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(71) Applicant: **KRONA I S.p.A.**
47040 Villa Verucchio (Rimini) (IT)

(72) Inventor: **Migliorini, Massimo**
I-47037 Rimini (IT)

(74) Representative: **Giambrocono, Alfonso, Dr. Ing.**
Ing. A. Giambrocono & C. S.r.l.
Via Rosolino Pilo 19/B
20129 Milano (IT)

(54) Easily transported and assembled wall structure with sliding door

(57) A wall structure with a sliding door (16) comprises a perimetral frame (1) consisting of a plurality of perimetral elements (2, 3, 4, 5) joined together, to the opposing faces (7, 8) of which there being fixed the wall panels (14, 15) of said structure, between said wall panels (14, 15) there being defined a compartment (41) into which said door (16) can slide to be totally contained therein. The structure comprises elongate modular elements (21, 22, 10, 10A, 11, 11A) to be associated with said perimetral elements (2, 3, 4, 5), said modular elements (21, 22, 10, 10A, 11, 11A) defining guide means (12) for the door (16) during its movement and support means (10, 10A, 11, 11A) for the wall panels (14, 15), which are slidingly engaged with the perimetral elements before being finally fixed to them, said support means comprising adhesive means (60) arranged to cooperate with said wall panels (14, 15) to retain them at least prior to their fixing to the perimetral elements (2, 3, 4, 5).

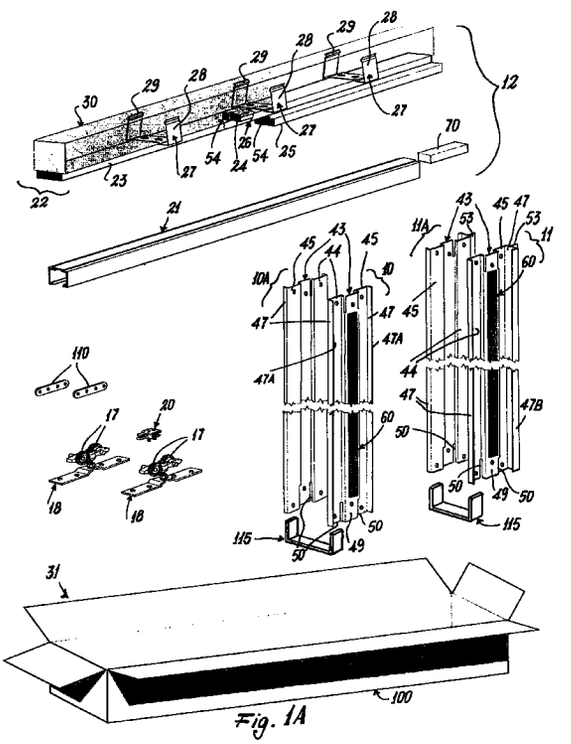

Fig. 1A

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Description

This invention relates to a wall structure in accordance with the introduction to the main claim.

Various wall structures with sliding doors are known. One of these, for example, comprises a preformed element of parallelepiped shape to be associated with the perimetral elements of the wall structure and having a seat for receiving the sliding door during its movement. The wall panels of the structure (for example of plasterboard) are fixed to said element by screws or equivalent members. Those regions in which said screws are inserted into the wall panels are then suitably plastered over.

This known arrangement has various drawbacks such as the large dimensions of the preformed element (at least equal to those of the sliding door), resulting in obvious problems in terms of transport, weight and handling during the assembly of the wall structure. Because of the dimensions of the preformed element, the method of its fixing to the wall panels and the transport difficulties, several persons (at least two) are required for assembling the wall structure, so negatively affecting the assembly cost. This cost is also increased by the need to finish the wall panels (of plasterboard) after these have been fixed to the preformed element, by covering the regions in which the screws used for fixing them to said element are present. In addition, this known arrangement only enables wall structures of predetermined dimensions to be obtained, each requiring an appropriate preformed element of suitable dimensions. This means that a provider of such structures must necessarily stock elements of all possible dimensions, resulting in very high storage costs.

Finally, because of the dimensional constraint of known wall structures it is not possible to form structures of special non-standard dimensions.

Another known arrangement is applicable in particular when the frame of the building into which the aforesaid wall structure is to be inserted is mainly of wooden beams. In this case, having chosen the position in which the structure with the sliding door is to be located, elements (also of woodd) are fixed to said beams to define the compartment for said door, the plasterboard wall panels then being fixed to these. This arrangement also has various drawbacks, including the fact that it can be used only for particular sizes of wall structure and only in buildings having a wooden beam frame. In addition, as the plasterboard wall panels are fixed by screws (or equivalent fixing members), the said plastering already described in relation to the other known arrangement must also be carried out. Moreover the assembly of the sliding door structure requires several persons, resulting in considerable cost.

An object of the invention is to provide a wall structure which obviates the drawbacks of analogous known structures.

A particular object of the invention is to provide a wall structure the components of which are easily transported, are of small dimensions allowing them to be packaged into a box, and can be assembled by one person.

A further object is to provide a wall structure of considerable applicational versatility, enabling wall structures of different dimensions to be obtained from the same basic components.

A further object is to provide a wall structure of the stated type which does not require particular finishing and which can be assembled in a very short time.

These and further objects which will be apparent to the expert of the art are attained by a wall structure in accordance with the accompanying claims.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is a perspective view of a known perimetral frame used in the wall structure according to the invention;
Figure 1A is a schematic perspective view of the main components of the wall structure according to the invention;
Figure 2 is a perspective view of some of the components of Figure 1;
Figure 3 shows a stage in the fixing together of the components of Figure 2;
Figure 4 shows a stage in the fixing of the components of Figure 2 to a usual perimetral frame of the wall structure according to the invention;
Figure 5 shows a further stage in the assembly of the structure according to the invention;
Figure 6 is an enlarged view of the detail indicated by A in Figure 5;
Figure 7 is an enlarged view of the part indicated by B in Figure 5;
Figure 8 shows a further stage in the assembly of the structure according to the invention;
Figure 9 shows a further stage in the assembly of the wall structure according to the invention;
Figure 10 shows a further stage in the assembly of the wall structure according to the invention; and
Figure 11 is a section on the line 11-11 of Figure 9 taken through the finished wall structure.

