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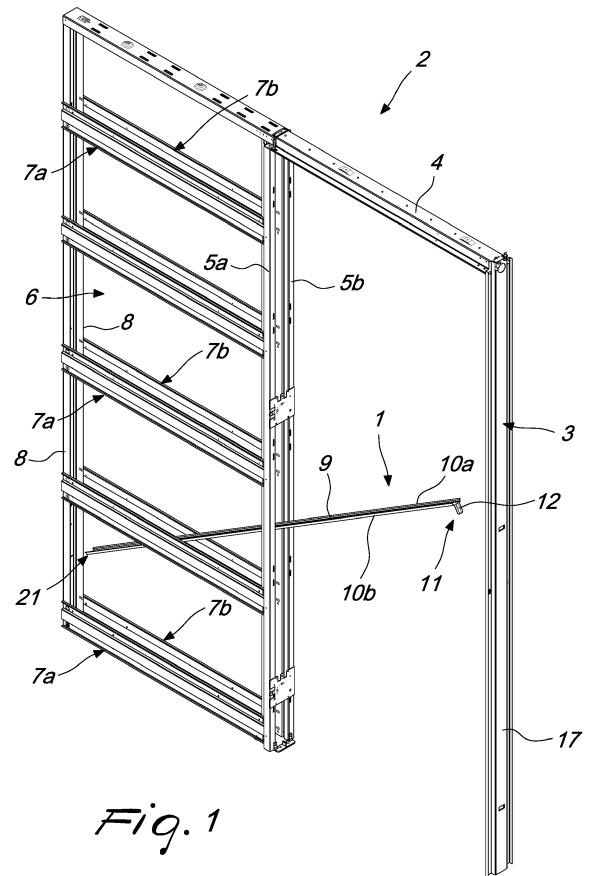
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(54) **ALIGNMENT DEVICE FOR INSTALLING IN-WALL FRAMES FOR SLIDING DOORS**

(57) An alignment device (1) for installing in-wall frames (2) for sliding doors which comprise a first abutment post (3) connected, by means of an upper cross-member (4), to a pair of second front abutment posts (5a, 5b) of a pocket (6) provided with a seat formed by a series of crossmembers (7a, 7b), which are arranged in pairs parallel to each other, the sliding door being accommodated slidingly between the internal side walls thereof, and which are in turn connected at one end to a third rear abutment post (8). The device (1) comprises a single profile, which can be arranged in the interspace between the internal side walls formed by the crossmembers (7a, 7b) of the pocket (6), having a length equal to the distance between the first abutment post (3) and the third rear abutment post (8). The single profile is connectable to the first abutment post (3), to the pair of second front abutment posts (5a, 5b), and to the third rear abutment post (8).



*Fig. 1*

## Description

**[0001]** The present invention relates to an alignment device for installing in-wall frames for sliding doors.

**[0002]** Currently it is known to provide door and window closure elements which require the use of an in-wall frame, firmly positioned within a wall, inside which a door or a panel, also termed retractable door, is slidingly associated.

**[0003]** This solution allows to reduce the space occupation of the door within a room by virtue of the possibility to make it slide into the in-wall frame: it is thus possible to use the space adjacent to the door, which would instead be occupied by doors of the type hinged laterally to a frame.

**[0004]** In the background art, the in-wall frame, embedded in the wall or between two plasterboard sheets, forms a containment casing for the sliding door and is usually constituted by a framework which comprises a plurality of vertical profiles, including a front post and a rear post, between which said door slides, and an upper crossmember, all of which form the opening or compartment that can be closed by means of said door.

**[0005]** A track protrudes above the casing, along an axis that is longitudinal to the casing and extends on the opposite side with respect to the containment casing, and is concealed by a horizontal jamb.

**[0006]** Carriages are slidingly associated inside the track and are coupled to the upper edge of the door to allow its sliding in and out of the in-wall frame.

**[0007]** An additional element is usually associated with the end of the track that is not associated with the vertical posts and acts as a terminal for the abutment and locator of the front edge of the door.

**[0008]** One problem that is observed in the use of these solutions resides in keeping the frame for the retractable sliding door aligned during installation.

**[0009]** In relation to this problem, this same Applicant is the proprietor of Italian utility model patent No. 263166, which claims an alignment device for installing sliding doors of the type comprising an alignment bar provided with at least one folding tab, an abutment post provided with at least one recess, and a removable mask for an in-wall frame, likewise provided with at least one recess, the alignment bar being provided, at the leading end, with at least one first folding tab and, at a region that precedes the one of the end that is opposite the leading end, with at least one second folding tab, wherein the alignment bar is partly accommodated in an adapted guiding seat which is suitable to allow the alignment bar to perform, in addition to a sliding motion, a movement in a vertical direction such as to allow the engagement of the second folding tab on at least one recess, with which the removable mask is provided and which is positioned below the guiding seat, and wherein the guiding seat is arranged at the lower part of the removable mask.

**[0010]** The profile (or alignment bar) described in this patent also has the purpose of aligning the frame, but it

has some drawbacks linked to its specific positioning and locking; the width of the profile is in fact equal to the internal width of the casing (or box) of the frame and therefore the casing determines the position of the profile; moreover, the profile extends only partially inside the casing, since a portion remains inside it in a cantilever manner, locking occurring only between the post that is external to the casing and the adjacent post of the casing itself and being therefore subject to possible misalignments.

**[0011]** Furthermore, the limitations and disadvantages of this solution reside in that a given width of the alignment profile must correspond with the thickness of the frame and/or the internal width of the casing (or box); therefore, it is necessary to produce multiple types of profiles of various widths, with high economic cost for production, storage and transport.

**[0012]** The part of the profile (or bar) arranged in a free condition within the in-wall frame is not involved in the alignment of the frame and therefore misalignments are possible.

