being a part of the set of elements suitable for forming corner joints joining profiles.

9. The shutter according to claim 8 **characterized in that** profiles (561, 562, 571, 573) of the frame are made of plastic.

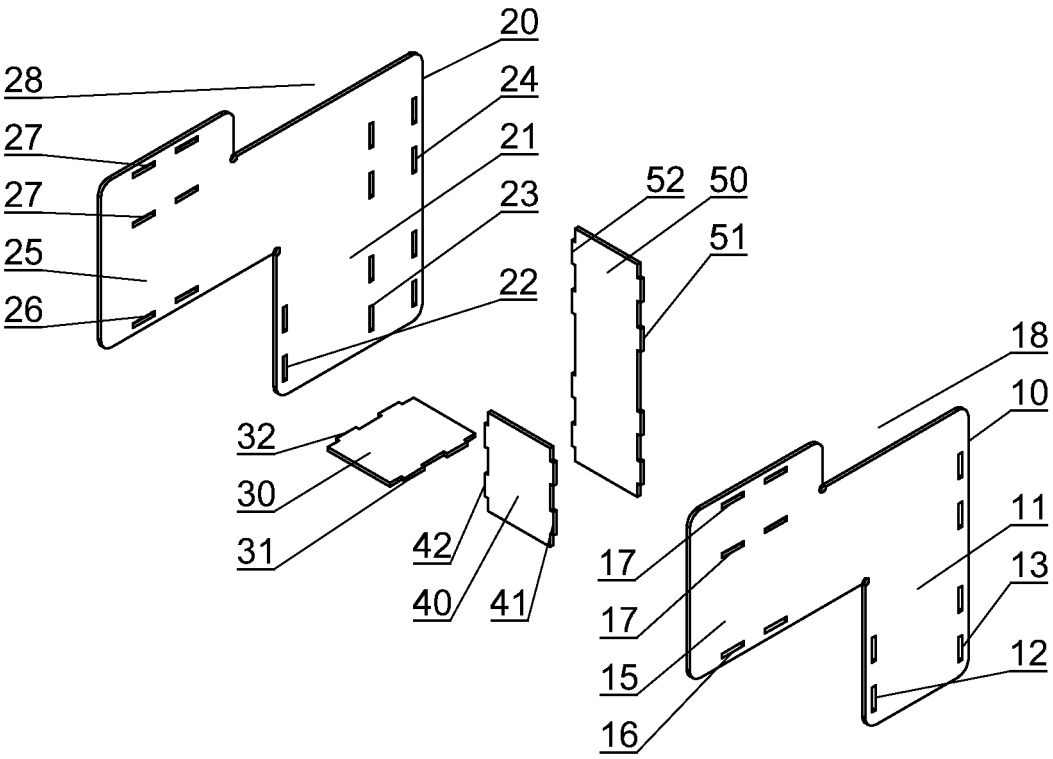
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Fig.1

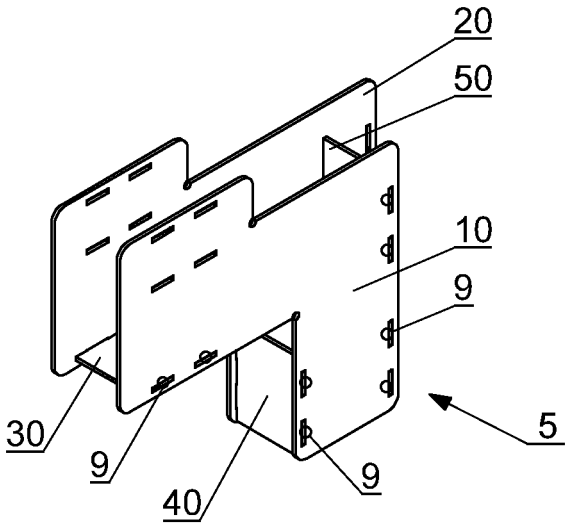
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Fig.2

