



(51) International Patent Classification:  
E04F 10/10 (2006.01)

(21) International Application Number:  
PCT/US2023/031589

(22) International Filing Date:  
31 August 2023 (31.08.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
63/406,469 14 September 2022 (14.09.2022) US

(71) Applicant: HUNTER DOUGLAS INC. [US/US]; 1 Blue Hill Plaza, Pearl River, New York 10965 (US).

(72) Inventor: MALKAN, Sanjiv R.; c/o Hunter Douglas Inc., 1 Blue Hill Plaza, Pearl River, New York 10965 (US).

(74) Agent: JENNINGS, Jason A.; DORITY & MANNING, P.A., P. O. BOX 1449, GREENVILLE, South Carolina 29602-1449 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:  
— with international search report (Art. 21(3))  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: INTERNAL CELL LINER FOR A CELLULAR PANEL OF A COVERING

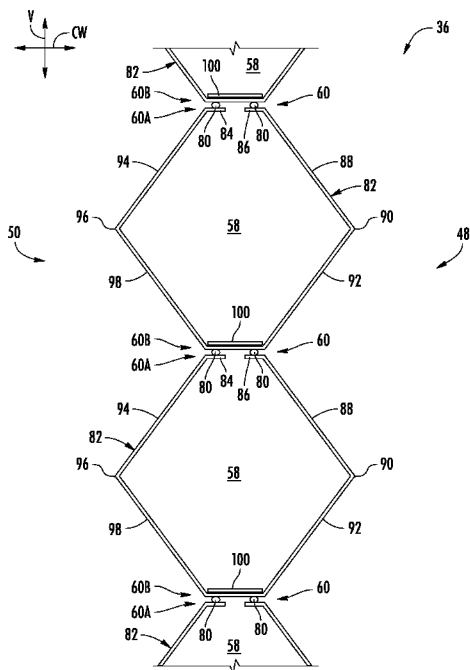


FIG. 2

(57) Abstract: In one aspect, a cellular panel includes a plurality of cells, with each cell being coupled to an adjacent first cell at a first cell junction and to an adjacent second cell at a second cell junction. Each cell extends between a first junction end and a second junction end. The cellular panel also includes a plurality of cell liners, with each cell liner being positioned within a respective cell. Each cell liner includes an inner side and an opposite outer side, with the outer side of each cell liner being coupled to the respective cell at the first or second junction end. The inner side of each cell liner faces towards the other of the first or second junction end. In addition, a release agent is provided along the inner side of each cell liner, and an adherence agent is provided along the outer side of each cell liner.



## INTERNAL CELL LINER FOR A CELLULAR PANEL OF A COVERING

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is based upon and claims the right of priority to U.S. Provisional Patent Application No. 63/406,469, filed September 14, 2022, the disclosure of which is hereby incorporated by reference herein in its entirety for all purposes.

### FIELD

[0002] The present disclosure relates generally to coverings for architectural structures and, more particularly, to a cellular panel with internal cell liners and related cellular coverings.

### BACKGROUND

[0003] A cellular covering for an architectural structure typically includes a head rail, a bottom rail, and a cellular blanket or panel extending between the head rail and the bottom rail. The cellular panel generally includes a plurality of vertically aligned cells, with the various cells being stacked or coupled one on top of the other to form the panel. For example, the cellular structure of each cell is typically formed from one or more strips of material, with the material strip(s) forming one cell being adhered to the material strip(s) forming adjacent cells (e.g., adjacent upper and lower cells).

[0004] During manufacturing of a cellular panel, adhesive beads or lines are typically applied at an interface or junction defined between adjacent cells to couple the cells together, with the various cells being continuously stacked one on top of the other in a closed or collapsed state. Depending on the type of material used to form the cells, the adhesive can weep through the cell material and into the interior of the cell, which, in turn, can lead to inner surfaces of the cell being adhered together in the closed or collapsed state. This results in a cellular panel with one or more cells that will not properly open as the panel is moved to its extended state.

[0005] Accordingly, an internal cell liner for a cellular covering that can prevent or at least assist in addressing one or more of the issues associated with manufacturing cellular panels would be welcomed in the technology.

## BRIEF DESCRIPTION

[0006] Aspects and advantages of the present disclosure will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the present disclosure.

[0007] In one aspect, the present subject matter is directed to a cellular panel for use with a covering for an architectural structure. The cellular panel includes a plurality of cells, with each cell of the plurality of cells being coupled to an adjacent first cell of the plurality of cells at a first cell junction and to an adjacent second cell of the plurality of cells at a second cell junction. Each cell extends between a first junction end positioned adjacent to the first cell junction and a second junction end positioned adjacent to the second cell junction. The cellular panel also includes a plurality of cell liners, with each cell liner of the plurality of cell liners being positioned within a respective cell of the plurality of cells. Each cell liner includes an inner side and an outer side opposite the inner side, with the outer side of each cell liner being coupled to the respective cell at one of the first junction end or the second junction end of the respective cell. The inner side of each cell liner faces towards the other of the first junction end or the second junction end of the respective cell. In addition, a release agent is provided along the inner side of each cell liner.

[0008] In another aspect, the present subject matter is directed to a covering for an architectural structure. The covering includes a headrail, a bottom rail spaced apart from the headrail, and a cellular panel extending between the headrail and the bottom rail. The cellular panel includes a plurality of cells, with each cell of the plurality of cells being coupled to an adjacent first cell of the plurality of cells at a first cell junction and to an adjacent second cell of the plurality of cells at a second cell junction. Each cell extends between a first junction end positioned adjacent to the first cell junction and a second junction end positioned adjacent to the second cell junction. Additionally, each cell is formed from a cell material that permits an adhesive to at least partially weep through the cell material. The cellular panel also includes a plurality of cell liners, each cell liner of the plurality of cell liners being positioned within a respective cell of the plurality of cells. Each cell liner includes an inner side and an outer side opposite the inner side, with the outer side of each cell liner is coupled to the respective cell at one of the first junction end or the second junction end of the respective cell. The inner side of each cell liner faces towards

the other of the first junction end or the second junction end of the respective cell.

Moreover, a release agent is provided along the inner side of each cell liner.

[0009] These and other features, aspects and advantages of the present disclosure will become better understood with reference to the following Detailed Description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the present disclosure and, together with the description, serve to explain the principles of the present disclosure.