**[0013]** The aim of the present invention is therefore to solve the described technical problems, eliminating the drawbacks of the cited background art, by providing a device that allows to achieve an optimum alignment, during installation, of in-wall frames for sliding doors and at the same time allows to align the entire structure adapted to support the sliding door, comprising the entire box of the in-wall frame and the abutment post.

**[0014]** Within this aim, an object of the present invention is to provide an alignment device that optimizes the alignment regardless of the thickness of the pocket or box that constitutes the in-wall frame in which it is to be installed.

**[0015]** Another object is to provide an alignment device that has low manufacturing costs.

**[0016]** Another object is to provide an alignment device that can be provided with ordinary machines and equipment and is structurally simple.

**[0017]** This aim, the objects mentioned, and others which will become better apparent hereinafter are achieved by an alignment device for installing in-wall frames for sliding doors which comprise a first abutment post connected, by means of an upper crossmember, to a pair of second front abutment posts of a pocket provided with a seat formed by a series of crossmembers, which are arranged in pairs parallel to each other, said sliding door being accommodated slidingly between the internal side walls thereof, and which are in turn connected at one end to a third rear abutment post, characterized in that said device comprises a single profile, which can be arranged in the interspace between said internal side walls formed by said crossmembers of said pocket, having a length equal to the distance between said first abutment post and said third rear abutment post, said single profile being connectable to said first abutment post, to said pair of second front abutment posts, and to said third rear abutment post.

**[0018]** Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular but not exclusive embodiment, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a lateral perspective view of an in-wall frame with the alignment device of the invention inserted;

Figure 2 is a lateral perspective view of the in-wall frame with the alignment device inserted;

Figure 3 is a view, similar to the preceding one, in a different lateral perspective view;

Figure 4 is a front view of the in-wall frame with the alignment device inserted;

Figure 5 is a view taken along the sectional plane V-V of Figure 4;

Figures 6 and 7 are two perspective views of a detail of the alignment device associated with the third rear abutment post;

Figure 8 is a view taken along the sectional plane VIII-VIII of Figure 5;

Figure 9 is a view of a detail of the alignment device at the second front abutment posts in the initial insertion step;

Figure 10 is a view, similar to the preceding one, with the alignment device stably associated with the second front abutment posts;

Figure 11 is a view taken along the sectional plane XI-XI of Figure 5;

Figure 12 is a view of a detail of the alignment device at the first abutment post;

Figure 13 is a sectional view, taken along the sectional plane XIII-XIII of Figure 5.

**[0019]** In the exemplary embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

**[0020]** With reference to the above figures, the reference numeral 1 generally designates an alignment device for installing in-wall frames 2 for sliding doors (not shown), which comprises a first abutment post 3 which is connected, by means of an upper crossmember 4, to a pair of second front abutment posts 5a, 5b of a pocket or box 6, which has a seat formed by a series of crossmembers 7a, 7b arranged in pairs parallel to each other, between the internal side walls of which said sliding door is accommodated slidingly, and in turn connected to one end of a third rear abutment post 8.

**[0021]** Adapted and known carriages are slidingly associated with the upper crossmember 4 and are adapted to support and guide the movement of the sliding door.

**[0022]** The device 1 is composed of a single profile, which has a substantially C-shaped cross-section so as to form a flat base 9 and two side wings 10a, 10b, the flat base 9 having a width that is narrower than the space

between the internal side walls formed by said crossmembers 7a, 7b of the pocket 6 and a length that is substantially equal to the length between the first abutment post 3 and the third rear abutment post 8.

**[0023]** The single profile can be connected to the first abutment post 3, to the pair of second front abutment posts 5a, 5b, and to the third rear abutment post 8.

**[0024]** The single profile has a first end 11, which can be associated with the first abutment post 3, from which a first tab 12 protrudes, substantially at right angles and downward, and enters a first seat 13 which protrudes inside the internal lateral surface 14 of the first abutment post 3.

**[0025]** The first seat 13 is formed by a first upper opening 15 which lies above a second front opening 16, which is provided on the external lateral surface 17 of the first abutment post 3 and faces a rear wall 18 which affects only part of the length of the first tab 12.

**[0026]** The latter is therefore longer than the extension of the rear wall 18 and has, beyond the terminal end 19 of the rear wall 18 and in the direction of the latter, a step 20 adapted to engage the terminal end 19 of the rear wall 18 to obtain a locking of the position of the first tab 12.

**[0027]** The single profile has the second end 21 which can be associated with the third rear abutment post 8 and has a second tab 22 which protrudes, when installed, through a third opening 23 provided on the third rear abutment post 8.

**[0028]** The single profile has, at the portion that lies above the pair of second front abutment posts 5a, 5b, a second seat 24 which is provided transversely to the flat base 9, for example by punching; a third tab 25 can be positioned within the second seat 24 and protrudes from a plate 26 which connects transversely the pair of second front abutment posts 5a, 5b.

**[0029]** The number of the plates 26 may vary according to the specific requirements; preferably, the plate 26 is arranged at least proximate to the resting plane of the in-wall frame 2.

**[0030]** The third tab 25 is then bendable to allow the locking of its position.

**[0031]** The single profile therefore can be associated with the in-wall frame 2 by arranging it initially between the pair of second front abutment posts 5a, 5b above the plate 26 and then the second tab 22 is inserted within the third opening 23 provided on the third rear abutment post 8.

**[0032]** The profile is then lowered until the third tab 25 is inserted within the second seat 24 and the first tab 12 is inserted in the first upper opening 15, locking the step 20 on the terminal end 19 of the rear wall 18.

**[0033]** The third tab 25 is then folded, thus stably locking the alignment device to the in-wall frame.

**[0034]** It has thus been found that the invention has achieved the intended aim and objects, a device having been devised which allows to achieve optimum and stable alignment in the installation of the various vertical components that constitute the in-wall frame.

