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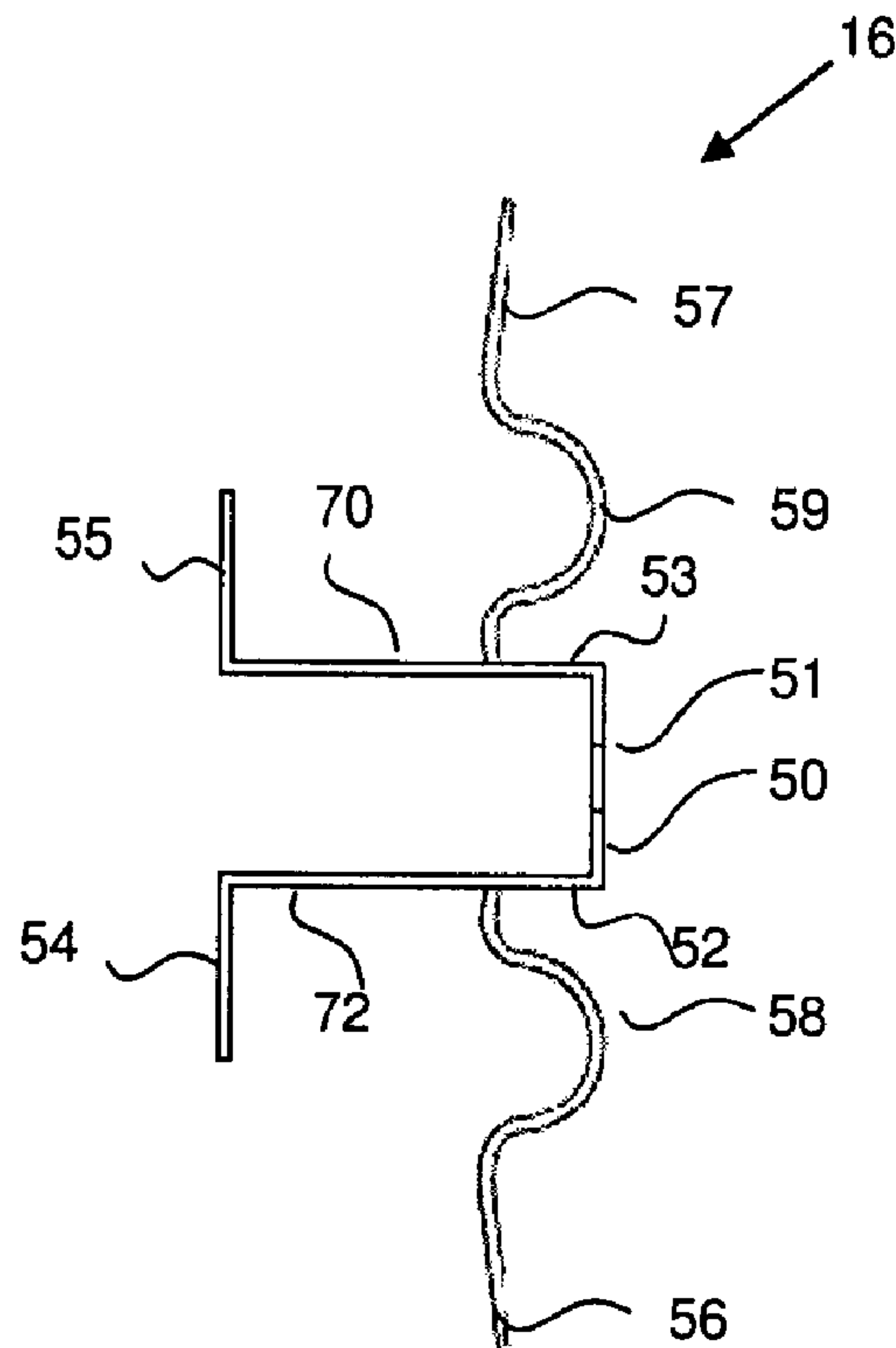
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(54) Titre : SYSTÈME DE REVÈTEMENT MURAL ET DISPOSITIFS DE SUPPORT ET D'ANCRAGE D'ÉLÉMENTS DE
REVÈTEMENT EN PIERRE

(54) Title: WALL FACING SYSTEM AND DEVICES FOR SUPPORTING AND ANCHORING STONE FACING
ELEMENTS



(57) Abrégé/Abstract:

The present invention provides anchors for securing stone facing elements to walls. One type of anchor comprises a backing member with one or more apertures to receive fastening means for securing the anchor to a wall, one or more vertical base



(57) **Abrégé(suite)/Abstract(continued):**

members projecting perpendicularly from the backing member, and one or more flanges projecting perpendicularly from a distal end of the one or more base members. The one or more base members are designed to abut with an edge and a back of the facing element and to provide a gap for air ventilation and/or water drainage between the back of the facing element abutting the anchor and the wall. The one or more flanges fit within a groove in an edge of a facing element to vertical position the edge of the facing element on the base.

ABSTRACT

The present invention provides anchors for securing stone facing elements to walls. One type of anchor comprises a backing member with one or more apertures to receive fastening means for securing the anchor to a wall, one or more vertical base members projecting perpendicularly from the backing member, and one or more flanges projecting perpendicularly from a distal end of the one or more base members. The one or more base members are designed to abut with an edge and a back of the facing element and to provide a gap for air ventilation and/or water drainage between the back of the facing element abutting the anchor and the wall. The one or more flanges fit within a groove in an edge of a facing element to vertical position the edge of the facing element on the base.

WALL FACING SYSTEM AND DEVICES FOR SUPPORTING AND ANCHORING STONE FACING ELEMENTS

FIELD OF THE INVENTION

[001] The present invention pertains to the field of wall facing systems, and more particularly, to devices for supporting and anchoring facing elements to a wall.

BACKGROUND OF THE INVENTION

[002] Since ancient times natural stones, such as limestone, granite and marble, have been preferred materials for finishing exterior and interior walls of buildings given their strength, beauty and durability. Walls were traditionally installed by professional masons by laying relatively thick natural stones one on top of each other in much the same manner as brick walls and related structures are constructed. Natural stone became prohibitively expensive for general use over the years and were replaced by less expensive alternatives such as stucco, manufactured stone and vinyl. Natural stone as a wall finishing material has however had a tremendous resurgence in popularity in recent years due to technological advances such as thin natural stone and method of installing stone facing elements without requiring a professional mason.

[003] Various methods of installing natural stones using panels, brackets or anchors have been developed. One prior art anchoring systems was recently described in Canadian Patent No. 2,526,876 to Shouldice Designer Stone Ltd. Shouldice discloses a thin wall facing system and clips for coupling thin stones to a wall. The clip has a support flange with one or more apertures for fastening the clip to a wall, one or more base flanges depending from the support flange and having a width equal to the distance from the rear face of a stone to a groove within its lower or upper edge, and one or more connecting flanges depending at right angles from one or more base flanges housable within a groove of the lower or upper edge of the stone.

[004] The stone of the wall facing system are support by a single edge of the clips and are loosely secured.

[005] In order to protect the wall from the effects of moisture and comply with building code regulations that require an air gap between the backing portion of the stone and the wall, Shouldice incorporates a drainage panel into the system.

[006] There remains a need in the art for a wall facing system and anchor devices for supporting and anchoring stone facing elements to a wall that do not require the use of additional panels for water management and ventilation between the facing elements and the wall.

[007] There also remains a need in the art for a wall facing system and anchor devices have a more secure mounted retention of the facing element.

[008] This background information is provided for the purpose of making known information believed by the applicant to be of possible relevance to the present invention. No admission is necessarily intended, nor should be construed, that any of the preceding information constitutes prior art against the present invention.

SUMMARY OF THE INVENTION

[009] An object of the present invention is to provide a wall facing system and devices for supporting and anchoring facing elements to a wall.

[010] In accordance with another aspect of the invention, there is provided an anchor for a wall facing system, said anchor comprising: a) a backing member having one or more apertures adapted to receive fastening means for securing the anchor to a wall, b) one or more base members projecting substantially perpendicularly from the backing member and configured to abut with an edge and back of a facing element and provide a gap between the facing element and the wall, and c) one or more flanges projecting from the distal end of one or more base members, said one or more flanges adapted to fit within a groove in an edge of a facing element to secure the facing element.

[011] In accordance with another aspect of the invention, there is provided an anchor for a wall facing system comprising: a) a backing member with one or more apertures adapted to receive fastening means for securing the anchor to a wall, b) one or more base members projecting

substantially perpendicularly from the backing member, c) one or more flanges projecting substantially perpendicularly from a distal end of the one or more base members, the one or more flanges adapted to fit within a groove in an edge of a facing element and to vertical position the edge of the facing element on the base, d) one or more retaining members projecting substantially perpendicularly to and at a position along the one or more base members, the one or more retaining members adapted to abut against a rear face of a facing element to secure the facing element and to provide a gap between the facing element and the wall.

[012] In accordance with an aspect of the invention, there is provided a wall facing system comprising a) a plurality of stone facing elements having a rear face, a front face, an upper edge, a lower edge and side edges, the upper and lower edges having a groove or slots, and b) a plurality of anchors as described above for securing and anchoring facing elements to a wall.

[013] In accordance with an aspect of the invention, there is provided a kit comprising a) a plurality of stone facing elements having a rear face, a front face, an upper edge, a lower edge and side edges, the upper and lower edges having a groove or slots, b) a plurality of anchors as described above for securing and anchoring facing elements to a wall, and c) a plurality of fasteners for securing the anchors to a wall.

BRIEF DESCRIPTION OF THE DRAWINGS

[014] These and other features of the invention will become more apparent in the following detailed description in which reference is made to the appended drawings.

FIG 1 is a partial view of a wall facing system, in accordance with one embodiment of the invention.

FIG 2A is a side view of a starter anchor for supporting and anchoring a stone facing element to a wall, in accordance with one embodiment of the invention.

FIG 2B is an isomeric view of the starter anchor of FIG 2A.

FIG 3 is a side view of a starter anchor for supporting and anchoring a stone facing element to a wall, in accordance with one embodiment of the invention.

FIG 4A is a side view of an intermediate anchor for supporting and anchoring stone facing elements to a wall, in accordance with one embodiment of the invention.

FIG 4B is a front view of the intermediate anchor of FIG 4A.

FIG 4C is an isomeric view of the intermediate anchor of FIGS 4A and 4B.

FIG 5 is a side view of an intermediate anchor for supporting and anchoring stone facing elements to a wall, in accordance with one embodiment of the invention.

FIG 6A is a side view of a finishing anchor for supporting and anchoring stone a facing element to a wall, in accordance with one embodiment of the invention.

FIG 6B is a front view of the finishing anchor of FIG 6A.

FIG 6C is an isomeric view of the finishing anchor of FIGS 6A and 6B.

FIG 7 is a side view of a finishing anchor for supporting and anchoring a stone facing element to a wall, in accordance with one embodiment of the invention.

FIG 8 is a side cross-sectional view of a section of a wall facing system secured to a wall, in accordance with one embodiment of the invention.

FIG 9 is an enlarged side cross-sectional view of the wall facing system secured to a wall in FIG 8 detailing the finishing anchor of the wall facing system

FIG 10 is an enlarged side cross-sectional view the wall facing system secured to a wall in FIG 8 detailing the intermediate anchor in the wall facing system.

FIG 11 is an enlarged side cross-sectional view of the wall facing system secured to a wall in FIG 8 detailing the starter anchor in the wall facing system.

FIG 12 is a side cross-sectional view of a section of a wall facing system secured to a wall with rigid wall insulation via washers and fasteners, in accordance with one embodiment of the invention.

FIG 13 is an enlarged side cross-sectional view of the wall facing system secured to a wall with rigid wall insulation via washers and fasteners in FIG 12 detailing the finishing anchor.

FIG 14 is an enlarged side cross-sectional view of the wall facing system secured to a wall with rigid wall insulation via washers and fasteners in FIG 12 detailing the intermediate anchor.

FIG 15 is an enlarged side cross-sectional view of the wall facing system secured to a wall with rigid wall insulation via washers and fasteners in FIG 12 detailing the starter anchor.

FIG 16 is a front view of a washer, in accordance with one embodiment of the invention.

FIG 17 is a front view of a washer, in accordance with one embodiment of the invention.

FIG 18 is a top plain view of the sheet metal blank used to form the starter anchor of FIGS 2A and 2B including bend lines represented by dashed lines.

FIG 19 is a top plain view of the sheet metal blank used to form the intermediate anchor of FIGS 4A-4C including bend lines represented by dashed lines.

FIG 20 is a top plain view of the sheet metal blank used to form the finishing anchor of FIGS 6A and 6B including bend lines represented by dashed lines.

FIG 21 is a side view of a finishing anchor for supporting and anchoring a stone facing element to a wall, in accordance with one embodiment of the invention.

FIG 22A is a side view of an intermediate anchor for supporting and anchoring stone facing elements to a wall, in accordance with one embodiment of the invention.

FIG 22B is a top plain view of the sheet metal blank used to form the starter anchor of FIG 22A including bend lines represented by dashed lines.

FIG 23A is a side view of a starter anchor for use in a wall facing system, in accordance with one embodiment of the invention.

FIG 23B is a top plain view of the sheet metal blank used to form the starter anchor of FIG 23A including bend lines represented by dashed lines.

FIG 24 is an isomeric view of an anchor for supporting and anchoring stone facing elements to a wall, in accordance with one embodiment of the invention.

FIG 25 is an isomeric view of an anchor for supporting and anchoring stone facing elements to a wall having dimples on its flange, in accordance with one embodiment of the invention.

FIG 26 is a partial perspective view of the anchor in FIG 24 having a portion on its flange in the groove of an upper edge of a facing element, in accordance with one embodiment of the invention.

FIG 27 is a partial view of a wall facing system, in accordance with one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[015] As used herein, the term "about" refers to a +/- 10% variation from the nominal value. It is to be understood that such a variation is always included in a given value provided herein, whether or not it is specifically referred to.

[016] The term "stone" as used herein is meant to refer to any natural or manufactured material often employed for purposes wall veneers, wall claddings or the like.

[017] The terms "wall" as used herein is meant to broadly refer to walls, panels, pillars which may be used to secure a stone façade or curtain wall.

[018] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs.

Overview

[019] The anchors for supporting and anchoring one or two stone facing elements to a wall generally include a backing member to be secured to a wall, one or more base members projecting substantially perpendicularly from the backing member, one or more flanges projecting substantially perpendicularly from a distal end of the one or more base members and adapted to fit within a groove in an edge of a facing element, and one or more facing element retaining means to provide a gap between a facing element and a wall.

[020] The wall facing system generally includes a plurality of stone facing elements having a groove or slots in their lower and upper edges, and a plurality of these anchors for securing and anchoring facing elements to a wall.

Anchors

[021] The anchors generally include a means of retaining the facing elements and a means to provide a gap between the facing elements and the wall for air ventilation or water drainage. Each anchor is fastened individually to the wall so that each facing element is individually secured to the wall by at least one anchor leading to improved mechanical strength for the stone facade. In one embodiment, each facing element is mounted to a wall by an anchor at its top edge and an anchor at its lower edge. In another embodiment, each facing element is mounted to a wall by two anchors at its top edge and two anchors at its lower edge. In yet another embodiment, each facing element is mounted to a wall by two anchors at its top edge, two anchors at its lower edge and an anchor at each of the side edges.

[022] The profile of each anchor depends on its particular function in the wall facing system. The length of the anchors is typically much less than the length of the groove so that the clip may be positioned at any one of a plurality of positions along the groove. This provides great versatility in respect of where the anchor will be fastened to the wall and the size of the facing element being used. This versatility leads to the ability to create virtually any pattern of stone on the curtain wall while having each stone mounted individually to the wall. This versatility also facilitates retrofitting of old buildings or sections of old buildings.

[023] In facing a wall with the wall facing system of the invention, a plurality of facing elements are mounted on a wall and arranged next to each other in a desired pattern. In order to mount the facing elements on the wall a plurality of specially designed anchors are used.

[024] In one embodiment, the wall facing system uses the same type of anchors are mounted on a wall throughout the system.

[025] Referring to FIGS 24 and 25, an anchor 200 includes a backing member 240, a base member 249 and a flange 244. The anchor 200 is can be used as a single anchor type for coupling a single facing element to a wall or as a double anchor type for coupling two facing elements in close proximity to a wall. The backing member 240 has a substantially flat vertical surface to rest against a wall. The backing member 240 has an aperture 241 adapted to receive a fastening means to secure the anchor 200 to a wall. A base member 242 projects substantially perpendicularly from one of the side edges of the backing member 240. The base member 242 has a substantially flat vertical surface with substantially right angle recesses at its opposite distal edges. The vertical portion of each of the recesses acts as a backing for the rear face of a facing element. The horizontal portion the top recesses acts as a seat for the lower edge of a facing element whereas the horizontal portion the lower recesses will receive the upper edge of a facing element. The base member 249 includes a flange 244 projecting substantially perpendicularly upwardly and downwardly from its distal end between the top and bottom recesses of the base member 249. The flange generally has a U-shape and is coupled to the base member 249 at its middle section. The top portion of the flange 244 is adapted to fit within a groove or slots in a lower edge of a facing element to secure the facing element. The bottom portion of the flange 244 is adapted to fit within a groove or slots in an upper edge of a facing element to secure the facing element.

[026] The distance between the horizontal surface of the recess and the flange is preferably substantially equal to the distance between the rear of the facing element and the inner portion of the groove or slot so that the facing elements are held in compressive engagement between the flange 244 and vertical surface of the recesses of the base member 242. The facing element is

therefore held by the anchor from three sides (the back face, an edge and the wall of the groove closest to the back face of the facing element).

[027] Referring to FIG 25, the anchor **200** may includes small ribs or projections on its interior surface to assist in the compressive engagement to secure the facing element to the anchor.

[028] In one embodiment, the anchor **200** is made of a 1 mm thick stainless steel and has a depth of about 38 mm, a height of about 30 mm and a maximum width of about 28 mm. The backing member **240** has a length of about 13 mm and a height of about 30 mm. The base member **249** has a length of about 38 mm, a height of about 30 mm and a width of about 1 mm. The recesses of the base member **249** located at the distal corners of the base member **249** have a length of about 10 mm and a height of about 10 mm. The distance between the flange **244** and the vertical portions of the recesses of the base member **249** is about 10 mm and represents the seat/holding portions for the facing element **12**.

[029] The flange **244** has a U-shape with a width of about 1 mm, a length of 19 mm and a height of about 30 mm. In this embodiment, the depth of the groove or slot of the lower and upper edges of the facing element would be slightly larger than 10 mm.

[030] In one embodiment, three types of anchors may be defined depending on where they are used in the wall facing system.

Starter Anchors

[031] A first type of anchor may be used to secure first facing elements to a wall. This starter anchor includes a backing member, base members, flanges and a retaining member.

[032] Referring to FIGS 2A and 2B, a starter or bottom anchor **14** includes a backing member **40**, base members (**42**, **43**), flanges **44** and a retaining member **46**. The starter anchor **14** is the single anchor type for coupling a starting facing element to a wall. The backing member **40** has a substantially flat vertical surface to rest against a wall. The backing member **40** has an aperture **41** adapted to receive a fastening means to secure the anchor **14** to a wall. The backing member **40** includes a base member **42** projecting substantially perpendicularly from its lower edge and a

base member 43 projecting substantially perpendicularly from its upper edge. The base member 42 has a substantially flat horizontal surface which can rest on a structural footing in a non load bearing wall facing system or form the lower edge of the curtain wall in a load bearing wall facing system. The base member 43 includes horizontally projecting members 49 having a flange 44 projecting substantially perpendicularly upwardly from the distal end of the projecting members 49 and a retaining member 46 projecting substantially perpendicularly upwardly from the base member 43 disposed between the two projecting members 49 of the base member 43. The flanges 44 are adapted to fit within a groove or slots in a lower edge of a facing element to vertical position the lower edge of a facing element on the base member. The retaining member 46 includes a vertical portion for abutting against a rear face of a facing element to secure the facing element on the anchor and a curved portion 48 projecting towards and abutting against the wall in order to provide a gap between the facing element and the wall. A mortar joint is formed between the parallel base member 42 and base member 43 and horizontally projecting members 49.

[033] In one embodiment, the starter anchor 14 has a depth of about 26 mm, a height of about 21 mm and a width of about 44 mm. The backing member 40 has a length of about 44 mm and a height of about 12 mm which is about the same distance between the base members (42, 43). The base member 42 has a length of about 44 mm and a width of about 26 mm. The base member 43 has a length of about 44 mm and a width of about 8 mm. The distance between the flange 44 and the vertical portions of the retaining member 46 for abutting against a rear face of a facing element is about 18mm. This portion of the base member 43 between the flange 44 and the vertical portions of the retaining member 46 represents the seat portion for the facing element 12. In this embodiment, the facing element would have corresponding groove or slot on its lower and upper edges at about 18mm from the rear surface. The flange 44 has a width of about 11 mm and a height of about 12 mm. In this embodiment, the depth of the groove or slot of the lower and upper edges of the facing element would be about 12 mm. The retaining member 46 has a width of about 15 mm and a height of about 30 mm.

[034] In one embodiment, the base member is a single horizontal projecting member with a single flange at its distal end. The base member includes a retaining member projecting substantially perpendicularly from a position along the base member. In one embodiment, the retaining member is positioned midway along the width of the base member.

