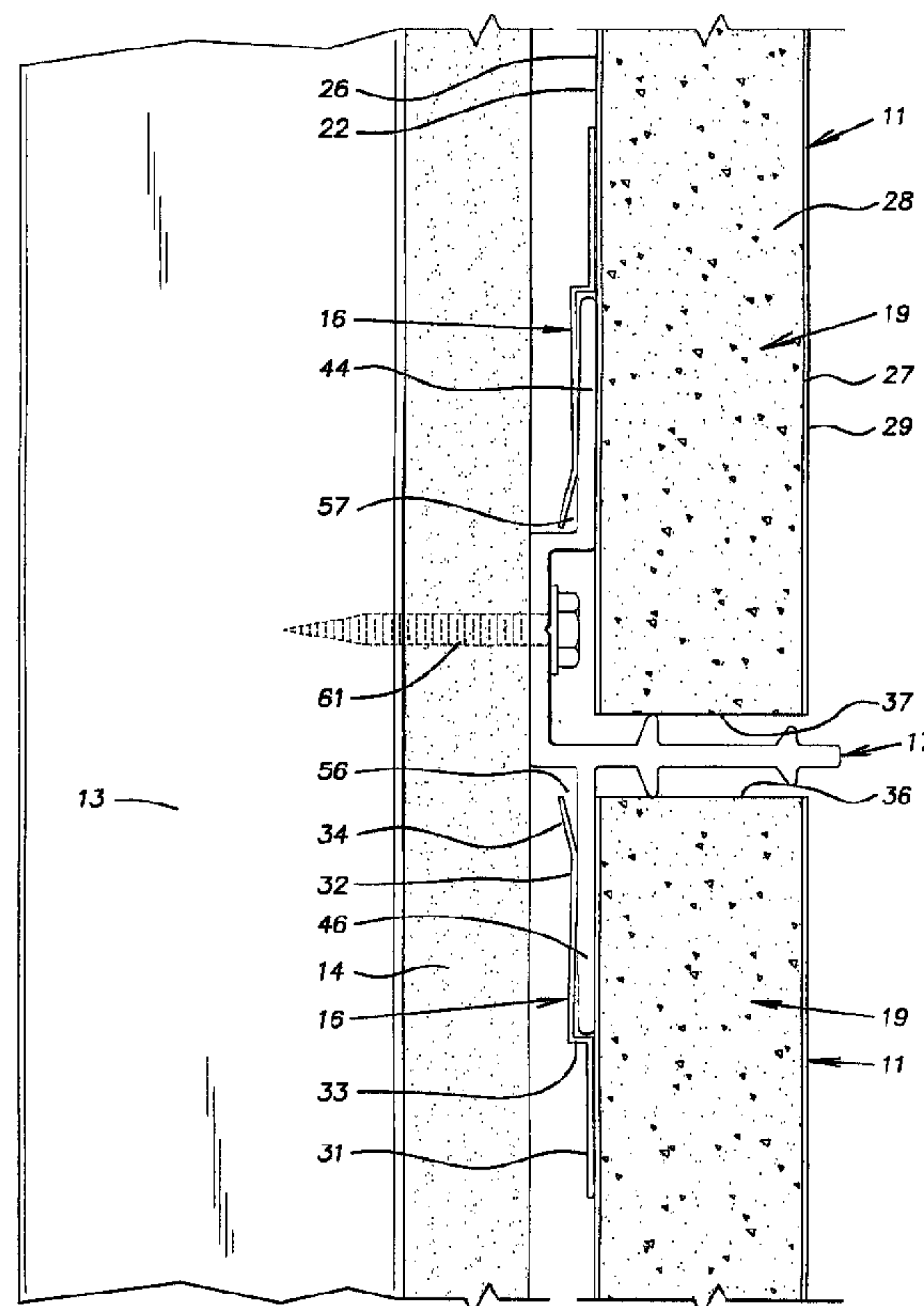




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(54) Titre : SYSTEME DE FIXATION DE PANNEAUX
(54) Title: PANEL ATTACHMENT SYSTEM



(57) Abrégé/Abstract:

A wall system comprising a plurality of rectangular rigid prefinished panels mounted on a wall support structure with main runners and cross runners. The main runners serve to lock the panels onto the support structure and with the cross runners serve to prevent the panels from warping due to adverse moisture conditions. The main runners are configured to space the panels from the wall support structure to encourage uniform humidity conditions at the front and rear of the panels. Clips that secure the panels to the main runners are fixed adjacent the top and bottom panel edges at different set-offs to obtain an advantageous nesting of panels for reduced packaging volume.



1 PANEL ATTACHMENT SYSTEM

2 ABSTRACT OF THE DISCLOSURE

3 A wall system comprising a plurality of rectangular
4 rigid prefinished panels mounted on a wall support
5 structure with main runners and cross runners. The main
6 runners serve to lock the panels onto the support
7 structure and with the cross runners serve to prevent the
8 panels from warping due to adverse moisture conditions.
9 The main runners are configured to space the panels from
10 the wall support structure to encourage uniform humidity
11 conditions at the front and rear of the panels. Clips
12 that secure the panels to the main runners are fixed
13 adjacent the top and bottom panel edges at different set-
14 offs to obtain an advantageous nesting of panels for
15 reduced packaging volume.

1 PANEL ATTACHMENT SYSTEM

2 BACKGROUND OF THE INVENTION

3 The invention relates to wall construction and, in
4 particular, to a wall system formed of an array of
5 prefinished rectangular panels mechanically held on a
6 wall framework.

7 PRIOR ART

8 It is known to construct a wall surface for a room
9 or other structure with a plurality of prefinished
10 rectangular panels. (As used herein, the term
11 "rectangular" includes "square".) Such constructions
12 using a real wood veneer, for example, can achieve a
13 custom high-quality appearance with moderate material and
14 labor costs. Under varied circumstances, prior art
15 panels such as those with a particle board core have
16 exhibited a tendency to warp after installation. This
17 warpage detracts from the appearance of the installation
18 and if severe enough, can require remedial work. It is
19 believed that warpage can be induced by moisture in
20 adhesives used to hold the panels on a substrate or
21 support wall and/or by different moisture levels between
22 the front and rear faces of a panel where air circulation
23 is limited at the back of the panels.

SUMMARY OF THE INVENTION

The invention provides a method and components for an improved wall construction of the type comprising an array of prefinished rectangular panels. In accordance with the invention, the panels are mechanically attached to a supporting wall frame or other structure and the attachment elements are arranged to constrain the panels against warpage.

In a preferred embodiment, the panels are stiffened by rigid runners, preferably made of suitable metal elements, extending substantially along the full length of their edges. The upper and lower edges of the panels are positively secured to the wall frame or other support structure by horizontal runners while the vertical panel edges are located to the wall frame indirectly by the close proximity of the ends of vertical runners to the horizontal runners.

More specifically, elongated panel mounting clips, preferably roll formed members of steel or other suitable metal, are factory attached to the rear or back side of each panel adjacent its upper and lower edges. The clips have a "Z"-like cross section to provide a flange that with the adjacent surface area of the panel forms a groove. These groove constructions at the top and bottom of a panel tightly receive flanges of corresponding main

1 runners to fix the panel in its desired location on the
2 wall framework.

3 As disclosed, the "Z" clips or brackets at the upper
4 and lower panel edges are preferably at different offsets
5 from their respective edges. This arrangement has the
6 advantage of minimizing shipping bulk and, consequently,
7 cost. The cross runners that stabilize the vertical
8 panel edges in the disclosed embodiment are formed as
9 splines that each tightly fit as a tongue into opposed
10 grooves of adjacent panels. The cross runners or splines
11 thus, in addition to reducing the tendency of the panel
12 to warp also align the edges of adjacent panels to one
13 another to improve the appearance of the installation.