[0010] This Brief Description is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Brief Description is not intended to identify key features or essential features of the claimed subject matter, nor is it intended as an aid in determining the scope of the claimed subject matter.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A full and enabling disclosure of the present subject matter, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

[0012] FIG. 1 illustrates a perspective view of one embodiment of a cellular covering for an architectural structure in accordance with aspects of the present subject matter;

[0013] FIG. 2 illustrates a partial, cross-sectional view of the cellular covering shown in FIG. 1 taken about line II-II, particularly illustrating a vertical section of a cellular panel of the covering including internal cell liners positioned within each cell of the panel;

[0014] FIG. 3 illustrates a cross-sectional view of one embodiment of an internal cell liner in accordance with aspects of the present subject matter; and

[0015] FIG. 4 illustrates a cross-sectional view of the cell liner shown in FIG. 3 as installed within a cell that is in a collapsed or closed state, with portions of adjacent upper and lower collapsed cells being shown for purposes of illustration.

#### DETAILED DESCRIPTION

[0016] In general, the present subject matter is directed to a cellular covering for an architectural feature or structure (referred to herein simply as an architectural “structure” for the sake of convenience without intent to limit), such as a window or door, that includes

internal cell liners installed within the cells of the cellular blanket or panel of the covering. Specifically, in several embodiments, each cell liner may be installed within the interior of a respective cell at or adjacent to the location or junction at which the cell is coupled to an adjacent cell.

[0017] As will be described below, each cell liner may be configured to function, at least in part, as a shield or divider to prevent the opposed ends of portions of each cell from sticking together prior to curing or drying of the adhesive used to couple adjacent cells together. In this regard, one side of each liner may be treated or coated with a release agent that serves to prevent portions of the cell from sticking the liner. As a result, when the cellular panel is collapsed and the opposed end or portion of a given cell is pressed against or otherwise contacts the associated liner, the release agent may prevent such portion of the cell from sticking to the liner despite any adhesive that may have wept through the cell material into the interior of the cell.

[0018] Additionally, in several embodiments, the side of each cell liner opposite the side treated or coated with the release agent may be treated or coated with an adherence agent that facilitates coupling the liner to the portion(s) of the cell material positioned at the adjacent junction end of the cell. As such, the adherence agent may function to provide a secure connection between the liner and the adjacent portion(s) of the cell, thereby ensuring that the liner is maintained at a desired position within the cell.

[0019] Referring now to the drawings, FIG. 1 illustrates a perspective view of one embodiment of a covering 30 for an architectural structure in accordance with aspects of the present subject matter. In general, the covering 30 may be configured to be installed relative to a window, door, or any other suitable architectural structure as may be desired. In one embodiment, the covering 30 may be configured to be mounted relative to an architectural structure to allow the covering 30 to be suspended or supported relative to the architectural structure. It should be understood that the covering 30 is not limited in its particular use as a window or door shade, and may be used in any application as a covering, partition, shade, and/or the like, relative to and/or within any type of architectural structure.

[0020] In several embodiments, the covering 30 may be configured as a horizontal-type, extendable/retractable cellular covering. For example, in the embodiment shown in FIG. 1, the covering 30 includes a headrail 32, a bottom rail 34, and a cellular covering element (e.g., a cellular blanket or panel 36) extending between the headrail 32 and the bottom rail

34. As shown, the headrail 32 and the bottom rail 34 extend in a longitudinal or lateral direction of the covering 30 (as indicated by arrow L in FIG. 1) across a lateral width 38 of the covering 30. Specifically, the headrail 32 extends laterally between a first lateral end 40 of the headrail 32 and a second lateral end 42 of the headrail 32. Similarly, the bottom rail 34 extends laterally between a first lateral end 44 of the bottom rail 34 and a second lateral end 46 of the bottom rail 34. Additionally, the cellular panel 36 is generally configured to extend in the lateral direction L across the lateral width 38 of the covering 30 (e.g., between opposed first and second lateral sides 48, 50 of the panel 36) and in a vertical direction of the covering 30 (as indicated by arrow V in FIG. 1) between the headrail 32 and the bottom rail 34. In this regard, the vertical height of the cellular panel 36 defined between the headrail 32 and the bottom rail 34 when the covering 30 is in the fully extended position (e.g., as shown in FIGS. 1 and 2) generally defines a drop length 52 of the covering 30 in the vertical direction V. Additionally, the cellular panel 36 may also define a front side 54 and a rear side 56 spaced apart from each other along a crosswise direction CW of the covering 30 (as indicated by arrow CW in FIG. 1)

[0021] It should be appreciated that the cellular panel 36 may generally have any suitable configuration that allows it to form a cellular-type covering element. For instance, in the illustrated embodiment, the cellular panel 36 includes a plurality of vertically aligned cells 58, with the cells 58 being stacked or joined one on top of the other to form the vertically extending blanket or panel 36. Specifically, each cell 58 may be coupled to or intersect with an adjacent cell 58 at a cell interface or junction 60 defined between the adjacent cells 58. In this regard, when each cell 58 is formed from one or more separate strips of material (e.g., a single strip of material forming the entire cell 58 or first and second strips of material forming the opposed front and rear sides of each cell 58, respectively), the strip(s) of material forming such cell 58 may be coupled to the strip(s) of material forming the adjacent cell 58 (e.g., via an adhesive) at the adjacent cell junction 60. Additionally, in the illustrated embodiment, the cells 58 of the cellular panel 36 generally define a honeycomb or hexagonal shape. However, in alternative embodiments, the cells 58 may define any other suitable shape, such as a pentagonal shape. It should also be appreciated that, although the cellular panel 36 is shown as including a single column of vertically aligned cells 58, the panel 36 may, instead, include two or more columns of vertically aligned cells.