Referring to FIG 3, there is shown a starter anchor 14' including a backing member 40, base members (42', 43), a flange 44 and a retaining member 46. The starter anchor 14 is the single anchor type for coupling a starting facing element to a wall. The backing member 40 has a substantially flat vertical surface to rest against a wall. The backing member 40 has an aperture 41 adapted to receive a fastening means to secure the anchor 14 to wall. The backing member 40 includes a base member 42' projecting substantially perpendicularly from its lower edge and a base member 43 projecting substantially perpendicularly from its upper edge. The base member 42' has a substantially flat horizontal surface which can rest on a structural footing in a non load bearing wall facing system. The base member 43 includes horizontally projecting members 49' having a flange 44 projecting substantially perpendicularly upwardly from the distal end of the projecting members 49' and a retaining member 46 projecting substantially perpendicularly upwardly from the base member 43 disposed between the two projecting members 49' of the base member 43. The base member 42' and base member 43 including its projecting members 49' each have a length of about 56 mm. In this embodiment, the distance between the flange 44 and the vertical portions of the retaining member 46 is about 48mm and can therefore accommodate wider facing elements. The flanges 44 are adapted to fit within a groove or slots in a lower edge of a facing element to vertical position the lower edge of a facing element on the base member. The retaining member 46 includes a vertical portion for abutting against a rear face of a facing element to secure the facing element on the anchor and a curved portion 48 projecting towards and abutting against the wall in order to provide an air gap between the facing element and the wall. A mortar joint is formed between the parallel base member 42' and base member 43 and horizontally projecting members 49'.

[035] A second embodiment of the starter anchor may be utilized in constructing a wall facing system. Referring to FIGS 23A and 23B, there is provided a starter anchor 114 in accordance

with one embodiment of the invention. The starter anchor 114 comprises backing member 120, base members (122,123) and flanges (131,132). The backing member 120 has a substantially flat vertical surface for resting against a wall. The backing member 120 has an aperture 121 adapted to receive a fastening means to secure the anchor 114 to a wall. The backing member 120 includes parallel base members (122, 123) projecting substantially perpendicularly from its side edges of the backing member 120. The base member (122, 123) each have a top recess (128, 129) to receive a portion of an edge of a facing member. The recesses (128, 129) each include a vertical portion receive the lower rear surface of a facing element and a horizontal portion to receive a portion of the lower edge of a facing element. Flanges (131, 132) project respectively from the distal end of base members (128, 129). The flanges (131, 132) have an upper portion adapted to fit within a groove in a lower edge of a facing element.

Intermediate Anchors

[036] A second type of anchor may be utilized between upper and lower facing elements to link upper and lower facing elements and to mount the stone facing elements to the wall. Referring to FIGS 4A and 4B, an intermediate anchor 16 includes a backing member 50, base members (52, 53), flanges (54, 55) and retaining member (56, 57). The intermediate anchor 16 is useful for linking an upper facing element and a lower facing element to a wall. The backing member 50 has a substantially flat vertical surface for resting against a wall. The backing member 50 has an aperture 51 adapted to receive a fastening means to secure the anchor 16 to a wall. The backing member 50 includes a base member 52 projecting substantially perpendicularly from its lower edge and a base member 53 projecting substantially perpendicularly from its upper edge. The base member 52 have two horizontally projecting members 72 each with flanges 54 at their distal end and a retaining member 56 disposed between the two separate projecting members 72 of the base member 52. The flanges 54 projects substantially perpendicularly downwardly from a distal end of the projecting members 72 of the base member 52. The retaining member 56 projects substantially perpendicularly downwardly from the base member 52 at a position between the projecting members 72 of the base member 52. The flanges 54 are adapted to fit within a groove in an upper edge of a facing element and to vertical position the upper edge of

the facing element on the projecting members of the base member 52. The retaining member 56 includes vertical portions for abutting against a rear face of a facing element to secure the facing element and a curved portion 58 projecting towards and abutting against a wall in order to provide an air gap between the facing element and the wall. The base member 53 have two horizontally projecting members 70 each with flanges 55 at their distal end and a retaining member 57 disposed between the two separate projecting members 70 of the base member 53. The flanges 55 projects substantially perpendicularly upwardly from a distal end of the projecting members 70. The retaining member 57 projects substantially perpendicularly upwardly from the base member 53 at a position between the projecting members of the base member 53. The flanges 55 are adapted to fit within a groove in an upper edge of a facing element and to vertical position the upper edge of the facing element on the projecting members of the base member 53. The retaining member 57 includes vertical portions for abutting against a rear face of a facing element to secure the facing element and a curved portion 58 projecting towards and abutting against a wall in order to provide an air gap between the facing element and the wall. A mortar joint is formed between the base member 52 with its horizontally projecting members 72 and the base member 53 with its horizontally projecting members 70.

[037] In one embodiment, the intermediate anchor 16 has a depth of about 26 mm, a height of about 73 mm and a width of about 44 mm. The backing member 50 has a height of about 13 mm which is about the same distance between the base members (52, 53) and a width of about 44 mm. The base members 52 and 53 have a length of about 8 mm and a width of about 44mm. Each base member has two horizontally projecting members (70, 72) having a length of 18 mm and a width of 11 mm and a retaining member having a height of 30 mm and a width of 15 mm disposed between the two projecting members. The flanges (54, 55) each have a height of about 12 mm and a width of about 11 mm.

[038] Referring to FIG 5, there is shown an intermediate anchor 16' including a backing member 50, base members (52, 53), flanges (54, 55) and retaining member (56, 57). The intermediate anchor 16' is useful for linking an upper facing element and a lower facing element of a wall. The backing member 50 has a substantially flat vertical surface for resting against a

wall. The backing member 50 has an aperture 51 adapted to receive a fastening means to secure the anchor 16 to a wall. The backing member 50 includes a base member 52 projecting substantially perpendicularly from its lower edge and a base member 53 projecting substantially perpendicularly from its upper edge. The base member 52 have two horizontally projecting members 72' each with flanges 54 at their distal end and a retaining member 56 disposed between the two separate projecting members 72' of the base member 52. The flanges 54 projects substantially perpendicularly downwardly from a distal end of the projecting members 72' of the base member 52. The retaining member 56 projects substantially perpendicularly downwardly from the base member 52 at a position between the projecting members 72' of the base member 52. The flanges 54 are adapted to fit within a groove in an upper edge of a facing element and to vertical position the upper edge of the facing element on the projecting members of the base member 52. The retaining member 56 includes vertical portions for abutting against a rear face of a facing element to secure the facing element and a curved portion 58 projecting towards and abutting against a wall in order to provide an air gap between the facing element and the wall. The base member 53 have two horizontally projecting members 70' each with flanges 55 at their distal end and a retaining member 57 disposed between the two separate projecting members 70' of the base member 53. The flanges 55 projects substantially perpendicularly upwardly from a distal end of the projecting members 70'. The retaining member 57 projects substantially perpendicularly upwardly from the base member 53 at a position between the projecting members of the base member 53. The flanges 55 are adapted to fit within a groove in an upper edge of a facing element and to vertical position the upper edge of the facing element on the projecting members of the base member 53. The retaining member 57 includes vertical portions for abutting against a rear face of a facing element to secure the facing element and a curved portion 58 projecting towards and abutting against a wall in order to provide an air gap between the facing element and the wall. The projecting members 70' and 72' each have a length of about 48 mm and can therefore accommodate wider facing elements. A mortar joint is formed between the base member 52 with its horizontally projecting members 72' and the base member 53 with its horizontally projecting members 70'.

[039] A second embodiment of the intermediate anchor may be utilized in the wall facing system. The intermediate anchor includes backing member, base members and flanges. Referring to FIGS 22A and 22B, there is provided an intermediate anchor 116 in accordance with one embodiment of the invention. The intermediate anchor 116 includes backing member 140, base members (142, 143) and flanges 148. The intermediate anchor 116 is useful for linking and securing an upper facing element and a lower facing element to a wall. The backing member 140 has a substantially flat vertical surface for resting against a wall. The backing member 140 has an aperture 141 adapted to receive a fastening means to secure the anchor 116 to a wall. The backing member 140 includes a parallel base members (142, 143) projecting substantially perpendicularly from its side edges of the backing member 140. The base member 143 has top and bottom recesses (145, 147) to receive a portion of an edge of a facing member. The base member 142 has corresponding top and bottom recesses (144, 146) to receive a portion of an edge of a facing member. The recesses (144, 145, 146, 147) include a vertical portion receive the rear surface of a facing element and a horizontal portion to receive a portion of the upper or lower edge of a facing element. Flanges (148, 149) project respectively from the distal end of base members (142, 143). The flanges (148, 149) have an upper portion adapted to fit within a groove in a lower edge of a facing element and a lower portion adapted to fit within a groove in an upper edge of a facing element.

[040] Intermediate anchors can also be used in a similar manner to link facing elements in a side-by-side arrangement. Instead of orienting the one or more connecting flanges linking vertically arranged facing elements, the anchors can be positioned to orient the flanges horizontally. The flanges are then housed within the grooves on the side edges of adjacent facing elements.

Finishing Anchors

[041] The third type of anchor is particularly useful as a finishing piece at the very top of the wall. These finishing anchors are similar to the first embodiment of the first type of anchor except that they do not have a second base. The second base in the first type of anchor helps to receive the weight on a facing element so given that finishing anchor hold any weight the second

base is not required. The finishing or top anchor includes a backing member, a base member, a flange and a retaining member.

[042] Referring to FIGS 6A and 6B, a finishing or top anchor 18 includes a backing member 60, a base member 62, a flange 64 and a retaining member 66. The finishing anchor 18 is a single anchor type for coupling a single facing element to a wall. The backing member 60 has a substantially flat vertical surface to rest against a wall. The upper edge of the backing member 60 can rests on a top wall, ceiling or window sill. The backing member has an aperture 61 adapted to receive a fastening means to secure the anchor 18 to a wall. The backing member 60 includes a base member 62 projecting substantially perpendicularly from its lower edge. The base member 62 has a substantially flat horizontal surface having horizontally projecting members 63. The horizontally projecting members 63 include flange 64 projecting substantially perpendicularly downwardly from a distal end of the projecting members 63 and a retaining member 66 projecting substantially perpendicularly downwardly from a position along the base member 62. The flange 64 is adapted to fit within a groove in an upper edge of a facing element to vertical position the upper edge of a facing element on the base member 62. The retaining member 66 includes vertical portions for abutting against a rear face of a facing element to secure the facing element on the anchor and a curved portion 68 projecting towards and abutting against a wall in order to provide an air gap between a facing element and a wall. When a facing element coupled to the anchor 18, a mortar joint is formed between the base members 62, the projecting members 63, the exposed upper edge of the facing element and a top wall or ceiling.

[043] Referring to FIG 7, there is shown a finishing anchor 18' including a backing member 60, a base member 62, a flange 64 and a retaining member 66. The finishing anchor 18 is a single anchor type for coupling a single facing element to a wall. The backing member 60 has a substantially flat vertical surface to rest against a wall. The upper edge of the backing member 60 can rests on a top wall, ceiling or window sill. The backing member has an aperture 61 adapted to receive a fastening means to secure the anchor 18 to a wall. The backing member 60 includes a base member 62 projecting substantially perpendicularly from its lower edge. The base member 62 has a substantially flat horizontal surface having horizontally projecting

members 63'. The horizontally projecting members 63' include flange 64 projecting substantially perpendicularly downwardly from a distal end of the projecting members 63' and a retaining member 66 projecting substantially perpendicularly downwardly from a position along the base member 62. The projecting members 63' have a length of about 48 mm and can therefore accommodate wider facing elements. The flange 64 is adapted to fit within a groove in an upper edge of a facing element to vertical position the upper edge of a facing element on the base member 62. The retaining member 66 includes vertical portions for abutting against a rear face of a facing element to secure the facing element on the anchor and a curved portion 68 projecting towards and abutting against a wall in order to provide an air gap between a facing element and a wall. When a facing element coupled to the anchor 18, a mortar joint is formed between the base members 62, the projecting members 63', the exposed upper edge of the facing element and a top wall or ceiling.

[044] A second embodiment of the finishing anchor includes a backing member, a base member and a retaining member. Referring to FIG 21, there is provided a finishing anchor 118 in accordance with one embodiment of the invention. The finishing anchor 118 includes a backing member 160, a base member 162 and a retaining member 164. The finishing anchor 118 couples the upper edge of a facing element to a wall. The backing member 160 has a substantially flat vertical surface to rest against a wall. The upper edge of the backing member 160 can rest on a top wall, ceiling or window sill. The backing member has an aperture 161 adapted to receive a fastening means to secure the anchor 18 to a wall. The backing member 160 includes a base member 162 projecting at right angle from its lower edge. The base member 162 has a substantially flat horizontal surface with a facing element retaining member 164 at its distal end. The retaining member 164 includes first vertical flange projecting substantially perpendicularly upwardwardly from the distal end of the base member 162, a horizontal flange projecting from the distal end of the first vertical flange at right angle and away from the backing member 160 and a retaining member projecting perpendicularly downwardly from the distal end of the horizontal flange. The retaining member is adapted to fit within a groove in an upper edge of a facing element to vertical position the upper edge of a facing element on the anchor 118. The vertical flange receives a portion of the upper edge of a facing element and the

flange abuts the rear face of the facing element. In this embodiment, the base member 162 provides for the gap between a facing element and a wall.

[045] Referring to FIGS 18-20, sheet metal blanks used to form anchors (14, 16, 18) are illustrated. The sheet metal can be comprised of carbon steel, stainless steel, aluminum or any other metal or metal alloy that is suitable for anchoring devices. The metal blanks can be cut out of galvanized steel sheet having a thickness of 0.91 mm. The anchors (14, 16, 18) are made by bending the sheet metal blanks along bend lines depicted by dashed lines.

[046] Referring to FIGS 22B and 23B, sheet metal blanks used to form anchors (114, 116) are illustrated.

Facing Elements

[047] The facing elements for the wall facing system are generally of a panel type construction having a rear (back) face, a front (outer) face, upper and lower edges and side edges. The facing elements can be made of thin or regular stones. Thin stones differ from regular stones by virtue of the size and weight of the facing element. Thin stones may be cut from natural materials such as limestone, granite and marble, or they can be manufactured by molding clay into shaped objects and firing the clay for hardness. Thin stones are typically about 6 cm thick or less and building codes require thin stone to be not heavier than 15 pounds per square foot. Regular stone are typically thicker than 6 cm and may be heavier than 15 pounds per square foot. The anchoring device for supporting and anchoring facing elements to a wall can be used with either thin stones or regular stones wall facing systems.

[048] It will be appreciated that facing elements can be customized for any particular application and may be of many suitable lengths, heights and widths. For example, in one embodiment, the facing elements are about 40 cm in length, 20 cm in height and 3 cm in width.

[049] In one embodiment, the facing elements have grooves formed and/or cut into both the upper and lower edges. The grooves are sized to accommodate a portion of an anchor. The grooves run along the edges at a fixed distance from the rear face of the facing element. The

grooves run along the entire length of the upper and lower edges. In one embodiment, the facing elements also have grooves formed and/or cut into one or both, side edges. The grooves in the side edges have the same depth and width as those in the upper and lower edges, and are the same distance from the rear face. In one embodiment, there is one continuous groove running along the edges around the perimeter of the facing element.

[050] The facing elements have slots or cuts into both the upper and lower edges. The slots along the edges are cut a fixed distance from the rear face of the facing element and at fixed positions along the edges corresponding to the number of anchors that will be used to secure a facing element. In one embodiment, each facing element comprises two slots in each upper and lower edge.

[051] Mortar joints can be formed between facing elements. The spaced-apart base members can be about 10 mm apart, which automatically provides 10 mm mortar joints over the entire curtain wall, which is standard in the stone facing industry. Once the veneer wall has been constructed, the mortar joints may be filled with mortar by any suitable means, for example, mortar guns, grout pumps, trowels, etc. Mortar filling the mortar joint helps prevent the clip from deflecting or collapsing since the mortar fills the space between the base flanges thereby providing support for the base flanges. Mortar may also enter the grooves thereby helping key the upwardly and downwardly depending flanges into the grooves. This helps strengthen the clip and adds to overall strength of the wall facing system.

[052] Anchors are fastened to the wall by fastening means, for example screws and nails. In one embodiment, all clips and fastening means comprise strong, durable material, for example plastic and/or steel, in particular galvanized steel or stainless steel. Stainless steel is preferred.

[053] The wall facing system is generally secured to a wall made of wood frame construction, steel frame construction, or poured concrete block construction and generally includes sheet material, for example wood-based sheet material (e.g. plywood, OSB), non-combustible sheet material or combinations thereof, mounted on the frame. In constructing the wall facing system of the present invention, anchors are secured to the wall, particularly to the sheet material, and

the facing elements set on the anchors. The veneer wall, stone face or curtain wall is generally built from the bottom up in courses, and, if desired, each course is leveled to ensure a consistent appearance over the entire wall.

Wall Facing System

[054] FIG 27 details a wall facing system having horizontal, vertically spaced, rows of facing elements 12 having different sizes secured to a wall 11 by anchors 200. The anchors 200 maintain the facing elements 12 at a set distance from the wall. The superposed rows of facing elements 12 form a stone facade or curtain wall.

[055] FIG 1 details a wall facing system 10 coupled to a wall. This figure shows horizontal, vertically spaced, rows of thin stone facing elements 12 secured to a wall by bottom or starter anchors 14, intermediate anchors 16 and top or finishing anchors 18. Although the facing elements 12 are preferably made of natural stone, tile or brick may also be used as facing elements. The wall facing system shown in FIG. 1 depicts the facing elements arranged in rows, however, it should be understood that other arrangements could be adopted by a skilled worker in the art. The anchors (14, 16, 18) maintain the facing elements 12 at a set distance from the wall. The superposed rows of facing elements 12 form a stone facade or curtain wall.

[056] The wall for a wall facing system can be load bearing or non-load bearing, depending of the application, the weight of the facing elements and building code requirements. This flexibility can significantly increase the type and shape of facing elements that can be used. The wall may also include structural reinforcement to increase its load bearing capacity.

[057] In one embodiment, the weight of the superposed rows of thin stone facing elements 12 is entirely supported by a structural footing 21, such as a concrete base. The structural footing can be the foundation of a building or a foot or extension portion extending along the outside of the foundation of a building. In one embodiment, the wall facing system with facing elements having a width less than 6 cm carries the weight of the facing elements on the wall instead of a structure footing.

[058] The anchors also provides for mortar joints 19 between the rows of thin stone facing elements 12. The mortar joints are then filled with mortar (not shown). In one embodiment, the anchors provide for mortar joints of about 10 mm, which is standard in the stone facing industry. In one embodiment, the anchors provide for mortar joints of 12.7 mm. It will be appreciated that the anchor can be customized for any size of mortar joint.

[059] Referring to FIGS. 1 and 8, each of the thin stone facing elements 12 is generally rectangular in shape and, as viewed when assembled on a wall 20 has a front face 22, a rear face 24, an upper edge 26, a lower edge 28 and two side edges 30. It will be appreciated that facing elements can be customized for any particular application and may be of many suitable lengths, heights and widths. Each facing element 12 has a groove 32 or edge slots formed in its upper and lower edge. The groove 32 runs the entire length of the facing element 12 whereas edge slots are of sufficient length and depth to receive a portion of an anchor to properly align the facing elements. In one embodiment, the side edges 30 also have a groove or edge slots.

[060] Optionally, the wall facing system 10 coupled to a wall includes one or more ventilation apertures 17. The ventilation apertures 17 are spaces without mortar between two adjacent facing elements 12 on the upper row of facing elements 12 for venting air from the air gap between the stone facade and the wall 20, and on the lower row of facing elements 12 for draining moisture and venting air from the air gap.

[061] The width of each facing element 12 is defined between the opposed side edges 30, the height between the upper edge 26 and the lower edge 28, and the thickness or depth is defined between the front face 22 and the rear face 24. The stone facing elements depicted in FIG 1 are approximately 40 cm in length, 20 cm in height and 3 cm in width.

[062] Referring to FIG 8, a side cross-sectional view of a section of a wall facing system 10 secured to a wall 20. Facing elements 12 are mounted on a wall 20 of a building structure by a starter anchor 14, a number of intermediate anchors 16 and a finishing anchor 18. The rear surfaces of the anchors (14, 16, 18) are attached to the wall 20 by fastening means 34. The fastening means 34 are preferably screws made of strong, durable material, for example plastic

and/or steel, in particular galvanized steel or stainless steel. The wall facing system 10 is non-load bearing since the weight of the facing elements 12 rest on the footing 21. The anchors (14, 16, 18) provides for mortar joints 19 between the rows of thin stone facing elements 12. The mortar joints depicted are filled with mortar.

[063] Referring to FIG 9, an enlarged view of the finishing anchor 18 in the wall facing system 10 secured to a wall in FIG 8 is shown. The finishing anchor 18 includes a backing member 60, a base member 62, a flange 64 and a retaining member 66. The finishing anchor 18 couples the upper edge of the facing element to a wall 20. The flat vertical surface of the backing member 60 rest against the wall 20 and is secured to the wall via fastening means 34. The upper edge of the backing member 60 rests against the top wall 38. A base member 62 projecting substantially perpendicularly from the lower edge of the backing member 60. The base member 62 has a substantially flat horizontal surface with horizontally projecting members 63. The horizontally projecting members 63 include flange 64 projecting substantially perpendicularly downwardly from a distal end of the projecting members 63 and a retaining member 66 projecting substantially perpendicularly downwardly from a position along the base member 62. The flange 64 fits within the groove 32 of the upper edge 26 of a facing element 12 to vertically position the upper edge of a facing element on the anchor 18. The retaining member 66 includes vertical portions 66 for abutting against a rear face of a facing element to secure the facing element on the anchor and a curved portion 68 projecting towards and abutting against the wall 20 to provide a gap 36 between the rear face 24 of the facing element 12 and the wall 20. Mortar fills the mortar joint 19.

