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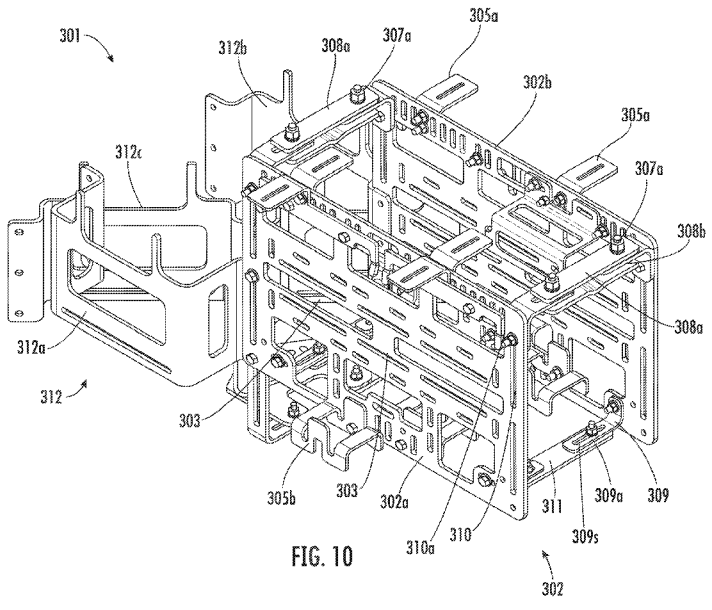


FIG. 10

(57) Abstract: The present disclosure describes strand mounts for small cell radios. A strand mount may include a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios, a plurality of mounting members, each mounting member coupled to the top and bottom plates within the interior cavity and configured such that a small cell radio can be mounted thereto, and one or more mounting brackets. The strand mount has the dual-capability of being mounted either horizontally on a cable strand or vertically on a pole. Alternative strand mounts and strand mount assemblies are also provided.

[Continued on next page]

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CONVERTIBLE STRAND AND POLE SMALL CELL MOUNTS AND ASSEMBLIES

RELATED APPLICATIONS

[0001] The present application claims priority to and the benefit of U.S. Provisional Patent Application No. 62/975,339, filed February 12, 2020, and U.S. Provisional Patent Application No. 63/088,612, filed October 7, 2020, the disclosures of which are hereby incorporated herein in their entireties.

FIELD

[0002] The present application is directed generally toward telecommunications equipment, and more particularly, small cell mounts and small cell mount assemblies.

BACKGROUND

[0003] Currently, very few strand mounts **10** for telecommunications equipment, such as cellular radios, exist (*see, e.g.*, **FIGS. 1A-1B**). Strand mounts enable equipment to be mounted on cables, wires, or the like, that extend between utility poles (*e.g.*, telephone or power poles). Of the strand mounts that exist in the market, none have the versatility and/or strength to be mounted to a pole. There may be a need for strand mounts that provide the ability to be mounted on both cable strands and poles, while also allowing for easy installation and less burdensome serviceability.

SUMMARY

[0004] A first aspect of the present invention is directed to a strand mount. The strand mount may include a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios, a plurality of mounting members, each mounting member coupled to the top and bottom plates within the interior cavity and configured such that a small cell radio can be mounted thereto, and one or more mounting brackets. The one or more mounting brackets of the strand mount are configured such that the

strand mount has the dual capability of being mounted on either horizontally on a cable strand or vertically on a pole.

[0005] Another aspect of the present invention is directed to a strand mount assembly. The assembly may include a mounting structure, one or more small cell radios, and a strand mount. The strand mount may include a top plate, a bottom plate, and opposing plates that form a housing having an interior cavity dimensioned to fit around the one or more small cell radios, a plurality of mounting members, each mounting member coupled to the top and bottom plates within the interior cavity, and one or more mounting brackets. Each of the small cell radios is mounted to a respective mounting pipe and the strand mount is mounted to the mounting structure by the one or more mounting brackets.

[0006] Another aspect of the present invention is directed to a strand mount assembly. The assembly may include a cable strand and a strand mount. The strand mount may include two or more interconnected frame sections that form a frame, each frame section having opposing sides configured such that one or more small cell radios can be mounted thereto, and a plurality of mount apertures sized and configured to receive the cable strand. Each mounting aperture is collinear with the other mounting apertures to create an unimpeded opening that the cable strand extends through, thereby mounting the strand mount on the cable strand. In some embodiments, one or more of the interconnected frames may be configured to rotate about the cable strand extending through the frame to adjust the tilt angle of the one or more small cell radios.

[0007] Another aspect of the present invention is directed to a strand mount. The strand mount may include a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios, a plurality of mounting arms removably attached to the top plate and extending downwardly into the interior cavity, each mounting arm being configured such that a small cell radio or antenna can be mounted thereto, and one or more mounting brackets configured to hang the strand mount on a cable strand.

[0008] Another aspect of the present invention is directed to a strand mount. The strand mount may include a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios, a center mounting frame secured to an inner surface of the top plate and extending downwardly into the interior cavity, the mounting frame having opposing sides, each side configured such that one or

more small cell radios can be mounted thereto, and one or more mounting brackets configured to hang the strand mount on a cable strand.

[0009] Another aspect of the present invention is directed to a strand mount. The strand mount includes a frame having two opposing side panels, each panel is configured such that one or more small cell radios and/or antennas can be mounted thereto, and a plurality of mounting clamps coupled to the side panels, where the plurality of mounting clamps are configured to secure the strand mount on a cable strand.

[0010] It is noted that aspects of the invention described with respect to one embodiment, may be incorporated in a different embodiment although not specifically described relative thereto. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination. Applicant reserves the right to change any originally filed claim and/or file any new claim accordingly, including the right to be able to amend any originally filed claim to depend from and/or incorporate any feature of any other claim or claims although not originally claimed in that manner. These and other objects and/or aspects of the present invention are explained in detail in the specification set forth below. Further features, advantages and details of the present invention will be appreciated by those of ordinary skill in the art from a reading of the figures and the detailed description of the preferred embodiments that follow, such description being merely illustrative of the present invention.

BRIEF DESCRIPTION OF THE FIGURES

[0011] **FIGS. 1A-1B** are photographs of prior known strand mounts.

[0012] **FIG. 2** is a bottom perspective view of a strand mount according to embodiments of the present invention.

[0013] **FIG. 3A** is a perspective view of the strand mount of **FIG. 2** mounted on a cable strand that is in turn mounted to a pole, wherein equipment is installed within the strand mount.

[0014] **FIG. 3B** is a bottom perspective view of the strand mount and equipment of **FIG. 3A** vertically mounted directly onto a pole without an intervening cable strand.

[0015] **FIG. 4A** is a bottom perspective view of an alternative strand mount according to embodiments of the present invention.

[0016] **FIG. 4B** is a top perspective view of the strand mount of **FIG. 4A** mounted on a cable strand that is mounted to a pole, wherein equipment is installed within the strand mount.

[0017] **FIG. 5A** is a bottom perspective view of an alternative strand mount according to embodiments of the present invention.

[0018] **FIG. 5B** is a bottom perspective view of the strand mount of **FIG. 5A** mounted on a cable strand that is mounted to a pole, wherein equipment is installed within the strand mount.

[0019] **FIG. 6A** is a bottom perspective view of an alternative strand mount according to embodiments of the present invention.

[0020] **FIG. 6B** is a bottom perspective view of the strand mount of **FIG. 6A** mounted on a cable strand that is mounted to a pole, wherein equipment is installed within the strand mount.

[0021] **FIG. 7A** is a perspective view of an alternative strand mount according to embodiments of the present invention.

[0022] **FIG. 7B** is a perspective view of the strand mount of **FIG. 7A** mounted on a cable strand that is mounted to a pole, wherein equipment is installed onto the strand mount.

[0023] **FIG. 8A** is a perspective view of an alternative strand mount according to embodiments of the present invention.

[0024] **FIG. 8B** is a perspective view of the strand mount of **FIG. 8A** mounted on a cable strand that is mounted to a pole, wherein equipment is installed onto the strand mount.

[0025] **FIG. 9A** is a perspective view of an alternative strand mount according to embodiments of the present invention.

[0026] **FIG. 9B** is a perspective view of the strand mount of **FIG. 9A** mounted on a cable strand, wherein equipment is installed on the side of the mount.

[0027] **FIG. 9C** is a perspective view of the strand mount of **FIG. 9A** that allows for additional equipment to be installed on an end of the mount.

[0028] **FIG. 9D** is a perspective view of the strand mount of **FIG. 9C** mounted on a cable strand, wherein additional equipment is installed an end of the mount.

[0029] **FIG. 10** is a perspective view of a strand mount assembly kit according to embodiments of the present invention, wherein the kit includes the option of a parallel configuration or a rotational configuration.

[0030] **FIG. 11A** is a side view of a strand mount having a parallel configuration according to embodiments of the present invention.

[0031] **FIG. 11B** is a top view of the strand mount of **FIG. 11A**.

[0032] **FIG. 11C** is an end view of the strand mount of **FIG. 11A**.

[0033] **FIG. 12A** is a top view of an alternative strand mount having a parallel configuration according to embodiments of the present invention.

[0034] **FIG. 12B** is an end view of the strand mount of **FIG. 12A**.

[0035] **FIG. 13A** is a perspective view of the strand mount of **FIG. 12A**, wherein telecommunications equipment is secured to the mount.

[0036] **FIG. 13B** is a perspective view of the strand mount of **FIG. 12A**, wherein different telecommunications equipment is secured to the mount.

[0037] **FIG. 14** is a perspective view of the strand mount of **FIG. 12A** mounted on a cable strand, wherein telecommunications equipment is secured on the mount.

[0038] **FIG. 15A** is a top view of an alternative strand mount having a rotational configuration according to embodiments of the present invention.

[0039] **FIG. 15B** is a side view of the strand mount of **FIG. 15A**.

[0040] **FIG. 15C** is an end view of the strand mount of **FIG. 15A**.

[0041] **FIG. 16A** is a top view of the strand mount of **FIG. 15A**, wherein telecommunications equipment is secured on the mount.

[0042] **FIG. 16B** is a top view of the strand mount of **FIG. 15A**, wherein different telecommunications equipment is secured on the mount.

DETAILED DESCRIPTION

[0043] The present invention now is described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0044] The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which illustrative embodiments of the invention are shown. Like numbers refer to like elements throughout and different embodiments of like elements can be designated using a different number of superscript indicator apostrophes (*e.g.*, **10'**, **10''**, **10'''**).

[0045] In the figures, certain layers, components or features may be exaggerated for clarity, and broken lines illustrate optional features or operations unless specified otherwise. This

invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0046] It will be understood that, although the terms first, second, 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 invention. The sequence of operations (or steps) is not limited to the order presented in the claims or figures unless specifically indicated otherwise.

[0047] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the specification and relevant art and should not be interpreted in an idealized or overly formal sense unless expressly so defined herein. Well-known functions or constructions may not be described in detail for brevity and/or clarity.

[0048] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. 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. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0049] As used herein, phrases such as "between X and Y" and "between about X and Y" should be interpreted to include X and Y. As used herein, phrases such as "between about X and

Y" mean "between about X and about Y." As used herein, phrases such as "from about X to Y" mean "from about X to about Y."

[0050] Pursuant to embodiments of the present invention, strand mounts are provided that may provide the dual capability to mount one or more small cell radios (and/or antennas or other telecommunications equipment) either on a cable strand or on a mounting structure (*e.g.*, a pole). Alternative strand mount and strand mount assemblies are also provided. Embodiments of the present invention will now be discussed in greater detail with reference to **FIGS. 2-16B**.

[0051] Referring to **FIG. 2** and **FIGS. 3A-3B**, a strand mount **100** according to embodiments of the present invention is illustrated. The strand mount **100** may include a top plate **102a**, a bottom plate **102b**, and opposing side plates **102c**. Together the top plate **102a**, bottom plate **102b**, and side plates **102c** form a housing **102** (*e.g.*, a semi-shroud) of the mount **100**. The top, bottom, and side plate **102a-c** may provide structural support to the mount **100**. The housing **102** of the mount **100** has an interior cavity **104** that is dimensioned to fit around one or more small cell radios **150**, antenna **160** and/or other related telecommunications equipment (*see, e.g.*, **FIGS. 3A-3B**). The "semi-shrouded" design of the strand mount **100** of the present invention may allow for easy installation and less burdensome serviceability of the one or more pieces of telecommunications equipment (*i.e.*, radios **150** and/or antennas **160**) mounted thereto. In some embodiments, the strand mount **100** may further include a housing cover **105** may be placed around the housing **102** to further protect any telecommunications equipment **150**, **160** that may be secured to the mount **100**.

[0052] In some embodiments, the strand mount **100** includes a plurality of mounting members **106**. In some embodiments, the mounting members **106** may comprise pipes. For example, in some embodiments, the strand mount **100** may include three mounting pipes **106** located within the interior cavity **104** of the housing **102** (*see, e.g.*, **FIG. 2**). The ends of each mounting member **106** may be secured to the top and bottom plates **102a**, **102b**, respectively, of the mount **100** and may provide further structural support to the strand mount **100**. In addition, each mounting member **106** is configured such that one or more small cell radios **150** or antennas **160** can be mounted thereto (*see, e.g.*, **FIGS. 3A-3B**). Each mounting member **106** may also be configured such that other telecommunications equipment, *e.g.*, diplexers, can be mounted thereto. In some embodiments, the radios **150** or antennas **160** may be secured directly to the mounting members **106** by bands or other similar fasteners. In some embodiments, the

inclusion of an antenna bracket (not shown) may be required to allow for azimuth adjustments, for example, when an antenna **160** is secured to the strand mount **100**.

[0053] The strand mount **100** of the present invention further includes one or more mounting brackets **108**. In some embodiments, the strand mount **100** has the dual capability of being mountable on either a cable strand **130** or a pole **140** (or other mounting structure). For example, as shown in **FIG. 3A**, in some embodiments, one or more mounting brackets **108** may be configured to hang (and secure) the strand mount **100** on a cable strand **130** (*e.g.*, the mount **100** may be mounted horizontally, or parallel, in relation to a ground surface). As shown in **FIG. 3B**, in some embodiments, the same mounting brackets **108**, in combination with one or more reinforcing mounting brackets **110**, may be configured to mount the strand mount **100** to a pole **140** or other mounting structure (*e.g.*, the mount **100** may be mounted vertically, or perpendicular, in relation to the ground surface). In some embodiments, the mounting brackets **108** may be removed and replaced with the reinforcing mounting bracket **110** (or similar mounting bracket) that is configured to attach the strand mount **100** to a pole **140** (or other mounting structure, *e.g.*, a building) and reinforce the connection surface between the strand mount **100** and the pole **140**. Thus, the strand mount **100** of the present invention could allow telecommunications carriers to purchase one strand mount **100** for small cell radios **150** and/or antennas **160** that fulfills both deployment types (*i.e.*, horizontal mounting to a cable strand **130** and vertical mounting to a pole **140**).

[0054] In some embodiments, the housing **102** and/or housing cover **105** of the strand mount **100** may include perforations **110** (*e.g.*, ventilation holes or slots). For example, in some embodiments, the perforations **110** may be located in at least one of the top plate **102a**, the bottom plate **102b**, and/or side plates **102c** of the mount **100**. Small cell radios **150** and antennas **160** typically generate heat during operation. When radios/antennas **150**, **160** are mounted within the interior cavity **104** of the mount **100**, the perforations **110** in the housing **102** can allow some of the heat generated by the radios/antennas **150**, **160** to escape and also allow air to circulate through the mount **100**, thereby helping to prevent the radios/antennas **150**, **160** from overheating. The perforations **110** can also help to reduce the overall weight of the mount **100**, again making installation less burdensome and reducing costs.

[0055] In some embodiments, the strand mount **100** of the present invention may further include an external mounting plate **112**. The external mounting plate **112** may extend outwardly

from an edge of the top plate **102a** or bottom plate **102b**. The external mounting plate **112** may be configured such that one or more additional small cell radios **150**, antennas **160**, or other telecommunications equipment can be mounted to the mount **100**.

[0056] Referring to **FIGS. 4A-4B**, an alternative strand mount **100'** according to embodiments of the present invention is illustrated. As shown in **FIG. 4A**, similar to the strand mount **100** described above, the strand mount **100'** includes a top plate **102a'**, a bottom plate **102b'**, and opposing side plates **102c'**, wherein at least one of the plates **102a-c'** include perforations **110** for ventilation. Together the top plate **102a'**, bottom plate **102b'**, and side plates **102c'** form the housing **102'** of the mount **100'**. The housing **102'** of the mount **100'** has an interior cavity **104'** that is dimensioned to fit around one or more small cell radios **150**, antennas **160**, and/or other telecommunications equipment) (*see, e.g.*, **FIG. 4B**).

[0057] The strand mount **100'** differs from mount **100** described herein by how the one or more small cell radios/antennas **150**, **160** are mounted within the interior cavity **104'** of the housing **102'**. As shown in **FIG. 4A**, in some embodiments, the mounting members **106** of the strand mount **100'** may comprise a plurality of mounting arms **114**. The mounting arms **114** may be attached to an inner surface of the top plate **102a'** and extend downwardly into the interior cavity **104'** of the mount **100'**. Each mounting arm **114** may be configured such that a small cell radio **150** (or antenna **160** or other related telecommunications equipment, such as, diplexers and pod-8 devices) can be mounted thereto (*see, e.g.*, **FIG. 4B**). In some embodiments, the mounting arms **114** may be removably attached to the top plate **102a'**, thereby allowing for easy installation and less burdensome serviceability of the one or more pieces of telecommunications equipment (*i.e.*, radios and/or antennas **150**, **160**).

[0058] Similar to the strand mount **100** described in, the mount **100'** includes one or more mounting brackets **108'**. As shown in **FIGS. 4A-4B**, the mounting brackets **108'** are configured to hang (and secure) the strand mount **100'** on a cable strand **130** (*e.g.*, mounted horizontally). The strand mount **100'** may further include an external mounting plate **112** that extends outwardly from an edge of the top plate **102a'** or bottom plate **102b'**. As shown in **FIG. 4B**, the external mounting plate **112'** may be configured such that one or more additional small cell radios/antennas **150**, **160** (or other telecommunications equipment) can be mounted to the strand mount **100'**.

