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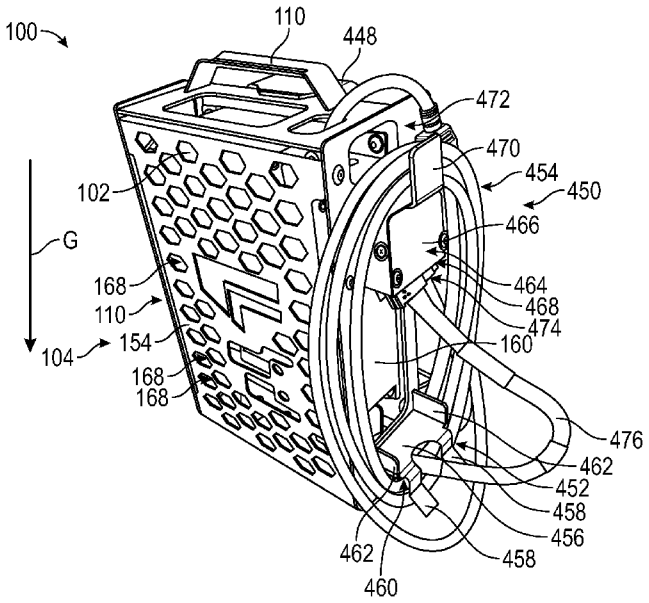

FIG. 11

(57) Abstract: A battery charger assembly can include a battery charger and a housing at least partially surrounding the battery charger. The housing can include a handle, a first latch arm, a second latch arm, a first multiple mounting brackets, and a first sidewall. The handle is arranged on a top side of the housing. The first plurality of mounting brackets extend from a bottom side of the housing. The first sidewall extends between the top side and the bottom side. The first sidewall defines a second plurality of mounting brackets. The first latch arm and the second latch arm are coupled to the first sidewall proximate the top side.

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BATTERY PACK CHARGER ASSEMBLY

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This application claims the benefit of and priority to U.S. Provisional Patent Application No. 63/502,386, filed on May 15, 2023, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] Electrified outdoor power equipment or chore products typically include an energy storage device (e.g., a battery) that is charged by connecting to a charger.

SUMMARY OF THE INVENTION

[0003] One embodiment relates to a battery charger assembly. The battery charger assembly includes a battery charger and a housing at least partially surrounding the battery charger. The housing includes a handle, a first latch arm, a second latch arm, a first multiple mounting brackets, and a first sidewall. The handle is arranged on a top side of the housing. The first plurality of mounting brackets extend from a bottom side of the housing. The first sidewall extends between the top side and the bottom side. The first sidewall defines a second plurality of mounting brackets. The first latch arm and the second latch arm are coupled to the first sidewall proximate the top side.

[0004] Another embodiment relates to a battery charger assembly. The battery charger assembly includes a battery charger and a housing supporting the battery charger. The housing includes a top side, a bottom side, a first pair of opposing sidewalls, a handle, a first multiple mounting brackets, a second multiple mounting brackets, and a pair of latch arms. The first pair of opposing sidewalls extend between the top side and the bottom side and a second pair of opposing sidewalls extending between the top side and the bottom side. The handle spans between the first pair of sidewalls or the second pair of sidewalls. The first multiple mounting brackets are proximate the bottom side and define a first mounting plane. The second multiple mounting brackets extend from one of the first pair of sidewalls, the second multiple mounting

brackets define a second mounting plane perpendicular to the first mounting plane. The pair of latch arms extend through the first mounting plane.

[0005] Another embodiment relates to a battery charger assembly for a chore product. The battery charger assembly includes a battery charger and a housing at least partially enclosing and supporting the battery charger. The housing includes a handle arranged on a top side of the housing, one or more latch arms, and a first plurality of mounting brackets extending from a bottom side of the housing. The one or more latch arms are configured to removably couple the battery charger to a mounting wall on the chore product to facilitate onboard charging. The first plurality of mounting brackets are configured to support the housing and the battery charger on a ground surface to facilitate offboard charging.

[0006] This summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the devices or processes described herein will become apparent in the detailed description set forth herein, taken in conjunction with the accompanying figures, wherein like reference numerals refer to like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The disclosure will become more fully understood from the following detailed description, taken in conjunction with the accompanying figures, in which:

[0008] FIG. 1 is a top, front, left perspective view of a battery charger assembly, according to some embodiments;

[0009] FIG. 2 is a top, front, left perspective view of the battery charger assembly of FIG. 1 mounted to a mounting wall of a frame;

[0010] FIG. 3 is a top, front, right perspective view of the battery charger assembly of FIG. 1 mounted to a mounting wall on a chore product;

[0011] FIG. 4 is a cross-sectional view of the battery charger assembly of FIG. 2 taken along line 4-4;

[0012] FIG. 5 is a top, front, right perspective view of the battery charger assembly of FIG. 1 mounted to a chore product;

[0013] FIG. 6 is a top, front, left perspective view of the battery charger assembly of FIG. 5;

[0014] FIG. 7 is a right side view of the battery charger assembly of FIG. 5;

[0015] FIG. 8 is a front view of the battery charger assembly of FIG. 5;

[0016] FIG. 9 is a top, front, right perspective view of the battery charger assembly of FIG. 5 showing an electrical conduit connected between the chore product and the battery charger assembly;

[0017] FIG. 10 is a top perspective view of the battery charger assembly of FIG. 9;

[0018] FIG. 11 is a top, front, left perspective view of the battery charger assembly, according to some embodiments;

[0019] FIG. 12 is a back left perspective view of the battery charger assembly of FIG. 11;

[0020] FIG. 13 is a top, front, right perspective view of the battery charger assembly of FIG. 11;

[0021] FIG. 14 is a front left perspective view of the battery charger assembly of FIG. 11;

[0022] FIG. 15 is a top, front, left perspective view of the battery charger assembly of FIG. 11 mounted to a chore product;

[0023] FIG. 16 is a cross-sectional view of the battery charger assembly of FIG. 15 taken along the line 16-16;

[0024] FIG. 17 is a top, front, left perspective view of the battery charger assembly of FIG. 11 mounted to a chore product;

[0025] FIG. 18 is a top, front, right perspective view of the battery charger assembly of FIG. 11 mounted to a chore product;

[0026] FIG. 19 is a top, front, left perspective view of the battery charger assembly of FIG. 11 mounted to a chore product;

[0027] FIG. 20 is a top, front, left perspective view of the battery charger assembly of FIG. 11 mounted to a chore product;

[0028] FIG. 21 is a front, left, top view of the battery charger assembly of FIG. 11 mounted to a chore product, according to some embodiments;

[0029] FIG. 22 is a top, front, left perspective view of the battery charger assembly, according to some embodiments; and

[0030] FIG. 23 is a top, front, left perspective view of a mounting location capable of suspending the battery charger assembly of FIG. 11.

DETAILED DESCRIPTION

[0031] Before turning to the figures, which illustrate the exemplary embodiments in detail, it should be understood that the present application is not limited to the details or methodology set forth in the description or illustrated in the figures. It should also be understood that the terminology is for the purpose of description only and should not be regarded as limiting.

[0032] The present disclosure is directed to battery-powered outdoor power equipment or chore products. A "chore product" as used herein refers to any type of equipment, machine, or vehicle that may be used to perform a chore (e.g., an outdoor chore, an indoor chore, lawn care, etc.). For example, a chore product may include a motor, a pump, an actuator, a compressor, and/or another device that is electrically-powered to operate some function of the chore product to facilitate performing a chore. In some embodiments, a chore is a task performed, either by a user or autonomously, at or near a household, a farm, an agricultural facility, a building, a sidewalk, a park, a parking lot, a forest, a field, and/or a lawn. In some embodiments, a chore product transports an operator and performs a chore. In some embodiments, a chore product autonomously operates to perform a chore without an operator being present on the chore product or physically/manually manipulating the chore product.

[0033] Referring now to FIGS. 1-23, a battery charger assembly (e.g., a transfer battery charger, a charger assembly, a recharger assembly, etc.), shown as battery charger assembly 100, is configured to electrically couple with one or more energy storage devices (e.g., batteries, capacitors, battery packs, battery cell arrays, capacitor arrays, etc.), according to some embodiments. The battery charger assembly 100 is configured to be mounted (e.g., attached, removably coupled, installed, placed) onto and/or into a mounting location (e.g., mounting area, charger dock, housing, etc.). For example, the battery charger assembly 100 may be mounted onto and/or into a mounting location associated with a piece of work equipment (e.g., a chore product, outdoor power equipment, etc.), a shop wall, a trailer wall, a vehicle wall, a battery pack transporter (e.g., a battery wagon, a battery cart, a battery carrier), and/or a charging station. In some embodiments, the battery charger assembly 100 is configured to provide electrical power to charge, maintain, top up, trickle charge, or otherwise transfer power to a battery pack that provides power to a chore product/outdoor power equipment, such as lawn mowers, riding tractors, snow throwers, fertilizer spreaders, salt spreaders, chemical spreaders, pressure washers, tillers, log splitters, zero-turn radius mowers, walk-behind mowers, wide area walk-behind mowers, riding mowers, stand-on mowers, pavement surface preparation devices, industrial vehicles such as forklifts, utility vehicles, commercial turf equipment such as blowers, vacuums, debris loaders, overseeders, power rakes, aerators, sod cutters, brush mowers, etc. In some embodiments, the battery charger assembly 100 is transferred between a first mounting location (e.g., a mounting wall associated with a piece of equipment), a second mounting location (e.g., a shop floor, etc.), and/or a third mounting location (e.g., a mounting wall associated with another piece of equipment, a workshop wall, a garage wall, etc.).

[0034] The battery charger assembly 100 can be removed by an operator from a mounting location without the use of tools, as described further herein. In this way, the operator may use a single charger to charge multiple energy storage devices at different locations and/or associated with different equipment by selectively transferring the battery charger assembly between a set of mounting locations corresponding to the pieces of equipment. In addition, the battery charger assembly 100 can be used on various types of equipment including indoor, outdoor, and portable jobsite equipment. Due to its uniformity across equipment, the battery

charger assembly 100 can also be used as part of a rental system, where rental companies who traditionally rent out pieces of equipment can also rent the battery charger assembly 100 to be used on such equipment. An operator can rent a battery charger assembly 100 to use on various types of equipment the operator may own and/or rent and then return the battery charger assembly 100 to be used by other operators on an as-needed basis. In some embodiments, the battery charger assembly 100 may charge one or more batteries associated with a piece of equipment (e.g., a chore product). For example, the battery charger assembly 100 may mount and electrically couple with a charge port (e.g., electrical coupler, electrical bus, charger quick connector, charger socket, charger plug, etc.) that may be in electrical communication with one or more battery packs of a chore product. In some embodiments, the battery charger assembly 100 may charge batteries in parallel, in series, or by cycling through individual or groups of multiple battery units sequentially (e.g., a charge order).

[0035] As shown in FIGS. 1-10, the battery charger assembly 100 includes a battery charger 102 (e.g., a battery recharger) and a housing (e.g., transfer case, enclosure, support structure, cage, etc.), shown as housing 104. The battery charger 102 may be a high-power battery charger (e.g., quick charger) or a low-power battery charger (e.g., a trickle charger, a battery maintainer, a charge manager, etc.). In some embodiments, the housing 104 at least partially surrounds and supports the battery charger 102. For example, the housing 104 may surround the battery charger 102 on one or more sides of the battery charger 102. For example, the housing 104 may surround the battery charger 102 on one side, two sides, three sides, four sides, five sides, or six sides of the battery charger 102. For example, the housing 104 may surround the battery charger 102 on the bottom side, front side, back side, left side, right side, and/or top side of the battery charger 102. In some embodiments, the housing 104 is made of a substantially rigid material (e.g., metal, metal alloy, etc.).

[0036] In some embodiments, the housing 104 includes a top portion 106 (e.g., top side) and a bottom portion 108 (e.g., a bottom side). In some embodiments, the top portion 106 is gravitationally higher than the bottom portion 108 when the battery charger assembly 100 is mounted to a mounting location. For example, arrow G illustrates the direction of a gravity vector in FIGS. 1, 2, and 4 and the top portion 106 is gravitationally higher than the bottom portion 108.

[0037] In some embodiments, the housing 104 includes one or more sidewalls 110. The sidewalls 110 may extend between the top portion 106 and the bottom portion 108. In some embodiments, the sidewalls 110 are formed by a continuous piece of material that extends around the perimeter of the bottom portion 108. In some embodiments, the sidewalls 110 comprise a plurality of individual sidewalls, each extending between the top portion 106 and the bottom portion 108. In some embodiments, the bottom portion 108 and the sidewalls 110 define an internal volume and at least a portion of the battery charger 102 is secured within the internal volume.

[0038] In some embodiments, the housing 104 includes a handle 112. The handle 112 may enable a user to grasp, hold, carry, etc., the battery charger assembly 100. In some embodiments, the handle 112 is arranged on the top portion 106. In some embodiments, the handle 112 spans across (e.g., bridges, extends, etc.) the top portion 106 and/or is gravitationally higher than (e.g., above) the sidewall 110, bottom portion 108, and/or battery charger 102.

[0039] In some embodiments, the housing 104 includes a latch arm 114 (e.g., hang arm, suspension arm, cantilever member, mounting arm, latch member, etc.). In some embodiments, the latch arm 114 is coupled to one of the sidewalls 110. In some embodiments, the latch arm 114 is fixedly coupled to (e.g., welded, glued, etc.) one of the sidewalls 110 or integrally formed with one of the sidewalls 110. In some embodiments, the latch arm 114 is coupled to the housing 104 in a cantilever arrangement. In some embodiments, the housing 104 includes one or more latch arms 114, shown as a first latch arm 114A and a second latch arm 114B. The first latch arm 114A is designed to include similar properties and features as the second latch arm 114B. As such, the description of the first latch arm 114A herein also applies to the second latch arm 114B.

[0040] In some embodiments, the first latch arm 114A may extend between a first end 116 and a second end 118 (e.g., terminal end or distal end) of the first latch arm 114A. The first end 116 may be coupled to one of the sidewalls 110. In some embodiments, the first latch arm 114A and the second latch arm 114B are coupled to the housing 104 near (e.g., proximate) the top portion 106 of the housing 104.

[0041] The first latch arm 114A includes a top edge 120 (e.g., upper edge) extending along an upper portion 122 (e.g., top portion) and a bottom edge 124 (e.g., lower edge) extending along a bottom portion 126 (e.g., lower portion). The bottom portion 126 includes a notch 128 (e.g., pocket, indentation, hook, catch, etc.). In some embodiments, the notch 128 is rectangular, triangular, u-shaped, v-shaped, or combinations thereof. In some embodiments, the bottom portion 126 of the first latch arm 114A includes multiple edges (e.g., two edges) and a bottom surface that spans between the bottom edges. For example, the intersection between the side surfaces of the first latch arm 114A and a bottom surface may define the bottom edge 124. In the illustrated embodiment, the notch 128 protrudes inwardly into the bottom edge 124.

[0042] In some embodiments, the housing 104 includes a first plurality of mounting brackets 130 (e.g., mounting feet, mounting legs, bumper feet, support feet, etc.). In some embodiments, the mounting brackets 130 extend from the bottom portion 108 of the housing 104. For example, the mounting brackets 130 may extend between a first end 132 and a second end 134, and the first ends 132 may be coupled to the bottom portion 108 of the housing 104. In some embodiments, the second end 134 is gravitationally lower than the first end 132 of the mounting bracket 130. In some embodiments, each of the mounting brackets 130 is coupled (e.g., mounted, welded, fastened, press fit, threaded into, threaded onto, etc.) to the housing 104 or formed with the housing 104 (e.g., as a unitary body). In some embodiments, the second end 134 of each of the mounting brackets 130 includes a bumper 136 (e.g., elastomeric member, rubber bumper, etc.) coupled thereto.

[0043] In some embodiments, the mounting brackets 130 define a first mounting plane 138 (see, e.g., FIG. 4). For example, the second ends 134 of the mounting brackets 130 may define and be arranged along the first mounting plane 138. In some embodiments, the first mounting plane 138 is substantially parallel to a bottom surface of the bottom portion 108 of the housing 104. In some embodiments, the mounting brackets 130 are configured to support the housing 104 on a ground surface when the housing 104 is decoupled from a mounting wall (see, e.g., FIG. 1).

[0044] In some embodiments, the housing 104 includes a second plurality of mounting brackets 140 (e.g., mounting arms, bumper arms, support arms, etc.). In some embodiments,

the mounting brackets 140 extend from one of the sidewalls 110 of the housing 104. For example, the mounting brackets 140 may extend between a first end 142 and a second end 144, and the first ends 142 may be coupled to the housing 104. For example, the first end 142 of each of the mounting brackets 140 may be coupled to one of the sidewalls 110. In some embodiments, the second end 144 of each of the mounting brackets 140 includes a bumper 146 (e.g., elastomeric member, rubber bumper, etc.) coupled thereto.

[0045] In some embodiments, the mounting brackets 140 define a second mounting plane 148 (see, e.g., FIG. 4). For example, the second ends 144 of the mounting brackets 140 may define and be arranged along the second mounting plane 148. The second mounting plane 148 is arranged perpendicular to the first mounting plane 138. In some embodiments, the second mounting plane 148 is perpendicular to a mounting surface 202. In some embodiments, the second mounting plane 148 is perpendicular to a bottom surface of the bottom portion 108 of the housing 104. In some embodiments, the second mounting plane 148 is parallel to at least a portion of one of the sidewalls 110.

[0046] The first latch arm 114A and the second latch arm 114B may extend through (e.g., intersect, pass through, etc.) the second mounting plane 148. For example, the distance between the first end 116 and the second end 118 of the latch arms 114 may be greater than the distance between the first end 142 and the second end 144 of the mounting brackets 140. In some embodiments, the latch arms 114 and mounting brackets 140 may extend away from the housing 104 in a same or similar direction, and the latch arms 114 may extend away from the housing 104 a greater distance than the mounting brackets 140. For example, the latch arms 114 may protrude from one of the sidewalls 110 a greater distance than the mounting brackets 140.