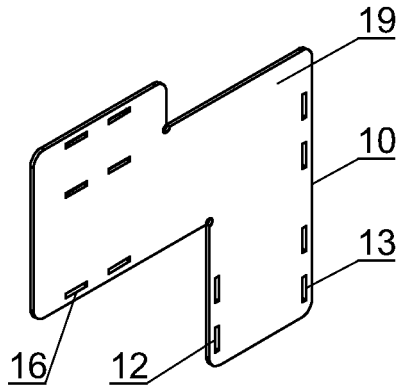



Fig.3

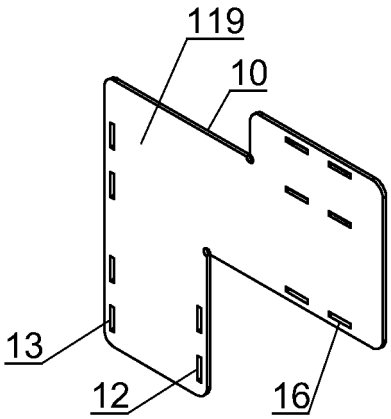



Fig.4

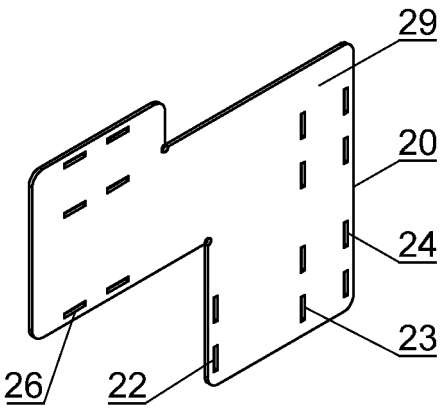



Fig.5

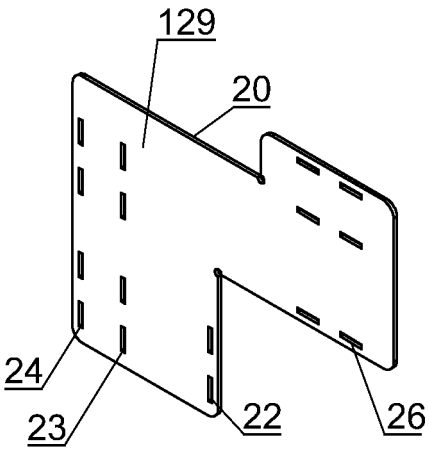



Fig.6

Fig.7A

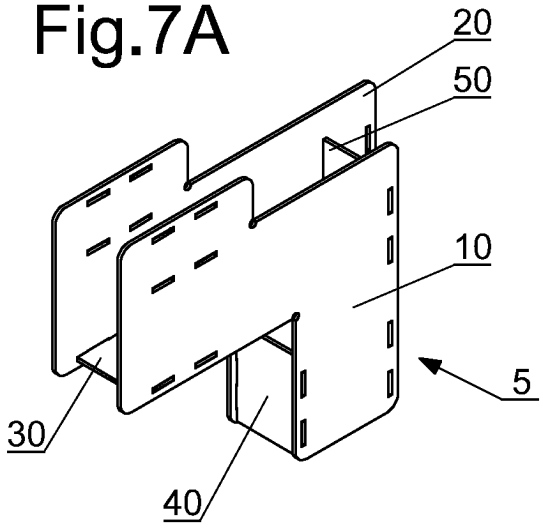



Fig.7B

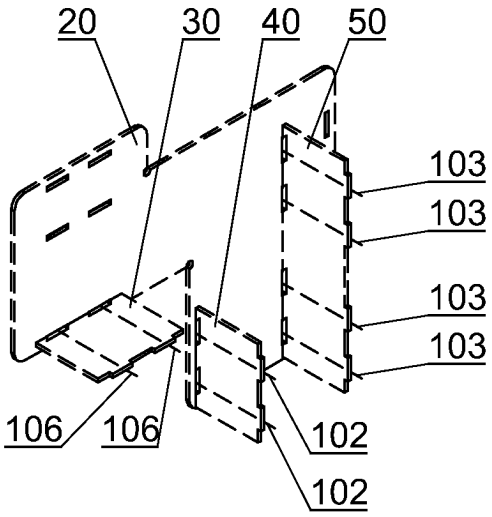
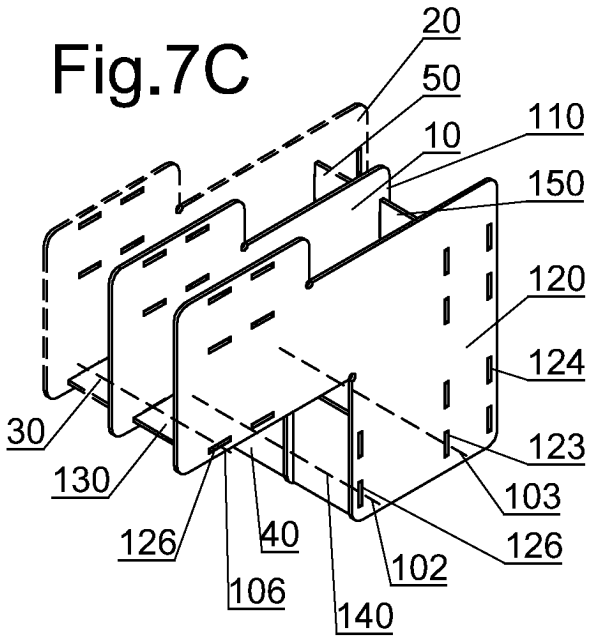