[0022] Additionally, in several embodiments, the covering 30 may include a lift system 62 for moving the covering 30 in the vertical direction V between a lowered or fully extended position (e.g., as shown in FIG. 1), at which the bottom rail 34 is spaced apart vertically from the headrail 32 by the covering's drop length 52, and a raised or fully retracted position, at which the bottom rail 34 is positioned generally adjacent to the headrail 32 (less the collapsed or flattened cellular panel 36 extended therebetween). In general, the lift system 62 may include a plurality of lift system components (shown in FIG. 1 in dashed lines), such as lift cords, lift stations, motors, lift rods, and/or the like. For instance, in the illustrated embodiment, the lift system 62 includes a pair of lift cords (e.g., a first lift cord 64 and a second lift cord 66), with each lift cord 64, 66 extending between the headrail 32 and the bottom rail 34 and being coupled to a respective lift station 68, 70. However, it should be appreciated that, depending on the lateral width 38 of the covering 30, the lift system 62 may include additional lift cords. For instance, for wider coverings, the lift system 62 may include four, six or more lift cords extending between the headrail 32 and bottom rail 34, with the various lift cords being spaced apart from one another across the lateral width 38 of the covering 30. Additionally, the lift system 62 may also include a lift rod 72 operatively coupled to the lift stations 68, 70, a motor 74 (e.g., a spring motor) configured to rotationally drive the lift rod 72, and, in certain instances, a brake assembly 76 configured to stop unintended rotation of the lift rod 72 and, thus, unintended motion of the bottom rail 34 relative to the headrail 32 (e.g., when the motor 74 is overpowered or underpowered). It should be appreciated that, although the various lift system components are shown as being housed within the bottom rail 34, such components may, instead, be housed within the headrail 32. It should also be appreciated that, in other embodiments, the lift system 62 may have any other suitable configuration (including any other suitable combination of components) that allows the bottom rail 34 to be raised and lowered relative to the headrail 32.

[0023] Referring now to FIG. 2, a partial, cross-sectional view of the covering 30 shown in FIG. 1 (e.g., taken about line II-II) is illustrated in accordance with aspects of the present subject matter, particularly illustrating a vertical section of the cellular blanket 36. As shown, the vertically aligned cells 58 are generally stacked or joined one on top of the other to form the cellular blanket 36, with each cell 58 being coupled to an adjacent cell 58 at a cell interface or junction 60 defined between the adjacent cells 58. Specifically, each cell 58

may extend vertically between a first or upper junction end 60A and a second or lower junction end 60B, with the upper junction end 60A of each cell 58 being coupled to the lower junction end 60B of an adjacent upper cell 58 at one cell junction 60 and the lower junction end 60B of such cell 58 being coupled to the upper junction end 60A of an adjacent lower cell 58 at its opposed cell junction 60. In several embodiments, the connection or coupling between adjacent cells 58 at each cell junction 60 may be provided via a suitable adhesive. For instance, as shown in FIG. 2, one or more lines of adhesive or adhesives beads 80 may be provided between the junction ends 60A, 60B of adjacent cells 58 to couple the cells 58 together at each cell junction 60.

[0024] In general, each individual cell 58 of the cellular blanket 36 may be formed from one or more separate strips of material or “material strips” 82 extending between the cell junctions 60 defined between adjacent cells 58. For example, in the illustrated embodiment, each cell 58 is formed from a single material strip 82 that is looped between the adjacent cell junctions 60 to form the perimeter or cellular structure of the cell 58. Specifically, the looped strip 82 may be configured to extend between a first strip end 84 and a second strip end 86, with the ends 84, 86 of the looped strip 82 being coupled to the material strip 82 of an adjacent cell 58 at one of the adjacent cell junctions 60 (e.g., at the upper junction end 60A of the cell 58). In such an embodiment, the looped strip 82 may be coupled to the material strip 82 of the other adjacent cell 58 at a given location between its first and second ends 84, 86 so as to define the other cell junction 60 (e.g., at the lower junction end 60B of the cell 58). Additionally, as shown in FIG. 2, by using a single strip design, the looped strip 82 may define portions of both the front and rear sides 48, 50 of the cellular panel 36. Specifically, along the front side 48 of the cellular panel 36, the material strip 82 may be configured to form a front upper wall segment 88 extending between the upper junction end 60A of the cell 58 and a front fold or crease line 90 formed in the material strip 82 and a front lower wall segment 92 extending between the front crease line 90 and the lower junction end 60B of the cell 58. Similarly, along the rear side 50 of the cellular panel 36, the material strip 82 may be configured to form a rear upper wall segment 94 extending between the upper junction end 60A of the cell 58 and a rear fold or crease line 96 formed in the material strip 82 and a rear lower wall segment 98 extending between the rear crease line 96 150 and the lower junction end 60B of the cell 58.



[0025] It should be appreciated that, in alternative embodiments, each cell 58 may be formed from more than one strips of material. For instance, in one alternative embodiment, each cell 58 may be formed from two separate strips of material extending between the adjacent cell junction 60, with the upper ends of each material strip being coupled to the adjacent upper cell 58 at the upper junction end 60A of the cell 58 and the lower ends of each material strip being coupled to the adjacent lower cell 58 at the lower junction end 60B of the cell 58. In such an embodiment, a “front” strip may extend between the adjacent cell junctions 60 along the front side 48 of the cellular panel 36 to form the front wall segments 88, 92 and associated crease line 90. Similarly, a “rear” strip may extend between the adjacent cell junctions 60 along the rear side 50 of the cellular panel 36 to form the rear wall segments 94, 98 and associated crease line 96.

[0026] In several embodiments, the cellular panel 36 may be configured to provide an at least partially transparent or “view-through” shade configuration. In such embodiments, the various material strips 82 defining the cells 58 of the panel 36 may be formed, for example, from a sheer material that allows visible light to pass therethrough. For instance, in one embodiment, the sheer material may have an openness factor (e.g., the percentage of open space within the material as calculated, for instance, by measuring the area occupied by both the material and the open spaces defined therein and calculating the percentage of total area that does not include material) of greater than or equal to 50% and less than or equal to 95%, such as greater than or equal to 55% and less than or equal to 90% and any other subranges therebetween in increments of 1 percent. As is generally understood, the higher the openness factor, the more sheer and greater transparency is provided by the material.

