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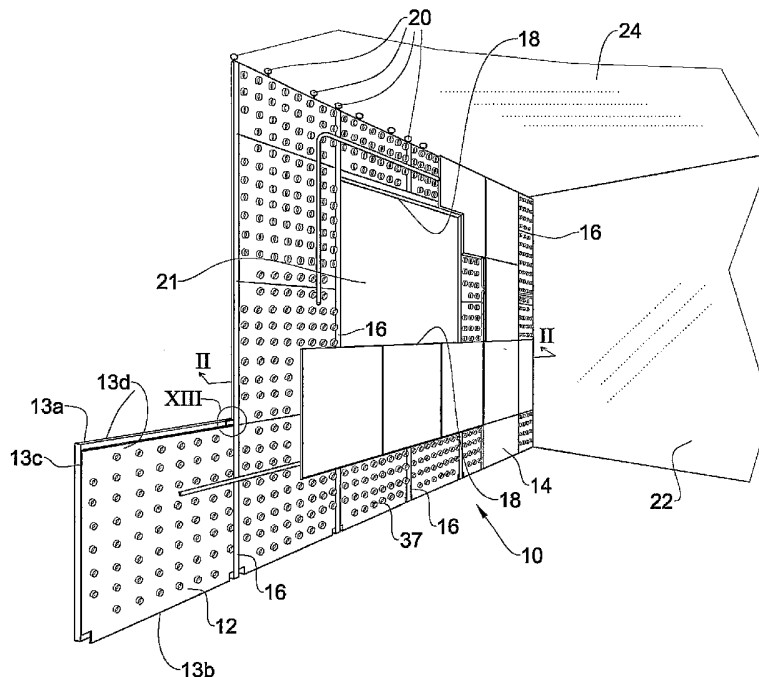
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(54) Title: MODULAR SPACE DIVIDING SYSTEM



(57) Abstract: A modular space dividing system comprising at least one panel comprising two parallel surfaces and at least one cover-plate adapted to be connectable to the at least one panel. The at least one cover-plate is detachably mountable to the at least one panel and spaced apart therefrom by a distance defined by connecting members whereby an interstice is formed providing a raceway for conduits

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MODULAR SPACE DIVIDING SYSTEM

FIELD OF THE INVENTION

The present invention is in the field of space dividing systems and more particularly it relates to modular wall panels and partition systems.

BACKGROUND OF THE INVENTION

Effective planning and layout of space is an important aspect of a functional work or activities area. When the occupancy of a space changes, often the layout of the space needs to change to suit the needs of the new tenants, workgroup, or function.

Temporary partitions are commonly used to effect such changes, for example, to subdivide an open room into individual workspaces. These partitions are easier to install than gypsum walls. They also may be designed to coordinate with other furniture components to define an equipped workstation, and can be moved easily to new office locations. However, due to their temporary nature, they do not provide traditional closed offices; rather, they provide an open workspace without sound attenuation or separation of heating, ventilation, and air conditioning (HVAC), electrical, lighting and other physical support services between workstations.

Modular space dividing systems offer solutions for the above issues, generally providing prefabricated segments that may be assembled onsite to form walls, doors, windows, furniture systems, and the like. Additionally, these systems can typically be deconstructed in such a way that the segments are reusable for other construction. Modular space dividing systems typically provide raceways for placement of conduits, including piping, electric utilities, and other pathways for utility services. Hereinafter in the specification and

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claims, the general term "*conduit*" will be used to refer to any of the above mentioned pathways.

Examples of such systems are described in US 3,927,498, US 5,056,285, US 5,809,708, and EP 1,245,750. US 3,927,498 discloses a space partitioning system utilizing prefabricated elements constituting a framework and consisting essentially of tubular main posts and small posts, and trussed beams supported thereby. The floor and ceiling structures comprise trough-shaped elements and/or flanged tubs bolted to the posts. The walls are formed by composite hollow panel structures filled with insulating material. All the components, including door and window frames, have modular dimensions and are prefabricated and adapted to be assembled at the building site.

US 5,056,285 discloses a partition wall comprising a frame having a number of vertical uprights and crosspieces, and covered on both faces by a number of panels, whereby the vertical uprights are formed from a bent sheet metal section with clinched lateral edges defining a hollow, substantially rectangular central portion and two opposed, substantially C-shaped lateral portions with turned-in ends.

US 5,809,708 discloses integrated prefabricated structures for finishing or fitting-out open plan building spaces. The structure comprises three wall systems: a demountable architectural wall system which covers the fixed walls of the building room, a portable partition wall system defining the interior space into individual work settings, and a demountable movable wall system forming custom width partitions. The three wall systems are completely compatible and fully integrated in function and appearance, and provide utility raceways at common heights, as well as interchangeable cover panels. A modular column cover system selectively covers the support columns in the building room, and provides vertical utility routing and storage that integrates with the raceways in the wall systems. Pre-assembled facades, a freestanding storage case system, a space frame system, a prefabricated low raised floor construction, a modular overhead link head system, and accessories are disclosed and are designed to be

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used anywhere throughout the system, and to serve to personalize the various individual work settings to accommodate specific users and tasks.

