

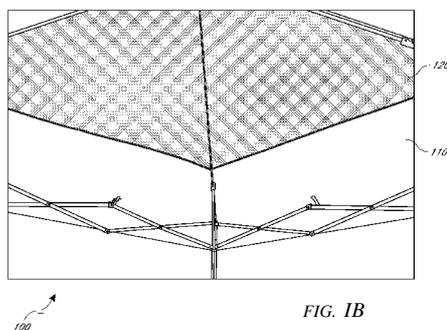
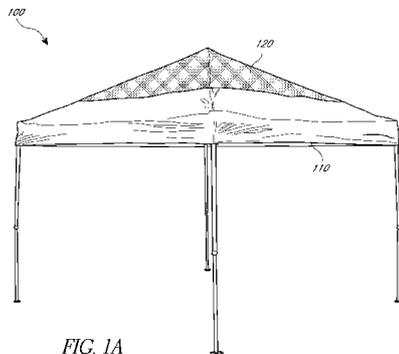


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(54) **Title:** CANOPY STRUCTURE



(57) **Abstract:** A canopy structure can comprise a frame comprising a base portion and a top portion. The top portion can comprise a plurality of frame members joined proximate to a peak of the frame. The canopy structure can further comprise a cover configured to cover the top portion of the frame comprising a center cover portion and one or more perimeter cover portions. The center cover portion can be configured to be adjustable between a closed position configured to provide a reduced ventilation air flow and an open position configured to provide an increased ventilation air flow.

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## CANOPY STRUCTURE RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/594,626, filed February 3, 2012, the entire contents of which are incorporated herein by reference.

### BACKGROUND

#### Field of the Invention

[0001] The inventions disclosed herein relates generally to canopy structures, including tent canopy structures, and collapsible support structures. The inventions disclosed herein also relate generally to collapsible chairs.

### SUMMARY

[0002] In some embodiments, a canopy structure generally comprises a frame comprising a plurality of support members; and a top cover configured to cover the frame comprising a center mesh portion and a perimeter fabric portion. The center mesh portion can comprise a peak of the cover. The perimeter fabric portion can comprise a lower perimeter of the cover. The center mesh portion can comprise about 50 percent or more of a surface area of the cover. Alternatively, the center mesh portion can comprise about 80 percent or more of a surface area of the cover. The center mesh portion can be permeable to air but not to water.

[0003] In some embodiments, the canopy structure can further comprise a rain fly comprising a fabric not permeable to water, the rain fly configured to cover the center mesh portion. The canopy structure can further comprise a plurality of D rings configured to connect the rain fly to the canopy structure. The rain fly can be configured to be partially removable. Alternatively, the rain fly can be configured to be completely removable.

[0004] In some embodiments, a canopy structure generally comprises a plurality of vertical support members; a first plurality of horizontal support members, each of the first plurality of horizontal support members comprising a first and second end, wherein the first end of each of the first plurality of horizontal support members is configured to be supported by one of the plurality of vertical support members; a second plurality of horizontal support members, each of the second plurality of horizontal support members comprising a first and second end, wherein the first end of each of the second plurality of horizontal support members is configured to be supported by one of the plurality of vertical support members; and a plurality of connectors, one of the plurality of connectors between the

second end of each of the first plurality of horizontal support members and the second end of each of the second plurality of horizontal support members; wherein each of the plurality of connectors can be configured in a first state in which one of the first plurality of horizontal support members and one of the second plurality of horizontal support members are joined in a substantially smooth and level line; and wherein each of the plurality of connectors can be configured in a second state in which one of the first plurality of horizontal support members and one of the second plurality of horizontal support members are rotatable with respect to each other. The canopy structure further can comprise drapes configured to be hung from the first and second plurality of horizontal support members. The drapes can be configured to slide smoothly from the first plurality of horizontal support members across one of the plurality of connectors to one of the second plurality of horizontal support members when the one of the plurality of connectors is in the first state.

[0005] In some embodiments, a canopy structure can comprise a plurality of vertical support members; a plurality of horizontal X-member supports, wherein each of the plurality of horizontal X-member supports can be configured in an unfolded state and a folded state; a cover configured to cover the plurality of vertical support members and plurality of horizontal X-member supports; and a first side vertical support bar supported by at least one of the plurality of horizontal X-member supports, wherein the first side vertical support bar is configured to support a first portion of the cover in a raised position. In some embodiments, the first side vertical support bar can be located in a center of a side of the canopy structure. The canopy structure can further comprise a second side vertical support bar supported by at least one of the plurality of horizontal X-member supports, wherein the second side vertical support bar is configured to support a second portion of the cover in a raised position.

[0006] In some embodiments, a canopy structure comprises a frame comprising a base portion and a top portion, the base portion comprising a first plurality of vertical frame support members, the top portion comprising a second plurality of frame support members, wherein each of the second plurality of frame support members comprises a first end portion and a second end portion, the first end portions of each of the second plurality of frame support members joined proximate to a peak of the frame; and a cover configured to cover the top portion of the frame comprising a center cover portion and one or more perimeter cover portions, wherein the center cover portion is configured to adjust between a first position configured to provide a first ventilation air flow and a second position configured to provide a second ventilation air flow, wherein the second ventilation air flow is greater

than the first ventilation air flow. At least one of the one or more perimeter cover portions can be configured to adjust between a third position configured to provide a third ventilation air flow and a fourth position configured to provide a fourth ventilation air flow, wherein the fourth ventilation air flow is greater than the third ventilation air flow. Each of the one or more perimeter cover portions can be configured to adjust between a third position configured to provide a third ventilation air flow and a fourth position configured to provide a fourth ventilation air flow, wherein the fourth ventilation air flow is greater than the third ventilation air flow. The canopy structure can further comprise a plurality of cover support members configured to support the center cover portion in the second position. The center cover portion can comprise a fabric, wherein a tautness in the fabric supports the center cover portion in the second position. The canopy structure can further comprise a plurality of spring members configured to support the center cover portion in the second position. A bottom portion of the center cover portion can be configured to overlap with an upper portion of the one or more perimeter cover portions when the center cover portion is in the first position. The center cover portion can comprise an edge, wherein the edge of the center cover portion is configured to face in a substantially horizontal direction when the center cover portion is in the second position. The center cover portion can comprise an edge, wherein the edge of the center cover portion is configured to face in a downward-sloping direction when the center cover portion is in the second position. The center cover portion additionally can be configured to adjust to a third position configured to provide a third ventilation air flow, wherein the third ventilation air flow is greater than the second ventilation air flow. The center cover portion can comprise an edge, wherein the edge of the center cover portion is configured to face in a substantially horizontal direction when the center cover portion is in the third position, and the edge of the center cover portion is configured to face in a downward-sloping direction when the center cover portion is in the second position. The first plurality of vertical frame support members can be configured to be adjustable between a first height in an extended state and a second height in a collapsed state, wherein the second height is less than the first height. The canopy structure can further comprise a first plurality of cover support members configured to support the center cover portion in the second position and a second plurality of cover support members configured to support the at least one of the one or more perimeter cover portions in the fourth position. The canopy structure can further comprise a first plurality of cover support members configured to support the center cover portion in the second position and a second plurality of cover support members configured to support each of the one or more perimeter cover portions in the fourth

position. At least one of the one or more perimeter cover portions can comprise a fabric, wherein a tautness in the fabric supports the at least one of the one or more perimeter cover portions in the fourth position. Each of the one or more perimeter cover portions can comprise a fabric, wherein a tautness in the fabric supports each of the one or more perimeter cover portions in the fourth position. The canopy structure can further comprise a plurality of spring members configured to support the at least one of the one or more perimeter cover portions in the fourth position. The canopy structure can further comprise a plurality of spring members configured to support each of the one or more perimeter cover portions in the fourth position.

[0007] In some embodiments, a collapsible chair generally comprises a plurality of legs configured to be adjustable between a folded state and an unfolded state; a fabric seat portion configured to form a substantially horizontal surface when the plurality of legs are configured in the unfolded position; a plurality of fabric stops configured to support the fabric seat portion, each of the plurality of fabric stops connected to each of the plurality of legs, wherein each of the plurality of fabric stops comprises a chamfered edge configured to distribute force to the fabric seat portion.

[0008] In some embodiments, a telescoping canopy leg generally comprises a lower telescoping leg portion having a first cross-sectional area, an upper end of the lower telescoping leg portion comprising a first pin; a middle telescoping leg portion comprising a first hollow interior region having a second cross-sectional area, a lower end of the middle telescoping leg portion comprising a first hole and an upper end of the middle telescoping leg portion comprising a second pin; and an upper telescoping leg portion comprising a second hollow interior region having a third cross-sectional area, a lower end of the upper telescoping leg portion comprising a second hole; wherein the first cross-sectional area is less than the second cross-sectional area and the second cross-sectional area is less than the third cross-sectional area, the lower telescoping leg portion configured to slide within the middle telescoping leg portion, the middle telescoping leg portion configured to slide within the upper telescoping leg portion, the first pin configured to fit within the first hole, the second pin configured to fit within the second hole; and wherein the telescoping canopy leg is configured to be adjustable between an extended state and a collapsed state, the extended state being in which the first pin is positioned within the first hole and the second pin is positioned within the second hole, and a collapsed state being in which the lower telescoping leg portion is telescoped within the middle telescoping leg portion and the middle telescoping leg portion is telescoped within the upper telescoping leg portion.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Figures 1A-1B illustrate perspective views of embodiments of a canopy structure comprising a top mesh portion.

[0010] Figures 2A-2F illustrate views of embodiments of a canopy structure comprising connectors configured for drapes to be hung.

[0011] Figures 3A-3F illustrate views of embodiments of a canopy structure that comprise a side vertical support bar.

[0012] Figures 4A-4J illustrate views of embodiments of a canopy structure that comprises canopy vents.

[0013] Figures 5A-5C illustrate embodiments of a collapsible chair.

[0014] Figure 6 illustrates an embodiment of telescoping canopy legs.

## DETAILED DESCRIPTION

[0015] For the purpose of understanding particular embodiments, reference will be made to the drawings.

[0016] Figures 1A-1B illustrate perspective views of embodiments of a canopy structure 100. A canopy structure 100 that is configured to be placed on a substantially horizontal surface can include a canopy frame comprising a plurality of vertical members that support a top canopy cover. The top canopy cover can comprise a bottom fabric portion 110 and a top mesh portion 120. The bottom fabric portion 110 can comprise a lower perimeter portion of the top canopy cover. The top mesh portion 120 can comprise a center portion of the top canopy cover. For example, the top mesh portion 120 can comprise a peak of the top canopy cover.

[0017] The bottom fabric portion 110 can comprise solid fabrics, including polyester and ballistic nylon, for example. The top mesh portion 120 can comprise any mesh materials and fabrics. For example, the top mesh portion 120 can comprise a mesh material that is permeable to air but not permeable to water. For example, the mesh can comprise nylon, polyester, and/or other super fine fiber material and include a relatively small pore size and a hydrophobic coating to achieve air permeability and water impermeability. In preferred embodiments, the top mesh portion 120 can comprise about 50% or more of the surface area of the canopy portion. In other embodiments, the top mesh portion 120 can comprise about 80% or more of the surface area of the canopy portion. In alternative embodiments, the top mesh portion 120 can comprise less than 50% of the surface area of the canopy portion.

**[0018]** Some canopy structures comprise canopy covers that are formed solely from solid fabrics. In such canopy structures, the top of the canopy cover can reach relatively high temperatures. For example, under certain weather conditions, the space near the top of the canopy cover can include a temperature gradient with a peak temperature of 135 °F. By replacing a top portion of the canopy cover with a mesh portion, as illustrated by the canopy embodiments in Figures 1A-1B, the peak temperature at the top of the canopy cover can be reduced. For example, in some embodiments, the peak temperature at the top of the canopy cover can be reduced to about 90 °F. The top mesh portion 120 advantageously can provide improved air flow.

**[0019]** In some embodiments, the canopy cover additionally can include a rain fly (not illustrated). The rain fly can comprise a solid fabric portion that covers the top mesh portion 120. The rain fly can be tied down or otherwise affixed to the canopy structure 100 and/or canopy cover. For example, the rain fly can be connected using D-rings located at the corners of the canopy cover. The rain fly can provide a barrier that prevents rain, snow, and other elements from passing through the top mesh portion 120. Optionally, the rain fly can be partially or completely removed to expose some or all of the mesh portion 120.

**[0020]** Figures 2A-2F illustrate views of embodiments of a canopy structure. The canopy structure 200 can include a plurality of vertical support members 205, a first plurality of horizontal support members 210, a second plurality of horizontal support members 218, and a plurality of connectors 220. The plurality of vertical support members 205 can provide support to the first and second pluralities of horizontal support members 210 and 218.

Each of the first plurality of horizontal support members 210 can comprise a first and second end. Similarly, each of the second plurality of horizontal support members 218 can comprise a first and second end. The first end of each of the first plurality of horizontal support members 210 can be configured to be supported by one of the plurality of vertical support members 205. Similarly, the first end of each of the second plurality of horizontal support members 218 can be configured to be supported by one of the plurality of vertical support members 205.

**[0021]** The plurality of connectors 220 can be provided between the first plurality of horizontal support members 210 and the second plurality of horizontal support members 218. For example, one of the plurality of connectors 220 can be between the second end of each of the first plurality of horizontal support members 210 and the second end of each of the second plurality of

horizontal support members 218. The first and second pluralities of horizontal support members 210 and 218 can comprise a structure that forms a perimeter of the canopy.

**[0022]** As illustrated in Figures 2A-2F, the plurality of connectors 220 can be configured in a first state in which the plurality of connectors 220 join the first plurality of horizontal support members 210 and second plurality of horizontal support members 218 in a substantially smooth level line. In some embodiments, the plurality of connectors 220 can lock the first plurality of horizontal support members 210 and second plurality of horizontal support members 218 into place so as to form a single horizontal support member that can be configured to hang drapes 250. For example, as illustrated in Figures 2E-2F, drapes 250 can hang from the first and second pluralities of horizontal support members 210 and 218. The connectors 220 can be configured so that an interface between the first plurality of horizontal support members 210, the connectors 220, and second plurality of horizontal support members 218 is substantially smooth and level. A smooth and level interface from the first plurality of horizontal support members 210 to the second plurality of horizontal support members 218 across the connectors 220 can allow the drapes 250 to slide smoothly from the first plurality of horizontal support members 210 to the second plurality of horizontal support members 218 across the plurality of connectors 220 without any points of substantially increased resistance at the connectors 220 that could substantially slow or stop the drapes 250 from sliding.

**[0023]** The plurality of connectors 220 can also be configured in a second state for transportation and storage. In the second state, the plurality of connectors 220 is configured to allow the first plurality of horizontal support members 210 and the second plurality of horizontal support members 218 to rotate with respect to each other. For example, when the plurality of connectors 220 is in the second state, the first plurality of horizontal support members 210 and the second plurality of support members 218 can be folded to be approximately parallel and adjacent to each other. Accordingly, when the plurality of connectors 220 is in the second state, the canopy structure 200 can be collapsed for transportation and storage.

**[0024]** Figure 2D illustrates one of the plurality of connectors 220 configured in the first state. The connector 220 comprises a left member 222, a right member 224, and connecting screws 226 and 228. The left member 222 can be rotatable about screw 226, and the right member 224 can be rotatable about screw 228. When the left member 222 is rotated about screw 226, and the right member 224 is rotated about screw 228, the connector 220 can transition to a second state in which the first horizontal support member 210 is movable and/or rotatable with respect to the second horizontal

support member 218. Although screws are used in the illustrated embodiments, other suitable rotational supports could also be used, such as rivets, axles, shafts or any other rotational support member disclosed herein, for example.

**[0025]** The canopy structure 200 can comprise several roof support members that support the canopy. As illustrated in Figures 2B and 2C, the canopy structure 200 can comprise a first roof support member 230, a second roof support member 232, a third roof support member 236, and a fourth roof support member 238. Pivot 231 can be provided to connect the first roof support member 230 and the second roof support member 232. Pivot 231 can allow the first roof support member 230 to be rotatable with respect to the second roof support member 232 to facilitate transition between an extended position and a collapsed position. Pivot 237 can be provided to connect the third roof support member 236 and the fourth roof support member 238. Pivot 237 can allow the third roof support member 236 to be rotatable with respect to the fourth roof support member 238 to facilitate transition between an extended position and a collapsed position. Pivots 234 can be provided to connect the first roof support member 230 and the fourth roof support member 238 and to connect the second roof support member 232 and the third roof support member 236.

**[0026]** As shown in Figures 2B and 2C, in an extended position, the first roof support member 230 and second roof support member 232 can form a crisscross pattern similar to the shape of an "X." Similarly, the third roof support member 236 and fourth roof support member 238 can form a crisscross pattern similar to the shape of an "X." Accordingly, the first roof support member 230 and second roof support member 232 can be referred to as "X-members."