With reference to said figures, a wall structure according to the invention comprises a known perimetral frame 1 comprising, in the illustrated example, four perimetral elements 2, 3, 4 and 5 fixed together in the usual manner. Each of these latter has a C-shaped cross-section and comprises an intermediate part 6 from which flanges 7 and 8 project from its lateral edges. The dimensions of this structure can be varied in known manner by using elements 3 and 5 of different lengths and/or by fixing them in different positions to the elements 2 and 4. The perimetral element 5 has a length such that its free end 5A is spaced from the element 2 by a distance L equal to the width of the sliding door to be used.

According to the invention, the wall structure comprises a plurality of rectilinear elements 10, 10A, 211, 11A, respectively defining support means for wall panels 14 and 15 (see for example Figure 11), for example of plasterboard, and guide means 12 for the sliding door 16 (see Figure 11). This latter slides along the guide means 12 via wheels 17 fixed to the door by usual fixing elements 18, a known brake 20 being provided to counter the free movement of these wheels along the means 12.

Specifically, these latter comprise a rail 21 fixed to a support element 22, for example of wood or of plastic material of wooden appearance. The support element 22 comprises a portion 23 of the same length as the rail 21 and two portions 24 and 25 of lesser length fixed to the portion 23 such as to define between then a recess 26 in which the rail 21 is positioned. These latter portions have a length L equal to the width of the door.

To the support element 22 there are also fixed in known manner a plurality of strip-like spring clips 27 of omega shape comprising opposing lugs 28 and 29 spaced from said element 22 and bent towards the interior of this latter. These spring clips are arranged to engage the perimetral element 8 in order to support said element 22 and the rail 21 (fixed to said element in the manner described hereinafter) prior to the final fixing of the guide means to said element 8 by screws or the like. Prior to the fixing of the rail 21 to the element 22 and before cooperating with the element 8, these spring clips cooperate with an element 30 preferably (for reasons of lightness) of expanded material, such as polystyrene, which protects said spring clips during transportation of the structure components (contained in a box 100 shown in Figure 1A) and at the same time acts as a support surface and a spacer during the fixing of the rail 21 to the support element 22.

The stages of this fixing procedure are shown in Figures 2 and 3, whereas those of the engagement and fixing of the guide means 12 to the frame 1 are shown in Figure 4. With reference to these latter figures, the rail 21 is coupled and fixed to the element 22 by placing the rail on the portion 23 of the element, between the portions 24 and 25 thereof, while resting the element 21 on the element 30. The parts are then finally fixed together by screws 35 (only one visible in Figure 3) using a suitable known tool 36. The element 30 is then withdrawn from the lugs 28 and 29 of the spring clips 27 (arrow K of Figure 3). The assembly obtained in this manner is the placed (Figure 4) against the perimetral element 8. The guide means 12 are then coupled to this latter by forcing the spring clips 27 about it so that their inwardly bent lugs grip over said element 8. The means 12 are then fixed to said perimetral element by screws 37 (of which only one is visible in Figure 4) using a suitable known tool 38.

Advantageously the rail 21 or the support element 22, or both, comprises or comprise at at least one of their opposing free ends a metre scale 39 enabling the length of the means 12 (measured along the element 23) to be reduced according to requirements. By virtue of this characteristic of the invention, starting with a single element 22 and a single rail, a plurality of guide means 12 can be obtained having different lengths, so as to be able to use sliding doors of dimensions variable at will. This is enabled by the aforesaid characteristic which, using a suitable known tool 40 (Figure 2), allows their length to be reduced before fixing these means to the frame 1.

As stated, the structure according to the invention comprises rectilinear elements 10, 12A, 11, 11A arranged to support the plasterboard wall panels 14 and 15 and define a compartment 41 into which the sliding door 16 disappears when moved along the guide means. These support elements are arranged to cooperate with at least one (3) of the elements 3 and 5, and are of two types depending on their position of use along said perimetral elements. Specifically, the elements 11 and 11A are to be positioned at the end 5A of the element 5, whereas the elements 10 and 10A can assume any position along this latter.

The support elements 10 and 10A (see Figure 1A, 5 and 11) are preferably of metal and are of substantially omega cross-section. They comprise a central portion 43 raised relative to flat lateral portions 44 and 45. From the free edges of these latter there perpendicularly project two flanges 47 facing the respective wall panels 14 and 15 and having a height less than the height of the central portion. In other words, this latter comprises a flat part 49 lying in a plane located at a greater distance from that in which the portions 44 and 45 lie than the plane in which the ends 47A of the flanges 47 lie. The central portion 43 of each element 10 and 10A comprises opposing slots 50 into which a corresponding flange 7 or 8 of the perimetral element 5 penetrates such that this insertion provides a temporary connection between each element 10 and 10A and said perimetral element.

The support elements 11 and 11A (see Figures 1A, 5, 6, 7 and 11) are very similar to the elements 10 and 10A, those parts thereof which are equal to the already described parts of these latter being indicated by the same reference numerals. The difference between said pairs of support elements is that the flanges 47 extending from the portions 45 of the elements 11, 11A have an end 47B bent towards the part 49, and an external projection or rib 53 arranged to cooperate with a corresponding slot 54 provided in a portion 24 or 25 of the adjacent means 12. The bent end 47B lies in a plane situated a greater distance from that in which the portion 45 lies than the plane in which the part 49 lies. In this manner a space is created between said planes in which the end 47B and the part 49 lie. This space receives an end 14A (or 15A) of a corresponding plasterboard wall panel 14 or 15.

The assembly of the elements 10, 10A, 11, 11A is shown in Figures 5, 6, 7 and 8. With reference to these latter, this assembly is achieved by drawing each of these elements over the flange 7 or 8 of the perimetral

element 5 (arrow X in Figure 6). The flange penetrates into the slots 50 so that each support element 10, 10A, 11, 11A remains associated with the perimetral frame 1. Each support element 10 and 10A is positioned in the required position (depending on the length of the perimetral element 5) and each support element 11 and 11A is positioned at the end 5A of the element 5 (by sliding it along this latter in the direction of the arrow Z of Figure 7) so as to insert the rib 53 into the slot 54 in the corresponding portion 24 or 25 of the adjacent means 12. These operations are facilitated by the ability of each support element 10, 10A, 11, 11A to slide along the frame 1.