**[0035]** This alignment is independent of the width of the profile used, which connects at three points to the in-wall frame and can be used and adapted to in-wall frames of various sizes and with different thicknesses of the various vertical components and/or posts and with a distance between the two front abutment posts 5a, 5b and between the internal side walls of the crossmembers 7a, 7b which can be variable, wherein, since the only variant is the length of the profile, said profile can be obtained by continuous machining, which does not entail machine tooling and not even a reduction in efficiency in production, keeping costs low.

**[0036]** The device according to the invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

**[0037]** The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to the specific requirements.

**[0038]** The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated. The characteristics indicated as advantageous, convenient or the like may also be omitted or be replaced with equivalents.

**[0039]** The disclosures in Italian Patent Application No. 102019000015057 from which this application claims priority are incorporated herein by reference.

**[0040]** 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. An alignment device (1) for installing in-wall frames (2) for sliding doors which comprise a first abutment post (3) connected, by means of an upper crossmember (4), to a pair of second front abutment posts (5a, 5b) of a pocket (6) provided with a seat formed by a series of crossmembers (7a, 7b), which are arranged in pairs parallel to each other, said sliding door being accommodated slidingly between the internal side walls thereof, and which are in turn connected at one end to a third rear abutment post (8), **characterized in that** said device (1) comprises a single profile, which can be arranged in the interspace between said internal side walls formed by said crossmembers (7a, 7b) of said pocket (6), having a length equal to the distance between said first abutment post (3) and said third rear abutment post (8), said single profile being connectable to said first abutment post (3), to said pair of second front abutment posts (5a, 5b), and to said third rear abutment post (8).
2. The device (1) according to claim 1, **characterized in that** said single profile is substantially C-shaped in cross-section so as to form a flat base (9) and two side wings (10a, 10b), said flat base (9) being narrower than the space between said internal side walls formed by said crossmembers (7a, 7b) and being substantially as long as the length between said first abutment post (3) and said third rear abutment post (8), said single profile having a first end (11), which can be associated with said first abutment post (3) and from which a first tab (12) protrudes substantially at right angles and downward and enters a first seat (13) which protrudes inside the internal lateral surface (14) of said first abutment post (3).
3. The device (1) according to claims 1 and 2, **characterized in that** said first seat (13) is formed by a first upper opening (15) which lies above a second front opening (16), provided on the outer lateral surface (17) of said first abutment post (3) and facing a rear wall (18) which affects only part of the length of said first tab (12), the latter being longer than the extension of said rear wall (18) and having, beyond the terminal end (19) of said rear wall (18) and in the direction of the latter, a step (20) adapted to engage said terminal end (19) of said rear wall (18) in order to achieve a locking of the position of said first tab (12).
4. The device (1) according to one or more of the preceding claims, **characterized in that** said single profile has a second end (21) which can be associated with said third rear abutment post (8) and has a second tab (22) which protrudes, when installed, through a third opening (23) provided on said third rear abutment post (8).
5. The device (1) according to one or more of the preceding claims, **characterized in that** said single profile has, at the portion that lies above said pair of second front abutment posts (5a, 5b), a second seat (24) which is provided transversely to said flat base (9), a third tab (25) being arrangeable within said second seat (24) and protruding from a plate (26) which connects transversely said pair of second front abutment posts (5a, 5b), said third tab (25) being bendable in order to allow the locking of its position.
6. The device (1) according to one or more of the preceding claims, **characterized in that** said single profile can be associated with said frame (2) by arranging it initially between said pair of second front abutment posts (5a, 5b) above said plate (26), inserting said second tab (22) within said third opening (23)

provided on said third rear abutment post (8) and, once said single profile has been lowered, said third tab (25) has been inserted within said second seat (24) and said first tab (12) has been inserted in said first upper opening (15), locking said step (20) on said terminal end (19) of said rear wall (18), said third tab (25) being folded so as to lock stably said alignment device (1) to said frame (2).

