



(51) International Patent Classification:

E04H 15/00 (2006.01)

(21) International Application Number:

PCT/US2022/035702

(22) International Filing Date:

30 June 2022 (30.06.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/217,354

01 July 2021 (01.07.2021)

US

(71) Applicant: ZIPWALL, LLC. [US/US]; 37 Broadway, Arlington, Massachusetts 02474 (US).

(72) Inventor: WHITEMORE, Jeffrey P.; 122 Jason Street, Arlington, Massachusetts 02174 (US).

(74) Agent: ONELLO, JR., Anthony P. et al.; Onello & Mello, LLP, Three Burlington Woods Drive, Suite 203, Burlington, Massachusetts 01803 (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, 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, ME, MG, MK, MN, 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, GH, GM, KE, LR, LS, MW, MZ, NA, RW, 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, 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).

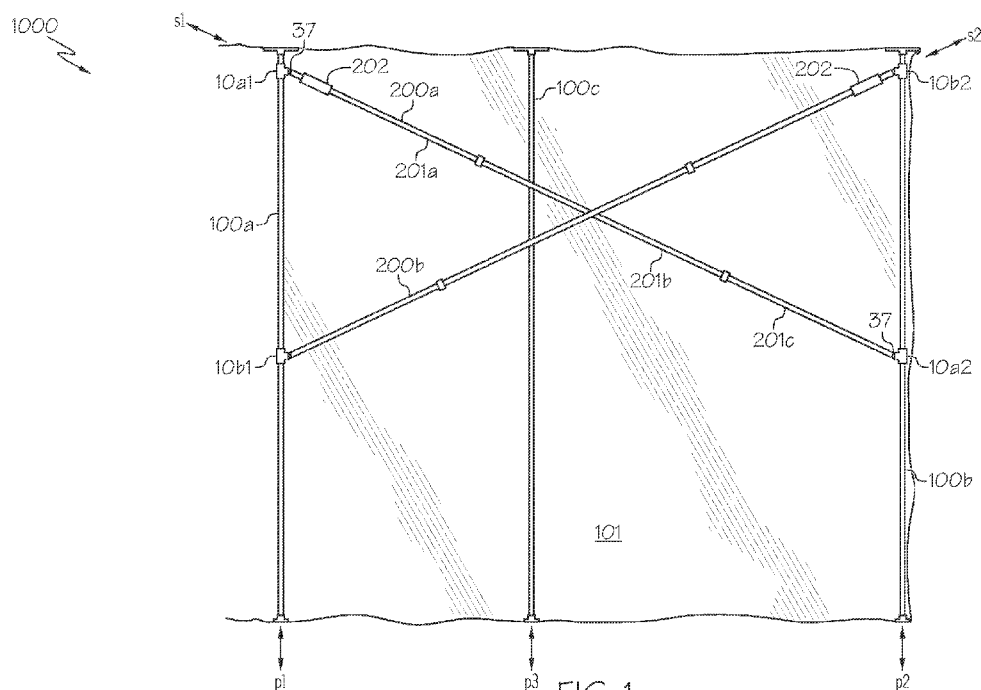
Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: SUPPORT SYSTEM



(57) Abstract: A support system is constructed and arranged to secure the position of at least one pole in a partition mount system.



SUPPORT SYSTEM

RELATED APPLICATIONS

This application claims benefit of United States Provisional Application Serial Number
5 63/217,354, titled "Support System", filed July 1, 2021, the content of which is incorporated
by reference in its entirety.

This application is related to:

United States Patent No. 5,924,469, issued on July 20, 1999;

10 United States Patent No. 6,564,512, issued on May 20, 2003;

United States Patent No. 7,073,758, issued on July 11, 2006;

United States Patent No. 7,533,712, issued on May 19, 2009;

United States Patent No. 7,658,219, issued on February 9, 2010;

United States Patent No. 7,670,401, issued on March 2, 2010;

15 United States Patent No. 7,743,512, issued on June 29, 2010;

United States Patent No. 7,717,382, issued on May 18, 2010;

United States Patent No. 9,115,539, issued on August 25, 2015;

United States Design Patent No. D777901, issued on Jan 31, 2017;

United States Patent No. 9,657,514, issued on May 23, 2017;

20 United States Patent No. 9,663,962, issued on May 30, 2017;

United States Patent No. 10,081,955, issued on September 25, 2018;

United States Patent No. 10,174,514, issued on January 8, 2019;

United States Patent No. 10,428,539, issued on October 1, 2019;

United States Patent No. 10,781,597, issued on September 22, 2020;

25 United States Patent Application Serial Number 15/822,423, filed on November 27,
2017, United States Publication No. 2018-0154293, published June 7, 2018;

Patent Cooperation Treaty Application Serial Number PCT/US20/013282, filed on
January 13, 2020, PCT Publication No. WO 2020/146862, published July 16, 2020;

30 Patent Cooperation Treaty Application Serial Number PCT/US19/065102, filed on
December 6, 2019, PCT Publication No. WO 2020/118277, published June 11, 2020;

Patent Cooperation Treaty Application Serial Number PCT/US20/013415, filed on
January 13, 2020, PCT Publication No. WO 2020/146904, published July 16, 2020; and

Patent Cooperation Treaty Application Serial Number PCT/US20/031284, filed on May 4, 2020, PCT Publication No. WO 2020/223726, published November 5, 2020; the content of each being incorporated herein by reference in its entirety.

5 BACKGROUND

Partition systems are often employed to isolate portions of a building or room, by serving as a barrier to dust, noise, light, odors, and other intrusions. In construction zones, partitions are useful for protecting a clean area from a work area, for example, protecting an area where furniture and rugs are temporarily stored from an area where wood floors are
10 being refinished.

Workers at construction sites often use rudimentary techniques for installing partitions. Some simply nail, screw, or staple the curtain or partition material to the floor, ceiling, and abutting walls, resulting in damage to their surfaces. Other workers setting up a
15 barrier employ tape or other adhesives which could result in paint being removed from the wall or the adhesive material being difficult to remove. The tape usually fails to stick, but, if it does stick, as the tape is removed, paint can pull off with the tape, or adhesive is left behind.

20 United States Patent Nos. 5,924,469 and 7,658,219, incorporated herein by reference, disclose partition mount systems that address these limitations. These systems utilize a plurality of spring-biased pole mounts that secure a curtain or drape material, such as plastic, cloth, and the like, to form a temporary partition. The disclosed system is a "clean" system configured to be installed and removed without damaging or otherwise marking the ceiling,
25 floor or walls in the construction zone. Assembly is easy and fast and can be accomplished by a single individual. In certain applications, however, a sag, or gap, may be present in the curtain along a pole next to a wall, ceiling, door frame, or other abutting surface, compromising the effectiveness of the installation.

30 United States Patent No. 7,533,712, the content of which is incorporated herein by reference, discloses a mount system that mitigates or eliminates sag, or gaps, between an installed curtain and an abutting surface such as a wall or ceiling. The system accomplishes this in a manner that avoids permanent damage to the wall or ceiling surface. The system

includes a head with an elongated body and a compressible curtain interface. A pole, for example, as described in connection with United States Patent No. 5,924,469 and United States Patent No. 7,658,219, may be configured to urge the head and the curtain to the abutting surface, thereby eliminating a sag, or gap in the curtain.

5

In some instances, the partition system may separate two regions with different air pressure. The resulting pressure gradient may adjust the position of the curtain, which may adjust the position of the pole mounts.

10 SUMMARY

In an aspect, a system comprises: a first pole elongated along a first axis; a second pole elongated along a second axis, the second axis being substantially parallel with the first axis; and a first support pole elongated along a third axis, the third axis being transverse to the first axis and the second axis, the first support pole comprising a first end coupled to the first pole and a second end coupled to the second pole.

15

In some embodiments, the first axis, the second axis, and third axis extend in a first plane.

In some embodiments, the system further comprises a first adapter, the first adapter coupled to the first end of the first support pole and the first pole.

20

In some embodiments, the system further comprises a second adapter, the second adapter coupled to the second end of the first support pole and the second pole.

In some embodiments, the first end of the support pole is removably coupled to the first adapter.

25

In some embodiments, the second end of the first support pole is removable coupled to the second adapter.

In some embodiments, the first end of the first support pole is coupled to the first adapter with a ball-and-socket joint.

In some embodiments, the second end of the first support pole is coupled to the second adapter with a ball-and-socket joint.

30

In some embodiments, the first end of the first support pole is rotatably coupled to the first adapter.

In some embodiments, the second end of the first support pole is rotatably coupled to the second adapter.

In some embodiments, the first adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to allow the first support pole to only rotate in the first plane.

5 In some embodiments, the second adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to allow the first support pole to only rotate in the first plane.

In some embodiments, the support pole comprises a compression mechanism.

10 In some embodiments, the support pole comprises an internal compression mechanism.

In some embodiments, the first pole is arranged between a floor and a ceiling.

In some embodiments, the first adapter comprises a friction pad constructed and arranged to create friction between the first adapter and the first pole.

15 In some embodiments, the second adapter comprises a friction pad constructed and arranged to create friction between the second adapter and the second pole.

In some embodiments, the friction pad comprises at least two raised regions constructed and arranged to create friction between the first adapter and the first pole.

In some embodiments, the friction pad comprises at least two raised regions constructed and arranged to create friction between the second adapter and the second pole.

20 In some embodiments, the first adapter comprises a hook-and-loop strap constructed and arranged to couple with the first pole.