It should be noted that each support element has a length less than that of the perimetral elements 2 and 4. As a result of this, after each support element has been drawn over the perimetral element 5, said element becomes positioned with one of its ends to the side of the rail 21. After carrying out the said operations the support elements are fixed to the perimetral element 5 and to the rail 21 by screws 57 using a usual tool 60 (Figure 8). The screws are inserted through holes 58 provided in the flat part 49 of each support element positioned in correspondence with the perimetral element 5, and through holes 59 in those portions 44 and 45 which are positioned to the side of the rail 21. This procedure fixes the guide means 12 and the support means for the wall panels 14, 15 (defined by the support elements 10, 10A, 11, 11A) to the frame 1 of the structure according to the invention.

On their flat part 49, said support elements comprise a biadhesive band or tape 60 which can be continuous (as in Figures 1A, 5 and 8) or in the form of separate portions. This band has a removable protection layer 61 which after fixing said elements to the frame 1 is removed (Figure 8) to expose an adhesive part 62 of this band.

During the assembly of the wall structure according to the invention, after fixing the guide means and support means as described, the protection layer 61 is removed from the biadhesive band 60 (Figure 8), a wall panel (14 in the example illustrated in Figure 9) is positioned in front of the frame 1 and is slid (arrows N of Figure 9) along this frame so as to insert the end 14A of said wall panel (or 15A of the wall panel 15) into the space between the planes in which the part 49 and the end 47B of the support element 11 lie (arrows Y of Figure 9). This sliding terminates when said end 14A abuts against the flange 47 of said support element. Having done this, the wall panel is pressed against the adhesive part 62 of each biadhesive tape to achieve an instantaneous fixing of the wall panel to the elements 10 and 11 and hence to the frame 1. This fixing is made permanent (Figure 10) by screwing the wall panel 14 to the perimetral elements 3 and 4 of the frame 1 by screws 66 using a suitable tool 68. This screwing is easily achieved without any danger of the wall panel 14 moving on the frame because of its previous adhesion to the elements 10 and 11.

The structure assembly terminates with known operations, comprising the fixing of usual doorposts (not shown) to the structure 1 (provided with a usual brush 120 for the dust), the arrangement of an end closure member 70 for the rail 21 (see Figure 1A), the fixing of the wheels to the door previously inserted into the rail, and other known operations related to the assembly of said structure.

Summarising, the assembly of the structure comprises the following operations:

a) assembling the frame in known manner by joining the perimetral elements 2, 3, 4 and 5 together;

b) fixing the rail 21 to the support element 22 to define the door guide means, this fixing being achieved by resting the element 22 on a base 30 removably associated with this latter; this base, kept associated with the element 22 by spring clips 27 fixed to this latter in known manner, is then removed from the guide means 12 after their assembly. The means 12 are then fixed to a perimetral element (3) of the frame 1 of the structure by two successive operations, comprising firstly engaging the spring clips 27 with said perimetral element 2 and then fixing the means 12 to this latter by known fixing means (preferably screws);

c) fixing the support elements 10, 10A, 11, 11A to the perimetral frame 1 by inserting flanges 7 and 8 of a perimetral element (5) into seats (50) provided at the end of each support element. Preferably each of these latter comprises seats 50 at each opposing free end to provide a considerable versatility for the person assembling the wall structure according to the invention. Said support elements can be of fixed length (as in the figures) or of variable length. In this latter case they can be of telescopic type, lockable in two or more elongate positions, or modular with parts fixed together by bayonet-insertion, snap-insertion or in another known manner. In this manner support elements of different heights can be obtained;

d) each plasterboard wall panel is fixed to the corresponding support elements by firstly attaching them to corresponding adhesive surfaces 60 associated with each of said elements and then finally securing them to the frame 1 of the wall structure by fixing the wall panels 14, 15 to its perimetral elements (2, 3, 4 and 5). Advantageously the adhesive surfaces 60 are prepared for the attachment of said wall panels by removing a protective layer 61 after fixing the support elements 10, 10A, 11, 11A to the perimetral frame 1;

e) inserting the wheels 17 into the rail 21 of the guide means 12, closing the rail 21 by fixing an end closure member 70 to it, arranging usual doorposts

around the opening provided in the wall structure to be closed by the sliding door and fixing the door to said wheels.

The aforedescribed operations can be quickly carried out by a single person with considerable saving in the cost of assembling the wall structure.

In addition the basic components of this latter (the perimetral elements, the rail, the element for supporting it and the support elements) can be contained in a single box 100 (see Figure 1A), so facilitating their transport. Moreover, two guide means 12 can be joined together by joining elements 110 (Figure 1A) joinable to adjacent rails 21 or to adjacent elements 22. Finally, if the perimetral element 5 is not used, a spacer 115 (having the shape of a piece of perimetral element) is associated with each pair of support elements 10, 10A, 11, 11A to maintain the required distance for passage of the sliding door between them and to maintain them parallel.

Various embodiments of the invention have been described. Others are however possible in the light of the present description, and are to be considered as falling within the scope of the present document.

Claims

1. A wall structure with a sliding door (16) comprising a perimetral frame (1) consisting of a plurality of perimetral elements (2, 3, 4, 5) joined together, to the opposing faces (7, 8) of which there being fixed the wall panels (14, 15) of said structure, between said wall panels (14, 15) there being defined a compartment (41) into which said door (16) can slide to be totally contained therein, characterised in that the structure comprises elongate modular elements (21, 22, 10, 10A, 11, 11A) to be associated with said perimetral elements (2, 3, 4, 5), said modular elements (21, 22, 10, 10A, 11, 11A) defining guide means (12) for the door (16) during its movement and support means (10, 10A, 11, 11A) for the wall panels (14, 15), which are slidingly engaged with the perimetral elements before being finally fixed to them, said support means comprising adhesive means (60) arranged to cooperate with said wall panels (14, 15) to retain them at least prior to their fixing to said perimetral elements (2, 3, 4, 5).

2. A structure as claimed in claim 1, characterised in that the guide means (12) comprise a rail (21) and a support element (22), this latter comprising elastic coupling means (27) arranged to cooperate with one (3) of the perimetral elements (2, 3, 4, 5) of the perimetral frame (1) to retain said guide means engaged with this latter at least until they have been fixed to said element (3).

3. A structure as claimed in claim 2, characterised in that the elastic coupling means are a plurality of spring clips (27) fixed to the support element (22) and comprising mutually converging lugs (28, 29) arranged to cooperate with the perimetral element (3).

4. A structure as claimed in claim 3, characterised in that the spring clips (27) cooperate with an elongate member (30) removably associated with the support element (22), said member being removed from this latter in order to engage the spring clips (27) with the perimetral element (3).