[064] Referring to FIG 10, an enlarged view of the intermediate anchor 16 of the wall facing system secured to a wall in FIG 8 is shown. The intermediate anchor 16 includes a backing member 50, base members (52, 53), flanges (54, 55) and retaining member (56, 57). The intermediate anchor 16 supports and anchor an upper and lower facing element 12 to the wall 20. The backing member 50 has a substantially flat vertical surface that rests against the wall 20 and is secured to the wall 20 via fastening means 34. The backing member 50 includes a base member 52 projecting substantially perpendicularly from the lower edge of the backing member

50 and a base member 53 projecting substantially perpendicularly from the upper edge of the backing member 50. The base member 52 has two horizontally projecting members 72 each with flanges 54 at their distal end and a retaining member 56 disposed between the two separate projecting members 72 of the base member 52. The flanges 54 projects substantially perpendicularly downwardly from a distal end of the projecting members 72 of the base member 52. The retaining member 56 projects substantially perpendicularly downwardly from the base member 52 at a position between the projecting members 72 of the base member 52. The flange 54 fits within the groove 32 in an upper edge 26 of the lower facing element 12. The retaining member 56 includes vertical portions for abutting against a rear face of a facing element 12 to secure the facing element 12 and a curved portion 58 projecting towards and abutting against the wall 20 to provide a gap 36 between the rear surface of the facing element 12 and the wall 20. The base member 53 has two horizontally projecting members 70 each with flanges 55 at their distal end and a retaining member 57 disposed between the two separate projecting members 70 of the base member 53. The flanges 55 projects substantially perpendicularly upwardly from a distal end of the projecting members 70. The retaining member 57 projects substantially perpendicularly upwardly from the base member 53 at a position between the projecting members of the base member 53. The flange 55 fits within the groove 32 in an upper edge 26 of a facing element 12. The retaining member 57 has vertical portions 57 for abutting against a rear face of the facing element to secure the facing element and a curved portion 58 projecting towards and abutting against the wall 20 to provide a gap 36 between the facing element 12 and the wall 20. Mortar fills the mortar joint 19.

[065] Referring to FIG 11, an enlarged view of the intermediate anchor 14 of the wall facing system of FIG 8 is shown. The starter anchor 14 couples a starting facing element 12 to the wall 20. The starter anchor 14 includes a backing member 40, base members (42, 43), flanges 44 and a retaining member 46. The flat vertical surface of the backing member 40 rests against the wall 20 and is secured to the wall 20 via fastening means 34. The backing member 40 includes a base member 42 projecting substantially perpendicularly from its lower edge and a base member 43 projecting substantially perpendicularly from its upper edge. The base member 42 has a substantially flat horizontal surface which rests on the footing 21. The base member 43 includes

horizontally projecting members 49 having a flange 44 projecting substantially perpendicularly upwardly from the distal end of the projecting members 49 and a retaining member 46 projecting substantially perpendicularly upwardly from the base member 43 disposed between the two projecting members 49 of the base member 43. The flanges 44 fits within the groove 32 in the lower edge 28 of a facing element 12. The retaining member 46 includes a vertical portion for abutting against a rear face of a facing element 12 to secure the facing element on the anchor and a curved portion 48 projecting towards and abutting against the wall 20 to provide a gap 36 between the facing element 12 and the wall 20. Mortar fills the mortar joint 19.

[066] Referring to FIGS 12-15, there is shown a side cross-sectional view of a section of a wall facing system 11 in accordance with one embodiment of the invention. The wall facing system 11 has rigid wall insulation 74 coupled to the outer surface of the wall 20. Anchors (14, 16, 18) are secured to the wall 20 with the rigid wall insulation 74 by fastening means 34. Appropriately sized shims or washers (76, 77), for example such as the washers illustrated in FIGS 16-17, are positioned between the backing members of the anchors (14, 16, 18) to increase the surface area of the force applied against the rigid wall insulation 74. The wall facing system 11 depicted is a non-load bearing system since the weight of the facing elements rest on the footing.

[067] Although the invention has been described with reference to certain specific embodiments, various modifications thereof will be apparent to those skilled in the art without departing from the spirit and scope of the invention. All such modifications as would be apparent to one skilled in the art are intended to be included within the scope of the following claims.

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

1. An anchor for a wall facing system, said anchor comprising:

a backing member having a substantially flat surface to rest against a wall and one or more apertures adapted to receive fastening means for securing the anchor to a wall,

one or more vertical base members projecting substantially perpendicularly from the backing member having a substantially right angle recess at the lower distal edge thereof to abut with portion of an upper edge and a back of a first facing element and a substantially right angle recess at the upper distal edge thereof to abut with an lower edge and a back of a second facing element,

one or more flanges projecting substantially perpendicularly from the distal end of one or more base members, said one or more flanges adapted to fit within a groove in an edge of a first or second facing element to secure the facing element,

wherein the right angle recesses of the one or more vertical base members provides a gap between the facing elements abutting the right angle recesses and the wall for air ventilation or water drainage,

and wherein the area between the upper and lower right angle recesses of the one or more vertical base members provides a gap for a mortar joint between the upper edge of the first facing element and the lower edge of the second facing element resting on the anchor.

2. The anchor of claim 1, wherein the backing member comprises one aperture adapted to receive a fastening means for securing the anchor to a wall.
3. The anchor of claim 2, wherein the aperture is substantially centered on the backing member.
4. The anchor of claim 1, wherein the anchor comprises one vertical base member.

5. The anchor of claim 4, wherein the one vertical base member extend from a side edge of the backing member.
6. The anchor of claim 1, wherein the anchor comprises two vertical base members.
7. The anchor of claim 6, wherein the two vertical base members each extend from a side edge of the backing member.
8. The anchor of claim 1, wherein the one or more vertical base members having a width of about 1mm.
9. The anchor of claim 1, wherein the one or more flanges project downwardly.
10. The anchor of claim 1, wherein the one or more flanges project upwardly.
11. The anchor of claim 1, wherein the anchor comprises one flange being adapted to fit within the grooves of an upper edge of a facing element and a lower edge of a facing element.
12. The anchor of claim 1, wherein the anchor comprises two flanges being adapted to fit within the grooves of an upper edge of a facing element and a lower edge of a facing element.
13. The anchor of claim 1, wherein the one or more flanges are generally U-shaped.
14. The anchor of claim 1, wherein the one or more flanges comprise ribs to assist in the compressive engagement of the facing element to the anchor.
15. The anchor of claim 1, wherein the area between the upper and lower right angle recesses of the one or more vertical base members has a height of about 10mm.
16. A wall facing system comprising:
 - a) a plurality of facing elements having a rear face, a front face, an upper edge, a lower edge and side edges, the upper and lower edges having a groove or slots at a distance between the rear face and front face of the facing element,
 - b) a plurality of anchors according to any one of claims 1 to 14 for securing and anchoring facing elements to a wall.
17. A kit comprising:
 - a) a plurality of facing elements having a rear face, a front face, an upper edge, a lower edge and side edges, the upper and lower edges having a groove or slots at a distance between the rear face and front face of the facing element,
 - b) a plurality of anchors according to any one of claims 1 to 15 for securing and anchoring facing elements to a wall,
 - c) a plurality of fasteners for securing the anchors to a wall.

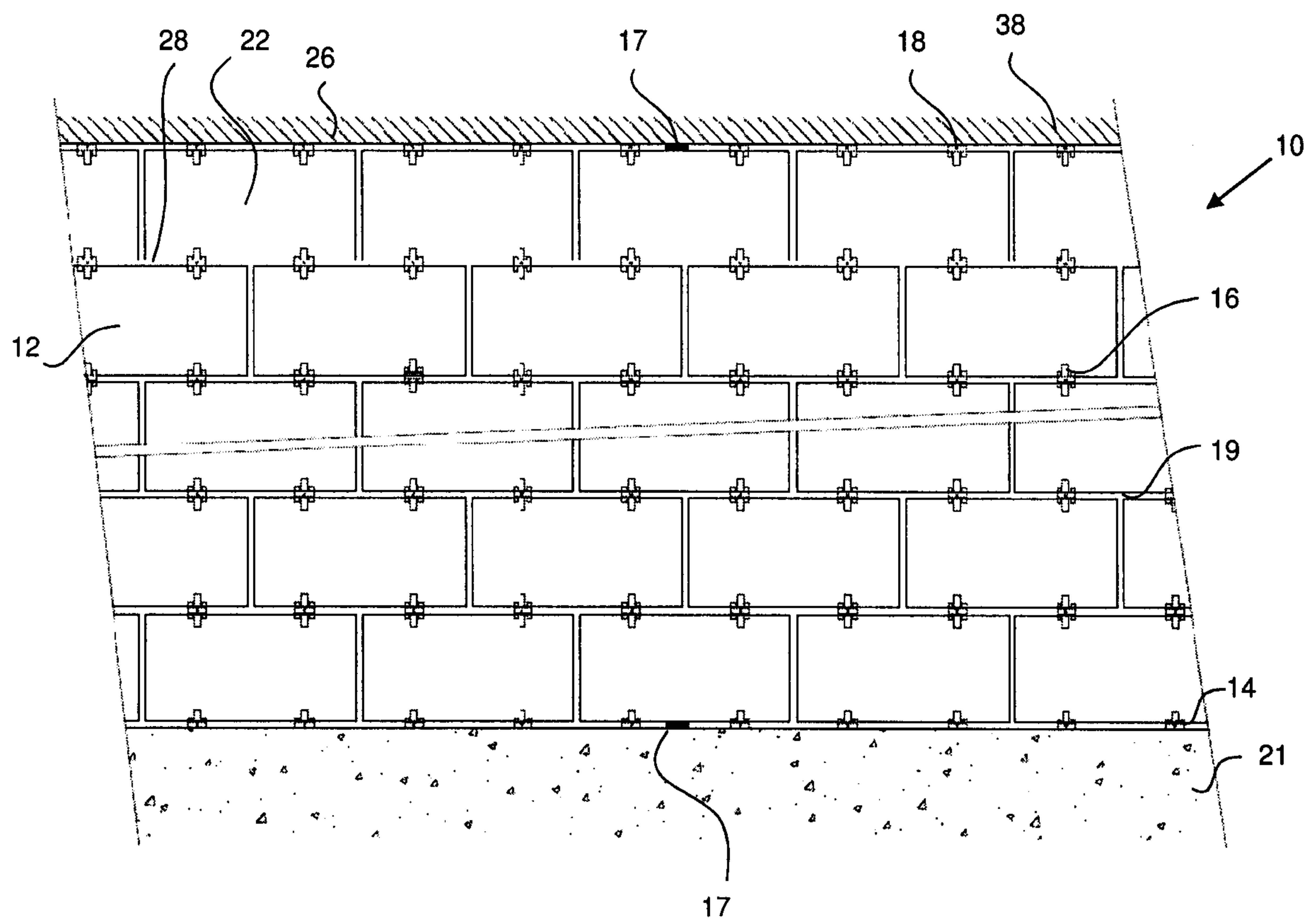
FIG 1

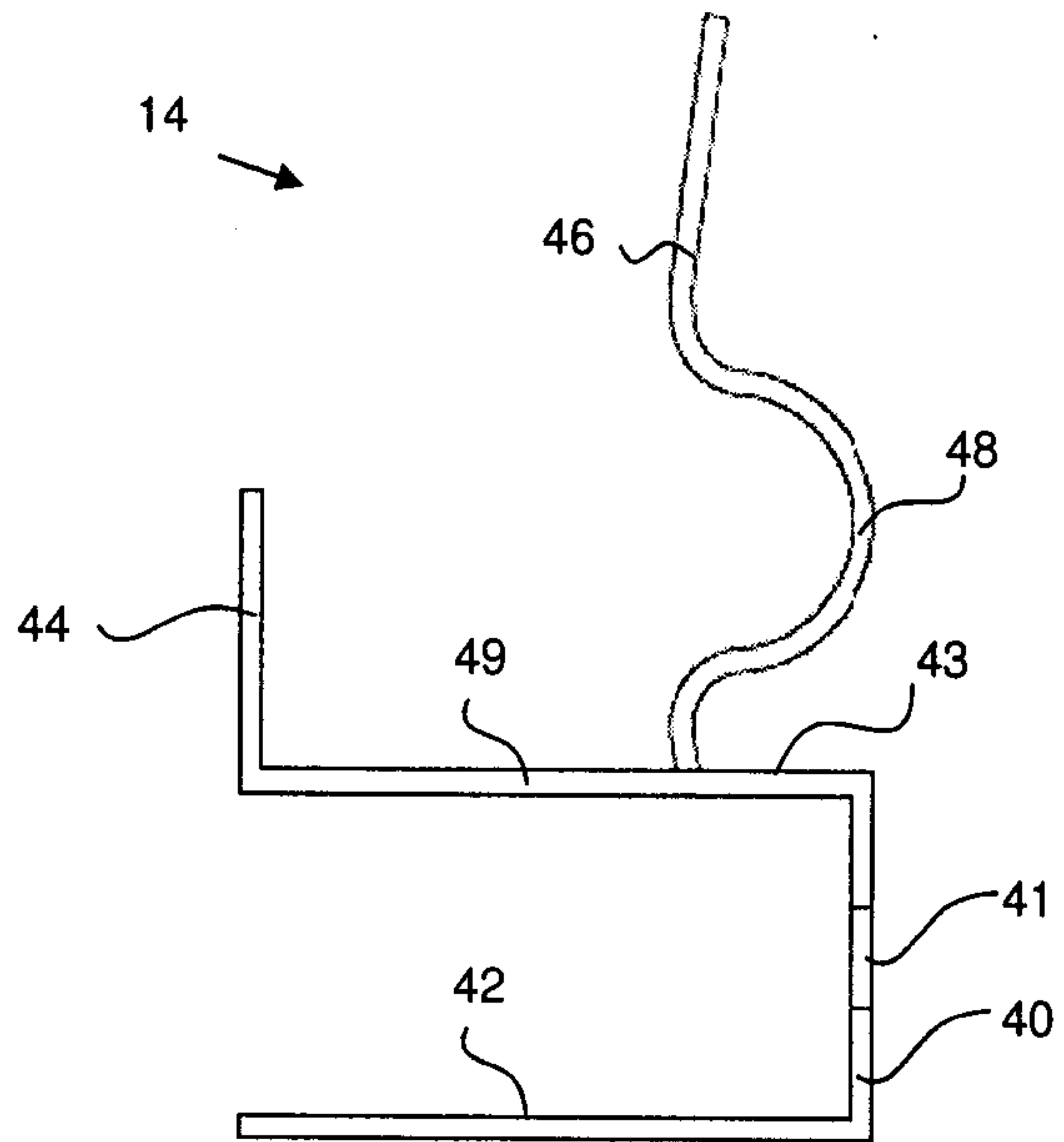
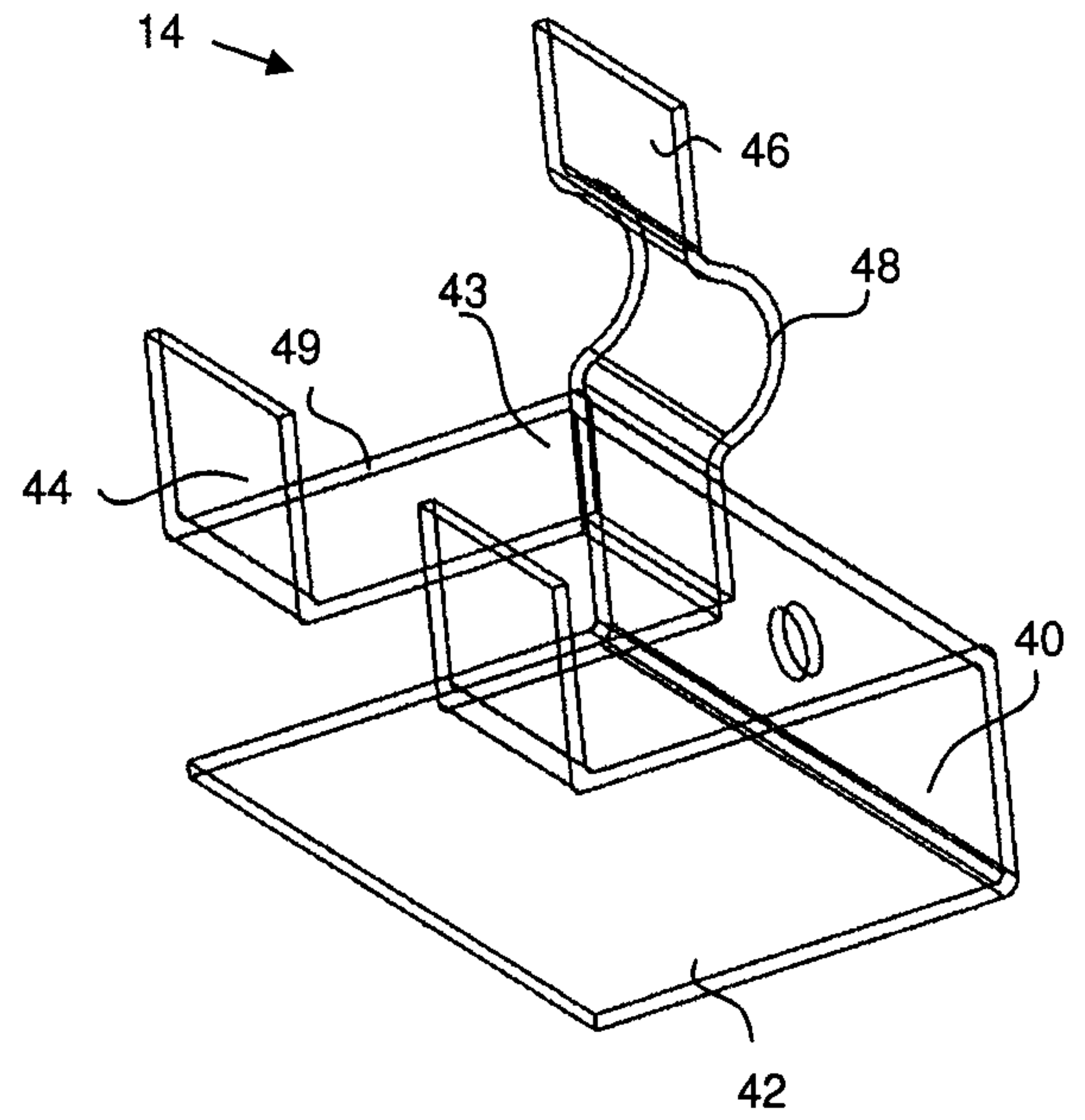
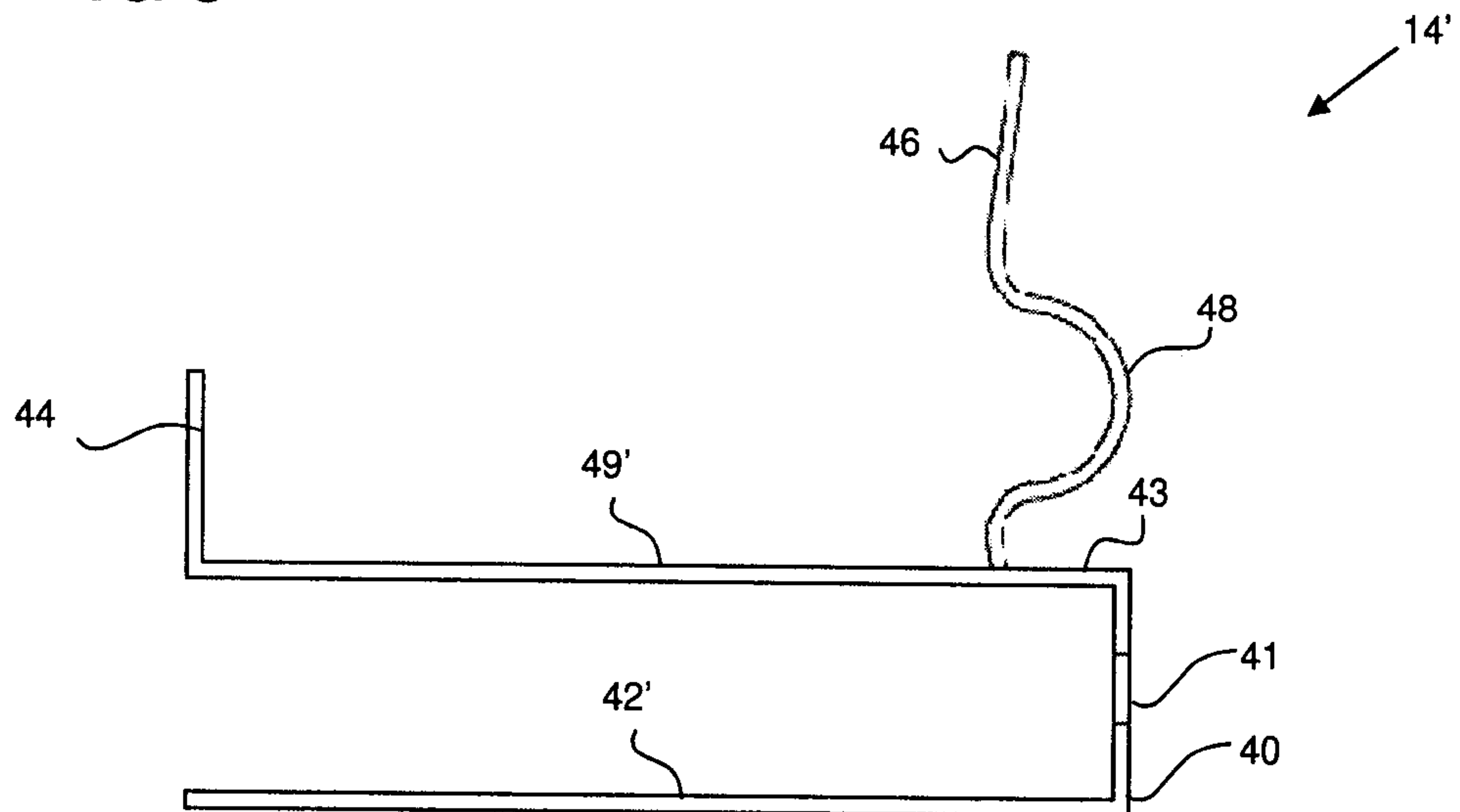
FIG 2A**FIG 2B****FIG 3**