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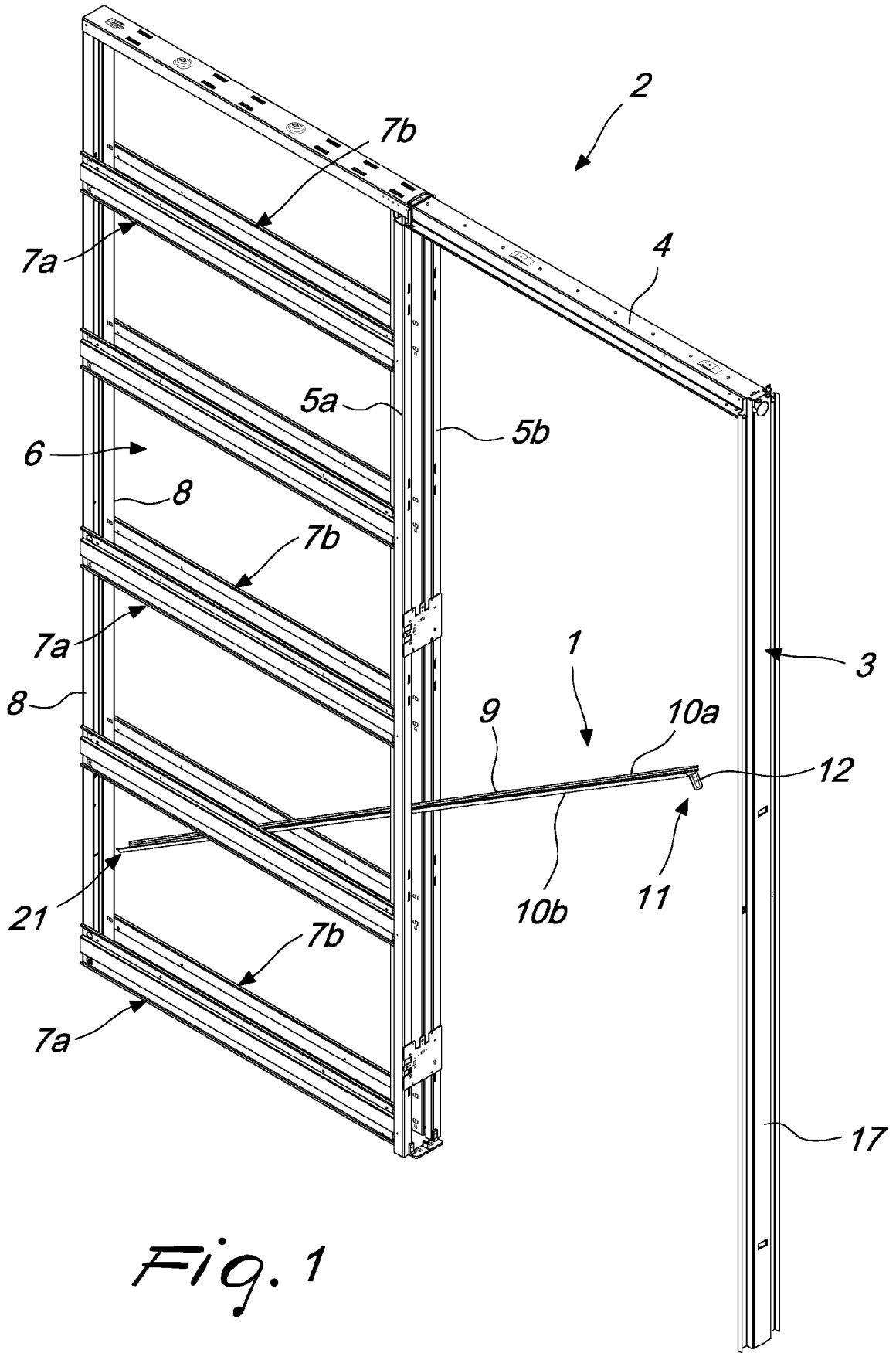


