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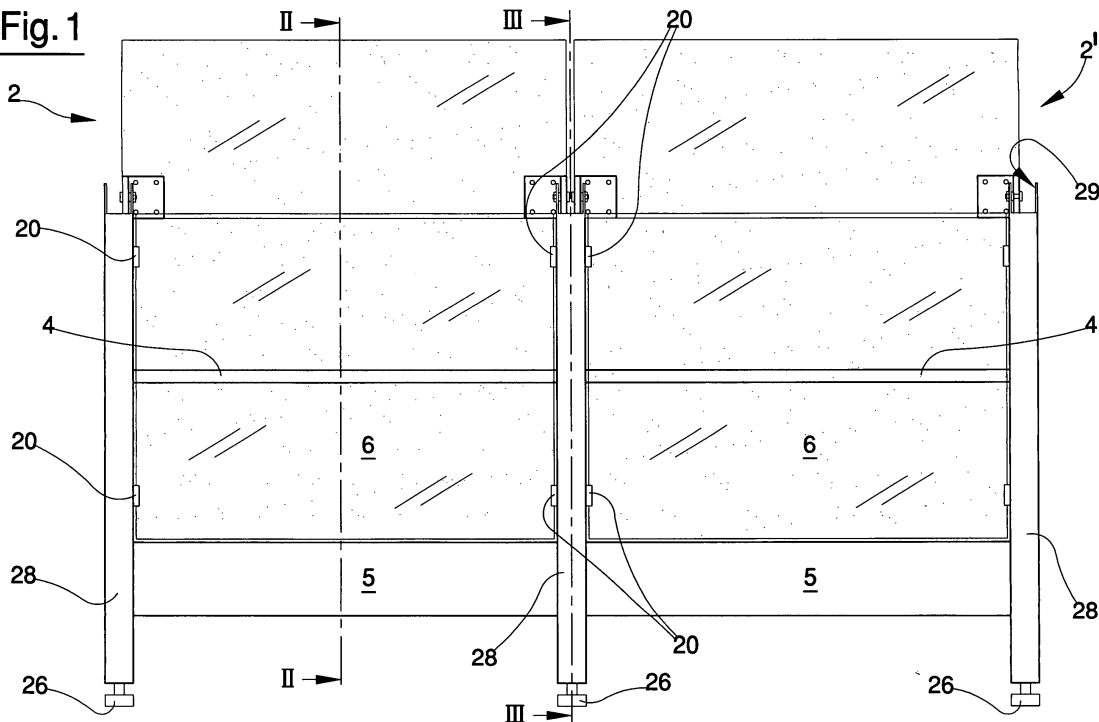
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(54) **A modular structure for non-permanent sectioning-off of external spaces having linear or broken profile, and an assembly process therefor**

(57) At least a first modular element (2) and a second modular element (2') each exhibit a pair of uprights (3), preferably a right upright (3a) and a left upright (2b), each developing vertically and having a straight transversal section, which uprights are associated to at least two crossbars (4,5) and a panel (6) connected thereto; the

process includes making a first series of holes (7) on the right upright (3a) of a first modular element (2) and a second series of holes (8) on the left upright (3b) facing the right upright (3a), belonging to a second modular element (2'). Thereafter the first series of holes (7) are connected to the second series of holes (8) by removable means for connecting coupled to spacers (10).

Fig. 1



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Description

[0001] The invention relates to a modular element for sectioning-off outside spaces, being linear or broken, and also to an assembly method thereof, having at least two modular elements for sectioning-off of external areas having linear or broken profile.

[0002] It is well-known that for offering refreshments in open spaces, both in Summer and in Winter, much use is made of elements for creating closed or sectioned-off areas outside a catering establishment.

[0003] These elements have to be removable so that they can be dismantled to obey council or local authority rules and free up the confined space.

[0004] The sectioning-off of a space outside a restaurant or the like is obtained by a combination of several panels, each consisting of a bearing frame structure internally of which a pane of glass is housed, the panels being arranged side-by-side and inter-connected in order to obtain a solid and self-standing perimeter delimitation.

[0005] For aesthetic improvement of this perimeter, the structures are provided with integrated accessory elements such as illumination, loud-speakers and the like. To improve the comfort of the perimeter delimitation, the structures are provided with integrated elements, such as mosquito repellent devices.

[0006] To this end various types of modular elements are developed for confining external areas; methods for connecting the elements together have all in common the need for the connections to be removable, and fast to mount and dismount.

[0007] A first known modular element is constituted by an internal frame and an external frame, each exhibiting two vertical uprights and two horizontal cross-bars, jointed to each other to form a frame having a quadrangular perimeter, and defining a bearing structure for housing a pane of glass.