5. A structure as claimed in claim 2, characterised in that the support element (22) comprises a first portion (23) of greater length and two parallel portions (24, 25) positioned spaced apart at one end of said first portion (23), between said parallel portions there existing a cavity (26) able to receive a part of the rail (21).

6. A structure as claimed in claim 1, characterised in that the support means (10, 10A, 11, 11A) are in the form of section bars comprising at at least one of their ends means (50) for their fixing to one of the faces (7, 8) of an element (5) of the perimetral frame (1).

7. A structure as claimed in claim 6, characterised in that the support elements (10, 10A, 11, 11a) are substantially of omega shape and comprise a central part (43) raised relative to flat lateral portions (44, 45), the central part (43) comprising opposing slots (50) to act as means for their fixing to the perimetral element (5), a face (7, 8) of this latter being positioned within said slots.

8. A structure as claimed in claim 7, characterised in that the central part (43) comprises a flat portion (49), at least one of said lateral portions (44, 45) comprising an edge flange (47) extending away from said lateral portion (44, 45), the end (47A) of said flange (47) lying in a plane located at a lesser distance from that in which the lateral portions (44, 45) lie than from that in which the flat portion (49) of the central part (43) lies.

9. A structure as claimed in claim 8, characterised in that the support elements (11, 11A), positioned at one end (5A) of the perimetral element (5) with which they are associated or positioned at the opening closable by the sliding door (16), comprise a flange (47) extending away from the flat portion (46, 47) closer to said opening and provided, on the outside of each support element, with a longitudinal rib (53) arranged to cooperate with a seat (54) provided in one of the spaced-apart parallel portions (24, 25) of the guide means (12) adjacent to said support element (11, 11A), said flange (47) having a bent flat end (47B) lying in a plane located at a

greater distance from that in which said flat portion (46, 47) lies than the plane in which the flat portion (49) of the central part (43) lies, between this latter plane and the first plane there being defined a space in which a corresponding wall panel (14, 15) is to be positioned, an end (14A, 15A) of this latter abutting against said flange (47).

10. A structure as claimed in claim 1, characterised in that the adhesive means (60) are positioned on the flat portion (49) of the central part (43) of each support element (10, 10A, 11, 11A).

11. A structure as claimed in claim 10, characterised in that the adhesive means are a biadhesive tape (60).

12. A structure as claimed in claim 1, characterised in that the support means (10, 10A, 11, 11A) for the wall panels (14, 15) are of variable length.

13. A structure as claimed in claim 12, characterised in that the support means (10, 10A, 11, 11A) are of modular type and comprise a plurality of portions which can be joined together.

14. A structure as claimed in claim 12, characterised in that the support means (10, 10A, 11, 11A) are of telescopic type and can be locked in a plurality of extended positions.

15. A structure as claimed in claim 1, characterised by comprising connection means (110) arranged to cooperate with two adjacent guide means (12) to increase the dimensions of the wall structure.

16. A structure as claimed in claim 1, characterised by comprising support means (115) arranged to cooperate with each pair of support elements (10. 10A; 11, 11A) if the perimetral frame (1) lacks at least one of its elements (5) to which to fix said pair, said means (115) comprising a body of substantially U cross-section cooperating with the slot (50) provided in each support element (10, 10A, 11, 11A) and enabling said elements of the pair to be maintained spaced apart and parallel.

17. A method for assembling the wall structure claimed in claim 1, comprising forming a perimetral frame (1) in known manner by joining together its perimetral elements (2, 3, 4 and 5), characterised by further comprising:

- fixing a rail (21) to a support element (22) to define guide means (12) for the door (16);
- engaging the guide means (12) obtained in this manner with one (3) of the perimetral elements (2, 3, 4, 5) of said frame and then fixing said means to said element (3);
- engaging the support elements (10, 10A, 11, 11A) with the perimetral frame (1) and then fixing these elements to this latter by known fixing means;
- engaging each wall panel (14, 15) with the support elements (10, 10A, 11, 11A) and then fixing the wall panels to the perimetral frame (1) by known fixing means;
- positioning sliding elements (17) in the guide means (12) and connecting the door (16) to these elements (17).

18. A method as claimed in claim 17, characterised in that the rail (21) is fixed to the support element by arranging this element on a base (30) removably associated with this latter, this base being maintained associated with said element (22) by elastic elements (27) fixed to this latter, and then being removed from the guide means after their assembly.

19. A method as claimed in claim 17, characterised in that the guide means (12) are fixed to the perimetral frame by engaging the elastic elements (27) with the perimetral element (2) of this frame and then fixing the guide means (12) to the frame by known fixing means.

20. A method as claimed in claim 17, characterised in that the support elements (10, 10A, 11, 11A) are engaged with the perimetral frame (1) by inserting flanges (7, 8) of a perimetral element (5) of said frame into seats (50) provided at the end of each support element.

21. A method as claimed in claim 17, characterised in that each plasterboard wall panel is fixed to the support elements (10, 10A, 11, 11A) by attaching it to corresponding adhesive surfaces (60) associated with each of said elements, followed by final securing to the frame (1) of the wall structure by fixing the wall panels (14, 15) to the perimetral elements (2, 3, 4 and 5).