[0027] In several embodiments, the various material strips 82 of the cellular panel 36 may be formed from a woven fabric having a plurality of intersecting yarns (e.g., in a given pattern). In such embodiments, the yarn density (e.g., in the warp and weft directions) can be selected in order to construct a fabric having a desired balance of strength and view-through. In one embodiment, the yarn density of the woven fabric may range from greater than or equal to 15 yarns per centimeter in a given direction (e.g., the warp or weft directions) to less than or equal to 80 yarns per centimeter in such direction, such as from greater than or equal to 20 yarns per centimeter in a given direction to less than or equal to 75 yarns per centimeter in such direction and any other sub-ranges defined therebetween in increments of 1 yarn per centimeter. Additionally, the size and type of yarns may be

selected, for example, so that: (1) the fabric is made with a desired amount of openness (e.g., with a certain number of crossover points); (2) the resulting fabric has sufficient strength, sufficient flexibility and a thickness that allows the material to extend and retract as part of an architectural covering; and/or (3) the material does not add an undesirable amount of weight to the covering. The yarns, for instance, may comprise spun yarns, multifilament yarns, monofilament yarns, or mixtures thereof. Moreover, the basis weight of the woven material can vary depending upon the type of yarns, the size of yarns used to make the material, and the amount of openness in the material). In some embodiments, the basis weight of the woven material is greater than or equal to about 5 grams per square meter (gsm) and less than or equal to about 200 gsm, such as from greater than or equal to 10 gsm and less than or equal to 190gsm and any other sub-ranges defined therebetween in increments of 1 gsm. One example of a woven material used to form a sheer fabric (e.g., a sheer organza fabric) suitable for use within the disclosed cellular panel 36 is described in International Application No. PCT/US2020/028114 (published as WO2020/219302), assigned to Hunter Douglas Inc., the disclosure of which is hereby incorporated by reference herein in its entirety for all purposes.

[0028] It should be appreciated that, as an alternative to sheer materials, the cellular panel 36 may be formed from any other suitable type of material having any suitable degree of transparency/opacity, including other semi-transparent/opaque materials, opaque materials (including blackout materials), and the like. Additionally, it should be appreciated that, as an alternative to woven fabric materials, the various cells 58 of the disclosed cellular panel 36 may be formed from any other suitable materials, including non-woven webs, films, etc. In particular embodiments, the cellular panel 36 may be formed from any suitable cell material that allows an adhesive applied thereto to at least partially weep through the cell material. Thus, in addition to sheer materials, various other materials having a given porosity or openness factor that allows an adhesive to at least partially weep therethrough may be used to form each cell 58.

[0029] Referring still to FIG. 2, in accordance with aspects of the present subject matter, the cellular panel 36 may also include an inner cell liner 100 positioned within the interior of each cell 58. In general, each cell liner 100 may be configured to be coupled along the inner perimeter of the associated cell 58 at or adjacent to one of the junction ends 60A, 60B of the cell 58. For instance, in the illustrated embodiment, each cell liner 100 is coupled to

an inner surface of the associated cell 58 at the lower junction end 60B of the cell 58. However, in other embodiments, the cell liners 100 may be coupled to the inner surface of their respective cells 58 at the upper junction ends 60A of the cells 58.

[0030] By installing the cell liner 100 within the interior of the cell 58 at one of the junction ends 60A, 60B, the liner 100 may provide numerous advantages. For instance, during the manufacturing process, the liner 100 may serve as a shield or divider to prevent the opposed junction ends 60A, 60B of each cell 58 from sticking to each other when cellular panel 36 is collapsed. Specifically, during formation of the cellular panel 36, the adhesive 82 applied at each cell junction 60 may weep through the adjacent portions of the material strip(s) 82, particularly for strips 82 formed from a relatively open material (e.g., a sheet material). Thus, if the cellular panel 36 is collapsed into a closed position prior to the adhesive drying or curing, the upper and lower junction ends 60A, 60B of each cell 58 can become stuck together via the adhesive that has wept through to the interior of the cell 58. In this regard, the disclosed liners 100 may prevent such sticking of the junction ends 60A, 60B of the cells 58. In addition, the liners 100 may also provide advantages to the finished panel post-manufacturing. For instance, by permanently installing the liners 100 within the cells 58, the liners 100 may provide additional structure at the cell junctions 58 defined between adjacent cells 58, thereby improving the structural integrity of the cellular panel 36.

[0031] In several embodiments, each cell liner 100 may be formed from a film, such as an engineered film. In one embodiment, each cell liner 100 may be formed from a polymer film. For instance, suitable polymer film materials may include, but are not limited to, polyester, polycarbonate, nylon, polypropylene, polyethylene, and/or the like. However, in other embodiments, each cell liner 100 may be formed from non-polymer materials and/or may not correspond to a film. Additionally, in several embodiments, each cell liner 100 may be fully transparent (e.g., by being formed from a clear film). However, in other embodiments, each liner 100 may have some degree of opacity, such as by having an opacity ranging from greater than 0% to less than or equal to 100%, such as an opacity of greater than or equal to 5% to less than or equal to 50% and any other subranges therebetween in increments of 1%. In several embodiments, a color of each cell liner 100 may be selected to substantially match the color of the respective cell 58 within each the liner 100 is installed. For instance, in one embodiment, each cell liner 100 may be colored (e.g., via the inclusion of suitable color tints, pigments, etc.) to substantially match the color

of the material (e.g., a fabric material) used to form the various cells 58 of the cellular panel 36.

[0032] In several embodiments, each cell liner 100 may be designed to be relatively thin to minimize both the added weight to the cellular panel 36 and any impact on the view-through the panel 36. For instance, in one embodiment, a material thickness 102 (FIG. 3) of each liner 100 may range from greater than or equal to 20 gauge (i.e., approximately 0.005 millimeters) to less than or equal to 625 gauge (i.e., approximately 0.158 millimeters), such as from greater than or equal to 25 gauge to less than or equal to 600 gauge and/or any subranges therebetween in increments of 1 gauge. However, in other embodiments, each liner 100 may have any other suitable thickness that allows it function as described herein. Additionally, in several embodiments, each cell liner may define a width 104 (FIG. 3) (e.g., in the crosswise direction CW of the cellular panel 36) that range from greater than or equal to 0.25 inches to less than or equal to 1 inch, such as from greater than or equal to 0.5 inches to less than or equal to 0.75 inches and/or any other subranges therebetween in increments of 0.05 inches. However, it should be appreciated that the liner width 104 may generally vary depending on the crosswise width of the cell junctions 60 defined between adjacent cells 58.

[0033] As indicated above, each internal cell liner 100 may be configured to function, at least in part, as a shield or divider to prevent the opposed junction ends 60A, 60B of each cell 58 from sticking together prior to curing or drying of the adhesive used to couple adjacent cells 58 together. In this regard, to facilitate such functionality, an inner side 106 (FIG. 3) of each liner 100 (i.e., the side of the liner 100 that faces the interior of the cell 58 and, thus, the opposed junction end of the cell) may be treated or coated with a release agent. For instance, suitable release agents may include, but are not limited to, silicone, a fluorosilicone, a fluorochemical, and/or other non-stick materials having a release chemistry that can prevent an adhesive from adhering thereto. As a result, when the cellular panel 36 is collapsed and the opposed junction end of each cell 58 (e.g., the upper junction end 60A in the illustrated embodiment) is pressed against or otherwise contacts the inner side of the associated liner 100, the release agent may prevent such portion of the cell 58 from sticking to the liner 100 despite any adhesive that may have wept through the cell material into the interior of the cell 58.