[0008] The modular elements are connected to one another by means of pairs of L-shaped elements, positioned opposite one another so that one completely envelops an external upright of a first panel and part of another external upright belonging to a second panel placed side-by-side with the first panel, while the other element completely envelops an internal upright of the second panel and part of the other internal upright belonging to the first panel.

[0009] A through-hole is made at the zone where the two panels are arranged side-by-side, into which a screw is inserted to block the two L-shaped elements and consequently the two panels.

[0010] The above-described modular element and the relative connection method involving connection at several points of the vertical development of the panel exhibit some disadvantages.

[0011] If a glass pane breaks, the modular element has the drawback of having to be completely dismantled for the pane to be replaced.

[0012] If we consider that these structures include ac-

cessories, then clearly the electrical circuitry of these accessories, such as electric wires for lighting signs, telephone lines etc, must not be left exposed, both because of possible risk to customers and due to the possibility of vandalising; it must be hidden within the structure.

[0013] Following a faulty or malfunctioning of one of the accessory elements, the above method has the drawback of having to temporarily dismount the joint elements, causing instability in the structure.

[0014] A second modular element is constituted by a tubular frame constituting the edge of a pane.

[0015] In this case the assembly of several modular elements is done by means of hinges located on the vertical sides of the tubular frame.

[0016] Following the breakage of a pane, the modular element, structurally more economical than the preceding prior art example, has the drawback of having to be totally replaced.

[0017] This structure, simplified in terms of ease of assembly thanks to the presence of hinges, has a reduced frame volume and offers no conduits for the location of supply cables to the ornamental elements.

[0018] A further disadvantage is connected to the poor flexibility of the modular elements, should the area to be sectioned off be situated on unlevel ground or on different levels; in such a case the hinges need to be re-positioned on the frame.

[0019] A further solution is described in Italian patent no. PR2002A00045, in which the modular element, made of a plastic material, exhibits on sides of the uprights a channel which is dovetailed and can be engaged with a connecting body having a vertical development for abutting contemporaneously on two channels belonging to two uprights located side-by-side.

[0020] These modular elements, being considerably lighter thanks to the use of plastic material for the frame, have however the drawback of being poorly resistant to wind-provoked tilting effects.

[0021] In order to lend greater stability to these structures, rest feet as used, connected to the lower crossbar of the panel frame, and stably fixed to the rest surface by screws.

[0022] The rest feet are larger than the vertical projection of the panel on the ground.

[0023] Consequently a disadvantage of the feet is the fact they invade the area outside of the perimeter of the sectioned-off space, which usually does not belong to the restaurant-owner, and also the inside of the perimeter of the sectioned-off area, creating a risk of injury for the customer who may trip on one of them.

[0024] If the sectioned-off part's perimeter is located in an area of social and cultural importance, such as for example a square in a historic quarter of a town, stability is precarious anyway because the feet cannot be fixed to the ground.

[0025] These structures also exhibit the disadvantage of being able only, in plan view, of establishing perimeter sections having horizontal or vertical sides.

[0026] Consequently, in the case in which there is an obstacle in proximity of the peripheral edge of the perimeter, such as for example a streetlamp, the only possible solution with the above methods is to reduce the size of the perimeter, leaving the obstacle outside it.

[0027] Also, should the modular elements be even partially made of metal, by law these have to be earthed if close to electrical conductors.

[0028] This leads to the need to set up an earth and to singly connect-up each potentially dangerous element.

[0029] The main aim of the present invention is to provide a modular element which enables a rapid replacement of a pane of glass in case of breakage.

[0030] A second aim of the present method is to obtain a bearing assembly between at least two contiguous panels, defining internally of the facing uprights a free space, for containing the rest feet and the electrical circuitry, which is easily accessible without at the same time reducing the structural characteristics of the structure itself.

[0031] A further aim of the present method is to obtain a bearing structure between at least two contiguous panels which are not only possibly parallel, perpendicular but also inclined, i.e. not aligned.

[0032] Last but not least an important aim of the invention is to enable a simple and reliable earthing of all the barrier without having to resort to connecting-up each element.

[0033] These aims and advantages and more besides are attained by the invention, as it is characterised in the appended claims.

[0034] The invention is described in more detail with reference to the figures of the drawings, which illustrate a preferred embodiment thereof, and in which:

Figure 1 is a front view of a pair of modular elements assembled to one another and each exhibiting a glass pane translation system;

Figure 2 is a transversal section, along line II-II of figure 1, located in a median position of a modular element;

Figure 3 is a transversal section, along line III-III of figure 1, median of the assembly zone of two uprights, each belonging to a respective modular element;

Figure 4 is a longitudinal section, along line IV-IV of figure 2, of two uprights, each belonging to a respective modular element, to which two panels are connected, which two panels define a straight angle;

Figure 5 is a detailed view of the connection of the panels on the uprights of two side-by-side modular elements;

Figure 6 illustrates, in longitudinal section, two uprights, each of which belongs to a respective modular element, to which two panels are respectively connected, which define between them an obtuse angle;

Figure 7 is a longitudinal section of two uprights, each belonging to a respective modular element, to which two panels are respectively connected, together de-

fining a right angle.