Fig.7C



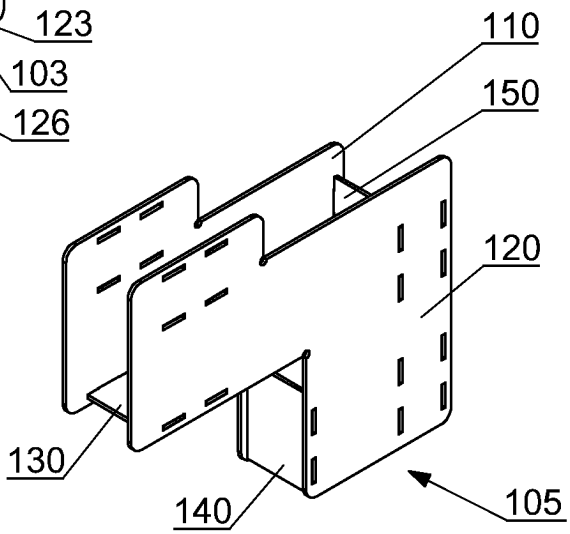




Fig.7D

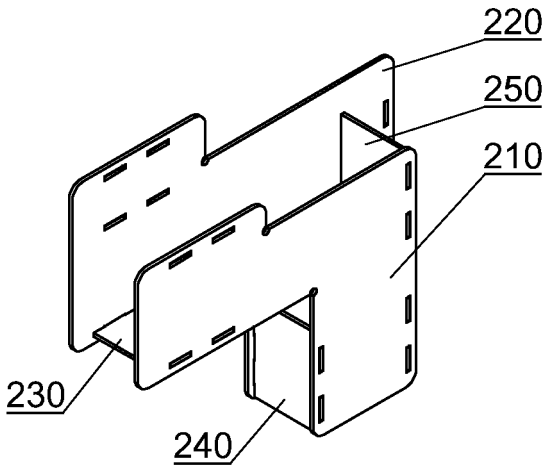



Fig.8

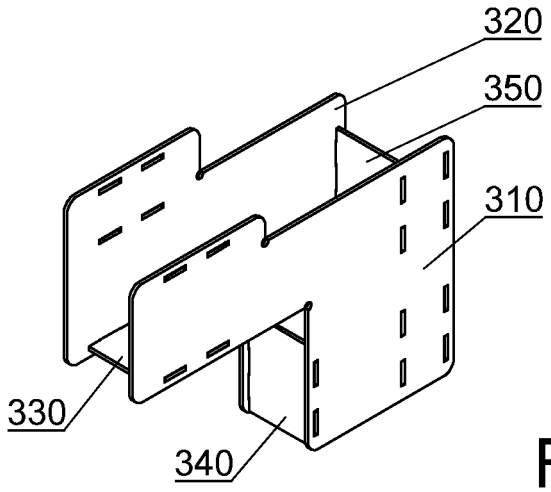



Fig.9

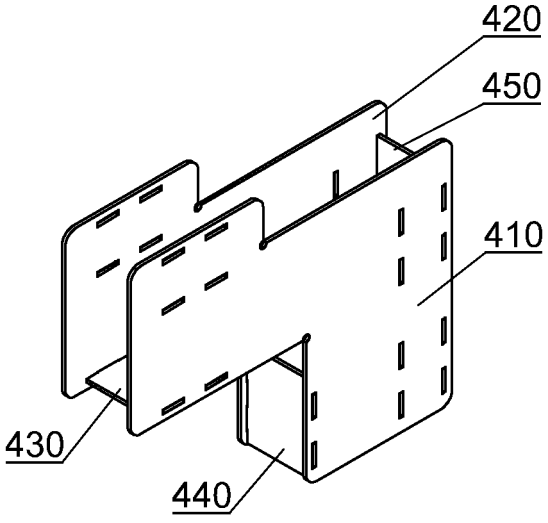