14 BRIEF DESCRIPTION OF THE DRAWINGS

15 FIG. 1 is a fragmentary perspective view of a wall
16 constructed in accordance with the invention;

17 FIG. 2 is an enlarged end view of a main runner;

18 FIG. 3 is an enlarged end view of a cross runner and
19 portions of adjacent panels;

20 FIG. 4 is a cross sectional view of the wall of FIG.
21 1 taken in a vertical plane;

22 FIG. 5 is a cross sectional view taken in a
23 horizontal plane at an inside and an outside corner of a
24 wall constructed like that of FIG. 1;

1 FIG. 6 is a cross sectional view taken in a
2 horizontal plane of an end of a wall constructed like
3 that of FIG. 1;

4 FIG. 7 is an end view of a plurality of panels
5 stacked for shipment and/or storage;

6 FIG. 7A is a plan view on a reduced scale showing
7 the rear face of a panel having clips mounted thereto;

8 FIG. 8 is an end view of an alternative main runner;
9 and

10 FIG. 9 is an end view of an alternative cross
11 runner.

12 DESCRIPTION OF THE PREFERRED EMBODIMENT

13 Referring now to the drawings, a wall system 10
14 constructed in accordance with the invention includes a
15 plurality of rigid rectangular panels 11 attached to a
16 wall support structure or framework 12 represented by
17 vertical studs 13 covered by gypsum board or drywall 14.
18 The panels 11 are mechanically attached to the framework
19 studs 13 with elongated clips 16 that grip horizontal
20 runners 17. Adjacent vertical edges of the panels 11 are
21 mutually aligned by cross runners 18.

22 The panels 11, which can be identical for the most
23 part, are an assembly of a flat, rigid board-like unit 19
24 and a pair of the clips 16 attached to a rear face 22 of
25 the board 19. A panel board 19 can comprise any suitable
26 construction material and in the preferred embodiment
27 comprises a laminate of two outer face layers 26 and 27

1 and an intermediate core 28. The core can be a
2 commercially available particle board that consists
3 primarily of wood particles bonded together with known
4 materials. This particle board and similar cellulose
5 based materials are particularly suited for the present
6 invention since they afford both economy and adequate
7 tensile and compressive strength. An exterior or front
8 surface 29 of the face 27 typically has a final finish
9 when it leaves the panel factory. For example, where
10 the face or layer 27 is a wood veneer, it can be
11 sanded, stained, and lacquered or otherwise prefinished
12 before shipment from the factory where the panel 11, as
13 described, is manufactured. The panels 11 have nominal
14 common face dimensions of, for example, 2 foot $\times$ 2 foot
15 square, or 2 foot high $\times$ 4 foot wide. It will be
16 understood, however, that other suitable dimensions are
17 envisioned.

18 Referring to FIGs. 7 and 7A, clips 16 fixed to the
19 rear faces 22 of the panel board 19 can be roll formed
20 sheet steel or aluminum, for example. In the
21 illustrated construction, the clips 16 are identical at
22 both the top and bottom edges of a panel board 19 and
23 have a length equal to or slightly shorter than the
24 horizontal length of the panel board. The cross
25 section of a clip 16, as shown in FIG. 7, is "Z"-shaped
26 albeit somewhat shortened and broadened with generally
27 planar flanges 31, 32 and an intermediate web 33. One

1 flange 31 is secured against the panel board 19 either
2 directly abutting it or adhered to it. The clips 16 are
3 fixed to the rear panel face 22 with suitable means such
4 as mechanical fasteners in the form of screws, staples or
5 the like and/or an adhesive fastening medium. The other
6 flange 32 has its edge remote from the web 33 bent
7 outwardly slightly forming a lip 34 which facilitates
8 assembly with a main runner 17 as explained below. At an
9 upper edge 36 of a panel board 19, the clip 16 is closely
10 adjacent the edge while at a lower edge 37 the clip is
11 adjacent but spaced a predetermined distance from this
12 edge.

13 Vertical edges 38 of the panel boards 19 are
14 provided with a groove 39 running their full length and
15 preferably centered in the thickness of the board and
16 having a round bottom to reduce any tendency of a stress
17 induced fracture in this area. By way of example, the
18 panel boards 19 can have representative thicknesses of
19 $3/4"$, $5/8"$, or $1/2"$ with the thicker dimensions being
20 preferred where greater strength is required. The
21 grooves 39 can be $1/8"$ wide and approximately $9/16"$ deep.

22 The illustrated main horizontal runners 17 are
23 extruded aluminum members with an irregular, asymmetrical
24 cross section. This cross section, with particular
25 reference to FIG. 2, includes a central channel section
26 41 with a web 42 and flanges 43. The flanges have

1 extended portions 44, 46 that project oppositely of one
2 another in a common plane parallel to but spaced from the
3 plane of the web 42. The main runner cross section also
4 includes an extension 47 of a lower one of the flanges
5 43. The extension has ribs 48, 49 that are useful in
6 gauging the vertical gap between adjacent panels 11. The
7 main runners 17 have a length preferably at least equal
8 to the combined horizontal length of two panels 11, and
9 can be, for example, 8, 10 or 12 feet long.

10 FIG. 3 illustrates an end view of a cross runner 18.
11 As shown, the cross runner 18 has an irregular cruciform
12 shape in section. One part 51 of the cruciform has
13 corrugations 52 while another part 53 has ribs 54, 55.
14 The illustrated cross runner 18 is made as an aluminum
15 extrusion. The cross runners 18 have lengths generally
16 equal to the vertical height of a panel 11.

17 The panels 11 are installed on the wall support
18 structure 12 by assembling a first row of panels 11,
19 typically starting at floor level, along the base of the
20 supporting wall structure with a cross runner 18
21 assembled in the opposed vertical slots or grooves 39 of
22 adjacent panels 11. The horizontal spacing between the
23 panels 11 is determined by abutting the panel edges 38
24 against the cross runner ribs 54. The panels 11 are
25 mechanically locked in position relative to the support

1 structure 12 by positioning the lower flange portion or
2 extension 46 of a main runner 17 into a groove or slot 56
3 formed by the clips 16 adjacent the upper edges 36 of the
4 panel boards 19 and then securing the main runner to the
5 support structure. In the illustrated case, this is
6 accomplished by driving a self-tapping screw 61 through
7 the web 42 into each of the studs 13. A shallow
8 groove 62 can be formed in the profile of the inside of
9 the channel 41 to locate and stabilize the screw 61 as it
10 is driven. The lower edges 37 of the first course or row
11 of panels 11 can be secured to the support structure by
12 suitable mechanical or adhesive means or other known
13 fastening means. If desired, a "Z" strip with the
14 proportions of the main runner channel 41 and upper
15 flange portion or extension 44 can be used for this
16 purpose. It should be understood that where desired, the
17 main runners 17 can be secured directly to an open
18 framework made up of studs or other elements not covered
19 by gypsum board or other board material.

20 After a sufficient length of a main runner or
21 runners 17 has been set and fixed to the wall support
22 structure 12 with the lower flange area 46 received in
23 the slot or groove 56 formed by the clips 16 and adjacent
24 rear face areas 22 of the panel boards 19, a second
25 course or row of panels 11 is installed above the first
26 row. This is accomplished by manipulating the panels 11

1 to cause the upper flange 44 of the main runner to be
2 received in a slot or groove 57 formed between the lower
3 clip 16 and the rear faces 22 adjacent the lower edges 37
4 of the second row of panels 11. Each panel 11 is forced
5 downwardly until the upper flange 44 of the main runner
6 17 is fully received in the groove 57 created between the
7 clip 16 and panel board 19 and the lower edge 37 contacts
8 the rib 48 of the main runner. As before, a cross runner
9 18 is inserted in the opposed vertical grooves 39 of
10 adjacent panel boards 19. When this second course of
11 panels 11 has been put in place, the process of securing
12 it to the wall structure with a main runner 17 at the
13 upper panel edges 36 is repeated. In the same manner,
14 subsequent rows or courses of panels 11 are positioned on
15 the wall with cross runners 18 disposed between the
16 panels and main runners 17 located at the lower and upper
17 edges 36, 37 of the panels. This process is repeated
18 until the wall support structure 12 is covered by the
19 panels 11 to the extent desired.

