(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 May 2008 (15.05.2008)

PCT

(10) International Publication Number
WO 2008/055320 A1

(51) International Patent Classification:
E04B 2/90 (2006.01) *E04D 3/366* (2006.01)
E04D 3/361 (2006.01) *F16B 5/00* (2006.01)
E04F 13/08 (2006.01) *E04B 9/24* (2006.01)
E04B 1/61 (2006.01) *E04F 13/07* (2006.01)

(21) International Application Number:
PCT/AU2007/001730

(22) International Filing Date:
9 November 2007 (09.11.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2006906257 9 November 2006 (09.11.2006) AU
2007903526 29 June 2007 (29.06.2007) AU

(71) Applicant *(for all designated States except US)*: **RE-TOWN PTY LTD** [AU/AU]; 5 Compton Street, North Lambton, NSW 2299 (AU).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **EDMAN, Robert, Alan** [AU/AU]; 5 Compton Street, North Lambton, NSW 2299 (AU).

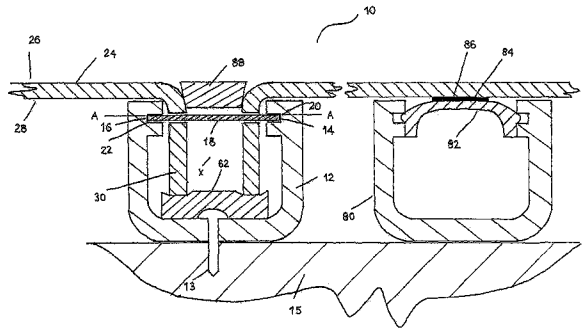
(74) Agent: **SPRUSON & FERGUSON**; GPO 3898, Sydney, NSW 2001 (AU).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *with amended claims*

(54) **Title:** A FASTENING SYSTEM AND A METHOD OF FASTENING A BUILDING PANEL



(57) **Abstract:** A fastening system (10) including; a support member (12) having a longitudinal axis (X). The support member (10) including a first channel (14) extending in a longitudinal direction parallel to the longitudinal axis, and a second channel (16) extending in a longitudinal direction parallel to the longitudinal axis, a first opening defined by the first channel facing a second opening defined by the second channel and the first and second openings being separated by a space (17). The fastening system includes a fastening element (18) having a first edge (20) which is insertable within the opening of the first channel (14), and an opposing second edge (22) which is insertable within the opening of the second channel (16), such that the fastening element (18) extends across the space (17). The fastening system includes a building panel (24) including a front face (26), a rear face (28) and a rearwardly extending mounting portion (30), a slot (32) being formed in the mounting portion (30), the slot (32) extending along a slot axis parallel to and adjacent an edge of the building panel and being positionable within the space (17). The fastening element (18) is insertable in the space (17) and displaced to a locked position in which the first edge (20) is within the slot (32) and the first edge (20) is within the first opening, thereby preventing removal of the mounting portion (30) from the support member (12), and an unlocked position in which the fastening element (18) is outside of the first opening, thereby permitting removal of the mounting portion from the support member (12).

WO 2008/055320 A1

A FASTENING SYSTEM AND A METHOD OF FASTENING A BUILDING PANEL

Field of the Invention

The present invention relates to a fastening system and a method of fastening a building panel to an underlying structure. In particular, the present invention relates to a system and method of fastening cladding sheets to planar building surfaces such as walls and ceilings. It will be appreciated by those skilled in the art that the invention is not limited to this particular field or application.

Background of the Invention

Building panels having a front decorative surface made of fibro, plastic, stone, sheet metals, glass and other such architectural materials are often fastened to the internal and external walls of buildings for aesthetic and other architectural purposes. Such building panels have particular application in the external cladding of buildings in which case the building's overall appearance can be dramatically influenced by the usage of building panels.

It is known to fasten building panels using adhesive tape located around the perimeter of the panel on the panel's underside. However, construction and building standards in many countries dictate that panels must be mechanically fixed to the building's underlying structure when the panel is located above a certain height. For example, in Australia building panels must be mechanically fixed when located more than 3 metres above the ground. Accordingly, the use of adhesive mounting alone is not permitted in certain applications.

A further disadvantage associated with adhesive fastening of building panels is that the high loading placed on building panels by wind can cause the panel to separate from the building, which poses a serious safety hazard.

Numerous mechanical systems are known for fastening building panels. Many of these mechanical systems require fastening with screws and/or bolts which pass through a backing portion of the panel and engage with the underlying building structure. A disadvantage of using screws or bolts is that they may be time consuming to install which adds to the end cost of the building panel assembly. A further disadvantage is that screw and bolt arrangements hold the edges of the building panel in predetermined, fixed locations and hence do not permit the panel to expand or contract, for example as the panel heats and cools under the effects of the sun. This is known to result in warping of

the panels which may compromise their structural integrity and may also result in the panel assembly appearing unsightly.

A further disadvantage of securing building panels with screw and bolt type fasteners is that the measuring and positioning of the fasteners can be a delicate process and prone to human errors. Small errors in placement and angular alignment between panels can have a dramatic effect on the assembled panel matrix. Accordingly, tradespeople installing such panels require special training and are required to take particular care.

Building panel fastening systems have previously been proposed which permit two adjacent panels in an assembled matrix to be fastened to the underlying structure along their adjacent edge using a single fastener. Whilst such systems may reduce the installation time for mounting the panel matrix, a disadvantage of these systems is that removal of the common fastener causes both panels to be released from the underlying support. Accordingly, it is generally not possible to remove a single panel from the matrix without removing the adjacent panels. This is particularly problematic when a panel in a central region of the matrix must be replaced, which accordingly necessitates significant handling of all the adjacent panels. Such systems often also dictate the order in which the panels must be installed, such that a panel can only be secured to the wall after or while an adjacent panel is being secured.

Object of the Invention

It is the object of the present invention to overcome or substantially ameliorate at least one of the above disadvantages, or at least to provide a useful alternative.

Summary of the Invention

In a first aspect, the present invention provides a fastening system comprising:

a support member having a longitudinal axis, said support member including a first channel extending in a longitudinal direction parallel to said longitudinal axis, and a second channel extending in a longitudinal direction parallel to said longitudinal axis, a first opening defined by the first channel facing a second opening defined by the second channel and the first and second openings being separated by a space;

a fastening element having a first edge which is insertable within said opening of said first channel, and an opposing second edge which is insertable within said opening of said second channel, such that said fastening element extends across said space; and

a building panel including a front face, a rear face and a rearwardly extending mounting portion, a slot being formed in said mounting portion, said slot extending along a slot axis parallel to and adjacent an edge of said building panel and being positionable within said space,

wherein said fastening element is insertable in said space and displaced to a locked position in which said first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member, and an unlocked position in which said fastening element is outside of said first opening, thereby permitting removal of said mounting portion from said support member.

The fastening element has a first axis and preferably includes:

a first plate portion having a first edge extending generally parallel to the first axis;

a second plate portion having a second edge extending generally parallel to the first axis, the second plate portion being coplanar with the first plate portion;

wherein the first edge is offset relative to the second edge in a direction which extends parallel to the first axis.

The fastening element preferably includes:

a body having the general form of a major segment of a circle when viewed in a first plane extending parallel to the building panel front face, the first edge and the second edge being located on opposing sides of an arc defined by the major segment.

The fastening element preferably has an axis of symmetry when viewed in the first plane, and the first edge and the second edge are located on opposing sides of the axis of symmetry.

The fastening element preferably has a varied thickness when viewed in a plane extending perpendicular to the first plane.

The fastening element preferably has a rotational drive engagement formation located generally at a centre of the arc.

The support member preferably includes a first arm and a second arm and a web extending between the first arm and the second arm,

further wherein the mounting portion includes a third channel adapted to receive one of the first arm and the second arm.

The first arm preferably includes a first engagement formation located adjacent to the space, the first engagement formation being engageable with a second engagement formation formed on the third channel.

The first arm preferably includes a third engagement formation located on an opposing side of the first arm relative to the first engagement formation, the third engagement formation being engageable with a fourth engagement formation formed on the third channel.

The support member preferably includes a slot extending parallel to the longitudinal axis, the slot being adapted to receive a coupler plate for connecting the support member to another support member.

In a second aspect, the present invention provides a method of fastening a building panel, said method including the steps of:

securing a first support member, said support member having a longitudinal axis and including a first channel extending in a longitudinal direction parallel to said longitudinal axis and a second channel extending in a longitudinal direction parallel to said longitudinal axis, whereby a first opening defined by the first channel faces a second opening defined by the second channel, and the first and second openings are separated by a space;

inserting a first edge of a fastening element within said space, and inserting an opposing, second edge of said fastening element within said space, such that said fastening element extends across said space; and

positioning a mounting portion of a building panel within said space, said building panel having a front face and a rear face, said mounting portion extending rearwardly and having a slot formed therein, said slot extending parallel to an edge of said building panel, said mounting portion initially being located such that said first edge is outside said slot; and

displacing the fastening element within said space to a locked position in which the first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member.

The step of displacing the fastening element preferably includes rotating a body portion of the fastening element having the general form of a major segment of a circle when viewed in a first plane extending parallel to the building panel front face.

The step of displacing the fastening element preferably includes sliding the fastening element along the longitudinal axis.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Fig. 1 is a cross-sectional view of an assembled fastening system of a first embodiment;

Fig. 2 shows a support member of the system of Fig. 1;

Fig. 3 shows the fastening element of the system of Figure 1;

Fig. 4 shows a second embodiment of a fastening element;

Fig. 5 shows a side view of the fastening element of Fig. 4;

Fig. 6 shows a third embodiment of a fastening element;

Fig. 7 shows a side view of the fastening element of Fig. 6;

Fig. 8 shows a perspective view of a building panel and the mounting portion of the system of Fig. 1;

Fig. 9 shows a second embodiment of a mounting portion and building panel;

Fig. 10 is a schematic of an assembled matrix of building panels;

Fig. 11 is a perspective schematic view showing the interface between the parallel sides of two adjacent panels in an assembled matrix;

Figs. 12a to 12c are top sectional views showing three different modes of operation of the fastening element,

Fig. 13 is an isometric view of a fastening element of the fastening system of Fig. 1;

Fig. 14 is a plan view of the fastening element of Fig. 14;

Fig. 15 shows a T coupler of the fastening system,

Fig. 16 shows an X coupler of the fastening system,

Fig. 17 shows an L coupler of the fastening system,

Fig. 18 shows an end view of a support member according to one embodiment of the fastening system;

Fig. 19 shows an end view of a support member according to a further embodiment of the fastening system;

Fig. 20 shows an end view of a support member according to a further embodiment of the fastening system;

Fig 21 is an end view of an embodiment of the invention used for masonry building panels;

Fig. 22 is a top view of a masonry mounting portion of the fastening assembly;

Fig. 23 shows an alternative embodiment of a mounting portion of the fastening system;

Fig. 24 shows a snap cover for the system;

Fig. 25 depicts an embodiment of the fastening system used on a corner of a support structure;

Fig. 26 shows an embodiment of the fastening system used for thin building panels;

Fig. 27 shows an alternative embodiment of the fastening system used on a corner of a support structure;

Fig. 28 depicts an embodiment of the fastening system in which the building panel projects at 90 degrees to the support member base;

Fig. 29 depicts an end view of an embodiment of the fastening system used with masonry products;

Fig. 30 depicts a brace system of the assembly;

Fig. 31 depicts an embodiment of a mounting portion of the fastening system;

Fig. 32 depicts an alternative embodiment of a mounting portion of the fastening system;

Fig. 33 depicts a support batten assembly of the fastening system;

Fig. 34 depicts an alternative embodiment of a support batten assembly of the fastening system;

Fig. 35 depicts a top view of a batten fastener of the fastening assembly;

Fig. 36 depicts an alternative embodiment of a batten fastener of the fastening assembly;

Fig. 37 is an isometric view of the masonry mounting portion of Fig. 22;

Fig. 38 is a side view of the masonry mounting portion of Fig. 22;

Fig. 39 depicts a further embodiment of a fastening system; and

Fig. 40 depicts a further embodiment of a fastening system have a snap connect building panel connector.

Detailed Description of the Preferred Embodiments

Fig. 1 depicts a fastening system 10. The system 10 includes a support member 12 in the form of an extruded section, such as an aluminium extrusion extending in a longitudinal direction, parallel to a longitudinal axis X, shown in Fig. 1 and extending into the page. As shown in Fig. 2, the support member 12 has a generally U-shaped profile when viewed in cross-section. The U-shaped support member 12 includes a web

11 connected to a first arm 13 and a second arm 21. At the free end of the first arm 13 there is a first channel 14 which extends parallel to the longitudinal axis X.

A second channel 16 is located at the free end of the second arm 21 and the second channel 16 also extends in a longitudinal direction parallel to the longitudinal axis X, such that an opening of the first channel 14 faces an opening of the second channel 16, and the first and second openings are separated by a space 17. The support member 12 may be secured to the underlying building structure 15 with screws 13, rivets, welding or another suitable means.

In an embodiment depicted in Fig 2, the support member 12 includes a first groove 250 located near the intersection between the web 11 and the first arm 13. The support member 12 further includes a second groove 252 located near the intersection of the web 11 and the second arm 21. The first groove 250 and the second groove252 are separated by a second space 254.

The support member 12 is arranged in a grid with other like support members 12. The grid may be assembled on site, or alternately, the grid may be factory pre-assembled to reduce installation times for the fastening system 10.

Fig. 3. depicts a first embodiment of a fastening element 18 of the system 10. The fastening element 18 has a first edge 20 which is insertable within the opening of the first channel 14. The fastening element 18 has an opposing second edge 22 which is insertable within the opening of the second channel 16, such that the fastening element 18 extends across the space 17, as is depicted in Fig. 1.

The first edge 20 of the fastening element 18 is parallel to the second edge 22, and the first and second edges 20, 22 are longitudinally offset relative to each other. Accordingly, the first, leading edge 20 is locatable within the first channel 14, and the second, trailing edge 22 is locatable in the second channel 16 at a different position in the longitudinal direction.

In the embodiment depicted in Fig. 3, the fastening element 18 is formed of a first generally rectangular portion 21 defining the first edge 20. The first rectangular portion 21 is adjacent to and integrally formed with a second generally rectangular portion 23 defining the second edge 21. The fastening element 18 is made from stainless steel plate, galvanised steel plate, plastic or any other suitable engineering material. The fastening element 18 may have a hole or other such aperture or protrusion formed on it for engaging the head of a driving tool. The fastening element 18 interferingly fits within the channels 14, 16.

Fig. 4 depicts a second embodiment of a fastening element 19 of the system 10. The fastening element 19 has a body 27 having the general form of a major segment of a circle (i.e. a profile defined by an arc intersecting with a chord and being greater than 50% of the surface area of a circle that would be formed by the arc if it traced a full circle) when viewed in a first plane extending parallel to a building panel 24 front face 26.

The fastening element 19 has a first edge 29 and a second edge 31 being located on opposing sides of an arc which defines the major segment. The first edge 29 is insertable within the opening of the first channel 14 and the second edge 22 is insertable within the opening of the second channel 16, such that the fastening element 18 extends across the space 17.

The fastening element 19 has an axis of symmetry AA when viewed in the first plane extending parallel to the building panel 24 front face 26 and the first edge 29 and the second edge 31 are located on opposing sides of the axis of symmetry AA.

The fastening element 19 has a varied thickness when viewed in a plane extending perpendicular to building panel 24 front face 26, as shown in Fig. 5. The varied thickness of the fastening element 19 permits an interfering fit of the first and second edges 29, 31 within the channels 14, 16. Figs. 5 and 7 depict embodiments of the fastening element 19 having different thicknesses. The fastening element 19 may be formed by pressing, casting or another suitable method.

The fastening element 19 may have an aperture or protrusion formed on it for engaging the head of a driving tool, such as the impression shown in Fig. 4 for receiving a Philips head screw driver.

The fastening element 19 has a straight edge 33, defined by the chord 33 which together with an arc defines the shape of the major segment. The fastening element 19 can be initially oriented within the space 17, such that the axis of symmetry AA extends perpendicular to the longitudinal axis X. In this configuration, a portion of the fastening element 19 enters within only one of the first channel 14 and the second channel 16. However, by rotating the fastening element 19 about the centre of the arc through an angle of 90 degrees, the first and second edges 29, 31 will enter both of the first and second channels 14, 16. By rotating the fastening element 19 a further 90 degrees in the same direction, it will reach an orientation similar to the starting position, but with a portion of the fastening element 19 entering within the other of the first channel 14 and the second channel 16. Accordingly, by rotating the fastening element 19 the user can select between securing an edge of a first building panel 24, an edge of an adjacent second building panel, or both adjacent building panels 24.

An embodiment of a building panel 24 of the system 10 is shown in Fig. 8. The building panel 24 has a front face 26, a rear face 28 and a mounting portion 30. The mounting portion 30 extends rearwardly and has at least one slot 32 formed therein.

In the embodiment of Fig 8, a first slot 32 has a first closed end 34 and a second open end 36 and the first slot 32 extends along a slot axis, which is parallel to and adjacent an edge of the building panel 24. The mounting portion 30 is positionable within the space 17 formed in the U-shaped support member 12.

The building panel 24 may be any internal or external building panel, such as a cladding member located against the side of a building or other structure. Alternatively, the building panel 24 may be a wall for use in a modular office partitioning system for example or a ceiling tile, or any other such generally planar panel attached to a structure.

