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(12) **United States Patent**
Nipke

(10) **Patent No.: US 7,017,598 B2**
(45) **Date of Patent: Mar. 28, 2006**

(54) **POWERED PATIO POLE UMBRELLA**

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(73) Assignee: **Vendor Development Group**, Grand Rapids, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/781,183**

(22) Filed: **Feb. 18, 2004**

(65) **Prior Publication Data**

US 2004/0221883 A1 Nov. 11, 2004

Related U.S. Application Data

(60) Provisional application No. 60/541,526, filed on Feb. 3, 2004, provisional application No. 60/448,704, filed on Feb. 18, 2003.

(51) **Int. Cl.**
A45B 3/02 (2006.01)

(52) **U.S. Cl.** **135/16**; 135/98; 135/910; 362/102; 439/638

(58) **Field of Classification Search** 135/16, 135/28, 910, 20.3, 98, 15.1; 362/102, 123, 362/253, 431; 439/638–639, 652
See application file for complete search history.

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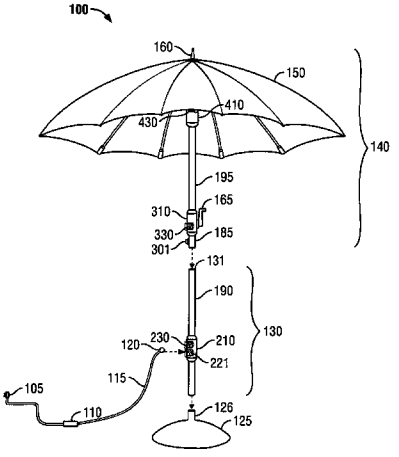
Primary Examiner—Winnie Yip
(74) *Attorney, Agent, or Firm*—McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**

A powered patio pole umbrella is provided. The powered patio pole umbrella receives power from an external outlet and provides power to a plurality of power hubs including electrical outlets positioned vertically within the central pole of the umbrella. Consumers may plug electrical devices into the electrical outlets in the power hubs. The power hubs are sealed for moisture and a ground fault circuit interrupter is provided for additional safety.

29 Claims, 20 Drawing Sheets



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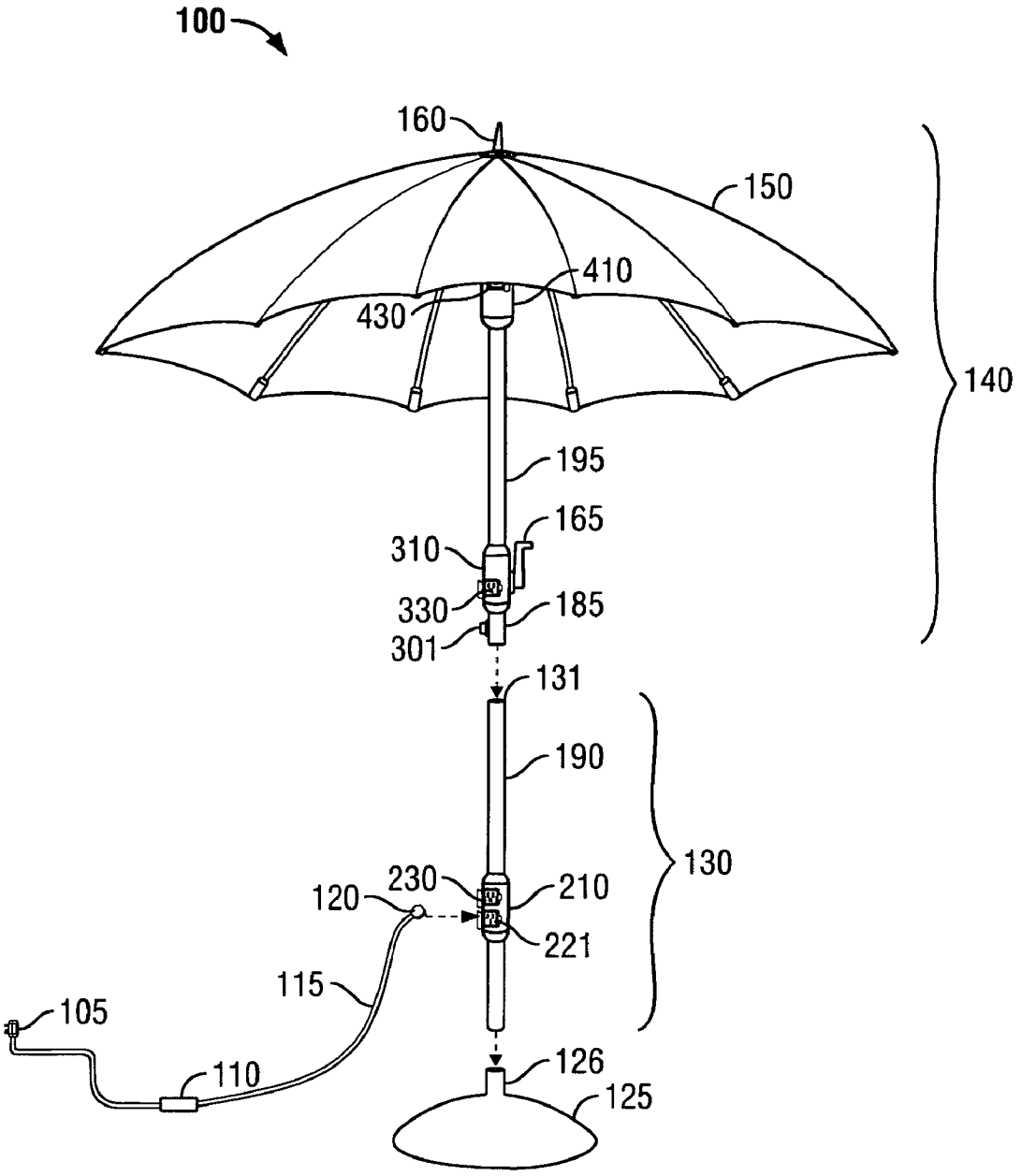
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FIG. 1

