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(54) **COLLAPSIBLE LIGHT-WEIGHT PERFORATED PARTITION**

ZUSAMMENKLAPPBARE LEICHTGEWICHTIGE PERFORIERTE TRENNWAND

CLOISON PERFORÉE LÉGÈRE POUVANT ÊTRE AFFAISSÉE

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Description

The Field of the Invention

[0001] Implementations of the present invention relate generally to systems, methods, and apparatus for partitioning an interior space.

Background and Relevant Art

[0002] Conventional room partitions range from permanent to temporary, and include any number of materials for facilitating the same. For example, permanent room partitions, such as a wall, often include some form of dry wall mounted to one or more studs, with an applied finish or treatment. Temporary partitions, on the other hand, range from movable or modular walls and panels, and, in some cases, flexible types of dividers that are temporarily or semi-permanently affixed to a wall, ceiling, or floor structure. In addition, some flexible dividers include curtains, as well as hanging, ornamental items such as beads, or the like. Additional types of flexible dividers include sliding or accordion-style partitions that can moved and fixed into one position, and subsequently returned and fixed in an original position.

[0003] Most of these types of materials, whether permanent or temporary, tend to present unique sets of challenges that make them difficult to use in every environment where a partition is desired. For example, many of the above-mentioned materials tend for use in permanent partitions to be heavy, and/or can require fairly elaborate installation procedures. By contrast, some of the more temporary partition materials, such as curtains, hanging beads, or the like, tend to use very flimsy materials that provide little in the way of a partitioning structure, and further tend to provide either too much privacy or too little privacy as a partition. Specifically, most of the aforementioned materials tend to be insufficient for use as a semi-private partition, which operates as a partition, but is only partly see-through, or partly insulating.

[0004] Some examples of materials that can be sometimes used for private or semi-private ends include window blinds, such as collapsible window blinds. In general, collapsible window blinds can be made of any type of material resin materials such as MYLAR, or other types of plastics. In addition, the material for these types of collapsible window blinds tends to be chosen primarily for light blocking and insulating effects. The material for these types of collapsible window blinds tends to be chosen primarily for light blocking and insulating effects. For example, collapsible window blinds often include a honeycomb-like structure (as viewed from the side, cross-section), such as flexible diamond shapes that are joined at the bottoms and tops by another diamond in a continuing chain. The materials and shape used in this type of collapsible window blind tends to provide a double insulating layer for trapping air as well as light.

[0005] Unfortunately, the design, standard sizes, and

overall shapes of such collapsible window blinds tend to make it impractical or impossible to use these types of materials as semi-private, or even decorative partitions for an interior or exterior room or other form of open space. In particular, decorations on such materials are usually limited to simple coloration or printing on the blind materials.

[0006] US 3,593,671 describes an expandable honeycomb structure, of corrugated paper board, suspended between a load and an adjacent surface in a freight carrier, to fill the space and prevent load shifting. Transverse rigid members in certain of the cells limits their horizontal contraction and prevents the honeycomb structure from sagging unduly.

[0007] GB 531,462 describes a blind comprising in combination two superposed pieces of pleated foldable material each having a plurality of parallel transverse strips arranged in a row extending from end to end of the blind with the pleats of one piece affixed to pleats of the other piece, one of which pieces is perforated to provide one or more longitudinal rows of holes extending in the direction of length of the blind. One of said pleated pieces has ventilating apertures formed in it by removing parts of its folds that lie space away from imperforate portions of the other piece.

BRIEF SUMMARY OF THE INVENTION

[0008] Implementations of the present invention solve one or more problems in the art with systems and apparatus that provide a semi-private partition, which has a wide range of decorative and functional capabilities. In at least one implementation, for example, a collapsible structure (e.g., honeycomb-style, or the like) can be manufactured with a sufficient width and length for use as a room divider or partition. In addition, a manufacturer can use one or more cutout apparatus to form one or more different patterns in the collapsible structure. When expanded, the cut-out shapes (formed via the cutout apparatus) provide an aesthetically pleasing design that can be used not only as a semi-private partition or divider, but also one that is easy to use, flexible, semi-structural, and light weight.

[0009] According to the present invention, there is provided a collapsible, semi-private partition or covering as defined in appended claim 1.

[0010] Furthermore, according to the present invention, there is provided a method of manufacturing a collapsible, semi-private partition as defined in appended claim 7.

[0011] In addition to the foregoing, there is provided a system as defined in appended claim 13.

[0012] Additional features and advantages of exemplary implementations of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by the practice of such exemplary implementations. The features and advantages of such implementations may be realized

and obtained by means of the instruments and combinations particularly pointed out in the appended claims. These and other features will become more fully apparent from the following description and appended claims, or may be learned by the practice of such exemplary implementations as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In order to describe the manner in which the above-recited and other advantages and features of the invention can be obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1A illustrates a side view of a single-cell partition in accordance with an implementation of the present invention;

Figure 1B illustrates a side perspective view of the single-cell partition shown in Figure 1A when in a collapsed state, and prior to being cut;

Figure 1C illustrates a plan view of a collapsed partition showing potential cutout lines using the cutout apparatus shown in Figure 1B;

Figure 1D illustrates a top view of one or more elongate cells in a partition after one or more cutout apparatus have been applied;

Figure 1E illustrates the collapsed, cutout elongate cells of Figure 1D when the manufacturer has affixed one or more mounting plates to a top and bottom portion thereof;

Figure 1F illustrates a side perspective view of the partition shown in Figure 1E when the elongate cells are in a collapsed state;

Figure 1G illustrates a side perspective view of the partition shown in Figures 1E-1F when the partition is partially expanded or folded out;

Figure 2A illustrates a front, facing view of the partition shown in Figures 1E-1G when in a fully expanded state;

Figure 2B illustrates another side perspective view of a plurality of elongate cells in a single-cell partition in accordance with an implementation of the present invention;

Figure 2C illustrates a side perspective, cross-sectional view of an alternate design of a partition in which a manufacturer has cut one or more squared lines into a unitary material, in accordance with an implementation of the present invention;

Figure 3A illustrates a side perspective, cross-sectional view still another design of a partition using a triple cell configuration in accordance with an imple-

mentation of the present invention; and

Figure 3B illustrates some of the flexibility properties of a partition in accordance with an implementation of the present invention, such as the partition shown in Figure 3A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] The present invention extends to systems and apparatus that provide a semi-private partition, which has a wide range of decorative and functional capabilities. In at least one implementation, for example, a collapsible structure (e.g., honeycomb-style, or the like) can be manufactured with a sufficient width and length for use as a room divider or partition. In addition, a manufacturer can use one or more cutout apparatus to form one or more different patterns in the collapsible structure. When expanded, the cut-out shapes (formed via the cutout apparatus) provide an aesthetically pleasing design that can be used not only as a semi-private partition or divider, but also one that is easy to use, flexible, semi-structural, and light weight.

[0015] Accordingly, and as will be appreciated more fully from the following specification and claims, a partition in accordance with an implementation of the present invention can be manufactured for a wide variety of aesthetic and functional concerns, and can be carried, moved, and installed in a wide variety of locations. In particular, the partitions described herein can be manufactured for use in any number of ceiling or wall applications, whether in indoor or outdoor environments, including any residential, commercial, or industrial environments. In addition, the partitions described herein can be configured primarily for aesthetic/decorative use, such as to apply a particular look, and/or texture to a wall, column, or lighting element/arrangement in an interior or exterior space, to project patterns, or even to act more functionally as a light diffuser (e.g., a three-dimensional textile used as a lamp shade).

[0016] Along these lines, the partitions described herein can also be manufactured for virtually any length or width as appropriate for a given room partition, from several inches tall or wide to several feet in height or width. In one implementation, for example, the partitions described herein can be manufactured or otherwise joined to heights and/or widths from about as high or wide as 15 feet, 30 feet, or even 50 feet. Furthermore, the partitions described herein can be made with any color, style, or thickness, and can be made with single or multiple layering, or the like for added aesthetic and functional concerns. Still further, the partitions herein can be formed with virtually any cutout shape or dimension to impart both a function and aesthetic to the partition.

[0017] Referring now to the Figures, Figure 1A illustrates a side view of a collapsible partition 100 in accordance with an implementation of the present invention. As shown, and as will be understood more fully herein, a

collapsible partition 100 can comprise a plurality of elongate cells 110 (whether single or multiple-cell configurations) that are joined together at various seams 103. These elongate cells 110 generally comprise hollow cell materials, which can be tubular, diamond, square, or virtually any other shape at the cross-section. For example, Figure 1A illustrates that the cells in the partition of Figure 1A are approximately ovular or circular in the expanded state. In additional or alternative implementations, however, the collapsible structure 100 alternatively comprises a unitary material that is folded along a series of horizontal seams, thereby forming a zig-zag style structure (e.g., Figure 2C) from the side or top view, as appropriate. Accordingly, one will appreciate that implementations of the present invention regarding cutting out portions of the collapsible partition apply equally to cell-type (or cell-in-cell) and unitary/zig-zag-type materials.

[0018] In either case, the material used in the collapsible partition 100 can comprise virtually any sufficiently flexible or collapsible material, such as paper (or paper-style materials), non-woven fabric, film materials, or even woven fabric. Other types of materials with which the partition can be made include resin materials such as MYLAR, flexible plastics, or other naturally occurring or synthetic materials such as polyester fiber and recycled polyester fiber, or the like. In addition, the fabric material can be chosen to have a quality of sheer, semi-sheer, opaque, or even semi-opaque (e.g., prior to creating perforations 120) appearance. The fabric material can also be chosen based on degree of translucence, and ability to transmit or block light between spaces in a partition. Furthermore, the chosen fabric or material can be combined with other materials in a particular configuration.