As shown in the embodiment of Fig. 8, the mounting portion 30 includes a second slot 38 extending along the slot axis in an opposing direction to the first slot 32. The second slot 38 has a closed first end 40 and an open second end 42. In this embodiment, the mounting portion 30 is formed by a side wall 44 of the building panel 24 which has been folded so that it is perpendicular to the front face 26. The side wall 44 includes a cut-out 46 formed along its rear edge 50, and the second end 36 of the first slot 32 terminates at the cut-out. Similarly, the second end 42 of the second slot 38 terminates at the cut-out 46. The cut-out 46 and the two slots 32, 38 together define a T-shaped aperture in the side wall 44 of the panel 24. Similarly, the three additional side walls of the panel 24 have T-shaped apertures formed therein.

Fig. 9 shows an alternative embodiment of the building panel 24 and mounting portion 30 particularly suitable for use with building panels 24 which are tiles or masonry products. The mounting portion 30 is defined by a bracket 52 which is bonded with an epoxy resin, or otherwise secured to the underside of the tile or masonry product.

A first bracket 52 is secured to the masonry product and has a slot 54 extending parallel and adjacent an edge of the tile 24, such that the slot 54 is open at a first end 56 and closed at an opposing second end 58. A like, second bracket 60 is also secured parallel and adjacent the same edge of the masonry product, but facing the opposite direction, such that the slot 54 of the first bracket 52 extends in an opposing direction along the slot axis to the slot 54 of the second bracket.

A gap 55 is located between the first and second brackets 52, 60. The gap 55 and the two slots 54 together define a t-shaped aperture. Two additional brackets 52, 60 are located adjacent to each remaining edge of the tile or masonry panel 24.

The fastening element 18 is slideable relative to the support member 12 in the longitudinal direction within the space 17. The fastening element 18 moves between a locked position in which the fastening element 18 enters the open second end 36 of the first slot 32, thereby preventing removal of the mounting portion 30 from the first support member 12, and an unlocked position in which said fastening element 18 is outside of the second end of the first slot 32 thereby permitting removal of the mounting portion 30 from the first support member 12.

An elastic element 62 in the form of a foam or rubber strip is located on the web 11 of the U-shaped support member 12 between the arms 13, 21. When the mounting portion 30 is inserted into the space 17, the rear edge 50 of the side wall 44 contacts with the elastic element 62. This provides a biasing force that urges the building panel 24 away from the web of the U-shaped support member 12. Accordingly, the mounting portion 30 applies a shear force to the fastening element 18, which assists in preventing the panels 24 from rattling in windy conditions.

The building panel 24 is arranged in a matrix 100 of like building panels 24 which is schematically shown in Fig. 10. Each panel 24 has a support member 12 extending parallel to and adjacent each of the panel's 24 peripheral edges. Accordingly, in the instance that the building panel 24 is rectangular, there are four peripheral support members 12 each located adjacent to an edge of the building panel 24. Adjacent edges of adjacent panels 24 share a single, common support member 12.

The fastening system 10 includes coupler plates 63, 65, 67 which are inserted into the openings in two adjacent support members 12, resulting in interconnection of those adjacent support members 12 Fig. 15 shows a "T" coupler plate 63 for use along a peripheral edge of the matrix 100. Fig. 16 shows an "X" coupler 65 for use in an intermediate region of the matrix 100. The coupler plate 63, 65, 67 is located at the junction between two or more support members 12. The T coupler plate 63 may be used to join a support member 12 with a perpendicular support member 12. The X coupler 65 may be used to join two parallel support members 12 with two perpendicular support members 12. The coupler members 63, 65, 67 ensure correct angular orientation of either 0° or 90° at the junctions of adjacent support members 12.

When an X coupler is used, one support member 12 extending in a first longitudinal direction has cut-outs formed in the free ends of the first arm 13 and the second arm 21. The two cut-outs have a width equal to or slightly larger than the width of each arm of the X coupler. The central junction portion 71 between the arms of the X coupler is inserted within the U-shaped support member 12, such that two arms of the X

coupler project perpendicularly to the first longitudinal direction through the cut-outs. The remaining two arms of the X coupler project parallel to the longitudinal direction, within the space of the U shaped support member 12. Accordingly, the two arms of the X coupler which project perpendicular to and beyond the support member 12 are inserted within the spaces 17 of two additional support members 12 which extend perpendicular to the first support member 12 and on each side thereof.

When the T coupler 63 is used, the support member 12 has a cut-out formed in only one of the first arm 13 and a second arm 21, and the T coupler 63 is inserted within the U shaped support member in a similar manner as described above, such that the stem of the T coupler 63 projects perpendicularly to the first longitudinal direction through the cut-out. The stem of the T coupler 63 which projects through the cut-out is inserted within the space 17 of an additional, perpendicularly extending support member 12.

An L-coupler 67 as shown in Figure 13 is located at each corner of the matrix 100. Each of the two arms of the L-coupler 67 is inserted into the end of adjacent perpendicular support members 12.

In an alternative mode of operation, the T coupler 63 may be arranged such that each arm and the stem of the T coupler 63 are inserted into the ends of a separate support member 12. Accordingly, three support member 12 may be connected to the T coupler 63, in an arrangement having two parallel support members 12, and one perpendicular support member 12, corresponding to the shape of the T coupler 63.

Similarly, the X coupler 65 may be arranged such that each arm of the X coupler 65 is inserted into one end of a support member, permitting the mounting of two parallel support members 12, and two perpendicular support members 12, corresponding to the shape of the X coupler 65.

The appendages of the T coupler 63, the X coupler 65 and the L coupler 67 may be located in channels 250, 252 formed in the support member 12 and shown in Figure 2. When a building panel 24 is located in the matrix 100 adjacent to another panel 24, the mounting portions 30 of each panel 24 extend into the space 17 of the common support member 12. Accordingly, the fastening element 18, located within the channels 14, 16 can simultaneously secure two adjacent panels. There may be more than one fastening element 18 located along each side of each building panel 24.

As shown in Fig. 1, the system 10 may also include an auxiliary support member 80 which is securable to the underlying support structure 15. The auxiliary support member has a closed profile, which may be formed by placing a cap 82 on a U-shaped support member 12 between the two arms of the U. Alternatively, the auxiliary support

member may be formed from a closed section extrusion, a rectangular solid bar or another such beam or bar. A hook and loop type fastener, such as a Velcro™ strip 84 is connected to the cap 82 of the auxiliary support member 80, and is engageable with a corresponding fastener 86 connected to the rear surface of each panel 24. The engagement between the fasteners 84, 86 acts to support the panels 24 during mounting, and also provides a secondary support for each panel 24 after the system 10 has been assembled. The engagement of the fasteners 84, 86 reduces any movement of the panels 24 during wind loading when the panels 24 are externally mounted. However, the fasteners 84, 86 permit the panels 24 to move slightly relative to each other to accommodate thermal expansion.

Alternative embodiments of the support member 12 are shown in Figs. 18, 19 and 20. In Fig 18, the two generally circular extruded apertures 90, 92 which have openings facing each other together define a longitudinally slot which is adapted to receive a first tongue member 94 of the coupler plates, 63, 65, 67.

In the embodiment of fig. 19, there are additional slots 96, 98 which are adapted to receive additional coupler plates 63, 65, 67 which are oriented perpendicular to a first coupler plate 63, 65, 67, closest to the base of the support member 12. This permits the overall rigidity of the assembled matrix 100 to be increased.

An embodiment of the mounting portion 30 depicted in Fig. 21 is used for securing masonry products such as stone and ceramic. The mounting portion 30 includes a first projection 320 and a second projection 322 and a web 324 extending between the first projection 320 and the second projection 322. The first and second projections 320, 322 and the web 324 together define a third channel adapted to receive one of the first arm and said second arms 13, 21 of the support member 12.

The projection 320 transfers the bending moment applied by the weight of the building panel 24 (for example when heavy masonry products are used) to the base of the support member 12.

In the embodiment shown in Fig. 29, a protrusion 304 is located towards the end of the arm projection 320, which serves the dual purpose of applying the load as close as possible to the base of the support member 12, and also permitting the mounting portion 30 to be inserted over the first arm 13 and the second arm 21 of the support member 12.

Also shown in the embodiment of Fig. 29, each support member 30 includes a flange 306 which projects generally perpendicular to the underlying support structure 15. The flange 306 is provided at a desired length to permit mounting of a building panel 24 such as a masonry block having a given thickness. The flange 306 is connected to a pin

309 or other such projections which engages with a corresponding hole or recess 311 in the masonry block. The mounting projection may be attached to the building panel with epoxy and/or mechanical fasteners such as bolts.

The first projection 320 of a mounting portion 30 is separated from the first projection 320 of an adjacent mounting portion 30 by the space 17, such that the slots 32 of each mounting portion 30 face each other as depicted in Fig. 21.

Fig. 22 shows a top view of a masonry mounting portion 30 in isolation.

Alternative embodiments of the mounting portion 400, 500 are shown in Fig. 23, and are used for securing glass, Perspex, metal cladding and other such relatively thin architectural materials. The mounting portions 400, 500 function similarly to the mounting portion 30 described above. In addition, the first projection 320 includes a first engagement formation 502 defined by a projection located adjacent to the space 17 of the support member 12.

Fig 25 shows the first engagement formation 502 being engageable with a second engagement formation 503 defined by a groove formed on the support member 12.

The mounting portion 400, 500 first projection 320 includes a third engagement formation 506 located on an opposing side of the first projection relative to the first engagement formation. The third engagement formation 506 is defined by a projection and engageable with a fourth engagement formation 507 defined by a groove formed on the support member 12. Accordingly, the engagement formations permit the mounting portion to snap into engagement with the support member 12.

Fig 24 depicts a snap cover 520 which may be used to covers the space 17 after two adjacent mounting portions 30 are assembled in the matrix 100.

Fig. 25 depicts a fastening system 10 for use at a 90 degree corner of a structure. The snap cover 520 bridges the space 17 between two perpendicular building panels 24, and provides a flush, uniform finished assembly.

Fig. 26 shows the fastening system 10 being used with a relatively thin building panel 24 such as glass. The thin panel 24 may be supported by a side recess, as shown in the top of Fig. 26, or alternatively a front groove as shown in the bottom portion of Fig. 26.

Fig. 27 depicts the system 10 being used at a corner of the underlying structure 15, such that a corner cap 530 snaps into the spaces 17 of two perpendicular support members 12, and the corner cap 530 has a surface which sits generally flush with the two perpendicularly mounted building panels 24.

Fig. 28 shows an alternative embodiment in which a building panel is mounted perpendicular to the web 11 of the support member 12.

As shown in Fig. 30, when supporting heavy building panels 24, such as masonry panels, an additional brace 308 may be used. The brace 308 may be a strap or metal sheet for example, which is secured to the underlying building structure 15 at a first end and at a second end secured to the end on one or both of the first arm 13 and the second arm 21 of the support member 12.

In the embodiment of Figs. 31 and 38, protrusions 304 of the mounting portion bracket 30, 211 are formed by a portion of the bracket 304 which has been stamped or folded. Accordingly, the bracket 211 may be formed by an extrusion process, and the protrusions are then formed at desired intervals in a secondary forming process.

The protrusion 304 contacts with the inner wall of the support member 12, and provides a counter force to the bending moment created by the weight of the building panel 24.

As shown in Fig. 21, when the brackets 211 are mounted in the system 10, the two flanges 306 are located side by side and generally parallel to each other. In this embodiment, each flange 306 has a small groove 310 formed therein. The grooves 310 face each other in the system such that a sealing bead 312 can be inserted between the two brackets 211, and positioned within the grooves 310. The bead 312 prevents water from entering into the interior of the support member 12 and accordingly assists to prevent rusting of the components of the fastening system 10.

Fig. 39 shows an alternative embodiment of the fastening system 10 for masonry building panels 24. The system 10 uses a pin 309 as discussed above in relation to Figs. 37 and 38 for securing the building panel 24. The mounting portion 30 may be formed by a plurality of pressed metal products which have been welded or otherwise attached together.

A spacer 360 can be located between the mounting portion 30 and the building panel 24. The protrusion 304 is angled relative to the web 11 of the support member 12.

Fig. 40 shows an embodiment of the fastening system 10 utilising a snapping building panel connector 700. The support member is secured to the underlying support structure 15 in the normal manner. In this embodiment, the mounting portions 30 are then installed and fastened to the support member 12 using fastening elements 18, 19. Each mounting portion 30 includes a projection 708 which extends toward the front surface 26 of the building panel 24, at an angle other than 90 degrees relative to the web 11.

The edge of the building panel 24 is angled to correspond to the angle of the projection, and the projections of two adjacent mounting portions 30 are directed away from each other. After the mounting portions 30 are installed, a first building panel 24 is then installed, and a second adjacent building panel 24 is also installed.

A wedge shaped snap connector 700 is inserted in the space between the two building panels 24. The snap connector 700 has cut outs to receive the projections 708. The snap connector 700 also has outwardly biased arms 702 which snap into engagement with grooves 722 formed within the space 17 by the two adjacent mounting portions 30. The snap connection between the connector 700 and the grooves 722 holds the building panels 24 in position.

A spring 724 may be located in a cavity formed in the rear side of the snap connector 700. The spring 724 provides additional biasing between the connector 700 and the mounting portion 30. The wedged shaped profile of the snap connector 700 secures the building panels 24 in place.

The installation of the system 10 will now be described. When an underlying structure 15 is to be clad with building panels 24, support members 12 are mounted to the structure 15 in a grid layout corresponding to the intended positioning of the edges of the panels 24 in the matrix 100. One or more fastening elements 18 are located in each space 17 of each support member 12.

As shown in Fig. 1, a first panel 24 (located on the right hand side of Fig. 7) is placed with the rear edge 50 of it's side wall 44 extending into the space, such that the panel 24 is positioned adjacent the underlying structure 15. Insulating batts (not shown) may be placed between the underlying structure 15 and the panel 24, against the rear face 28 of the panel 24.

The fastening element 18 of the first embodiment is initially located within the channels 14, 16 at a longitudinal location along the axis X which permits the first rectangular portion 21 of the fastening element 18 to enter the cut-out 46. The fastening element 18 is then manually slid along the longitudinal axis X with a screw driver, finger or other tool towards the closed end 34 of the first slot 32. At this point of the assembly, the first panel 24 is secured along one of its four edges. Similarly, the same procedure is performed on the three other edges of the panel 24.

Because the first edge 20 and the second edge 22 of the fastening element 18 are offset relative to each other along the longitudinal direction, the adjacent second panel 24 is then located with the rear edge 50 of it's side wall 44 extending into the space 17, and the second rectangular portion 23 of the fastening element is permitted to enter the cut-out

46 of the second panel 24. By subsequently sliding the fastening element 18 further towards closed end of the first slot 32, the fastening element 18 enters the first slot 32 of the second panel 24. Accordingly, the first and second panels 24 are then both secured along their adjacent edge.

Fig. 12a shows a top sectional view taken through axis A-A from Fig. 1. In this position, the fastening element 18 is within the first slot 32 of a first building panel 24a. Accordingly, the first building panel 24a is secured to the support member 12. However, the fastening element 18 is in the cut-out 46 of the second building panel 24b, and accordingly, the second building panel 24b is not secured to the support member 12.

Fig 8b shows the scenario where the fastening element has been slid parallel to the X axis such that both the first building panel 24a and the second building panel 24b are secured to the support member 12.

Fig. 8c shows the alternative where the fastening element 18 is within the second slot 38 of a second building panel 24b. Accordingly, the second building panel 24b is secured to the support member 12. However, the fastening element 18 is in the cut-out 46 of the first fastening element 24a. Accordingly, the first building panel 24a is not secured to the support member 12.

In a further mode of operation not shown in the drawings, the fastening element 18 may be located in the first slot 32 of a first building panel 24a and also in the first slot 32 of the second building panel 24b, thereby both the first building panel 24a and the second building panel 24b are secured to the support member 12.

The offset geometry of the first edge 20 and the second edge 22 of the fastening element 18 permits the fastening element 18 to be positioned in a location that will secure either one of the two adjacent panels 24, or both of the adjacent panels 24. Accordingly, a single panel 24 can be selectively removed from the matrix without unlocking the adjacent panels 24.

When a building panel 24 is located vertically, such as against a wall, for each of the vertically extending side walls of the panel 24, the fastening element 18 is generally slid to a position in which it is located in the lower of the first slot 32 and the second slot 38. This prevents the fastening element 18 from moving under the effects gravity in the instance that the fit between the fastening element 18 and the channels 14, 16 is not an interference fit.

When the matrix of panels 24 is secured to the underlying support structure 15, a bead of flexible rubber or foam 88 may be placed in the gap between adjacent panels 24, thereby hiding the fastening elements 18.

The operation of the fastening element 19 of the second embodiment operates in a similar manner, such that either one of two adjacent building panels 24, or alternatively both building panels 24 may selectively be secured to the support member 12.

As depicted in Fig. 33, in order to cut back installation time, the fastening system 10 may be supplied to a building site already partially assembled in a matrix 100. The support members 12 are connected off site to a matrix of rigid battens 600. Each batten has holes formed at predetermined intervals along its length, and a nut 602 is attached to the inside of the batten 600 by welding or another such means over the hole. Threaded bolts are placed within threaded holes formed on the support structure 15. The threaded bolts are placed to correspond with the location of each of the nuts 602.

