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(54) **A framing system and method for forming curved block walls, and an interconnecting web member therefor**

Rahmensystem und Verfahren zur Herstellung gebogener Wände aus Blöcken und Verbindungselement

Système d'encadrement et méthode pour ériger un mur courbé en blocs, et élément d'assemblage à cet effet

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US-A- 5 640 818 **US-A- 5 655 345**

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Description

Field of the Invention

[0001] This invention relates to the field of forming curved block walls, and in particular to such walls utilising glass blocks, although the invention is not limited to or exclusive to such types of blocks. Moreover, the invention relates particularly to a modular interconnecting web member as specified in the preamble of Claim 1.

[0002] Such a web member is known eg from US-A-5 640 818 or US-A-5 655 345.

Background Art

[0003] Various systems and methods are employed in the forming of walls using blocks, however, these methods have become more particular in the formation of walls using glass blocks, due to the aesthetic and fragile nature of glass and the especial configuration of glass blocks that predominate the market place.

[0004] Two systems that are used in the Australian market for the mounting of glass blocks and the erection of walls are described in Australian Patents 637665 and 680088. In order to facilitate the wall construction process, as has been described in Australian Patent 680088, a rectangular frame is used comprising a sill frame section, a pair of jamb frame sections and a head frame section, within which the glass blocks may be laid upon each other to form a glass block wall matrix.

[0005] US 5,640,818 describes a glass brick wall assembly comprising a plurality of generally rectangular glass bricks arranged in horizontal runs. The wall has horizontally extending elongate separation strips comprising sections connected together by hinge means so that adjacent sections are set at a pivoted position relative to one another.

[0006] The applicant's International Patent Application PCT/AU02/00793 describes different styles of rectangular frames constituting the prior art and an improved type of rectangular frame.

[0007] The frame sections making up the rectangular frame are formed of straight aluminium extrusions and facilitate the laying of the glass blocks to form a precisely vertical wall with precise alignment of the blocks to ensure complete coverage of the requisite area whilst optimising the aesthetics in having regular spacing between the blocks. However, whilst the use of straight frame sections is convenient and satisfactory for the construction of rectilinear walls, a problem arises when it is desired to construct a curved wall, given the rigid nature of the frame sections.

[0008] In such applications, it is normal to fabricate a composite curved frame, which can replace the sill and head frame sections.

[0009] As shown in Figure 1 of the drawings, this curved frame 11' comprises a pair of T-bar members 13' and a transverse joiner bar 15', which is pop riveted at

either end to the respective inwardly projecting toe portions 17' of the T-bars to laterally fix the bars in position and create a composite frame. In this arrangement, the T-bars 13' are rolled within a rolling machine, one bar with its toe on the inside and the other bar with its toe on the outside to achieve the requisite radius of curvature.

[0010] A particular difficulty however is that extruded aluminium bar has a temper which changes from material to material and which effects the degree of curvature arising for the same amount of applied stress to the bar. Consequently, in practice, the amount of curvature for different bars is difficult to control so as to achieve precisely the same radius of curvature for each bar.

[0011] Thus, forming composite frame sections in this manner is extremely arduous, time consuming and hence is very expensive, which naturally impacts upon the flexibility of providing block wall structures to suit the needs of the customer. Unfortunately, a highly desirable facet of incorporating block walls into a building design is the ability to provide curved portions of the wall, which have high aesthetic appeal.

Disclosure of the Invention

[0012] It is an object of the present invention to provide for the construction of curved and straight sections of block walls, which alleviates some or all the problems associated with the prior art methods described above.

[0013] In accordance with a first aspect of the present invention, there is provided a modular interconnecting web member for forming curved block walls, comprising:

an elongated web portion having a male end, an opposing female end, a pair of side flanges coextending from an inner side of the web portion and forming a pair of legs for the member to stand upon a substantially planar surface, and a block supporting platform provided on the outer side of the web portion;

the male end has a convexly curved and radiused tongue having a deformable spigot projecting transversely thereof from the inner side of the web portion at the centre of the tongue radius, and the female end has a concavely curved and radiused recess of complementary size and shape to the tongue, and having a socket open on the outer side of the web portion and extending transversely thereof through towards the inner side of the web portion at the centre of the recess radius; and

the side flanges each being provided with a longitudinally extending groove on the outer side thereof to respectively accommodate a discrete external flange member along the outer side of the web portion;

wherein the male end of one web member may be interlockingly interconnected with the female end of another

web member with the tongue snapping into the recess in a friction fit on the spigot, the one member being disposed within the socket at a relative angular disposition of choice;

whereby the block supporting platforms present a contiguous, substantially planar surface on the outer side of the web members, and the bottom edges of the coextending side flanges of each member terminate in a common plane.

[0014] Preferably, the convex end of the tongue and the concave end of the recess are knurled with teeth precisely disposed to locate and frictionally retain an interconnecting tongue and recess of adjoining members at one of a predetermined set of angular alignments when the spigot of the adjoining male end is disposed in the socket of the adjoining female end.

[0015] Preferably, the spigot is annular having an inner aperture to accommodate a discrete locking pin, the pin being of substantially commensurate size to the aperture but having a flared portion to ensure fixed locking engagement between the spigot and the socket when corresponding male and female ends of adjoining members are interconnected and the locking pin is impressed into the aperture.

[0016] Preferably, the inner side of the web portion has an inner flange centrally disposed between the side flanges and coextending longitudinally therewith, to reinforce the socket.

[0017] Preferably, a transverse convex portion is disposed at the distal end of the inner flange symmetrical therewith and protruding axially from the female end, adjacent and radiused with respect to the socket; and the opposing distal end of the inner flange terminates with an abutting end, spaced from the centre point of the spigot a distance commensurate to the radius of the convex portion with respect to the socket; whereby the abutting end of one web member may be disposed in abutting relationship with the convex portion of another adjoining web member, when the spigot and socket of the respective web members are interconnected, irrespective of the relative angular relationship adopted between the adjoining web members, thereby providing and maintaining planar stability to the block supporting platforms thereof.

[0018] Preferably, a plurality of transversely extending and opposing inner ribs are disposed on the inner side of the web portion to define a pair of tapered grooves extending longitudinally in conjunction with the side flanges, one tapered groove being disposed adjacent one side flange, and the other tapered groove being disposed adjacent to the other side flange, symmetrically about the centre of the web member, each tapered groove being provided for selectively accommodating a further discrete external flange member for forming a fin projecting externally through the common plane.

[0019] Preferably, the side flanges are each formed with a longitudinally extending groove internally thereof for forming a screw flute to facilitate affixing the web member orthogonally to an end frame member.

[0020] In accordance with a second aspect of the present invention, there is provided a framing system comprising a system for constructing a curved block wall comprising:

a modular interconnecting web member according to the first aspect of the present invention for forming a track along which the blocks may be laid, the member having opposing parts of a positive interlocking means at opposing ends thereof so that the members can be serially interconnected together to form the track at prescribed angular orientations to each other;

a pair of external flange members for affixing one to each side of the web member so that the flange members adopt the prescribed angular orientation of the web members when interconnected;

wherein the external flanges combine with the web members to form a channel within which the ends of a block may be situated to follow the line of the track.

[0021] Preferably, the framing system includes a further external flange member for affixing to the inner side of the web member for forming an externally projecting fin that also follows the line of the track to facilitate locating the track upon a cavity wall.

[0022] In accordance with a third aspect of the present invention, there is provided a method for constructing a block wall comprising:

laying a track of modular interconnecting web members according to the first aspect of the present invention along a surface where the wall is intended to be constructed;

fixedly locking adjacent web members together at a prescribed angular disposition corresponding to the intended line and curvature of the wall;

affixing external flange members to each side of the track so that the flange members adopt the prescribed line of curvature of the track and create a channel within which the ends of a block may be situated to follow the line of the track.

[0023] Preferably, the method includes affixing a further external flange member to the inner side of the web members for forming an externally projecting fin that also follows the line of the track to facilitate locating the track upon a cavity wall.

Brief Description of the Drawings

[0024]

Figure 1 of the drawings is a fragmentary perspective view of a portion of a composite frame section typical

of the prior art.

The remaining drawings depict various aspects of the preferred embodiment of the invention for the purposes of describing the best mode for carrying out the invention, wherein:-

Figure 2 is a perspective view of the modular inter-connecting web member from above;

Figure 3 is a perspective view of the interconnecting web member from below;

Figure 4 is a top plan view of the interconnecting web member;

Figure 5 is a front-end view of the interconnecting web member;

Figure 6 is a side view of the interconnecting web member;

Figure 7 is an underside plan view of the interconnecting web member;

Figure 8 is a rear end view of the interconnecting web member;

Figures 9 show the before and after positions of two adjoining interconnecting web members before and after pinning, whereby

Figure 9A shows one web member elevated relative to the other and with the pin shown prior to interconnection;

Figure 9B shows the two web members positively joined to each other in a rectilineal arrangement with the pin in place;

Figure 9C is a similar view to Figure 9B, but showing the two members adjoined to each other at a fixed angular orientation disposed from the rectilineal position;

Figure 10 is a schematic perspective view showing a series of the interconnecting web members adjoined to each other to form a track and with one of the external side flanges and an end jamb member in position performing part of the framing system and showing where two blocks in dotted outline would be positioned when initially constructing the block wall; and

Figure 11 is an underside view showing a further external flange member positioned within a pair of aligned tapered grooves formed between the inner flanges of two adjoining interconnecting web members so as to form a weather fin.