[0019] With particular respect to elongate cells, for example, the elongate cells can also be inserted within each other (i.e., cell-in-cell configuration), and even nested and/or bonded against each other to form any number of functional or aesthetic cross-sections, which include a set of single-cells, cells-within-cells, dual-cells, triple-cells, and so on. In general, the manufacturer can select the elongate cells (or tubes) based on any number of factors, including size and depth between seams 103 and pleats 105 along which the collapsible structure 100 will collapse, as well as the width and depth of the given cell. Furthermore, the manufacturer can select the number of elongate cells that are stacked vertically in order to result in a particular expanded size of a partition. In at least one implementation, for example, the manufacturer determines an appropriate number of elongate cells to create a partition that is at least 8 feet tall when expanded, and/or otherwise configured to span a ceiling-to-floor space.

[0020] As previously mentioned, however, the manufacturer can create a much longer or wider sheet or partition by adjoining additional elongate cells, or even adjoining partitions/sheets together. In one implementation, for example, the manufacturer cuts partitions or sheets (e.g., elongate cell or unitary material structure) to mul-

tiple 10 foot lengths. The manufacturer then prepares a glue line and seams two or more partitions or sheets together so as to appear as one piece. In at least one implementation, the manufacturer can make a partition, sheet, or other form of treatment that is anywhere from 15 feet long, to 30 feet long, or even as long as 50 feet long or longer. Such a partition can be used to simply partition a space, or even to treat an existing wall, floor, or ceiling structure. The sheet/partition (e.g., 100/100a/100b) can also be used to adorn another structure, rather than just a conventional ceiling, wall or floor.

[0021] In either case, when a user collapses the partition 100, each elongate cell 100 is generally configured to collapse at an approximate midpoint, thereby forming opposing pleats 105 on each cell 110. In general, each pleat can be thought to provide a mid point for an "upper portion" and a "lower portion" for each elongate cell. Thus, for example, one configuration of pleats 105 that are about 3/8" deep result from elongate cells 110 that are about 3/4" wide when collapsed. In additional or alternative configurations, the pleats 105 are configured to be anywhere from about 3/8" deep to about 1" deep (i.e., spaced apart from each other) or greater. This choice in pleat 105 depth applies not only to elongate tubes, but also to unitary materials that are simply folded along a zig-zag pattern (e.g., Figure 2B). Along these lines, Figure 1B illustrates a side perspective view of the collapsible structure 100 when in a collapsed state.

[0022] Upon selecting the particular materials and pleat/seam spacing, the manufacturer can then bond (e.g., glue, affix, secure, heat seal, tape, or apply vibration-style sonic bonding, etc.) the elongate cells together in a particular cross-sectional alignment with one or more next or adjacent elongate cells. The affixed or bonded elongate cells thus form a structure with a plurality of uniform, horizontal seams 103 at the affixed/bonded points. In general, the hollow elongate cells/tubes of the collapsible partition 100 are of such material, and are specifically positioned together, so that the entire structure 100 can be easily expanded and collapsed onto itself along the horizontal seams 103 and pleats 105 from top to bottom along virtually the same vertical axes (e.g., columns 115, Figure 2A), and for each horizontal length of elongate cell.

[0023] Figure 1A (as well as 1C, 1D, etc.) also shows that partition 100 can comprise a plurality of mounting plates 130 positioned at extreme edges of partition 100. In general, mounting plates 130 can be made from virtually any material, although typically from more rigid materials such as relatively rigid, inflexible plastics, metals, or composites thereof. In one implementation, each plate 130 is configured in size and shape to mount (permanently, semi-permanently, or temporarily) the partition 100 to a ceiling (e.g., vertical/drop-down layouts), wall (e.g., in horizontal/side-to-side layouts), floor, or other form of support structure. In most cases, the opposing plate 130 will not be mounted to two opposing surfaces, as such, but rather will be used to either weigh down the

collapsible structure (e.g., when stretched from a ceiling), or only temporarily mount or hold the partition at an opposing end. In other cases, such as with a horizontal layout, the partition is configured to be mounted or folded out to two vertically-standing support structures.

[0024] To create the various illustrated aesthetic and functional features of the semi-private structure (e.g., Figure 2A), a manufacturer can use one or more cutout apparatus 140. In at least one implementation, the cutout apparatus 140 comprises any one or more of a die-cut apparatus, saw, hole saw, laser cut apparatus, or water jet apparatus sufficient for cutting through the chosen material of the collapsible structure 100. In particular, and as understood more fully herein, the manufacturer uses the cutout apparatus 140 to impart a series of particular shapes (e.g., perforations 120, Figure 2A) in the collapsible structure, and ultimately in the partition 100. To this end, Figure 1B illustrates an implementation in which the manufacturer chooses the cutout apparatus 140 as an open-sided blade tool (e.g., 140, Figure 1B) that is pressed against the material with a pneumatic press. In additional or alternative implementations, the cutout apparatus 140 can comprise a closed tool such as a coring drill bit.

[0025] In any event, Figure 1B illustrates an implementation in which the manufacturer collapses the collapsible structure 100 so that each of the elongate cells 110 overlaps or collapses against a next adjacent elongate cell, and then positions half-circle cutout apparatus 140 at or about the seams 105 thereof (e.g., in a collapsed state). Of course, one will appreciate that the manufacturer can adjust and select the cutout apparatus 140 (or select alternate forms of the apparatus) in terms of size, shape, depth, width, or other form of design for both aesthetic as well as functional ends. At least some of the considerations that can drive these optimizations include the amount of light and/or sound that a designer will want to allow transmitted between partitioned spaces. One will appreciate that such optimizations can relate not only to the size, depth, and arrangement of each perforation, but also the shape and dispersion of a plurality of different perforations.

[0026] With respect to perforation shape, for example, the manufacturer might configure the cutout apparatus 140 so that it imparts any one or more of circular, diamond, heart, flower, square, oval, star, hexagonal, octagonal shapes, or the like in partition 100. In addition, the manufacturer might alternate different shapes along a horizontal length of the collapsible partition. For example, the manufacturer might choose to create a column of star shapes, then a column of circle shapes, following with another column of star shapes and so on. In additional or alternative implementations, the manufacturer might randomly disperse cutout apparatus shapes 140, as well as their positioning relative to center line 133, along the collapsed, collapsible partition in order to achieve any number of desired ends.

[0027] Specifically, the manufacturer might choose a

particular size of the cutout shape in order to allow a certain amount of light through the partition, or to insulate or release a select amount of air (hot or cold), sound, or the like through partition 100. Along these lines, and with further respect to perforation 120 size, the manufacturer may position the cutout apparatus relatively near the center 133 (on opposing sides of center 133) of the collapsed, collapsible structure 100 to create a relatively large perforation 120. By contrast, to create a smaller perforation 120, the manufacturer can position the cutout apparatus 140 relatively near the peripheral edge of pleat 105, and thus farther from the center line 133 of the collapsed, collapsible structure 100. In some cases, the manufacturer can even choose only to cutout one side of the collapsed structure. In such a case, the manufacturer may create a perforation that does not necessarily extend all the way through the given elongate cells, but nevertheless thins out the material for additional aesthetic or functional effects.

[0028] In either case, at least one implementation involves the manufacturer selecting the position of the cutout apparatus 140 relative to the collapsed, collapsible structure 100 to create hollow perforations 120 that are at least 1/4" in any or all dimensions. In another implementation, the manufacturer selects and positions the cutout apparatus 140 to create hollow perforations 120 that are at least 1.25" in diameter within a 1.5 inch" wide collapsible structure 100. In additional or alternative implementations, a manufacturer gauges how much material is removed as a percentage of the structure weight.

[0029] In one implementation, for example, the manufacturer can remove from about 10-80% (with about 90-10% remaining) of a collapsible partition, preferably from about 25-60% of material (with about 75-40% remaining). In still other implementations, the manufacturer selects the material, cutout, cutout depth, and cutout shape as a function of the amount of light, sound, or air intended to ultimately pass through the expanded collapsible structure 100, and ultimately the level of privacy (or lack thereof). For example, the manufacturer can determine an amount of light or sound that should be transmitted between spaces to be partitioned, and then optimize the shape, arrangement, and size of each cutout apparatus in order to achieve a perforation that results in passage of the determined amount of light or sound.

[0030] In any event, upon selecting the size, shape, dimension, and positioning of the materials and cutout apparatus, the manufacturer prepares a "cutout assembly" (i.e., including the cutout apparatus positioned over the collapsible structure in collapsed form). The manufacturer then applies the cutout apparatus 140 on the collapsible partition. In at least one implementation, the manufacturer applies the cutout apparatus 140 through the collapsible structure 100 on both sides of the collapsed, collapsible structure through the entire vertical length, and along as much of the horizontal length of the collapsible structure as desired. For example, the manufacturer depresses a pneumatic press comprising one

or more particularly aligned cutout apparatus 140, or depresses a coring drill bit-form of the cutout apparatus 140 onto the collapsed material, in either case within the particularly selected pattern.

[0031] Figure 1C illustrates a plan view of the intended application/pattern of the cutouts shown in Figure 1B. As shown, the intended pattern is typically a partial form of the intended resulting shape. For example, to impart a circle shape, the intended pattern (e.g., Figure 1C) in the collapsed form of the material will be half-circle, as illustrated. For a star shape, the intended pattern in the collapsed form of the material will have the appearance of a half-star. One will appreciate, therefore, that the removed material will thus result in a perforation 120 that spans virtually equal, opposing spaces about a pleat 105 in a given elongate cell.

[0032] In any event, Figure 1D shows that the manufacturer has thus applied the cutout apparatus 140, and subsequently removed the cutout material. Similarly, Figure 1E illustrates a plan view of the collapsed, collapsible structure 100 shown in Figure 1D after the manufacturer has applied or affixed mounting plates 130. Furthermore, Figure 1F illustrates a side perspective view of the collapsed, collapsible structure 100 shown in Figure 1E. Still further, Figure 1G illustrates the partition of Figure 1F when partly expanded or folded out.