EP 1,245,750 discloses a modular construction and enclosure system with reusable panels to form partitions. The basic panels have a perimeter grooving occupied by a C-section joint arranged with the opening outwards, and can be lined on one or two of their faces with a decorative panel which, in turn, can be veneered with ceramic pieces or other materials. The joint is secured with clamps and a front section set. The partitions are attached by disks comprising a central stub which is inserted into the section. If the partitions are to be constructed on a non-level floor slab, a skirting board with leveling feet may be used. Coplanar panels are joined by pincers, and corner panels are joined with clamps or universal joints. The edges of the partitions are lined with ornamental sections. The electrical installation elements are arranged on support boards with dorsal grooves.

SUMMARY OF THE INVENTION

The present invention provides a space dividing system for the construction, covering, and decoration of partitions and a method for its construction. Hereinafter in the specification and claims, the general term "*partition*" will be used to refer to any partition, such as a wall, a ceiling, a floor, or the like.

The system according to the invention comprises a plurality of panels forming a wall or partition, each of the panels having two parallel planar faces and a connecting arrangement for securing thereto cover-plates leaving there between an interstice useful as a raceway for conduits and the like.

The cover-plates include an inner face attachable to the planar faces of the panels. Typically, the cover-plates are easily detachably connectable to the planar faces of the panels by way of engaging corresponding connecting members to each other, whereby the panel and cover-plate are spaced apart from one another to form the interstice.

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To facilitate simple and fast adjacent/detachment of the cover-plates from the panels, there are provided connecting members, which may be of any type, such as male/female connectors, bolts, rivets, hooks, hook and pile fasteners (VelcroTM), etc. or a combination of fasteners.

According to some embodiments, the connecting members serve as spacers for giving rise to the interstice between the panels and the cover-plates. Thus, the connecting members may assume different sizes to correspond with different interstice sizes, as may be required for different conduits.

The cover-plate has an outer face oriented away from the partition and which may be adapted for ornamentation. The ornamentation may be pre-formed, or may be applied at any time thereafter.

According to one particular aspect of the present invention, there is provided a wall covering system, for applying over existing walls, e.g. for obtaining an eye-pleasing effect. The system comprises cover-plates attachable at their inner face to the existing wall's faces. The cover-plates are detachably connectable to the walls by connecting members as discussed above, whereby the panel and cover-plate are spaced apart from one another to form the interstice.

The system may further include vertical support columns and horizontal beams for providing the structure rigidity. They are also useful for forming openings for doors, windows, and the like.

A further aspect of the invention, is a method for construction of partitions and planer structures, the method comprises attaching panels in an installed position to form a planar structure, and attaching cover-plates on surfaces of the planar structure, forming an interstice there between, providing a raceway for conduits.

The planar structures may be attached to each other to form various more complex structures.

The space dividing system of the present invention may be assembled substantially without the use of tools, causing only minimal damage to the existing walls, ceilings, and floors, and without leaving excess waste that needs

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to be discarded. It may be assembled on finished floors or carpeting, and disassembled and reassembled many times without substantial wear and tear thereto. The raceways are formed in such a way so that conduits may be placed in almost any location and position, and may be easily moved. The cover-panels are easily detachable for servicing the conduits and may be changed, making redecorating a room a simple task not requiring a professional.

The space dividing system may also be used as a veneer or cover for an existing wall, by constructing it adjacent thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which:

Fig. 1A is a perspective view of a partially constructed space dividing system according to the present invention;

Fig. 1B is a section of the space dividing system of the present invention taken along line II-II in Fig. 1A;

Fig. 2 is a similar view as of Fig. 1, illustrating an alternative embodiment of the space dividing system of the present invention;

Fig. 3 is a front view of a wall constructed according to the embodiment shown in Fig. 2, without the cover-plates;

Fig. 4 is an exploded perspective view of a panel according to an embodiment of the present invention;

Fig. 5 is a rear perspective view of a cover-plate for use in conjunction with a panel as in Fig. 4;

Fig. 6 is a schematic sectioned view of a portion of a wall according to a modification of the invention;

Fig. 7 is a perspective view of the top of a panel of the space dividing system of Fig. 1A;

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Fig. 8 is an enlargement of portion XIII in Fig. 1A, showing a fastening arrangement for assembling components of the space dividing system;

Figs. 9A, 9B and 9C illustrate securing arrangements of the space dividing system, wherein:

Fig. 9A is a perspective view of a securing arrangement using clips; and

Figs. 9B and 9C are side views of connecting arrangements incorporated into connecting members;

Figs. 10A and 10B are plan sectioned views of arrangements for connecting paneled walls of the space division system to form a corner or intersection, respectively; and

Fig. 11 is a partial perspective view of the side of a wall according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1A illustrates a partially constructed modular space dividing wall system or wall, generally designated **10**, according to an embodiment of the present invention. The wall **10** may be full-height or partial-height, and may be used to subdivide an existing space, cover an existing wall **22**, or construct a new space. The space may be fully or partially enclosed, and it may be indoors or outdoors.

The wall **10** comprises panels **12**, each having a top edge **13a**, a bottom edge **13b**, two side edges **13c**, and two faces **13d**. The panels **12** may be of any suitable material, but ideally are composed of a polymeric substance, such as high density polyethylene (plastic), reinforced plastic, polycarbonate, PVC, and the like. The panels **12** may optionally be composed of a flame-retardant or recyclable material.

