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(56) Related Art
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ABSTRACT

A sliding panel assembly (1) is provided which has a peripheral outer frame (3). The outer frame (3) carries two panels (11, 13) one of which may be a sliding panel. The panels (11, 13) are mounted within their own panel frames (15, 17), and where a stile (21) of the sliding panel (11) overlaps a stile (25) of the other panel (15) when the sliding panel is closed. The sliding panel is mounted in its panel frame (15) so that a structural body thereof extends more predominantly from one face of the panel (11) than the other face. The other panel (15) is mounted in its panel frame (17) so that a structural body thereof extends more predominantly from one face of the panel than the other face. The arrangement is such that the more predominantly extending bodies overlap and face each other when the sliding panel is closed. This, in turn, provides for greater structural overall thickness of the stiles within the thickness of the other peripheral frame (3) as the stiles (15, 17) overlap one another. This, in turn, provides for greater structural strength compared to prior art arrangements for the same overall thickness of the assembly.

AUSTRALIA
Patents Act 1990

COMPLETE SPECIFICATION
STANDARD PATENT



Applicant(s): *Crane Enfield Metals Pty limited*
~~DOWELL AUSTRALIA LIMITED~~ *Boral Window Systems Limited.*
~~A.C.N. 004 437 898~~

Invention Title:
SLIDING PANEL ASSEMBLY



The following statement is a full description of this invention, including the best method of performing it known to me/us:

SLIDING PANEL ASSEMBLY

FIELD OF THE INVENTION

5 This invention relates to a sliding panel assembly and relates particularly but not exclusively to panels used as windows and/or doors where the frames therefore are manufactured from extruded aluminium.

DESCRIPTION OF PRIOR ART

10 Hitherto, sliding doors or window assemblies have the frames thereof manufactured from extruded aluminium. Architecturally, such windows have traditionally not been satisfactory in the sense that the windows or doors generally provide an unaesthetic appearance by virtue of
15 the large cross sectional sizes of the extrusions which are used. In addition, the known extrusions have considerable numbers of external flanges which distract from the aesthetic appearance of the assembly.

20 OBJECT AND STATEMENT OF THE INVENTION

The present invention attempts to provide an improved sliding panel assembly which has particular application for use in the aluminium extruded window/door arts.

25 Therefore, in accordance with the first broad aspect of the present invention there may be provided a sliding panel assembly having a peripheral outer frame carrying two panels, at least one of which is a sliding panel, each of the panels being mounted within a respective
30 panel frame, a stile of the frame of the sliding panel overlapping with a stile of the frame of the other panel when the sliding panel is closed,

the sliding panel being mounted in its panel frame so that a structural body of the stile extends more
35 predominantly from one face of the panel than the other face,

the other panel being mounted in its panel frame

so that a structural body of the stile extends more predominantly from one face of the panel than the other face,

5 so that the more predominantly extending bodies overlap and face each other.

Most preferably the stile of the sliding panel, and the stile of the other panel have a thickness in a direction perpendicular to the plane of the panels which is wholly within the thickness of the outer peripheral frame
10 in the same direction.

Most preferably there is interlocking flange means on the stile of the sliding panel, and corresponding interlocking flange means on the stile of the other panel.

15 Most preferably the interlocking flange means are between the respective internal and external faces of the stile of the sliding panel, and the internal and external faces of the stile of the other panel.

20 Most preferably the panel frames are of extruded material with the structural bulk of the material being adjacent the internal and external faces of the stiles.

25 Most preferably the panels are disposed in said peripheral frame so that one panel is immediately adjacent one side face of said peripheral frame and the other panel is immediately adjacent the opposite side face of said peripheral frame, and so said structural bodies of the stiles are wholly within the one side face and the opposite side face of the peripheral frame.

BRIEF DESCRIPTION OF THE DRAWINGS

30 In order that the invention can be more clearly ascertained an example of a preferred embodiment will now be described with reference to the accompanying drawings wherein:

35 Figure 1 is a horizontal transverse cross sectional view showing a typical prior art sliding panel assembly,

Figure 2 is a view similar to that of Figure 1

showing a different prior art panel assembly,

Figure 3 is a view similar to that of Figure 1 showing a still further prior art panel assembly,

5 Figure 4 is a view similar to that of Figure 1 showing the example of the preferred embodiment of the invention with the sliding panel in a partly opened condition,

10 Figure 5 is a view similar to that of Figure 4 but showing the sliding panel closed,

Figure 6 is a vertical transverse cross sectional view through the panel assembly shown in Figures 4 and 5,

Figure 7 is a transverse cross sectional view showing an example of a different embodiment of the present invention, and

15 Figure 8 is a close-up perspective view showing mounting of a pair of handles and a door lock to a sliding panel of glass panel door.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

20 Referring firstly to Figure 1 there is shown a prior art sliding panel assembly in the form of sliding door assembly which is made from extruded aluminium sections. Sliding panel assembly 1 has an outer peripheral frame 3 which has two upright extending side members 5, a head member (not shown), and a sill member 7. The outer peripheral frame 3 is fixed to a building by means of fixing flanges 9.

25 The panel assembly 1 has at least one sliding panel 11 and a fixed panel 13 although both panels may be sliding panels and this is not to be excluded from the inventive concepts. The sliding panel 11 has a panel frame 15, and fixed panel 13 has a panel frame 17. The sliding panel 11 has a first stile 19 which fits within flanges on the upright side member 5 (the jamb) of the outer
30 peripheral frame 3. The outer peripheral frame 3 therefore acts as a jamb for the assembly. The sliding panel 11 also has a second stile 21 and in this case it comprises a stile
35

mullion.

5 The fixed panel 13 has a first stile 23 which is engaged with the outer peripheral frame 3 at the opposite upright side member 5. Typically, the stile 23 fits
10 between a pair of flanges and is suitably fixed thereto. The opposite end of the fixed panel 13 has a second stile 25. The stiles 21 and 25 are arranged to overlap when the sliding panel 11 is closed as shown in Figure 1. Each of the stiles 21 and 25 carries respective interlocking
15 flanges 27 and 29. These flanges 27 and 29 are arranged to overlap one another and come into engagement with one another when the sliding panel 11 is in the closed position as shown. Felt or other material strip seal means 31 are carried by the respective stiles 21 and 25 to attempt to
inhibit against rattling in the wind.

