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(54) Modular security barrier

(57) An adjustable security barrier (10) for mounting on one or more surfaces (42, 61, 62) that define a predetermined opening (42). The barrier comprises one or more panels (11) made of a plurality of fixed bars (12, 13) arranged in a grid-like pattern. At least some of the bars (12, 13) have an end that, in use, projects towards the one or more surfaces. Attachment members (31) are provided on selected bars (12, 13), and are moveable along the length of the selected bar in a direction towards the one or more surfaces to a fixing position where in use each attachment member (31) can contact and be fixed to said one or more surfaces. A securing means (28) is provided for securing each member (31) to its respective bar (12, 13) in the fixing position thereby to secure the barrier (10) to the one or more surfaces.

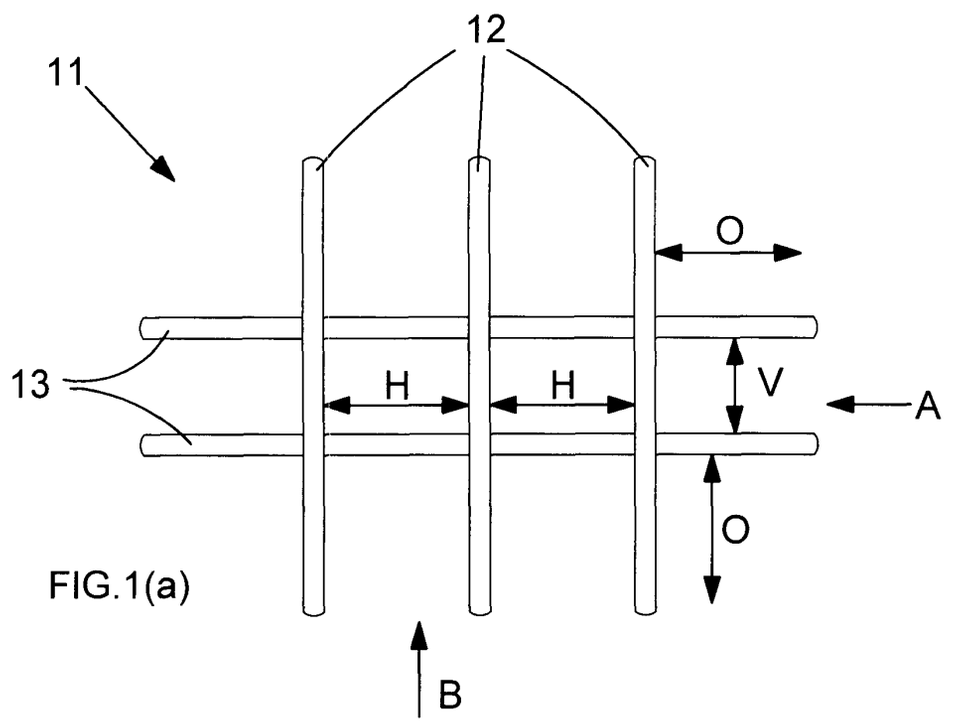

FIG.1(a)

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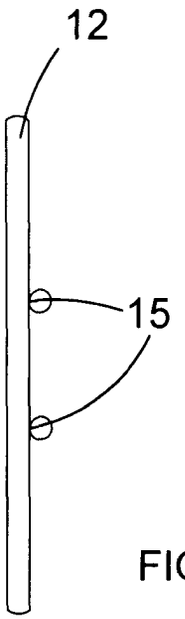

FIG.1(b)

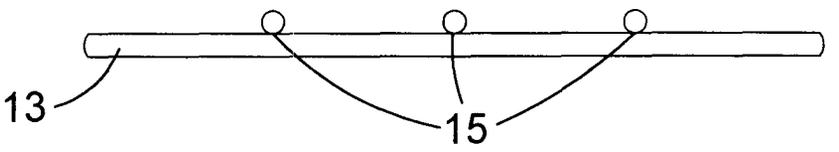

FIG.1(c)

Description

[0001] This invention relates to a physical security barrier comprising an interconnection of modules capable of forming a barrier, the size and shape of which can be chosen by a user so as to fit a multitude of different sizes of openings and frames. Within this specification, the term 'barrier' includes, unless the contexts implies otherwise, closures for window or door openings, fences, gates, blinds, grilles, shutters, screens and the like.

[0002] Presently, physical security barrier systems, in particular any fixed or movable closures for openings, need to be constructed in accordance with the dimensions and specifications of the opening. If the opening is not of a standard size or shape, then in order to protect it effectively with a security barrier, the security barrier has to be either fabricated or modified so as to fit adequately into the area requiring protection. Bespoke or adapted products are costly in terms of time and money, as work is invested into design, alteration and/or manufacture of non-standard size units.

[0003] It is an object of the present invention to reduce these costs by providing standard, but adjustable barrier that can take the place of a purpose-built security barrier.

[0004] It is a further objective of the present invention to provide a method of securing an opening in a structure, using for example, DIY applications and thereby reduce the need to employ specialist security fitting services to provide a bespoke service, especially in the case of irregular or non-standard openings.

[0005] According to the present invention there is provided an adjustable security barriers as set out in the attached claims.

[0006] The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figures 1(a), 1(b) and 1(c) show a panel of a security barrier constructed in accordance with the present invention., where Figure 1(a) is a plan view of the panel, Figure 1(b) is a view of the panel of Figure 1(a) looking in the direction of arrow A, and Figure 1(c) is a view of the panel of Figure 1(a) looking in the direction of arrow B;

Figures 2(a), 2(b) and 2(c) show an extension piece for use with the panel shown in Figure 1, where Figure 2(a) is a plan view of the extension piece, Figure 2(b) is a view of the extension piece of Figure 2(a) looking in the direction of arrow C, and Figure 2(c) is a view of the extension piece of Figure 2(a) looking in the direction of arrow D;

Figures 3(a) and 3(b) show an attachment member allowing the attachment of a panel of Figure 1(a) and/or the extension piece of Figure 2(a) to structure such as a wall that has a predefined opening therein. Figure 3(a) is the front view of the attachment member, and Figure 3(b) is the side view of the attachment member looking in the direction of the arrow E;

Figure 4 shows how two panels of Figure 1(a), an extension piece of Figure 2(a) and attachment members of Figure 3(a) can be combined to form a security barrier that is constructed in accordance with the present invention. Figure 4 shows the components of the security barrier superimposed on a schematic representation of an opening in a wall;

Figure 5(a-c) shows panels belonging to the same set;

Figure 6 shows a security barrier of the present invention in the form of a section of a fence secured between two upright posts;

Figure 7 shows a security barrier of the present invention in the form of a gate;

Figure 8 shows a locking means for use with a panel according to Figure 1; and

Figure 9 shows in greater detail a cover for the locking means of Figure 8.