[0035] With reference to the figures of the drawings, 2 denotes in its entirety a first modular element and 2' indicates a second modular element, side-by-side and connected to the first element 2.

[0036] Each modular element 2, 2' exhibits a pair of uprights 3, preferably defined by a right upright 3a and a left upright 3b, parallel to one another, having a vertical development and a flat transversal section, and each exhibiting at least a pair of guides 20.

[0037] The right upright 3a and the left upright 3b, which are lateral containment walls of the modular element 2, 2', are connected to at least a lower crossbar 4 and an upper crossbar 5.

[0038] The lower crossbar 4 and the upper crossbar 5, parallel to one another, are perpendicular to the pair of uprights 3 they are connected to.

[0039] A panel 6, preferably a pane of glass, rests on the lower crossbar 4 and is channelled in the pair of guides 20 on the pair of uprights 3.

[0040] The assembly of at least two modular elements 2, 2', includes a series of stages which are now described.

[0041] Taking a first modular element 2, a first plurality of holes 7 is made on a first upright 3 a thereof.

[0042] The first plurality of holes 7 is uniformly distributed in two series of holes, each lying on a respective vertical line.

[0043] The arrangement of the two series of holes, constituting the first plurality 7, is preferably at the vertical margins of the right upright 3a and thus external of the pair of guides 20, as can be seen in figure 2, or on a side with respect to the location of the pair of guides 20.

[0044] On completion of the first plurality of guides 7, a second modular element 2' is taken and a second plurality of holes 8 is made on the left upright 3b, i.e. the upright which will be brought side-to-side with the right upright 3a of the first modular element 2.

[0045] The second plurality of holes 8 is, on a vertical plane, specularly arranged with respect to the first plurality of holes 7.

[0046] Thus a first hole 7', made on the right upright 3a of the first modular element 2, faces a second hole 8', coaxial to the previous hole and made on the left upright 3b of the second modular element 2'.

[0047] Consequently the second plurality of holes 8 too is uniformly distributed in two series of holes, each lying on a respective vertical line.

[0048] In this case too the location of the two series of holes constituting the second plurality 8 is preferably on the vertical margins of the left upright 3b, and is thus external of the pair of guides 20 or by the side thereof.

[0049] When the first modular element 2 and the second modular element 2' are located at the same height, so that each hole belonging to the first plurality 7 faces a corresponding hole of the second plurality 8, the right upright 3a, belonging to the first modular element 2, can be assembled to the left upright 3b, belonging to the sec-

ond modular element 2', by removable means for connecting 9.

[0050] During this stage spacers 10 are interpositioned at each hole of the first plurality 7 and the reciprocal holes of the second plurality 8 internally of the free space generated by placing the right upright 3a and the left upright 3b side-by-side.

[0051] The removable means for connecting 9, in a first embodiment, illustrated in figure 4, are suitable for contiguous panels making a straight angle, i.e. connected to a pair of parallel uprights, and are defined by a threaded pivot 12, exhibiting a first end 12a and a second end 12b terminating in a head 13, and a first nut 14.

[0052] Each spacer 10 used in this configuration is constituted by a truncated tubular body 11.

[0053] The first end 12a of the pivot 12 is inserted in the first hole 7' of the first plurality 7, previously made in the first upright 3a of the first modular element 2.

[0054] Immediately after insertion of the first end 12a in the first hole 7' the pivot 12 is coupled to the spacer 10, by sliding the first end 12a internally of the tubular body 11.

[0055] The first end 12a is inserted in the second hole 8' facing the first hole 7', belonging to the second plurality of holes 8.

[0056] At this point the end 12a projecting from the second hole 8' of the left upright 3b is coupled with the first nut 14.

[0057] In this way the right upright 3a, belonging to the first modular element 2, and the left upright 3b, belonging to the second modular element 2', are blocked and the head 13 of the second end 12b strikes against the right upright 3a and the first nut 14 is tightened on the first end 12a up until the nut 14 contacts the left upright 3b.

[0058] This process is repeated several times according to the number of holes in the first plurality 7 and the second plurality 8, to obtain a sturdy structure with a reduced risk of lateral flexion.

[0059] The removable means for connecting 9, in a second embodiment illustrated in figure 6, is suitable for panels which are contiguous and define an obtuse angle, i.e. are connected to a pair of non-aligned uprights. These means are defined by a threaded tie rod 15 exhibiting a first end 15a and a second end 15b, a first nut 14 and a second nut 16, and a first washer 17 and a second washer 18.

[0060] Each spacer 10 used in this configuration is defined by a hollow cylindrical body 19 terminating in a pair of faces 19a, 19b, each parallel with respect to the upright it is closer to.

