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(54) **IN-WALL FRAME FOR SLIDING DOORS**

(57) An in-wall frame (10) for sliding doors, of the type comprising a framework enclosed in a casing (50), the in-wall frame (10) comprising:
- two opposite end posts, respectively a first one (11) and a second one (12),
- a main crossmember (13), which extends between the upper ends of the two end posts (11, 12),
- two mutually opposite intermediate posts (14a, 14b), in a position that is substantially central between the two end posts (11, 12),
- one or more pairs of secondary crossmembers (15a, 15b), each comprised between one of the end posts (12) and one of the intermediate posts (14a, 14b).

The in-wall frame (10) comprises the main crossmember (13), the end posts (11, 12), the intermediate posts (14a, 14b) and the secondary crossmembers (15a, 15b), which have a length that can be modified.

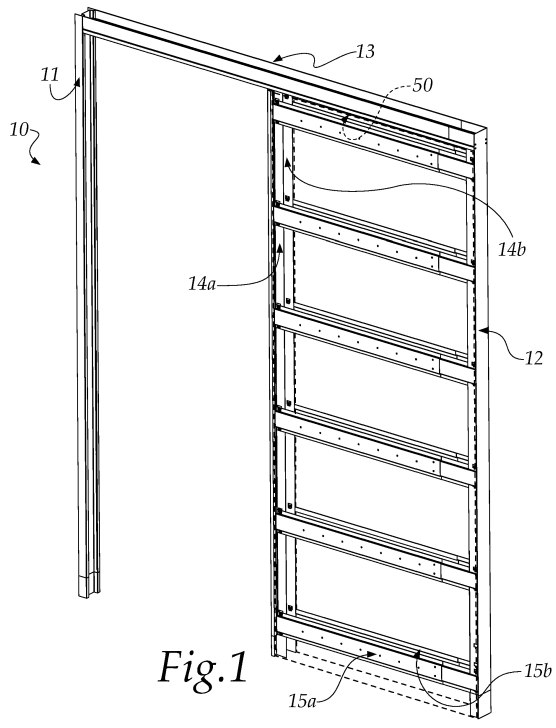

Fig.1

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Description

[0001] The present invention relates to an in-wall frame for sliding doors.

[0002] The use of sliding doors is currently widespread in buildings in which it is not possible to resort to swing-doors due to aesthetic reasons or for lack of space.

[0003] Sliding doors generally comprise one or two leaves.

[0004] These leaves can be made of a plurality of materials, such as for example metal, wood, plastic material, glass or a combination thereof.

[0005] Sliding doors are distinguished into two main categories: external ones and retractable ones.

[0006] External sliding doors have leaves which are constrained so as to slide along a visible guide that is fixed at least partly in a wall portion located above the passage opening.

[0007] Such leaves are arranged so as to slide between the passage opening and a wall that is contiguous to said opening, however always remaining visible.

[0008] Retractable doors instead have leaves which are constrained so as to slide along a guide that is hidden from view and is fixed at least partially above the passage opening. These leaves are arranged so as to slide between the passage opening and an accommodation casing which is contiguous to said opening. This casing is adapted to conceal the presence of the leaves when they are in the open configuration.

[0009] Both external sliding doors and retractable ones have leaves which are each fixed to at least two carriages which slide within the guide described above.

[0010] Retractable sliding doors therefore require a casing for accommodating the leaves in the open configuration.

[0011] In order to provide such a casing, an in-wall frame is installed, fixing it to the edges of the original opening. In this manner, the original opening is made smaller.

[0012] This type of in-wall frame is normally made of metal.

[0013] Considering for example a single-leaf sliding door, normally this in-wall frame is provided with two end posts constituted by adapted profiles arranged vertically, which support an upper profiled element which contains the sliding guide.

[0014] Two facing vertical profiles for supporting said upper profiled element are arranged in a substantially central position and are adapted to define the limit of the passage opening and the inlet of the leaf retraction casing.

[0015] In particular, these central profiles are arranged at a distance that allows the passage of the sliding leaf.

[0016] Substantially horizontal crossmembers are furthermore fixed between one of the two end posts and each one of the two opposite central profiles in order to give greater rigidity to the in-wall frame and to form the structure of the retraction casing.

[0017] The casing has surfaces formed externally by panels made of plasterboard.

[0018] In addition or as an alternative to these crossmembers it is possible to use adapted metal plates between the end post and the two opposite central profiles.

[0019] This background art has some drawbacks.

[0020] The posts and crossmembers usually have standard sizes. For applications with smaller sizes it is necessary to resort to the provision of specific elements having the required sizes.

[0021] This entails considerable costs and long installation times.

[0022] As an alternative it is possible to perform directly, during installation, a series of operations such as the measurement of the necessary length of the individual elements and cutting to size.

[0023] However, this causes an extension of the installation times of the in-wall frame and a complex and awkward procedure.

[0024] Furthermore, the cutting of the structural elements of the in-wall frame at the building site, if not performed well, risks compromising the structural characteristics of the individual element and consequently compromising also those of the structure as a whole. Significant torques or flexural moments can in fact be generated.

[0025] For applications with larger sizes, it is instead still possible to resort to the provision of elements of specific length, with considerable costs and long installation times.

[0026] As an alternative, it is possible to add auxiliary elements by fixing them to the base ones in order to bring them to size.

[0027] This entails the need for a considerable number of additional operations such as: measurement of the necessary length, search for the appropriate auxiliary element, and fixing of the latter to the base element.

[0028] Moreover, even this background art entails additional costs with respect to those of the standard elements for the in-wall frame.