In some embodiments, the second adapter comprises a hook-and-loop strap constructed and arranged to couple with the second pole.

25 In some embodiments, the first adapter comprises a clamp constructed and arranged to couple with the first pole.

In some embodiments, the second adapter comprises a clamp constructed and arranged to couple with the second pole.

30 In some embodiments, the system further comprises a second support pole elongated along a fourth axis, the fourth axis being transverse to the first axis and the second axis, the second support pole comprising a first end coupled to the first pole and a second end coupled to the second pole.

In some embodiments, the first axis, the second axis, third axis, and fourth axis extend in a first plane.

In some embodiments, the system further comprises a third adapter, the third adapter coupled to the first end of the second support pole and the first pole,

In some embodiments, the system further comprises a fourth adapter, the fourth adapter coupled to the second end of the second support pole and the second pole.

5 In some embodiments, the first support pole is extendable.

In some embodiments, the second support pole is extendable.

In some embodiments, the first adapter comprises an open region.

In some embodiments, the first adapter extends around a portion of the first pole.

10 In another aspect, an adapter comprises: a curved base extending along a first axis, the curved base comprising an upper surface and a lower surface; the curved base constructed to extend around at least a portion of a pole, at least one sidewall extending from the upper surface and extending parallel to the first axis; at least one socket coupled to the upper surface, the at least one socket constructed and arranged to mate with a corresponding connector to form a ball-and-socket joint; and a friction pad coupled to the lower surface, the
15 friction pad constructed and arranged to create friction between the adapter and a pole.

In some embodiments, the friction pad comprises at least two raised regions constructed and arranged to create friction between the adapter and the pole.

In some embodiments, the at least one sidewall comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall being spaced apart from each
20 other.

In some embodiments, the at least one socket is positioned between the first sidewall and the second sidewall.

In another aspect, a method comprises: providing a first pole elongated along a first axis; providing a second pole elongated along a second axis, the second axis being
25 substantially parallel with the first axis; providing a first support pole elongated along a third axis, the third axis being transverse to the first axis and the second axis; and coupling a first end of the first support pole to the first pole; and coupling a second end of the first support pole to the second pole.

30

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features and advantages of the inventive concepts will be apparent from the more particular description of embodiments of the inventive concepts, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the inventive concepts.

FIG. 1 is a front view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 2 is a perspective close-up view of the first end of the second support pole of the embodiment shown in FIG. 1, in accordance with aspects of inventive concepts herein.

FIG. 3 is a front view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 4 is a perspective close-up view of the second end of the first support pole and the second support pole of the embodiment shown in FIG. 3, in accordance with aspects of inventive concepts herein.

FIG. 5A is a front view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 5B is a front view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 5C is a front view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 5D is a perspective view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 5E is a perspective view of an embodiment of a support system, in accordance with aspects of inventive concepts herein.

FIG. 6 is a perspective view of a top side of an embodiment of an adapter, in
5 accordance with aspects of inventive concepts herein.

FIG. 7 is a perspective view of a bottom side of an embodiment of an adapter, in accordance with aspects of inventive concepts herein.

10 FIG. 8 is a perspective view of a bottom side of an embodiment of an adapter, in accordance with aspects of inventive concepts herein.

FIG. 9 is a perspective view of an embodiment of an adapter comprising a clamp locking mechanism, in accordance with aspects of inventive concepts herein.
15

FIG. 10 is a perspective view of an embodiment of an adapter comprising a hook-and-loop locking mechanism, in accordance with aspects of inventive concepts herein.

DETAILED DESCRIPTION OF EMBODIMENTS

20 Various example embodiments will be described more fully hereinafter with reference to the accompanying drawings, in which some example embodiments are shown. The present inventive concepts may, however, be embodied in many different forms and should not be construed as limited to the example embodiments set forth herein.

25 It will be understood that when an element or layer is referred to as being “on,” “connected to” or “coupled to” another element or layer, it can be directly on, connected or coupled to the other element or layer or intervening elements or layers may be present. In contrast, when an element is referred to as being “directly on,” “directly connected to” or “directly coupled to” another element or layer, there are no intervening elements or layers
30 present. Like numerals refer to like elements throughout. As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items.

It will be understood that, although the terms first, second, third, etc. may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer or section from another region, layer or section. Thus, a first element, component, region, layer or section discussed below could be termed a second element, component, region, layer or section without departing from the teachings of the present inventive concepts.

Spatially relative terms, such as “beneath,” “below,” “lower,” “above,” “upper” and the like, may be used herein for ease of description to describe one element’s or feature’s relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “below” or “beneath” other elements or features would then be oriented “above” the other elements or features. Thus, the example term “below” can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly. A first element may be said to be “transverse” to a second element if the first element has a direction of extension that is not parallel to the direction of extension of the second element.

The terminology used herein is for the purpose of describing particular example embodiments only and is not intended to be limiting of the present inventive concepts. As used herein, the singular forms “a,” “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

Example embodiments are described herein with reference to cross-sectional illustrations that are schematic illustrations of idealized example embodiments (and intermediate structures). As such, variations from the shapes of the illustrations as a result, for example, of manufacturing techniques and/or tolerances, are to be expected. Thus, example

embodiments should not be construed as limited to the particular shapes of regions illustrated herein but are to include deviations in such shapes.

5 The embodiments described herein describe a support system that is constructed and arranged to secure the position of at least one pole in a partition mount system.

FIG. 1 is a front view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the one shown FIG. 1, the system 1000 comprises a first pole 100a elongated along a first pole axis p1 and a second pole 100b elongated along a second pole axis p2. In some embodiments, the second pole axis p2 can be substantially parallel with the first pole axis p1. In other embodiments, the first and second pole axes p1, p2 are other than parallel. In some embodiments, such as the one shown in FIG. 1, the system 1000 comprises a first support pole 200a elongated along a first support axis s1, the first support axis s1 being transverse to the first pole axis p1 and the second pole axis p2, the first support pole 200a comprising a first end coupled to the first pole 100a and a second end coupled to the second pole 100b. In some embodiments, such as the one shown in FIG. 1, the system 1000 comprises a second support pole 200b elongated along a second support axis s2, the second support axis s2 being transverse to the first pole axis p1 and the second pole axis p2, the second support pole 200b comprising a first end coupled to the first pole 100a and a second end coupled to the second pole 100b.

In some embodiments, the first pole 100a and second pole 100b comprise curtain poles constructed and arranged to support a curtain 101 or sheet of material. In some embodiments, the curtain poles can be adjustable in length, for example including multiple telescoping components. In some embodiments the curtain poles can include a compression mechanism that outwardly biases a first end of the curtain pole relative to a second end of the curtain pole. In some embodiments, a first end of the curtain pole includes a curtain clip for securing a curtain to a top of the curtain pole.

30 In the embodiment shown in FIG. 1 the system 1000 further comprises a third pole 100c elongated along a third pole axis p3. In the embodiment shown in FIG. 1, the first pole 100a, the second pole 100b, and the third pole 100c are arranged between a floor and a ceiling of a room. In some embodiments, the third pole 100c can comprise a curtain pole constructed and arranged in a manner similar to the first and second curtain poles 100a, 100b.

In alternative embodiments, the one or more poles are not arranged between the floor and the ceiling of a room, but instead are arranged between other structures.

In some embodiments, the support pole, for example, the first and second support poles 200a, 200b comprises a pole that is adjustable in length. In some embodiments, the first support pole 200a includes multiple telescoping segments 201a, b, c with twist-lock cam mechanisms for locking their respective positions. In some embodiments the first support pole 200a includes a compression mechanism 202 that outwardly biases a first end of the first support pole 200a relative to a second end of the first support pole 200a. In some
5
10
15
20
embodiments, the compression mechanism 202 comprises a spring. In some embodiments, the compression mechanism comprises a plunger mechanism. In some embodiments, the compression mechanism comprises a ratchet mechanism. In some embodiments, the compression mechanism comprises a pneumatic system. In some embodiments, the compression mechanism comprises a piston. In some embodiments, a first end of the first support pole 200a includes a ball 37 of a ball-and socket joint constructed and arranged to mate with a socket 12 of a ball-and-socket joint positioned at an adapter clip 10a1 as described herein. In some embodiments, both a first end of the first support pole 200a and a second end of the first support pole 200a includes a ball 37 of a ball-and socket joint constructed and arranged to mate with a socket 12 of a ball-and-socket joint positioned at a corresponding first and second adapter clip 10a1, 10a2 as described herein.

In some embodiments, such as the one shown in FIG. 1, the system 1000 further comprises a first adapter 10a1, the first adapter 10a1 coupled to the first end of the first support pole 200a and side region of the first pole 100a. The first adapter 10a1 is constructed and arranged to position and secure the first support pole 200a to the first pole 100a. In some
25
embodiments, such as the one in FIG. 1, the first end of the first support pole 200a is removably coupled to the first adapter 10a1. In some embodiments, such as the one in FIG. 1, the first end of the first support pole 200a is rotatably coupled to the first adapter 10a1. In some embodiments, the first end of the first support pole 200a is rotatably coupled to the first
30
adapter 10a1 in such a manner that rotation is permitted about a first rotation axis and that rotation is limited or prevented about a second rotation axis.