[0047] As shown in FIGS. 2-4, the battery charger assembly 100 is configured to engage a mounting location (e.g., mounting area, dock, etc.), shown as a mounting wall 200. In some embodiments, the mounting wall 200 defines a mounting surface 202. The mounting surface 202 may be substantially planar. In some embodiments, the mounting surface 202 is substantially planar over one or more portions of the mounting surface 202. For example, the mounting surface 202 may be substantially planar over a collective of two, three, four, or more

areas of the mounting surface 202 corresponding to the location of the mounting brackets 140 and/or the bumpers 146. In some embodiments, each of the mounting brackets 140 and/or bumpers 146 simultaneously, concurrently, or synchronously contact the mounting surface 202 when the housing 104 is mounted to the mounting wall 200.

[0048] In some embodiments, the mounting wall 200 is associated with, defined on, coupled to, built into, etc., a chore product (e.g., a machine, a vehicle, outdoor power equipment, indoor power equipment, a lawn care vehicle or device, a lawn mower, etc.), shown as chore product 300. In some embodiments, the mounting wall 200 is incorporated into a frame or body of chore product 300 (see, e.g., FIGS. 2-3). In some embodiments, the chore product 300 is configured as an electrified chore product (see, e.g., FIGS. 5-10). In some embodiments, the chore product 300 is an all-electric chore product (i.e., does not include an internal combustion engine). In some embodiments, the chore product 300 is a hybrid electric chore product (i.e., includes two modes of mechanical power generation). For example, the chore product 300 may include one or more of an internal combustion engine, a hydrogen fueled engine, and/or an electric motor. In some embodiments, the chore product 300 is configured as a zero turn radius ("ZTR") mower. In some embodiments, the chore product 300 is configured as a stand-on mower. In some embodiments, the chore product 300 is configured as a ride-on or riding mower (e.g., a lawn tractor mower, a non-ZTR ride-on or riding mower, etc.). In some embodiments, the chore product 300 is configured as a walk-behind mower. In some embodiments, the chore product 300 is an electrified or fully electric piece of equipment. In some embodiments, the chore product 300 includes one or more energy storage devices (e.g., capacitors, capacitor banks, battery cells, battery arrays, battery packs, etc.), shown as battery 302 (see, e.g., FIG. 8), configured to store electrical energy and provide electrical power to one or more electrically-powered device(s) 304. For example, electrically-powered devices 304 may be or include a traction motor (e.g., electric traction motor, electric motor for powering a rotation of one or more tractive wheels), a wheel motor (e.g., electric wheel motor), a hub motor (e.g., electric hub motor), an implement motor, a brushless motor, an alternating current motor, a direct current motor, a single phase motor, a multi-phase motor, a single pole motor, a multi-pole motor, a mower blade motor, a sensor, a speaker system, a lighting system, an air handling unit, a seat adjustment motor, a steering assist system, etc.

[0049] In some embodiments, the mounting wall 200 includes one or more aperture 204 (e.g., mounting apertures, cutouts, slots, channels, grooves, pockets, through holes, blind holes, etc.), each being configured to receive at least a portion of one of the latch arms 114. For example, the apertures 204 may accommodate the length of the latch arms 114 extending past the second mounting plane 148. For example, the second end 118 of the latch arms 114 may pass through or be received by the apertures 204. In some embodiments, the notch 128 is configured to engage a mounting edge 206 (e.g., catch, retainer, protrusion, etc.) of the mounting wall 200. In some embodiments, the notch 128 is configured to engage a mounting edge 206 (e.g., catch, retainer, protrusion, etc.) of the mounting wall 200 when the second end 118 of the latch arms 114 is received within the apertures 204. For example, the mounting wall 200 may receive a portion of the latch arms 114 and the latch arms 114 may receive a portion of the mounting wall 200 when the battery charger assembly 100 is mounted to the mounting wall 200.

[0050] In some embodiments, the notch 128 engages the mounting wall 200 and pivotally couples the latch arms 114 to the mounting edge 206. For example, the notch 128 may engage the mounting edge 206 to constrain movement of the latch arms 114 within the apertures 204 such that the latch arms 114 and the housing 104 can pivot about a pivot axis defined at the interface(s) between the notch 128 and the mounting edge 206. In some embodiments, the latch arms 114 are coupled near the top portion 106 of the housing 104 and are configured to suspend the battery charger 102 and the housing 104 from the mounting wall 200. For example, the latch arms 114 may suspend (e.g., hang) the battery charger 102 and the housing 104 on the mounting wall 200.

[0051] With continued reference to FIGS. 1-4, each of the sidewalls 110 includes an exterior surface 150 (e.g., external surface) and a sidewall interior surface 152. In some embodiments, one or more sidewalls 110 include a front sidewall 154, a back sidewall 156, a right sidewall 158, and a left sidewall 160. In some embodiments, the front sidewall 154, the back sidewall 156, the right sidewall 158, and the left sidewall 160 may span between the top portion 106 and bottom portion 108 along some or all of the length of the perimeter of the bottom portion 108. In some embodiments, the front sidewall 154, the back sidewall 156, the right sidewall 158, and the left sidewall 160 collectively define a volume 162 (e.g., an interior volume)

between the top portion 106 and the bottom portion 108. In some embodiments, the battery charger 102 is at least partially disposed within the volume 162.

[0052] In some embodiments, the front sidewall 154 opposes the back sidewall 156 and the right sidewall 158 opposes the left sidewall 160. For example, the front sidewall 154 may be on a first side of the volume 162 that is opposite the back sidewall 156, and the left sidewall 160 may be on a second side of the volume 162 that is opposite the right sidewall 158. In some embodiments, the front sidewall 154 and/or the back sidewall 156 are coupled with the right sidewall 158 and/or the left sidewall 160.

[0053] In some embodiments, one or more of the front sidewall 154, the back sidewall 156, the right sidewall 158, or the left sidewall 160 have one or more apertures (e.g., cutouts, holes, voids, gaps, though holes, etc.). In some embodiments, the right sidewall 158 includes an aperture 164, and the aperture 164 is configured to receive at least a portion of one or more electrical conduits 166 (e.g., wires, electrical couplers, electricity conductors, electrical cord, etc.,) operatively coupled with the battery charger 102. For example, at least a portion of a length of one or more electrical conduits 166 electrically coupled to the inlet portion of the battery charger 102 may be disposed within the aperture 164.

[0054] In some embodiments, the front sidewall 154 may include aperture(s) 168. In some embodiments, the one or more apertures 168 may facilitate access to, placement of, interaction with, etc. a user interface 170. The user interface 170 may be operatively coupled to or native to the battery charger 102. For example, the user interface 170 may be a user interface on a surface of the battery charger 102 housed within the housing 104. The apertures 168 may permit or accommodate a line of sight to the user interface 170, an audio transmission, a message (e.g., a control message, a command) transmission, message reception, a touch input, an audio input, a visual input, etc.

[0055] In some embodiments, the left sidewall 160 includes aperture(s) 172. In some embodiments, the apertures 172 have one or more of the features and functions of the aperture 164 and/or the apertures 168. In some embodiments, the apertures 172 are configured to receive at least a portion of electrical conduit(s) 174 (e.g., wires, electrical couplers, electricity conductors, electrical cord, etc.) operatively coupled with the battery charger 102. For

example, at least a portion of a length of one or more electrical conduits 166 electrically coupled to an inlet portion of the battery charger 102 may be disposed within the aperture 164.

[0056] In some embodiments, the battery charger 102 includes an electrical inlet portion configured to receive an alternating current via the one or more electrical conduits 166. In some embodiments, the battery charger 102 is configured to transform the alternating current into a direct current. In some embodiments, the battery charger 102 includes an electrical outlet portion configured to supply direct current via the one or more electrical conduits 174 based on alternating current received via the one or more electrical conduits 166. In some embodiments, the aperture 164 (e.g., a conduit cutout, a cutout, etc.) of the right sidewall 158 and apertures 172 (e.g., conduit cutout) of the left sidewall 160 are configured to accommodate at least one of the electrical inlet portion or the electrical outlet portion of the battery charger 102.

[0057] In the illustrated embodiment, the mounting brackets 140 include a first upper mounting bracket 140A and a second upper mounting bracket 140B. In some embodiments, the first upper mounting bracket 140A is laterally spaced from the second upper mounting bracket 140B. For example, the first upper mounting bracket 140A and the second upper mounting bracket 140B may define a gap 176 (e.g., space, volume, etc.) therebetween (see, e.g., FIG. 10). In some embodiments, the first latch arm 114A and the second latch arm 114B are within the gap 176. In the illustrated embodiment, the first upper mounting bracket 140A and the second upper mounting bracket 140B extend in a direction D1 (e.g., a direction perpendicular to the second mounting plane 148) a distance that is less than a distance that the latch arms 114 extend along the direction D1.

[0058] In some embodiments, the handle 112 spans between the right sidewall 158 and the left sidewall 160 above the battery charger 102 and is coupled to the right sidewall 158 and the left sidewall 160. In some embodiments, the front sidewall 154 is coupled to the right sidewall 158 and the left sidewall 160 by fasteners 177. The fasteners 177 may be in the form of a screw, nut, bolt, rivet, threaded body, latch, hook and loop, magnets, etc. In some embodiments, the front sidewall 154 is removed by unfastening the fasteners 177, which provides access to the volume 162. In some embodiments, the battery charger 102 is selectively remove from the

housing 104 to facilitate maintenance, removal, replacement, and/or installation, of battery charger 102 within the volume 162.

[0059] In some embodiments, the peripheral edge (e.g., outer edges, side edges, etc.) of the back sidewall 156 includes one or more tabs 178. In some embodiments, the right sidewall 158 and/or the left sidewall 160 include a plurality of slots 180. In some embodiments, the slots 180 are configured to receive the tabs 178 to couple the back sidewall 156 to the right sidewall 158 and/or the left sidewall 160.

[0060] In some embodiments, the housing 104 includes retaining arms 182 arranged on an opposite side of the housing 104 than the mounting brackets 140 or the latch arms 114. In some embodiments, the retaining arms 182 extend outwardly and upwardly relative to one of the sidewalls 110 (e.g., the front sidewall 154). In some embodiments, the retaining arms 182 (e.g., cord wrap arms, hooks, etc.) facilitate hanging or wrapping an electrical conduit (e.g., electrical conduit 166). For example, the retaining arms 182 may define a wrap path 184 (see, e.g., FIG. 1) that starts at the aperture 164 and extends around the exterior surface 150 of the right sidewall 158, the bottom portion 108, the left sidewall 160, and the top portion 106. In some embodiments, the cord wrap path 184 extends around the exterior surface 150 (e.g., outer surface, outside surface, external surface, etc.) of the bottom portion 108 within a space 186 defined between two of the mounting brackets 130. In some embodiments, the cord wrap path 184 extends around the top portion 106 in a space 188 defined between the retaining arms 182, the top edge of the right sidewall 158, the top edge of the left sidewall 160, and the handle 112.

[0061] In some embodiments, the mounting wall 200 or the chore product 300 includes an electrical coupler 190 (e.g., socket, plug, quick connector, etc.) configured to couple a terminal end of the electrical conduit 174 (e.g., a terminal end having a corresponding coupler) to the mounting wall 200 and thereby electrically connect the outlet portion of the battery charger 102 to one or more energy storage devices (e.g., battery 302) associated with the mounting wall 200 (see, e.g., FIGS. 5-10). In some embodiments, the mounting wall 200 or the chore product 300 includes one or more electrical couplers 190, and some of the multiple electrical couplers 190 may receive power from the battery charger 102, and some of the multiple electrical couplers 190 may output power at least partially based on the battery charger 102. For example,

a first electrical coupler 190A may couple the battery charger 102 to the battery 302, and a second electrical coupler 190B may couple the battery 302 and/or the battery charger 102 to a bus (e.g., bus bar, electrical node, etc.) such that power from the battery 302 and/or the battery charger 102 supply power to the second electrical coupler 190B and any devices electrically coupled to the second electrical coupler 190B. That is, the second electrical coupler 190B may act as an electrical outlet or power supply on the chore product 300 to power other equipment such as a string trimmer, debris blower (e.g., leaf blower), edger, trimmer, aerator, horticultural instrument, etc.

[0062] In some embodiments, the second electrical coupler 190B may act as a communication connector for the battery 302. That is, the second electrical coupler 190B may be coupled to the battery 302 and a busbar, and power delivered by the battery charger 102 may pass from the second electrical coupler 190B to the battery 302 (e.g., via an electrical conduit having an electrical connector at an end(s) thereof), and/or the busbar. The electrical coupler 190B may be controlled by a charge controller having a logic that selectively permits the battery charger 102 to supply a charge power to the battery 302 and also selectively permits the battery 302 to power an accessory coupled to the electrical coupler 190B based on, for example, detecting whether the battery charger 102 is coupled to the second electrical coupler 190B. In some embodiments, the electrical couplers 190 are coupled to the battery 302 via an electrical connector such as a ring and a corresponding stud of the battery 302.

[0063] In some embodiments, the mounting location 200 includes a protective member (e.g., rubber pad, an elastomeric surface coating, a scratch plate, a shield, etc.) to protect the interfaces between the battery charger assembly 100 and the mounting location 200. For example, the protective member may be situated between some or all of the contact areas defined on the mounting location 200 and the mounting brackets 140. The protective member may protect surface finishes (e.g., paint, anodizing, etc.) and prevent formation of signs of wear (e.g., scratches, dents, gouges, etc.) at the interfaces of the battery charger assembly 100 and the mounting location 200 during operation of the chore product 300.

[0064] In some embodiments, the mounting wall 200 is, forms part of, or is coupled to a chassis or frame of the chore product 300. In this way, the weight of the battery charger assembly 100

may be supported by the chassis or frame of the chore product 300. Advantageously, the battery charger assembly 100 secures the battery charger 102 either in in a ground position where the housing 104 supports the battery charger 102 on a ground floor via the mounting brackets 130 or a suspended position where the housing 104 suspends the battery charger 102 from a mounting wall (e.g., on a chore product, a shop wall, a trailer, etc.). In the ground position, the housing 104 elevates the battery charger 102 above the surface of the ground floor, which protects the battery charger 102 from oil, debris, or contaminates. In the suspended position, the battery charger 102 is also elevated above a surface of a ground floor, for example, on which a chore product travels. As such, the battery charger assembly 100 enables both onboard and offboard charging, while providing protection to the battery charger 102 and enabling easy transport/installation of the battery charger 102 via the features of the housing 104 (e.g., the handle 112, the latch arms 114, the mounting brackets 130, the mounting brackets 140, etc.).

[0065] As shown in FIGS. 12 and 16, the battery charger 100 includes a heat sink assembly 400 (e.g., a thermal energy dissipation system, a cooling system, etc.), according to some embodiments. The heat sink assembly 400 may include a heat sink body 402 having one or more fins, ribs, pins, poles, etc., that increase the total surface area and thermal capacitance of the heat sink body 402. In some embodiments, the heat sink assembly 400 includes one or more fans 404 configured to induce a flow of ambient fluid (e.g., air) across surfaces of the heat sink assembly 400. For example, the fan 404 may facilitate forced convection. In some embodiments, the heat sink assembly 400 is passively cooled (e.g., via natural convection, via forced convection due to travel of the chore product 300) until a condition is met (e.g., a threshold temperature is achieved and detected by a temperature sensor in communication with a processing circuit operating a control logic), and subsequently fans 404 may be powered to direct a flow of air across the surfaces of the heat sink body 402.

[0066] In some embodiments, the heat sink body 402 is a unitary body. In some embodiments, the heat sink body 402 defines a fin axis 406. One or more fins 408 may extend radially away from the fin axis 406. In some embodiments, fins 408 span from a fin first end 410 to a fin second end 412. The junction between the fin first ends 410 of the fins 408 may be at or near the center of the heat sink body 402. In some embodiments, the fins 408 are interspaced by

secondary fins 414. The secondary fins 414 may extend radially away from the fin axis 406 between a secondary fin first end 416 and a secondary fin second end 418. In some embodiments, a distance between the secondary fin first end 416 and the fin axis 406 is greater than a distance between the fin first end 410 and the fin axis 406. In some embodiments, the fan 404 is configured to rotate one or more fan blades about a fan axis 420. In some embodiments, the heat sink body 402 includes posts 422 that span between the fins 408 and a fan plate 424. The fan plate 424 may include one or more cutouts (e.g., holes, etc.). In some embodiments, the fan 404 is coupled to the fan plate 424. The fan plate 424 may be coupled to the posts 422. The fan axis 420 may be collinear with the fin axis 406. That is, the fan axis 420 may align with the fin axis 406. The fan 404 may draw or blow air in the direction of the fan axis 420 which may force air to flow between the fin first end 410 and the fin second end 412.

[0067] The heat sink body 402 may be coupled to the back sidewall 156. For example, the heat sink body 402 may be coupled to the back sidewall 156 via one or more of thermal adhesive, thermal tape, welding, fusion, fasteners, etc., that couple the heat sink body 402 with the back sidewall 156 and facilitate, promote, encourage, etc., conductive heat transfer between the back sidewall 156 and the heat sink body 402. In some embodiments, the heat sink body 402 has an overall rectangular or square shape. The footprint of the heat sink body 402 may span some or all of the width and/or height of the back sidewall 156.

[0068] As shown in FIGS. 11-20, the latch arms 114A, 114B are coupled to the top edge of the back sidewall 156, according to some embodiments. In some embodiments, the second end 118 includes a notch 128. In some embodiments, the heat sink body 402 is situated between the back sidewall 156 and the notch 128. For example, the first end 116 may span in a first direction above the heat sink body 402, then along a transition portion, then in a direction parallel and offset from the first direction. In other words, the latch arms 114 may step down from the first end 116 to the second end 118. The first end 116 and second end 118 of the latch arms 114 may extend in a parallel direction.