20 Two problems exist with the assembly shown in Figure 1. Firstly, the outer peripheral frame always has an untidy appearance because of the unsightly visible flanges which protrude from the main body portions thereof.
25 Secondly, it can be seen that the stile/mullion 21 extends outwardly of the assembly from one side face 33 of the outer peripheral frame 3. This further provides a protruding surface which is unsightly and does not have an architecturally aesthetic appearance. Additionally, when
30 the size of the panels becomes large, the stile/mullion 21 requires its transverse cross section dimensions to be increased to take the increased loading which would be applied to the panel 11 during wind loading and during closing. In the prior art, this increased cross section
has been achieved by extending the thickness of the stile/mullion 21 in a direction which extends outwardly further away from the outer side face 33 of the outer peripheral frame 3 as shown in dotted line. This further exacerbates the above problem.

35 Figure 2 is a view similar to that of Figure 1 showing an alternative prior art arrangement which has the same problems with the outer peripheral frame 3 and the

jamb/mullion 21 as referred to previously.

Figure 3 is a view similar to that of Figure 1 showing a still further known prior art arrangement which has similar problems. In this example, it can be seen that
5 in order to increase the strength of the stile/mullion 21, the cross section is increased in size by the application of a generally 'T' shaped extension 35. This is an unsightly extension from an architectural point of view. Thus, in the example of Figure 3, similar problems exist.

10 In all cases, it can be seen that when the cross section of the stile/mullion 21 is increased, the prior art practice has been to extend the cross section so that it extends outwardly from the side face 33 of the outer peripheral frame 3.

15 Referring now to Figure 4 which shows one example of a preferred embodiment of the present invention for aluminium extrusion sections, it can be seen that the sliding panel assembly 1 has an outer peripheral frame 3 with upright side members 5, a head member (not shown), and
20 a sill member 7. The outer peripheral frame 3 can be fixed within a building by the fixing flanges 9 in a manner similar to that in the prior art. The sliding panel assembly 1 has a sliding panel 11 and a fixed panel 13. Both panels 11 and 13 may be sliding panels if required.
25 The sliding panel 11 has a panel frame 15, and the fixed panel 13 has a fixed panel frame 17. The sliding panel 11 has a first stile 19 and a second stile 21. The second stile 21 may, in fact, be a stile/mullion. The fixed panel 13 has a first stile 23 and a second stile 25. In the
30 example shown, the stiles 21 and 25 are of identical extrusions. When the sliding panel 11 is closed, the first stile 19 is received within flanges 37 and 39 of the upright extending side member 5 and thus side member 5 acts as a jamb therefor.

35 The sliding panel 11 is mounted within its frame 15 so that a structural body of the stile 21 extends more predominantly from one face 41 of the panel 11 than the

other face 43. The fixed panel 13 is mounted in its panel frame 17 so that a structural body of the stile extends more predominantly from one face 45 than the other face 47. The arrangement is such that the more predominantly extending bodies of the stiles 21 and 25 extend inwardly of the assembly and overlap and face each other when the sliding panel 11 is closed. In this arrangement, panel 11 is immediately adjacent one side face 49 of the outer peripheral frame 3, and the other panel 13 is immediately adjacent the opposite side face 51 of the outer peripheral frame 3.

The above arrangement contrasts significantly from the prior art referred to in Figures 1 through 3. In the prior art, it can be seen that the panels 11 and 13 are mounted generally centrally of their panel frames 15 and 17 at least at the stiles 21 and 25. Thus, the panels 11 and 13 are generally closer to the side face 33 of the outer peripheral frame than the other side face 53 (see Figure 1). In the prior art, it can be seen that the stiles 21 and 25 do not extend so that a structural body of the stile is more predominantly from one face of the panel than the other face as in the embodiment of Figure 4. Thus, in the prior art, there is no part which extends more predominant in overlapping relationship when the sliding panel is closed. In the example of Figure 4 it can be seen quite clearly that the stiles 21 and 25 are disposed inwardly of the one side face 49 and other side face 51 of the outer peripheral frame 3, and overlap and face each other when the sliding panel 11 is closed. In the prior art, there are extending flanges 27 and 29 which overlap but the structural body of the stiles does not overlap.

The term "the structural body" of the stiles is to be construed sufficiently broadly to embrace the main cross sectional part thereof where the structural strength of the stiles is provided, as distinct from co-operating flanges 27 and 29 which are provided merely to overlap one another and provide a form of interlocking relationship

between the panels 11 and 13. Thus, in the prior art shown in Figures 1, 2 and 3 the interlocking flanges can be disregarded for the purposes of "the structural body" and it is seen that the panels are generally positioned so that they are central of the "structural body".

By viewing Figure 4 it can be seen that the structural body of the stiles 21 and 25 is provided by material which extends from the internal faces 55 and 57, and the external faces 59 and 61, and by the relative spacing apart of those faces by the interconnecting bodies 63 and 65.

It can be seen that the stiles 21 and 25 have respective interlocking flange means 67 and 69 between the internal faces 55 and 57, and the external faces 59 and 61. These flanges have shallow inclined surfaces which are intended to engage with one another when the sliding panel 11 is closed and hold the panels 11 and 13 together. It can also be seen that the stiles 21 and 25 have respective flanges 71 and 73 which carry respective seal means 31. It can also be seen that the internal face 55 and 57 of the respective stiles 21 and 25 carry further seal means 31.

Referring now to Figure 5 the sliding panel 11 is shown closed. Here, the interlocking flanges 67 and 69 are engaged. The sealing means 31 are also engaged with respective opposite surfaces of the stiles 21 and 25. Reference numerals to these integers have not been shown in Figure 5 in order to add clarity. The arrangement is such that rattling is inhibited.