In some embodiments, such as the one shown in FIG. 1, the system 1000 further comprises a second adapter 10a2, the second adapter 10a2 coupled to the second end of the first support pole 200a and the second pole 100b. The second adapter 10a2 is constructed and

arranged to secure the first support pole 200a to the second pole 100b. In some embodiments, such as the one in FIG. 1, the second end of the first support pole 200a is removably coupled to the second adapter 10a2. In some embodiments, such as the one in FIG. 1, the second end of the first support pole 200a is rotatably coupled to the second adapter 10a2. In some
5 embodiments, the second end of the first support pole 200a is rotatably coupled to the second adapter 10a2 in such a manner that rotation is permitted about a first rotation axis and that rotation is limited or prevented about a second rotation axis.

In some embodiments, such as the one shown in FIG. 1, the system 1000 further
10 comprises a third adapter 10b1, the third adapter 10b1 coupled to the first end of the second support pole 200b and the first pole 100a. The third adapter 10b1 is constructed and arranged to secure the second support pole 200b to the first pole 100a. In some embodiments, such as the one in FIG. 1, the first end of the second support pole 200b is removably coupled to the third adapter 10b1. In some embodiments, such as the one in FIG. 1, the first end of the
15 second support pole 200b is rotatably coupled to the third adapter 10b1. In some embodiments, the first end of the second support pole 200b is rotatably coupled to the third adapter 10b1 in such a manner that rotation is permitted about a first rotation axis and that rotation is limited or prevented about a second rotation axis.

20 In some embodiments, such as the one shown in FIG. 1, the system 1000 further comprises a fourth adapter 10b2, the fourth adapter 10b2 coupled to the second end of the second support pole 200b and the second pole 100b. The fourth adapter 10b2 is constructed and arranged to secure the second support pole 200b to the second pole 100b. In some
25 embodiments, such as the one in FIG. 1, the second end of the second support pole 200b is removably coupled to the fourth adapter 10b2. In some embodiments, such as the one in FIG. 1, the second end of the second support pole 200b is rotatably coupled to the fourth adapter 10b2. In some embodiments, the second end of the second support pole 200b is rotatably coupled to the fourth adapter 10b2 in such a manner that rotation is permitted about a first
30 rotation axis and that rotation is limited or prevented about a second rotation axis.

In this manner, the system 1000 provides for enhanced structural integrity to maintain the curtain poles 100a, 100b, and 100c in position between the floor and ceiling. The support poles 200a, 200b can operate as trusses in the system to provide for structural triangulation

between the curtain poles 100a, 100b, 100c, rendering the system 1000 more resistant to stress, for example stress forces imparted by a change in differential air pressure at opposed regions of the curtain 101. Compression mechanisms 202 of the support poles 200a, 200b operate to relax rigidity in the system to provide “give” when needed, thereby allowing the system to accommodate rapid changes in applied forces.

In alternative embodiments, at least one of the ends of at least one of the support poles is integral with at least one adapter. In alternative embodiments, at least one of the ends of at least one of the support poles is fixed in arrangement with at least one adapter so they are not rotatably coupled.

In the embodiment shown in FIG. 1, the system 1000 comprises two support poles 200a, b. In alternative embodiments, the system 1000 comprises one support pole. In alternative embodiments, the system 1000 comprises more than two support poles.

In the embodiment shown in FIG. 1, the first support pole 200a extends between the first pole 100a and the second pole 100b. In alternative embodiments, the first support pole extends between the first pole 100a and the third pole 100c. In alternative embodiments, the first support pole extends between the second pole 100b and the third pole 100c.

In the embodiment shown in FIG. 1, the second support pole 200b extends between the first pole 100a and the second pole 100b. In alternative embodiments, the second support pole extends between the first pole 100a and the third pole 100c. In alternative embodiments, the second support pole extends between the second pole 100b and the third pole 100c.

In the embodiment shown in FIG. 1, the first support axis s1 is positioned transverse to the first pole axis p1 and the second pole axis p2. In alternative embodiments, the first support axis s1 is perpendicular with the first pole axis p1 and/or the second pole axis p2.

In the embodiment shown in FIG. 1, the second support axis s2 is positioned transverse to the first pole axis p1 and the second pole axis p2. In alternative embodiments, the second support axis s2 is perpendicular with the first pole axis p1 and/or the second pole axis p2. In various embodiments, the number poles and number of corresponding axes can be more than two.

In some embodiments, as described herein at least one of the support poles includes a length-adjustment mechanism such that the length can be adjusted. In some embodiments, at least one of the support poles is constructed such that the length is fixed.

5

In some embodiments, at least one of the support poles comprises a compression mechanism. In some embodiments, at least one of the support poles comprises an internal compression mechanism. In some embodiments, at least one of the support poles does not comprise a compression mechanism.

10

FIG. 2 is a perspective close-up view of the first end of the second support pole 200b of the embodiment shown in FIG. 1, in accordance with aspects of inventive concepts herein. In some embodiments, such as the one shown in FIG. 2, at least one adapter 10b1 comprises an open end such that it is easy to couple the adapter to the pole. FIG. 2 shows the fourth adapter 10b1 of FIG. 1 and the adapter 10b1 comprises an open region 12b1 and does not extend around the first pole 100a.

15

In some embodiments, such as the one shown in FIG. 2, the adapter comprises at least one sidewall. In FIG. 2, first and second side walls 11a, 11b of the fourth adapter 10b1 are shown. In some embodiments, each sidewall 11a, 11b is constructed and arranged to limit the direction of rotation of the corresponding support pole. For example, in the embodiment shown in FIG. 2, the fourth adapter 10b1 comprises a first sidewall 11a and a second sidewall 11b. In this embodiment, the first sidewall 11a and the second sidewall 11b are constructed and arranged to allow the second support pole 200b to only rotate in the first plane. In the present embodiment the first and second sidewalls 11a, 11b flank a socket of the fourth adapter 10c1 so that an inserted ball 37 at an end of the support pole 200b attached to the fourth adapter interfaces with and interacts with the sidewalls 11a, 11b. In this manner, the support pole 200b can freely rotate in a first degree of rotation 39a between the sidewalls 11a, 11b, while being limited from rotation in a second degree of rotation 39b by the sidewalls 11a, 11b.

20

25

30

FIG. 3 is a front view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In the embodiment shown in FIG. 3, the first pole 100a, the second pole 100b, and the third pole 100c are arranged as they are in the embodiment of

FIG. 1. In the embodiment shown in FIG. 3, the first support pole 200a is arranged as it is in the embodiment of FIG. 1.

In some embodiments, such as the one shown in FIG. 3, the system 1000 comprises a
5 second support pole 200b elongated along a second support axis s2, the second support axis s2 being orthogonal to the first pole axis p1, the second pole axis p2, and the third pole axis p3, the second support pole 200b comprising a first end coupled to the third pole 100c and a second end coupled to the second pole 100b. In this embodiment, the third adapter 10b1 is coupled to the second support pole 200b and the third pole 100c. In this embodiment, the
10 fourth adapter 10b2 is coupled to the second support pole 200b and the second pole 100b. In alternative embodiments, the second support pole 200b is coupled between the first pole 100a and the third pole 100c.

FIG. 4 is a perspective close-up view of the second end of the first support pole 200a
15 and the second support pole 200b of the embodiment shown in FIG. 3, in accordance with aspects of inventive concepts herein.

FIG. 5A is a front view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment
20 shown in FIG. 5A, the system 1000 comprises a first support pole 200a coupled between the first pole 100a and the second pole 100b. In some embodiments, such as the embodiment shown in FIG. 5A, the first support axis s1 is substantially orthogonal to the first pole axis p1 and the second pole axis p2.

FIG. 5B is a front view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment
25 shown in FIG. 5B, the system 1000 comprises a first support pole 200a coupled between the first pole 100a and the second pole 100b. In some embodiments, such as the embodiment shown in FIG. 5B, the first support axis s1 is transverse to the first pole axis p1 and the second pole axis p2. In some embodiments, such as the embodiment shown in FIG. 5B, the
30 system 1000 comprises a second support pole 200b coupled between the first pole 100a and the third pole 100c. In some embodiments, such as the embodiment shown in FIG. 5B, the second support axis s2 is orthogonal to the first pole axis p1 and the third pole axis p3.

FIG. 5C is a front view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 5C, the system 1000 comprises a first support pole 200a coupled between the first pole 100a and the third pole 100c. In some embodiments, such as the embodiment shown in FIG. 5C, the system 1000 comprises a second support pole 200b coupled between the second pole 100b and the third pole 100c. In some embodiments, such as the embodiment shown in FIG. 5C, the first support axis s1 is orthogonal to the first pole axis p1 and the second pole axis p2. In some embodiments, such as the embodiment shown in FIG. 5C, the second support axis s2 is orthogonal to the second pole axis p2 and the third pole axis p3.

FIG. 5D is a perspective view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 5D, the first pole 100a and the second pole 200a are oriented such that the first pole axis p1 and the second pole axis p2 are substantially parallel with a lower surface. In some embodiments, the first pole 100a and the second pole 200a are oriented such that the first pole axis p1 and the second pole axis p2 are transverse with a lower surface. In some embodiments, such as the embodiment shown in FIG. 5D, the system 1000 comprises a first support pole 200a coupled between the first pole 100a and the second pole 100b. In some embodiments, the first support axis s1 is orthogonal to the first pole axis p1 and the second pole axis p2.