A fastener 606 is connected to each bolt. The fastener 606 has arms 608 which can be manually engaged to effect rotation of the fastener 606. When the preassembled batten matrix 600 is positioned over the support structure 15, each of the fasteners 606 is rotated manually or with a driving tool to cause each nut 602 to engage one of the bolts. The assembly teams can ensure correct alignment of the matrix 100 by adjusting each of the fasteners 606 by a desired amount.

Fig 35 shows the fastener 606 for use along the length of the support member 12. Fig 36 shows an alternative fastener 607 which is used at an intersection of perpendicular support members 12.

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

Claims:

1. A fastening system comprising:

a support member having a longitudinal axis, said support member including a first channel extending in a longitudinal direction parallel to said longitudinal axis, and a second channel extending in a longitudinal direction parallel to said longitudinal axis, a first opening defined by the first channel facing a second opening defined by the second channel and the first and second openings being separated by a space;

a fastening element having a first edge which is insertable within said opening of said first channel, and an opposing second edge which is insertable within said opening of said second channel, such that said fastening element extends across said space; and

a building panel including a front face, a rear face and a rearwardly extending mounting portion, a slot being formed in said mounting portion, said slot extending along a slot axis parallel to and adjacent an edge of said building panel and being positionable within said space,

wherein said fastening element is insertable in said space and displaced to a locked position in which said first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member, and an unlocked position in which said fastening element is outside of said first opening, thereby permitting removal of said mounting portion from said support member.

2. The fastening system of claim 1, wherein said fastening element has a first axis and includes:

a first plate portion having a first edge extending generally parallel to said first axis;

a second plate portion having a second edge extending generally parallel to said first axis, said second plate portion being coplanar with said first plate portion;

wherein said first edge is offset relative to said second edge in a direction which extends parallel to said first axis.

3. The fastening system of claim 1, wherein said fastening element includes:

a body having the general form of a major segment of a circle when viewed in a first plane which passes through said first edge and said second edge, said first edge and said second edge being located on opposing sides of an arc defined by said major segment.

4. The fastening system of claim 3, wherein said fastening element has an axis of symmetry when viewed in said first plane, and said first edge and said second edge are located on opposing sides of said axis of symmetry.

5. The fastening system of claim 4, wherein said fastening element has a varied thickness when viewed in a plane extending perpendicular to said first plane.

6. The fastening system of claim 5, wherein said fastening element has a rotational drive engagement formation located at or adjacent a centre of said arc.

7. The fastening system of claim 1, wherein said support member includes a first arm and a second arm and a web extending between said first arm and said second arm,

further wherein said mounting portion includes a third channel adapted to receive one of said first arm and said second arm.

8. The fastening system of claim 7, wherein said first arm includes a first engagement formation located adjacent to said space, said first engagement formation being engageable with a second engagement formation formed in said third channel.

9. The fastening system of claim 8, wherein said first arm includes a third engagement formation located on an opposing side of said first arm relative to said first engagement formation, said third engagement formation being engageable with a fourth engagement formation formed in said third channel.

10. The fastening system of claim 1, wherein said support member includes a slot extending parallel to said longitudinal axis, said slot being adapted to receive a coupler plate for connecting said support member to another support member.

11. A method of fastening a building panel, said method including the steps of:

securing a first support member, said support member having a longitudinal axis and including a first channel extending in a longitudinal direction parallel to said longitudinal axis and a second channel extending in a longitudinal direction parallel to said longitudinal axis, whereby a first opening defined by the first channel faces a second

opening defined by the second channel, and the first and second openings are separated by a space;

inserting a first edge of a fastening element within said space, and inserting an opposing, second edge of said fastening element within said space, such that said fastening element extends across said space; and

positioning a mounting portion of a building panel within said space, said building panel having a front face and a rear face, said mounting portion extending rearwardly and having a slot formed therein, said slot extending parallel to an edge of said building panel, said mounting portion initially being located such that said first edge is outside said slot; and

displacing the fastening element within said space to a locked position in which the first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member.

12. The method of claim 11, wherein the step of displacing the fastening element includes rotating a body portion of the fastening element having the general form of a major segment of a circle when viewed in a first plane extending parallel to said building panel front face.

13. The method of claim 11, wherein the step of displacing the fastening element includes sliding the fastening element along said longitudinal axis.

AMENDED CLAIMS
received by the International Bureau on 10 March 2008 (10.03.08).

1. A fastening system comprising:

a support member having a longitudinal axis, said support member including a first channel extending in a longitudinal direction parallel to said longitudinal axis, and a second channel extending in a longitudinal direction parallel to said longitudinal axis, a first opening defined by the first channel facing a second opening defined by the second channel and the first and second openings being separated by a space;

a fastening element having a first edge which is insertable within said opening of said first channel, and an opposing second edge which is insertable within said opening of said second channel, such that said fastening element extends across said space; and

a building panel including a front face, a rear face and a rearwardly extending mounting portion, a slot being formed in said mounting portion, said slot extending along a slot axis parallel to and adjacent an edge of said building panel and being positionable within said space,

wherein said fastening element is insertable in said space and displaced to a locked position in which said first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member, and an unlocked position in which said fastening element is outside of said first opening, thereby permitting removal of said mounting portion from said support member;

further wherein said fastening element has a first axis and includes:

a first plate portion having a first edge extending generally parallel to said first axis;

a second plate portion having a second edge extending generally parallel to said first axis, said second plate portion being coplanar with said first plate portion;

wherein said first edge is offset relative to said second edge in a direction which extends parallel to said first axis.

2. The fastening system of claim 1, wherein said fastening element includes:

a body having the general form of a major segment of a circle when viewed in a first plane which passes through said first edge and said second edge, said first edge and said second edge being located on opposing sides of an arc defined by said major segment.

3. The fastening system of claim 2, wherein said fastening element has an axis of symmetry when viewed in said first plane, and said first edge and said second edge are located on opposing sides of said axis of symmetry.

4. The fastening system of claim 3, wherein said fastening element has a varied thickness when viewed in a plane extending perpendicular to said first plane.

5. The fastening system of claim 4, wherein said fastening element has a rotational drive engagement formation located at or adjacent a centre of said arc.

6. The fastening system of claim 1, wherein said support member includes a first arm and a second arm and a web extending between said first arm and said second arm,

further wherein said mounting portion includes a third channel adapted to receive one of said first arm and said second arm.

7. The fastening system of claim 6, wherein said first arm includes a first engagement formation located adjacent to said space, said first engagement formation being engageable with a second engagement formation formed in said third channel.

8. The fastening system of claim 7, wherein said first arm includes a third engagement formation located on an opposing side of said first arm relative to said first engagement formation, said third engagement formation being engageable with a fourth engagement formation formed in said third channel.

9. The fastening system of claim 1, wherein said support member includes a slot extending parallel to said longitudinal axis, said slot being adapted to receive a coupler plate for connecting said support member to another support member.

10. A method of fastening a building panel, said method including the steps of:

securing a first support member, said support member having a longitudinal axis and including a first channel extending in a longitudinal direction parallel to said longitudinal axis and a second channel extending in a longitudinal direction parallel to said longitudinal axis, whereby a first opening defined by the first channel faces a second opening defined by the second channel, and the first and second openings are separated by a space;

inserting a first edge of a fastening element within said space, and inserting an opposing, second edge of said fastening element within said space, such that said fastening element extends across said space; and

positioning a mounting portion of a building panel within said space, said building panel having a front face and a rear face, said mounting portion extending rearwardly and having a slot formed therein, said slot extending parallel to an edge of said building panel, said mounting portion initially being located such that said first edge is outside said slot; and

displacing the fastening element within said space to a locked position in which the first edge is within said slot and said first edge is within said first opening, thereby preventing removal of said mounting portion from said support member, wherein the step of displacing the fastening element includes sliding the fastening element along said longitudinal axis.

11. The method of claim 10, wherein the step of displacing the fastening element includes rotating a body portion of the fastening element having the general form of a major segment of a circle when viewed in a first plane extending parallel to said building panel front face.