Fig. 1

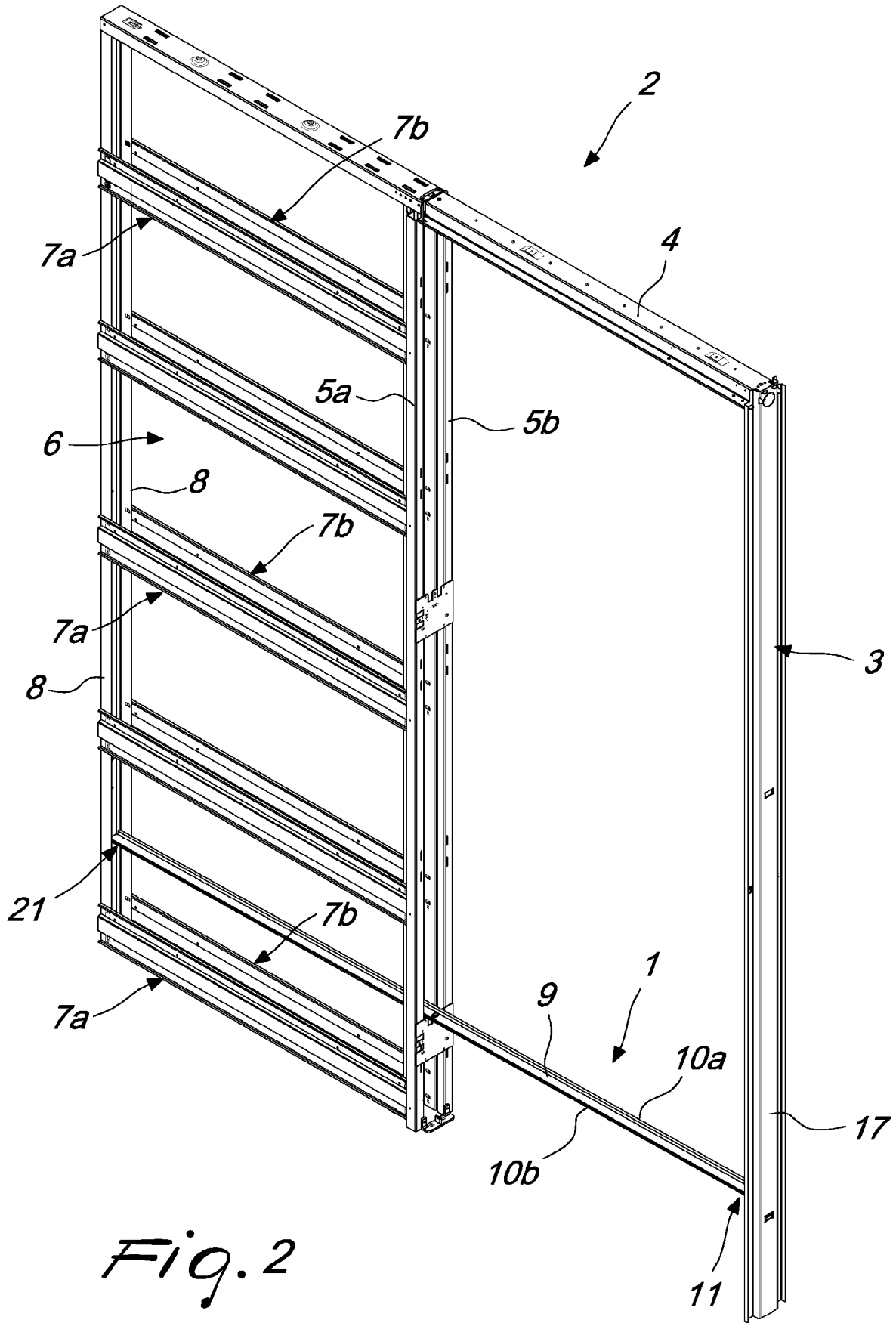


Fig. 2



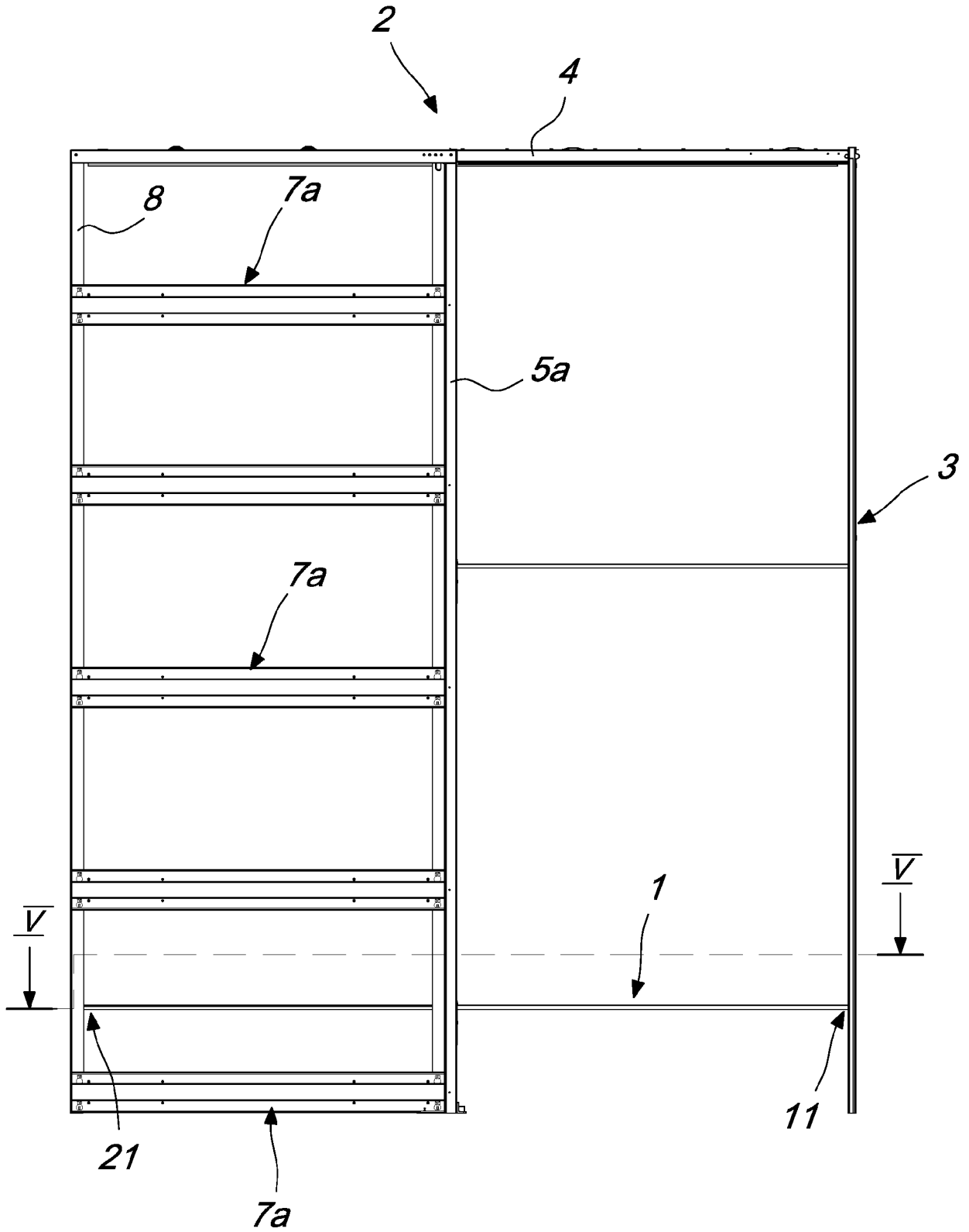