**[0027]** The pivots used to connect X-members can comprise PTFE and/or Teflon bearings or bearings comprising other materials. For example, pivots 231 and 237 can comprise PTFE and/or Teflon bearings or bearings comprising other materials. By comprising PTFE and/or Teflon, the bearings can be tightened down while still allowing the X-members to slide with respect to each other. For example, if pivot 231 is comprised of a PTFE and/or Teflon bearing, the PTFE and/or Teflon bearing can be tightened down to securely connect the first roof member 230 and second roof member 232 while allowing the first roof member 230 and second roof member 232 to sufficiently slide with respect to each other so as to be rotatable. In other embodiments, pivots 231 and 237 can comprise non-PTFE or Teflon bearings.

**[0028]** In preferred embodiments, the canopy structure 200 can have four sides. Alternatively, the canopy structure 200 can have any other number of sides, including five sides to

form a pentagon and eight sides to form an octagon. In addition, the canopy structure 200 can be configured as a gazebo.

**[0029]** Figures 3A-3F illustrate views of embodiments of a canopy structure 300 that comprise a side vertical support bar. The canopy structure 300 comprises a plurality of vertical support members, support members 310 and 320, pivots 312 and 332, side vertical support bar 330, and slider 322. Sets of support members 310 and 320 can be connected at pivot 312 to form an X-member support. The support members 310 and 320 can be movable about the pivot 312 to facilitate transition between a folded position and an unfolded position. One end of support member 310 can be connected to the base of the vertical support bar 330 at the pivot 332. One end of support member 320 can be connected to the vertical support bar 330 through a slider 322. The slider 322 can be attached to the vertical support bar 330 and can comprise a hollow portion to facilitate movement of the slider 322 along the vertical support bar 330.

**[0030]** In some embodiments, the side vertical support bar can be located in a center of sides of the canopy structure. In some embodiments, additional side vertical support bars can be supported by the plurality of horizontal X-member supports.

**[0031]** Figure 3A illustrates an embodiment of a canopy structure 300 that comprises a vertical support bar in an open, unfolded position. A peak in the side of the canopy structure can be provided. The peak can increase the slope of the canopy surface so as to facilitate runoff of rain and other condensation.

**[0032]** Figure 3B illustrates an embodiment of a canopy structure 300 that comprises a vertical support bar 330 in a partially folded position.

**[0033]** Figure 3C illustrates an embodiment of a canopy structure 300 that comprises a vertical support bar 330 in an open, unfolded position. Both support bars 310 connect at pivot 332 to the base of the vertical support bar 330. Both support bars 310 provide vertical support to the vertical support bar 330. The top end of the vertical support bar 330 can be connected to the socket 334. The socket 334 can be sewn into the canopy top. The top end of the vertical support bar 330 can be permanently attached at the socket 334. Alternatively, the top of the vertical support bar 330 can be removable from the socket 334. When the X-members are in an unfolded opened position that provides support to the vertical support member 330, the vertical support member 330 pushes upwards on the canopy surface to raise its height. For example, the vertical support member 330 can facilitate raising the slope of the canopy surface to facilitate runoff of rain and other condensation.

[0034] In some embodiments, one vertical support bar is provided for each side of the canopy structure and can be located approximately half way between vertical frame members. In other embodiments, two or more vertical support bars can be provided for each side of the canopy structure.

[0035] Figures 4A-4J illustrate views of embodiments of a canopy structure that comprises canopy vents. The canopy structure 400 can include a base canopy portion 410, a first canopy vent 420, and a second canopy vent 430. For example, the second canopy vent 430 can correspond to a center cover portion, the first canopy vent 420 can correspond to a first perimeter cover portion, and the base canopy portion 410 can correspond to a second perimeter cover portion.

[0036] The base canopy portion 410, the first canopy vent 420, and the second canopy vent 430 can be supported by a plurality of canopy frame members. For example, canopy frame members 440 and 450, as well as two other canopy frame members, support the base canopy portion 410, the first canopy vent 420, and the second canopy vent 430. Canopy frame members 440 and 450 each can comprise a first end portion and a second end portion. The first end portions of each of the canopy frame members 440 and 450 can be joined proximate to a peak of the canopy frame.

[0037] The canopy vents can be configured to be alterable between a first, closed position and a second, open position. In the closed position, the bottom surface of the canopy vents can be adjacent to the top surface of the nearest canopy portion below, whether another canopy vent or the base canopy portion. In the closed position, the canopy vents can block passage of wind similar to the performance of a unitary canopy top. In the closed position, the canopy vents can provide a reduced ventilation air flow.

[0038] In an open position, the canopy vents can be flipped up to provide ventilation to the canopy structure. For example, the canopy vents can comprise an edge configured to face in a substantially horizontal direction when the canopy vents are in an open position. In the open position, warm air underneath the canopy surfaces can rise relative to cooler surrounding air. When the canopy vents are in a closed position, the warm air remains underneath the canopy surfaces. When the canopy vents are in an open position, the warm air can escape out of the canopy structure. In the open position, the canopy vents can provide an increased ventilation air flow relative to the closed position.

[0039] Figure 4A illustrates an embodiment of the canopy structure 400 showing the first canopy vent 420 and second canopy vent 430 in an open position. Support member 442 connects the canopy frame member 440 with a corner of the first canopy vent 420. Support member 442 is rotatable with respect to the canopy frame member 440. When the first canopy vent 420 is in an open

position, support member 442 props up a corner of the first canopy vent 420. An end of the support member 442 may be sewn into a pocket in the corner of the first canopy vent 420. In some embodiments, the tautness of the material comprising the first canopy vent 420 when the support member 442 props up a corner of the first canopy vent 420 helps to maintain the first canopy vent 420 in an open position. In other embodiments, a spring-loaded plastic cap may be used to prop up a corner of the first canopy vent 420 in an open position. Just as the support member 442 connects to the canopy frame member 440 to prop up one corner of the first canopy vent 420 in an open position, other support members connect to the other canopy frame members to prop up the other corners of the first canopy vent 420 when in an open position. For example, support member 452 connects the canopy frame member 450 with another corner of the first canopy vent 420. When the first canopy vent 420 is in an open position, support member 452 props up the other corner of the first canopy vent 420. Raising each corner of the first canopy vent 420 can facilitate in creating the tautness in the material of the first canopy vent 420 that helps to maintain the first canopy vent 420 in an open position. Similarly, support members can connect to the plurality of canopy frame members to prop up the second canopy vent 430 in an open position.

**[0040]** In some embodiments, the canopy vents can be configured to be held open in other positions. For example, the canopy vents can be configured to be held open in a downward sloping position that prevents the canopy vents from holding water and reduces rain water from being carried into the canopy interior by wind. The downward-sloping position can provide a ventilation air flow between the closed position and the open position.

**[0041]** In some embodiments, the canopy vents can be opened and closed when the canopy structure is in a collapsed or partially-collapsed state. For example, one side of the canopy, comprising two supporting legs, can be lowered, and a user can open and close a canopy vent by hand. In other embodiments, the canopy structure can comprise a system of cables, levers, push-rods, or other mechanical means to allow a user to adjust the canopy vents between an opened and closed state when the canopy vents are out of reach when the canopy structure is fully assembled. For example, a push-rod can be used to push the canopy vents from a closed to an open state. In addition, the push rod can include a hook at one end that interfaces with a loop in the canopy vent to allow the user to pull the canopy vents from an open state to a closed state.

**[0042]** Figure 4B illustrates an embodiment of the canopy structure 400 showing the first canopy vent 420 in a closed position and the second canopy vent 430 in an open position.

[0043] Figure 4C illustrates an embodiment of the canopy structure 400 in which the first canopy vent 420 is in an open position.

[0044] Figure 4D illustrates an embodiment of the canopy structure 400 in which the first canopy vent 420 is in a closed position.

[0045] Figure 4E illustrates an embodiment of the canopy structure 400 showing the first canopy vent 420 and second canopy vent 430 in a closed position.

[0046] Figure 4F illustrates an embodiment of the canopy structure 400 showing a canopy vent in a partially collapsed state.

[0047] Figure 4G illustrates an embodiment of a canopy structure 400 comprising vents in a partially collapsed state.

[0048] Figures 4H-4J illustrate embodiments of a canopy structure 400 comprising vents in a collapsed state.

[0049] In some embodiments, the canopy vents can be pre-attached to the frame members. In other embodiments, a user can attach the canopy vents to the frame members when setting up the canopy.

[0050] In some embodiments the canopy vents can be permanently attached to the canopy frame members. In other embodiments, the canopy vents can be removable with respect to the canopy frame members.

[0051] Although the Figures illustrate embodiments that include a first canopy vent and a second canopy vent, any number of canopy vents may be provided. For example, in some embodiments the canopy structure can comprise a base canopy portion and one canopy vent. Alternatively, the canopy structure can comprise a base canopy portion and three or more canopy vents.

[0052] Canopy vents, as described with respect to Figures 4A-4J, and mesh fabric portions, as described with respect to Figures 1A-1B, each can be used to facilitate air ventilation in a canopy structure. In other embodiments, canopy vents can additionally comprise mesh fabric portions for improved air ventilation.

[0053] Figure 5C illustrates a collapsible chair. Figures 5A-5B illustrate a close-up view of a leg of a collapsible chair. A collapsible chair 500 can comprise a leg 510 and a fabric stop 520. A screw 530 can help to attach the fabric stop 520 to the leg 510. A fabric can be used to form a seat of the collapsible chair 500. When the chair fabric is loaded with weight to support, the fabric stop 520 provides a supporting force to the chair fabric. To minimize stress on the fabric that can result in a

fabric chair, the fabric stop 520 can comprise a chamfered edge 522. The chamfered edge 522 can be rounded and sloped to distribute the supporting force more evenly so as not to tear the chair fabric.

**[0054]** Figure 6 illustrates an embodiment of telescoping canopy legs. Figure 6 illustrates the telescoping canopy legs in various views from a telescoped state to a fully extended state. For reference purposes, description of the telescoping canopy legs will be made with reference to the numerals that show the telescoping canopy legs in an extended state. The telescoping canopy legs can comprise a base telescoping leg portion 610, a middle telescoping leg portion 620, and a top telescoping leg portion 630. The base telescoping leg portion 610, middle telescoping leg portion 620, and top telescoping leg portion 630 can comprise different cross-sectional areas and hollow interiors. For example, the top telescoping leg portion 630 can comprise a larger cross sectional area than the middle telescoping leg portion, and the middle telescoping leg portion 620 can comprise a larger cross sectional area than the base telescoping leg portion 610. The different cross sectional areas and hollow interiors of the telescoping leg portions allow the telescoping leg portions to telescope with respect to each other. For example, the top telescoping leg portion 630 can slide down the exterior of the middle telescoping leg portion 620. Similarly, both the top telescoping leg portion 630 and the middle telescoping leg portion 620 can slide down the base telescoping leg portion 610.

**[0055]** The pins 640 and 650 can support the telescoping leg portions in an extended position. For example, the pin 640 can support the middle telescoping leg portion 620 on the base telescoping leg portion 610. The pin 640 can be attached near the top of the base telescoping portion 610. The middle telescoping leg portion 620 can include a hole near its bottom end that is configured to receive the pin 640. When the bottom end of the middle telescoping leg portion 620 is slid over the location of pin 640, the pin 640 can spring into the hole near the bottom end of the middle telescoping portion 620, fixing its position and providing vertical support. Alternatively, a user can press the pin 640 in to allow the middle telescoping portion 620 to slide past the base telescoping portion 610.

**[0056]** Similarly, the pin 650 can support the top telescoping leg portion 630 on the middle telescoping leg portion 620. The pin 650 can be attached near the top of the middle telescoping portion 620. The top telescoping leg portion 630 can include a hole near its bottom end that is configured to receive the pin 650. When the bottom end of the top telescoping leg portion 630 is slid over the location of the pin 650, the pin 650 can sprint into the hole near the bottom end of the top telescoping portion 630, fixing its position and providing vertical support. Alternatively, a user can

press the pin 650 in to allow the top telescoping portion 630 to slide past the middle telescoping portion 620.

**[0057]** If the pins 640 and 650 were the same size, it may be possible for the hole near the bottom of the top telescoping leg portion 630 to become attached to the pin 640 near the top of the base telescoping leg portion 610. Advantageously, the pin 640 may be a larger size than the pin 650. The smaller size of the pin 650 would not permit the hole near the bottom of the top telescoping leg portion 630 be able to inadvertently attach to the pin 640 near the top of the base telescoping portion 610. So, varying the sizes of the pins 640 and 650, and, in particular, making the size of pin 640 larger than the size of pin 650, can prevent the wrong telescoping leg portion from inadvertently being attached to the wrong pin.

**[0058]** The features and attributes of the specific embodiments disclosed above may be combined in different ways to form additional embodiments, all of which fall within the scope of the present disclosure. Although this invention has been described in terms of certain preferred embodiments, other embodiments that are apparent to those of ordinary skill in the art, including embodiments which do not provide all of the benefits and features set forth herein, are also within the scope of this invention. Accordingly, the scope of the present invention is defined only by reference to the appended claims.

WHAT IS CLAIMED IS:

1. A canopy structure comprising:

a frame comprising a base portion and a top portion, the base portion comprising a first plurality of vertical frame support members, the top portion comprising a second plurality of frame support members, wherein each of the second plurality of frame support members comprises a first end portion and a second end portion, the first end portions of each of the second plurality of frame support members joined proximate to a peak of the frame; and

a cover configured to cover the top portion of the frame comprising a center cover portion and one or more perimeter cover portions, wherein the center cover portion is configured to adjust between a first position configured to provide a first ventilation air flow and a second position configured to provide a second ventilation air flow, wherein the second ventilation air flow is greater than the first ventilation air flow.

2. The canopy structure of Claim 1, wherein at least one of the one or more perimeter cover portions is configured to adjust between a third position configured to provide a third ventilation air flow and a fourth position configured to provide a fourth ventilation air flow, wherein the fourth ventilation air flow is greater than the third ventilation air flow.

3. The canopy structure of Claim 1, wherein each of the one or more perimeter cover portions is configured to adjust between a third position configured to provide a third ventilation air flow and a fourth position configured to provide a fourth ventilation air flow, wherein the fourth ventilation air flow is greater than the third ventilation air flow.

4. The canopy structure of Claim 1, further comprising a plurality of cover support members configured to support the center cover portion in the second position.

5. The canopy structure of Claim 1, the center cover portion comprising a fabric, wherein a tautness in the fabric supports the center cover portion in the second position.

6. The canopy structure of Claim 1, further comprising a plurality of spring members configured to support the center cover portion in the second position.

7. The canopy structure of Claim 1, wherein a bottom portion of the center cover portion is configured to overlap with an upper portion of the one or more perimeter cover portions when the center cover portion is in the first position.

8. The canopy structure of Claim 1, the center cover portion comprising an edge, wherein the edge of the center cover portion is configured to face in a substantially horizontal direction when the center cover portion is in the second position.

9. The canopy structure of Claim 1, the center cover portion comprising an edge, wherein the edge of the center cover portion is configured to face in a downward-sloping direction when the center cover portion is in the second position.

10. The canopy structure of Claim 1, wherein the center cover portion additionally is configured to adjust to a third position configured to provide a third ventilation air flow, wherein the third ventilation air flow is greater than the second ventilation air flow.

11. The canopy structure of Claim 10, the center cover portion comprising an edge, wherein the edge of the center cover portion is configured to face in a substantially horizontal direction when the center cover portion is in the third position, and the edge of the center cover portion is configured to face in a downward-sloping direction when the center cover portion is in the second position.

12. The canopy structure of Claim 1, wherein the first plurality of vertical frame support members are configured to be adjustable between a first height in an extended state and a second height in a collapsed state, wherein the second height is less than the first height.

13. The canopy structure of Claim 2, further comprising a first plurality of cover support members configured to support the center cover portion in the second position and a second plurality of cover support members configured to support the at least one of the one or more perimeter cover portions in the fourth position.

14. The canopy structure of Claim 3, further comprising a first plurality of cover support members configured to support the center cover portion in the second position and a second plurality of cover support members configured to support each of the one or more perimeter cover portions in the fourth position.

15. The canopy structure of Claim 2, the at least one of the one or more perimeter cover portions comprising a fabric, wherein a tautness in the fabric supports the at least one of the one or more perimeter cover portions in the fourth position.

16. The canopy structure of Claim 3, each of the one or more perimeter cover portions comprising a fabric, wherein a tautness in the fabric supports each of the one or more perimeter cover portions in the fourth position.

17. The canopy structure of Claim 2, further comprising a plurality of spring members configured to support the at least one of the one or more perimeter cover portions in the fourth position.

18. The canopy structure of Claim 3, further comprising a plurality of spring members configured to support each of the one or more perimeter cover portions in the fourth position.