FIG. 5E is a perspective view of an embodiment of a support system 1000, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 5D, the first pole 100a and the second pole 200a are oriented such that the first pole axis p1 and the second pole axis p2 are substantially parallel with a lower surface. In some embodiments, the first pole 100a and the second pole 200a are oriented such that the first pole axis p1 and the second pole axis p2 are transverse with a lower surface. In some embodiments, such as the embodiment shown in FIG. 5D, the system 1000 comprises a first support pole 200a and a second support pole 200b coupled between the first pole 100a and the second pole 100b. In some embodiments, the first support axis s1 is orthogonal to the first pole axis p1 and the second pole axis p2. In some embodiments, the second support axis s2 is orthogonal to the first pole axis p1 and the second pole axis p2.

FIG. 6 is a perspective view of the top side of an embodiment of an adapter 10, in accordance with aspects of inventive concepts herein. In some embodiments, such as the one shown in FIG. 6, the adapter 10 comprises a base 18 that extends along an adapter axis a1. In some embodiments, such as the one shown in FIG. 6, the base is curved such that it can extend around at least a portion of a pole. In some embodiments, the base comprises an upper surface 19 and a lower surface 20. In some embodiments, the base includes a concave interface region 41 constructed and arranged to interface with a side portion of a curtain pole.

In some embodiments, such as the one shown in FIG. 6, the adapter 10 comprises at least one connection region 12 constructed and arranged for coupling the adapter to a support pole. In the embodiment shown in FIG. 6, the adapter 10 comprises one connection region 12. In alternative embodiments, the adapter 10 comprises more than one connection region 12, which allows the adapter to couple to more than one support pole.

In some embodiments, such as the embodiment shown in FIG. 6, the adapter couples with the support pole via a ball-and-socket joint. In some embodiments, such as the one shown in FIG. 6, the connection region 12 of the adapter 10 comprises a socket and the corresponding support pole comprises a ball. In alternative embodiments, the connection region comprises a ball and the support pole comprises a socket. In some embodiments, the socket comprises a plurality of socket fingers 12a that receive a ball in a snap-fit connection relationship. In some embodiments, the socket fingers 12a are elastically deformable so that they are constructed and arranged to temporarily deform about an inserted ball and snap back into place to retain the inserted ball 37.

In some embodiments, the adapter 10 comprises at least one sidewall extending from the upper surface and extending parallel to the adapter axis a1. In some embodiments, such as the one shown in FIG. 6, the adapter 10 comprises a first sidewall 11a and a second sidewall 11b, the first sidewall and the second sidewall being oriented parallel to each other. In some embodiments, such as the one shown in FIG. 6, the connection mechanism 12 is positioned between the two sidewalls 11a, 11b. In the present embodiment the first and second sidewalls 11a, 11b flank a socket of the adapter 10 so that an inserted ball 37 at an end of the support pole 200 interfaces with and interacts with the sidewalls 11a, 11b. In this manner, the support pole 200 can freely rotate in a first degree of rotation 39a between the sidewalls 11a, 11b, while being limited from rotation in a second degree of rotation 39b by the

sidewalls 11a, 11b. In some embodiments, the ball 37 can be provided with a flange 51, the flange in turn including flats 53a, 53b. The flats 53a, 53b are dimensioned to be spaced apart by a distance that is slightly less than the spacing between the sidewalls 11a, 11b. In this manner, the flats 53a, 53b further resist inadvertent rotation of the support pole 200 in the second degree of rotation 39b, and in other degrees of rotation.

FIG. 7 is a perspective view of a bottom side of an embodiment of an adapter 10, in accordance with aspects of inventive concepts herein.

FIG. 8 is a perspective view of a bottom side of an embodiment of an adapter 10, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 8, the adapter 10 comprises a friction pad 14 constructed and arranged to create friction between the adapter 10 and a curtain pole. In this manner, the friction pad mitigates slipping of the adapter 10 relative to the curtain pole. In some embodiments, such as the embodiment shown in FIG. 8, the friction pad 14 comprises at least two raised regions 15a, b constructed and arranged to create friction between the adapter 10 and a curtain pole. The raised regions 15a, b extend in a direction along the adapter axis a1 and are spaced apart from each other. In this manner, the raised regions 15a, b provide for two defined regions of friction that are applicable to curtain poles of a range of diameters. In alternative embodiments, the friction pad 14 comprises a different number of raised regions.

FIG. 9 is a perspective view of an embodiment of an adapter comprising a clamp locking mechanism 16, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 9, the clamp locking mechanism is coupled to the adapter 10 and secures the adapter 10 to the curtain pole 100a. In some embodiments, the clamp locking mechanism 16 comprises a bail 45 and a plurality of seats 47 to accommodate curtain poles 100a of different diameters. In some embodiments, the seats 47 are integral with the adapter. In some embodiments, the bail 45 comprises an elastic band that is tensioned about the pole 100a for securing the adapter 10 to the pole 100a

FIG. 10 is a perspective view of an embodiment of an adapter comprising a hook-and-loop coupling mechanism 17, in accordance with aspects of inventive concepts herein. In some embodiments, such as the embodiment shown in FIG. 10, the hook-and-loop coupling mechanism is coupled about the adapter 10 and secures the adapter 10 to the curtain pole

100a. In a first embodiment 17a the hook-and-loop coupling mechanism 17 comprises a band that wraps about itself and has mating hooks and loops for securing an end of the band to a body of the band. In a second embodiment 17b (also shown in FIG 10) the hook-and-loop coupling mechanism comprises a band with a return 17c. An end of the band passes through
5 the return and is pulled back to double back on itself to secure the adapter to the pole 101 In some embodiments, the return 17c is integral with the adapter 10.

While inventive concepts have been particularly shown and described with references to embodiments thereof, it will be understood by those skilled in the art that various changes
10 in form and detail may be made herein without departing from the spirit and scope of the inventive concepts as defined by the appended claims.

I claim:

1. A system, comprising:
 - a first pole elongated along a first axis;
 - 5 a second pole elongated along a second axis, the second axis being substantially parallel with the first axis; and
 - a first support pole elongated along a third axis, the third axis being transverse to the first axis and the second axis, the first support pole comprising a first end coupled to the first pole and a second end coupled to the second pole.
- 10 2. The system of claim 1, wherein the first axis, the second axis, and third axis extend in a first plane.
3. The system of claim 2, further comprising a first adapter, the first adapter coupled to the
- 15 first end of the first support pole and the first pole.
4. The system of claim 3, further comprising a second adapter, the second adapter coupled to the second end of the first support pole and the second pole.
- 20 5. The system of claim 3, wherein the first end of the support pole is removably coupled to the first adapter.
6. The system of claim 4, wherein and the second end of the first support pole is removably coupled to the second adapter.
- 25 7. The system of claim 3, wherein the first end of the first support pole is coupled to the first adapter with a ball-and-socket joint.
8. The system of claim 4, wherein the second end of the first support pole is coupled to the
- 30 second adapter with a ball-and-socket joint.
9. The system of claim 3, wherein the first end of the first support pole is rotatably coupled to the first adapter.

10. The system of claim 4, wherein the second end of the first support pole is rotatably coupled to the second adapter.
- 5 11. The system of claim 9, wherein the first adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to limit rotation of the support pole about a first axis of rotation.
- 10 12. The system of claim 10, wherein the second adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to limit rotation of the support pole about a first axis of rotation.
13. The system of claim 1, wherein the support pole comprises a compression mechanism.
- 15 14. The system of claim 13, wherein the support pole comprises and internal compression mechanism.
15. The system of claim 1, wherein the first pole is arranged between a floor and a ceiling.
- 20 16. The system of claim 3, wherein the first adapter comprises a friction pad constructed and arranged to create friction between the first adapter and the first pole.
17. The system of claim 4, wherein the second adapter comprises a friction pad constructed and arranged to create friction between the second adapter and the second pole.
- 25 18. The system of claim 16, wherein the friction pad comprises at least two raised regions constructed and arranged to create friction between the first adapter and the first pole.
19. The system of claim 17, wherein the friction pad comprises at least two raised regions constructed and arranged to create friction between the second adapter and the second pole.
- 30 20. The system of claim 3, wherein the first adapter comprises a hook-and-loop strap constructed and arranged to couple with the first pole.

21. The system of claim 4, wherein the second adapter comprises a hook-and-loop strap constructed and arranged to couple with the second pole.
22. The system of claim 3, wherein the first adapter comprises a clamp constructed and
5 arranged to couple with the first pole.
23. The system of claim 4, wherein the second adapter comprises a clamp constructed and arranged to couple with the second pole.
- 10 24. The system of claim 1, further comprising a second support pole elongated along a fourth axis, the fourth axis being transverse to the first axis and the second axis, the second support pole comprising a first end coupled to the first pole and a second end coupled to the second pole.
- 15 25. The system of claim 24, wherein the first axis, the second axis, third axis, and fourth axis extend in a first plane.
26. The system of claim 25, further comprising a third adapter, the third adapter coupled to the first end of the second support pole and the first pole,
20
27. The system of claim 26, further comprising a fourth adapter, the fourth adapter coupled to the second end of the second support pole and the second pole.
28. The system of claim 1, wherein the first support pole is extendable.
25
29. The system of claim 24, wherein the second support pole is extendable.
30. The system of claim 3, wherein the first adapter comprises an open region.
- 30 31. The system of claim 3, wherein the first adapter extends around a portion of the first pole.
32. An adapter, comprising:

a curved base extending along a first axis, the curved base comprising an upper surface and a lower surface; the curved base constructed to extend around at least a portion of a pole,

at least one sidewall extending from the upper surface and extending parallel to the first axis;

at least one socket coupled to the upper surface, the at least one socket constructed and arranged to mate with a corresponding connector to form a ball-and-socket joint; and

a friction pad coupled to the lower surface, the friction pad constructed and arranged to create friction between the adapter and a pole.