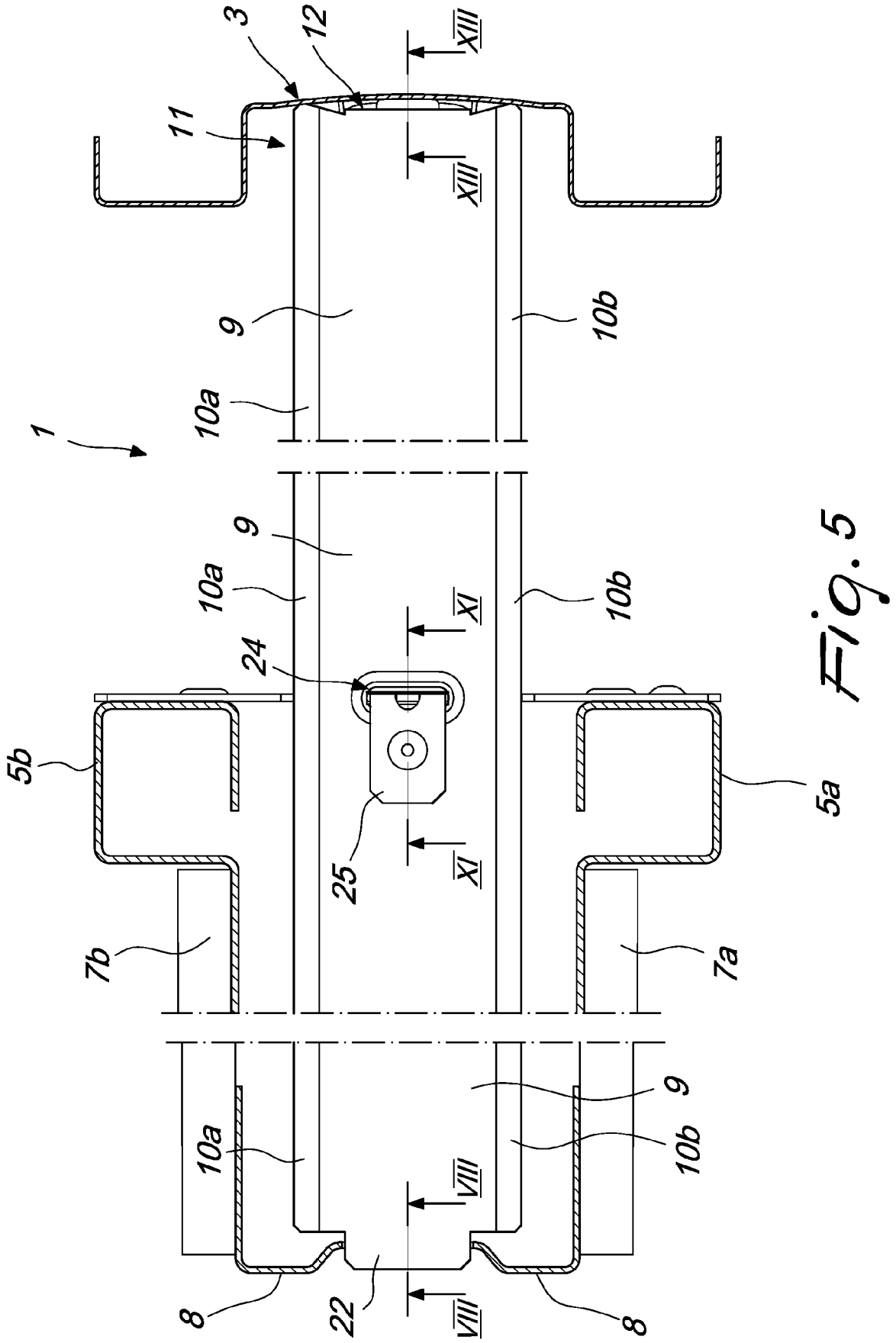
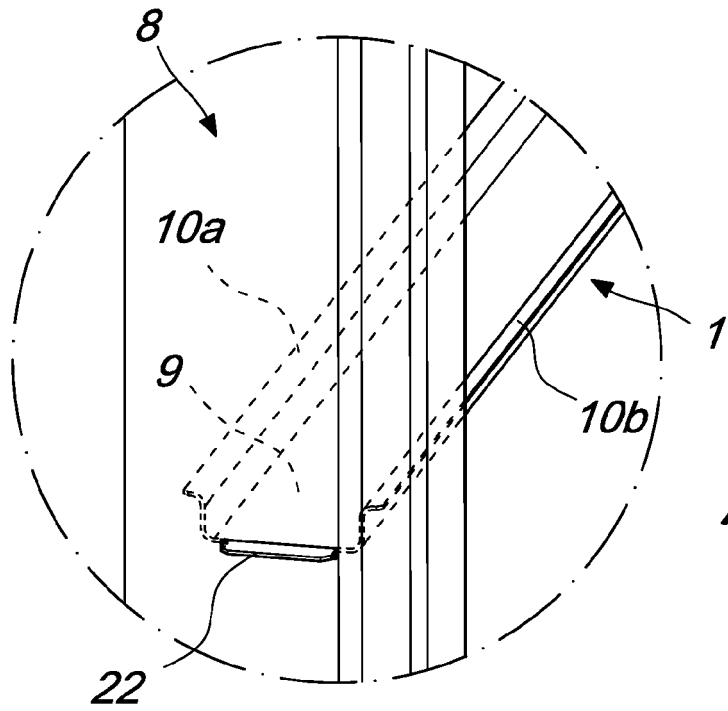
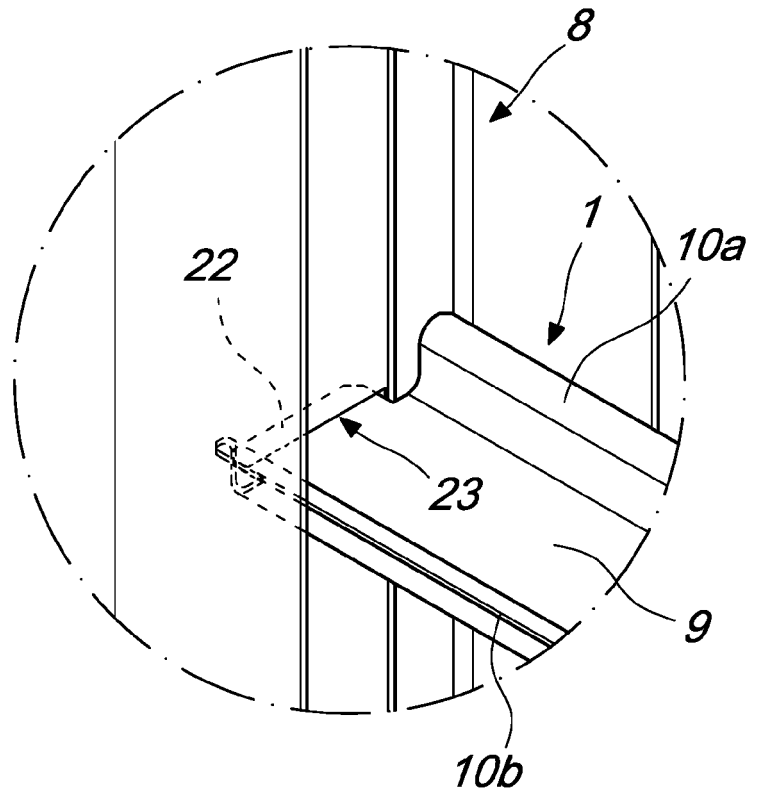