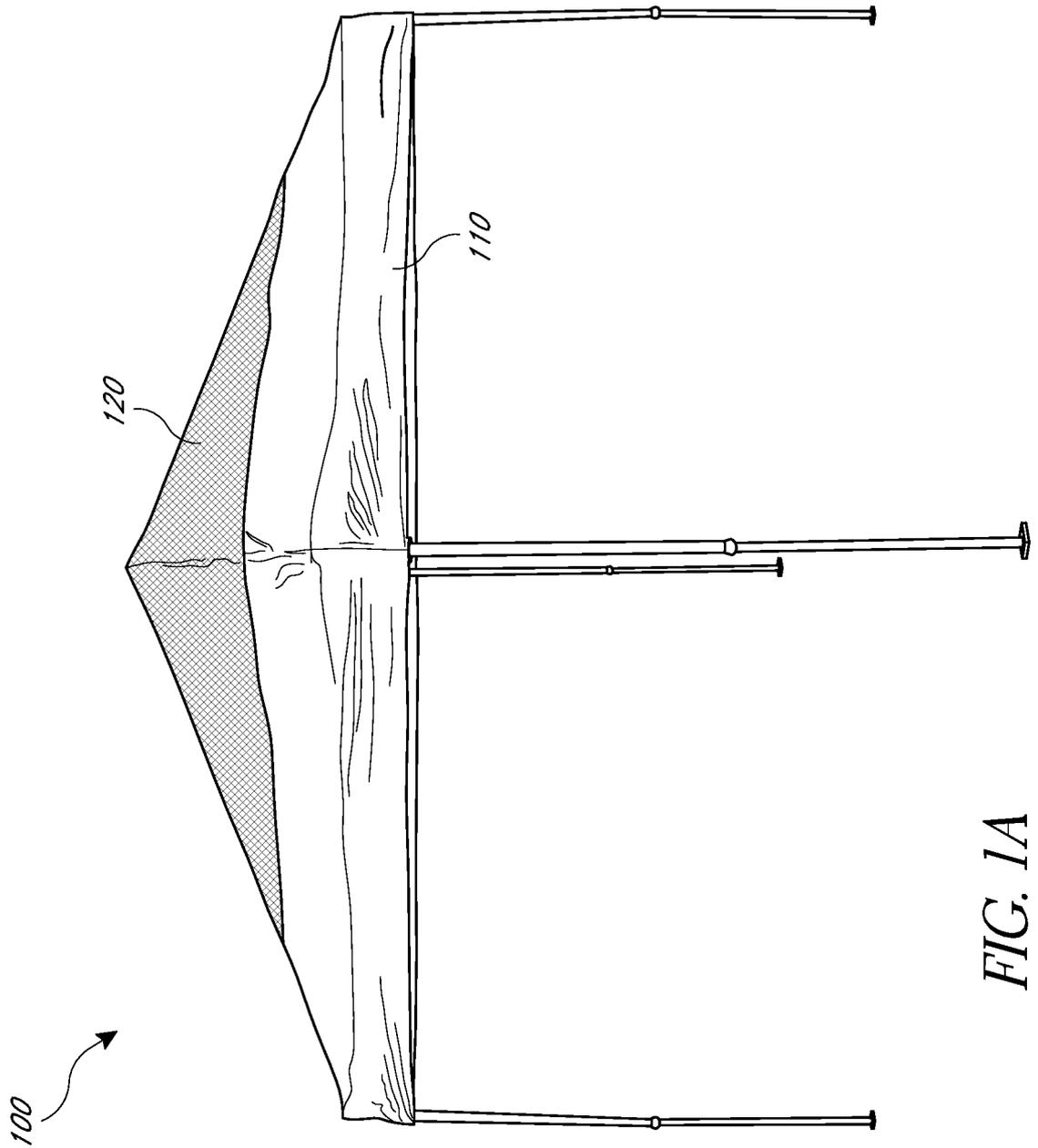
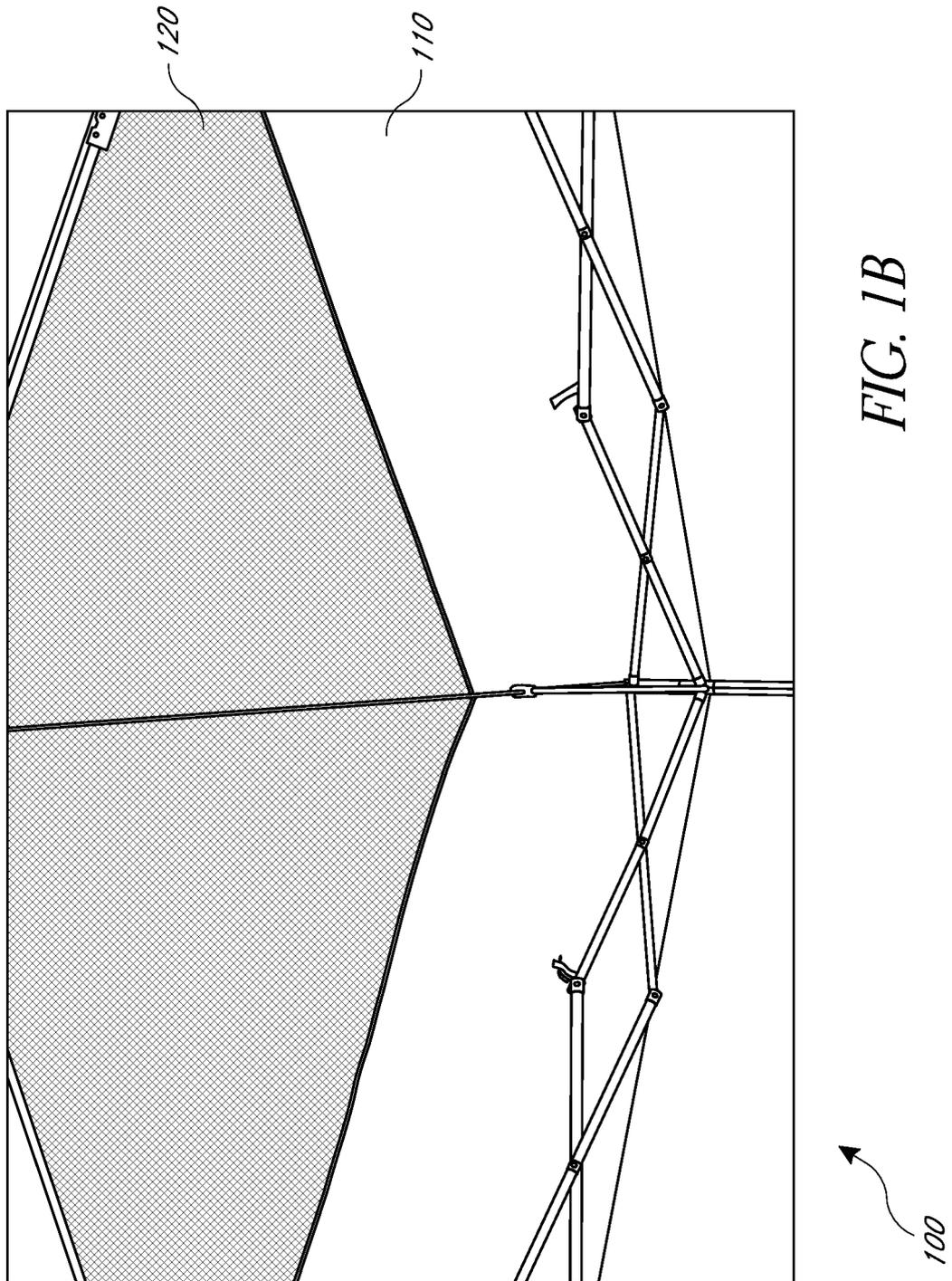


FIG. 1A



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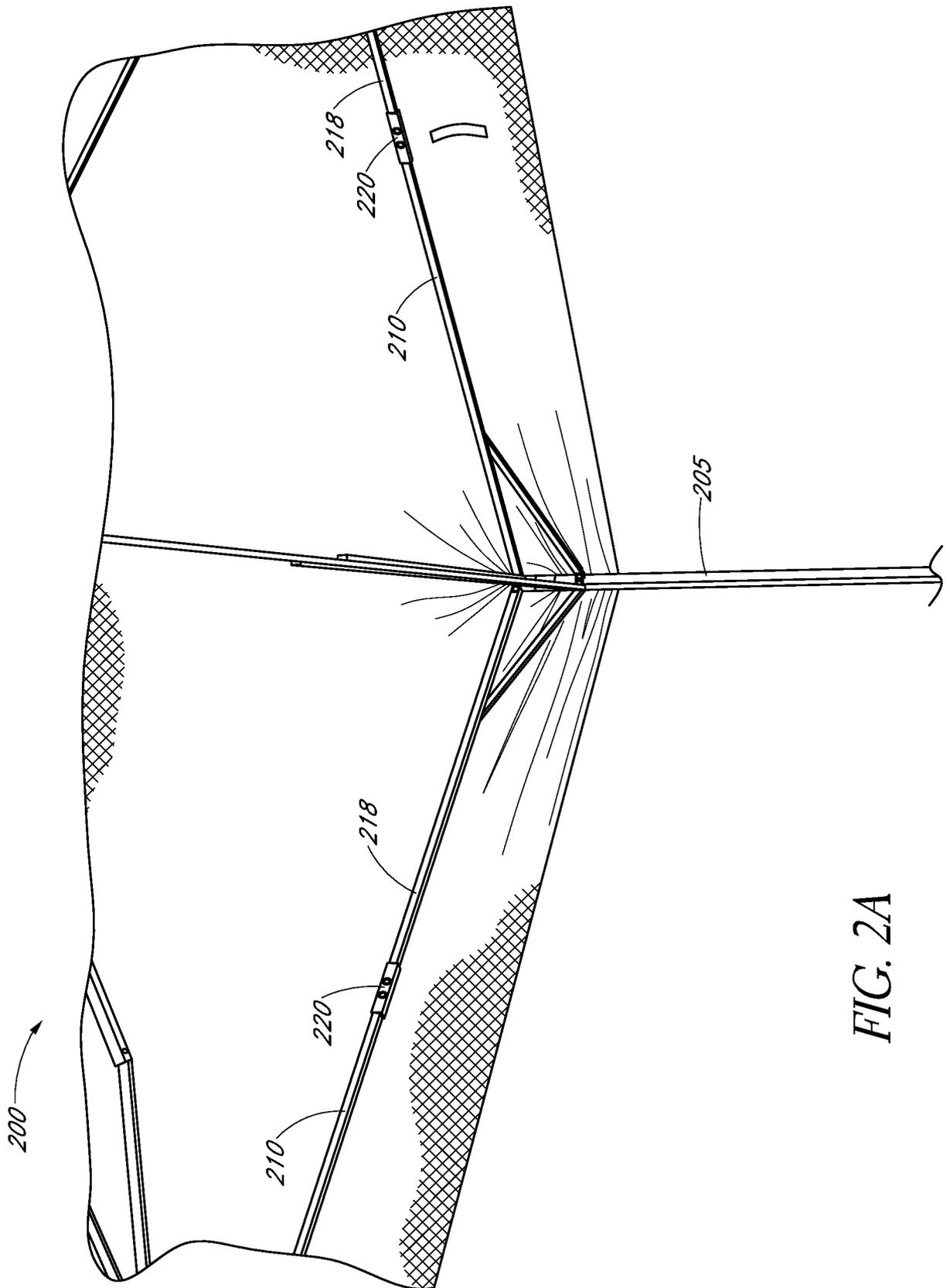


FIG. 2A

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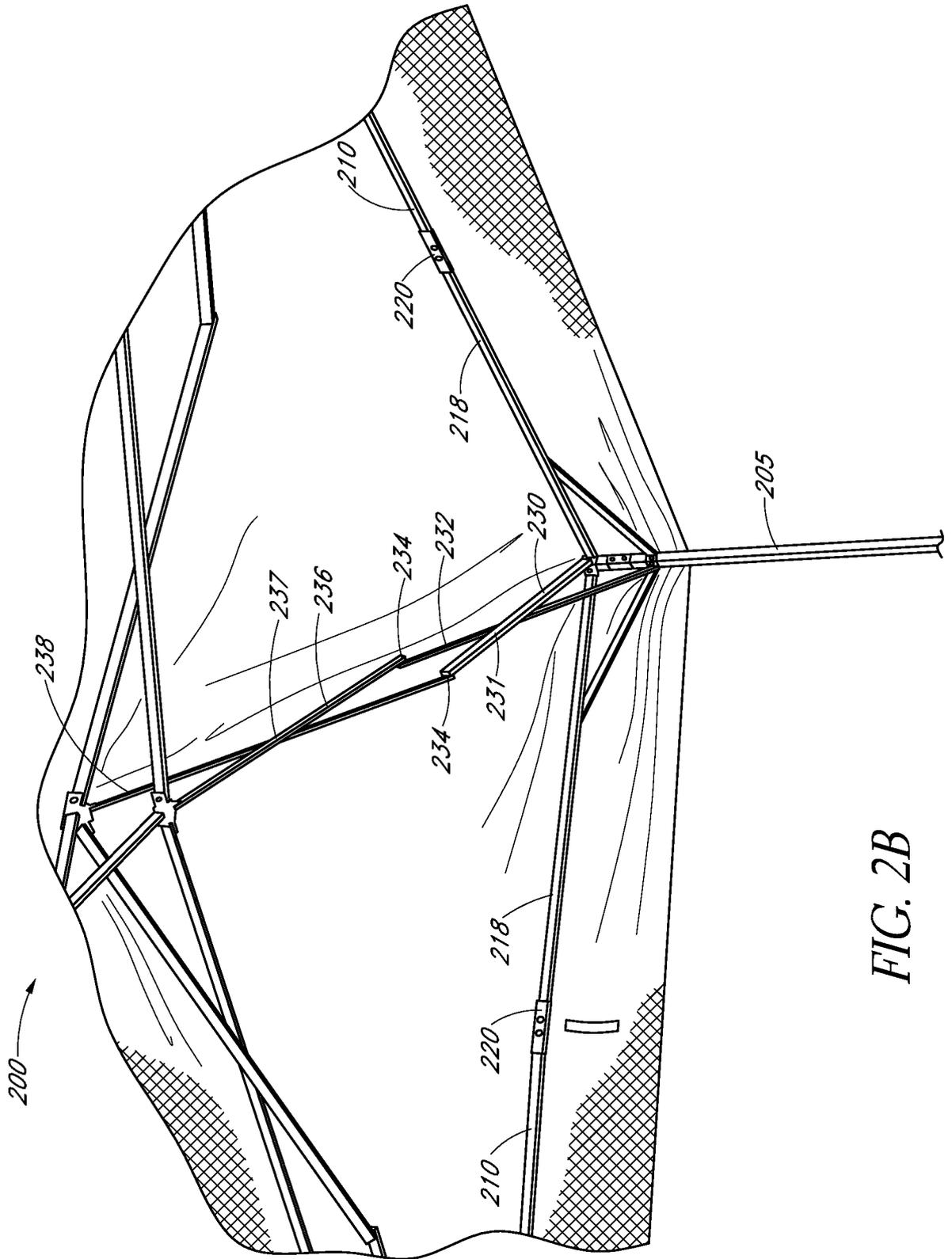