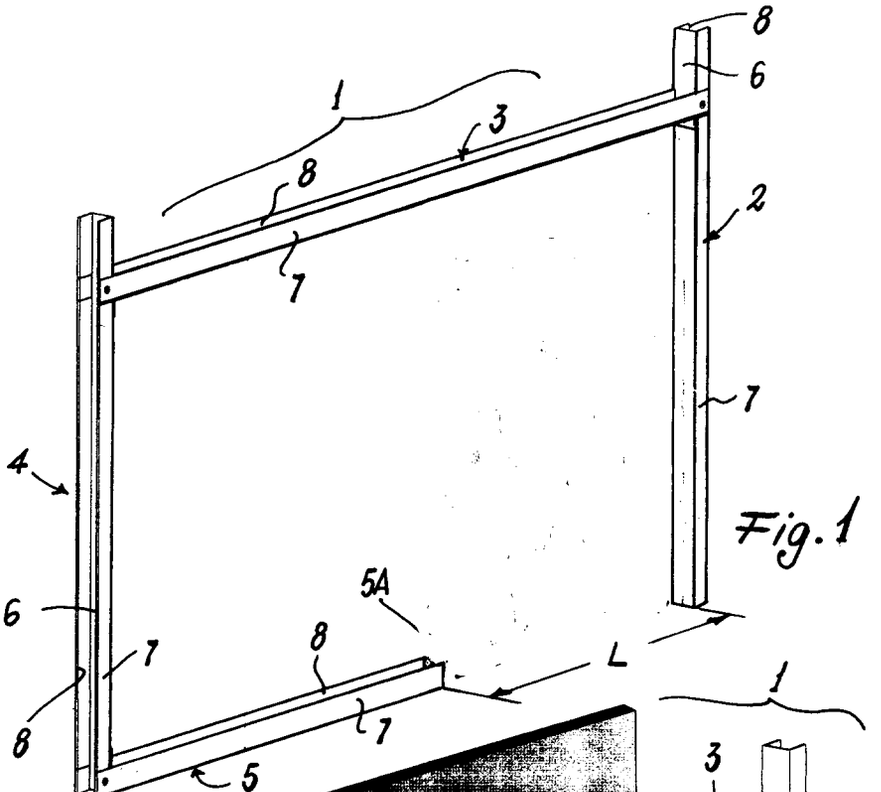

Fig. 1

Fig. 10

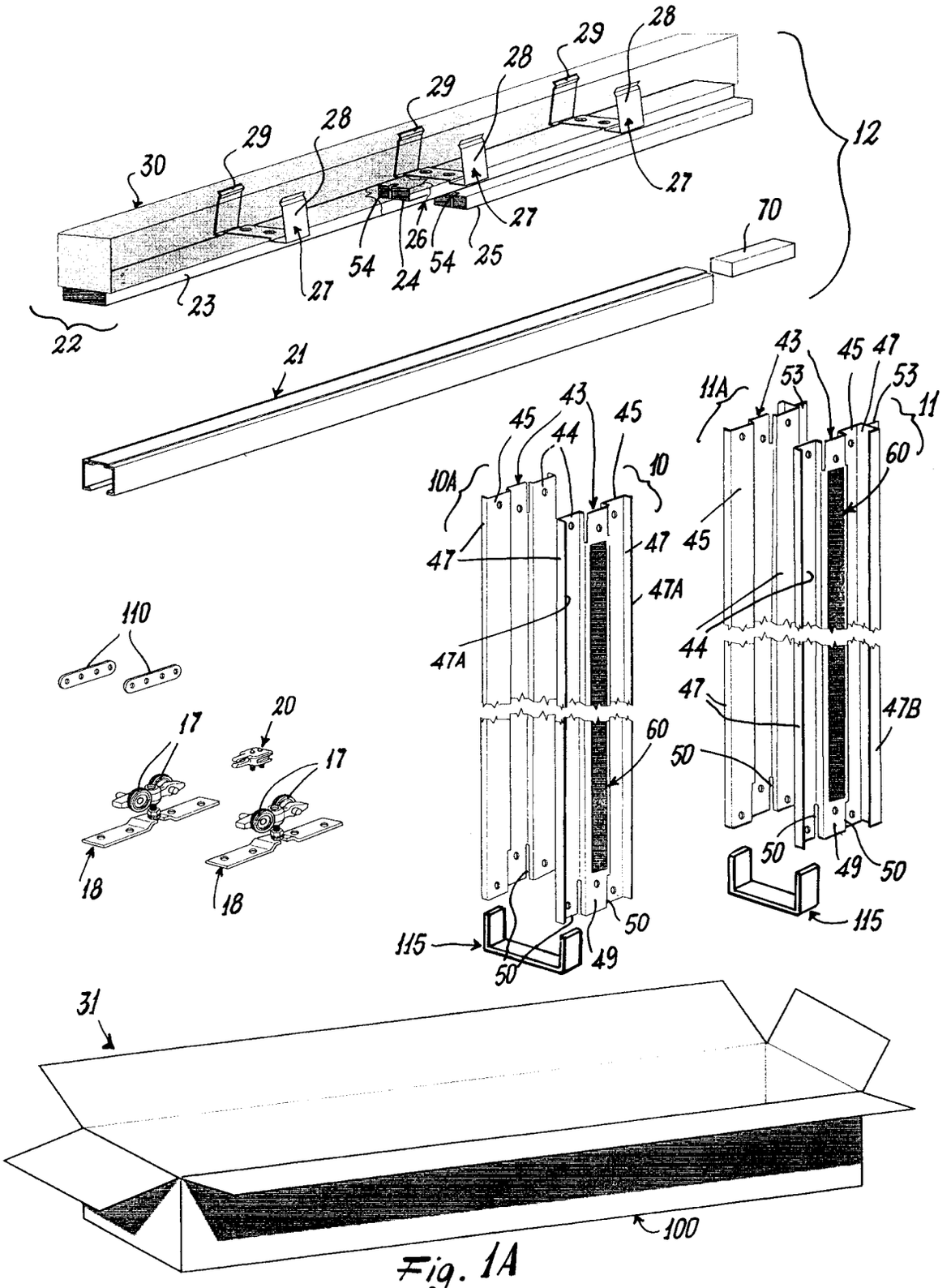
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Fig. 1A

