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(71) Applicant: **SEU PLASTICS ONE MAN L.L.C.**
62122 Serres (GR)

(72) Inventor: **MYLONAS, Alexandros**
552 36 Panorama Thessaloniki (GR)

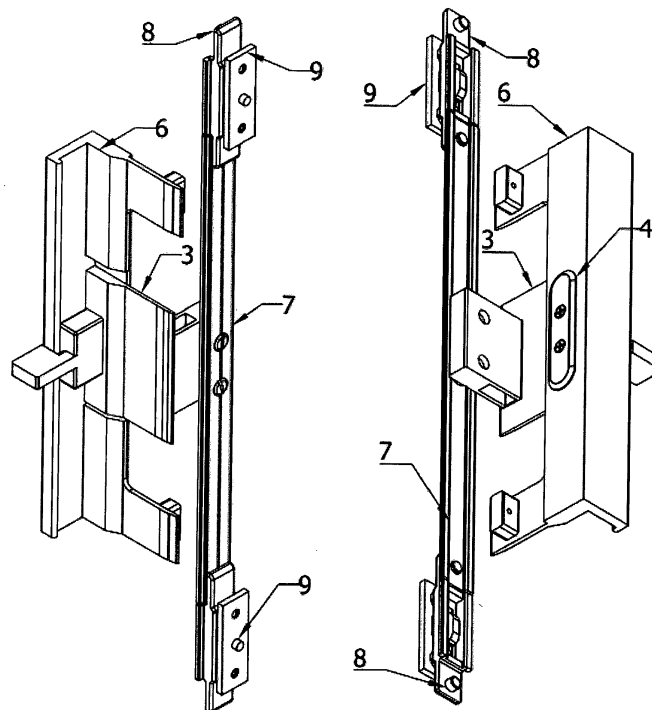
(74) Representative: **Panagiotidou, Effimia**
3 Aristotelous Str.
546 24 Thessaloniki (GR)

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(54) LOCKING MECHANISM FOR HIDDEN RECESSED FRAME

(57) Locking mechanism (1) with transmission component (3) located on the vertical side profile (10) of the sliding leaf (1) that is fully inserted into the case (2) of the frame. The mechanism has a support base (15), a controller (16) and a protrusion (17). The base (15) is flat. Its bottom behind the controller (16) has holes (18) in a rectangular recess (19). The controller (16) is per-

pendicular to the base (15). The protrusion (17) has two through holes (23) connecting to the bowden cable (7) corresponding to the holes (24) of the bowden cable (7). The protrusion (17) located inside the vertical profile (10) serves as an extension for the controller (16) located outside the vertical profile (10) and outside the case (2).

**Drawing 4****EP 3 865 644 A1**

Description

[0001] The invention belongs to the field of engineering and in particular concerns hidden sliding door frames.

[0002] "Hidden sliding frame" means the frame whose case may be built-in into the floor and the surrounding walls. "Recessed sliding frame" means the frame whose leaf frame, when in "closed position", is inserted into the frame case. This invention serves to combine the features of these two types of frames.

[0003] The recessed sliding frames maximise the field of the user's vision, but also increase the thermal insulation coefficient, since the frames of their leaves enter the case. However, their technical problem is that inserting the frame into the case limits the vital space required for fitting sufficient frame locking and, in particular, handling means. For this reason, it is not possible to fully insert the vertical profile of the sheet into the frame case, with the frame's means for handling locking fitted on the leaf. According to the current technique of recessed frames, the locking mechanism of the frame is located either on the frame's vertical case or on the wall. Not on the leaf. The above show the problem to be solved, i.e. that there is no recessed frame in the currently used technique, meaning that the vertical profile of the leaf is fully inserted into the case and at the same time the locking mechanism is located on the leaf while the mechanism is operated by means of the leaf's handle that remains outside the case.

[0004] A solution proposed in the currently used technique is that many recessed sliding frames have the locking mechanism fitted in the middle of the opening, at the point where the vertical frames of the two frame leaves overlap. This is the solution that EP 2921624 A1 proposes, namely placing the handle at the point where the vertical frames of the two leaves of the frame overlap, as opposed to the present invention featuring the handle at the vertical profile that is inserted into the case. In other proposed solutions, such as EP1353034B1 and EP2853674B1, the largest part of the leaf enters the frame case, or the entire leaf enters the case, as in WO 2017/195064 (ER3456911), where the locking mechanism of the frame is located outside the leaf, on the masonry and is connected to the case.

[0005] The present invention resolves the above technical problem. It achieves the manufacture of a hidden recessed frame by integrating the vertical side profile of the leaf inside the case, while at the same time, thanks to an innovative locking mechanism located on the leaf, the mechanism is operated by means of the leaf's handle that remains outside the case.

[0006] The present invention briefly functions as follows:

The locking mechanism is fitted on the handle located on the inside of the leaf's vertical side profile that moves and stops at the frame case. The leaf has a long handle both on the inside and outside, fixed along the frame. The locking mechanism consists of a transmission com-

ponent, its restrainer, a bowden cable and two locks, all fitted on the moving leaf and two locking hooks of the lock fitted on the frame case that is built into the masonry. The component achieves the transmission of movement from the outside to the inside of the profile.

[0007] The advantage of this invention is that, thanks to the locking mechanism, a frame is manufactured that, when the leaf stops in the frame case, the vertical side profile of the sheet fully enters the case. It therefore combines maximum visibility for the user that hidden frames offer, with the maximum thermal insulation capability, since it reduces the opening area covered by the aluminium frame.

A further advantage is that, thanks to the locking mechanism built in the leaf, there are no visible level differences ("steps") between the technical elements of the frame such as case, frame, glass. When the leaf is closed, the vertical side frame enters the walls (where the side case of the frame is located). The only level that the user sees is the glass level, thus offering high aesthetics and state of the art.

[0008] Finally, the advantage of this invention is that the handles are screwed to the front exterior of the sliding profile and not to the inside of the profile and therefore it is easy to both install and replace the handles.

[0009] The 10 drawings accompanying the invention briefly present the following:

Drawing 1 illustrates, in perspective view, the part of the leaf that has the locking mechanism (figure 1a) and the part of the case that is built in, with the locking hooks of the lock (figure 1b).

Drawing 2 illustrates the leaf, the handle, the locking mechanism and the locking locks of the lock, disassembled.

Drawing 3 illustrates part of an overlapping frame that has the locking mechanism in a horizontal section X-X' (figure 3a) and determines the level of horizontal section X-X' (figure 3b).

Drawing 4 illustrates the inside handle and locking mechanism, assembled, in perspective views.

Drawing 5 illustrates the inside handle with its shaping /processing, in perspective views.

Drawing 6 illustrates the inside handle in various views.

Drawing 7 illustrates the handle transmission component, in perspective views.

Drawing 8 illustrates the handle transmission component, in various views.

Drawing 9 illustrates the retainer of the transmission

component, in various views.

Drawing 10 illustrates the profile of the leaf with its processing and cross section.

[0010] There follows a detailed description of the present invention with reference to the accompanying drawings.