33. The system of claim 32, wherein the friction pad comprises at least two raised regions constructed and arranged to create friction between the adapter and the pole.

34. The system of claim 32, wherein the at least one sidewall comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall being spaced apart from each other.

35. The system of claim 34, wherein the socket is positioned between the first sidewall and the second sidewall.

36. A method, comprising:

providing a first pole elongated along a first axis;

providing a second pole elongated along a second axis, the second axis being

substantially parallel with the first axis;

providing a first support pole elongated along a third axis, the third axis being transverse to the first axis and the second axis; and

coupling a first end of the first support pole to the first pole; and

coupling a second end of the first support pole to the second pole.

37. The method of claim 36, wherein the first axis, the second axis, and third axis extend in a first plane.

38. The method of claim 37, further comprising providing a first adapter and coupling the first adapter between the first end of the first support pole and the first pole.

5 39. The method of claim 38, further comprising providing a second adapter, and coupling the second adapter between the second end of the first support pole and the second pole.

40. The method of claim 38, wherein the first end of the support pole is removably coupled to the first adapter.

10 41. The method of claim 39, wherein and the second end of the first support pole is removably coupled to the second adapter.

42. The method of claim 38, wherein the first end of the first support pole is coupled to the first adapter with a ball-and-socket joint.

15

43. The method of claim 39, wherein the second end of the first support pole is coupled to the second adapter with a ball-and-socket joint.

20 44. The method of claim 38, wherein the first end of the first support pole is rotatably coupled to the first adapter.

45. The method of claim 39, wherein the second end of the first support pole is rotatably coupled to the second adapter.

25 46. The method of claim 44, wherein the first adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to limit rotation of the support pole about a first axis of rotation.

30 47. The method of claim 45, wherein the second adapter comprises a first sidewall and a second sidewall, the first sidewall and the second sidewall constructed and arranged to limit rotation of the support pole about a first axis of rotation.

48. The method of claim 36, wherein the support pole comprises a compression mechanism.

49. The method of claim 48, wherein the support pole comprises an internal compression mechanism.

50. The method of claim 36, wherein the first pole is arranged between a floor and a ceiling.

5

51. The method of claim 38, wherein the first adapter comprises a friction pad constructed and arranged to create friction between the first adapter and the first pole.

52. The method of claim 39, wherein the second adapter comprises a friction pad constructed and arranged to create friction between the second adapter and the second pole.

10

53. The method of claim 51, wherein the friction pad comprises at least two raised regions constructed and arranged to create friction between the first adapter and the first pole.

54. The method of claim 52, wherein the friction pad comprises at least two raised regions constructed and arranged to create friction between the second adapter and the second pole.

15

55. The method of claim 38, wherein the first adapter comprises a hook-and-loop strap constructed and arranged to couple with the first pole.

20

56. The method of claim 39, wherein the second adapter comprises a hook-and-loop strap constructed and arranged to couple with the second pole.

57. The method of claim 38, wherein the first adapter comprises a clamp constructed and arranged to couple with the first pole.

25

58. The method of claim 39, wherein the second adapter comprises a clamp constructed and arranged to couple with the second pole.

59. The method of claim 36, further comprising providing a second support pole elongated along a fourth axis, the fourth axis being transverse to the first axis and the second axis, the second support pole comprising a first end coupled to the first pole and a second end coupled to the second pole.

30

60. The method of claim 59, wherein the first axis, the second axis, third axis, and fourth axis extend in a first plane.

5 61. The method of claim 60, further comprising a third adapter, the third adapter coupled to the first end of the second support pole and the first pole,

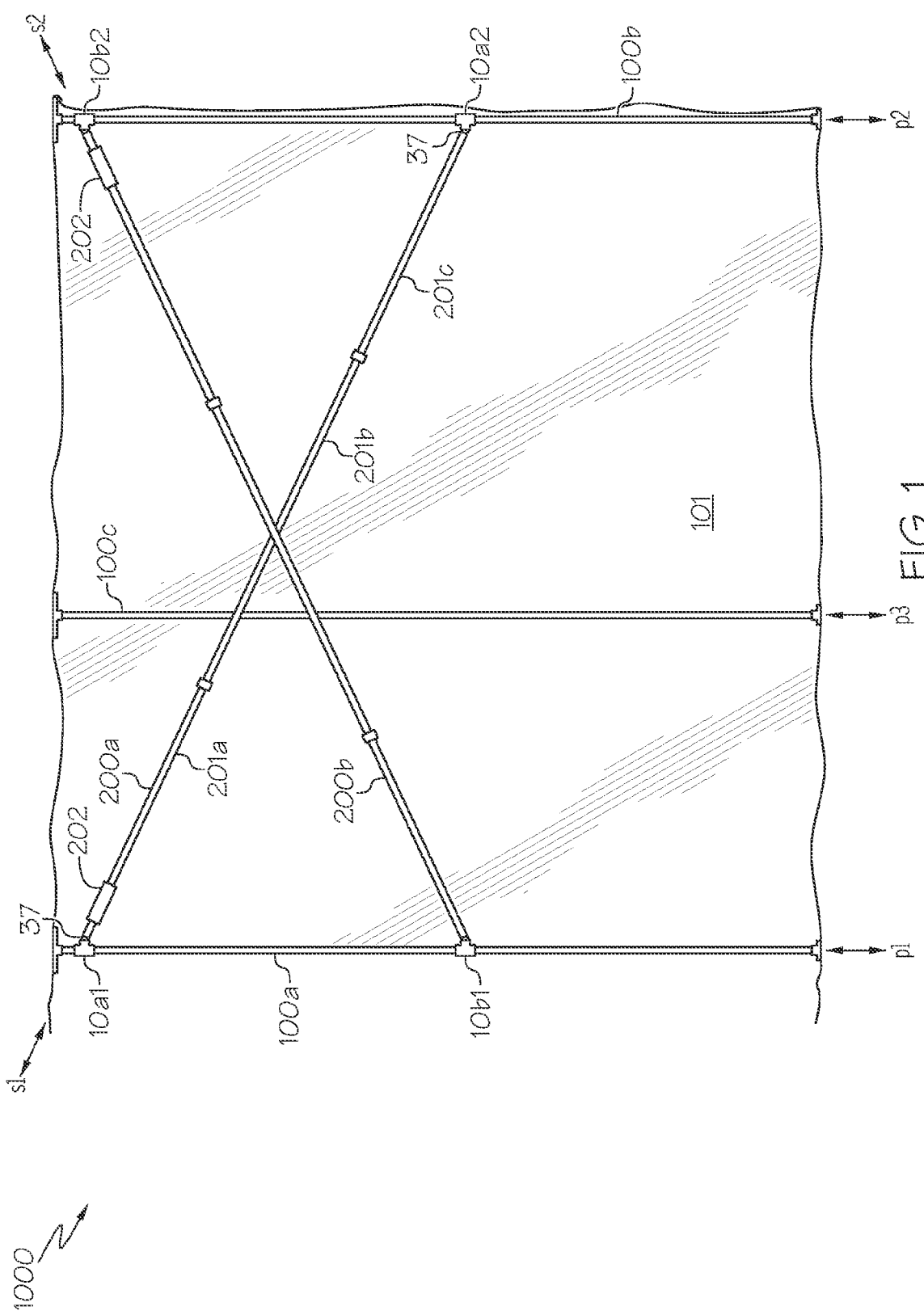
62. The method of claim 61, further comprising a fourth adapter, the fourth adapter coupled to the second end of the second support pole and the second pole.

10 63. The method of claim 36, wherein the first support pole is extendable.

64. The method of claim 59, wherein the second support pole is extendable.

15 65. The method of claim 39, wherein the first adapter comprises an open region.