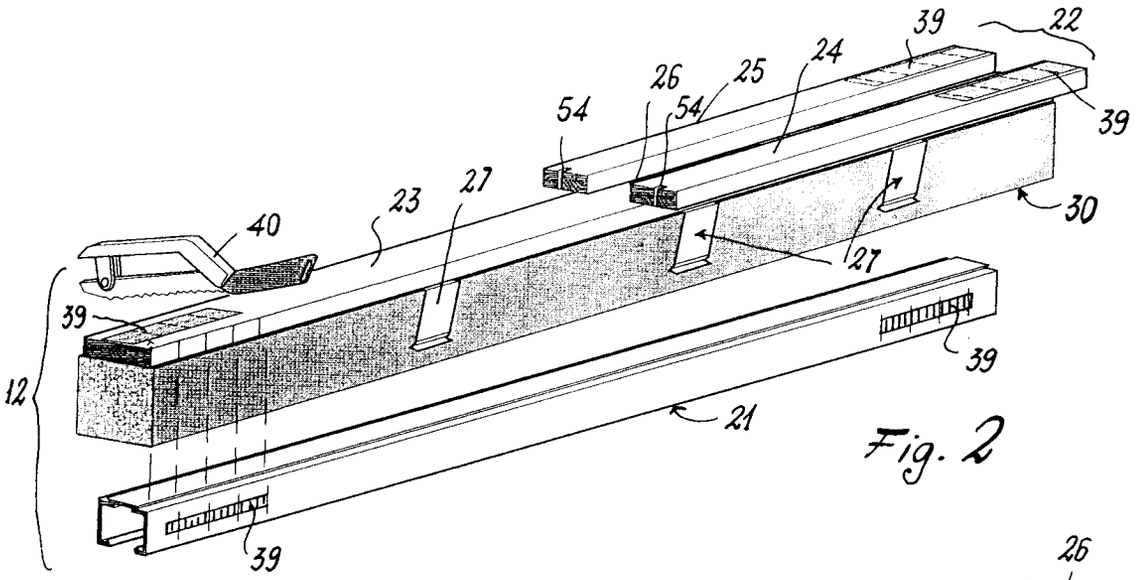


Fig. 2

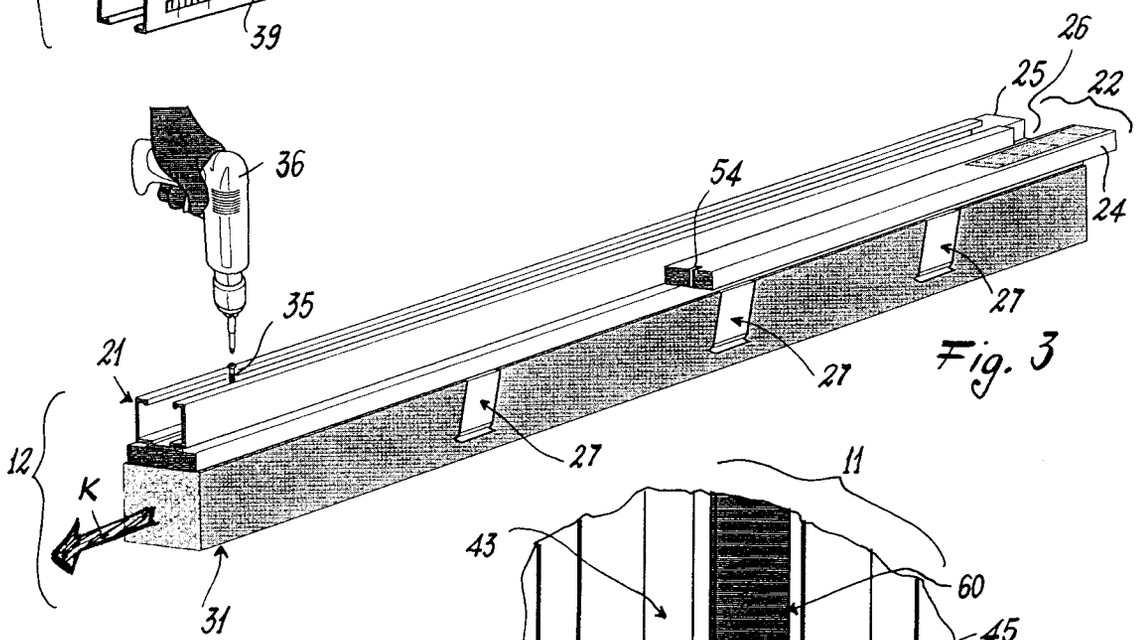


Fig. 3

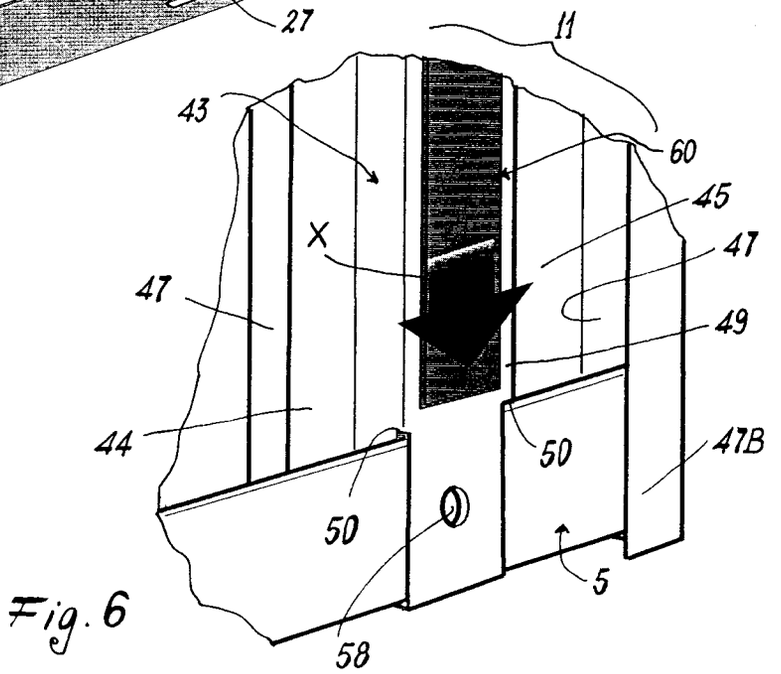


Fig. 6