[0007] Referring in greater detail to Figures 1(a-c) there is shown a panel 11 for a security barrier 10 of the type shown in Figure 4. The panel 11 comprises two sets of parallel bars 12,13; each set of bars 12 of the first set extend at an angle (perpendicular) to the bars 13 of the second set of bars. The bars 12, 13 form a grid-like panel 11.

[0008] Preferably, the orientation of the bars 12 are (but not restricted to) vertical and the orientation of the bars 13 are horizontal with reference to the vertical and horizontal coordinates of the opening (not shown) across which they are to be secured. In Figures 1(a-c), the vertical bars 12 extend in the direction B and the horizontal bars 13 extend in the direction A.

[0009] The bars 12, 13 are securely fixed to one another (e.g. welded) at the points of intersection of the bars 12,13 (hereinafter called a 'weld-point' 15). Preferably, the bars 12 or 13 that run parallel to each other are the same length and the ends of the bars are aligned with each other so that if a line was traced from the end of one bar to another, the line would be perpendicular to the direction of the length of the bars 12,13.

[0010] Referring to Figures 2(a-c), there is shown an extension piece 21 comprising a single bar 12 or 13 of the same type and length as either the horizontal 12 or vertical bar 13 in the panel 11 shown in Figure 1(a),and two orthogonal bars each in the form of hollow tube 22 welded at right angles to the bar 12 or 13. The tubes 22 of an extension piece 21 are dimensioned to receive the

bars 12 or 13 of the panel 11 of Figure 1(a), or the bars 12/13 of other extension pieces 21 of Figure 2(a). The tubes 22 are intended to slot onto the bars 12, 13 on an outer edge of a panel 11 to increase the vertical height or horizontal width of the entire barrier 10. An extension piece 21 may also consist of only a tube 78 (i.e. no bar) as shown in Figure 7.

[0011] Preferably, the outer diameters of the bars 12, 13 in any panel 11 (or extension piece 21 that includes a bar 12, 13) are equal so that they may be slotted into the tube 22 of an extension piece 21. The inner diameters of the tubes 22 in an extension piece 21 are greater than, or equal to, the outer diameter of the bars, but it is noted that as the discrepancy increases the fit will become progressively looser. It is preferable to have a tight fit with a mind to security, but not too tight so as to hinder the fitting of the extension piece 21 onto the end of a panel 11. Preferably, a nylon sleeve 23 is provided between the bar 12, 13 and each tube 22.

[0012] Referring to Figure 2(d), once a bar 12, 13 has been completely, or partially, slid into a tube 22 such that the desired position has been reached, it is then possible to fix the bar 12,13 at that location. The fixing of the panels 11 and extension pieces 21 can be achieved by providing a threaded hole 26 in the tube 22 such that a screw 28 (e.g. grub screw) can be tightened so as to clamp the tube 22 into place on the bar 12,13. Figure 2 (e) shows an example of a security screw 28 where the head is of a non-standard type so that only a specific mating tool (not shown) that is not an ordinary cross-head / flat head screwdriver can be used to tighten and loosen it.

[0013] Other methods of fixing bars 12/13 and tubes 22 are possible in further embodiments of the invention, for example, they may be welded together.

[0014] Referring to Figure 3, there is shown an attachment member 31 comprising a tube 32 of the same inner diameter as that of the tubes 22 of an extension piece 21. The tubes 32 are preferably, but not essentially, of a length (L) equal to, or shorter than, the distance from the end of any outermost bar 12, 13 in a panel 11 to its closest respective weld-point 15. The tube 32 is open at one end to receive a bar 12,13 from a panel 11 (or an extension piece 21 that includes bars 12,13). The tubes 31 are securely attached (e.g. welded) to a fixing member 33 that facilitates the fixing of the attachment member 31 to structure defining an opening into which the barrier is to be fitted. This permits the security barrier 10 comprising the panels 11 and extension pieces 21 to be attached to a structural surface (for example, the frame of a window) through the use of screws, nails, adhesive or other fixing means.

[0015] Referring to Figure 4, once one panel 11 has been fitted into one side of an extension piece 21, a further panel 11 may be fitted to the other side of the extension piece 21 to make up a barrier 10 to fit different sizes of openings.

[0016] Attachment members are then placed on selected bars 12, 13 at both ends of each set of bars and the screws 28 are loosely tightened to stop them falling off. The assembled panels 11, extension pieces 21, and the attachment members 31, are offered up to the opening 42 in a wall 44 and the attachment members fixed to the structure (wall 44). This is achieved by sliding each attachment member along the respective bars 12, 13 on which they are mounted (shown by the arrows) to bring them into contact with either the confronting surfaces 42(a) to 42(d) that define the opening 42 in the wall 44 or to overlie the opening 42 by a small distance from the edge of the opening 42,(not shown). The screws 28 are then tightened to hold the barrier into place and the attachment members 31 are then secured to the walls of the opening to hold the barrier 10 in the opening.

[0017] Referring to Figures 5(a-c), panels 11 belonging to a set of panels comprise panels that have the same spacing arrangement, or pitch, between the bars 12 or 13. The panels, however, differ with regards to either their horizontal widths or their vertical heights. The panel 11 of Figure 5(a) has five vertical bars 12 and three horizontal bars 13. The panel 11 of Figure 5(b) also has three horizontal bars 13, but only has two vertical bars 12. The vertical bars 12 are the same size as that of the panel 11 of Figure 5(a), but the horizontal bars 13 are truncated to preserve the bar spacing 12 common to that of the panel 11 of Figure 5(a). Similarly, the panel 11 of Figure 5(c) has five vertical bars (as in the panel of Figure 5(a)), but only two horizontal bars. The horizontal bars 13 of the panel 11 of Figure 5(c) are the same length as that of the panel 11 of Figure 5(a) and, in this case, it is the vertical bars 12 that are truncated to preserve the spacing between the bars 13.