Similar sealing means 31 are provided in the flanges 37 and 39 in the side member 5 to provide sealing of the first stile 19

From the views shown in Figures 4 and 5 it can be seen that the stiles 21 and 25 have a thickness perpendicular to the plane of the panels 11 and 13 which is contained within the thickness of the outer peripheral frame 3 in the same direction.

The arrangement shown provides for an extremely

aesthetic appearance particularly at the stiles 21 and 25 when the sliding panel 11 is closed. Further, the outer peripheral frame 3 is finished with infill sections 75 to provide an aesthetic appearance which is quite different to that shown in the prior art examples of Figures 1 and 3 where there are protruding flanges. In the case of the fixed panel 13 it can be seen that its stile 77 has its face aligned with the infill section 75 and thus the sight viewing through a window has the appearance of a continuous planar face arrangement which extend from the side face 33 to the other side face 53 of the outer peripheral frame 3. The only exception is where the stile 19 of the sliding panel 11 butts into the side member 5. The reason that this is unable to have the appearance of a planar face arrangement is that the stile 19 needs to accommodate a locking mechanism 79. Thus, extra dimensions are required within the stile 19 to accommodate the locking mechanism 79.

Figure 6 shows a vertical sectional view taken through the panel assembly of Figures 4 and 5. Here it can be seen that there is a head frame part 81 to the outer peripheral frame 3. The top frame portions 83 of the panel frames 15 and 17 are of the identical transverse cross sectional shape as the first stile 23. The bottom rail sections 85 of the panel frames 15 and 17 are of identical transverse cross sections. Sliding panel 11 is supported for sliding movement within the outer peripheral frame 3 by being carried on side saddle rollers 87 which are rotatably supported from the bottom rail 85 of the panel frame 15 by an axles (not shown to aid clarity). Side saddle mounting of rollers 87 is generally known and therefore the detail has not been shown. The side saddle mounting of the rollers 87 is utilised to enable a minimum height bottom rail 85. If the roller wheels 87 were mounted directly under the panel 11 a greater height of the rails 85 would be needed. The arrangement enables a relatively shallower depth bottom rail 85 and this can be sized to have same

depth as the upright sashes. The rollers 87 engage on an upstanding rib 89 which is formed integrally with the sill 7.

5 Sealing means 31 are provided throughout the arrangement as shown to inhibit against rattling.

10 It can therefore be seen that with the arrangement provided, the panels 11 and 13 are placed as close as possible to the outer side faces 33 and 53 of the outer peripheral frame 3, thereby providing as much possible space between the panels to accommodate the predominant extending bodies of the stiles 15 and 17. In this way, the stiles 15 and 17 can be kept substantially wholly within the confines of the side faces 33 and 53 thereby providing an improved aesthetic appearance to the assembly. Further, should the area of the stiles 15 and 17 need to be increased to carry the extra load caused by a larger than normal size sliding panel 11, then this can be accommodated by extending the dimensions of the stiles in a direction parallel with the planes of the panels 11 and 13. In this way, the external faces of the stiles 15 and 17 can be kept within the side faces 33 and 53 of the outer frame 3. It can also be appreciated that by displacing the panels 11 and 13 to the outer faces as distinct from being closer to one face than the other as in the prior art, this provides for greater room within the thickness of the outer peripheral frame 3 as the stiles 15 and 17 overlap one another whereas in the prior art they are essentially stacked across the width of the frame 3 in a direction transverse to the plane of the panels. Thus, economies of space can be achieved without sacrificing structural strength.

35 It should also be noted that, the width of the stiles 15 and 17 shown in Figures 4 through 6 is relatively narrower than that of the corresponding stiles shown in the embodiments of Figures 1 through 3. In addition the stiles 15 and 17 are within the faces 33 and 53 of the outer peripheral frame 3.

Referring now to Figure 7 there is shown an arrangement depicting the inventive concept shown in Figures 4 through 6 but wherein the stiles 15 and 17 are produced from wood. In this arrangement, structural strength to the stiles 15 and 17 can be achieved by the extra depth now possible between the faces 33 and 53 of the outer peripheral frame 3 and because of the overlapping relationship of the predominantly extending body parts. This is similar to that shown in embodiment of Figures 4 through 6 but shows use of different material for the frame assembly other than extruded metal such as aluminium.

Modifications may be made to the invention as would be apparent to persons skilled in the art of manufacturing sliding panels including the art relating to sliding windows and doors. For example, the locking mechanism 75 may be incorporated within the frame 3 and arranged to lock on the stile 19. In this way, the locking mechanism 79 will not be carried within the stile 19 but within the upright side member 5 or jamb of the outer peripheral frame 3. This, in turn, will provide further enhanced aesthetic architectural appearance to the assembly because there will be a planar viewing line along the faces of the stile 19 and the in-fill 75 of the upright side member 5.

Figure 8 shows a particular arrangement where a pair of handles and door lock are fastened to the sliding panel 11. Figure 8 is a close-up perspective view of the arrangement. Here, the sliding panel 11 has its own peripheral frame 15 with a stile 19, as shown in the previous embodiments. The cross sectional shape of the stile 19 is slightly different to that shown in the previous embodiments. In this embodiment, the stile 19 has a main body portion 91 of rectangular configuration. A flange 93 extends from the body portion 91. The flange 93, in turn, connects with a further flange 95 and provides an open channel 97 in which the glass panel 11 is received. Gasket sealing means 99 inhibits against water penetration

into the channel 97. In this arrangement, the flange 95 is arranged to be adjacent one side face of the outer peripheral frame 3. The body portion 91 is arranged to extend towards the opposite side face 51 of the outer peripheral frame 3. In this arrangement the body portion 91 extends further from the panel 11 than does the flange 95. The dimensions of the body portion 91, in a direction perpendicular to the plane of the panel 11, are suitably chosen to provide the required strength to the stile for the given height of the panel 11. In such an arrangement, the stile does not need to extend past the outer side faces 49 or 51 of the outer peripheral frame 3.