[0059] Referring to **FIGS. 5A-5B**, an alternative strand mount **100''** according to embodiments of the present invention is illustrated. The strand mount **100''** is similar to the strand mounts **100'** described herein. The strand mount **100''** differs from the mount **100'** by the manner in which each of the mounting members (*i.e.*, mounting arms **114'**) is attached to the mount **100''**. As shown in **FIG. 5A**, in some embodiments, a strand mount **100''** of the present invention may further include a support member **116**. The support member **116** may be coupled to or integral with an inner surface of the top plate **102a''** of the mount **100''** and may extend longitudinally down the center of the top plate **102a''**. The mounting arms **114'** are attached to the support member **116** and extend downwardly into the interior cavity **104''** of the mount **100''**. In some embodiments, the mounting arms **114'** may have extension flanges **114a'** that are configured to latch or hook onto the support member **116**. The extension flanges **114a'** may allow the mounting arms **114'** to be removably attached to the support member **116**. Thus, the configuration of the mounting arms **114'** may allow for easy installation and less burdensome serviceability of the one or more small cell radios **150** and/or antennas **160**.

[0060] Referring to **FIGS. 6A-6B**, an alternative strand mount **100'''** according to embodiments of the present invention is illustrated. The strand mount **100'''** is similar to the strand mounts **100'**, **100''** described herein. The strand mount **100'''** includes a top plate **102a'''**, a bottom plate **102b'''**, and opposing side plates **102c'''** where at least one of the plates **102a-c'''** include perforations **110** for ventilation. Together the top plate **102a'''**, bottom plate **102b'''**, and side plates **102c'''** form the housing **102'''** of the mount **100'''**. The housing **102'''** of the mount **100'''** has an interior cavity **104'''** that is dimensioned to fit around one or more small cell radios **150**, antennas **160**, or other telecommunications equipment (*see, e.g.*, **FIG. 6B**).

[0061] The strand mount **100'''** differs from the other strand mounts **100'**, **100''** described herein by the manner in which the one or more small cell radios/antennas **150**, **160** are mounted within the interior cavity **104'''** of the housing **102'''**. As shown in **FIG. 6A**, in some embodiments, the strand mount **100'''** may include a center mounting frame **118**. The mounting frame **118** is attached to an inner surface of the top plate **102a'''** and extends downwardly into the interior cavity **104'''**. The mounting frame **118** has opposing sides **118a**, **118b** that are each configured such that one or more small cell radios **150**, antennas **160**, and/or other telecommunications equipment may be mounted thereto.

[0062] In some embodiments, the mount **100'''** includes one or more mounting brackets **108'''**. As shown in **FIGS. 6A-6B**, the mounting brackets **108'''** are configured to hang (and secure) the strand mount **100'''** on a cable strand **130** (*e.g.*, mounted horizontally). The strand mount **100'''** may further include an external mounting plate **112** that extends outwardly from an edge of the center mounting frame **118** (*see, e.g.*, **FIG. 6A**). In some embodiments, the external mounting plate **112'''** may extend from an edge of the top or bottom plate **102a'''**, **102b'''**. As shown in **FIG. 6B**, in some embodiments, the mounting plate **112'''** may be configured such that one or more additional small cell radios/antennas **150**, **160** (or other telecommunications equipment) can be mounted to the mount **100'''**.

[0063] Referring now to **FIGS. 7A-7B**, an alternative strand mount **200** according to embodiments of the present invention is illustrated. The strand mount **200** includes a frame **202** comprising two or more interconnected frame sections (*e.g.*, **202a-c** in **FIG. 7A**). As shown in **FIG. 7A**, in some embodiments, the strand mount **200** may include three interconnected frame sections **202a-c**. In some embodiments, the interconnected frame sections **202a-c** may also be secured together via bolts **201** to form the frame **202** of the mount **200**. However, other known methods may be used to secure the frame sections **202a-c** (and halves) together, such as, welding. The individual frame sections **202a-c** can vary in size or dimensions to accommodate different types of small cell radios **150**, antennas **160**, and related telecommunications equipment. For example, as shown in **FIG. 7A**, in some embodiments, the middle frame section **202b** may be smaller than the two outer frames sections **202a**, **202c**.

[0064] The frame sections **202a-c** have opposing sides (*e.g.*, $\mathbf{202a_1}$, $\mathbf{202a_2}$, $\mathbf{202b_1}$, $\mathbf{202b_2}$, $\mathbf{202c_1}$, $\mathbf{202c_2}$) that are configured such that one or more small cell radios **150**, antennas **160**, and/or other telecommunications equipment may be mounted thereto. In some embodiments, each frame section **202a-c** also comprises mounting apertures **204** sized and configured to receive a cable strand **130**. In some embodiments, the opposing sides (*e.g.*, $\mathbf{202a_1}$, $\mathbf{202a_2}$) are separable and may be secured together via bolts **201** to form each frame section **202a-c**. In some embodiments, one side of one or more of the frame sections **202a-c** may comprise a clamp **206** or other fastener configured to mount to a cable strand **130**.

[0065] As shown in **FIG. 7A**, the mounting apertures **204** are located generally in the center of the right and left sides of each frame section **202a-c** (*e.g.*, when viewed from the orientation of the mount **200** shown in **FIGS. 7A-7B**). The mounting apertures **204** of each frame

section **202a-c** are aligned with the mounting apertures **204** of the adjacent frame section **202a-c** to create an unimpeded opening through the frame **202** (*i.e.*, the mounting apertures **204** are collinear with the other mounting apertures **204**). This configuration allows a cable strand **130** to extend through the frame **202** of the mount **200** (*i.e.*, through each mounting aperture **204**), thereby mounting the strand mount **200** on the cable strand **130**.

[0066] In some embodiments, to install the strand mount **200** on a pre-existing cable strand **130**, the side of the mount **200** that includes the clamps **206** (or similar fasteners) is first secured on the cable strand **130**. Next, the opposing side of the mount **200** is secured to the first side of the mount **200** (*e.g.*, via bolts **201**) thereby securing the cable strand **130** in-between the two sides of the mount **200**. Twisting or rotation of the strand mount **100** on the cable strand **130** is mitigated through gravitational orientation of the mount **100** on the cable strand **130**. The mount **100** has limited adjustable up and down movement which helps to prevent the cable strand **130** from sitting on the balance point of the mount **100**.

[0067] In some embodiments, the strand mount **200** may further include an external mounting plate **212** that may be coupled to one of the outer frame sections (*e.g.*, **202a, 202c**). As shown in **FIG. 7B**, the mounting plate **212** may be configured such that one or more additional small cell radios **150**, antennas **160**, and/or other telecommunications equipment can be mounted to the mount **200**.

[0068] As shown in **FIGS. 7A-7B**, when the strand mount **200** is mounted on a cable strand **130**, the frame **202** of the mount **200** is perpendicular to a ground surface. Referring now to **FIGS. 8A-8B**, an alternative strand mount **200'** according to embodiments of the present invention is illustrated which allows at least one of the frame sections (*e.g.*, **202b'**) to be adjusted to a desired tilt angle **α** for a mounted small cell radio **150** and/or antenna **160**.

[0069] Similar to mount **200**, the strand mount **200'** includes a frame **202'** comprising two or more interconnected frame sections (*e.g.*, **202a-c'**). In some embodiments, the strand mount **200'** may include three interconnected frame sections **202a-c'**. The frame sections **202a-c'** are configured such that one or more small cell radios **150** (or other telecommunications equipment) may be mounted thereto. As shown in **FIG. 8A**, the outer frame sections **202a'**, **202c'** are parallel to a ground surface and are locked in that configuration. However, in some embodiments, the middle frame section **202b'** may be adjustable (rotatable) on the cable strand **130** relative to the outer frame sections **202a'**, **202c'**. Similar to the frame sections **202a-c**

of mount **200** described herein, the frame sections **202a-c'** of mount **200'** comprise mounting apertures **204'** sized and configured to receive a cable strand **130** which allows a cable strand **130** to extend through the frame **202** of the mount **200**, thereby mounting the strand mount **200'** on the cable strand **130**.

[0070] In some embodiments, the middle frame section **202b'** may comprise a tubular member **206** sized to receive the cable strand **130**. The tubular member **206** may be configured such that the middle frame section **202b'** is able to rotate about the cable strand **130** while remaining mounted on the cable strand **130**. This allows the middle frame section **202b'** (and one or more small cell radios **150** and/or antennas **160** mounted thereto) to be adjusted (tilted) to a desired angle **α**. In some embodiments, the mount **200'** further includes a locking mechanism **208** configured to lock the middle frame section **202b'** at a desired tilt angle **α**. Additionally, the locking mechanism(s) **208** provide some force that may help to prevent the mount **200'** from swaying on the cable strand **130**.

[0071] In some embodiments, the strand mount **200'** may further include a mounting plate **212'** that may be coupled to one of the outer frame sections (*e.g.*, **202a'**, **202c'**). As shown in **FIG. 8B**, in some embodiments, the mounting plate **212'** may be configured such that one or more additional small cell radios **150**, antennas **160**, and/or other telecommunications equipment can be mounted to the mount **200'**. In some embodiments, the frame sections **202a'**, **202c'** that reside on top of the cable strand **130** in addition to the mounting plate **212'**, gravitationally align with one another, while the radio/antenna portion (*e.g.*, frame section **202b'**) places the cable strand **130** directly on the balance point of the tray. This may allow the downward orientation of frame sections **202a'**, **202c'** to maintain the tilt angle **α** of the middle frame section **202b'**. The angle **α** is also unique as it may drastically reduce the effective projected area (EPA) of the mount **200'**, thereby allowing for higher wind loading easier to achieve.

[0072] Referring now to **FIGS. 9A-9D**, an alternative strand mount **200''** according to embodiments of the present invention is illustrated. The strand mount **200''** includes a frame **202** comprising two opposing side panels **202a''**, **202b''**. The side panels **202a''**, **202b''** are configured such that a small cell radio **150** and/or antenna **160** can be mounted thereon. Each side panel **202a''**, **202b''** may comprise a plurality of slots **203** configured such that different sizes/types of radios **150** or antennas **160** may be secured to the mount **200''**. The strand mount **200''** also includes a plurality of mounting clamps **208''** that are each configured to secure

and lock the strand mount **200''** to a cable strand **130**. The side panels **202a''**, **202b''** are secured to the mounting clamps **208''** via bolts **210a**. In some embodiments, the side panels **202a''**, **202b''** may comprise a plurality of elongated slots **210** that are each configured to receive the bolts **210a**. The elongated slots **210** may allow the side panels **202a''**, **202b''** to be raised or lowered relative to the mounting clamps **208''** to assist in balancing the strand mount **200''** on a cable strand **130** (*e.g.*, when different size/types of radios **150** and/or antennas **160** are mounted on the side panels **202a''**, **202b''**).

[0073] In some embodiments, the mounting clamps **208''** may each comprise two plates **208a**, **208b** that are held together by two or more bolts **207a**. The two plates **208a**, **208b** of each mounting clamp **208''** are configured to clamp and secure a cable strand **130** there between when the strand mount **200''** is installed on a cable strand **130** (*see, e.g.*, **FIGS. 9B** and **9D**). In some embodiments, the plates **208a**, **208b** may comprise a plurality of slots **207** configured to receive the bolts **207a**. The slots **207** allow the mounting clamps **208''** to be adjustable, for example, to accommodate for different size cable strands **130** and to assist with balancing the strand mount **200''** on the cable strand **130**.

[0074] In some embodiments, the strand mount **200''** may further include an extension or additional mounting plate **212''**. The mounting plate **212''** is configured such that one or more small cell radios **150** and/or antennas **160** can be mounted thereon. In some embodiments, the mounting plate **212''** may comprise a top extension **212a''** and a bottom extension **212b''**. The top extension **212a''** may be configured such that one or more radios **150** or antennas **160** may be mounted thereon and the bottom extension **212b''** may provide additional support to the mounted equipment **150**, **160**. As shown in **FIGS. 9A-9B**, in some embodiments, the mounting plate **212''** may be secured and extends from the side of the strand mount **200''**. As shown in **FIGS. 9C-9D**, in some embodiments, the mounting plate **212''** may be secured to the end of the strand mount **200''**. When secured to the end of the strand mount **200''**, the mounting plate **212''** may be secured at an angle (**β**), for example, to achieve a desired azimuth.

[0075] In some embodiments, the strand mount **200''** may further include a housing (not shown) that is dimensioned to fit around the one or more radios **150** and/or antennas **160** that are mounted to the strand mount **200''**. Similar to the strand mounts described herein, the housing for the strand mount **200''** may include perforations for ventilation.

[0076] Referring now to **FIGS. 10-14**, alternative strand mounts **300**, **300'** and strand mount assemblies **400**, **400'**, **400''** are illustrated. Properties and/or features of the strand mounts **300**, **300'** and/or strand mount assemblies **400**, **400'**, **500** may be as described above in reference to **FIGS. 2-9D** and duplicate discussion thereof may be omitted herein for the purposes of discussing **FIGS. 10-14**.

[0077] **FIG. 10** illustrates a strand mount assembly kit **301** according to embodiments of the present invention. The strand mount assembly kit **301** may comprise components for a strand mount having a "parallel" configuration (*i.e.*, strand mounts **300**, **300'**) and/or a strand mount having a "rotational" configuration (*i.e.*, strand mount **300''**). As used herein, the term "parallel," when used in reference to the configuration or orientation of the strand mounts, means that all of the antennas secured to the strand mount in a static or fixed position. As used herein, the term "rotational," when used in reference to the configuration or orientation of the strand mounts, means that the position of at least one of the antennas secured to the strand mount may be rotated or moved in relation to the strand mount, for example, to change the azimuth direction of the antenna(s). The components of these respective strand mounts are described in further detail below with respect to the alternative strand mounts **300**, **300'**, **300''** and corresponding strand mount assemblies **400**, **400'**, **500**, **600'**, **600'** shown in **FIGS. 11A-16B**.

[0078] Referring to **FIGS. 11A-11C**, in some embodiments, the strand mount **300** may include a frame **302** comprising two opposing side panels **302a**, **302b**. The side panels **302a**, **302b** are configured such that a small cell radio **150**, antenna **160**, and/or other telecommunications equipment **170** (*e.g.*, diplexer, triplexer, etc.) can be mounted thereon. Each side panel **302a**, **302b** may comprise a plurality of perforations or slots **303** configured such that different sizes/types of radios **150** or antennas **160** may be secured to the mount **300**. The slots **303** also allow some of the heat generated by the radios/antennas **150**, **160** to escape and also allow air to circulate through the mount **300**, thereby helping to prevent the radios/antennas **150**, **160** from overheating. The slots **303** can also help to reduce the overall weight of the mount **300**, making installation less burdensome and reducing costs.

[0079] In some embodiments, the strand mount **300** may comprise a plurality of mounting brackets **305a**, **305b** configured to provide further support to the radios **150**, antennas **160** and/or other telecommunications equipment **170** that may be secured to the side panels **302a**, **302b**.

[0080] The strand mount **300** also includes a plurality of mounting clamps **308** that are each configured to secure and lock the strand mount **300** to a cable strand **130** (*see, e.g.*, **FIG. 14**). The side panels **302a**, **302b** may be secured to the mounting clamps **308** via bolts **310a**. In some embodiments, the side panels **302a**, **302b** may comprise a plurality of elongated slots **310** that are each configured to receive the bolts **310a**. The elongated slots **310** may allow the side panels **302a**, **302b** to be raised or lowered relative to the mounting clamps **308** to assist in balancing the strand mount **300** on a cable strand **130** (*e.g.*, when different size/types of radios **150**, antennas **160** and/or other telecommunications equipment **170** are mounted on the side panels **302a**, **302b**). In some embodiments, the strand mount **300** may also include a plurality of support brackets **309**, **311** configured to further secure each side panel **302a**, **302b** together and create the frame **302**. As shown in **FIG. 10** and **FIG. 11B**, side support brackets **309** are each secured to a respective side panel **302a**, **302b**. A main support bracket **311** is secured between each side support bracket **309** via bolts **309a**. In some embodiments, the side support brackets **309** may each comprise a slot **309s** through which the respective bolts **309a** are received. The slots **309a** may allow the distance between the side panels **302a**, **302b** to be adjusted, for example, increasing or decreasing the distance between the side panels **302a**, **302b** to fit different sized radios **150** (or other telecommunications equipment **170**) mounted to an interior surface of the side panels **302a**, **302b** (*see, e.g.*, **FIGS. 12A-12B**).

[0081] In some embodiments, the mounting clamps **308** may each comprise two plates **308a**, **308b** that are held together by two or more bolts **307a**. The two plates **308a**, **308b** of each mounting clamp **308** are configured to clamp and secure a cable strand **130** there between when the strand mount **300** is installed on a cable strand **130** (*see, e.g.*, **FIG. 14**). In some embodiments, the plates **308a**, **308b** may comprise a plurality of slots **307** configured to receive the bolts **307a**. The slots **307** allow the mounting clamps **308** to be adjustable, for example, to accommodate for different size cable strands **130** and to assist with balancing the strand mount **300** on the cable strand **130**.

[0082] In some embodiments, the strand mount **300** may further include additional mounting or extension plates **312a**, **312b**. The extension plates **312a**, **312b** are configured such that one or more additional small cell radios **150** and/or antennas **160** can be mounted thereon. As shown in **FIGS. 11A-11B**, the extension plates **312a**, **312b** extend axially outward from a respective side panel **302a**, **302b** and extend generally parallel to each other (*i.e.*, a "parallel configuration"). In

some embodiments, the extension plates **312a**, **312b** are configured (*e.g.*, bent) such that a recess **R** is formed along an interior surface of each extension plate **312a**, **312b**. The extension plates **312a**, **312b** (*i.e.*, the recesses **R**) may be configured such that different sized radios **150** and/or antennas **160** may be mounted thereon. For example, as shown in **FIG. 11B** and **FIG. 11C**, in some embodiments, the extension plate **312a** may have a larger recess **R** which extends the extension plate **312a** radially outward farther than the extension plate **312b**, thereby allowing the extension plate **312a** to accommodate a larger sized radio **150** or antenna **160** than the opposing extension plate **312b**.