The panels **12** are connected to form a vertical stack **19**, which can be attached one to another to form the modular wall **10**, and the modular wall **10** can be attached to the existing wall **22**. The top edge **13a** of each panel **12** is adapted to interlock (e.g., by a male/female arrangement) with the bottom edge **13b** of the

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panel above it. Panels 12 are arranged thusly atop one another, forming the vertical stack 19. Additional vertical stacks 19 may be added to form the wall 10, until a desired wall length is achieved.

The vertical stack 19 may be attached to the vertical columns 16, which provide support for the wall 10. Alternatively, the stack 19 may be assembled in a staggered fashion as shown in Fig. 3. For this purpose, the side edges 13c of the panels 12 are adapted to interlock with edges of the columns 16.

The wall 10 further comprises cover-plates 14 attached to the panels 12, vertical columns 16, horizontal beams 18, and extension members 20 which are attached to the panels 12, vertical columns 16, and/or horizontal beams 18. The vertical columns 16 may be attached to the existing wall 22.

An important feature of the invention can be seen also in Fig. 1B, in which additional elements of the system are seen. Spacing or connecting members 37 form interstices 23 between the panels 12 and the cover-plates 14 giving rise to a raceway suitable for introducing various conduits e.g. electric and telecom wiring, sanitary piping, etc. The side edges 13c of the panels 12 have arrangements 15 whereby panels 12 may be interconnected with elements, such as other panels 12 or vertical columns 16.

According to one particular embodiment, the side edges 13c are adapted to interconnect with the columns 16, and the top edges 13a of the panels 12 are adapted to interconnect with the bottom edges 13b of other panels 12. Top edges 13a and bottom edges 13b are adapted to interconnect with horizontal beams 18. All of the aforementioned interconnections may be accomplished with the use of male/female connections, or the like.

Fig. 2 shows an additional embodiment of the wall 10 (not illustrating the cover-plates), wherein the panels 12 are interconnected directly to one another without the vertical columns 16 therebetween. A staggered arrangement of panels 12, as seen in Fig. 3, provides stability for the wall. This staggered arrangement can also be used for the embodiment shown in Figs. 1A and 1B.

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The space dividing system may include openings **21**, e.g., windows, doors, and the like. For this purpose, the openings **21** are typically, though not necessary, defined above and below by horizontal beams **18**. In the case of an opening which abuts the floor or ceiling, the opening may be defined at the top or bottom, respectively, without a horizontal member **18**.

The horizontal beams **18** are attachable (e.g., snappably, slideably, or by a coupling or connecting element) at their ends to a vertical column **16** and along their length to a panel **12**, or vice versa.

Fig. 4 shows an exploded view of the panel **12**, which comprises an outer frame **34**, which may be constructed of more than one piece, and an inner core **36**. The inner core **36** is typically made of a material which provides thermal insulation and acoustic attenuation, such as polyurethane. This may be in the form of boards of material, a sprayed layer, rigid foam, or an insulation blanket. Projecting from the faces **13d** of the panel **12** are the connecting members **37**, which also act as spacers. They may be integral to the panel **12** or detachably fastened thereto. The connecting members **37** may be sized to allow a standard electrical outlet, electrical switch, telephone jack, or the like, to be incorporated into the wall **10**. The panel may be *a priori* compacted and sandwiched together or may be assembled onsite, with the inner core **36** selected and introduced according to particular requirements.

Fig. 5 shows further details of a cover-plates **14** of the present invention, wherein it comprise receiving members **38**, adapted to mate with the connecting members **37** of the panel **12**. The connecting members **37** keep the cover-plates **14** at a distance so that an interstice **23** is formed, providing raceways for running conduits **30** (Fig. 9A). These conduits **30** may include electrical, telephone, or communications wiring, piping, heating, ventilation, and air conditioning services, and other utilities. Providing raceways in such a manner allows conduits **30** to be placed at any height along the wall, and to follow virtually any desired path therein.

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An outer surface **40** of the cover-plate **14** may comprise a decorative face, and may, for example, be preformed with an aesthetic pattern or texture, or may be adapted to receive a wall covering, such as a decal, an ornament, or a liquid pigment coating such as paint.

It is appreciated that the size of the cover-plates typically corresponds with that of the panels, though they may both be made of material easily re-sized onsite, e.g. by using a jigsaw or other suitable tool. To facilitate this, the panel **12** is formed with pairs of projecting parallel strips **42**, each pair forming between them a groove **44** (Fig. 11). The pairs of strips **42** extend along the faces **13d** of the panel, typically in a grid formation, forming thereby scoring mark useful as a guide for cutting. It should be noted that the panel **12** is adapted to be cut anywhere; the strips **42** only act as guides in places where a panel **12** is likely to be cut.

Fig. 6 shows an option whereby a larger raceway can be formed, wherein an expansion connecting member **37a** is added intermediate to the panels **12** and the cover-plates **14** forming a larger interstice **39**, thereby providing a larger raceway. The connecting members **37** or the receiving members **38**, or both, may be integral to the panel **12** or the cover-plate **14** or may be removable (e.g., replaceable by connecting members **37** of a different size or shape, allowing for a space for larger or several conduits, and/or electrical outlets, etc.).