[0033] Accordingly, one will appreciate that applying the cutout apparatus 140 to a collapsed form of the collapsible structure 100 can result in a series of uniformly shaped and positioned perforations 120 in each elongate cell 110, which, when the collapsible structure is expanded, forms a column 115 corresponding to the shape of the cutout apparatus 140. Such uniformity, however, is not required. In particular, a manufacturer can even stretch out the collapsible structure, and cutout any type or shape of uniform or non-uniform patterns as hollow perforations 120, so that a column 115, as such, is less apparent or otherwise not formed. In one implementation, for example, the manufacturer lays out a collapsible partition in expanded form, and uses one or more of a laser cutout apparatus or a water jet cutout apparatus to cut any number of different or alternative shapes in the expanded, collapsible structure 100.

[0034] Figures 2A through 3B illustrate various features of a finished, exemplary collapsible partition 100 when in an expanded (or at least partially expanded) form. For example, Figure 2A shows that partition 100 comprises a plurality of hollow perforations 120 (hollow all the way through from one side to the next) formed in a row/column alignment. In particular, Figure 2A shows that at least one implementation of a collapsible partition 100 can comprise a series of columns 115 corresponding to the shape of the cutout apparatus 140. That is, each cutout apparatus 140 cuts through and creates each entire column 115 in a set of adjoined elongate cells 110. In addition, Figure 2A shows that each elongate cell 110 further defines a row in the collapsible partition 100.

[0035] As previously mentioned, the removed material

generally results in the ability to intermittently or differentially pass light or sound through the partition 100. For example, Figure 2A shows that the perforations 120 allow at least some light to pass through partition 100 generally, with all light being able to pass through any given hollow perforation 120. Of course, peering directly through any given perforation 120 (when perforated completely through an elongate cell 100) provides a clear line of sight to at least a portion of the person standing on the other side. Thus, the resultant partition 100 is at least "semi-private." Figure 2B shows a side perspective view of the collapsible partition 100 shown in Figure 2A. In particular, Figure 2B shows the cross-section of a single cell partition 100 in expanded form.

[0036] As previously mentioned, however, circular perforations as primarily illustrated herein, are but one of the many different types of shapes that a manufacturer can choose to use in order to optimize the amount of light and/or sound that can pass through. Figure 2C shows a facing view of another, differently shaped collapsible partition 100a in accordance with an implementation of the present invention. In particular, Figure 2C illustrates a partition 100a that has been created using a different shape (hexagonal-shaped) of cutouts.

[0037] Figure 2C also illustrates that the collapsible partition in this particular case can comprise a unitary material, rather than on a set of bonded cells, as with partition 100. In at least some cases, the manufacturer chooses a unitary material since it may allow more light or sound to pass through than the otherwise described cell structures. That is, cell structures generally mean that light or sound can be blocked by effectively two different walls in a given elongate cell. A unitary material, however, only provides a single wall barrier for light and sound (unless combined with another unitary material for a double wall construction). In any event, Figure 2C also shows hollow perforations 120a that have been formed along square/rectangular-style patterns in the corresponding collapsible structure. In this example, the manufacturer has chosen not only the material (single layer, unitary material), the shape (wide hexagons), the style, and the general dimension of the cutout patterns to allow more light (or even air, sound, etc.) through the partition 100a compared with a cell-structure partition.

[0038] Figure 3A illustrates a side-perspective view of yet another partition 100b, which includes a plurality of elongate cells/rows 110 that are bonded along alternating seams and pleats (similarly as described for partition 100). In this example, because the manufacturer has bonded the plurality of tubes for a "triple cell" design, the cells are bonded along seams that are somewhat staggered in formation (e.g., in honeycomb formation). Figure 3B illustrates another side, cross-sectional view of the partition of Figure 3A, albeit when twisted. In particular, Figure 3B illustrates at least one advantage of one or more of the designs, such as the triple cell partition 100, which is that the partition can be not only light weight and collapsible, but also flexible. One will appreciate that the

flexibility provided by these materials provides yet another consideration for a designer that is optimizing a partition of opposing spaces not only in terms of functional light/sound dispersion goals, but also various aesthetic ends.

[0039] Accordingly, Figures 1A-3B and the corresponding text illustrate or describe a light-weight, collapsible structure with three-dimensional features, or otherwise a three-dimensional textile structure. The textile structure can be easily manufactured, assembled, joined together, and stored/reused as desired in a particular location, such as for use as a wall, or ceiling structure/partition, or other form of space divider or adornment. The three-dimensional partition/structure can be used to generally provide a semi-private barrier or divider, which can allow light, air, or sound on a differential basis depending on the size, dimension, or otherwise shape of the cutout apparatus, as well as the color, translucency, and material used to create the initial collapsible structure. The three-dimensional partition/structure can also or alternatively be used to provide a space with an artistic component, which adds to various functional and aesthetic features in a given space. One will appreciate that implementations of the present invention can be used in any home or office environment where an at least temporary, aesthetically pleasing, three-dimensional textile structure is desired.

[0040] In addition, and as previously mentioned, implementations of the present invention can be configured for a wide range of lengths, widths, and even vertical or horizontal layout configurations. For example, the depth and size of collapsible materials and corresponding cut-outs can be configured to create potentially as high as anywhere from 12-50 foot (or longer) partition/structure/treatment that is also perhaps 1 to several feet wide (e.g., a large wall-style partition or covering), or even much smaller dimensions for smaller partitions or coverings. As also previously mentioned, the partition 100 (or 100a-b) can also be configured to drop down from an upper or ceiling support structure, or to be pulled across a horizontal length from one side to another, and thus anchored at two vertical standing posts. The partition can be even further configured with sufficiently rigid materials in some cases to be complete free standing (or at least anchored with only one post).

[0041] In addition, the hollow perforations 120 (or 120a) can be chosen and configured to project certain designs or shapes onto a wall, and/or for light diffusion techniques. In one implementation, for example, the partition is configured in size, shape, and perforation to cover a wall or other form of panel or partition. In between the opposing partition and the perforated, collapsible partition 100 can be positioned near or about a plurality of light sources, such as halogen or fluorescent bulbs, light emitting diodes, or the like. When the lights are turned on (and effectively trapped between the wall and collapsible partition), the perforated, collapsible partition 100 can project or otherwise create a unique aesthetic and func-

tional effect. In one implementation, the perforated, collapsible partition 100 is further configured to wrap around a light source or light tube, for similar light diffusion effects (e.g., as a lamp shade).

[0042] Furthermore, and as also previously mentioned, the collapsible, perforated partitions 100 described herein can be useful in any range of residential, commercial, and/or otherwise industrial purposes. For example, the partition 100 can be used to separate living spaces in a home or to separate outdoor spaces on a patio, garden, or deck, just as the partition 100 could also be used as a semi-private partition/barrier in virtually any interior or exterior work space. Accordingly, the principles of using and creating a semi-private collapsible partition in accordance with implementations of the present invention can be applied broadly both for structural partitions in existing spaces, and as treatments to existing structures.

[0043] One will appreciate, therefore, that any of the illustrated partitions (e.g., 100-100b) can be used easily in virtually any environment (indoor, outdoor) to provide any number of different aesthetic and functional effects and for any number of aesthetic and/or functional uses, including purely aesthetic or purely functional uses, as desired. In particular, the partitions described herein can be used not only to divide a space (interior or exterior), but also in some cases just as a retractable covering. As with the partitions described herein, the retractable covering is specifically cut to differentially filter or otherwise diffuse light coming through from another space, such as light coming through a translucent glass/resin panel or other form of space partition.

[0044] Although not shown, any or all of the partitions illustrated or otherwise described herein can be manufactured to contain one or more collapse and release apparatus, such as one or more draw string-style apparatus (e.g., with vertically collapsing structures) that are typically used with window blinds. In particular, any or all of the partitions can be constructed with a wide range of collapse and release apparatus, so that a user can pull on a string or cord to release or expand the partition to any full or partition expanse/collapse dimension. One will appreciate that there may be many reasons or implementations in which a user will want to only partly expand or collapse a given partition, and still obtain a particular function or aesthetic that is unique to that partition's particular state of expanse/collapse.

[0045] The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description.

Claims

1. A collapsible, semi-private partition or covering (100) configured to partition one or more spaces in an ar-

chitectural design environment while diffusing light and sound therein, comprising:

a collapsible structure having a plurality of horizontal pleats (105) that each splits a plurality of horizontal rows into opposing upper and lower portions thereof;

wherein the collapsible material expands in width when collapsed along the plurality of horizontal pleats (105);

a plurality of fixed perforations (120) formed in each of the horizontal pleats (105);

wherein each perforation (120) comprises a shape having a first half that spans into the upper portion of the horizontal row, and a second half that spans into the lower portion of the horizontal row; and

at least one mounting plate (130) mounted to one of the plurality of horizontal rows, the at least one mounting plate (130) being configured to secure the collapsible partition to a support structure; **characterized in that**

the collapsible partition comprises a plurality of elongate cells (110) that are bonded together; each elongate cell (110) comprises at least one of the horizontal pleats (105) formed along the elongate cell (110);

each of the horizontal rows is joined to an adjacent horizontal row at a horizontal seam; and the perforations (120) are formed in opposing sides of the elongate cells (110).

2. The partition as recited in claim 1, wherein:

the plurality of elongate cells (110) comprise a cell-in-cell configuration; and

each of the plurality of horizontal rows comprises a first elongate cell (110) that has been inserted within and bonded to a second elongate cell (110).

3. The partition as recited in claim 1, wherein:

the plurality of elongate cells comprise a triple-cell configuration; and

each of the plurality of horizontal rows comprises a first elongate cell that has been bonded at both a vertical position and a horizontal position to at least another elongate cell, each of the plurality of perforations may pass through the first and second elongate cells of each horizontal row and the collapsible partition may intermittently block light from one side of the partition to an opposing side.

4. The partition as recited in claim 1, wherein the plurality of perforations (120) comprise a plurality of different shapes and wherein each of the different

shapes may alternate along the pleat corresponding to each horizontal row or the plurality of different shapes of the perforations may be distributed randomly along the pleat corresponding to each horizontal row.

5. The partition as recited in claim 1, wherein the collapsible partition further comprises one or more collapse and release apparatus for differentially collapsing or expanding the partition in the one or more spaces.

6. The partition as recited in claim 1, wherein the collapsible partition is at least about 8 feet tall, and spans a ceiling to floor space when expanded.