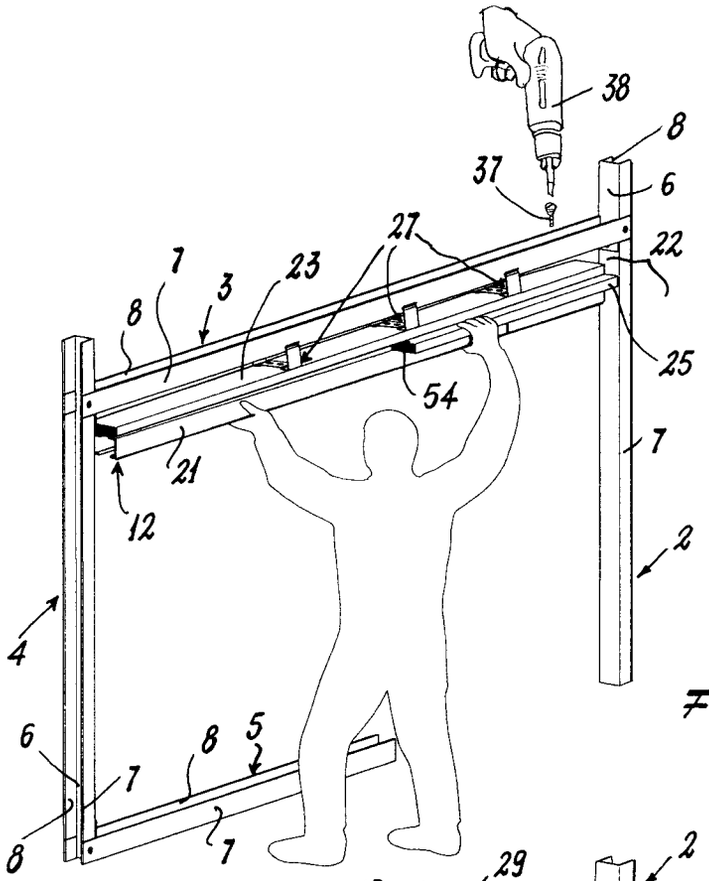


Fig. 4

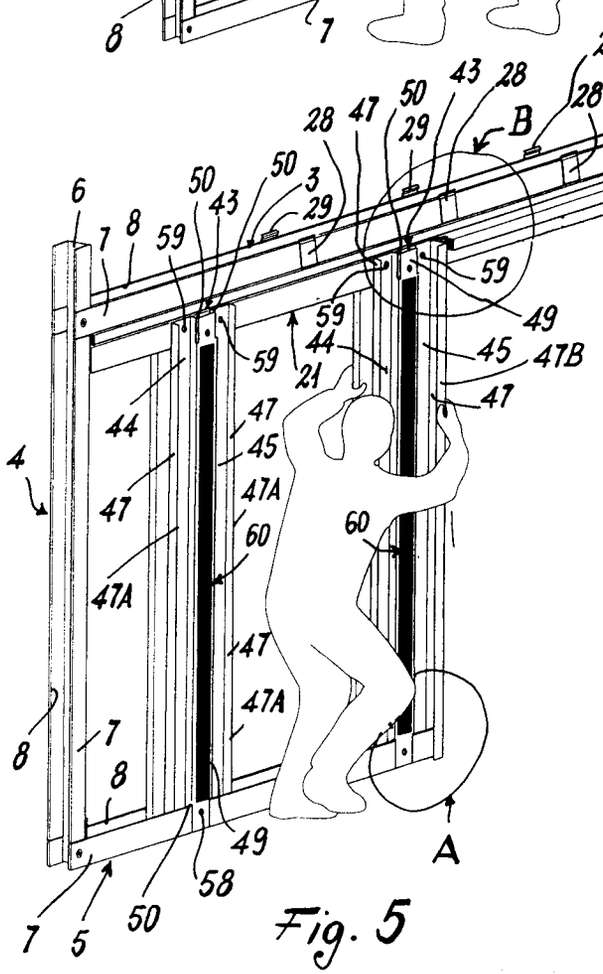


Fig. 5

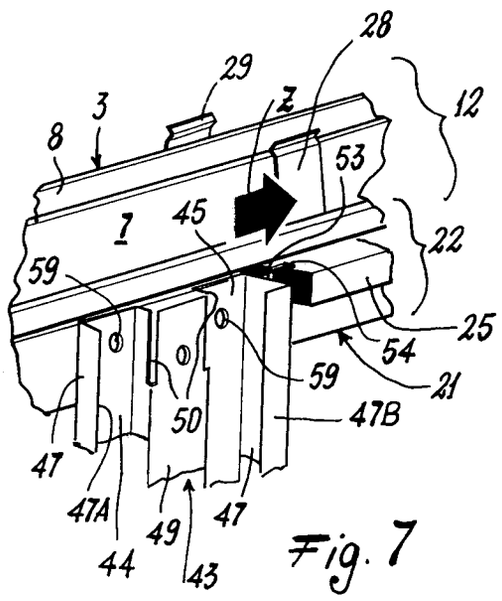
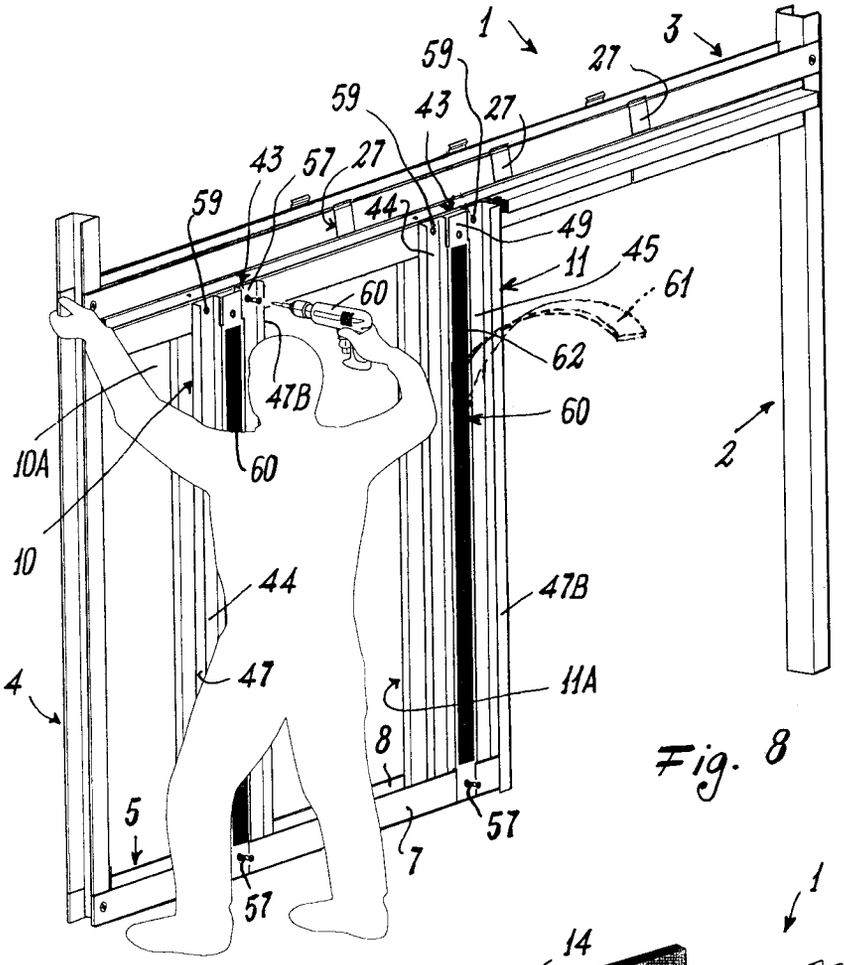