[0011] As illustrated in drawing 10, the vertical profile (10) of the sliding leaf (1) has side A located inside the building, side C located outside the building and side B which is its front side, i.e. the one entering the case (2) of the frame and locking onto the case (2).

[0012] As illustrated in drawings 1 and 2, the locking mechanism is located on the vertical side profile (10) of the sliding leaf (1) that is fully inserted into the case (2) of the frame. The case (2) may be built-in, i.e. it may be covered by the walls completely, or part of it may remain outside the walls. The locking mechanism, disassembled, consists of a transmission component (3), a retainer (4) of the transmission component, an outside (5) and an inside (6) handle, a bowden cable (7), and at least two lock strike plates (8), which are fitted on a bowden cable on the vertical profile (10) of the sliding leaf (1), as well as of a respective number of locking hooks (9) with the strike plates (8) located on the frame case (2). As illustrated in drawings 2 and 10, the side vertical profile (10) of the sliding leaf (1) on side A, has a hole (12) for fitting the transmission component (3) and two holes (11a and 11b) both of similar cross-section equally spaced above and below the hole (12), for fitting the inside handle (6). Side C of the vertical profile (10), has only two holes (11c and 11d) for fitting the outside handle (5), which have both the same cross section, and are at the same level with the two holes (11a and 11b) supporting the inside handle (6).

[0013] As illustrated in drawing 10, the vertical side profile (10) on the front side of B that enters the frame case (2) and locks onto the case (2), has:

- a hole (13a) corresponding to the hole (11a) supporting the inside handle (6) at its top part, the two communicating holes (11a and 13a) inside the vertical profile (10),
- a hole (13c) corresponding to the hole (11c) supporting the outside handle (5) at its top part, the two communicating holes (11c and 13c) inside the vertical profile (10),
- a hole (13b) corresponding to the hole (11b) supporting the inside handle (6) at its bottom part, the two communicating holes (11b and 13b) inside the vertical profile (10), and
- a hole (13d) corresponding to the hole (11d) supporting the outside handle (5) at its bottom part, the two communicating holes (11d and 13d) inside the vertical profile (10).

[0014] The vertical profile (10) also has on the front

side of B, a hole (14) corresponding to the hole (12) for fitting the transmission component (3) of side A, on the same horizontal level with the hole (12). The two holes (12 and 14) on sides A and B of the vertical profile (10), communicate on its inside.

[0015] Finally, the vertical profile (10) has a channel (29) formed along its length, for placing the bowden cable (7) and the lock strike plates (8) inside, which are at least two.

[0016] In the frame case (2) the locking hooks (9) are fitted and fixed without being able to move, at equal numbers with the lock strike plates (8) in points opposite thereto.

[0017] The handle has two parts: the inside (6) handle located on inner side A of the vertical profile (10) and the outside (5) handle located on outer side C of the vertical profile (10).

As illustrated in drawings 5 and 6, the inside handle (6) fitted on side A of the vertical profile (10), has a hole (20) and a recess (21) for mounting the transmission component (3), which can be rectangular in shape, or tiered, etc. Both ends of the inside handle (6) have two identical protrusions (22) so it can be mounted and fixed in holes (11a and 11b) located on side A of the vertical profile (10). The protrusions (22) have holes (25) for fixing the inside handle (6), through the corresponding holes (13a and 13b) of the front part B of the vertical profile (10).

As illustrated in drawings 4, 5, 6 and 9, the hole (20) where the restrainer (4) of the transmission component (3) is fitted and fixed, has configurations on its walls (27). The retainer (4) has configurations (26) on its main part (e.g. springs) corresponding to the configurations (27) of the hole (20) and holes (28).

[0018] The outside handle (5) has the same protrusions (22) with holes (25) for fixing purposes, just like the inside (6) handle.

[0019] As illustrated in drawing 2, the bowden cable (7) has two connection holes (24) with the transmission component (3).

As illustrated in drawings 4, 7 and 8, the transmission component (3) is an element that has a support base (15), a controller (16) and a protrusion (17), either in the form of one single component or in the form of an assembly. The base (15) is flat. Its bottom behind the controller (16) has holes (18) in a rectangular recess (19). The controller (16) is perpendicular to the base (15). The protrusion (17) has two through holes (23) connecting to the bowden cable (7) corresponding to the holes (24) of the bowden cable (7). The protrusion (17) located inside the vertical profile (10) serves as an extension for the controller (16) located outside the vertical profile (10) and outside the case (2).

[0020] The locking mechanism is assembled and operated as follows:

The transmission component (3) is mounted along with its flat base (15) inside the recess (21) of the inside handle (6). The retainer (4) is fitted into the rectangular recess (19) of the transmission component base (15) through

the main hole (20). The two transmission components (3) and retainers (4) are screwed into the holes (28 and 18) they have and now move as one inside the hole (20) giving a linear back and forth motion in the recess (21) of the inside handle (6). The controller (16) protrudes from the handle (6) to allow easy access and operation (Figure 3). Then, the handle (6) assembled with the transmission component (3) and the retainer (4), is fitted in the vertical profile (10) as follows: the protrusion (17) of the transmission component (3) enters the hole (12) on side A on the side (10), then the similar protrusions (22) of the handle (6) enter the holes (11a and 11b) located in side A of the vertical profile (10). The handle (6) is fixed by fastening screws in the corresponding holes (13a and 13b) of part B of the vertical profile (10) with the holes (25) of the handle's (6) protrusions (22).

[0021] The outside handle (5) is fitted on side C of the vertical profile (10) as follows: the identical protrusions (22) of the handle (5) enter the holes (11c and 11d) located on the side C of the vertical profile (10). The handle (5) is fixed by fastening screws in the corresponding holes (13c and 13d) of side B of the vertical profile (10) with the holes (25) of the handle's (5) protrusions (22).

[0022] The bowden cable (7) is slid into the channel configuration (29), as well as the lock strike plates (8) that are at least two. The transmission component (3) is screwed on the bowden cable (7) in the through holes (23) of the component (3) and in the through holes (24) of the bowden cable (7) and the locking mechanism for the hidden recessed frame is ready to use.

[0023] During operation of the invention, the mechanism works as follows:

To lock the frame, the user pushes the leaf (1) towards the frame case (2) by means of the inside handle (6). As illustrated in drawing 3, the leaf (1) enters the case, and stops at the end of the case (2). The entire vertical profile (10) enters the case (2) and is no longer visible to the user. The user pushes the controller (16) of the transmission component (3) down, the base (15) of the transmission component (3) moves inside the recess (21) of the inside handle (6), the configurations (26) of the component's (3) retainer (4) fit into the configurations (27) of the handle's (6) hole (20). As the transmission component (3) moves downwards, its protrusion (17) moves and drags the bowden cable (7) and the lock strike plates (8) mounted on the bowden cable (7) engage with the locking hooks (9) located on the frame case (2) and the frame locks.