A pair of handles and door lock 101 are then mounted to the panel 11 by drilling holes 103 through the glass of the panel 11 itself. Screws not shown can then pass from the body 105 of the pair of handles and door lock 101 through the holes 103 and hold the pair of handles and door lock 101 to the panel 11. The pair of handles and door lock 101 is similar to the pair of handles and door lock shown in our Australian patent number 656055. Operation of the push buttons 107 causes a tongue member 109 to either move towards the panel 11 or away from the panel 11. This, in turn, enables the door lock of the pair of handles and door lock 101 to latch with a corresponding lock part on the outer peripheral frame 3 and thus lock the panel 11 in a closed position. A key operated barrel lock 111 can be used to lock the door lock in a closed position. In the arrangement shown, the tongue member 109 is caused to extend into a rectangular shaped opening 113 in the stile 19 when the pair of handles and door lock 101 is mounted at the holes 103. Thus, the tongue member 109 moves towards or away from the panel 11 within the stile 19. The corresponding lock part extending from the jamb of the frame passes into a similar opening 113 on the opposite face of the stile 19 to the opening 113 and then engages with or disengages from the tongue member 109. Thus, the tongue 109 can pass through the body portion 91 of the

stile 19. In another arrangement, the two handles of the pair of handles and door lock 101 may be swapped so that they are fitted on opposite faces of the panel 11 to that shown. In that environment, the tongue 109 would extend
5 across the outer face of the flange 95 and there would be no need to provide an opening 113. In such an arrangement the corresponding catch lock part extending from the jamb of the outer peripheral frame 3 would then be arranged to engage with or disengage from the tongue member 109
10 depending on its position as determined by operation of the push buttons 107.

These and other modifications may be made without departing from the ambit of the invention the nature of which is to be determined by the foregoing description.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A sliding panel assembly having a peripheral outer frame carrying two panels, at least one of which is a sliding panel, each of the panels being mounted within a respective panel frame, a stile of the frame of the sliding panel overlapping with a stile of the frame of the other panel when the sliding panel is closed,

the sliding panel being mounted in its panel frame so that a structural body of the stile extends more predominantly from one face of the panel than the other face,

the other panel being mounted in its panel frame so that a structural body of the stile extends more predominantly from one face of the panel than the other face,

so that the more predominantly extending bodies overlap and face each other.

2. An assembly as claimed in claim 1 wherein the stile of the sliding panel, and the stile of the other panel have a thickness in a direction perpendicular to the plane of the panels which is wholly within the thickness of the outer peripheral frame in the same direction.

3. An assembly as claimed in claim 1 or claim 2 wherein there is interlocking flange means on the stile of the sliding panel, and corresponding interlocking flange means on the stile of the other panel.

4. An assembly as claimed in claim 3 wherein the interlocking flange means are between the respective internal and external faces of the stile of the sliding panel, and the internal and external faces of the stile of the other panel.

5. An assembly as claimed in any one of the preceding claims wherein the panel frames are of extruded material with the structural bulk of the material being adjacent the internal and external faces of the stiles.

6. An assembly as claimed in any one of the preceding

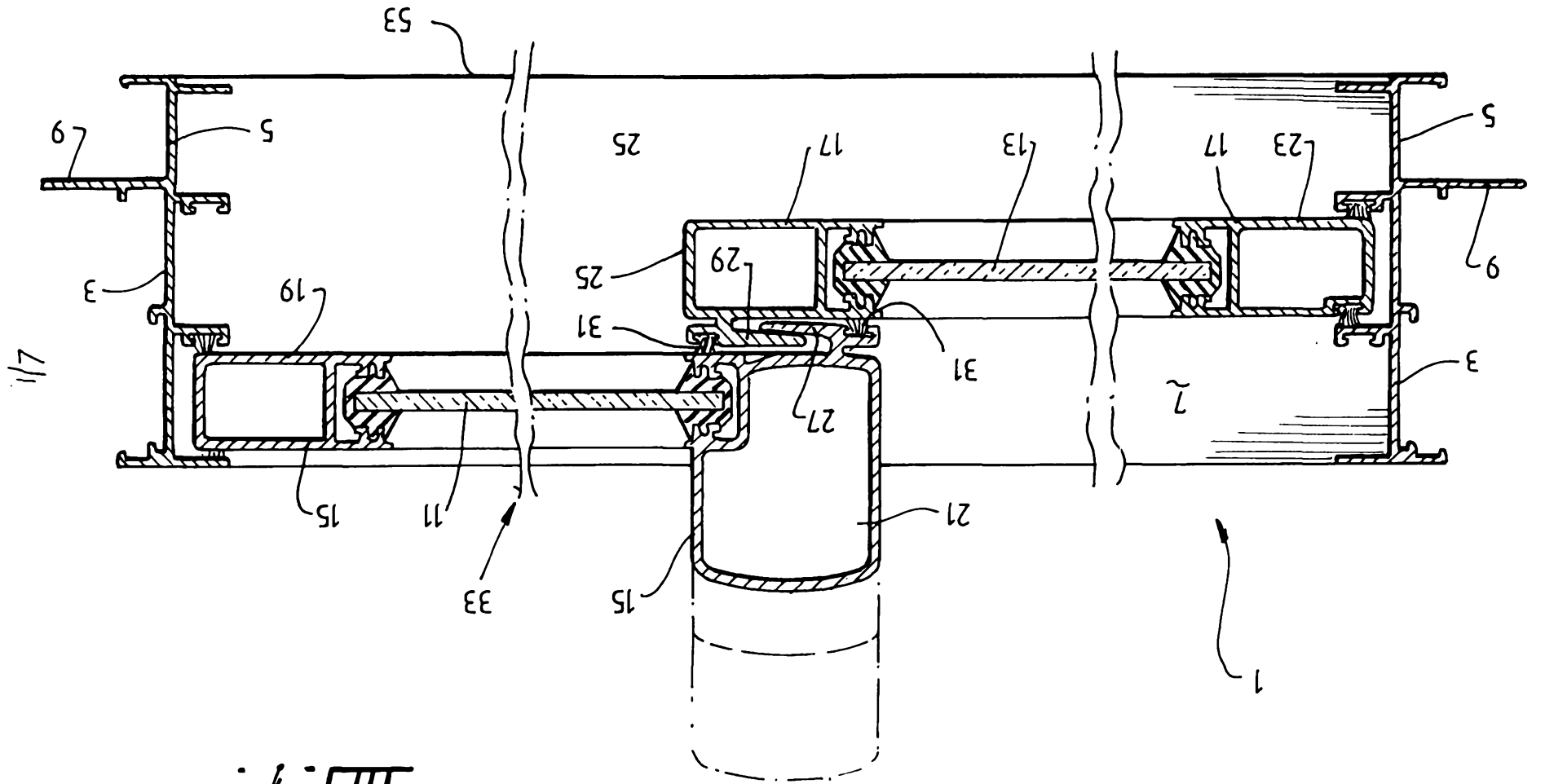
claims wherein the panels are disposed in said peripheral
frame so that one panel is immediately adjacent one side
face of said peripheral frame and the other panel is
immediately adjacent the opposite side face of said
5 peripheral frame, and so said structural bodies of the
stiles are wholly within the one side face and the opposite
side face of the peripheral frame.