[0029] The aim of the present invention is to provide an in-wall frame that is capable of improving the background art in one or more of the aspects indicated above.

[0030] Within this aim, an object of the invention is to provide an in-wall frame for sliding doors that ensures great adaptability in application.

[0031] Another object of the invention is to provide an in-wall frame for sliding doors that allows to extend or shorten its elements easily in applications respectively with larger or smaller sizes and does not require the use of auxiliary elements.

[0032] A further object of the invention is to provide an in-wall frame for sliding doors that allows a quick variation of the length of its elements in case of applications with larger or smaller sizes.

[0033] A still further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0034] Another object of the invention is to provide an in-wall frame that is highly reliable, relatively easy to provide and at competitive costs.

[0035] This aim, as well as these and other objects which will become better apparent hereinafter, are achieved by an in-wall frame for sliding doors of the type comprising a framework enclosed in a casing, said in-wall frame comprising:

- two opposite end posts, respectively a first one and a second one,
- a main crossmember, which extends between the upper ends of said two end posts,
- two mutually opposite intermediate posts, in a position that is substantially central between said two end posts,
- one or more pairs of secondary crossmembers, each comprised between one of said end posts and one of said intermediate posts,

said in-wall frame being characterized in that said main crossmember, said end posts, said intermediate posts and said secondary crossmembers have a length that can be modified.

[0036] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the in-wall frame for sliding doors according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a general perspective view of an in-wall frame for sliding doors according to the invention;
Figure 2 is an exploded view of the in-wall frame of Figure 1;
Figure 3 is an enlarged-scale view of a first detail of Figure 2;
Figure 4 is an enlarged-scale view of a second detail of Figure 2;
Figure 5 is an enlarged-scale view of a third detail of Figure 2;
Figure 6 is an enlarged-scale view of a fourth detail of Figure 2;
Figure 7 is an exploded detail view of the in-wall frame of Figure 1;
Figure 8 is a view of a detail of the in-wall frame of Figure 1.

[0037] With reference to the figures, an in-wall frame for sliding doors, according to the invention, is designated generally by the reference numeral 10.

[0038] The in-wall frame 10 is made of metallic material.

[0039] This in-wall frame 10 for sliding doors comprises two opposite end posts 11 and 12.

[0040] In particular, the two posts 11 and 12, in addition to forming the ends of the in-wall frame 10, define: the first end post 11, an end of the passage opening, which faces the edge of a leaf, not shown in the figures, in the closed configuration; the second end post 12, instead, an end of a leaf accommodation casing 50, shown in dashes in the figures, which is faced by the edge of the leaf that is opposite to the one described above when said leaf is in the open configuration.

[0041] The in-wall frame 10 comprises a main crossmember 13. The main crossmember 13 extends between the upper ends of the end posts 11 and 12.

[0042] The main crossmember 13 contains a guide, not shown in the figures, for the sliding of at least two carriages which are fixed to the above cited leaf.

[0043] As mentioned, the in-wall frame 10 comprises a framework which, enclosed by panels, forms a casing 50 for the accommodation of the leaf in the open configuration.

[0044] The casing, which is not part of the in-wall frame, extends from one of the two end posts towards the passage opening.

[0045] In the example shown in the figures, the casing extends from the second post 12.

[0046] The in-wall frame 10 comprises two mutually opposite intermediate posts 14a and 14b, which are arranged in a substantially central position between the two end posts 11 and 12, which form the inlet of the casing.

[0047] The intermediate posts 14a and 14b are fixed in an upper region to the main crossmember 13.

[0048] The in-wall frame 10 also comprises a plurality of pairs of secondary crossmembers 15a and 15b, which are horizontal in the configuration for use and are comprised between one of the end posts and one of the intermediate posts 14a and 14b and are fixed thereto.

[0049] In the example shown in Figure 1, the pairs of crossmembers 15a, 15b are associated with the second end post 12.

[0050] The secondary crossmembers 15a, 15b are made of a metal plate, preferably made of galvanized steel, for example the one defined by the EN 10142 standard as DX 51 D, Z 140.

[0051] The secondary crossmembers 15a, 15b are arranged in pairs and are mutually opposite; in this manner a first secondary crossmember 15a is associated with the first intermediate post 14a and the opposite second secondary crossmember 15b is associated with the second intermediate post 14b.

[0052] In particular, the two intermediate posts 14a and 14b and the two secondary crossmembers 15a and 15b of each pair are identical and arranged symmetrically with respect to the sliding direction of the leaf.

[0053] The second end post 12, the two intermediate posts 14a, 14b, the pairs of secondary crossmembers 15a, 15b, and the corresponding main crossmember portion 13 constitute the framework of the casing 50, which is finished with the fixing, to the components mentioned above, of a plurality of panels, not shown in the figures, for example made of plasterboard, wood or the like.

[0054] One of the particularities of the invention resides in that in the in-wall frame 10 the main crossmember 13,

the end posts 11 and 12, the intermediate posts 14a, 14b and the secondary crossmembers 15a, 15b are adjustable in length.

[0055] Considering Figure 3, the main crossmember 13 comprises a composite profiled element 44, which is provided with a plurality of notches and/or markings 16 which indicate predefined lengths, adapted to help the installation technician in the operation for cutting the crossmember to size during the installation in applications with a width above or below size.

[0056] The profiled element 44 can be provided, for example, in two sizes, one for standard openings, with notches 16 for applications with a width of smaller size, and the other one, which is longer, with notches 16 for openings with a width of larger size.