66. The method of claim 38, wherein the first adapter extends around a portion of the first pole.



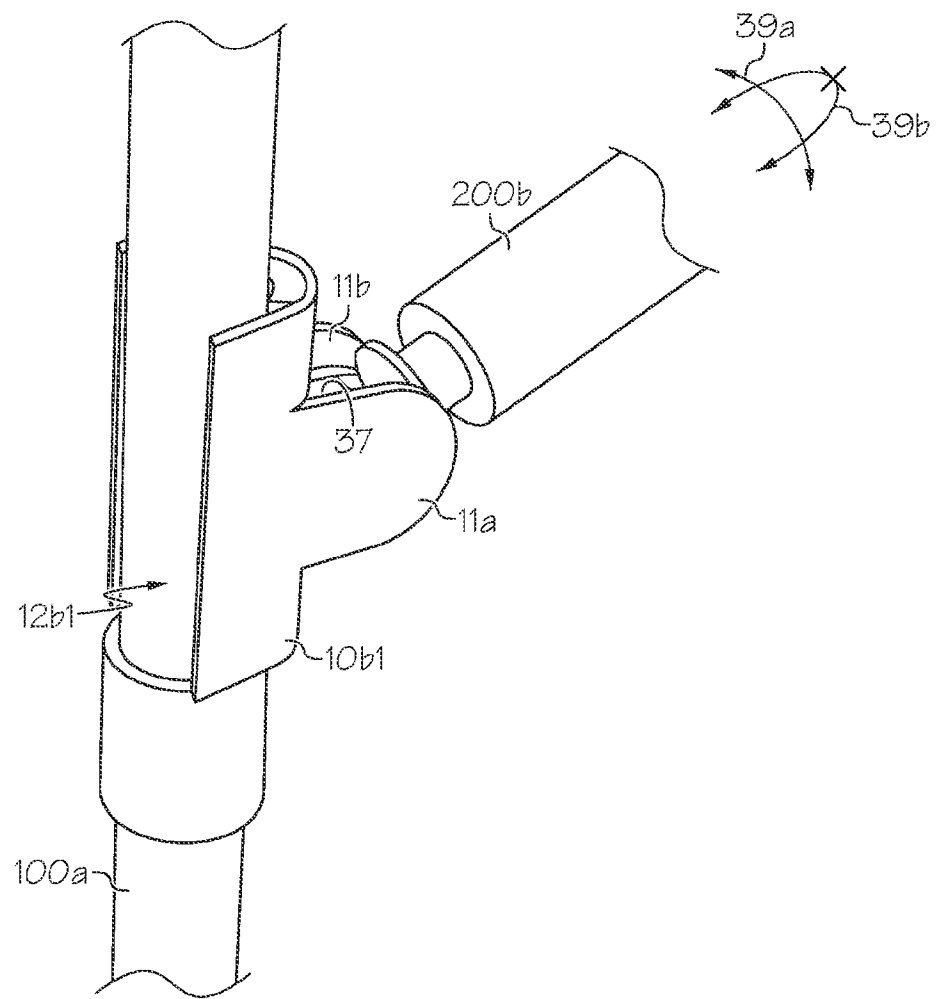


FIG. 2

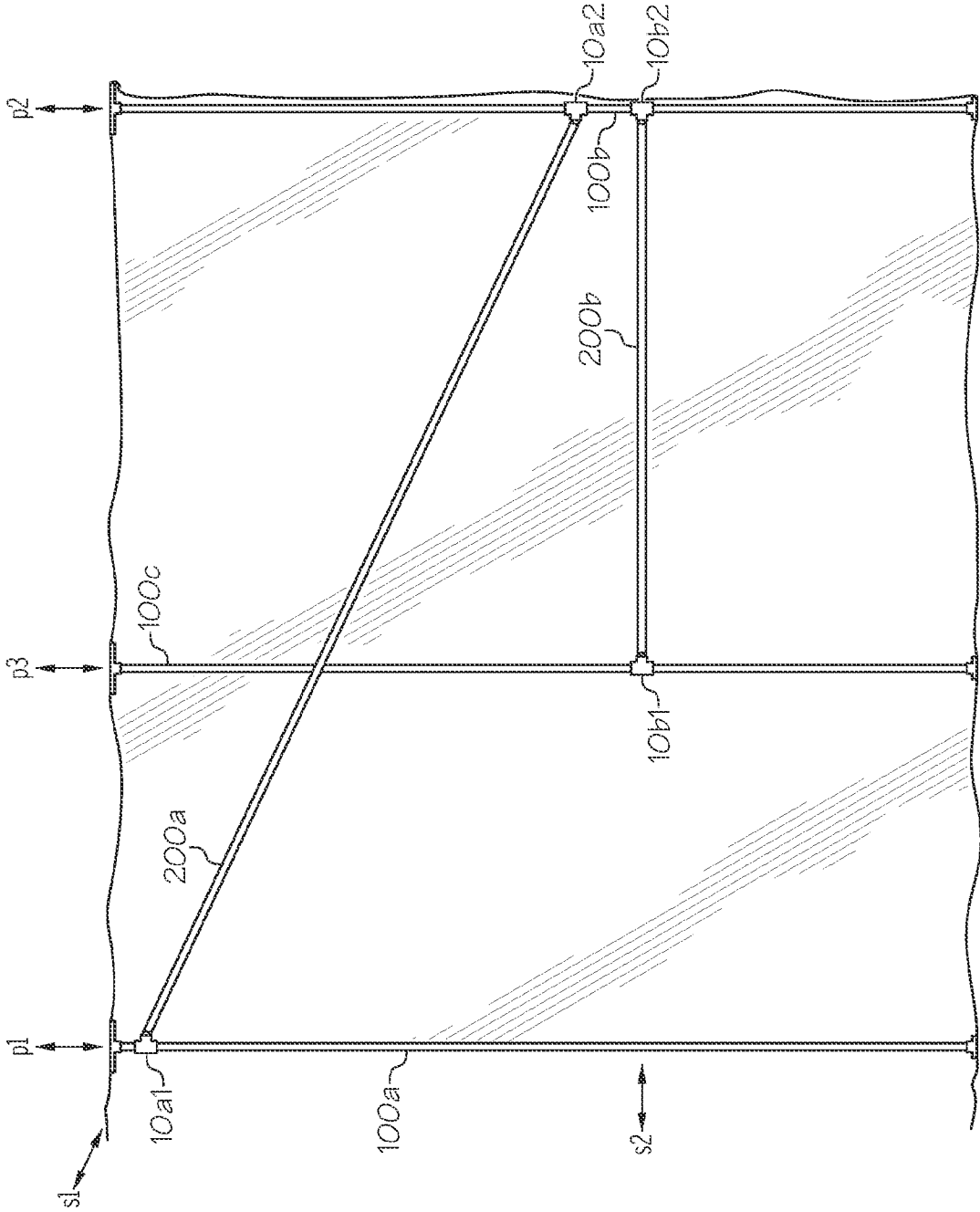


FIG. 3

4 / 11

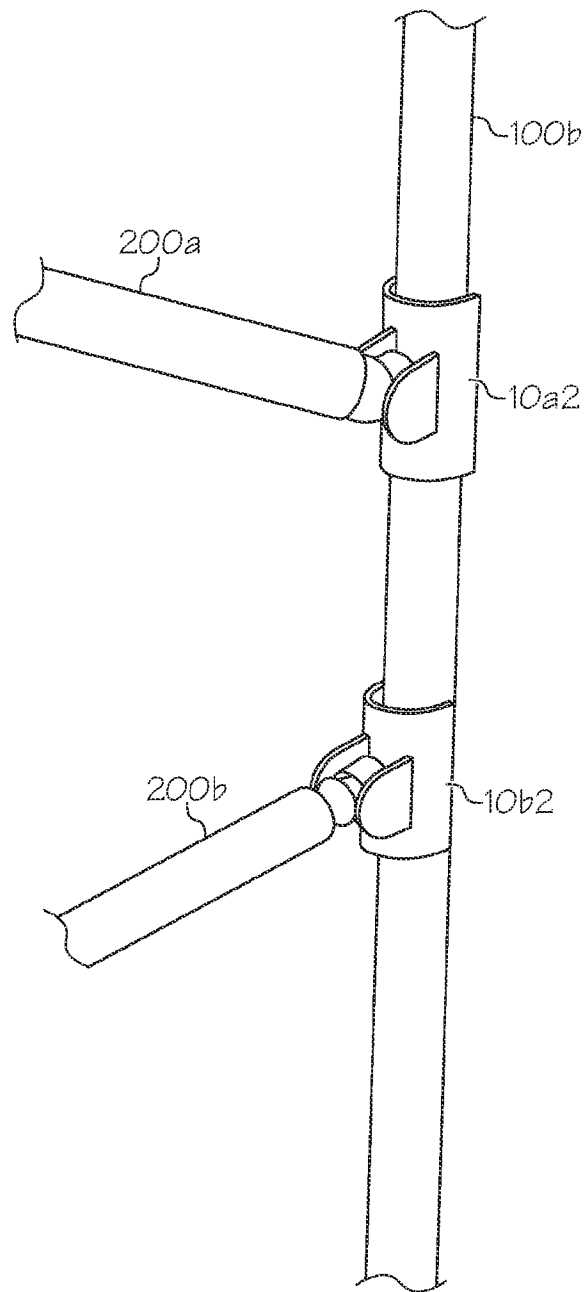


FIG. 4

5 / 11