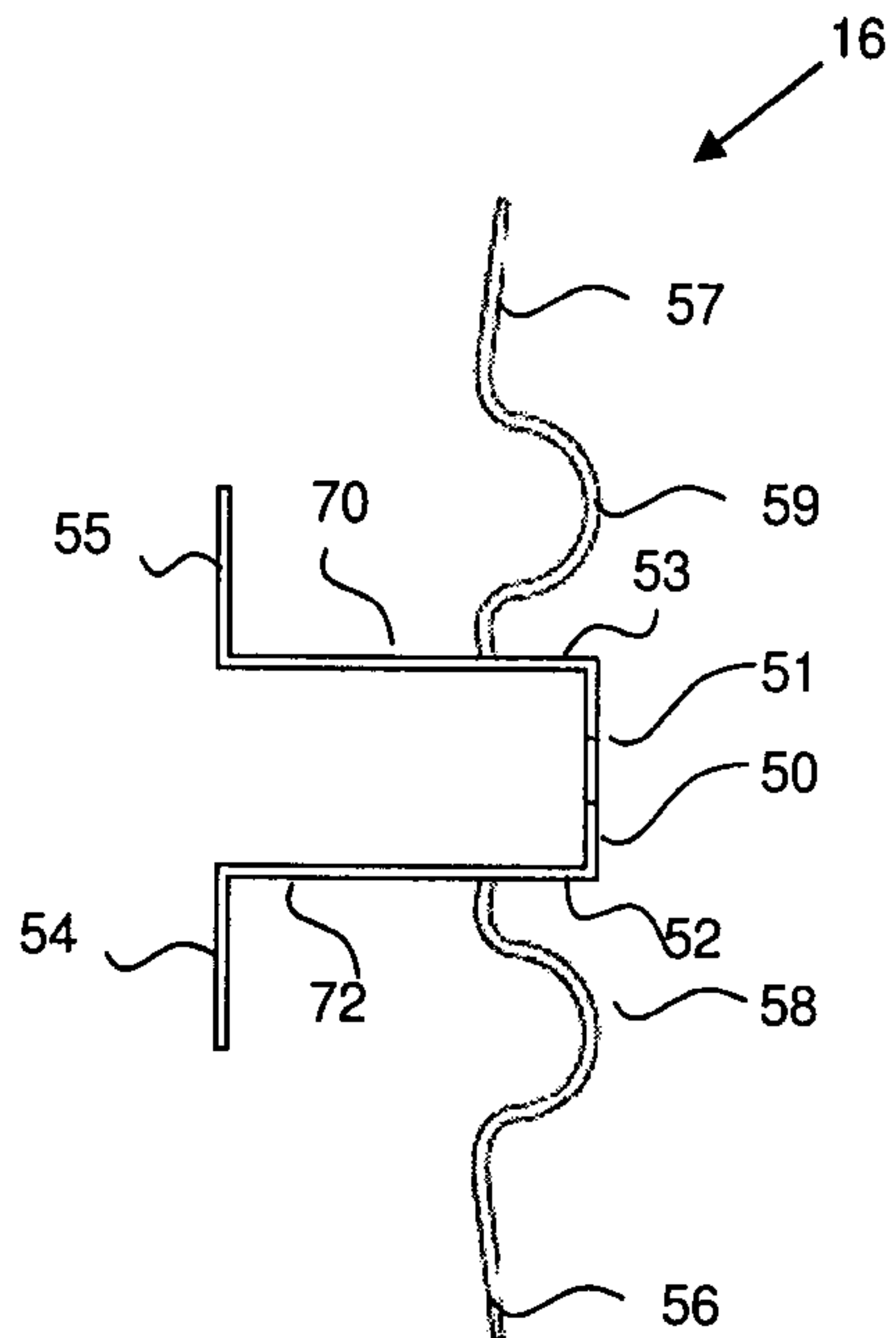
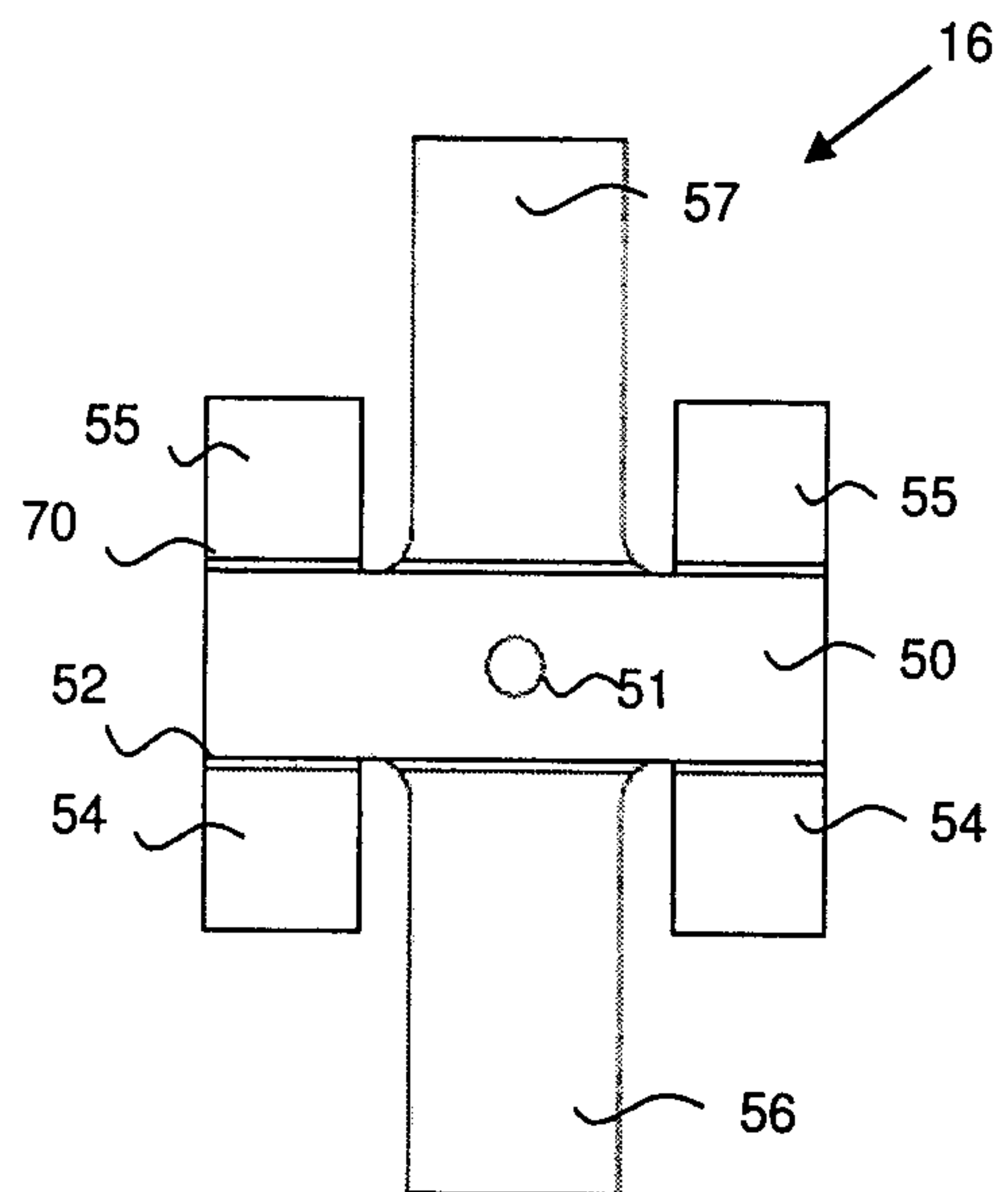
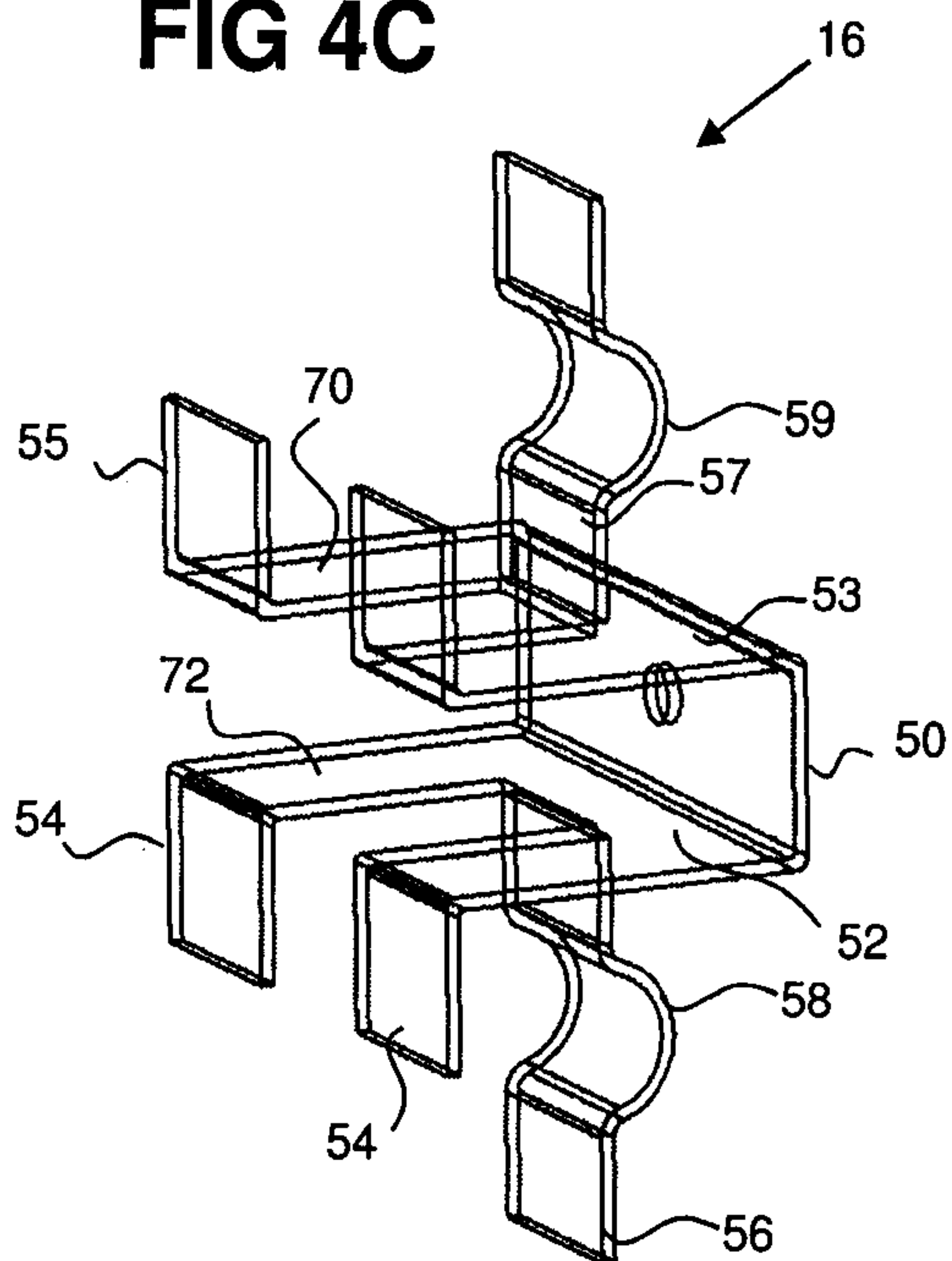
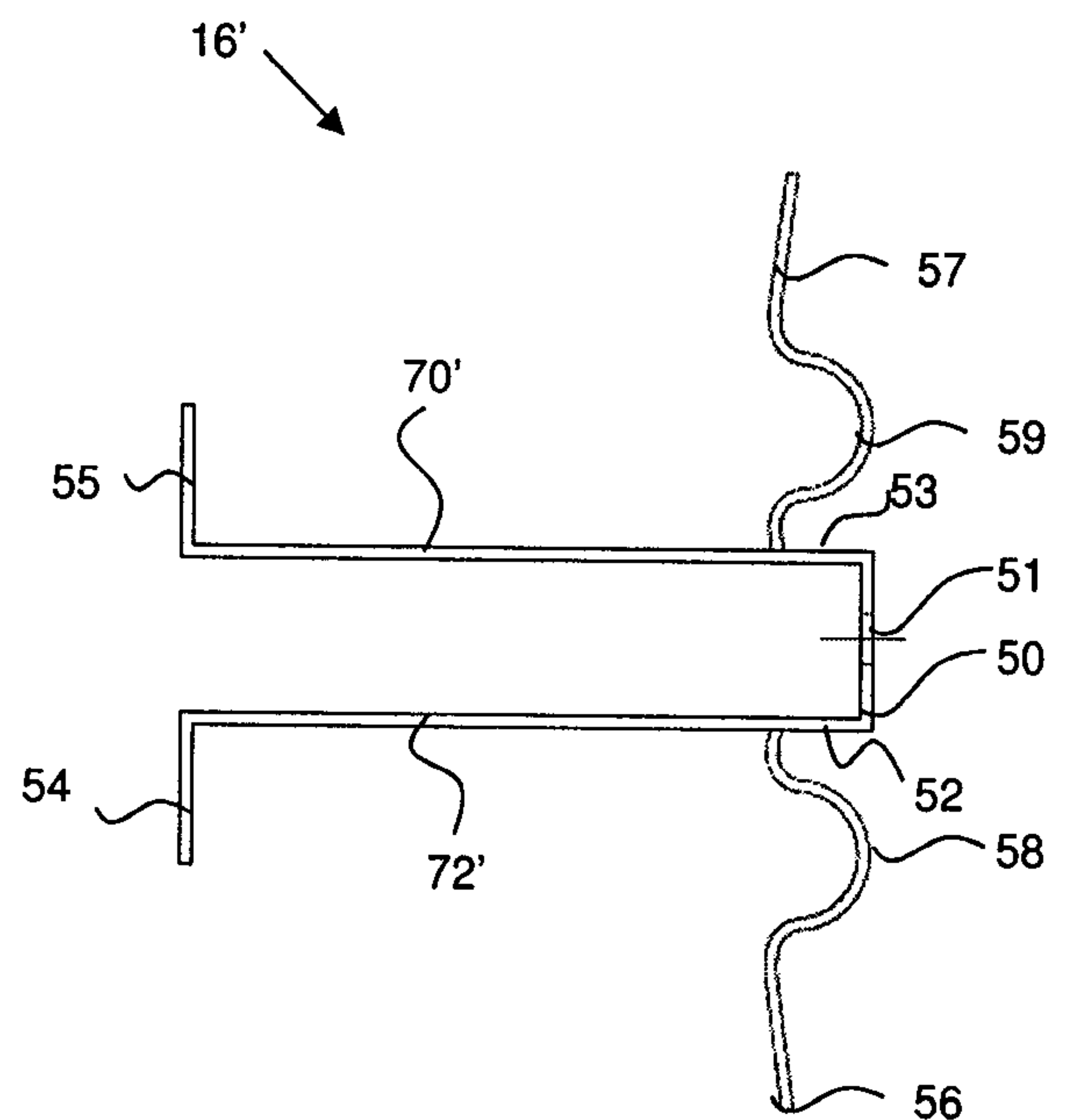
FIG 4A**FIG 4B****FIG 4C****FIG 5**