[0069] In some embodiments, the latch arm 114A is coupled to the latch arm 114B via a bridge 428. The bridge 428 may span between the latch arm 114A and the latch arm 114B. The

bridge 428 may be perpendicular to the latch arm 114A and the latch arm 114B and/or the back sidewall 156.

[0070] As shown in FIGS. 15-17, the mounting edges 206 are at the bottom of the apertures 204. That is, the second ends 118 may pass through the apertures 204 and the notches 128 may engage (e.g., latch onto) the mounting edges 206 at the bottom of the apertures 204.

[0071] As shown in FIGS. 11, 15, and 16 the handle 112 may be coupled to a top plate 430. The top plate 430 may be coupled to the sidewalls 110. For example, the top plate 430 may be welded between the right sidewall 158 and the left sidewall 160. The top plate 430 may include one or more apertures 432. The top apertures 432 may accommodate one or more electrical conduits (e.g., wires, cords, cordsets, etc.) such that the electrical conduits may be coupled to the battery charger 102 at one end and pass through the top plate 430 and terminate at a second end being external to the internal volume of the housing 104.

[0072] As shown in FIGS. 11 and 12, the battery charger 100 may include a cord dock 450 (e.g., an electrical coupler hub, an electrical conduit retainer, an electrical conduit manager, etc.). The cord dock 450 may include a wrap fork 452 and a wrap dock 454. The wrap fork 452 may include a fork base 456. The fork base 456 may extend away from the sidewall 110. The wrap fork 452 may include tines 458 that extend away from the fork base 456. The tines 458 may extend perpendicularly to the fork base 456 at a first end and then at an oblique angle (e.g., 45 degrees) relative to the first end at a second end. The surfaces and space defined between the fork base 456, tines 458, and left sidewall 160 may define a fork wrap track 460. In some embodiments, the fork base 456 includes flanges 462 which extend away from the fork wrap track 460. The flanges 462 may be coupled to the sidewall 110 and stabilize the fork base 456. The junction between the flanges 462 and the fork base 456 may provide a soft edge (e.g., rounded edge, a non-sharp edge), which prevents the material of the fork base 456 from shearing into (e.g., cutting into) an electrical conduit when the electrical conduit is raced around (e.g., wrapped around) the fork wrap track 460.

[0073] In some embodiments, a first electrical conduit may extend from the battery charger 102 within the internal volume of the housing 104, through the sidewall 110, through the fork wrap track 460 and between the tines 458. A different electrical conduit may be raced around

the fork wrap track 460 which may trap the first electrical conduit against the fork base 456 and between the tines 458.

[0074] In some embodiments, the wrap dock 454 may include a receptacle 464. The receptacle 464 may include receptacle sidewalls 466 that define a receptacle volume therebetween. In some embodiments, the receptacle sidewalls 466 and/or sidewall 110 may enclose the receptacle volume on five sides. For example, the receptacle 464 may include a receptacle opening 468 (e.g., port, hole, etc.). The receptacle opening 468 may face the wrap fork 452. The receptacle opening 468 may be coupled to the sidewall 110 near the top portion 106 of the housing 104, and the wrap fork 452 may be coupled to the sidewall 110 near the bottom portion 108 of the housing 104. The wrap dock 454 may include a wrap tab 470. The wrap tab 470 may be parallel to the sidewall 110. The space between the sidewall 110, receptacle sidewalls 466 and wrap tab 470 may define a dock wrap track 472. The fork base 456 may be parallel to a top panel of the receptacle sidewall 466. The dock wrap track 472 may open toward the top portion 106 of the housing 104 and the fork wrap track 460 may open toward the bottom portion 108 of the housing. The dock wrap track 472 may open in a first direction and the fork wrap track 460 may open in a direction opposite the first direction.

[0075] The receptacle 464 may receive (e.g., enclose, house, dock, etc.,) an electrical coupler 474 of an electrical conduit 476. For example, the electrical conduit 476 may extend from the battery charger 102 within the internal volume of the housing 104, through the fork wrap track 460, between the tines 458, and terminate at the electrical coupler 474. The electrical coupler 474 may couple to the chore product 300 (e.g., via the electrical coupler 190) in a first position, and be stored within the receptacle 464 in a second position. The electrical coupler 474 may be disconnected from the electrical coupler 190 and docked (e.g., deposited) within the receptacle 464. The electrical conduit 476 may be structurally resilient such that the length of material of the electrical conduit 476 between the tines 458 and electrical coupler 474 may be bent toward the receptacle 464. In doing so, the material of the electrical conduit 476 may (1) endeavor to return to an unloaded state (e.g., the memory state) which can force the electrical coupler 474 into place within the receptacle 464, and/or (2) plastically deform into a shape that accommodates the placement of the electrical coupler 474 within the receptacle 464. The wrap fork 452 and the wrap dock 454 may provide a wrap track around which a first electrical

conduit 478 (e.g., a long lead, an extension cord, etc.) can be coiled. The wrap fork 452 may secure the electrical conduit 476 at a first end and the wrap dock 454 may secure the electrical conduit 476 at a second end. The wrap dock 454 may facilitate docking the electrical coupler 474 to the housing 104. The receptacle 464 can prevent the electrical coupler 474 from an exposure to dust, debris, or liquids. For example, the receptacle 464 may shield against water and debris falling (e.g., due to gravity) onto the electrical coupler 474. For example, the receptacle 464 may dome over, occlude, etc., the electrical coupler 474 from falling debris and fluids. In some embodiments, the receptacle 464 is within a space defined between the wrap fork 452 and the wrap dock 454. In some embodiments, the electrical coupler 474 is retained within the core (e.g., void, hole, etc.) of a coiled electrical conduit 476 when the electrical coupler 474 is received by the receptacle 464. Advantageously, the cord dock 450 provides an improved and efficient management of multiple conduits. For example, multiple conduits may be managed on a single side of the housing 104 which can improve the efficiency of a user manipulating the electrical conduits. In operation, the electrical conduit 476 may be coiled or uncoiled while the electrical coupler 474 of the electrical conduit 476 is docked or undocked in the receptacle 464. Thus, a compact (e.g., space efficient) management of electrical conduits is realized.

[0076] As shown in FIG. 21, the mounting location 200 may be situated above a tractive wheel (e.g., drive wheel) of the chore product 300. The mounting location 200 may be rearward of a mower deck. The mounting location 200 may be above a fender or wheel well of the chore product 300.

[0077] As shown in FIG. 22, battery charger assembly 100 may include a center frame 490. The center frame 490 may include the handle 112. The center frame 490 may partition the internal volume of the housing 104. In some embodiments, the battery charger 102 is coupled to the center frame 490. In some embodiments, the battery charger assembly 100 includes a first battery charger 102A and a second battery charger 102B. For example, the first battery charger 102A may be coupled to a first side of the center frame 490 and the second battery charger 102B may be coupled to a second side of the center frame 490. The center frame 490 may be coupled to the bottom portion 108.

[0078] As shown in FIG. 23, a mounting bracket 500 is shown, according to some embodiments. In some embodiments, the mounting bracket 500 includes some or all of the features and functions of the mounting wall 200. In some embodiments, the mounting wall 200 includes some or all of the features and functions of the mounting bracket 500.

[0079] In some embodiments, the mounting bracket 500 includes a ledge 502 (e.g., shelf, etc.) defining mounting edges 206. For example, the mounting bracket 500 may include slots 504. The slots 504 may receive a portion of the second end 118 of the latch arm 114 when the notches 128 engage the mounting edges 206. The mounting edges 206 may be spaced from a supporting surface by a distance similar to the distance between the mounting plane 148 and the second end 118. In some embodiments, the ledge 502 defines a lip that the notches 128 may capture and suspend the battery charger assembly 100. The mounting bracket 500 may be an angle bracket (e.g., corner bracket, L-shaped bracket, corner brace, etc.). The mounting bracket 500 may be fastened (e.g., bolted, welded, bonded, etc.,) to a supporting surface (e.g., a wall, a shop wall, a trailer wall, etc.) and the ledge 502 may protrude away from the supporting surface. The latch arms 114 may be placed onto the ledge 502 which can engage the mounting edges 206. The ledge 502 may suspend the battery charger assembly 100 above the ground surface and against the supporting surface (e.g., a shop wall). In some embodiments, the mounting bracket 500 is provided as part of a kit. For example, the mounting bracket 500 may be included in a kit with the housing 104. A user may mount the mounting bracket 500 to a supporting surface (e.g., wall, shelving unit, door, etc.,) which can facilitate storing the battery charger assembly 100 on a supporting surface which can free up floor space and contribute to user convenience.

[0080] Advantageously, the battery charger assembly 100 can removably or permanently couple the battery charger 102 to a mounting wall 200 associated with one or more chore products 300, a trailer, a shop wall, etc. The battery charger assembly 100 enables a compact storage (e.g., not needing a footprint on a shop floor, not requiring a footprint on a transport trailer floor, not taking up space and adding weight on a shelving unit, etc.), protection (e.g., shielding, covering, etc.), handling (e.g., ergonomics, etc.), and management of charging equipment. In addition, the housing 104 may be stored onboard a chore product (e.g., the chore

product 300) or offboard (e.g., on a ground floor) next to a chore product to facilitate charging of an onboard energy storage device.

[0081] The battery charger assembly 100 also provides a reduced cost associated with maintaining chore products and/or other electrified equipment. The battery charger assembly 100 and mounting wall 200 further enable a charger coupling solution that secures the charger in a manner sufficient for retaining the battery charger assembly 100 on the mounting wall 200 during transport (e.g., by being pivotally coupled and isolated from vibrations via the bumpers). Additionally, the battery charger assembly 100 facilitates rapid and efficient installation and/or removal of the battery charger 102 (e.g., via tool-less removal/installation due to the engagement associated with the latch arms 114 and the mounting wall 200 as described herein).

[0082] As utilized herein with respect to numerical ranges, the terms "approximately," "about," "substantially," and similar terms generally mean +/- 10% of the disclosed values. When the terms "approximately," "about," "substantially," and similar terms are applied to a structural feature (e.g., to describe its shape, size, orientation, direction, etc.), these terms are meant to cover minor variations in structure that may result from, for example, the manufacturing or assembly process and are intended to have a broad meaning in harmony with the common and accepted usage by those of ordinary skill in the art to which the subject matter of this disclosure pertains. Accordingly, these terms should be interpreted as indicating that insubstantial or inconsequential modifications or alterations of the subject matter described and claimed are considered to be within the scope of the disclosure as recited in the appended claims.

[0083] It should be noted that the term "exemplary" and variations thereof, as used herein to describe various embodiments, are intended to indicate that such embodiments are possible examples, representations, or illustrations of possible embodiments (and such terms are not intended to connote that such embodiments are necessarily extraordinary or superlative examples).

[0084] The term "coupled" and variations thereof, as used herein, means the joining of two members directly or indirectly to one another. Such joining may be stationary (e.g., permanent or fixed) or moveable (e.g., removable or releasable). Such joining may be achieved with the

two members coupled directly to each other, with the two members coupled to each other using a separate intervening member and any additional intermediate members coupled with one another, or with the two members coupled to each other using an intervening member that is integrally formed as a single unitary body with one of the two members. If "coupled" or variations thereof are modified by an additional term (e.g., directly coupled), the generic definition of "coupled" provided above is modified by the plain language meaning of the additional term (e.g., "directly coupled" means the joining of two members without any separate intervening member), resulting in a narrower definition than the generic definition of "coupled" provided above. Such coupling may be mechanical, electrical, or fluidic.

[0085] References herein to the positions of elements (e.g., "top," "bottom," "above," "below") are merely used to describe the orientation of various elements in the FIGURES. It should be noted that the orientation of various elements may differ according to other exemplary embodiments, and that such variations are intended to be encompassed by the present disclosure.

[0086] It is important to note that the construction and arrangement of the battery charger assembly 100 as shown in the various exemplary embodiments is illustrative only. Additionally, any element disclosed in one embodiment may be incorporated or utilized with any other embodiment disclosed herein. Although only one example of an element from one embodiment that can be incorporated or utilized in another embodiment has been described above, it should be appreciated that other elements of the various embodiments may be incorporated or utilized with any of the other embodiments disclosed herein.

CLAIMS

What is claimed is:

1. A battery charger assembly, comprising:

a battery charger; and

a housing at least partially surrounding the battery charger, the housing including:

a handle arranged on a top side of the housing;

a first latch arm;

a second latch arm;

a first plurality of mounting brackets extending from a bottom side of the housing; and

a first sidewall extending between the top side and the bottom side, the first sidewall defining a second plurality of mounting brackets,

wherein the first latch arm and the second latch arm are coupled to the first sidewall proximate the top side.

2. The battery charger assembly of claim 1, wherein the first latch arm and the second latch arm both include a notch that protrudes inwardly into a bottom edge thereof.

3. The battery charger assembly of claim 2, wherein the notch is configured to engage a mounting wall so that the housing and the battery charger are pivotally suspended from the mounting wall.

4. The battery charger assembly of claim 1, wherein the first latch arm and the second latch arm are configured to pivotally couple the housing to a mounting wall.

5. The battery charger assembly of claim 1, further comprising a second sidewall opposing the first sidewall, a third sidewall, and a fourth sidewall opposing the third sidewall.

6. The battery charger assembly of claim 5, wherein the third sidewall and the fourth sidewall include a conduit cutout, wherein the conduit cutout is configured to receive at least one electrical conduit operatively coupled to the battery charger.

7. The battery charger assembly of claim 5, wherein the second sidewall includes a plurality of interface cutouts, wherein at least one of the plurality of interface cutouts provides access to a user interface of the battery charger.

8. The battery charger assembly of claim 5, wherein the handle extends between the third sidewall and the fourth sidewall in a direction parallel to the first sidewall.

9. The battery charger assembly of claim 1, wherein the first plurality of mounting brackets and the second plurality of mounting brackets each include an elastomeric bumper coupled to an end thereof.

10. The battery charger assembly of claim 1, wherein the second plurality of mounting brackets comprise a first upper mounting bracket and a second upper mounting bracket defining a gap therebetween, wherein the first latch arm and the second latch arm are within the gap.

11. The battery charger assembly of claim 1, wherein a distal end of the first plurality of mounting brackets define a first mounting plane, wherein the distal end of the second plurality of mounting brackets define a second mounting plane, wherein the first mounting plane is perpendicular to the second mounting plane.

12. The battery charger assembly of claim 1, further comprising a pair of retaining arms arranged on an opposite side of the housing than the second plurality of mounting brackets.

13. The battery charger assembly of claim 1, wherein the battery charger includes an electrical inlet portion configured to receive an alternating current, wherein the battery charger is configured to transform the alternating current into a direct current, wherein the battery charger comprises an electrical outlet portion configured to supply the direct current, wherein a first pair of opposing sidewalls of the housing comprise a plurality of conduit cutouts, and wherein the electrical inlet portion comprises a first electrical conduit extending through a first conduit cutout of the plurality of conduit cutouts, and wherein the electrical outlet portion comprises a second electrical conduit extending through a second conduit cutout of the plurality of conduit cutouts on an opposite side of the housing than the first conduit cutout.

14. A battery charger assembly for a chore product, the battery charger assembly comprising:

a battery charger;

a housing at least partially enclosing and supporting the battery charger, the housing including:

a handle arranged on a top side of the housing;

a latch arm;

a first plurality of mounting brackets extending from a bottom side of the housing; and

wherein the latch arm is configured to removably couple the battery charger to a mounting wall on the chore product to facilitate onboard charging, and wherein the first plurality of mounting brackets are configured to support the housing and the battery charger on a ground surface to facilitate offboard charging.

15. The battery charger assembly of claim 14, wherein the latch arm is a first latch arm and the housing further includes a second latch arm, and wherein the first latch arm and the second latch arm both include a notch that protrudes inwardly into a bottom edge thereof.

16. The battery charger assembly of claim 15, wherein the notch is configured to engage the mounting wall so that the housing and the battery charger are pivotally suspended from the mounting wall.

17. The battery charger assembly of claim 14, wherein the housing includes a first sidewall, a second sidewall opposing the first sidewall, a third sidewall, and a fourth sidewall opposing the third sidewall.

18. The battery charger assembly of claim 17, wherein the third sidewall and the fourth sidewall include a conduit cutout, wherein the conduit cutout is configured to receive at least one electrical conduit operatively coupled to the battery charger.

19. The battery charger assembly of claim 17, wherein the second sidewall includes a plurality of interface cutouts, wherein at least one of the plurality of interface cutouts provides access to a user interface of the battery charger.

20. The battery charger assembly of claim 14, wherein the first plurality of mounting brackets each include an elastomeric bumper coupled to an end thereof.

21. The battery charger assembly of claim 20, further comprising a second plurality of mounting brackets each having a first upper mounting bracket and a second upper mounting bracket defining a gap therebetween, wherein the latch arm is within the gap.

22. The battery charger assembly of claim 21, wherein a distal end of the first plurality of mounting brackets define a first mounting plane, wherein the distal end of the second plurality of mounting brackets define a second mounting plane, wherein the first mounting plane is perpendicular to the second mounting plane.

23. The battery charger assembly of claim 14, wherein the battery charger includes an electrical inlet portion configured to receive an alternating current, wherein the battery charger is configured to transform the alternating current into a direct current, wherein the battery charger comprises an electrical outlet portion configured to supply the direct current, wherein a first pair of opposing sidewalls of the housing comprise a plurality of conduit cutouts, and wherein the electrical inlet portion comprises a first electrical conduit extending through a

first conduit cutout of the plurality of conduit cutouts, and wherein the electrical outlet portion comprises a second electrical conduit extending through a second conduit cutout of the plurality of conduit cutouts on an opposite side of the housing than the first conduit cutout.

