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(54) STRUCTURE FOR SLIDING DOORS AND RELATED KIT FOR ASSEMBLY

(57) A structure (1) for sliding doors, which comprises:
- an in-wall frame (2) which internally defines an internal cavity (10) and comprises a passage opening (14) defined between two vertical side posts (41, 42);
- an upper guide (8) along which an extractable supporting element (90) can slide which is adapted to support a door body (9) so as to guide its sliding into, and out of, said internal cavity (10) through the passage opening (14), and
- a guiding element (50) adapted to be fixed in a fixed position relative to the in-wall frame (2) and provided with a vertical protrusion (51) which is adapted to engage a lower slot of the door body (9) in order to limit the sliding thereof along a sliding axis;
the guiding element (50) comprises two main lateral projections (52, 53), which are arranged at two opposite lateral ends, each one defining an interlocking recess (55, 56) which is adapted to accommodate a respective appendage (43, 44) of one of the two vertical side posts (41, 42) in order to provide a fixed condition for use.

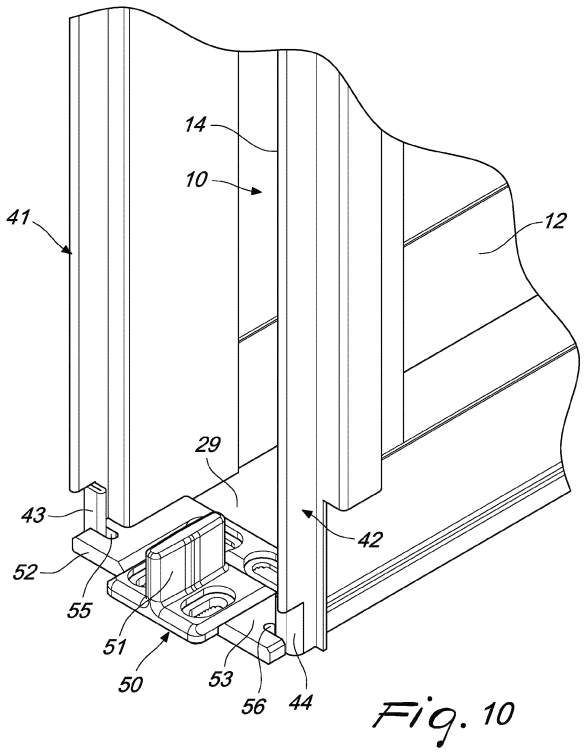

Fig. 10

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Description

[0001] The present invention relates to a structure for sliding doors and other elements adapted to close an architectural opening, which is useful and practical in the field of domestic construction and in interior furnishings.

[0002] Structures are known for sliding doors which comprise an in-wall frame which is provided with a carriage that slides inside a guide so that the door can be opened and closed by sliding inside the in-wall frame.

[0003] Generally, in these conventional structures, the in-wall frame needs to be installed inside a brick wall and the door is therefore opened by sliding into such wall.

[0004] Structures are also known in which, instead of the door, a shelving unit or other item of furniture can be slid inside the in-wall frame. In the present description, the term "sliding door" generally refers to any element that is adapted to close an opening by sliding.

[0005] Usually, these conventional structures for sliding doors comprise a guiding element, commonly called a "tiller", which needs to be fixed to the ground and has a vertical protrusion adapted to engage a sliding slot provided in the underside of the sliding door so as to constrain the sliding thereof along the sliding axis, in so doing preventing excessive transverse oscillations.

[0006] The conventional structures for sliding doors, although useful and practical, present the disadvantage that their installation, and also their removal or transfer if necessary, requires invasive and expensive interventions, such as drilling the floor in order to affix the tiller.

[0007] Another disadvantage of the conventional structures for sliding doors consists of difficulties in transport, storage and assembly.

[0008] Another disadvantage of the conventional structures for sliding doors lies in their limited versatility: it is difficult to adapt a structure to different requirements and measurements.

[0009] The aim of the present invention is to overcome the above-mentioned limitations and drawbacks of the background art, by devising a structure for sliding doors that is easier to assemble, or which in any case requires interventions that are less invasive.

[0010] Within this aim, an object of the present invention is to provide a structure for sliding doors that is simpler in terms of transport and storage.

[0011] Another object of the invention consists in providing a structure for sliding doors that is highly versatile.

[0012] Another object of the invention consists in providing a structure for sliding doors that is simpler to install, remove and, optionally, transfer.

[0013] Another object of the invention consists in providing a structure for sliding doors that is easy to implement and economically competitive when compared to the known art.

[0014] This aim and these and other objects which will become more apparent hereinafter are achieved by a structure for sliding doors according to claim 1.

[0015] This aim and these and other objects which will become better apparent hereinafter are also achieved by a kit according to claim 10.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of some preferred, but not exclusive, embodiments of a structure for sliding doors, which are illustrated by way of non-limiting example with the aid of the accompanying drawings wherein:

- Figure 1 is a side view of a possible embodiment of a structure for sliding doors, according to the invention, installed in a wall;
- Figure 2 is a side view, with partial cutaway to illustrate the contents, of a kit for assembly according to the invention in the configuration for transport and storage;
- Figure 3 is an exploded view of the kit for assembly;
- Figure 4 is a perspective view of the internal body of the upper guide;
- Figure 5 is a perspective view of the external body of the upper guide;
- Figure 6 is an enlarged detail of Figure 5;
- Figure 7 is an exploded view of only the structure for sliding doors;
- Figure 8 is a perspective view of only the structure for sliding doors;
- Figure 9 is an enlarged detail of the structure during a step of assembling the guiding element;
- Figure 10 is the same view as Figure 9 with the guiding element mounted;
- Figure 11 is the same detail as Figure 10 seen from below;
- Figure 12 is a transverse cross-section of the upper guide with the extractable element mounted;
- Figure 13 is a perspective view of the guiding element;
- Figure 14 is a plan view from above of the guiding element;
- Figure 15 is a perspective view of the central part of the guiding element when separated from the lateral projections;
- Figure 16 is a perspective view from below of the guiding element with a pair of supplementary lateral projections inserted;
- Figure 17 is a plan view from above of the guiding element of Figure 16;
- Figures 18, 19, 20 and 21 show a series of pairs of supplementary lateral projections of increasing dimensions;
- Figures 22 and 23 are perspective views, from two different viewpoints, of two contoured elements 20 included in the kit according to the invention.

[0017] With reference to the figures, the structure for architectural elements that can slide, generally designated by the reference numeral 1, comprises an in-wall frame 2 which defines internally an internal cavity 10 which is substantially parallelepiped in shape.

[0018] In the preferred embodiments, the in-wall frame 2 is adapted to be built into a wall and/or to be covered with plaster P (as shown in Figure 1) or another covering.

[0019] The in-wall frame 2, in the preferred embodiment, comprises a first and a second main vertical wall 11, 12 (preferably made of sheet metal and even more preferably made of corrugated sheet metal which are mutually parallel and which define the internal cavity 10 between them. The structure 1 also preferably comprises a rear post 18 which delimits, in a rearward region, the internal cavity 10 of the in-wall frame 2 and even more preferably also a front post 19 which is adapted to be arranged at the distal limit of the architectural opening to be closed with the door.

[0020] In some embodiments, including the one illustrated, the in-wall frame 2 also comprises a bottom element which delimits, in a lower region, the internal cavity 10, which is adapted to be placed on the ground and defines a bottom 29 of the in-wall frame 2.

[0021] The in-wall frame 2 comprises a passage opening 14 which allows access to the internal cavity 10, for the passage of the extractable element 90 which will be described below and of the door body 9 when mounted.

[0022] Such passage opening 14 is defined between two vertical side posts 41, 42, preferably made of sheet metal, which in practice take the form of columns.

[0023] The structure 1 also comprises an upper guide 8 along which an extractable supporting element 90 can slide which is adapted to support a door body 9 so as to guide the sliding of such door body 9 into, and out of, the internal cavity 10 through the passage opening 14.

[0024] The extractable supporting element 90 is preferably a longitudinally-extending element, even more preferably made of aluminum and preferably extruded. In the illustrated embodiment, the extractable supporting element 90 is substantially rectangular in cross-section, with the lower side open and with a raised portion on the upper side which is configured to fit inside the upper guide 8 so it can slide.

[0025] In the preferred embodiments, the upper guide 8 extends from the rear post 18 to the front post 19.

[0026] In more detail, the upper guide 8 comprises an internal body (or cover) 70 which defines (closes) in an upper region the internal cavity 10 of the in-wall frame 2, and an external body (or cover) 80 which is positioned externally to the internal cavity 10, extending from the in-wall frame 2 to the front post 19.

[0027] The external body 80 and the internal body 70 extend longitudinally, are rigidly coupled and are mutually aligned along a same axis, and extend parallel to the sliding axis of the door body.

[0028] Conveniently, the external body 80 and the internal body 70 define inside them a sliding track 89, 79 along which the extractable element 90 can be inserted, can be extracted and can slide (note that the sliding track is self-centering and its shape is complementary to the upper portion of the extractable element 90).

[0029] Advantageously, the external body 80 is provided with fixing holes 87; on the internal body 70 there are also affixing slots 77.

[0030] In the embodiment illustrated, each one of the external and internal bodies 80, 70 comprises a central tab 71, 81 and two lateral wings 72, 73, 82, 83. Advantageously, between each one of these lateral wings 72, 73, 82, 83 and the central tab 71, 81 there is a longitudinally-extended lateral chamber 75, 76, 85, 86, which extends substantially for the entire longitudinal length of the respective body 70, 80. The presence of these chambers increases the general strength of the structure.

[0031] According to an optimal solution, the external body 80 and the internal body 70 are coupled by interlocking by means of a connecting spring clip interposed between them, which with a single movement enables the centering and fixing of the internal and external bodies 70, 80 and of the extractable element 90.

[0032] Advantageously, the internal and external bodies 70, 80 consist of bodies made of extruded aluminum; preferably these two bodies have the same finish.

[0033] The structure also comprises a guiding element 50 (or tiller) adapted to be fixed in a fixed position with respect to the in-wall frame 2 (in a lower region with respect to the door body 9 so that this slides above it), fixed to the floor or other lower resting surface, and provided with a vertical protrusion 51 which is adapted to engage, in a known manner, a lower slot of the door body 9 in order to limit the sliding thereof along a sliding axis (i.e. into and out of the in-wall frame).

[0034] In the preferred embodiments, the guiding element 50 is constituted by a single monolithic body.

[0035] According to the invention, the guiding element 50 comprises two lateral projections 52, 53, positioned at two opposite lateral ends of the guiding element 50.

[0036] Each one of such lateral projections 52, 53 defines an interlocking recess 55, 56 (preferably U-shaped) which is adapted to accommodate a respective appendage 43, 44 of one of the two vertical side posts 41, 42 in order to provide a fixed condition for use, as shown in Figures 9 and 10.