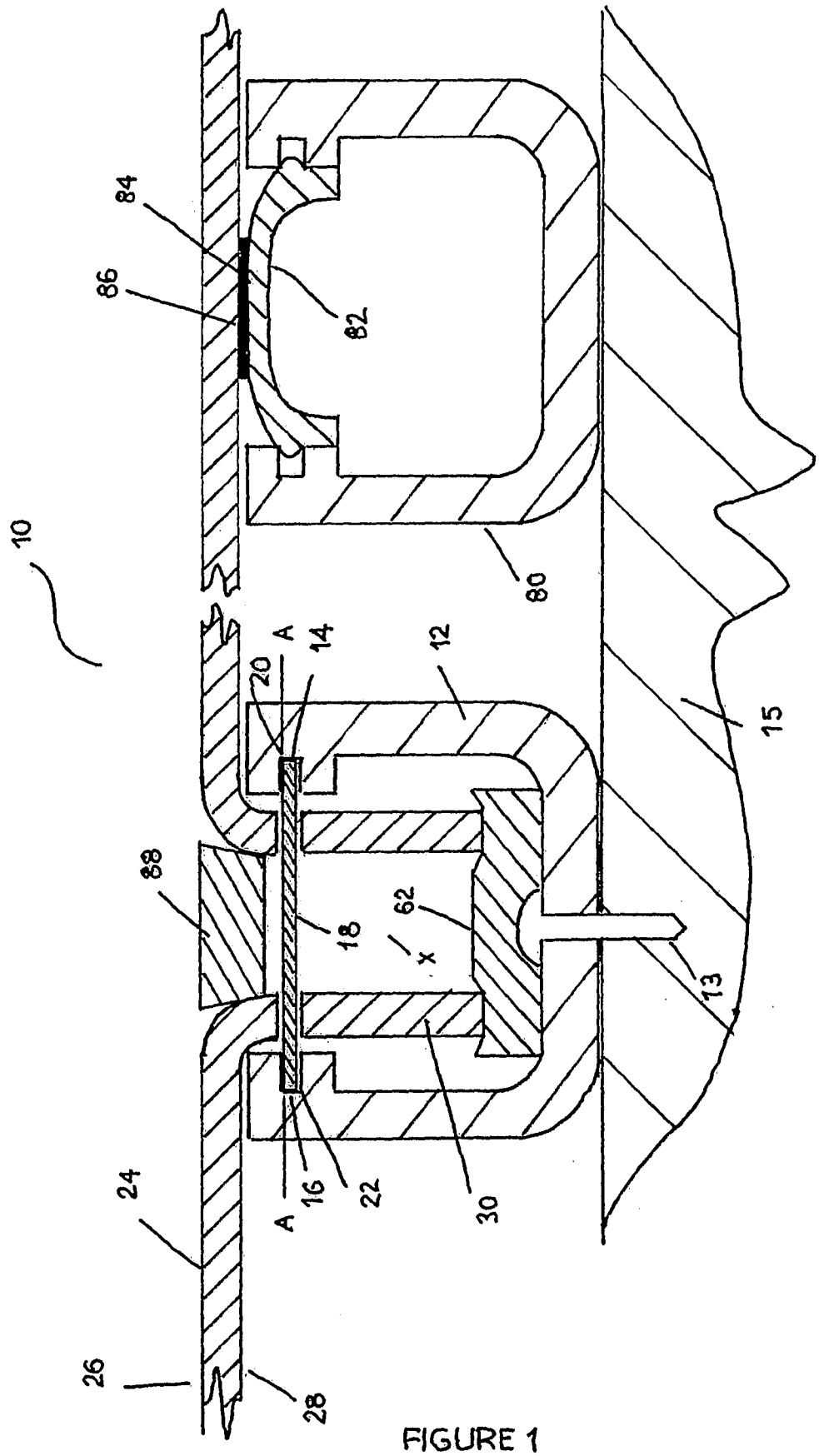


FIGURE 1

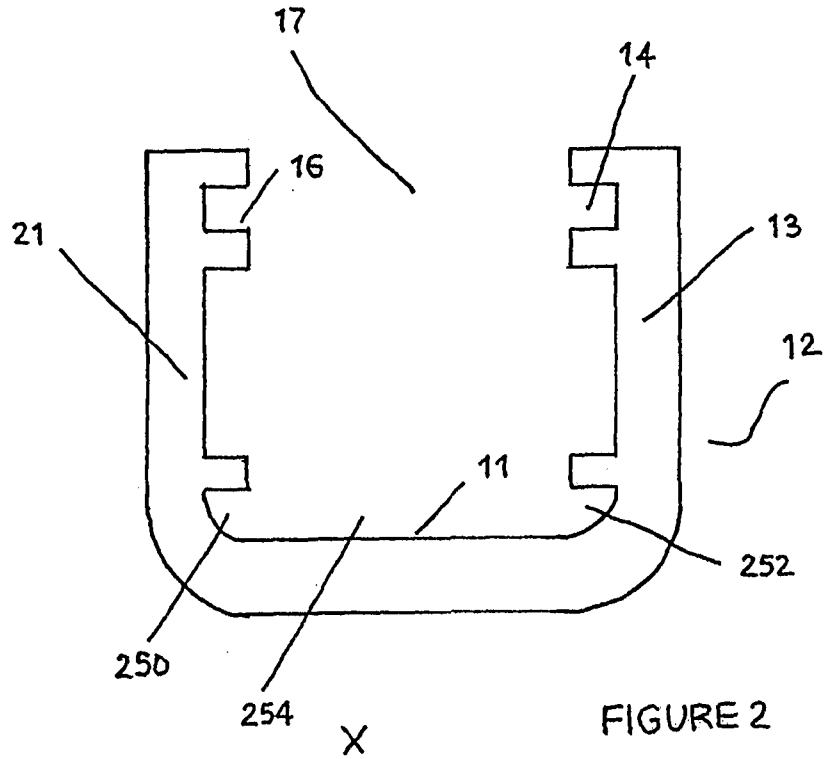


FIGURE 2

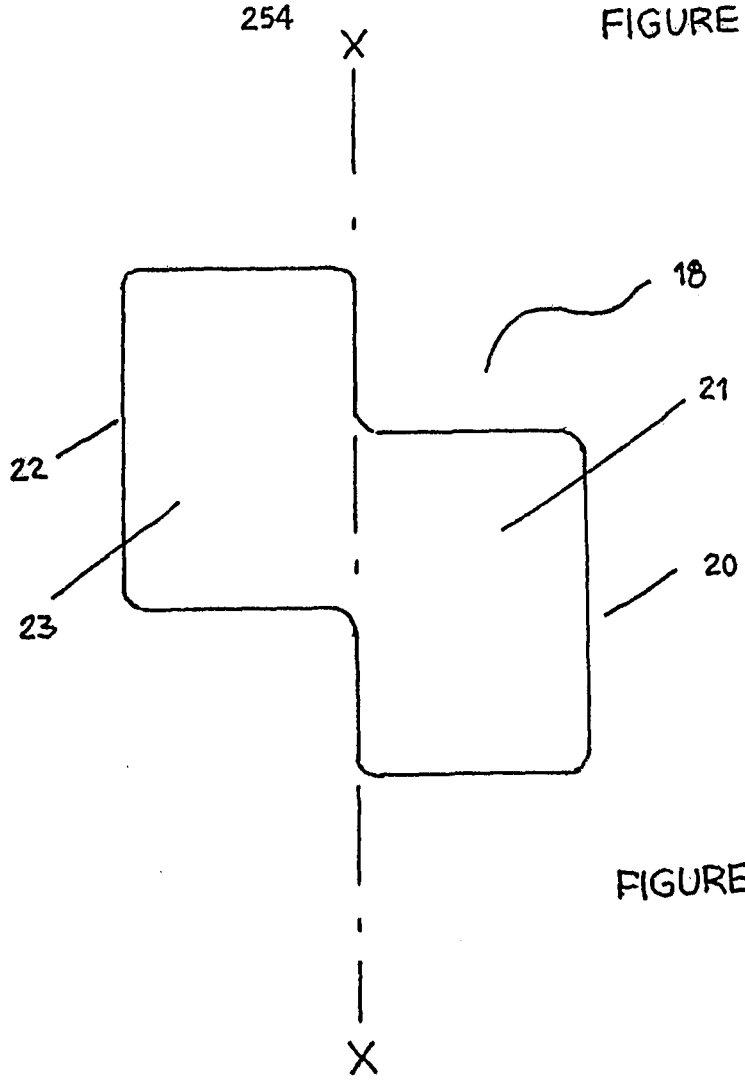


FIGURE 3

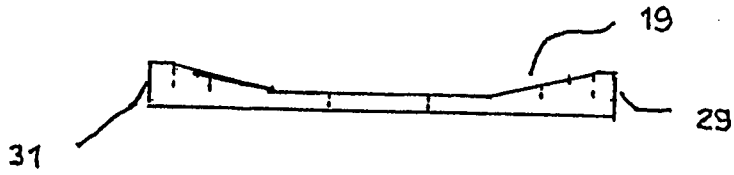


FIGURE 5

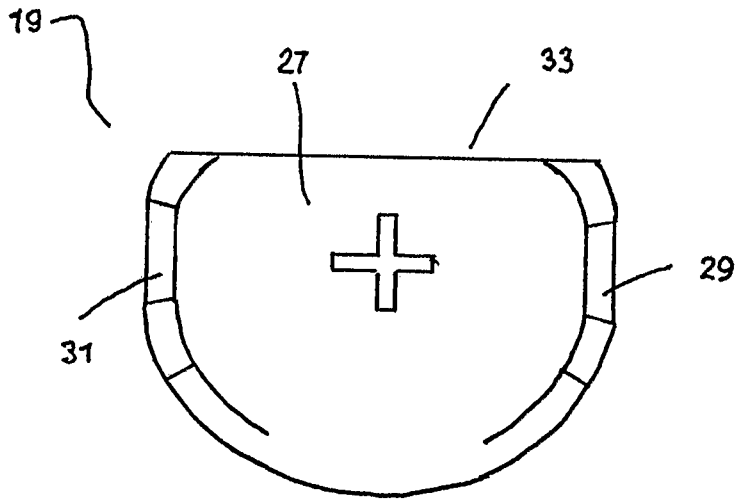


FIGURE 4

FIGURE 7

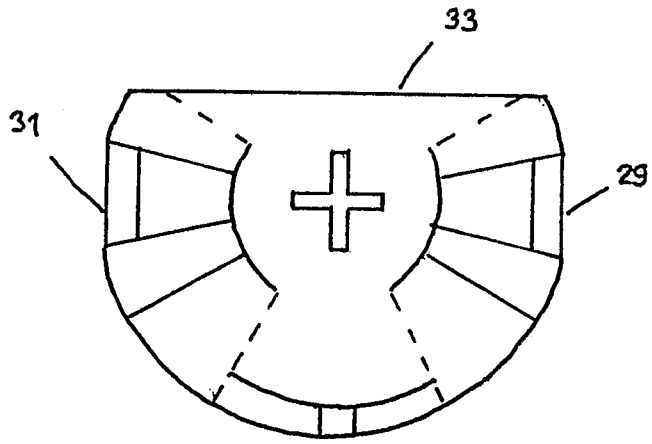


FIGURE 6

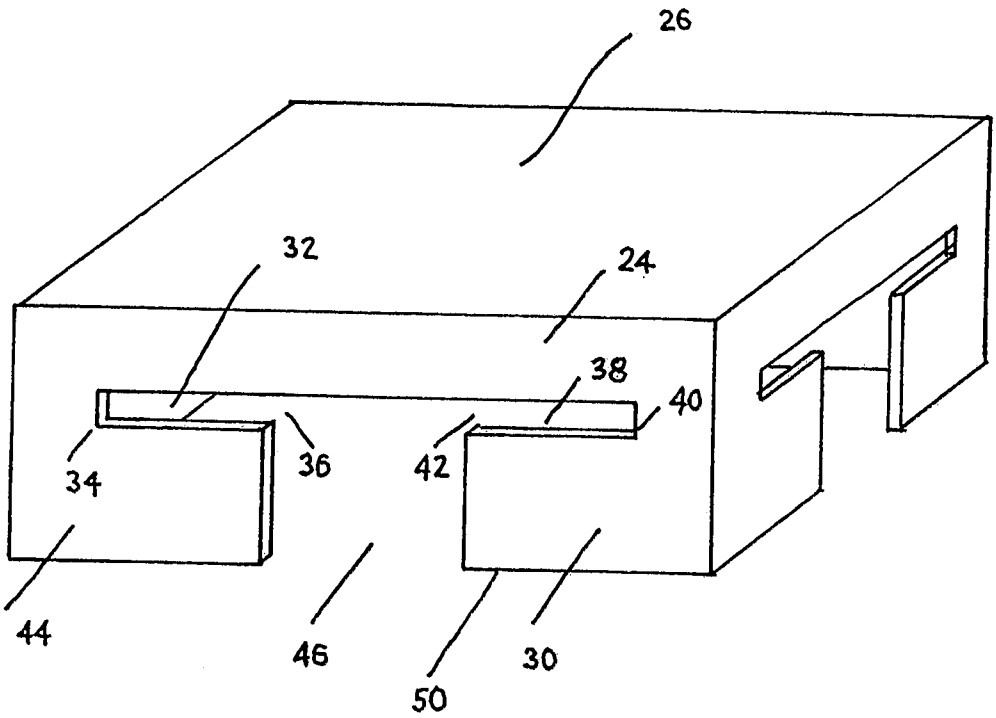


FIGURE 8

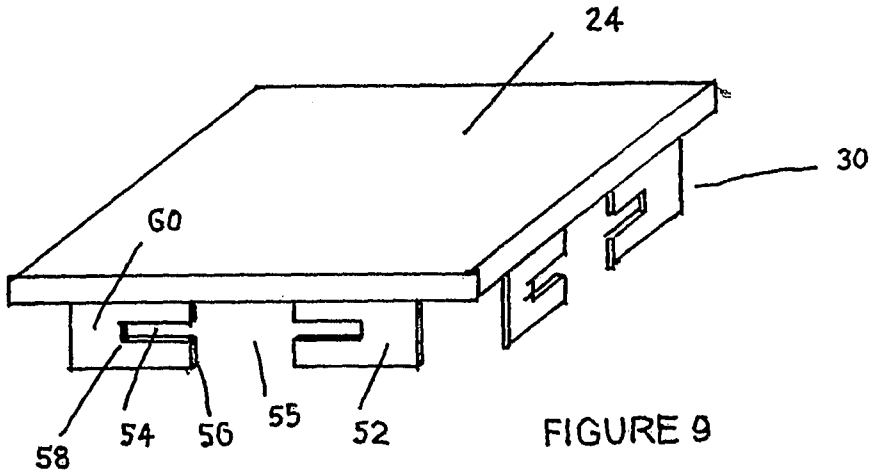


FIGURE 9

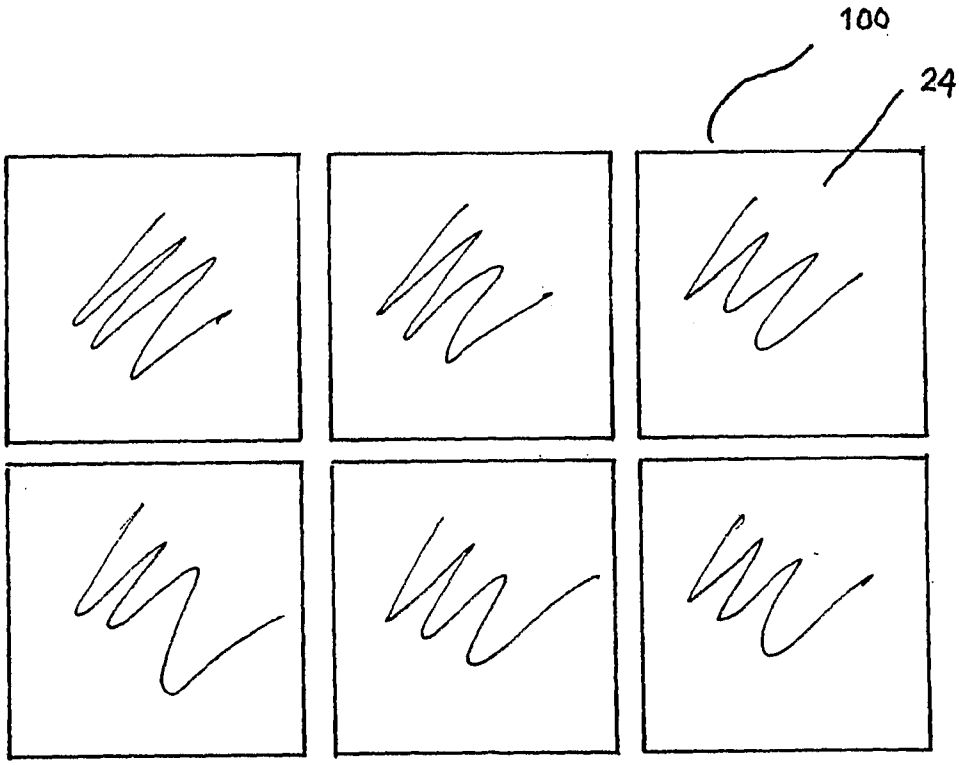


FIGURE 10

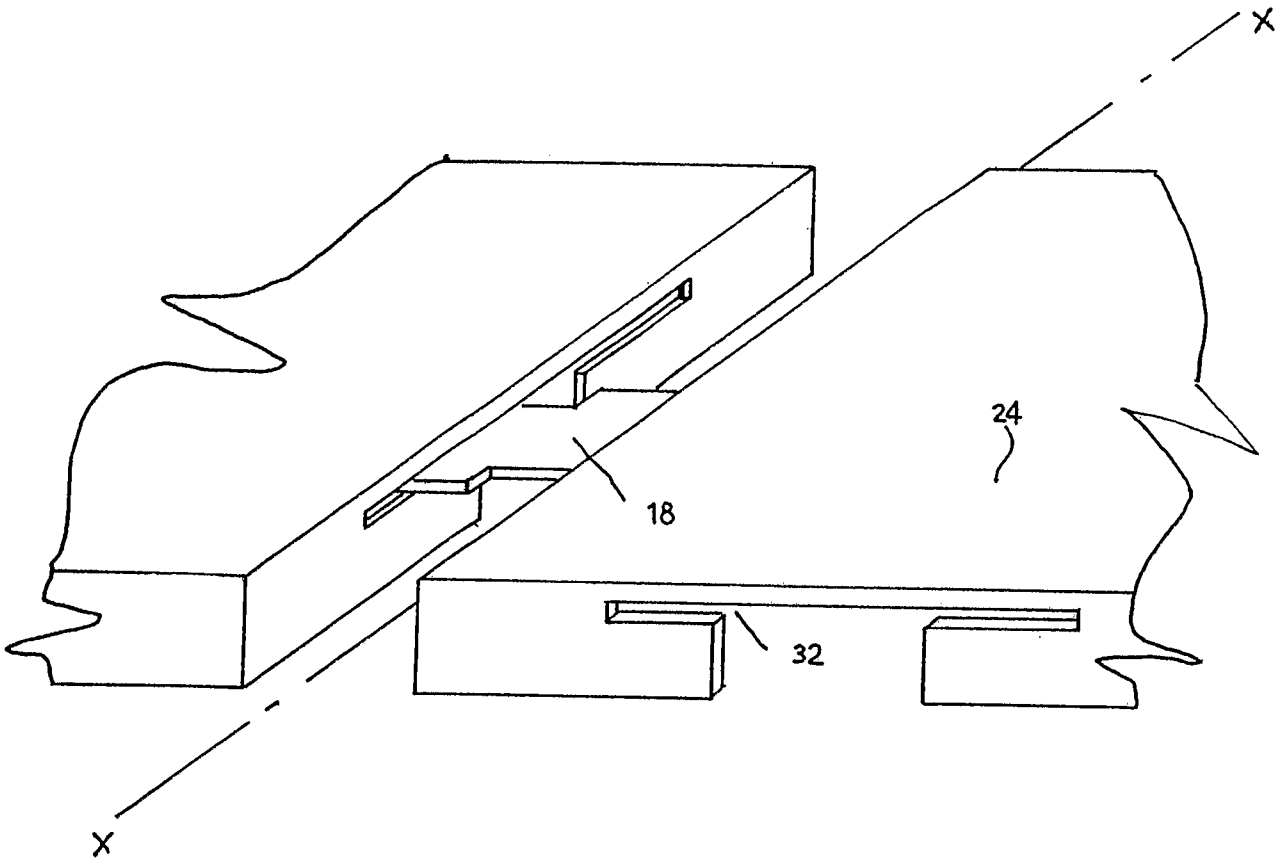


FIGURE 11

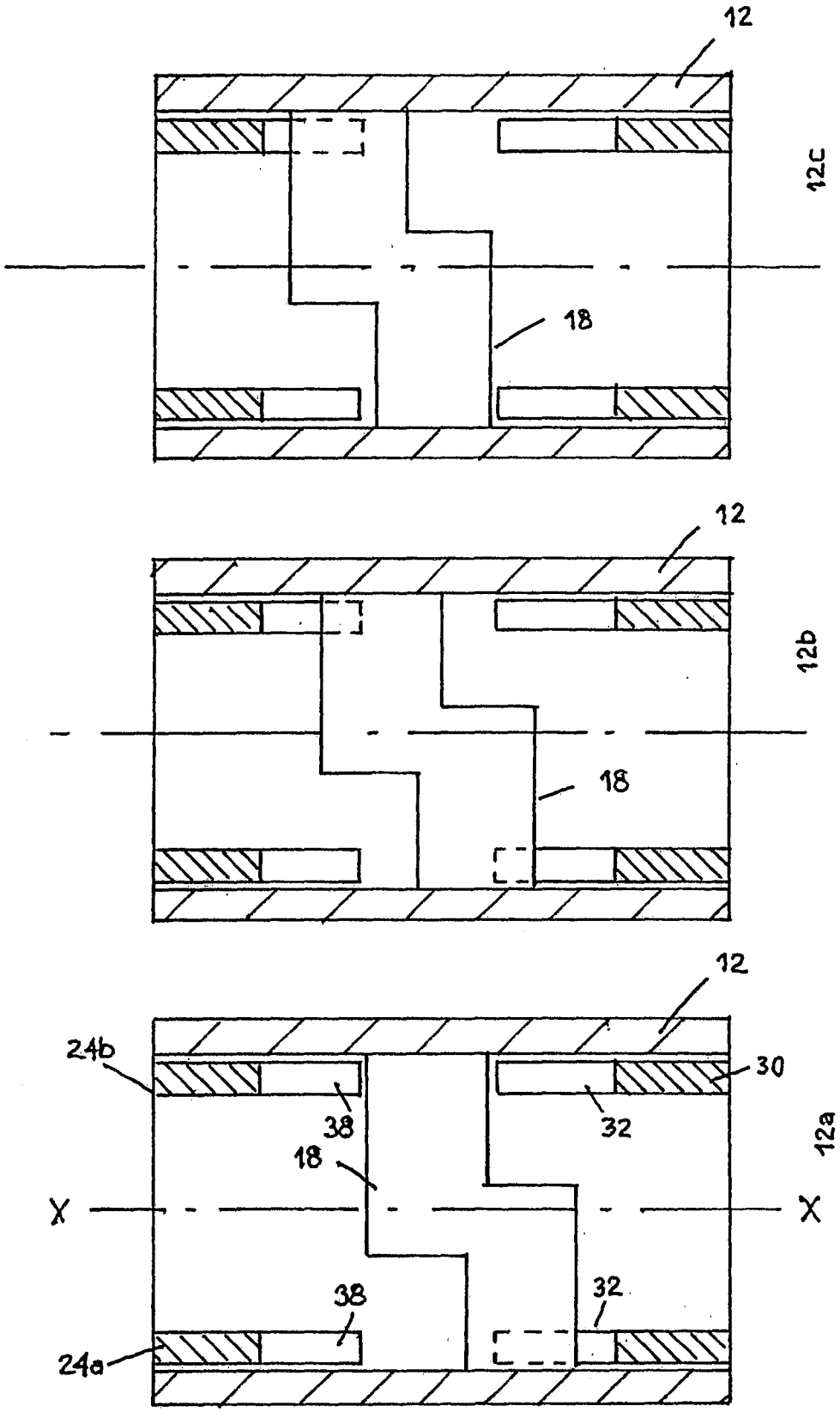


FIGURE 12

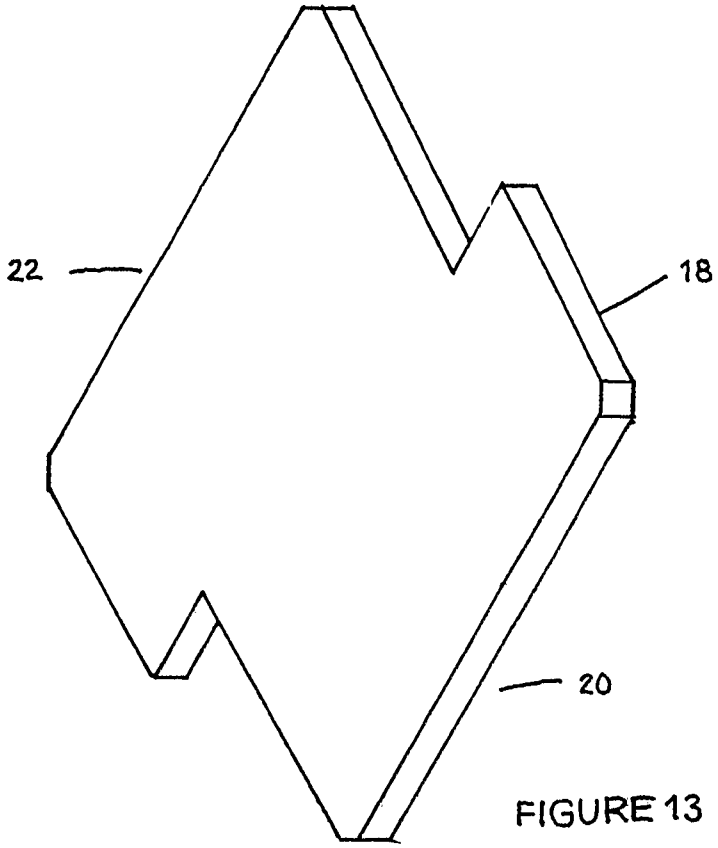


FIGURE 13