FIG. 2B

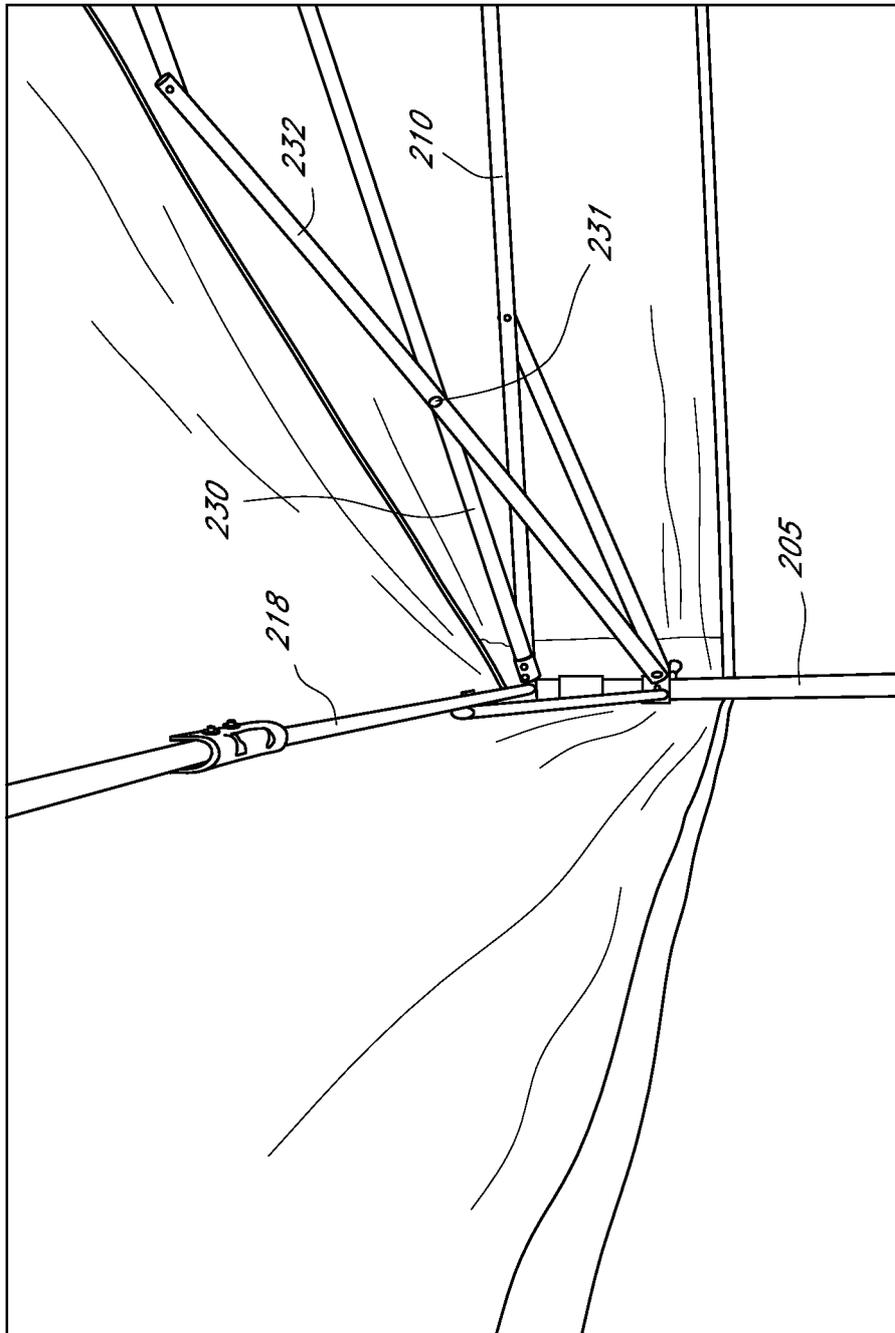


FIG. 2C

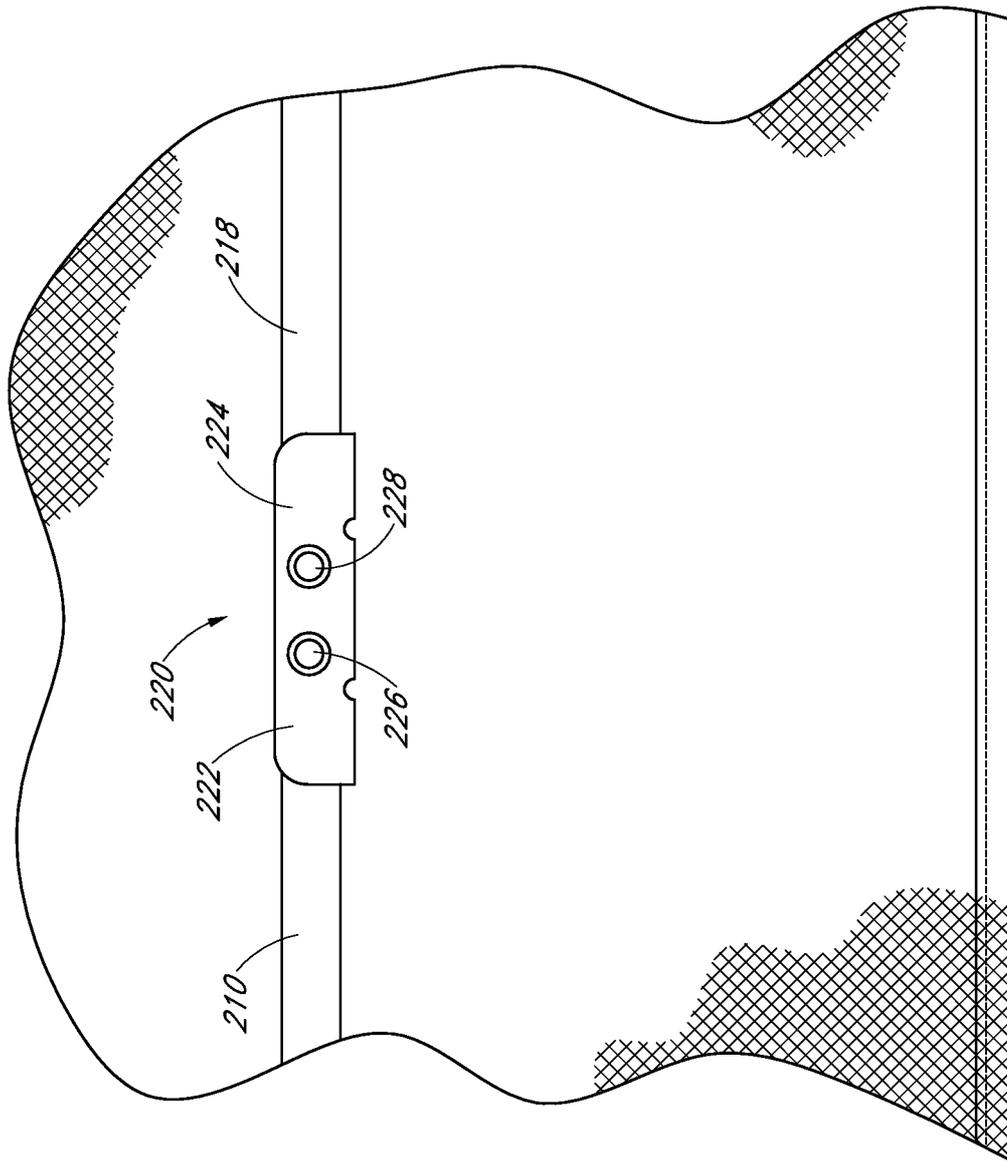


FIG. 2D

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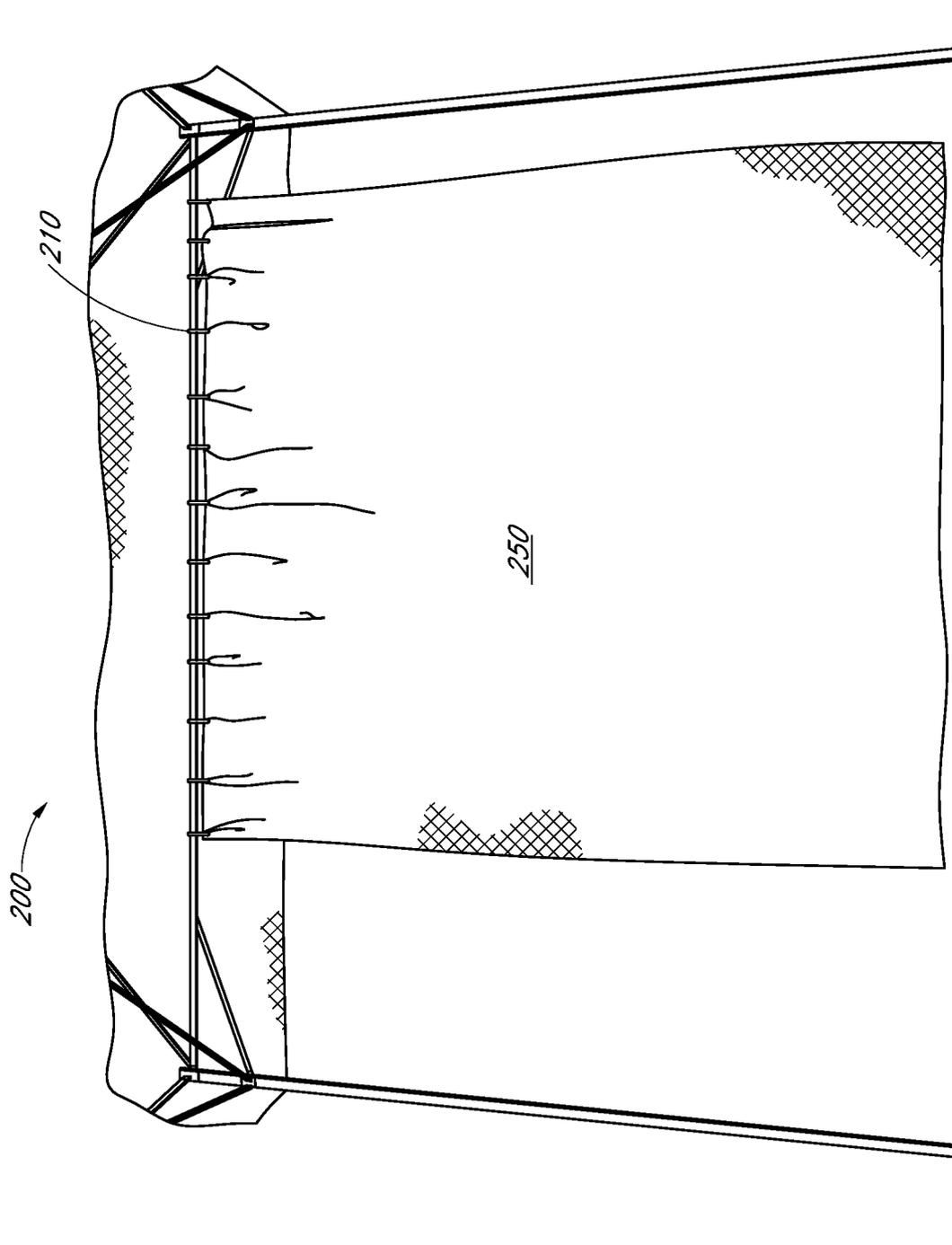


FIG. 2E

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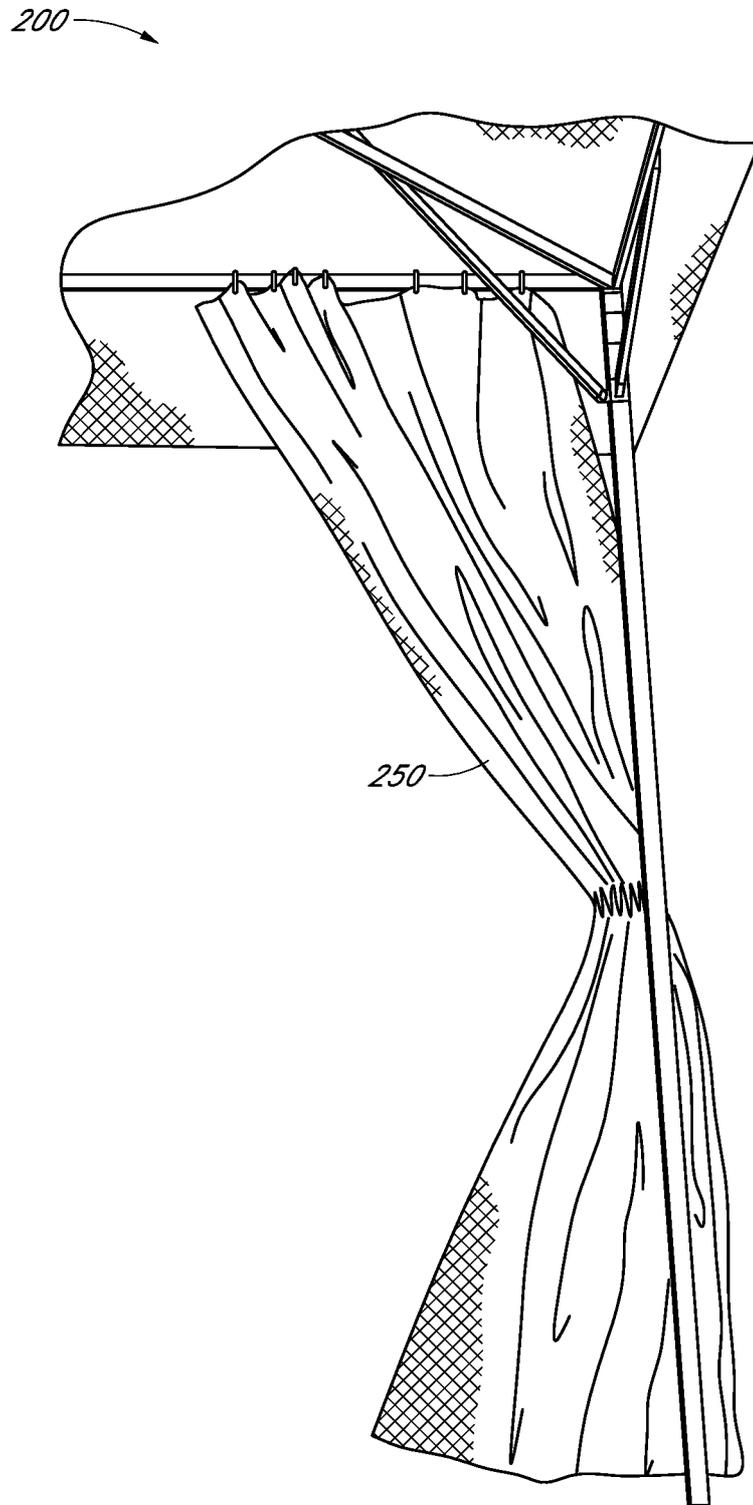