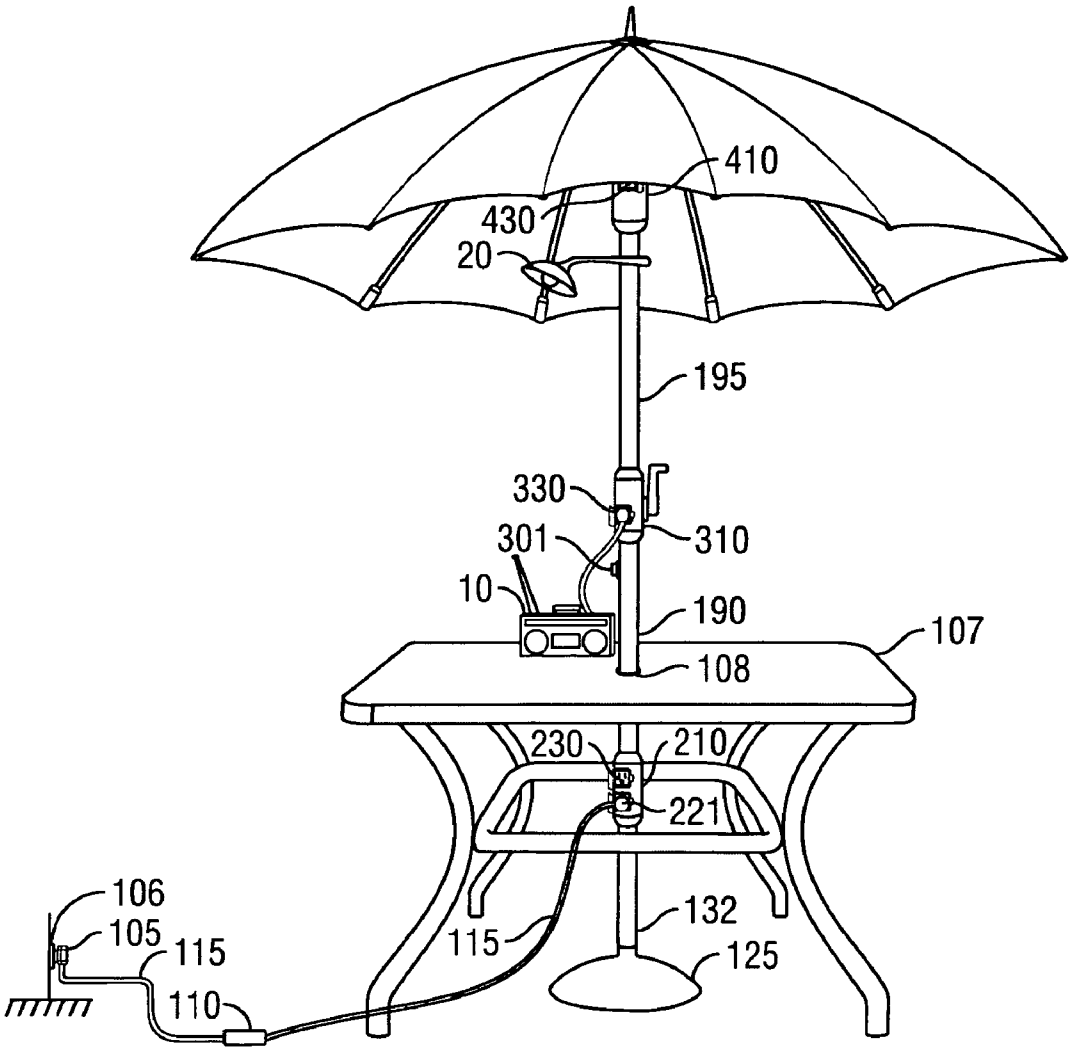
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FIG.2