FIG 6A

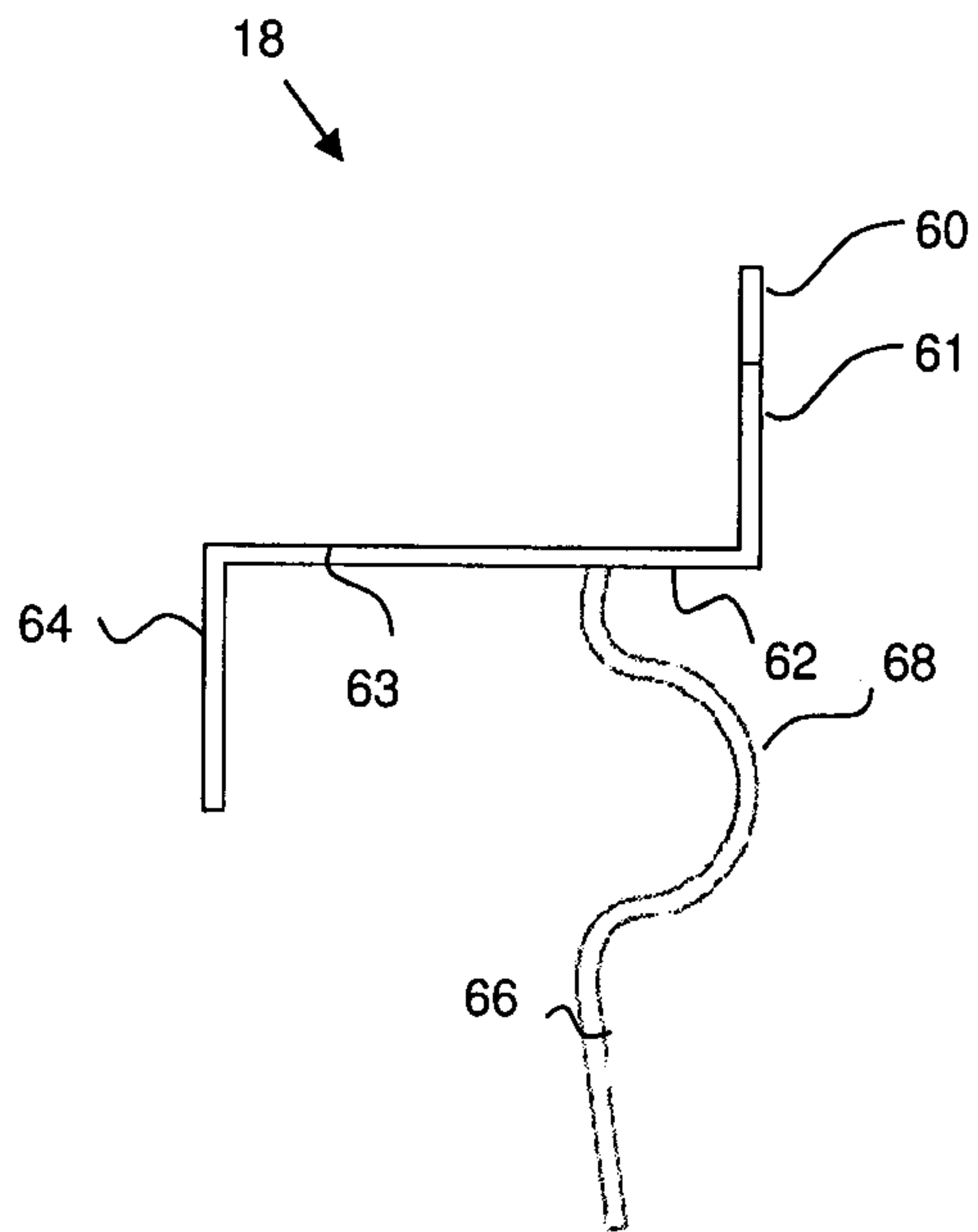


FIG 6B

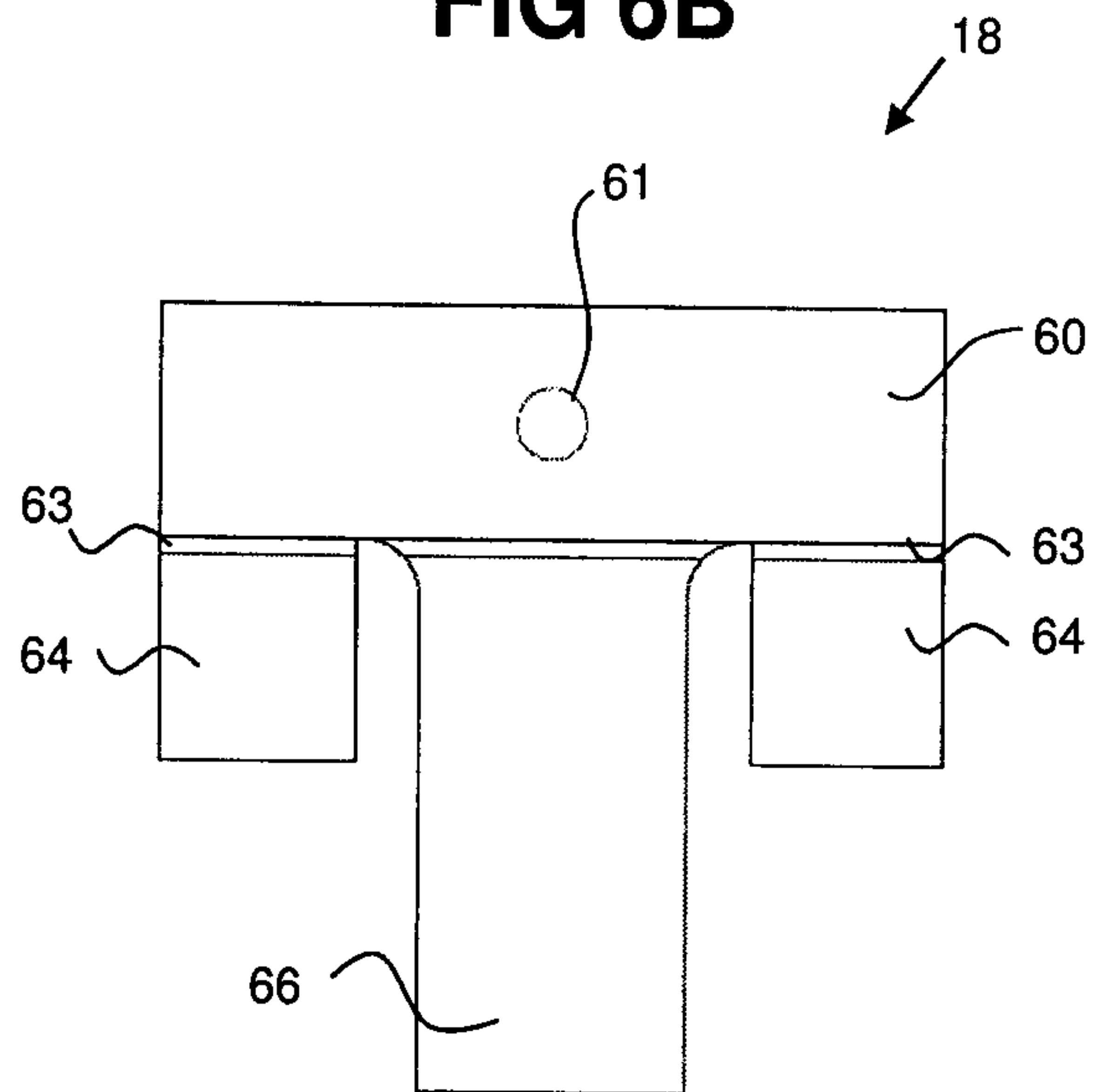


FIG 6C

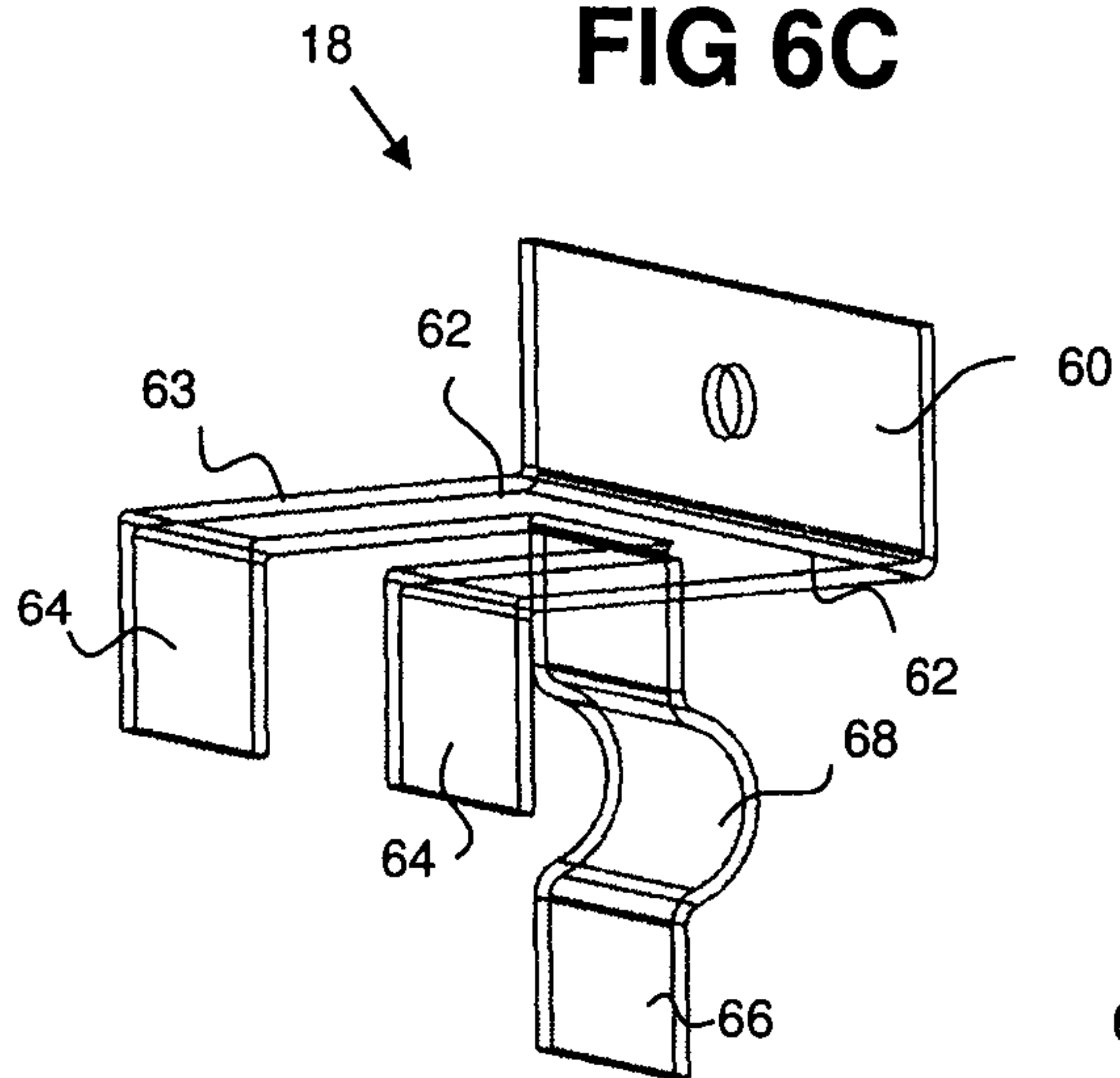
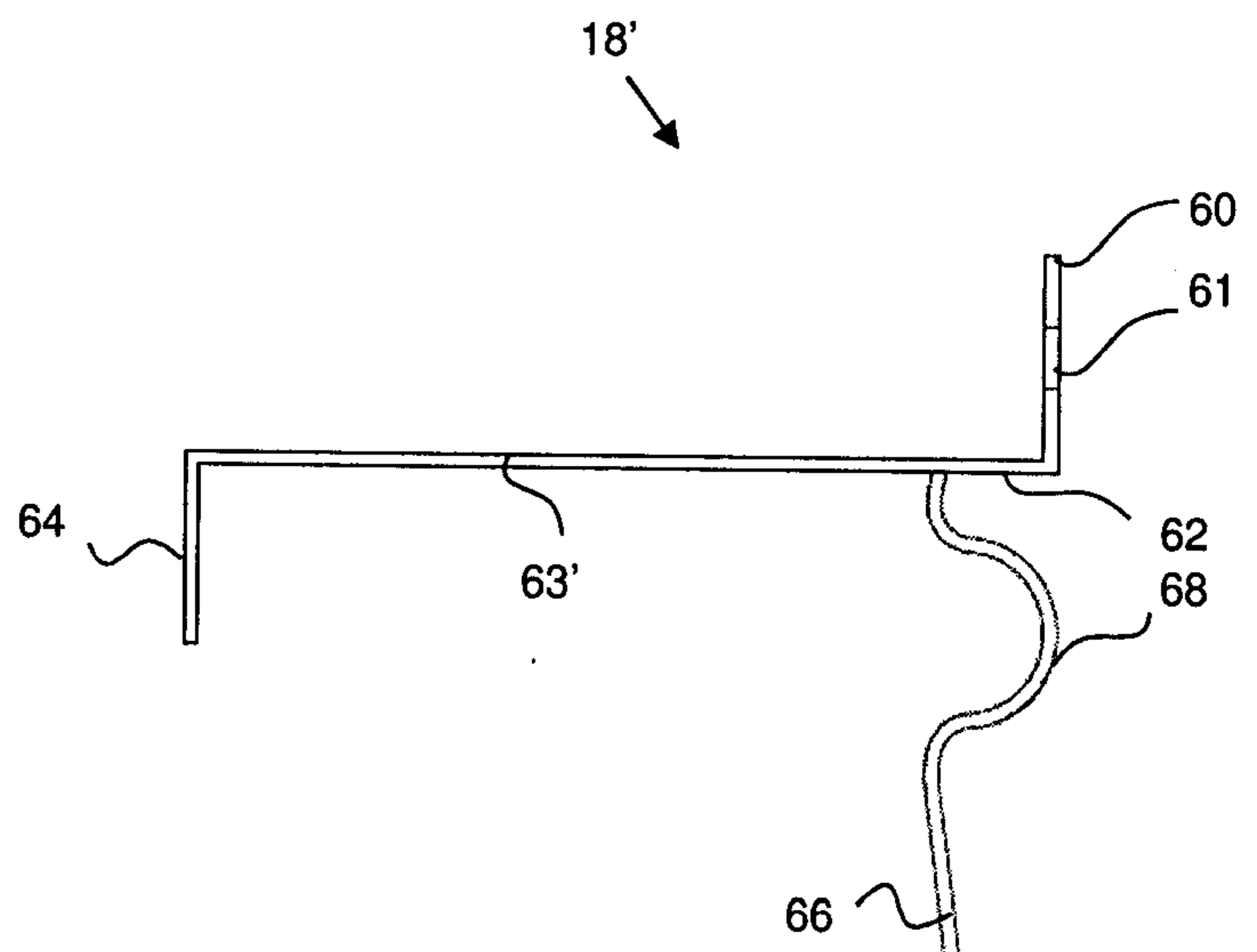


FIG 7



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FIG 8

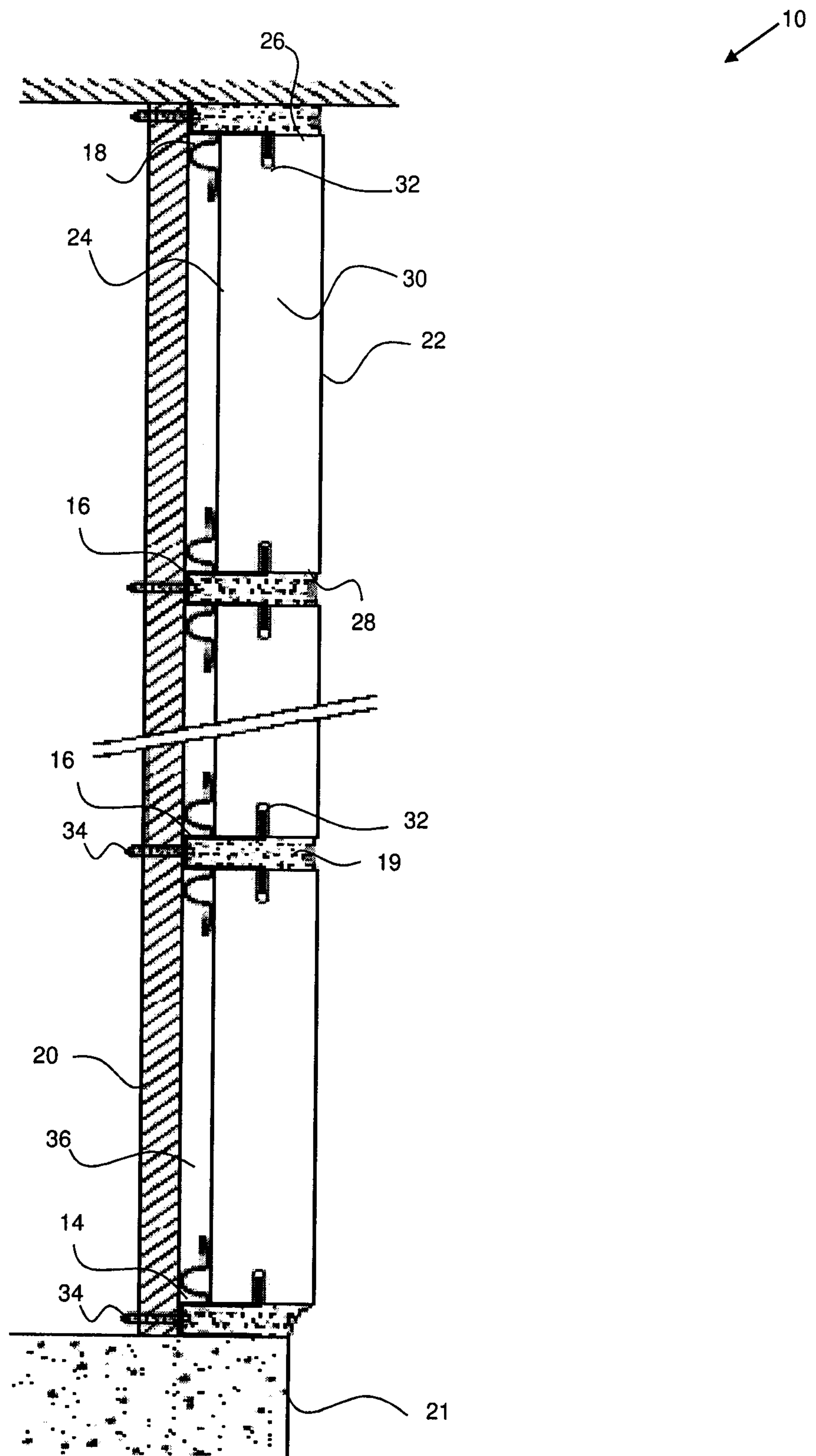


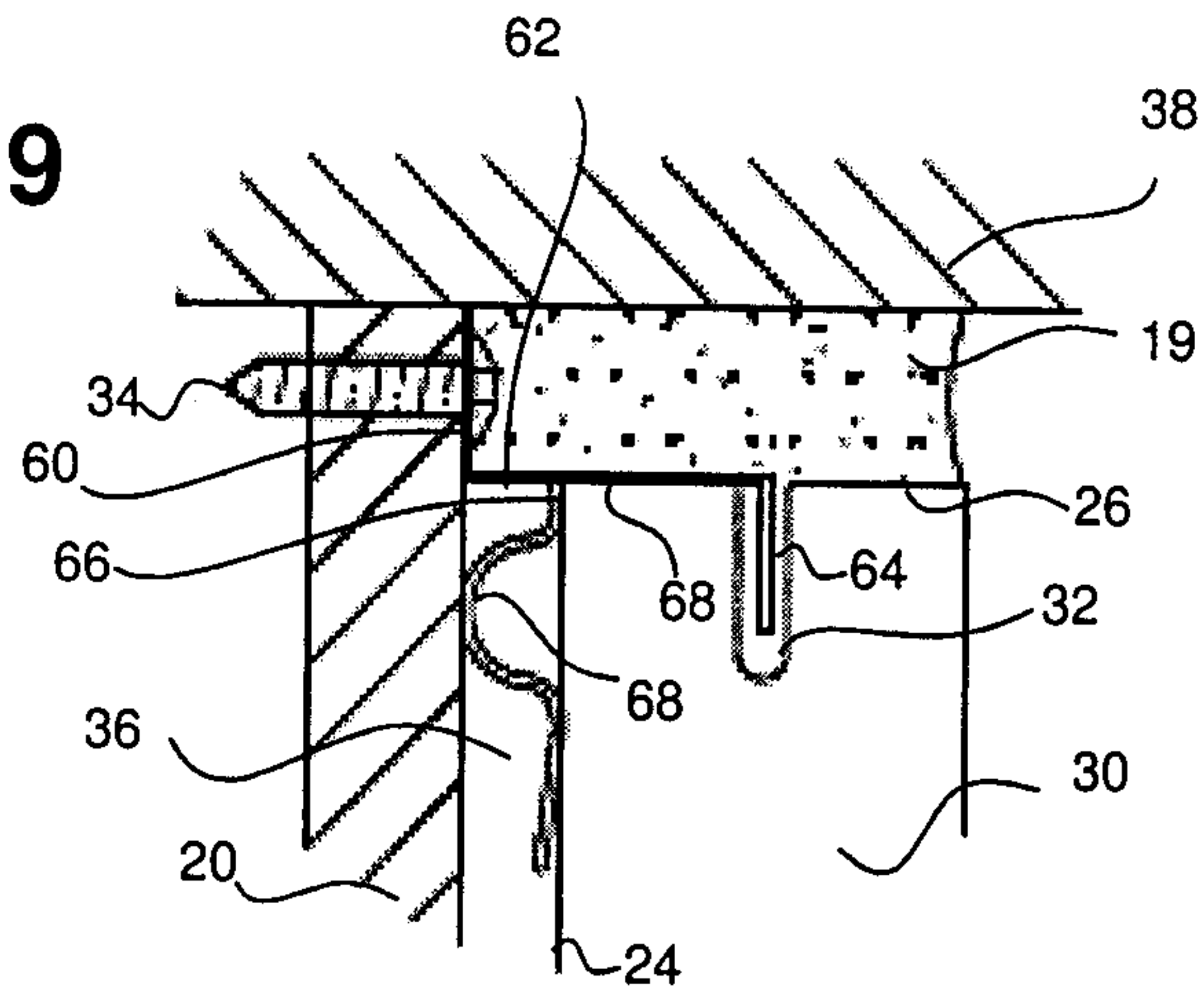
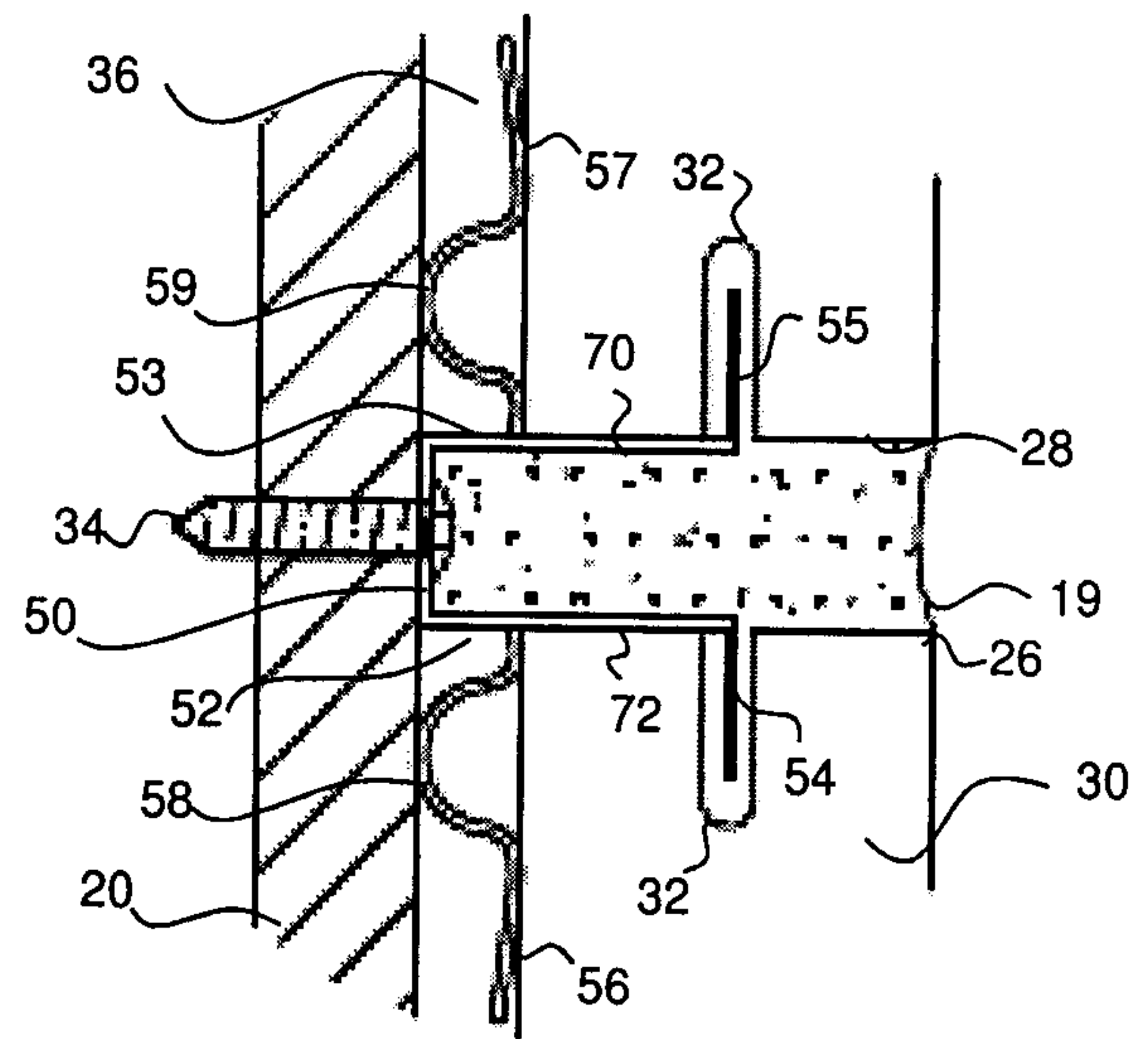
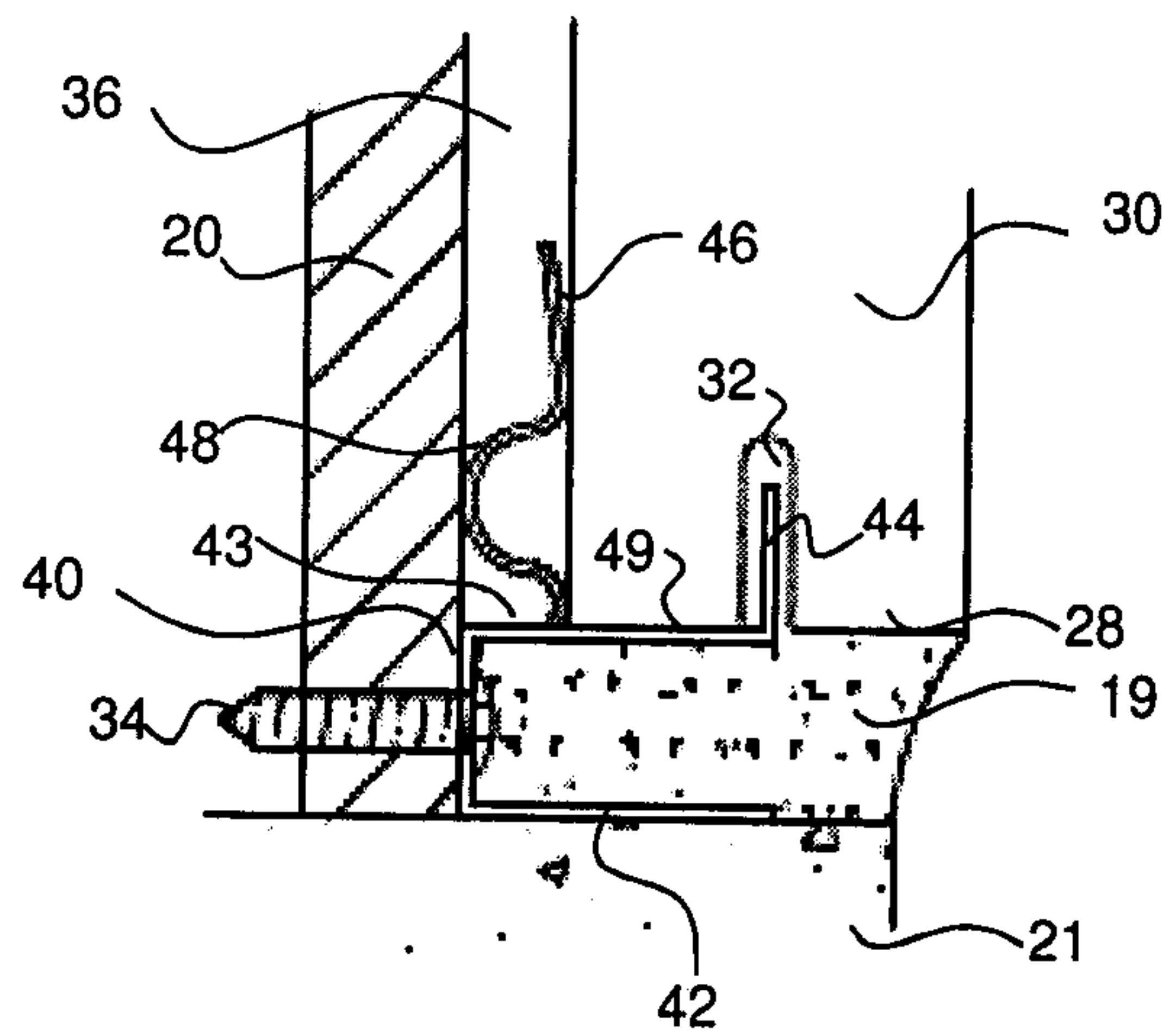
FIG 9**FIG 10****FIG 11**