[0083] **FIGS. 12A-12B** illustrate a strand mount **300'** similar to the strand mount **300** shown in **FIGS. 11A-11C**. Strand mount **300'** differs in the size of the extension plates **312a'**, **312b'** (and corresponding recesses **R'**) which may be configured hold different sizes and/or types of radios **150** and/or antennas **160** than strand mount **300** described herein. For example, as shown in **FIG. 12A**, in some embodiments, the recesses **R'** for extension plates **312a'**, **312b'** are approximately equal in size (compared to strand mount **300** in which extension plate **312a** has a larger recess **R** than extension plate **312b**). In some embodiments, the strand mount **300'** may comprise additional mounting brackets **305a'**, **305b'** compared to the strand mount **300** shown in **FIGS. 11A-11C**.

[0084] Referring now to **FIGS. 13A-13B**, exemplary strand mount assemblies **400**, **400'** according to embodiments of the present invention, are illustrated. As shown in FIGS. 13A-13B, the strand mount assemblies **400**, **400'** utilize a strand mount **300**, **300'** having a "parallel" configuration (*i.e.*, including extension plates **312a**, **312b**). In some embodiments, for example, as shown in **FIG. 13A**, the strand mount assembly **400** may have an antenna **160** secured to each extension plate **312a**, **312b**, a radio **150** secured to the exterior surface of each side panels **302a**, **302b**, and additional telecommunications equipment **170** (*e.g.*, a diplexer) secured to an interior surface of at least one of the side panels **302a**, **302b**. The assembly **400'** illustrated in **FIG. 13B** is similar to assembly **400** except differs in that the exterior surface of each side panel **302a**, **302b** has two radios **150** secured thereto. It should be noted that these assemblies **400**, **400'** are only shown for exemplary purposes, and a person of ordinary skill in the art would understand that various configurations (*i.e.*, types, sizes, and numbers of radios **150**, antennas **160**, and/or other telecommunications equipment **170** may be employed utilizing the strand mounts **300**, **300'** described herein.

[0085] **FIG. 14** illustrates an exemplary strand mount assembly **500** according to embodiments of the present invention where the strand mount **300'** is secured to a cable strand **130**. As shown in **FIG. 14**, the cable strand **130** is secured between the mounting clamps **308**, thereby securing the strand mount **300'** (and corresponding radios **150**, antennas **160**, and/or other telecommunications equipment **170**) to the cable strand **130**. A bundle of cables **135** (*e.g.*, power cables, telecommunications cables, etc.) extends parallel to the cable strand **130** and through the strand mount **300'**. In some embodiments, as shown in **FIG. 14**, mounting brackets **305a'**, **305b'** may also be used to help support/secure the radios **150** to the side panels **302a'**, **302b'** of the strand mount **300'**. Other strand mounts **300**, **300''** described herein may be secured to a cable strand **130** in a similar manner.

[0086] Referring now to **FIGS. 15A-15C**, an alternative strand mount **300''** according to embodiments of the present invention is illustrated. Properties and/or features of the strand mount **300''** and/or strand mount assemblies **600**, **600'** may be as described above in reference to **FIGS. 10-14** and duplicate discussion thereof may be omitted herein for the purposes of discussing **FIGS. 15A-16B**.

[0087] The strand mount **300''** is similar to the strand mounts **300, 300'** described herein in that the mount **300''** includes a frame **302''** comprising two opposing side panels **302a''**, **302b''** that are configured such that a small cell radio **150**, antenna **160**, and/or other telecommunications equipment **170** (*e.g.*, diplexer, triplexer, etc.) can be mounted thereon. Each side panel **302a''**, **302b''** may comprise a plurality of perforations or slots **303''** configured such that different sizes/types of radios **150** or antennas **160** may be secured to the mount **300''** while also allow some of the heat generated by the radios/antennas **150**, **160** to escape and also allow air to circulate through the mount **300''**, thereby helping to prevent the radios/antennas **150**, **160** from overheating.

[0088] In some embodiments, the strand mount **300''** may also comprise a plurality of mounting brackets **305a''**, **305b''** configured to provide further support to the radios **150**, antennas **160** and/or other telecommunications equipment **170** that may be secured to the side panels **302a''**, **302b''**. The strand mount **300''** further includes a plurality of mounting clamps **308''** that are each configured to secure and lock the strand mount **300''** to a cable strand **130**, similar to other strand mounts **300, 300'** described herein (*see, e.g.*, **FIG. 14**).

[0089] Similar to strand mounts **300**, **300'**, in some embodiments, the strand mount **300''** may also include a plurality of support brackets **309''**, **311''** configured to further secure each side panel **302a''**, **302b''** together. The support brackets **309''**, **311''** may allow the distance between the side panels **302a''**, **302b''** to be adjusted, for example, increasing or decreasing the distanced between the side panels **302a''**, **302b''** to fit different sized radios **150** (or other telecommunications equipment **170**) mounted to an interior surface the side panels **302a''**, **302b''**.

[0090] The strand mount **300''** differs from strand mounts **300**, **300'** in that rather than having two extension plates **312a**, **312b** (**312a'**, **312b'**) that extend outwardly from the side panels **302a**, **302b** (**302a'**, **302b'**), the strand mount **300''** includes a mounting plate **312c''** that may be secured to the end of the strand mount **300''**. The mounting plate **312c''** may comprise a pair of arms **312a''**, **312b''** sized and configured such that one or more antennas **160** may be secured thereto. Similar to the strand mount **200''** described herein (*see, e.g.*, **FIGS. 9C-9D**), when secured to the end of the strand mount **300''**, the mounting plate **312c''** may be rotated and locked at an angle (**θ**), for example, to achieve a desired azimuth for the mounted antennas **160**.

[0091] As shown in **FIGS. 15A-15C**, in some embodiments, a flange **314''** may extend outwardly from an end of the strand mount **300''**. The flange **314''** includes an arcuate slot **313a''**. The mounting plate **312c''** may be coupled to the flange **314''** via a mounting bracket **313''**. The mounting bracket **313''** may be secured to the flange **314''** via a bolt **313b''** that is received through the arcuate slot **313a''**. The bolt **313b''** may be slid along the arcuate slot **313a''**, thereby rotating the mounting plate **312c''**. The bolt **313b''** may be slid within the arcuate slot **313a''** until the desired angle (**θ**) is reached, then the bolt **313b''** may be tightened to lock the mounting plate **312c''** (and antenna(s) **160** mounted thereon) in place at that angle (**θ**).

[0092] As shown in **FIG. 15B**, in some embodiments, the flange **314''** may be secured to the strand mount **300''** such that the flange **314''** resides below a bottom edge of the side panels **302a''**, **302b''**. In some embodiments, the flange **314''** may be coupled to the end of the strand mount **300''** via a pair of extension members **316**". Each extension member **316''** may be secured to a respective side panel **302a''**, **302b''** via a bolt **315a''**. In some embodiments, the extension members **316''** may comprise an elongated slot **315''** configured to receive the bolts **315a''**. The elongated slots **315''** may allow the flange **314''** (and mounting plate **312c''**) to

be raised or lowered relative to the strand mount **300''**, thereby allowing the vertical elevation (*i.e.*, horizontal plane) of the antenna(s) **160** secured thereto to be adjusted.

[0093] Referring now to **FIGS. 16A-16B**, exemplary strand mount assemblies **600**, **600'** according to embodiments of the present invention are illustrated. The strand mount assemblies **600**, **600'** utilize a strand mount **300''** having a "rotational" configuration (*i.e.*, mounting plate **312c''**). In some embodiments, for example, as shown in **FIG. 16A**, the strand mount assembly **600** may have multiple antennas **160** secured to the mounting plate **312c** which is rotated at a desired angle (**θ**). Multiple radios **150** may secured to the exterior surface of each side panels **302a''**, **302b''** and supported by mounting brackets **305a''**, **305b''** (some not shown). In some embodiments, additional radios **150** and/or other telecommunications equipment **170** (*e.g.*, a diplexer) may be secured to an interior surface of at least one of the side panels **302a''**, **302b''**. The assembly **600'** illustrated in **FIG. 16B** is similar to assembly **600** except differs in the number and size of the radios **150** and telecommunications equipment **170** that is secured to the exterior and interior surfaces of each side panel **302a''**, **302b''** of the strand mount **300''**. It should be noted that these assemblies **600**, **600'** are only shown for exemplary purposes, and a person of ordinary skill in the art would understand that various configurations (*i.e.*, types, sizes, and numbers of radios **150**, antennas **160**, and/or other telecommunications equipment **170** may be employed utilizing the strand mount **300''** described herein.

[0094] In some embodiments, the strand mounts **100**, **100'**, **100''**, **100'''**, **200**, **200'**, **200''**, **300**, **300'**, **300''** of the present invention described herein may be formed from aluminum or an aluminum alloy. The mounts **100**, **100'**, **100''**, **100'''**, **200**, **200'**, **200''**, **300**, **300'**, **300''** of the present invention described herein may be used in association with a variety of different small cell radios **150** and/or antennas **160** (and related telecommunications equipment). For example, in some embodiments, the small cell radio **150** is a picocell radio. A picocell is a small cellular base station covering a smaller scale cell site, such as within buildings.

[0095] The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of

this invention as defined in the claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

That which is claimed is:

1. A strand mount, comprising:

a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios and/or antennas;

a plurality of mounting members, each mounting member coupled to the top and bottom plates within the interior cavity and configured such that a small cell radio can be mounted thereto; and

one or more mounting brackets,

wherein the one or more mounting brackets of the strand mount are configured such that the strand mount has the dual capability of being mounted on either horizontally on a cable strand or vertically on a pole.

2. The strand mount of Claim 1, wherein the mount is secured horizontally on a cable strand by the one or more mounting brackets.

3. The strand mount of Claim 1, further comprising one or more reinforcing mounting brackets, wherein the strand mount is secured vertically on a pole by the one or more mounting brackets in combination with the one or more reinforcing mounting brackets.

4. The strand mount of any one of the preceding claims, wherein the mount is formed from aluminum or an aluminum alloy.

5. The strand mount of any one of the preceding claims, wherein at least one of the top plate, bottom plate, and/or side plates comprises perforations.

6. The strand mount of any one of the preceding claims, further comprising an external mount plate extending outwardly from an edge of the top or bottom plate and configured such that one or more small cell radios and/or antennas can be mounted thereto.

7. The strand mount of any one of the preceding claims, further comprising one or more small cell radios and/or antennas mounted to the mounting members and/or external mount plate.

8. The strand mount of any one of the preceding claims, wherein the one or more small cell radios is a picocell radio.

9. The strand mount of any one of the preceding claims, wherein the mounting members comprise pipes.

10. A strand mount assembly, comprising:

a mounting structure;

one or more small cell radios and/or antennas; and

a strand mount, the mount comprising:

a top plate, a bottom plate, and opposing plates that form a housing having an interior cavity dimensioned to fit around the one or more small cell radios and/or antennas;

a plurality of mounting members, each mounting member coupled to the top and bottom plates within the interior cavity; and

one or more mounting brackets,

wherein each of the small cell radios and/or antennas are mounted to a respective mounting member and the strand mount is mounted to the mounting structure by the one or more mounting brackets.

11. The strand mount assembly of Claim 10, wherein the mounting structure is a cable strand.

12. The strand mount assembly of Claim 10, further comprising one or more reinforcing mounting brackets, wherein the mounting structure is a pole by the one or more mounting brackets in combination with the one or more reinforcing mounting brackets.

13. The strand mount assembly of any one of Claims 10-12, wherein the one or more small cell radios is a picocell radio.

14. A strand mount assembly, comprising:

a cable strand; and

a strand mount, the strand mount comprising:

two or more interconnected frame sections that form a frame, each frame section having opposing sides configured such that one or more small cell radios and/or antennas can be mounted thereto; and

a plurality of mount apertures sized and configured to receive the cable strand, wherein each of the mounting apertures is collinear with the other mounting apertures to create an unimpeded opening that the cable strand extends through, thereby mounting the strand mount on the cable strand.

15. The strand mount assembly of Claim 14, wherein one or more of the interconnected frames are configured to rotate about the cable strand extending through the frame to adjust the tilt angle of the one or more small cell radios and/or antennas.

16. The strand mount assembly of Claim 15, wherein one or more of the interconnected frame sections comprises a tubular member sized to receive the cable strand and configured such that the one or more interconnected frame sections are rotatable about the cable strand while remaining mounted on the cable strand.

17. The strand mount assembly of any one of Claims 14-16, further comprising one or more small cell radios and/or antennas mounted to one or more of the interconnected frame sections.

18. The strand mount assembly of Claim 17, further comprising a locking mechanism, wherein one or more of the small cell radios and/or antennas are rotated to, and locked at, a desired tilt angle.

19. A strand mount, comprising:

a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios and/or antennas;

a plurality of mounting arms removably attached to the top plate and extending downwardly into the interior cavity, each mounting arm configured such that a small cell radio and/or antenna can be mounted thereto; and

one or more mounting brackets configured to hang the strand mount on a cable strand.

20. The strand mount of Claim 19, wherein the strand mount is secured on a cable strand by the one or more mounting brackets.

21. The strand mount of any one of Claims 19 or 20, wherein at least one of the top plate, bottom plate, and/or side plates comprises perforations.

22. The strand mount of any one of Claims 19-21, further comprising an external mount plate extending outwardly from an edge of the top or bottom plates and configured such that one or more small cell radios and/or antennas can be mounted thereto.

23. The strand mount of any one of Claims 19-22, further comprising one or more small cell radios and/or antennas mounted to the mounting arms and/or external mounting plate.

24. The strand mount of any one of Claim 19-23, further comprising a support member coupled to and extending longitudinally down a center of the top plate.

25. The strand mount of Claim 24, wherein the plurality of mounting arms is removably attached to the support member.

26. The strand mount of any one of Claims 19-25, wherein the one or more small cell radios is a picocell radio.

27. A strand mount, comprising:

a top plate, a bottom plate, and opposing side plates that form a housing having an interior cavity dimensioned to fit around one or more small cell radios and/or antennas;

a center mounting frame secured to an inner surface of the top plate and extending downwardly into the interior cavity, the mounting frame having opposing sides, each configured such that one or more small cell radios and/or antennas can be mounted thereto; and

one or more mounting brackets configured to hang the strand mount on a cable strand.

28. The strand mount of Claim 27, wherein the mount is secured on the cable strand by the one or more mounting brackets.

29. The strand mount of any one of Claims 27 or 28, wherein at least one of the top plate, bottom plate, and/or side plates comprises perforations.

30. The strand mount of any one of Claims 27-29, further comprising an external mounting plate extending outwardly from an edge of the top or bottom plates and configured such that one or more small cell radios and/or antennas can be mounted thereto.

31. The strand mount of any one of Claims 27-30, further comprising one or more small cell radios and/or antennas mounted to the center mounting frame and/or external mounting plate.

32. The strand mount of any one of Claims 27-31, wherein the one or more small cell radios is a picocell radio.

33. A strand mount, comprising:

a frame comprising two opposing side panels, each panel is configured such that one or more small cell radios and/or antennas can be mounted thereto; and

a plurality of mounting clamps coupled to the side panels, wherein the plurality of mounting clamps is configured to secure the strand mount on a cable strand.

34. The strand mount of Claim 33, wherein each mounting clamp comprises two plates configured such that a cable strand can be secured therebetween.

35. The strand mount of any one of Claims 33 or 34, wherein the side panels comprise a plurality of slots configured such that the panels can be raised or lowered relative to the mounting clamps.

35. The strand mount of any of one of Claims 33-35, further comprising a mounting plate coupled to one of the side panels and configured such that one or more small cell radios and/or antennas can be mounted thereto.

36. The strand mount of any one of Claims 33-35, further comprising a pair of extension plates, each extension plate is coupled to a side panel and extends axially outward therefrom and generally parallel to the other extension plate, wherein the extension plates are configured such that one or more additional small cell radios and/or antennas can be mounted thereon.

37. The strand mount of any one of Claims 33-35, further comprising a mounting plate coupled to an end of the side panels and configured such that one or more antennas can be mounted thereto, wherein the mounting plate is configured to rotate to a desired angle relative to the side panels.