[0034] Additionally, in accordance with aspects of the present subject matter, an opposed, outer side 108 (FIG. 3) of the liner 100 (i.e., the side of the liner 100 that faces away from the interior of the cell 58 and, thus, towards the adjacent junction end of the cell 58) may, in several embodiments, be treated or coated with or otherwise come into contact with an adherence agent that facilitates coupling the liner 100 to the portion(s) of the cell material positioned at the adjacent junction end of the cell 58 (e.g., the lower junction end 58B in the illustrated embodiment). In one embodiment, the adherence agent may correspond to an adhesive coating or treatment, such as a pressure sensitive adhesive, that serves to couple the liner 100 to the adjacent portion(s) of the cell 58. In another embodiment, as opposed to a separate adhesive coating or treatment that is applied to the outer side 108 of the liner 100, the adherence agent may correspond to all or a portion of the adhesive placed at the adjacent cell junction 60 that has wept through the cell material into the interior of the cell 58 or the adherence agent may correspond to an additional bead(s) or line(s) of adhesive has been applied between each liner 100 and the adjacent portion(s) of its corresponding cell 58 to secure the liner 100 to the cell 58. Alternatively, the adherence agent may correspond to a coating or treatment that enhances the ability of the liner 100 to be coupled to the adjacent junction end of the cell 58 via a separate adhesive, such as a coating or treatment of acrylic, modified polyurethane or any other material having suitable properties for enhancing the adherence of the liner 100 to the adjacent portion(s) of the cell 58. For instance, to the extent that the adhesive placed at the adjacent cell junction 60 weeps through the cell material into the interior of the cell 58, the adherence agent may enhance the ability of the liner 100 to be adhered to the adjacent portion(s) of the cell 58 via such adhesive. Alternatively, in an embodiment in which an additional bead(s) or line(s) of adhesive has been applied between each liner 100 and the adjacent portion(s) of its corresponding cell 58 to secure the liner 100 to the cell 58, the adherence agent may enhance the ability of the liner 100 to be adhered to the adjacent portion(s) of the cell 58 via such additional layer of adhesive.

[0035] Referring now to FIGS. 3 and 4, cross-sectional views of one embodiment of one of the cell liners 100 described above with reference to FIG. 2 are illustrated in accordance with aspects of the present subject matter. In particular, FIG. 3 illustrates a close-up, cross-sectional view of the cell liner 100, with the liner 100 including suitable coatings or treatments along its opposed sides. Additionally, FIG. 4 illustrates a cross-sectional view of

the cell liner 100 shown in FIG. 3 as installed within a cell 58 that is in a collapsed or closed state, with portions of adjacent upper and lower collapsed cells 58 being shown for purposes of illustration.

[0036] As shown in FIG. 3, the liner 100 includes a base material 110 (e.g., a polymer film material) that has been coated or treated with separate agents along its opposed sides 106, 108. Specifically, in the illustrated, the inner side 106 of the liner 100 (i.e., the side that is configured to face towards the interior of the corresponding cell 58 and, thus, the opposed junction end of the cell 58) has been treated with a release agent 112 (e.g., a silicone coating). For instance, as shown in FIG. 3, the release agent 112 defines or forms part of an inner surface 114 of the liner 100 extending across the inner side 106 of the liner 100. As such, when the cell 58 in which the liner 100 is installed is moved to its collapsed or closed state (see FIG. 4), the portion(s) of the cell 58 contacting against the inner surface 114 of the liner 100 will not stick to the liner 100. For example, as shown in FIG. 4, the opposed ends 84, 86 of the material strip 82 positioned at the upper junction end 6-A of the illustrated cell 58 are pressed against or otherwise contact the inner surface 114 (FIG. 3) of the liner 100 when the cell 58 is collapsed. In such instance, even if adhesive (e.g., from adhesive lines 80) weeps through the cell material from the adjacent cell junction 60, the release agent 112 will prevent the adjacent portions of the cell 58 from sticking to the inner surface 114 of the liner 100.

[0037] Additionally, as shown in FIG. 3, the outer side 108 of the liner 100 (i.e., the side that is configured to face away from the interior of the corresponding cell 58 and, thus, towards the adjacent junction end of the cell 58) has been treated with an adherence agent 116. Specifically, in the illustrated embodiment, the adherence agent 116 defines or forms part of an outer surface 118 of the liner 100 extending across the outer side 108 of the liner 100. As such, when the liner 100 is installed relative to one of the junction ends 60A, 60B of a given cell 58, the adherence agent 116 may facilitate coupling the liner 100 to the cell 58. For example, when the adherence agent 116 comprises a layer or coating of a given adhesive, the adherence agent 116, itself, may provide a direct connection to the adjacent portion of the cell 58. Alternatively, when the adherence agent 116 comprises a coating or treatment adapted to enhance the ability of the liner 100 to engage with or stick to a separate source of adhesive (e.g., adhesive wept through the adjacent junction end of the cell 58 or from an additional adhesive line positioned between the cell 58 and the liner 100), the

adherence agent 116 may allow for a strong adhesive connection to be formed between the liner 100 and the cell 58.

[0038] While the foregoing Detailed Description and drawings represent various embodiments, it will be understood that various additions, modifications, and substitutions may be made therein without departing from the spirit and scope of the present disclosure. Each example is provided by way of explanation without intent to limit the broad concepts of the present disclosure. In particular, it will be clear to those skilled in the art that principles of the present disclosure may be embodied in other forms, structures, arrangements, proportions, and with other elements, materials, and components, without departing from the spirit or essential characteristics thereof. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present disclosure covers such modifications and variations as come within the scope of the appended claims and their equivalents. One skilled in the art will appreciate that the disclosure may be used with many modifications of structure, arrangement, proportions, materials, and components and otherwise, used in the practice of the disclosure, which are particularly adapted to specific environments and operative requirements without departing from the principles of the present disclosure. For example, elements shown as integrally formed may be constructed of multiple parts or elements shown as multiple parts may be integrally formed, the operation of elements may be reversed or otherwise varied, the size or dimensions of the elements may be varied. The presently disclosed embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the present disclosure being indicated by the appended claims, and not limited to the foregoing description.