With further reference to Fig. 7, the wall **10** may comprise extension members **20** at the top edges **13a** of the topmost panels **12** of the wall **10**, for allowing the wall **10** to interface with an existing ceiling **24**. These extension members **20** are attachable to the top of a panel **12**, vertical column **16**, or horizontal beam **18**, and typically have a flat surface **26** for bearing against a ceiling (or floor) surface. They may be secured (e.g., by a screwing mechanism, pin and hole arrangement, etc.) directly to the panel **12**, the vertical column **16**, or the horizontal beam **18**, or to a mounting bracket **25** attached to any of these.

During construction, the wall **10** is assembled until the top edges **13a** of the topmost panels **12** are relatively close to the ceiling **24**. The extension

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members **20** are then adjusted (e.g., by unscrewing, being outwardly snapped, etc.), extending them until the flat surface **26** snugly engages the ceiling **24**, rigidly fixing the wall **10** or vertical column **16** between the floor and the ceiling **24**. Alternatively, the extension members **20** may be located at the bottom of the wall adjacent the floor or at the side of the wall **10** adjacent the existing wall **22** or another wall **10** (not shown).

Fig. 8 illustrates how a vertical column **16** and a horizontal beam **18** may be attached to each other by a fastening member **32**. A window or door assembly (not shown), or other appropriate fixture, may be fitted within the opening **21** thus formed.

Fig. 9A shows how the conduits **30** may be placed and secured to the panels **12** of the wall **10**. According to one embodiment of the present invention, at least one face **13d** of at least one of the panels **12** comprises apertures **27**, adapted to receive a fastening element, such as a snap-type clip **28**. Such clips **28** are adapted to receive conduits **30** and maintain their position in the interstices **23** between the panel **12** and the cover plate **14**, and they may be added as needed and may be relocated if conduits **30** are to be moved. The clips may also be integrated with the panels and according to another embodiment may be formed on an inner face of the cover-plate.

The connecting members **37** may additionally be adapted to support the conduits **30**. Fig. 9B shows another example of a connecting member **37a**, having an indentation **31** formed therein, providing a seat for the conduit **30**. Fig. 9C shows yet another example of a connecting member **37b**, comprising a clasp **35** adapted for holding the conduit **30**. The clasp **35** may be integrally formed with the connecting member **37b**, or may be adapted to be attached thereto.

Figs. 10A and 10B show exemplary connections between walls **10** to form corners, intersections, wall joints, and the like. Fig. 10A shows a vertical column **16a** adapted to hold two vertical panels **12** together, for example at a right angle, as seen in the figure. However, it should be understood that columns **16a** could be adapted for holding walls **10** together at various angles. This is useful, for

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example, in outdoor applications where there is no existing wall, and an outer boundary of an enclosed space needs to be defined by a self-supporting wall **10**.

Fig. 10B shows a variation of the arrangement in Fig. 10A, wherein there is a vertical column **16b** adapted to hold more than two walls **10** together, shown here in a cross pattern. While the figure illustrates four walls, it should be understood that the column **16b** could be adapted to hold any number of walls **10** at various angles, and that one or more of the walls may be omitted.

Those skilled in the art to which this invention pertains will readily appreciate that numerous changes, variations and modifications can be made. For example, the space dividing system of the present invention can be used to form a ceiling, closets or other storage spaces, shelves, bars, etc., without departing from the scope of the invention *mutatis mutandis*.

CLAIMS

1. A modular space dividing system comprising at least one panel comprising two parallel surfaces and at least one cover-plate adapted to be connectable to said at least one panel, wherein said at least one cover-plate is detachably mountable to said at least one panel and spaced apart therefrom by a distance defined by connecting members whereby an interstice is formed, said interstice providing a raceway for conduits.
2. A system according to claim 1, wherein at least one of an inner face of the cover-plate and an outside face of the panel are fitted with a connecting member for detachable connection there between.
3. A system according to claim 1, wherein a first connecting member extends from an outside face of the panel and a second connecting member extends from an inside face of the cover-plate, wherein said first and second connecting member are detachably attachable to one another.
4. A system according to claim 3, further comprising one or more expansion connecting members, intermediate the first connecting member and the second connecting member.
5. A system according to claim 1, further comprising at least one fastening element adapted for receiving and holding the conduits.
6. A system according to claim 5, wherein the fastening elements are integral with or attachable to one of the panel and the cover-plate.
7. A system according to claim 5, wherein at least some of the connecting members are adapted to support the conduits.
8. A system according to claim 1, wherein a plurality of panels are attachable to one another to form a partition.
9. A system according to claim 8, wherein the panels are snappingly attachable to one another.

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10. A system according to claim 1, wherein the panels comprise a core layer intermediate to the two parallel surfaces, said core layer being made of a thermally insulating and/or acoustically attenuating material.
11. A system according to claim 1, comprising an arrangement for fixedly extending the system between an existing floor and ceiling, or existing walls.
12. A system according to claim 1, further comprising vertical columns extending at least the height of two panels in an assembled position, said vertical columns being attachable to the panels.
13. A system according to claim 12, wherein the vertical columns are attachable to panels from two or more sides.
14. A system according to claim 12, wherein the vertical columns are attachable to at least one panel at a first side, and attachable to an existing wall at a second side.
15. A system according to claim 1, further comprising at least one horizontal member, attachable at both ends to at least one component of the system, said horizontal members being further attachable along its length to the at least one component of the system, wherein the component is one of a panel or a column.
16. A panel for construction of modular space dividing system, said panel comprising two parallel surfaces and a core layer intermediate to the two parallel surfaces, with connecting members for detachably attaching thereto cover-plates.
17. A panel according to claim 16, further comprising at least one fastening element adapted for receiving and holding conduits.
18. A panel according to claim 16, wherein the panels are snappingly attachable to one another.
19. A panel according to claim 16, wherein one or more side edges of panel are fitted with attachments for interconnecting to neighboring panels.
20. A panel according to claim 16, wherein one or more side edges of panel are fitted with attachments for interlocking with support columns and beams.
21. A cover-plate in combination one or more panels and being attachable thereto, the cover-plate having an outer face adaptable for ornamentation.