Fig. 7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11A
57

Fig. 8

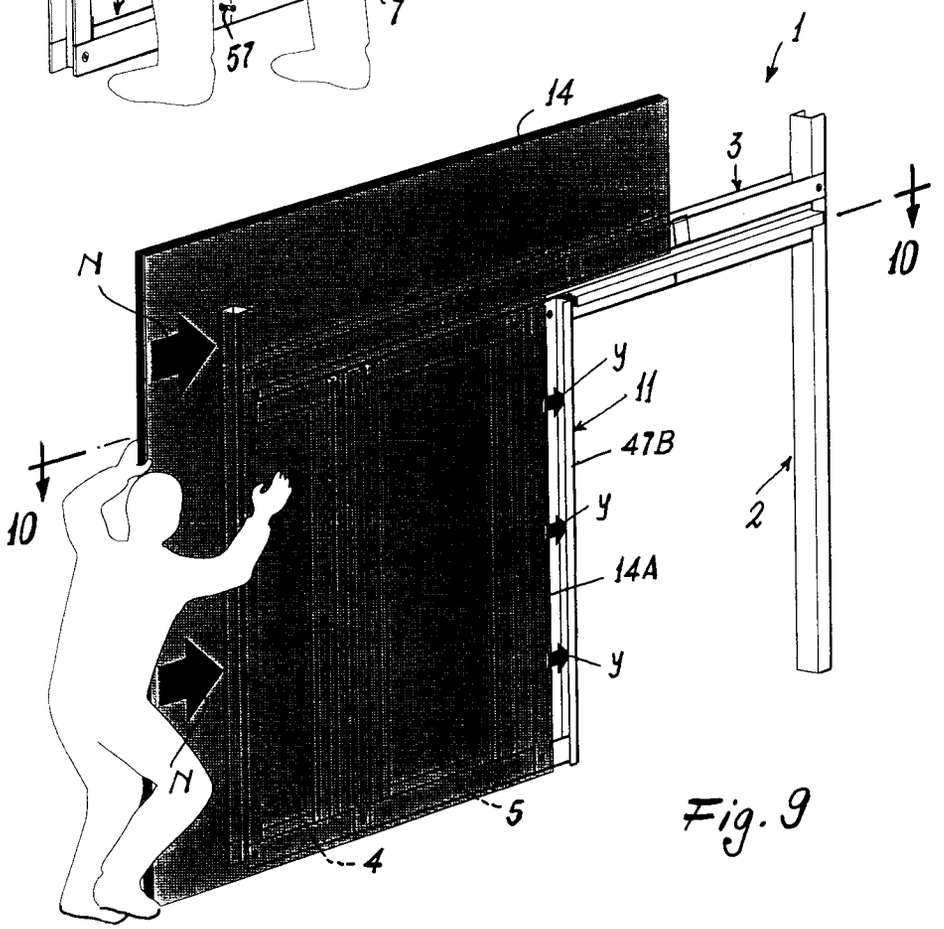
1
14
3
10
N
y
11
47B
2
14A
5
4

Fig. 9

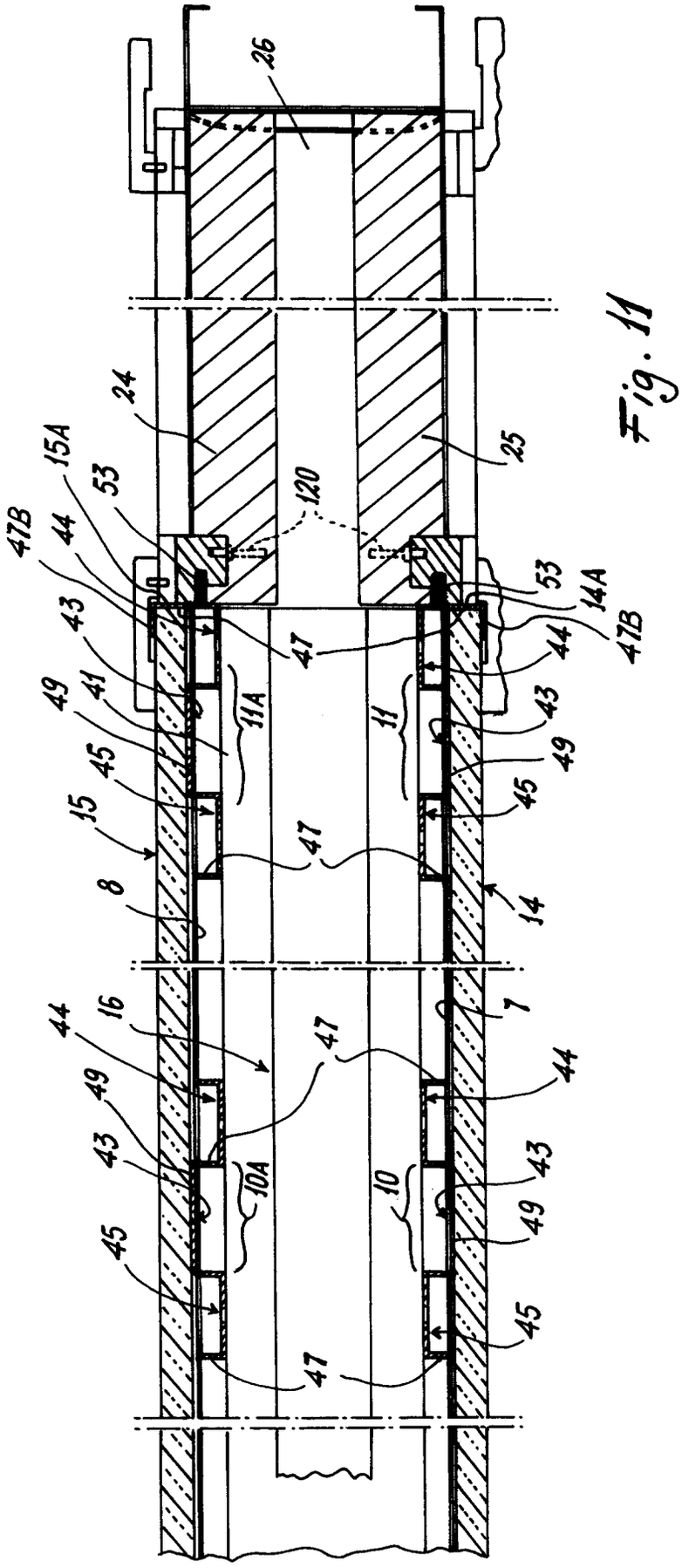
26
24
25
15A
53
120
47B
44
43
41
49
45
15
8
11A
11
47
14A
14
16
7
10A
10

Fig. 11