[0061] The tie rod 15 is inserted by its first end 15a in the first hole 7' of the first plurality 7 so that the tie rod 15's first end 15a is downstream of the right upright 3a, while a second end 15b thereof is upstream of the right upright 3a.

[0062] Immediately after insertion of the first end 15a in the first hole 7' the tie rod 15 is coupled to the spacer 10, the first end 15a being slid internally of the hollow

cylindrical body 19.

[0063] The first end 15a is then inserted into the second hole 8' belonging to the second plurality of holes 8.

[0064] The tie rod 15 then exhibits, outside the right upright 3a and the left upright 3b, respectively the second end 15b and the first end 15a and internally thereof the spacer 10.

[0065] The first end 15a is coupled to a first washer 17, cut skewed, which strikes on the left upright 3b and is tightened there by the second nut 16, and similarly the second end 15b is coupled to a second washer 18, also cut skewed, which strikes on the right upright 3a and is tightened thereon by the first nut 14.

[0066] The first washer 17 and the second washer 18 each have a first side 21, in contact with the nut 14 and 16, oriented perpendicular to the axis of the tie rod 15, and an opposite side 22, oriented parallel to the upright it is in contact with.

[0067] The removable means for connecting 9, in a third embodiment, illustrated in figure 7, for panels which are contiguous and define an acute angle or a right-angle, are connected to a pair of uprights which are perpendicular to one another, and are defined by a threaded pivot 12 exhibiting a first end 12a and a second end 12b terminating in a head 13, by a first nut 14 and by a first right-angled element 31.

[0068] The right-angled element 31 has a series of coaxial openings coinciding with one of the holes of the first plurality 7 and one of the two series of holes of the second plurality of holes 8.

[0069] Each spacer 10 is defined by a truncated tubular body 11.

[0070] As, in this arrangement, the modular elements are perpendicular, the first hole 7' and the corresponding hole 8' are not coaxial and consequently are not engaged with a same pivot 12.

[0071] The first end 12a of the pivot 12 is inserted in the first hole 7' of the second plurality 7, previously made in the right upright 3a of the first modular element 2.

[0072] At the same time another pivot 12 is inserted, again by the first end 12a, into the second hole 8' of the second plurality 8, previously made on the left upright 3b of the second modular element 2'.

[0073] Each first end 12a, after being connected to a tubular body 11, is coupled to a first opening 32 or a second opening 33 made in the first right-angled element 31, then to be closed by a first nut 14.

[0074] In order to give the structure greater sturdiness, a second right-angled element 34 is used.

[0075] The second element 34 exhibits, like the first element 31, a series of openings which can be coupled with the series of holes which are not engaged by the first element 31, belonging respectively to the first plurality of holes 7 and the second plurality of holes 8 located at the periphery of the right upright 3a and the left upright 3b.

[0076] The procedure is repeated several times, depending on the number of holes present in the first plu-

rality 7 and the second plurality 8.

[0077] The interpositioning of several spacers 10 in contact with the right upright 3a and the left upright 3b leads to the creation of a free space which can contain the circuitry for loudspeakers, lights, signs and whatever else.

[0078] The free space is laterally protected from atmospheric damage by a cover 28 friction-coupled with the two uprights 3a, 3b, which are contiguous and which superiorly exhibit a recess 29.

[0079] The inspection or substitution of a supply cable of an ornamental element can be done very rapidly, simply removing the cover 28.

[0080] A rest foot 26 can be inserted below the right upright 3a and the left upright 3b, thanks to the interpositioning of several spacers 10; the rest foot 26 is up-turned-T-shaped and exhibits, on the lateral walls 30, a pair of projections 27 which abut, by interference, on the spacers 10.

[0081] The rest foot 26, which lends stability to the modular element, is entirely contained within the chamber generated by placing two uprights, left and right, side-by-side.

[0082] The modular element 2, 2' exhibits the further advantage of being rapidly replaceable in case of breakage of the panel 6. This is done by raising the panel along the pair of guides 20 located laterally on the pair of uprights 3.

[0083] A further advantage is that the whole assembly is electrically integrated, thanks to the conformation of the removable means for connecting 9, with the result that the whole assembly can be earthed in one point only, obviating the need to earth each element individually.

Claims

1. An assembly process for a modular structure for sectioning-off of external spaces with linear or broken profile, exhibiting at least a first modular element and a second modular element (2'), both comprising:

at least a pair of uprights (3), preferably a right upright (3a) and a left upright (3b) which function as lateral walls for containing a panel (6);

characterised in that it comprises following stages:

making a first series of holes (7) on the right upright (3a) of the first modular element (2);

making a second series of holes (8) on the left upright (3b) of the second modular element (2') placed side-by-side to the first modular element (2);

connecting the first series of holes (7) with the second series of holes (8) using removable means for connecting (9), interpositioning spacers (10) between the first modular element (2) and the second modular element (2').