7. An assembly as claimed in any one of the
preceding claims and substantially as herein described with
10 reference to any one of the examples of figures 4 to 8 of
the accompanying drawings.

Dated this 8th day of October 1999

15 ~~DOWELL AUSTRALIA LIMITED~~ *Boral Window Systems Limited.*
By their Patent Attorneys *Crane Embed Metals Pty limited*
GRIFFITH HACK
Fellows Institute of Patent
Attorneys of Australia





III. 1.

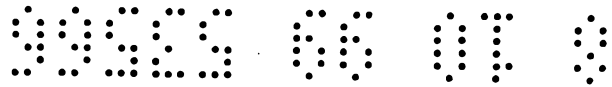
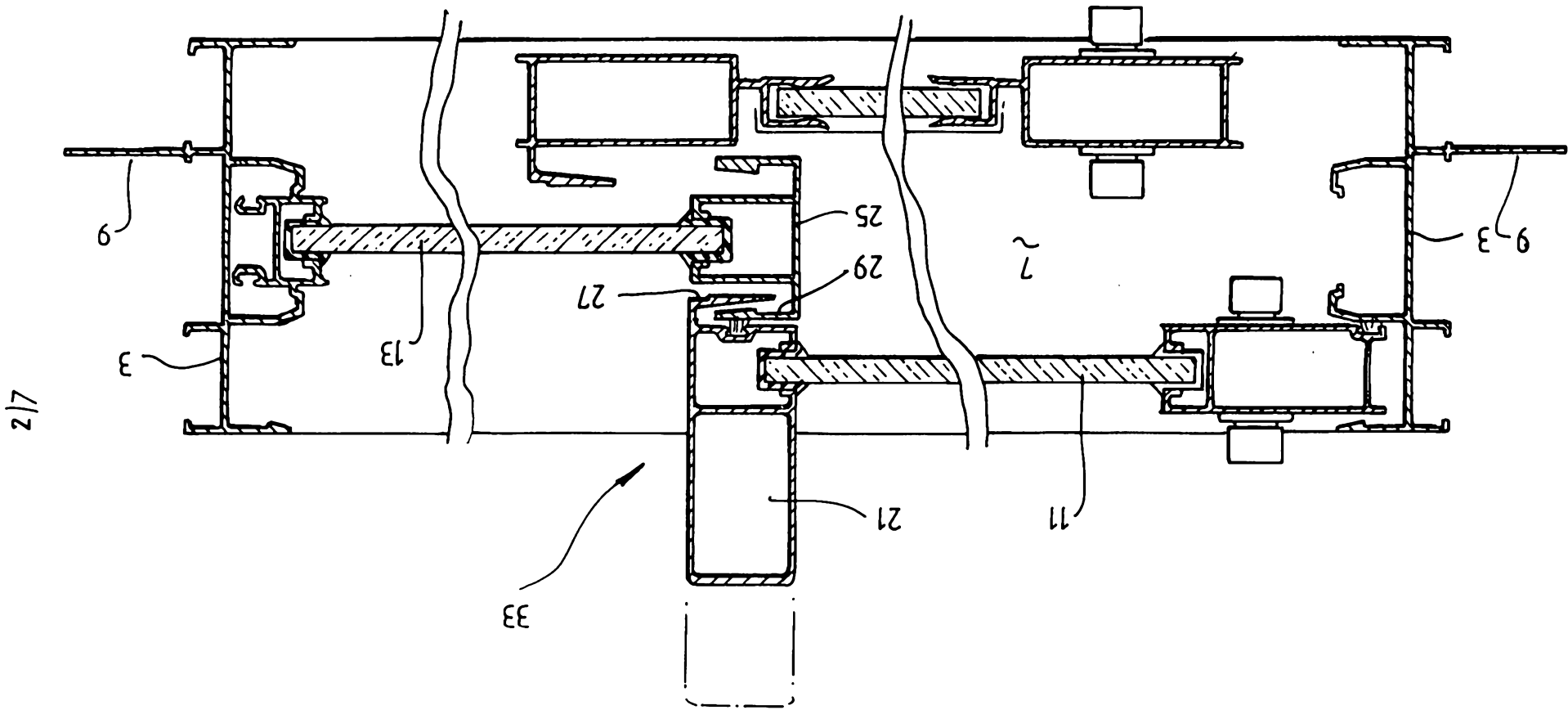