24. A battery charger assembly, comprising:

a battery charger; and

a housing supporting the battery charger, the housing including:

a top side;

a bottom side;

a first pair of opposing sidewalls extending between the top side and the bottom side and a second pair of opposing sidewalls extending between the top side and the bottom side;

a handle spanning between the first pair of opposing sidewalls or the second pair of opposing sidewalls;

a first plurality of mounting brackets proximate the bottom side, the first plurality of mounting brackets defining a first mounting plane;

a second plurality of mounting brackets extending from one of the first pair of opposing sidewalls, the second plurality of mounting brackets defining a second mounting plane perpendicular to the first mounting plane; and

a pair of latch arms extending through the first mounting plane.

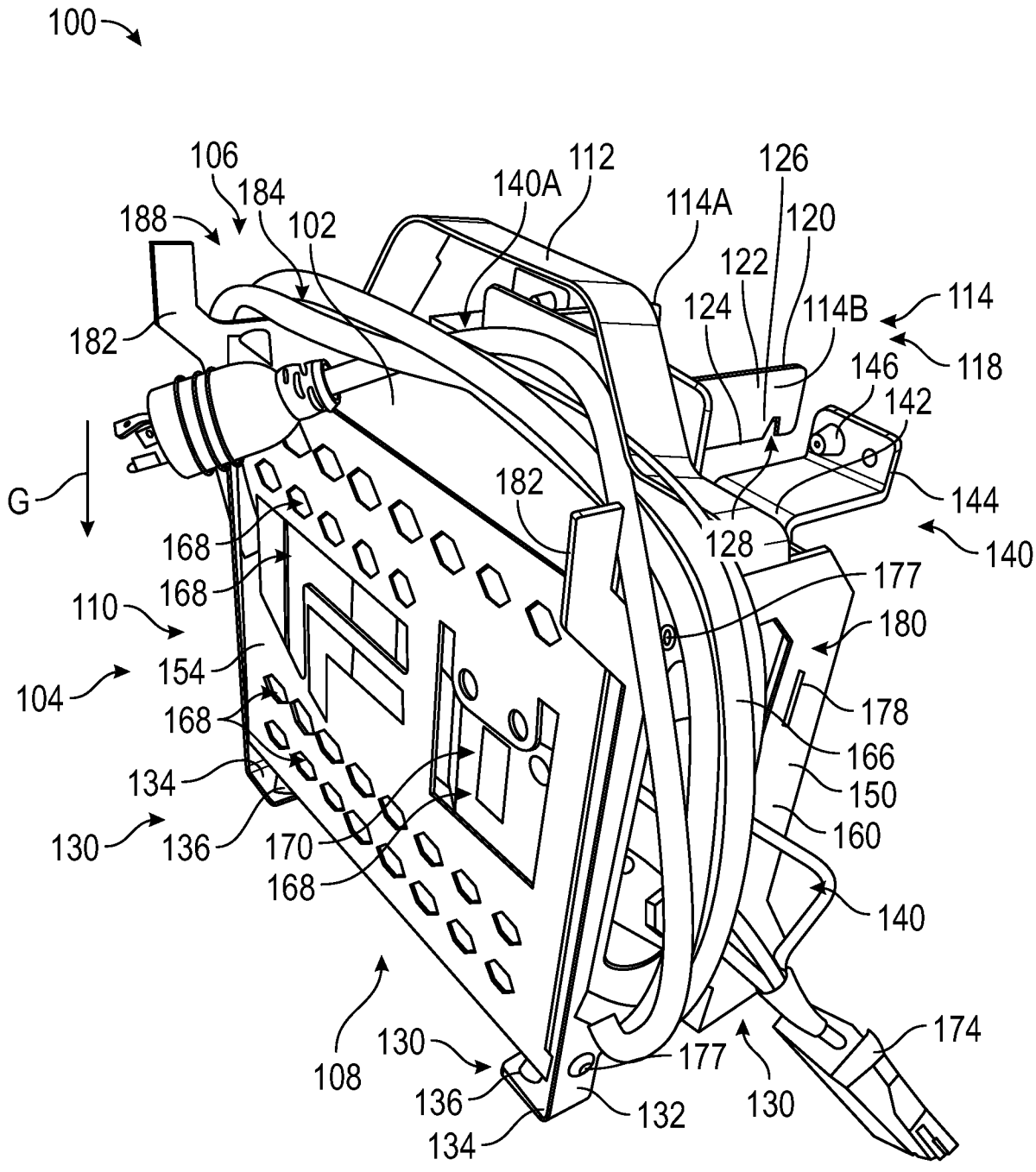
25. The battery charger assembly of claim 24, wherein the pair of latch arms each include a top edge and a bottom edge, wherein the bottom edge define a notch, and wherein the notch is configured to engage a mounting wall and pivotally suspend the housing from the mounting wall.

26. The battery charger assembly of claim 24, wherein the pair of latch arms define a top edge and a bottom edge, and wherein the bottom edge defines a notch configured to engage a mounting edge of a mounting wall when the pair of latch arms are received within mounting apertures of the mounting wall.

27. The battery charger assembly of claim 24, wherein the first plurality of mounting brackets are configured to support the housing on a ground surface when the housing is decoupled from a mounting wall.

28. The battery charger assembly of claim 24, wherein the pair of latch arms are configured to suspend the housing in a cantilever arrangement.

29. The battery charger assembly of claim 24, wherein the battery charger includes an electrical inlet portion configured to receive an alternating current, wherein the battery charger is configured to transform the alternating current into a direct current, wherein the battery charger comprises an electrical outlet portion configured to supply the direct current, wherein the first pair of opposing sidewalls comprise a plurality of conduit cutouts, and wherein the electrical inlet portion comprises a first electrical conduit extending through a first conduit cutout of the plurality of conduit cutouts, and wherein the electrical outlet portion comprises a second electrical conduit extending through a second conduit cutout of the plurality of conduit cutouts on an opposite side of the housing than the first conduit cutout.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140
108
130
136
134
132
177
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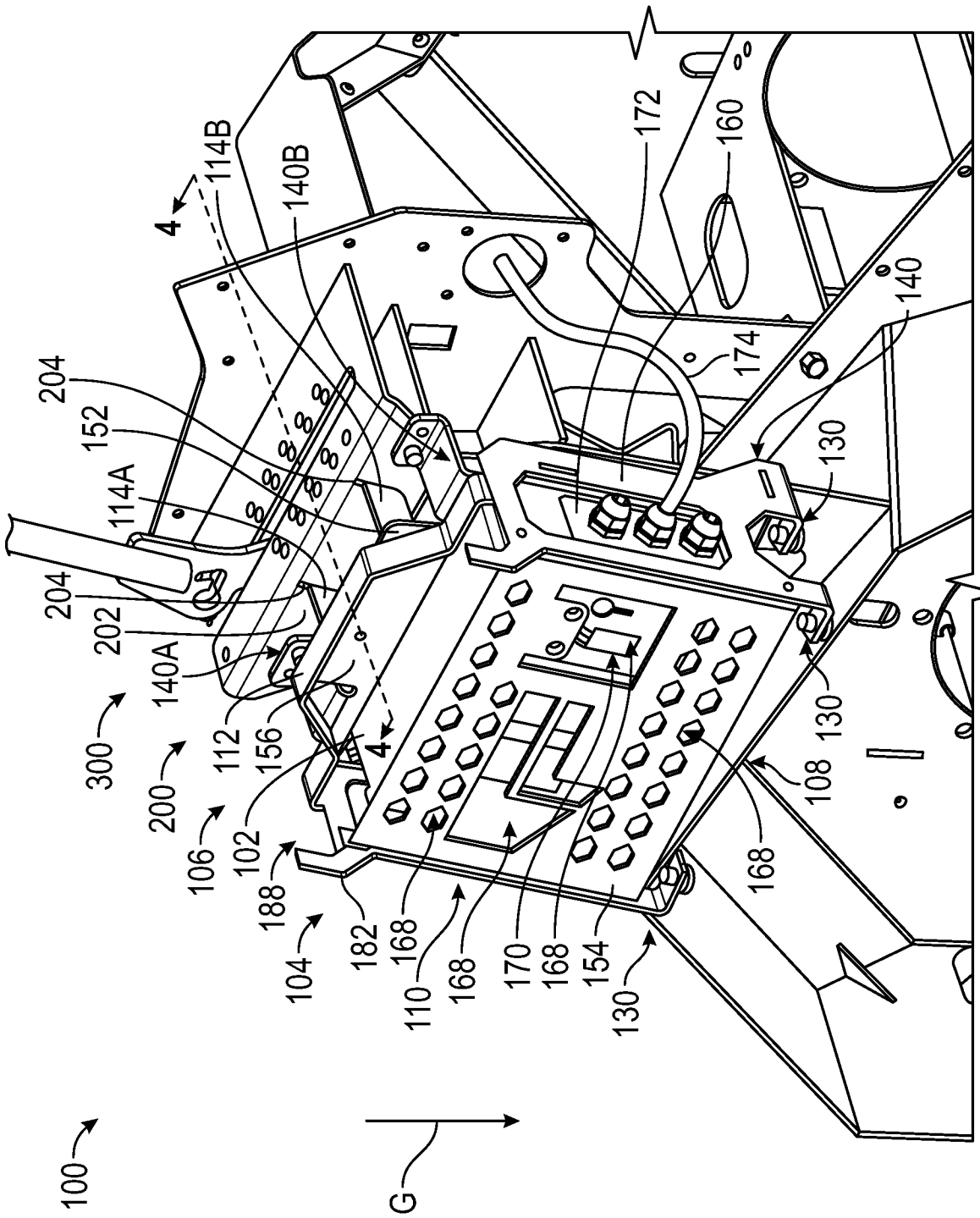
174

FIG. 1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114B
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152
114A
204
202
140A
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188
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168
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168
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130
108
130
168

FIG. 2

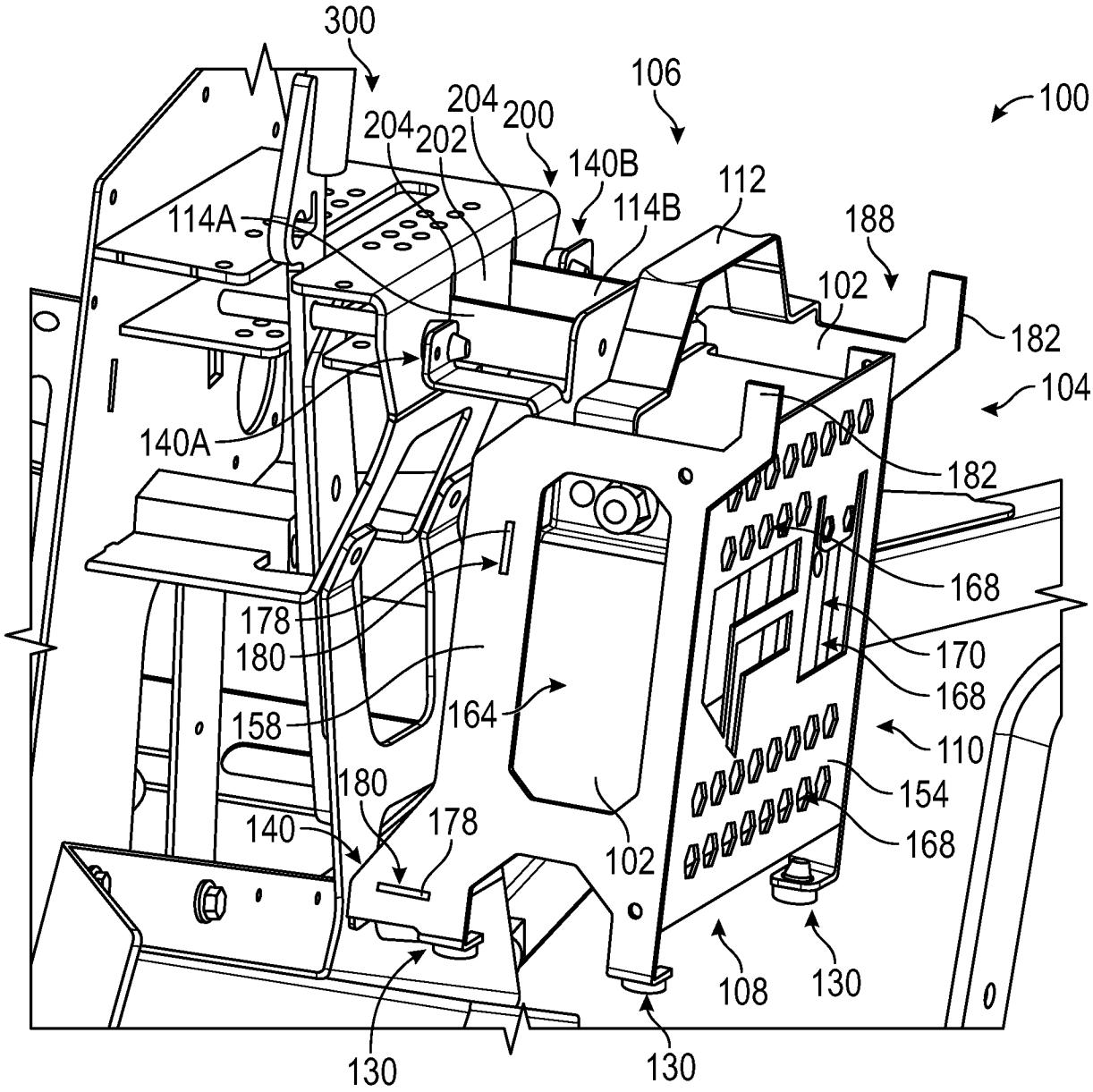
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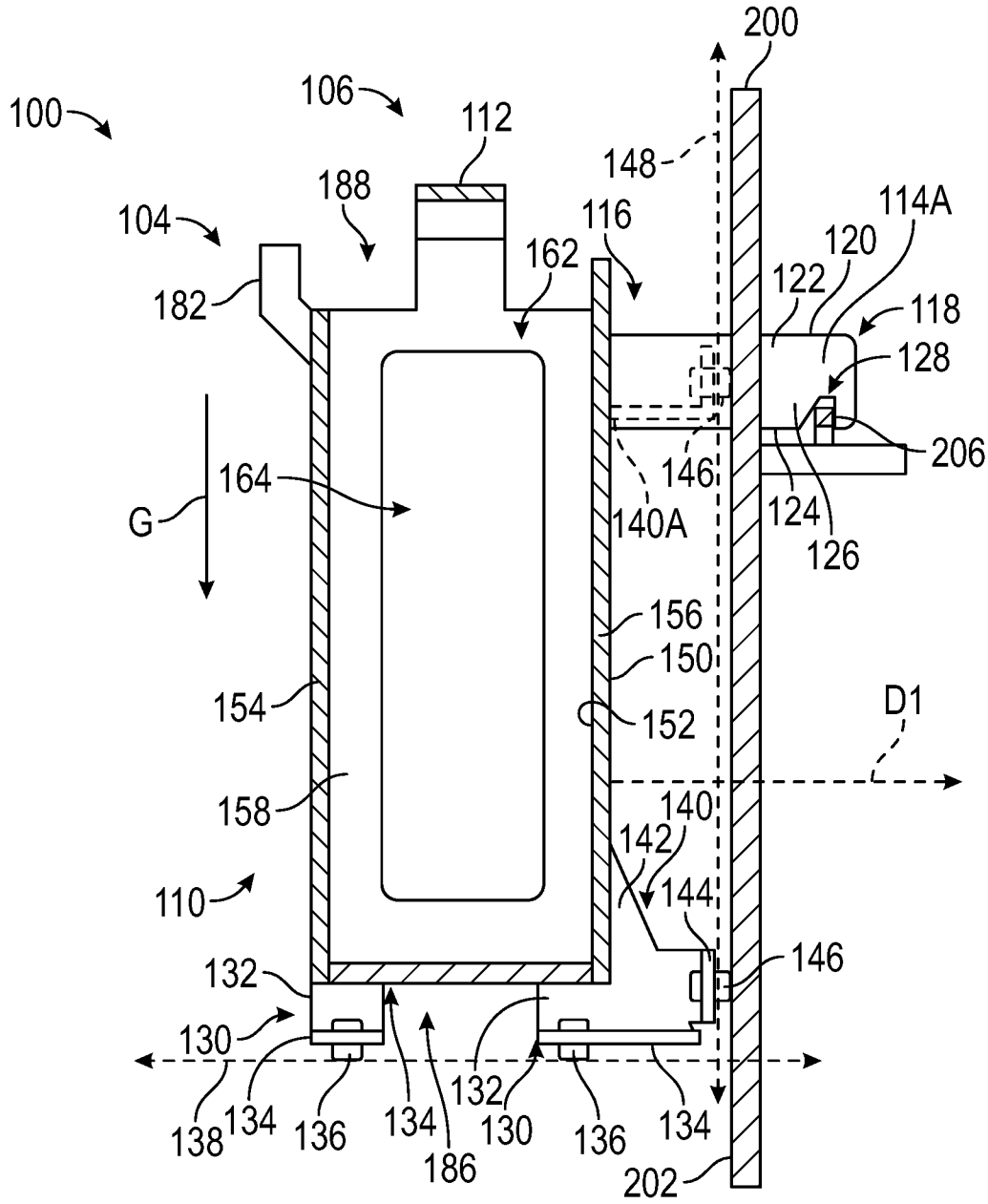
FIG. 3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G
156
150
154
152
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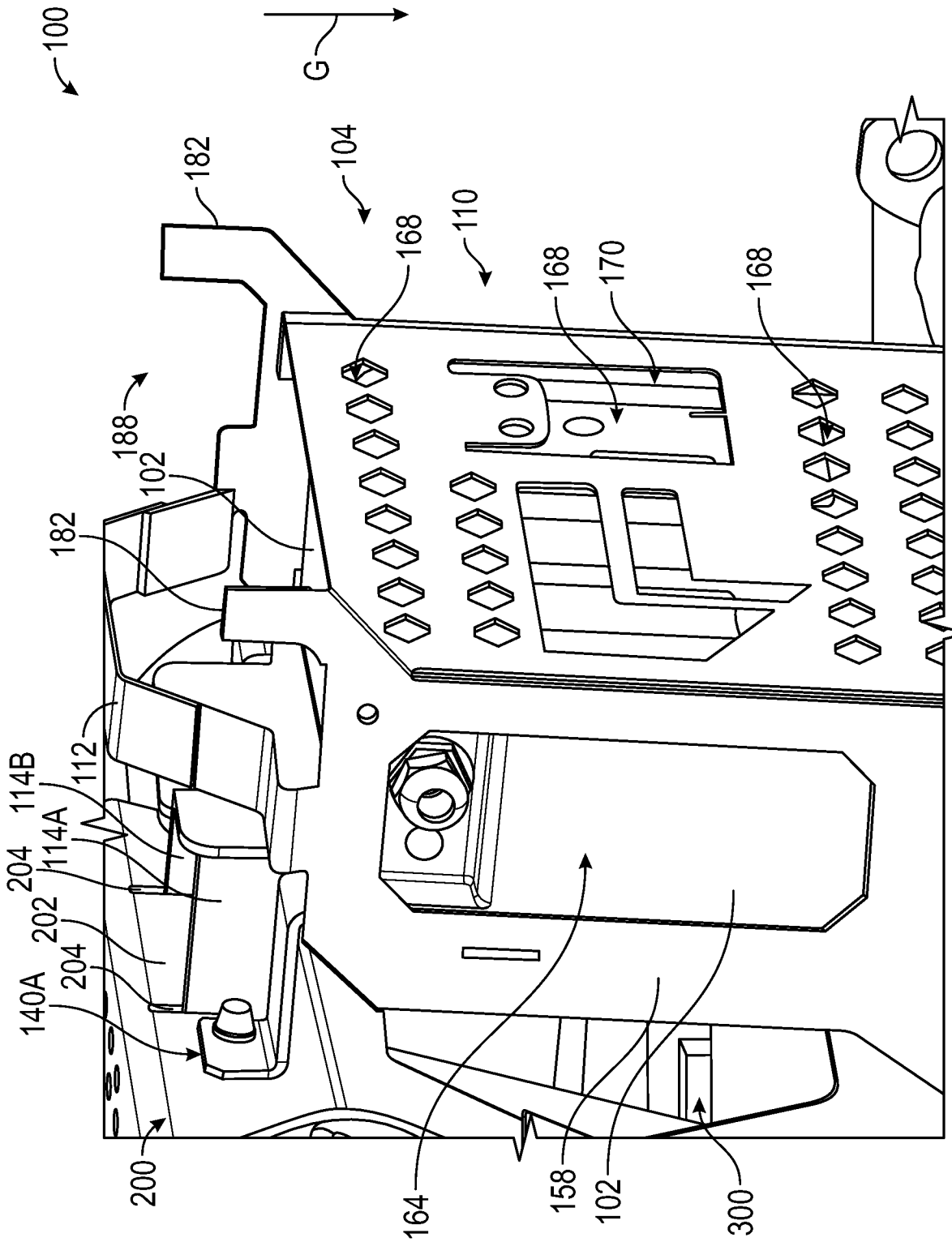
186
202