FIG 12

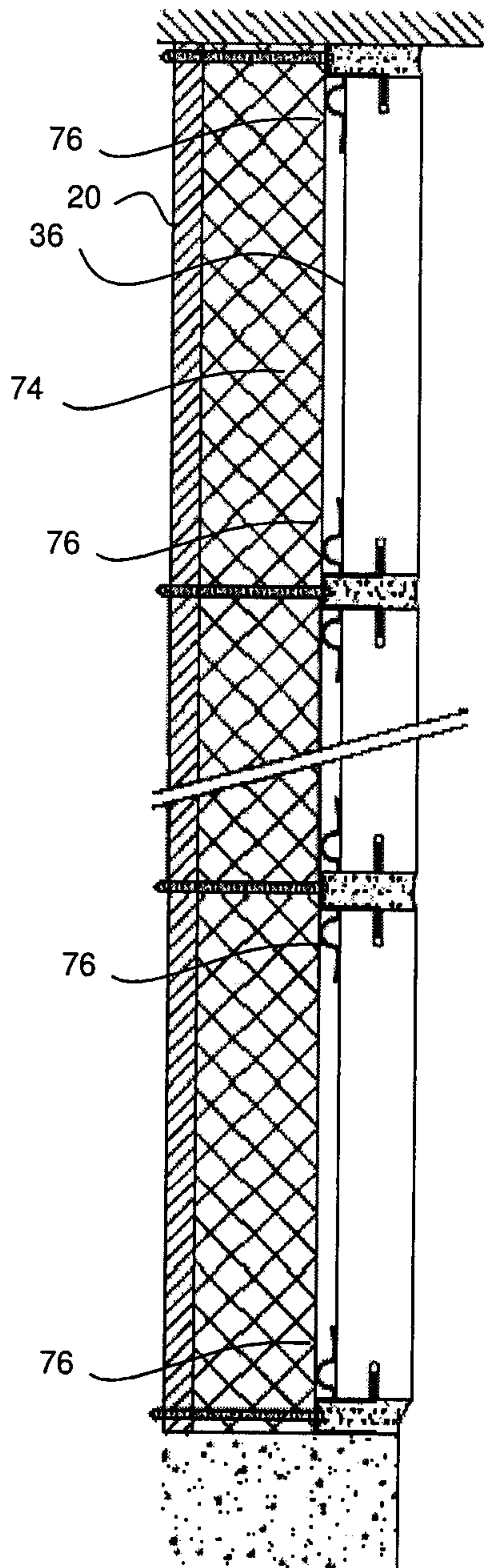


FIG 13

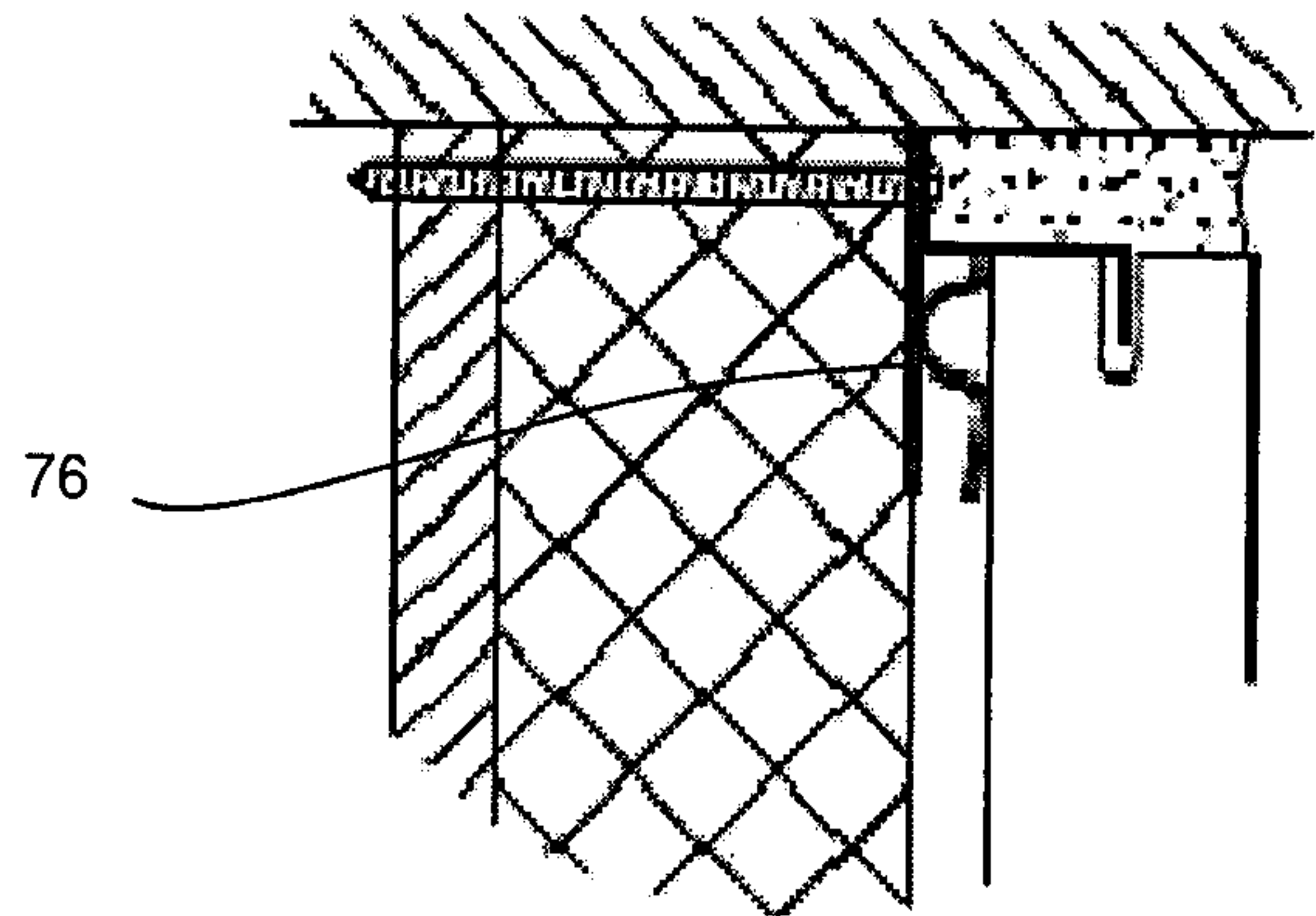


FIG 14

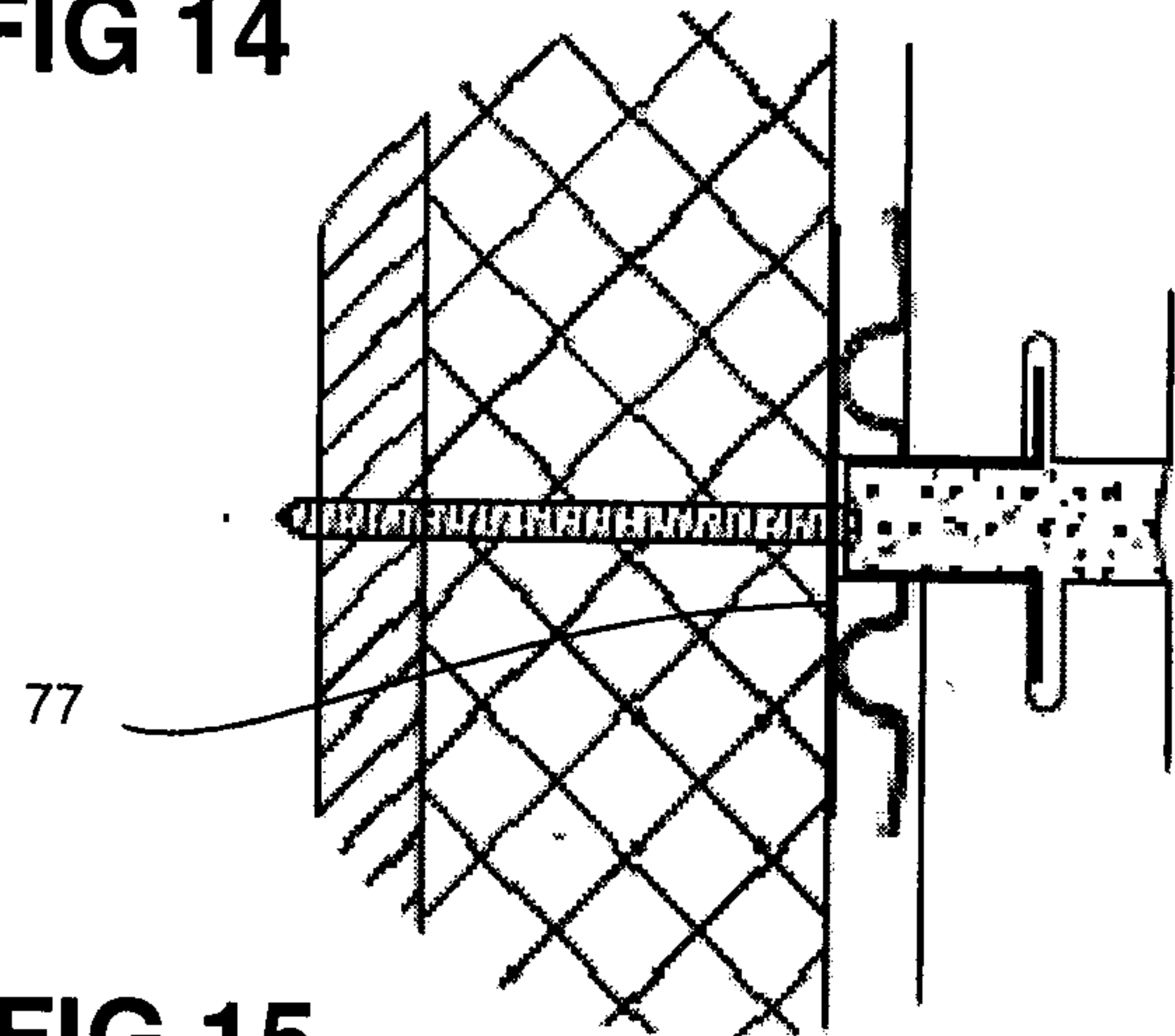
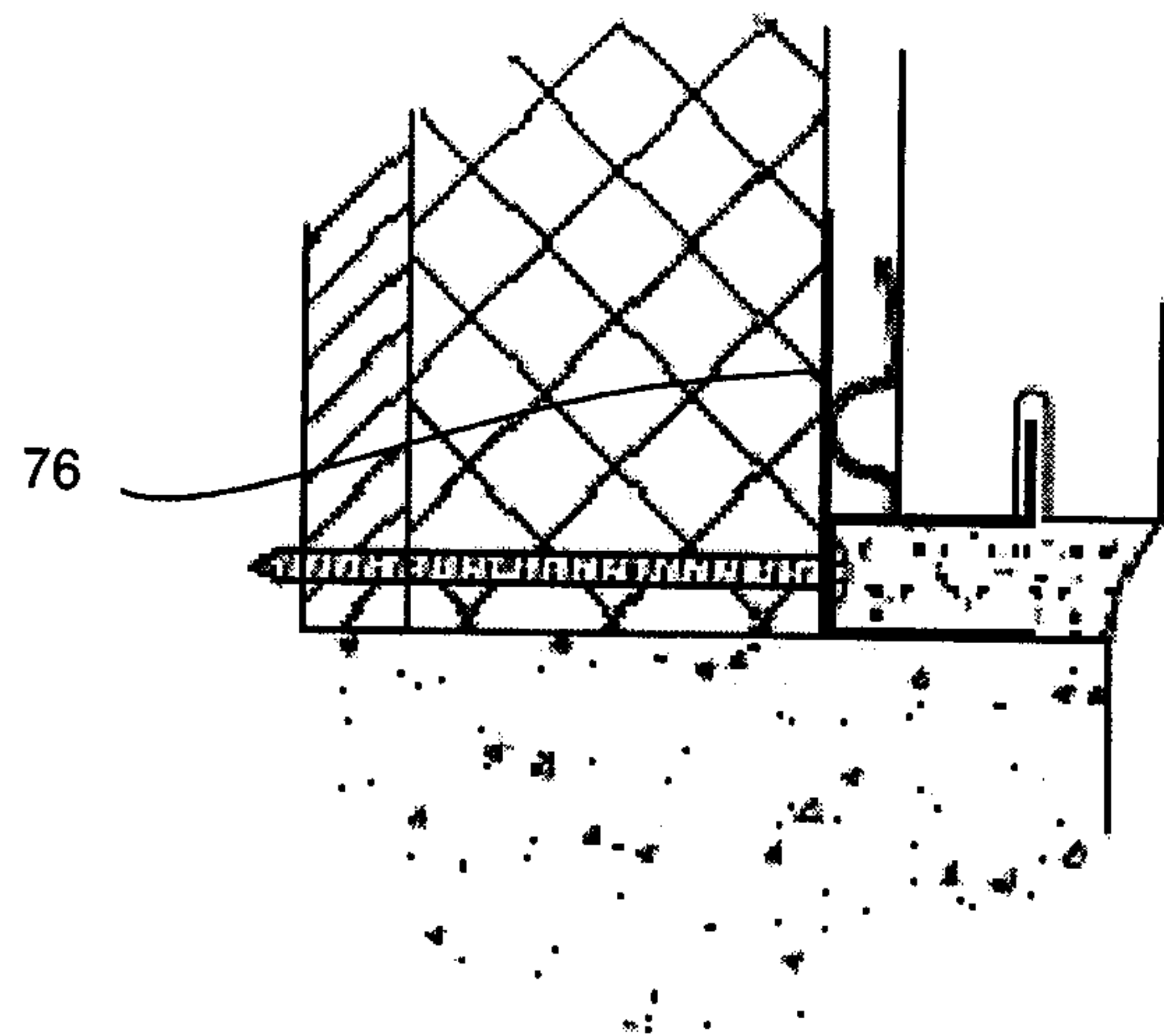