[0037] In this manner, during assembly, it is sufficient to push the guiding element 50 downward, fitting it onto the appendages 43, 44, in order to immediately find the correct and exact fixing position; furthermore, the fixing occurs by interlocking, so eliminating the need for drilling the floor. In this way the problems associated with drilling the floor (damage to tiles and to any plumbing or wiring underneath) are eliminated, the assembly is made easier and cheaper, and it is possible to transfer or remove the structure 1 without leaving signs.

[0038] In more detail, the appendages 43, 44 of the vertical side posts 41, 42 protrude toward each other and extend vertically for a limited height with respect to the post 41, 42 of which they are a part, so that the guiding element 50 can be fitted on from above in order to engage the appendages 43, 44, as shown in Figure 9.

[0039] In the preferred embodiments, the appendages 43, 44 are constituted by inward-folded portions of the

lateral posts 41, 42.

[0040] Advantageously, the two lateral posts 41, 42 are symmetrical in shape so as to be ambidextrous, i.e. interchangeable.

[0041] According to an optimal embodiment, the height of the appendages 43, 44 exceeds the distance between the door body 9 (when installed in the condition for use) and the floor or ground (and therefore the bottom 29), so that, when the door body 9 is installed, the uncoupling of the guiding element 50 is prevented, since this cannot slip out from the appendages 43, 44 owing to the presence of the door body 9.

[0042] According to an optimal and advantageous embodiment, the guiding element 50 comprises, on a lower face, a resting step which comprises a first resting surface 45 which is adapted to be placed on a bottom 29 of the in-wall frame 2 and which is raised with respect to a second resting surface 46, such second resting surface 46 being adapted to be placed on the ground or floor when the in-wall frame 2 is placed on that ground or floor in the installed condition. Preferably, the resting surfaces 45, 46 are provided with knurling in order to allow adhesive bonding if desired.

[0043] Optionally, the guiding element 50 is also provided with holes 59 for affixing by way of screws or the like, if desired.

[0044] According to a particularly advantageous embodiment, the guiding element 50 comprises a central part 4, which comprises the vertical protrusion 51, and one or more stress raisers 57 which are positioned between the lateral projections 52, 53 and the central part 4.

[0045] Such stress raisers 57 preferably consist of preweakened linear incisions for breakage and their function is to allow the manual separation, by way of breakage, of the main lateral projections 52, 53 from the central part 4. In this manner it is possible to convert the guiding element 50 to a "standard" guiding element, as shown in Figure 15, constituted only by the central part 4, which can be fixed to the floor for example with screws by virtue of the presence of special holes 59, or can be glued.

[0046] In more detail, in the preferred embodiments of the guiding element 50, the central part 4 comprises the second resting surface 46 and at least one stress raiser 57 is positioned between the central part 4 and the first resting surface 45 in order to allow the manual separation, via breakage, of the first resting surface 45 from the central part 4.

[0047] In the particular illustrated embodiment, the two main lateral projections 52, 53 and the first resting surface 45 are part of a single peripheral piece that can be detached from the central part 4 by virtue of the stress raiser 57 which acts as a boundary between such peripheral piece and the central part 4.

[0048] In even more detail, the central part 4 has a substantially rectangular base and borders the peripheral piece on three sides.

[0049] Optionally, the guiding element 50 can be provided with a pair of supplementary lateral projections 52', 53' which are fixed by interlocking to the main lateral projections 52, 53 in the manner of a jigsaw, outside these (each one at a respective lateral projection 52, 53) so as to be manually removable. Each one of these supplementary lateral projections 52', 53' is provided with an interlocking recess 55', 56' which is adapted to accommodate one of the appendages 43, 44.

[0050] In practice, the function of such supplementary lateral projections 52', 53' is to widen the guiding element 50 in order to allow it to be interlocked in wider passage openings 14.

[0051] It is possible to provide various pairs of supplementary lateral projections 52', 53' with increasing dimensions (as shown in Figures 18-21, in which the increasing number of superscript marks " ' " after the reference numerals indicates lateral projections of increasing dimensions) and interchangeable, so as to be able to adapt the guiding element 50 to in-wall frames 2 of different dimensions.

[0052] The present invention also relates to a kit 900 for assembly of a structure 1 for sliding doors as described above. Such kit is in practice the set of the elements that make up the structure 1, at least partially disassembled, together with the contoured elements 200, 300 made of polymeric material (preferably polystyrene), the function of which is to facilitate storage, transport and assembly.

[0053] The kit 900 that therefore comprises the in-wall frame 2 (i.e. all the elements that go to make it up), the upper guide 8, the extractable element 90, any other additional element necessary to compose the structure 1 and at least one contoured element made of polymeric material 200, 300. Preferably, there are at least two contoured elements 200, 300.

[0054] Each one of the contoured elements 200, 300 comprises a back wall 202 and a plurality of transverse ribs 201, 203, 301, 303 which protrude perpendicularly from the back wall 202 and are mutually spaced apart so as to define a plurality of seats 210, 220, 310. These seats 210, 220, 310 include at least one longitudinal seat 210 which is contoured to accommodate a portion of the external body 80 and/or of the internal body 70 of the upper guide 8 and preferably also a central seat 220, substantially rectangular, which is adapted to accommodate components of the structure 1 such as for example a trolley kit.

[0055] Preferably, each one of these contoured elements 200, 300 is constituted by a monolithic body made of polystyrene, produced by molding.

[0056] In the preferred embodiments, the back wall 202, 302 is substantially rectangular in plan view, with two tapered portions at the ends of a diagonal.

[0057] The kit for assembly 900 can therefore be configured in a transport and storage condition, shown in Figure 2, in which the contoured elements 200, 300, the upper guide 8 (i.e. the assembled bodies 80 that make it up), the extractable element 90 and all the other possible components are contained in the in-wall frame 2 (in

the internal cavity 10); the upper guide 8 and the extractable element 90 are interlocked in, and held in position by, the contoured elements 200, 300.

[0058] Note that the contoured elements 200, 300 are arranged so as to keep the guide 8 and the extractable element 90 positioned obliquely inside the in-wall frame 2.

[0059] Advantageously, the contoured elements 200, 300 are provided with studs or protruding pins 242 which are adapted to interfere mechanically with the corrugations present in the internal walls of the in-wall frame 2 so as to be locked in position when they are inserted in the internal cavity 10 of the in-wall frame 2. In this manner, in the transport and storage condition, the contoured elements 200, 300 and everything supported by them are kept suspended inside the in-wall frame 2 without the use of glue or adhesive tape.

[0060] Optionally, the contoured elements 200, 300 are provided with holes 241 which can be occupied by the above-mentioned studs or protruding pins 242 in order to be superimposed in an interlocking manner.

[0061] The contoured elements are made to be self-supporting, superimposable, stackable, and stackable when reversed, so as to occupy the least possible space.

[0062] Advantageously, by virtue of the contoured elements 200, 300, when the kit is in the transport and storage condition there is a reduction in the space occupation, while in the assembly condition, once the guide 8 is extracted, the in-wall frame 2 is capable of optimally withstanding the lateral pressures that normally occur during the step of installation (in particular when screwing plasterboard slabs and/or when applying plaster). This is by virtue of the fact that the contoured elements 200, 300 are arranged at the center of the in-wall frame 2, and the dimensions of the contoured elements 200, 300 are such as to reduce the distance not covered by the contoured elements 200, 300 to the minimum. In this manner the leverage that is created by pressing against the lateral walls 11, 12 of the in-wall frame 2 during assembly is minimized, thus facilitating the drilling of the lateral walls if plasterboard slabs are to be screwed on, and offering the necessary rigidity to withstand the step of plaster application and drying.

[0063] In practice, therefore, the contoured elements 200, 300, when inserted in the in-wall frame 2, increase the structural rigidity of the in-wall frame 2 during installation.

[0064] In addition, the peculiar shape of the contoured elements 200, 300 allows the extraction of the components which in the transport and storage condition are placed inside the in-wall frame 2, in a simple and organized fashion: to extract the guide 8 and spacers and an optional kit of bolts and screws, all that is needed is to tilt the in-wall frame 2 upwards and these will slide out from the passage opening 14.

[0065] Once the in-wall frame 2 is installed, the contoured elements can be easily extracted by pulling them outward from the passage opening 14.

[0066] In practice it has been found that the structure for sliding doors, according to the present invention, achieves the intended aim and objects, in that it is easier to assemble and it requires interventions that are less invasive.

[0067] Another advantage of the structure for sliding doors, according to the invention, consists in that it is simpler in terms of transport and storage.

[0068] Another advantage of the structure for architectural elements that can slide, according to the invention, consists in that it is highly versatile.

[0069] Another advantage of the structure for architectural elements that can slide, according to the invention, consists in that it is simple to remove and, optionally, transfer.

[0070] Another advantage of the structure for architectural elements that can slide, according to the invention, consists in that it is easy to implement and economically competitive when compared to the known art.

[0071] Another advantage of the invention is that it makes available an alternative to the known art.

[0072] The structure for sliding doors thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0073] Moreover, all the details may be substituted by other, technically equivalent elements.

[0074] In practice the materials employed, and the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0075] The disclosures in Italian Patent Application No. 102022000018651 from which this application claims priority are incorporated herein by reference.

[0076] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A structure (1) for sliding doors, which comprises:

- an in-wall frame (2) which internally defines an internal cavity (10) and comprises a passage opening (14) defined between two vertical side posts (41, 42);
- an upper guide (8) along which an extractable supporting element (90) can slide which is adapted to support a door body (9) so as to guide its sliding into, and out of, said internal cavity (10) through said passage opening (14), and
- a guiding element (50) adapted to be fixed in a fixed position relative to the in-wall frame (2) and provided with a vertical protrusion (51) which is adapted to engage a lower slot of the

door body (9) in order to limit the sliding thereof along a sliding axis;

characterized in that said guiding element (50) comprises two main lateral projections (52, 53), which are arranged at two opposite lateral ends, each one defining an interlocking recess (55, 56) which is adapted to accommodate a respective appendage (43, 44) of one of the two vertical side posts (41, 42) in order to provide a fixed condition for use.

2. The structure (1) according to claim 1, **characterized in that** said appendages (43, 44) protrude toward each other and extend vertically for a limited height with respect to the post of which they are a part, so that said guiding element (50) can be fitted on from above in order to engage said appendages (43, 44).

3. The structure (1) according to claim 1 or 2, **characterized in that** said guiding element (50) comprises, on a lower face, a resting step which comprises a first resting surface (45) which is adapted to be placed on a bottom (29) of the in-wall frame (2) and raised with respect to a second resting surface (46) which is adapted to be placed on the ground when the in-wall frame (2) is placed on said ground.

4. The structure (1) according to one or more of the preceding claims, **characterized in that** said guiding element (50) comprises:

- a central part (4) comprising said vertical protrusion (51), and
- one or more stress raisers (57) between said main lateral projections (52, 53) and said central part (4), in order to allow the manual separation, via breakage, of said main lateral projections (52, 53) from said central part (4).