7. A method of manufacturing a collapsible, semi-private partition or covering according to any of claims 1-6 that partitions one or more spaces in an architectural design environment while diffusing light and sound therein, comprising:

bonding a plurality of elongate cells (110) along a corresponding plurality of horizontal seams; wherein the bonded elongate cells (110) form a collapsible structure (100) that expands to at least about 8 feet;

collapsing the collapsible structure (100) along the plurality of horizontal seams and pleats so that each elongate cell (110) from top to bottom in the collapsible structure overlaps with a vertically adjacent elongate cell (110); and removing material from opposing sides of each elongate cell (110) in the collapsed, collapsible partition by applying one or more cutout apparatus (140) on an uppermost elongate cell (110); wherein application of each of the one or more cutout apparatus (140) forms a uniform column in the collapsible partition that corresponds to a shape of the corresponding cutout apparatus.

8. The method as recited in claim 7, wherein application of each of the one or more cutout apparatus (140) forms a perforation (120) that extends from one side to another of each of the elongate cells (110).

9. The method as recited in claim 7, further comprising positioning a plurality of cutout apparatus (140) which may comprise a plurality of different shapes on opposing sides of the uppermost elongate cell (110).

10. The method as recited in claim 7, further comprising:

determining an amount of light to be transmitted from one space to another opposing space when the collapsible partition is in an expanded state; and

optimizing, based on the determined amount of light to be transmitted, a position and shape of each of the one or more cutout apparatus (140) along the collapsed collapsible structure (100) and optionally determining a percentage of material to be removed from the collapsible partition.

11. The method as recited in claim 7, wherein the plurality of elongate cells (110) are configured in size and number to span at least about 8 feet in height when the collapsible partition is in an expanded state.
12. The method as recited in claim 7, further comprising selecting a material for the plurality of elongate cells (110) based on degree of translucence when the collapsible partition is in an expanded state.
13. A system for reversibly partitioning one or more spaces in an architectural design environment with one or more collapsible partitions (100) configured to diffuse light and sound therein, comprising:

opposing first and second support structures; and

a collapsible partition (100) according to claim 1 that is anchored to the first support structure, and releasably anchored to the second support structure.

Patentansprüche

1. Zusammenklappbare halbprivate Trennwand oder Abschirmung (100), die konfiguriert ist, um einen oder mehrere Räume in einer architektonisch gestalteten Umgebung bei gleichzeitiger Licht- und Tondiffusion abzutheilen, umfassend:

eine zusammenklappbare Konstruktion mit mehreren horizontalen Falten (105), wobei jede Falte mehrere horizontale Reihen in gegenüberliegende obere und untere Abschnitte davon unterteilt,
wobei sich das zusammenklappbare Material in der Breite ausdehnt, wenn es an den mehreren horizontalen Falten (105) entlang zusammengeklappt ist;
mehrere feststehende Perforationen (120), die in jeder der horizontalen Falten (105) ausgebildet sind,
wobei jede Perforation (120) eine Form umfasst, die eine erste Hälfte, die in den oberen Abschnitt der horizontalen Reihe hineinreicht, sowie eine zweite Hälfte aufweist, die in den unteren Abschnitt der horizontalen Reihe hineinreicht; und
mindestens eine Montageplatte (130), die an ei-

ner der mehreren horizontalen Reihen montiert ist, wobei die mindestens eine Montageplatte (130) konfiguriert ist, um die zusammenklappbare Trennwand an einer Stützkonstruktion zu sichern;

dadurch gekennzeichnet, dass

die zusammenklappbare Trennwand mehrere längliche Zellen (110) umfasst, die miteinander verbunden sind,
wobei jede längliche Zelle (110) mindestens eine der horizontalen Falten (105) umfasst, die an der länglichen Zelle (110) entlang ausgebildet sind,
wobei jede der horizontalen Reihen mit einer angrenzenden horizontalen Reihe an einer horizontalen Naht verbunden ist, und
wobei die Perforationen (120) in gegenüberliegenden Seiten der länglichen Zellen (110) ausgebildet sind.

2. Trennwand nach Anspruch 1, bei der die mehreren länglichen Zellen (110) eine Zelle-in-Zelle-Konfiguration umfassen, und wobei jede der mehreren horizontalen Reihen eine erste längliche Zelle (110) umfasst, die innerhalb einer zweiten länglichen Zelle (110) eingefügt und damit verbunden ist.
3. Trennwand nach Anspruch 1, bei der die mehreren länglichen Zellen eine Dreifach-Zellen-Konfiguration umfassen, und wobei jede der mehreren horizontalen Reihen eine erste längliche Zelle umfasst, die sowohl in einer vertikalen Position als auch in einer horizontalen Position mit mindestens einer anderen länglichen Zelle verbunden ist, wobei jede der mehreren Perforationen durch die ersten und zweiten länglichen Zellen einer jeden horizontalen Reihe verlaufen kann, und wobei die zusammenklappbare Trennwand Licht von einer Seite der Trennwand zu einer gegenüberliegenden Seite intermittierend blockieren kann.
4. Trennwand nach Anspruch 1, bei der die mehreren Perforationen (120) mehrere unterschiedliche Formen umfassen, und wobei jede der unterschiedlichen Formen an der Falte entlang entsprechend jeder horizontalen Reihe alternieren kann oder die mehreren unterschiedlichen Formen der Perforationen an der Falte entlang entsprechend jeder horizontalen Reihe willkürlich verteilt sein können.
5. Trennwand nach Anspruch 1, bei der die zusammenklappbare Trennwand weiterhin eine oder mehrere Zusammenklapp- und Freigabevorrichtungen umfasst, um die Trennwand in dem einen oder den mehreren Räumen unterschiedlich zusammenzuklappen oder auszudehnen.
6. Trennwand nach Anspruch 1, bei der die zusammen-

klappbare Trennwand mindestens etwa 8 Fuß hoch ist und im ausgedehnten Zustand einen von der Decke bis zum Boden reichenden Raum abdeckt.

7. Verfahren zur Herstellung einer zusammenklappbaren halbprivaten Trennwand oder Abschirmung nach einem der Ansprüche 1 bis 6, mit der ein oder mehrere Räume in einer architektonisch gestalteten Umgebung bei gleichzeitiger Licht- und Tondiffusion abgeteilt werden, umfassend:

Verbinden von mehreren länglichen Zellen (110) an entsprechenden mehreren horizontalen Nähten entlang, wobei die verbundenen länglichen Zellen (110) eine zusammenklappbare Konstruktion (100) bilden, die auf mindestens etwa 8 Fuß ausdehnbar ist; Zusammenklappen der zusammenklappbaren Konstruktion (100) an den mehreren horizontalen Nähten und Falten entlang, so dass jede längliche Zelle (110) von oben bis unten in der zusammenklappbaren Konstruktion mit einer vertikal angrenzenden länglichen Zelle (110) überlappt; und Entfernen von Material von gegenüberliegenden Seiten einer jeden länglichen Zelle (110) in der zusammengeklappten zusammenklappbaren Trennwand durch Verwendung von einer oder mehreren Ausschnittvorrichtungen (140) an einer obersten länglichen Zelle (110), wobei die Verwendung von jeder der einen oder mehreren Ausschnittvorrichtungen (140) eine einheitliche Säule in der zusammenklappbaren Trennwand bildet, die einer Form der entsprechenden Ausschnittvorrichtung entspricht.

8. Verfahren nach Anspruch 7, bei dem die Verwendung von jeder der einen oder mehreren Ausschnittvorrichtungen (140) eine Perforation (120) bildet, die sich von einer Seite zu einer anderen von jeder der länglichen Zellen (110) erstreckt.

9. Verfahren nach Anspruch 7, das weiterhin das Positionieren von mehreren Ausschnittvorrichtungen (140) umfasst, die mehrere unterschiedliche Formen auf gegenüberliegenden Seiten der obersten länglichen Zelle (110) umfassen können.

10. Verfahren nach Anspruch 7, das weiterhin umfasst:

Bestimmen einer von einem Raum zu einem anderen gegenüberliegenden Raum zu übertragenden Lichtmenge, wenn sich die zusammenklappbare Trennwand in einem ausgedehnten Zustand befindet; und Optimieren, auf der Basis der bestimmten zu übertragenden Lichtmenge, einer Position und

Form einer jeden der einen oder mehreren Ausschnittvorrichtungen (140) an der zusammengeklappten zusammenklappbaren Konstruktion (100) entlang, und, wahlweise, Bestimmen eines Prozentsatzes von aus der zusammenklappbaren Trennwand zu entfernendem Material.

11. Verfahren nach Anspruch 7, bei dem die mehreren länglichen Zellen (110) in Größe und Anzahl konfiguriert sind, um mindestens etwa 8 Fuß in der Höhe zu überspannen, wenn sich die zusammenklappbare Trennwand in einem ausgedehnten Zustand befindet.

12. Verfahren nach Anspruch 7, das weiterhin das Auswählen eines Materials für die mehreren länglichen Zellen (110) auf Transluzenzgradbasis umfasst, wenn sich die zusammenklappbare Trennwand in einem ausgedehnten Zustand befindet.

13. System zum reversiblen Abtrennen von einem oder mehreren Räumen in einer architektonisch gestalteten Umgebung mit einer oder mehreren zusammenklappbaren Trennwänden (100), die konfiguriert sind, um Licht und Ton darin auszubreiten, umfassend:

gegenüberliegende erste und zweite Stützkonstruktionen; und eine zusammenklappbare Trennwand (100) nach Anspruch 1, die mit der ersten Stützkonstruktion verankert und freigebbar mit der zweiten Stützkonstruktion verankert ist.