[0025] The best mode for carrying out the invention will now be described by way of one specific embodiment of the invention, which is described with reference to the accompanying drawings, briefly described above.

[0026] The embodiment is directed towards a composite framing system for constructing a curved wall from glass blocks of standard design, a method for forming the framing system and the block wall, and a modular elongated web member that is integral to the system.

[0027] As shown in figures 2 to 8, the modular inter-connecting web member 11 is a specially configured element which is injection moulded from plastic.

[0028] The web member 11 effectively forms an elongated web portion having an outer web portion 12a and an inner web portion 12b, which when affixed to external flanges forms a composite frame section that constitutes both a sill section and a head section of a frame within which the glass blocks may be laid to construct a glass block wall matrix.

[0029] This elongated web portion has a male end 13, an opposing female end 15, a pair of side flanges 17, an inner side 19 and an outer side 21.

[0030] The male end 13 has a convexly curved and radiused tongue 23, which has a deformable spigot 25 protecting transversely thereof on the inner side 19 of the web portion. The spigot 25 is annular, being provided with a central aperture 27 that extends through from the upper side 21 to the inner side 19. The spigot 25 is split with three slots 29 to be deformable radially of the aperture 27.

[0031] The female end 15 has a concavely curved and radiused recess 31, which is of complementary size and shape to the tongue 23. As shown in the drawings, the recess 31 extends axially along the outer side 21 of the web portion to define a planar face 33 which is stepped down from the remainder of the outer surface which is contiguous with the tongue 23.

[0032] The female end 15 also has a socket 35 formed therein which is open on the outer side 21 of the web portion and extends transversely therethrough towards the inner side of the web portion at the centre of the recess radius. The socket 35 is also formed with an annular wall 37, which is not split, but to the contrary, is reinforced by a centrally and axially extending inner flange 39 on the inner side 19 of the web portion. The inner flange 39 assists with radial deformation of the socket walls 37 to facilitate locking engagement of the spigot 25 of an adjoining member, which will be described in more detail later. Thus, the socket 35 is of commensurate size to the

[0033] A transverse convex portion 38 is disposed at the distal end 39a of the inner flange 39, symmetrical therewith. The outer surface of the convex portion 38 protrudes axially of the female end 15 marginally beyond the corresponding distal ends 17a of the side flanges 17, and is adjacent and radiused with respect to the socket 35. The opposing distal end 39b of the inner flange 39

similarly projects marginally beyond the corresponding distal ends 17b of the side flanges 17 at the male end of the web member, and terminates with an abutting end 40. The abutting end 40 is spaced from the centre axis of the spigot 25, a distance that is commensurate to the radius of the convex portion from the centre axis of the socket 35. In this manner, the abutting end 40 of one web member may be disposed in abutting relationship with the outer surface of the convex portion 38 of another adjoining web member, when the spigot and socket of the respective web members are interconnected. This will be described in further detail later.

[0034] The side flanges 17 coextend from the inner side 19 of the web portion and form a pair of legs for the member to stand upon a substantially planar surface when forming the framing system. The side flanges 17 are equidistant so that the bottom edges 41 thereof terminate in a common plane, which is parallel to the plane defined by the outer surface 21.

[0035] Each of the side flanges 17 are provided with longitudinally extending grooves 43 on the outer side thereof. The grooves 43 are effectively disposed at the junction between the outer web portion 12a and the inner web portion 12b. The grooves 43 are sized to respectively accommodate the toe portion of an external flange member in the form of a T bar that will be described in more detail later.

[0036] As can be seen in the drawings, the side flanges 17 are substantially rectangular in cross section and are formed with a series of transverse ribs 45 and flutes 47 to facilitate the moulding and strengthening thereof. The side flanges are also each formed with a longitudinally extending inner groove 49 which forms a screw flute to facilitate affixing the web member orthogonally to an end frame member that will also be described in more detail later.

[0037] The inner side 19 of the web portion is also formed with a plurality of inner ribs 51 extending transversely from confronting faces on the inner side 17a of the side flanges 17 and the inner flange 39. The distal ends of the transverse ribs 51 define a pair of tapered grooves 53, whereby the grooves are at their widest spacing 53a towards the opposing ends of each of the side flanges 17 and are at their narrowest spacing 53b adjacent the median of the side flanges.

[0038] The tapered grooves are provided for accommodating a further external flange member that forms a weather fin that will similarly be described in more detail later.

[0039] The outer side 21 of the web portion is divided into an outer web portion 12a and an inner web portion 12b. The outer web portion 12a defines a planar block supporting platform and the inner web portion 12b defines a planar surface for receiving the underside of the tongue 23 of an adjoining web member.

[0040] The size of the step of the recess 31 is commensurate to the thickness of the tongue 23 so that when the tongue is juxtaposed with the face 33, the upper sur-

face of the outer web portions of the adjoining members are contiguous and coplanar.

[0041] The convex end of the tongue 23 and the concave end of the recess 31 are both knurled with teeth 55, which are precisely disposed to locate and frictionally retain an interconnecting tongue and recess of adjoining members at one of the predetermined set of angular alignments when the spigot of the adjoining male end is disposed in the socket of the adjoining female end of two adjoining web members.

[0042] Now describing the manner of interconnection between adjoining web members, as shown in Figure 9 of the drawings, one web member 11 a is to be adjoined to a second web member 11 b. As shown in Figure 9A, the web member 11 a is disposed with the tongue 23 thereof above the recess 31 of the other web member 11 b at the desired angular orientation of one to the other. In the case of a rectilinear alignment, the spigot of the one member 11 a is located within the socket of the other member and the confronting teeth 55 of the tongue and recess engaged at the requisite alignment. When brought into mutual engagement, the abutting end 40 of inner flange 39 will be brought into confronting and abutting relationship with outer surface of the convex portion 38.

This abutting relationship functions to provide and maintain planar stability of the block supporting platforms of the adjoining web members, irrespective of the relative angular relationship adopted between the web members. Once in this position, a pin 57 having a spigot portion of substantially commensurate shape to the aperture 27 of the spigot but with a flared portion of marginally larger configuration, is impressed into the aperture, expanding the spigot 25 to lockingly engaged against the wall 37 of the socket 35, and permanently adjoin the web members together at the adopted angular relationship.

[0043] To facilitate rectilinear alignment, a radial mark 59a is disposed on the outer edge of the tongue 23 and a corresponding mark 59b is disposed on the outer web portion adjacent the recess 31, at the requisite locations.

[0044] In the case of the two members being disposed at a predetermined angular orientation, the web member 11 a is simply rotated into the correct rectangular orientation relative to the other web member 11 b on inserting the spigot 25 into the socket 35, allowing the teeth of the respective tongue and recess to engage at the appropriately aligned position. The abutting end 40 will simply be angularly shifted in position along the outer surface of the convex portion 38, but will maintain its confronting and abutting relationship thereto, to provide the planar stability to the adjoining web members, irrespective of the particular angular position adopted between the two. Again, an appropriate mark 59c may be provided on the outer web portion adjacent the recess 31 that may be aligned with the mark 59a on the tongue of the member 11 a to facilitate correct orientation of the two members prior to the pin 57 being impressed to lockingly engage the members together.

[0045] Now describing the framing system, a series of

interlocking web members 11 are adjoined to each other and locked in prescribed angular orientations to each other to define a track 61 upon which the glass blocks 63 forming the wall are laid as shown in Figure 10 of the drawings.

[0046] External flanges in the form of T-bar members 65 having an intermediate toe are rolled to adopt the general curvature of the track and are malletted into position with the toe being frictionally engaged within the longitudinal grooves 43. Due to the frictional engagement, the T-bars 65 will adopt the curvature of the track as opposed to their own curvature facilitating construction of the sill. An end jamb member 67 is disposed at either end of the track, whereby the jamb member abuts the corresponding end of the end web member and the threaded fasteners 69 are screwed in to position so that the shank of the fastener is accommodated within the screw flutes formed by the longitudinally extending inner grooves 49, affixing the jamb section to the track.

[0047] The web members are particularly sized so that the distance between successive centres of the pinned spigot and socket connections correspond to half a full block size and a full half block size. In this manner, half blocks can be used to form curved portions of the wall, as well as full blocks. In the case of full blocks following a curve, two adjoining web members will be interconnected rectilinearly and then will be angularly oriented and interconnected to a successive pair of rectilinear web members. The particular sizing also permits the tongue portion of the end web member to be docked at the appropriate end of the track so that a corresponding jamb section 67 can be positioned adjacent to the remaining side flanges of the end web member so that the screw flutes provided therein can be reached by corresponding fasteners 69.

[0048] As shown in Figure 11 of the drawings, the T-bar 65 can be used as a further external flange inserted into the tapered groove 53 to form a weather fin. The tapered nature of the groove is required to accommodate angular orientations of adjoining web members from the rectilinear position, allowing the T-bar to follow the requisite contour from one web member to the successive web member within the same groove.

[0049] As shown in Figure 12 of the drawings, the T-bar is retainedly grooved at the toe end and one of the flange ends so that it may be used either as a side flange member with the grooved end of the toe of the T-bar engaged within the groove 43 of the side flange 17, or a weather fin with the grooved end of the flange of the T-bar engaged within the groove 53 of the web member.