20 The effective thickness of the cross runner part 51
21 that is received in a groove 39 is proportioned to
22 provide an interference with the groove to ensure a tight
23 fit therewith. It will be seen that the cross runners 18
24 serve to align adjacent panel edges 38 to one another.
25 As shown in FIG. 7, the clips 16 can be made with the
26 flange 32, in its free state, close to the rear face 22

1 so that a somewhat tight interference fit is achieved
2 between this flange and the main runner flange 44.
3 Inspection of FIG. 4 reveals that the channel-like
4 structure of the main runner 17 serves to space the
5 panels 11 away from any subwall such as that represented
6 by the gypsum board 14. This spacing ensures that
7 adequate air circulation exists around the panels so that
8 any tendency of a differential in moisture content
9 between the front and back of the panels 11 is reduced
10 and, consequently, a tendency for the panels to warp from
11 moisture conditions is reduced. It will be understood
12 that panels such as the illustrated panels 11, formed of
13 wood or similar cellulose based materials, can be
14 particularly susceptible to moisture-induced warping.
15 The disclosed wall system 10 is effective in overcoming
16 the problem of warpage of such panels since the main and
17 cross runners 17, 18 which are relatively rigid and free
18 of moisture related warpage, engage substantially the
19 full perimeter of each panel and serve to maintain the
20 corresponding edges of the panel in a common plane
21 thereby preventing visually distracting warpage.

22 FIG. 5 is a cross section of a wall system
23 constructed in accordance with the invention taken in a
24 horizontal plane to illustrate metal corner accessories
25 63, 64 at inside and outside corners, respectively. The
26 accessories, 63, 64 can be aluminum extrusions and can

1 include channel structures 66, 67 to appropriately space
2 the panels 11 from the subwall. FIG. 6 similarly
3 illustrates an aluminum extrusion accessory 68 for the
4 end of a wall.

5 With reference to FIG. 7, the offset of one of the
6 clips 16 from its adjacent edge 37 allows a pair of
7 panels 11 to be stacked rear face to rear face and offset
8 clip to non offset clip so as to reduce the effective
9 bulk of the panels and thereby reduce storage and
10 shipping expense.

11 FIGS. 8 and 9 illustrate modified forms of a main
12 runner 117 and a cross runner 118. In these
13 arrangements, a flange extension 147 and cruciform part
14 153 have channels 71, 72, respectively, which exist
15 between edges of associated panels 11 and are adapted to
16 receive the stem of a decorative strip having a T-shaped
17 cross section as is known in the art.

18 It should be evident that this disclosure is by way
19 of example and that various changes may be made by
20 adding, modifying or eliminating details without
21 departing from the fair scope of the teaching contained
22 in this disclosure. The invention is therefore not
23 limited to particular details of this disclosure except
24 to the extent that the following claims are necessarily
25 so limited.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A finished wall construction comprising a plurality of rectangular generally planar panels arranged in a vertical plane with their edges lying in vertical and horizontal orientations and runners adjacent the edges of the panels, the panels having a front face and a rear face and being constructed of wood material or other material which is susceptible to warping because of ambient humidity conditions, the runners being formed of metal or other substantially rigid structural material that is substantially free of a tendency to warp due to ambient humidity conditions, the runners being attached adjacent each of the four edges of the panels, each panel having outwardly opening horizontal grooves adjacent their horizontal edges formed by clips secured to rear faces of the panels and extending along substantially the full horizontal length of their panels, said horizontal grooves being located behind said rear faces of said panels, each panel having a pair of said runners on opposite edges attached to a supporting wall in a manner that permits such runners to engage said horizontal grooves to hold the panel in place relative to the supporting structure with adjacent horizontal panel edges vertically spaced apart and to cooperate with runners on edges perpendicular to said attached runners to maintain the panel in said vertical plane.

2. A finished wall construction as set forth in claim 1, wherein said attached runners are main runners

having lengths substantially greater than the dimensions of the panels.

3. A finished wall construction as set forth in claim 2, wherein the runners on edges perpendicular to said parallel associated runners are cross runners and have lengths generally equal to the lengths of said perpendicular edges.

4. A finished wall construction as set forth in claim 1, wherein said panels have a thickness substantially less than their major dimensions.

5. A finished wall construction as set forth in claim 4, wherein said perpendicular edges are formed with a groove within the thickness of the panel and said cross runners associated with said edges are disposed in said grooves with a relatively close fit.

6. A finished wall construction as set forth in claim 5, wherein a single cross runner is assembled in opposed grooves of adjacent panels.

7. A finished wall construction as set forth in claim 1, wherein said attached runners comprise main runners that are arranged horizontally on said support structure.

8. A finished wall construction as set forth in claim 7, wherein said clips are Z-shaped metal clips and said main runners are mechanically locked in said

horizontal grooves by said Z-shaped clips coacting with said rear faces of said panel.

9. A finished wall construction as set forth in claim 1, wherein said attached runners include portions received within said horizontal grooves and an extension projecting between said adjacent horizontal panel edges.

10. A finished wall construction as set forth in claim 9, wherein said clips are configured to grip the received portions of the attached runners.

11. A finished wall construction as set forth in claim 1, wherein said attached runners engage said grooves to hold the panel in place relative to the supporting structure in a manner that prevents removal of a panel while another panel is installed above it.

12. A finished wall construction as set forth in claim 1, wherein said grooves are formed between said clips and said rear faces.

13. A kit for constructing a prefinished wall comprising a plurality of rectangular panels, a plurality of substantially rigid main runners having lengths greater than that of horizontal edges of the panels, and a plurality of substantially rigid cross runners having lengths generally equal to the length of the vertical edges of the panels, the vertical panel edges having outwardly opening grooves formed therein and the horizontal edges having associated clips attached to the adjacent margins of the rear panel face forming outwardly

opening horizontal grooves therewith, said horizontal grooves being located behind said rear faces of said panels, the main runners having a lower flange area adapted to be received in the horizontal grooves adjacent the upper panel edges and an upper flange adapted to be received in the horizontal grooves adjacent the lower panel edges, the cross runners each being adapted to be received in the opposed vertical grooves of an adjacent pair of panels, the main runners being adapted to be secured to a wall structure to thereby hold the panels in a rectangular array in a vertical plane parallel to the wall structure and whereby the main and cross runners when installed in the respective horizontal and vertical grooves serve to stabilize the associated panels against warpage.

14. A kit as set forth in claim 13, wherein said runners and grooves are proportioned to produce an interference fit therebetween when such runners are assembled into such grooves.

15. A kit as set forth in claim 13, wherein the main runners have a configuration that causes the panels to be spaced from a wall support structure when the panels and runners are assembled on the wall support structure.

16. A kit as set forth in claim 13, wherein said runners are formed of metal.

17. A kit as set forth in claim 13, wherein the main and cross runners are extruded aluminum members.

18. A kit as set forth in claim 15, wherein the main runner has a channel-like cross section including a web and opposed flanges with oppositely extending coplanar portions parallel to a plane of said web.

19. A kit as set forth in claim 14, wherein the cross runners have longitudinally corrugated flanges adapted to be received in the vertical grooves of the panels with an interference fit.

20. A kit as set forth in claim 13, wherein said clips extend along substantially the full horizontal length of their panels.

21. A kit as set forth in claim 20, wherein said clips are metal elements attached to said panels.

22. A kit as set forth in claim 20, wherein said clips on said panels have different spacing from the adjacent edges to permit the panels to be stacked with their rear faces confronting one another and the clips being offset to reduce the volume taken up by a pair of panels.

23. A kit as set forth in claim 11, wherein said cross runners are arranged to avoid interference with the main runners when the main and cross runners are installed in their respective grooves.

24. A method of assembling a prefinished wall comprising the steps of assembling a row of rectangular

panels alongside a wall structure, each of said panels having a front face, a rear face and upper and lower edges, securing a clip to the rear face of each panel of a first row to form an upper groove adjacent an upper edge of each panel of the first row, securing the upper edge area of the panels of the first row to the wall structure with a horizontally disposed runner that has a length greater than the individual panels, the runner having a portion that is received in said upper groove formed on the panel adjacent its upper edge and a portion that overlies said upper edge, securing the runner with mechanical fasteners after it is received in said upper grooves, assembling successive rows of panels above a preceding row of panels by engaging a lower groove on each panel of the successive row adjacent its lower edge over a portion of the runner of the preceding row of panels whereby the overlying portions of the runners are adapted to space adjacent panels vertically from one another.

25. A method as set forth in claim 24, wherein the panels are provided with grooves on their vertical edges and adjacent panels are interconnected by a tongue element in said vertical grooves.