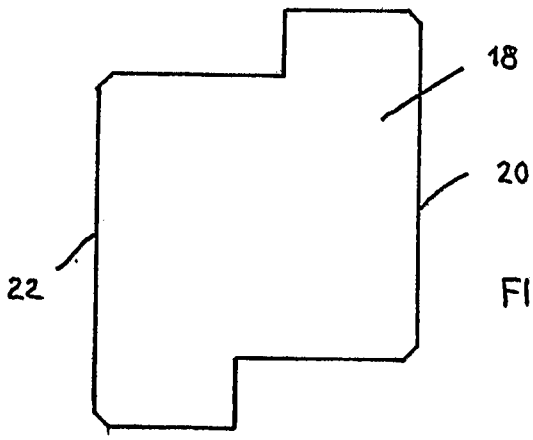


FIGURE 14

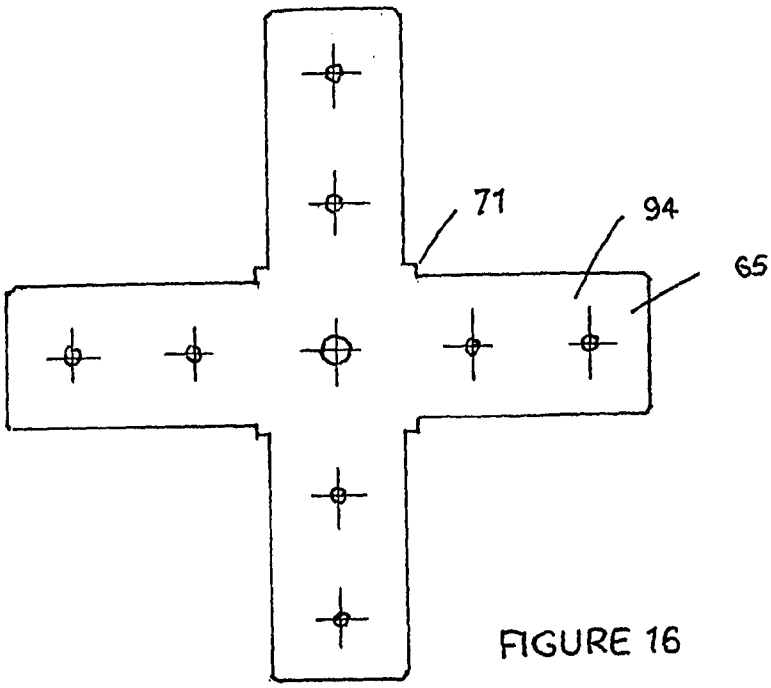


FIGURE 16

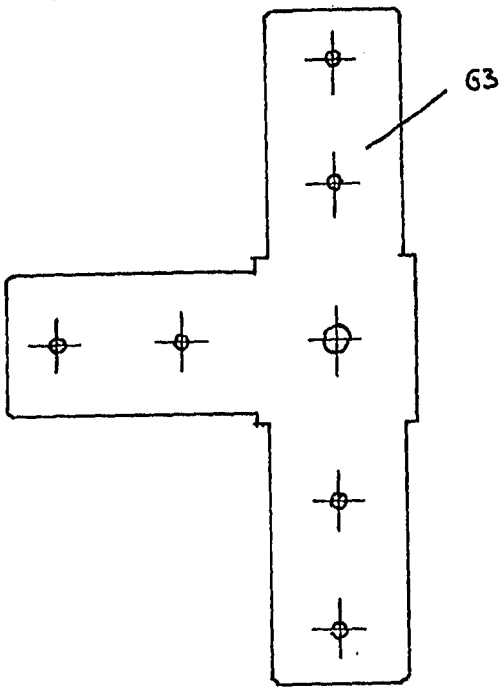


FIGURE 15

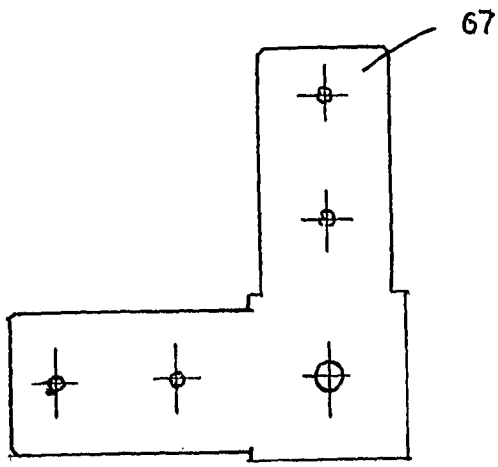


FIGURE 17

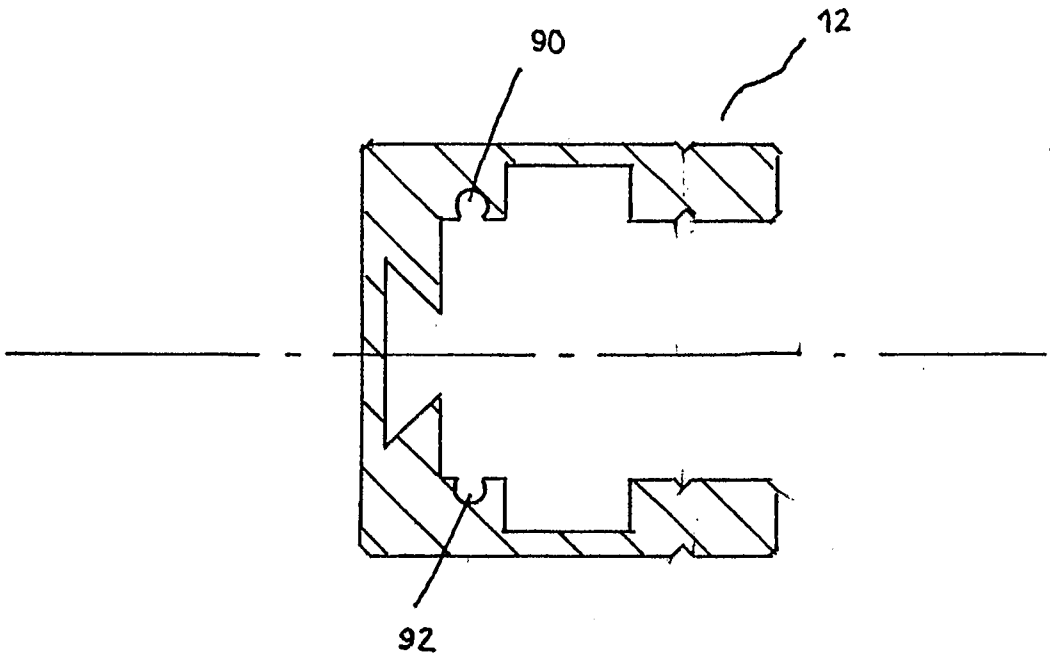


FIGURE 18

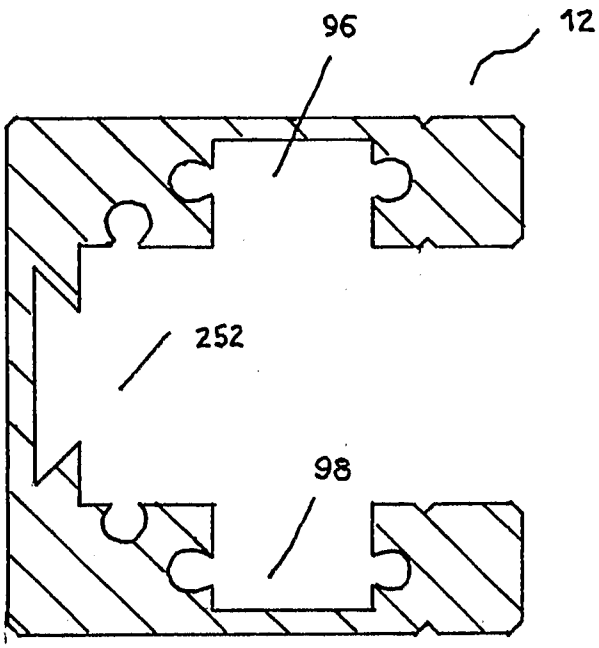


FIGURE 19

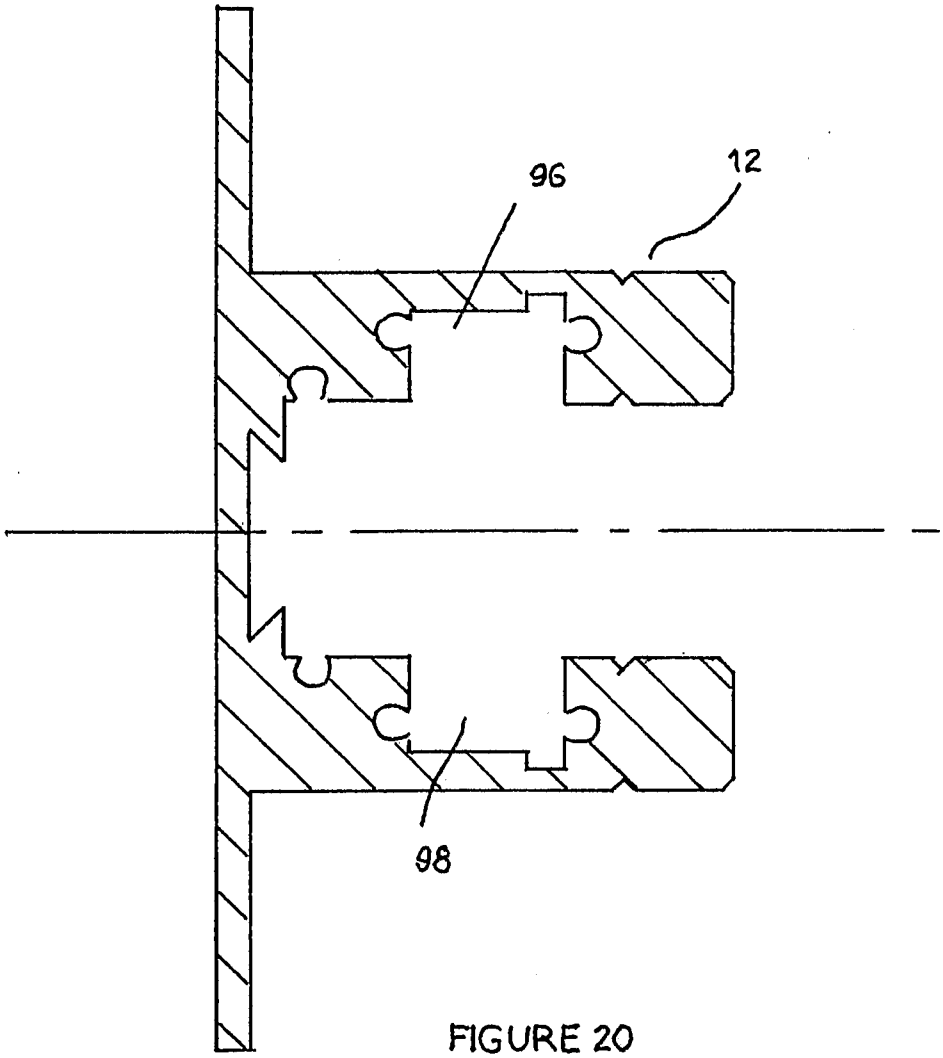


FIGURE 20

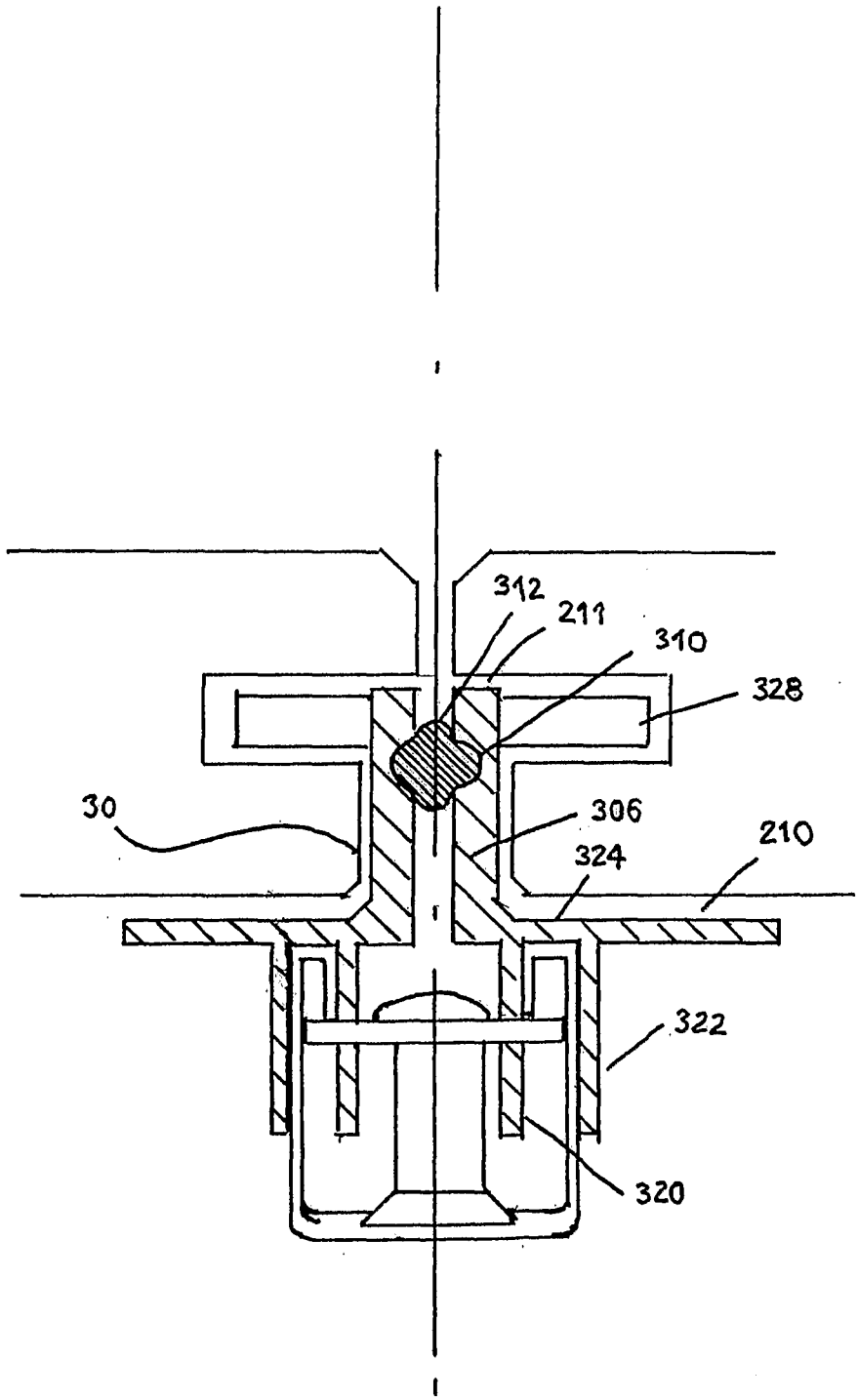


FIGURE 21

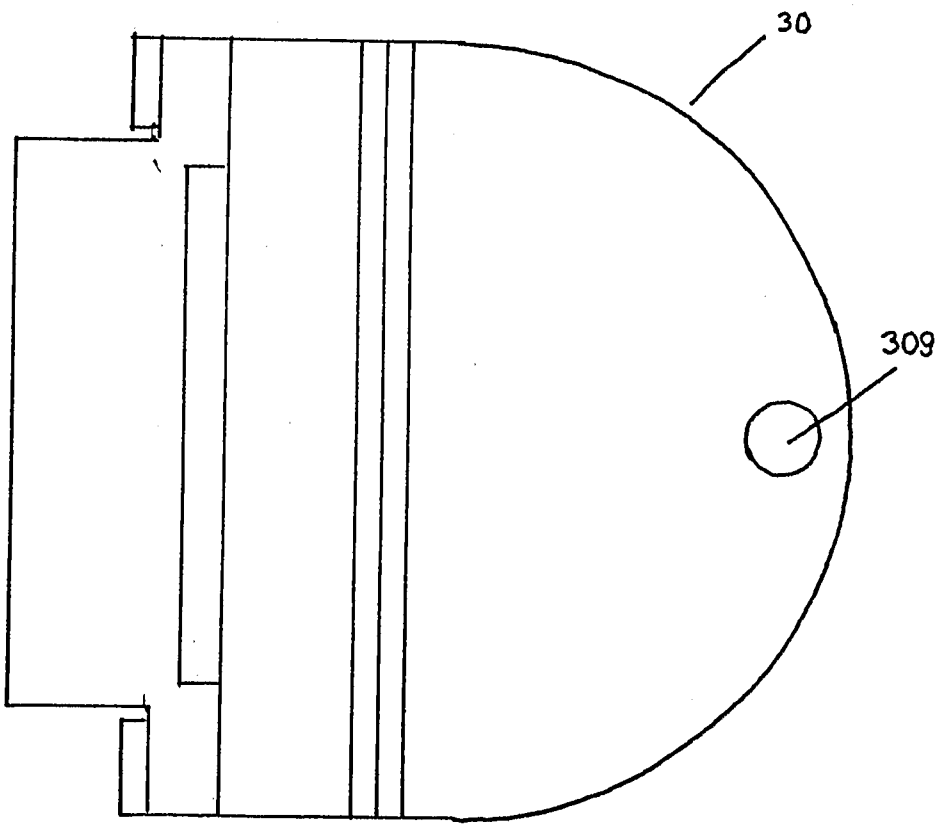


FIGURE 22

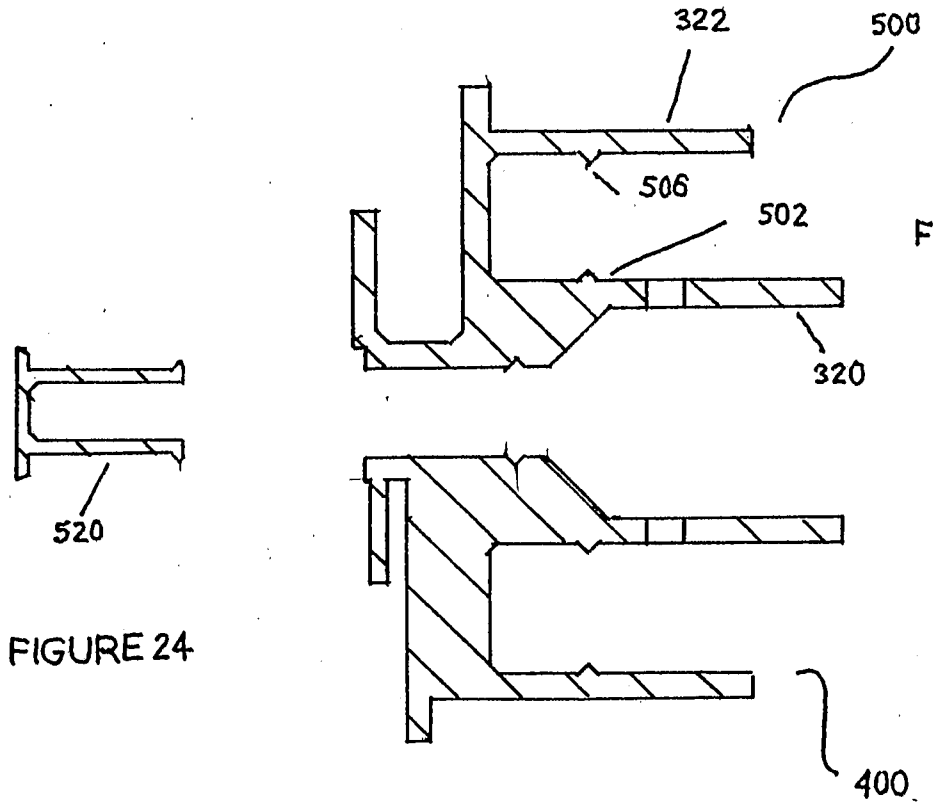


FIGURE 23

FIGURE 24

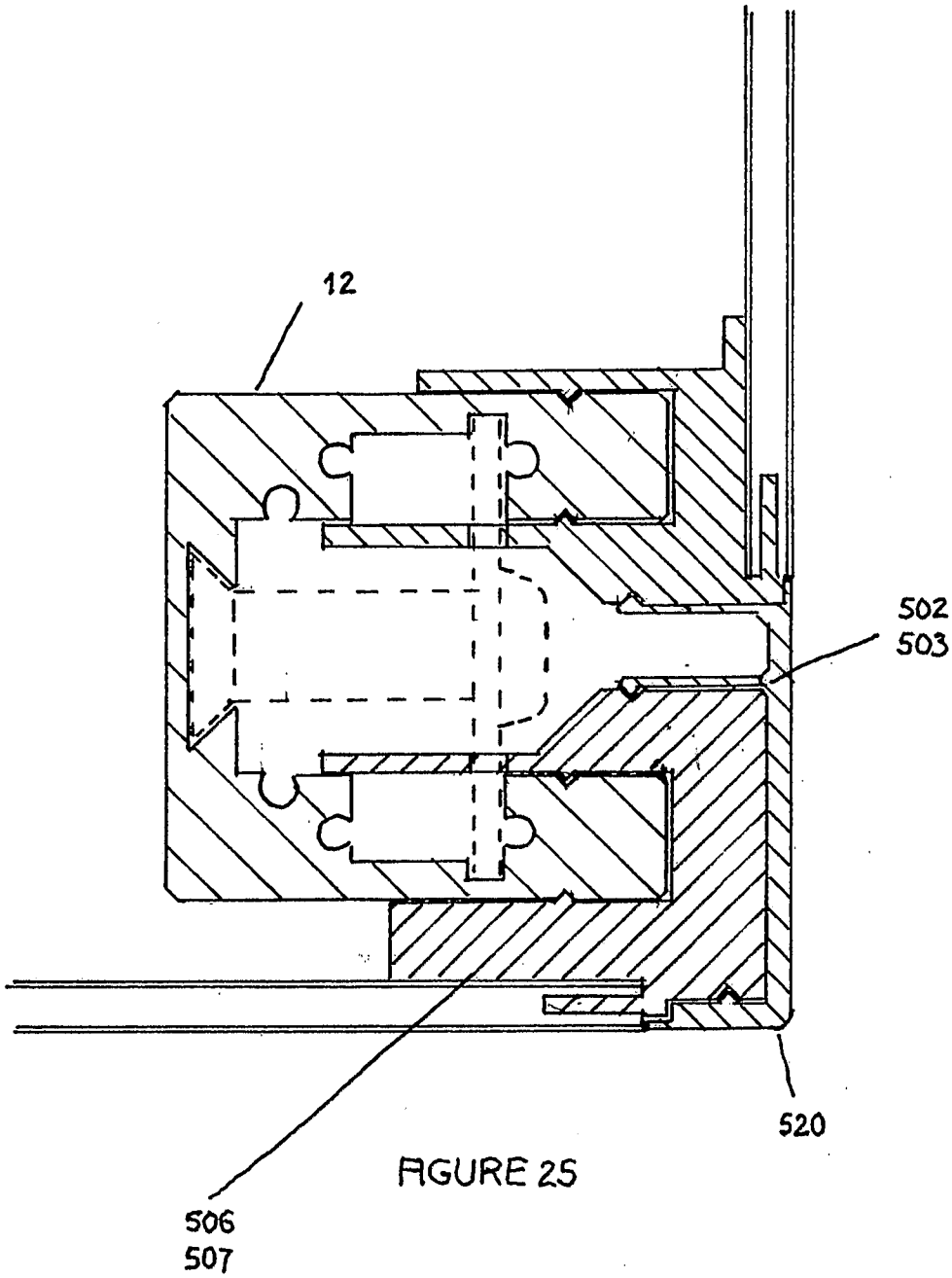


FIGURE 25

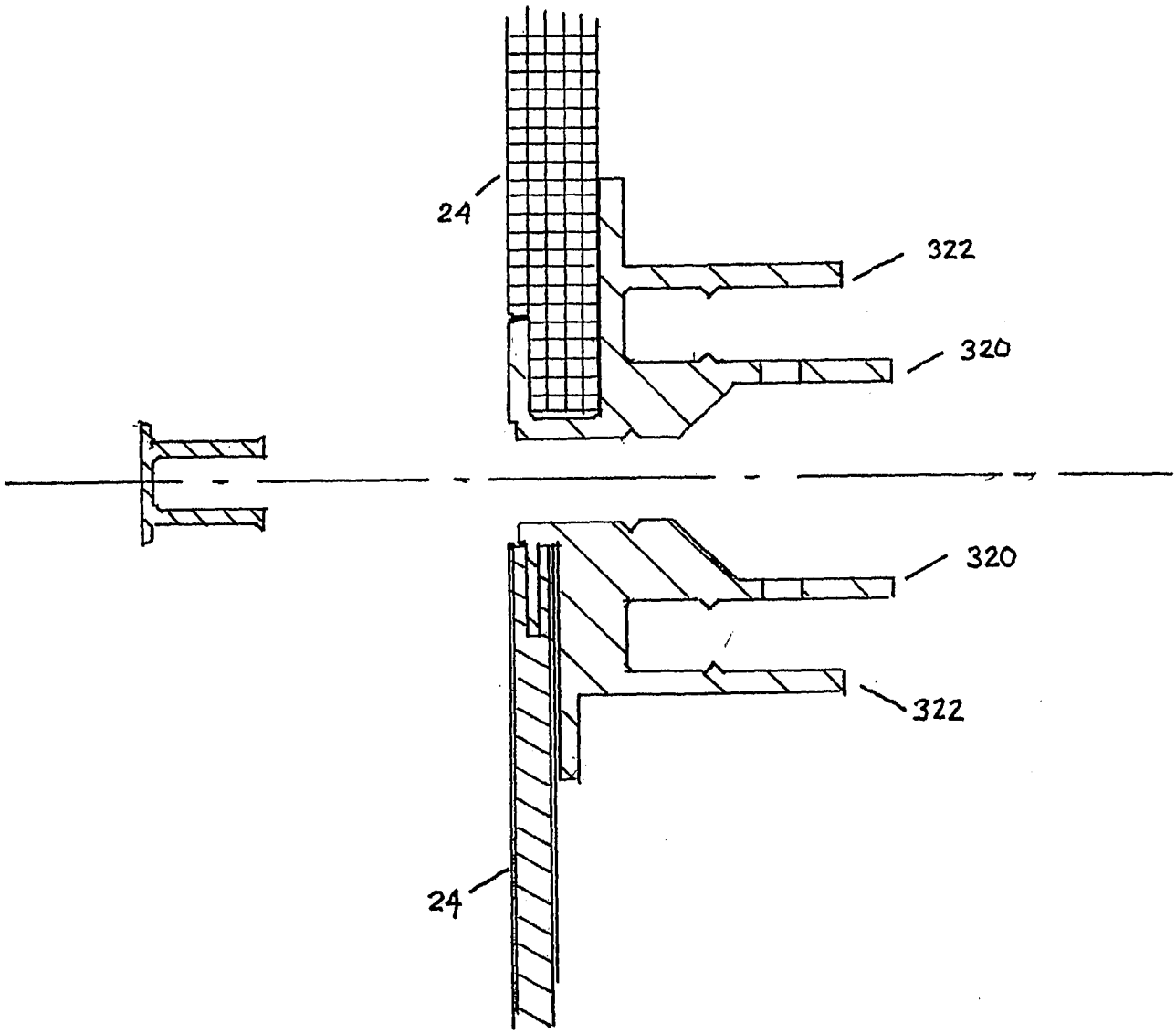


FIGURE 26