[0050] It should be appreciated that the scope of the present invention is not limited to the particular embodiment described herein.

Claims

1. A modular interconnecting web member (11) for

forming curved block walls, comprising:

an elongated web portion (12a, 12b) **characterized by** having a male end (13), an opposing female end (15), a pair of side flanges (17) co-extending from an inner side (19) of the web portion (12a, 12b) and forming a pair of legs for the member to stand upon a substantially planar surface, and a block supporting platform provided on the outer side (21) of said web portion; said male end (13) having a convexly curved and radiused tongue (23) and a deformable spigot (25) projecting transversely of the tongue from the inner side (19) of said web portion at the centre of the tongue radius, and said female end (15) having a concavely curved and radiused recess (31) of complementary size and shape to said tongue (23), and a socket (35) open on the outer side (21) of said web portion and extending transversely thereof, through towards the inner side (19) of said web portion at the centre of the recess radius; and said side flanges (17) each being provided with a longitudinally extending groove (43) on the outer side thereof to respectively accommodate a discrete external flange member (65) along the outer side of said web portion; wherein said male end (13) of one web member may be interlockingly interconnected with said female end (15) of another web member, with said tongue (23) and said spigot (25) snapping into said recess and said socket (35) respectively, in a friction fit, said one web member being disposed at a relative angular disposition of choice with respect to the other web member, about the spigot and socket connection; whereby said block supporting platforms present a contiguous, substantially planar surface on the outer side (21) of said interconnecting web members (11), and the bottom edges (41) of the coextending side flanges (17) of each member terminate in a common plane.

2. A modular interconnecting web member (11) as claimed in claim 1, wherein the convex end of said tongue (23) and the concave end of said recess (31) are knurled with teeth (55) precisely disposed to locate and frictionally retain an interconnecting tongue and recess of adjoining members at one of a predetermined set of angular alignments when the spigot (25) of the adjoining male end (13) is disposed in the socket (35) of the adjoining female end (15).
3. A modular interconnecting web member (11) as claimed in claim 1 or 2, wherein said spigot (25) is annular having an inner aperture (27) to accommodate a discrete locking pin (57), the locking pin (57) being of substantially commensurate size to the ap-

erture but having a flared portion to ensure fixed locking engagement between said spigot (25) and said socket (35) when corresponding male and female ends of adjoining members are interconnected and said locking pin (57) is impressed into said aperture (27).

4. A modular interconnecting web member (11) as claimed in any one of the preceding claims, wherein the inner side (19) of said web portion has an inner flange centrally disposed between said side flanges (17) and coextending longitudinally therewith, to reinforce said socket (27).

5. A modular interconnecting web member (11) as claimed in claim 4, including a transverse convex portion (38) disposed at the distal end of said inner flange (39), symmetrical therewith, and protruding axially from said female end (15), adjacent and radiused with respect to said socket (35); and wherein the opposing distal end (39b) of said inner flange (39) terminates with an abutting end (40), spaced from the centre axis of said spigot (25) a distance commensurate to the radius of said convex portion (38) from the centre axis of said socket; whereby said abutting end (40) of one web member may be disposed in abutting relationship with said convex portion (38) of another adjoining web member, when the spigot (25) and socket (35) of the respective web members are interconnected, irrespective of the relative angular relationship adopted between the adjoining web members, thereby providing and maintaining planar stability to said block supporting platforms thereof.

6. A modular interconnecting web member (11) as claimed in any one of the preceding claims, including a plurality of transversely extending and opposing inner ribs (51) disposed on the inner side (19) of said web portion to define a pair of tapered grooves (53) extending longitudinally in conjunction with said side flanges (17), one tapered groove being disposed adjacent one side flange, and the other tapered groove being disposed adjacent to the other side flange, symmetrically about the centre of the web member, each tapered groove being provided for selectively accommodating a further discrete external flange member for forming a fin projecting externally through said common plane.

7. A modular interconnecting web member (11) as claimed in any one of the preceding claims, wherein said side flanges (17) are each formed with a longitudinally extending groove (49) internally thereof for forming a screw flute to facilitate affixing the web member orthogonally to an end frame member.

8. A framing system for constructing a curved block wall

comprising:

a modular interconnecting web member (11) as claimed in any preceding claim for forming a track (61) along which the blocks (63) may be laid, the member having opposing parts of a positive interlocking means at opposing ends thereof so that the members can be serially interconnected together to form the track at prescribed angular orientations to each other; and a pair of external flange members (65) for affixing one to each side of the web member so that the flange members adopt the prescribed angular orientation of the web members (11) when interconnected; wherein the external flanges (65) combine with the web members to form a channel within which the ends of a block may be situated to follow the line of the track.

9. A framing system as claimed in claim 8, wherein the framing system includes a further external flange member (65) for affixing to the inner side (19) of the web member for forming an externally projecting fin that also follows the line of the track (61) to facilitate locating the track upon a cavity wall.

10. A method for constructing a block wall comprising:

laying a track (61) of modular interconnecting web members (11) as claimed in any of claims 1 to 7 along a surface where the wall is intended to be constructed; fixedly locking adjacent web members (11) together at a prescribed angular disposition corresponding to the intended line and curvature of the wall; affixing external flange members (65) to each side of the track (61) so that the flange members adopt the prescribed line of curvature of the track and create a channel within which the ends of a block may be situated to follow the line of the track.

11. A method as claimed in claim 10, including affixing a further external flange member (65) to the inner side (19) of the web members (11) for forming an externally projecting fin that also follows the line of the track (61) to facilitate locating the track upon a cavity wall.

Patentansprüche

1. Modulares Zwischenverbindungselement (11) zum Ausbilden bogenförmiger Wände aus Blöcken, enthaltend:

einen länglichen Verbindungsabschnitt (12a, 12b), **dadurch gekennzeichnet, dass** er über ein Steckerende (13), ein gegenüberliegendes Kupplungsende (15), ein Paar Seitenflansche (17), die sich gemeinsam von einer Innenseite (19) des Verbindungsabschnittes (12a, 12b) erstrecken und ein Paar Schenkel bildet, damit das Element auf einer im wesentlichen planen Oberfläche stehen kann, und eine Blockauflagerfläche verfügt, die auf der Außenseite (21) des Verbindungsabschnittes vorgesehen ist; wobei das Steckerende (13) eine konvex abgerundete und kreisförmige Zunge (23) und einen verformbaren Zapfen (25) hat, der quer zur Zunge von der Innenseite (19) des Verbindungsabschnittes am Zentrum des Zungenradius' hervorragt, und das Kupplungsende (15) eine konvex gekrümmte konkav abgerundete und kreisförmige Aussparung (31) komplementärer Größe und Form zur Zunge (23) sowie eine Buchse (35), die auf der Außenseite (21) des Verbindungsabschnittes geöffnet ist und sich querverlaufend zu diesem hindurch zur Innenseite (19) des Verbindungsabschnittes am Zentrum des ausgenommenen Radius' erstreckt, enthält; und

die Flansche (17) jeweils eine in Längsrichtung verlaufenden Rille (43) auf ihrer Außenseite (43) enthalten, um jeweils ein separates externes Flanschelement (65) entlang der Außenseite des Verbindungsabschnittes aufzunehmen; wobei das Steckerende (13) des Verbindungselementes verriegelnd mit dem Kupplungsende (15) eines weiteren Verbindungselementes verbunden werden kann, wobei die Zunge (23) und der Zapfen (25) in die Ausnehmung bzw. die Buchse (35) mit Reibungspassung einrasten, wobei das eine Verbindungselement in einer beliebigen relativen Winkelanordnung im Bezug auf das andere Verbindungselement um die Zapfen- und Buchsenverbindung angeordnet ist;

wobei die Blockauflagerplattformen eine zusammenhängende, im wesentlichen plane Oberfläche auf der Außenseite (21) der Zwischenverbindungselemente (11) bilden und die Bodenränder (41) der sich gemeinsam erstreckenden Flansche (17) jedes Elementes in einer gemeinsamen Ebene enden.

2. Modulares Zwischenverbindungselement (11) nach Anspruch 1, bei dem das konvexe Ende der Zunge (23) und das konkave Ende der Aussparung (31) mit Zähnen (55) gerändelt sind, die präzise ausgebildet sind, um eine Zwischenverbindungszunge und eine Ausnehmung von aneinander grenzenden Elementen an einer einer vorbestimmten Anordnung von Winkelausrichtungen anzuordnen und durch Rei-

bung festzuhalten, wenn sich der Zapfen (25) des angrenzenden Steckerendes (13) in der Buchse (35) des angrenzenden Kupplungsendes (15) befindet.

3. Modulares Zwischenverbindungselement (11) nach Anspruch 1 oder 2, bei dem der Zapfen (25) ringförmig ist und eine Innenöffnung (27) aufweist, um einen separaten Arretierstift (57) aufzunehmen, wobei der Arretierstift (57) eine im wesentlichen angemessene Größe für die Öffnung hat, jedoch einen gebögelten Abschnitt aufweist, um eine feste Verriegelungsverbindung zwischen dem Zapfen (25) und der Buchse (35) sicherzustellen, wenn jeweilige Stecker- und Kupplungsenden aneinander grenzender Elemente miteinander verbunden sind und der Arretierstift (57) in die Öffnung (27) gepresst ist.
4. Modulares Zwischenverbindungselement (11) nach einem der vorhergehenden Ansprüche, bei dem die Innenseite (19) des Verbindungsabschnittes einen Innenflansch hat, der zentral zwischen den Flanschen (17) angeordnet ist und sich zusammen mit diesem in Längsrichtung erstreckt, um die Buchse (35) zu verstärken.
5. Modulares Zwischenverbindungselement (11) nach Anspruch 4, enthaltend einen querverlaufenden konvexen Abschnitt (38), der am äußersten Ende des Innenflansches (39) symmetrisch dazu angebracht ist und axial vom Kupplungsende (15) hervorragt, benachbart und abgerundet im Bezug auf die Buchse (35); und wobei das gegenüberliegende äußerste Ende (39b) des Innenflansches (39) in einem Anschlagende (40) endet, das von der Mittelachse des Zapfens (25) in einem geeigneten Abstand zum Radius des konvexen Abschnittes (38) von der Mittelachse der Buchse beabstandet ist; wodurch das Anschlagende (40) eines Verbindungselementes in anschlagender Beziehung mit dem konvexen Abschnitt (38) eines weiteren angrenzenden Verbindungselementes angeordnet sein kann, wenn der Zapfen (25) und die Buchse (35) der entsprechenden Verbindungselemente miteinander verbunden sind, unabhängig von der relativen Winkelbeziehung, die zwischen aneinander grenzenden Verbindungselementen eingenommen ist, wodurch eine Flächenstabilität für die Blockauflagerflächen derselben gegeben und beibehalten wird.
6. Modulares Zwischenverbindungselement (11) nach einem der vorhergehenden Ansprüche, enthaltend eine Vielzahl in Querrichtung verlaufender und gegenüberliegender Innenstege (51), die auf der Innenseite (19) des Verbindungsabschnittes angeordnet sind, um ein Paar abgeschrägter Rillen (53) zu bilden, die sich in Längsrichtung in Verbindung mit den Flanschen (17) erstrecken, wobei eine abgeschrägte Rille benachbart zu einem Seitenflansch

und die andere abgeschrägte Rille benachbart zum anderen Seitenflansch, symmetrisch um das Zentrum des Verbindungselementes angeordnet sind, wobei jede abgeschrägte Rille vorgesehen ist, um wahlweise ein weiteres separates externes Flanschelement aufzunehmen, um eine Rippe zu bilden, die nach außen durch die gemeinsame Ebene hervorragt.

7. Modulares Zwischenverbindungselement (11) nach einem der vorhergehenden Ansprüche, bei dem die Seitenflansche (17) jeweils mit einer sich in Längsrichtung erstreckenden Rille (49) im Inneren derselben ausgebildet sind, um eine Schraubennut auszubilden, mit der das Verbindungselement orthogonal an einem Stirnrahmenelement befestigt werden kann.

8. Wandbausystem zum Errichten einer Bogenförmigen Wand aus Blöcken, enthaltend:

ein modulares Zwischenverbindungselement (11) nach einem der vorhergehenden Ansprüche zum Ausbilden einer Spur (61), entlang derer die Blöcke (63) ausgelegt werden können, wobei das Element gegenüberliegende Teile einer formschlüssigen Verriegelungseinrichtung an gegenüberliegenden Enden desselben aufweist, so dass die Elemente hintereinander miteinander verbunden werden können, um die Spur in vorgeschriebenen Winkelausrichtungen zueinander auszubilden; und ein Paar externer Flanschelemente (65), von denen eines auf jeder Seite des Verbindungselementes befestigt wird, so dass die Flanschelemente die vorgeschriebene Winkelausrichtung der Verbindungselemente (11) einnehmen, wenn sie verbunden sind; wobei sich die externen Flansche (65) mit den Verbindungselementen zusammenschließen, um mit diesen einen Kanal zu bilden, in dem sich die Enden eines Blocks befinden können, um der Linie der Spur zu folgen.

9. Wandbausystem nach Anspruch 8, bei dem das Wandbausystem ein weiteres externes Flanschelement (65) enthält, das an der Innenseite (19) des Befestigungselementes befestigt wird, um eine nach innen hervorragende Rippe auszubilden, die ebenfalls der Linie der Spur (61) folgt, um eine Anordnung der Spur auf einer Hohlraumwand zu erleichtern.

10. Verfahren zum Errichten einer Wand aus Blöcken, umfassend:

auslegen einer Spur (61) modularer Zwischenverbindungselemente (11) nach einem der Ansprüche 1 bis 7 entlang einer Oberfläche, auf

der die Wand errichtet werden soll; festes Verriegeln der benachbarten Verbindungselemente (11) miteinander in einer vorgeschriebenen Winkelanordnung entsprechend der beabsichtigten Linie und Krümmung der Wand;

Befestigen der externen Flanschelemente (65) an jeder Seite der Spur (61), so dass die Flanschelemente die vorgeschriebene Linie der Krümmung der Spur einnehmen und einen Kanal erzeugen, in dem sich die Enden der Blöcke befinden können, um der Linie der Spur zu folgen.

11. Verfahren nach Anspruch 10, enthaltend das Befestigen eines weiteren externen Flanschelementes (65) an der Innenseite (19) der Verbindungselemente (11), um eine nach außen hervorragende Rippe auszubilden, die ebenfalls der Linie der Spur (61) folgt, um eine Anordnung der Spur auf einer Hohlraumwand zu erleichtern.

Revendications

1. Élément d'assemblage d'interconnexion modulaire (11) pour former des parois courbées en blocs, comprenant:

une partie d'assemblage allongée (12a, 12b) **caractérisée par** une extrémité mâle (13), une extrémité femelle opposée (15), une paire de brides latérales (17) s'étendant conjointement d'un côté intérieur (19) de la partie d'assemblage (12a, 12b) et formant une paire de pattes pour que l'élément repose sur une surface sensiblement plane, et une plate-forme de support de bloc prévue sur le côté extérieur (21) de ladite partie d'assemblage ;

ladite extrémité mâle (13) ayant une languette incurvée de manière convexe et arrondie (23) et un ergot déformable (25) faisant saillie transversalement à la languette à partir du côté intérieur (19) de ladite partie d'assemblage au centre du rayon de la languette, et ladite extrémité femelle (15) ayant un évidement incurvé de manière concave et arrondi (31) de taille et de forme complémentaires à ladite languette (23), et une douille (35) ouverte sur le côté extérieur (21) de ladite partie d'assemblage et s'étendant transversalement à celle-ci, vers le côté intérieur (19) de ladite partie d'assemblage au centre du rayon d'évidement ; et

lesdites brides latérales (17) étant chacune munie d'une rainure s'étendant longitudinalement (43) sur leur côté extérieur pour recevoir respectivement un élément de bride externe discret (65) le long du côté extérieur de ladite partie

- d'assemblage ;
 où ladite extrémité mâle (13) d'un élément d'assemblage peut être reliée par verrouillage à ladite extrémité femelle (15) d'un autre élément d'assemblage, ladite languette (23) et ledit ergot (25) s'emboîtant dans ledit évidement et ladite douille (35) respectivement, en un ajustement à friction, ledit un élément d'assemblage étant disposé selon une disposition angulaire relative voulue par rapport à l'autre élément d'assemblage, au niveau du raccord de l'ergot et de la douille ;
 grâce à quoi lesdites plates-formes de support de bloc présentent une surface sensiblement plane contiguë sur le côté extérieur (21) desdits éléments d'assemblage d'interconnexion (11), et les bords inférieurs (41) des brides latérales s'étendant conjointement (17) de chaque élément se terminent dans un plan commun.
2. Élément d'assemblage d'interconnexion modulaire (11) selon la revendication 1, dans lequel l'extrémité convexe de ladite languette (23) et l'extrémité concave dudit évidement (31) sont moletées avec des dents (55) disposées précisément pour positionner et maintenir par friction une languette et une rainure d'interconnexion des éléments de jonction selon un alignement d'un ensemble prédéterminé d'alignements angulaires quand l'ergot (25) de l'extrémité mâle de jonction (13) est disposé dans la douille (35) de l'extrémité femelle de jonction (15).
 3. Élément d'assemblage d'interconnexion modulaire (11) selon la revendication 1 ou 2, dans lequel ledit ergot (25) est un ergot annulaire ayant une ouverture intérieure (27) pour recevoir une broche de verrouillage discrète (57), la broche de verrouillage (57) étant de taille sensiblement appropriée à l'ouverture mais ayant une partie évasée pour garantir un engagement de verrouillage serré entre ledit ergot (25) et ladite douille (35) quand les extrémités mâle et femelle correspondantes des éléments de jonction sont reliées entre elles et ladite broche de verrouillage (57) est introduite dans ladite ouverture (27).
 4. Élément d'assemblage d'interconnexion modulaire (11) selon l'une quelconque des revendications précédentes, dans lequel le côté intérieur (19) de ladite partie d'assemblage possède une bride intérieure disposée centralement entre lesdites brides latérales (17) et s'étendant conjointement longitudinalement à celles-ci, pour renforcer les ladite douille (27).
 5. Élément d'assemblage d'interconnexion modulaire (11) selon la revendication 4, comprenant une partie convexe transversale (38) disposée à l'extrémité distale de ladite bride intérieure (39), de manière symétrique à celle-ci, et faisant saillie axialement à partir de ladite extrémité femelle (15), adjacente et arrondie par rapport à ladite douille (35) ; et où l'extrémité distale opposée (39b) de ladite bride intérieure (39) se termine par une extrémité d'aboutement (40), éloignée de l'axe central dudit ergot (25) à une distance appropriée du rayon de ladite partie convexe (38) de l'axe central de ladite douille ; grâce à quoi ladite extrémité d'aboutement (40) d'un élément d'assemblage peut être disposée en une relation d'aboutement avec ladite partie convexe (38) d'un autre élément d'assemblage de jonction, quand l'ergot (25) et la douille (35) des éléments d'assemblage respectifs sont reliés entre eux, indépendamment de la relation angulaire relative adoptée entre les éléments d'assemblage adjacents, en fournissant et maintenant ainsi une stabilité planaire auxdites plates-formes de support de bloc de ceux-ci.
 6. Élément d'assemblage d'interconnexion modulaire (11) selon l'une quelconque des revendications précédentes, comprenant une pluralité de nervures intérieures opposées s'étendant transversalement (51) disposées sur le côté intérieur (19) de ladite partie d'assemblage pour définir une paire de rainures effilées (53) s'étendant longitudinalement conjointement avec lesdites brides latérales (17), une rainure effilée étant disposée de manière adjacente à une bride latérale, et l'autre rainure effilée étant disposée de manière adjacente à l'autre bride latérale, de manière symétrique par rapport au centre de l'élément d'assemblage, chaque rainure effilée étant prévue pour recevoir de manière sélective un autre élément de bride externe discret pour former une ailette faisant saillie de manière externe à travers ledit plan commun.
 7. Élément d'assemblage d'interconnexion modulaire (11) selon l'une quelconque des revendications précédentes, dans lequel lesdites brides latérales (17) sont chacune formées d'une rainure s'étendant longitudinalement (49) de manière interne à celle-ci pour former une cannelure de vissage pour faciliter la fixation de l'élément d'assemblage de manière orthogonale à un élément d'armature d'extrémité.
 8. Système d'armature pour construire une paroi en blocs incurvée comprenant
 un élément d'assemblage d'interconnexion modulaire (11) selon l'une quelconque des revendications précédentes, pour former un rail (61) le long duquel les blocs (63) peuvent être déposés, l'élément ayant des parties opposées d'un moyen de verrouillage positif à ses extrémités opposées de sorte que les éléments puissent être reliés entre eux pour former le rail selon des orientations angulaires prédéterminées les uns par rapport aux autres ; et

une paire d'éléments de bride externes (65) pour fixer un élément de chaque côté de l'élément d'assemblage de sorte que les éléments de bride adoptent l'orientation angulaire prédéterminée des éléments d'assemblage (11) quand ils sont reliés entre eux ;
 où les brides externes (65) se combinent avec les éléments d'assemblage pour former un canal dans lequel les extrémités d'un bloc peuvent être situées pour suivre la ligne du rail.

9. Système d'armature selon la revendication 8, lequel système d'armature comprend un autre élément de bride externe (65) pour la fixation au côté intérieur (19) de l'élément d'assemblage pour former une ailette faisant saillie vers l'extérieur qui suit également la ligne du rail (61) pour faciliter le positionnement du rail sur une paroi à cavité.

10. Procédé de construction d'une paroi en blocs consistant à :

déposer un rail (61) d'éléments d'assemblage d'interconnexion modulaire (11) selon l'une quelconque des revendications 1 à 7, le long d'une surface où la paroi est destinée à être construite ;
 verrouiller solidement des éléments d'assemblage adjacents (11) conjointement selon une disposition angulaire prédéterminée correspondant à la ligne et la courbure voulues de la paroi ;
 fixer les éléments de bride externes (65) de chaque côté du rail (61) de sorte que les éléments de bride adoptent la ligne de courbure prédéterminée du rail et créent un canal à l'intérieur duquel les extrémités d'un bloc peuvent être positionnées pour suivre la ligne du rail.

11. Procédé selon la revendication 10, comprenant la fixation d'un autre élément de bride externe (65) du côté intérieur (19) des éléments d'assemblage (11) pour former une ailette faisant saillie vers l'extérieur qui suit également la ligne du rail (61) pour faciliter le positionnement du rail sur une paroi à cavité.

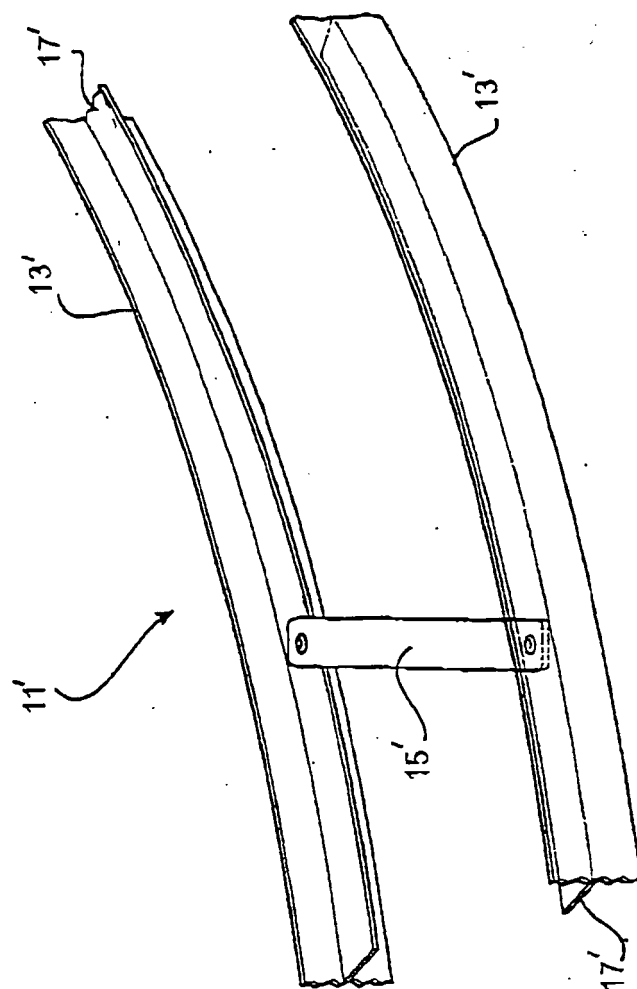
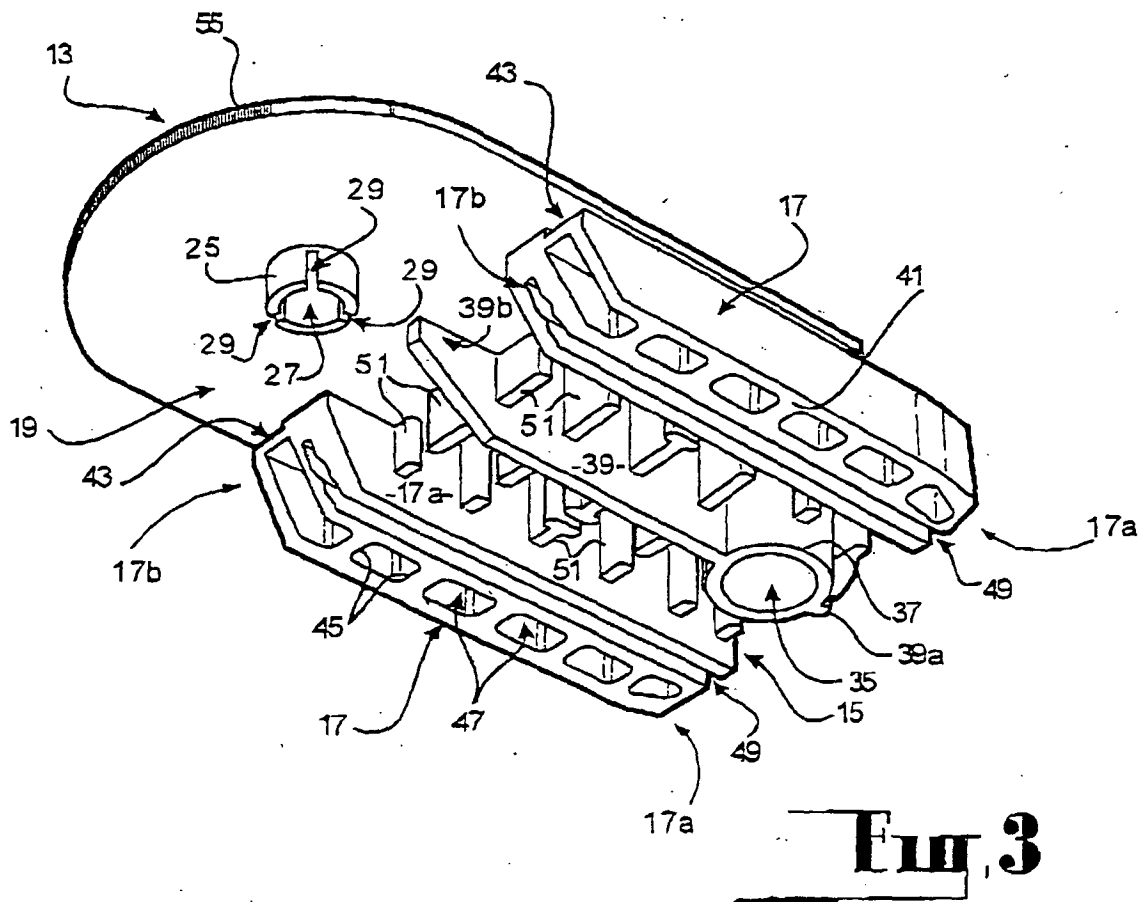
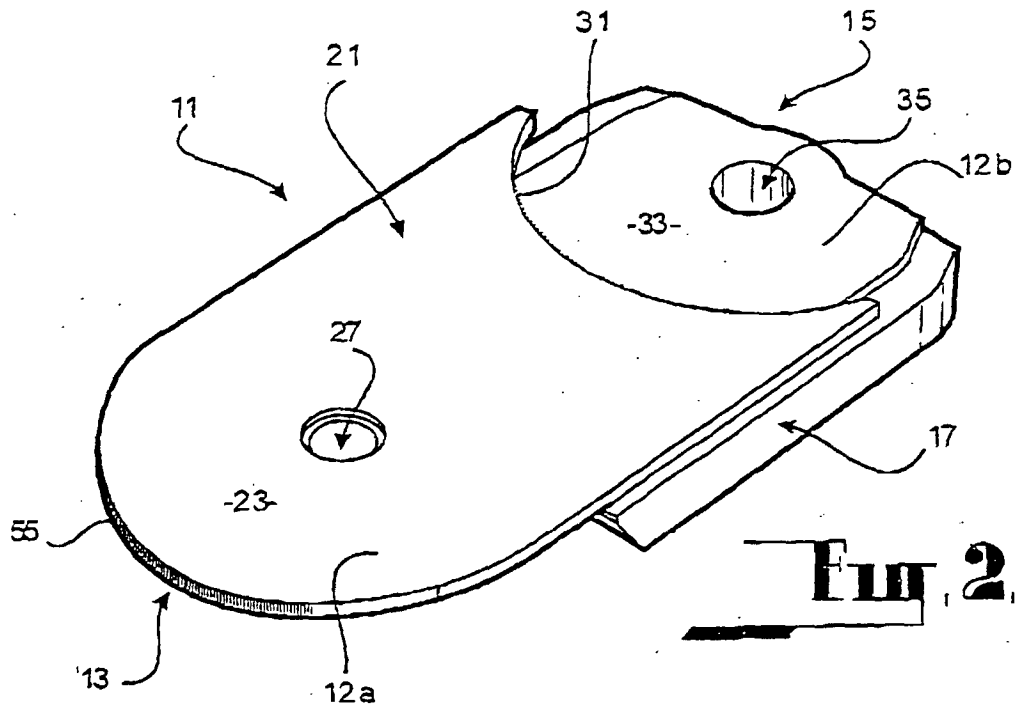
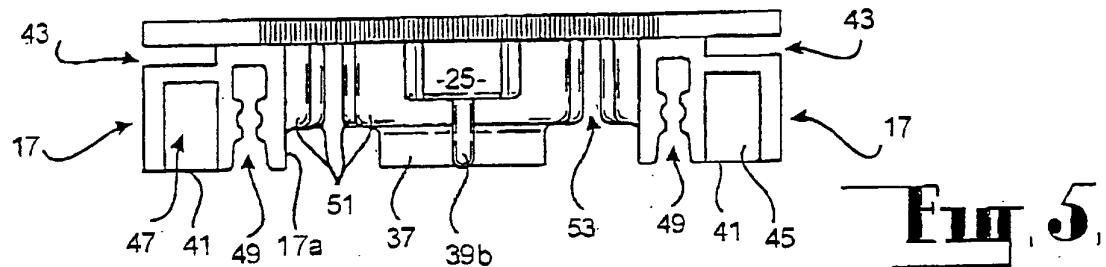
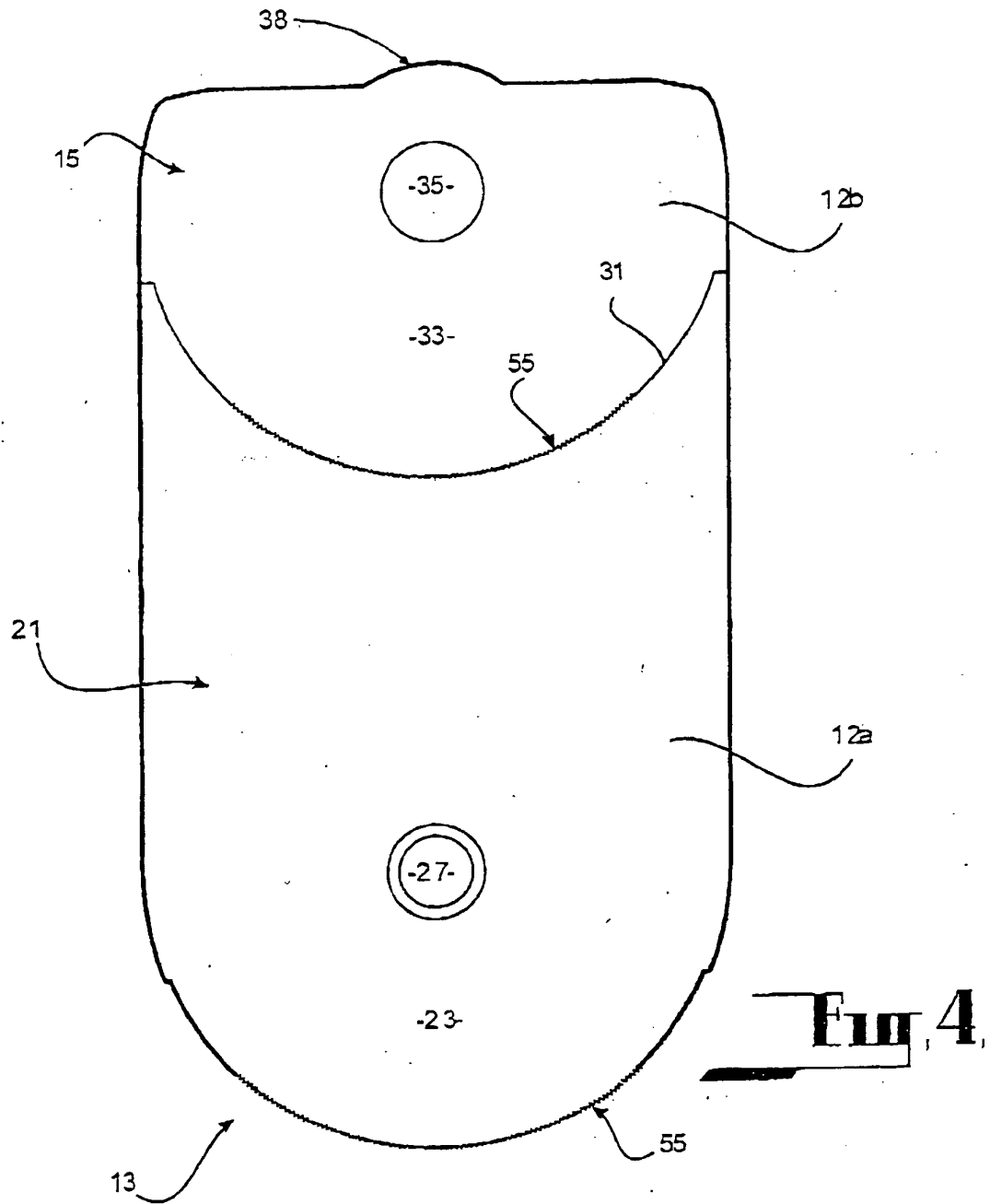


Fig. 1. (PRIOR ART)





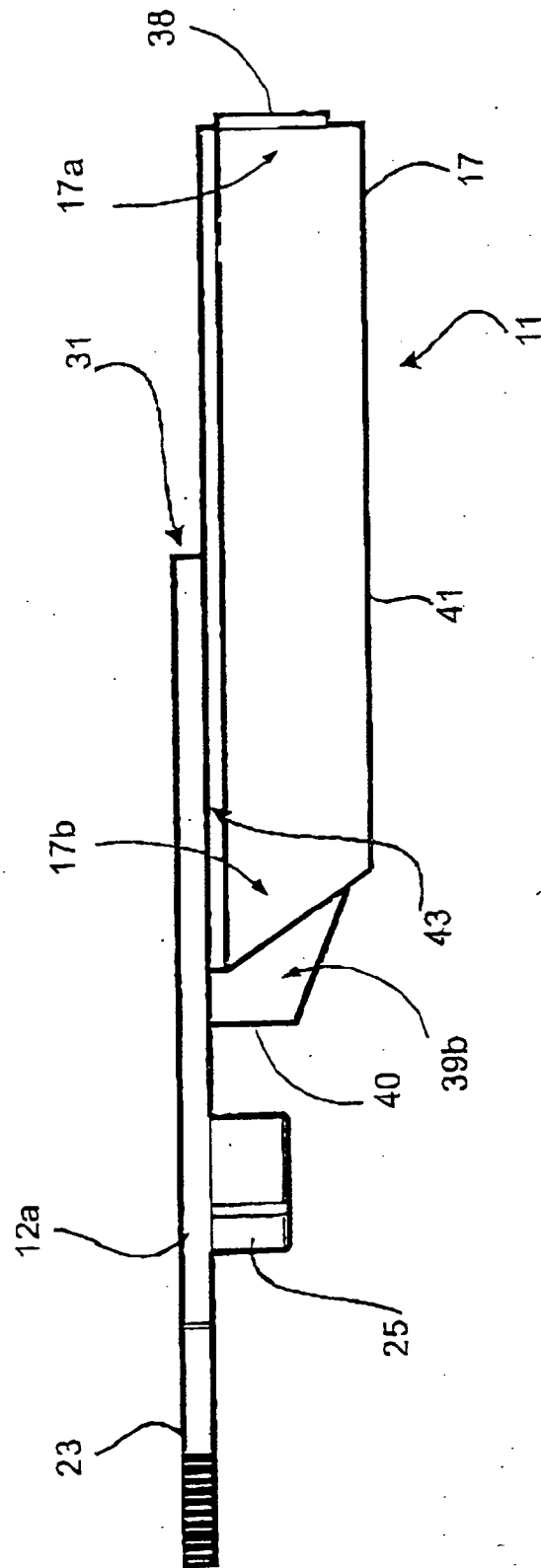


Fig. 6

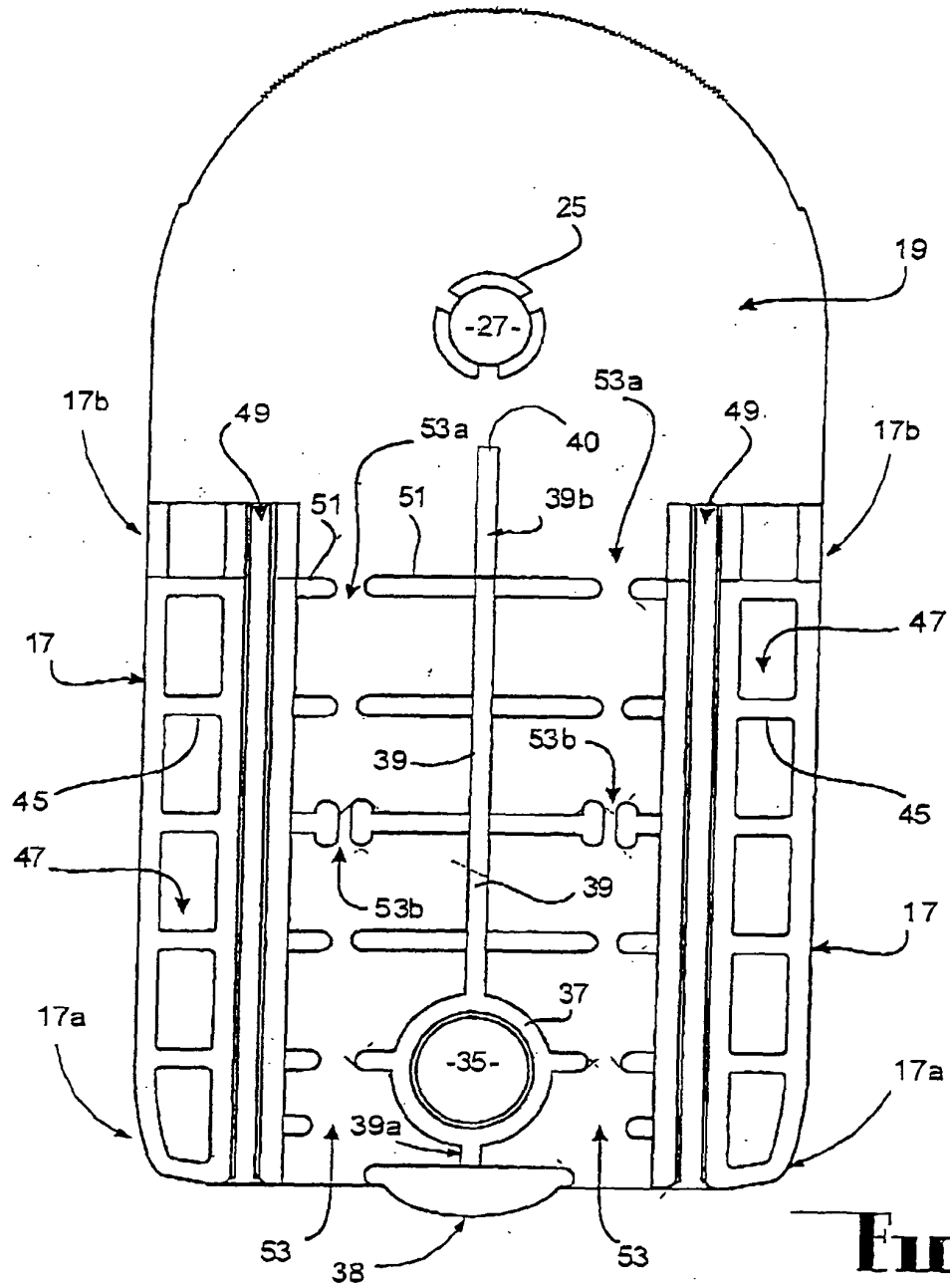


Fig. 7

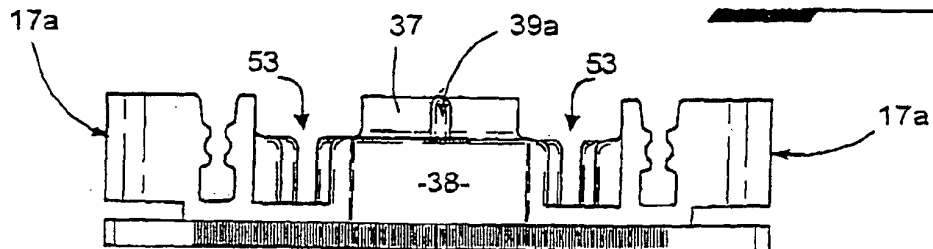


Fig. 8

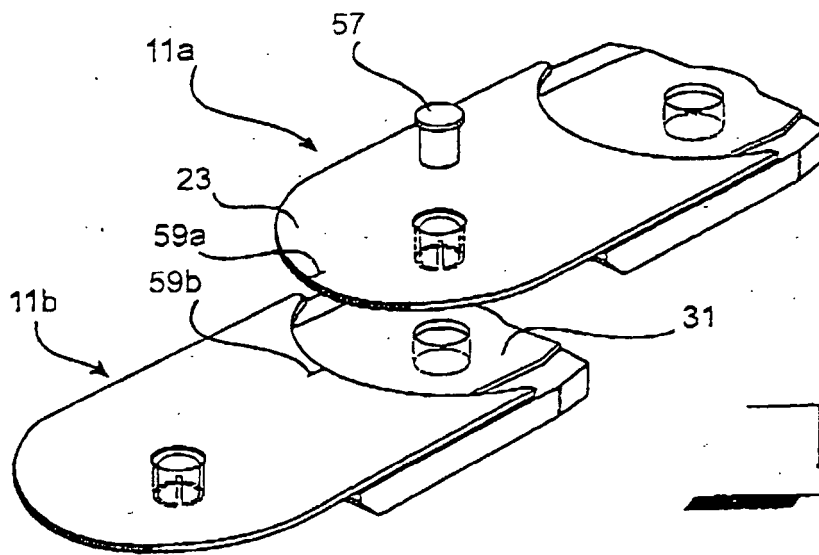


Fig. 9a,

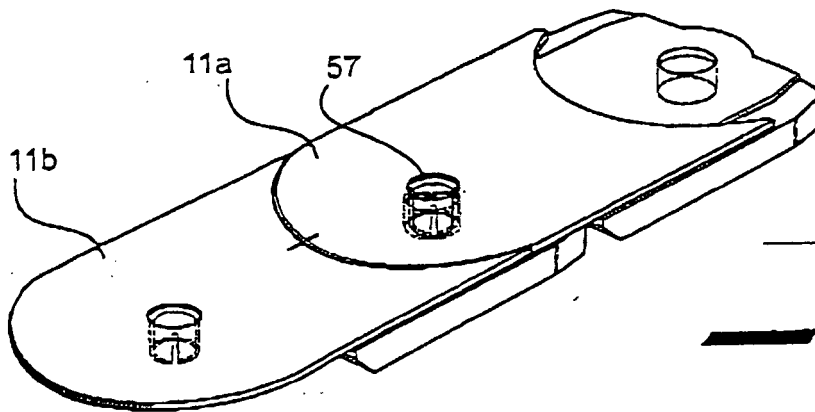


Fig. 9b,

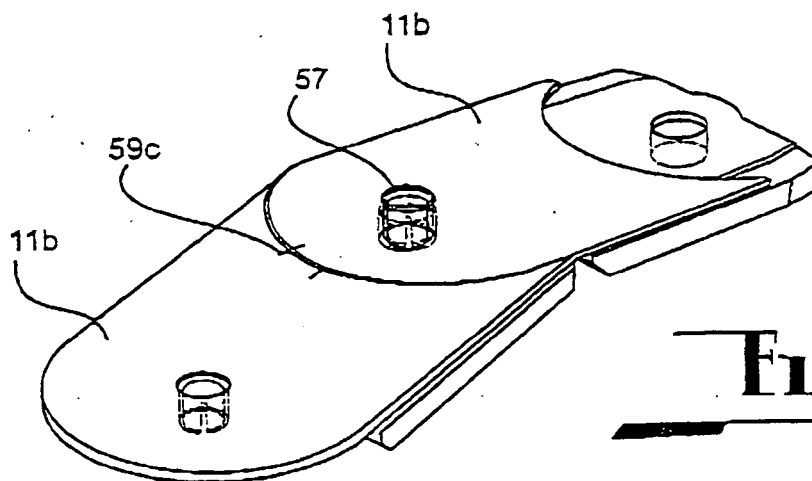