[0039] It should also be understood that, as described herein, an "embodiment" (such as illustrated in the accompanying Figures) may refer to an illustrative representation of an environment or article or component in which a disclosed concept or feature may be provided or embodied, or to the representation of a manner in which just the concept or feature may be provided or embodied. However, such illustrated embodiments are to be understood as examples (unless otherwise stated), and other manners of embodying the described concepts or features, such as may be understood by one of ordinary skill in the art upon learning the concepts or features from the present disclosure, are within the scope of

the disclosure. In addition, it will be appreciated that while the Figures may show one or more embodiments of concepts or features together in a single embodiment of an environment, article, or component incorporating such concepts or features, such concepts or features are to be understood (unless otherwise specified) as independent of and separate from one another and are shown together for the sake of convenience and without intent to limit to being present or used together. Independent concepts can be used in any configuration as may be appreciated by one ordinary skill in the art. For instance, concepts or features illustrated or described as part of one embodiment can be used separately, or with another embodiment to yield a still further embodiment. Thus, it is intended that the present disclosure covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0040] In the foregoing Detailed Description, it will be appreciated that the phrases “at least one”, “one or more”, and “and/or”, as used herein, are open-ended expressions that are both conjunctive and disjunctive in operation. The term “a” or “an” element, as used herein, refers to one or more of that element. As such, the terms “a” (or “an”), “one or more” and “at least one” can be used interchangeably herein. All directional references (e.g., proximal, distal, upper, lower, upward, downward, left, right, lateral, longitudinal, front, rear, top, bottom, above, below, vertical, horizontal, cross-wise, radial, axial, clockwise, counterclockwise, and/or the like) are only used for identification purposes to aid the reader’s understanding of the present disclosure, and/or serve to distinguish regions of the associated elements from one another, and do not limit the associated element, particularly as to the position, orientation, or use of the present disclosure. Connection references (e.g., attached, coupled, connected, joined, secured, mounted and/or the like) are to be construed broadly and may include intermediate members between a collection of elements and relative movement between elements unless otherwise indicated. As such, connection references do not necessarily infer that two elements are directly connected and in fixed relation to each other. Identification references (e.g., primary, secondary, first, second, third, fourth, etc.) are not intended to connote importance or priority, but are used to distinguish one feature from another.

[0041] All apparatuses and methods disclosed herein are examples of apparatuses and/or methods implemented in accordance with one or more principles of the present disclosure. These examples are not the only way to implement these principles but are merely



examples. Thus, references to elements or structures or features in the drawings must be appreciated as references to examples of embodiments of the present disclosure, and should not be understood as limiting the disclosure to the specific elements, structures, or features illustrated. Other examples of manners of implementing the disclosed principles will occur to a person of ordinary skill in the art upon reading this disclosure.

[0042] This written description uses examples to disclose the present disclosure, including the best mode, and also to enable any person skilled in the art to practice the present disclosure, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the present disclosure is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

[0043] The following claims are hereby incorporated into this Detailed Description by this reference, with each claim standing on its own as a separate embodiment of the present disclosure. In the claims, the term “comprises/comprising” does not exclude the presence of other elements or steps. Furthermore, although individually listed, a plurality of means, elements or method steps may be implemented by, e.g., a single unit or processor. Additionally, although individual features may be included in different claims, these may possibly advantageously be combined, and the inclusion in different claims does not imply that a combination of features is not feasible and/or advantageous. In addition, singular references do not exclude a plurality. The terms “a”, “an”, “first”, “second”, etc., do not preclude a plurality. Reference signs in the claims are provided merely as a clarifying example and shall not be construed as limiting the scope of the claims in any way.

## WHAT IS CLAIMED IS:

1. A cellular panel for use with a covering for an architectural structure, the cellular panel comprising:

a plurality of cells, with each cell of the plurality of cells being coupled to an adjacent first cell of the plurality of cells at a first cell junction and to an adjacent second cell of the plurality of cells at a second cell junction, each cell extending between a first junction end positioned adjacent to the first cell junction and a second junction end positioned adjacent to the second cell junction; and

a plurality of cell liners, each cell liner of the plurality of cell liners being positioned within a respective cell of the plurality of cells, each cell liner including an inner side and an outer side opposite the inner side,

wherein:

the outer side of each cell liner is coupled to the respective cell at one of the first junction end or the second junction end of the respective cell;

the inner side of each cell liner faces towards the other of the first junction end or the second junction end of the respective cell; and

a release agent is provided along the inner side of each cell liner.

2. The cellular panel of claim 1, wherein an adherence agent is provided along the outer side of each cell liner.

3. The cellular panel of claim 2, wherein the adherence agent comprises an adhesive that has wept through a cell material forming each cell at the one of the first junction end or the second junction end or the adherence agent comprises a separate layer of adhesive provided along the outer side of each cell liner.

4. The cellular panel of claim 2, wherein the adherence agent comprises a coating or treatment applied to a base material of each cell liner.

5. The cellular panel of claim 4, wherein the coating or treatment comprises at least one of an acrylic or a modified polyurethane.

6. The cellular panel of claim 1, wherein:  
each cell liner defines an inner surface extending across the inner side of said cell liner; and

the other of the one of the first junction end or the second junction end of the respective cell is configured to contact the inner surface of the cell liner positioned therein when the respective cell is moved to a collapsed or closed state.

7. The cellular panel of claim 6, wherein the release agent defines or forms part of the inner surface of each cell liner.

8. The cellular panel of claim 1, wherein the release agent comprises a coating or treatment applied to a base material of each cell liner.

9. The cellular panel of claim 8, wherein the coating or treatment comprises at least one of silicone a fluorosilicone, or a fluorochemical.

10. The cellular panel of claim 1, wherein each cell is formed from a cell material that permits an adhesive applied at one or both of the first cell junction or the second cell junction to at least partially weep through the cell material.

11. The cellular panel of claim 1, wherein each cell is formed from a sheer material.

12. The cellular panel of claim 1, wherein each cell liner is formed from a film.

13. The cellular panel of claim 12, wherein the film comprises a polymer film.

14. The cellular panel of claim 13, wherein the polymer film is formed from at least one of polyester, polycarbonate, nylon, polypropylene, or polyethylene.