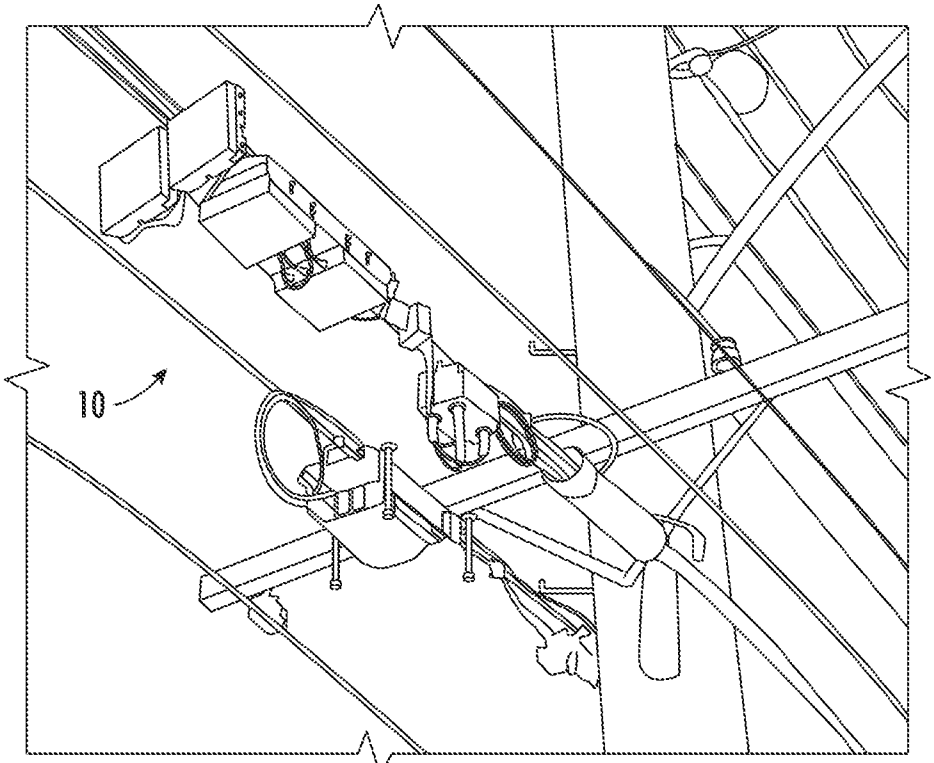


FIG. 1A
PRIOR ART

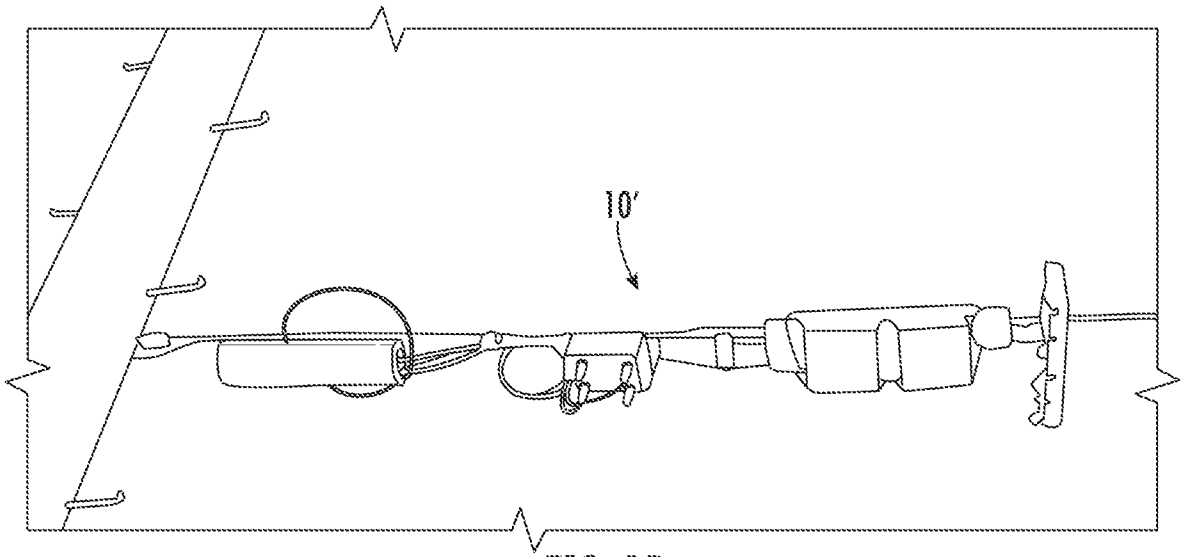


FIG. 1B
PRIOR ART

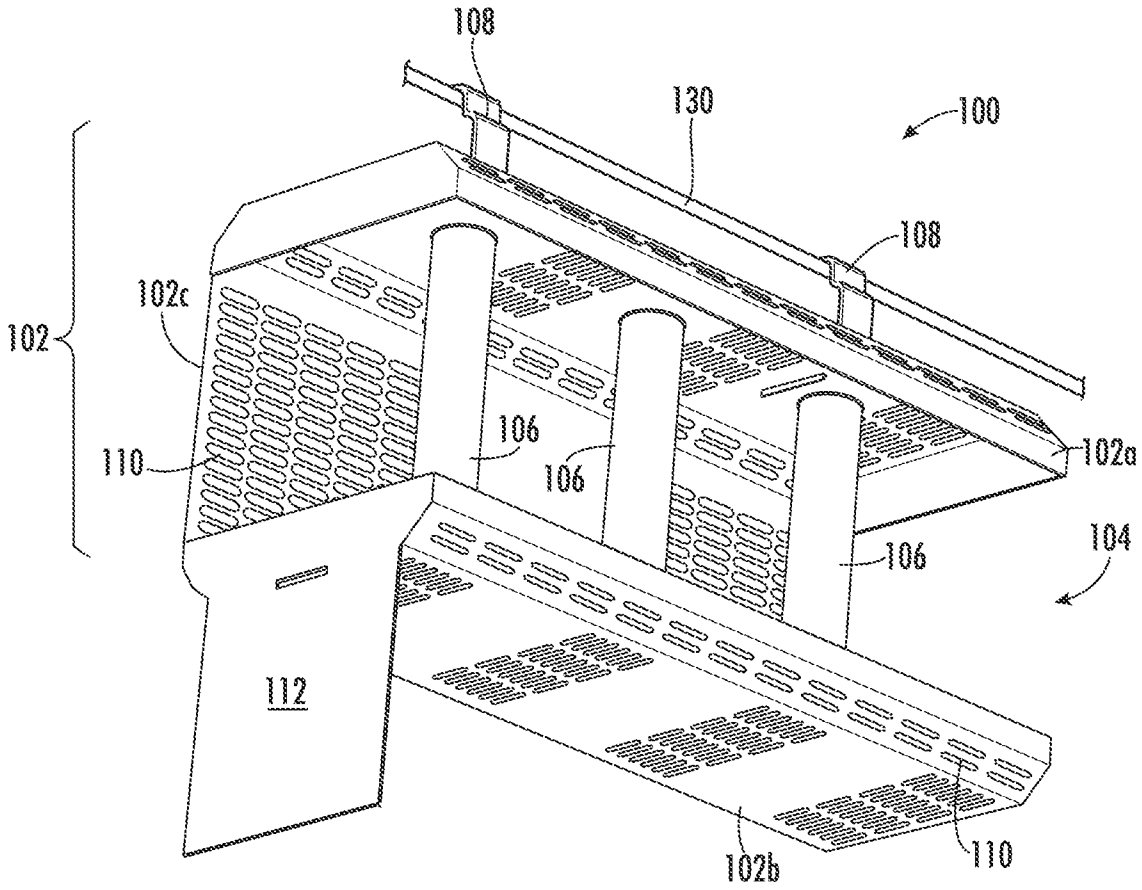


FIG. 2

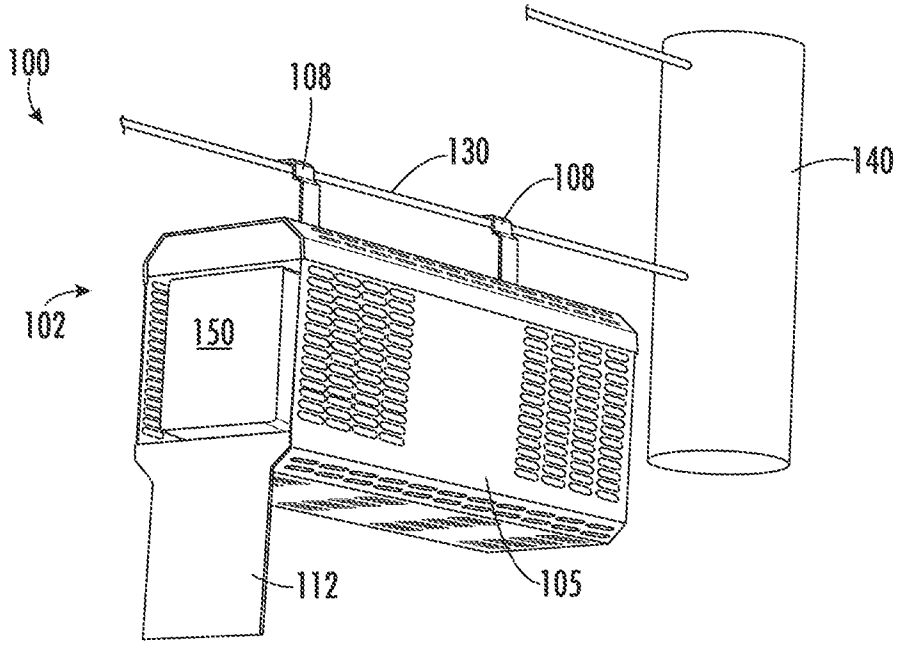

100
108
130
108
140
102
150
112
105

FIG. 3A

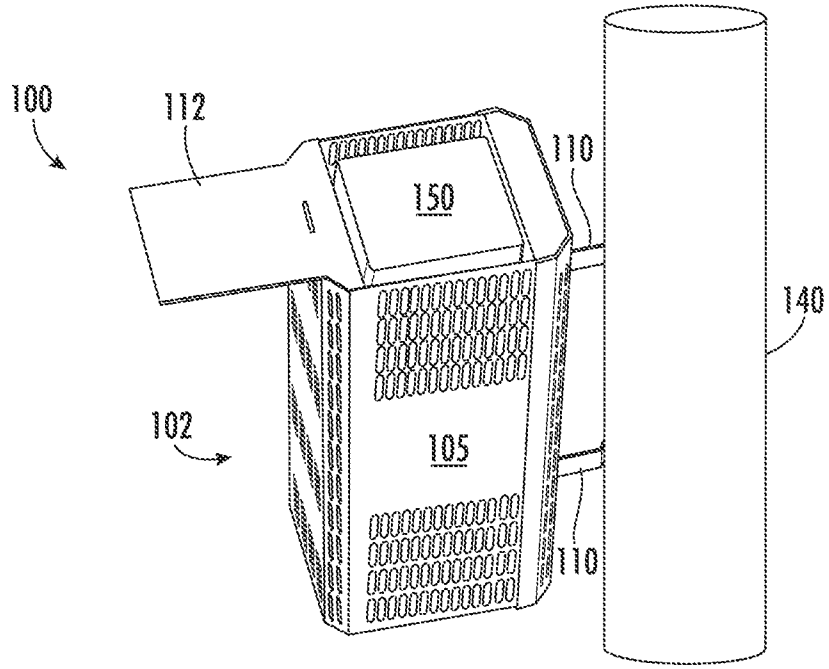

100
112
110
150
140
102
105
110

FIG. 3B

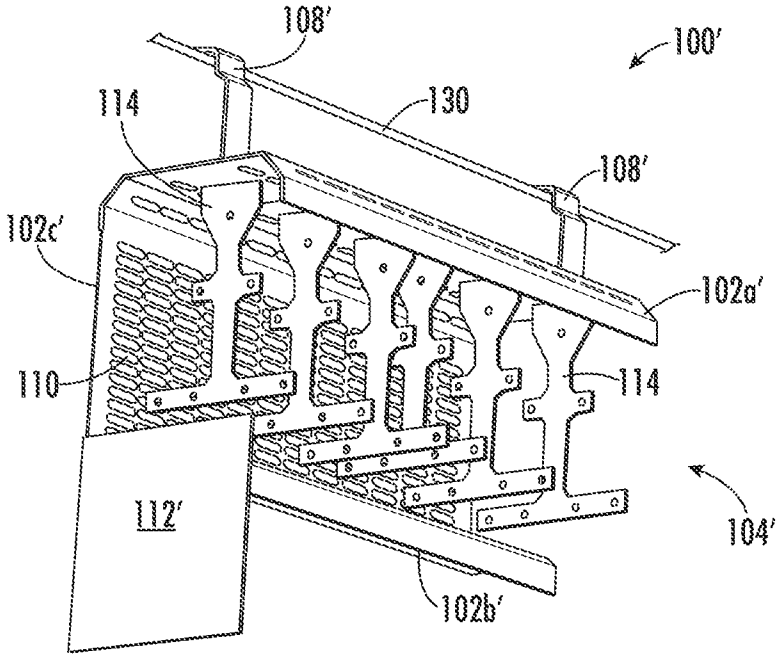

108'
100'
114
130
108'
102c'
102a'
110
114
112'
104'
102b'

FIG. 4A

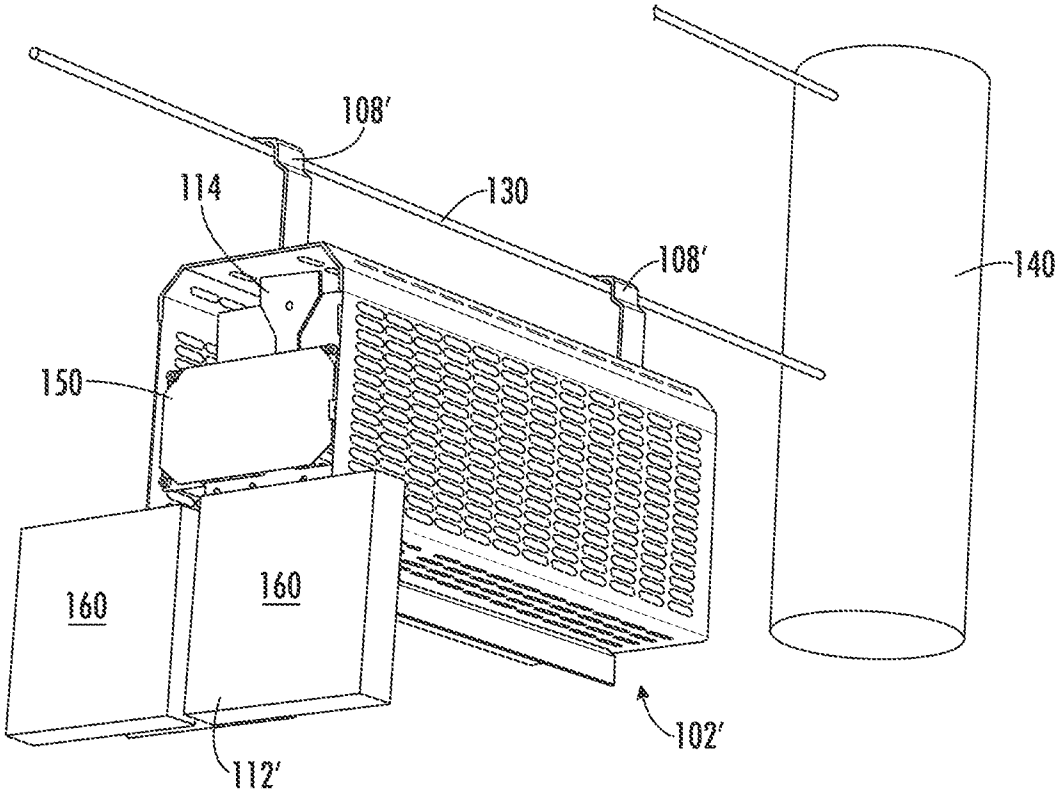

108'
114
130
108'
140
150
160
160
102'
112'

FIG. 4B

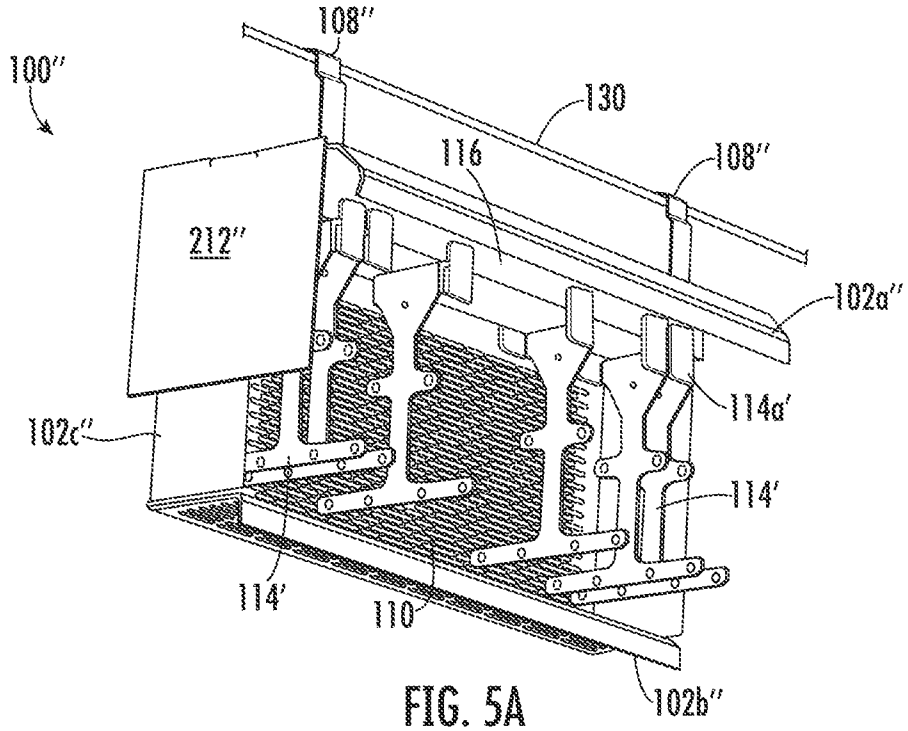

100''
108''
130
116
108''
212''
102a''
114a'
102c''
114'
114'
110
102b''

FIG. 5A

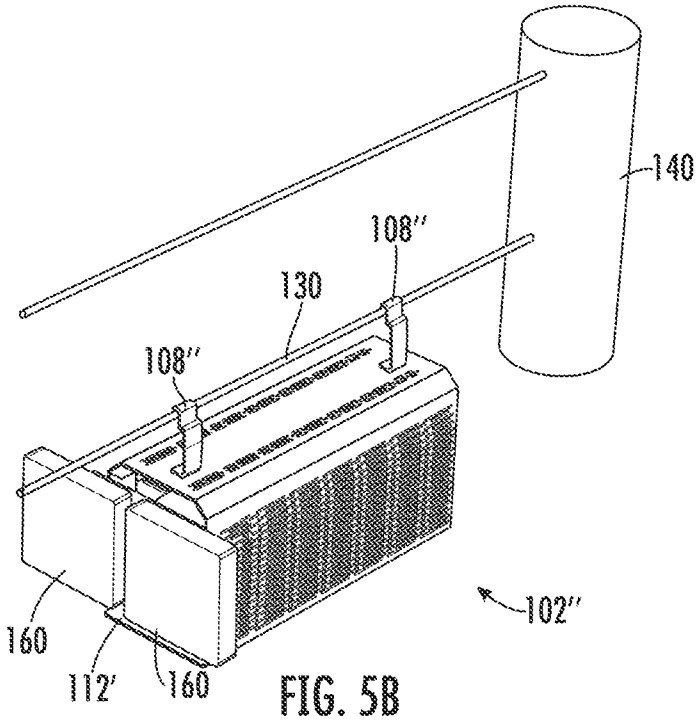

140
108''
130
108''
160
112'
160
102''