FIG. 2F

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300

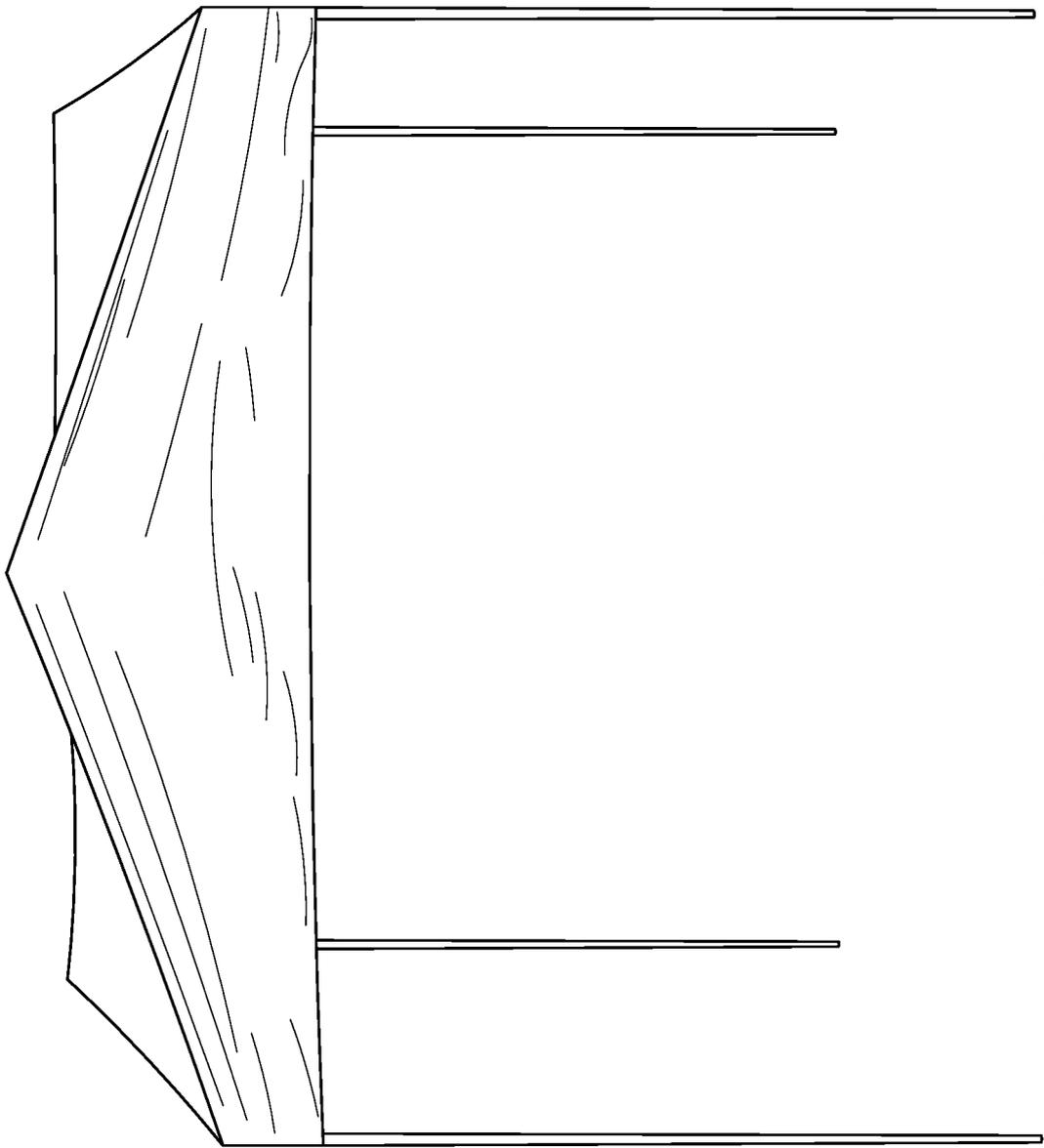


FIG. 3A

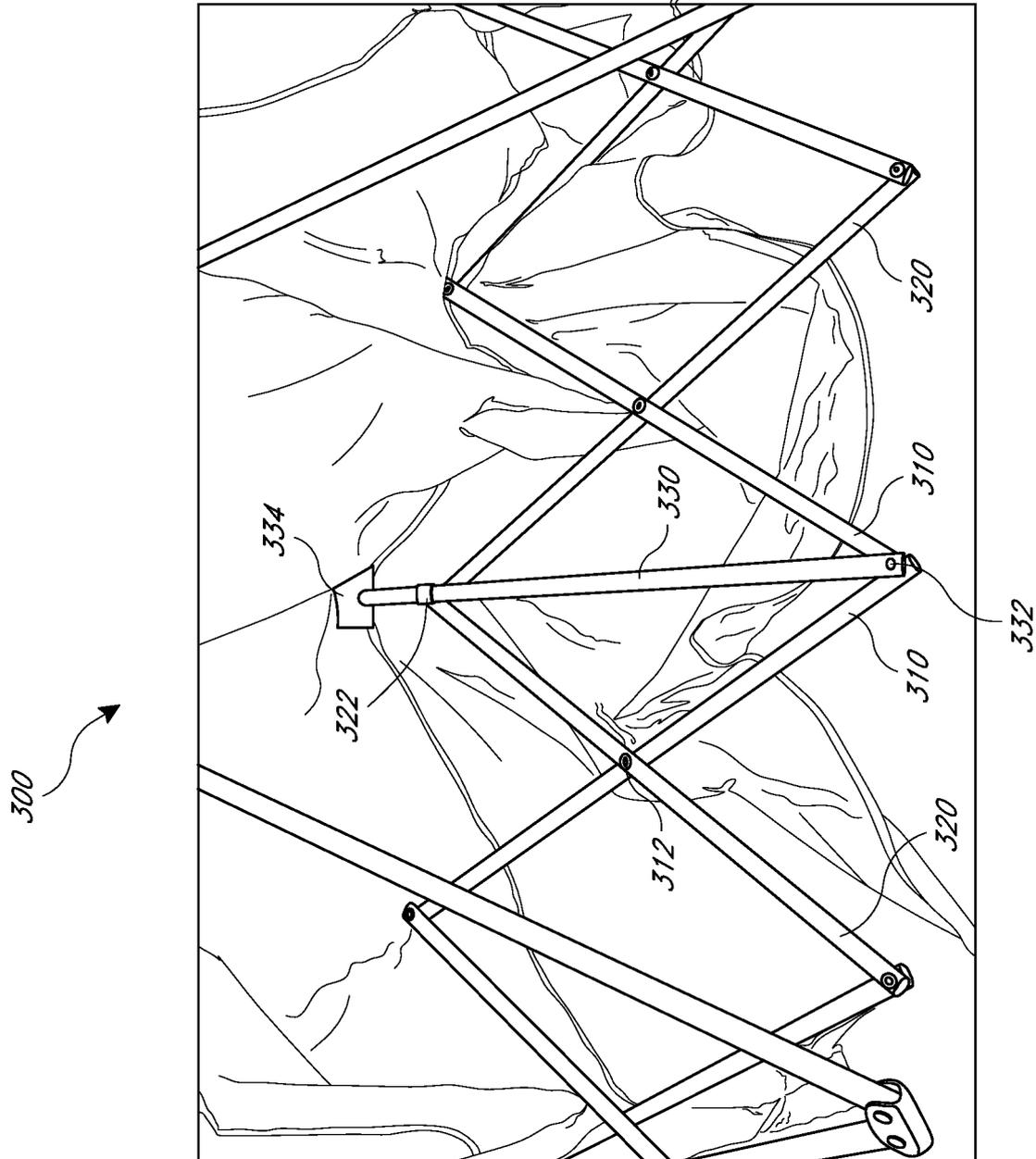


FIG. 3B

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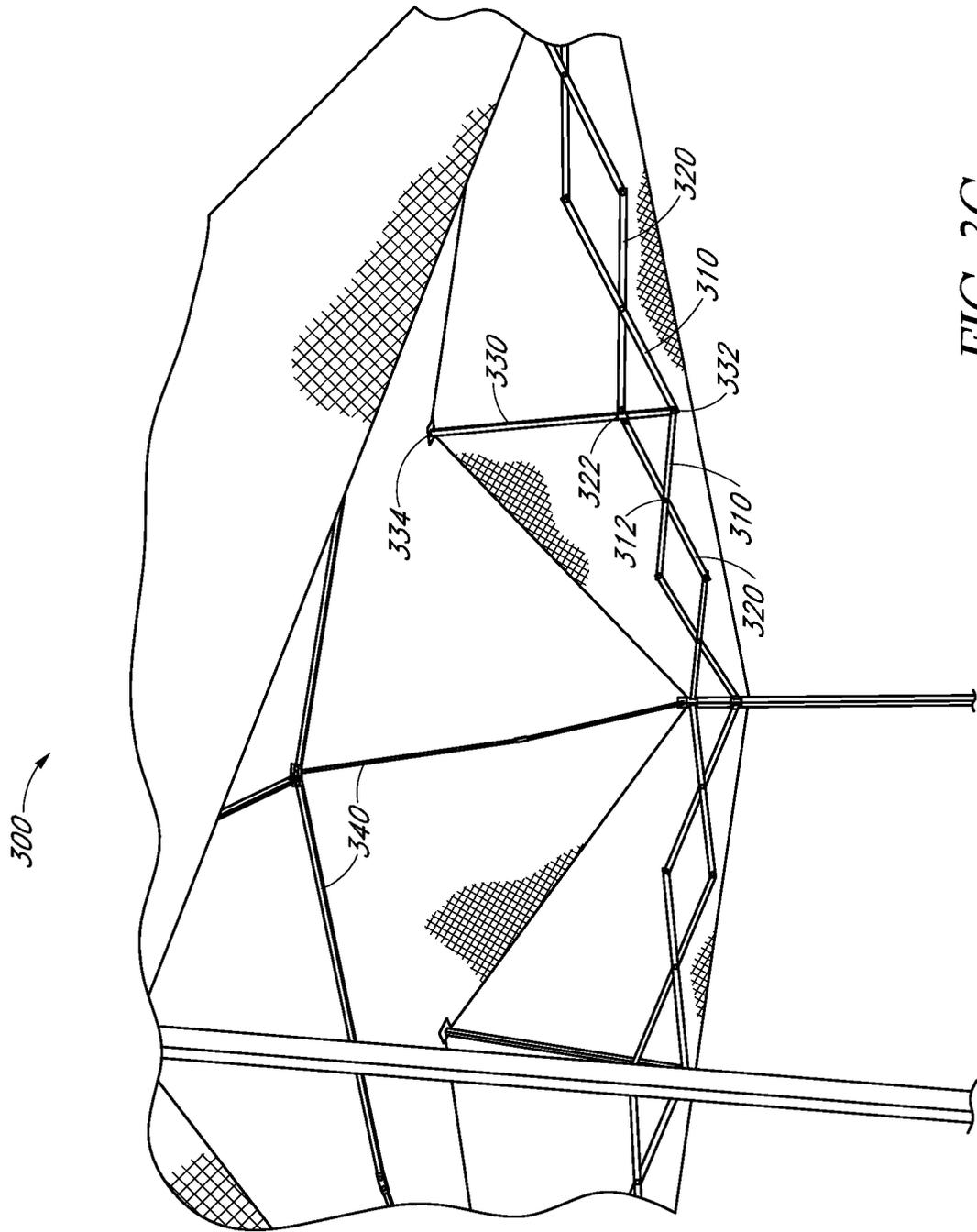
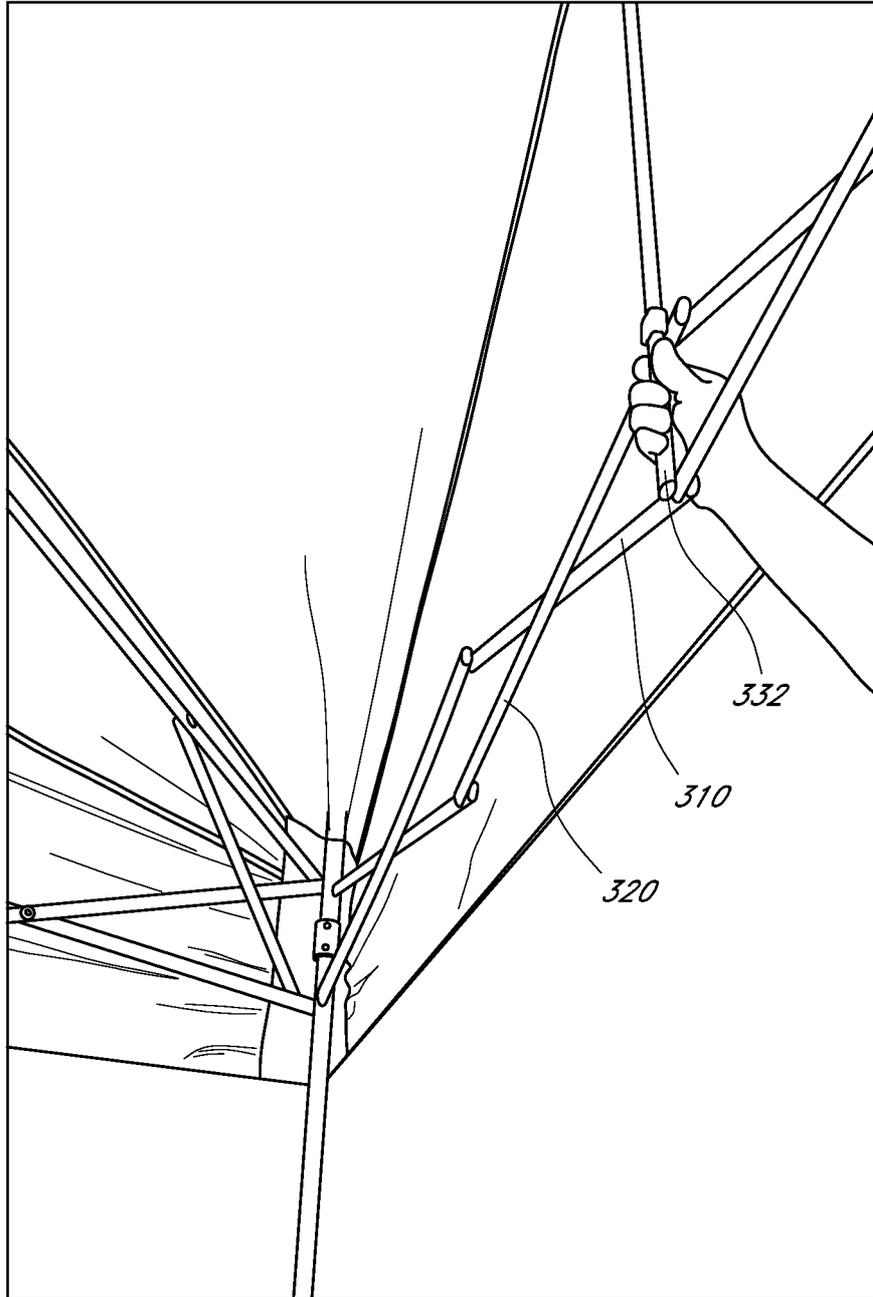
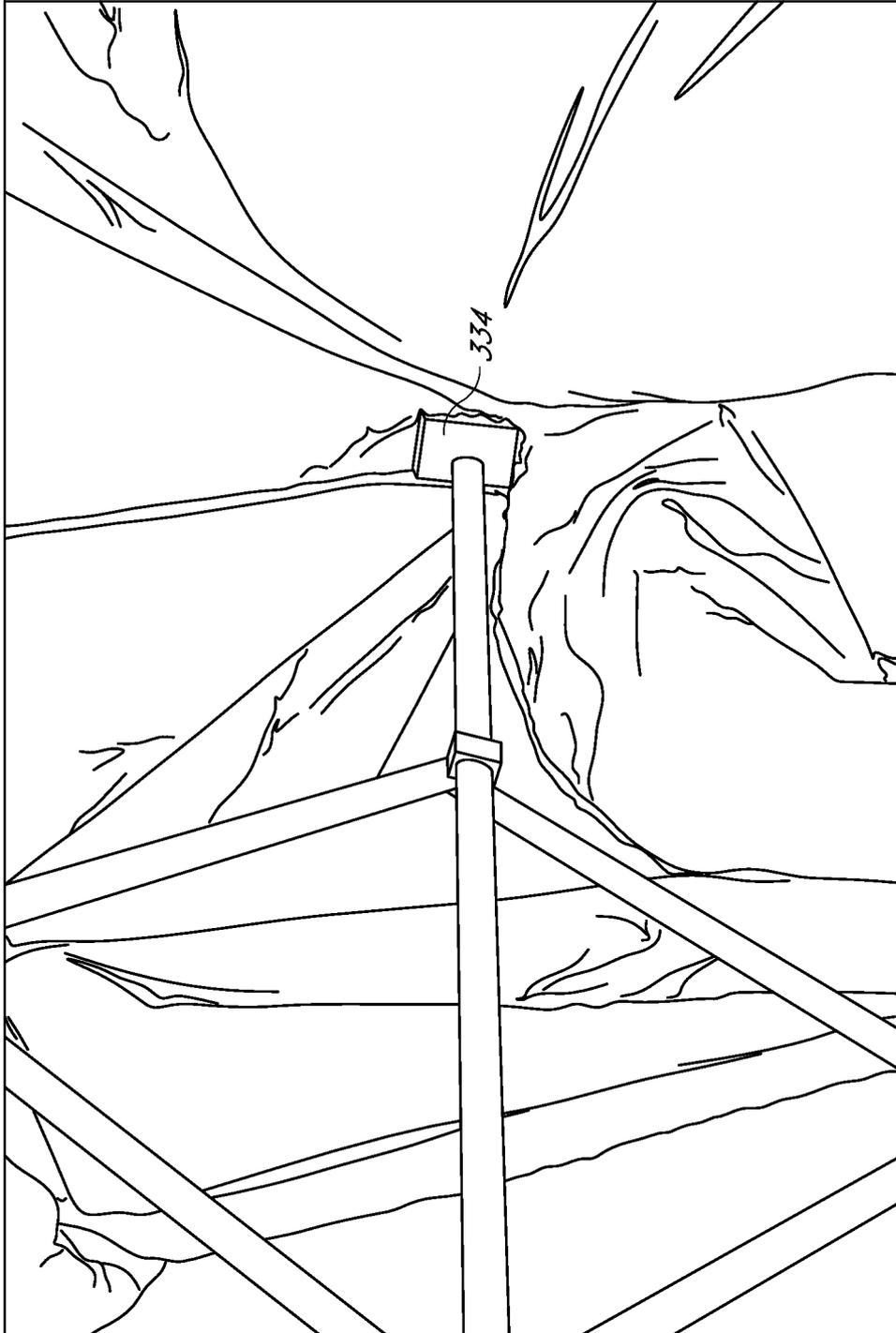