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22. A cover-plate according to claim 21, wherein the outer face is adapted to receive a wall covering.
23. A cover-plate according to claim 22, wherein the covering is one of a decal, an ornament, and a liquid pigment coating.
24. A cover-plate according to claim 22, comprising connecting members for detachably attaching to panels of a partition.
25. A method for constructing a modular space dividing system comprising:
- (a) providing panels adapted to be attached one to another at their edges, flush with one another;
 - (b) attaching the edges of said panels one to another to form a planar structure;
 - (c) providing cover-plates adapted to be attached to the planar structure; and
 - (d) attaching cover-plates to the planar structure via connecting members; said connecting members providing a distance between the panels and the cover-plates thereby forming an interstice between the planar structure and the cover-plates, providing a raceway for conduits.
26. A method according to claim 25, further comprising providing for thermal insulation and/or acoustic attenuation through the system.
27. A method according to claim 25, further comprising:
- (a) providing vertical support members adjacent at least some of the panels;
 - (b) attaching said vertical support members to the panels; and
 - (c) rigidly fixing the vertical support members between a floor and a ceiling.
28. A method according to claim 25, the method further comprising attaching at least one of the vertical support members to an existing wall.
29. A method according to claim 25, further comprising forming an opening in the system.
30. A method for covering a partition, the method comprising:

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- (a) providing a cover-plate, at least one surface of which is adapted for ornamentation; and
- (b) attaching said cover-plate to the partition, with said surface disposed away from the partition.

31. A modular space dividing system substantially as described herein and illustrated in the accompanying drawings.

32. A cover-plate for a partition substantially as described herein and illustrated in the accompanying drawings.

33. A method for constructing a modular space dividing system substantially as described herein and illustrated in the accompanying drawings.