FIG. 4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164
158
102
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FIG. 5

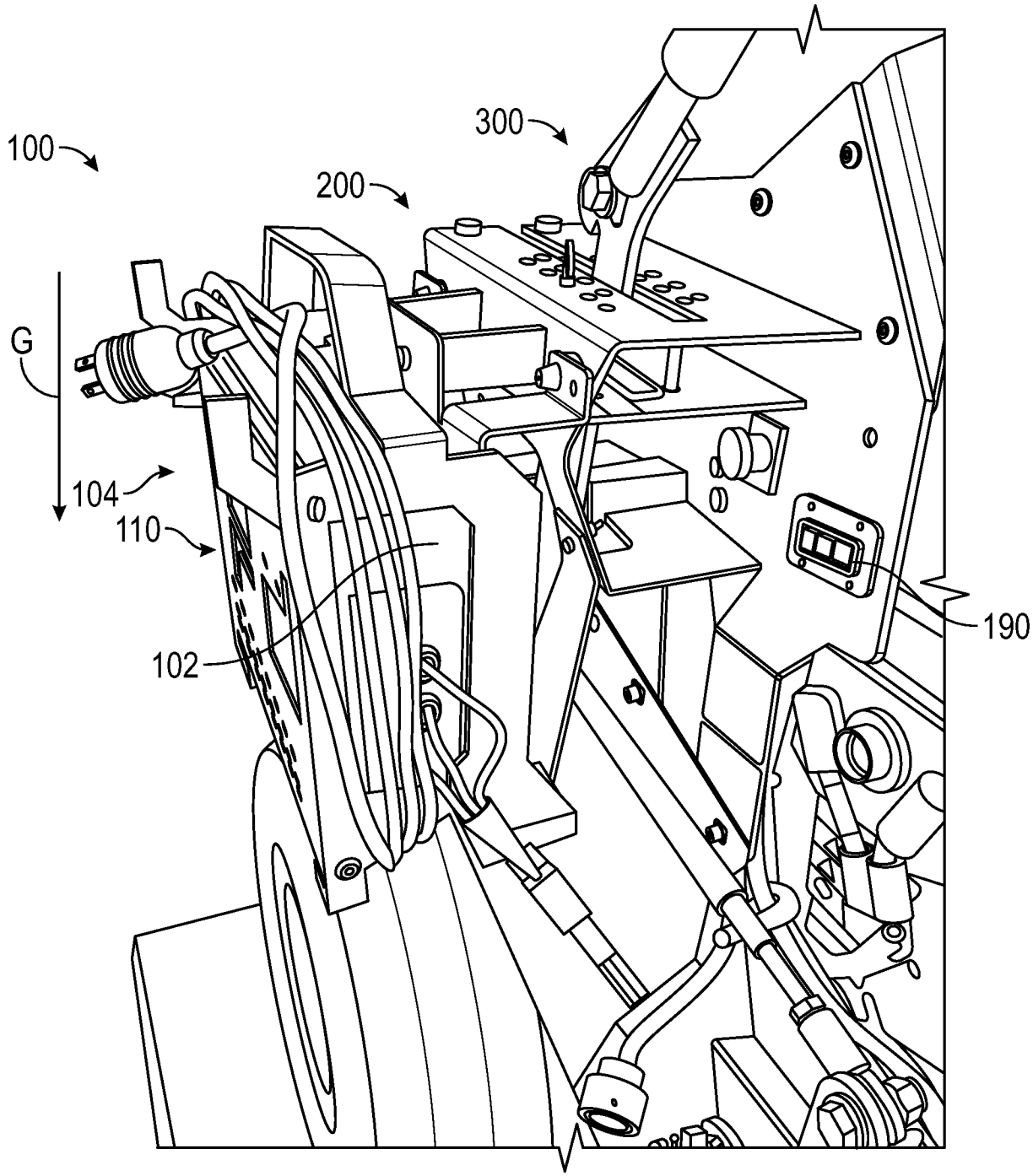


FIG. 6

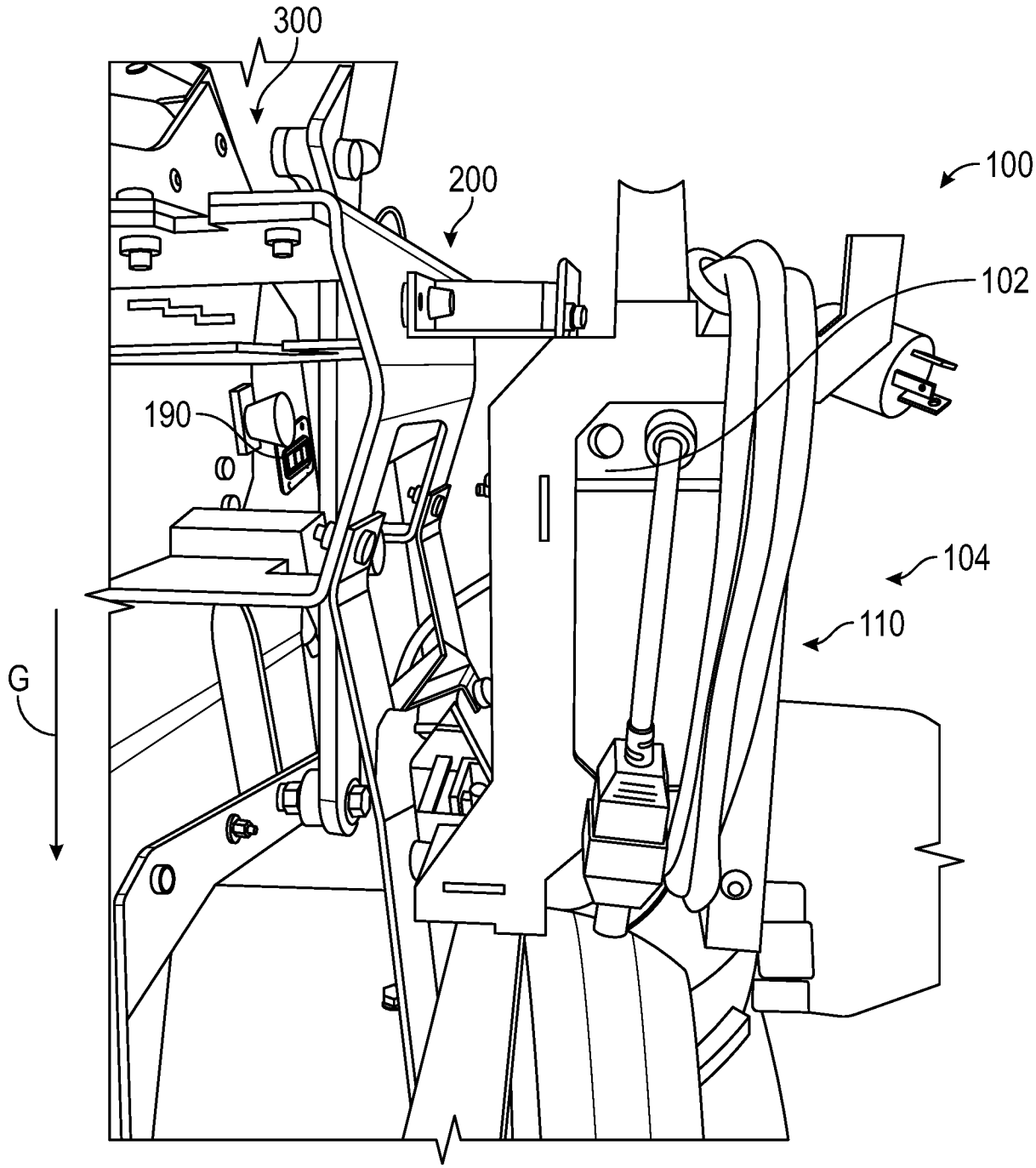


FIG. 7

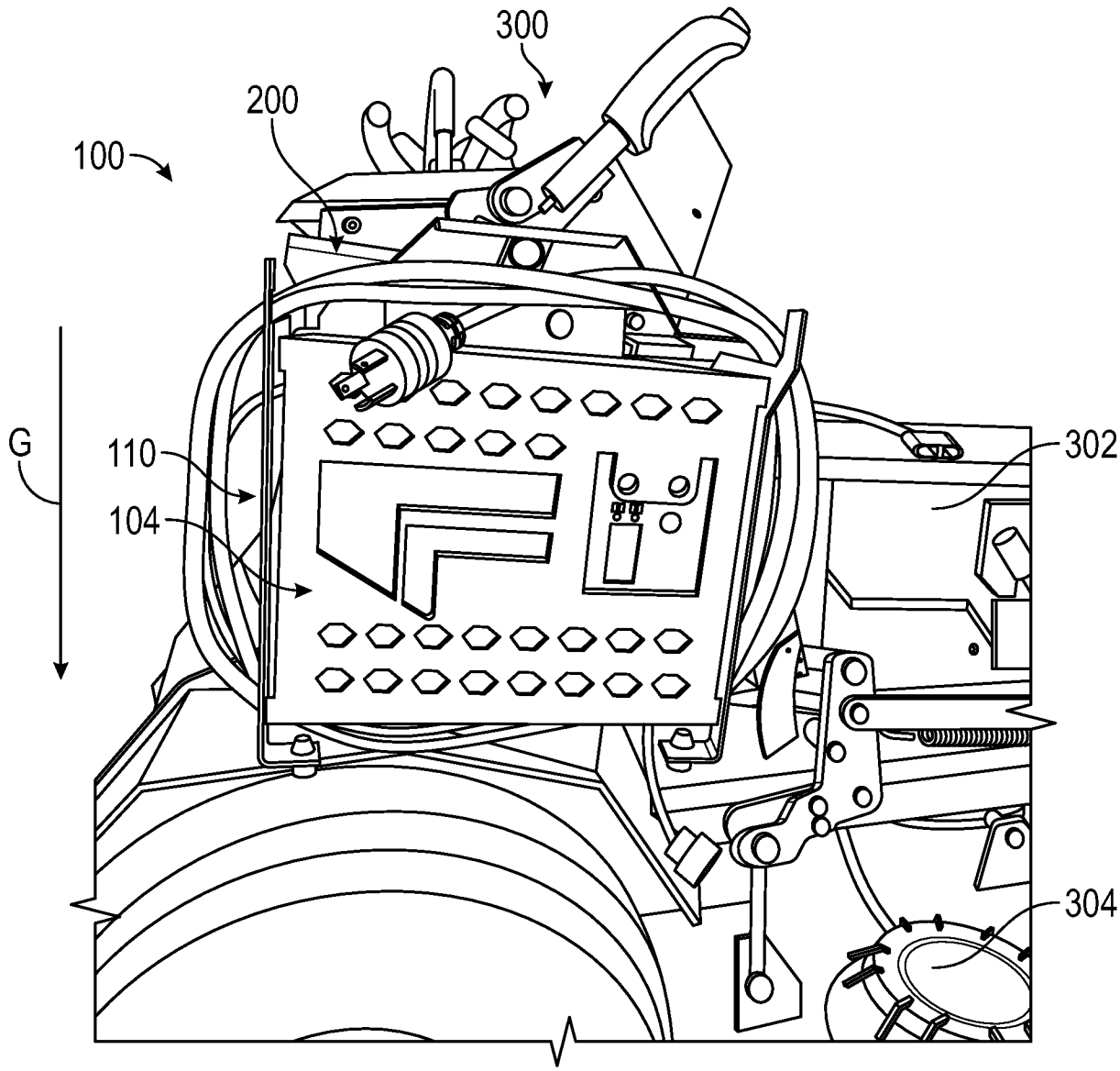


FIG. 8

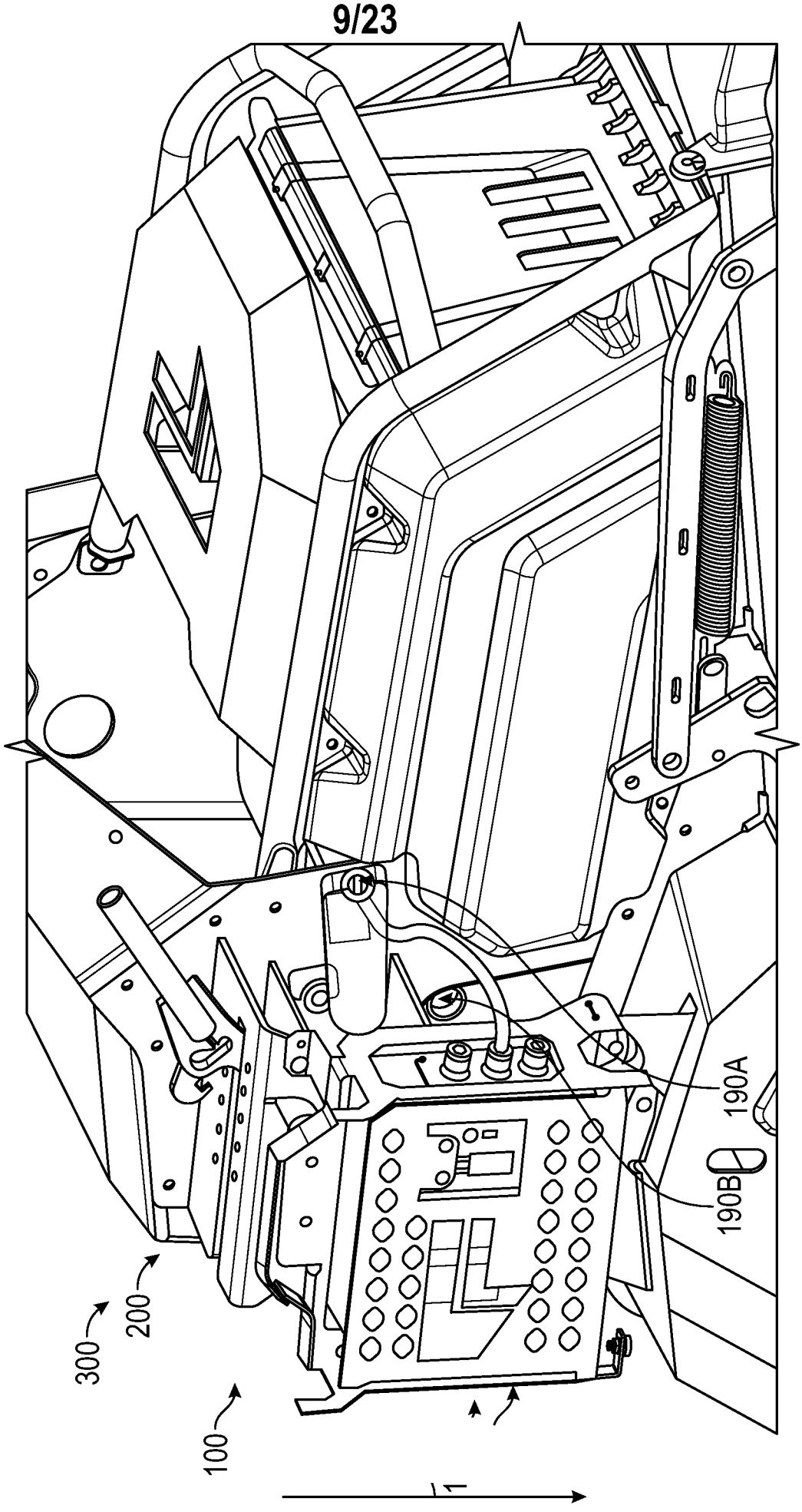


FIG. 9

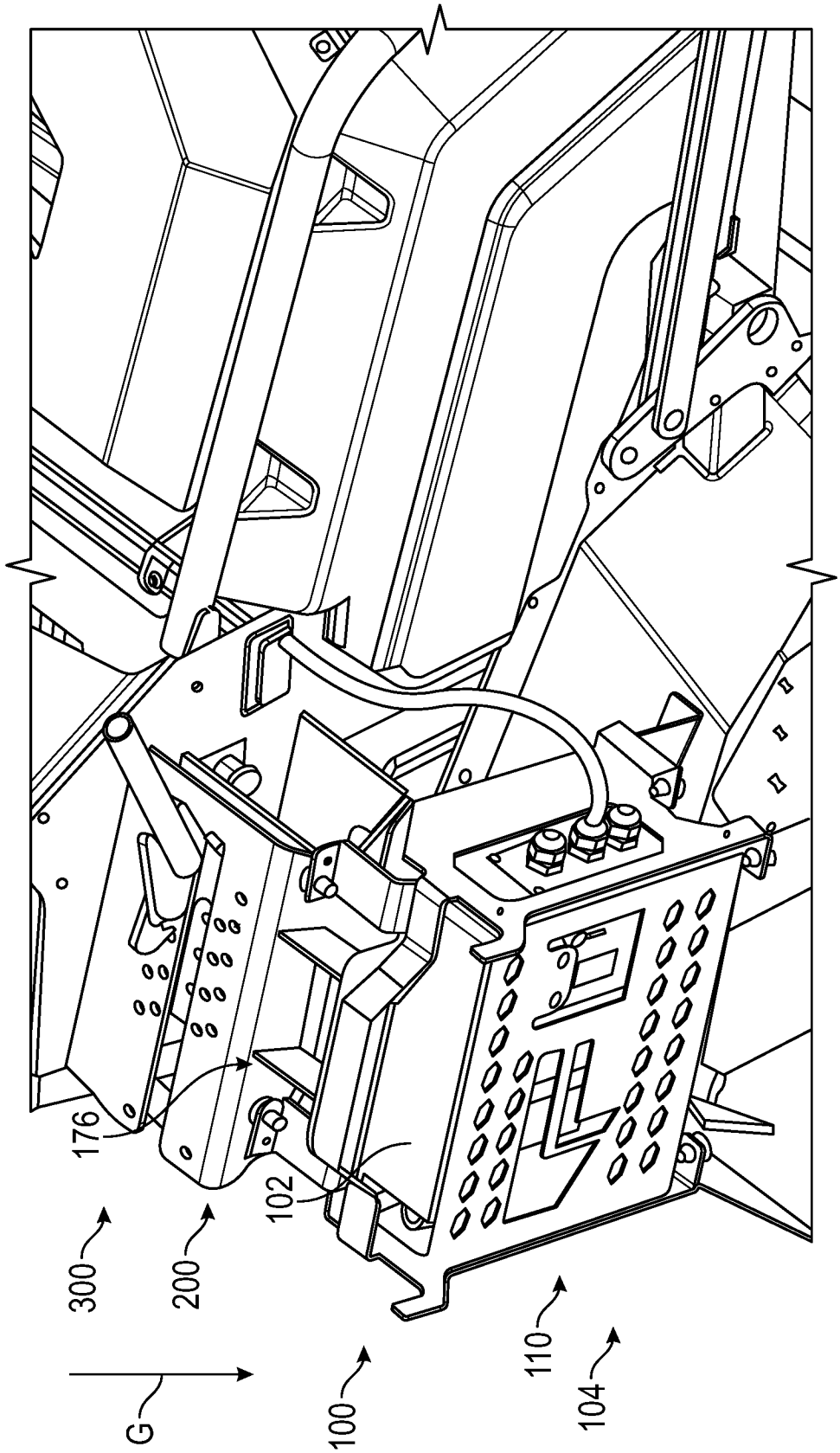
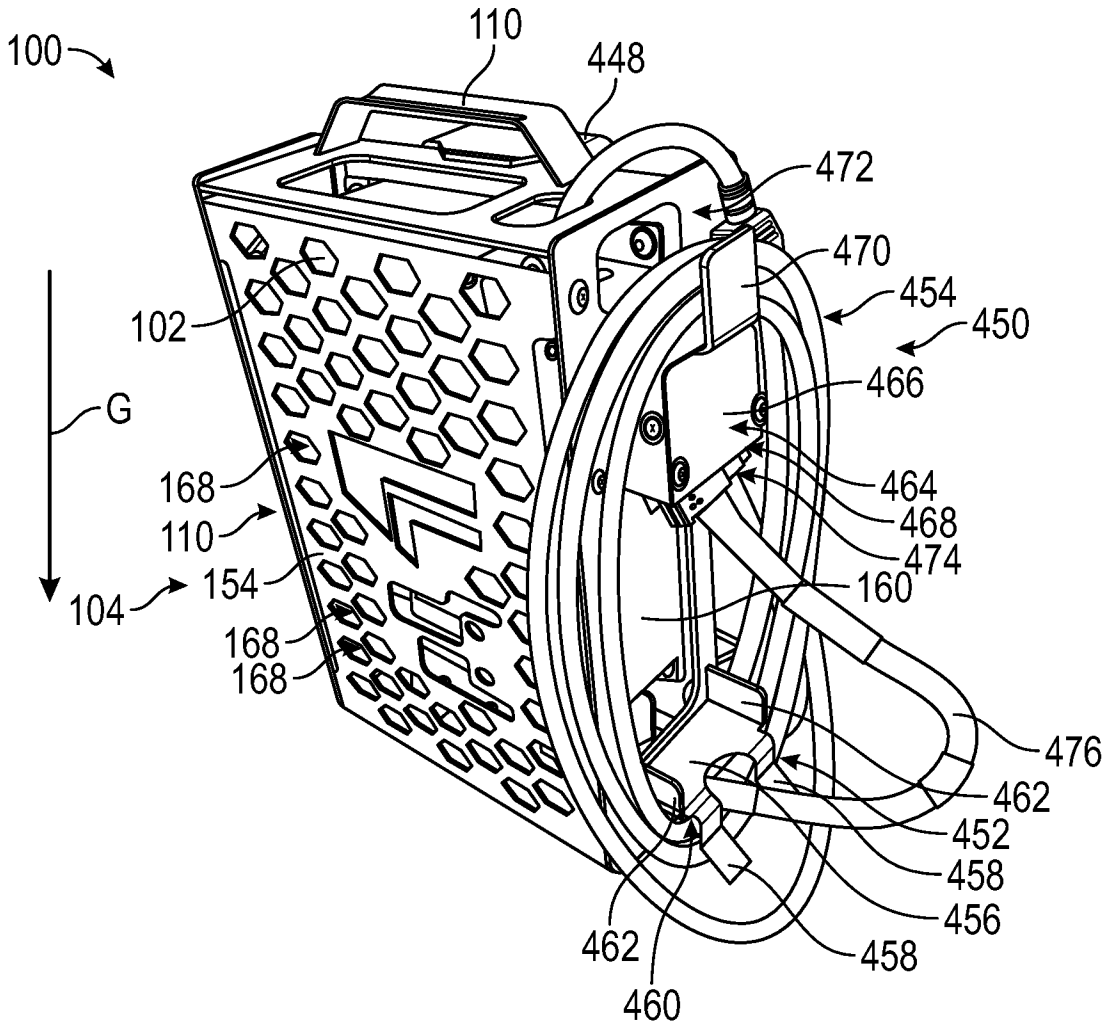