[0024] To unlock, the user pushes the controller (16) of the transmission component (3) upwards, the transmission component (3) moves upwards, the protrusion (17) moves and drags the bowden cable (7) towards the same direction and releases the lock strike plates (8) from the locking hooks (9). The frame is now unlocked, the user can push it open. The present invention can be applied in all door and window openings covered by sliding frames, whether bypass or not.

Claims

1. Locking mechanism for hidden recessed frame that fits to the vertical profile (10) of the leaf (1) having an inner side A, outer side C and front side B, includes an inside (6) and outside (5) handle, a bowden cable (7), lock strike plates (8) and a number of locking hooks corresponding to the strike plates (8) mounted on the frame case (2), which is **characterised in that** it has fitted on the inside handle (6) on side A of the profile (10):

- a transmission component (3) that has a flat support base (15), a controller (16), a protrusion (17),
- a retainer (4) of the transmission component (3),

and in that

- the inside handle (6) has a hole (20) and a recess (21) where the transmission component (3) moves with the retainer (4).

2. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** the protrusion (17) of the transmission component (3) has connecting holes (23) to the bowden cable (7).

3. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** under the controller (16) there is a recess (19) with holes (18) where the retainer (4) is connected to the transmission component (3).

4. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** the controller (16) is perpendicular to its base (15).

5. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** the vertical profile (10) of the leaf has openings on side A and the vertical profile (10) of the sliding leaf (1) has a hole (12) on side A for fitting the transmission component (3) and two holes (11a and 11b) for fitting the inside handle (6).

6. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** the vertical profile (10) has a hole (14) on the front side of B corresponding to the hole (12) for fitting the transmission component (3) of side A, at the same horizontal level with the hole (12).

7. Locking mechanism for hidden recessed frame, according to claim 1, **characterised in that** the front side of B of the vertical side (10) has two holes (13a, 13b) corresponding to the holes (11a, 11b) support-

ing the inside handle (6) and two holes (13c, 13d) corresponding to the holes (11c, 11d) supporting the outside handle (5).