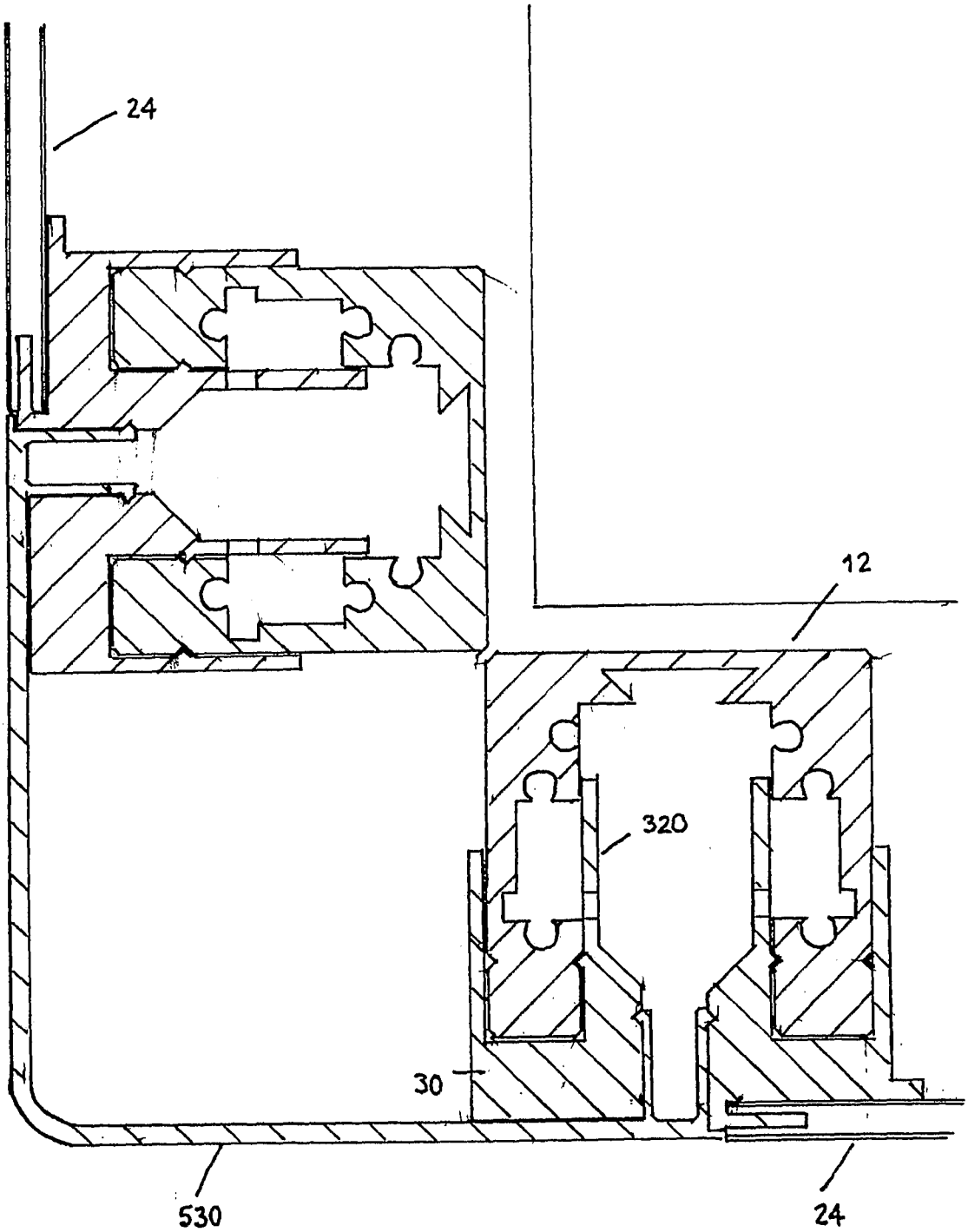


FIGURE 27

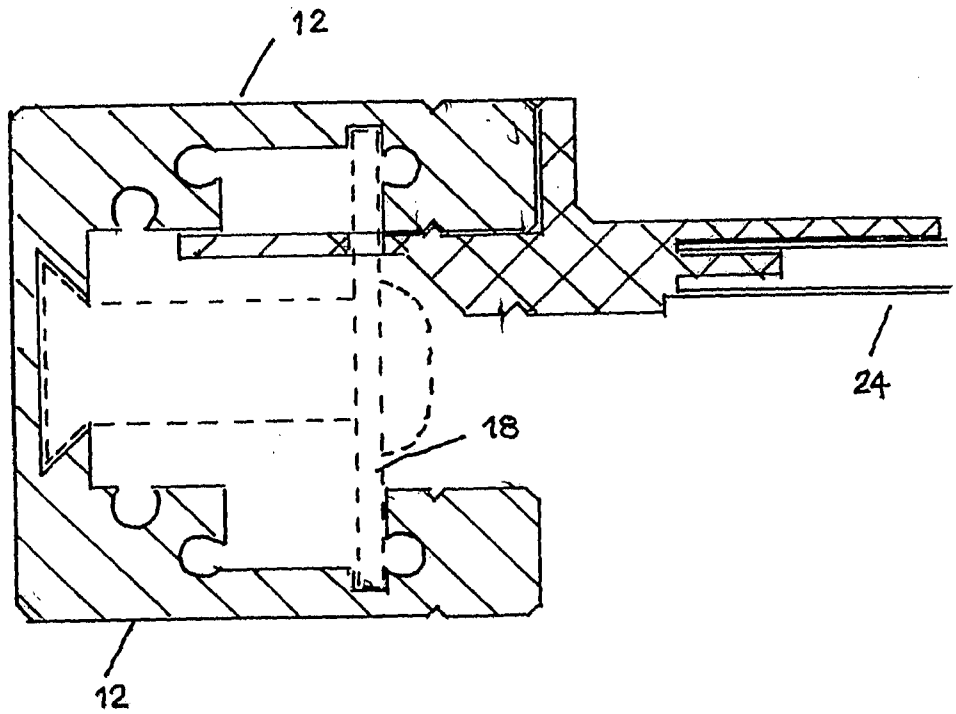


FIGURE 28

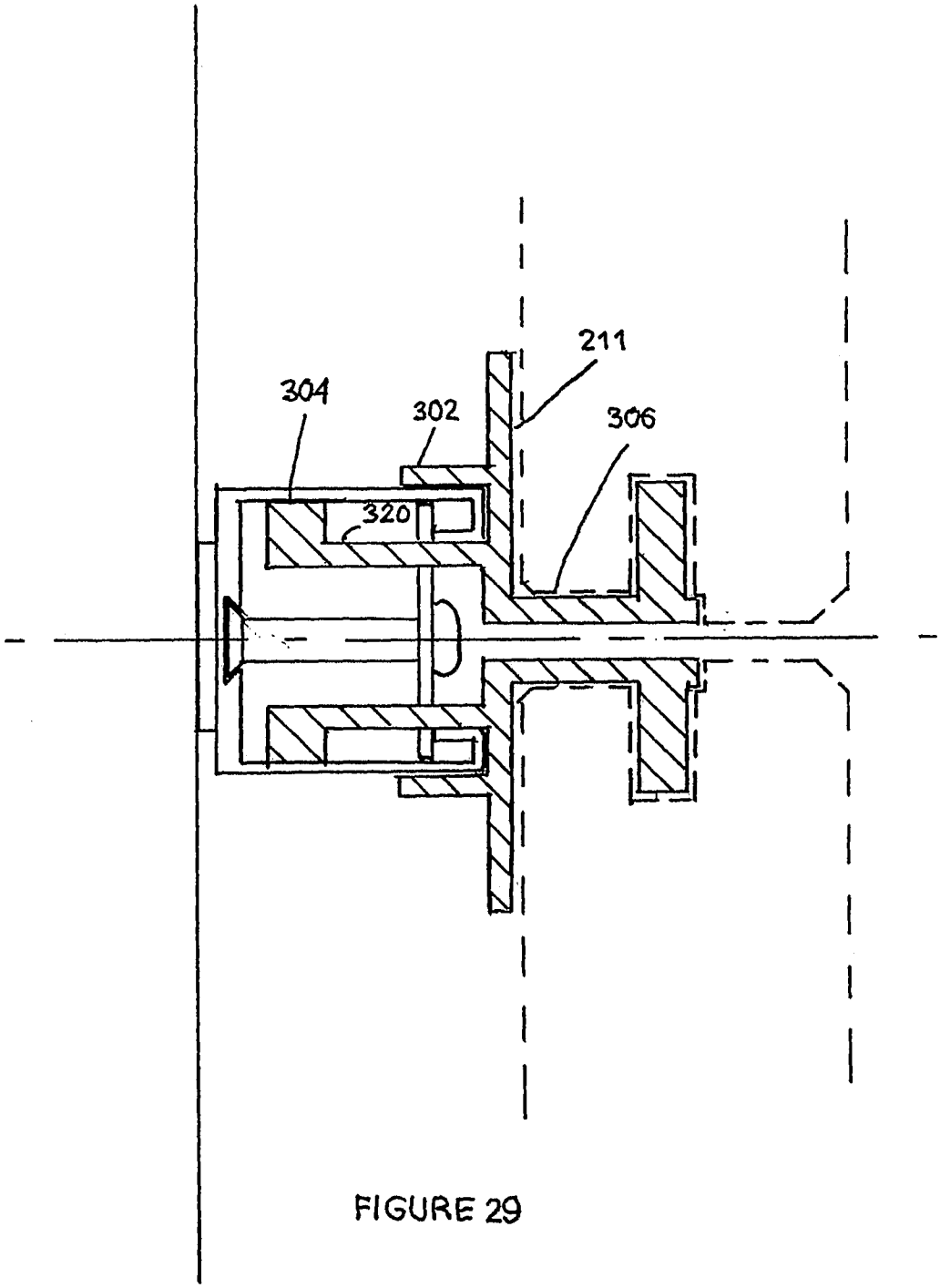


FIGURE 29

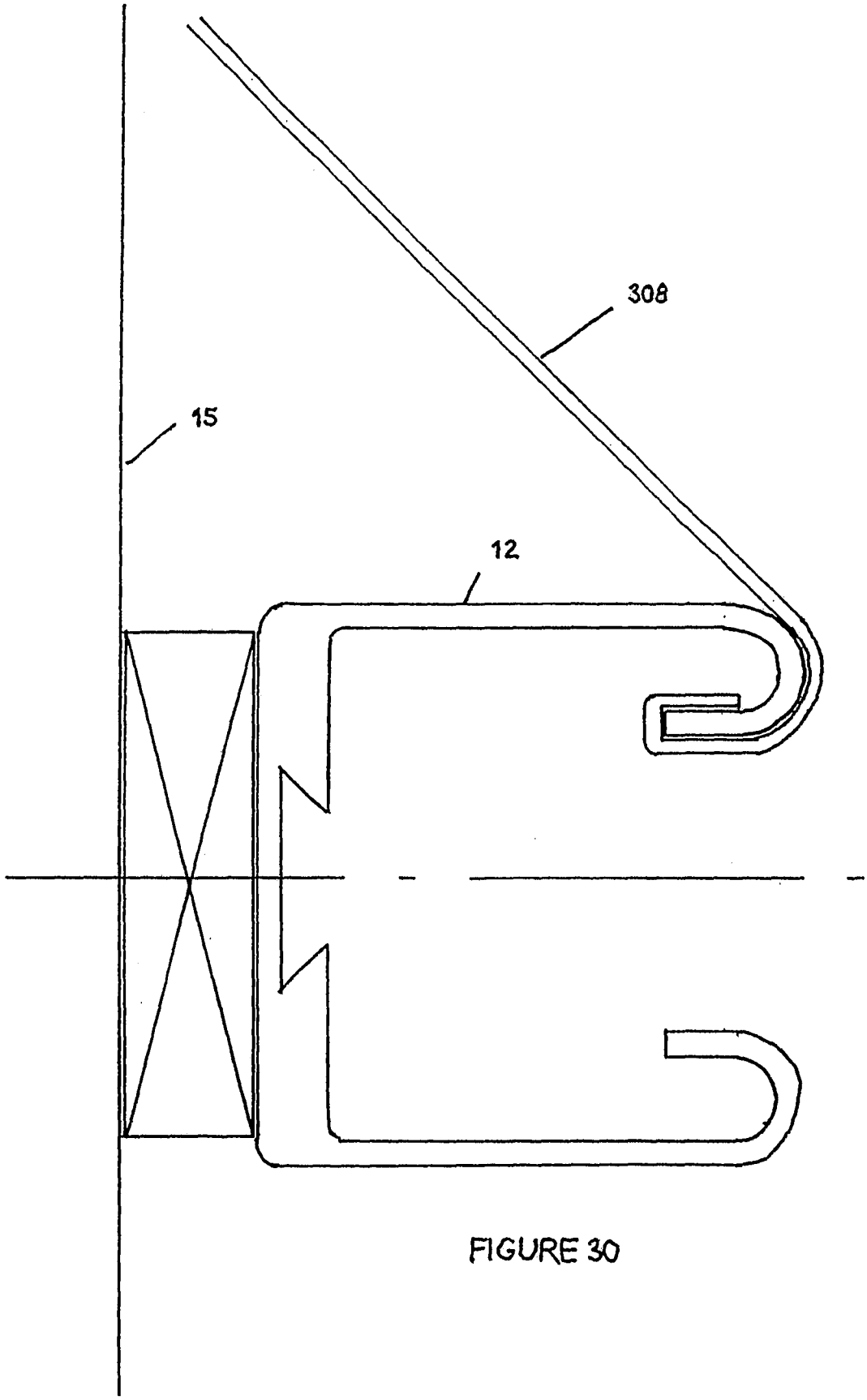


FIGURE 30

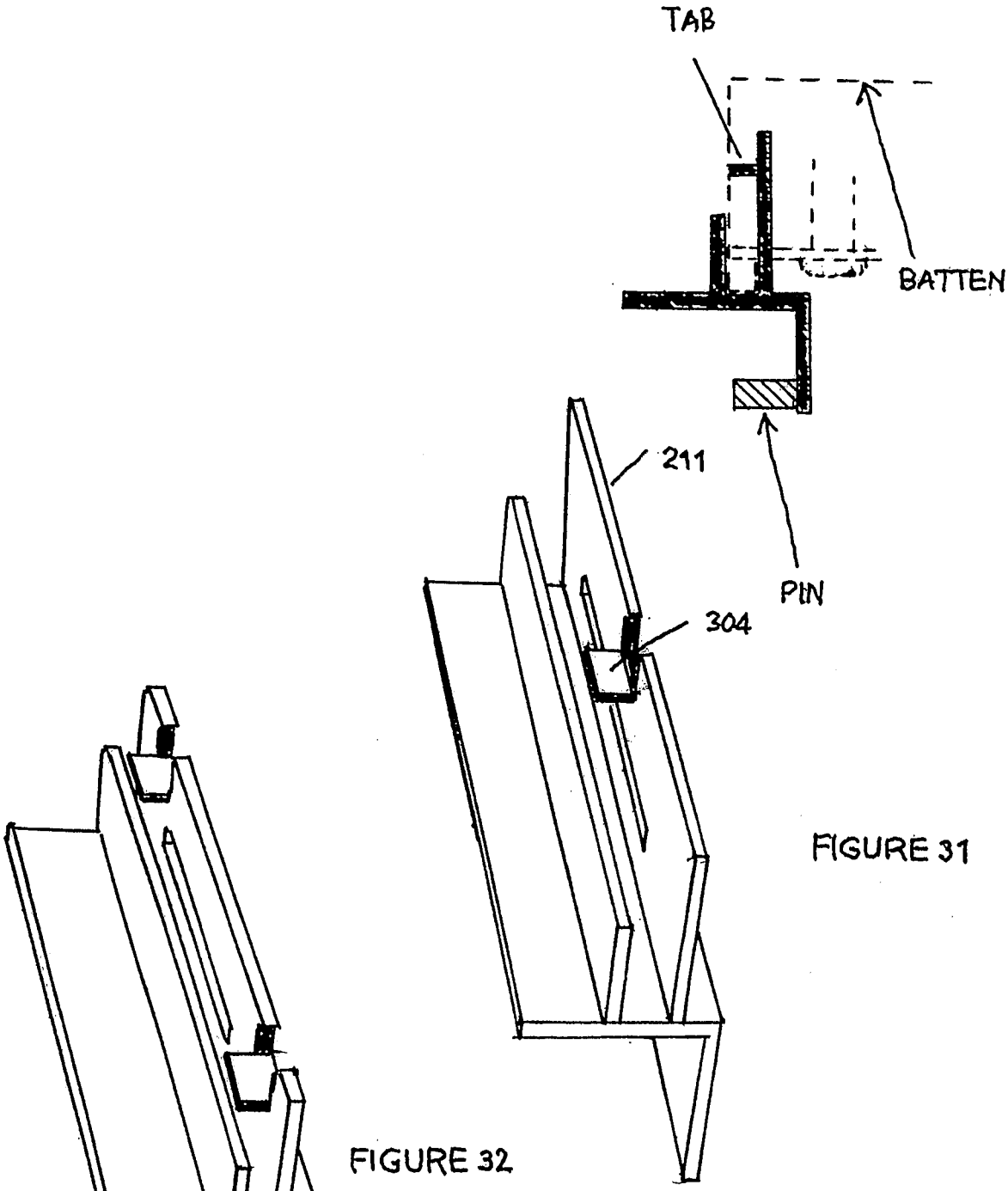


FIGURE 31

FIGURE 32

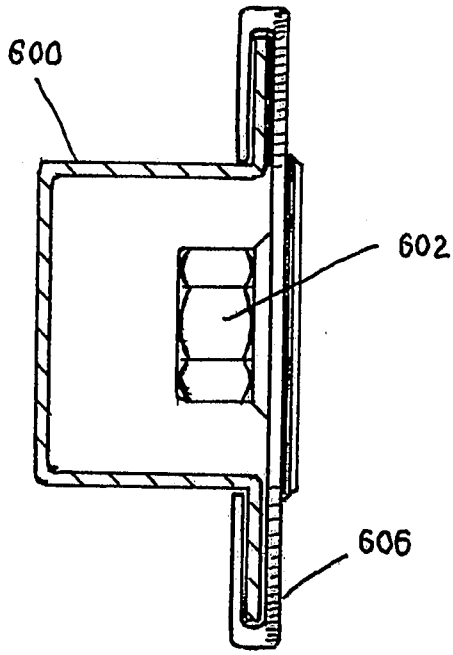


FIGURE 33

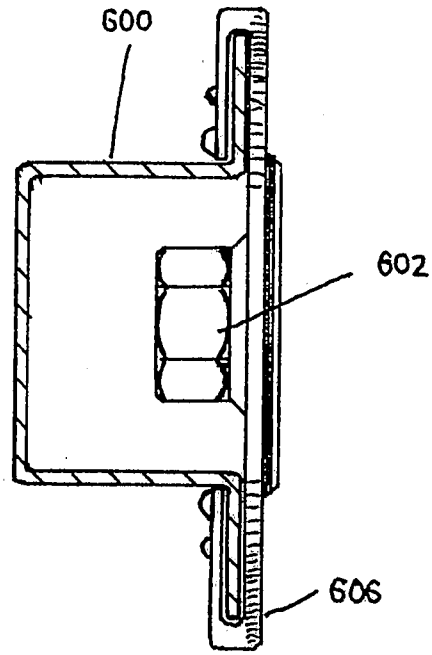


FIGURE 34

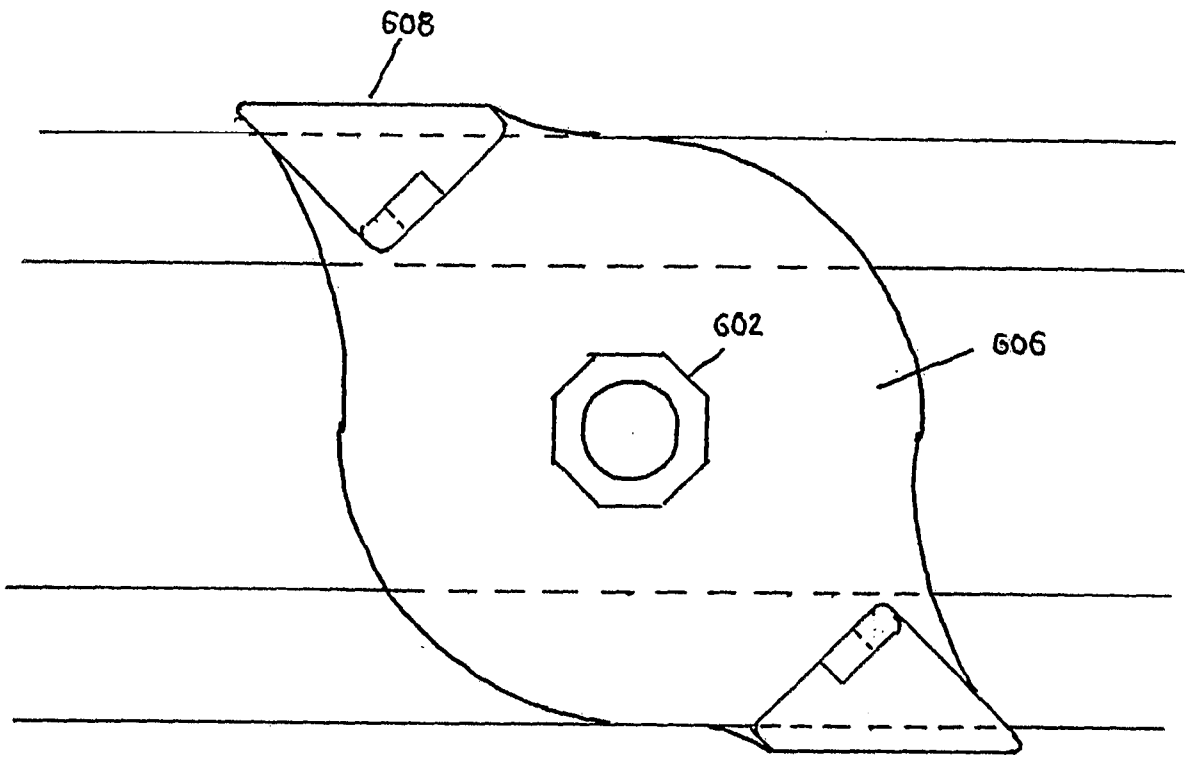


FIGURE 35

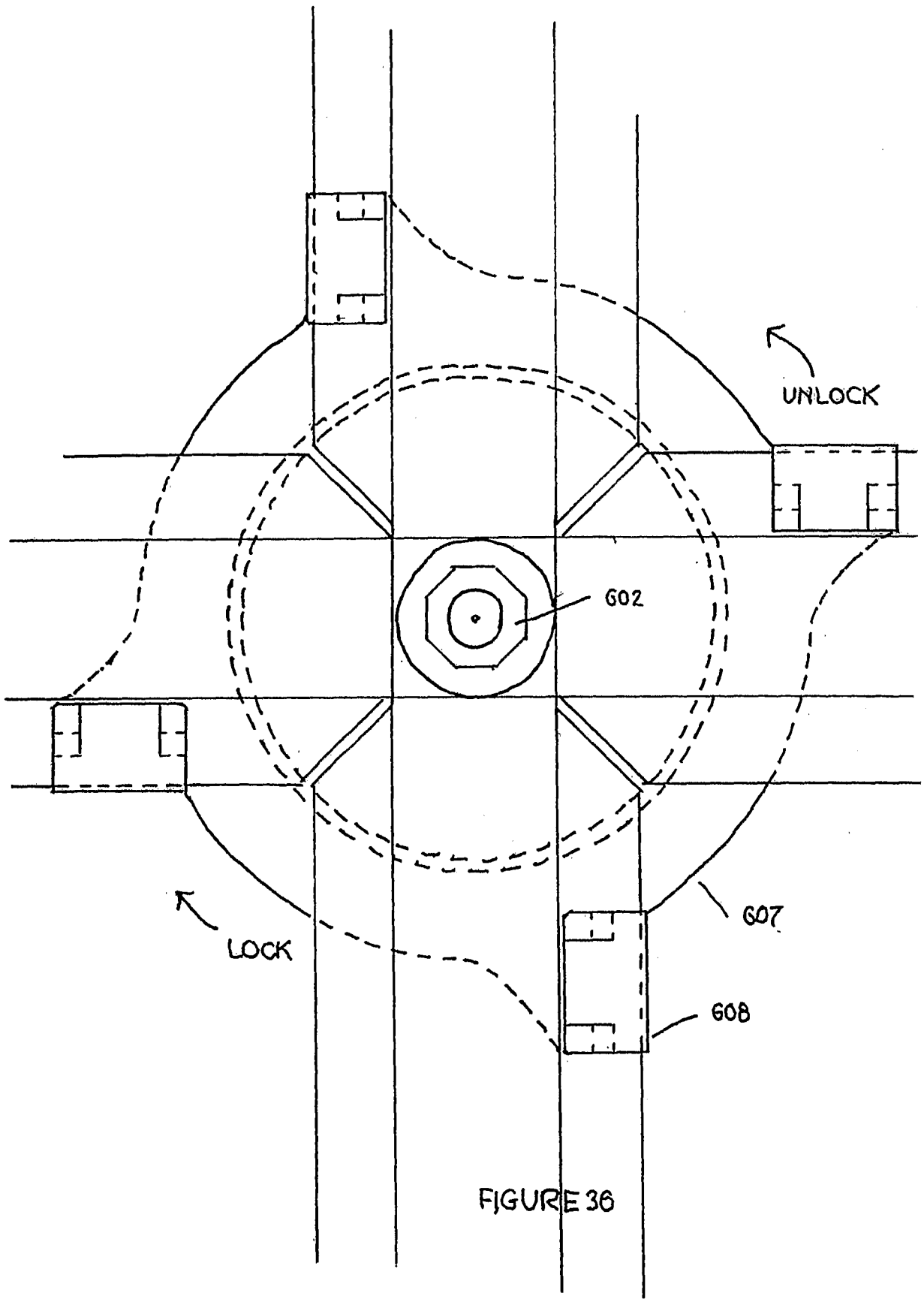


FIGURE 36

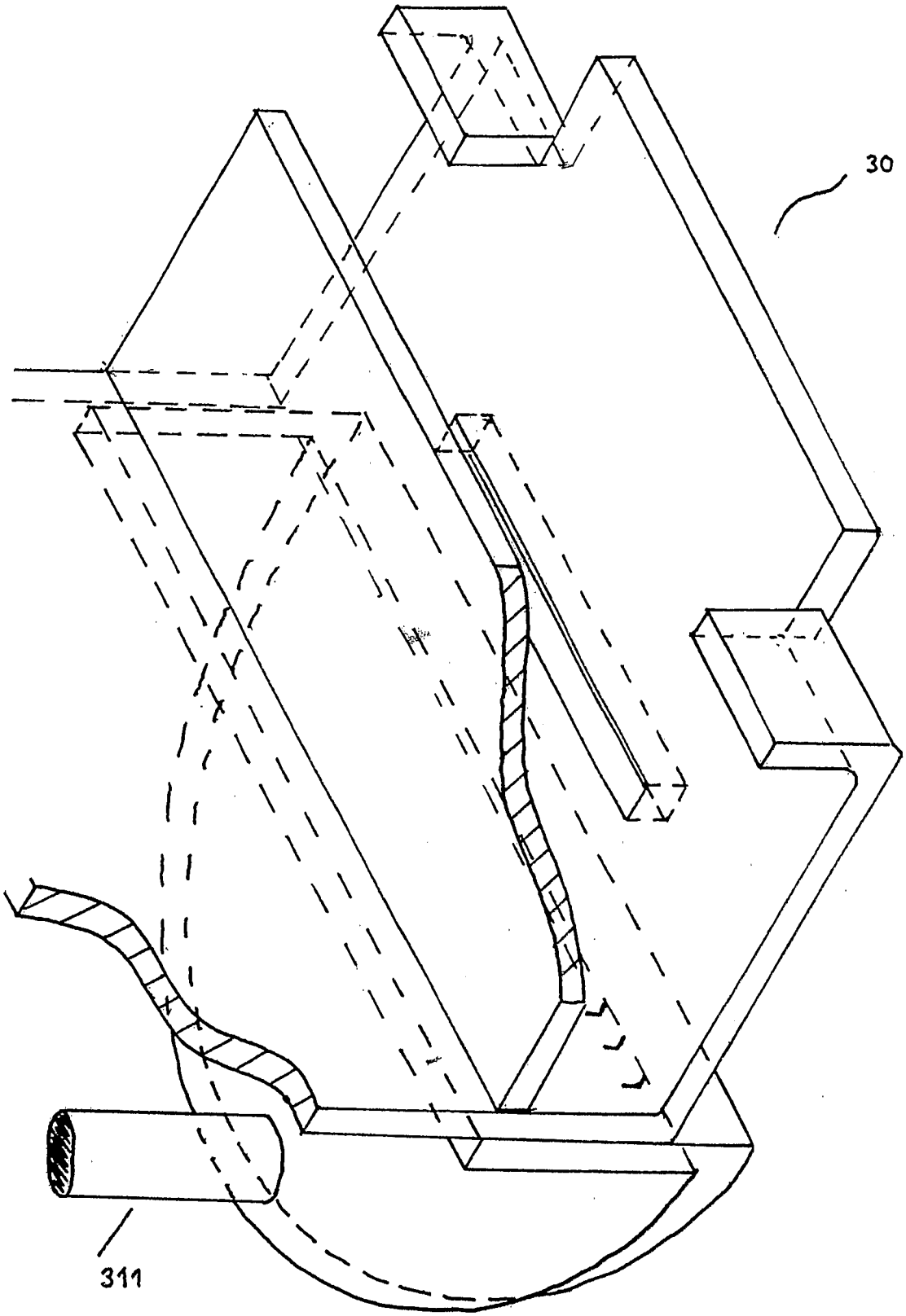


FIGURE 37

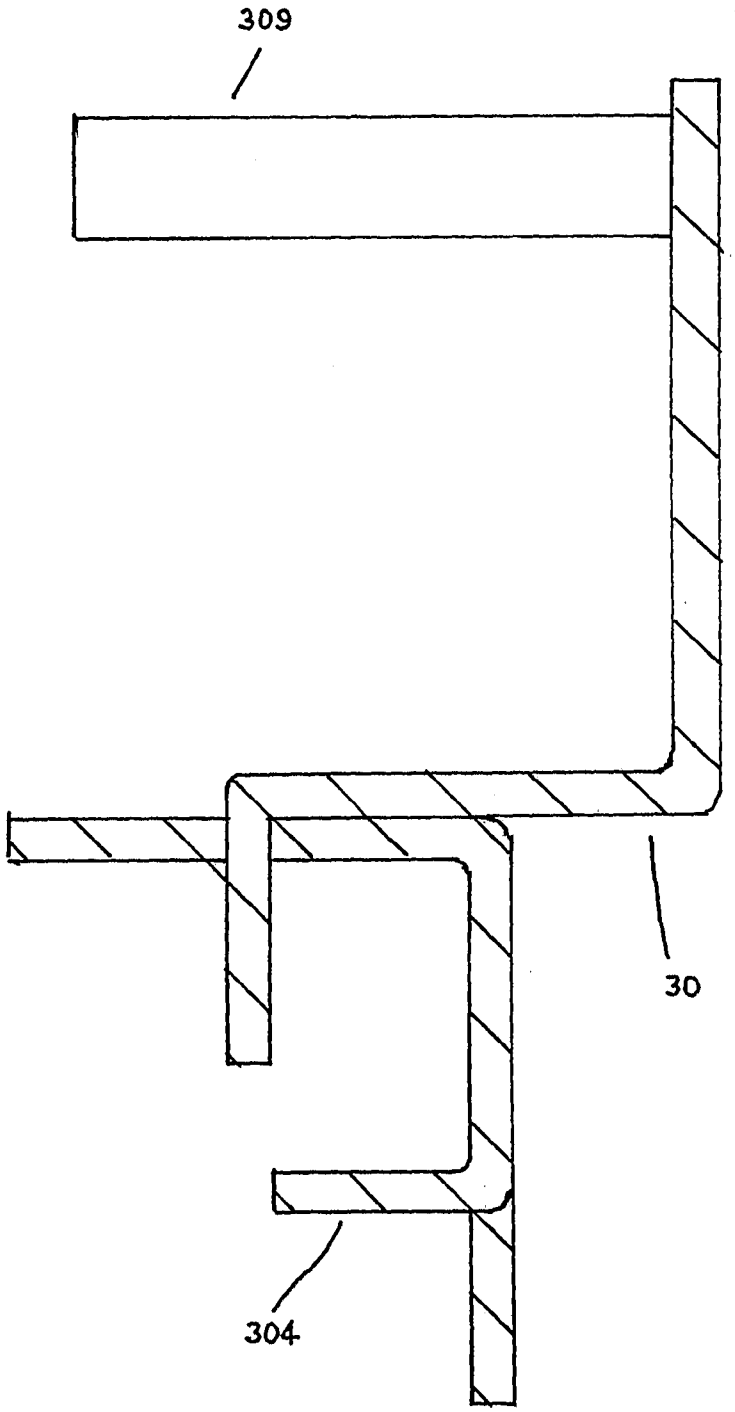
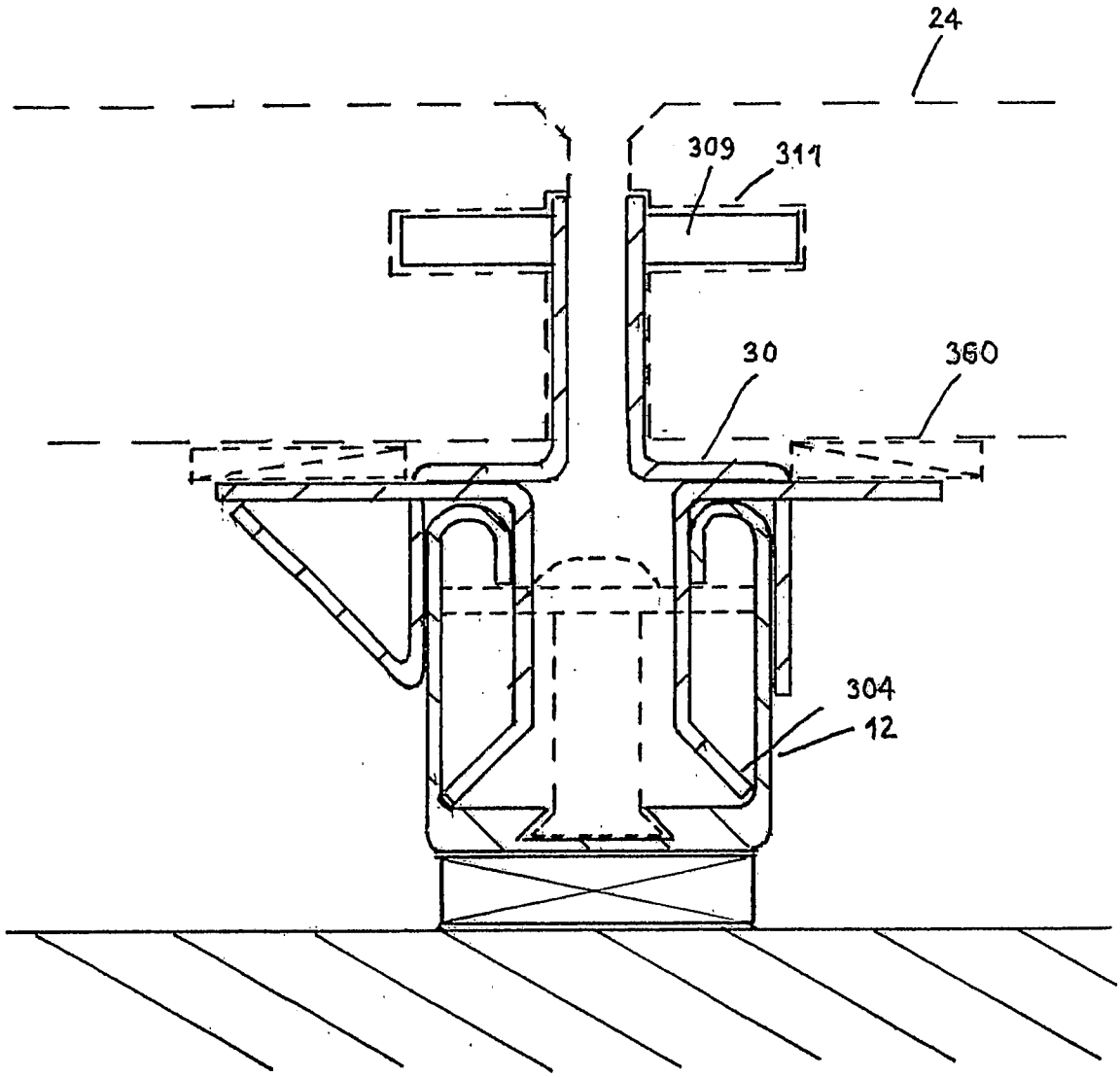


FIGURE 38


24
309
311
30
360
304
12