FIG. 10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458
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FIG. 11

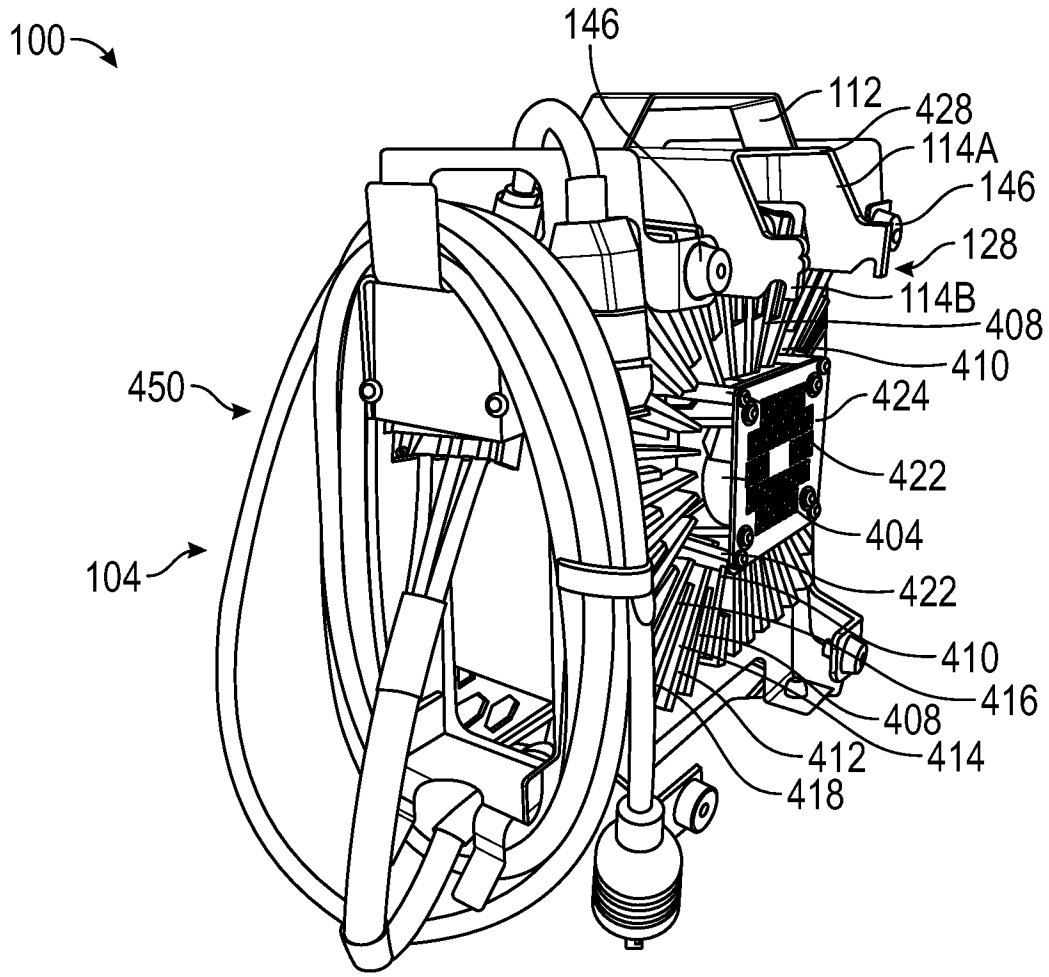
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FIG. 12

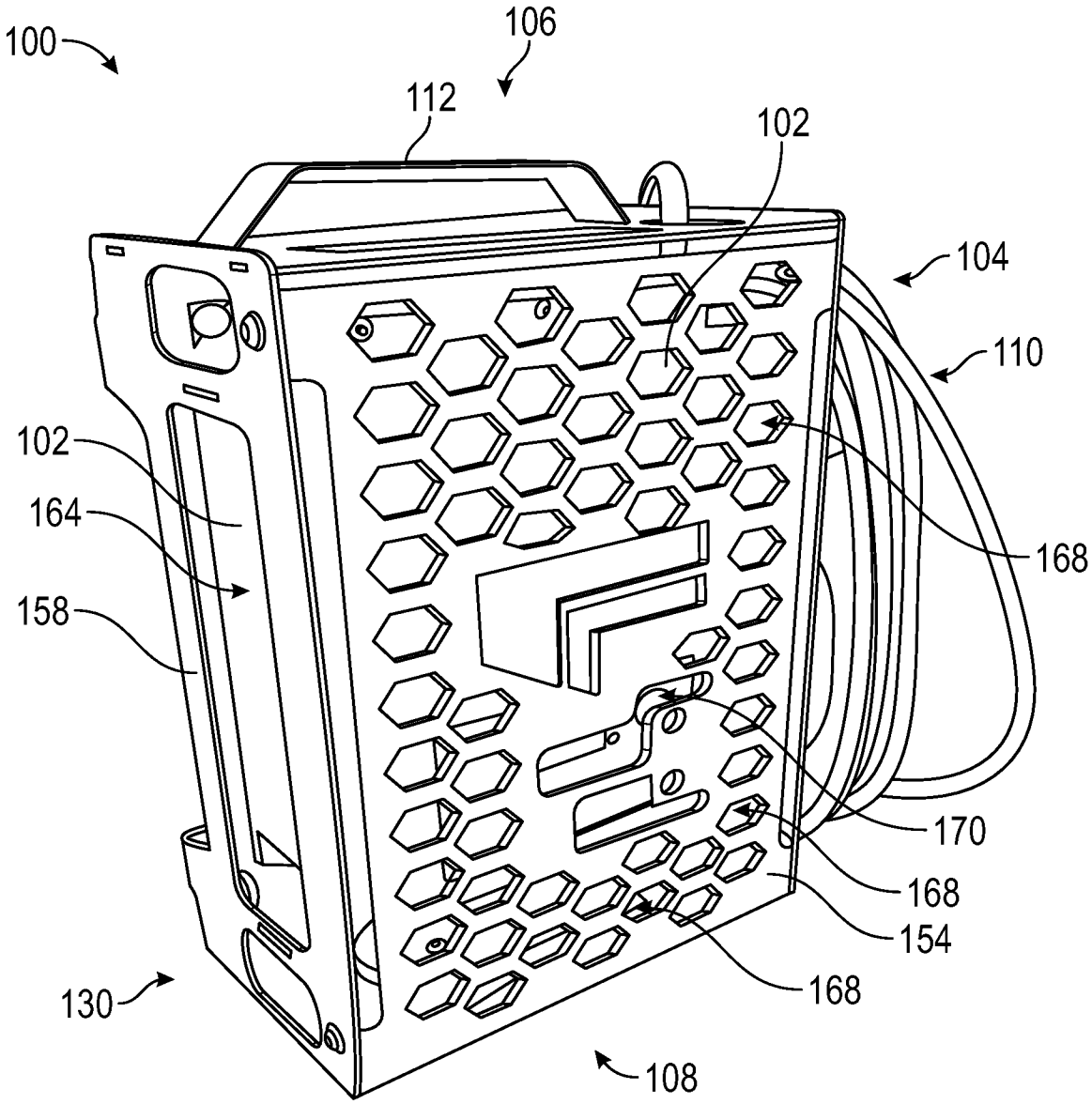

FIG. 13

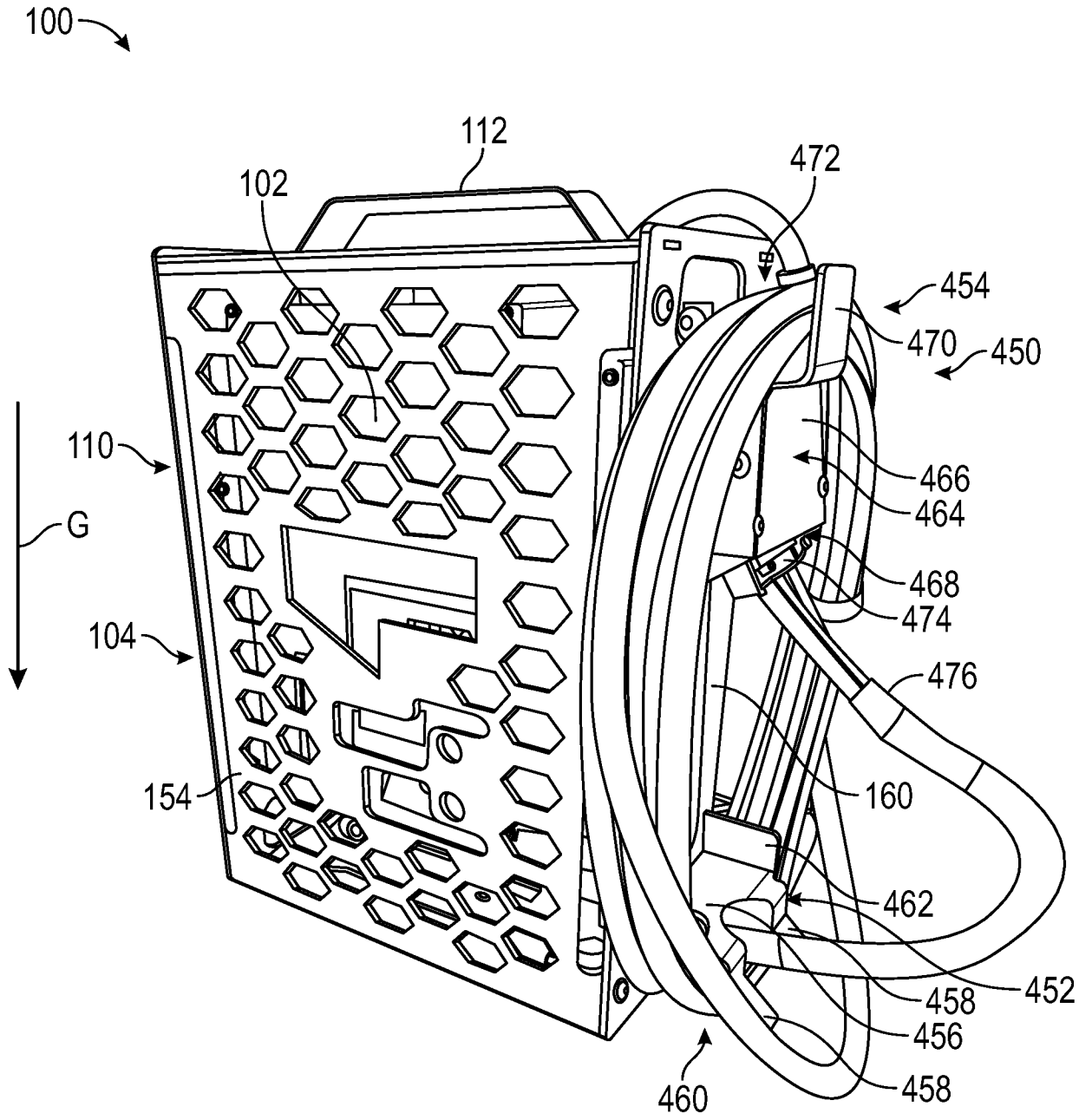
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FIG. 14