FIG. 5B

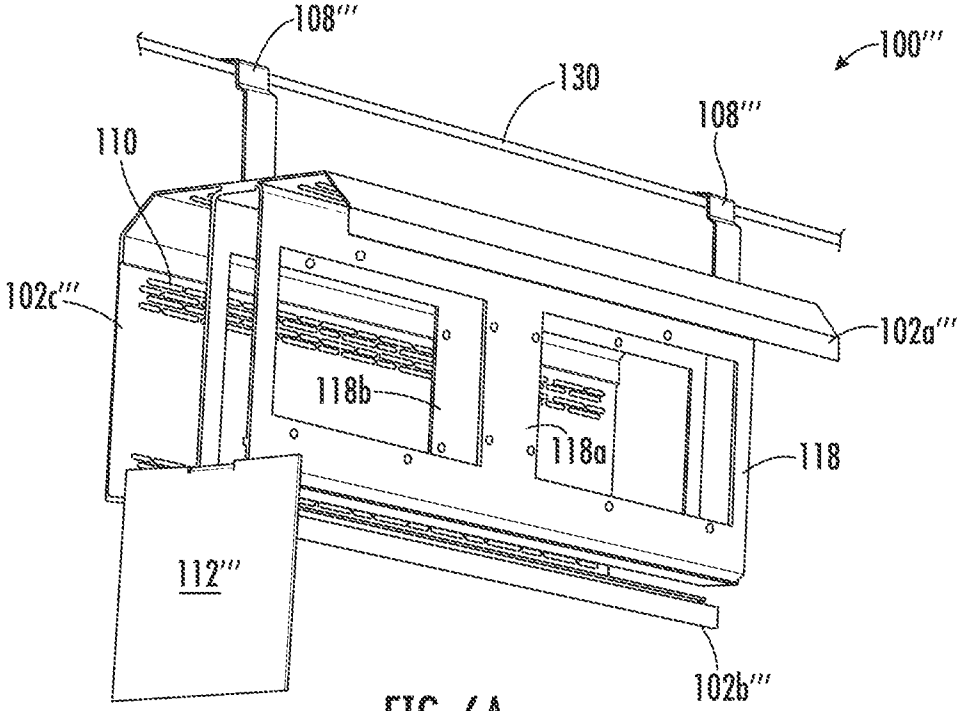

108'''
100'''
130
108'''
110
102c'''
102a'''
118b
118a
118
112'''
102b'''

FIG. 6A

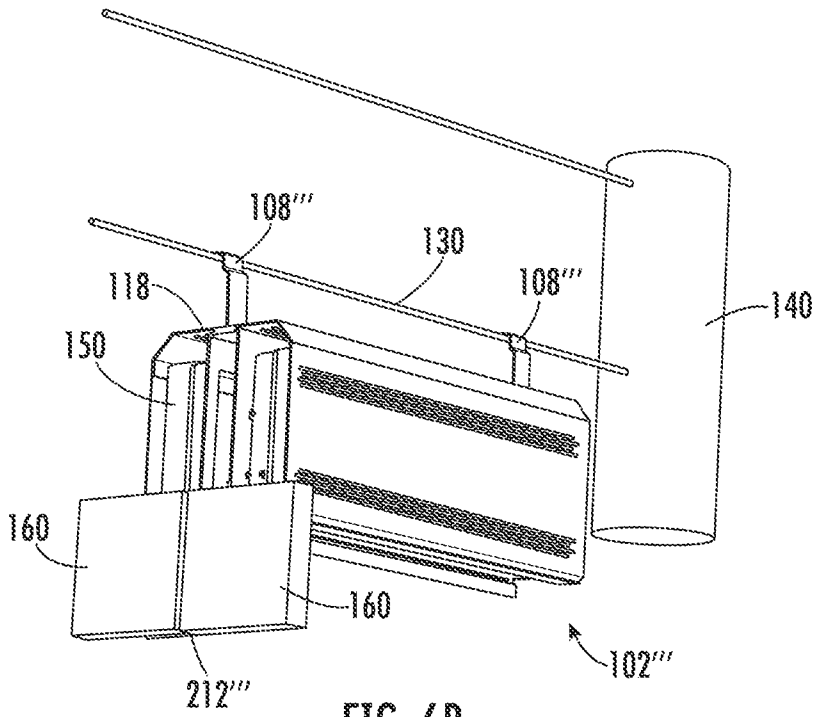

108'''
130
108'''
118
140
150
160
160
102'''
212'''

FIG. 6B

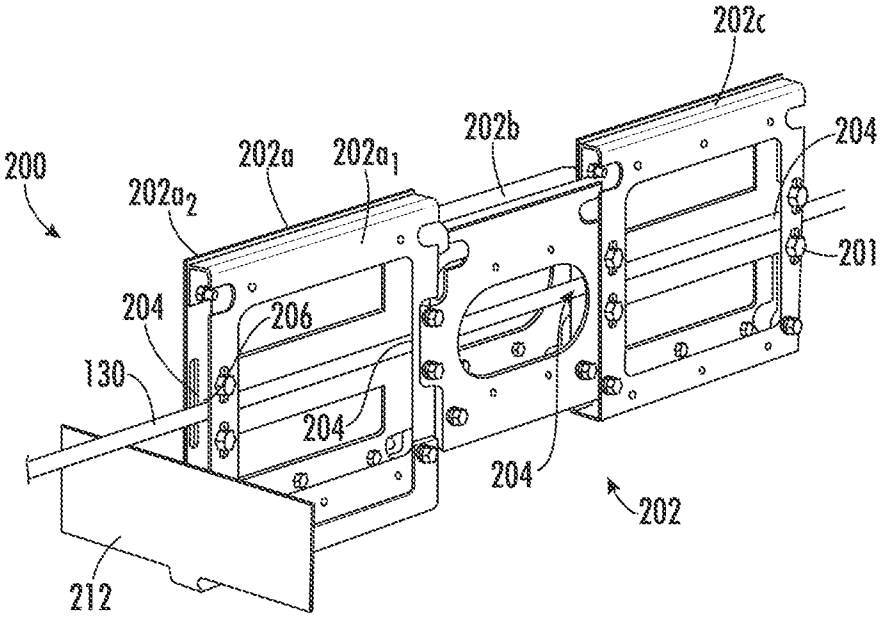

202c
202b
204
200
202a
202a1
202a2
201
204
206
130
204
204
202
212

FIG. 7A

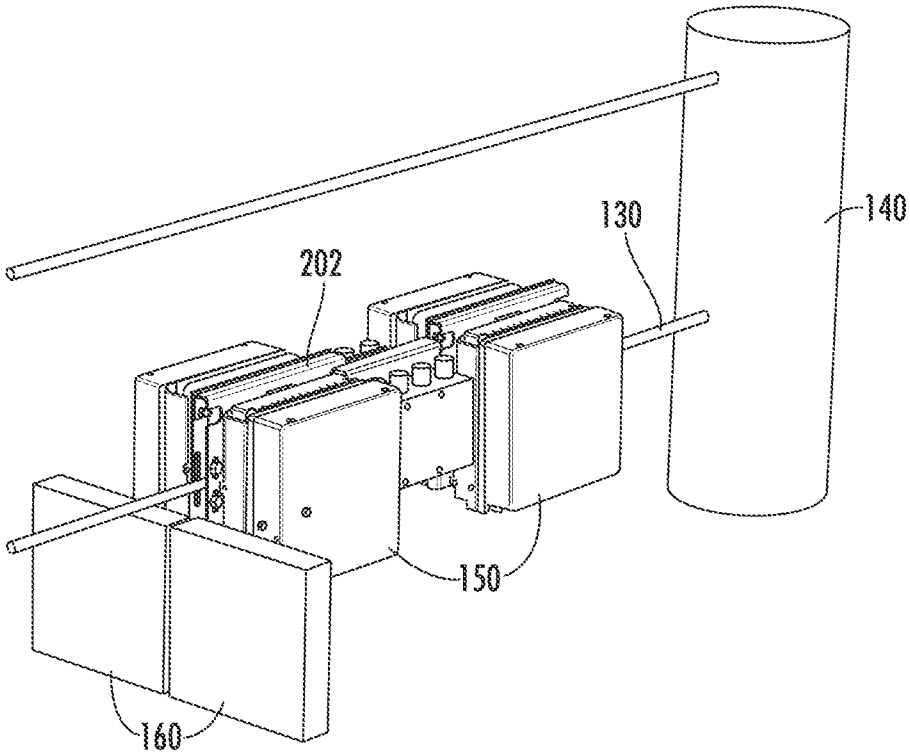

140
130
202
150
160

FIG. 7B

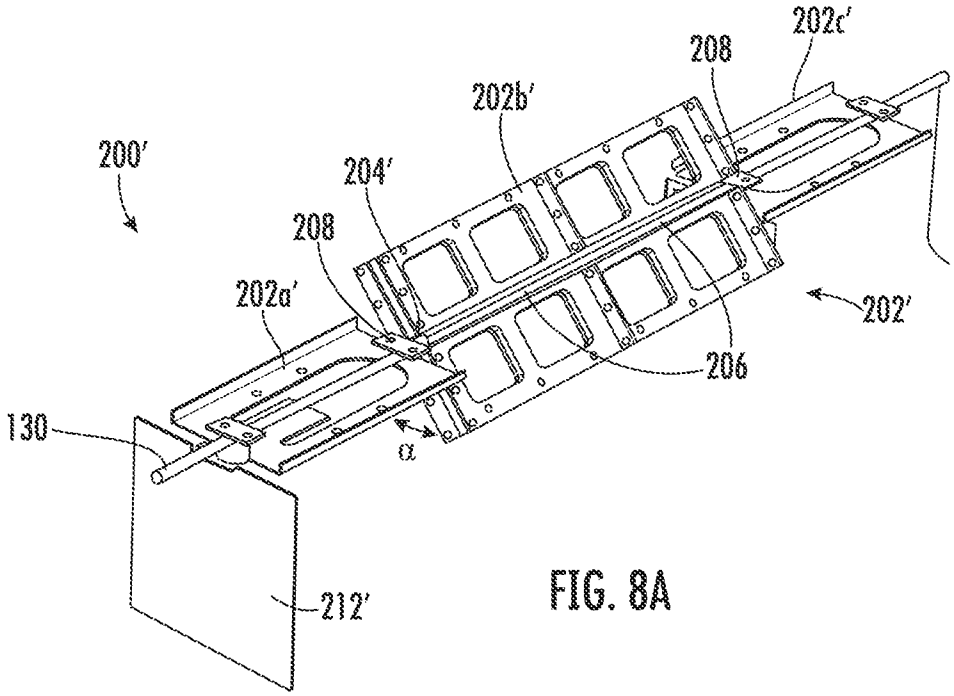

200'
202a'
202b'
202c'
204'
208
208
206
202'
130
α
212'

FIG. 8A

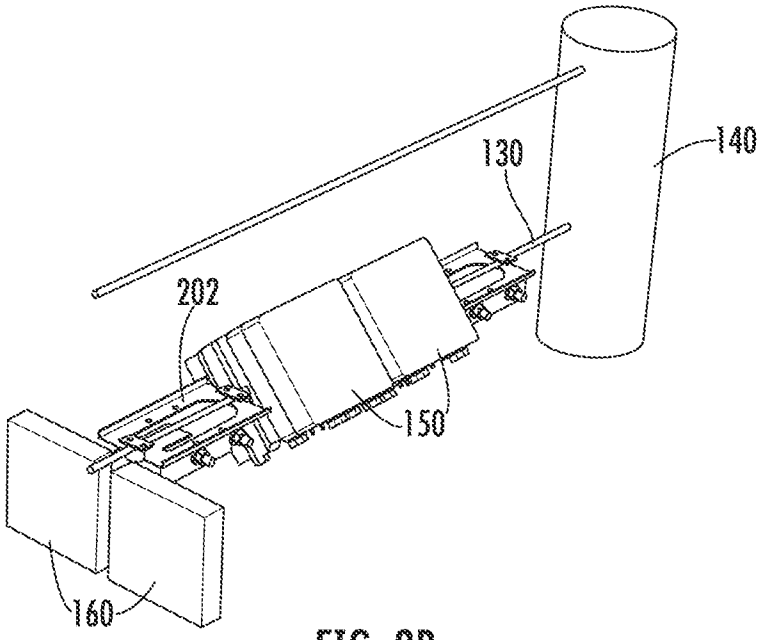

140
130
202
150
160

FIG. 8B

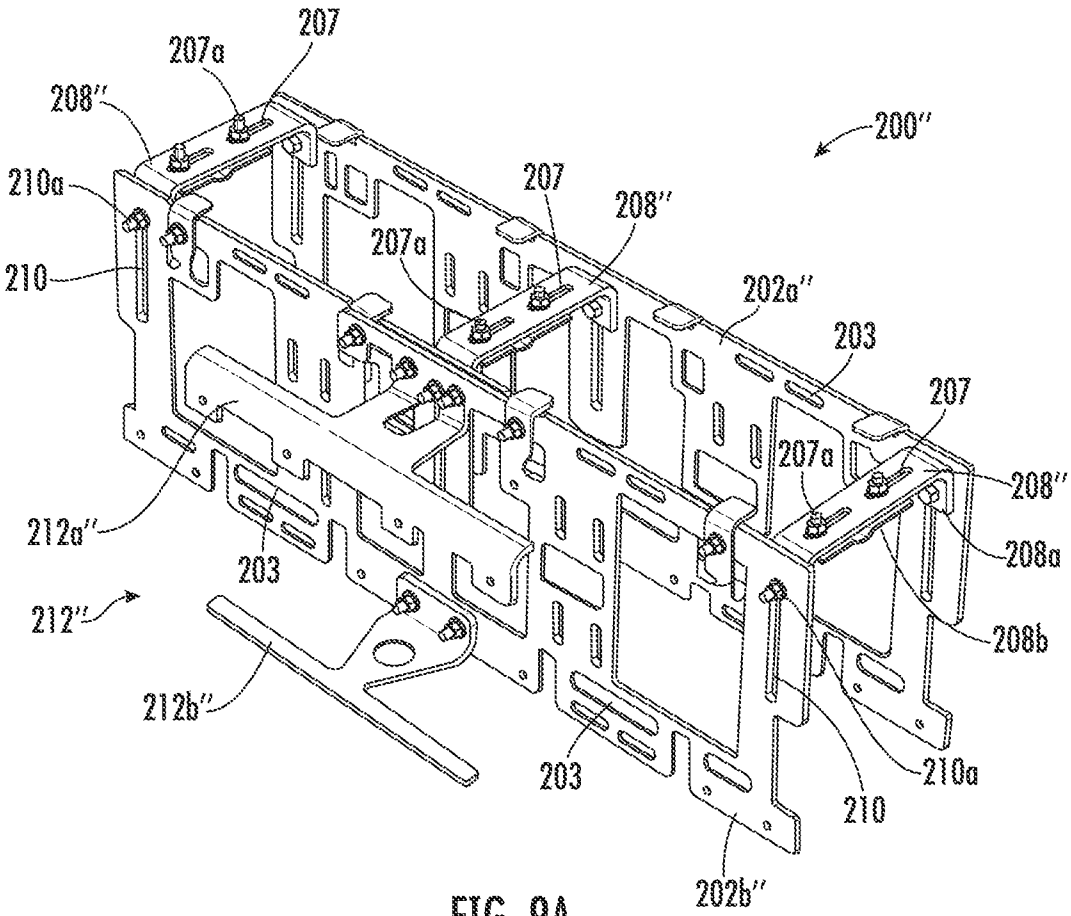

207
207a
208''
200''
210a
207
208''
210
207a
202a''
203
207
207a
208''
212a''
203
208a
212''
208b
212b''
203
210a
210
202b''

FIG. 9A

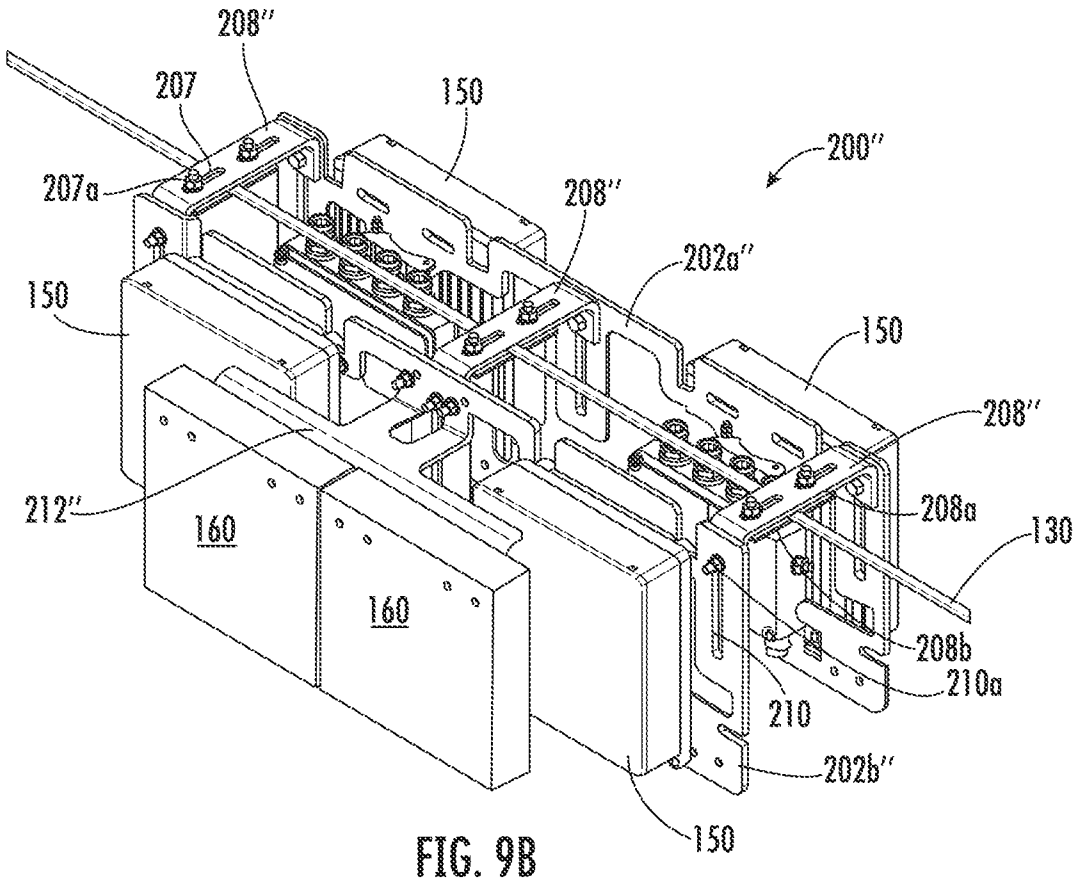

208''
207
150
200''
207a
208''
202a''
150
150
208''
208a
130
212''
160
160
208b
210a
210
202b''
150