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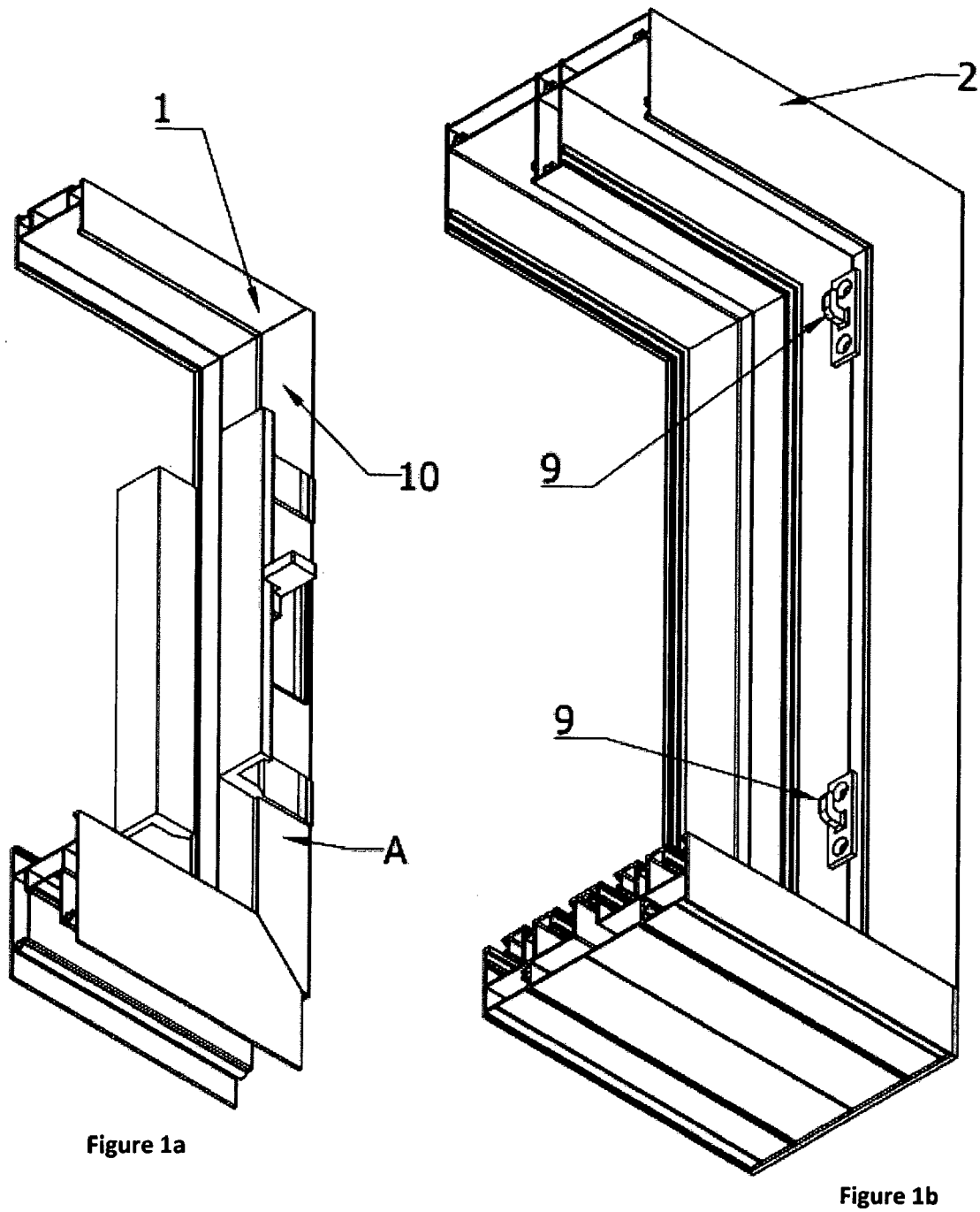
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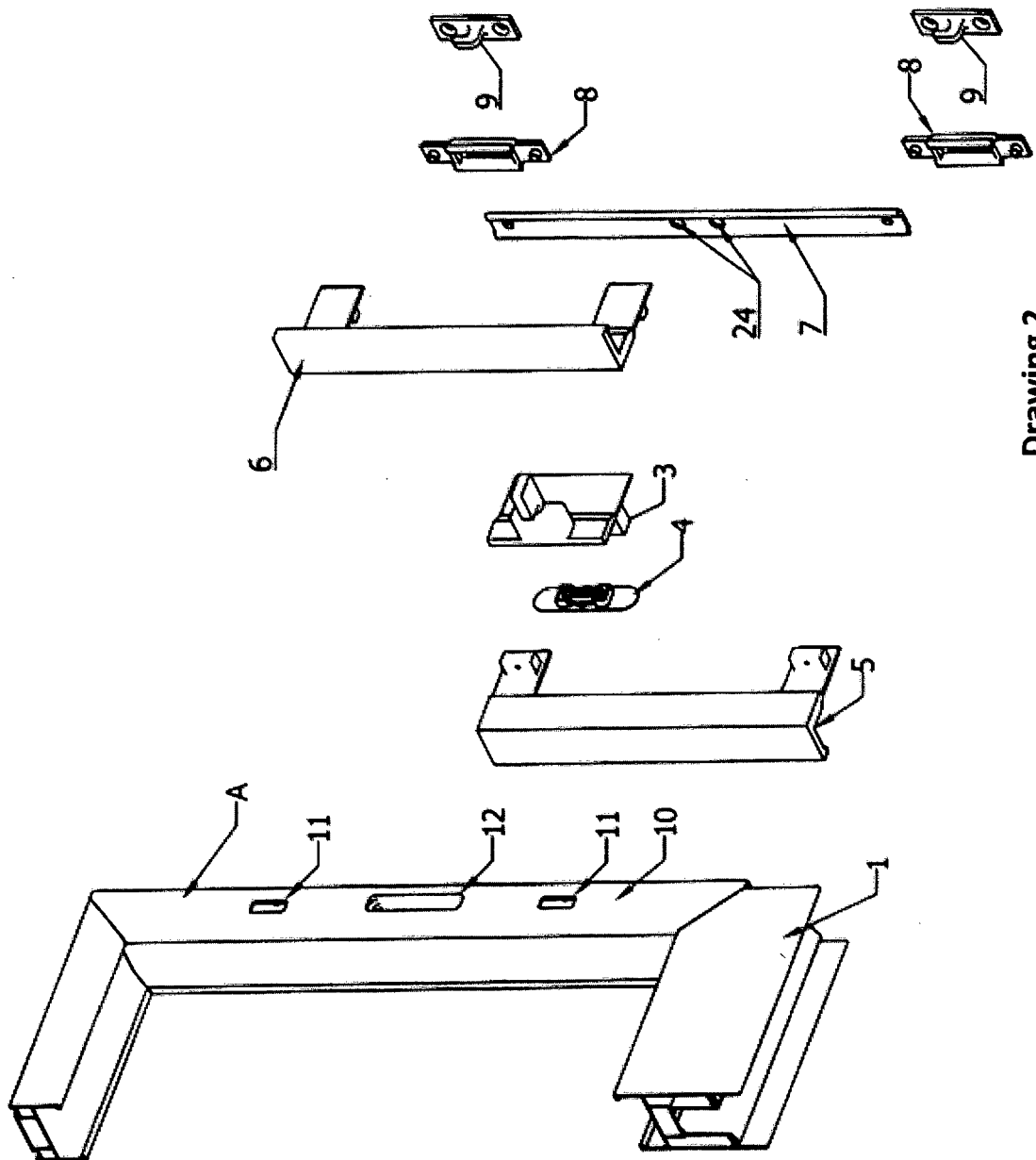