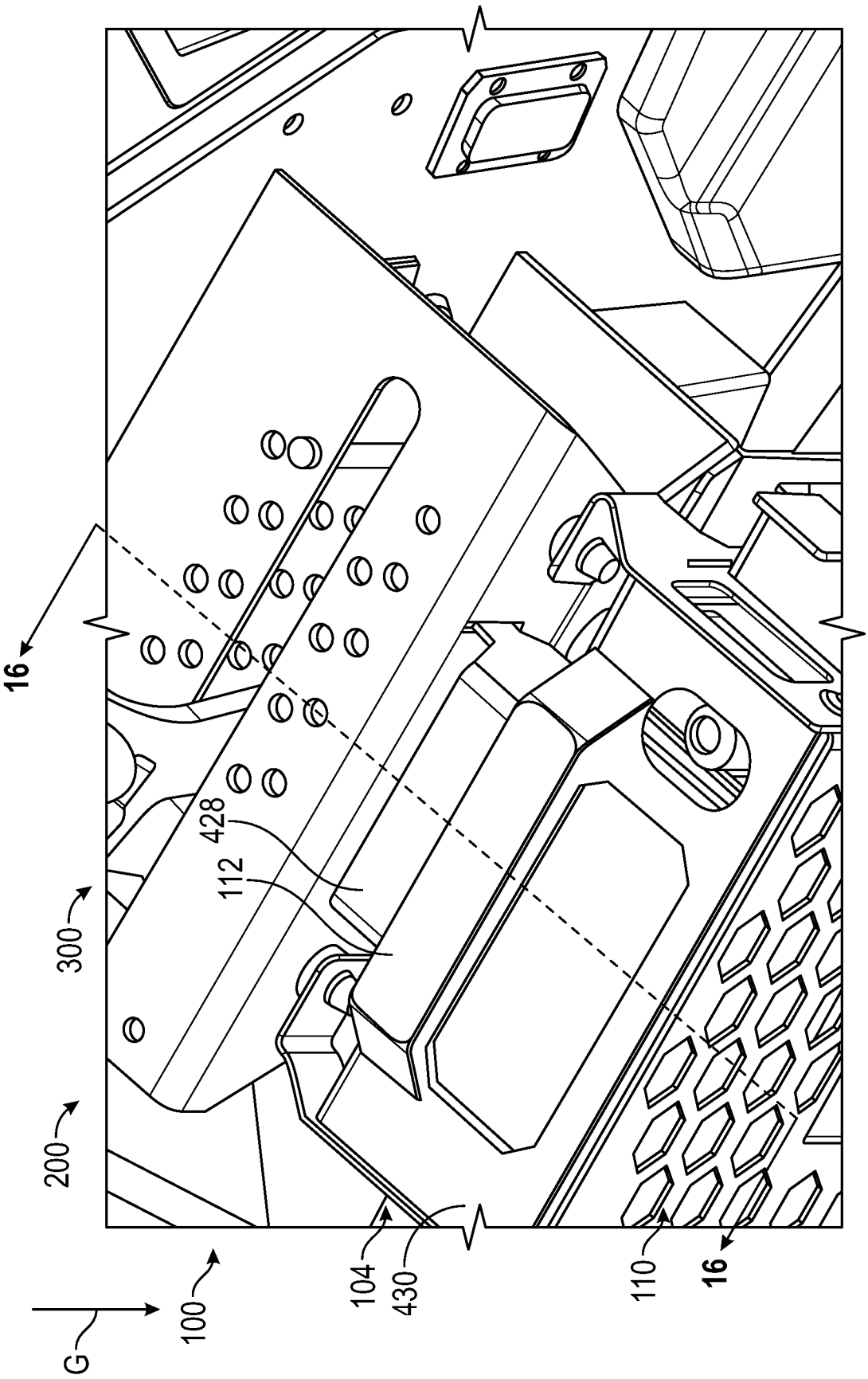

FIG. 15

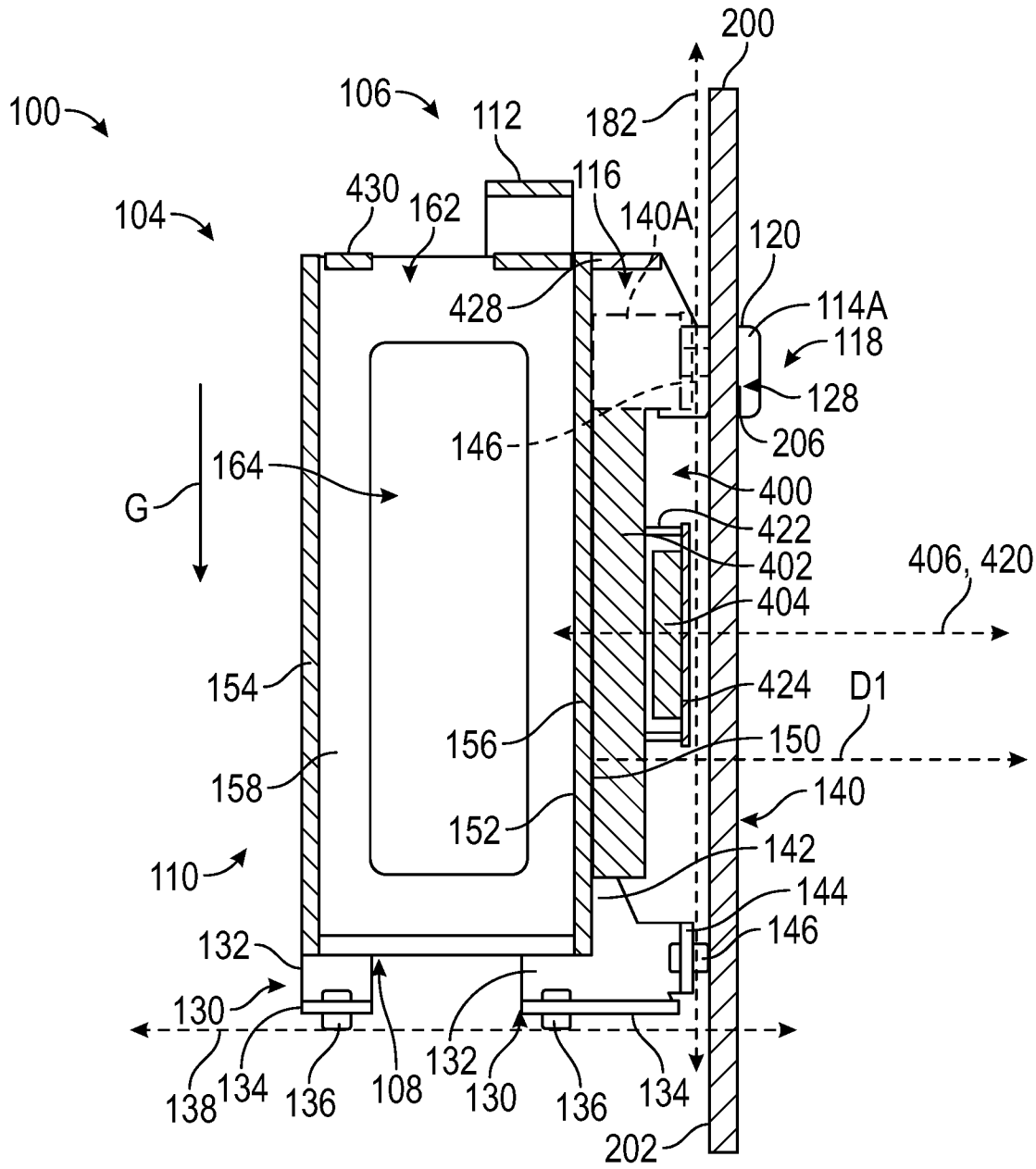
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FIG. 16