Fig.10

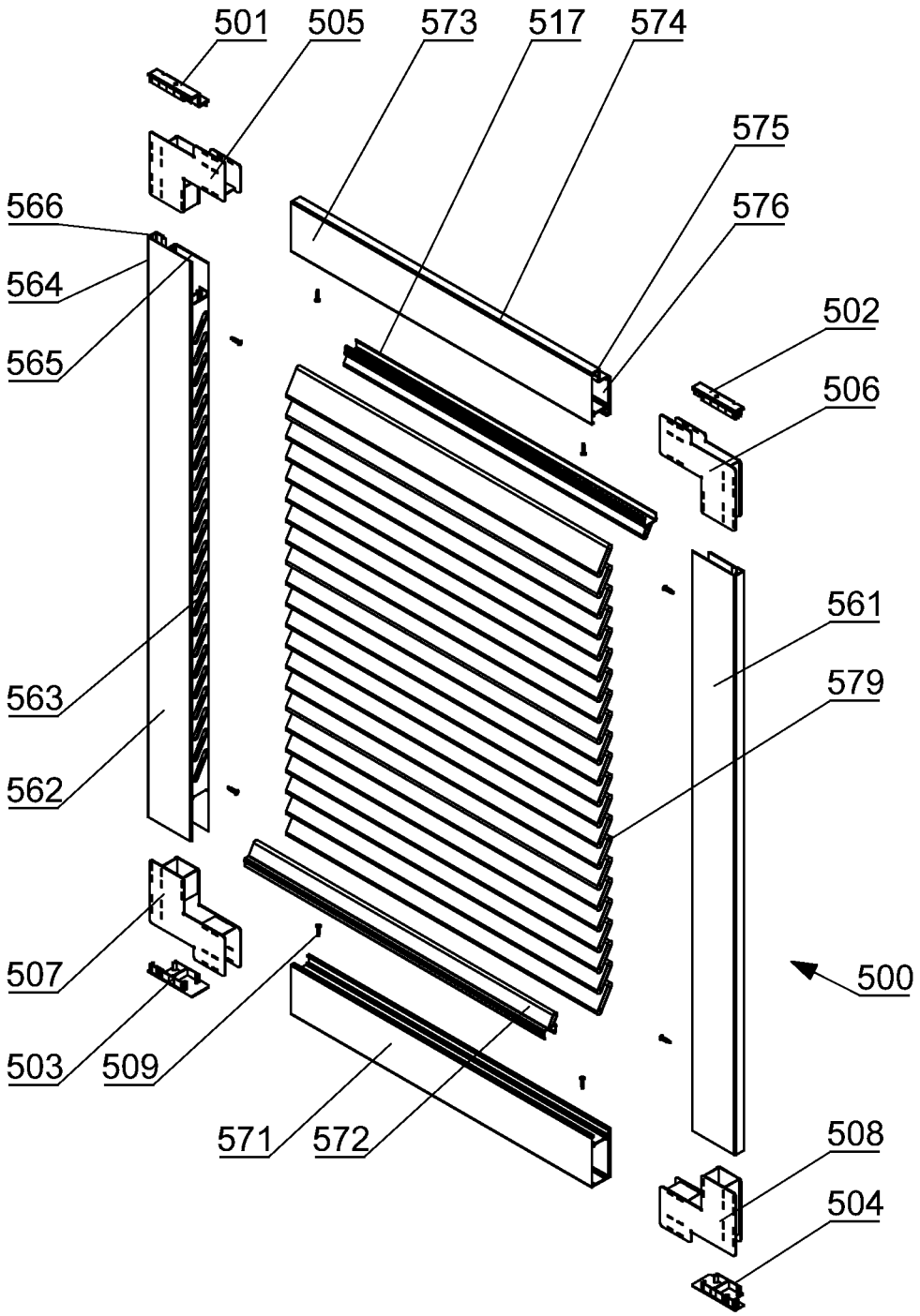

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Fig.11

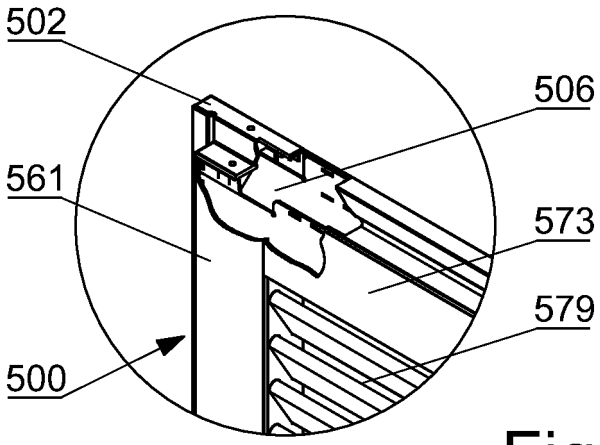
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Fig.12