Revendications

1. Cloison (100) semi-privée repliable - ou élément couvrant - configurée pour cloisonner un ou plusieurs espaces dans un environnement de conception architecturale, tout en diffusant de la lumière et du son dans ces espaces, comprenant :

une structure repliable ayant une pluralité de plis horizontaux (105) dont chacun divise une pluralité de rangées horizontales en parties supérieures et inférieures opposées de ces rangées ; où la matière repliable se déploie en largeur quand elle est repliée le long de la pluralité de plis horizontaux (105) ; une pluralité de perforations fixes (120) formées dans chacun des plis horizontaux (105) ; où chaque perforation (120) présente une forme ayant une première moitié qui passe dans la partie supérieure de la rangée horizontale et une seconde moitié qui passe dans la partie inférieure de la rangée horizontale ; et

- au moins une plaque de montage (130) montée sur l'une des rangées formant la pluralité de rangées horizontales, la plaque de montage (130) au moins au nombre de un étant configurée pour fixer la cloison repliable sur une structure de support ;
- caractérisée en ce que** la cloison repliable comprend une pluralité d'alvéoles allongées (110) qui sont reliées ensemble ;
- chaque alvéole allongée (110) comprend au moins l'un des plis horizontaux (105) formés le long de l'alvéole allongée (110) ;
- chacune des rangées horizontales est jointe à une rangée horizontale adjacente au niveau d'une jointure horizontale ; et
- les perforations (120) sont formées dans des côtés opposés des alvéoles allongées (110).
2. Cloison comme exposé dans la revendication 1, dans laquelle :
- la pluralité d'alvéoles allongées (110) comprend une configuration d'alvéoles imbriquées les unes dans les autres ; et
- chacune des rangées formant la pluralité de rangées horizontales comprend une première alvéole allongée (110) qui a été insérée à l'intérieur de ladite rangée et reliée à une deuxième alvéole allongée (110).
3. Cloison comme exposé dans la revendication 1, dans laquelle :
- la pluralité d'alvéoles allongées comprend une configuration de triples alvéoles ; et
- chacune des rangées formant la pluralité de rangées horizontales comprend une première alvéole allongée qui a été reliée, à la fois au niveau d'une position verticale et d'une position horizontale, à au moins une autre alvéole allongée, chacune des perforations formant la pluralité de perforations peut traverser les premières et deuxièmes alvéoles allongées de chaque rangée horizontale, et la cloison repliable peut, de façon intermittente, bloquer la lumière provenant d'un côté de la cloison, jusqu'à un côté opposé.
4. Cloison comme exposé dans la revendication 1, dans laquelle la pluralité de perforations (120) comprend une pluralité de formes différentes et dans laquelle chacune des formes différentes peut alterner le long du pli correspondant à chaque rangée horizontale, ou bien la pluralité des différentes formes des perforations peut être répartie de façon aléatoire le long du pli correspondant à chaque rangée horizontale.
5. Cloison comme exposé dans la revendication 1, dans laquelle la cloison repliable comprend en outre un ou plusieurs appareils servant à replier et à libérer, pour replier ou déployer la cloison, de façon différentielle, dans un ou plusieurs espaces.
6. Cloison comme exposé dans la revendication 1, dans laquelle la cloison repliable est d'une hauteur au moins de 8 pieds environ, et ladite cloison, quand elle est déployée, couvre un espace allant du plafond jusqu'au plancher.
7. Procédé de fabrication d'une cloison semi-privée repliable ou d'un élément couvrant selon l'une quelconque des revendications 1 à 6, qui cloisonne un ou plusieurs espaces dans un environnement de conception architecturale, tout en diffusant de la lumière et du son dans ces espaces, consistant :
- à relier une pluralité d'alvéoles allongées (110) le long d'une pluralité correspondante de jointures horizontales ;
- dans lequel les alvéoles allongées reliées (110) forment une structure repliable (100) qui se déploie sur une hauteur au moins de 8 pieds environ ;
- à replier la structure repliable (100) le long de la pluralité de jointures horizontales et de plis, de sorte que chaque alvéole allongée (110), du haut jusqu'en bas de la structure repliable, chevauche une alvéole allongée (110) verticalement adjacente ; et
- à enlever de la matière provenant des côtés opposés de chaque alvéole allongée (110) dans la cloison repliable repliée, en appliquant un ou plusieurs appareils de découpe (140) sur une alvéole allongée (110) placée tout en haut ;
- dans lequel l'application d'un ou de chacun des multiples appareils de découpe (140) forme une colonne uniforme dans la cloison repliable qui correspond à une forme de l'appareil de découpe correspondant.
8. Procédé comme exposé dans la revendication 7, dans lequel l'application d'un ou de chacun des multiples appareils de découpe (140) forme une perforation (120) qui s'étend d'un côté à l'autre de chacune des alvéoles allongées (110).
9. Procédé comme exposé dans la revendication 7, consistant en outre à positionner une pluralité d'appareils de découpe (140) qui peuvent comporter une pluralité de formes différentes sur des côtés opposés de l'alvéole allongée (110) placée tout en haut.
10. Procédé comme exposé dans la revendication 7, consistant en outre :

à déterminer une quantité de lumière à transmettre d'un espace à un autre espace opposé quand la cloison repliable est dans un état déployé ; et

à optimiser, en se basant sur la quantité déterminée de lumière à transmettre, une position et une forme d'un ou de chacun des multiples appareils de découpe (140) le long de la structure repliable repliée (100) et, éventuellement, à déterminer un pourcentage de matière à enlever de la cloison repliable.

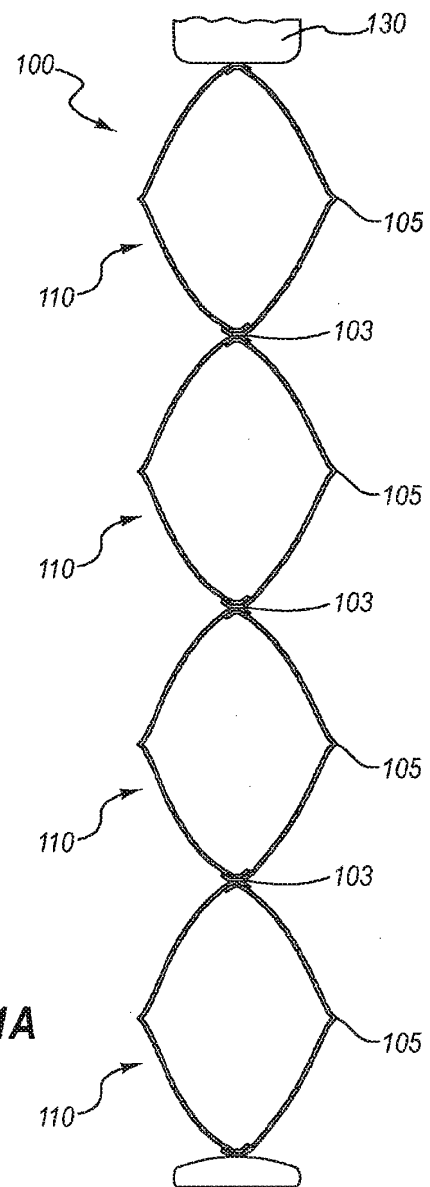
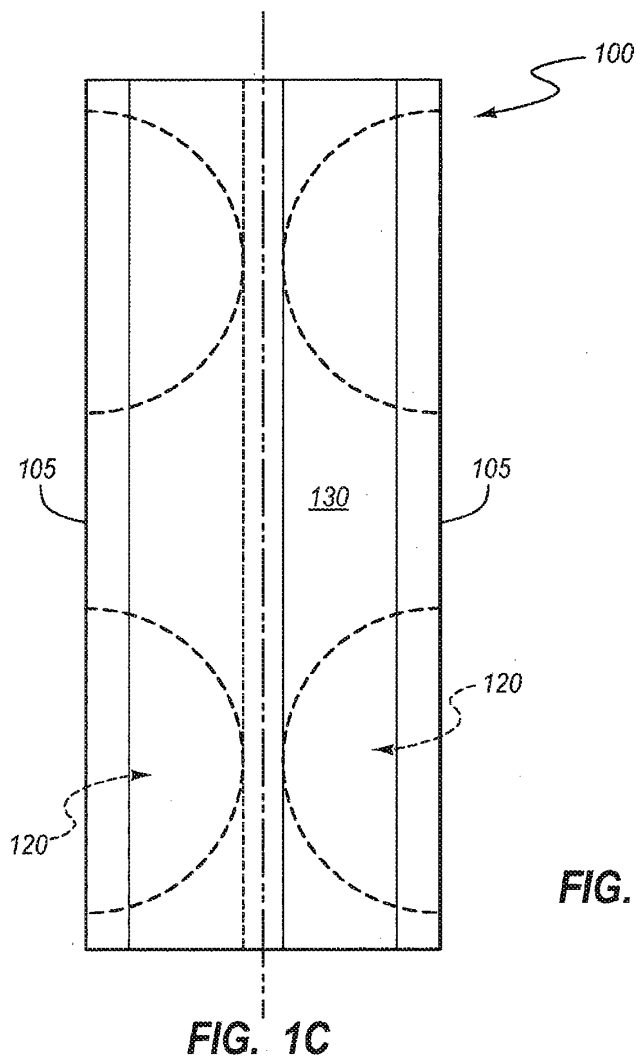
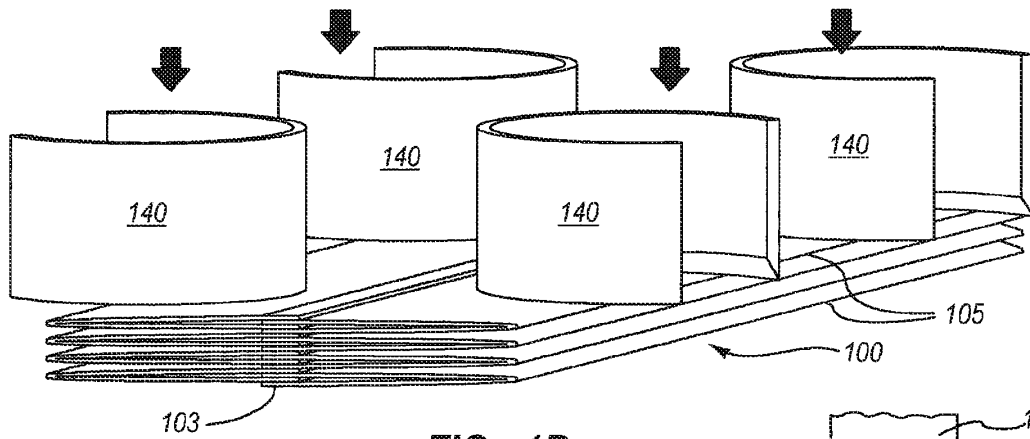
11. Procédé comme exposé dans la revendication 7, dans lequel la pluralité d'alvéoles allongées (110) est configurée en taille et en nombre pour couvrir une hauteur au moins de 8 pieds environ, quand la cloison repliable est dans un état déployé.
12. Procédé comme exposé dans la revendication 7, consistant en outre à sélectionner une matière pour la pluralité d'alvéoles allongées (110), en se basant sur le degré de transparence quand la cloison repliable est dans un état déployé.
13. Système pour séparer un ou plusieurs espaces de façon réversible, dans un environnement de conception architecturale, par une ou plusieurs cloisons repliables (100) configurées pour diffuser de la lumière et du son dans ces espaces, comprenant :
 - des première et seconde structures de support opposées; et
 - une cloison repliable (100) selon la revendication 1, cloison qui est ancrée à la première structure de support et ancrée de manière détachable à la seconde structure de support.