26. A method as set forth in claim 25, wherein both vertical edges of each of said panels are provided with said groove.

27. A method as set forth in claim 24, wherein said lower groove is formed by securing a second clip to the

rear face adjacent the lower edge of each panel of successive rows.

28. A method as set forth in claim 27, wherein said first mentioned clip and second clip are substantially identical.

29. A finished wall construction comprising a plurality of rectangular generally planar panels arranged in rows and columns in a vertical plane with their edges lying in vertical and horizontal orientations and runners adjacent the edges of the panels, the panels having a front face and a rear face and being constructed of wood material or other material which is susceptible to warping because of ambient humidity conditions, the runners being formed of metal or other substantially rigid structural material that is substantially free of a tendency to warp due to ambient humidity conditions, the runners being attached adjacent each of the four edges of the panels, each panel having clips mounted to its rear face adjacent the upper and lower edges to form an upper outwardly opening groove adjacent the upper panel edge and a lower outwardly opening groove adjacent the lower panel edge, said horizontal grooves being formed between said clips and said rear faces of said panels, each panel having a pair of said runners on opposite edges attached to a supporting wall in a manner that permits such runners to engage said horizontal grooves to hold the panel in place relative to the supporting structure and to cooperate with runners on edges perpendicular to said attached runners to maintain the panel in said vertical plane.

30. A finished wall as set forth in claim 29, wherein said clips each extend along substantially the full horizontal length of their panels.

31. A finished wall as set forth in claim 30, wherein said associated runners include portions received within said upper and lower grooves, edges perpendicular to said parallel associated runners having a thickness and a groove therein, and cross runners having lengths generally equal to the lengths of said perpendicular edges receiving portions of said cross runners in said grooves, said runner portions received within said grooves extending about substantially the full perimeter of the panel to tend to maintain the corresponding edges of the panels in a common place.

32. A finished wall construction comprising a plurality of rectangular generally planar panels arranged in rows and columns in a vertical plane with their edges lying in vertical and horizontal orientations and runners adjacent the edges of the panels, the panels having a front face and a rear face and being constructed of material selected from wood material and material which is susceptible to warping because of ambient humidity conditions, the runners being formed of a material selected from metal and substantially rigid structural material that is substantially free of a tendency to warp due to ambient humidity conditions, the panels each having grooves along substantially the full length of each of its edges, the runners being received in the grooves of the four edges of the panels along

substantially the full length of the respective grooves, each panel having a pair of said grooves located behind said panel rear face for respectively engaging a pair of said runners on opposite edges attached to a supporting wall in a manner that permits such runners to hold the panel in place relative to the supporting structure and to cooperate with runners on edges perpendicular to said attached runners to maintain the panel in said vertical plane.