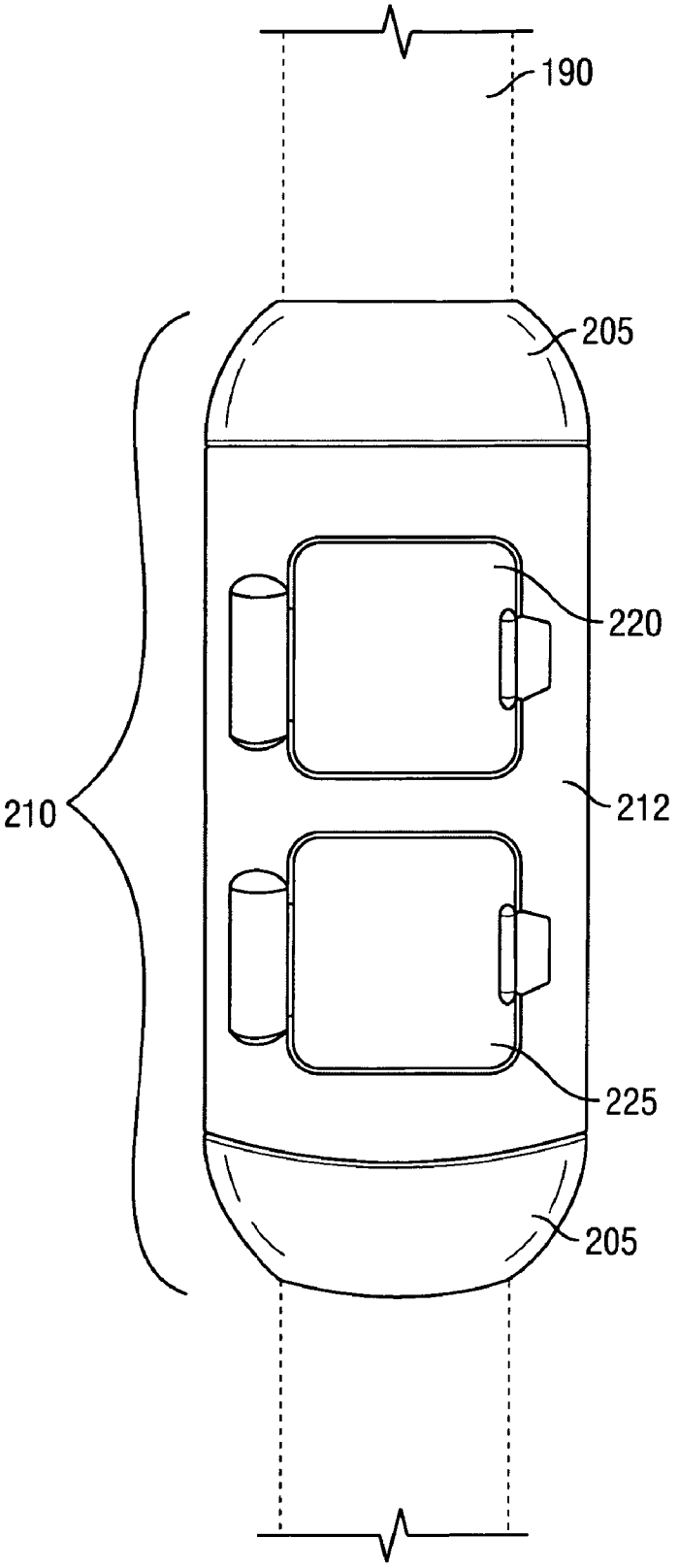

FIG. 3

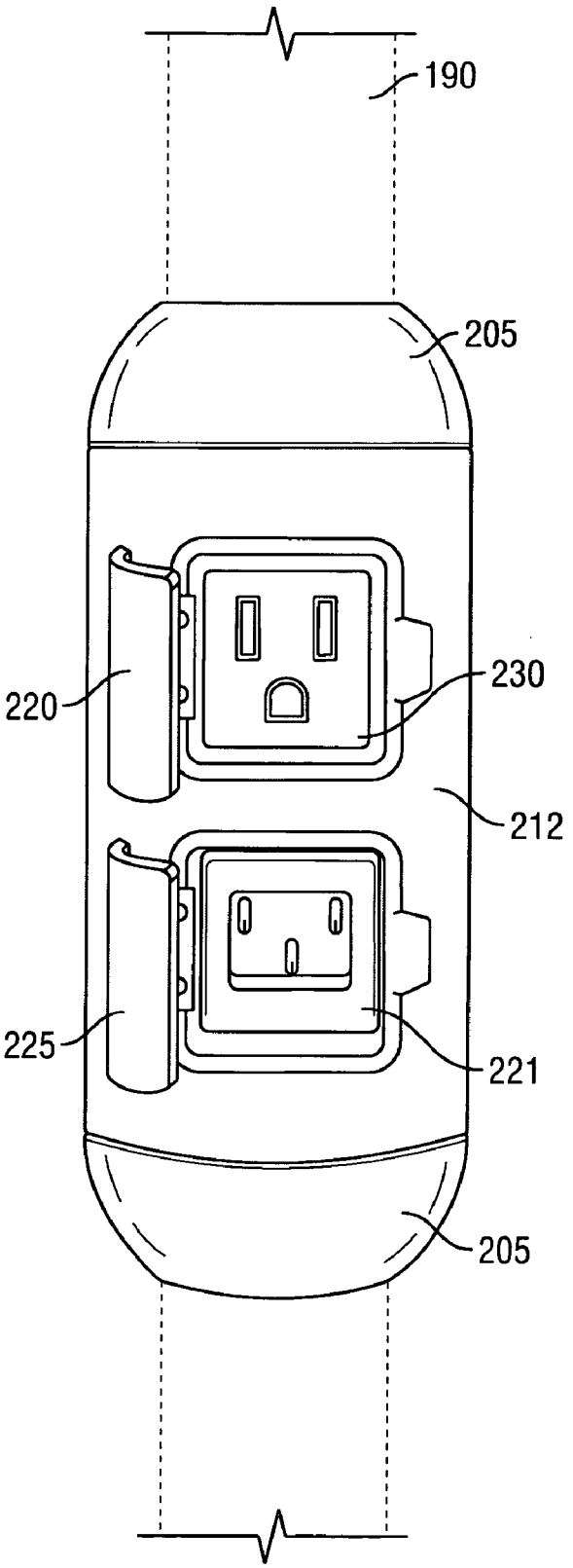

FIG. 4