[0018] A set of panels may also comprise a range of complimentary shaped extension pieces 21 that may be provided to allow the panels 11 of the same set to be joined together in the manner hereinbefore described. Barriers 10 can therefore be extended from a base panel size laterally in both the vertical and horizontal directions to set different size openings.

[0019] Preferably, panels 11 and extension pieces 21 are available as part of a set as shown in Figures 5(a-c), where the height and width of a panel 11 and corresponding extension pieces 21 in any one set is different from those of another set. For example, the first set would have a panel 11 with a maximum height and width of 450mm x 300mm and one or more extension pieces 21 having a bar length of 450mm or 350mm and suitable length of tubes 22. The second set may comprise of a panel 11 of 600mm x 450mm and one or more extension pieces 21 having a bar length of 600mm or 450mm and suitable length of tubes 22. A third set may comprise a panel 11 of dimension 850mm x 675mm, and so on. This enables the selection of different sizes of panels 11 and extension pieces 21 to fit different sizes of openings in structures with minimum additional work.

[0020] Referring to Figure 6 there is shown a security

barrier 10 in the form of a section of a fence secured between two upright posts 61, 62 and two rails 63,64. The fence may be made of any desired length by positioning and fixing similar barriers 10 between pairs of posts 61, 62. In greater detail, each barrier 10 uses a panel 11 constructed in accordance with that shown in Figure 1. Different lengths of barrier 10, to fit between different gaps between posts 61, 62 can be made by assembling different sizes of panels 11 and/or extension pieces 21 to make up the desired length. The barrier 10 is fixed to the respective posts 61, 62 and the rails 63,64 by means of the attachment members 31 (shown in Figure 3) being slid on to the ends of the horizontal bars 13. Where it is desired to fix the fence at the top and bottom ends of selected vertical bars, 12, attachment members 31 may be fixed to selected vertical bars 12.

[0021] Referring to Figure 7, there is shown a security barrier 10 in the form of a gate 70 secured between two support members 74, 75 and horizontal rails that form part of the gate 70. Support member 74, 75 is in the form of a long strip of rigid metal to which is welded a number of tubes 22 similar in size and dimension to the tubes 22 of Figure 2(a) so as to provide a slot into which the bars 12,13 of a panel 11 or extension piece 21 can fit. The extension piece 21 is slightly different to that shown in Figure 2??(a), in that the tubes 22 are replaced by bars 13. The extension piece 21 has one vertical bar 12 and three horizontal bars. The support member 75 on one side of the gate 70 is provided with hinges 77 that cooperate with hinge members 78 provided on an upright post 71 located adjacent to the gate 70. The support member 76 on the other side of the gate 70 is provided with a latch and locking mechanism 79 that mates with a keeper 80 recessed into another upright post 72.

[0022] The gate 70 comprises a panel 11 attached to the tubes 22 of the support member 75 on one of its sides attached on the other side by means of connecting pieces to an extension piece 21. The extension piece 21 is in turn attached to the support member 74 on the other side of the gate 70.

[0023] In the above embodiments, the panel 11 comprises three vertical bars 12 and two horizontal bars 13. It is to be understood that in further embodiments of the invention, a panel 11 can comprise one or more bars 12 extending in the vertical direction and one or more bars 13 extending in the horizontal direction although, to maintain a rigid structure, a minimum of at least two bars 12 or 13 is preferable.

[0024] In further embodiments of the invention, the bars forming the panel 11 may be spaced in a variety of ways, but it is preferred that a uniform spacing is adopted where the distances from the end of any bar 12, 13 to its closest respective weld-point 15 are all equal, and in the case of two or more bars running parallel to each other, for each horizontal or vertical orientation, there is an equal spacing between the bars 12 or 13 of the same orientation on that panel. The distances in the former and latter case do not need to be equal.

[0025] In the above embodiments, the 12,13 bars are joined together by method of welding. In further embodiments of the invention (not shown), other methods of fixing the bars 12, 13 to one another may be used, for example through use of screws, adhesive or other fixing means.

[0026] In the above embodiments, the bars 12, 13 are made of a material capable of being welded (for example, steel). In further embodiments of the invention, the bars 12, 13 may be made from other materials; a rigid plastic for example. The bars 12, 13 may be solid (i.e. do not have a cavity within them) or they may be hollow tubes, or partially hollow.

[0027] In the above embodiments, the means of adjustment of the barrier 10 is achieved by providing tubes 22 capable of sliding over the bars 12, 13 of a panel (or an extension piece comprising at least one bar). It is to be understood that in further embodiments of the invention, the same adjustability may be achieved by providing tubes in the place of the bars 12, 13 (in the above embodiment) and replacing the tubes 22 with solid rods. Similarly, the tubes 32 of the attachment members 31 may be made of solid rods instead of hollow tubes. By way of example, a panel 11 may comprise a grid-like arrangement of fixed tubes into which the rods 32 of an attachment member 31 may be introduced. The feature of adjustability is provided by the telescopic arrangement of tubes and bars.

[0028] Referring to Figures 8 and 9 there is shown a releasable locking means 65 that can be used with any of the panels 11 and extension pieces 21 described above to enable the barrier 10 to be mounted across an opening in a structure such as, for example a wall in a way that allows the panel to be removed in an emergency. The locking means 65 comprises a base plate 66 with a flange 67 normal to the base that is secured to the one or more surfaces 42(a) to (d) of the opening 42, or secured to the inside face 44 (a) of the wall 44 at a location where the attachment members 31 would be positioned.

[0029] The base plate 66 has one or more spaced sockets 68 that are shaped, dimensioned and positioned to receive the fixing member 32 of the, or each, respective attachment member 31 (in the drawing there are two spaced sockets 68). Each socket 68 comprises the back plate 67 of the base plate 65 and two spaced side walls 69. The open end of the, or each, socket 68 faces towards the space on the inside of the wall 44, that is to say the space on the side of the wall 44 furtherest away from a possible intruder. The base plate 66 has a catch 70 for receiving a lockable latch 71on a cover 72 shown in Figure 9.

[0030] The cover 72 has two slots 73 corresponding to the position of the sockets 68. These slots 73 have open ends that face towards the wall 44 (or, where fitted to the surfaces 42(a) to 42(d) towards a possible intruder) so as to retain the attachment members 31 within the locking means against the flange 67 of the base

plate.