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FIG. 1

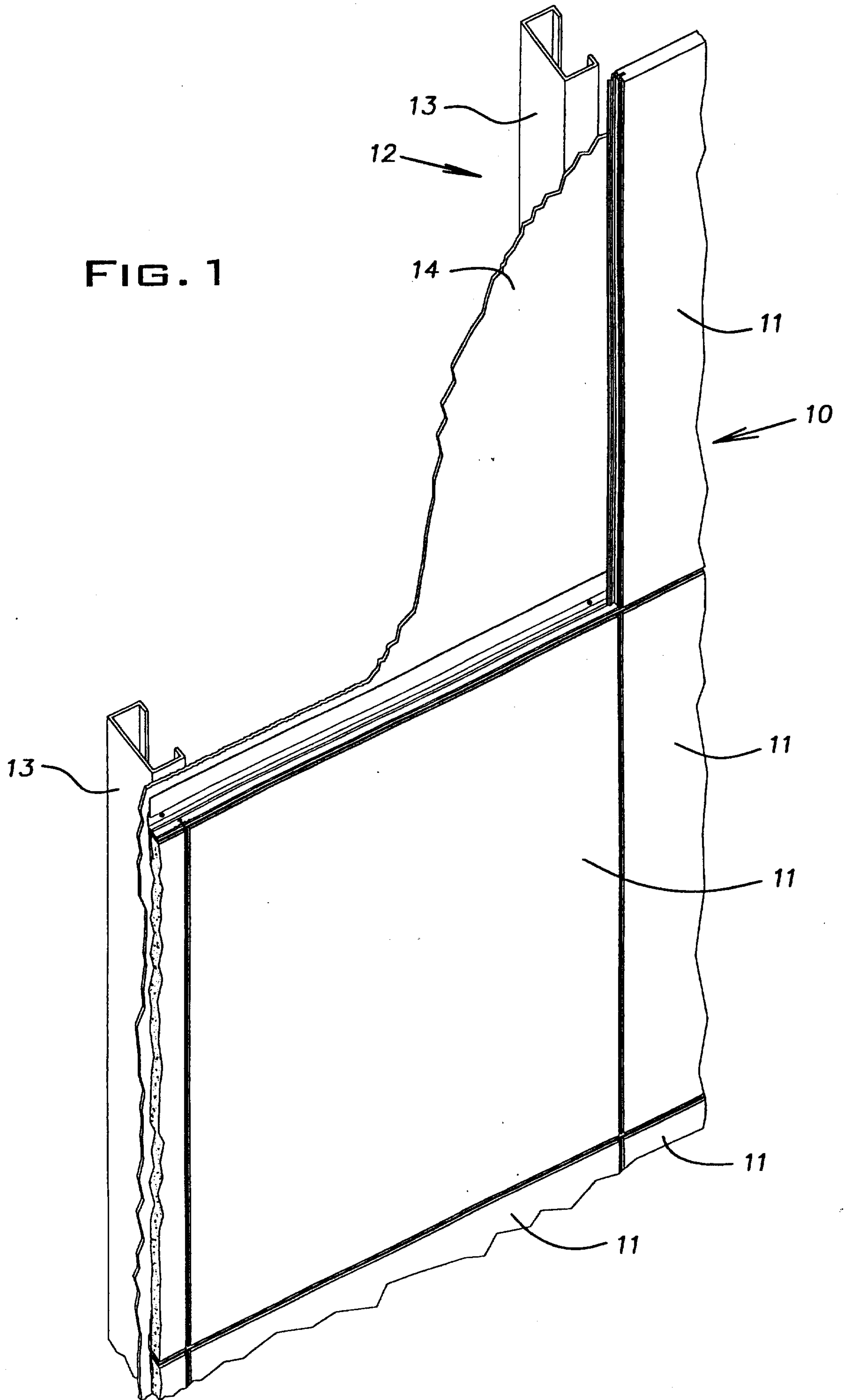


FIG. 2