[0057] The expression "standard sizes" refers to the sizes for an in-wall frame related to a standard opening. These sizes vary from country to country and therefore the sizes of the country in which the in-wall frame 10 is to be applied must be considered.

[0058] By way of nonlimiting example, the standard sizes for a door in Italy are provided: width 815-835 mm, height 2010-2100 mm.

[0059] The profiled element 44 can also be provided in a single size with markings and/or notches 16 that define various lengths, both for openings of standard width and for openings with a width of smaller or larger size.

[0060] Considering Figure 4, the first end post 11 can be extended in order to allow the application of the in-wall frame 10 in openings with a height of larger size.

[0061] The first end post 11 has a longitudinal extension and is provided with a main profile 20, of standard length, which comprises two opposite tubular bodies 17a and 17b, which are parallel to each other and are parallel to the direction of extension of the post 11.

[0062] The expression "standard length", referred to the main profile 20 of the first end post 11, is understood to reference a length of the profile that substantially follows the standard height of the door of the country in which the in-wall frame 10 is applied.

[0063] The main profile 20 has a cross-section with a substantially C-shaped contour and comprises two tubular bodies 17a, 17b, respectively a first one 17a and a second one 17b, substantially at the two corners of the cross-section.

[0064] The term "cross-section", in the present description, is to be understood as the cross-section defined by a plane that is perpendicular to the direction of extension of the component being considered.

[0065] A third tubular body 46 is present between the two tubular bodies 17a and 17b, has a quadrangular and preferably rectangular cross-section, and is monolithic with the other two.

[0066] The tubular bodies 17a and 17b have a quadrangular, preferably square, cross-section.

[0067] These tubular bodies 17a, 17b are both directed toward the passage opening, one toward a first environment and the other one toward a second environment, these two environments being separated by the sliding door being considered.

[0068] Each tubular body 17a, 17b is adapted for the partial insertion of a corresponding pin having a quadrangular cross-section, respectively 18a and 18b.

[0069] The pins 18a and 18b are fixed to the respective tubular bodies 17a and 17b by means of a plurality of screws, not shown in the figures, each of which passes through two corresponding through holes, also not shown in the figures, one of the tubular body 17a, 17b and the other of the corresponding pin 18a, 18b.

[0070] The elongation of the first end post 11 is ensured by the presence of a secondary profile 19, which has the same contour as the main profile 20 and comprises two similar tubular bodies 21a and 21b having a quadrangular cross-section.

[0071] The secondary profile 19 can be produced in different sizes or in a single size. In the second case, the secondary profile 19 has a plurality of markings, which define different sizes, in order to facilitate the necessary operation for cutting to size.

[0072] The tubular bodies 21a and 21b are adapted for the insertion of the remaining portions of the pins 18a and 18b after their fixing to the main profile 20.

[0073] The pins 18a and 18b are fixed to the respective tubular bodies 21a and 21b by means of screws, not shown in the figures, each of which crosses two corresponding through holes, partly shown in the figures, one in the tubular body 21a, 21b and the other in the corresponding pin 18a, 18b.

[0074] The main profile 20 of the first end post 11 and the secondary profile 19 are superimposed so that the projections of the respective cross-sections substantially coincide.

[0075] Considering Figure 5, each of the intermediate posts 14a and 14b has a main profile, respectively 22a and 22b, of standard length and having a substantially L-shaped cross-section, which has a tubular body, designated by the reference numeral 23a for the main profile 22a and not shown for the main profile 22b.

[0076] These tubular bodies have a quadrangular, preferably square, cross-section.

[0077] Each of the tubular bodies has a cross-section that corresponds substantially to the shorter part of the L-shaped contour that forms the cross-section.

[0078] Each of the main profiles 22a and 22b has a flat portion, respectively 43a and 43b.

[0079] The flat portions 43a and 43b have a cross-section that corresponds to the longest part of the L-shaped contour that forms the cross-section of the main profiles 22a and 22b.

[0080] The two posts 14a and 14b are mirror-symmetrical with respect to the plane that passes through the leaf sliding direction.

[0081] In particular, the tubular body 23a of the main profile 22a and its corresponding tubular body of the main profile 22b are parallel, extend in the same direction of extension as the intermediate posts 14a, 14b, and have

a quadrangular, preferably square, cross-section.

[0082] The tubular bodies of the main profiles 22a and 22b of the intermediate posts are arranged in an end position of the casing 50, both directed toward the passage opening, one toward a first environment and/or a first wall and the other one toward a second environment and/or a second wall, these two environments being separated by the sliding door being considered.

[0083] These tubular bodies are adapted for the insertion of a pin, respectively 24a and 24b, which has a quadrangular, preferably square, cross-section, for connection to a corresponding secondary profile, respectively 25a and 25b.

[0084] The secondary profiles 25a, 25b have the same contour as the corresponding main profile 22a, 22b and comprise a similar tubular body 26a and 26b having a quadrangular cross-section, for the insertion of the remaining pin portion 24a, 24b after the insertion of the latter in the corresponding tubular body of the main profile 22a, 22b.

[0085] The secondary profiles 25a, 25b can be produced in different sizes or in a single size.

[0086] In the second case, the secondary profiles 25a, 25b have a plurality of notches and/or markings, not shown in the figures, which define different sizes, in order to facilitate the necessary operation for cutting to size.

[0087] The secondary profiles 25a and 25b each have a flat portion, respectively 27a and 27b.

[0088] The flat portions 27a and 27b have a cross-section that corresponds to the longest part of the L-shaped contour that forms the cross-section of the secondary profiles 25a and 25b.