[0031] Whereas the attachment members 32 of the embodiments described above are secured to the structure 44 by means of screws or other fasteners those used in the Figure 8 and 9 locking means are not. The attachment members 31 are slid into the sockets 68 and retained securely in the locking means against the flange 67 by the cover 72. The cover 72 is provided with a key operated latch 76 that engages the catch on the base plate.

[0032] In an emergency requiring exit through the opening the cover is removed and the panel 11 pulled towards the intruder of the room to pull the attachment members 31 out of the sockets 67.

Claims

1. An adjustable security barrier for mounting across an opening in a structure, the barrier comprising one or more panels in the form of a grid-like pattern of first and second sets of bars, the bars of one set extending in direction at an angle to the bars of the other set and the bars being connected to each other at points of intersection of the bars, **characterised in that** each set of bars is secured at each of its ends the structure by one or more attachment members mounted on one or more selected bars of the respective set of bars, each attachment member being moveable along the length of the selected bar in a direction across the opening that enables the attachment member to be attached to the structure.

2. A security barrier according to claim 1 wherein a releasable locking means is provided for fitment to the structure at a location to receive one or more of the attachment members of a respective set and thereby retain the panel to the structure in a way that allows the attachment members to be released from the structure in the event of an emergency requiring escape through the opening.

3. A barrier according to claim 2 wherein the lockable means comprises a base member for fitting to the structure said base plate being having and a lockable cover for fitting to the base plate, said cover being shaped positioned and arranged relative to one or more attachment members so that when the cover is locked to the base plate the lockable means retains the attachment member within the cover, and when the cover is not locked to the base it can be removed from the base plate to enable the attachment member or members together with the panel, to be removed from the lockable means.

4. A security barrier according to claim 2 or claim 3 wherein the base plate has one or more sockets each having a back plate and spaced side plates positioned and dimensioned to receive a fixing member of an attachment member.

5. A barrier according to any one of the preceding claims further comprising an extension piece having a pattern of bars that matches and aligns with the grid-like pattern of the bars of the panel, and connecting means for connecting the extension piece to the panel thereby to extend the panel laterally.

6. A barrier according to any one of the preceding claims wherein one or more bars is/are solid.

7. A barrier according to any one of claims 1 to 5 wherein one or more bars is/are hollow tubes.

8. A barrier according to claim 4 wherein the connecting means are hollow tubes.

9. A barrier according to any one of the preceding claims wherein the, or each, attachment member comprises a fixing member for fitting to the structure and a tubular member for fitting on to a selected bar.

10. A barrier according to any one of the [preceding claims wherein one or more bars of the panel are hollow tubes and the attachment member comprises a fixing member for fitting to the structure and a rod for insertion into a selected hollow tube.

11. A barrier according to any one of the preceding claims wherein the opening in the structure is defined by one or more surfaces, and, in use, each set of bars extends across the opening and engages said one or more surfaces.

12. A barrier according to any one of the preceding claims wherein there are two or more pairs of confronting surfaces each pair defining two sides of an opening and, in use, each set of bars extends across a gap between a pair of confronting surfaces,

13. A barrier according to claim 12 wherein the confronting surfaces are walls of an opening in a structure, and each set of bars extends across the opening between at least two walls of the opening.

14. A barrier according to claim 12 wherein a first pair the confronting surfaces are sides of posts and a second pair of the confronting surfaces are rails extending between the posts and, in use, the barrier extends across the gap between two posts and is attached to the two rails.

15. A barrier according to claim 8 wherein a first pair of

confronting surfaces are sides of two side members of a gate, a second pair of confronting surfaces are on spaced rails extending between the sides of the gate and the barrier extends across the gap between the two side members and is attached to the rails to define a gate.

16. A barrier according to claim 15 wherein one of the side members is provided with hinge means for connection to hinge means on an adjacent structure.

17. A barrier according to claim 15 or claim 16 wherein one of the side members is provided with a latch means for cooperation with a keep means on an adjacent structure.

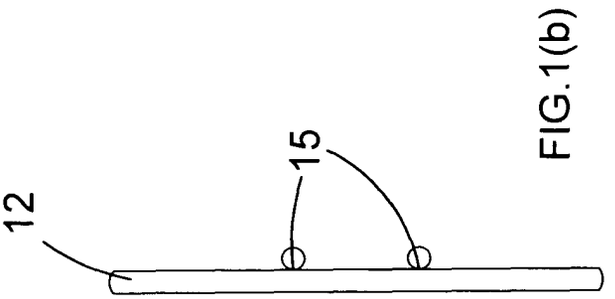

FIG.1(b)

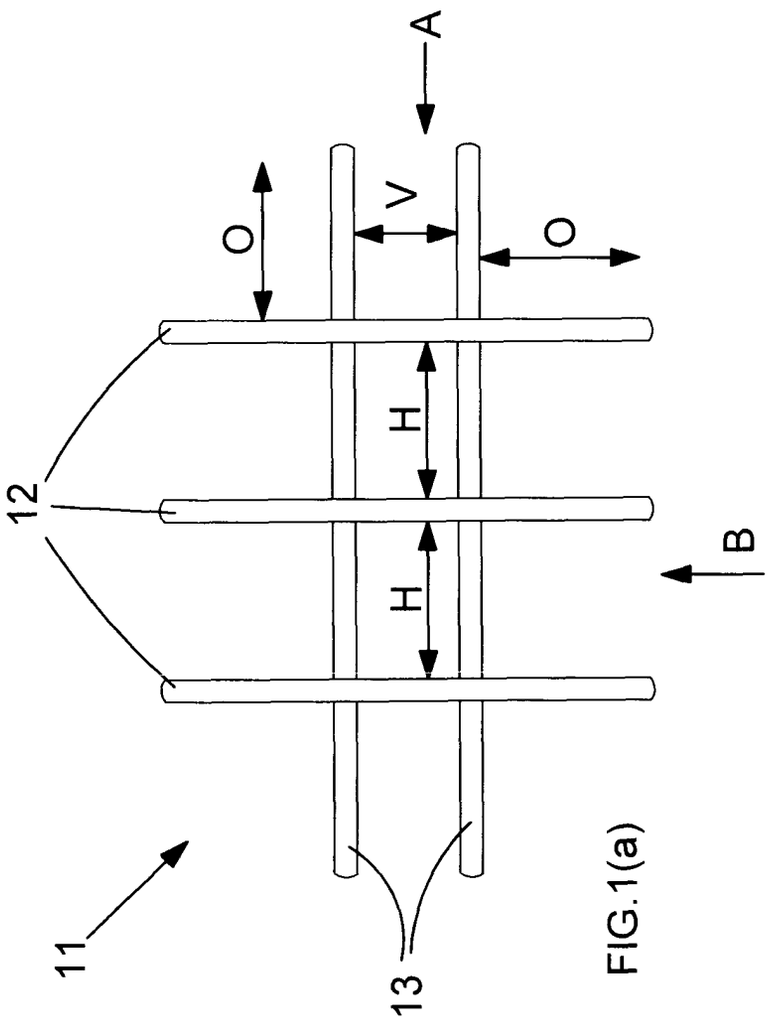

FIG.1(a)