FIG 15



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FIG 16

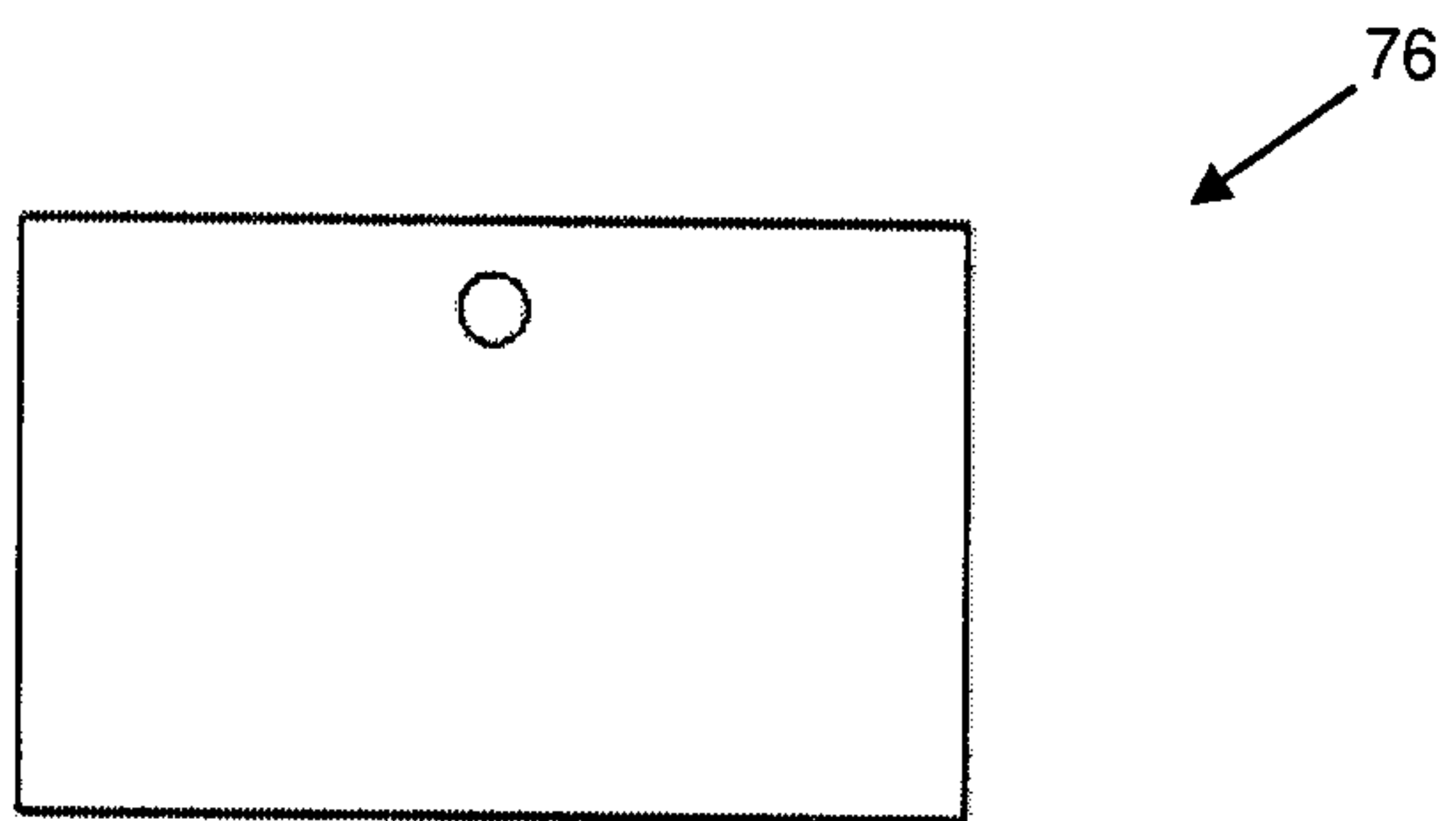


FIG 17

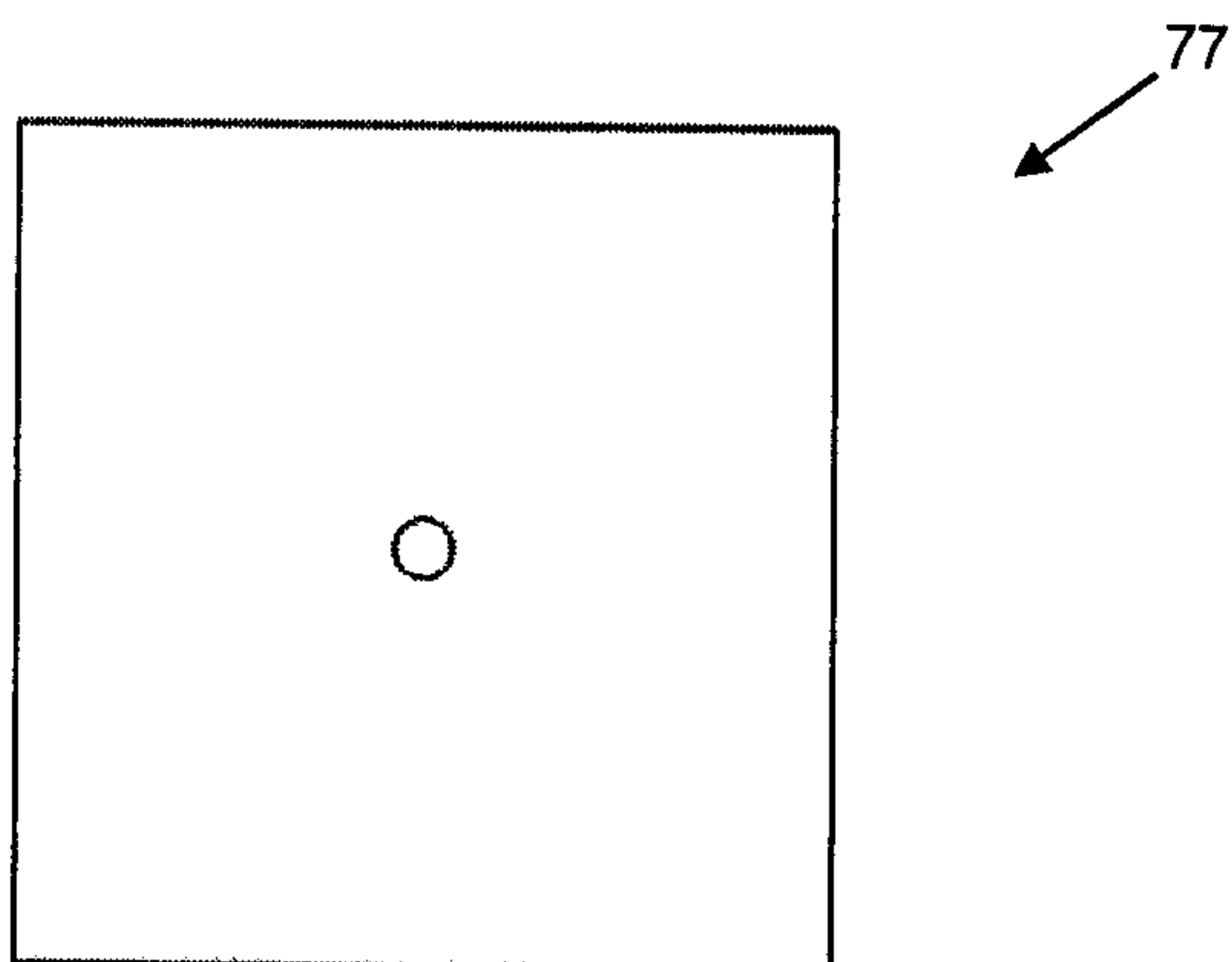


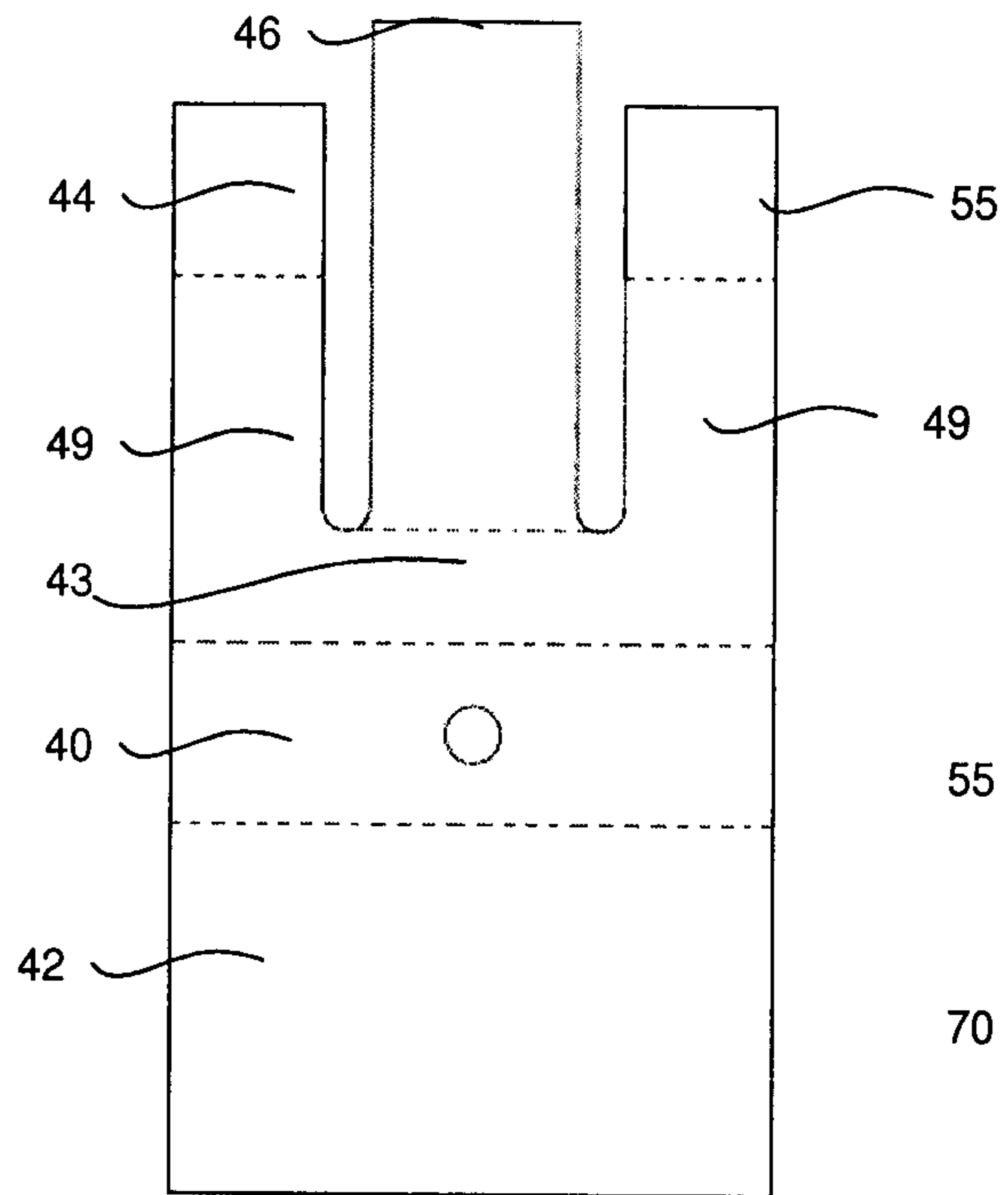
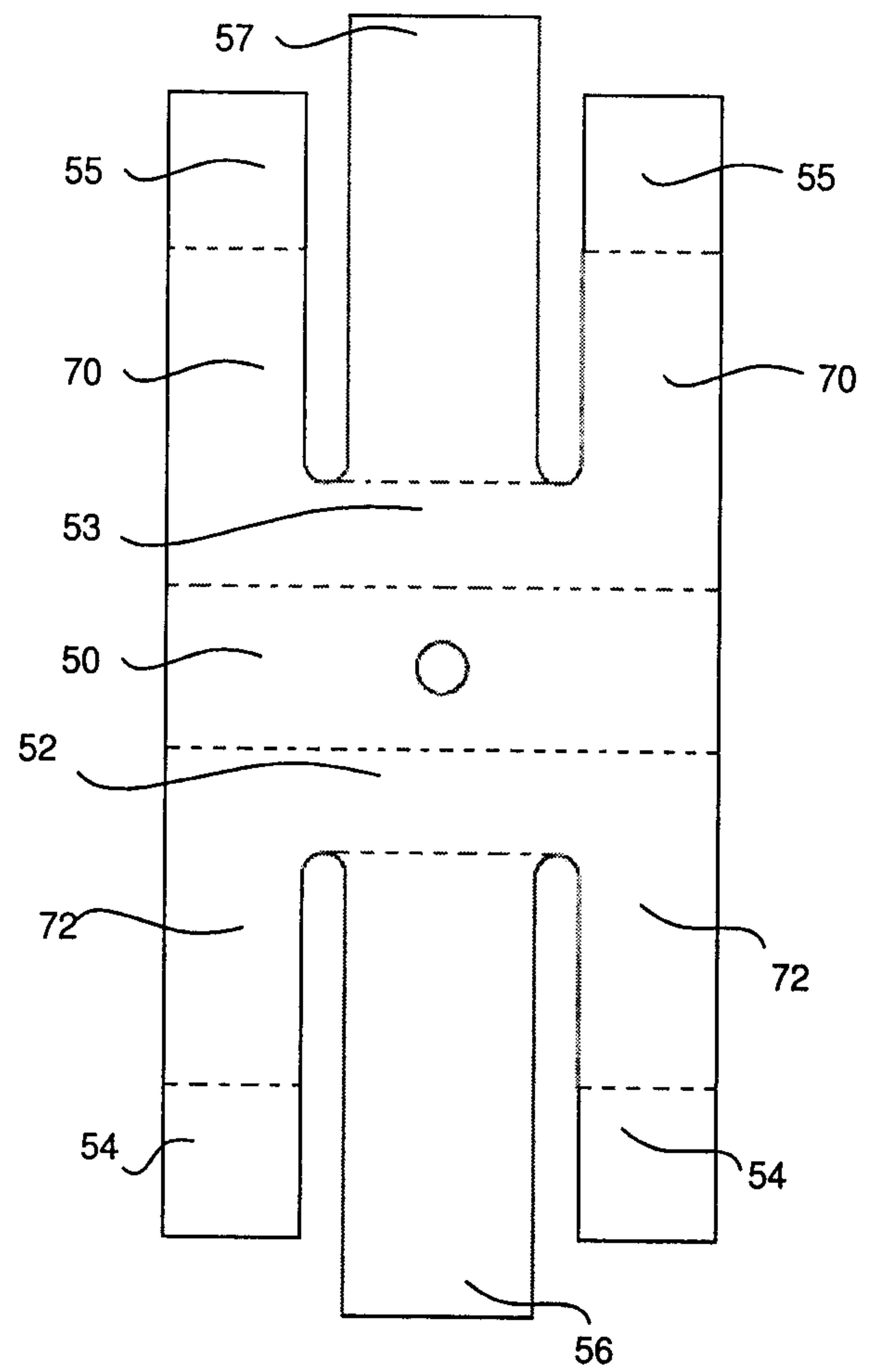
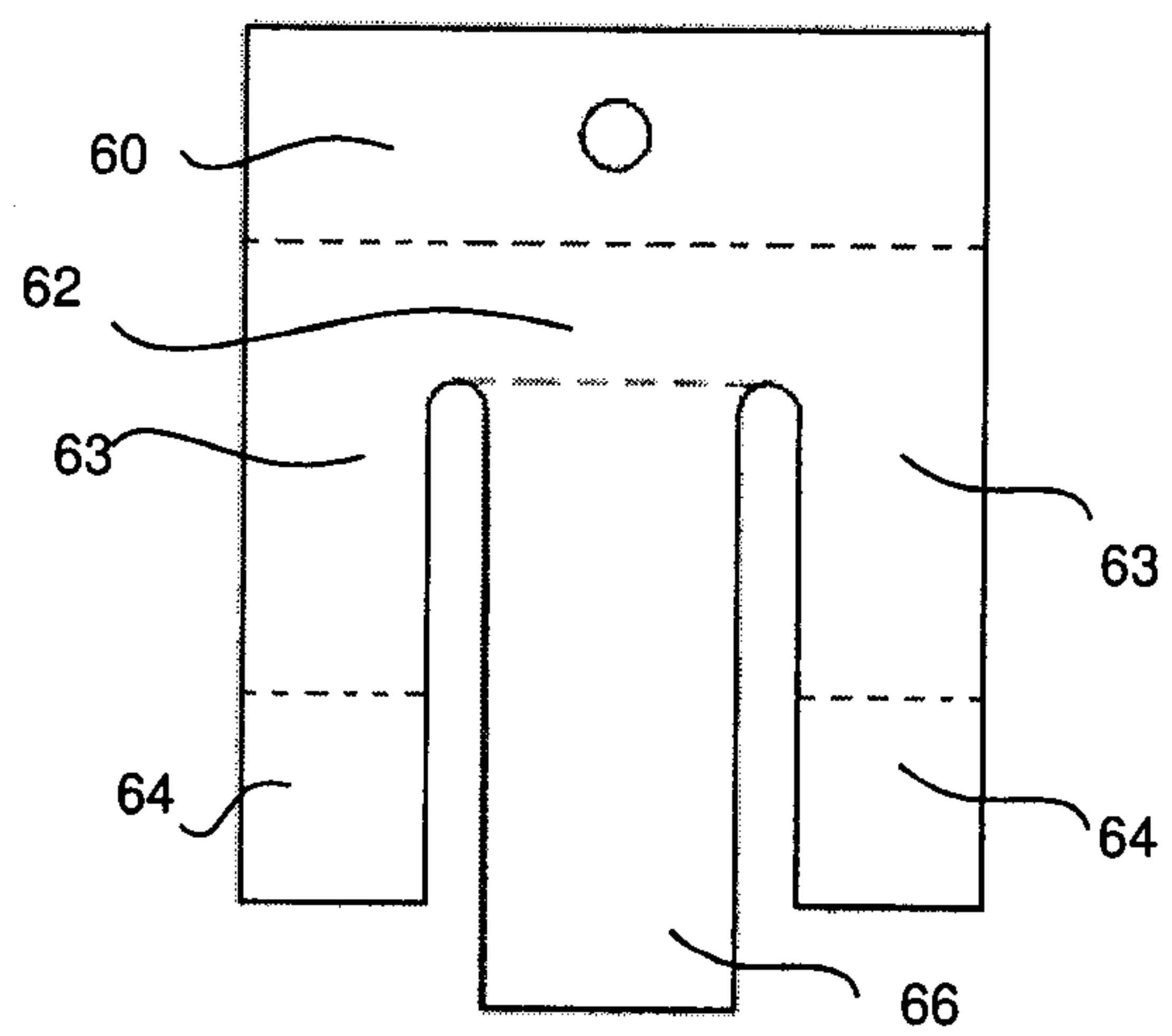
FIG 18**FIG 19****FIG 20**