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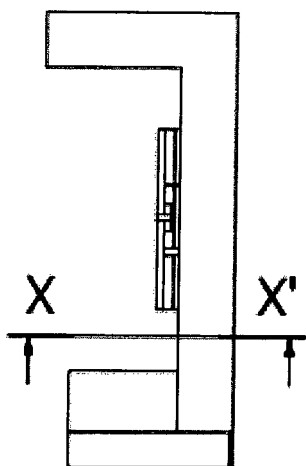
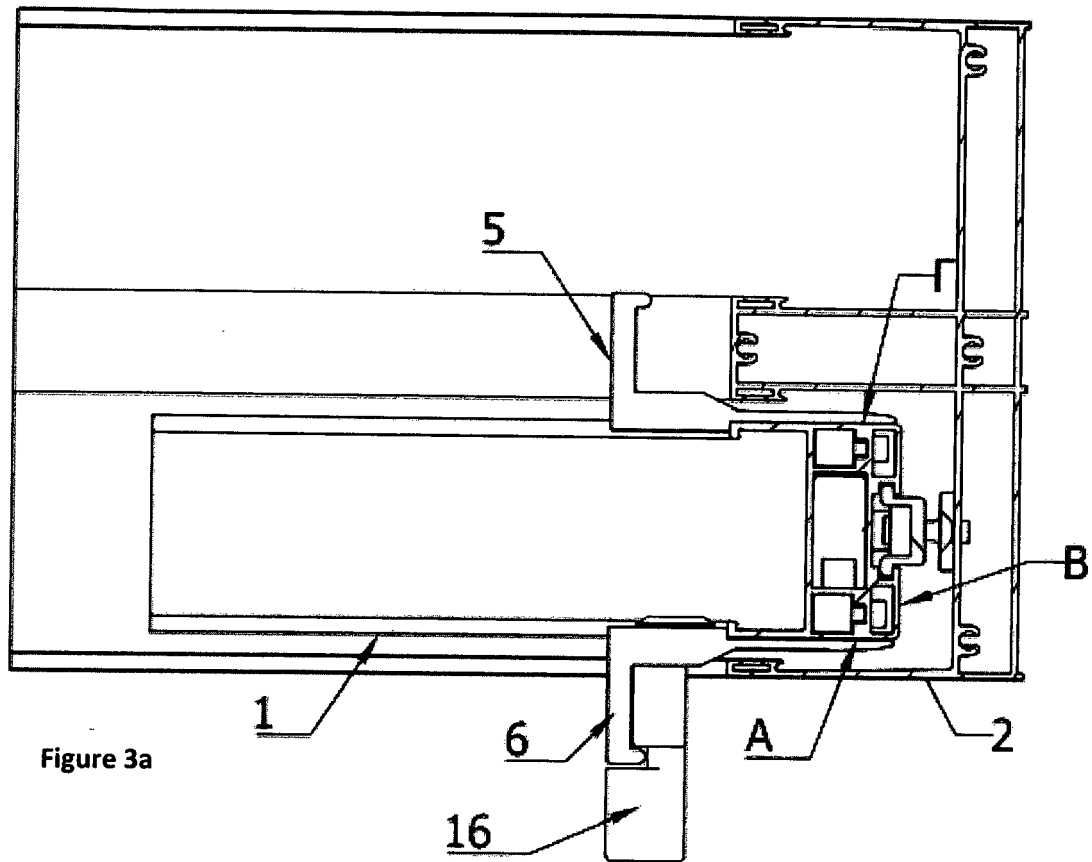
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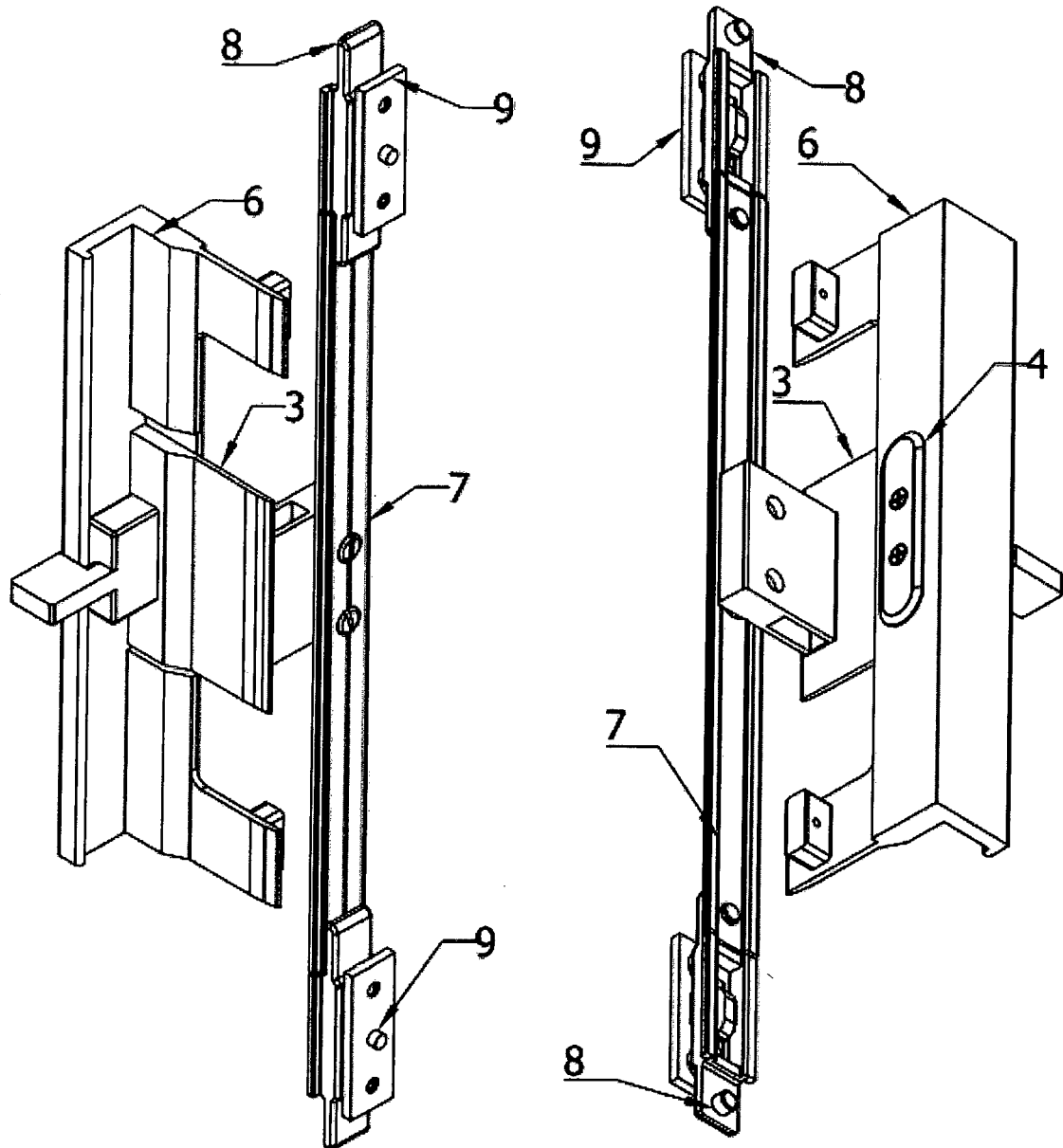
Drawing 1