34. A method for covering a partition substantially as described herein and illustrated in the accompanying drawings.

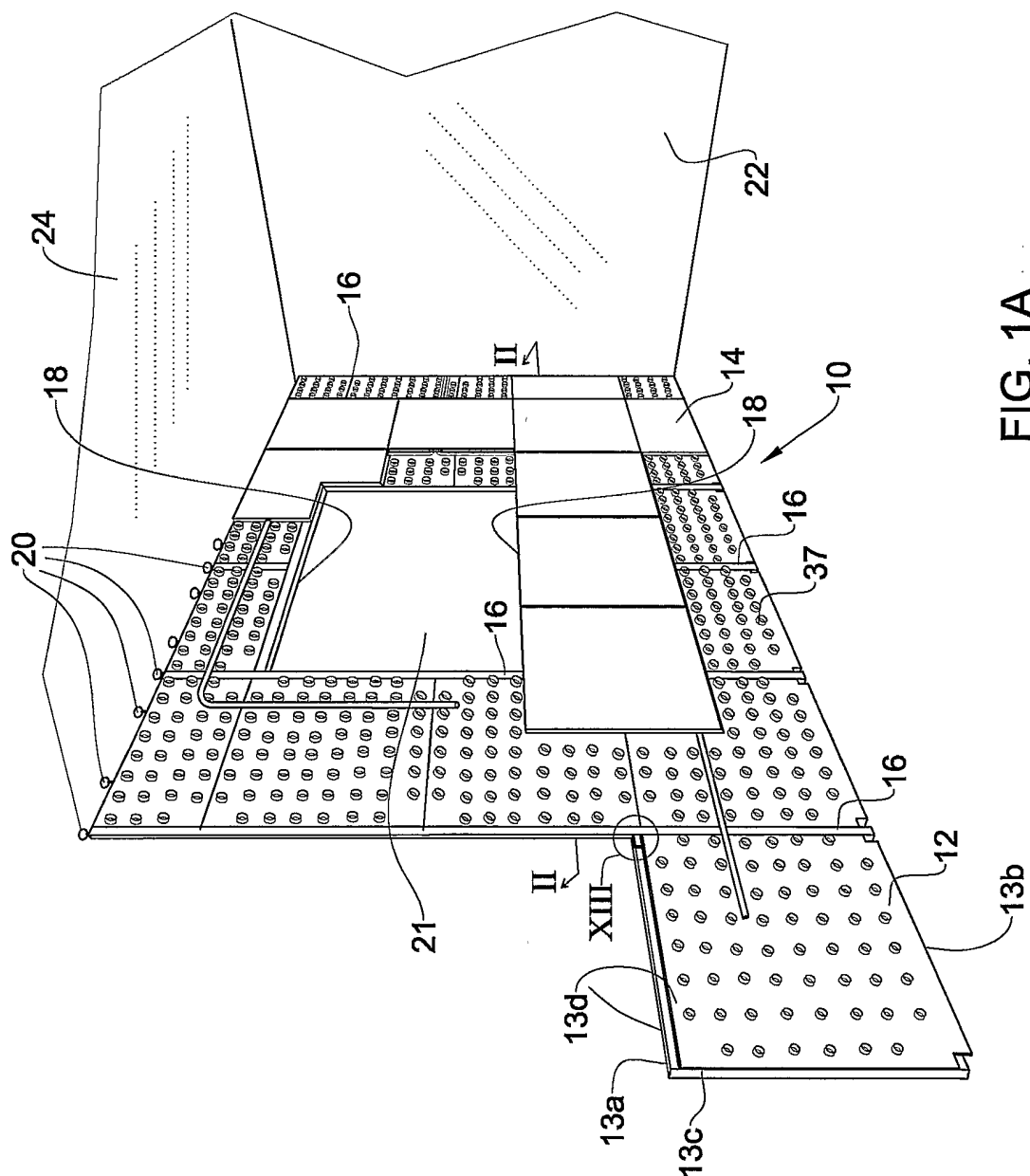
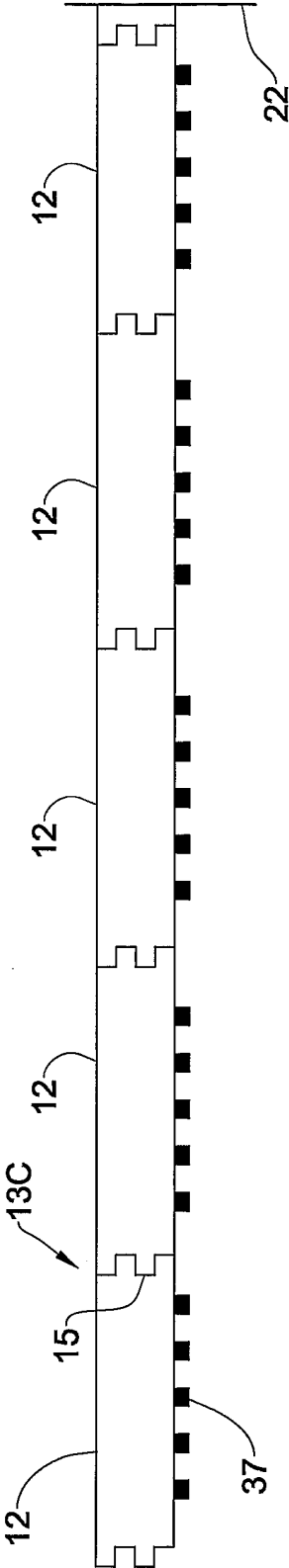
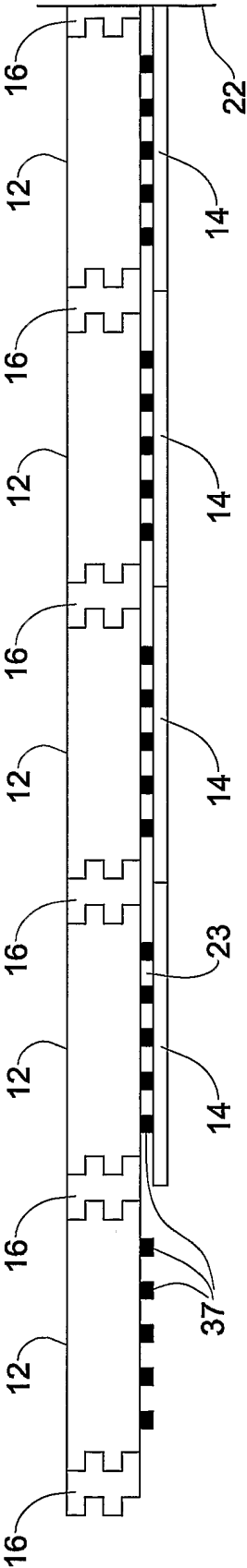


FIG. 1A



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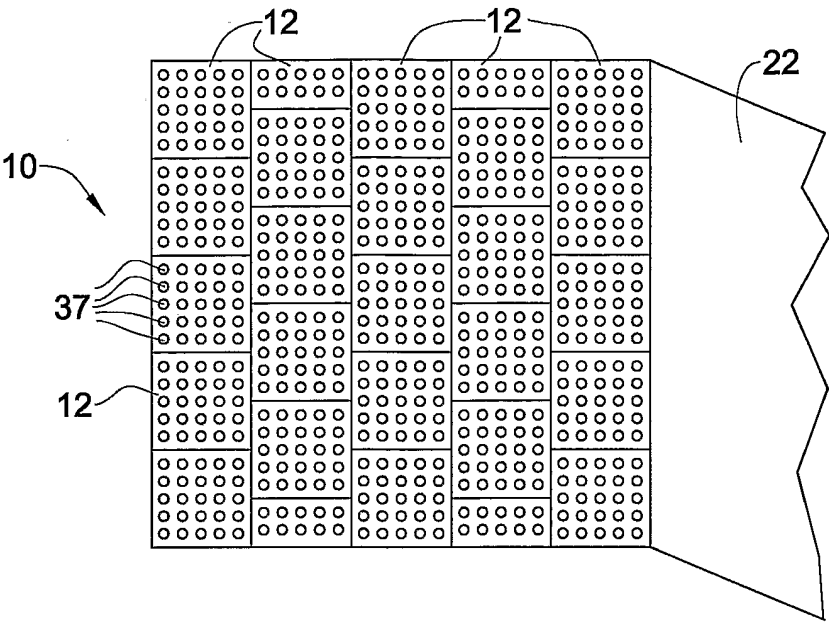