2. The assembly process of claim 1, **characterised in that** after the stage of connecting a following stage is performed: closing the right upright (3a) and the left upright (3b) of two contiguous modular elements (2, 2'), with a pair of covering beams (28).

3. The assembly process of claim 1, **characterised in that** in a first assembly configuration the panels (6) belonging respectively to the first modular element (2) and the second element (2') are vertically coplanar and define a straight angle.

4. The assembly process of claim 3, **characterised in that** the removable means for connecting (9) comprise:

at least a threaded pivot (12) having a first end (12a) inserted internally of a second hole (8') belonging to the second series of holes (8) and a second end (12b) crossing a first hole (7'), preferably coaxial to the second hole (8'), belonging to the first series of holes (7) and terminating with a head (13) striking on the right upright (3a) of the first modular element (2);

at least a nut (14) screwed to the first end (12a) of the pivot (12) and striking on the left upright (3b) of the second modular element (2').

5. The assembly process of claim 1 or 4, **characterised in that** the spacers (10) are defined by at least a tubular body (11) coupled to at least a pivot (12) of the removable means for connecting (9).

6. The assembly process of claim 1, **characterised in that** in a second configuration the panels (6) belonging respectively to the first modular element (2) and the second modular element (2') are skewed to one another and define an obtuse angle.

7. The assembly process of claim 6, **characterised in that** the removable means for connecting (9) comprise:

at least one tie rod (15) having a threaded first end (15a) that internally crosses a second hole (8') belonging to the second series of holes (8) and a threaded second end (15b) which internally crosses a first hole (7'), coaxial to the second hole (8') and belonging to the first series of holes (7);

at least a first washer (17) and a second washer (18), each coupled with play respectively to the first end (15a) and the second end (15b), each washer being provided with a first side (21) oriented perpendicular to an axis of the tie rod (15) and a second side (22) oriented parallel to the upright (3a, 3b) the second side faces;

at least a first nut (14) and a second nut (16),

respectively screwed to the second end (15b) and the first end (15a) of the tie rod (15).

8. The assembly process of claim 1 or 7, **characterised in that** the spacers (10) are preferably made of at least a hollow cylindrical body (19) coupled to at least a tie-rod (15) of the removable means for connecting (9), terminating in a pair of faces (19a, 19b), each of which is oriented parallel to the upright (3a, 3b) it is in contact with.

9. The assembly process of claim 1, **characterised in that** in a third assembly configuration the panels (6) belonging to the first modular element (2) and the second modular element (2') are perpendicular to one another, defining a right-angle to one another.

10. The assembly process of claim 9, **characterised in that** the removable means for connecting (9) comprise:

at least a right-angled element (31) exhibiting at least a first and a second opening (32, 33);
at least two threaded pivots (12), each having a second end (12b) inserted internally of a first hole (7') of the first plurality of holes (7) or alternatively in a second hole (8') of the second plurality of holes (8) and
terminating in a head (13) striking on the left upright (3b) or the right upright (3a), and a first end (12a) inserted in the first opening (32) or alternatively in the second opening (33);
at least a first nut (14) screwed to the first end (12a) of the pivot (12) and striking on the right-angled element (31).

11. A modular structure for non-permanent sectioning-off of external spaces having linear or broken profile, exhibiting at least a first modular element (2) and a second modular element (2'), each having a right upright (3a) and a left upright (3b) for supporting a panel (6), **characterised in that** at least the right upright (3a) of the first modular element (2) and the left upright (3b) of the second modular element (2') respectively exhibit a first plurality of holes (7) and a second plurality of holes (8), the structure also comprising removable means for connecting (9) engaged in the first and second plurality of holes (7, 8) for connecting the first modular element (2) to the second modular element (2').

12. The modular structure of claim 11, **characterised in that** the removable means for connecting (9) are coupled to spacers (10).

13. The modular structure of claim 12, **characterised in that** the spacers (10) fix the right upright (3a) belonging to the first modular element (2) at a prede-

termined distance, and the left upright (3b), belonging to the second modular element (2') defining a free space for housing an element which is not part of the modular structure.

14. The modular structure of claim 11, **characterised in that** the first modular element (2) and the second modular element (2') each exhibit a right upright (3a) and a left upright (3b), each developing vertically.

15. The modular structure of claim 15, **characterised in that** the right upright (3a) and the left upright (3b) each exhibit a transversal section which is straight.

16. The modular structure of claim 15, **characterised in that** the right upright (3a) and the left upright (3b) each exhibit a transversal section which is C-shaped.

17. The modular structure of claim 15, **characterised in that** the right upright (3a) and the left upright (3b) each exhibit a transversal section which is L-shaped.