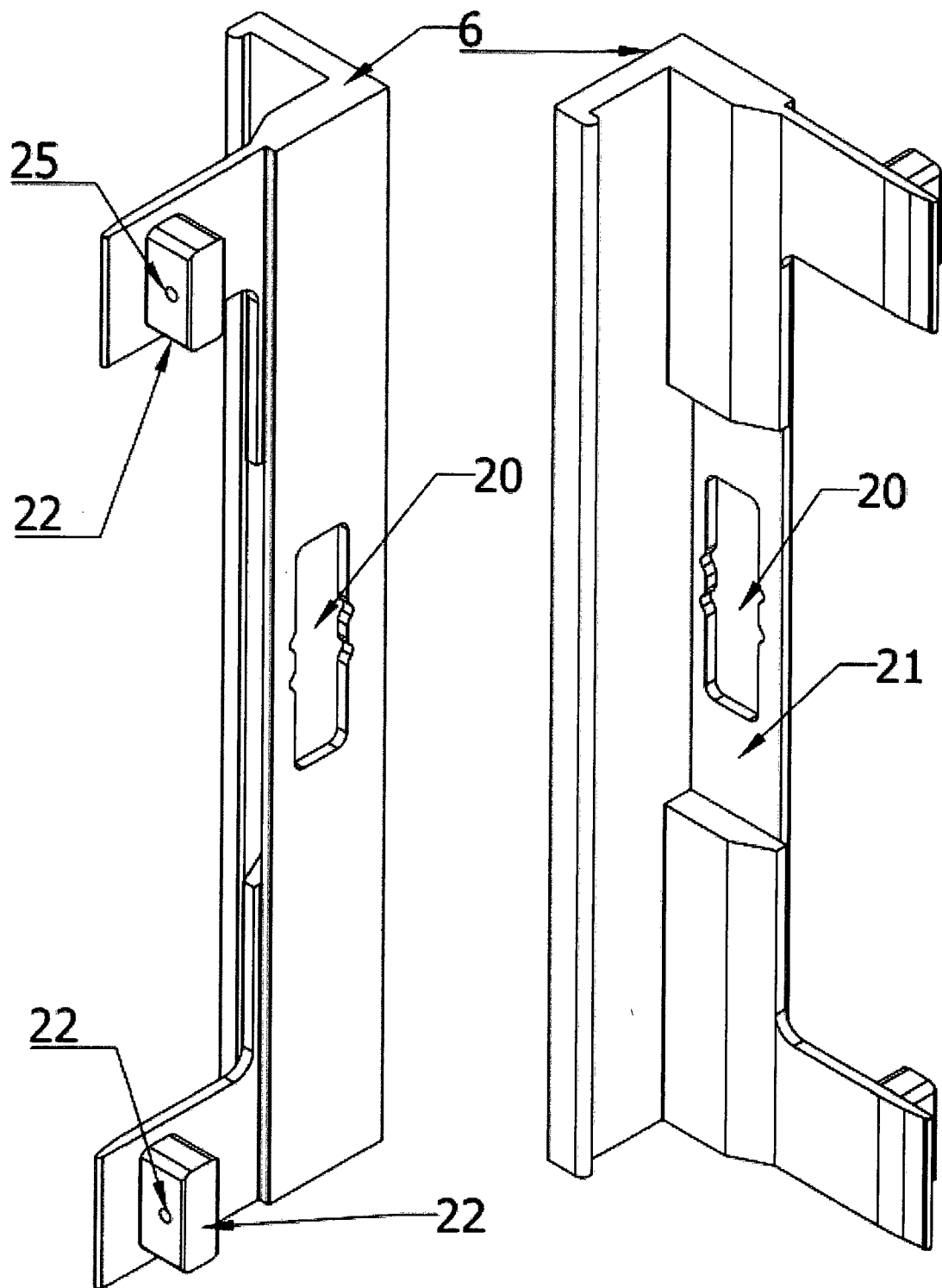
Drawing 2



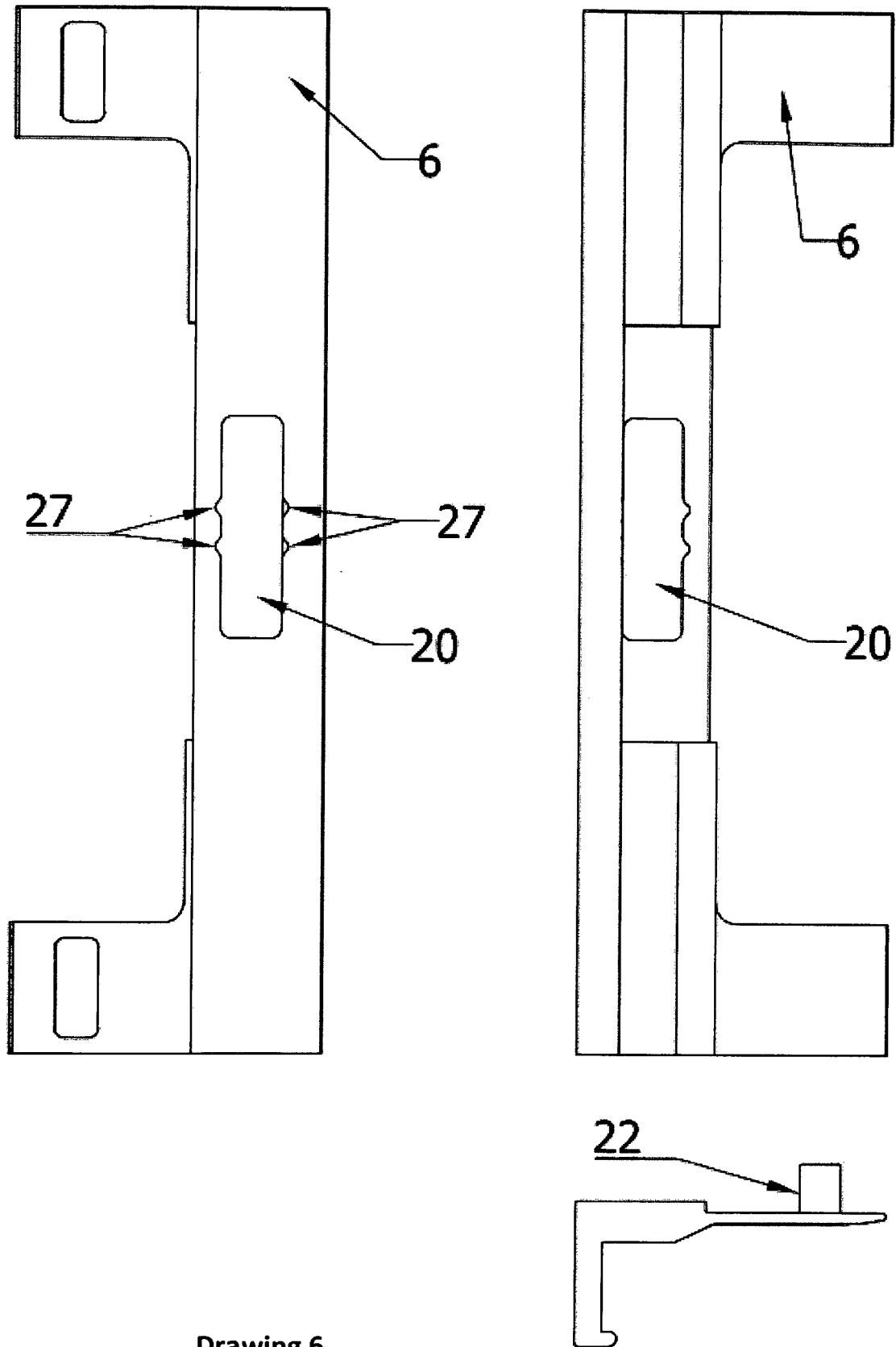
Drawing 3



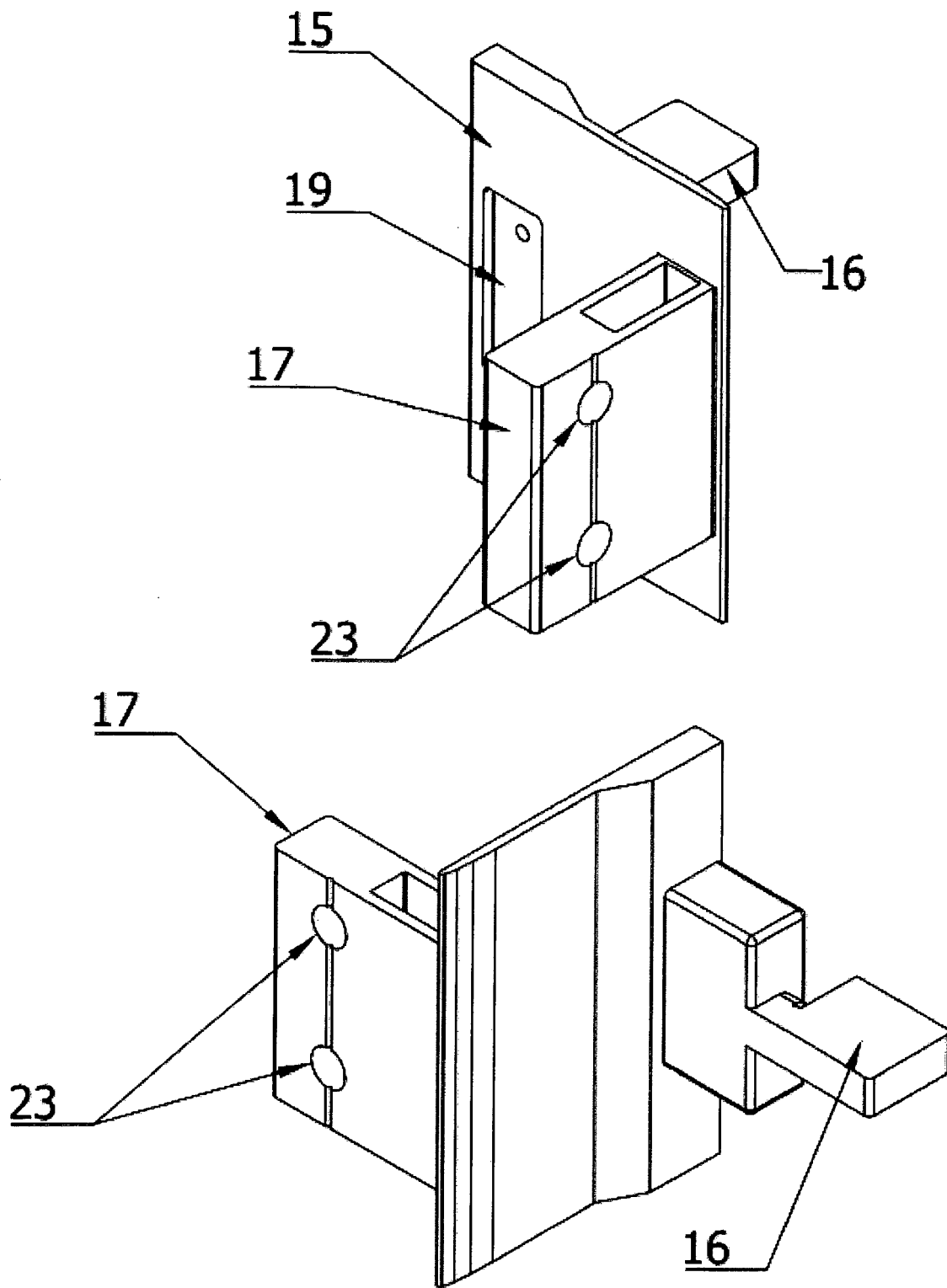
Drawing 4



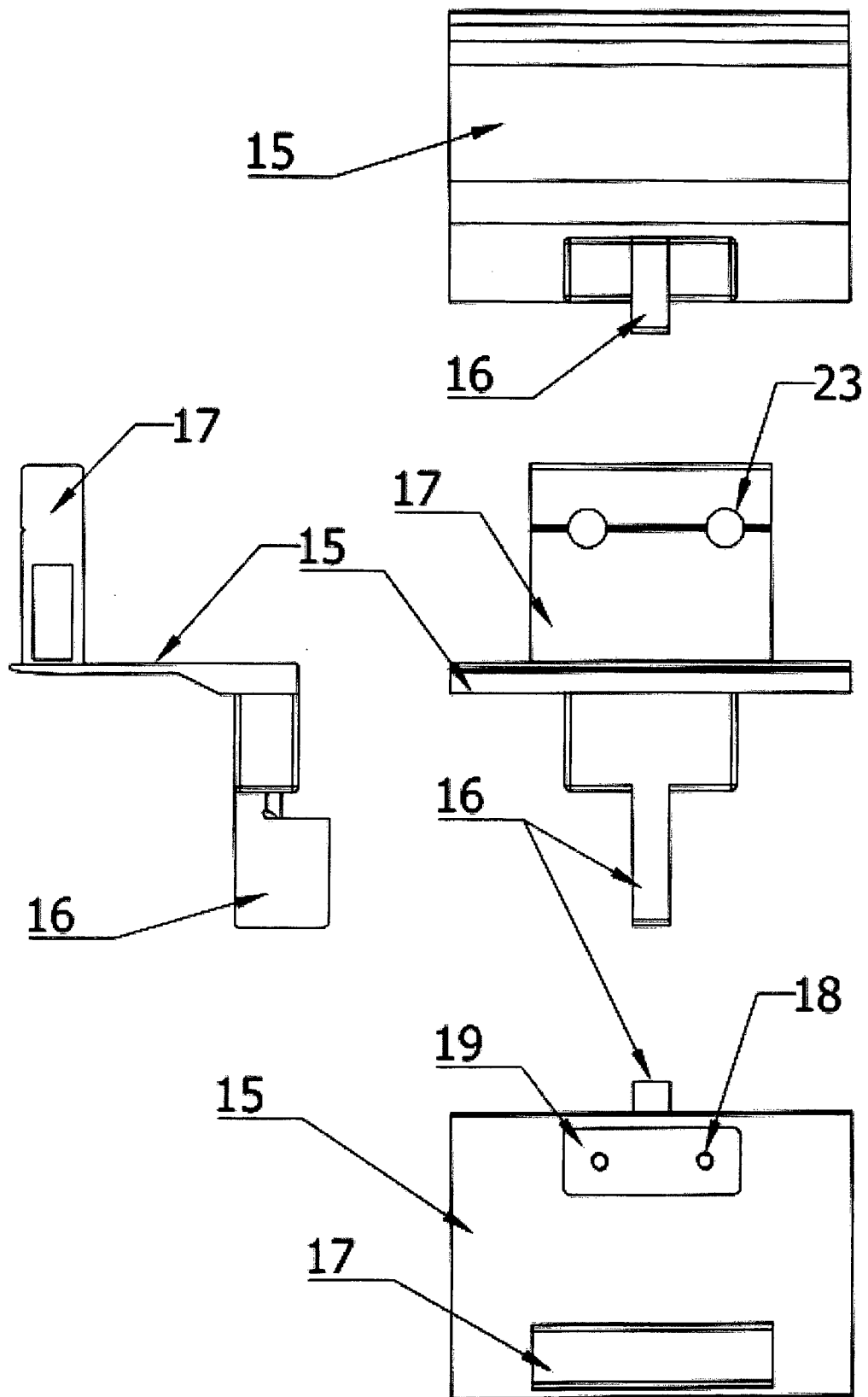
Drawing 5