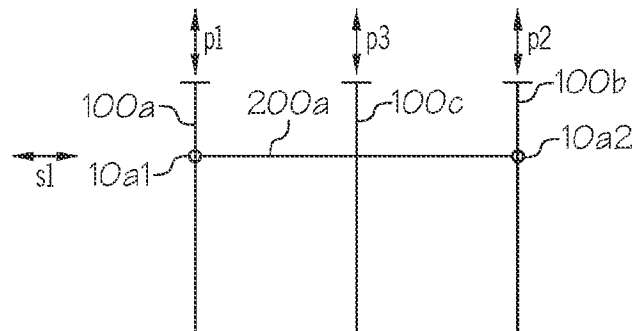


FIG. 5A

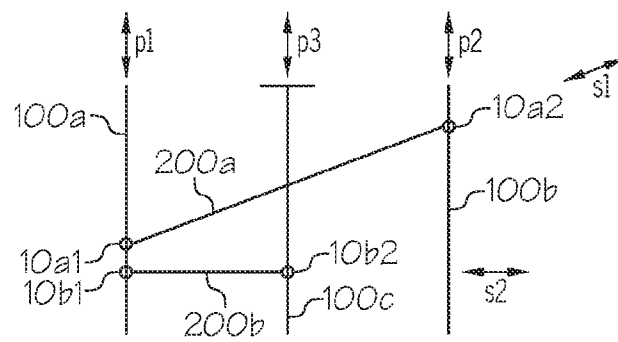


FIG. 5B

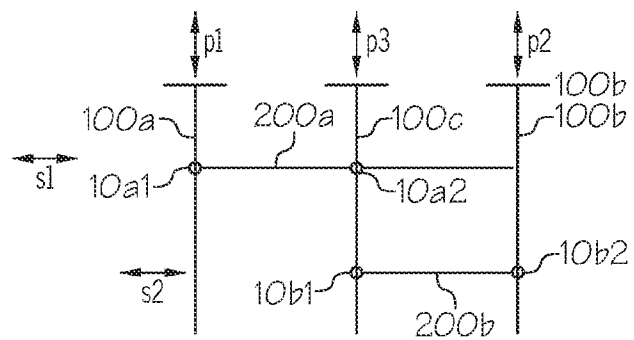


FIG. 5C

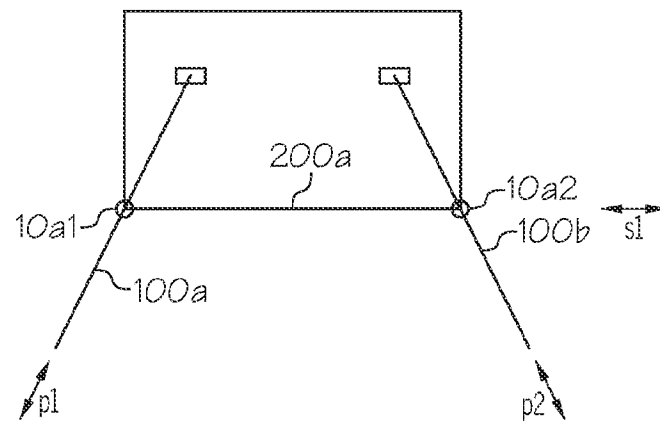


FIG. 5D

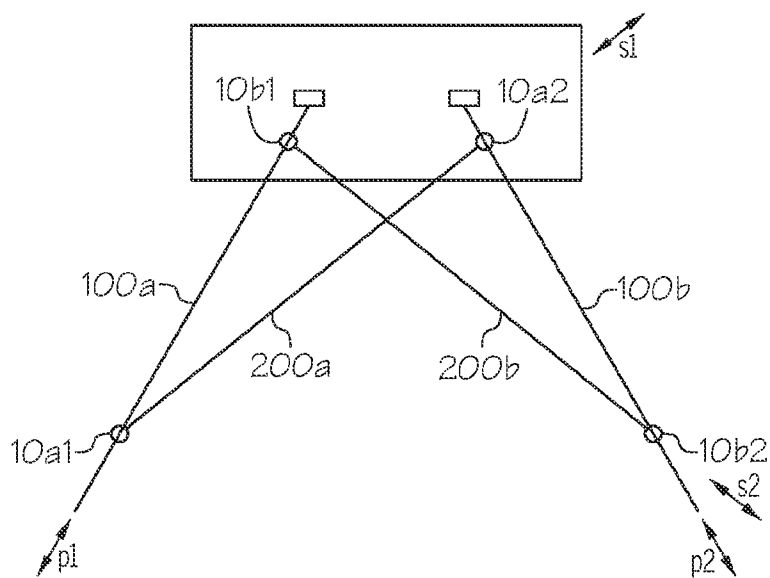
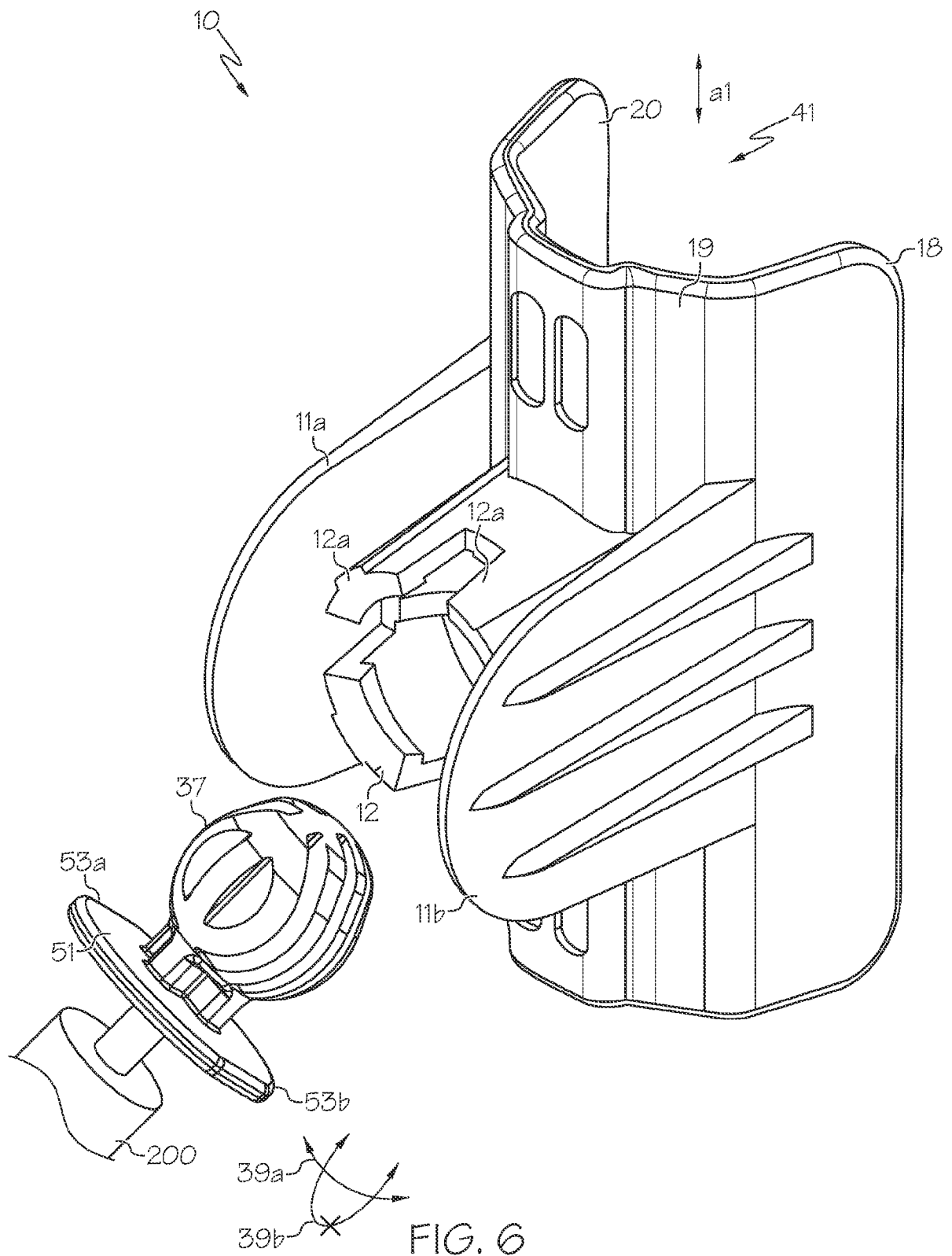