FIG. 9B

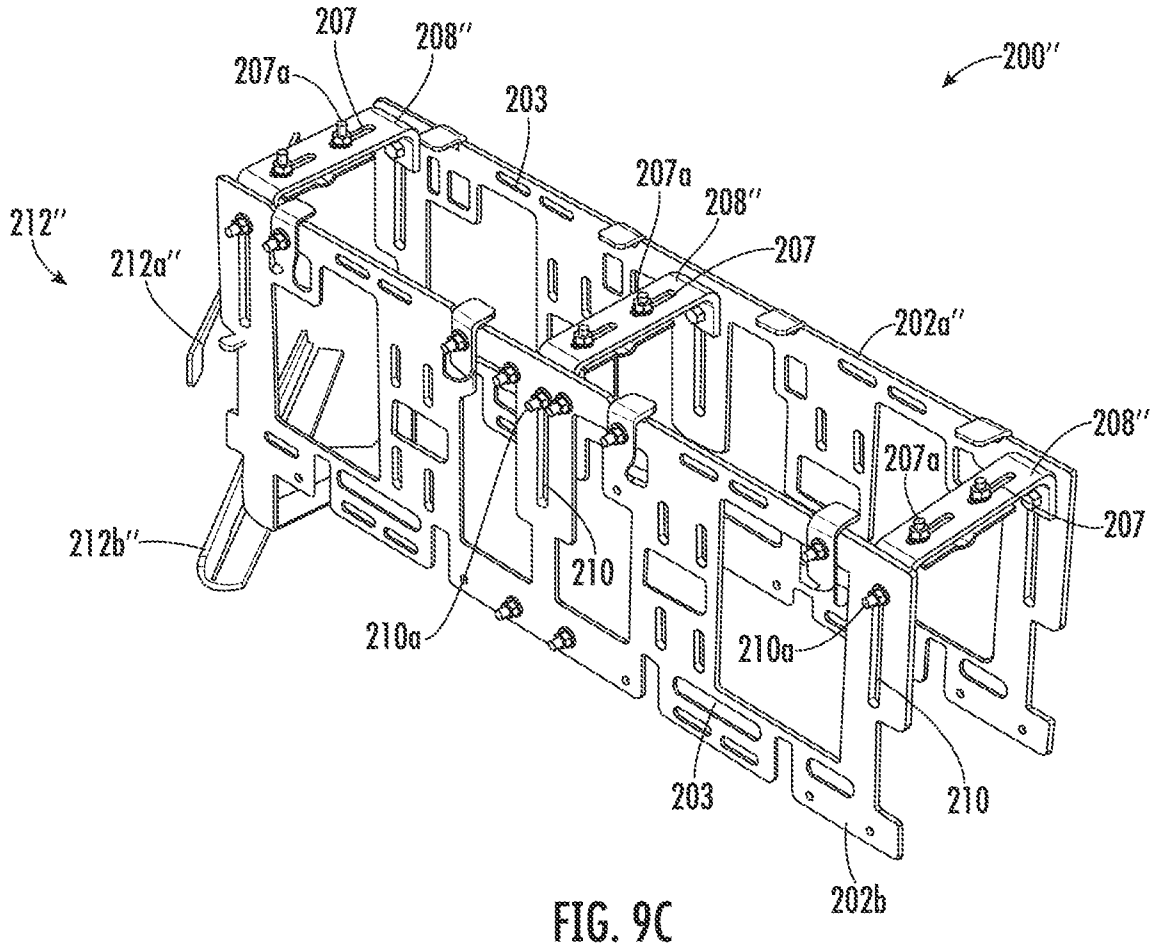

207
208''
207a
203
200''
207a
208''
212''
212a''
207
202a''
208''
207a
207
212b''
210
210a
210a
203
210
202b

FIG. 9C

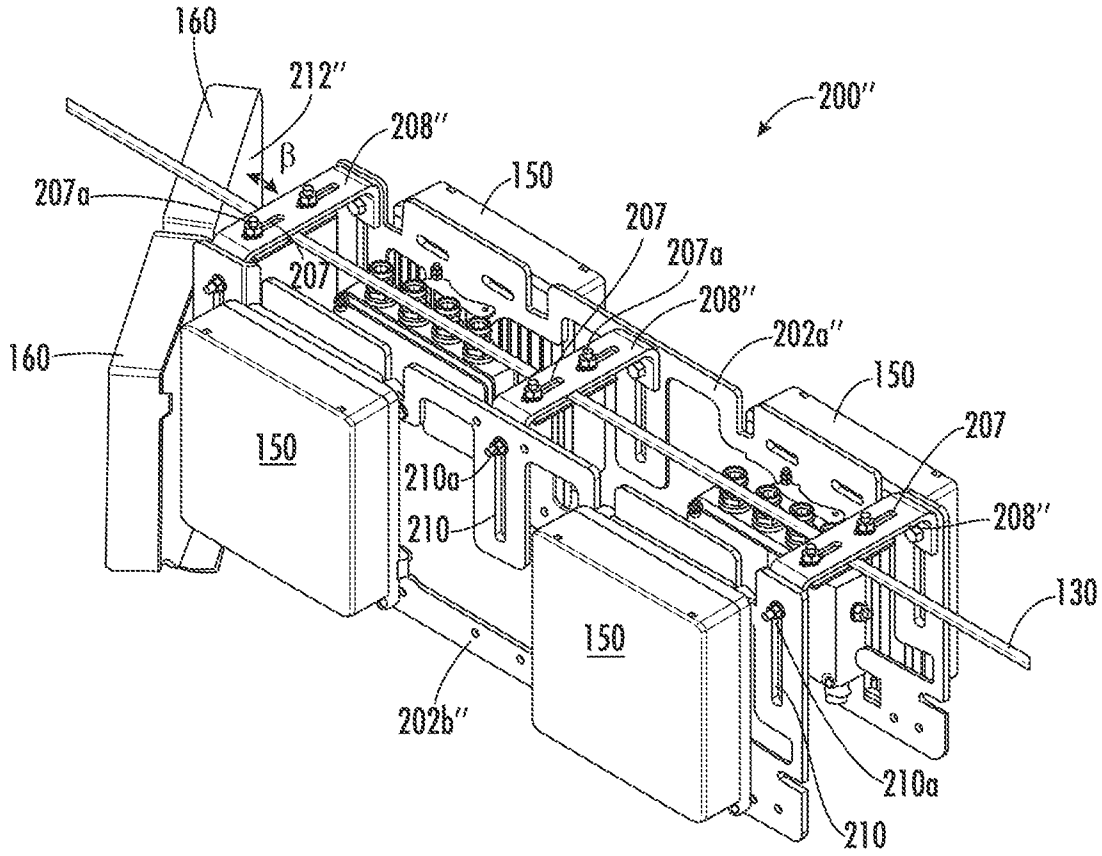

160
212''
β
208''
200''
207a
150
207
207a
207
208''
202a''
160
150
150
207
210a
208''
210
130
150
202b''
210a
210

FIG. 9D

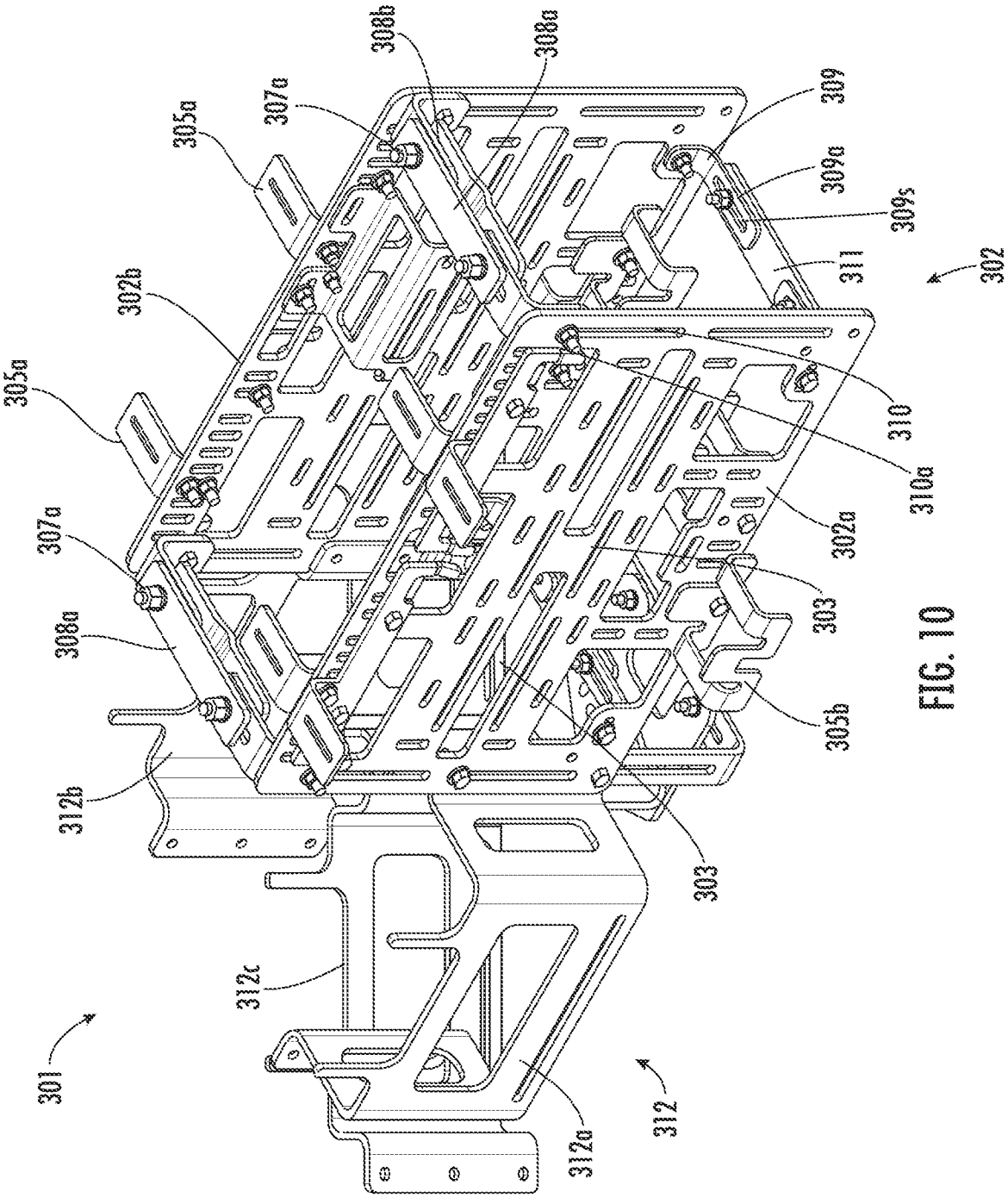

308b
308a
307a
305a
309
309a
309s
311
302
302b
305a
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310a
307a
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308a
303
305b
312b
303
312c
301
312
312a

FIG. 10

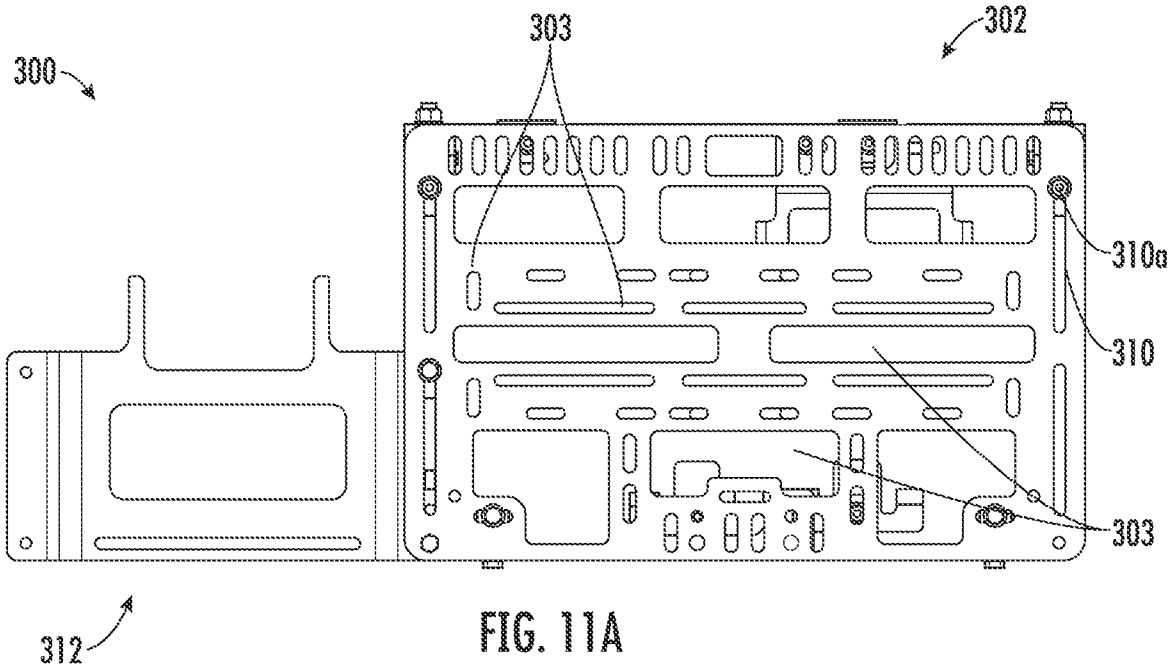


FIG. 11A

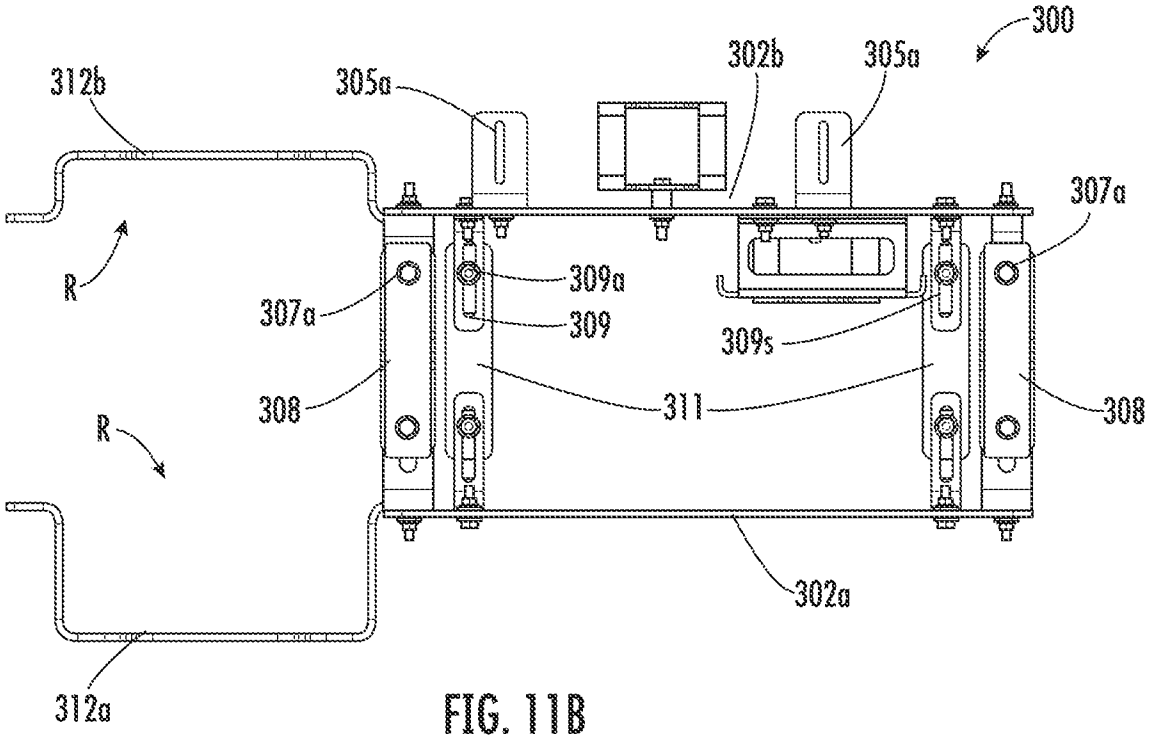


FIG. 11B

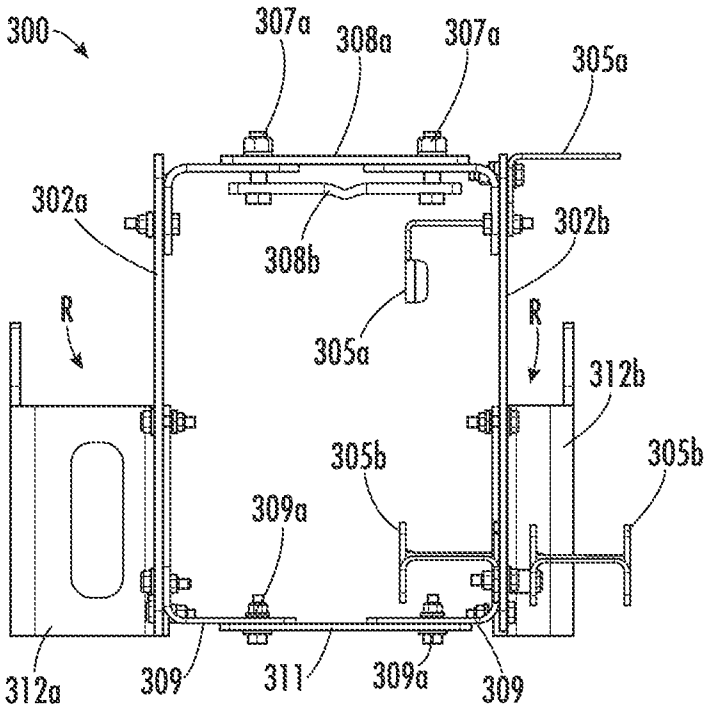

300
307a
308a
307a
305a
302a
308b
302b
R
305a
R
312b
305b
305b
309a
312a
309
311
309a
309