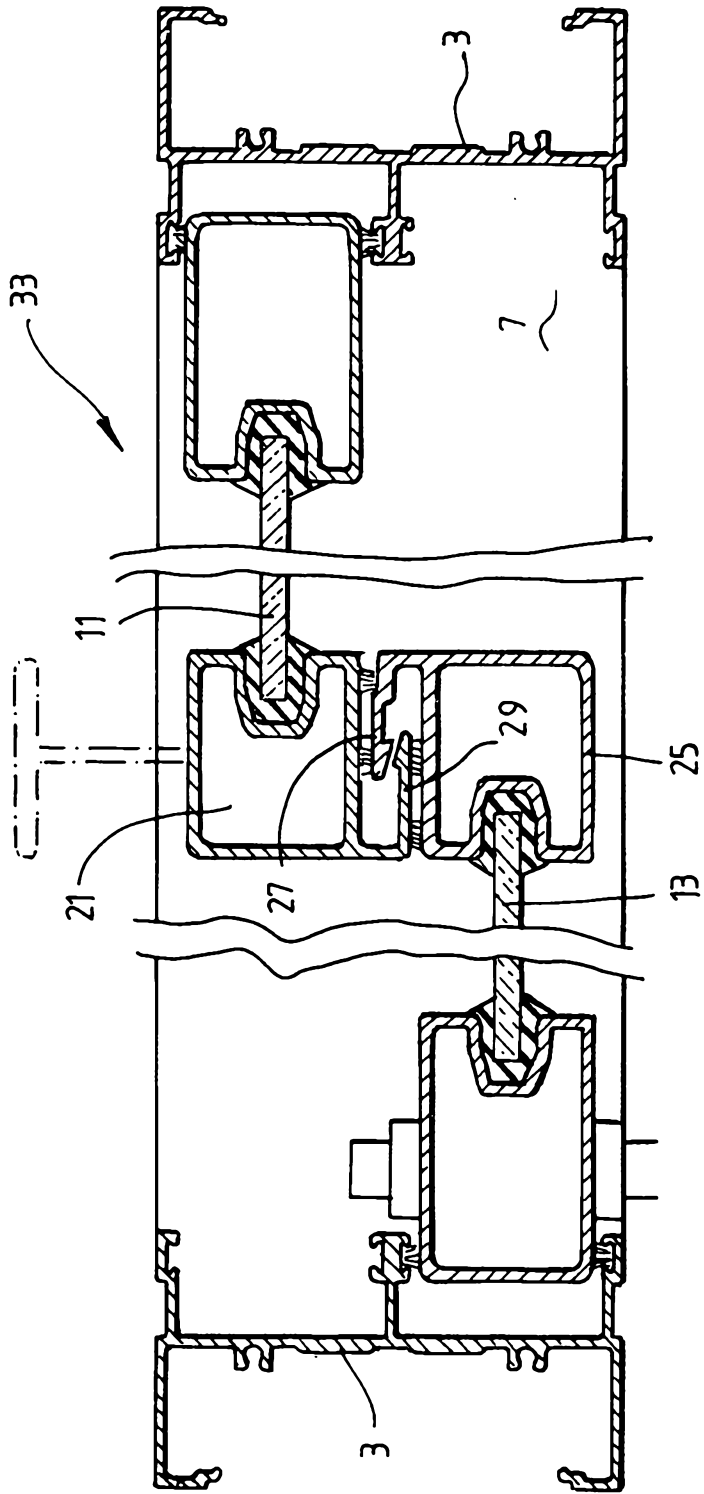
Fig. 2.



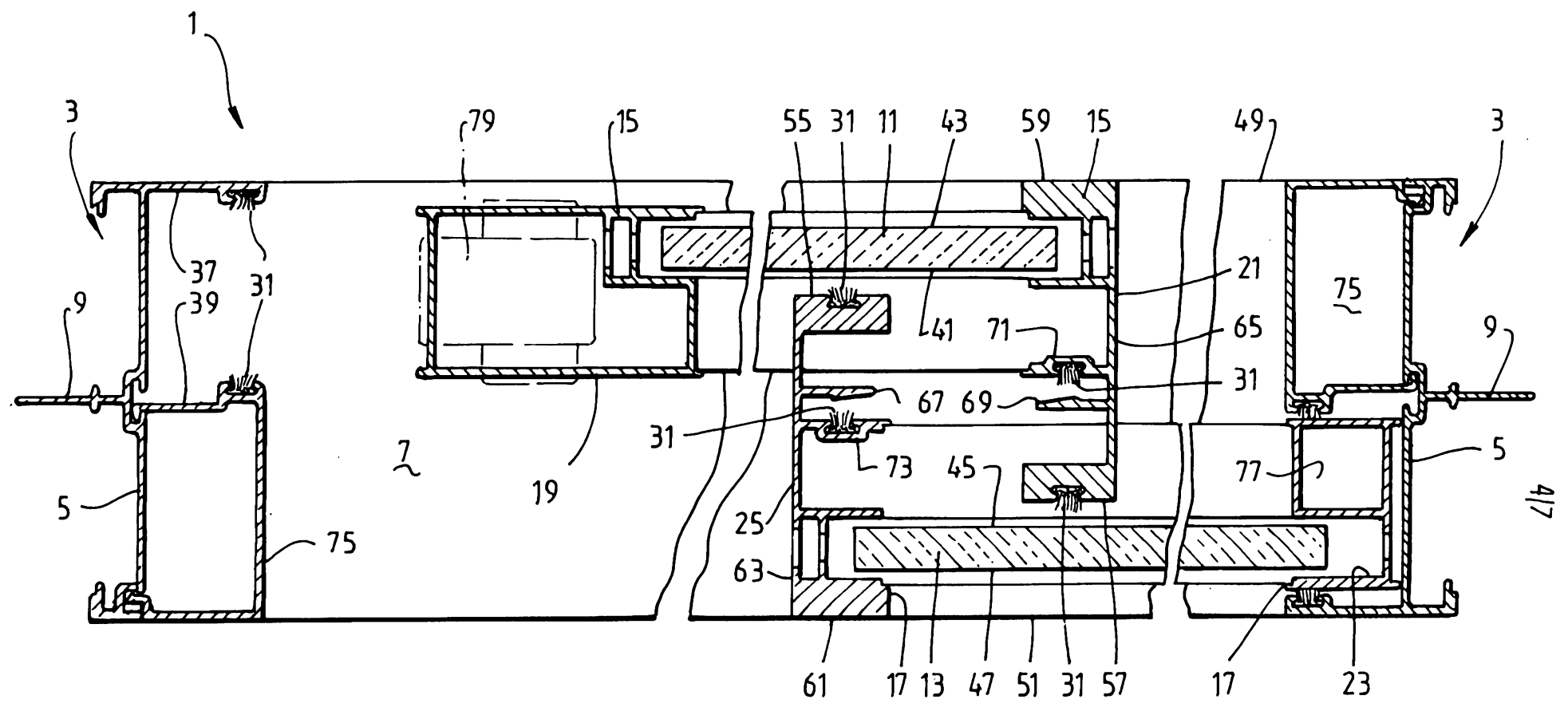
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III. 3.