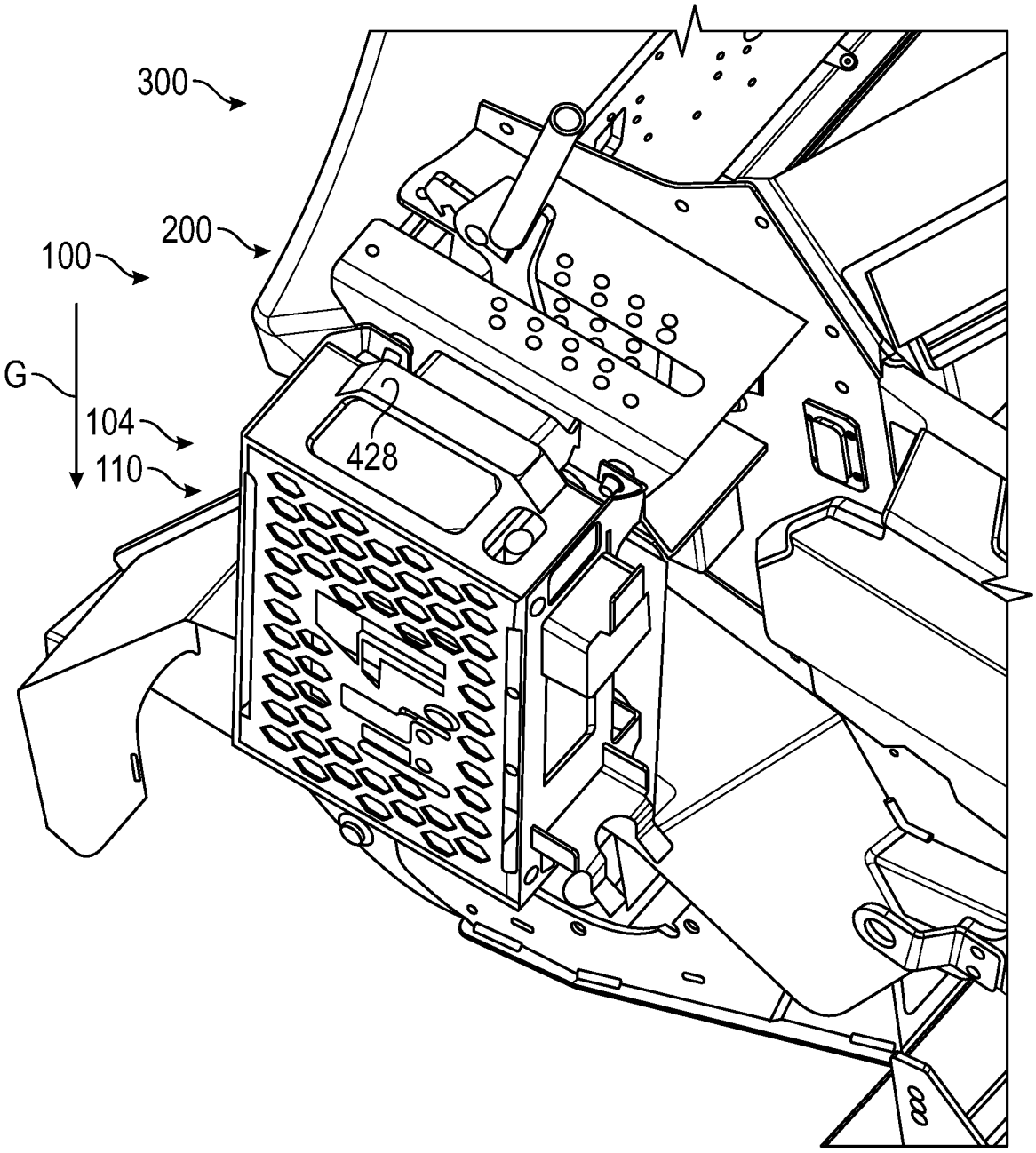


FIG. 17

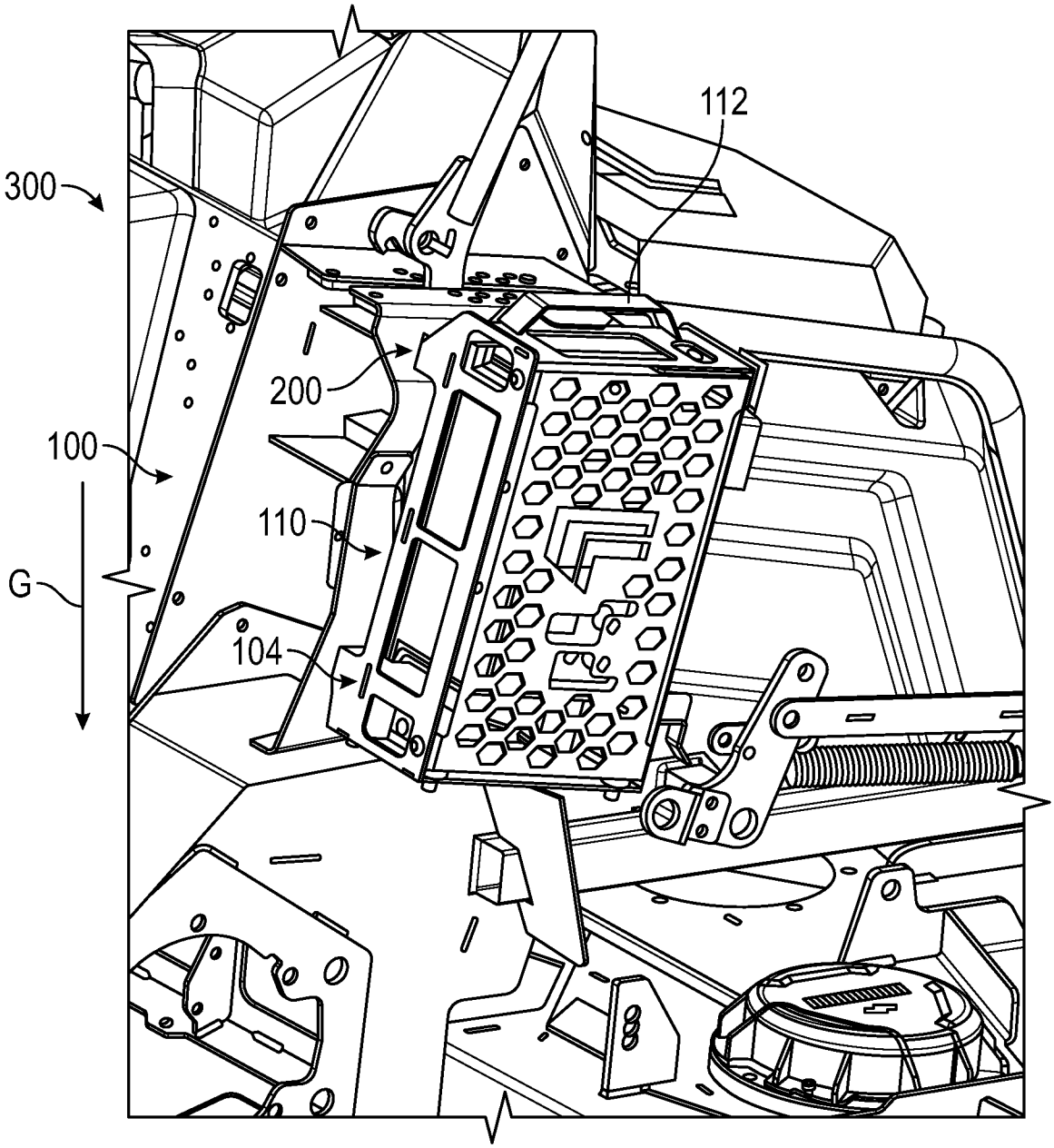


FIG. 18

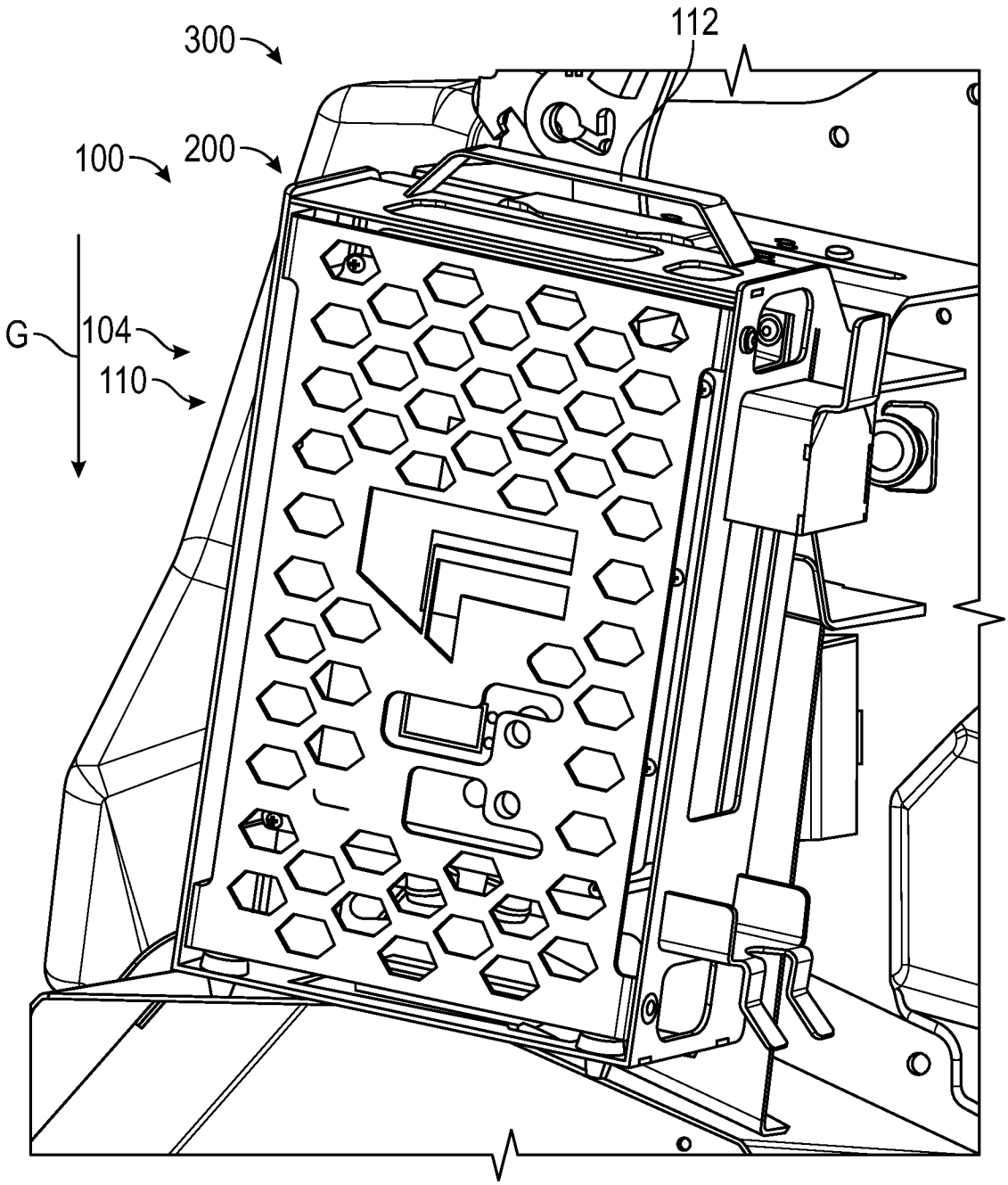


FIG. 19

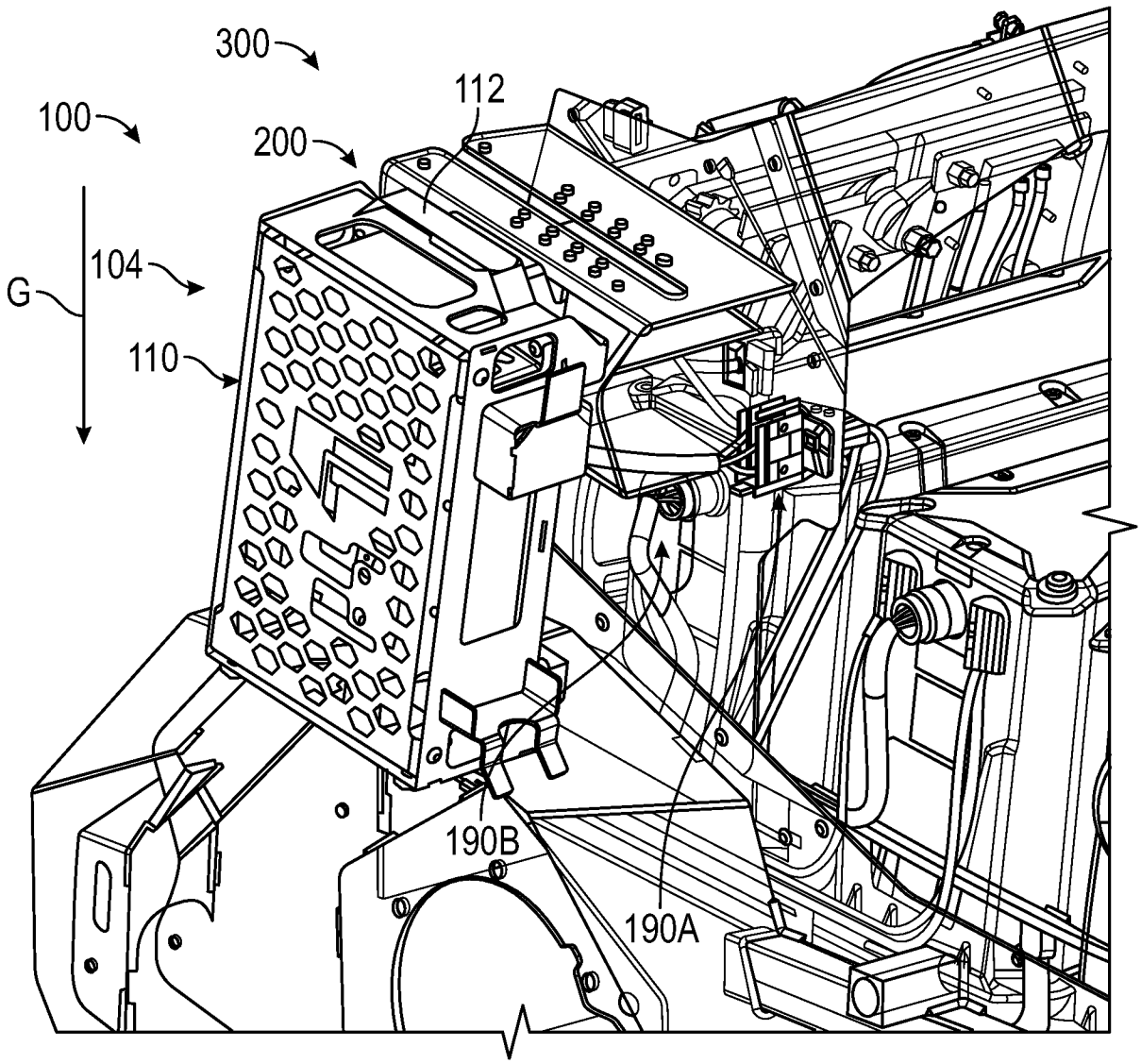
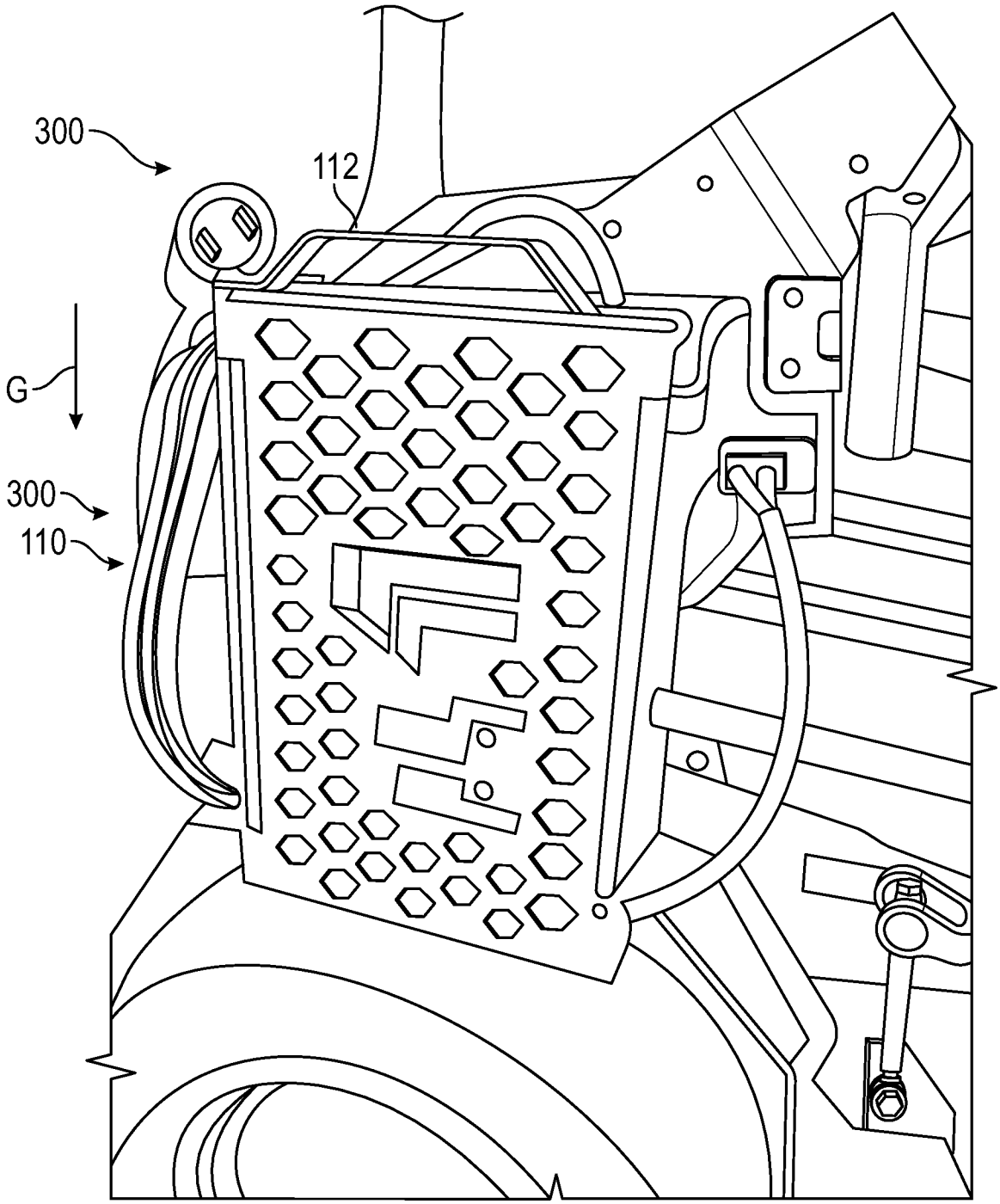


FIG. 20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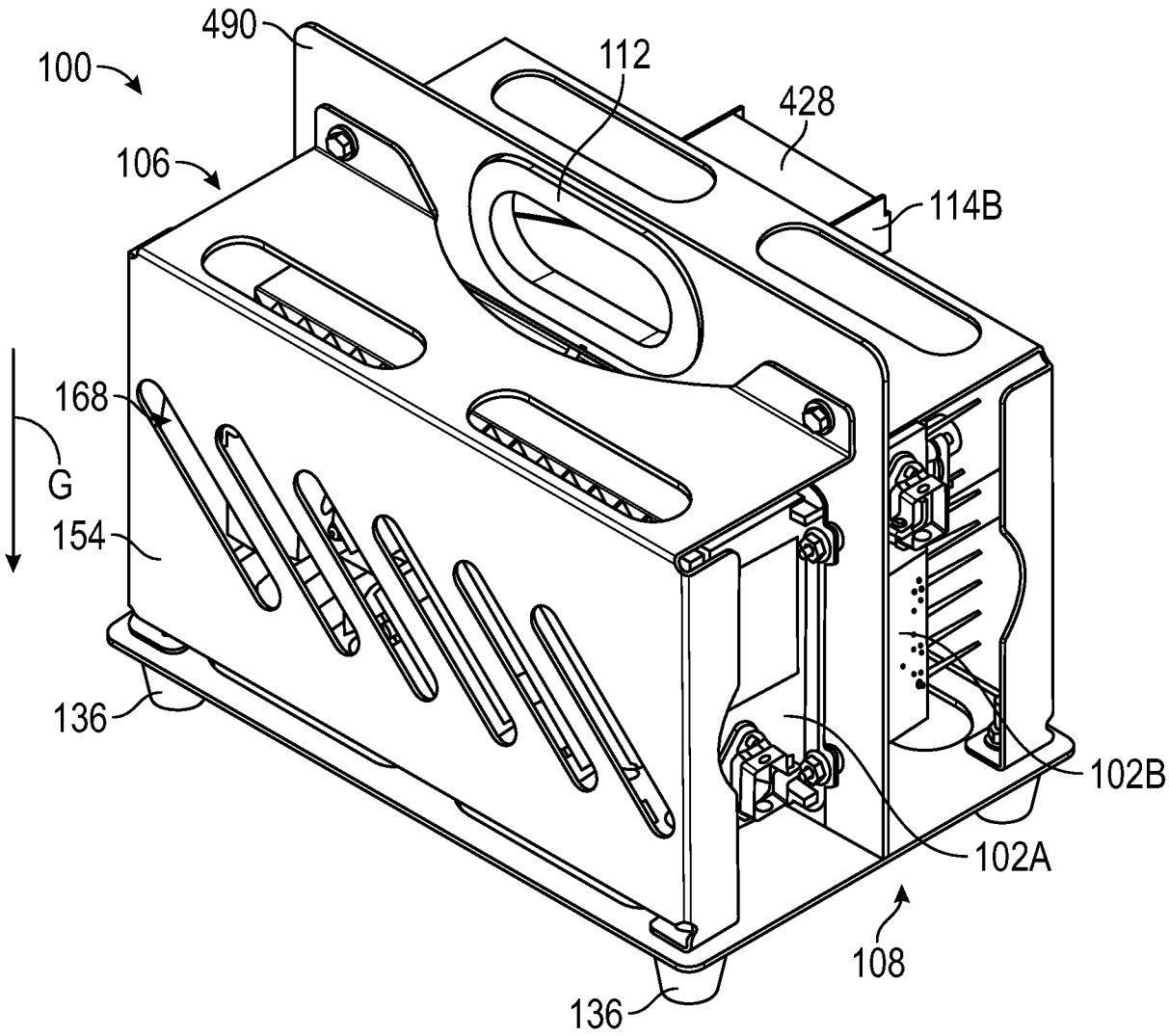

FIG. 22

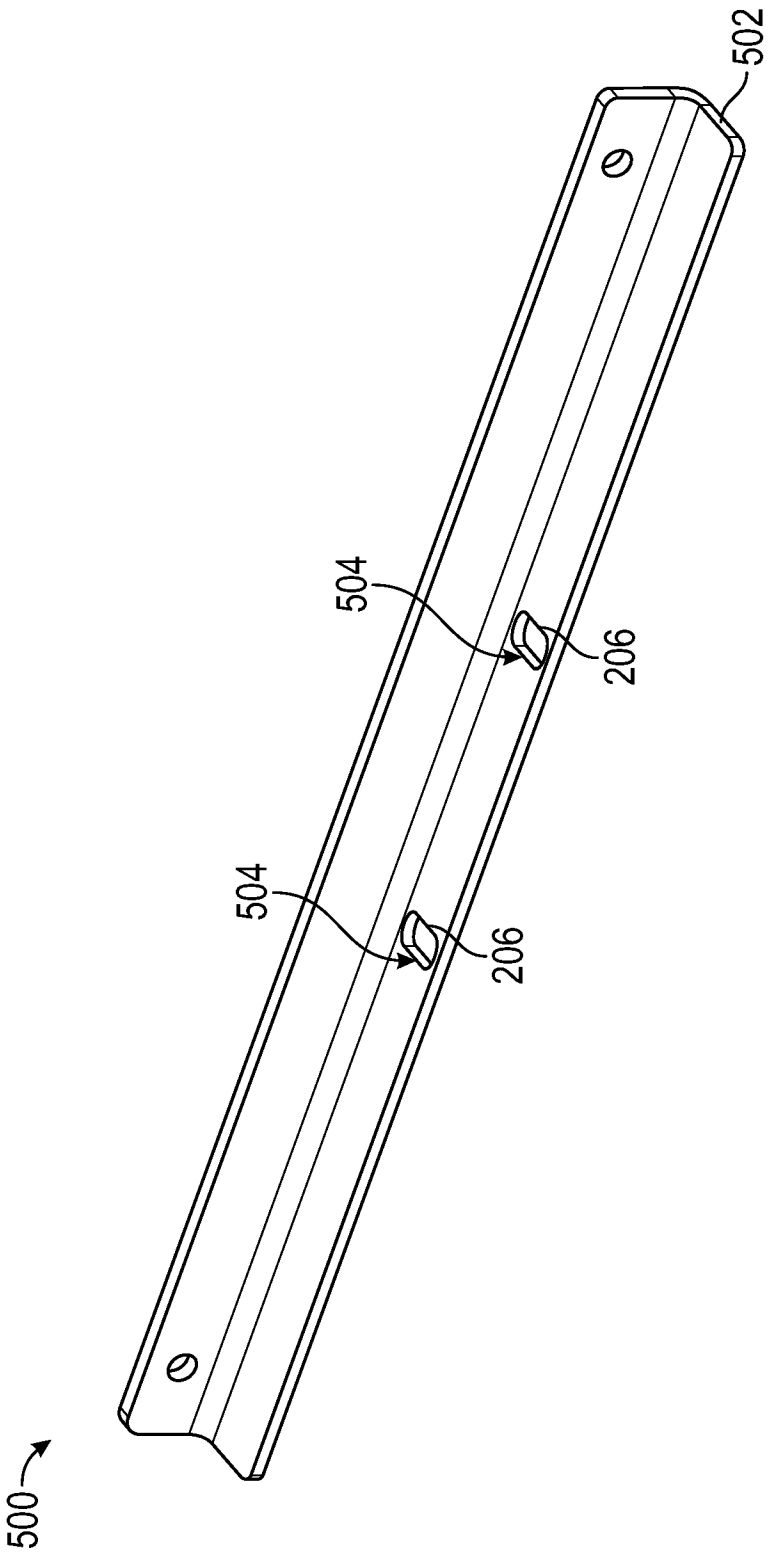

FIG. 23