[0089] The flat portions 27a and 27b have a plurality of through holes 28, in a manner similar to the corresponding flat portions 43a, 43b of the profiles 22a, 22b of the intermediate posts 14a, 14b, for the fixing of one or more pairs of secondary crossmembers 15a, 15b.

[0090] The main profiles 22a, 22b of the intermediate posts 14a, 14b are superimposed on the respective secondary profiles 25a, 25b so that the projections of the respective cross-sections substantially coincide.

[0091] Considering Figure 6, the second end post 12 comprises a main profile 29 of standard length having a substantially C-shaped cross-section and constituted by three flat portions.

[0092] In particular, the external surface of the central flat portion 31 is in contact with the end of the opening in which the sliding door is installed and/or an external wall.

[0093] The two opposite flat portions 32 are instead directed respectively: one toward a first environment and/or a first wall and the other toward a second environment and/or a second wall, these two environments being separated by the sliding door being considered.

[0094] The second end post 12 can be extended, for heights of larger size, by using a secondary profile 30.

[0095] The secondary profile 30 has the same cross-section as the main body 29.

[0096] A portion of a plate 33 is fixed to the central portion 31 of the main profile 29 of the second end post 12 by means of the use of a plurality of screws, not shown in figures, each of which crosses a pair of corresponding through holes, one 34 on the plate 33 and the other 35 on the main profile 29.

[0097] The plate 33 is fixed, in the remaining portion, to the central portion of the secondary profile 30, by means of the use of a plurality of screws, not shown in the figures, each of which crosses a pair of corresponding through holes, one 34 on the plate 33 and the other 36 on the secondary profile 30.

[0098] The main profile 29 and the secondary profile 30 are superimposed so that the projections of the respective cross-sections substantially coincide.

[0099] The secondary profile 30 can be produced in different sizes or in a single size. In the second case, the secondary profile 30 has a plurality of markings and/or notches, which define different sizes, to facilitate the necessary operation for cutting to size.

[0100] With reference to Figures 2 and 7, each secondary crossmember 15a, 15b has a main profile, respectively 37a and 37b, of standard length.

[0101] The expression "standard length", referred to the main profiles 37a, 37b of the secondary crossmembers 15a, 15b, is understood to reference a length of the profiles that substantially follows the standard width of the door of the country in which the in-wall frame 10 is applied.

[0102] Each main profile 37a, 37b is provided with a flat central portion 38, comprised between two flat lateral portions 39a, 39b, which are monolithic with the central portion 38 and are joined thereto by means of a fold of the metal plate.

[0103] The central portion 38 and the two lateral portions 39a, 39b extend parallel to each other and parallel to the directions of extension of the main profile 37a, 37b.

[0104] In particular, the central portion 38 is directed toward the outside of the casing 50, in the configuration for use, while the lateral portions 39a, 39b are directed toward the inside of the casing 50.

[0105] Each main profile 37a, 37b is associated with the corresponding intermediate post 14a, 14b, with an extension that is perpendicular to the extension of the intermediate post.

[0106] Each main profile 37a, 37b is associated with the corresponding intermediate post 14a, 14b by means of a bayonet coupling.

[0107] Each crossmember 15a, 15b also comprises a secondary profile 40a, 40b, which is shaped like the corresponding primary profile 37a, 37b, which extends from it so as to be telescopic with respect to it.

[0108] Each secondary profile 40a, 40b is associated with the second end post 12 by means of a bayonet coupling.

[0109] Each primary profile 37a, 37b has a plurality of holes 41, arranged at a constant distance along a line X that is parallel to the axis of extension of the profile. These holes 41 are adapted for the insertion of corresponding

studs 42, or the like, to ensure a stable and definite elongation to the crossmember 15.

[0110] In particular, the various holes 41 and the corresponding studs 42 are arranged at such distances as to define predefined lengths of the crossmembers 15a and 15b.

[0111] For applications in holes with larger sizes, the secondary profile 40a, 40b is made to slide telescopically with respect to the primary profile 37a, 37b, or vice versa, until the desired crossmember length is obtained. Said length is then maintained by the hindrance to relative sliding between the two profiles caused by the interference generated by the studs 42 of the secondary profiles 40a, 40b in the holes 41 of the primary profiles 37a, 37b.

[0112] Considering the figures, and in particular Figure 8, the lateral portions 39a, 39b of the primary profiles 37a, 37b and the corresponding lateral portions 47a, 47b of the secondary profiles 40a, 40b each have at least one tab 45, not shown in the figures for the first profile, which protrudes toward the inside of the casing, considering the profiles in the configuration for use.

[0113] Each tab 45 is adapted for insertion in a corresponding hole in the corresponding post, so as to provide a bayonet coupling.

[0114] These holes are designated by the reference numeral 48 for the second end post 12 and are not designated for the intermediate posts 14a, 14b.

[0115] In this manner it is possible to obtain a quick installation of the frame of the casing.

[0116] As an alternative, the two primary and secondary profiles of each crossmember can be associated with the corresponding post by fixing with screws.

[0117] All the components of the in-wall frame 10, according to the invention, are self-supporting.

[0118] In a constructive variation, not shown in the figures, the sliding door is provided with two leaves which move in opposite directions and the in-wall frame is provided with two frames, each enclosed in a casing, at the ends and with a central passage opening, or with a single central casing and two passage openings at the ends.

[0119] In practice it has been found that the invention achieves the intended aim and objects, providing an in-wall frame that can be adapted to openings of larger or smaller size.

[0120] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may furthermore be replaced with other technically equivalent elements.