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III. 4.

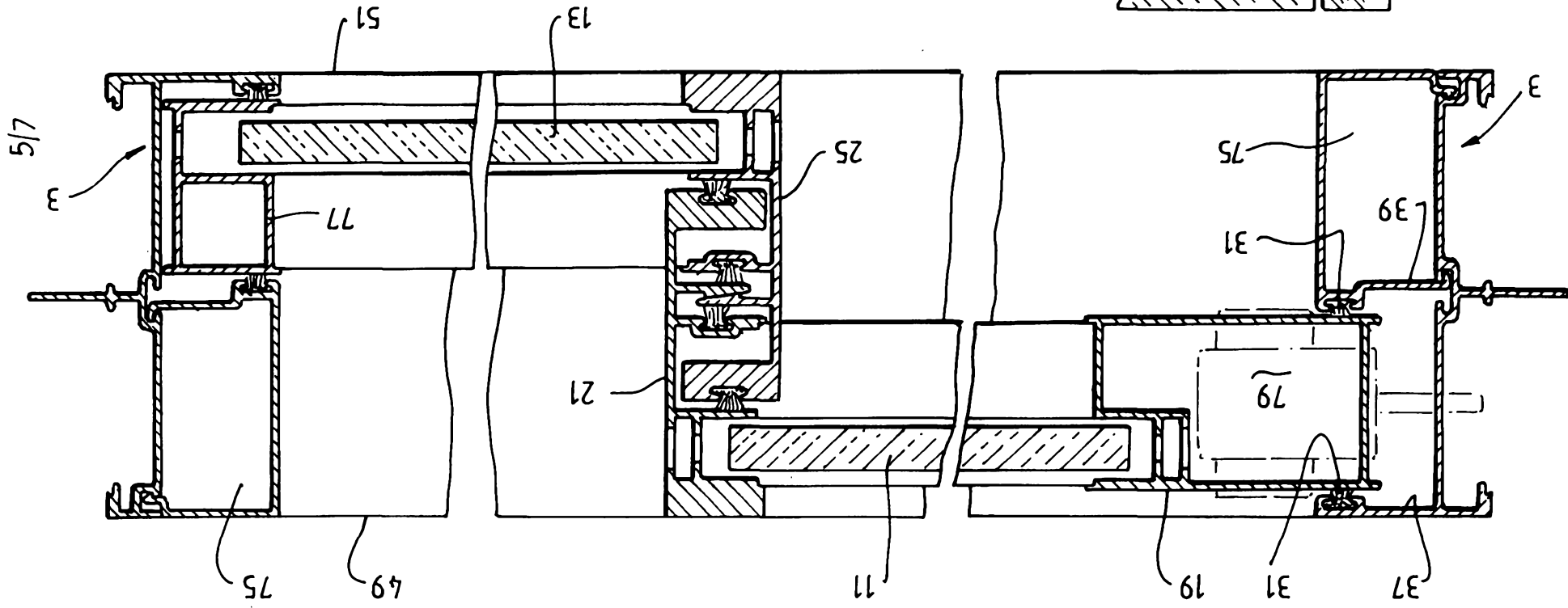


FIG. 5.

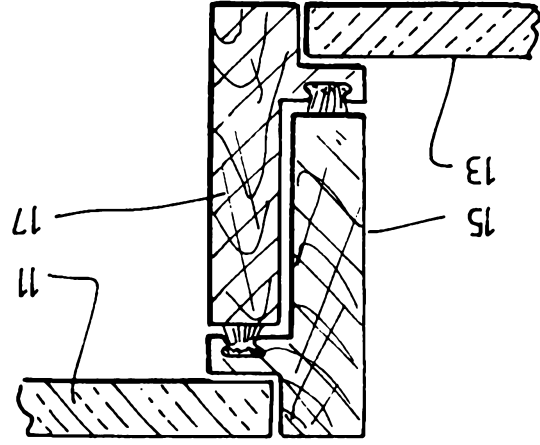


FIG. 7.