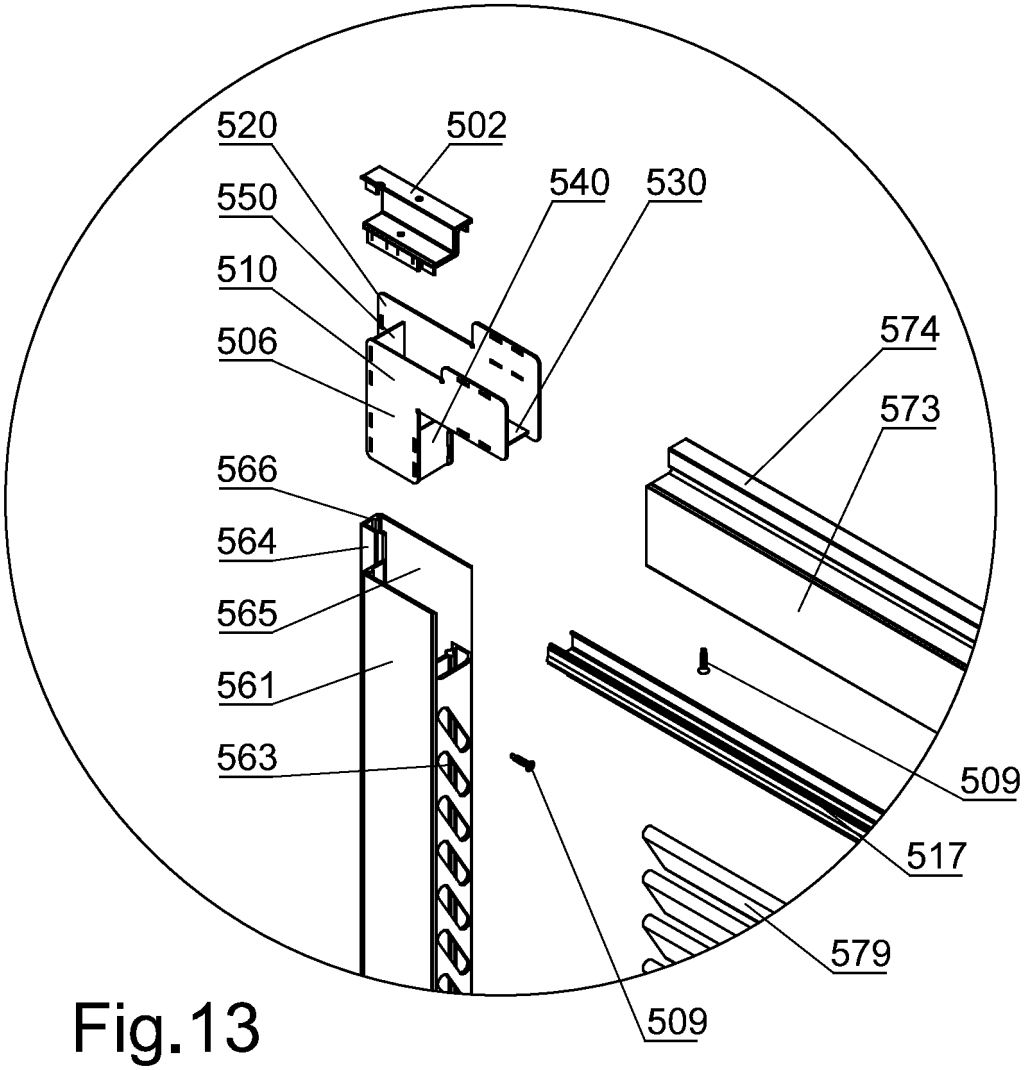
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Fig.13