5. The structure according to claims 3 and 4, **characterized in that** said central part (4) comprises said second resting surface (46) and at least one stress raiser (57) is positioned between said central part (4) and said first resting surface (45) in order to allow the manual separation, via breakage, of said first resting surface (45) from the central part (4).

6. The structure (1) according to one or more of the preceding claims, **characterized in that** said guiding element (50) comprises a pair of supplementary lateral projections (52', 53') which are fixed by interlocking to said main lateral projections (52, 53), externally to them, so as to be manually removable, and each one is provided with an interlocking recess (55', 56') which is adapted to receive one of said appendages (43, 44).

7. The structure (1) according to one or more of the preceding claims, **characterized in that** said upper guide (8) comprises an internal body (70) which defines, in an upward region, said internal cavity (10) of the in-wall frame (2) and an external body (80) which is positioned externally to said internal cavity (10);

said external body (80) and said internal body (70) extending longitudinally, rigidly coupled to each other and aligned and extending parallel to the sliding axis;
said external body (80) and said internal body (70) defining inside them a sliding track (89, 79) along which said extractable supporting element (90) can be inserted, can be extracted, and can slide.

8. The structure (1) according to the preceding claim, **characterized in that** each one of said external body (80) and said internal body (70) comprises a central tab (71, 81) and two lateral wings (72, 73, 82, 83), between each one of said lateral wings (72, 73, 82, 83) and the central tab (71, 81) there being a longitudinally-extended lateral chamber (75, 76, 85, 86).

9. The structure (1) according to claim 7 or 8, **characterized in that** said external body (80) and said internal body (70) are interlocking by means of a connecting spring clip interposed between them.

10. A kit (900) for assembling a structure (1) according to one or more of the preceding claims, which comprises said in-wall frame (2), said upper guide (8), said extractable supporting element (90) and one or more contoured elements made of polymeric material (200, 300);

each one of said contoured elements (200, 300) comprising:

- a back wall (202),
- a plurality of transverse ribs (201, 203, 301, 303) which protrude perpendicularly from said back wall (202) and are mutually spaced apart so as to define a plurality of seats (210, 220, 310) including at least one longitudinal seat (210, 310) which is shaped to accommodate a portion of said external body (80) of the upper guide (8);

said kit being configurable in a transport and storage condition, in which said contoured elements (200, 300), said upper guide (8) and said extractable supporting element (90) are contained in said in-wall frame (2) and the upper guide (8) and the extractable supporting element (90) are interlocked in, and held in place

by, said contoured elements (200, 300).

11. The kit (900) according to claim 10, **characterized in that** said contoured elements (200, 300) are provided with studs or protruding pins (242) which are adapted to interfere mechanically with corrugations present in internal walls of the in-wall frame (2) so as to be locked in position when they are inserted in the internal cavity (10) of the in-wall frame (2).

12. The kit (900) according to claim 11, **characterized in that** said contoured elements (200, 300) are provided with holes (241) which can be occupied by said studs or protruding pins (242) in order to be superimposed in an interlocking manner.

13. The kit (900) according to one or more of claims 10 to 12, **characterized in that** each one of said contoured elements (200, 300) is constituted by a monolithic body made of polystyrene.

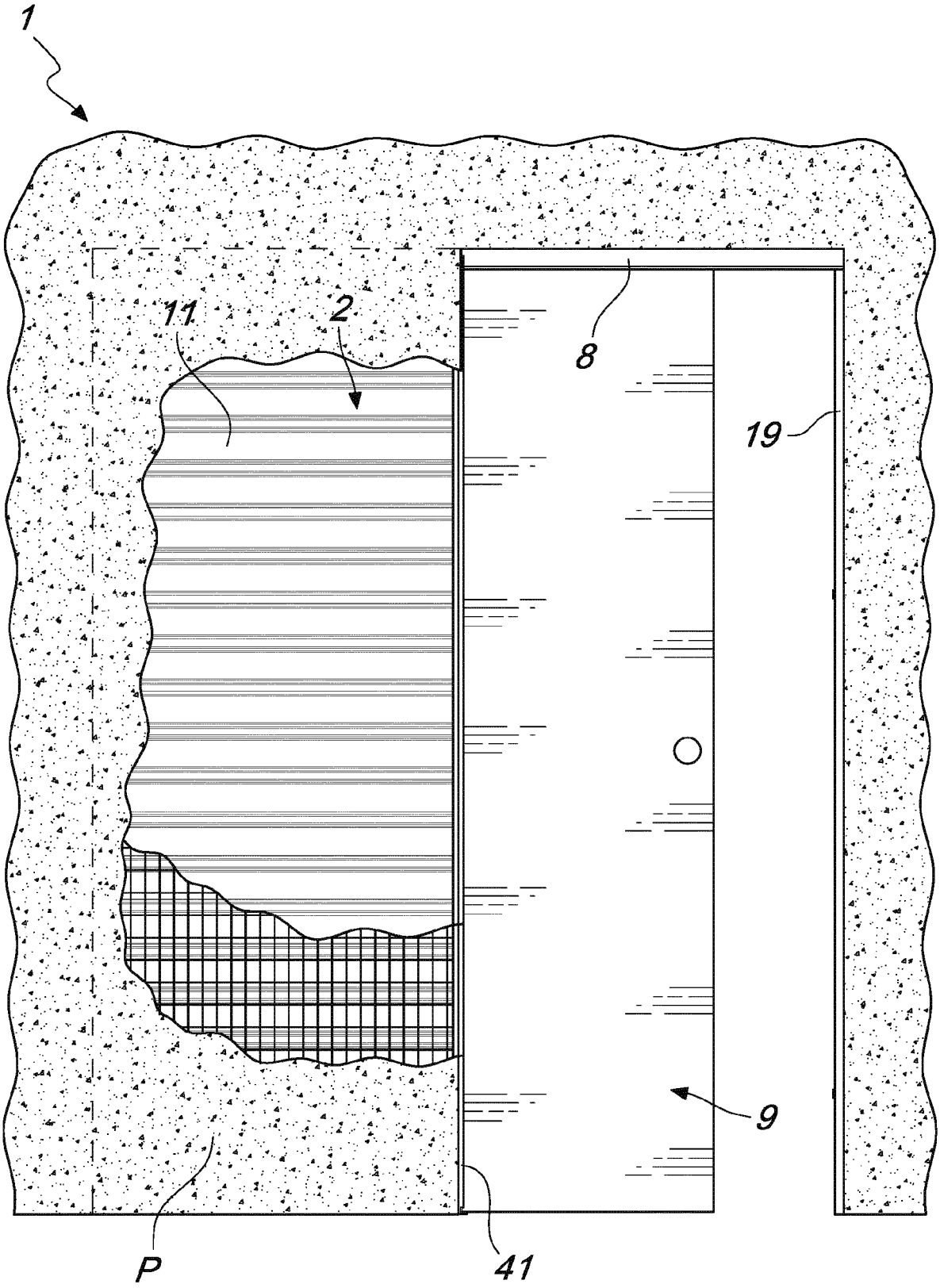

Fig. 1

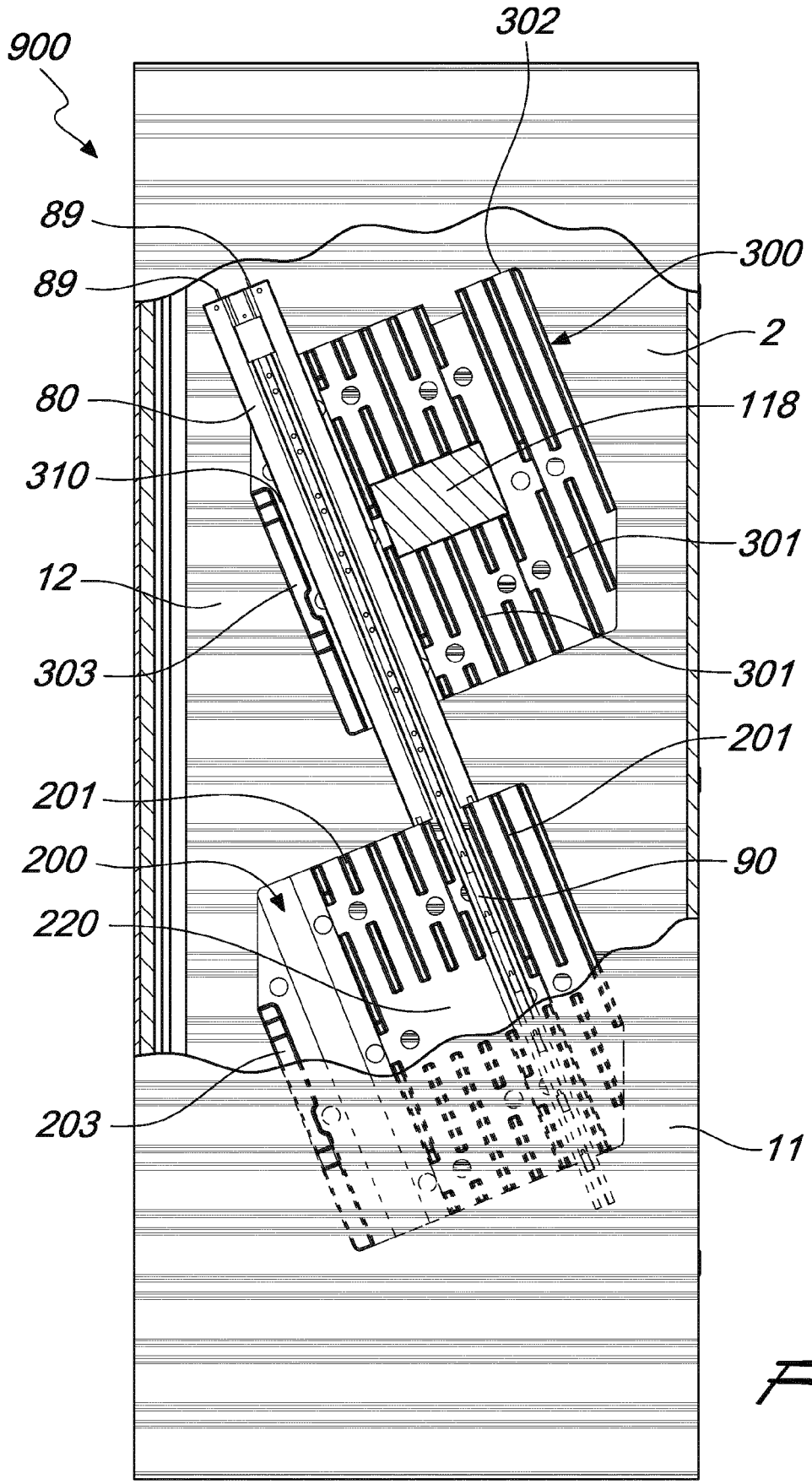
900
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Fig. 2