15. The cellular panel of claim 1, wherein the film comprises a transparent film.

16. The cellular panel of claim 1, wherein a thickness of each cell liner ranges from greater than or equal to 20 gauge to less than or equal to 625 gauge.

17. The cellular panel of claim 1, wherein a color of each cell liner substantially matches a color of the respective cell.

18. A covering for an architectural structure, the covering comprising:  
a headrail;  
a bottom rail spaced apart from the headrail; and  
a cellular panel extending between the headrail and the bottom rail, the cellular panel comprising:

a plurality of cells, with each cell of the plurality of cells being coupled to an adjacent first cell of the plurality of cells at a first cell junction and to an adjacent second cell of the plurality of cells at a second cell junction, each cell extending between a first junction end positioned adjacent to the first cell junction and a second junction end positioned adjacent to the second cell junction, each cell being formed from a cell material that permits an adhesive to at least partially weep through the cell material; and

a plurality of cell liners, each cell liner of the plurality of cell liners being positioned within a respective cell of the plurality of cells, each cell liner including an inner side and an outer side opposite the inner side, wherein:

the outer side of each cell liner is coupled to the respective cell at one of the first junction end or the second junction end of the respective cell;

the inner side of each cell liner faces towards the other of the first junction end or the second junction end of the respective cell; and

a release agent is provided along the inner side of each cell liner.

19. The covering of claim 18, wherein an adherence agent is provided along the outer side of each cell liner.

20. The covering of claim 19, wherein the adherence agent comprises an adhesive that has wept through a cell material forming each cell the one of the first junction end or the second junction end or the adherence agent comprises a separate layer of adhesive provided along the outer side of each cell liner.

21. The covering of claim 19, wherein the adherence agent comprises a coating or treatment applied to a base material of each cell liner.

22. The covering of claim 21, wherein the coating or treatment comprises at least one of an acrylic or a modified polyurethane.

23. The covering of claim 18, wherein:  
each cell liner defines an inner surface extending across the inner side of said cell liner; and

the other of the one of the first junction end or the second junction end of the respective cell is configured to contact the inner surface of the cell liner positioned therein when the respective cell is moved to a collapsed or closed state.

24. The covering of claim 23, wherein the release agent defines or forms part of the inner surface of each cell liner.
25. The covering of claim 18, wherein the release agent comprises a coating or treatment applied to a base material of each cell liner.
26. The covering of claim 25, wherein the coating or treatment comprises at least one of silicone a fluorosilicone, or a fluorochemical.
27. The covering of claim 18, wherein from the cell material comprises a sheer material.
28. The covering of claim 18, wherein each cell liner is formed from a film.
29. The covering of claim 28, wherein the film comprises a polymer film.
30. The covering of claim 29, wherein the polymer film is formed from at least one of polyester, polycarbonate, nylon, polypropylene, or polyethylene.
31. The covering of claim 28, wherein the film comprises a transparent film.
32. The covering of claim 18, wherein a thickness of each cell liner ranges from greater than or equal to 20 gauge to less than or equal to 625 gauge.
33. The covering of claim 18, wherein a color of each cell liner substantially matches a color of the respective cell.