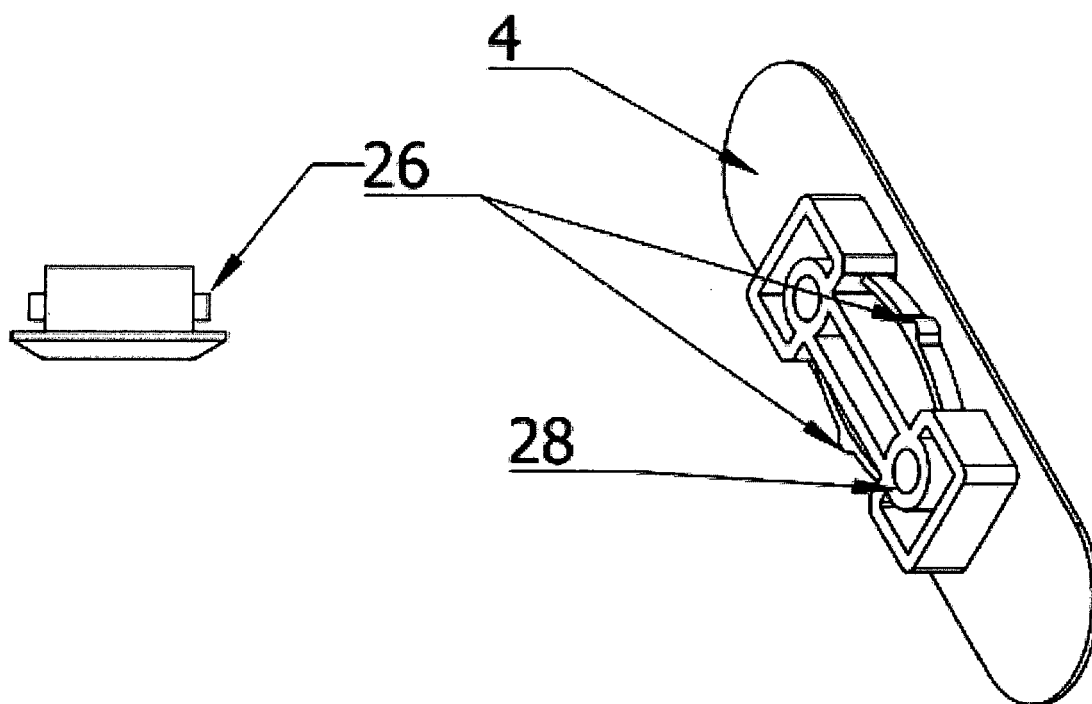
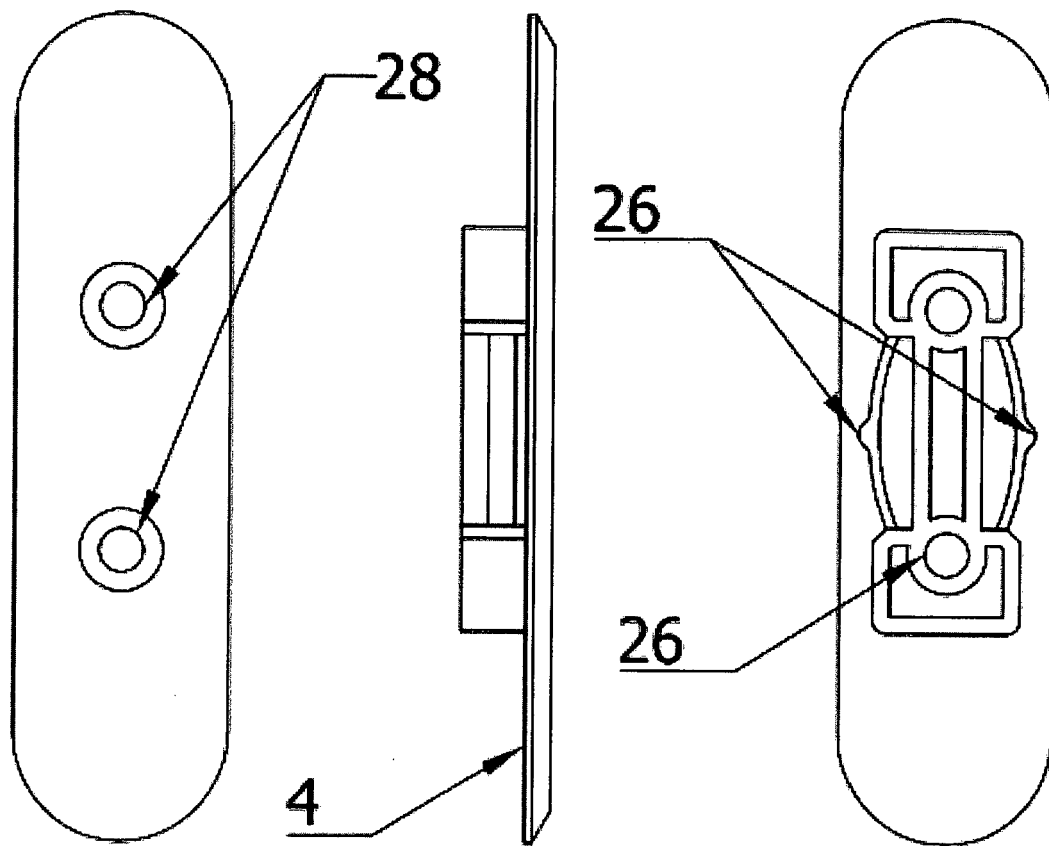
Drawing 6



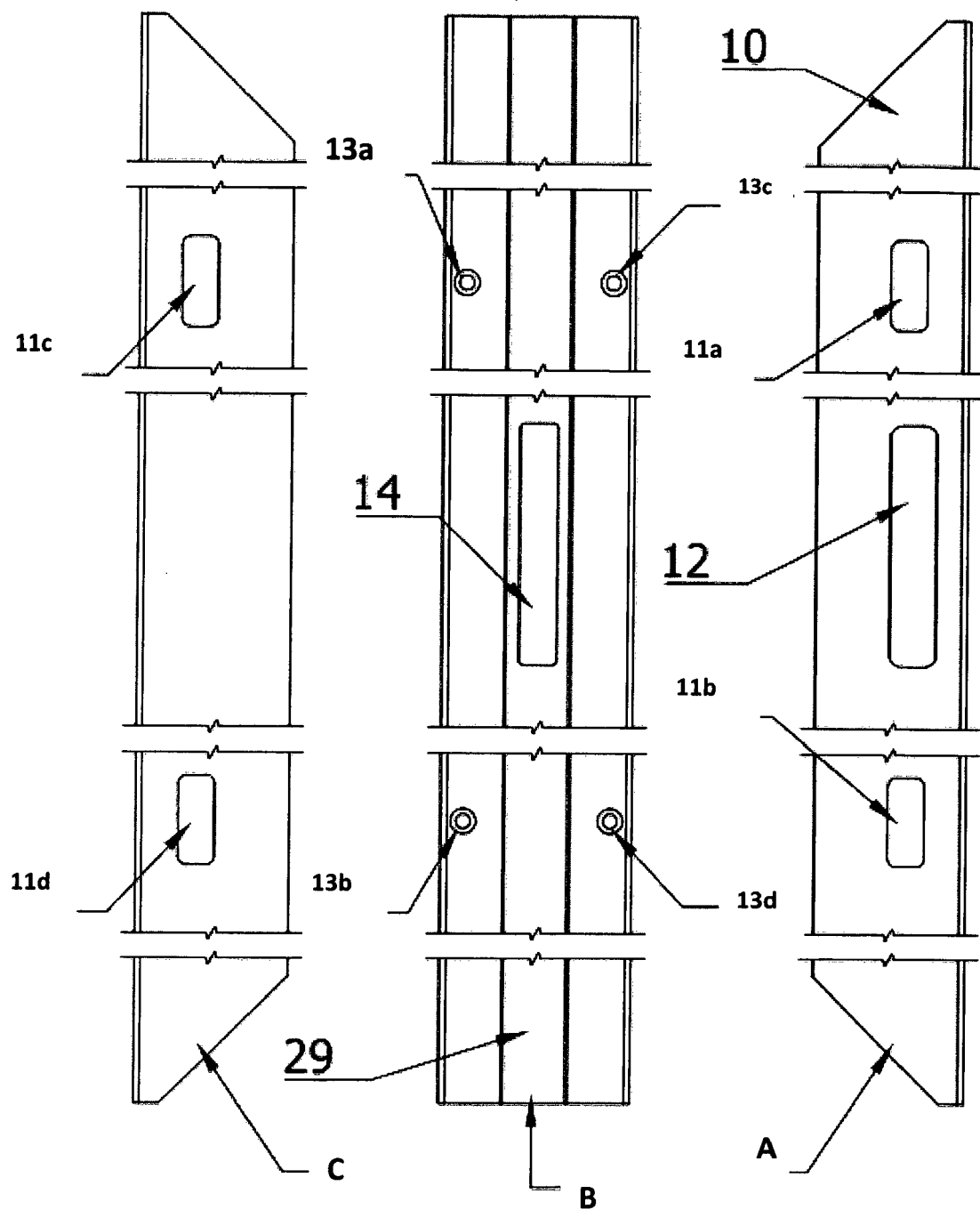
Drawing 7



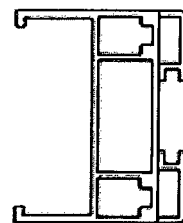
Drawing 8



Drawing 9



Drawing 10





EUROPEAN SEARCH REPORT

Application Number
EP 21 38 6004

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 June 2021	Examiner Blancquaert, Katleen
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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