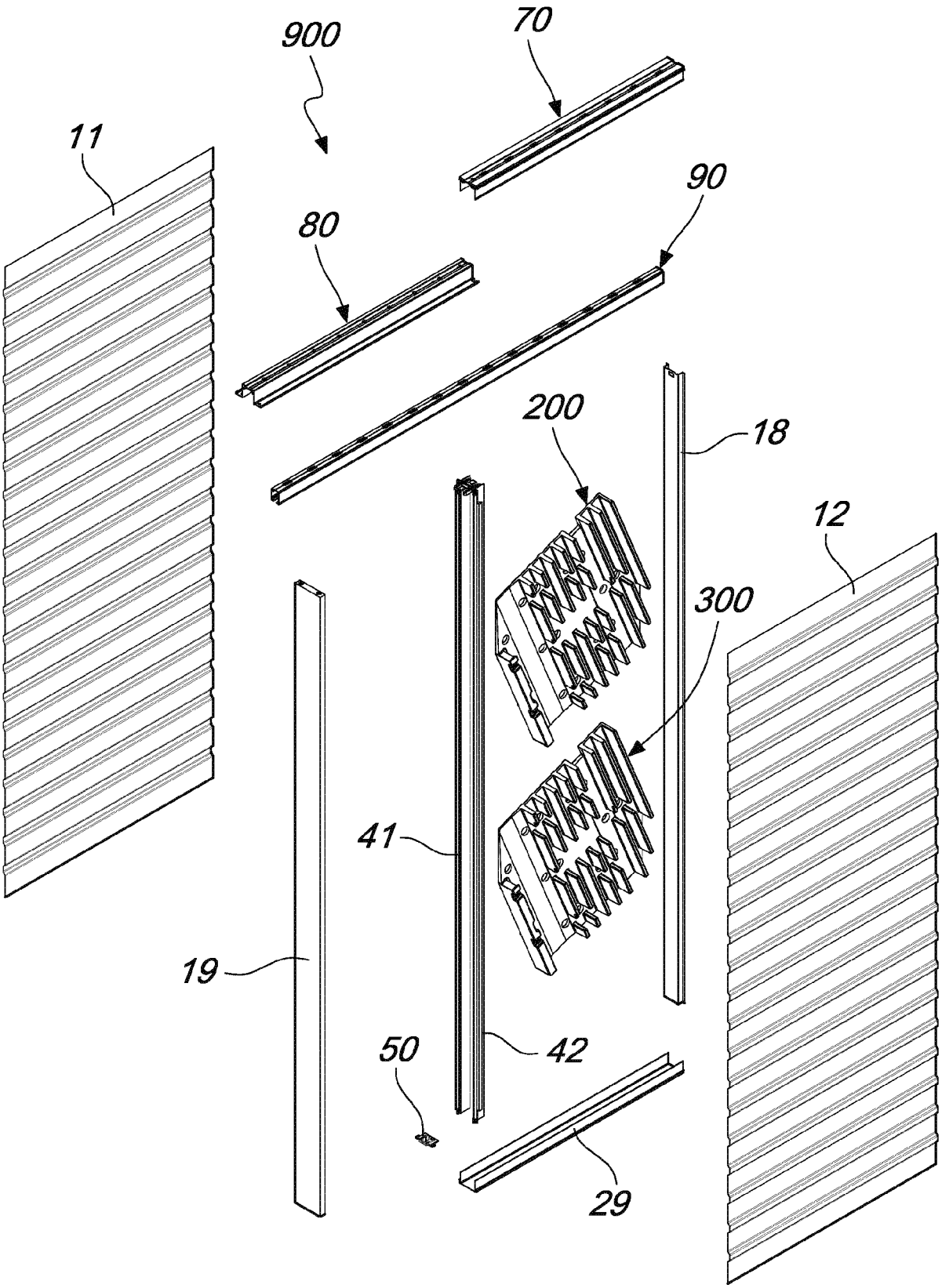


Fig. 3

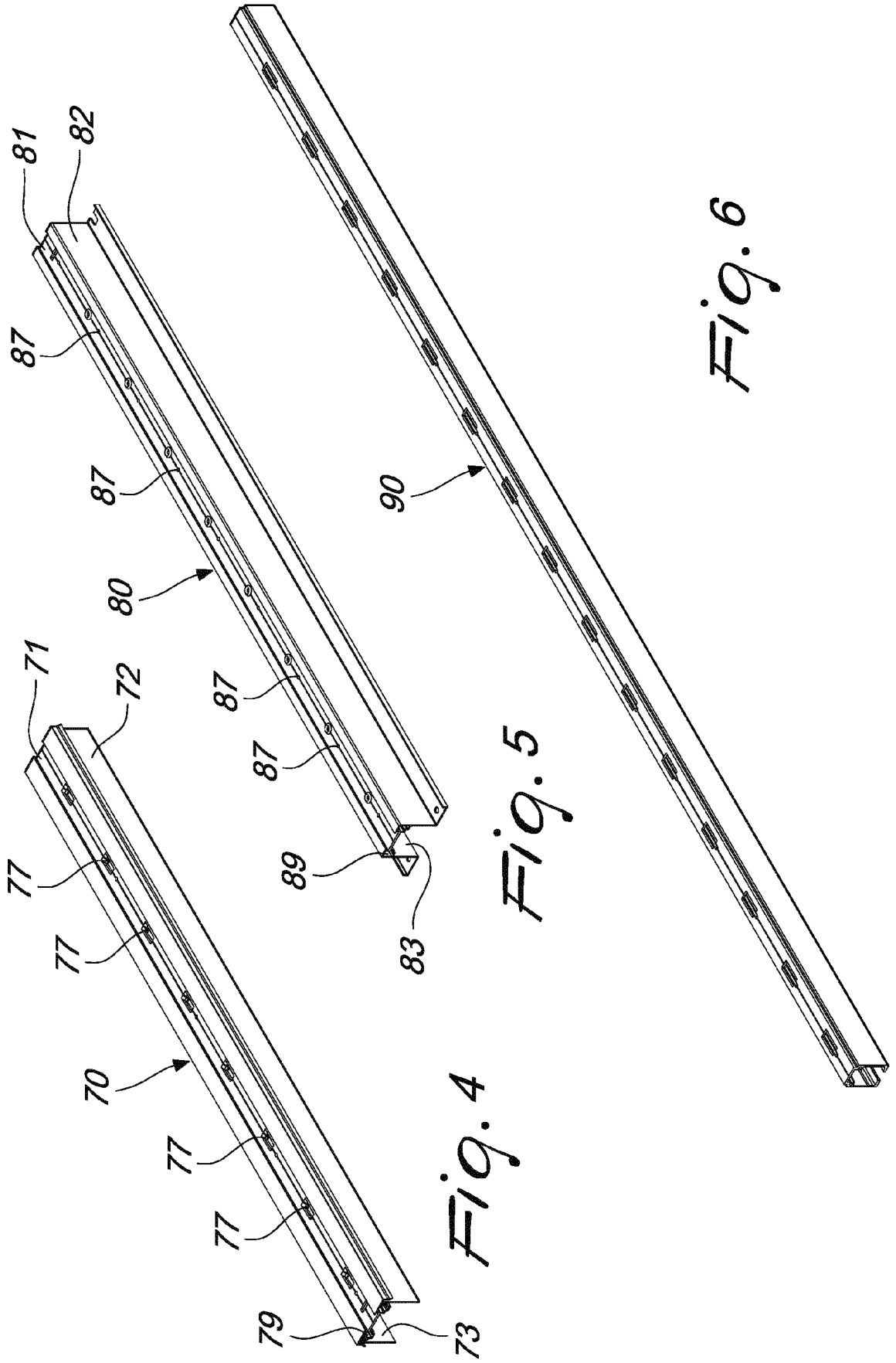


Fig. 4

Fig. 5

Fig. 6

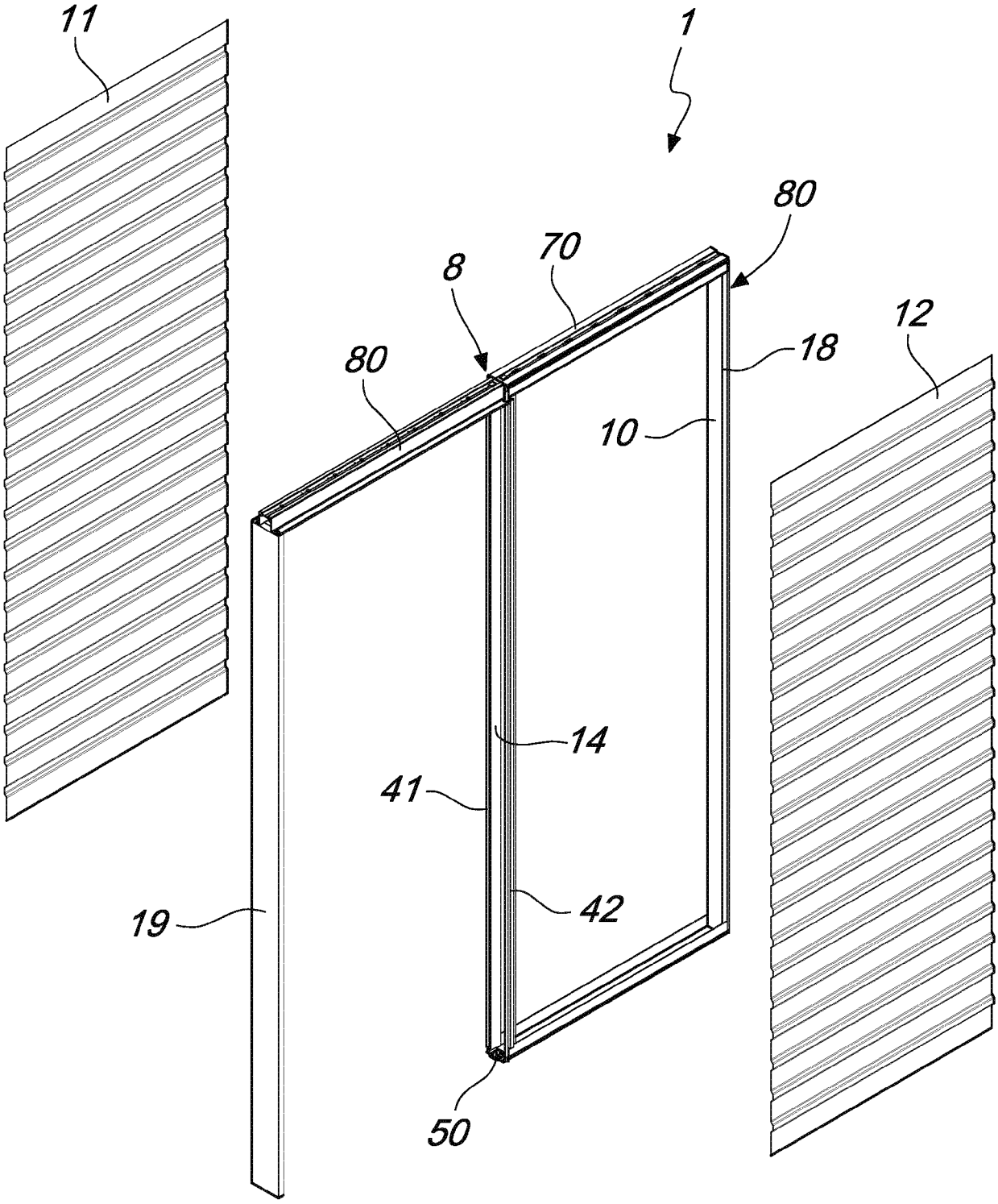
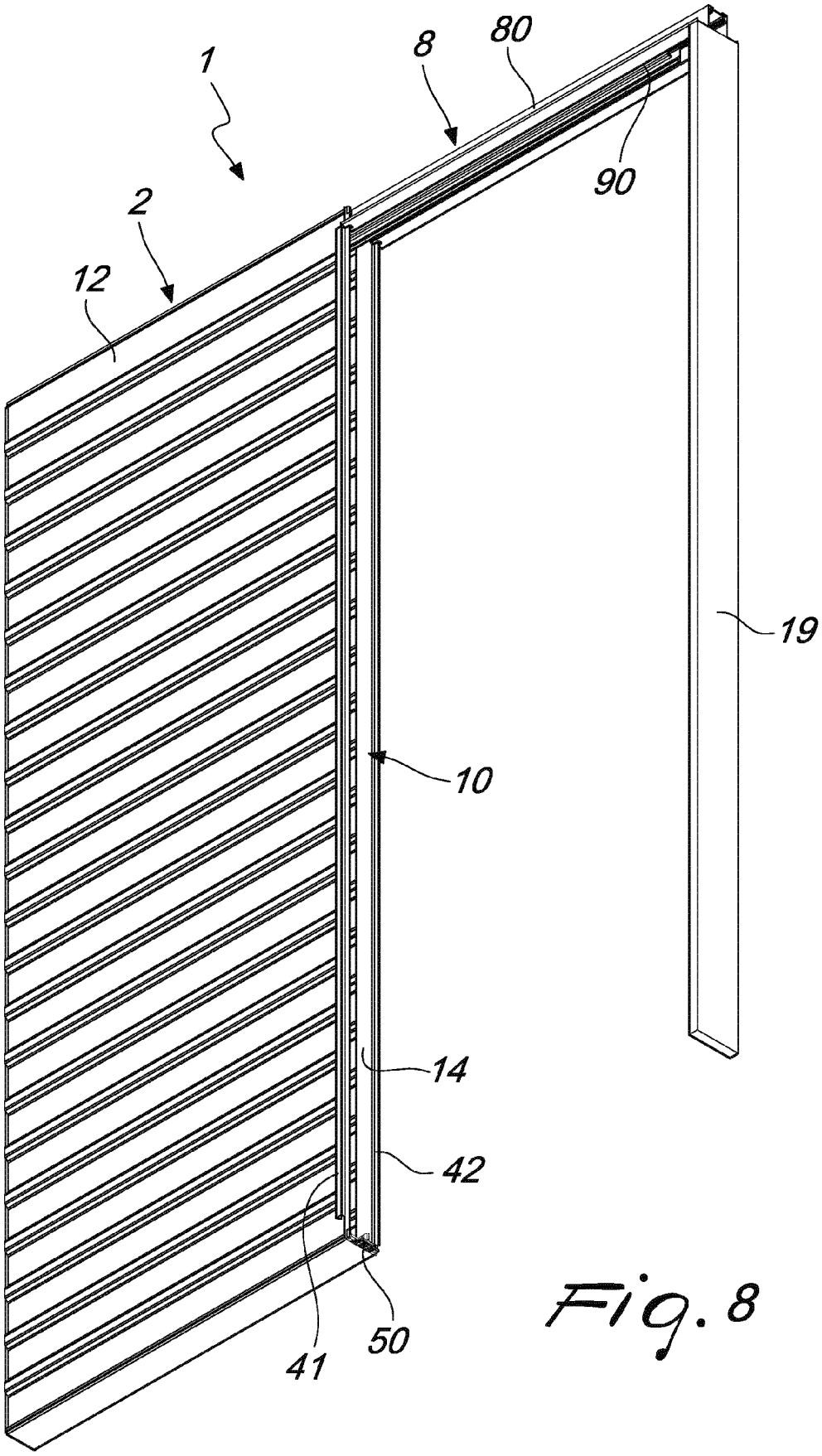