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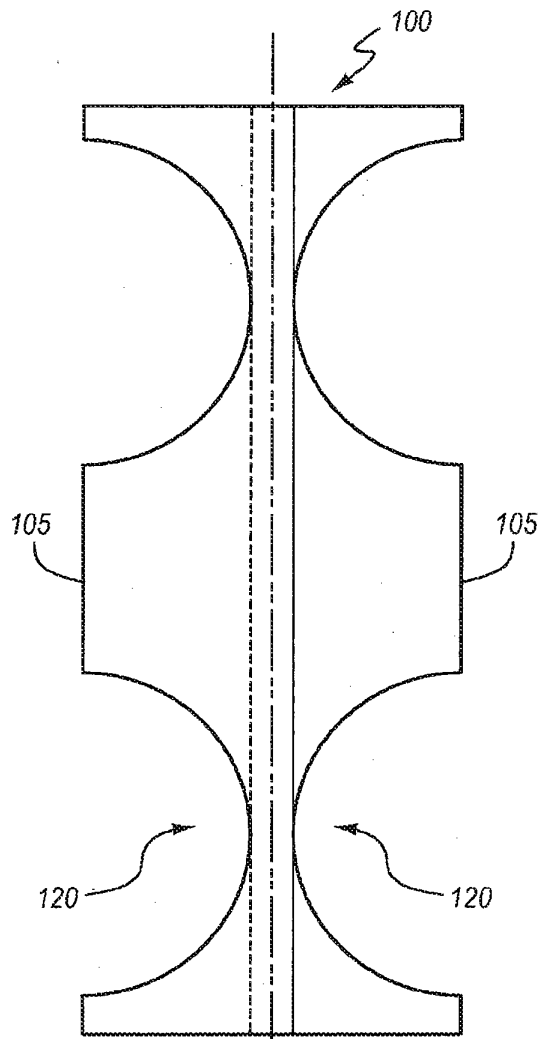