[0121] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0122] The disclosures in Italian Patent Application No. 102018000006481 from which this application claims priority are incorporated herein by reference.

[0123] 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 in-wall frame (10) for sliding doors, of the type comprising a framework enclosed in a casing (50), said in-wall frame (10) comprising:

   - two opposite end posts, respectively a first one (11) and a second one (12),
   - a main crossmember (13), which extends between the upper ends of said two end posts (11, 12),
   - two mutually opposite intermediate posts (14a, 14b), in a position that is substantially central between said two end posts (11, 12),
   - one or more pairs of secondary crossmembers (15a, 15b), each comprised between one of said end posts (12) and one of said intermediate posts (14a, 14b),

   said in-wall frame (10) being **characterized in that** said main crossmember (13), said end posts (11, 12), said intermediate posts (14a, 14b) and said secondary crossmembers (15a, 15b) have a length that can be modified.

2. The in-wall frame (10) according to claim 1, **characterized in that** said first end post (11) comprises a main profile (20) and a secondary profile (19).

3. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profile (20) and said secondary profile (19) of said first end post (11) are superimposed so that the projections of the respective cross-sections substantially coincide.

4. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profile (20) has a cross-section with a substantially C-shaped contour and comprises two tubular bodies (17a, 17b), respectively a first one (17a) and a second one (17b), substantially at the two corners of the cross-section, and a third tubular body (46) between said two tubular bodies (17a, 17b), monolithically with the other two.

5. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said first tubular body (17a) and said second tubular body (17b) have a quadrangular cross-section and are adapted for a partial insertion of a corresponding pin

(18a, 18b).

6. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said secondary profile (19) has the same contour as said main profile (20) and comprises two similar tubular bodies (21a, 21b), which are adapted for the partial insertion of a portion of said pins (18a, 18b).

7. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** each one of said intermediate posts (14a, 14b) has a main profile (22a, 22b) and a secondary profile (25a, 25b).

8. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profiles (22a, 22b) of said intermediate posts (14a, 14b) are superimposed on said respective secondary profiles (25a, 25b) so that the projections of the respective cross-sections substantially coincide.

9. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said profiles (22a, 22b) of said intermediate posts (14a, 14b) have a substantially L-shaped cross-section and comprise a tubular body (23a) and a flat portion (43a, 43b).

10. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said secondary profiles (25a, 25b) have the same contour as said corresponding main profile (22a, 22b) and comprise a similar tubular body (26a, 26b).

11. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** each one of said intermediate posts (14a, 14b) comprises a pin (24a, 24b) that is partially inserted in said tubular body (23a) of said main profile (22a, 22b) and is partially inserted in said tubular body (26a, 26b) of said secondary profile (25a, 25b).

12. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said second end post (12) comprises a main profile (29) and a secondary profile (30).

13. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profile (29) and said secondary profile (30) of said second end post (12) are superimposed so that the projections of the respective cross-sections substantially coincide.

14. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profile (29) of said second end post (12) has a substantially C-shaped cross-section, constituted by three flat portions (31, 32).

15. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said second end post (12) comprises a plate (33), which is partly fixed on said main profile (29) and partly fixed on said secondary profile (30).

16. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** each of said secondary transverse crossmembers (15a, 15b) has a main profile (37a, 37b) and a secondary profile (40a, 40b).

17. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** each said main profile (37a, 37b) has a flat central portion (38), which is comprised between two flat lateral portions (39a, 39b), which are monolithic with said central portion (38) and are joined to it by means of a fold of the metal plate, said central portion (38) and said lateral portions (39a, 39b) extending parallel to each other and parallel to the direction of extension of said main profile (37a, 37b).

18. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said secondary profile (40a, 40b) is shaped in a manner similar to the corresponding main profile (37a, 37b), said secondary profile (40a, 40b) having two flat lateral portions (47a, 47b), said secondary profile (40a, 40b) extending from said main profile (37a, 37b) so as to be telescopic with respect to it.

19. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** each said main profile (37a, 37b) has a plurality of holes (41) and each said secondary profile (40a, 40b) comprises a plurality of corresponding studs (42).

20. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said holes (41) are arranged at a constant distance along a line (X) that is parallel to the axis of extension of said primary profile (37a, 37b).

21. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main profile (37a, 37b) is associated with a corresponding said intermediate post (14a, 14b) and each secondary profile (40a, 40b) is associated with said second end post (12).

22. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said lateral portions (39a, 39b) of said primary profile (37a, 37b) and said corresponding lateral portions (47a, 47b) of said secondary profile (40a, 40b) each have

at least one tab (45), which is adapted for insertion in a corresponding hole (48) in said corresponding post (12, 14a, 14b), so as to provide a bayonet coupling.

23. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main crossmember (13) comprises a composite profiled element (44), which is provided with a plurality of notches and/or markings (16) which indicate different lengths.

24. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said main crossmember (13), said end posts (11, 12), said intermediate posts (14a, 14b), and said transverse elements (15a, 15b) are made of metallic material.

25. The in-wall frame (10) according to one or more of the preceding claims, **characterized in that** said secondary crossmembers (15a, 15b) are provided starting from a metal plate, preferably made of galvanized steel.