Fig. 7



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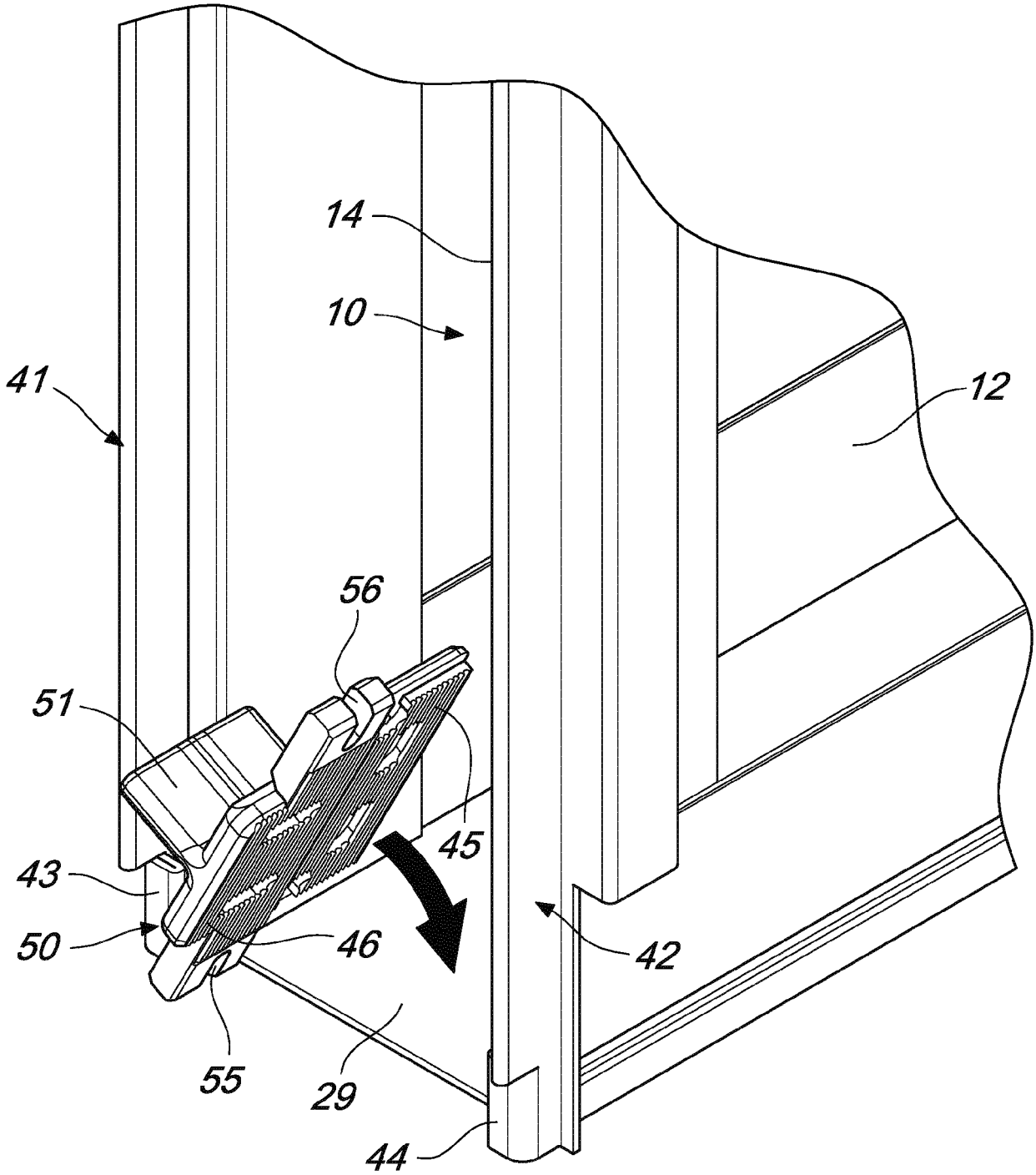

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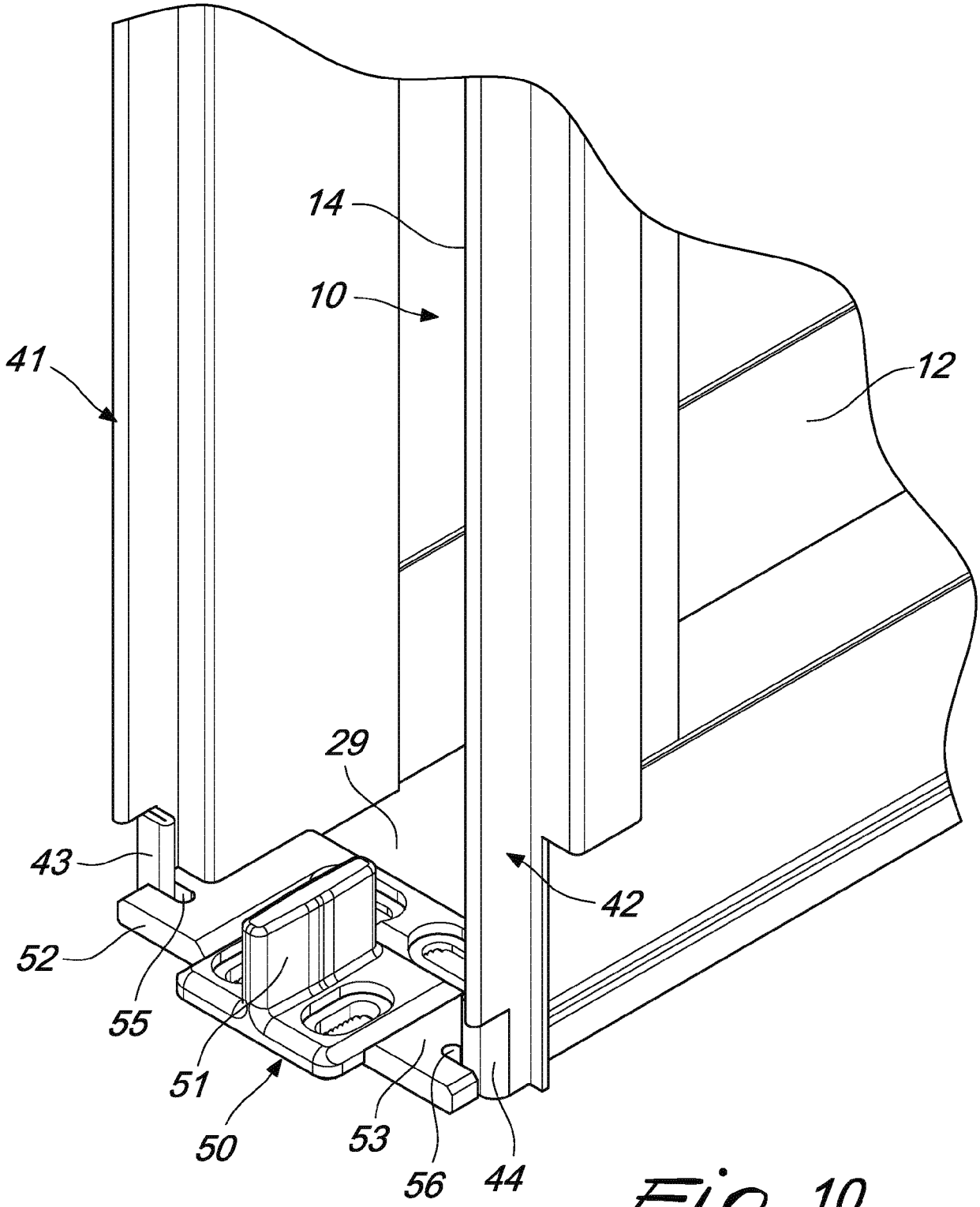