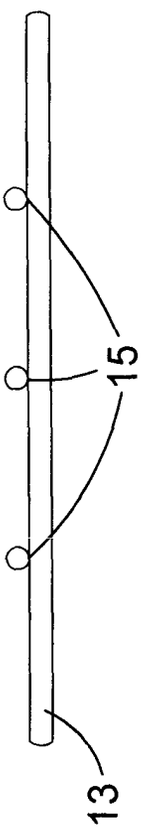

FIG.1(c)

FIG.2(e)

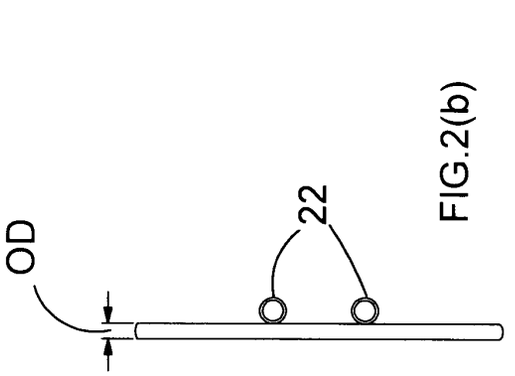

FIG.2(b)

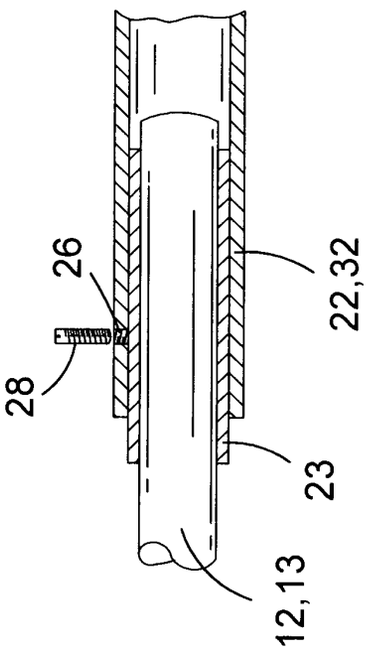

FIG.2(d)

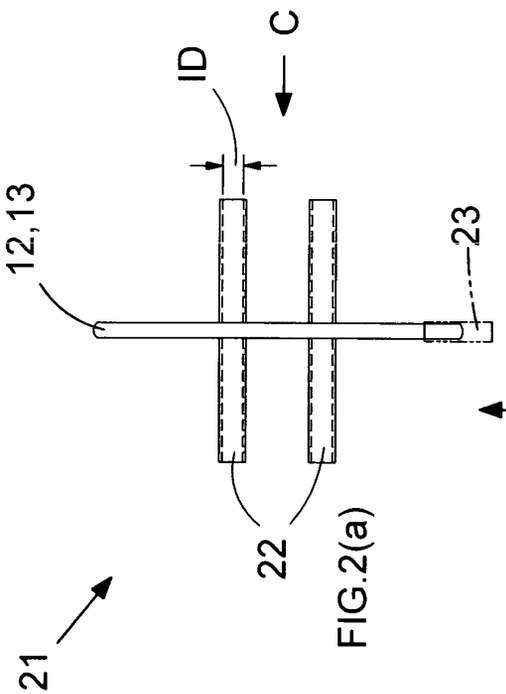

FIG.2(a)

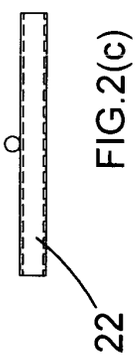

FIG.2(c)

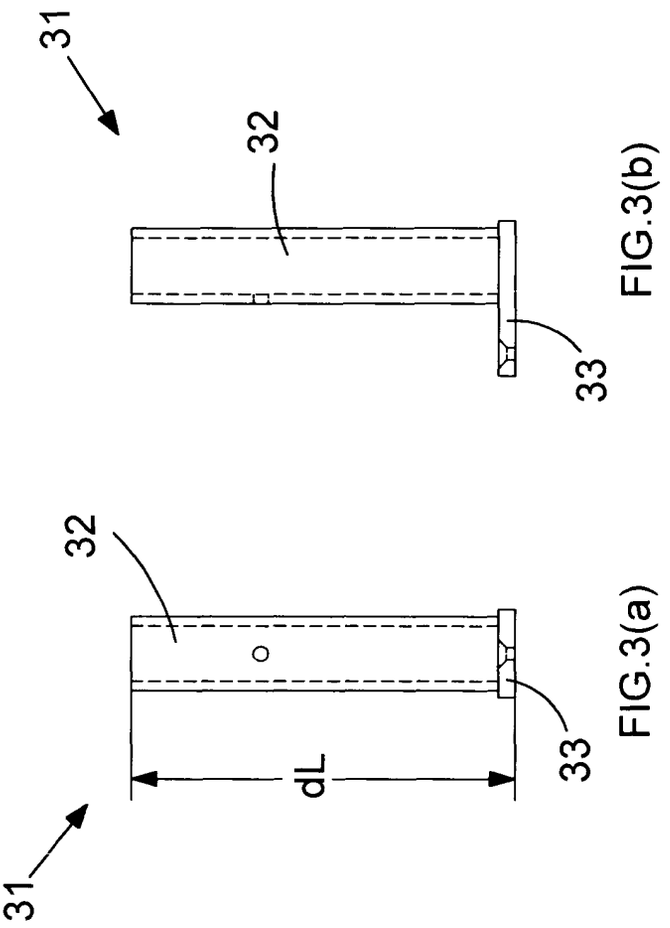

FIG.3(b)

FIG.3(a)