18. The modular structure of claim 11, **characterised in that** each modular element (2, 2') exhibits a panel (6) which is oriented perpendicular with respect to the right upright (3a) and the left upright (3b) to which the panel (6) is mounted.

19. The modular structure of claim 11, **characterised in that** each right upright (3a) and each left upright (3b) exhibits at least a pair of guides (20) for inserting and extracting the panel (6) into and from each modular element (2, 2').

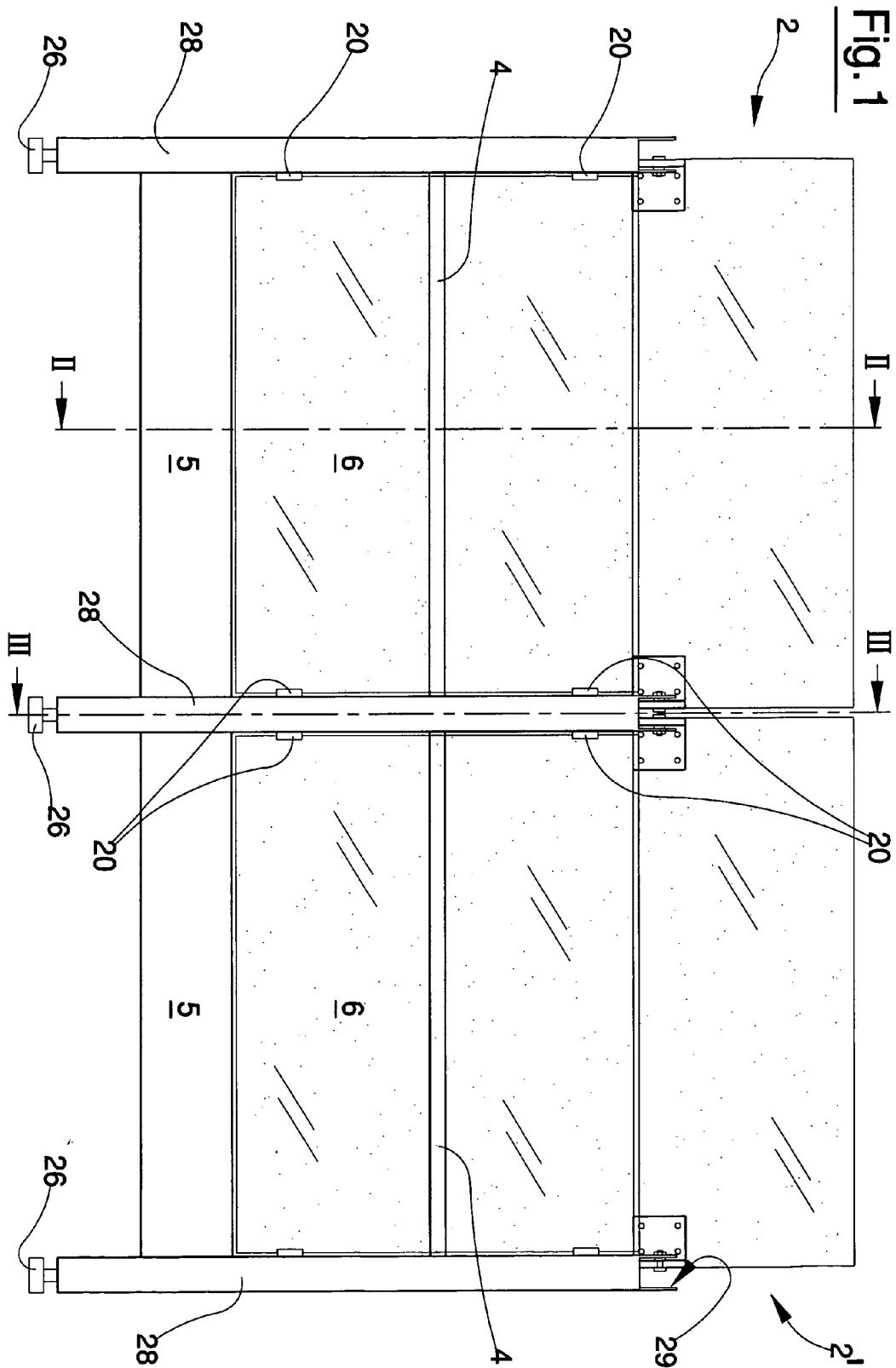


Fig. 2

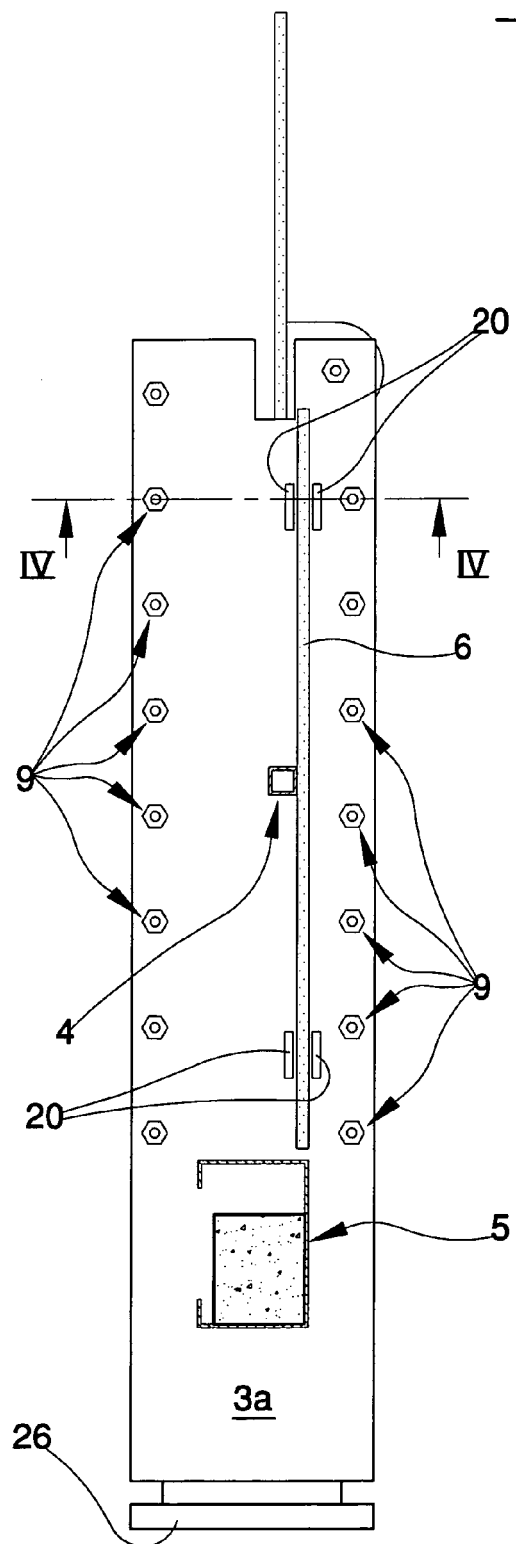
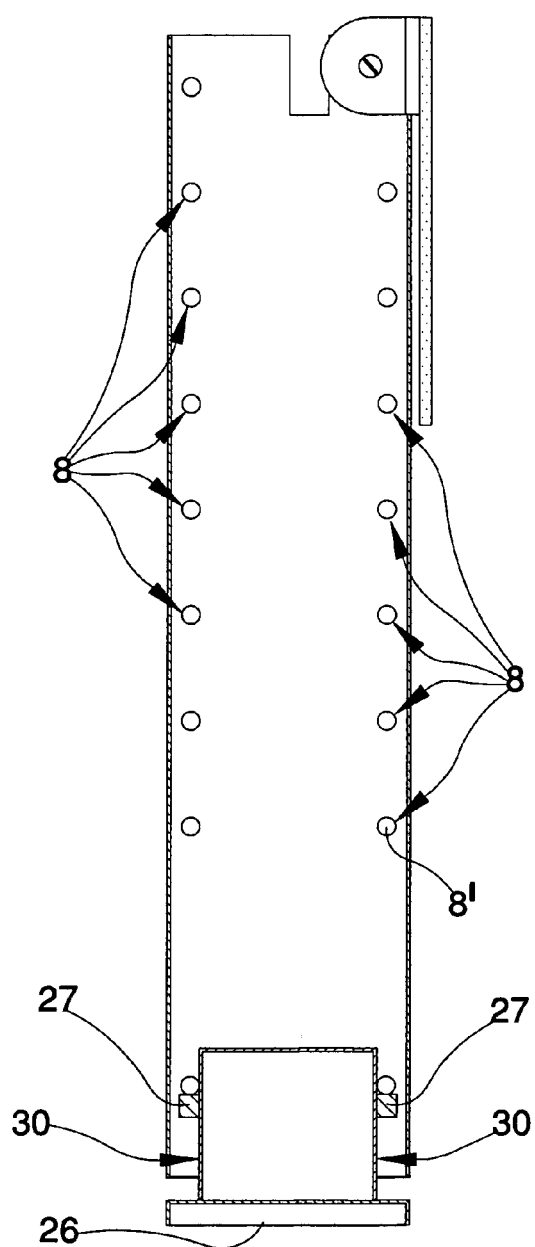