Fig. 4

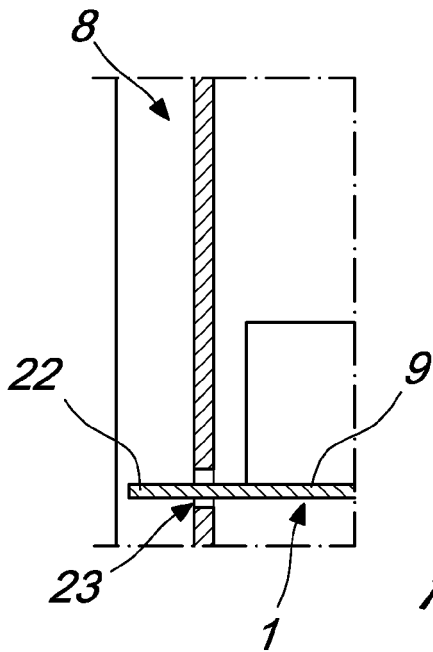




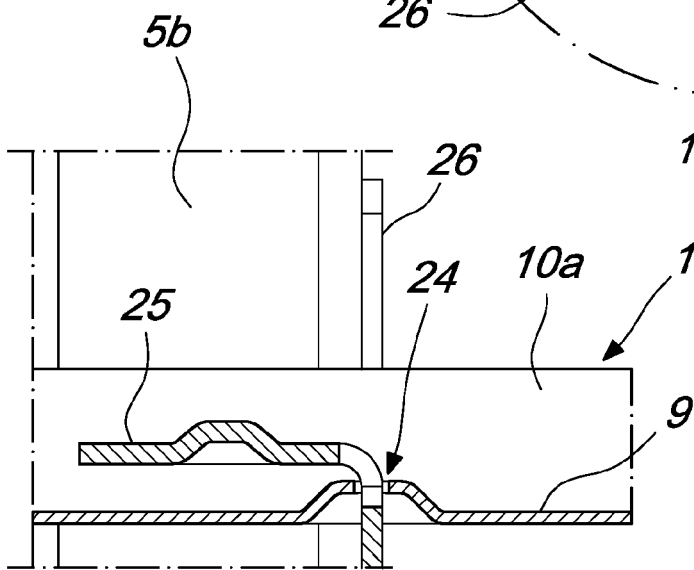
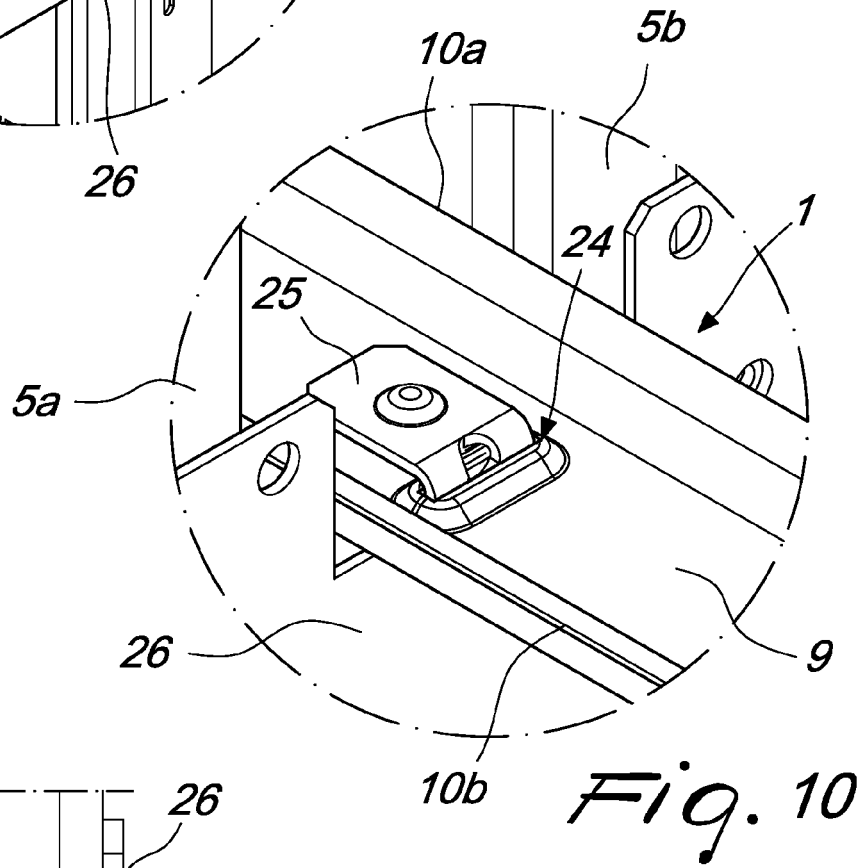
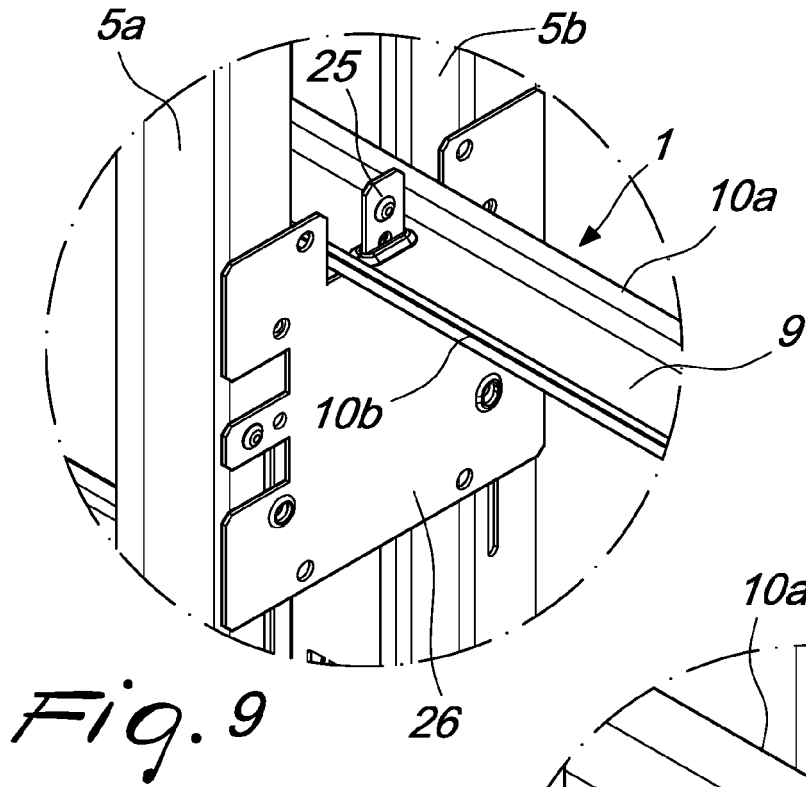
*Fig. 6*