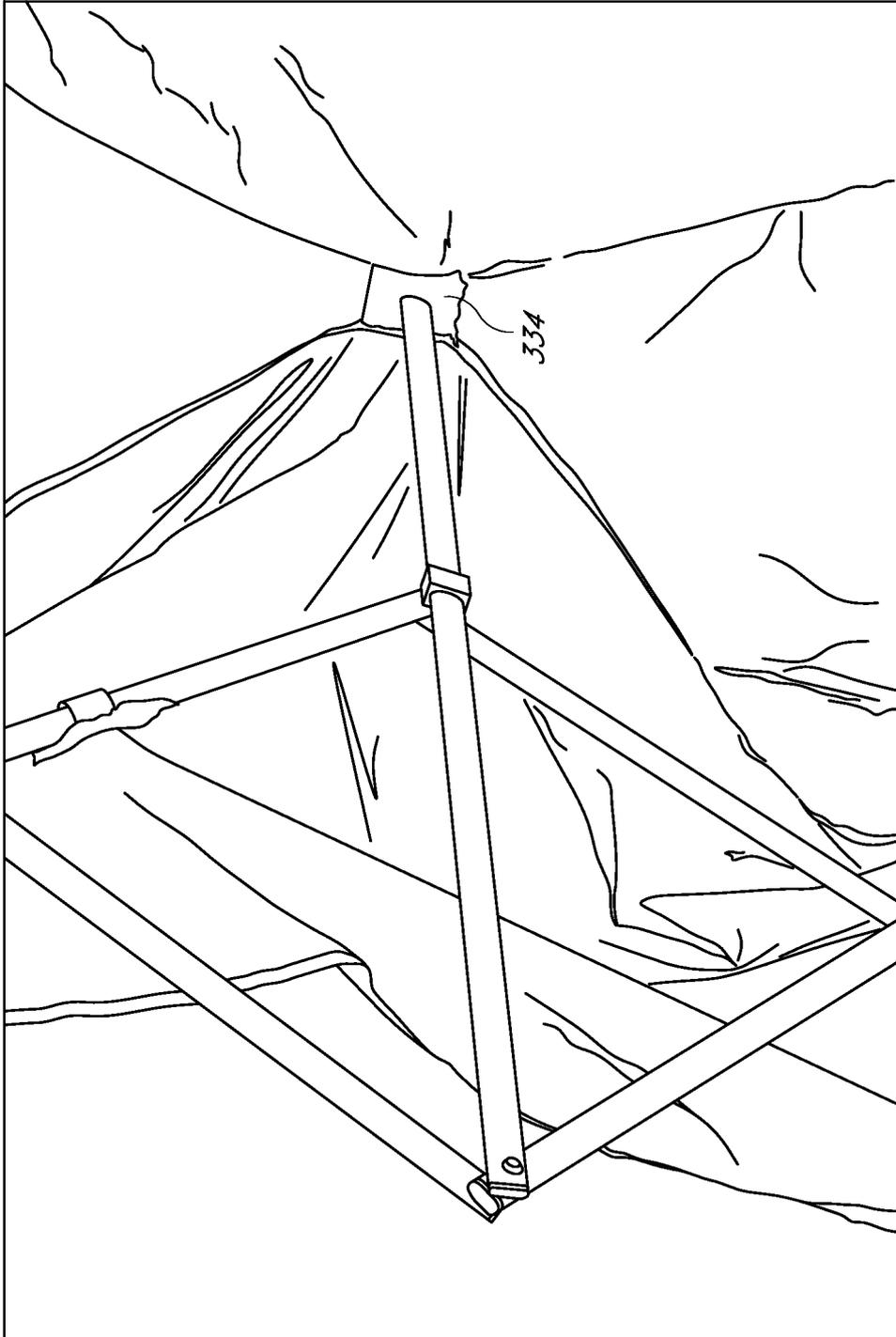
FIG. 3C



*FIG. 3D*



*FIG. 3E*



*FIG. 3F*

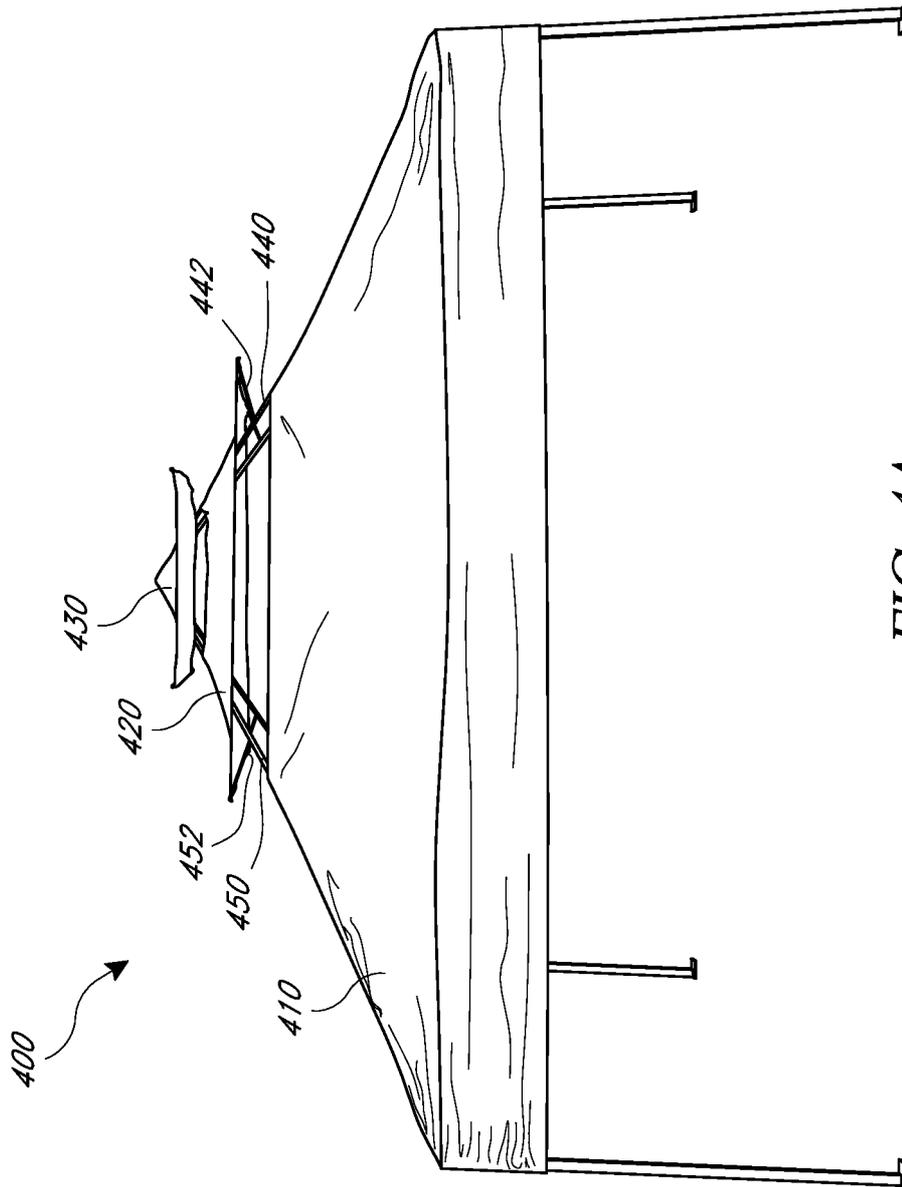


FIG. 4A

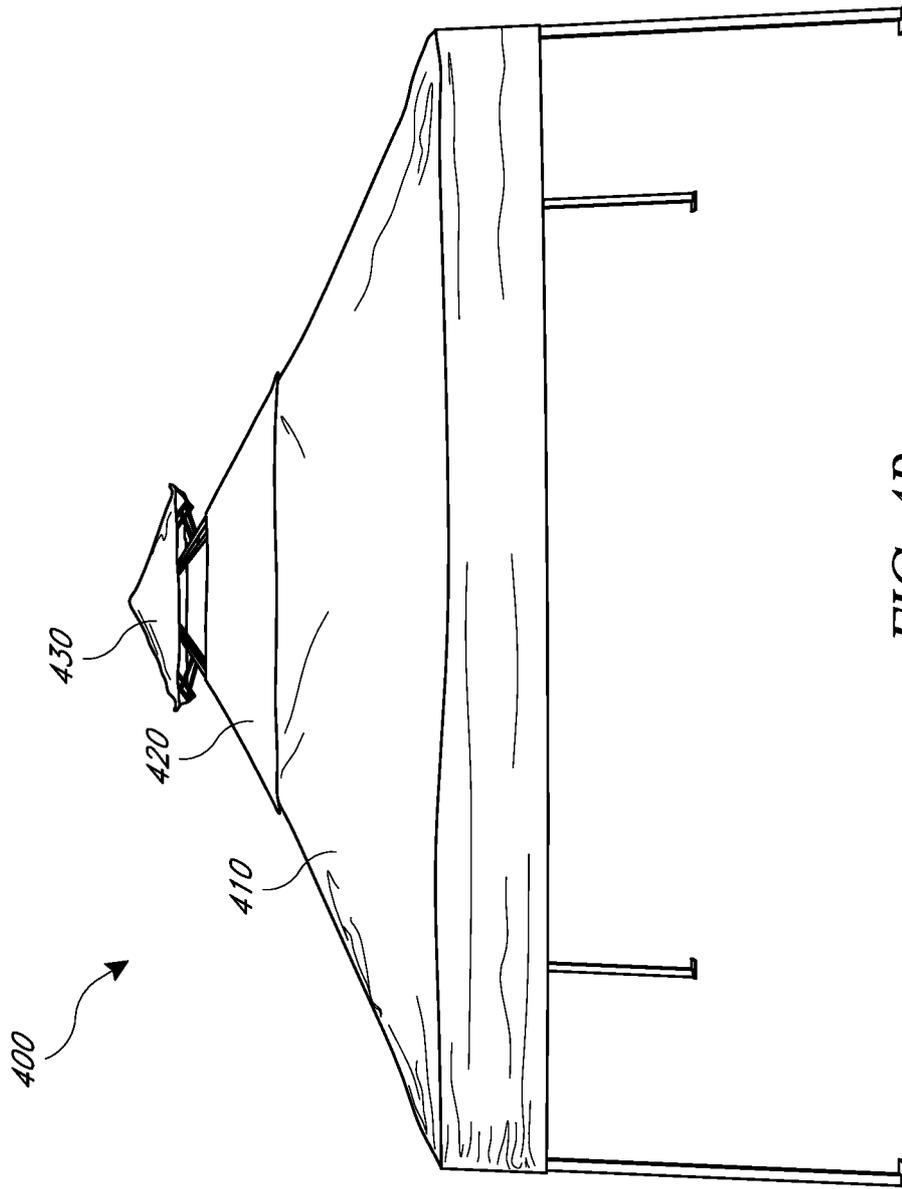


FIG. 4B

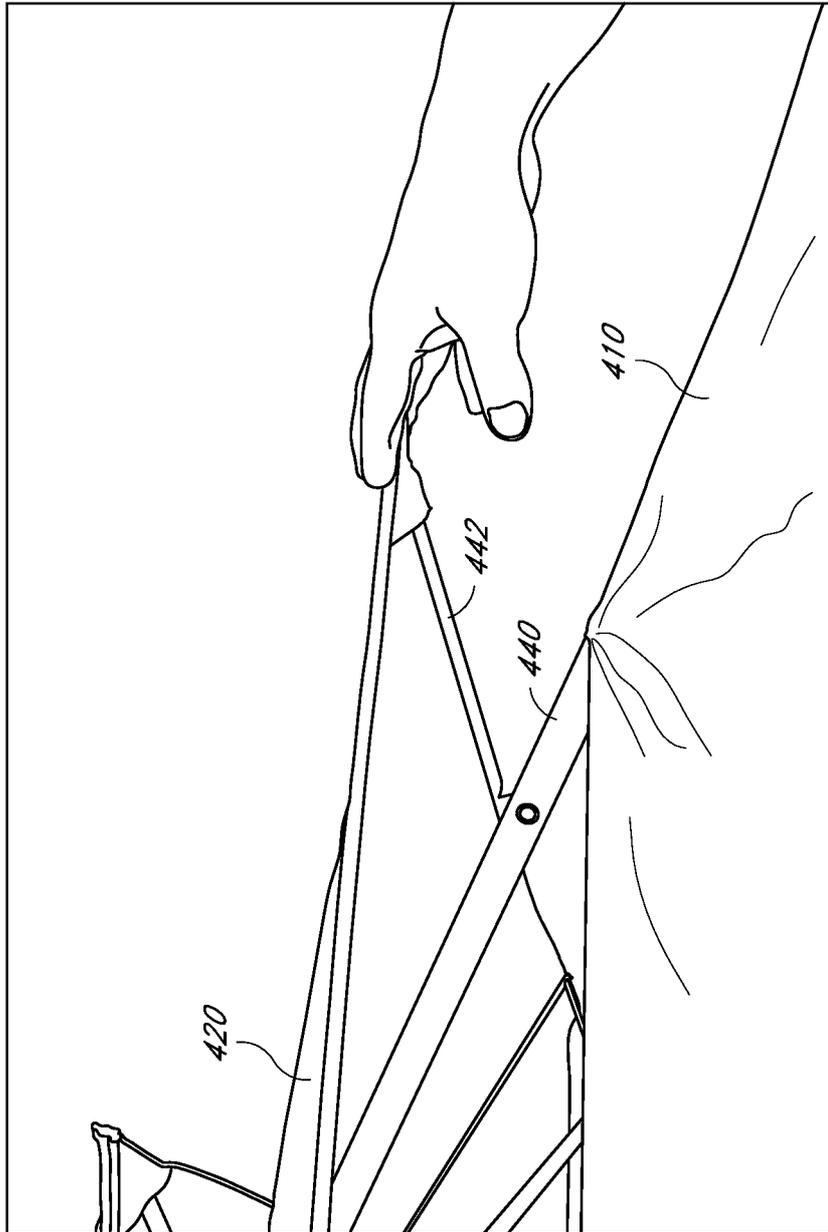


FIG. 4C