FIG. 1D

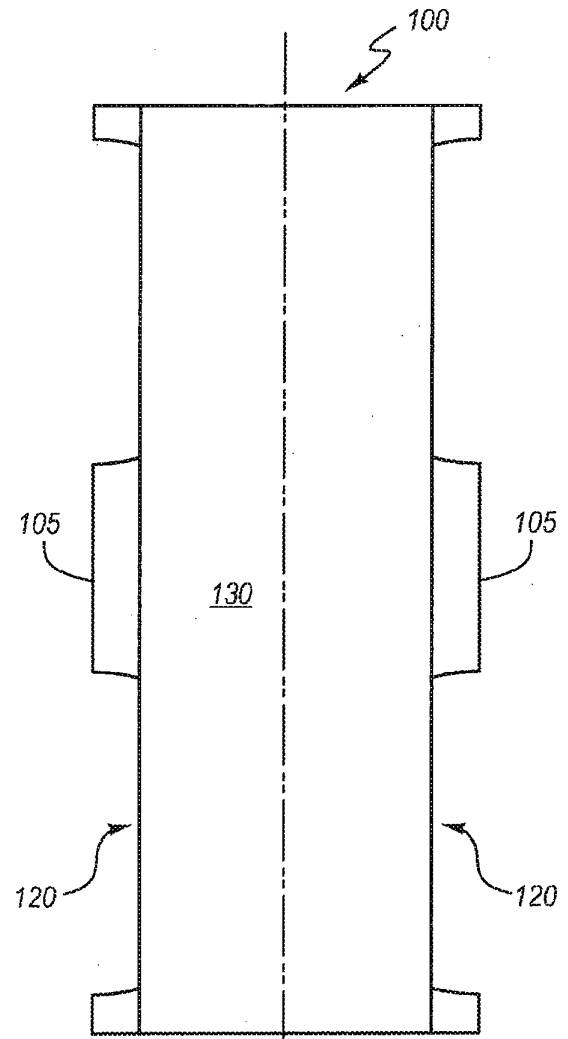


FIG. 1E

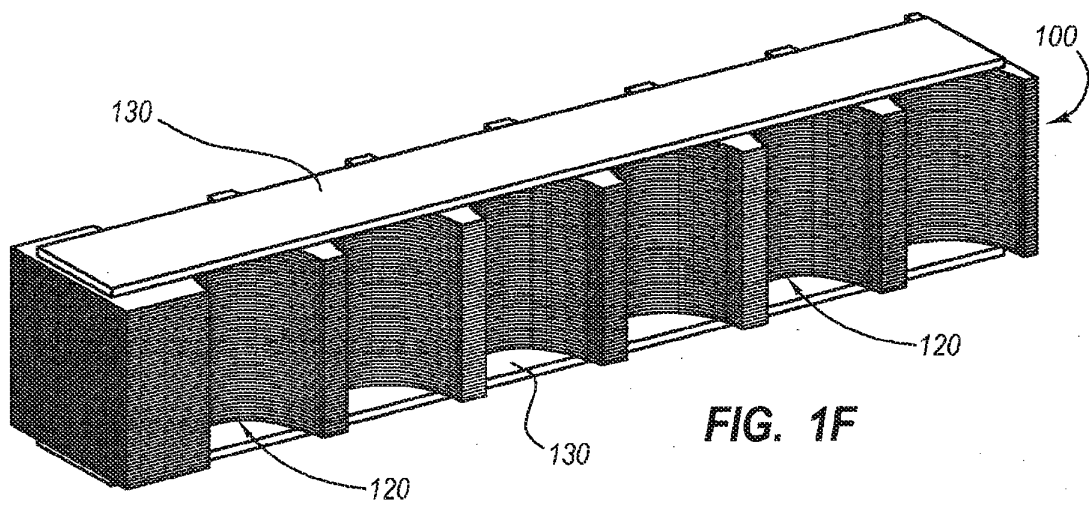


FIG. 1F

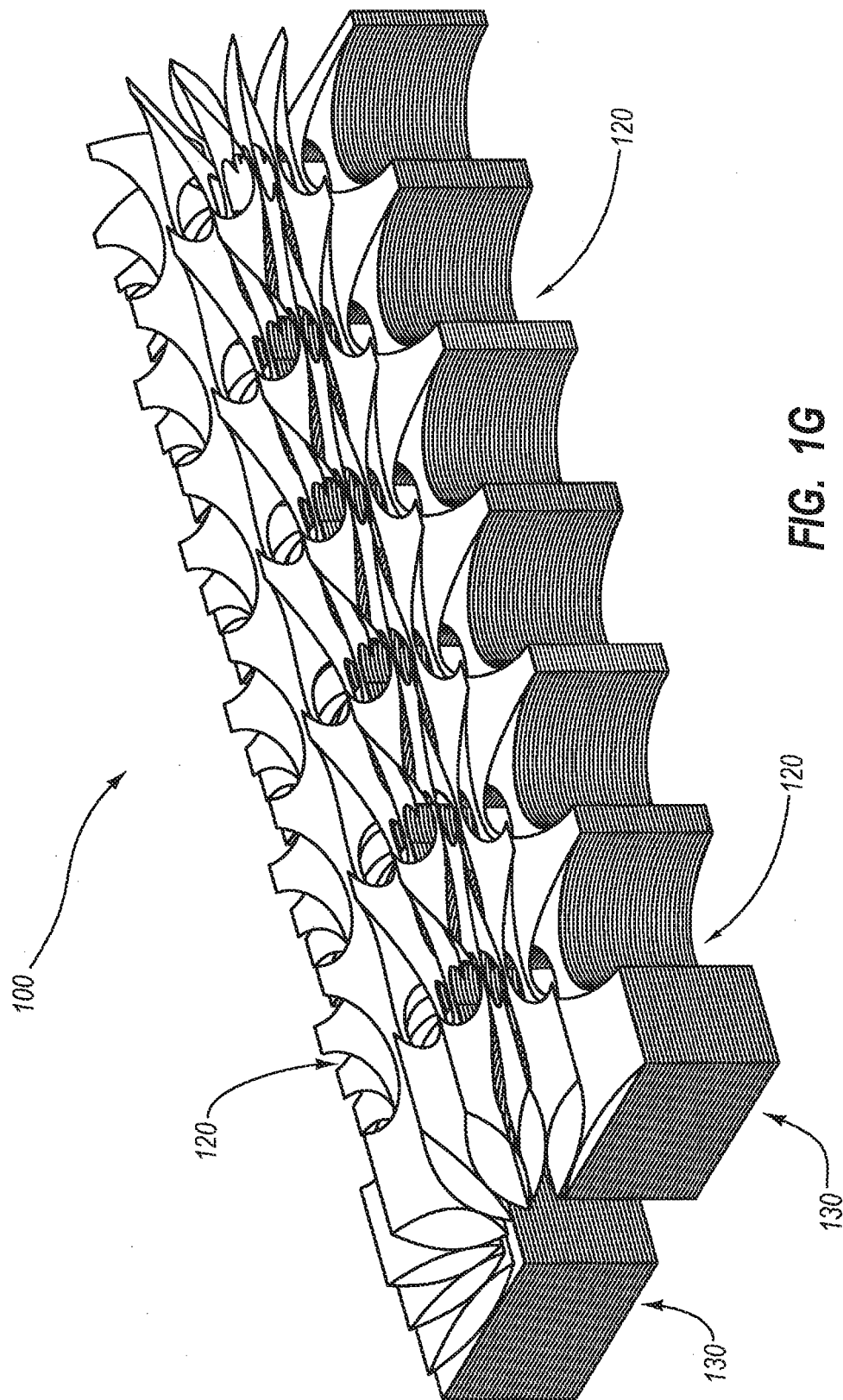


FIG. 1G

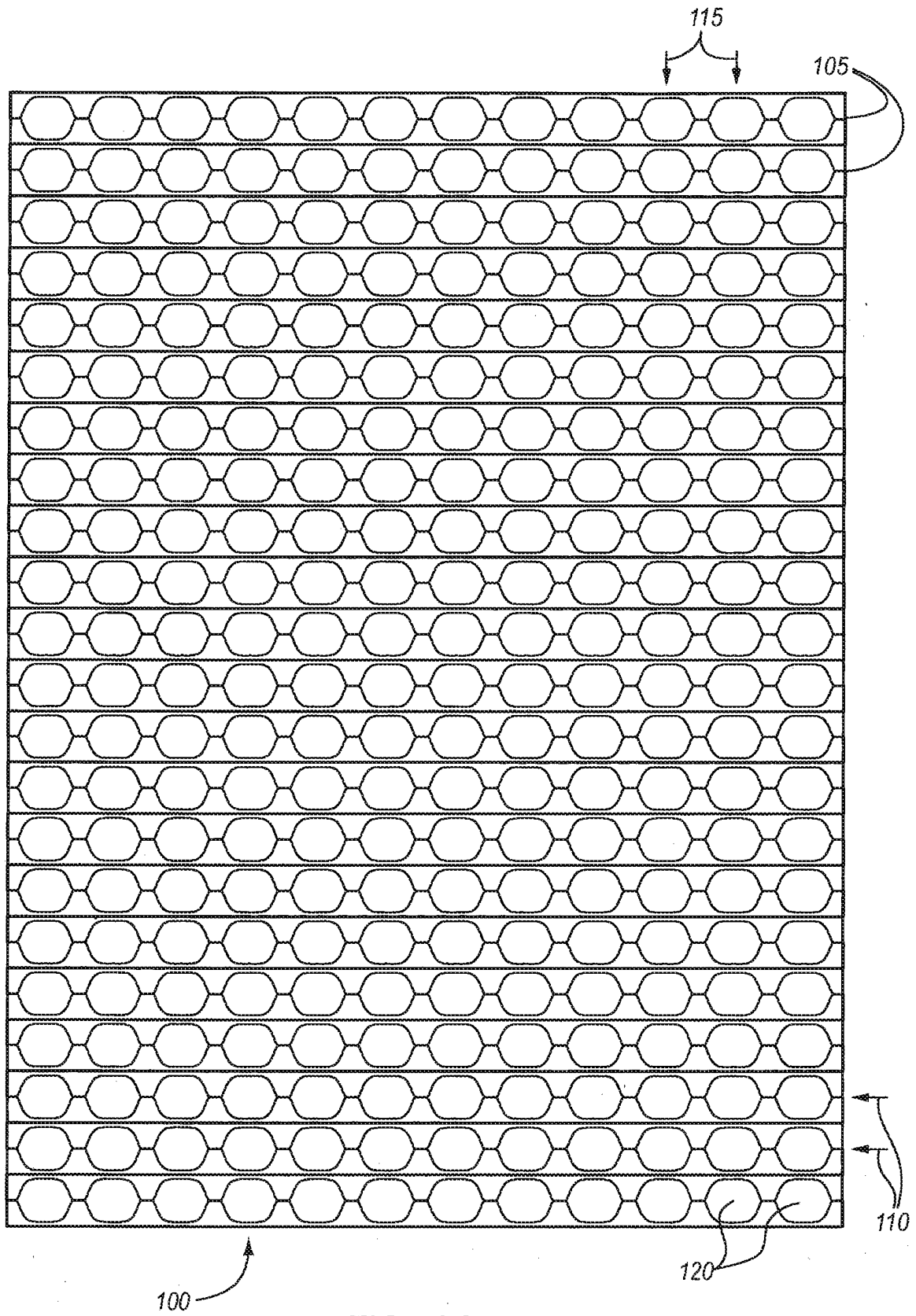


FIG. 2A

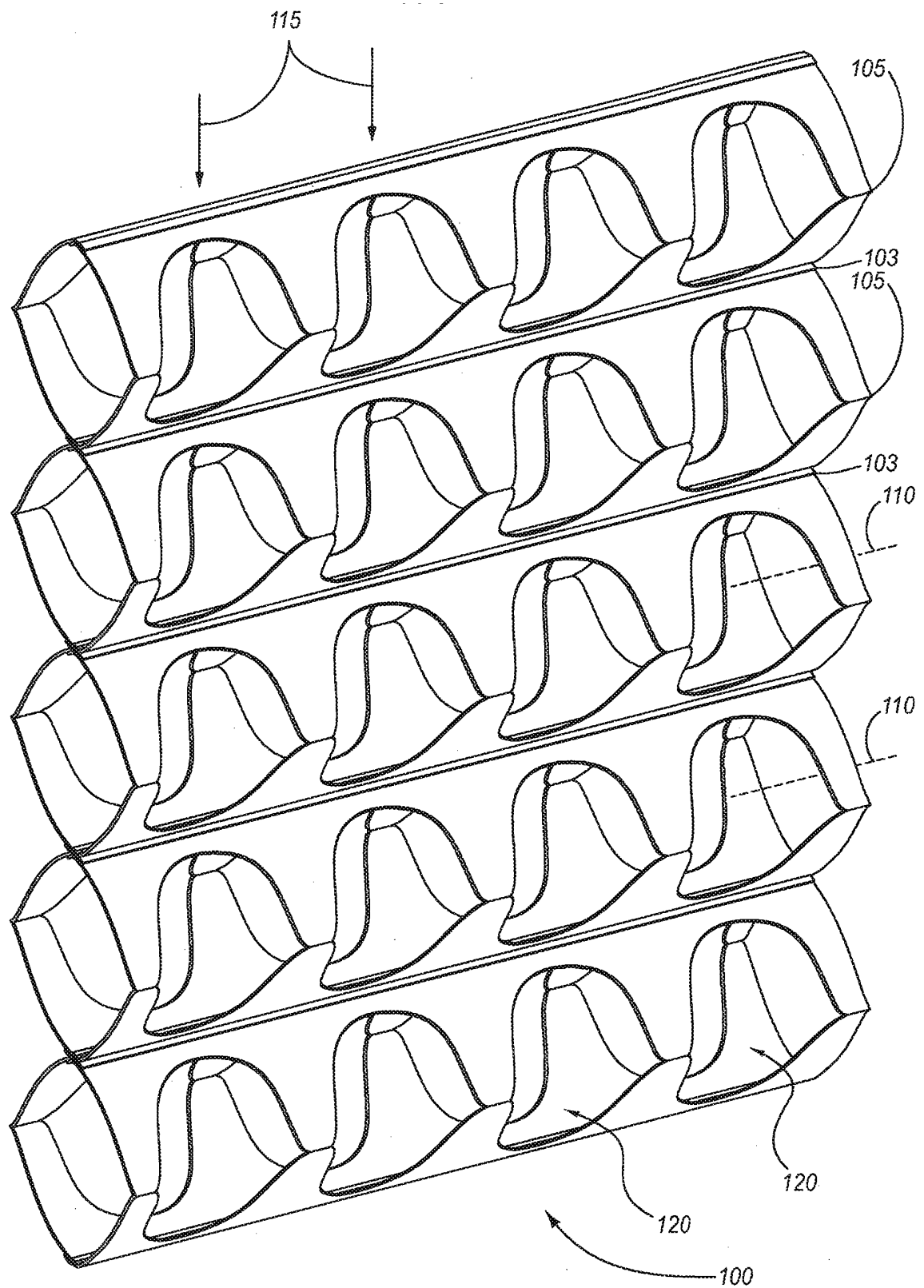