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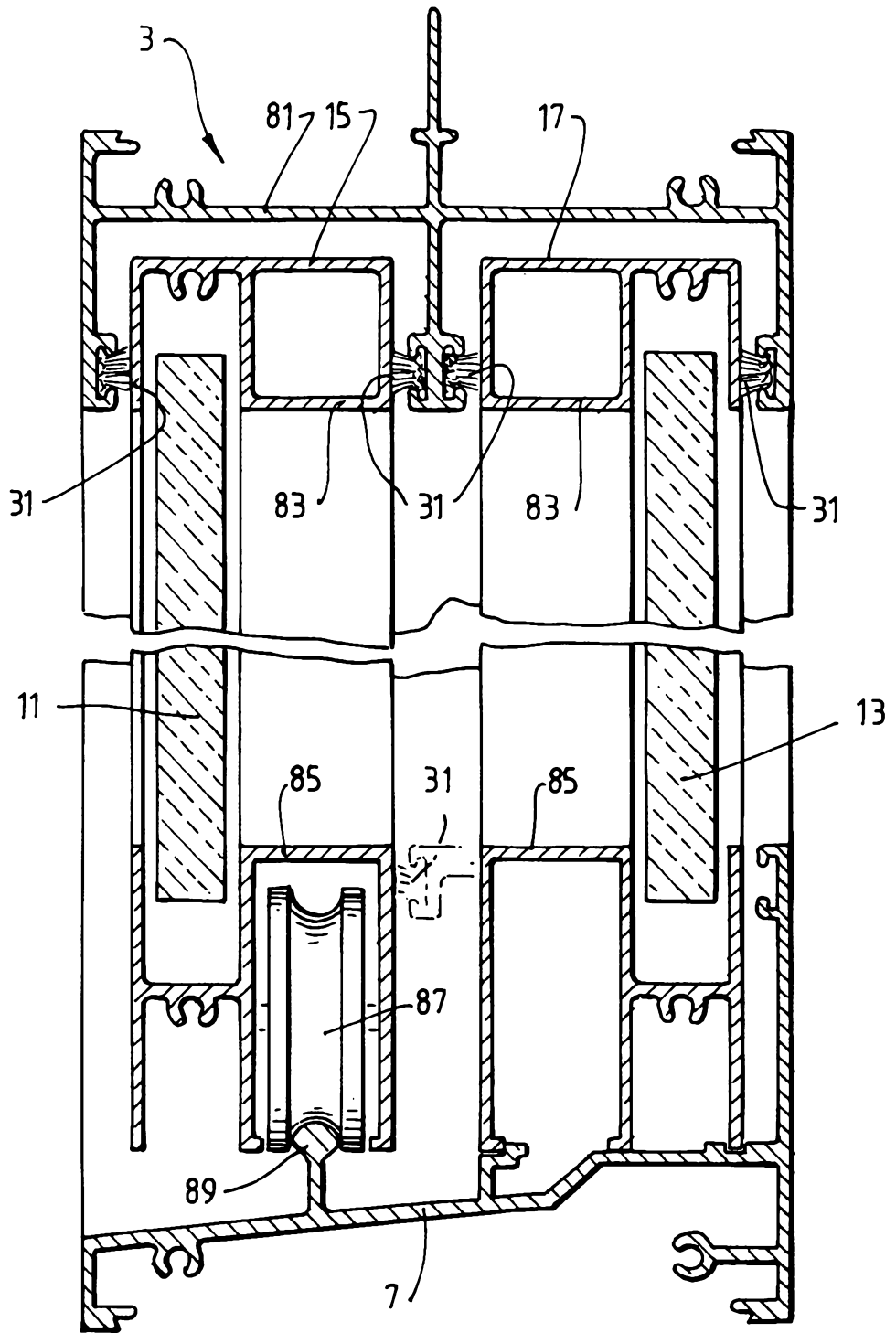


FIG. 6.

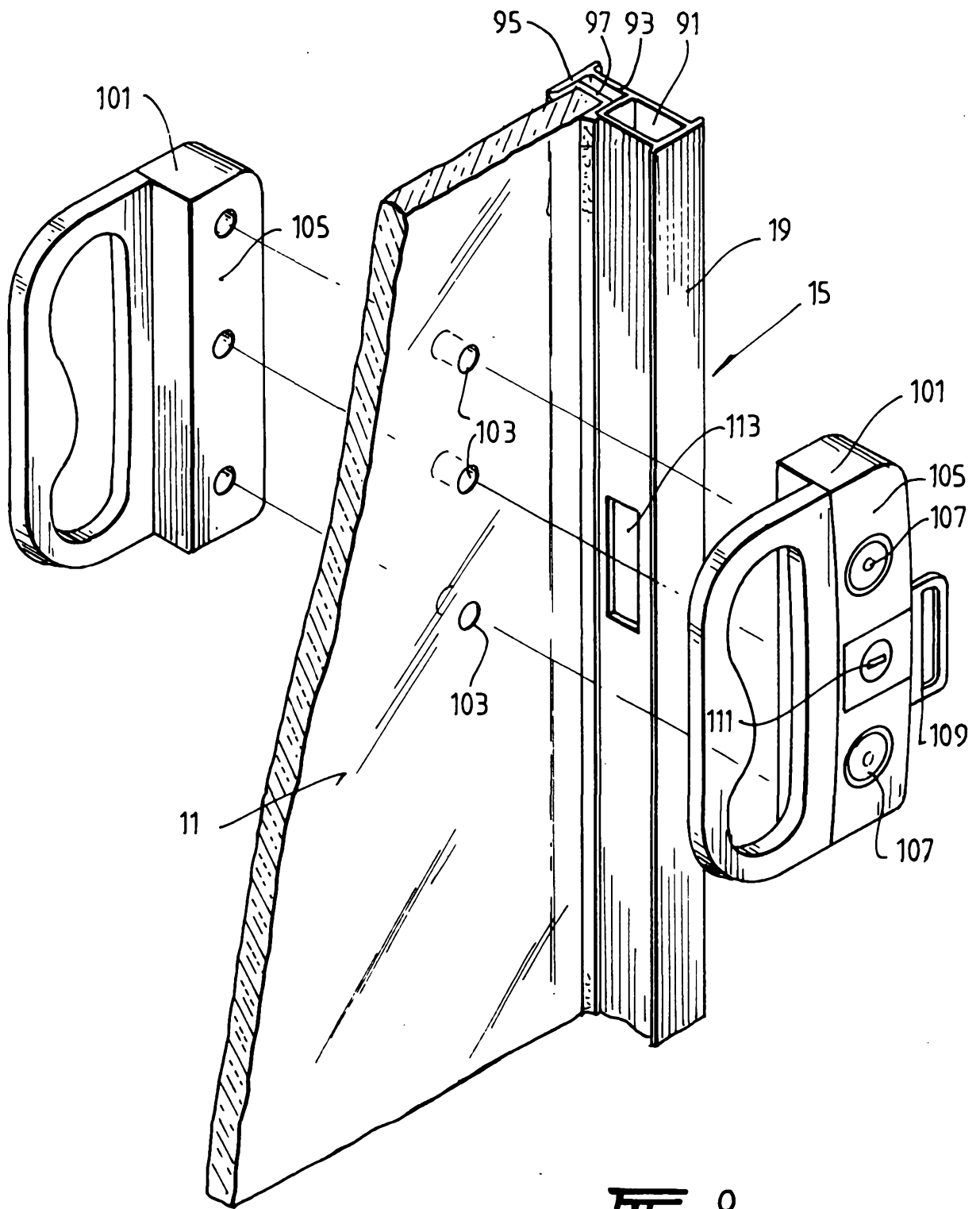


FIG. 8.