FIG. 11C

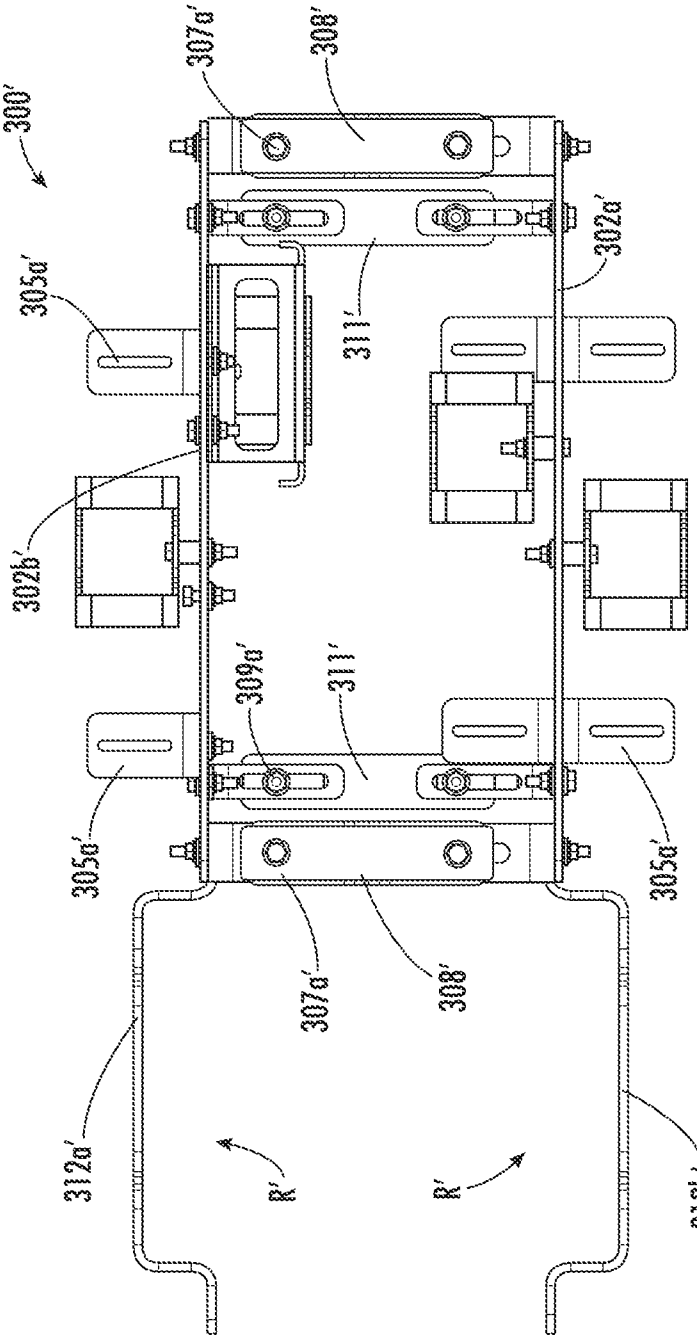

300'
307a'
308'
302a'
305a'
311'
302b'
309a'
311'
305a'
305a'
307a'
308'
312a'
312b'
R'
R'

FIG. 12A

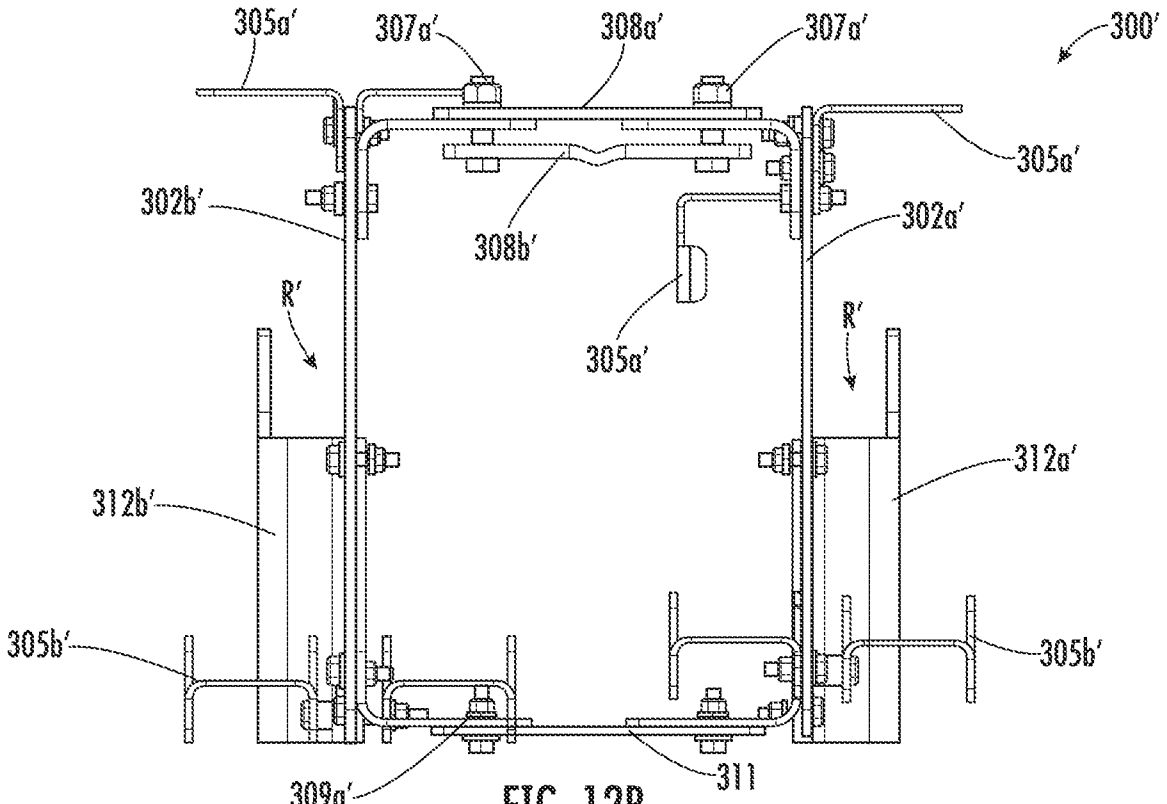

305a'
307a'
308a'
307a'
300'
305a'
302b'
308b'
302a'
R'
305a'
R'
312a'
312b'
305b'
305b'
309a'
311

FIG. 12B

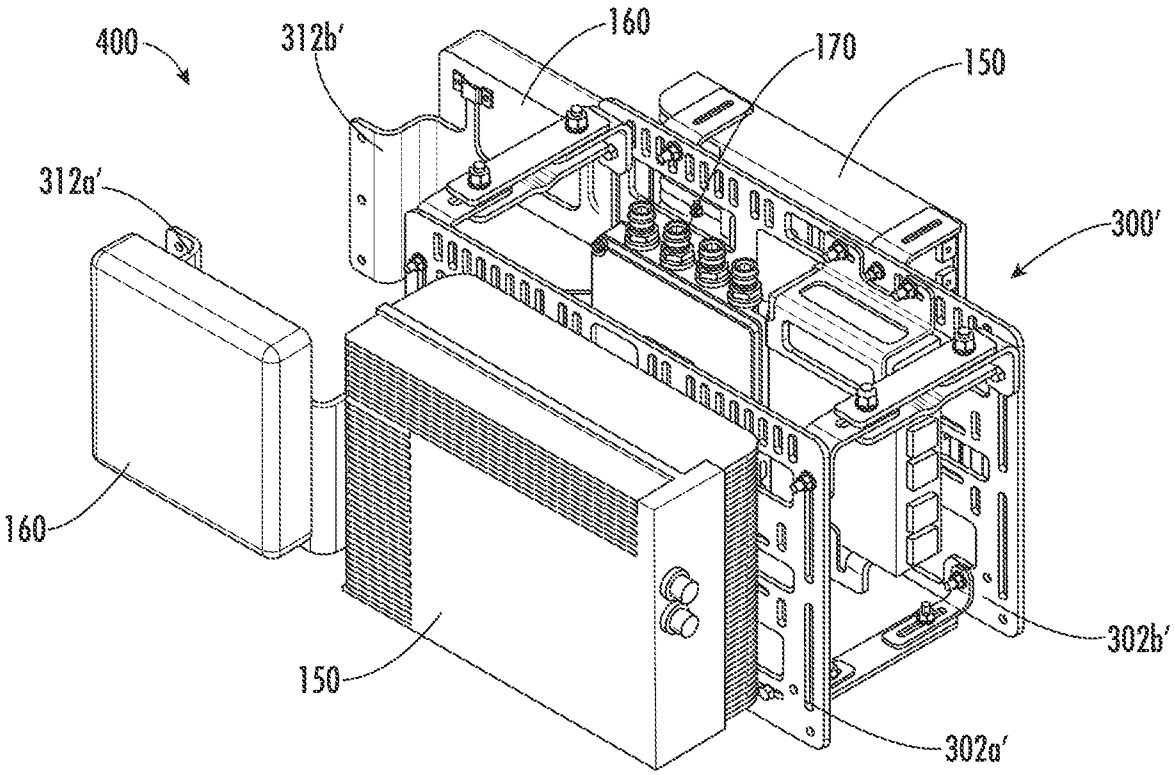


FIG. 13A

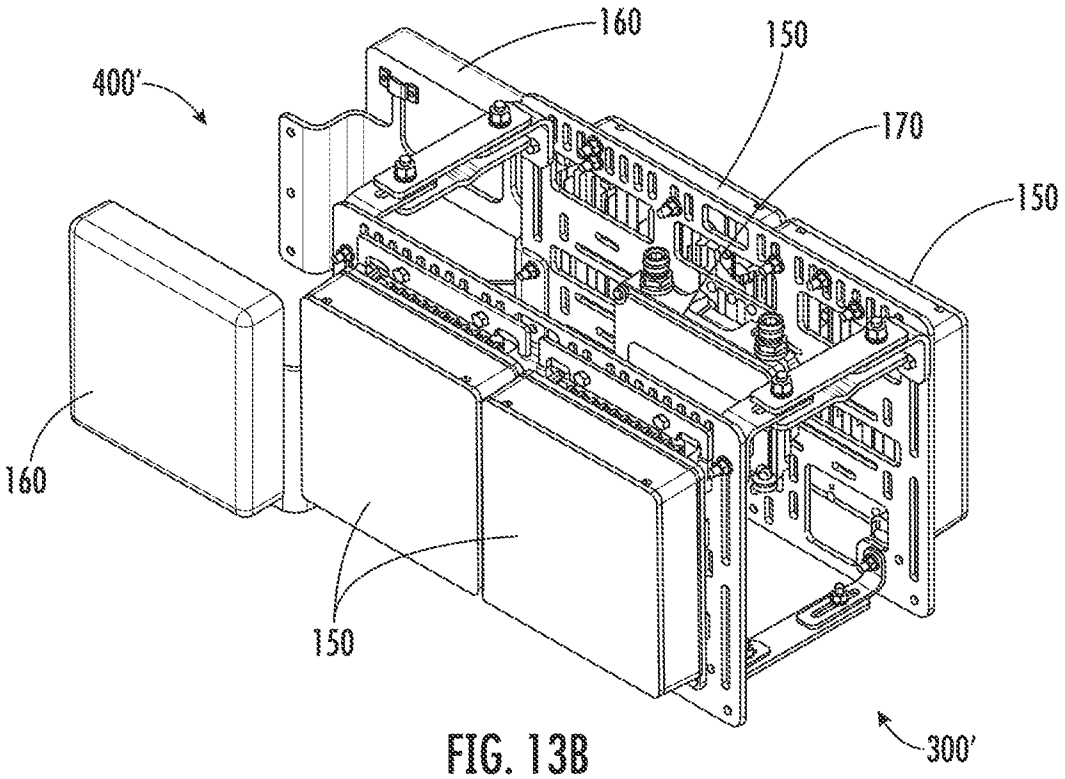


FIG. 13B

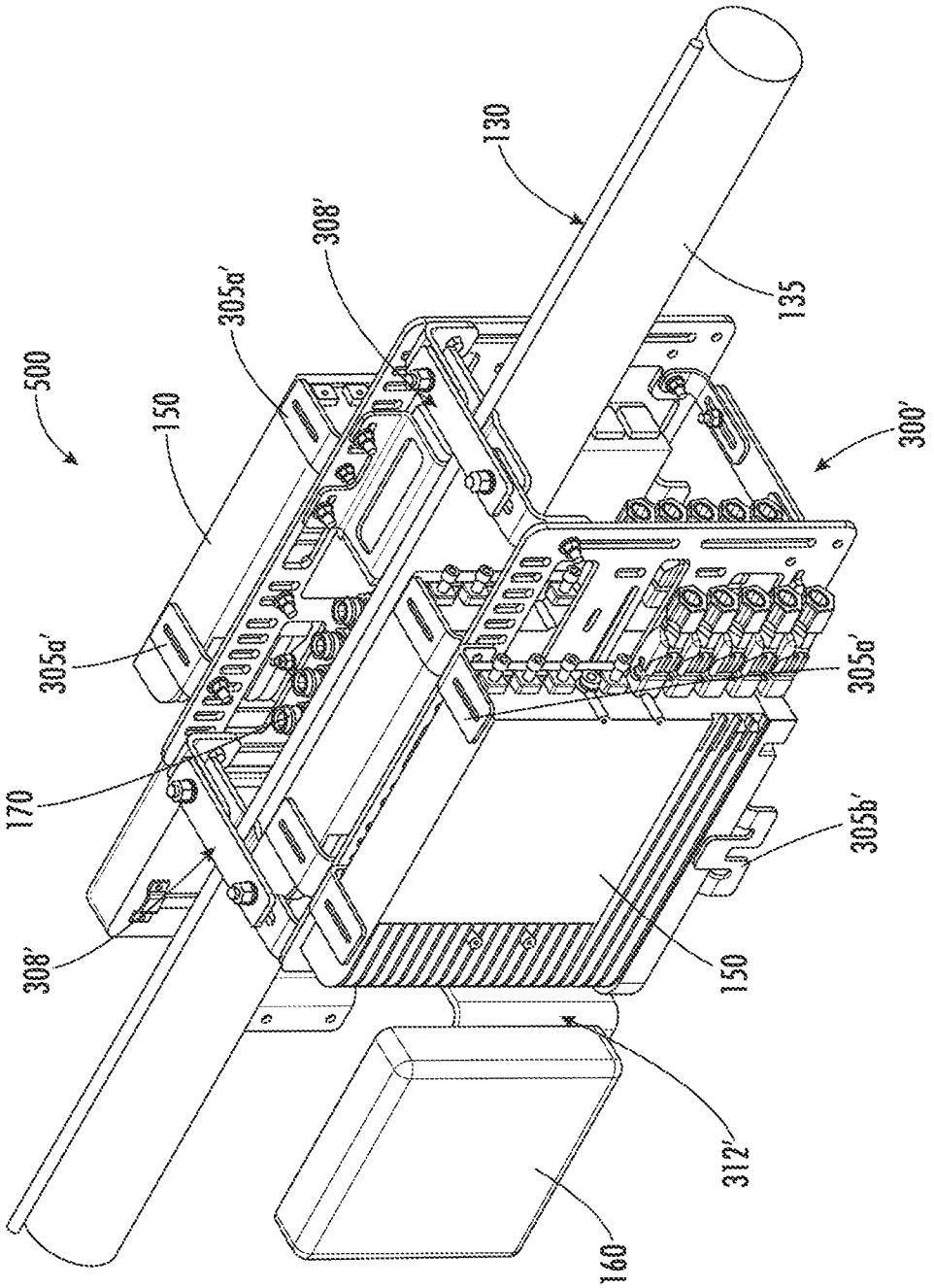


FIG. 14

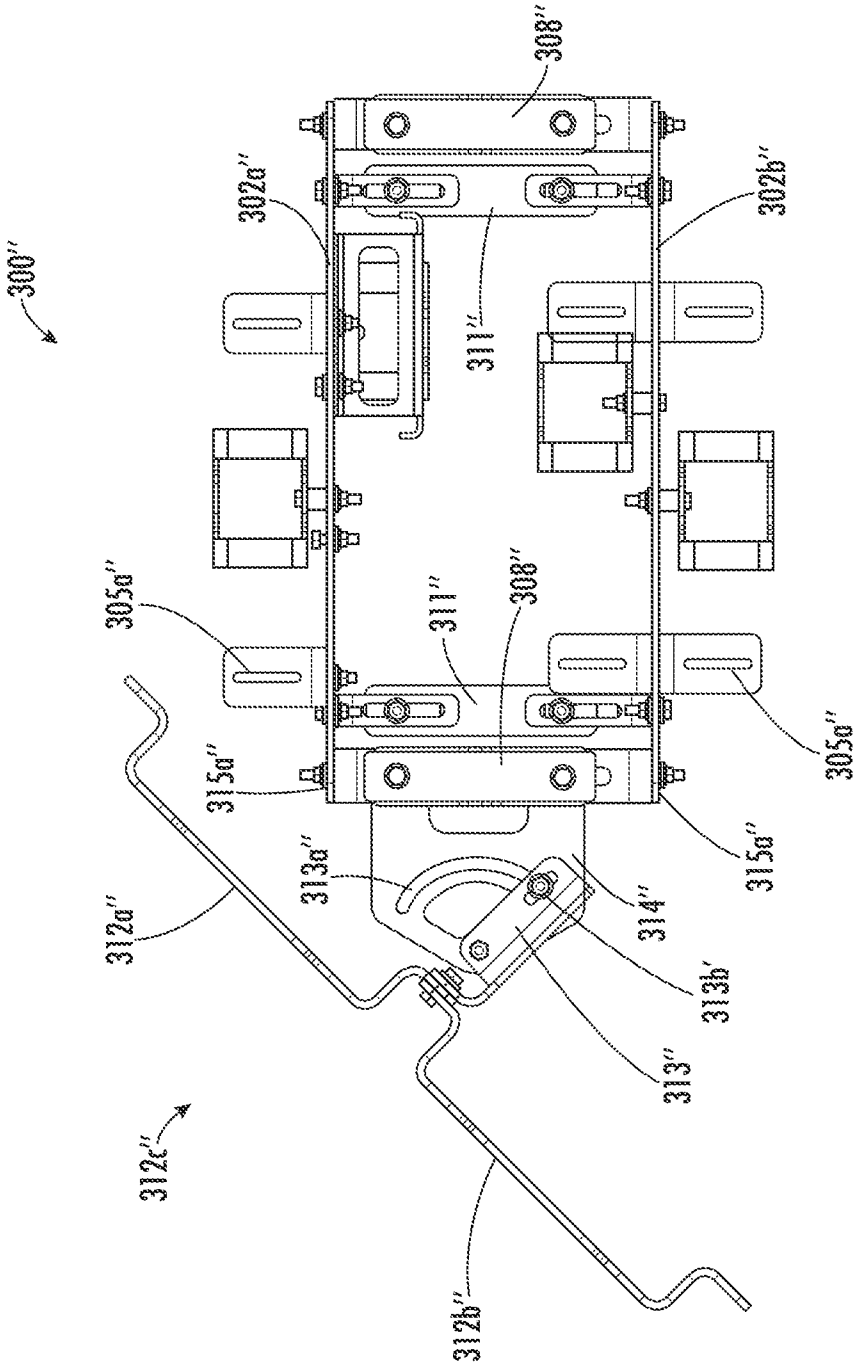

300''
308''
302a''
302b''
311''
305a''
311''
308''
315a''
305a''
315a''
313a''
314''
312a''
313b'
313''
312c''
312b''