FIG. 3

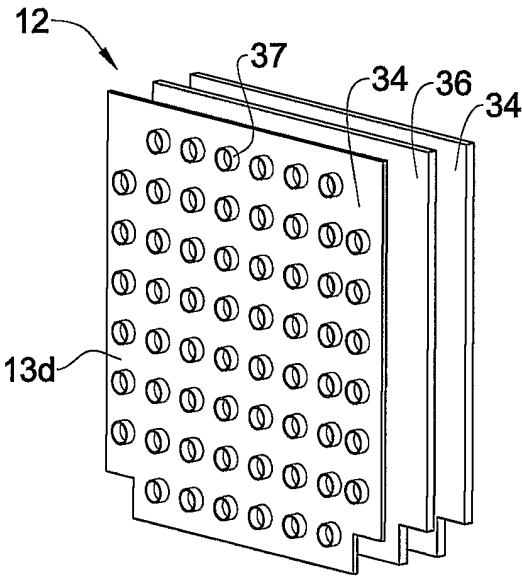


FIG. 4

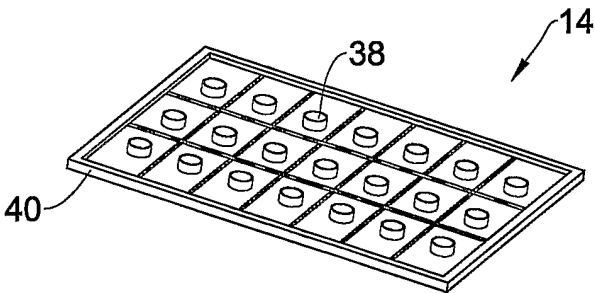


FIG. 5

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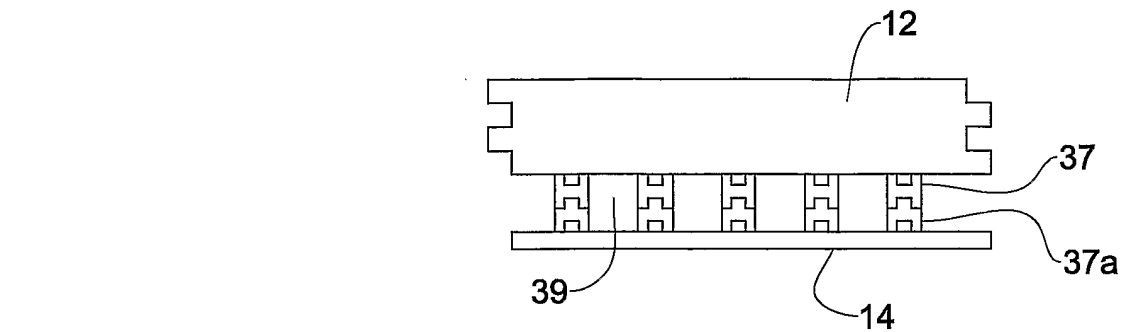