Fig. 3



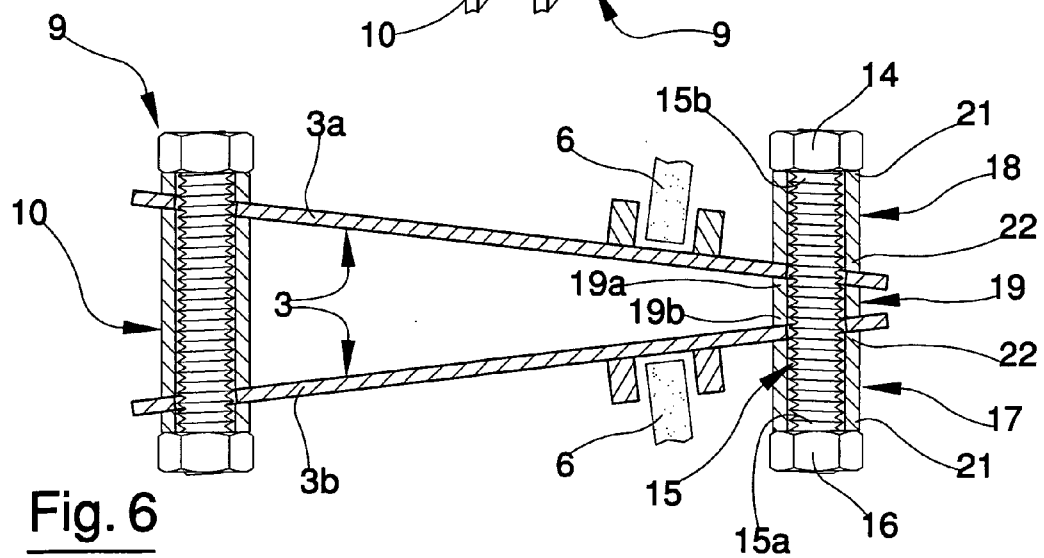
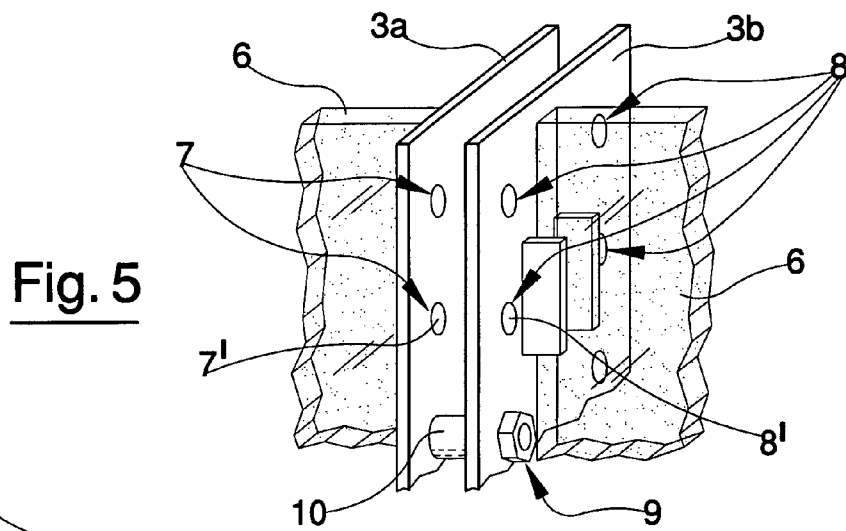
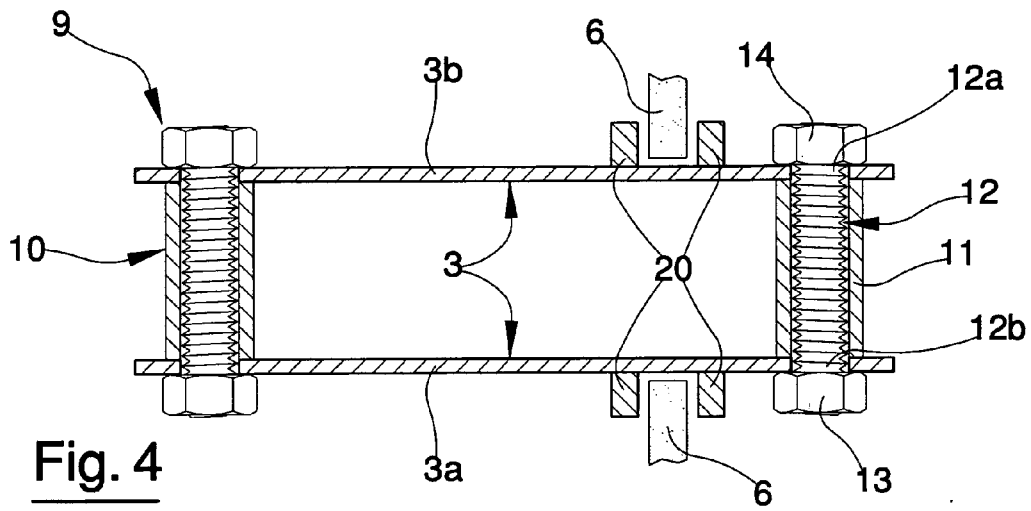


Fig. 7