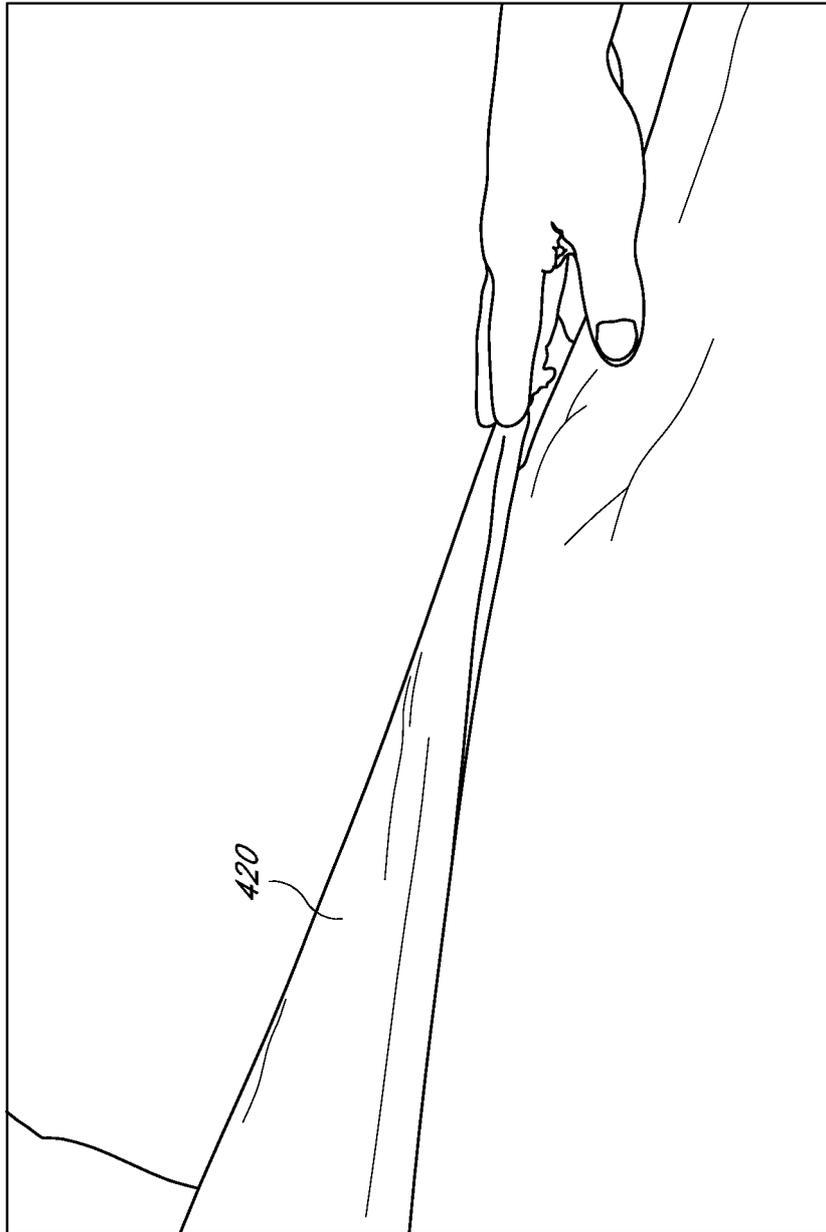


FIG. 4D

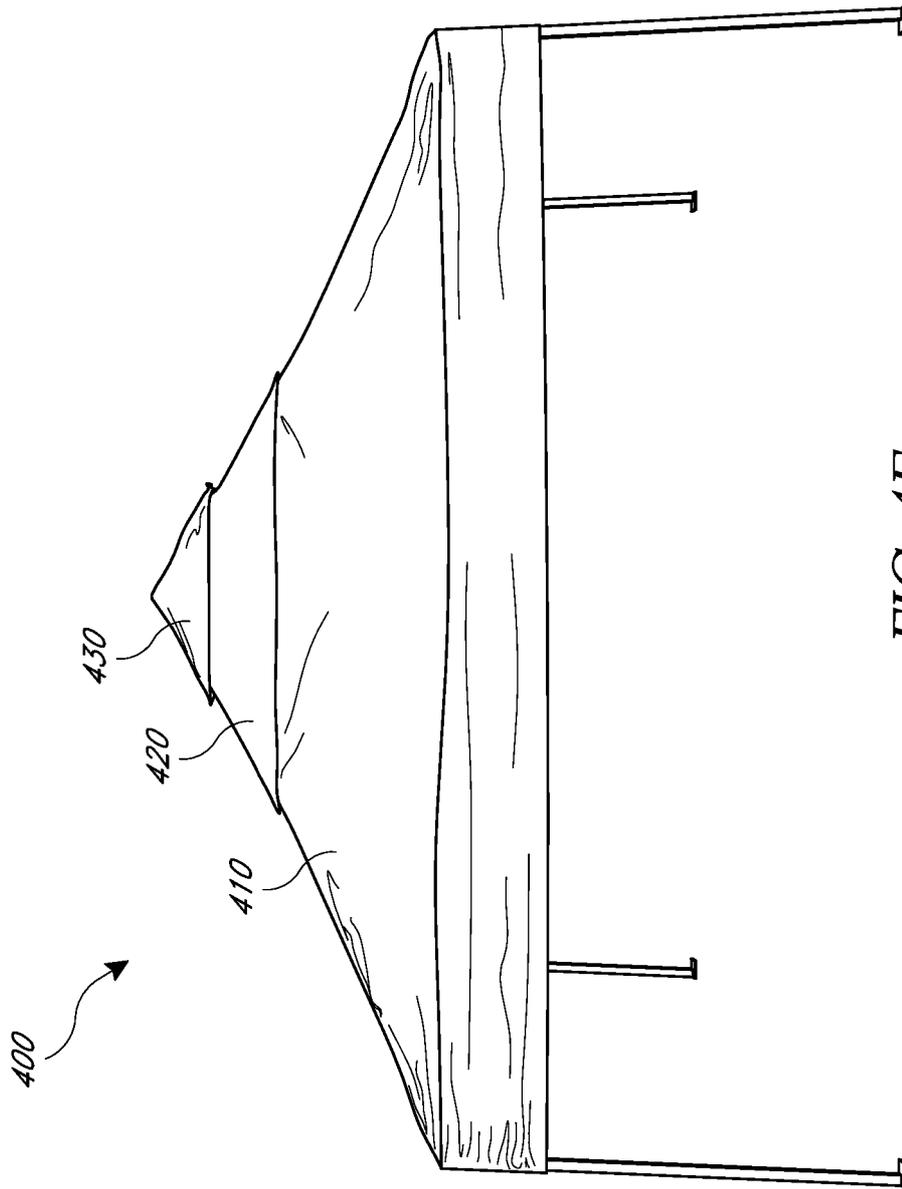
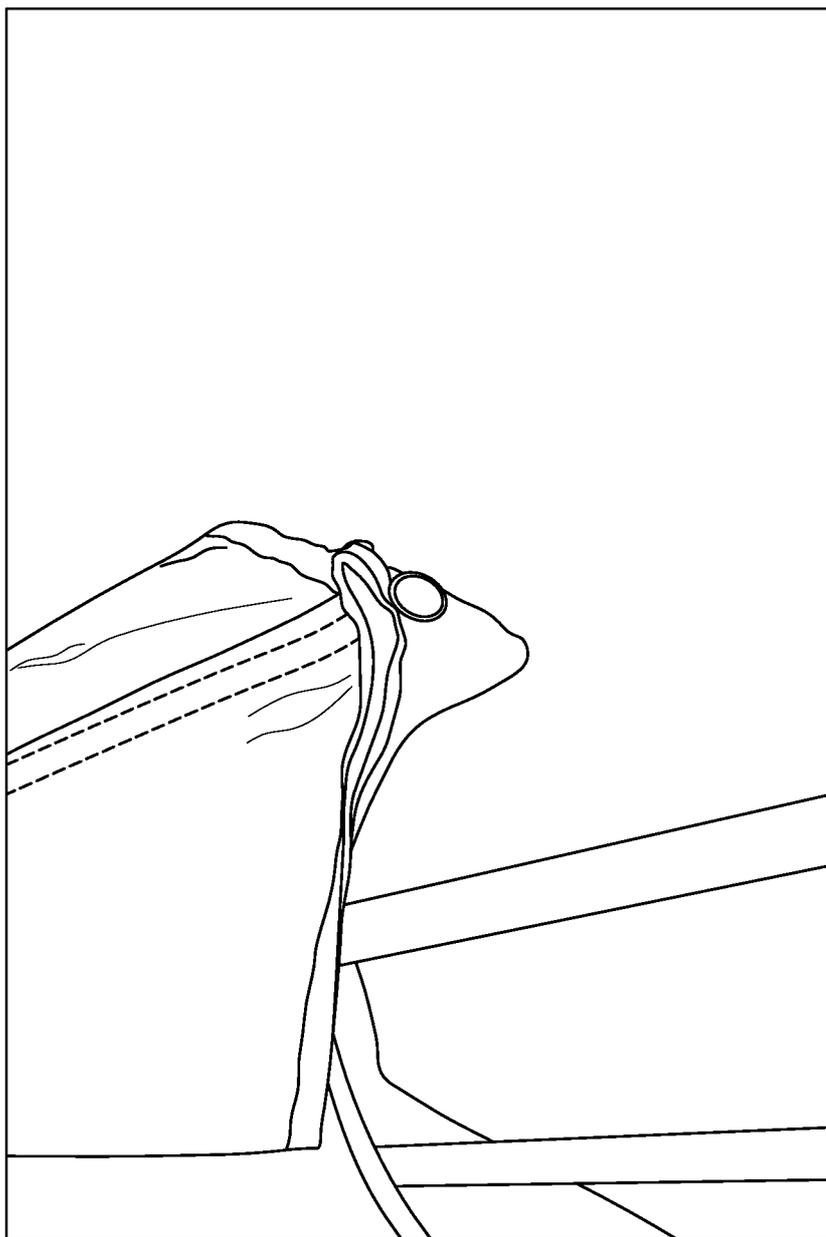


FIG. 4E



*FIG. 4F*

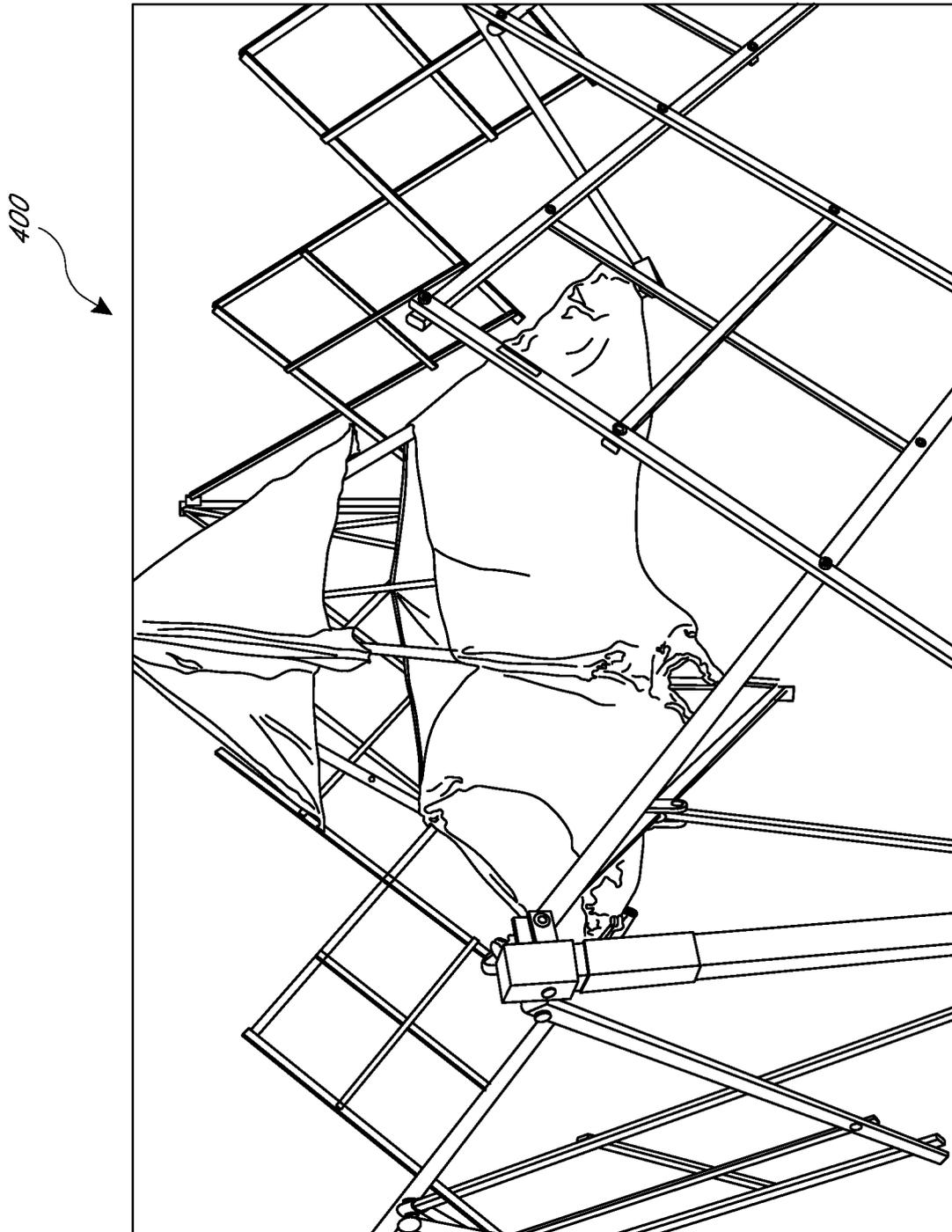
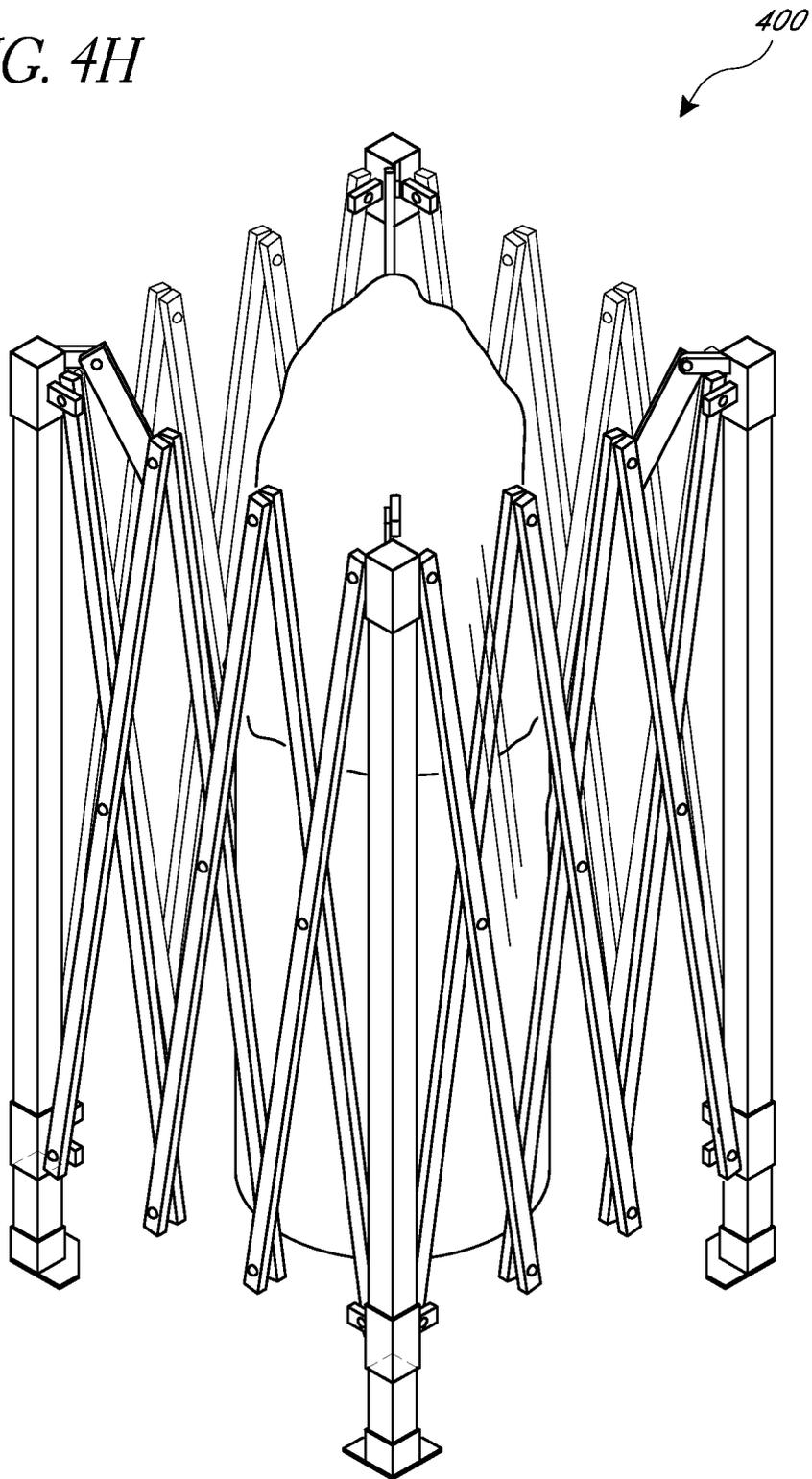