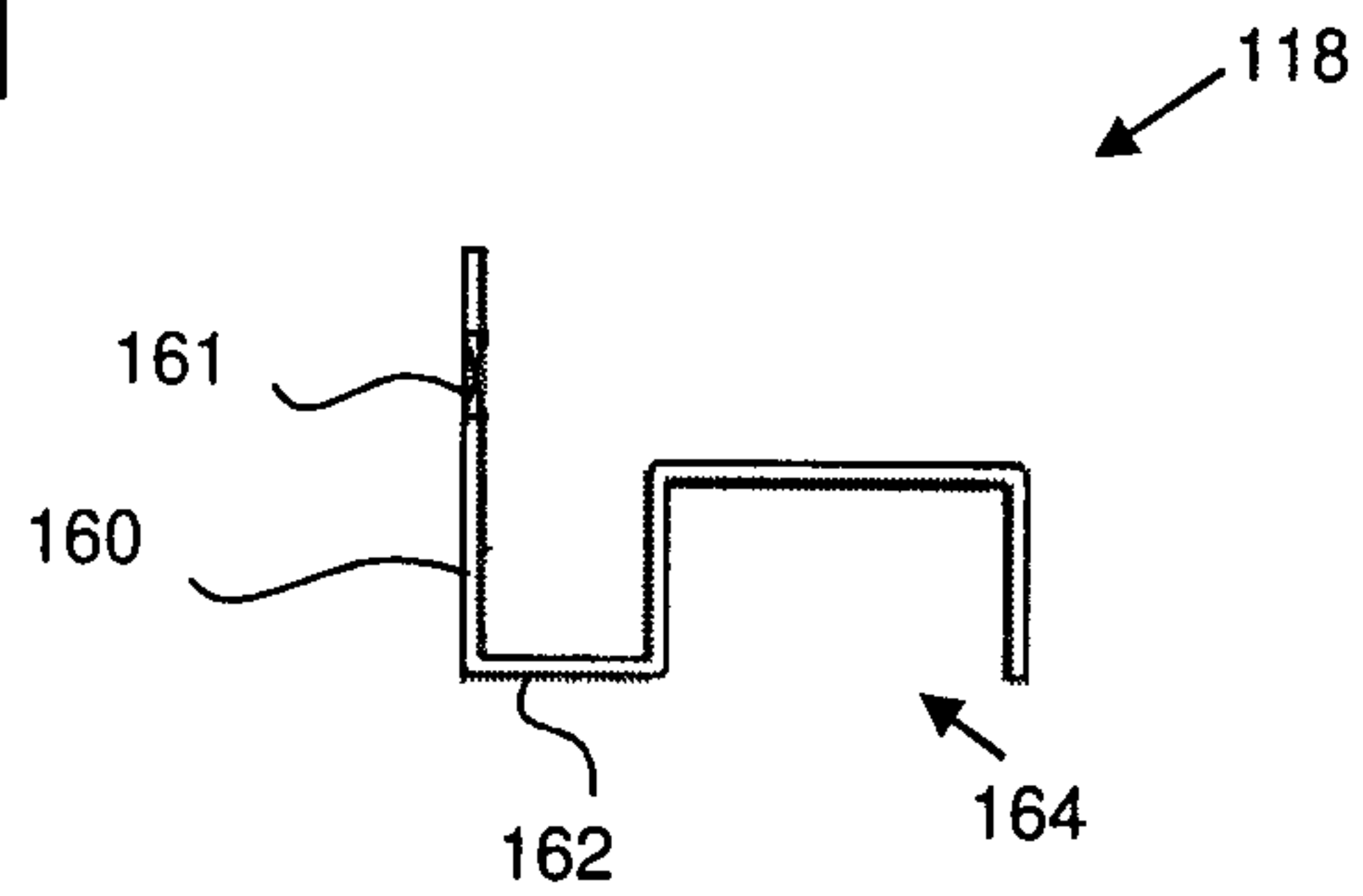
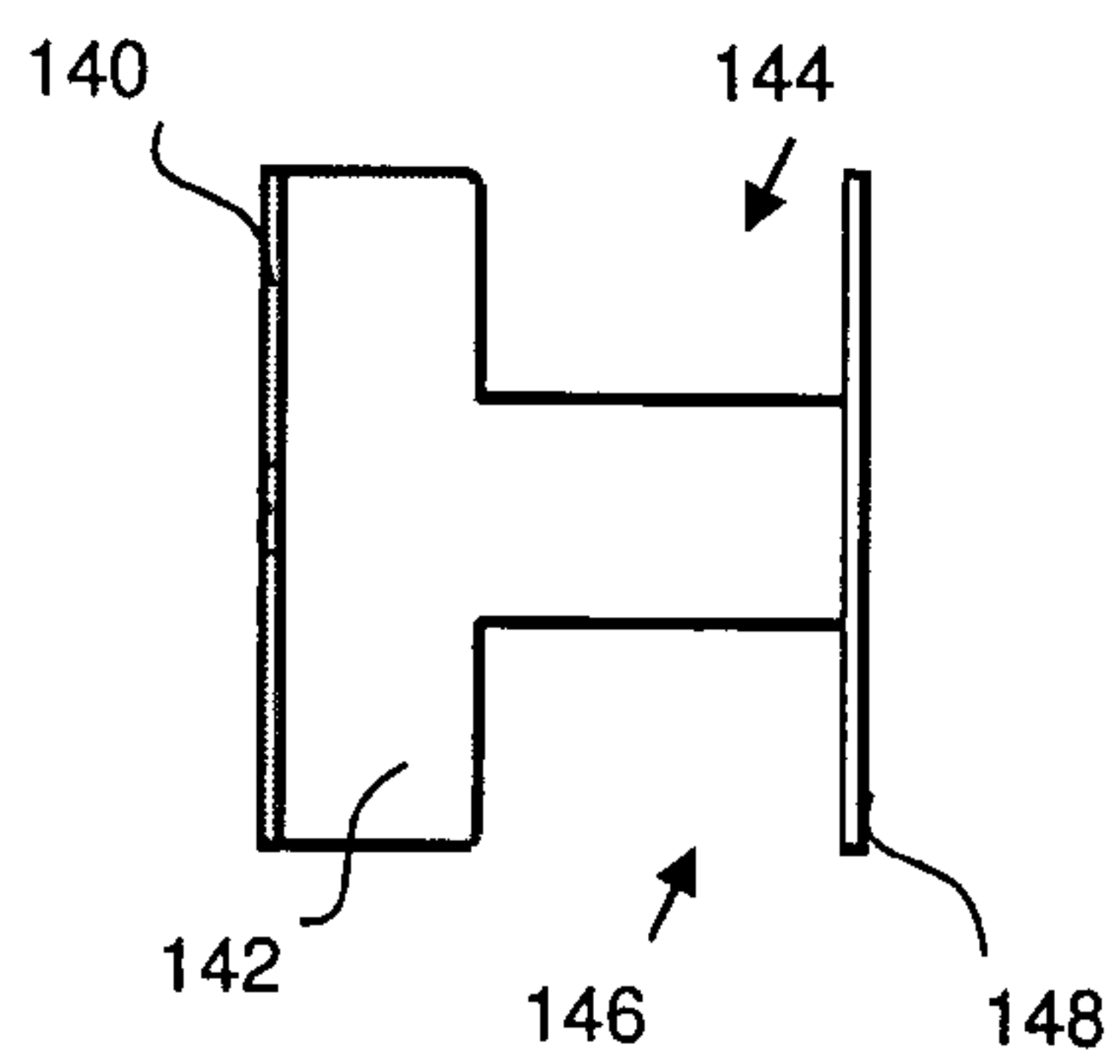
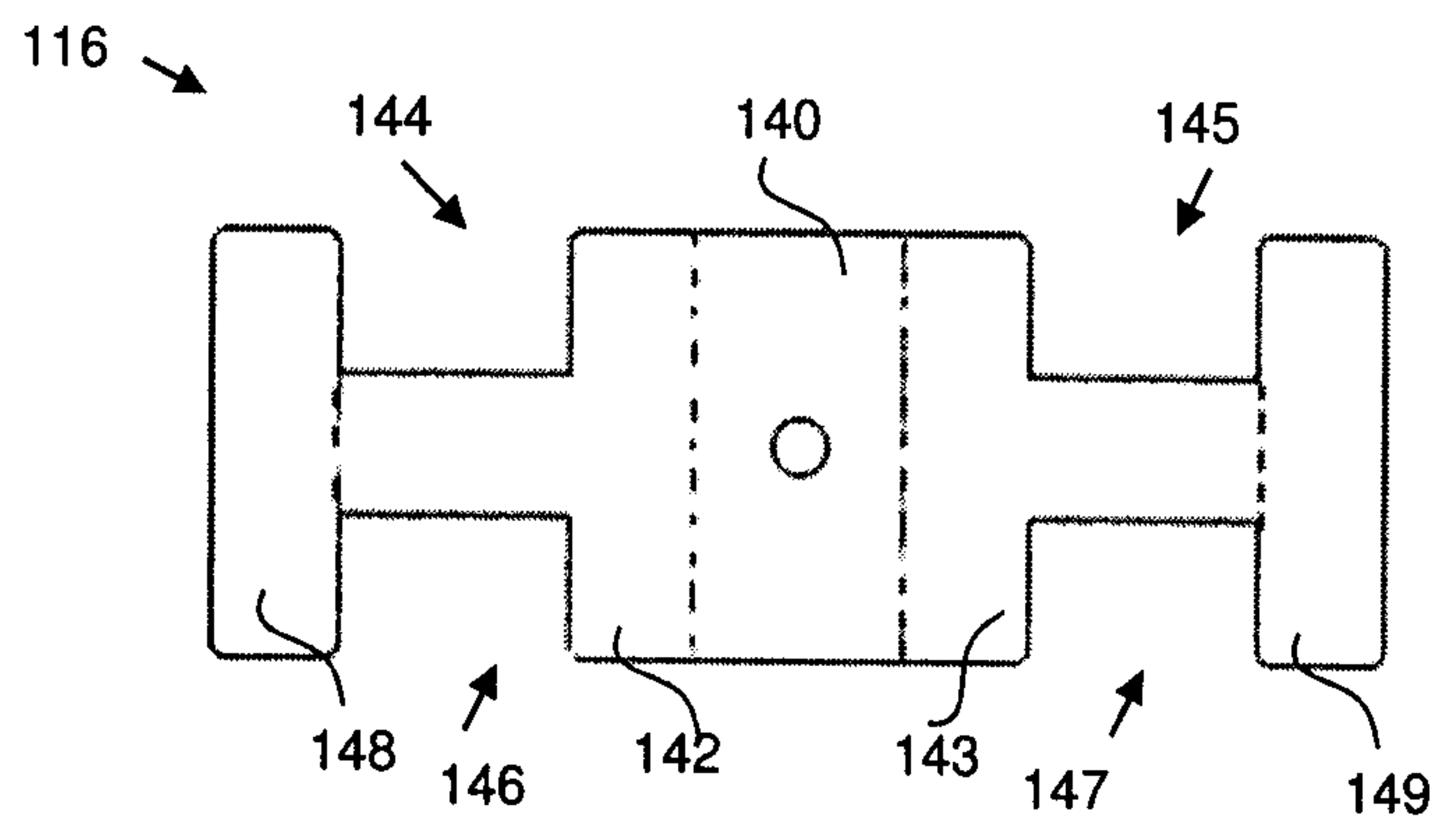
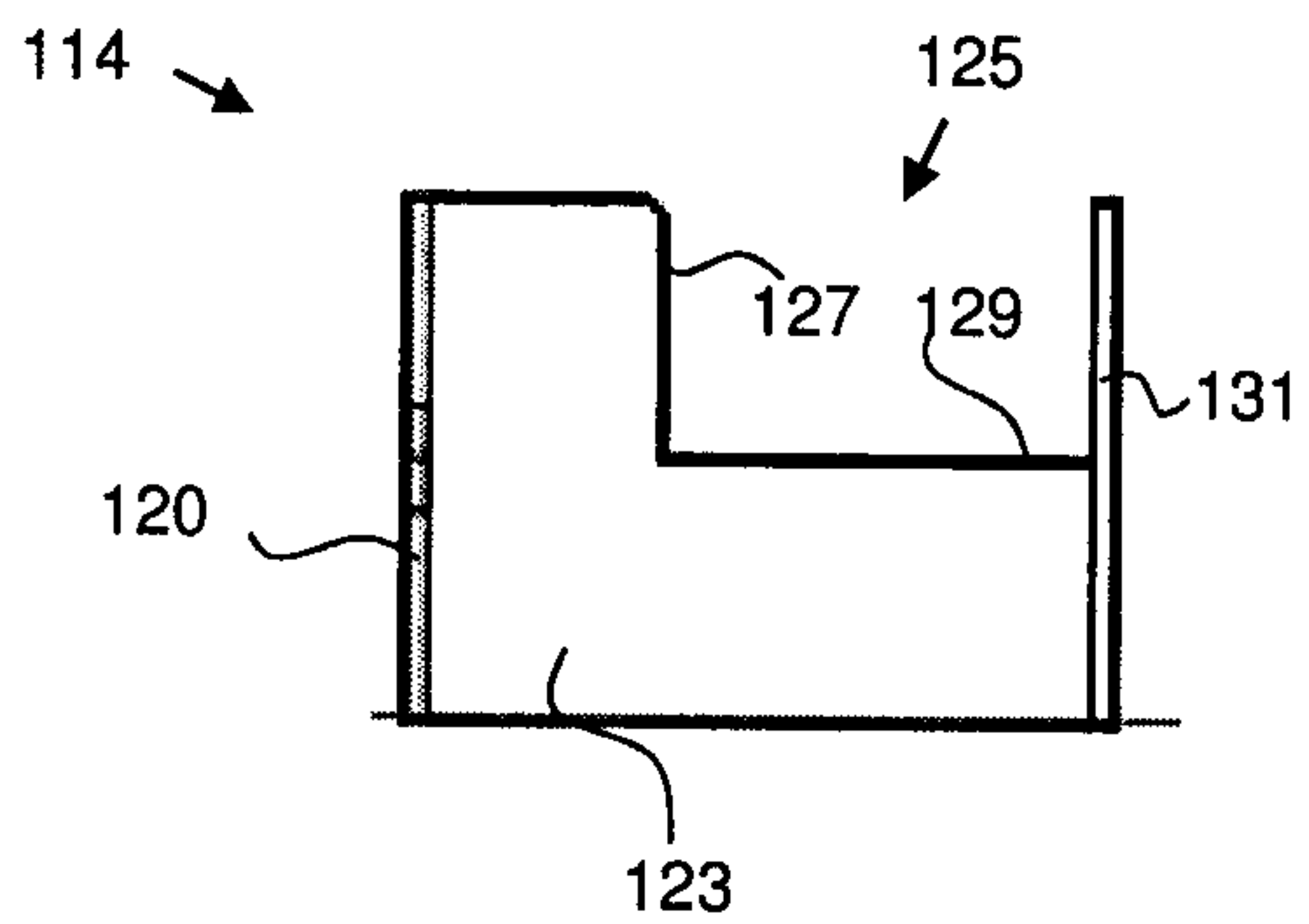
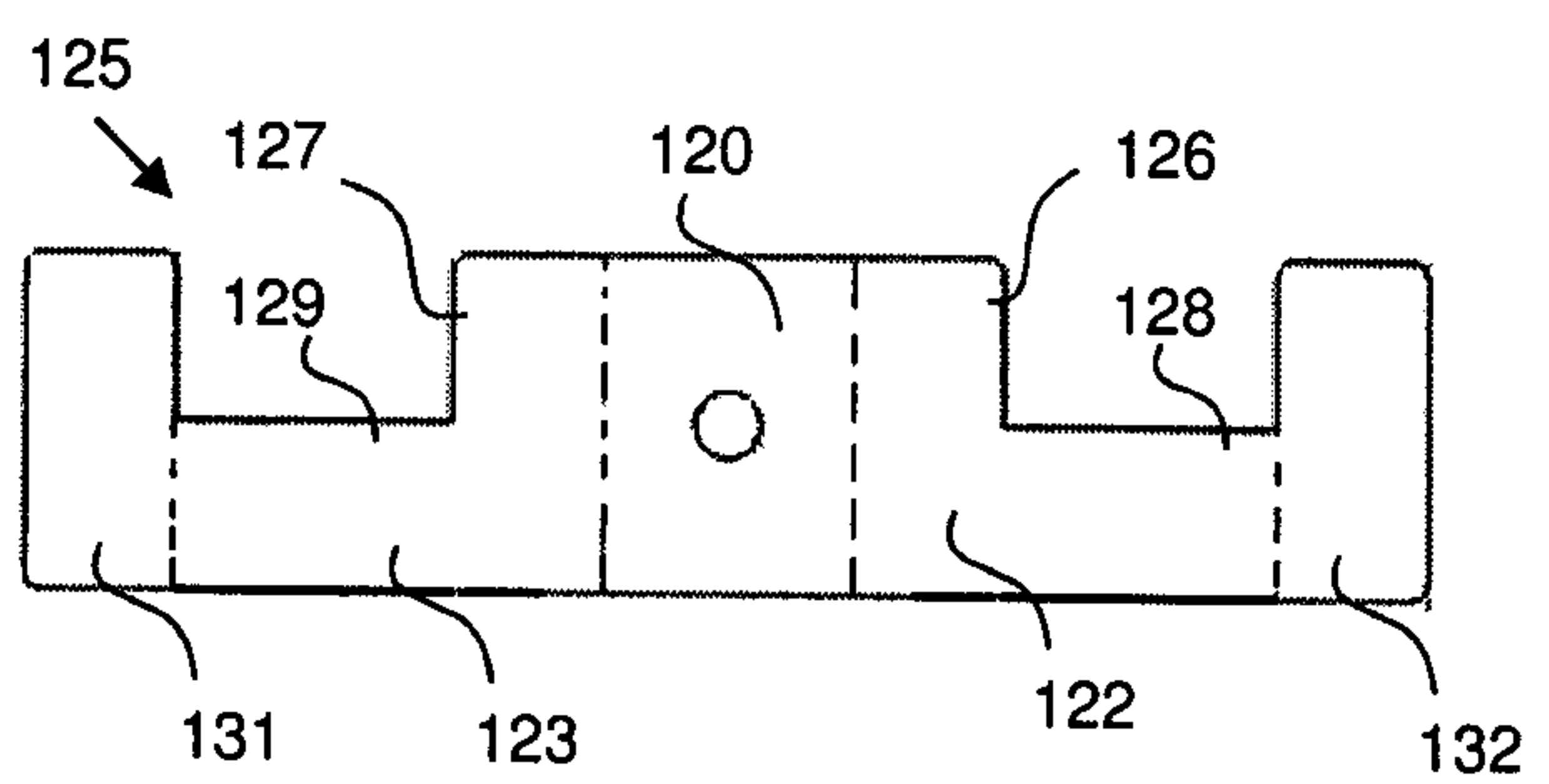
FIG 21**FIG 22A****FIG 22B****FIG 23A****FIG 23B**

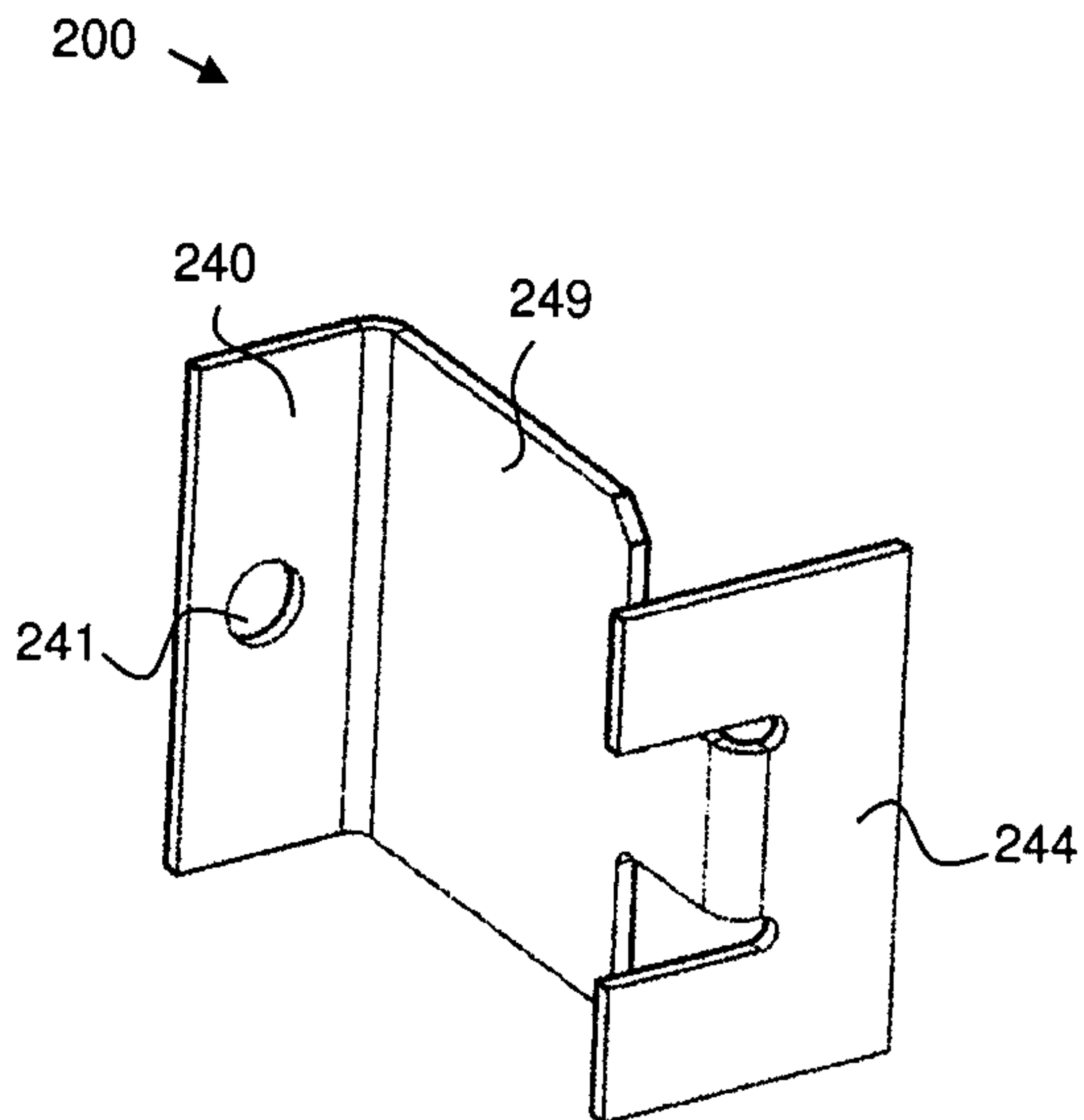
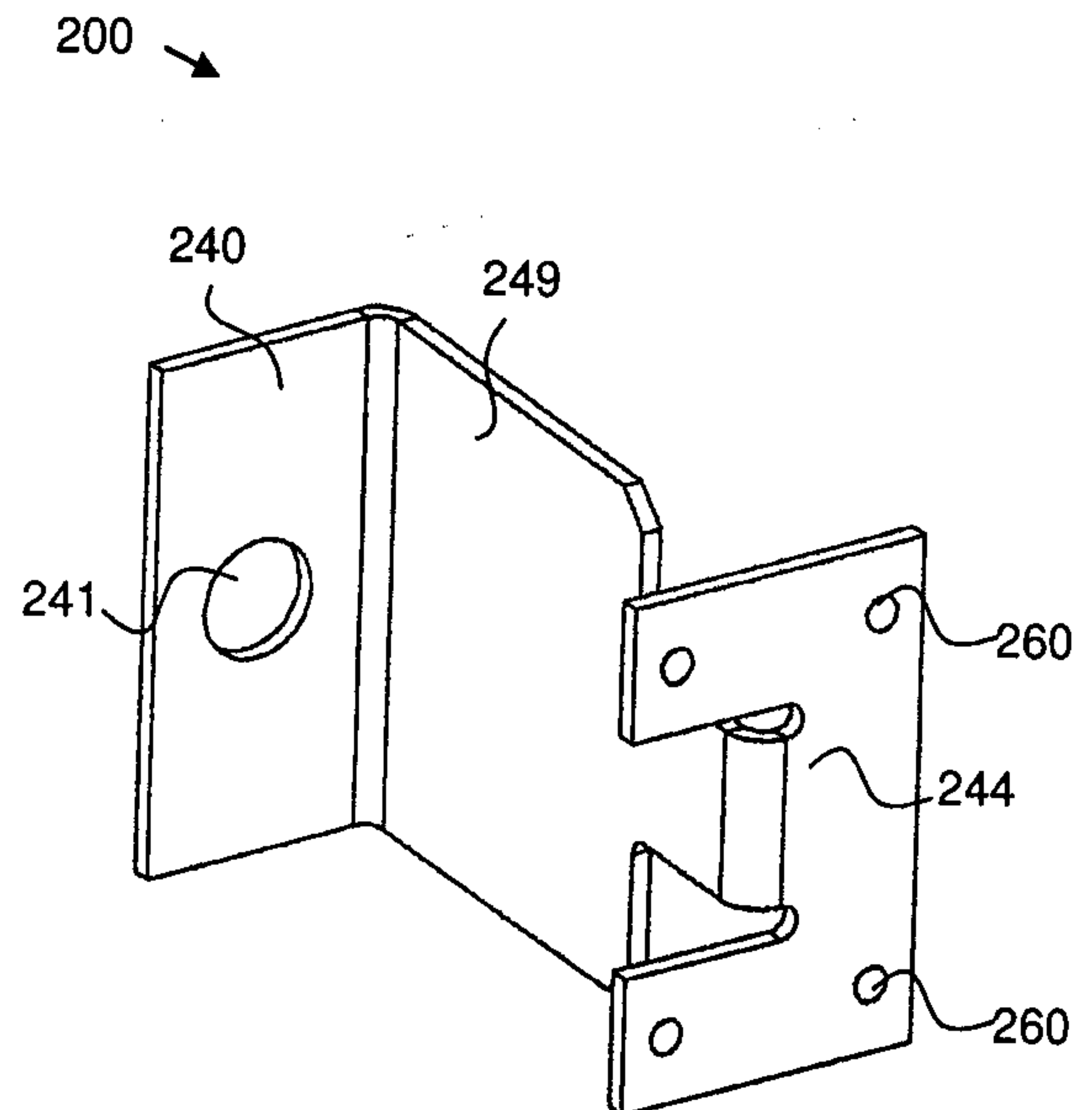
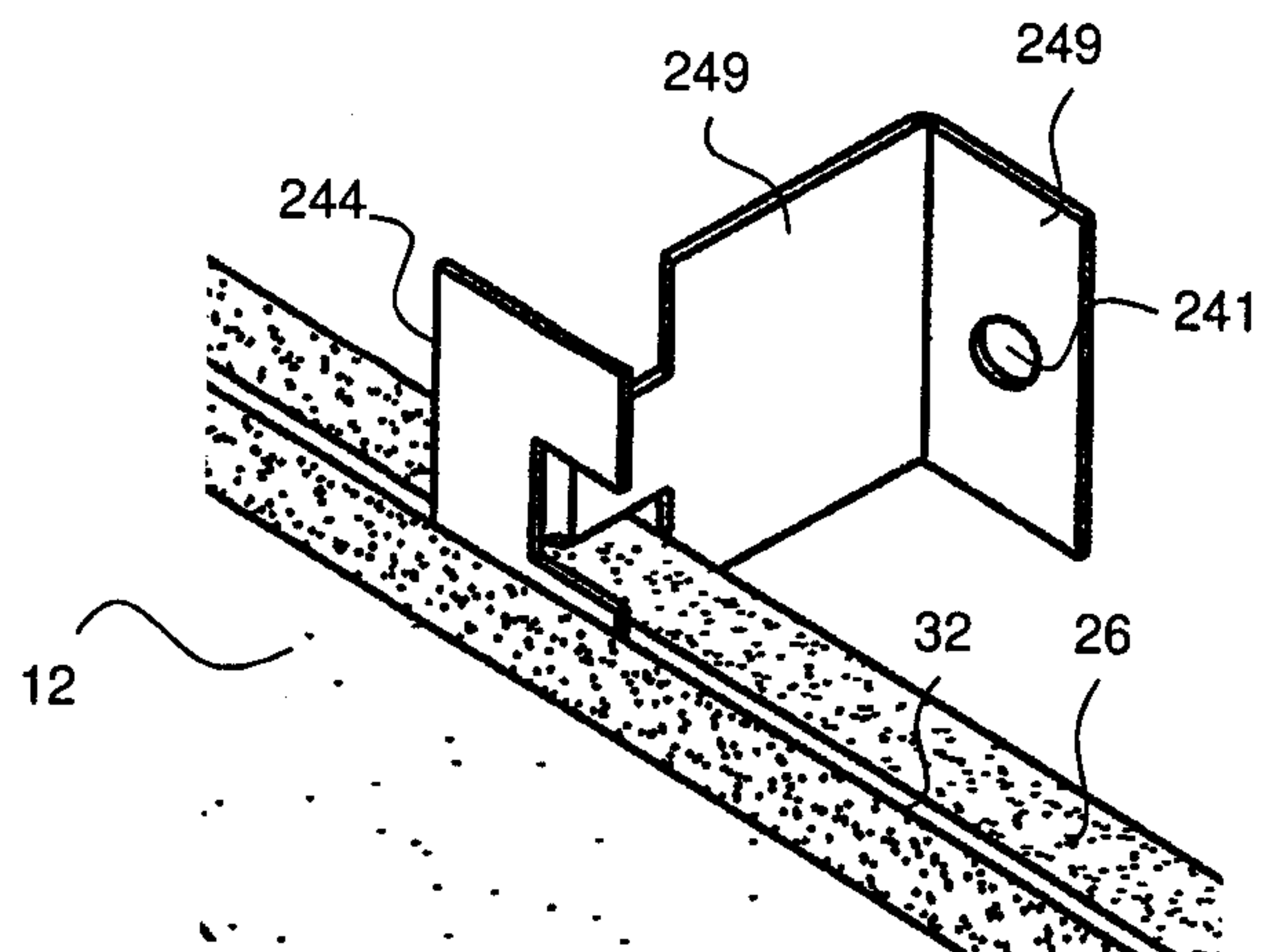
FIG 24**FIG 25****FIG 26**

FIG 27