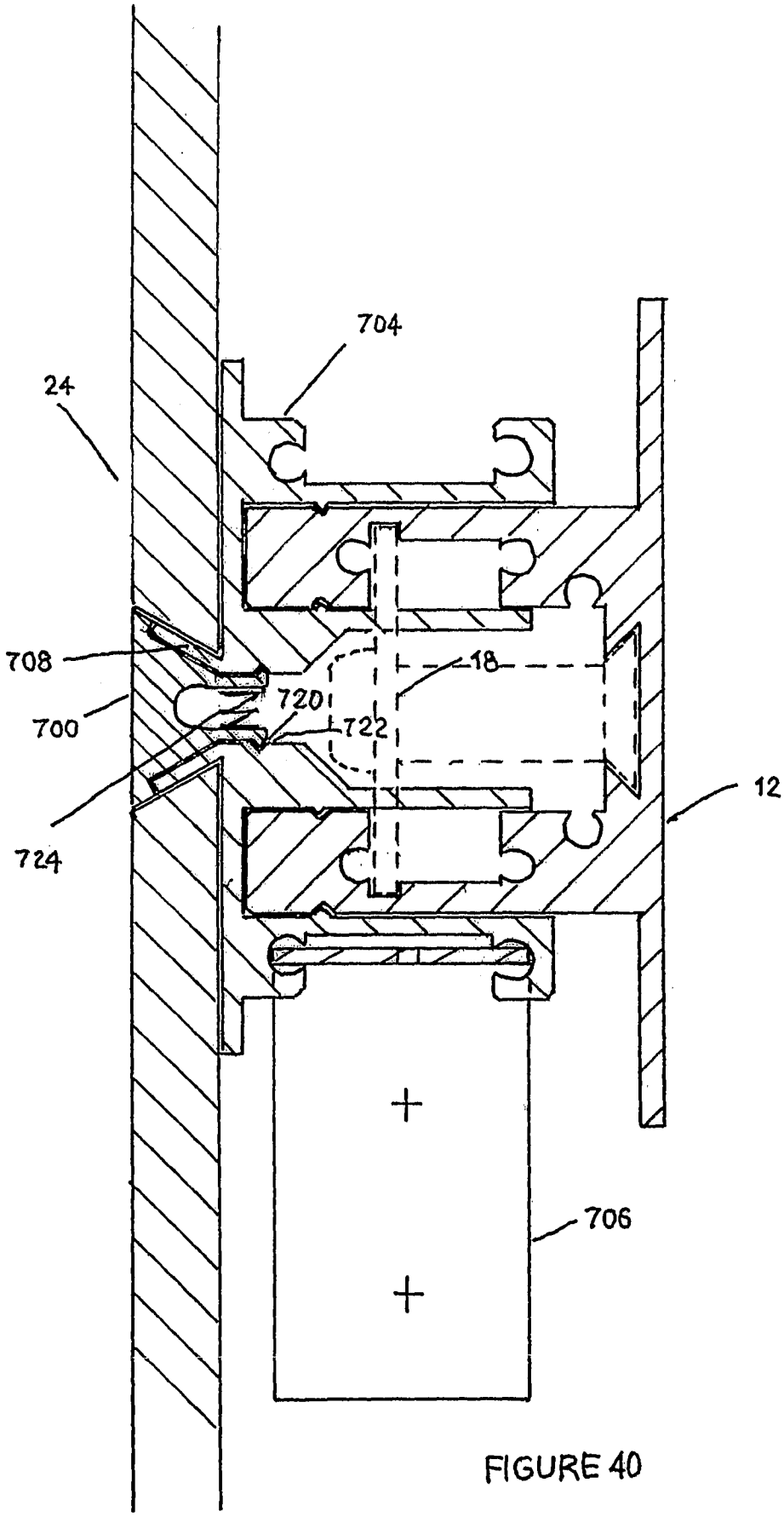


FIGURE 40

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2007/001730

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ***E04B 2/90*** (2006.01) ***E04D 3/361*** (2006.01) ***E04F 13/08*** (2006.01) ***E04B 1/61*** (2006.01) ***E04D 3/366*** (2006.01) ***F16B 5/00*** (2006.01) ***E04B 9/24*** (2006.01) ***E04F 13/07*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Dwpi: E04B/ic, E04D/ic, E04F/ic, F16B 5/00 with keywords

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	WO 2007/104074 A1 (RETOWN PTY LTD) 20 September 2007 The whole document	1, 11 and 13
X	DE 3604585 A1 (LOOS) 27 August 1987 The whole document	1, 10 and 11
X	FR 2759104 A1 (ARCHIDEE SOCIETE A RESPONSABILITE LIMITEE) 7 August 1998 The whole document	1 and 10-12
A	DE 3905185 A1 (RHEINHOLD & MAHLA GMBH) 23 August 1990 The whole document	1-13

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 January 2008	08 JAN 2008
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **LEOPOLD FILIPOVIC** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : (02) 6283 2105

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2007/001730

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
WO	2007104074		
DE	3604585	DE	3527224
FR	2759104		
DE	3905185		

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX