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(54) SYSTEM FOR MAKING AN AT LEAST PARTIALLY CLOSED ENVIRONMENT USING PANES OF GLASS, PANELS OR THE LIKE

(57) A system for making an at least partially closed environment (such as a box or the like) using a plurality of panels is described, the system comprising: a lower plate, two or more panels and connection means for connecting said panels at the top, wherein said lower plate comprises a plurality of pin-like supporting and alignment members projecting upwardly, wherein at least a portion of said members is adjustable heightwise to compensate for different heights of the floor, each of said panels comprising a perimetral frame or a lower profile, wherein the perimetral frame or the lower profile comprises a cavity for accommodating the projecting portion of said pin-like supporting and alignment members.

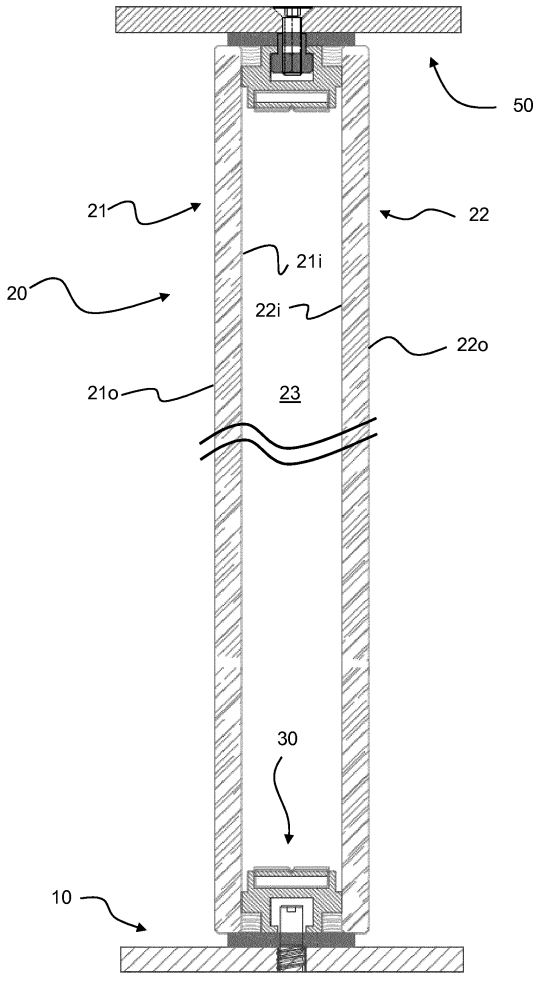

Fig. 2

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Description

BACKGROUND

[0001] The present invention relates to the sector of dividing walls and in particular relates to a system for making an at least partially closed environment, for example a box or the like, using panes of glass, panels or the like.

[0002] Advantageously, it relates to a self-supporting modular system configured to be supported and which does not need to be fixed to near existing fixed structures.

STATE OF THE ART

[0003] At present, there is a growing trend to design offices or work spaces in the form of an open-space environment, with a minimum number of walls or even without walls. In such working environments the available space is made better use of and there is a different interaction between the persons working there.

[0004] However, on some occasions (such as in airports, railway stations, hospitals, highway service areas and any public environment), it is nevertheless required to provide spaces with a degree of privacy greater than that present in an open-space environment. For example, at least partially closed spaces are created for conducting meetings, for accommodating machines which are noisy and/or produce heat (for example photocopiers or printers) or for making confidential telephone calls. These spaces form a kind of room or box. Often these boxes are bounded by walls which are at least partly transparent.

[0005] The creation of an at least partially closed environment poses one or more of the following problems.

[0006] Especially where the walls are made of glass it is necessary for the walls to be arranged in a perfectly vertical position. This often is problematic because the floor may have depressions or areas which are slightly higher than the rest of the floor.

[0007] In order to compensate for small variations in height of the floor, a fine adjustment mechanism must be provided.

[0008] In some cases, it is not possible (for aesthetic and/or structural reasons) to connect the panels at the bottom and therefore this gives rise to the need to connect the panels stably to one another in the region of their bottom edge.

[0009] Moreover, in some cases, it is not possible (for aesthetic and/or structural reasons) to connect the panels at the top and therefore this gives rise to the need to connect the panels stably to one another in an upper position.

[0010] In addition to partially closed environments with a roughly rectangular or square shape, on some occasions there is the need to provide environments with one or more curved walls, also using panes of glass or the like. At present the known systems do not allow such environments to be made in a practical, relatively low-cost and modular manner.

[0011] EP 1 630 312 A1 discloses a connector for panel walls or the like of wood, pressing chip, hard fiber or other materials, such as are used, for example, in the construction of measuring stands.

[0012] GB 2 305 205 A discloses a combined double glazing spacer and mounting section.

[0013] DE 10 2005 027528 A1 discloses a wall system for exhibition booths. The system comprises multiple intrinsically rigid wall elements that are magnetically joined together at vertical frame legs.

SUMMARY OF THE INVENTION

[0014] The aim of the Applicant is to provide a novel system for making an environment which is at least partially closed using panels or panes, which is practical, solid, reliable and is able to overcome at least some of the aforementioned problems.

[0015] In particular, the Applicant has noticed that the solution described in EP 1 630 312 A1 does not allow to create a solid base arranged horizontally with respect to the surface where the structure has to be mounted. The Applicant has noted that the solution disclosed in EP 1 630 312 A1 provides for support points and does not provide a base structure which forms a closed loop or an open loop.

[0016] According to the present invention, there is provided a lower plate which is shaped as a closed loop or an open loop. The language "closed loop" will indicate that the lower plate is loop closed and that neither a starting point nor an end point can be identified. For instance, a closed loop shape is a circular shape, an oval shape, an elliptic shape, a square shape, a rectangular shape, or the shape of any polygon (either regular or not). The language "open loop" will indicate that the lower plate forms a closed loop except for an open length. Such an open length has a length which is lower than half of the base perimeter. Preferably, it is lower than 40%, more preferably lower than 30%, more preferably lower than 20% and still more preferably, lower than 10%. The base plate according to the present invention is very stable and it can be arranged perfectly horizontal in a practical and efficient manner. In fact, once it has been arranged on the floor, an installer can regulate the height through the pin-like members, in particular on those which are adjustable heightwise simply by a screwdriver or an hexagonal key or any other similar tool. Preferably, the installer can start to regulate the height of the pin-like members clockwise or anticlockwise and then make the further regulations up to the starting point. If necessary, the base plate can also be moved fromj a point to another point of a certain environment (for instance in case there is a change of layout).

[0017] Advantageously, once the base plate has been mounted and arranged on the floor, the installer and/or the designer has the possibility to decide where an open-

ing should be provided.

[0018] Preferably, there are provided fixed pin-like members. They preferably provide alignment means but they do not operate as supporting means. In other words, the panels preferably are supported on the base plate and not on the top ends of the pin-like members.

[0019] For the sole purpose of simplification of the present description and the claims, without this being regarded as a limitation, the present description will describe systems made using panes of glass. However, the term "panel" will include a panel with one or more panes of glass (or sheets of any at least partially transparent material, for example Plexiglas) or with one or more non-transparent sheets, for example made of wood, metal, plastic, cloth, ceramic, back enamelled glass, ...etc.

[0020] According to a first aspect the present invention relates to a system for making an at least partially closed environment using a plurality of panels, the system comprising:

a lower plate which is shaped as a closed loop or as an open loop,
a plurality of panels in a supported configuration with respect to the lower plate, and
connection means for connecting said panels at the top,
wherein said lower plate comprises first pin-like members and second pin-like members projecting upwardly, wherein said first pin-like members are adjustable heightwise to compensate for possible different heights of the floor, wherein both said first and second pin-like members comprise rotation means in their upwardly projecting portion,
wherein each of said panels comprises a perimetral frame or a lower profile, wherein the perimetral frame or the lower profile comprises a cavity for accommodating the projecting portion of said pin-like members providing stability and alignment.

[0021] Preferably, said rotation means comprise, on the top of said first and second pin-like members, an incision (shaped as a blade head or cross head) for a screwdriver or with a hexagonal socket for a hexagonal key (such as a Allen key).

[0022] In embodiments, said pin-like stability and alignment members comprise first and second threaded pins and said lower plate comprises through-holes suitable for receiving said first and second threaded pins, wherein said first threaded pins have a thread which allows screwing of said first pins so that they project also partly downwards, and wherein said second threaded pins have a thread which allows them to be screwed so that they do not project downwards, the upwardly projecting ends at least of said second pins forming a discrete alignment element.

[0023] The lower plate preferably comprises separate modular sections joinable together to form said lower plate which is shaped in a closed loop or an open loop.

[0024] Preferably, the adjacent separate sections of lower plate are joinable together with a key which is configured to engage a recess of a plate section and a recess of the adjacent plate section.

[0025] Each of said panels may comprise two individual panes and a perimetral frame. The two individual panes are arranged facing one another and define, together with said perimetral frame, a closed chamber.

[0026] The connection means for connecting said panels at the top comprise an upper plate in one piece or formed by separate modular sections joinable together to form a closed-loop or an open-loop upper plate.

[0027] The adjacent sections of upper plate are joinable with a key which is configured to engage a recess of a plate section and a recess of the adjacent plate section.

[0028] Preferably, the upper plate comprises slots, each slot comprising an enlarged part and a straight part of smaller width than the enlarged part.

[0029] At least two of said panels may comprise a profile comprising an upper groove for receiving and holding a pane.

[0030] The system may further comprise a clamp for joining a panel with an adjacent panel, wherein said clamp comprises two retaining members and a connecting pin for connecting together said two retaining members, wherein said retaining members are partially or completely recessed in said panels.

[0031] According to another aspect, it isprovided an at least partially closed environment made using a system of the aforementioned type.

BRIEF DESCRIPTION OF DRAWINGS

[0032] The present invention will become clearer from the following detailed description, provided by way of a non-limiting example, to be read with reference to the accompanying drawings, in which:

- Figure 1 is a schematic axonometric view of a box according to a first embodiment;
- Figure 2 is a cross-sectional view of a system according to a first embodiment of the present invention for forming, for example, the box shown in Figure 1;
- Figure 3.1 is a top plan view of a linear module of the lower plate of the system according to Figures 1 and 2;
- Figure 3.2 is a top plan view of a curved module of the lower plate of the system according to Figures 1 and 2;
- Figure 4 is an enlarged cross-section of the lower plate in the region of a hole;
- Figure 5 is a side view of an adjustable pin of the lower plate according to Figures 1 and 2;
- Figure 6 is a side view of a fixed pin of the lower plate according to Figures 1 and 2;
- Figure 7.1 is a cross-section through a lower plate section with an adjustable pin and fixed pin on a level floor;

- Figure 7.2 is a cross-section through a lower plate section with an adjustable pin and a fixed pin on an uneven floor;
- Figure 8 is an enlarged cross-sectional view of a double-glazing pane according to an embodiment of the present invention;
- Figure 9 is a plan view of en edge of a pane according to Figure 8;
- Figure 10 is a plan view of an edge of a pane according to a first variant;
- Figure 11 is a plan view of an edge of a pane according to a second variant;
- Figure 12.1 is a top plan view of a linear module of the upper plate of the system according to an embodiment of the present invention;
- Figure 12.2 is a top plan view of a curved module of the upper plate of the system according to an embodiment of the present invention;
- Figure 13 is a top plan view of an upper plate section;
- Figure 14 is a cross-section through the double-glazing pane of Figure 8 with the upper plate mounted;
- Figure 15 is a cross-section which shows the stages of fixing the upper plate to the double-glazing pane;
- Figures 16A, 16B and 16C show the key for joining together two lower plate/upper plate sections and mounting thereof;
- Figure 17 is a schematic axonometric view of a box according to a second embodiment;
- Figure 18 is a cross-sectional view of a system according to a second embodiment of the present invention for forming, for example, the box shown in Figure 17;
- Figure 19 is an enlarged view of the profile according to the second embodiment; and
- Figure 20 is a side view of two single-sheet panels joined together by a clamp according to an embodiment of the invention.

DETAILED DESCRIPTION

[0033] According to the present invention, a lower plate, two or more panels supported by the lower plate and upper connection means for connecting two or more panels at the top are provided. According to a first embodiment, the upper connection means comprise an upper plate connected to the panels. According to a second embodiment, the panels are joined together by means of a clamp.

[0034] In the continuation of the present description, as far as possible, the various components will be described separately.

Lower plate

[0035] The lower plate may be formed by a single plate shaped in a closed loop (for example in the form of a rectangle, a circle, an ellipse or the like) or in an open loop (for example C, U or L shaped).

[0036] Preferably, as shown in Figures 3.1 and 3.2, the lower plate comprises two or more modules which can be connected together in a permanent or removable manner. According to an embodiment, modules which are identical to each other are provided. According to another embodiment, modules of at least two types are provided so as to form a closed-loop or open-loop plate.

[0037] As shown in Figures 3.1 and 3.2 preferably at least one linear module 11 and at least one curved module 12 with predefined dimensions are provided. For example, the linear module 11 could have a length of 100 cm and the curved module 12 a radius of about 100 cm. According to preferred embodiments, the lower plate 10 could have a width of a few centimetres, for example 5-13 cm or more, for instance 5-10 cm. The lower plate 10 could be advantageously made of iron, steel, aluminium, thermoplastic material, reinforced (for instance by fibers) composite material or metal alloys.

[0038] Preferably, the lower plate 10 comprises a plurality of holes 13. Figure 4 shows a cross-section along an axis of a hole 13 in the lower plate (11 or 12). Preferably the holes 13 are equidistant. For example, they may be at a few centimetres distance from each other. Preferably, the holes 13 have a diameter of a few millimetres, for example 10-15 mm and are threaded. Preferably, they are through-holes as shown in Figure 4.

[0039] Threaded pins 15, 16 are screwed inside at least a part of the holes. Figures 5 and 6 show, respectively, an adjustable pin 15 and a fixed pin 16.

[0040] Preferably, the adjustable pin 15 has a flat, wide, washer-like, bottom head 151 and a top end with an incision 152 for a screwdriver or with a hexagonal socket for a hexagonal key (such as an Allen key) or the like. When the adjustable pin 15 is rotated (using the screwdriver or an Allen key), the washer head 151 projects downwards and correspondingly raises the lower plate 11, 12. This condition is visible in Figure 7.2. This functional feature is particular advantageous since it allows adjustments to be made for small differences in height of the floor. In this way, the lower plate is extremely stable. If instead the floor is perfectly flat (Figure 7.1), the pins 15, 16 project upwards by the same height.

[0041] Preferably, the fixed pin 16 also has an end with an incision 162 for a screwdriver or with a hexagonal socket for a hexagonal key (such as an Allen key) or the like. The incision (or hexagonal socket) 162 allows the fixed pin 16 to be screwed in position. The length of the thread 163 is chosen so as to cause penetration of the fixed pin 16 inside the respective hole 13 only by the desired amount, so as not to project downwards.

[0042] Preferably, before laying the lower plate on a floor, the projecting part of the fixed pins 16 and of the adjustable pins 15 has the same length. In other words, the ends of the pins 15, 16 lie in a same plane. This condition is obtained using any known means, for example by means of a laser instrument. The same laser instrument may be used to check that, after the adjustments performed with the adjustable pins 15, the fixed

pins 16 lie in a perfectly horizontal plane.

[0043] Therefore, if the floor on which the lower plate 11 is laid is perfectly flat, the ends of the fixed pins 16 and of the adjustable pins 15 lie in the same plane. If, instead, there are differences in height, some adjustable pins are at a lower height.

[0044] In any case, the fixed pins 16 (and in certain cases at least some of the adjustable pins 15) form a centring and alignment member which is discrete, i.e. not continuous, but formed by a plurality of aligned single support pins. As will become clear below, the centring and alignment member overall is configured to centre and align one or more panes or sheets. Owing to the levelling action performed by means of the adjustable pins (which function as adjustable feet), the panels 20 are supported so as to be perfectly horizontal.

Panels

[0045] The panels 20 are configured so as to cooperate with the pins 15, 16 of the lower plate 10. Each panel 20 comprises a lower profile 40 or a perimetral frame 30 shaped so as to cooperate with said pins 15, 16.

Panel comprising a double-glazing pane

[0046] Figure 8 shows, cross-sectioned, a double-glazing pane according to an embodiment of the present invention.

[0047] The double-glazing pane is indicated overall by 20 and comprises two single panes 21, 22 of glass facing each other and parallel. Each single glass pane 21, 22 comprises an outer side 21o and 22o and an inner side 21i and 22i.

[0048] The double-glazing pane 20 also comprises a perimetral frame 30. The perimetral frame 30 extends along all the sides of the double-glazing pane 20 and keeps the two single glass panes 21, 22 spaced from each other. An interspace or closed chamber 23 is therefore formed between the two single glass panes 21, 22. The closed chamber 23 is therefore defined by the inner sides 21i, 22i of the two single panes 21, 22 and by the frame 30.

[0049] The frame 30 is preferably a suitably shaped, extruded, metal body. Suitable metals may be chosen from the group comprising aluminium, aluminium alloy, steel, stainless steel or combinations thereof.

[0050] Alternatively, the frame 30 may be made by means of moulding using a plastic material, for example PE (polyethylene), PP (polypropylene) or PET (polyethylene terephthalate) or a composite material.

[0051] The frame 30 comprises a central body 32, a salt-containing compartment 34 and an outer engaging channel 38.

[0052] The central body 32 defines the distance between the two single glass panes and comprises two surfaces 33 for gluing two corresponding strips of the inner side 21i, 22i of the two single glass panes 21, 22. According to embodiments, each of the gluing surfaces 33 may have a width of a few centimetres (for example 2-5 cm).

[0053] According to the preferred embodiment of Figure 8, the frame 30 comprises an internal compartment 34 containing dehydrating salts. The salt-containing compartment 34 is preferably formed by two parallel flanges 36 configured to retain a strip of dehydrating salts 35 to prevent the formation of condensation. If the double-glazing unit of the present invention is to be used in internal environments, the salts may not be provided. However, they prevent the formation of condensation for example owing to a difference in temperature between the two single glass panes.

[0054] According to the embodiment of Figure 8, the frame 30 comprises an engaging and/or coupling channel 38. The channel 38 is an outwardly open channel and has preferably a roughly rectangular cross-section.

[0055] The outward opening 381 is partially closed by two teeth 382 which reduce the opening 381 of the channel 38. This form of the channel is able to retain a member inside it. For example, a nut or a washer with a threaded hole, a pin or a screw may be retained inside it.

[0056] Advantageously, the pins 15, 16 of the lower plate 10 may be inserted inside the opening 381 of the channel 38, as shown in Figure 2. Advantageously, when the double-glazing unit 20 is associated with the lower plate 10, the ends of the pins 15, 16 act essentially as engaging members and ensure centring and alignment of the panels. Preferably, the ends of the pins 15, 16 are not in contact with the bottom of the channel 38 and do not act as a support. This allows a double-glazing unit 20 according to the invention to be fixed to a floor (or to a lower plate 10), to a ceiling (or to an upper plate 50) or to a vertical upright. The vertical upright could be symmetrically shaped so as to connect two double-glazing panes 20 according to the invention. The shaped channel 38 along the entire perimetral edge of the double-glazing pane 20 also allows hinges or other closing/plugging members to be installed.

[0057] Preferably, the channel 38 is partially recessed inside the central body 32 and partly projects therefrom. In this way two zones 39 are formed, these being suitable for holding a sealant able to ensure an effective sealing action along the entire perimeter of the double-glazing unit 20, in addition to the sealing provided by the adhesive used to glue the two single panes to the frame. The sealant may be any known sealant, preferably a substance such as silicone or a similar mono or bicomponent.

[0058] According to embodiments, the double-glazing pane according to the present invention is a flat pane. According to other embodiments the double-glazing pane is a curved pane and the frame is suitably curved to follow the desired curvature of the double-glazing pane. In this way curved dividing walls may be provided.

[0059] The teeth 382 may be continuous, as shown in Figure 9, or may be discontinuous, as shown in Figure 10. The embodiment of Figure 10 also has sections with-

out teeth so as to allow easy insertion of a member (for example a nut or a washer) or any opposition member for fixing the double-glazing pane (for example) to an upright, to a plate or to a hinge.

[0060] Figure 11 shows an alternative to the embodiment in which the channel 38 is provided. This embodiment has holes 38, which are preferably threaded, for fixing a hinge, an upright, a plate or the like. Preferably, the holes 38 are equidistant.

Upper plate

[0061] According to an embodiment of the present invention, an upper plate 50 is provided for connecting at the top two or more panels, for example two double-glazing panes 20, as described above.

[0062] Preferably, the upper plate may also be formed by a single plate shaped in a closed loop (for example in the form of a rectangle, an ellipse or the like) or in an open loop (for example C, U or L shaped).

[0063] Preferably, as shown in Figures 12.1 and 12.2, the upper plate 50 comprises two or more modules which can be connected together in a permanent or removable manner. According to an embodiment, modules which are identical to each other are provided. According to another embodiment, modules of at least two types are provided so as to form a closed-loop or an open-loop upper plate 50.

[0064] As shown in Figures 12.1 and 12.2 preferably at least one linear module 51 and at least one curved module 52 with predefined dimensions are provided. For example, the linear module 51 could have a length of 100 cm and the curved module 52 a radius of about 100 cm. According to preferred embodiments, the upper plate 50 could have a width of a few centimetres, for example 5-10 cm or more. The upper plate 50 could be advantageously made of iron, steel, aluminium or metal alloys.

[0065] Preferably, the upper plate 50 comprises a plurality of slots 53. Figure 13 shows a top plan view of an upper plate section (51, 52) mounted on a double-glazing unit 20 as described above. Preferably, the slots 53 comprise a circular part 531 with a certain diameter and a straight section 532 with a width smaller than the diameter of the circular part. Preferably, the slots 53 are through-slots.

[0066] Figures 14 and 15 show in schematic form a way of fixing the upper plate 50 to the double-glazing unit 20. A washer with a threaded hole or a nut is preferably inserted inside the channel 38 of the perimetral frame 30. The upper plate 50 is rested on top of the double-glazing unit 20 and a screw 55 is inserted inside the slot 53 (vertical arrow in Figure 15). The straight section 532 of the slot 53 allows centring of the threaded hole of the washer or the nut (as suggested by the horizontal arrow, pointing to the right, in Figure 15).

Key for the upper/lower plate

[0067] Figures 16A, 16B and 16C show schematically how two sections (for example 11 and 12) of the lower plate and/or the upper plate (for example 51 and 52) may be connected together according to embodiments of the present invention. Advantageously, the sections of the lower plate and the upper plate terminate in two recesses (14 and 54, respectively). Preferably, the recesses are shaped in the same manner. Preferably, each recess 14, 54 has an enlarged head and a narrower neck. Preferably a symmetrical key 60 with two enlarged heads 61 at the ends and a double neck 62 is provided. In this way, when two plate sections (for example 11+12 or 51+52) are moved close together in an end-to-end configuration, they may be held together by inserting the key 60. The key is configured so as to be inserted with precision inside the recesses 14, 54 of the two plate sections so as to ensure precise fastening.

[0068] According to a preferred embodiment, the key 60 has at least one threaded hole 63. In this way, a screw (not shown) may be inserted in order to extract the key 60 when it is required to disassemble the lower plate 10 and/or the upper plate 50.

[0069] Considering Figure 1 again, this shows a box which can be made with a lower plate 10, a number of double-glazing panes 20 and, optionally, an upper plate 50. Some double-glazing panes 20 are flat, while other units are curved. Obviously the embodiment of Figure 1 is just one of an infinite number of embodiments. The (upper and lower) plates allow a large degree of modularity and adaptability. The curved sections of the lower plate (and the respective curved double-glazing panels) ensure a high degree of stability also when the box is formed in an open loop. However, it is preferable (for stability reasons) to have a lower plate and an upper plate in a closed loop.

[0070] The box in Figure 1 may be advantageously also installed without connection to the ceiling. Figure 2 shows a cross-section through the lower plate 10, the double-glazing unit 20 and the upper plate 50.

Panel with single pane

[0071] Panels with a single-thickness pane or sheet 23 may be associated with a lower plate 10 such as that described above. Figure 18 shows the bottom part of a panel according to a second embodiment of the present invention. The panel 20 comprises a shaped lower profile 40 and a glass pane 23 (or sheet of other material). Preferably, the profile 40 has a cross-section which is similar to that of the double-glazing unit of Figure 8, at least as regards the bottom part of the profile which is configured to engage with the pins 15, 16 of the lower plate 10.

[0072] The profile 40 is preferably a suitably shaped, extruded, metal body. Suitable metals may be chosen from the group comprising aluminium, aluminium alloy, steel, stainless steel or combinations thereof.

[0073] Alternatively, the profile 40 may be made by means of moulding using a plastic material, for example PE (polyethylene), PP (polypropylene) or PET (polyethylene terephthalate) or a composite material.

[0074] The profile 40 comprises a central body 42, a bottom engaging/coupling channel 48 and a top cavity 49.

[0075] According to the embodiment in Figures 18 and 19, the profile 40 comprises an engaging and/or coupling channel 48. The channel 48 is a downwardly open channel and has preferably a roughly rectangular cross-section.

[0076] The downward opening 481 is partially closed by two teeth 482 which reduce the opening of the channel. The shape of the channel allows a member to be retained inside it. For example, a nut or a washer with a threaded hole, a pin or a screw may be retained inside the channel 48.

[0077] Advantageously, the pins 15, 16 of the lower plate 10 may be inserted inside the opening 481 of the channel 48, as shown in Figure 18. Advantageously, when the pane or sheet of Figure 18 is associated with the lower plate 10, the ends of the pins 15, 16 act essentially as engaging members and ensure centring and alignment of the panels. Preferably, the ends of the pins 15, 16 are not in contact with the bottom of the channel 48 and do not act as a support. This allows a panel 20 according to the invention to be fixed to a floor (or to a lower plate 10 resting on the floor), to the ceiling (or to an upper plate 50).

[0078] In a manner similar to that described for the double-glazing unit, the teeth 482 may be continuous or may be discontinuous. Alternatively, the bottom part of the profile could be solid with holes, preferably threaded holes, for fixing a hinge, an upright, a plate or the like. Preferably, the holes are equidistant.

[0079] The profile also comprises a U-shaped groove 49 for retaining the pane or sheet. Preferably two seats 491 are provided for two seals (not shown) so that the glass pane is firmly held and no moisture and/or dirt may enter into the bottom of the groove 49. Preferably the bottom of the groove 49 is provided with a support of rubbery and/or elastic material on which the edge of the pane or sheet rests.

Retaining clamp

[0080] Two single-thickness adjacent glass panes, supported at the bottom by the profile 40, may also be fasted together at the top and/or at an intermediate height.

[0081] According to embodiments, in order to fasten together at the top and/or at an intermediate height two adjacent panes or sheets (of glass or other material), a retaining clamp 70 may be used.

[0082] Figure 20 shows a clamp 70 suitable for joining and holding together two adjacent panels. Preferably, the clamp comprises two retaining members 71, 72 and a connecting pin 73 for connecting together said two retaining members. Preferably, each retaining member 71, 72 comprises a body with a shape which matches a circular cavity (such as that shown in Figure 20), a triangular cavity or a trapezoidal cavity. A first retaining member (indicated by the number 71) has preferably a through-hole, while the other retaining member 72 has preferably a threaded through-hole or blind hole. The connecting pin 73 is inserted inside the through-hole of the first member 71 and is partially screwed into the threaded through-hole or blind hole of the other member 72.

[0083] The two panes or sheets to be joined together are provided with holes 25 (through-holes or blind holes) for accommodating the retaining members 71, 72 of the clamp, and with a slot 26 for the connecting pin 73 so that the connecting pin 73 and the retaining members, when the clamp is in position, do not project from the surface of the panes or sheets.

[0084] Figure 17 shows in schematic form a box 2 made with single-layer panes or sheets. The configuration shown in Figure 17 is provided by way of example since any shape may be provided. A lower plate 10, such as that which can be formed with the sections shown in Figures 3.1 and 3.2, is provided on the floor. The panels 20 are supported by profiles such as that shown in Figures 18 and 19 and are fastened with clamps 70 such as those shown in Figure 20. Preferably there are top clamps 70 and clamps 70 close to the lower plate.

[0085] In view of the above description, it is clear that the system of the present invention provides several advantages with respect to the known systems. For instance, it is a modular system (in terms of shape, height and width).

[0086] Advantageously, the system is modular and self-supporting and it does not need to be fixed to the existing close structures. It is a "finished" environment which can be transported (preferably in an at least partially disassembled configuration).

[0087] The system allows to realize environments which are at least partially closed in any different place, not only in offices. For instance, thanks to the system of the present invention, environments at least partially closed can be made also in airports, railway stations, motorway service areas, hospitals, public places, exhibitions, congress centers or the like.

[0088] The components of the system can be easily re-used for making environments having a different shape or in a different place.

[0089] Advantageously, according to the present invention, it is provided a controlled environment, both under the acoustic point of view and of the environment conditions, in particular when double-glazing panes are used.

Claims

1. A system for making an at least partially closed en-

vironment (1, 2) using a plurality of panels, the system comprising:

a lower plate (10) which is shaped as a closed loop or as an open loop,
a plurality of panels (20) in a supported configuration with respect to the lower plate (10), and connection means (50, 70) for connecting said panels (20) at the top,
wherein said lower plate (10) comprises first pin-like members (15) and second pin-like members (16) projecting upwardly, wherein said first pin-like members (15) are adjustable heightwise to compensate for possible different heights of the floor, wherein both said first and second pin-like members (15, 16) comprise rotation means (152, 162) in their upwardly projecting portion,
wherein each of said panels (20) comprises a perimetral frame (30) or a lower profile (40), wherein the perimetral frame (30) or the lower profile (40) comprises a cavity (38, 48) for accommodating the projecting portion of said pin-like members (15, 16) providing stability and alignment.

2. The system of claim 1, wherein said rotation means (152, 162) comprise, on the top of said first and second pin-like members (15, 16), an incision (152, 162) for a screwdriver or with a hexagonal socket for a hexagonal key.

3. The system of claim 1 or 2, wherein said pin-like stability and alignment members (15, 16) comprise first and second threaded pins (15, 16) and wherein said lower plate (10) comprises through-holes (13) suitable for receiving said first and second threaded pins (15, 16), wherein said first threaded pins (15) have a thread which allows screwing of said first pins (15) so that they can project also partly downwards, and wherein said second threaded pins (16) have a thread which allows them to be screwed so that they do not project downwards, the upwardly projecting ends at least of said second threaded pins (16) forming a discrete alignment element.

4. The system of claims 1, 2 o 3, wherein said lower plate (10) comprises separate modular sections (11, 12) joinable together to form a lower plate in a closed loop or an open loop.

5. The system of claim 4, wherein said adjacent separate sections of lower plate (10) are joinable together with a key (60) which is configured to engage a recess (14) of a plate section and a recess (14) of the adjacent plate section.

6. The system of any one of the preceding claims, wherein each of said panels (20) comprises two individual panes (21, 22) and a perimetral frame (30), wherein the two individual panes (21, 22) are arranged facing one another and define, together with said perimetral frame (30), a closed chamber (23).

7. The system of any one of the preceding claims, wherein said connection means (50, 70) for connecting said panels (20) at the top comprise an upper plate (50) in one piece or formed by separate modular sections (51, 52) joinable together to form a closed-loop or an open-loop upper plate.

8. The system of claim 7, wherein said adjacent sections (51, 52) of upper plate are joinable with a key which is configured to engage a recess (14, 54) of a plate section and a recess (14, 54) of the adjacent plate section.

9. The system of claim 8, wherein said upper plate (50) comprises slots (53), each slot (53) comprising an enlarged part (531) and a straight part (532) of smaller width than the enlarged part (531).

10. The system of any of previous claims, wherein at least two of said panels comprise a profile (40) comprising an upper groove (49) for receiving and holding a pane.

11. The system of claim 10, further comprising a clamp (70) for joining a panel with an adjacent panel, wherein said clamp comprises two retaining members (71, 72) and a connecting pin (73) for connecting together said two retaining members, wherein said retaining members are partially or completely recessed in said panels.

12. An at least partially closed environment (1, 2) made using a system according to any one of the preceding claims.

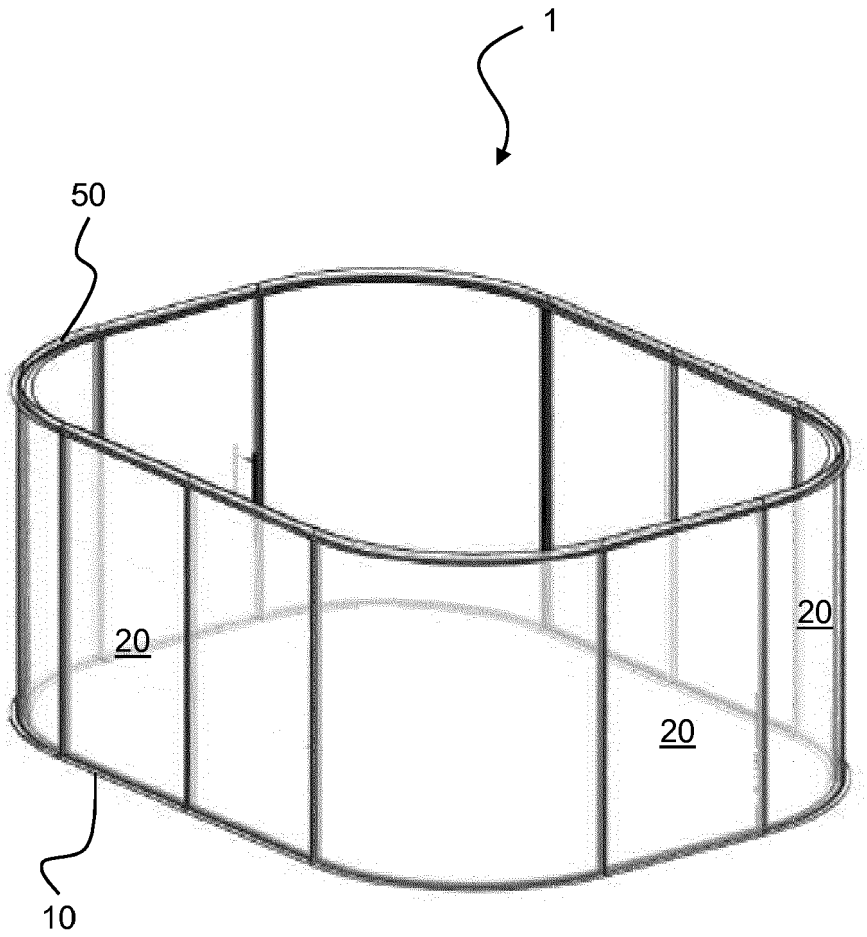

Fig. 1

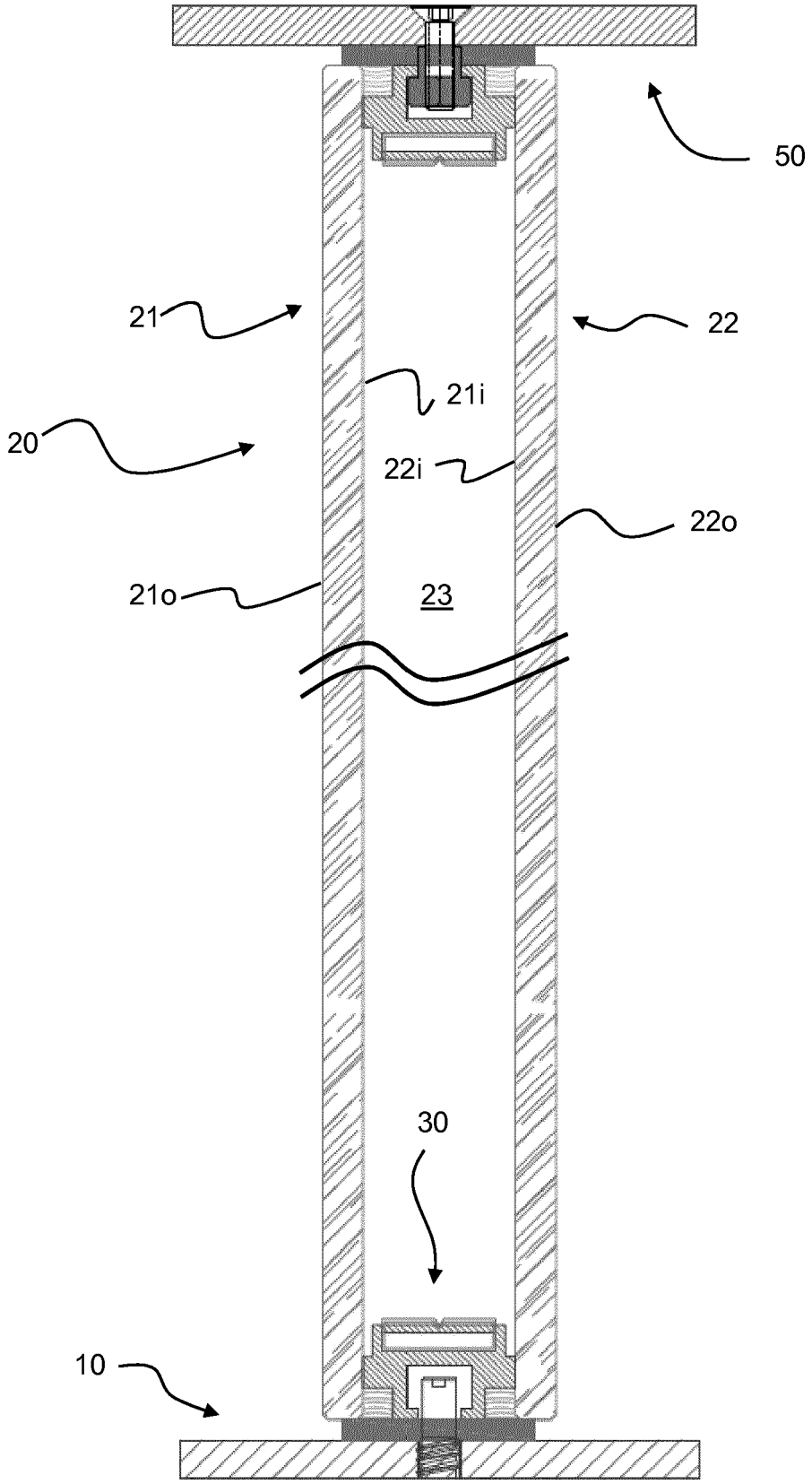

Fig. 2

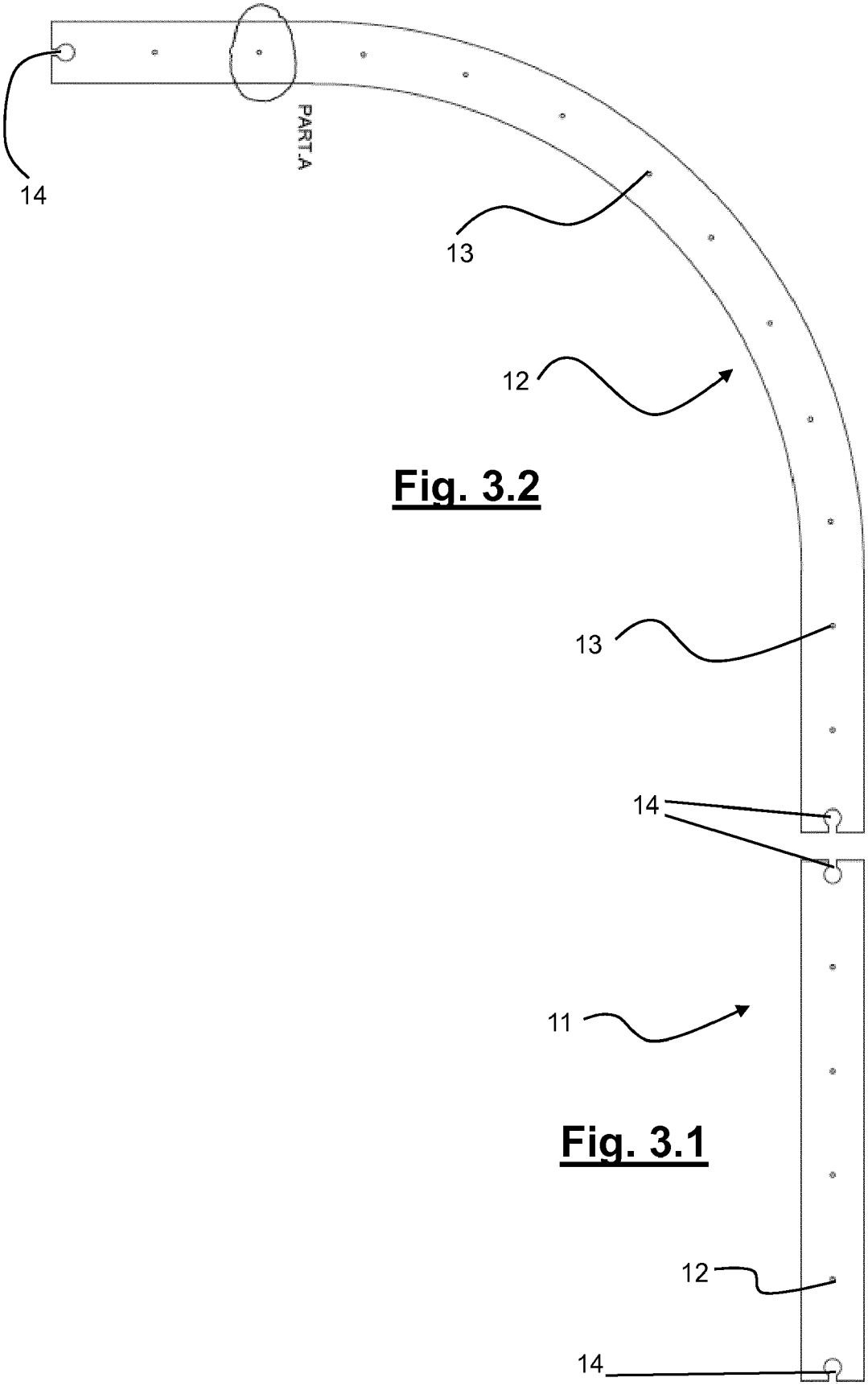

Fig. 3.2

Fig. 3.1

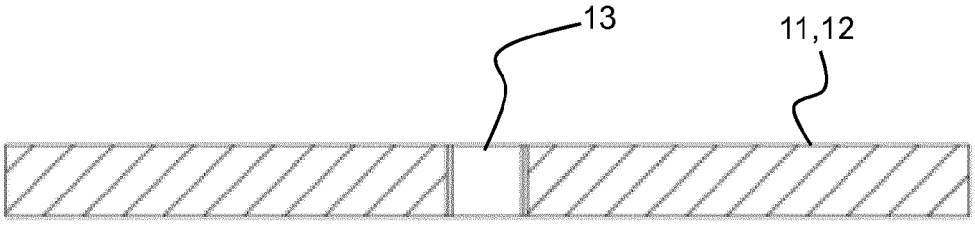

Fig. 4

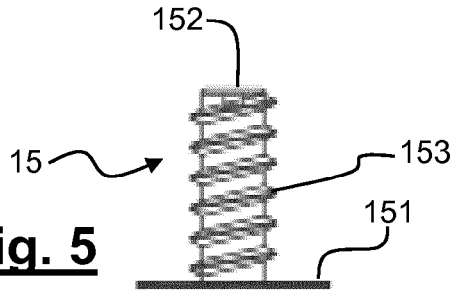

Fig. 5

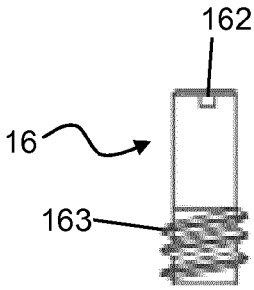

Fig. 6

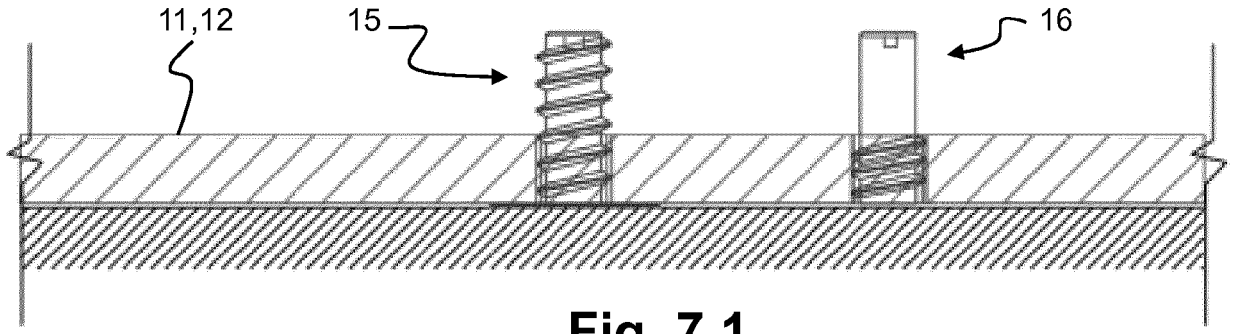

Fig. 7.1

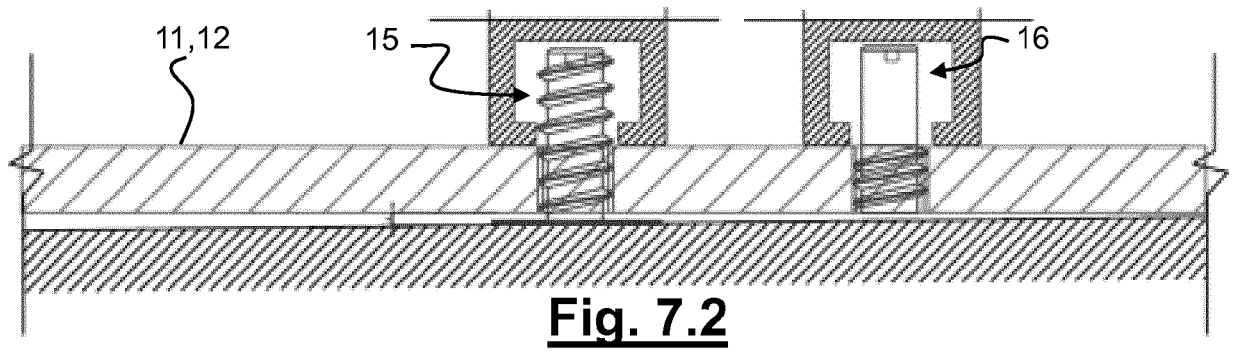

Fig. 7.2

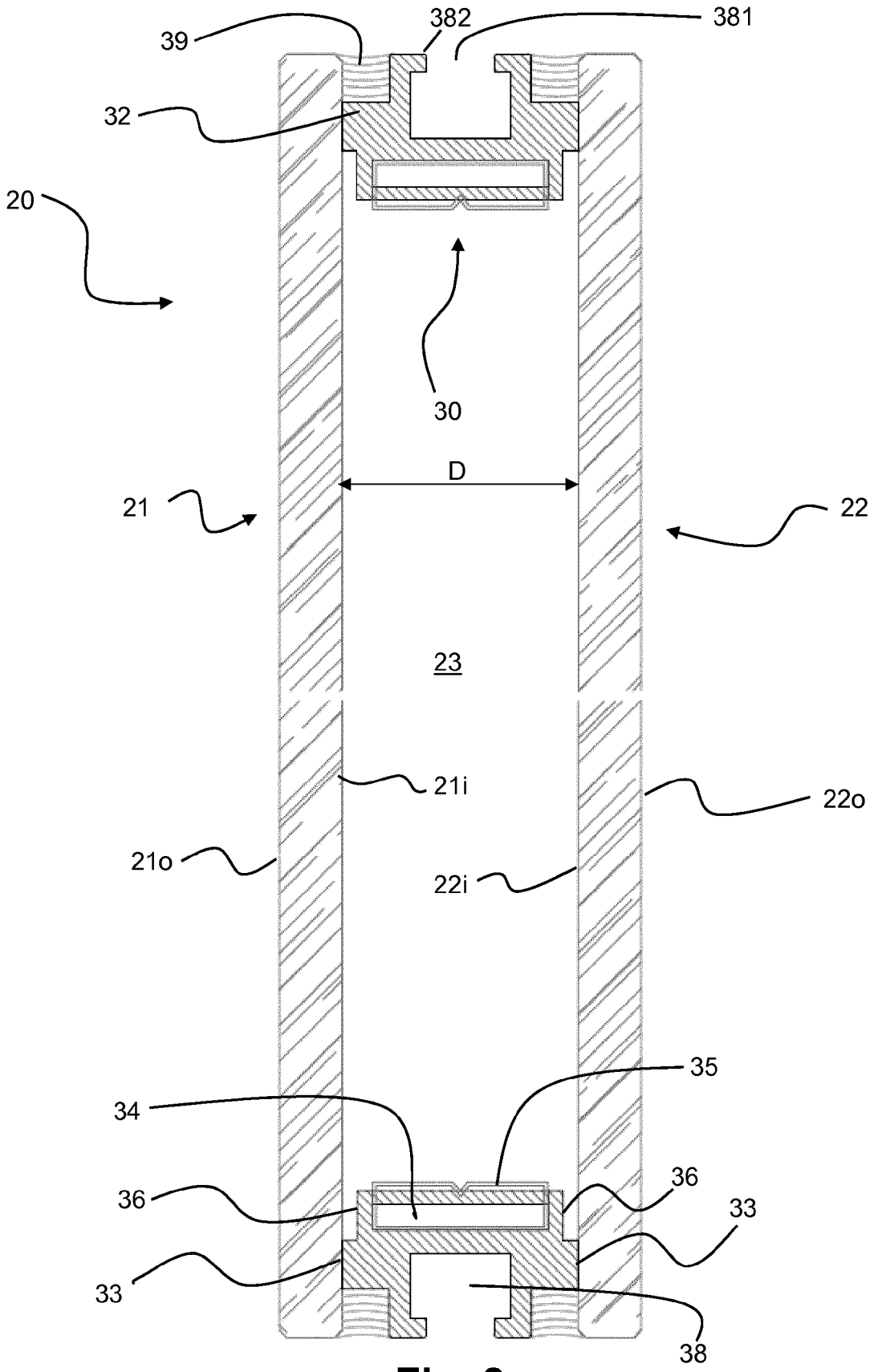

Fig. 8

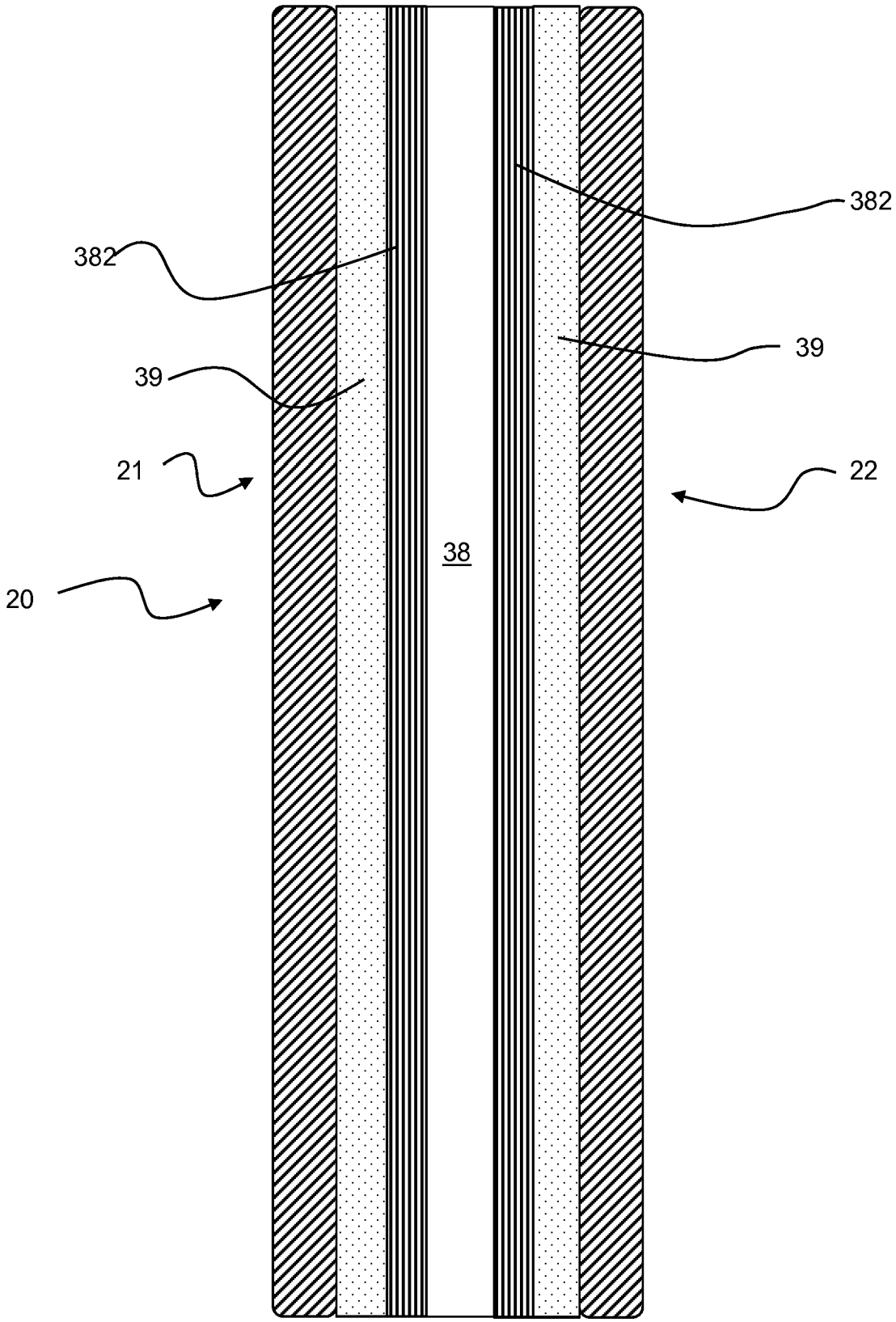

Fig. 9

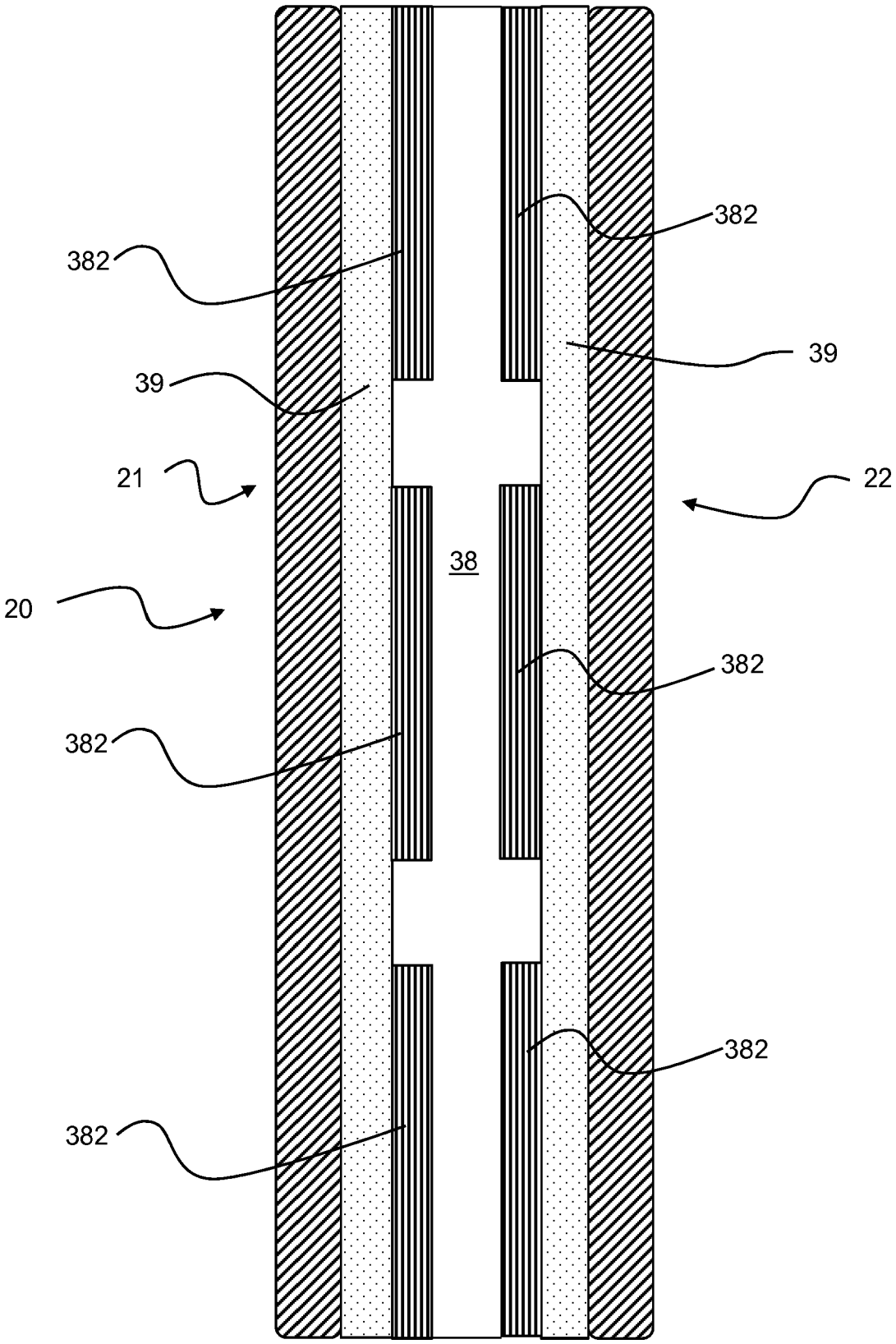

Fig. 10

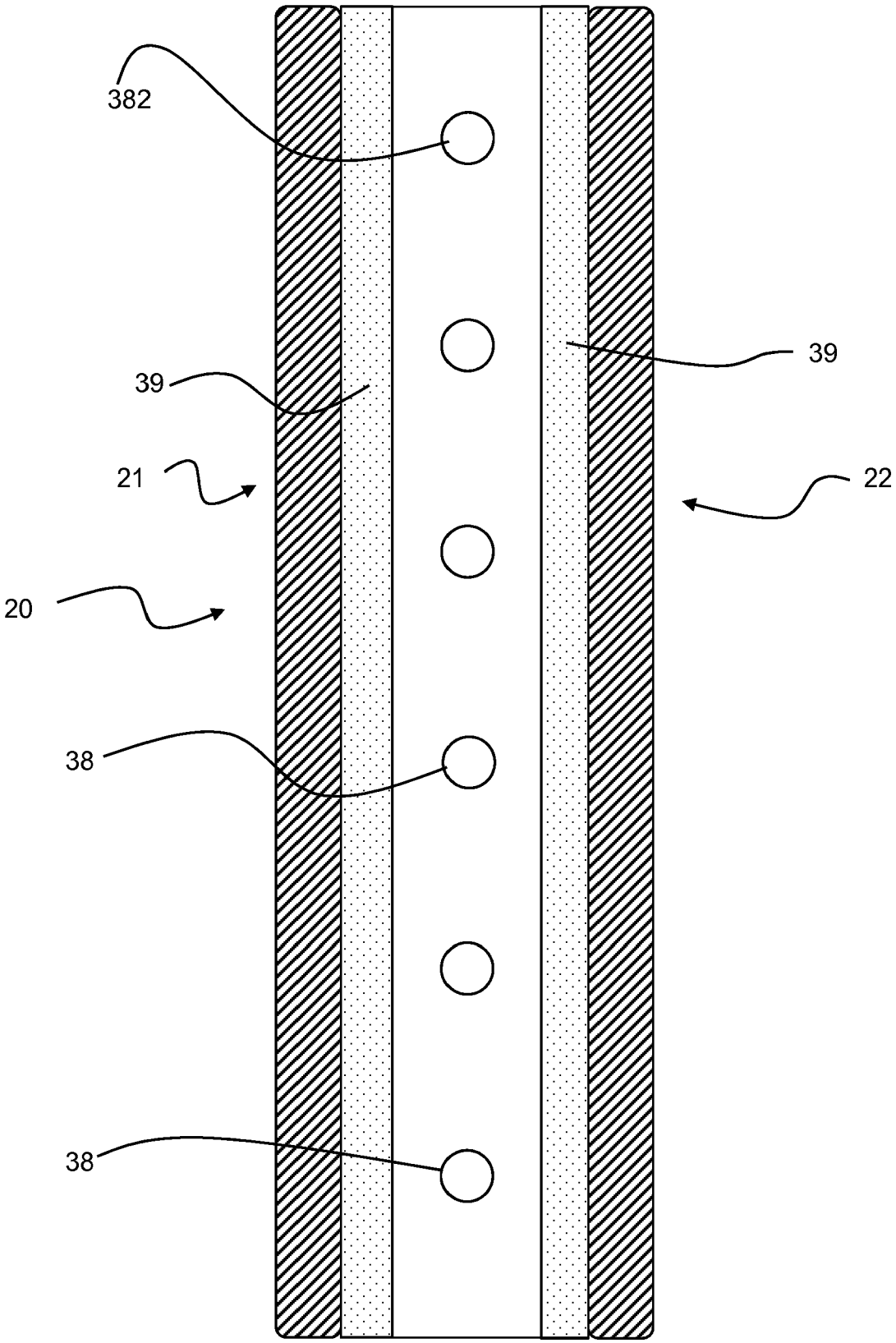

Fig. 11

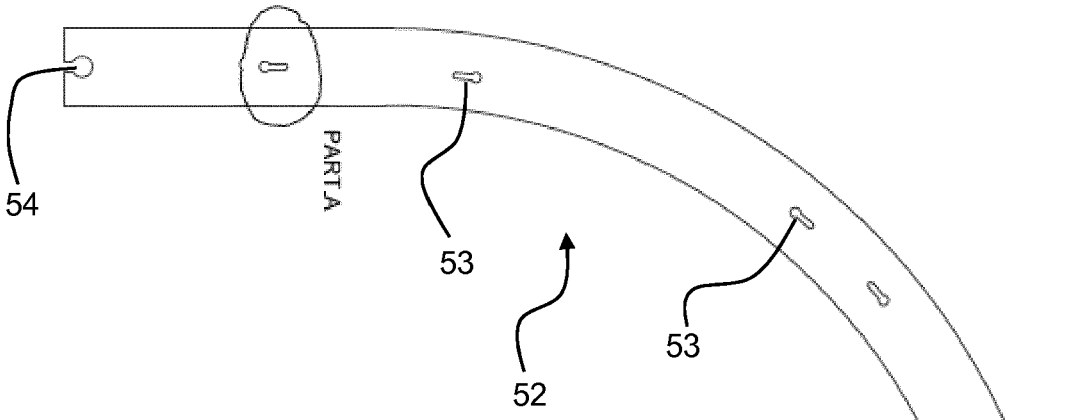

Fig. 12.2

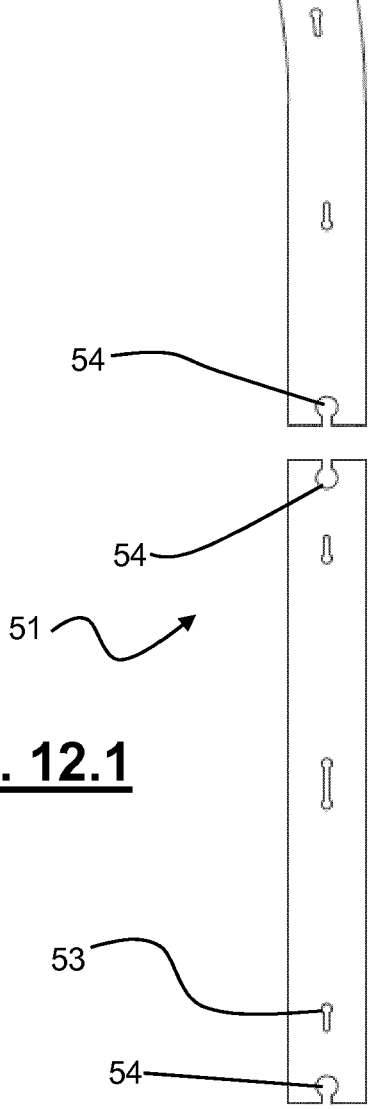

Fig. 12.1

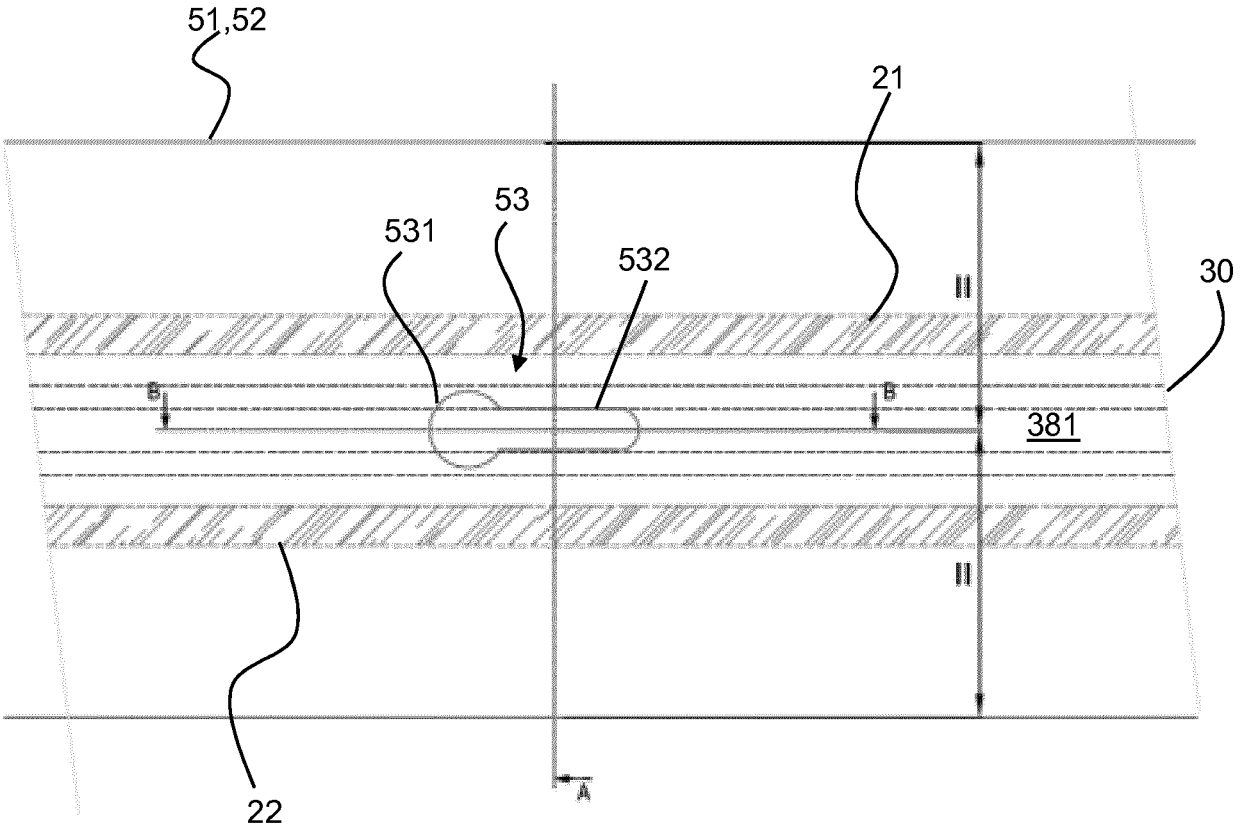

Fig. 13

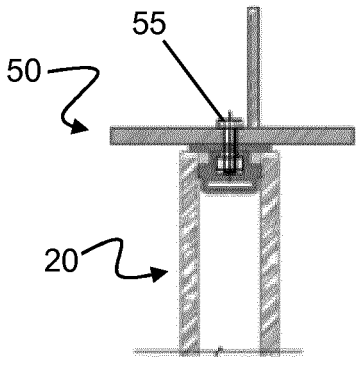

Fig. 14

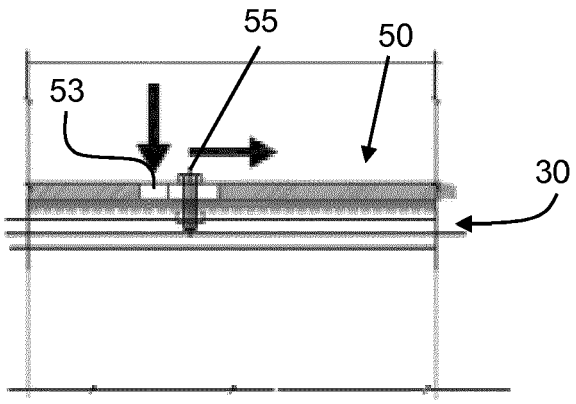

Fig. 15

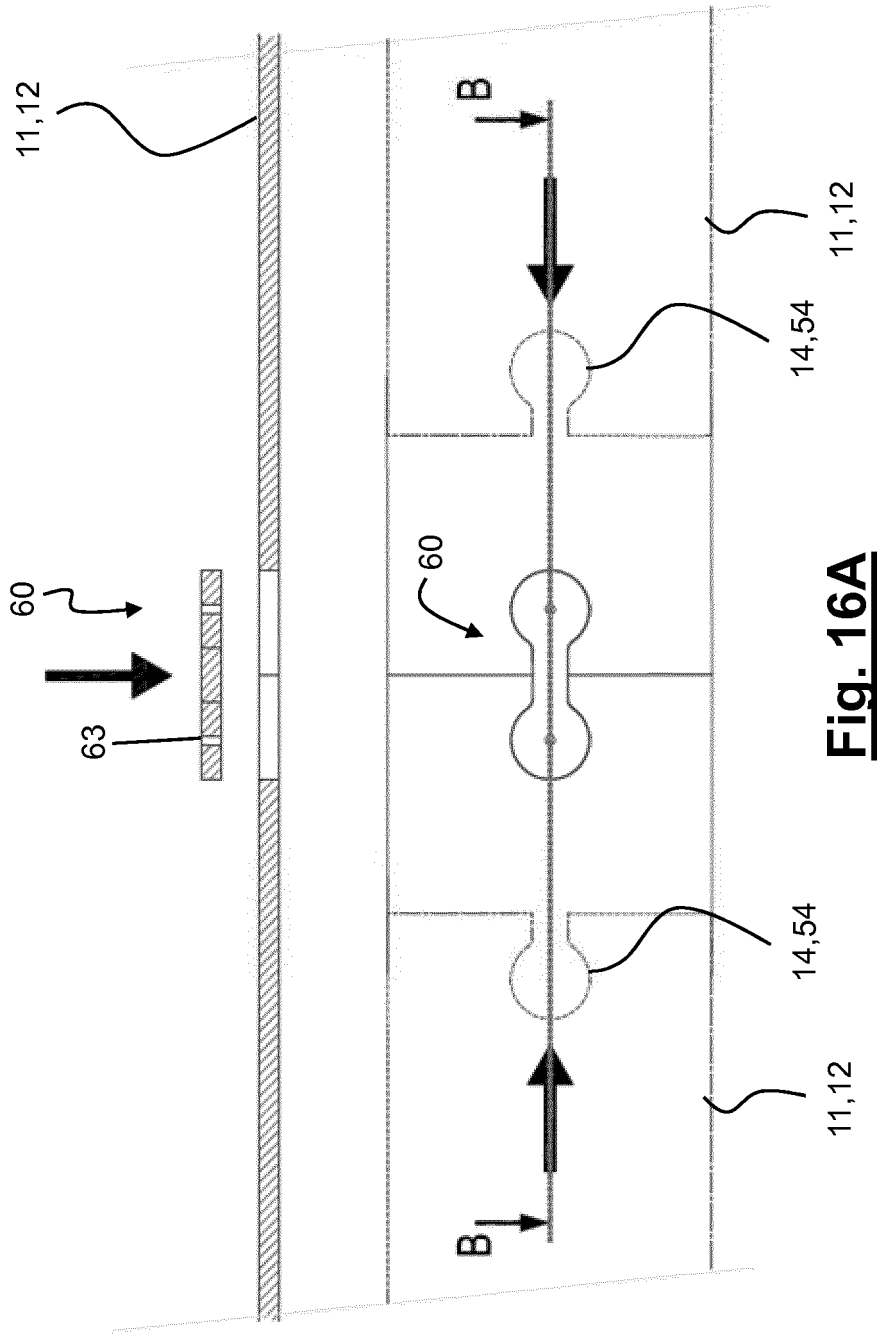

Fig. 16A

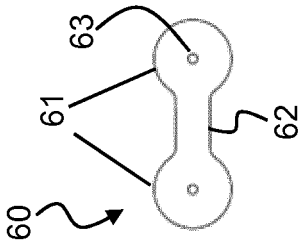

Fig. 16C

Fig. 16B

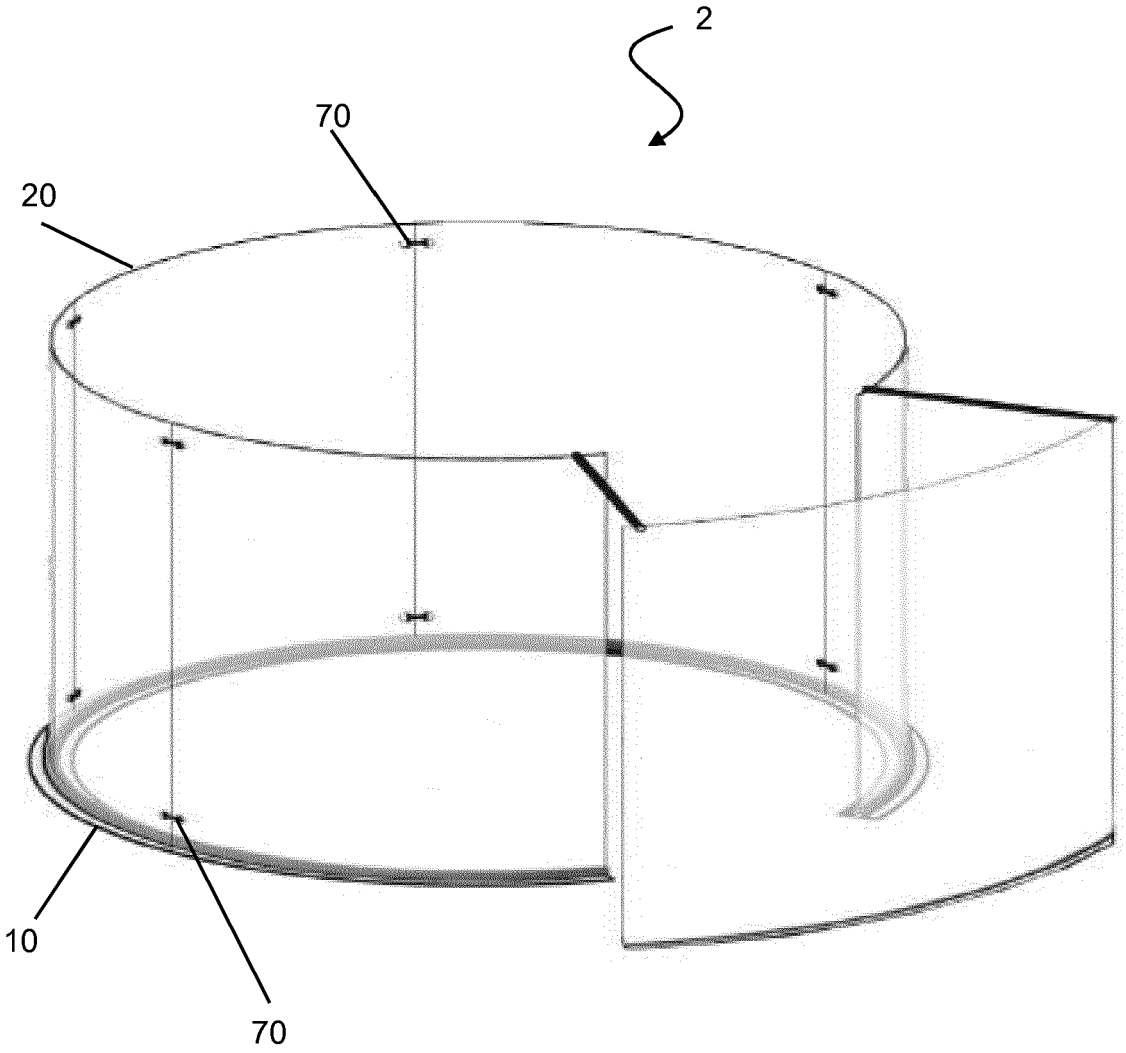

Fig. 17

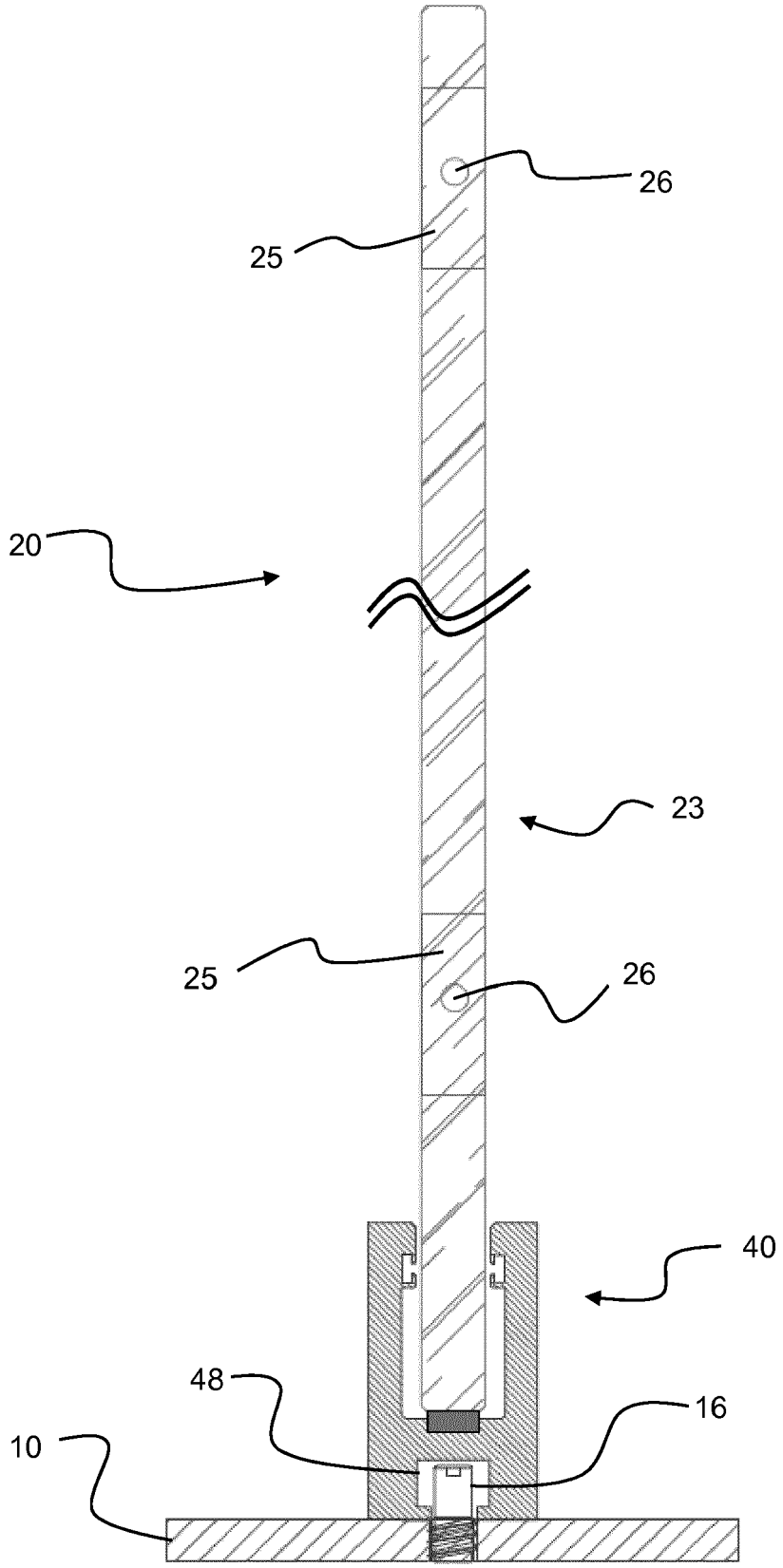

Fig. 18

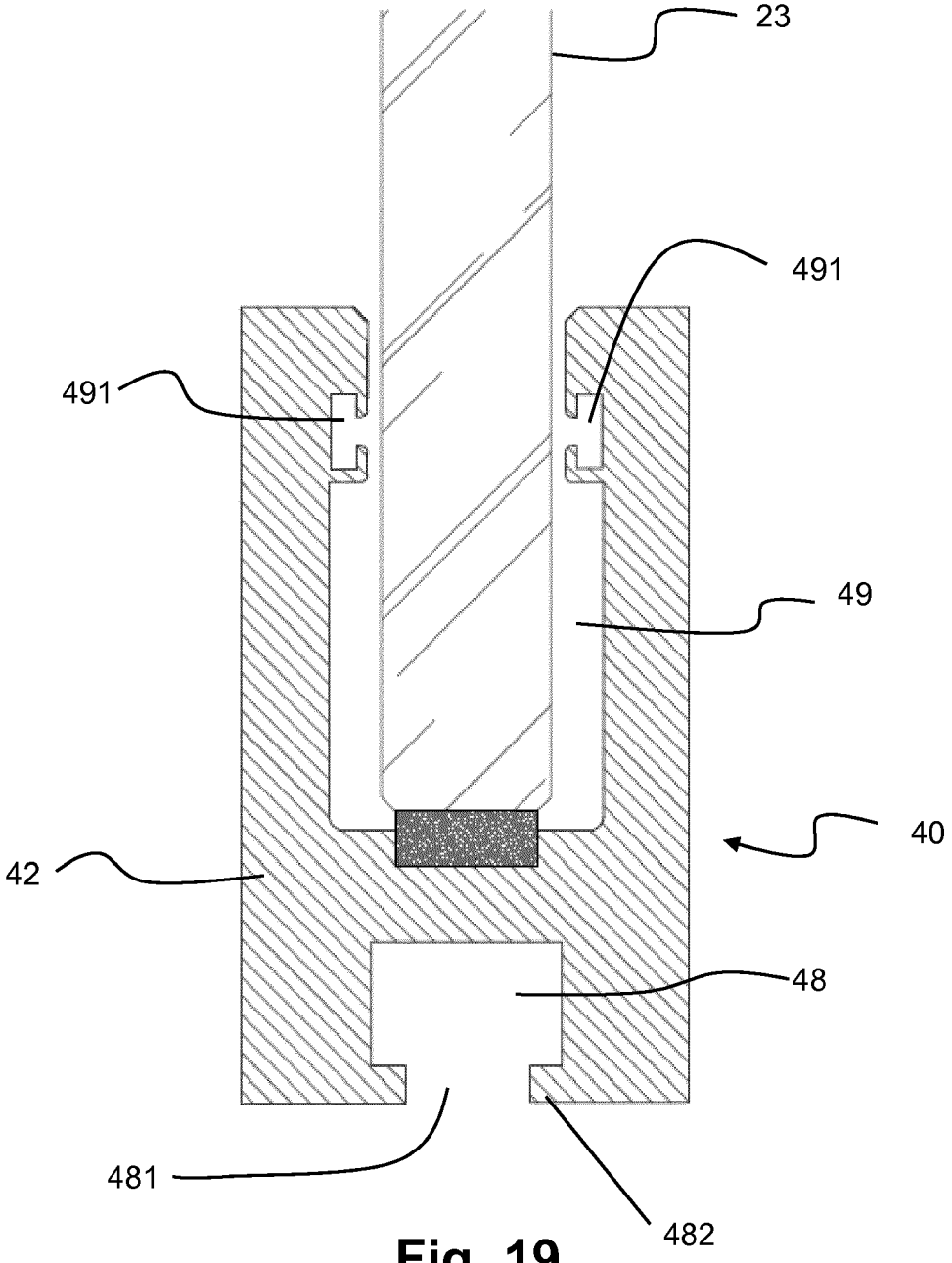

Fig. 19

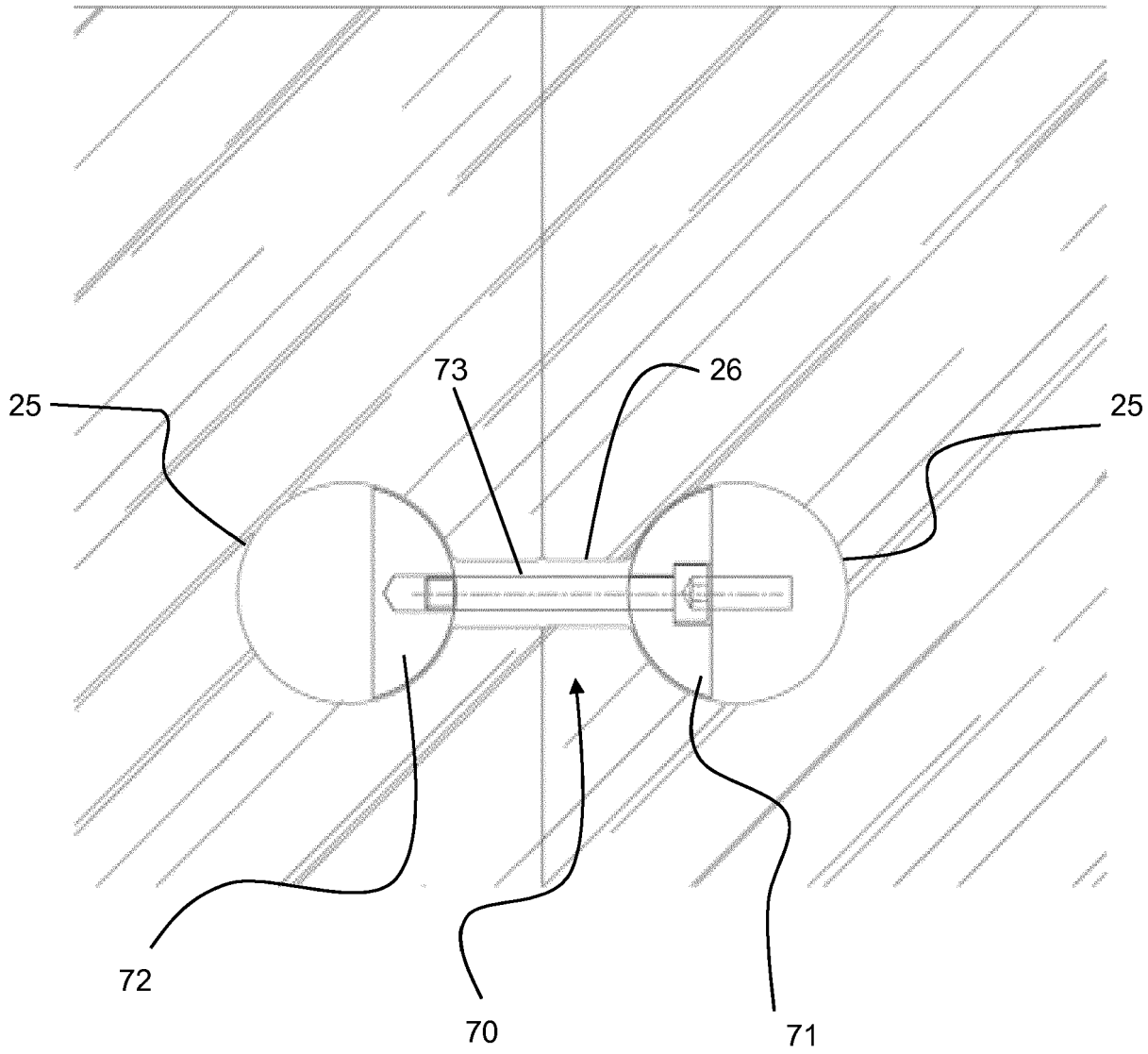

Fig. 20

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 7754

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 630 312 A1 (MESSEBAU MUEHLICH GMBH [DE]) 1 March 2006 (2006-03-01) * figures 1,3,5 * -----	1-9,12	INV. E04B2/74 E06B3/663 E06B3/54 E06B3/66 E04B2/82
A	GB 2 305 205 A (CROY ELDEN DOUGLAS [GB]; CULLINAN DOMINIC GUY [GB]) 2 April 1997 (1997-04-02) * figures 12-15 * -----	6	
A	DE 10 2005 027528 A1 (MBA DESIGN & DISPLAY PRODUKT G [DE]) 28 December 2006 (2006-12-28) * figure 6 * -----	9	

TECHNICAL FIELDS SEARCHED (IPC)

E04B
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 March 2018	Crespo Vallejo, D

CATEGORY OF CITED DOCUMENTS

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09-03-2018

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EP 1630312 A1	01-03-2006	NONE	
GB 2305205 A	02-04-1997	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- GB 2305205 A **[0012]**
- DE 102005027528 A1 **[0013]**