FIG. 15A

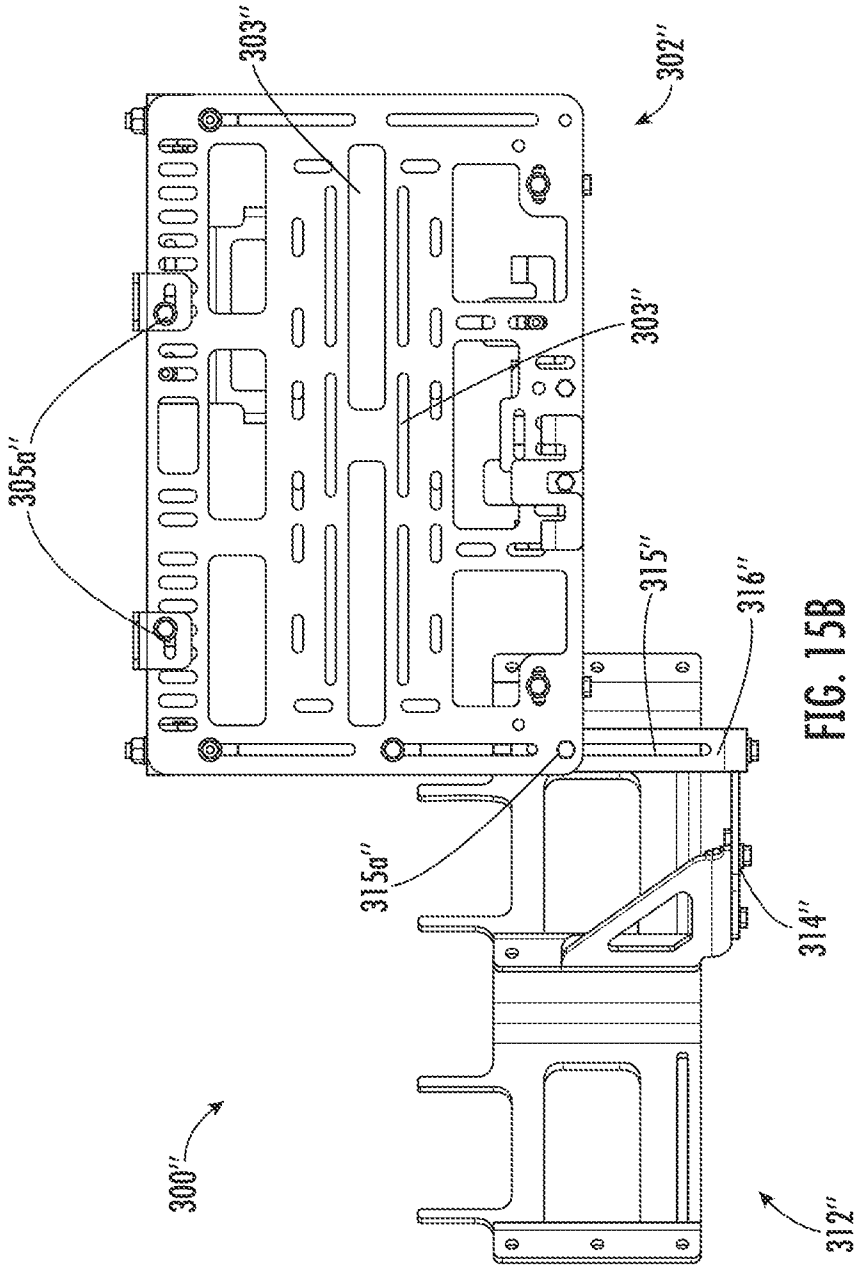


FIG. 15B

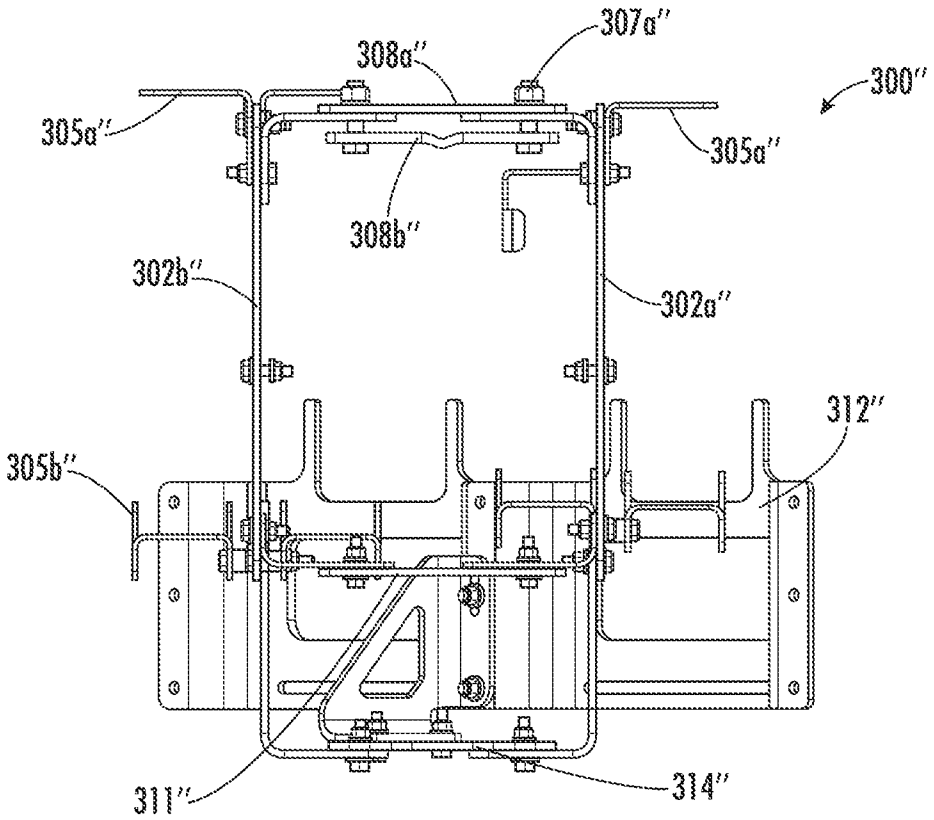


FIG. 15C

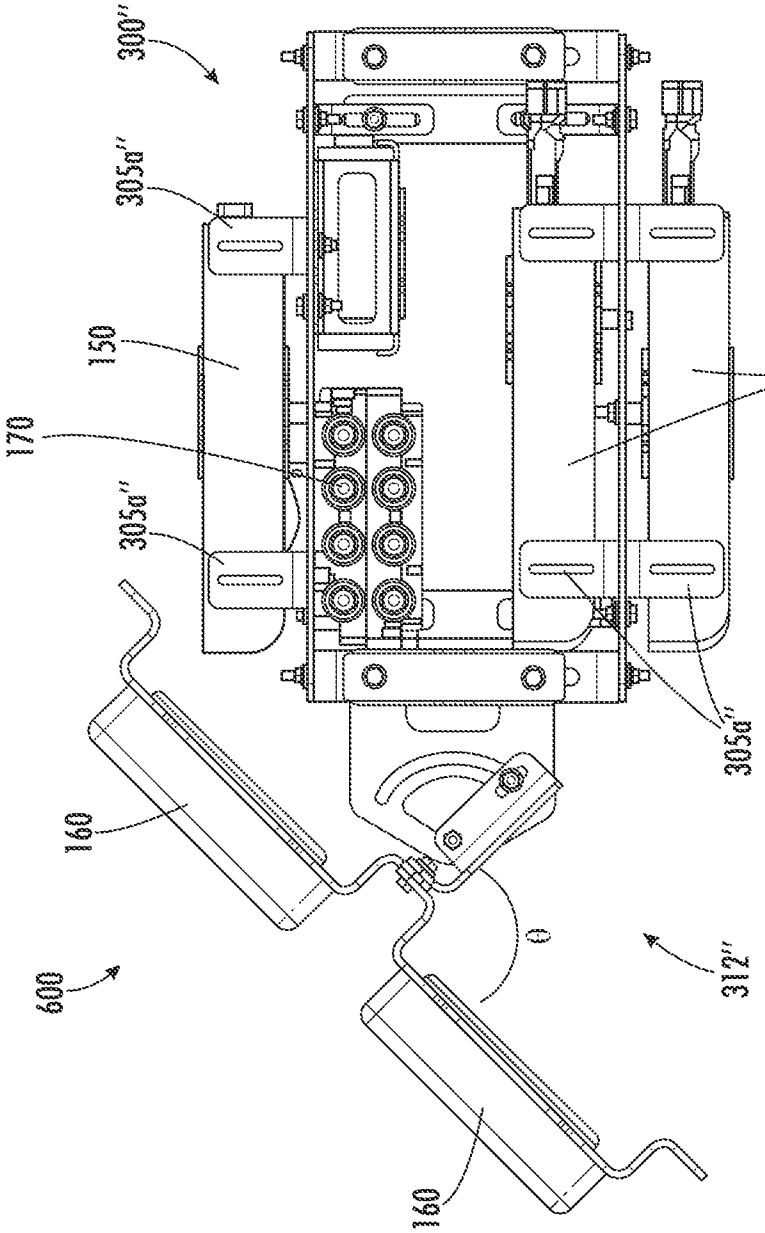


FIG. 16A

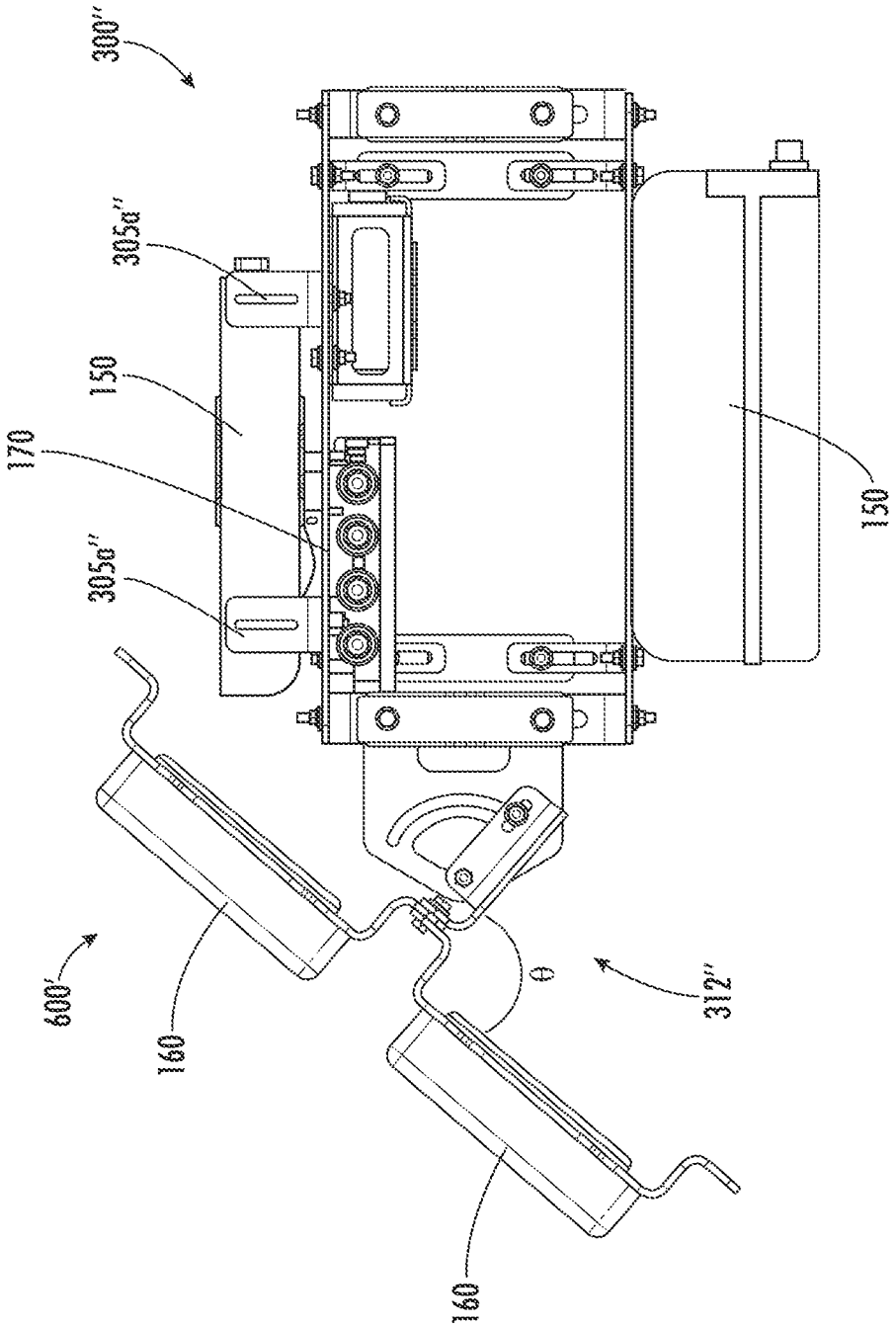


FIG. 16B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2021/012889

A. CLASSIFICATION OF SUBJECT MATTER

H04B 1/38(2006.01)i; **H04B 1/03**(2006.01)i; **H04B 1/08**(2006.01)i; **H02G 7/05**(2006.01)i; **H01Q 1/22**(2006.01)i

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)

H04B 1/38(2006.01); G02B 6/00(2006.01); G03B 37/04(2006.01); G08B 13/196(2006.01); H01Q 1/18(2006.01); H01Q 3/04(2006.01); H02B 1/04(2006.01); H04B 7/00(2006.01)

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: brackets, small cell radios, cable strand, pole, mounting

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009-0231828 A1 (RICHARD MADORE) 17 September 2009 (2009-09-17) Paragraphs [0017]-[0021]; claim 1; and figures 2-4	1-14,19-35,35(1),36-37
A		15-18
Y	WO 2018-226808 A1 (SECUREWATCH24, LLC) 13 December 2018 (2018-12-13) Paragraphs [0063], [0106], [0129]-[0131]; claim 1; and figures 2-4, 17, 24-27 Note : For the claim 35(1), the claim is renumbered by this authority because the claim 35 is found twice.	1-14,19-35,35(1),36-37
A	US 8687531 B2 (MARK JEFFREY SMITH) 01 April 2014 (2014-04-01) Column 3, line 34 – column 4, line 49; claim 1; and figure 1	1-35,35(1),36-37
A	US 2007-0237484 A1 (RANDY REAGAN et al.) 11 October 2007 (2007-10-11) Paragraphs [0037]-[0043]; claim 1; and figure 12	1-35,35(1),36-37

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 April 2021	**29 April 2021**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office **189 Cheongsa-ro, Seo-gu, Daejeon** **35208, Republic of Korea**	**YANG, JEONG ROK**
Facsimile No. **+82-42-481-8578**	Telephone No. **+82-42-481-5709**

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2021/012889

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 9705177 B1 (SPRINT COMMUNICATIONS COMPANY, L.P.) 11 July 2017 (2017-07-11) Column 3, line 29 – column 4, line 59; claim 1; and figures 1-3	1-35,35(1),36-37

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2021/012889

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
US 2009-0231828 A1	17 September 2009	None	
WO 2018-226808 A1	13 December 2018	US 2020-0099828 A1	26 March 2020
US 8687531 B2	01 April 2014	AU 2002-307218 A1	08 October 2002
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		CA 2485099 C	26 September 2017
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		EP 1910396 A2	16 April 2008
		US 2002-0182627 A1	05 December 2002
		US 2004-0146849 A1	29 July 2004
		US 2005-0009004 A1	13 January 2005
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		US 2013-0266490 A1	10 October 2013
		US 2016-0370345 A1	22 December 2016
		US 7162234 B1	09 January 2007
		US 7433343 B1	07 October 2008
		US 7433361 B1	07 October 2008
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		US 7968305 B2	28 June 2011
		US 8340064 B2	25 December 2012
		US 8687532 B1	01 April 2014
		US 9146221 B2	29 September 2015
		WO 02-077259 A2	03 October 2002
		WO 02-077259 A3	14 November 2002
		WO 03-093494 A2	13 November 2003
		WO 2003-093494 A3	05 February 2004
		WO 2005-007866 A2	27 January 2005
		WO 2005-007866 A3	14 June 2007
		WO 2005-098396 A2	20 October 2005
		WO 2005-098396 A3	09 October 2008
		WO 2006-033696 A2	30 March 2006
		WO 2006-033696 A3	21 December 2006
US 2007-0237484 A1	11 October 2007	BR PI0710576 A2	16 August 2011
		BR PI0710576 A8	02 January 2019
		BR PI0710576 B1	17 September 2019
		CN 101501546 A	05 August 2009

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2021/012889

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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