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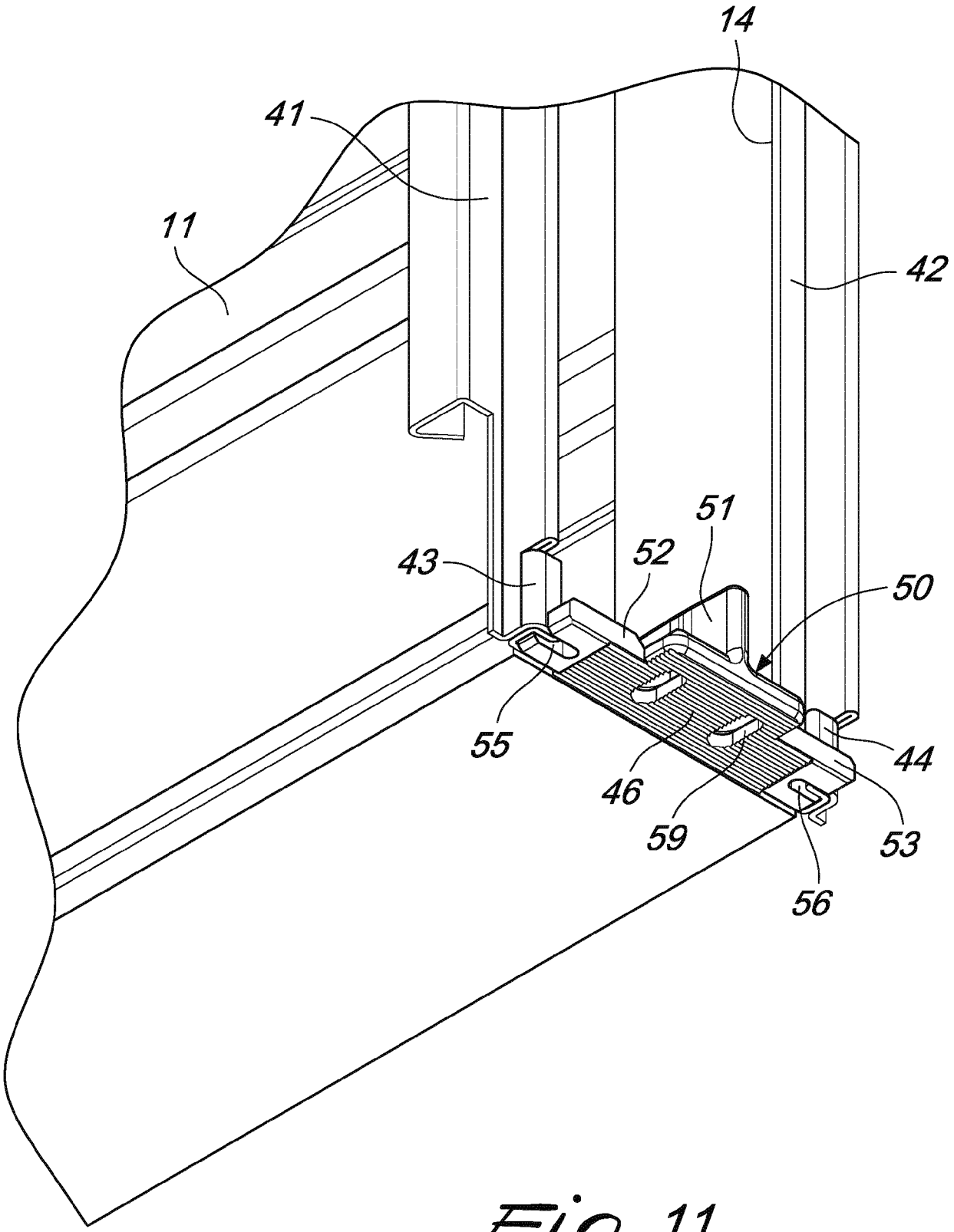

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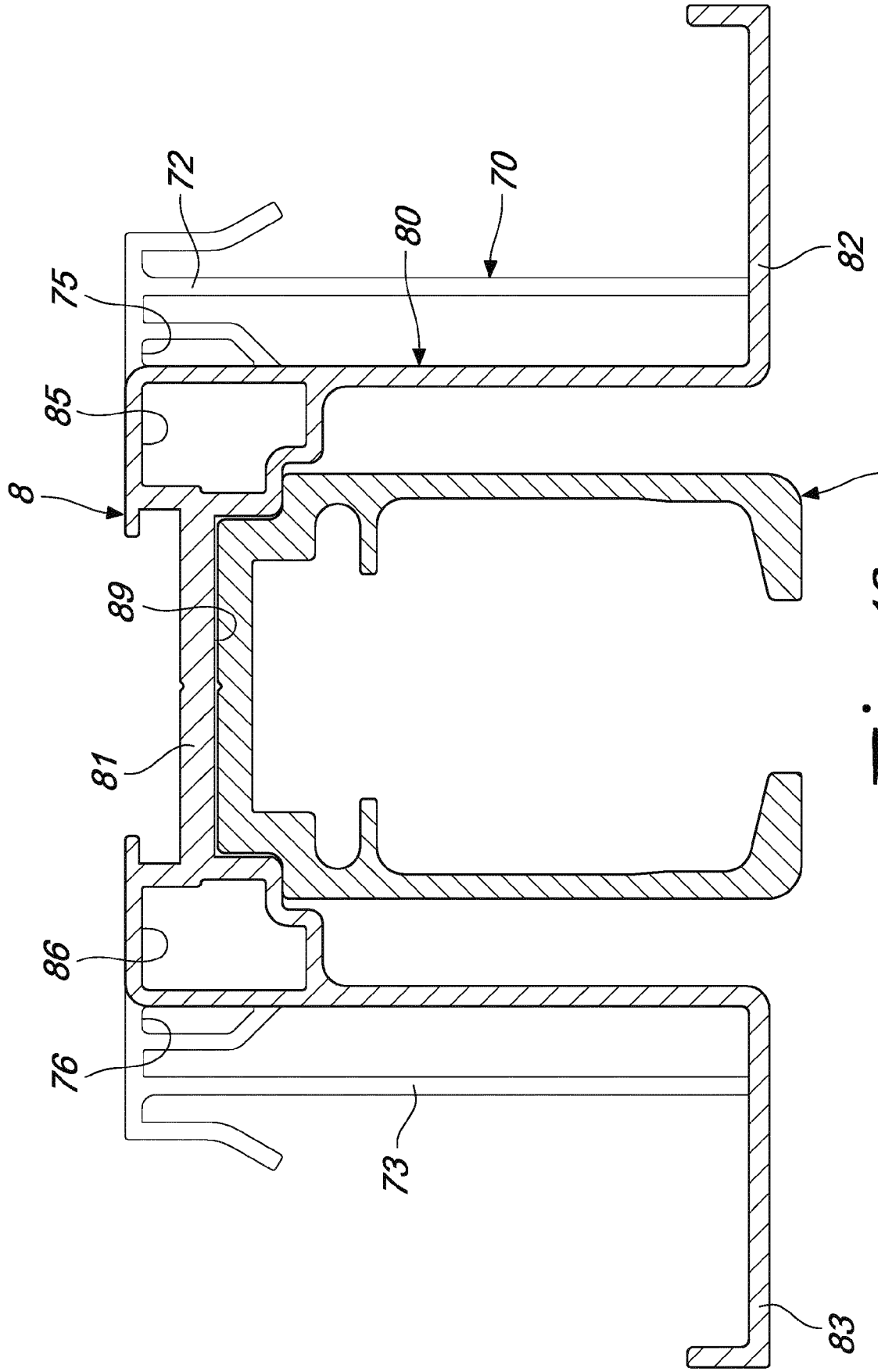

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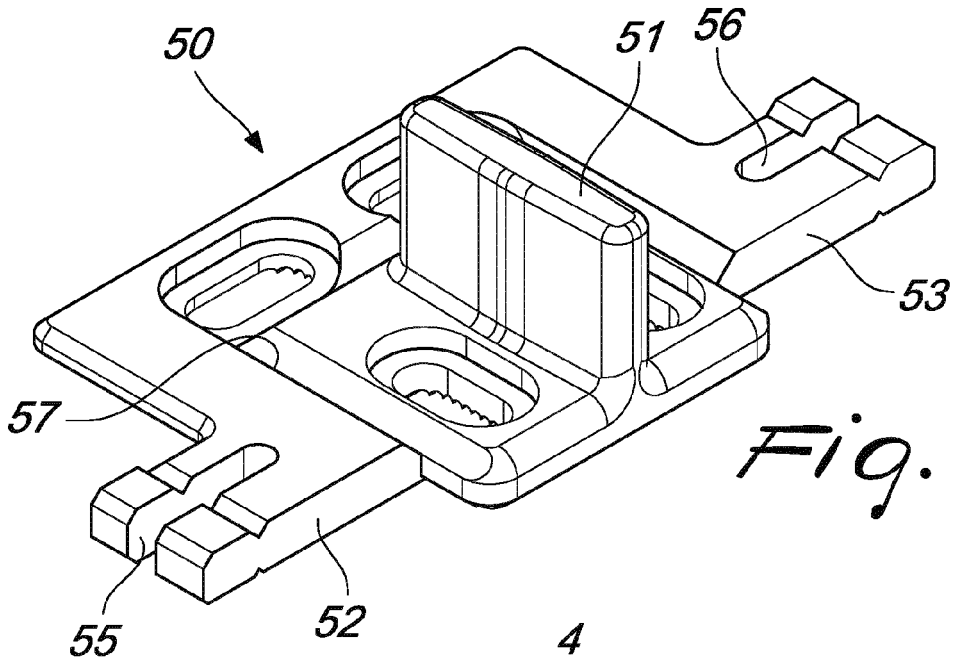