FIG. 4G

FIG. 4H



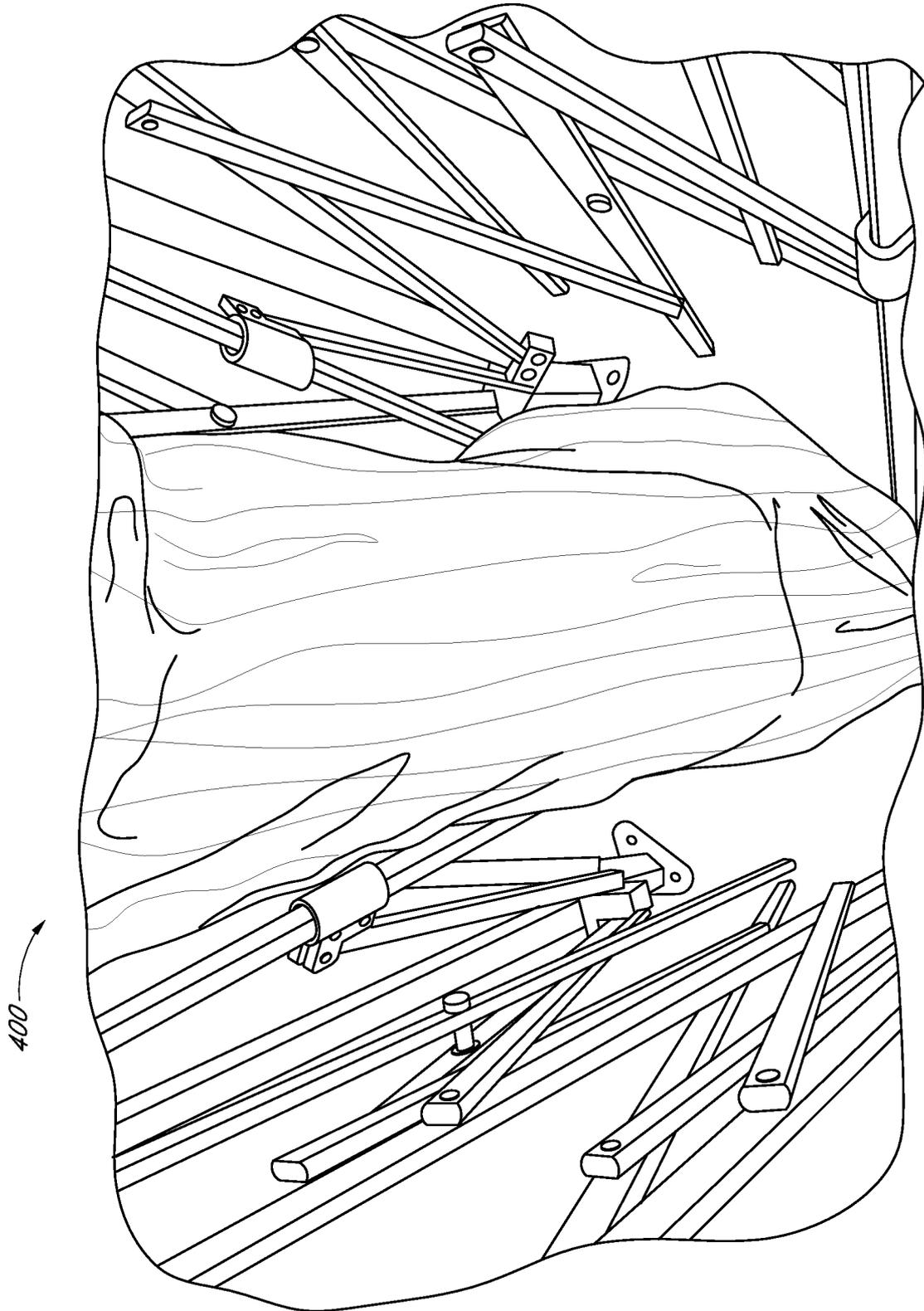


FIG. 4I

400

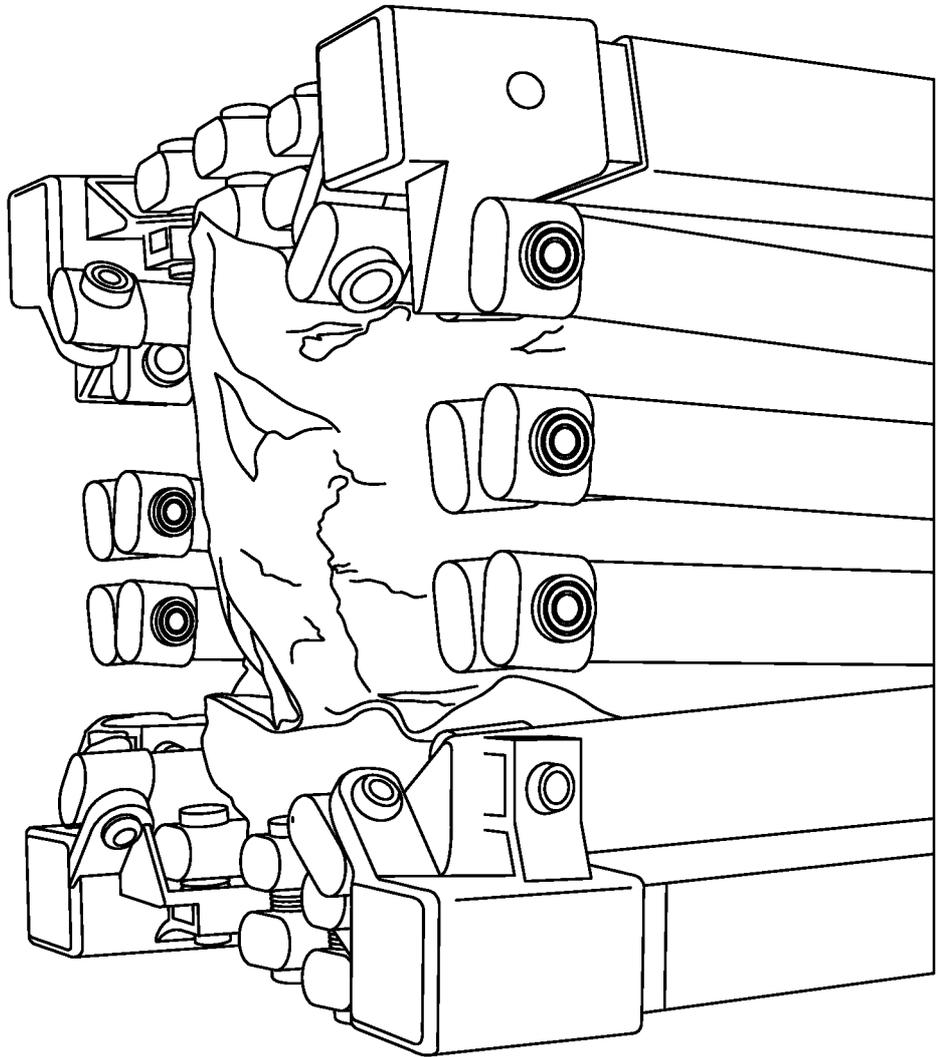
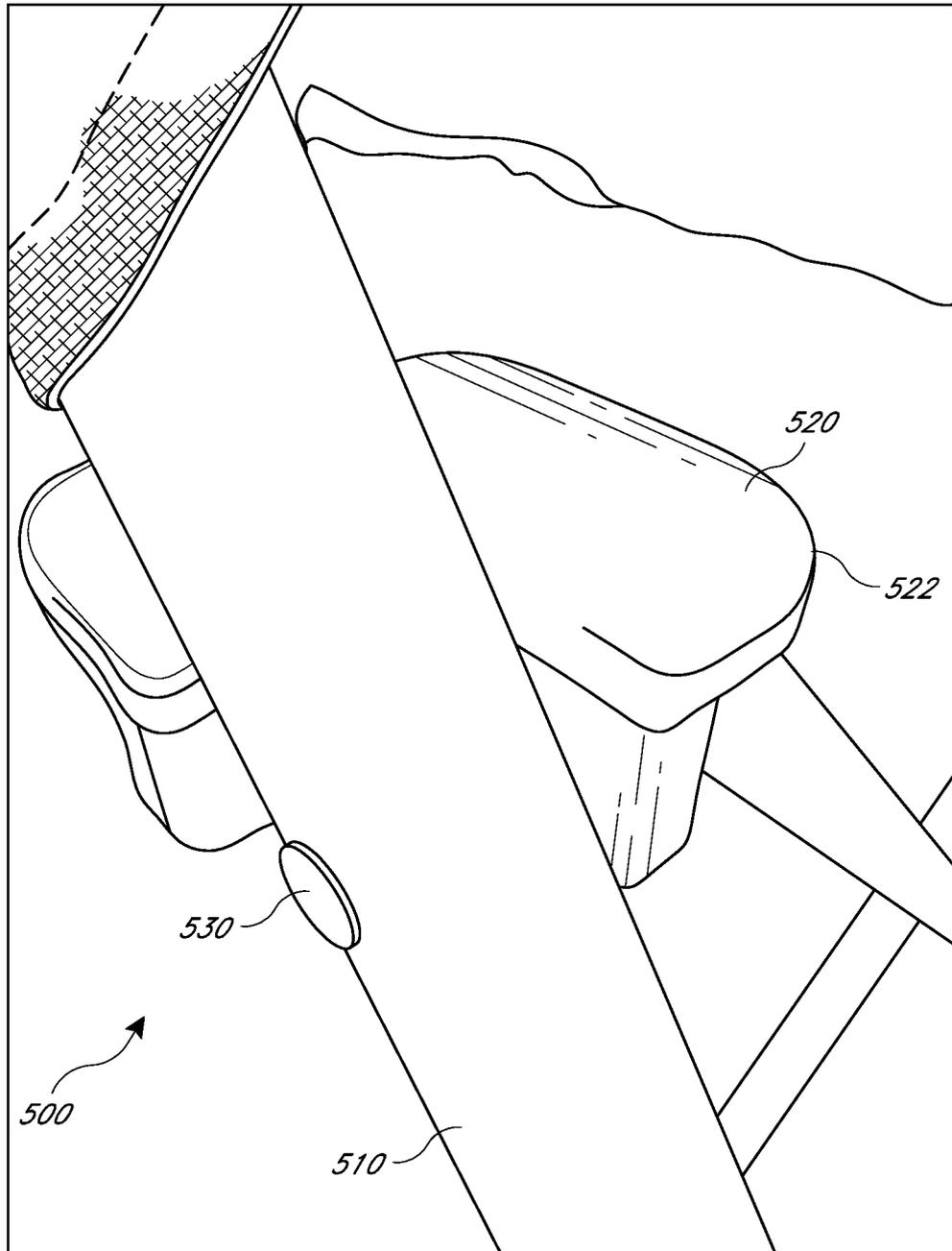
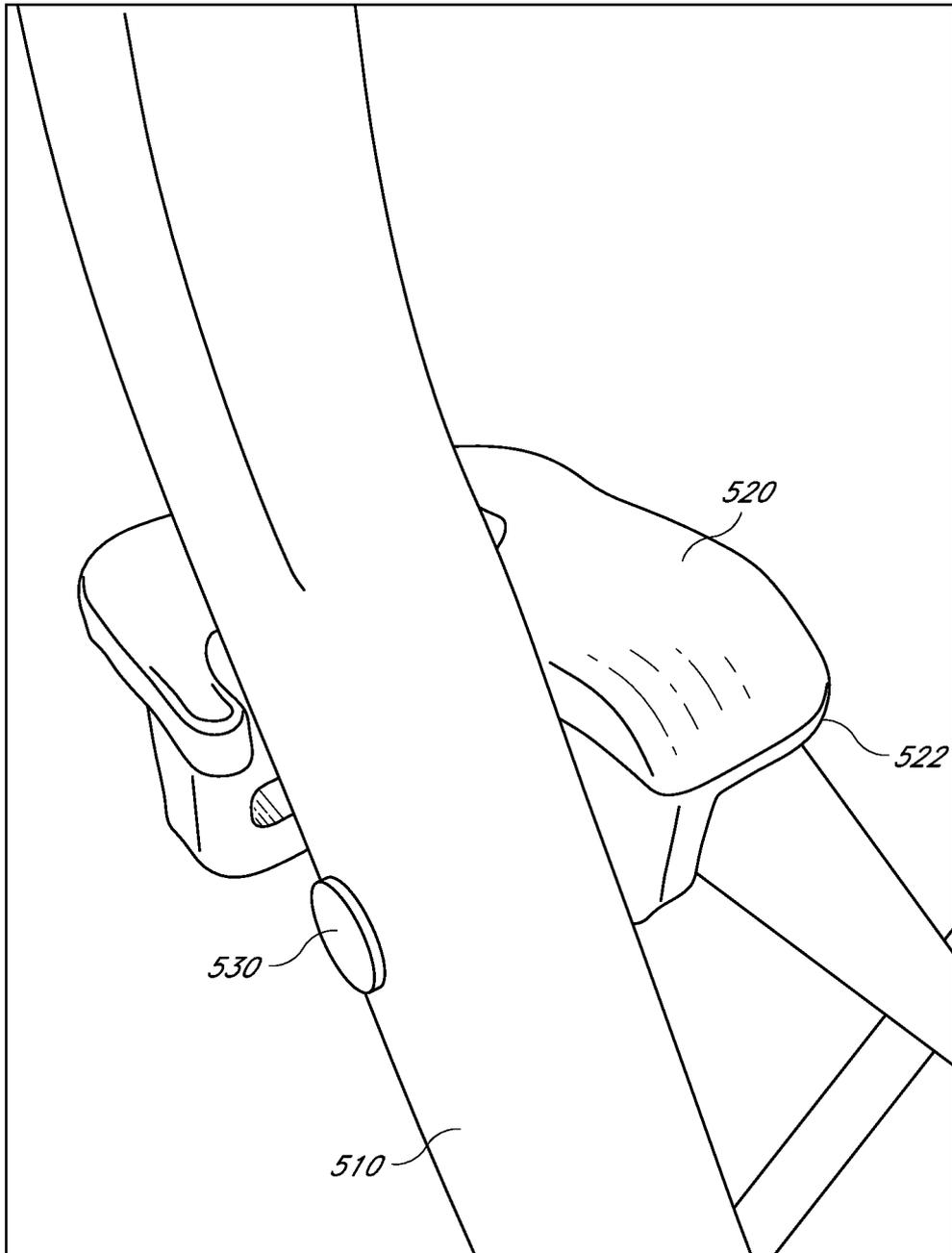


FIG. 4J

FIG. 5A



*FIG. 5B*



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*FIG. 5C*

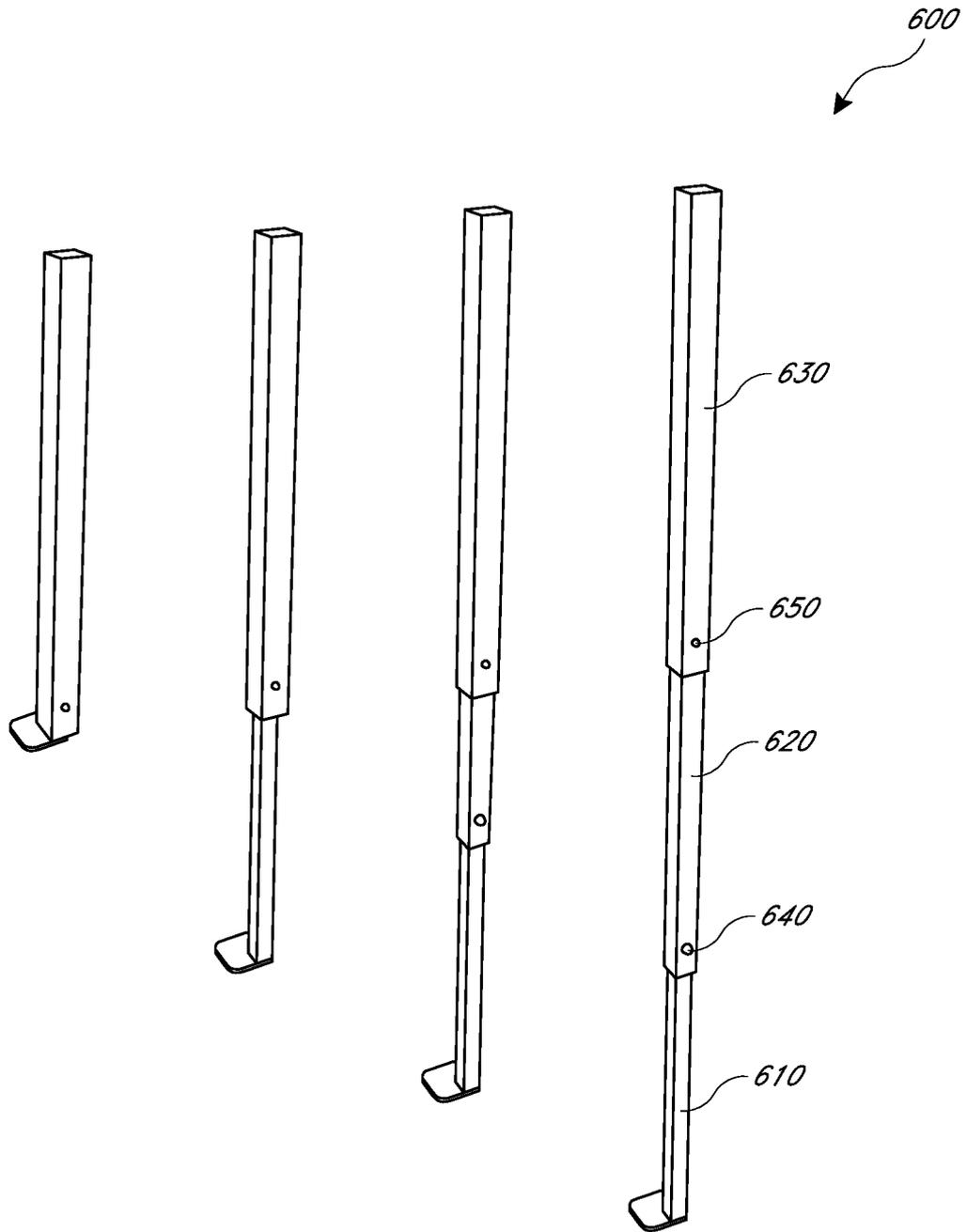


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 13/24186

A. CLASSIFICATION OF SUBJECT MATTER  
**IPC(8) - E04H 15/00 (2013.01)**  
**USPC - 135/93, 122**

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)  
 IPC(8) - E04H 15/00 (2013.01)  
 USPC - 135/93, 122

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 USPC - 135/94, 121, 158, 159, 160, 115, 120.2

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 PatBase, FreePatentsOnline, GoogleScholar, search terms used - frame, cover, center, middle, edge, peri\*, vent\*, air, mesh, tent, canopy, air, adjust\*, posit\*, roof, awning, adapt\*, chang\*, spring, move, configure, ventilation, peripheral or perimeter, layer, reposition, reconfigure

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US 7,775,229 B2 (Sy-Facunda) 17 August 2010 (17.08.2010) entire document	1-5, 8-11, 13-16
Y		6, 12, 17-18
X	US 2005/0081904 A1 (Suzuki et al.) 21 April 2005 (21.04.2005) Abstract; Figs. 5(a), 6, 7(a), 7(b); para [0034]-[0049], [0091]-[0099]	1, 2, 4, 7
Y	US 2005/0155637 A1 (Kim) 21 July 2005 (21.07.2005) Fig. 1B, 2K, 6A; Title; para [0002], [0039], [0056], [0058]	12
Y	US 4,779,635 A (Lynch) 25 October 1988 (25.10.1988) Fig. 3; col. 2, In. 39-43; col. 3, In. 57-60; col. 6, In. 31-46	6, 17-18
A	CN 20205561 1 U (Wang) 30 November 2011 (30.11.2011) entire document	1-18
A	US 7,568,307 B1 (Zimhoni et al.) 04 August 2009 (04.08.2009) Fig. 3, 4A, 4B, col. 2, In. 55-65; col. 3, In. 9-32; col. 3, In. 58 to col. 4, In. 13	1-18
A	US 7,784,480 B2 (Sy-Facunda) 31 August 2010 (31.08.2010) entire document	1-18

**FI** Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 27 March 2013 (27.03.2013)	Date of mailing of the international search report <b>15 APR 2013</b>
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young  PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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