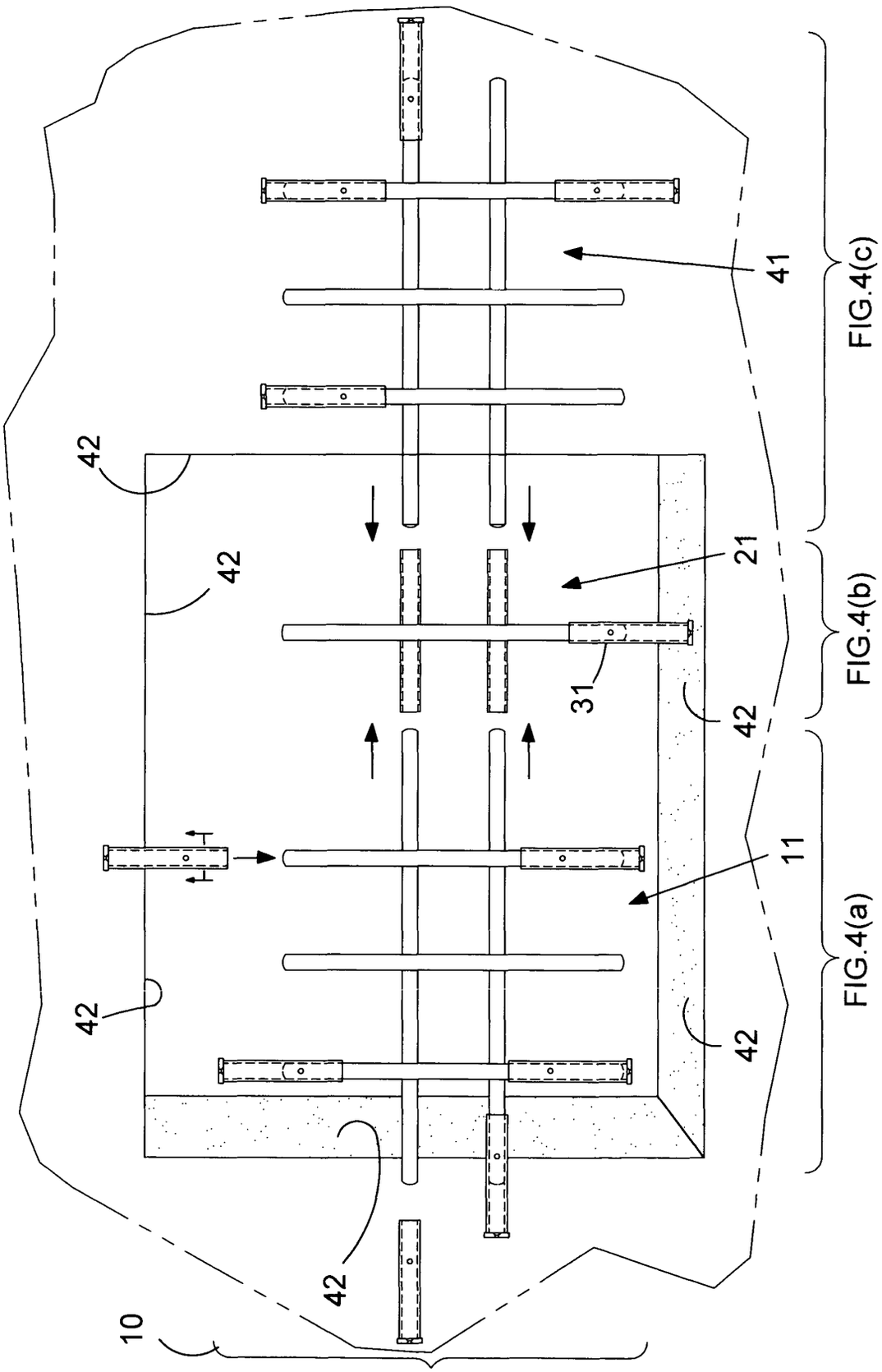
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FIG.4(c)
FIG.4(b)
FIG.4(a)

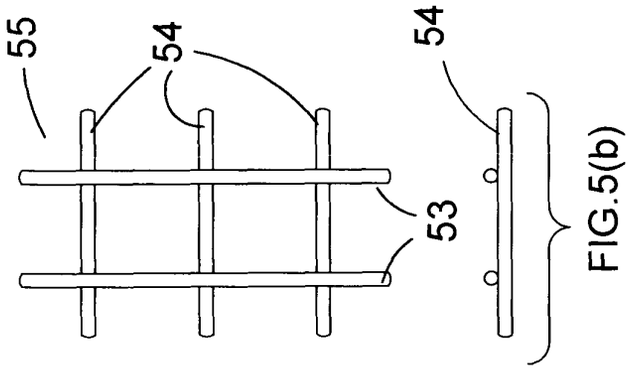


FIG.5(b)

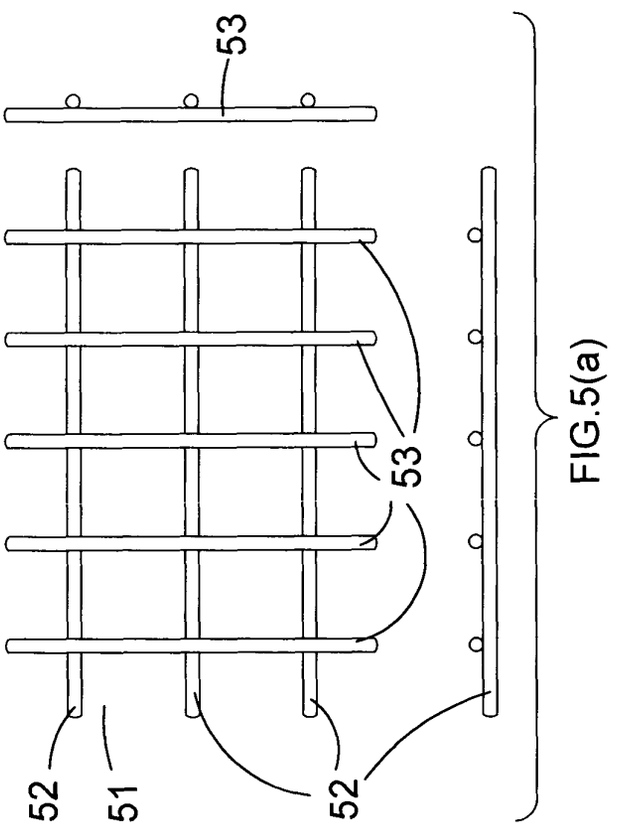


FIG.5(a)