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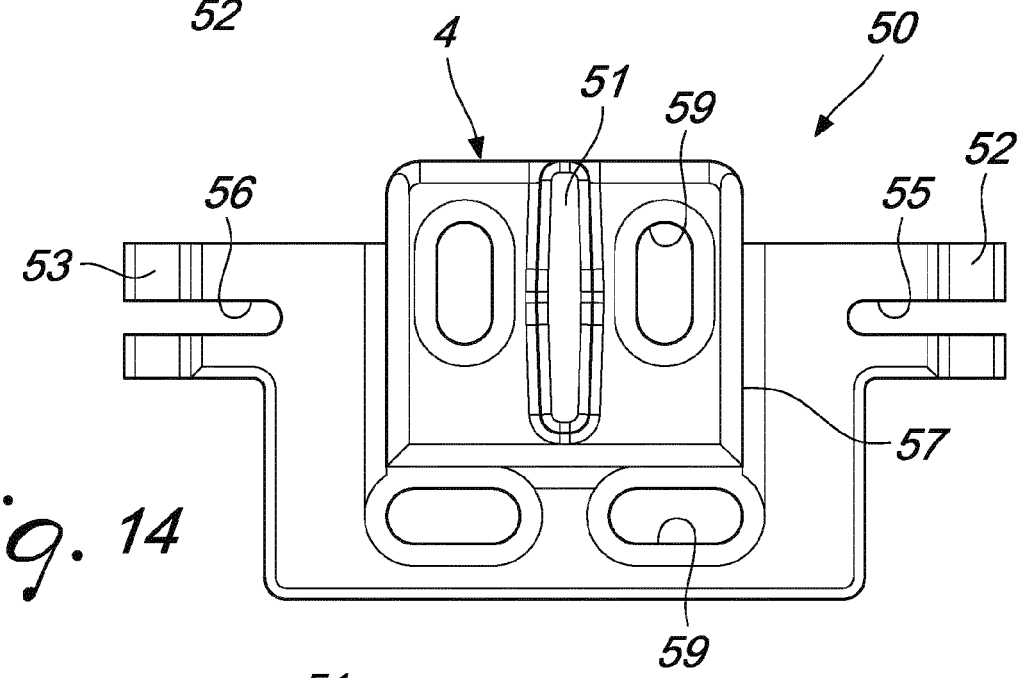

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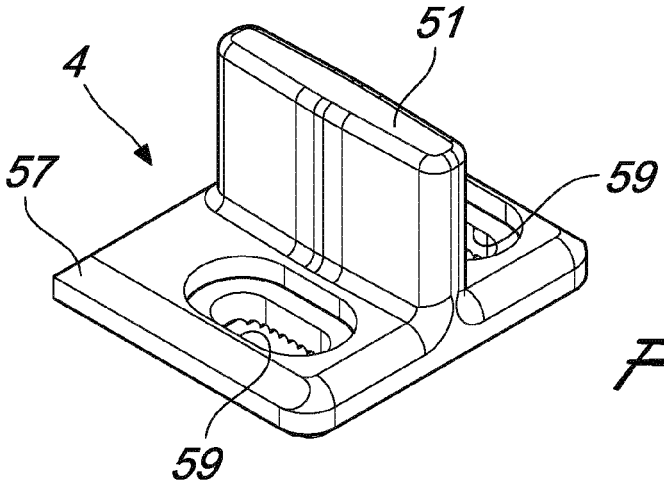

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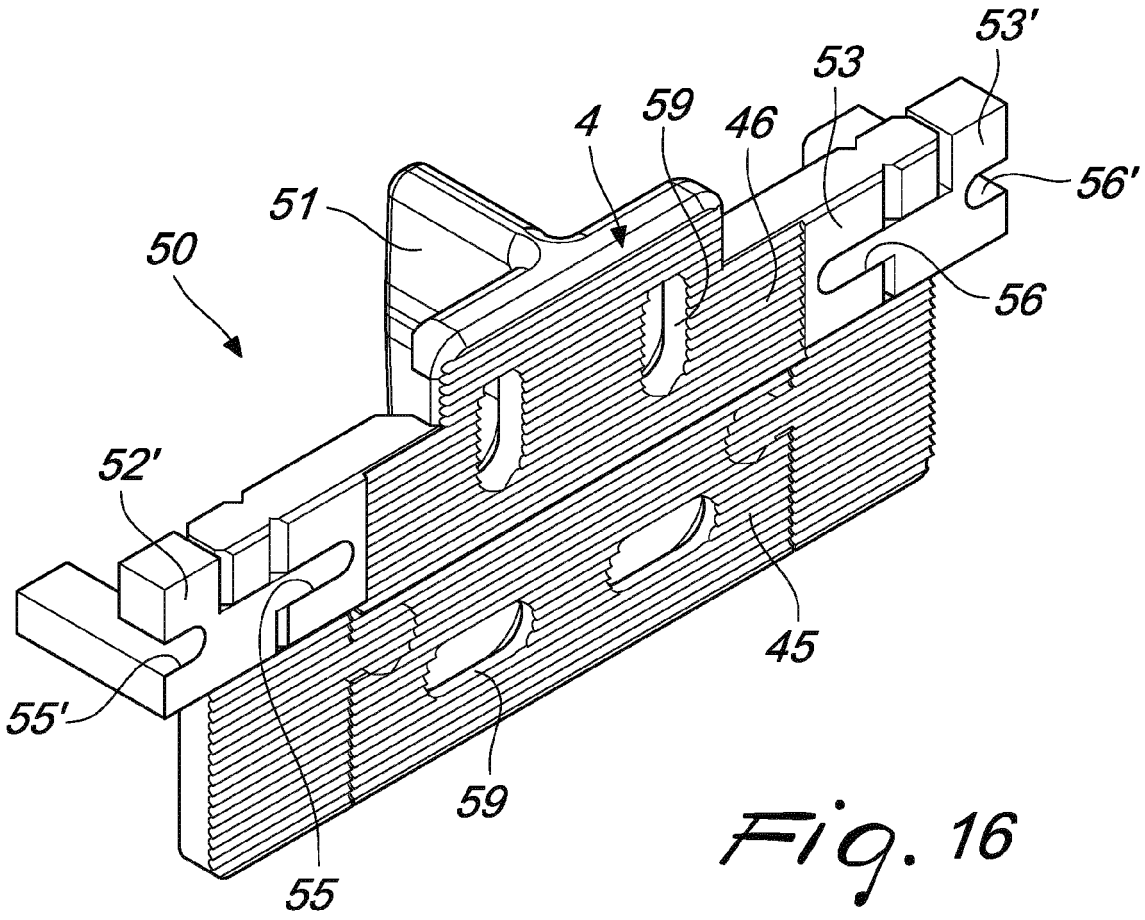
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Fig. 16

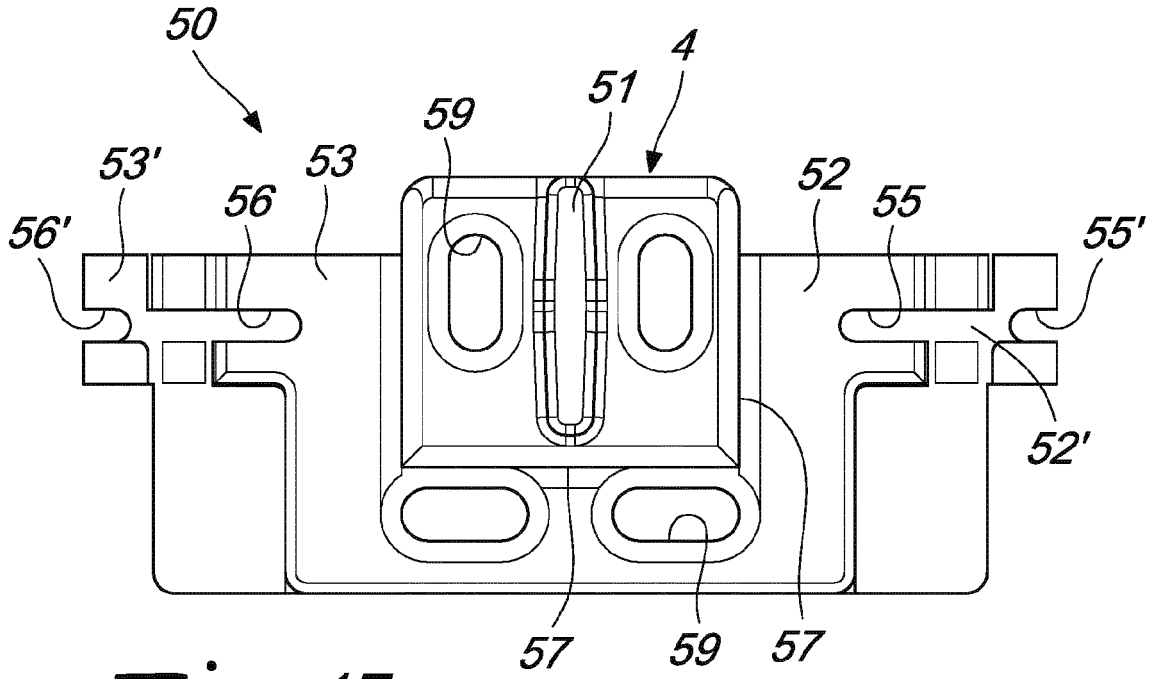
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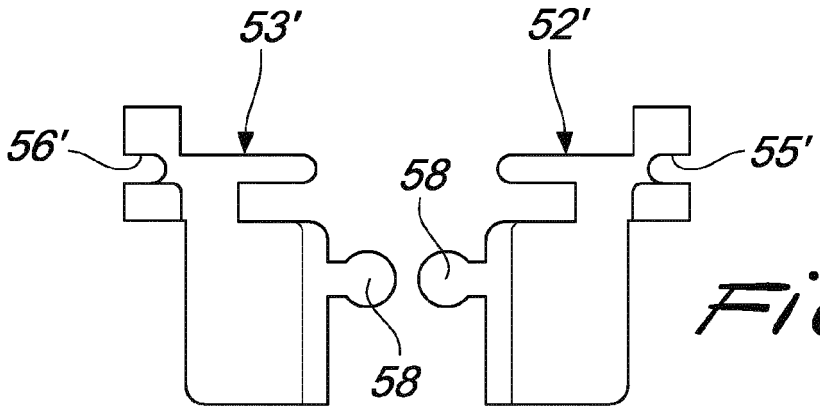
Fig. 17