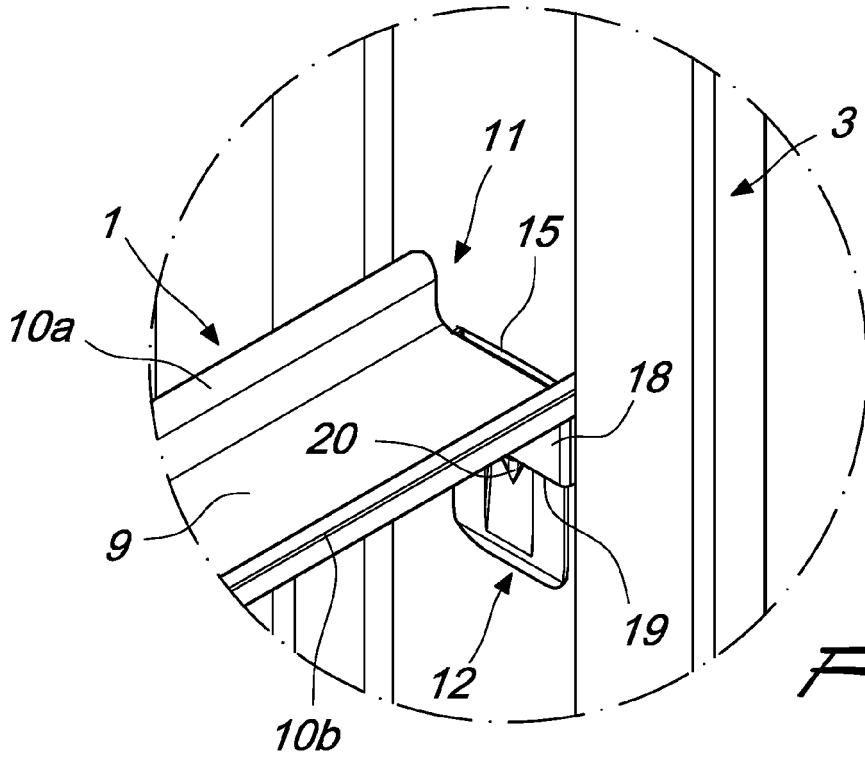


*Fig. 7*

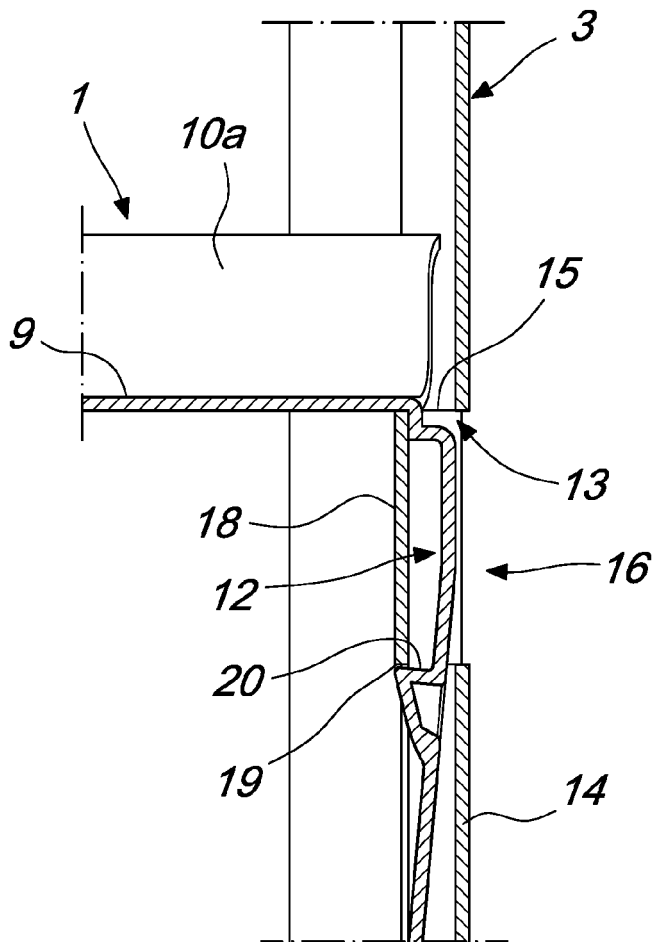


*Fig. 8*





*Fig. 12*



*Fig. 13*



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Application Number  
EP 20 19 2969

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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X	EP 2 299 043 A1 (S C S P A [IT]) 23 March 2011 (2011-03-23) * figures *	1-6	INV. E06B3/46
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			TECHNICAL FIELDS SEARCHED (IPC)
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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 January 2021	Examiner Verdonck, Benoit
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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**REFERENCES CITED IN THE DESCRIPTION**

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