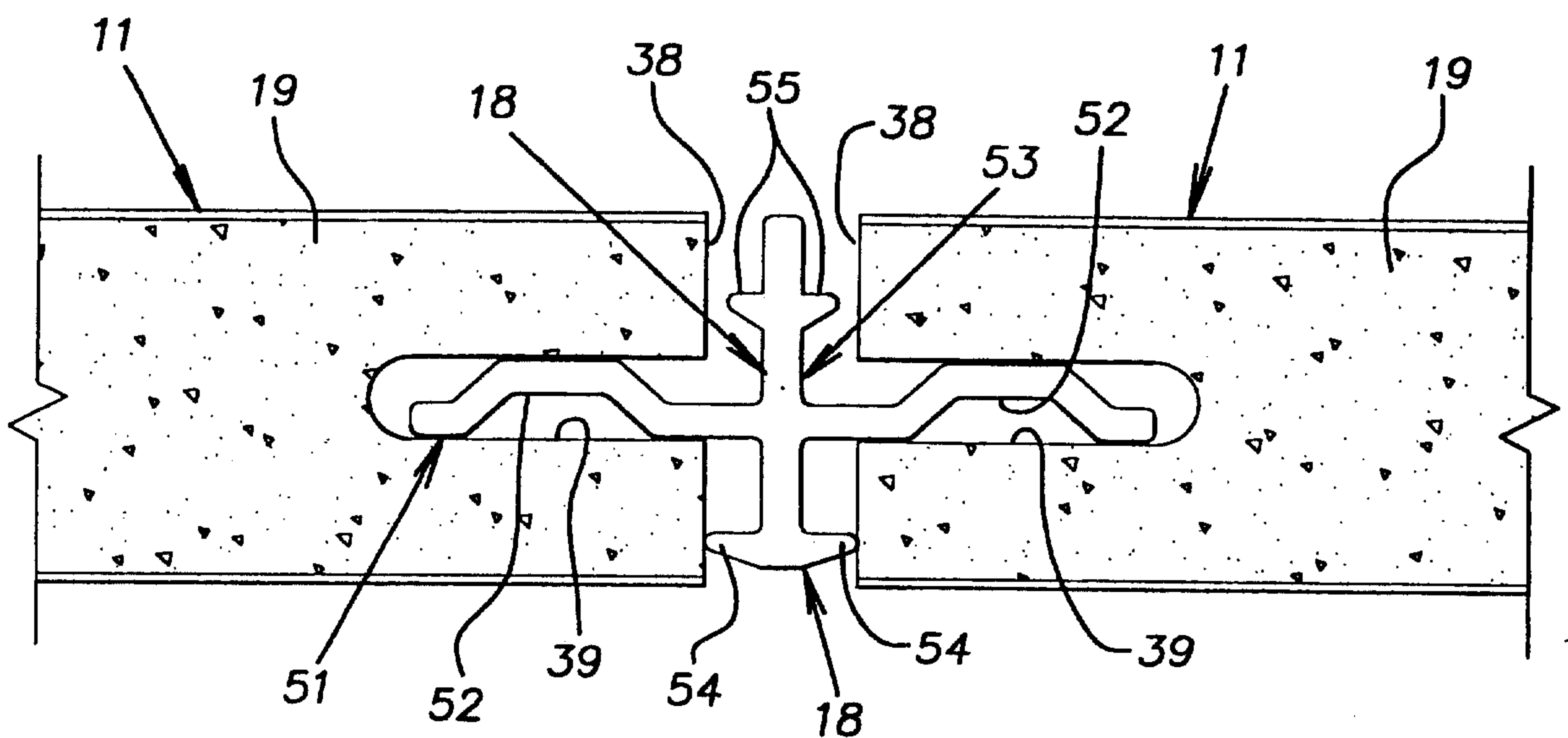
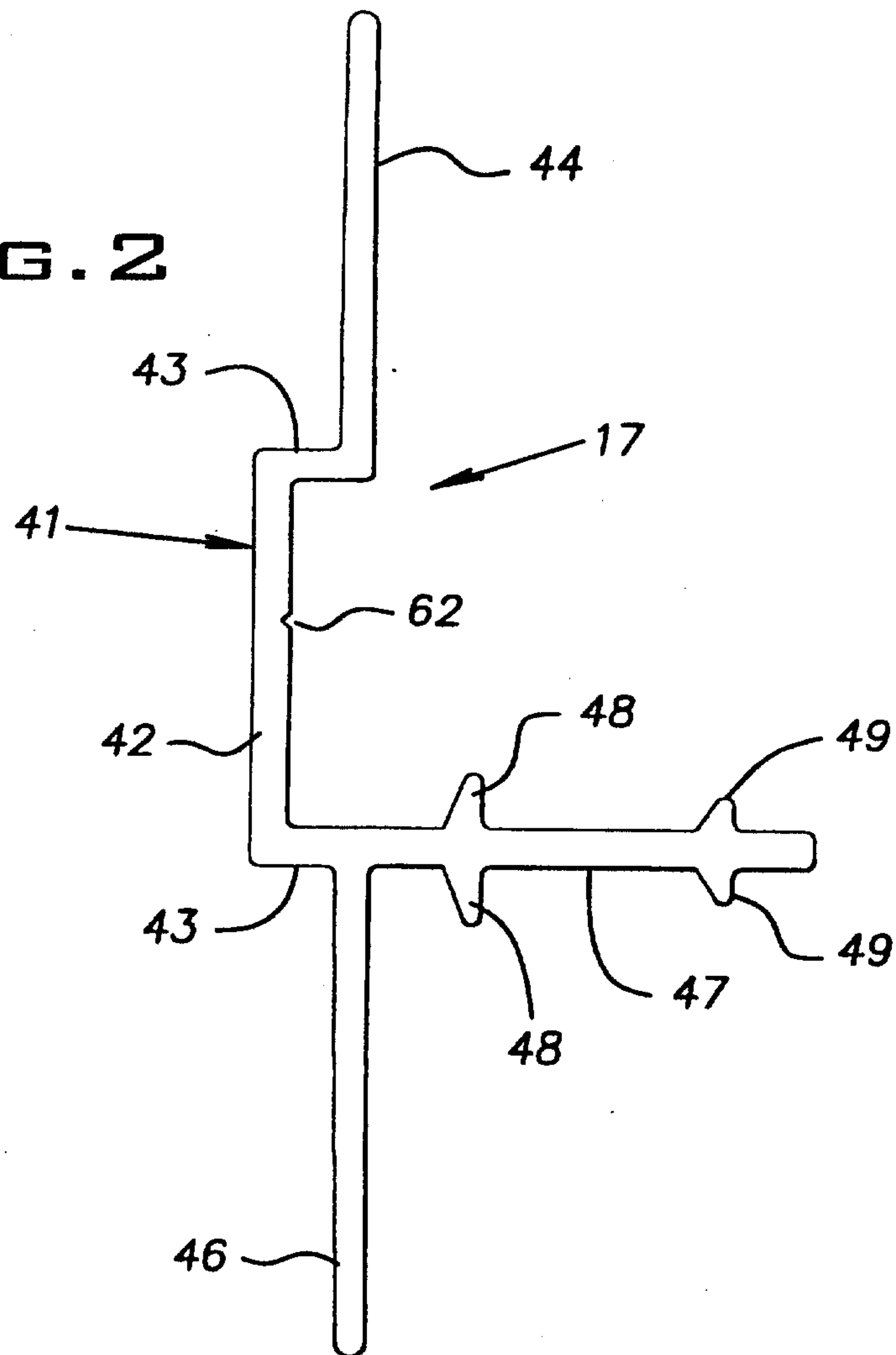
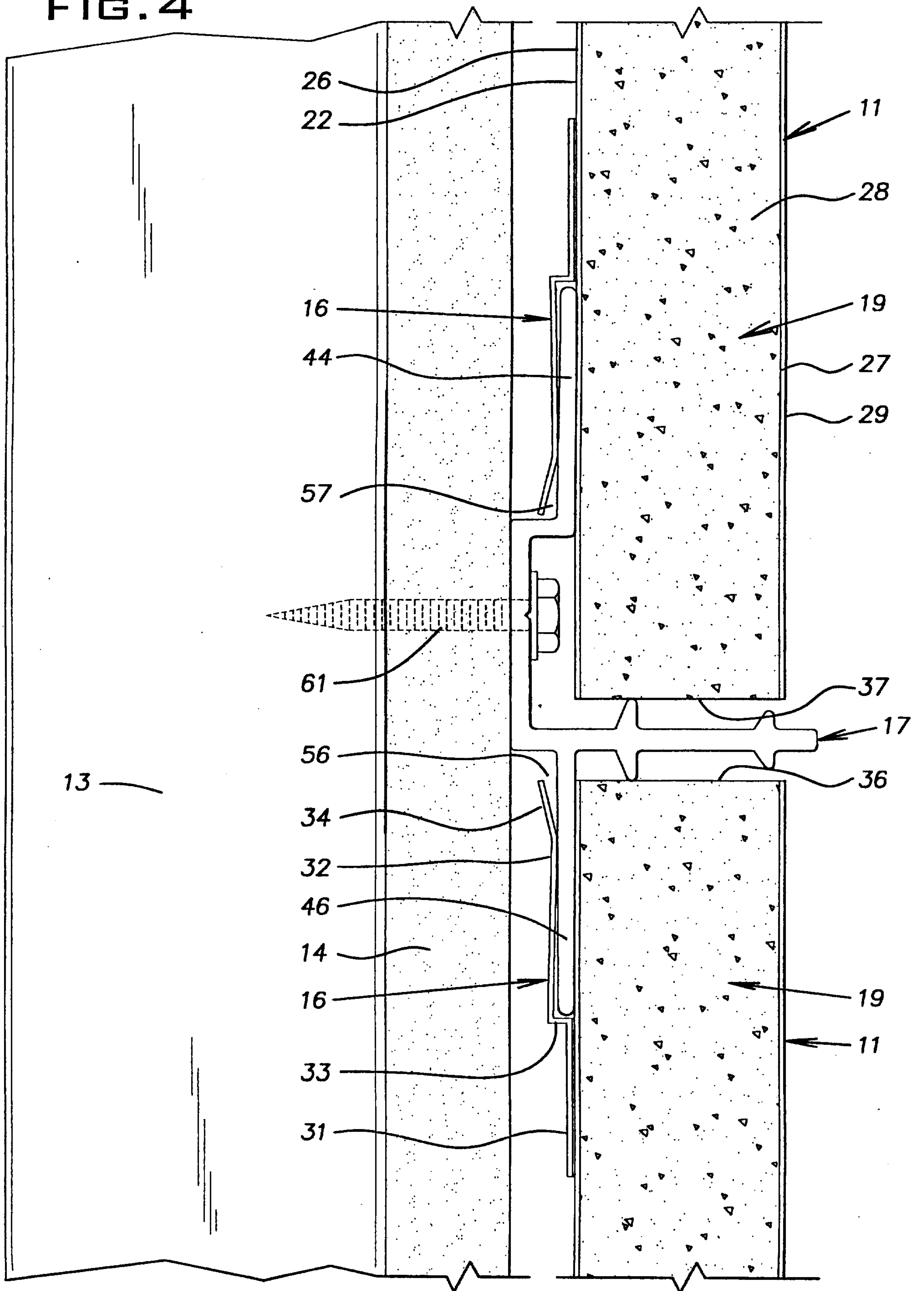