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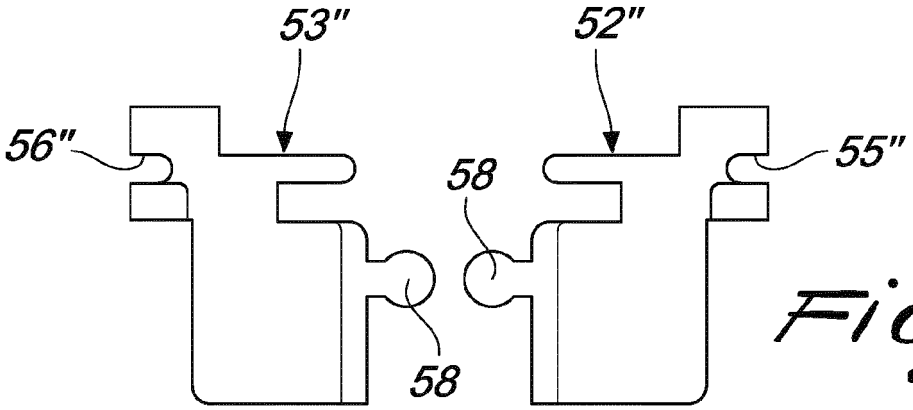

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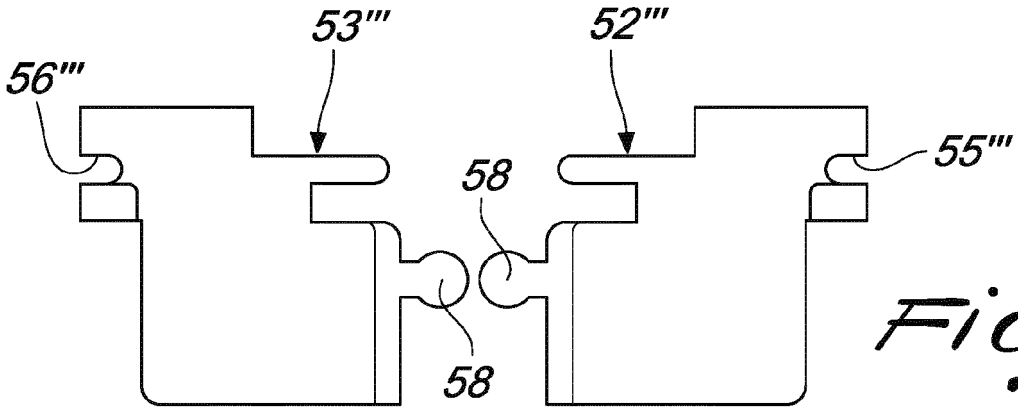

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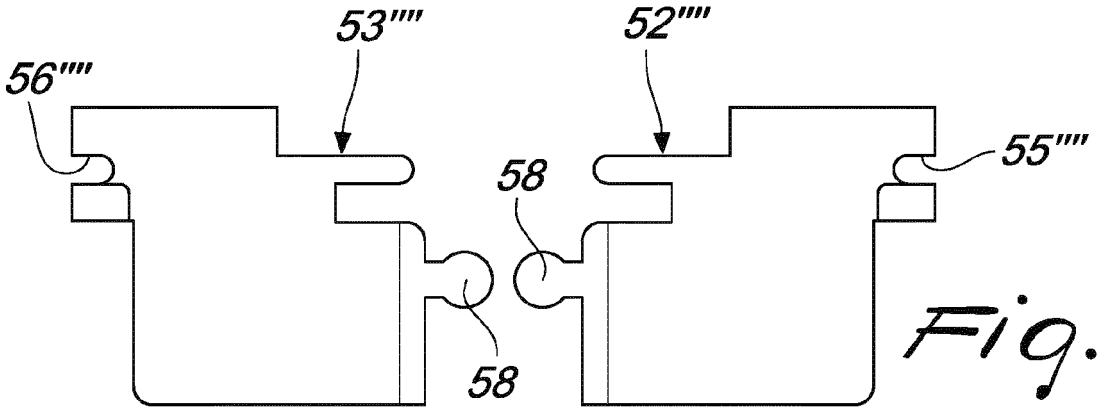

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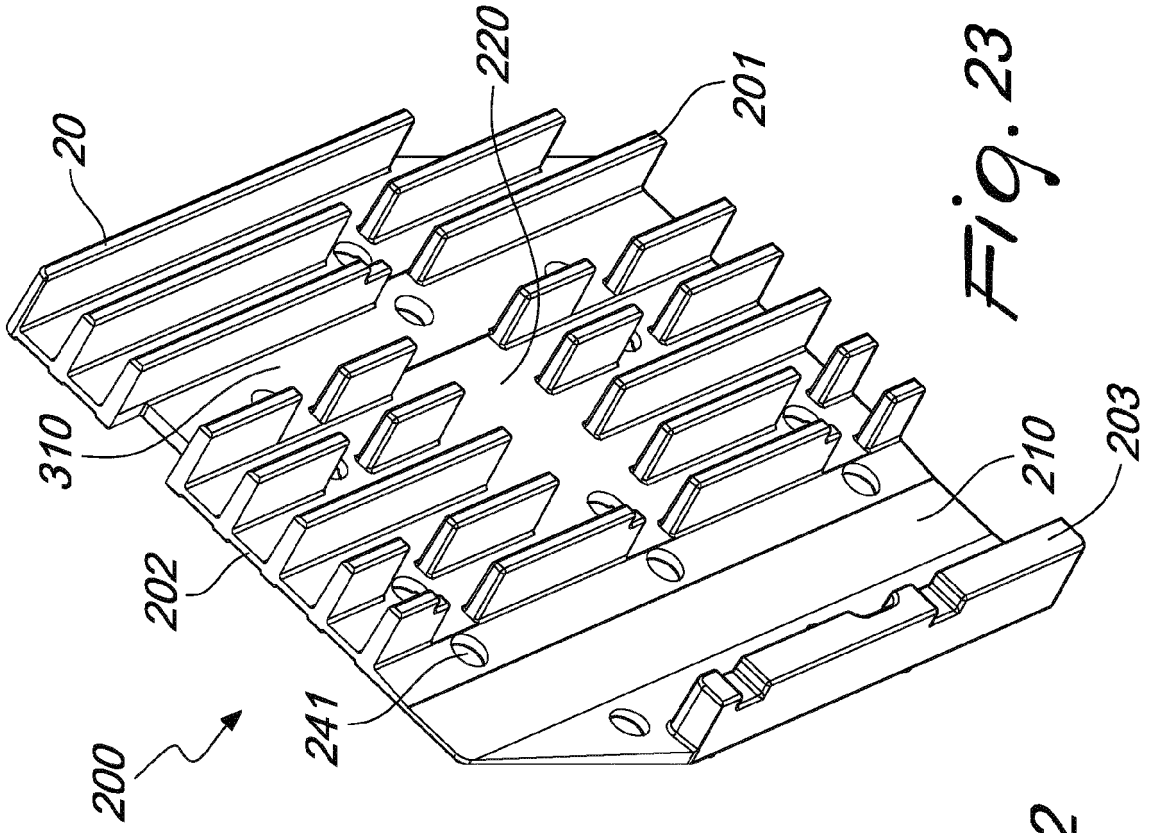

Fig. 23

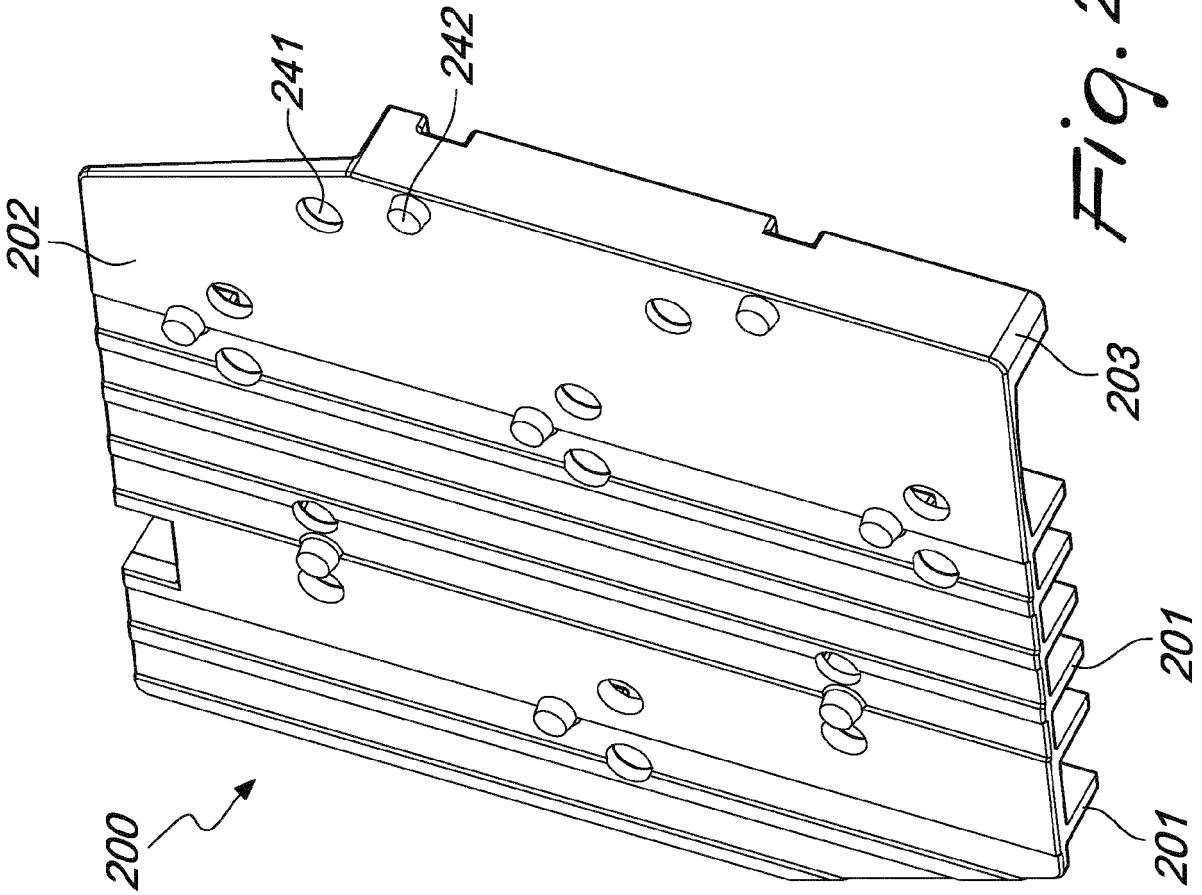

Fig. 22

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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 20 2013 103663 U1 (HÜCKING GMBH [DE]) 14 November 2014 (2014-11-14) * 70; figures 1-13 *	1-13	INV. E06B3/46 E05F7/04 E05D15/06 B65D81/05
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 November 2023	Cobusneanu, D

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