FIG. 2B

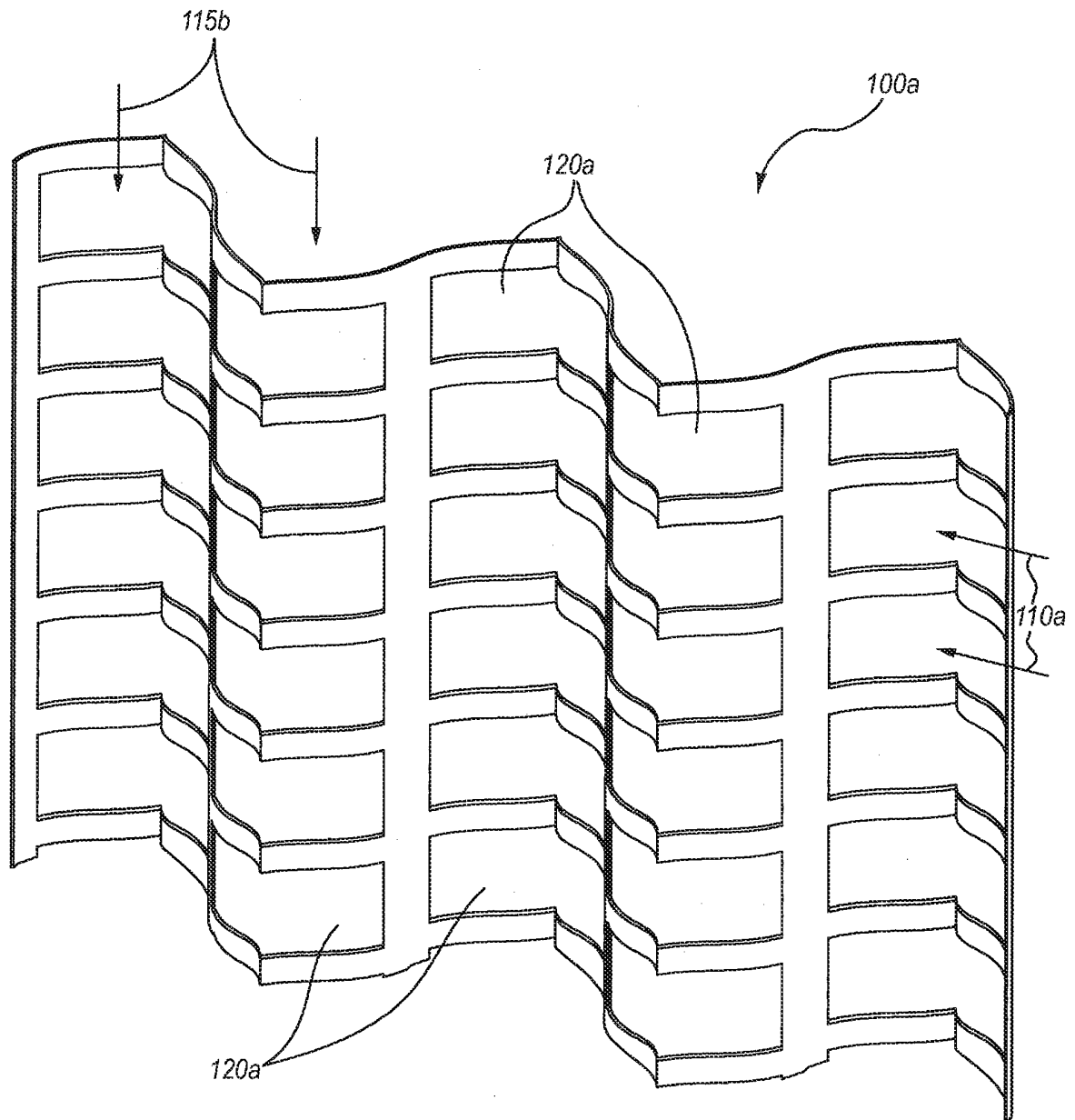
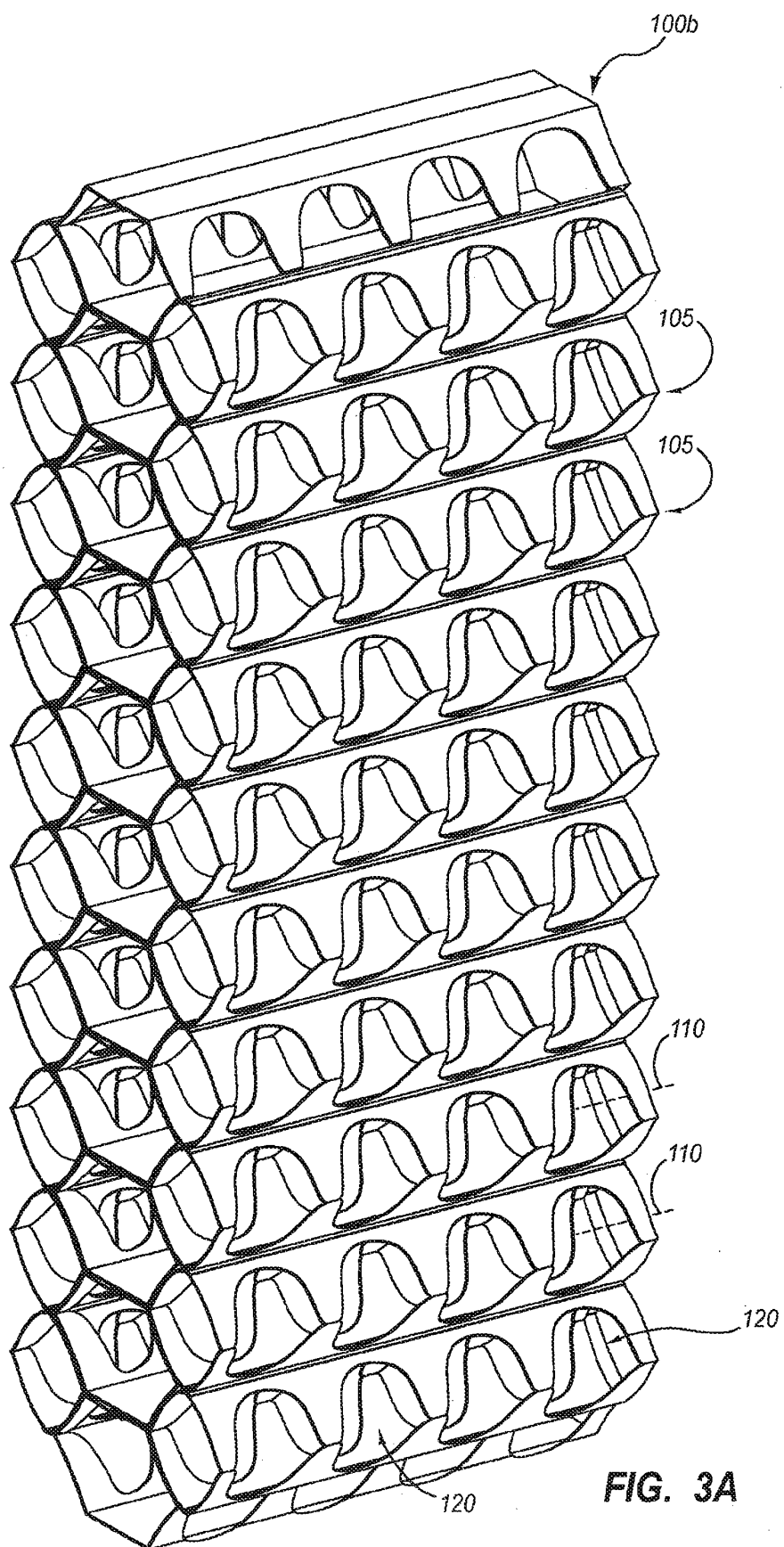


FIG. 2C



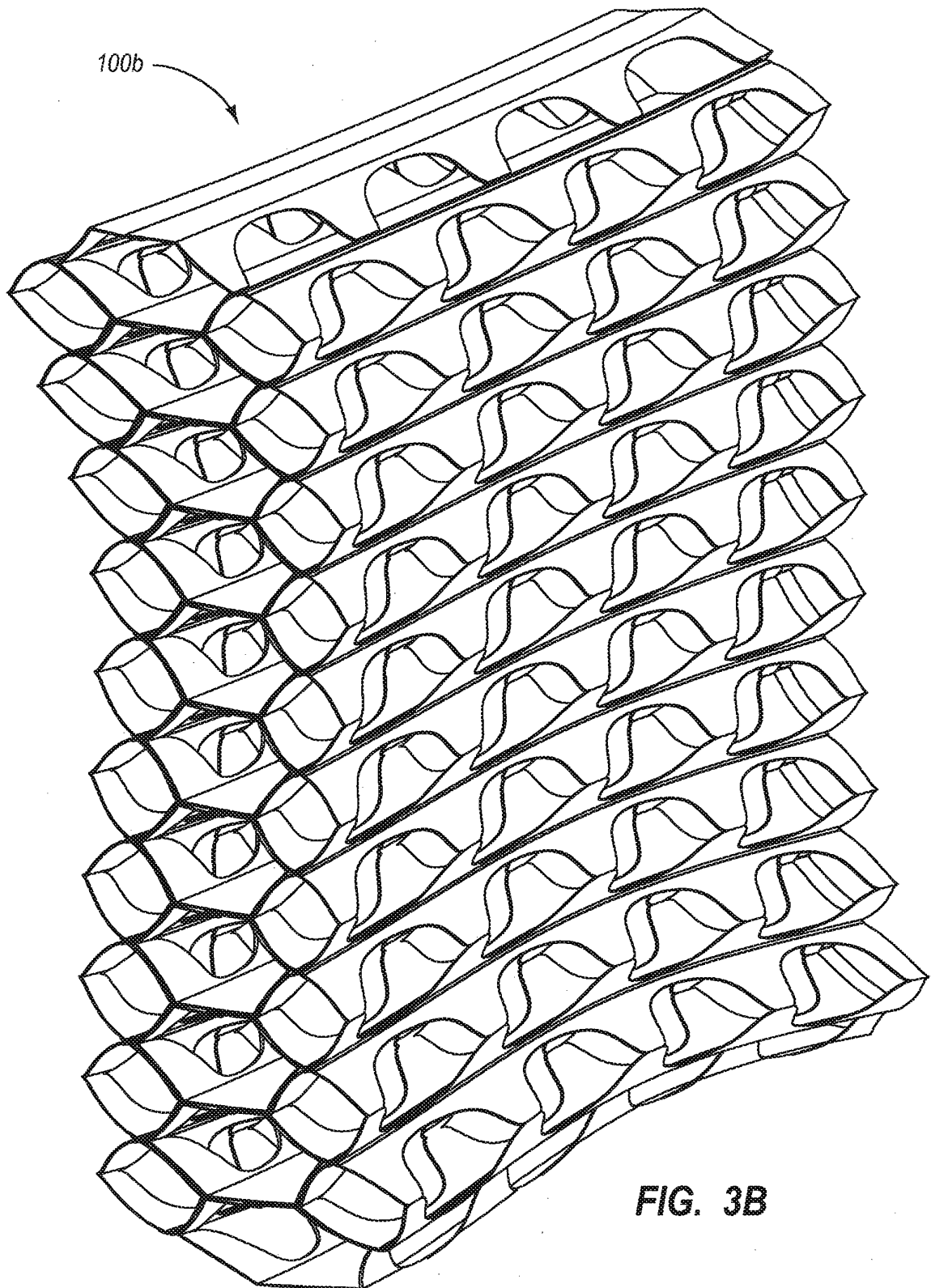


FIG. 3B

REFERENCES CITED IN THE DESCRIPTION

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