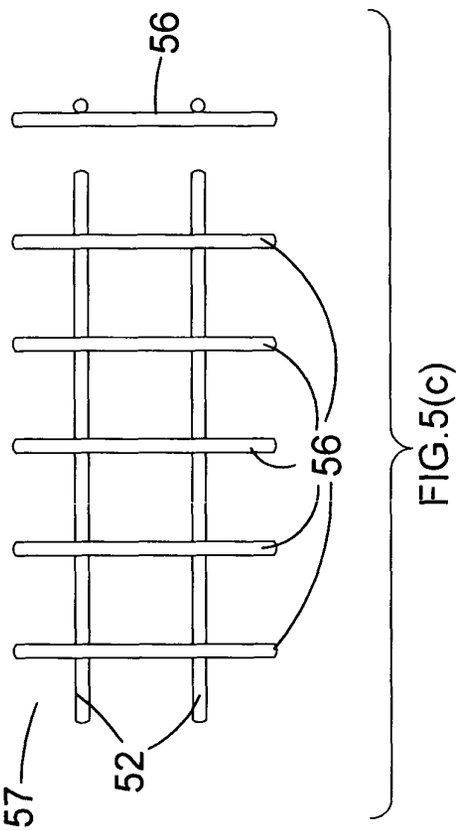


FIG.5(c)

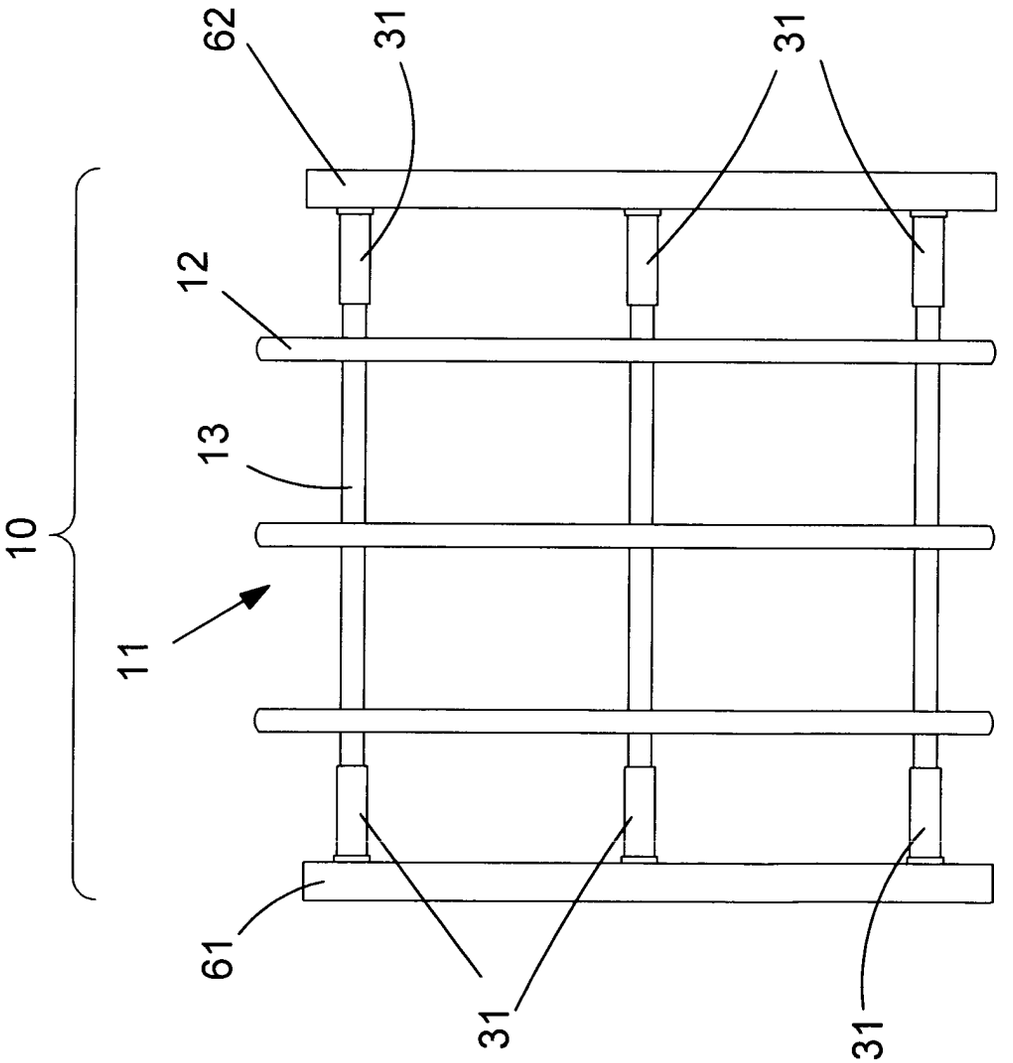
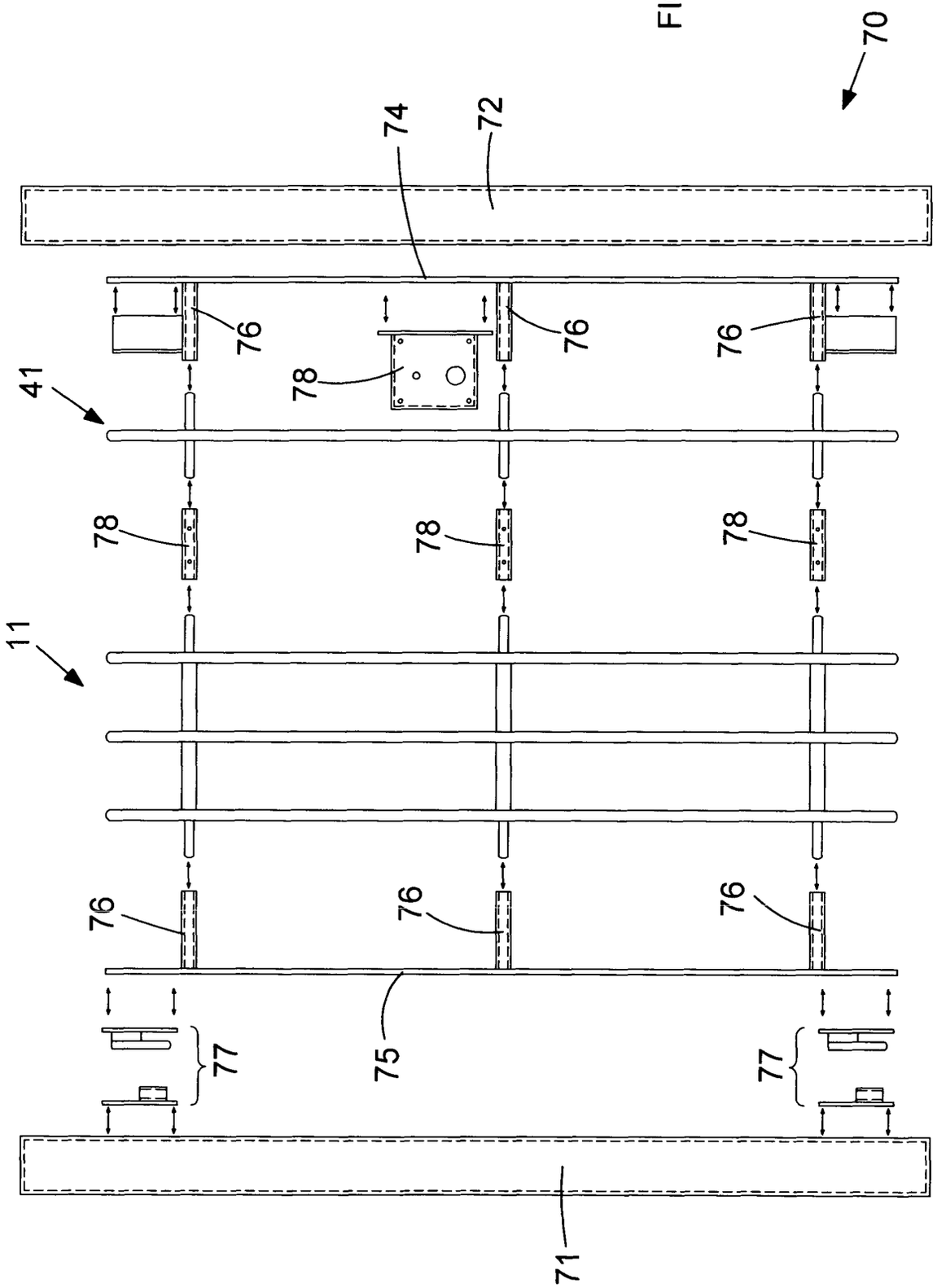