FIG. 6

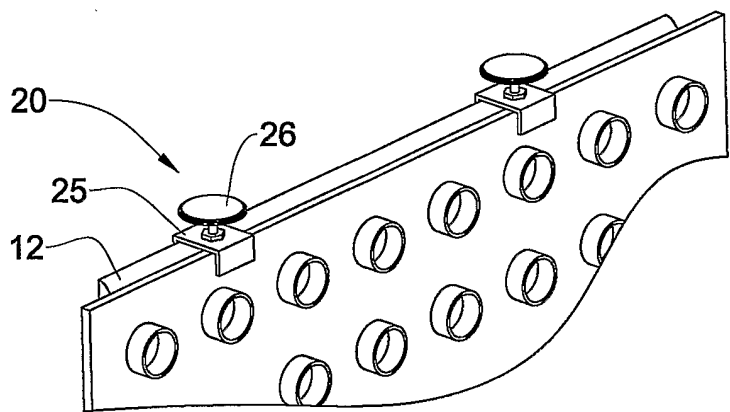


FIG. 7

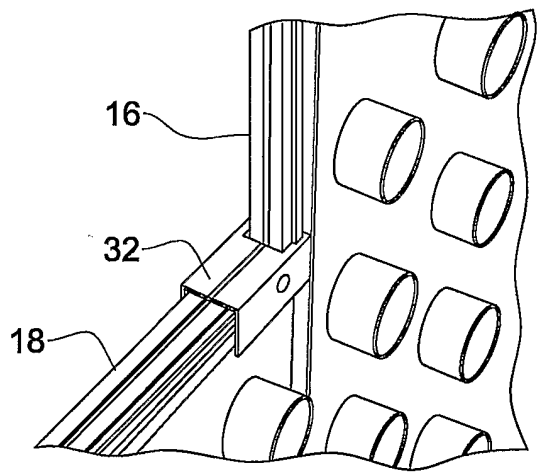


FIG. 8

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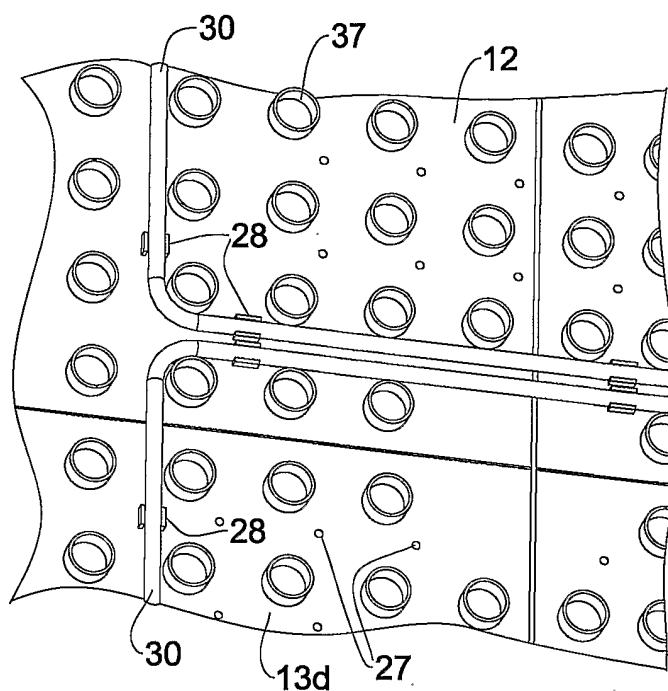


FIG. 9A

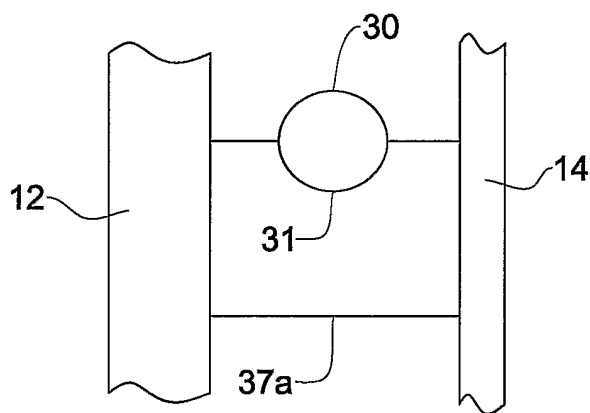


FIG. 9B

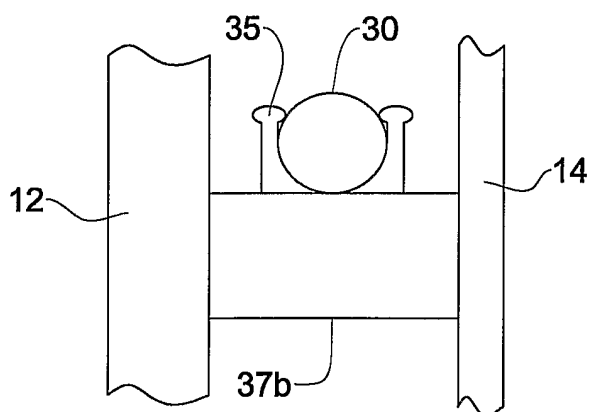


FIG. 9C

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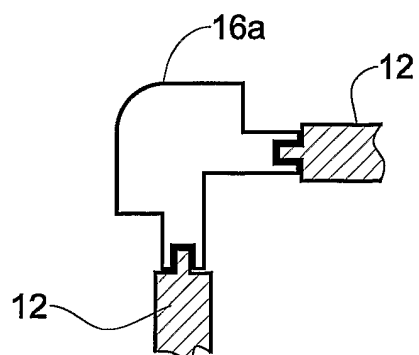


FIG. 10A

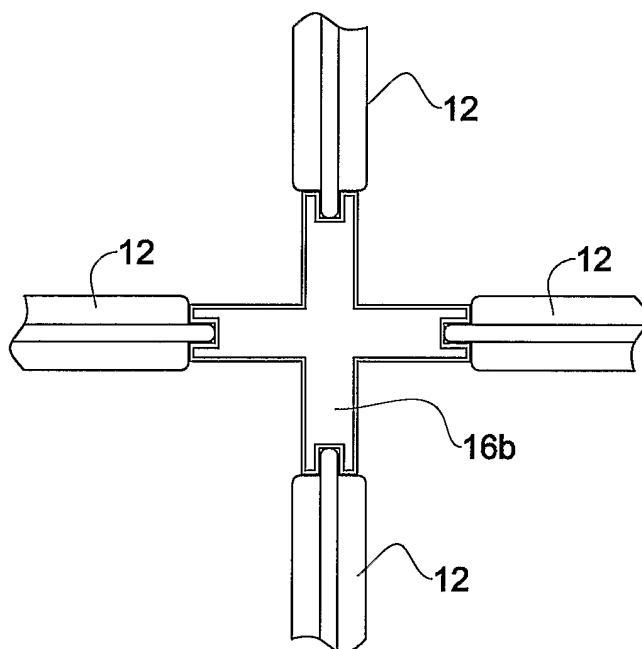


FIG. 10B

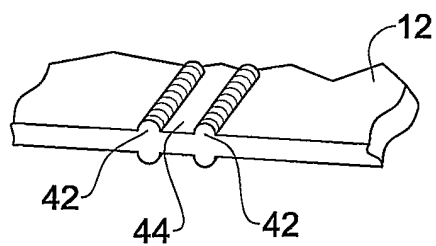


FIG. 11