FIG. 3

FIG. 4



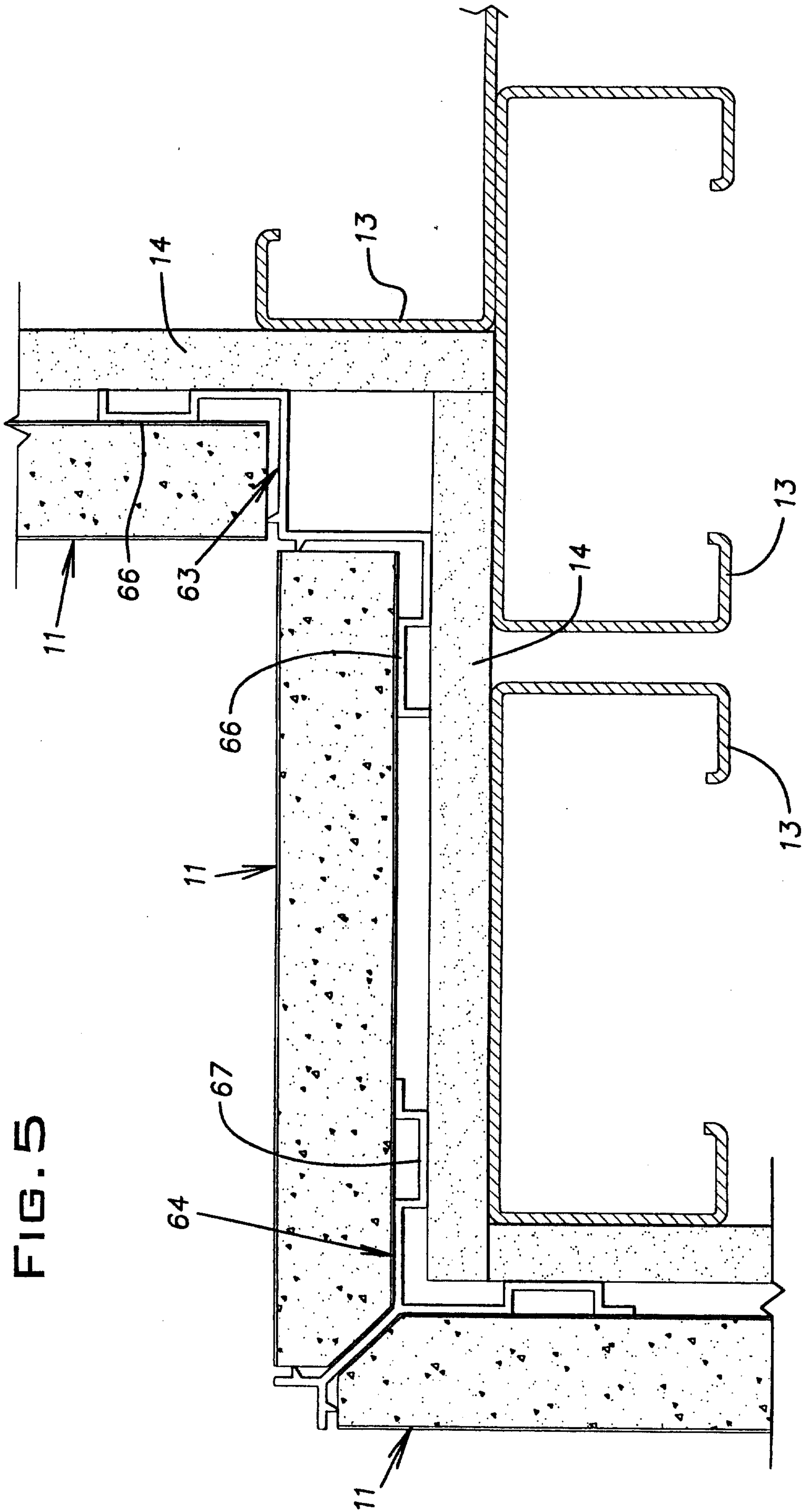


FIG. 5

FIG. 6

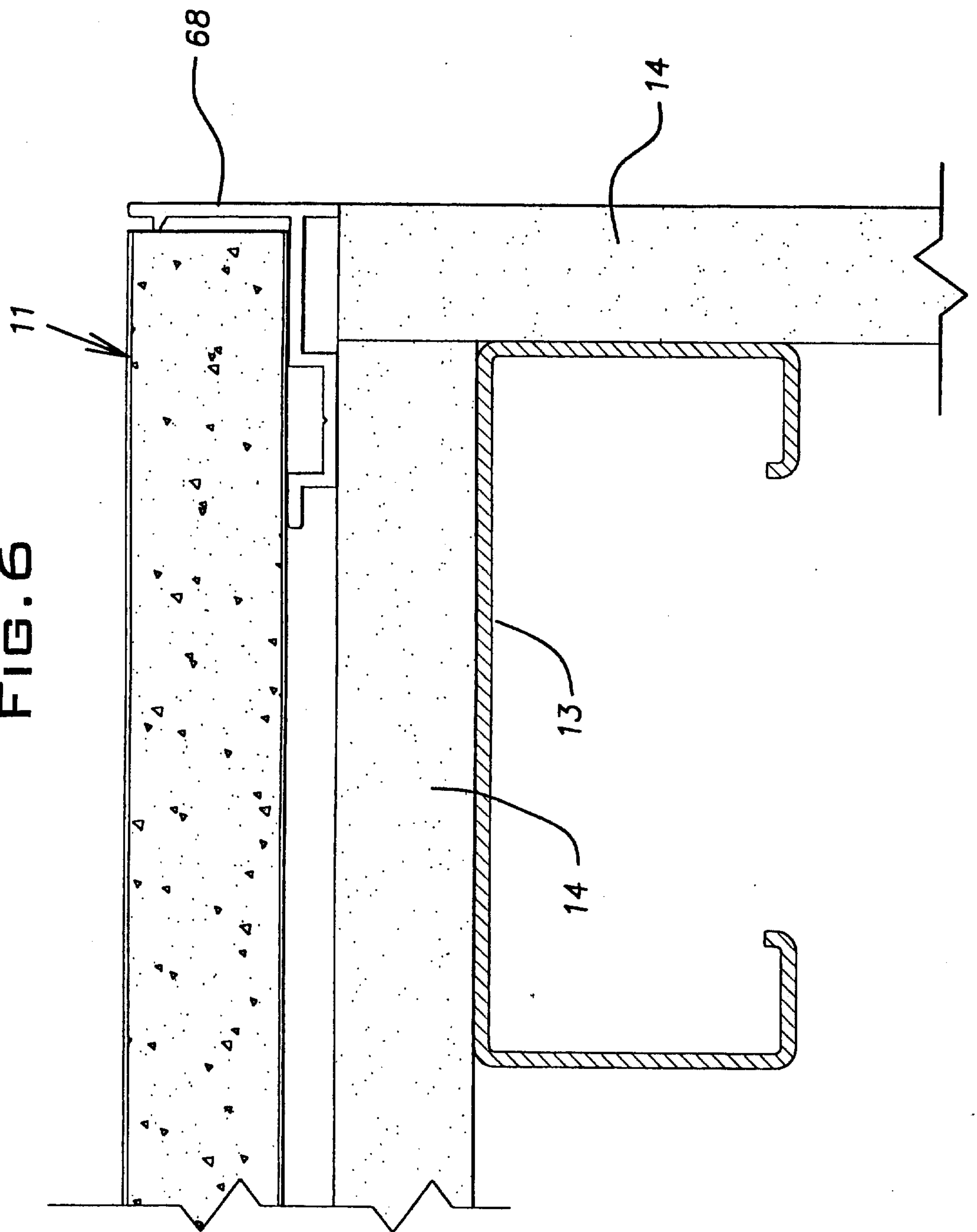
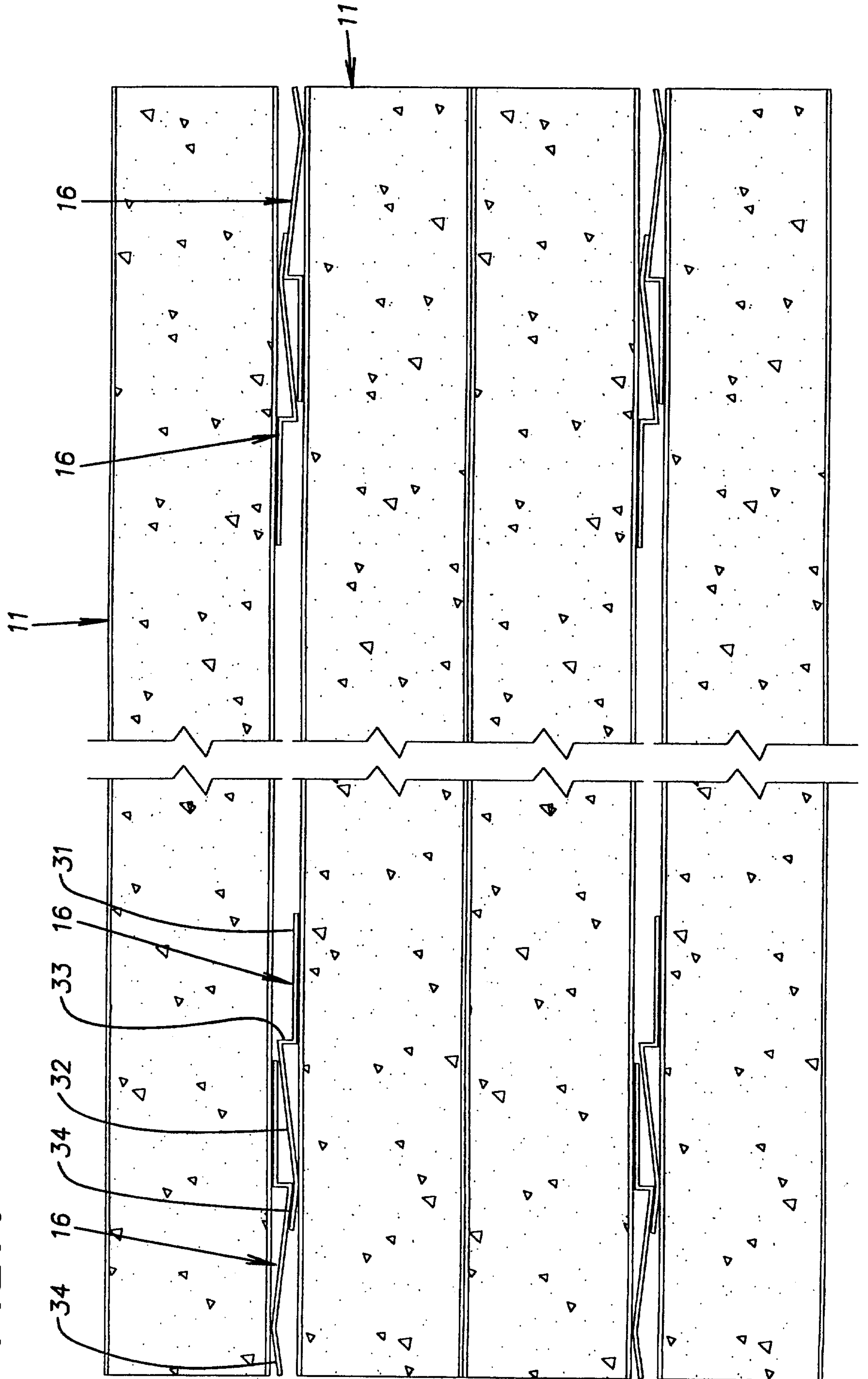