Fig. 9c,

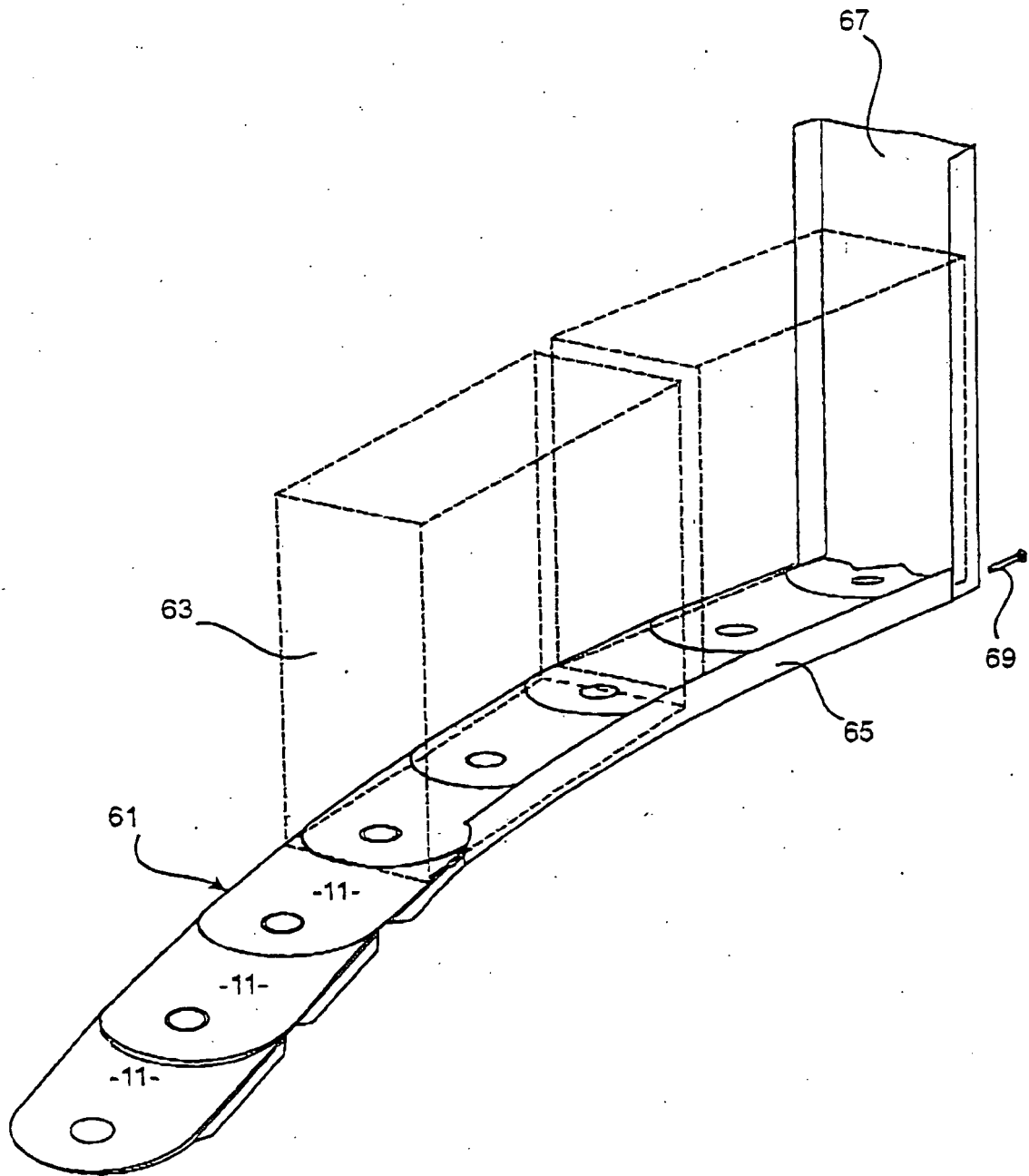


Fig. 10.

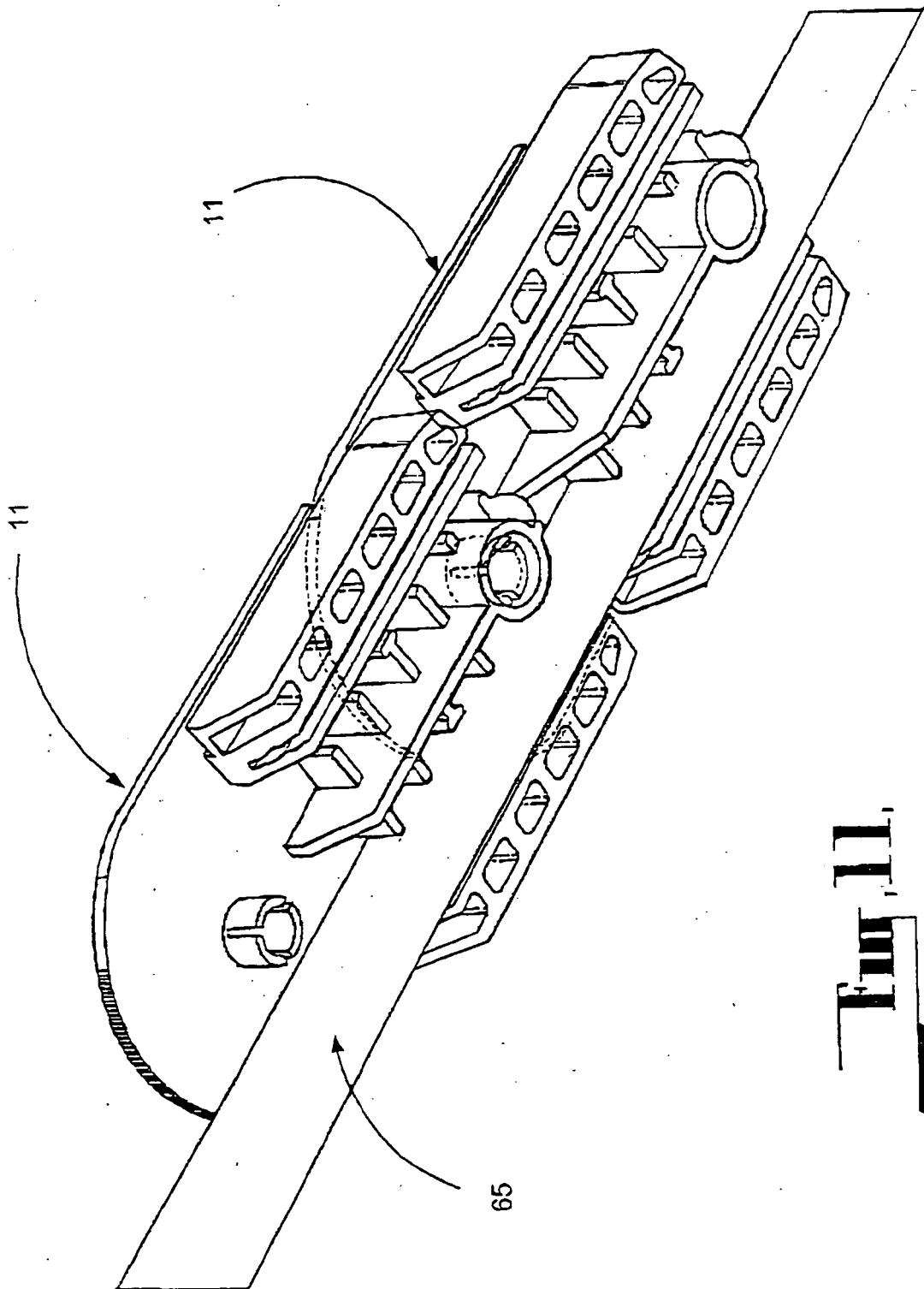


Fig. 11.

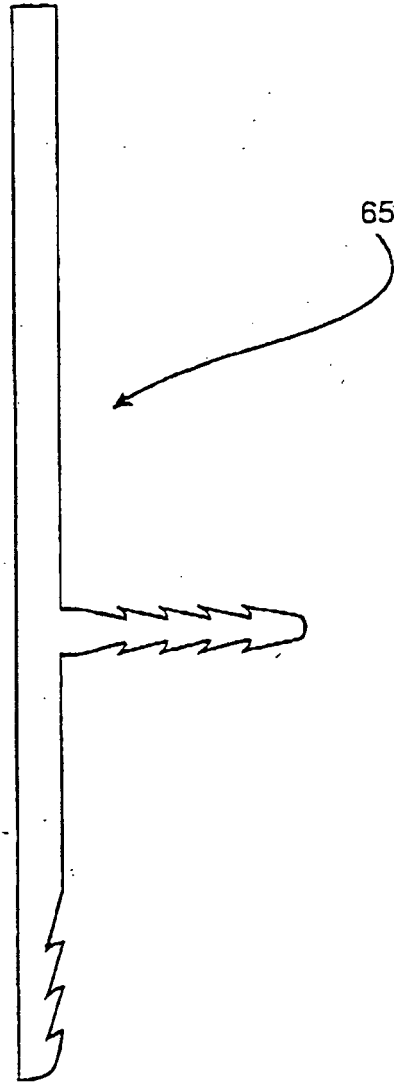


Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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