FIG. 5E



8 / 11

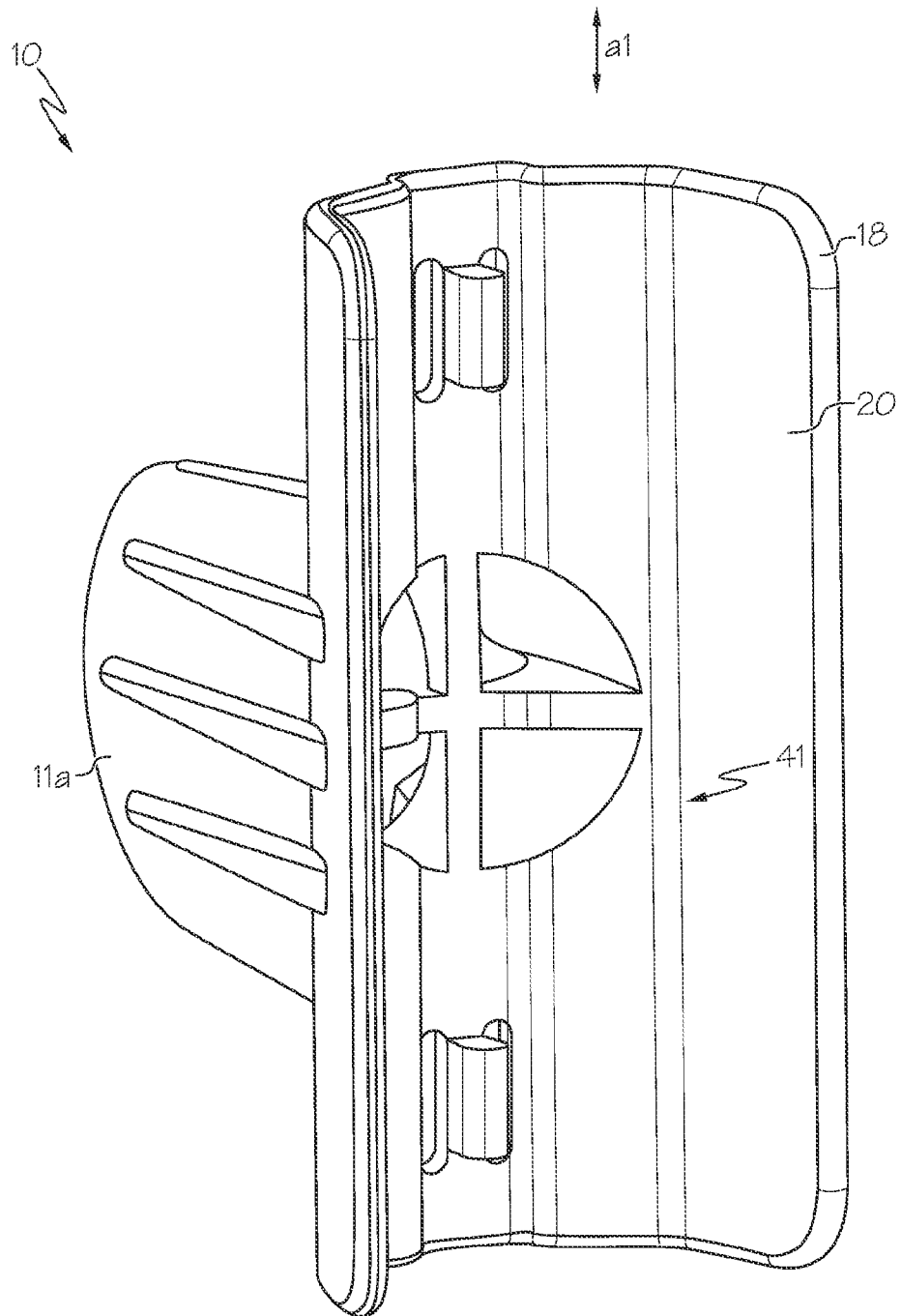


FIG. 7

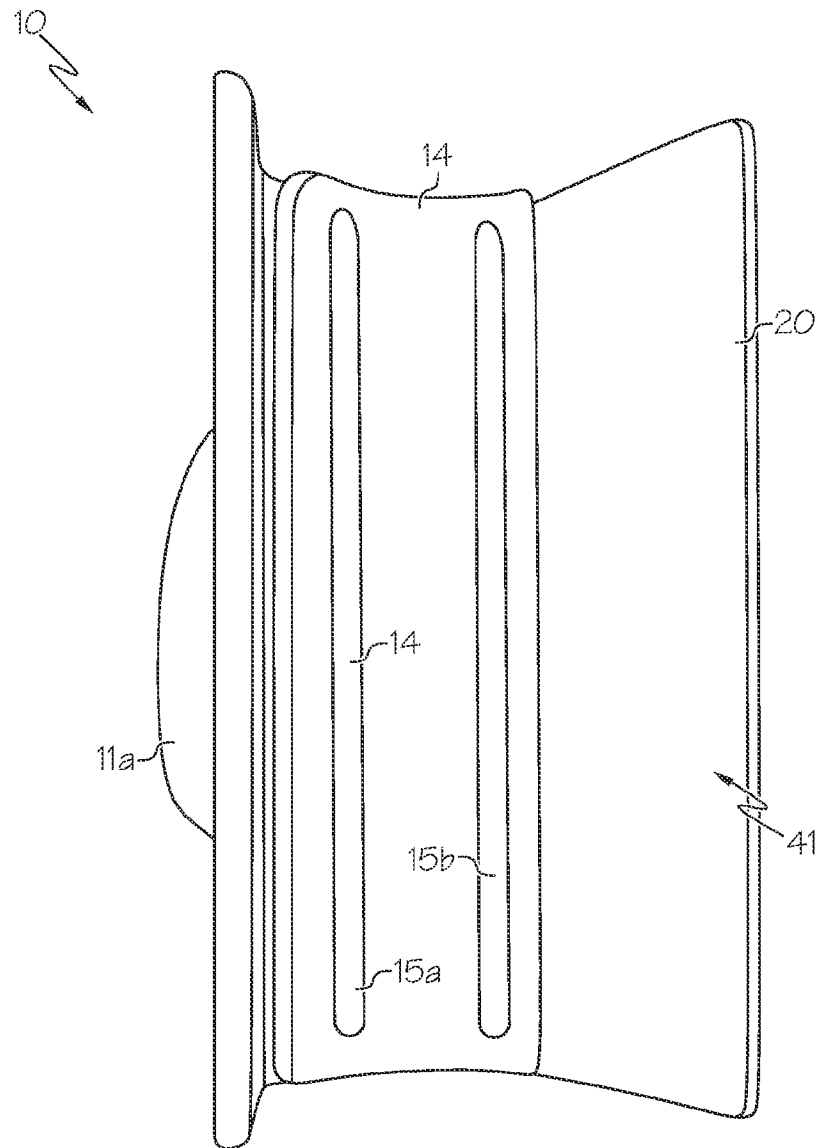


FIG. 8

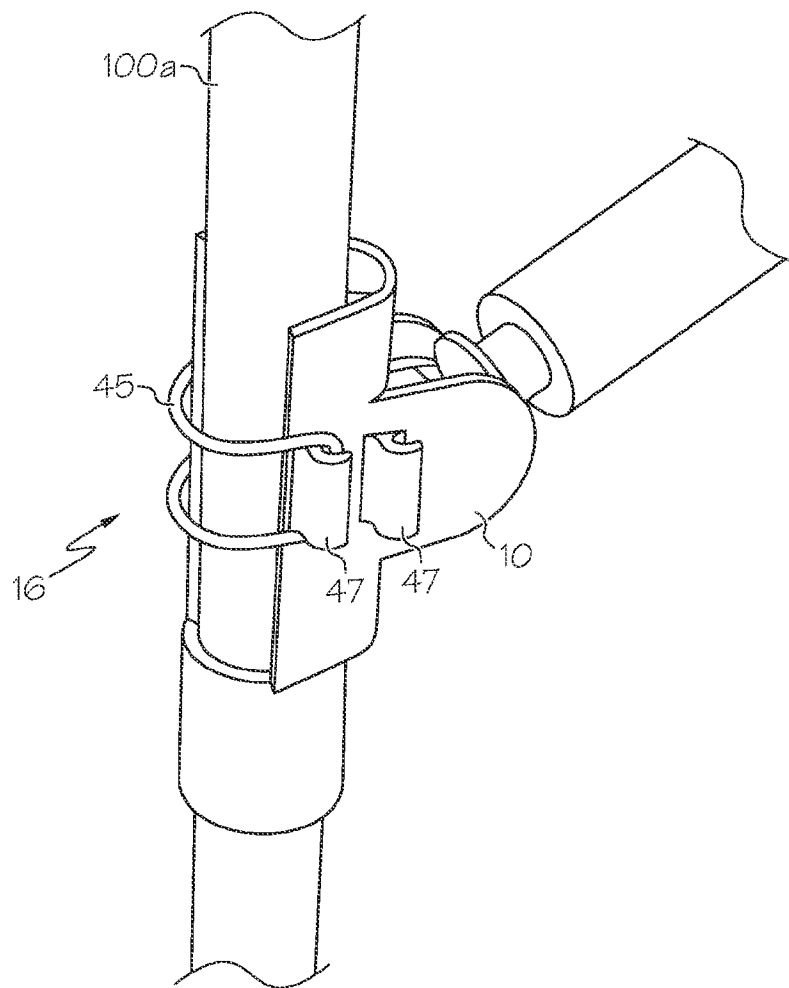


FIG. 9

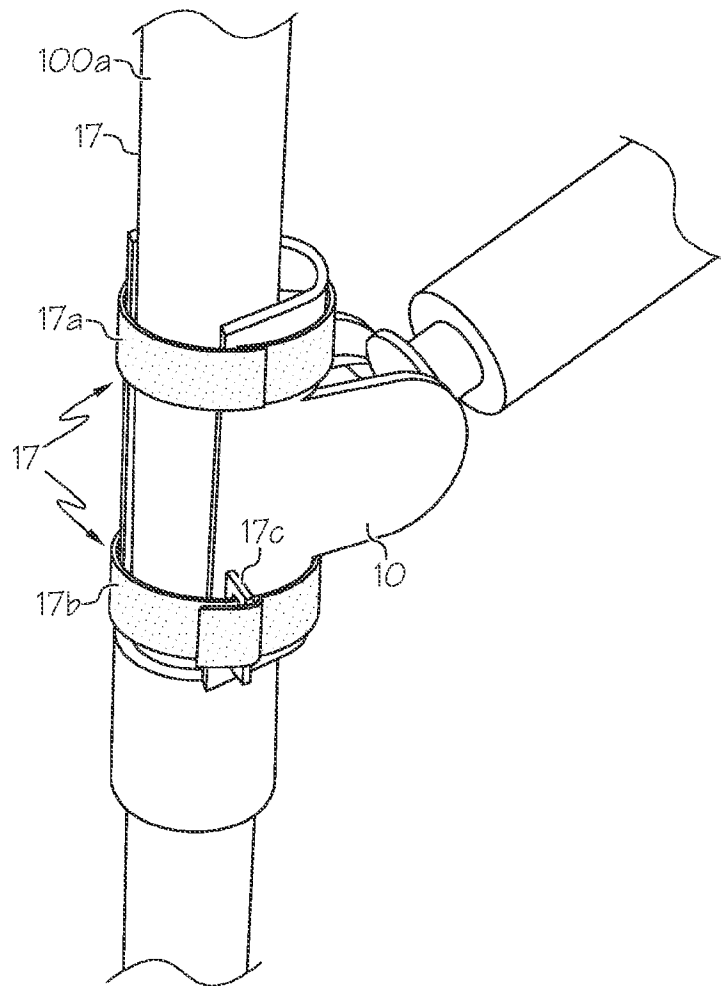


FIG. 10