FIG.6

FIG.7



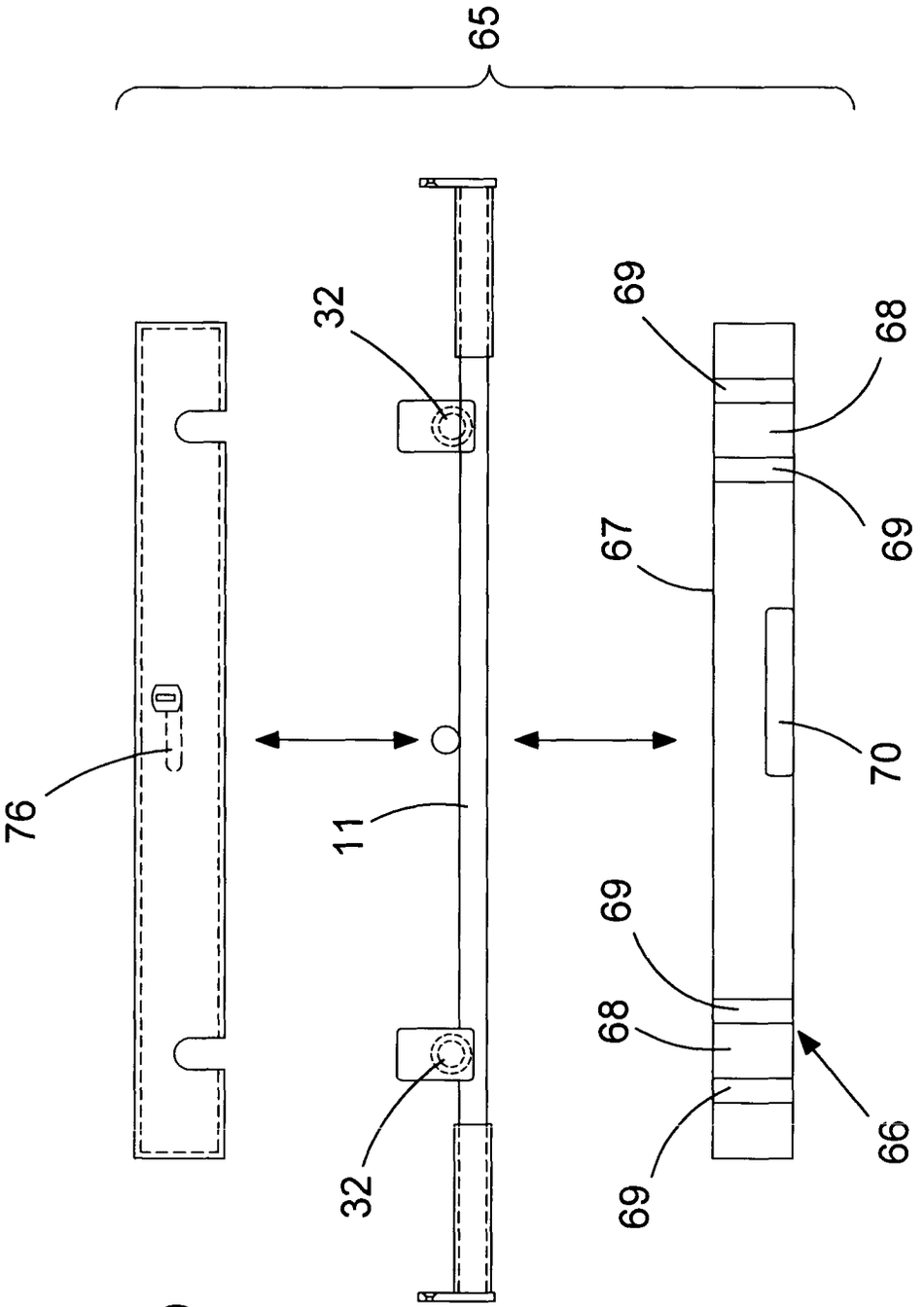


FIG.9

FIG.8