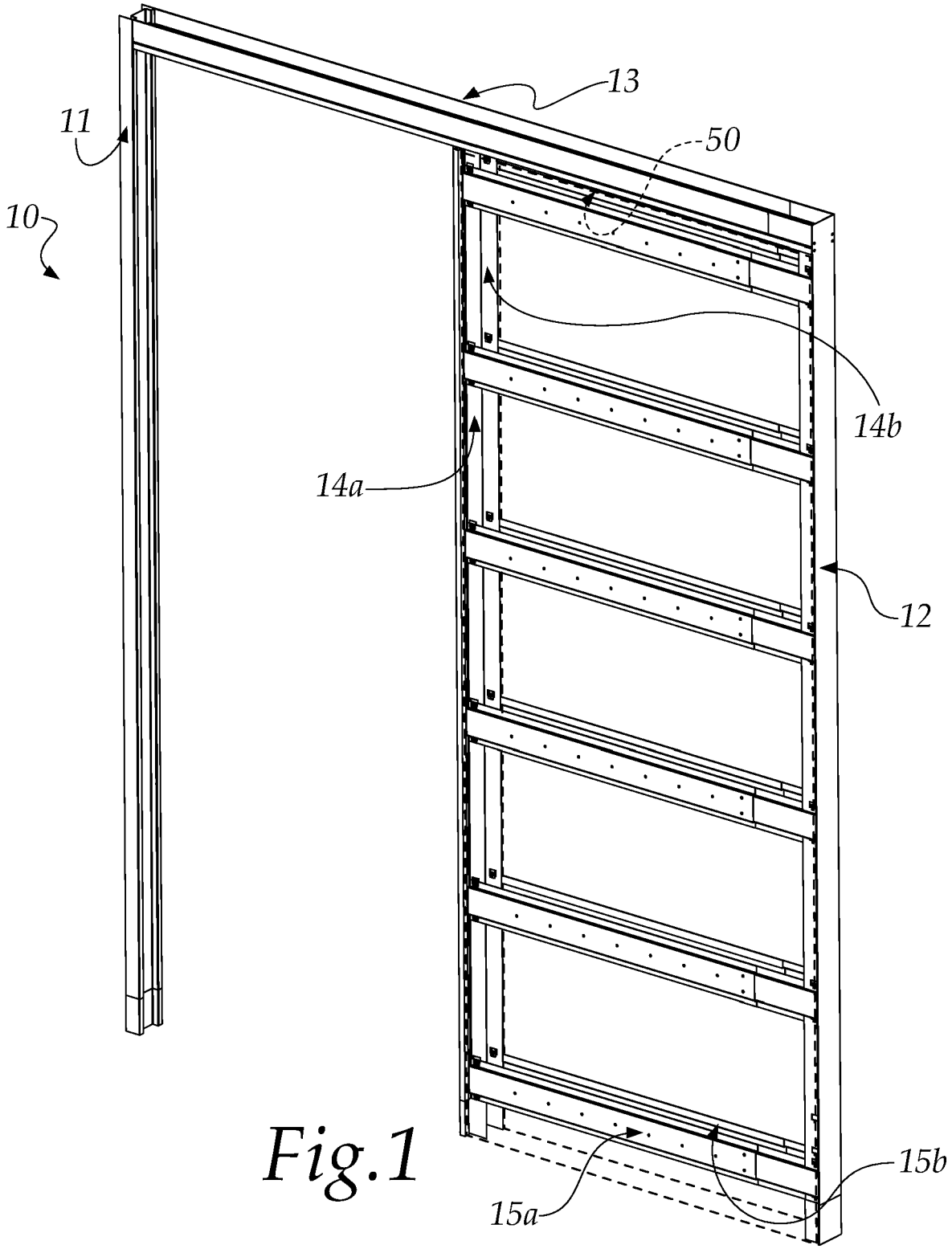

Fig.1

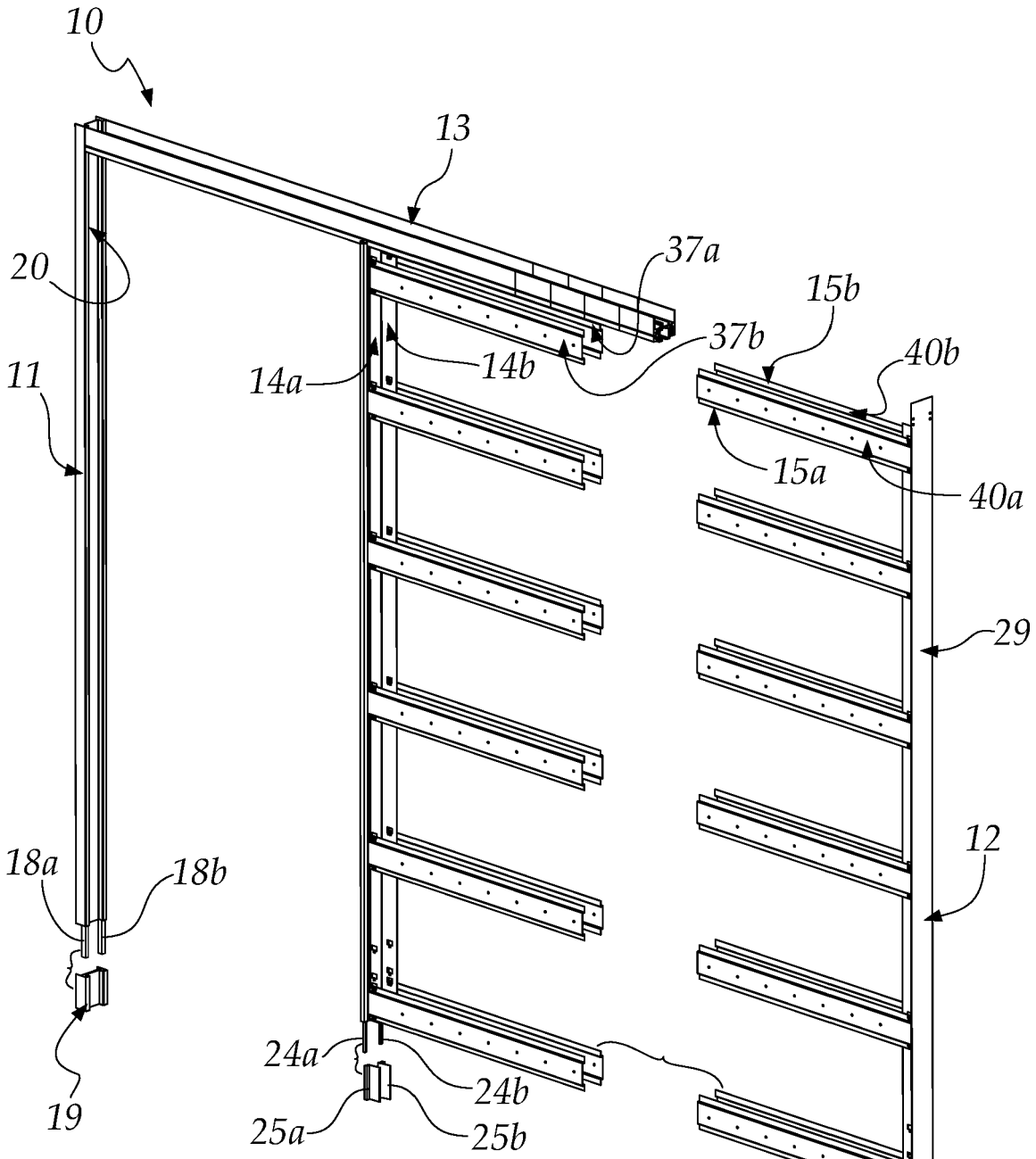
10
13
20
37a
15b
37b
40b
11
14a
14b
15a
40a
29
12
18a
18b
19
24a
24b
25a
25b
33
30