2/3

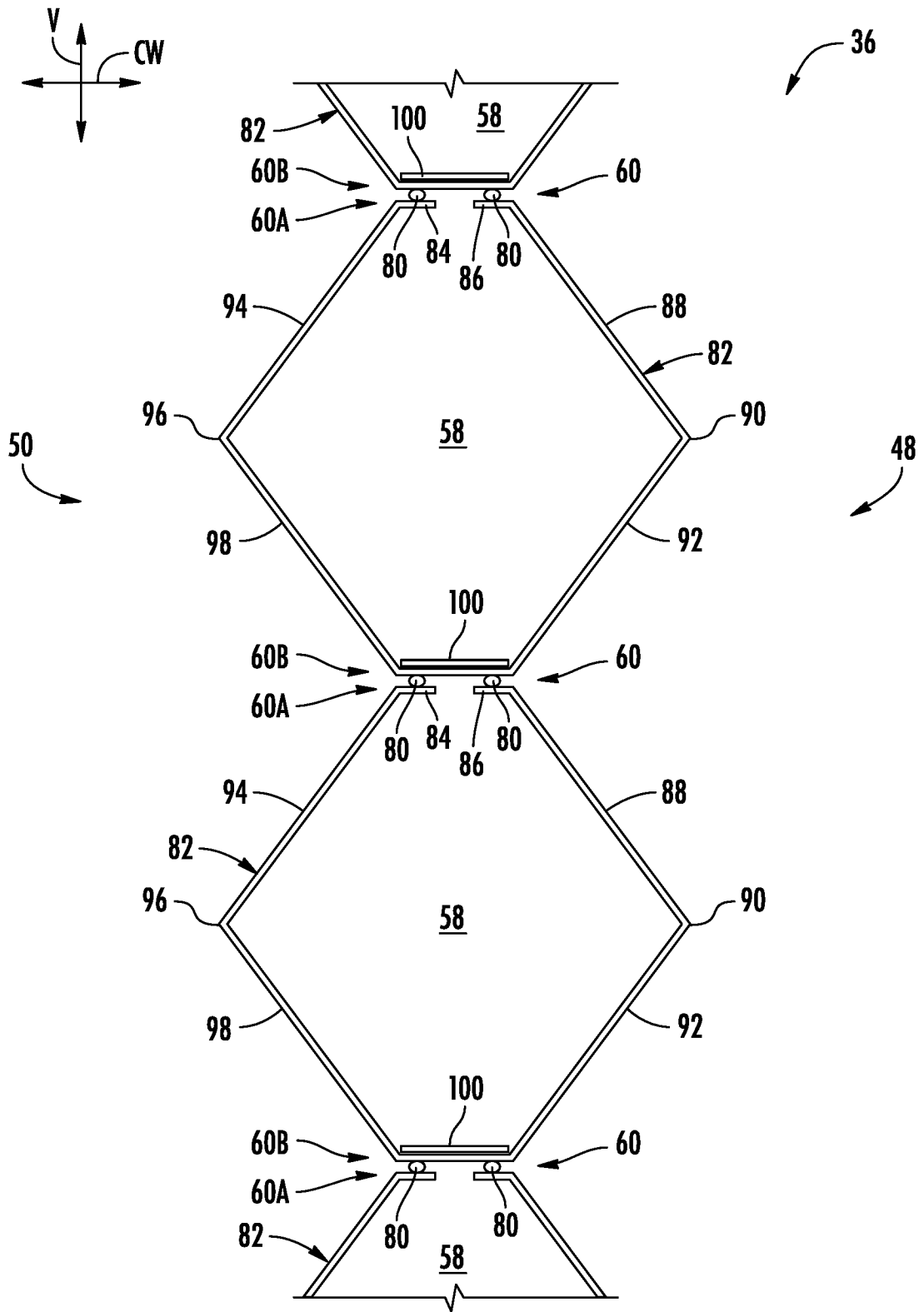


FIG. 2

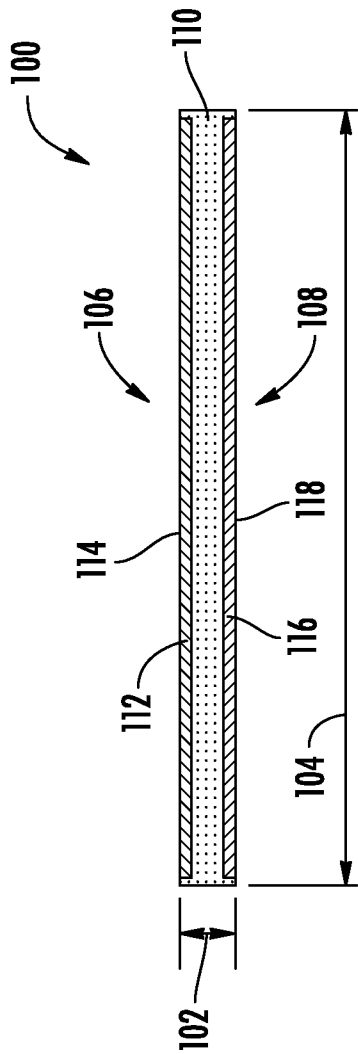


FIG. 3

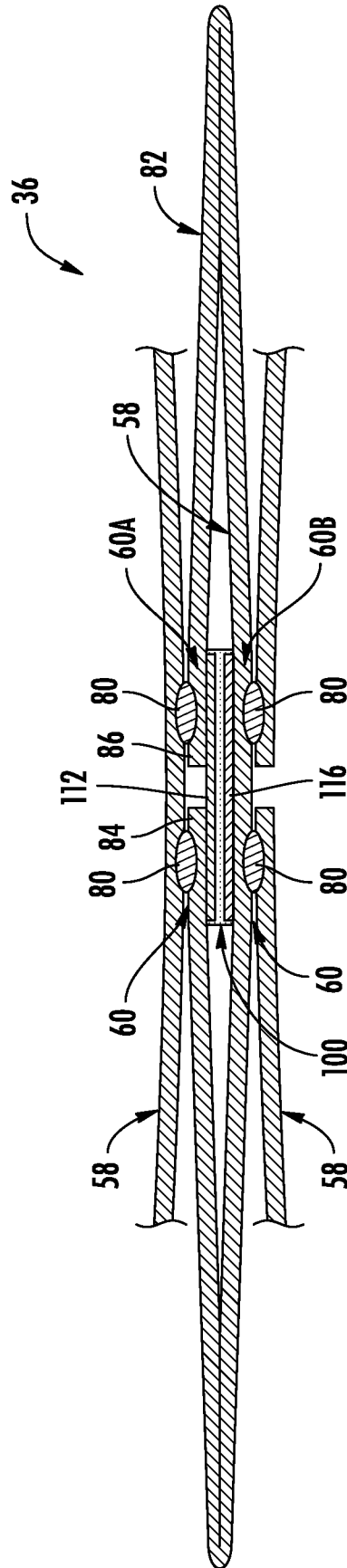


FIG. 4



# INTERNATIONAL SEARCH REPORT

International application No  
**PCT/US2023/031589**

**A. CLASSIFICATION OF SUBJECT MATTER**  
**INV. E04F10/10**  
**ADD.**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
**E04F E06B**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**EPO-Internal**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--|-----------------------|
| <b>X</b>  | <b>US 5 205 333 A (JUDKINS REN [US])</b><br><b>27 April 1993 (1993-04-27)</b><br><b>abstract; figures 21-22,1-3</b><br><b>column 13, line 10 - line 20</b><br>-----      | <b>1-33</b>           |
| <b>X</b>  | <b>US 5 043 039 A (SWISZCZ PAUL [US])</b><br><b>27 August 1991 (1991-08-27)</b><br><b>abstract; figure 9</b><br>-----  | <b>1</b>              |
| <b>X</b>  | <b>US 8 596 327 B2 (RUPEL JOHN D [US]; HUNTER DOUGLAS [US])</b><br><b>3 December 2013 (2013-12-03)</b><br><b>abstract; figures 3,8</b><br><b>feature 40,240</b><br>----- | <b>1</b>              |
| <b>A</b>  | <b>US 5 691 031 A (SWISZCZ PAUL G [US] ET AL)</b><br><b>25 November 1997 (1997-11-25)</b><br><b>abstract; figure 4</b><br><b>feature 58</b><br>-----                     | <b>1-33</b>           |

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

**24 January 2024**

**07/02/2024**

Name and mailing address of the ISA/  
 European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040,  
 Fax: (+31-70) 340-3016

Authorized officer

**Wehland, Florian**

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

**PCT/US2023/031589**

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date        |
|--|------------------|-------------------------|-------------------------|
| US 5205333                             | A                | 27-04-1993              | NONE                    |
| -----                                  |                  |                         |                         |
| US 5043039                             | A                | 27-08-1991              | NONE                    |
| -----                                  |                  |                         |                         |
| US 8596327                             | B2               | 03-12-2013              | NONE                    |
| -----                                  |                  |                         |                         |
| US 5691031                             | A                | 25-11-1997              | AU 2813492 A 20-05-1993 |
|  |                  | CA 2082206 A1           | 14-05-1993              |
|  |                  | EP 0542492 A2           | 19-05-1993              |
|  |                  | JP H05231078 A          | 07-09-1993              |
|  |                  | US 5654073 A            | 05-08-1997              |
|  |                  | US 5690778 A            | 25-11-1997              |
|  |                  | US 5691031 A            | 25-11-1997              |
|  |                  | US 6066382 A            | 23-05-2000              |
|  |                  | ZA 928691 B             | 10-05-1993              |
| -----                                  |                  |                         |                         |