FIG. 7



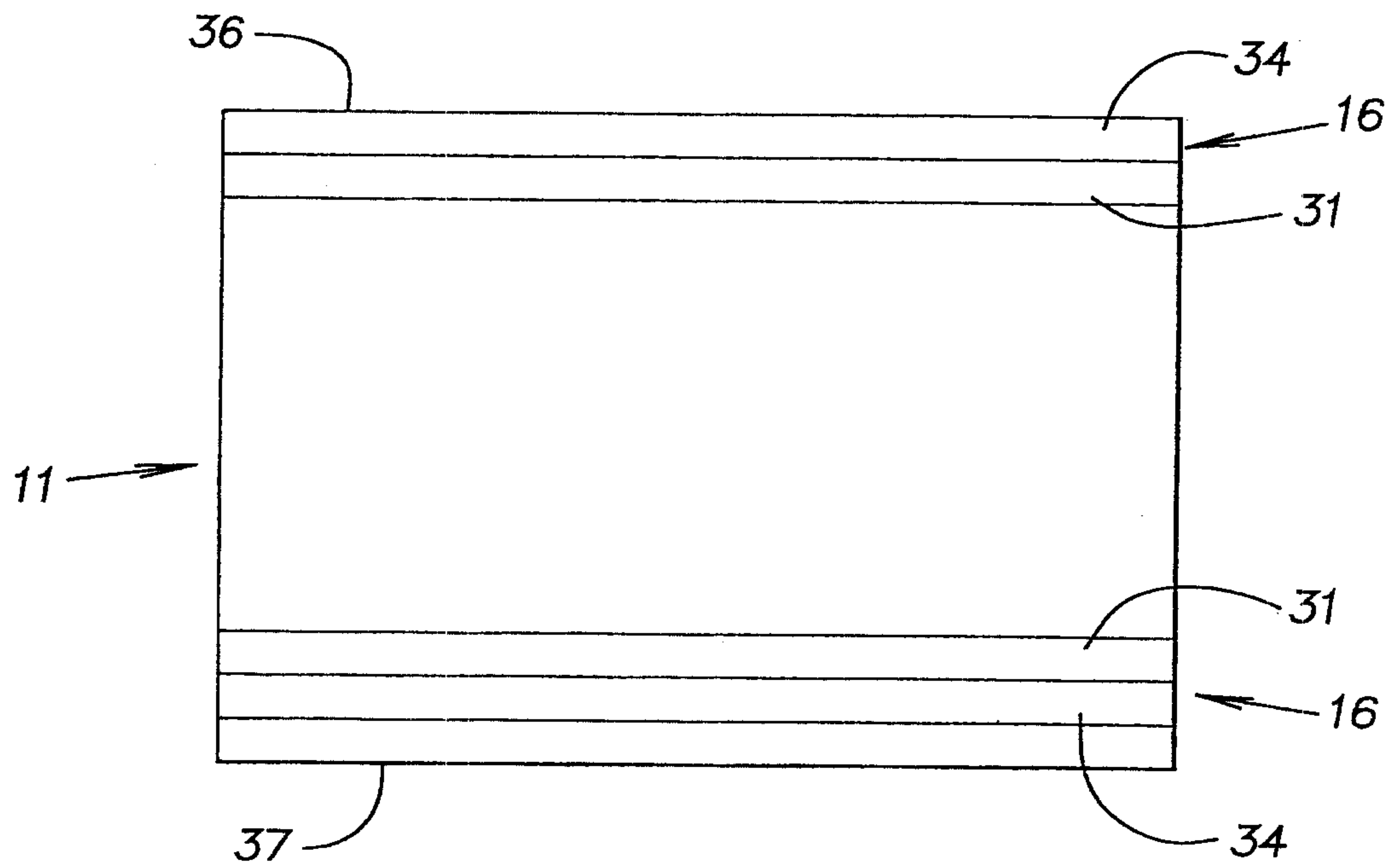


FIG. 7A

FIG. 8

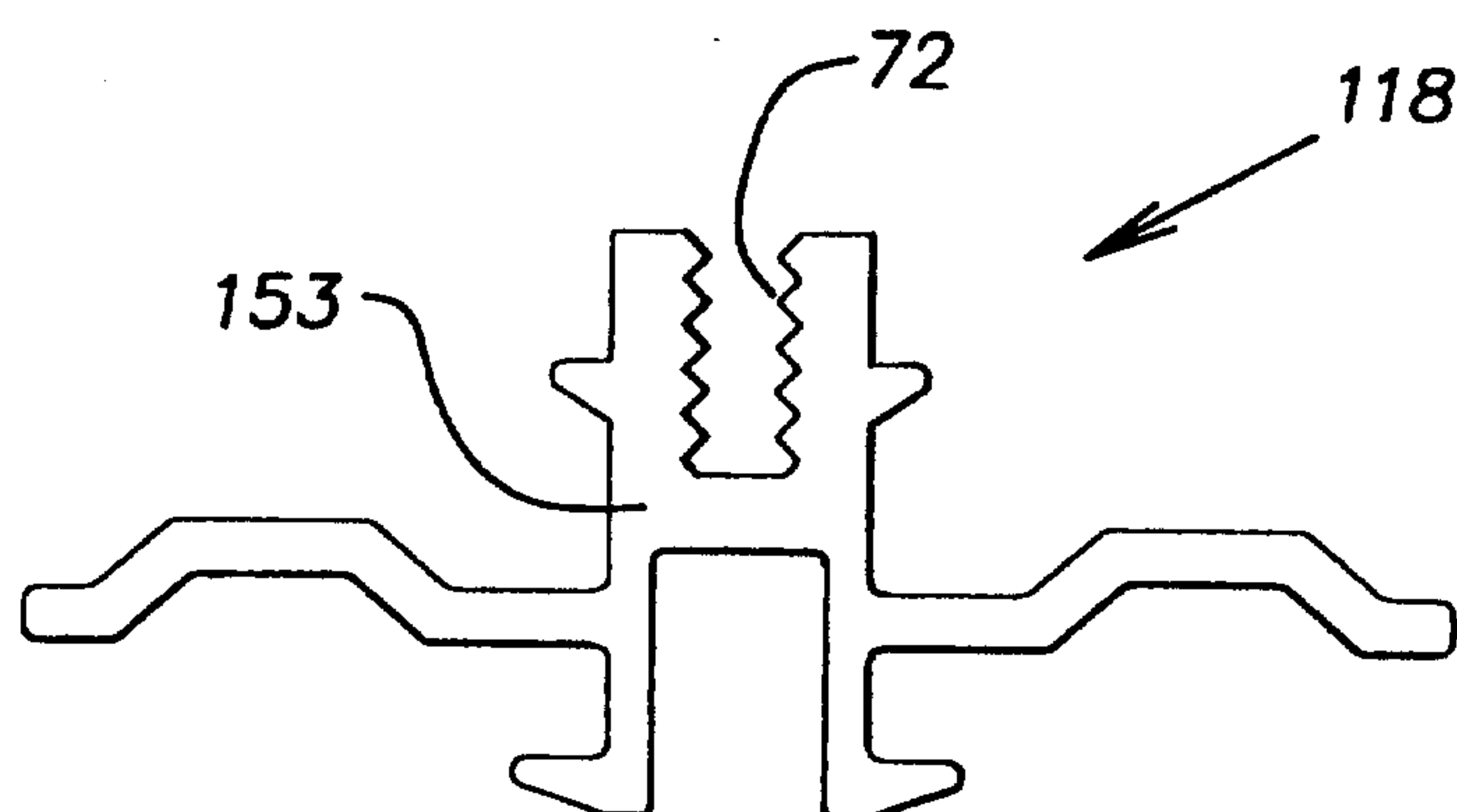
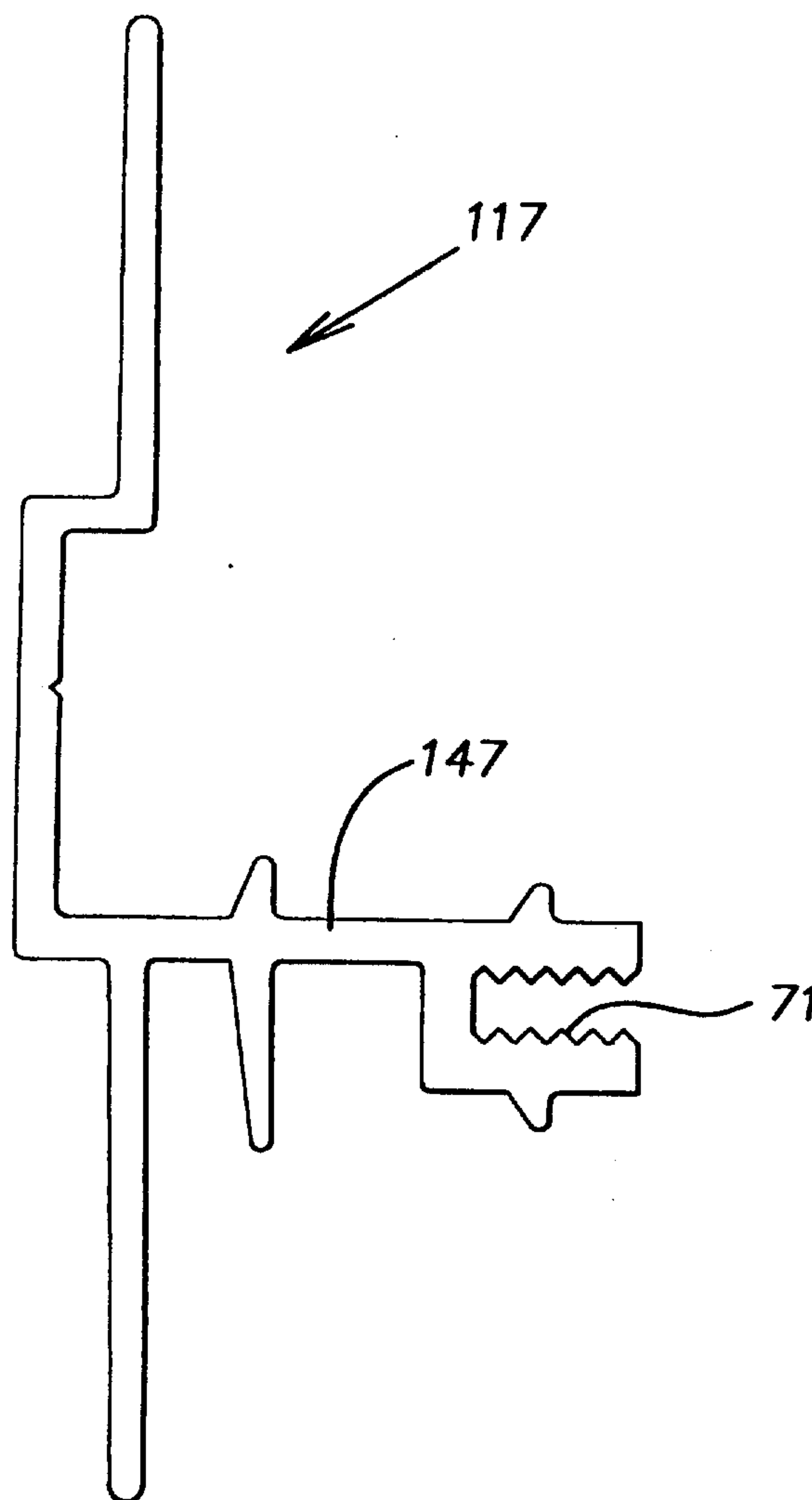


FIG. 9