Fig.2

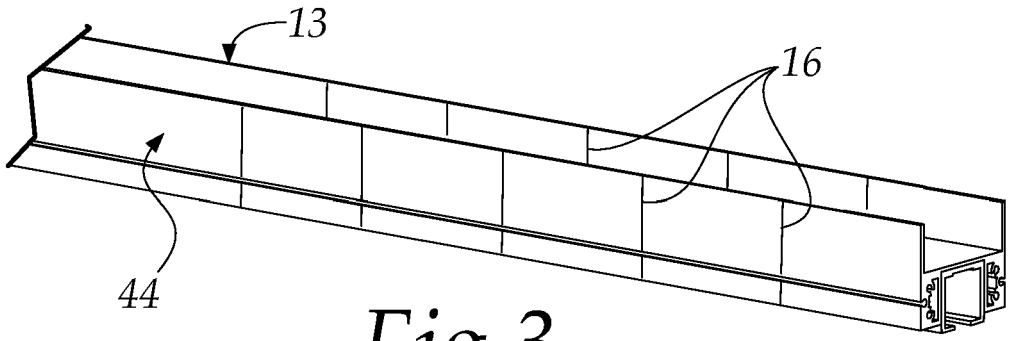

Fig.3

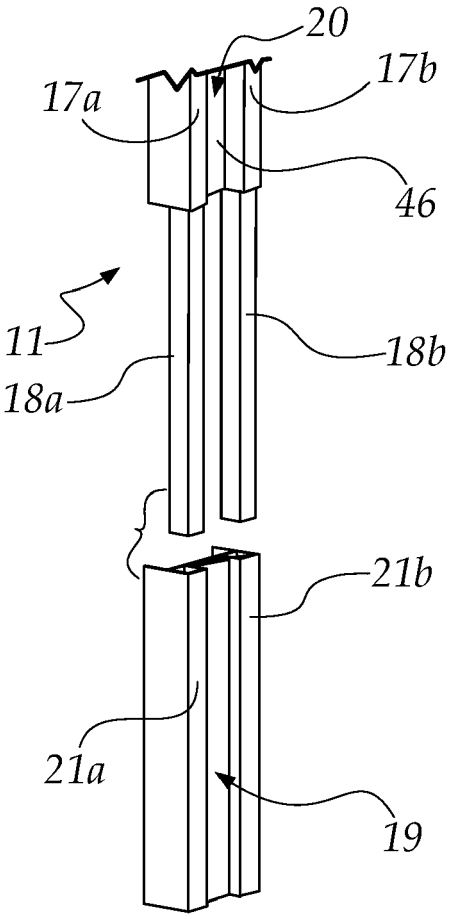

Fig.4

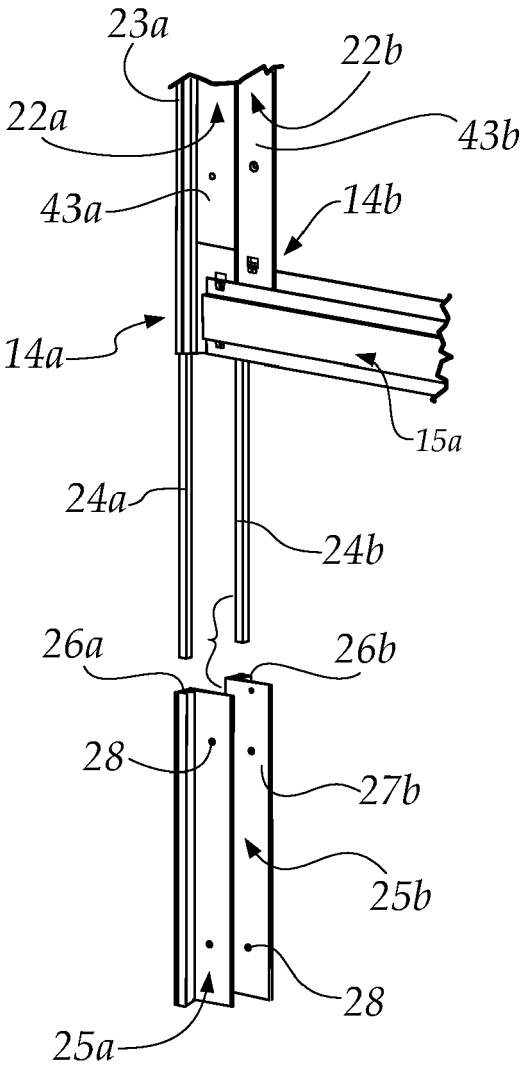

Fig.5

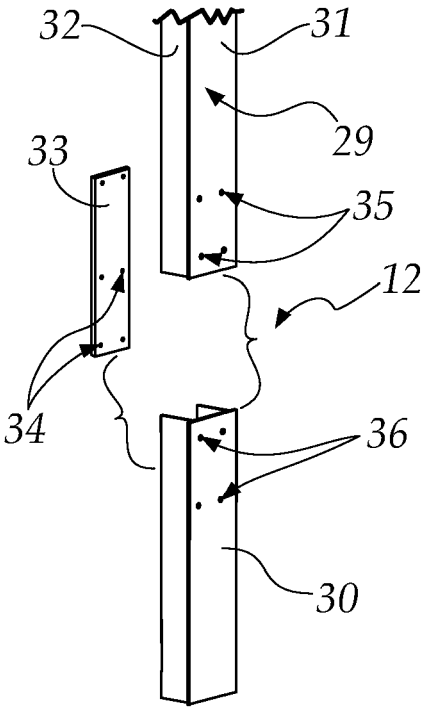

Fig.6

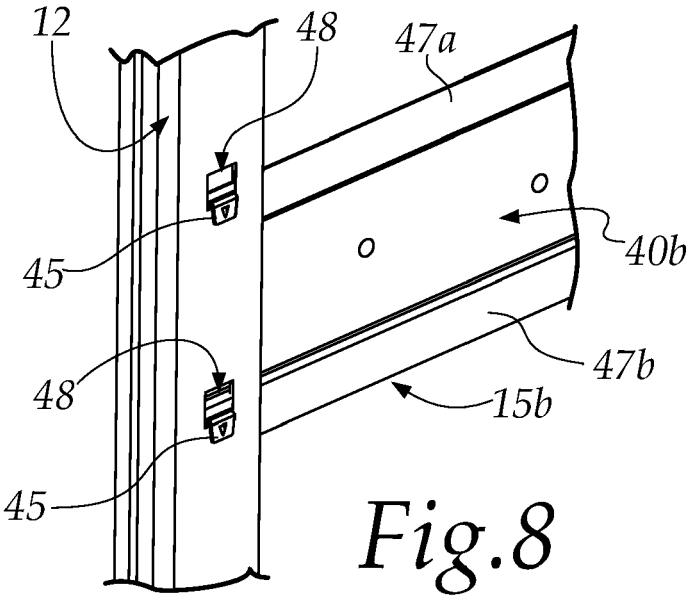

Fig.8

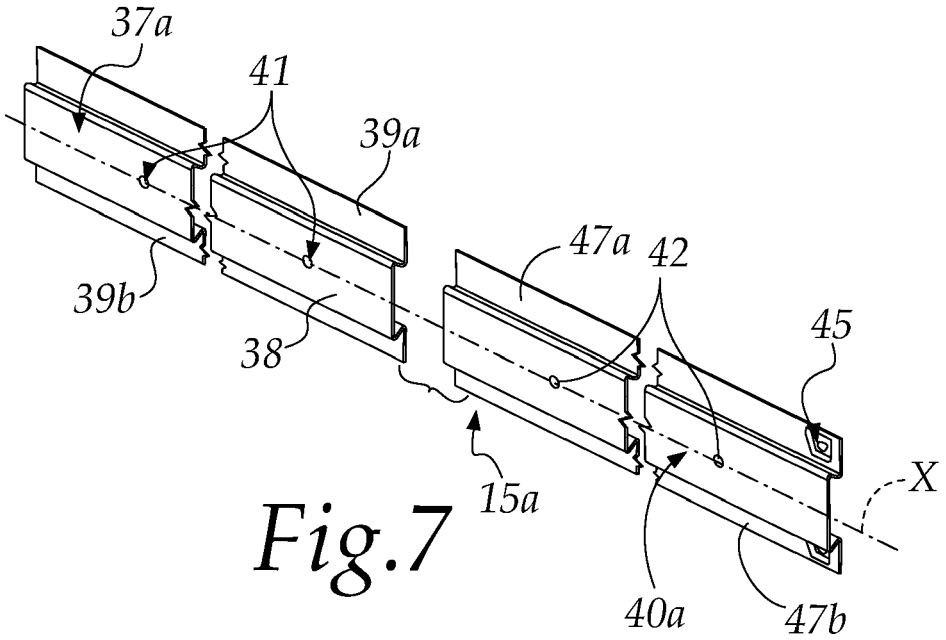

Fig.7

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EUROPEAN SEARCH REPORT

Application Number
EP 19 17 7323

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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	15 October 2019	Jülich, Saskia

CATEGORY OF CITED DOCUMENTS

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