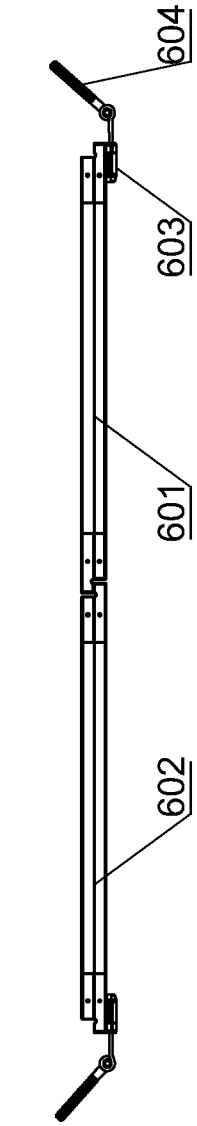


Fig.15

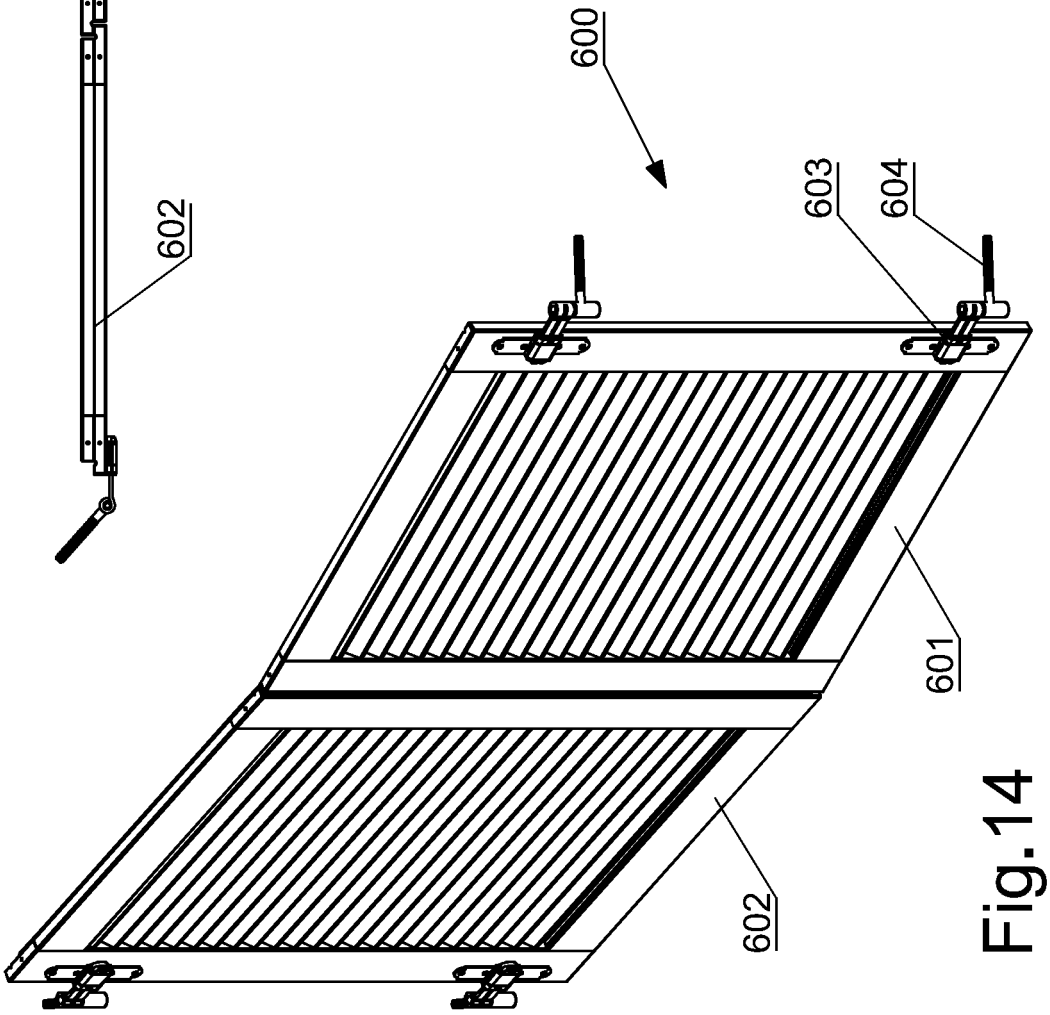


Fig.14

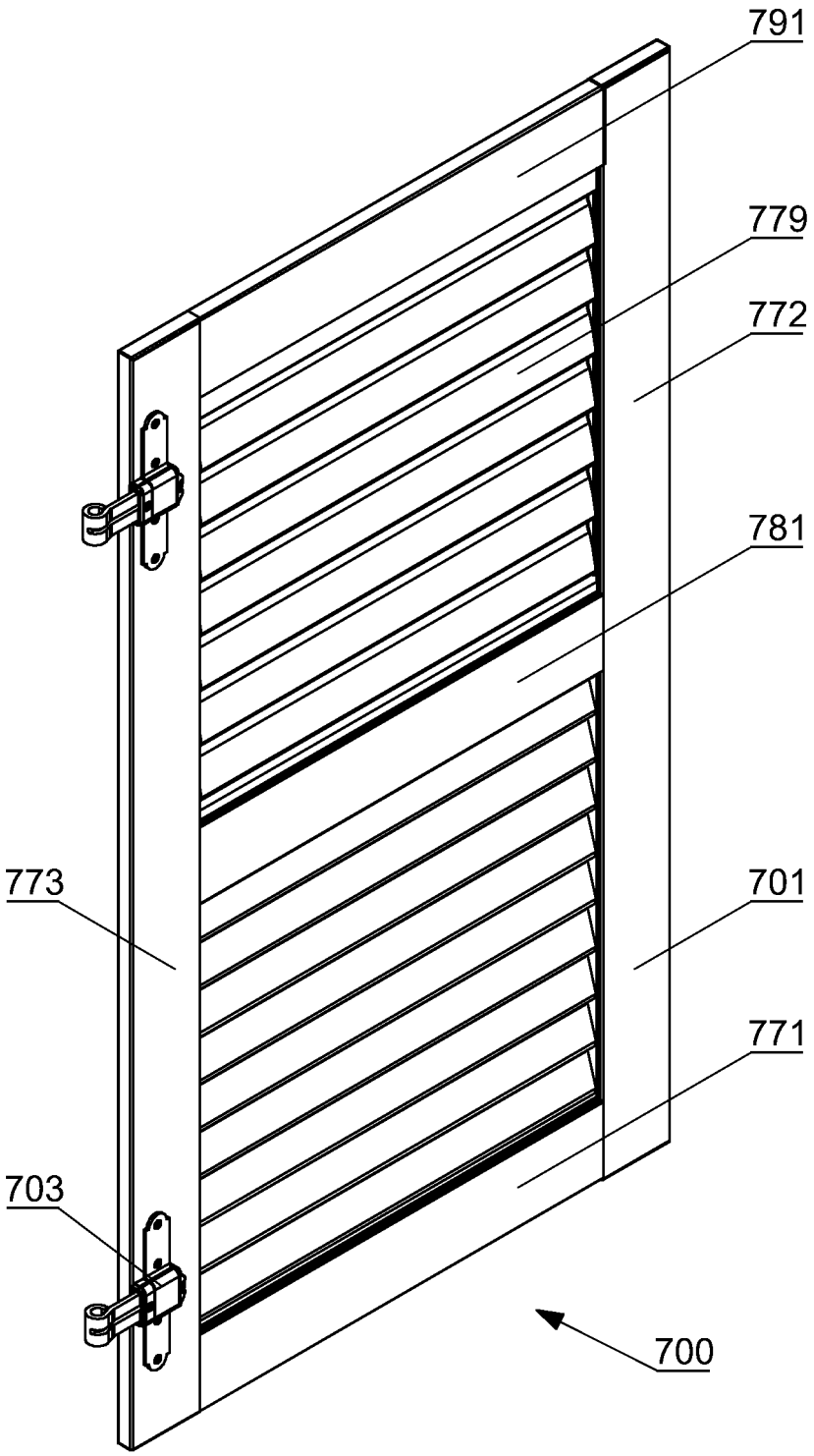


Fig.16

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# EUROPEAN SEARCH REPORT

Application Number
EP 12 46 1548

## 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<br>A | EP 2 360 344 A2 (ALCOA ALUMINIUM DEUTSCHLAND INC [DE])<br>24 August 2011 (2011-08-24)<br>* figures 3-5 * | 1,7<br>2-6 | INV.<br>E06B3/964 |
| A | DE 203 16 758 U1 (SCHUECO INT KG [DE])<br>24 December 2003 (2003-12-24)<br>* figure 1 * | 1 | |
| A | FR 2 222 524 A1 (JEANTILS PIERRE HENRI [FR]) 18 October 1974 (1974-10-18)<br>* figure 1 *<br>* claim 1 * | 8,9 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC)<br>E06B |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 8 March 2013 | Tänzler, Ansgar |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 46 1548

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08-03-2013

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| EP 2360344 A2 | 24-08-2011 | NONE | |
| DE 20316758 U1 | 24-12-2003 | NONE | |
| FR 2222524 A1 | 18-10-1974 | AT 346564 B | 10-11-1978 |
| | | BE 811205 A1 | 17-06-1974 |
| | | CH 586832 A5 | 15-04-1977 |
| | | FR 2222524 A1 | 18-10-1974 |
| | | IT 1018425 B | 30-09-1977 |
| | | LU 69661 A1 | 10-07-1974 |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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### Patent documents cited in the description


- PL 193379 B1 **[0003]**
- CA 2561334 A1 **[0004]**
- TW M316305 U **[0005]**
- US 2008060314 A1 **[0006]**