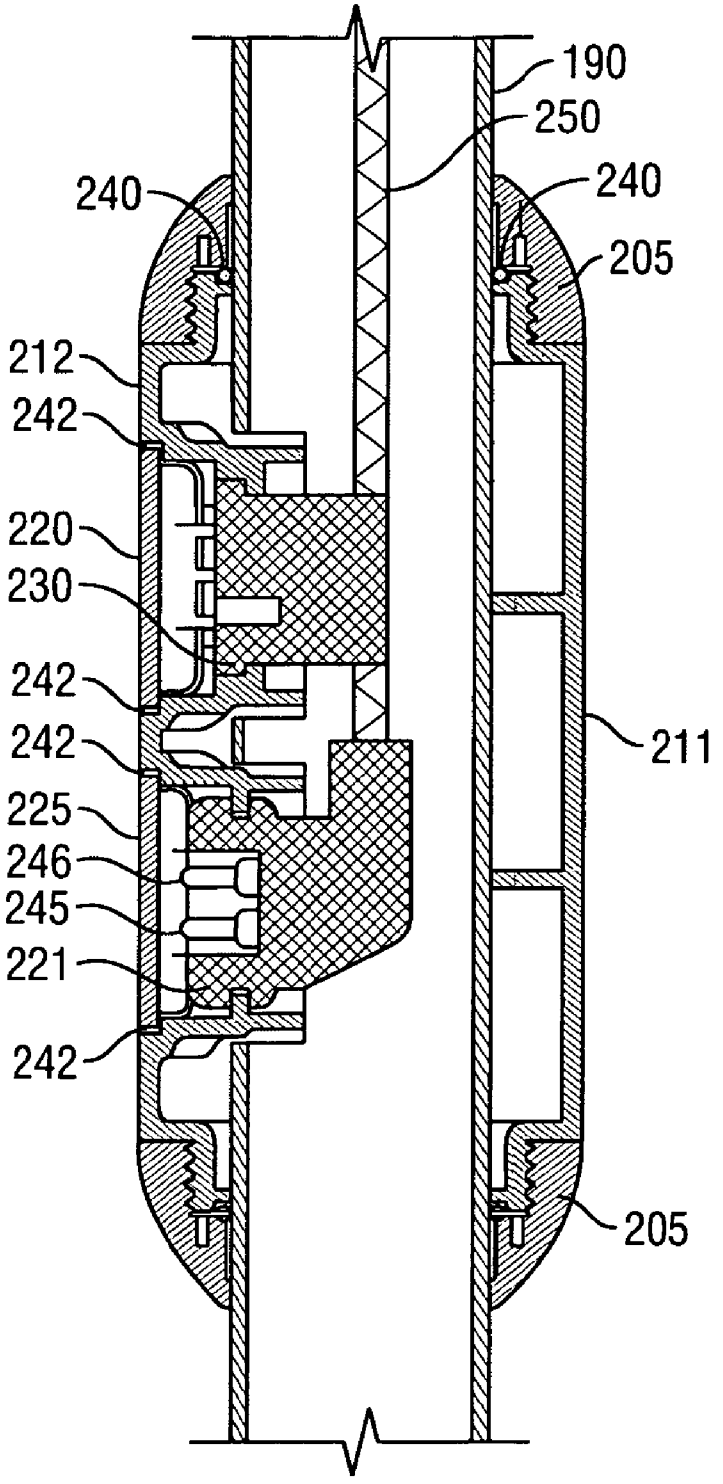
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FIG. 5

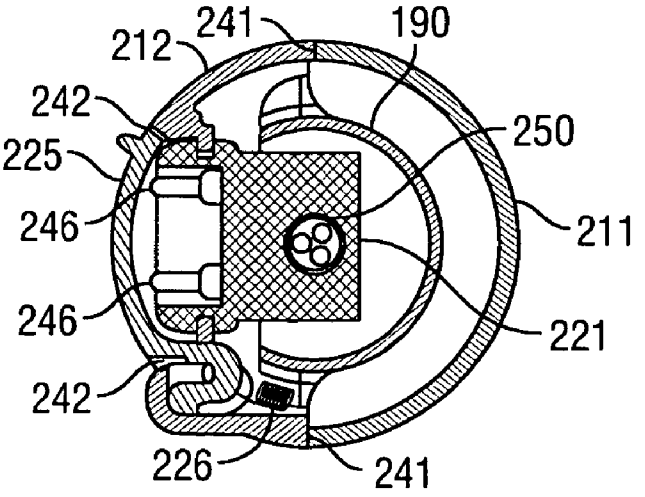
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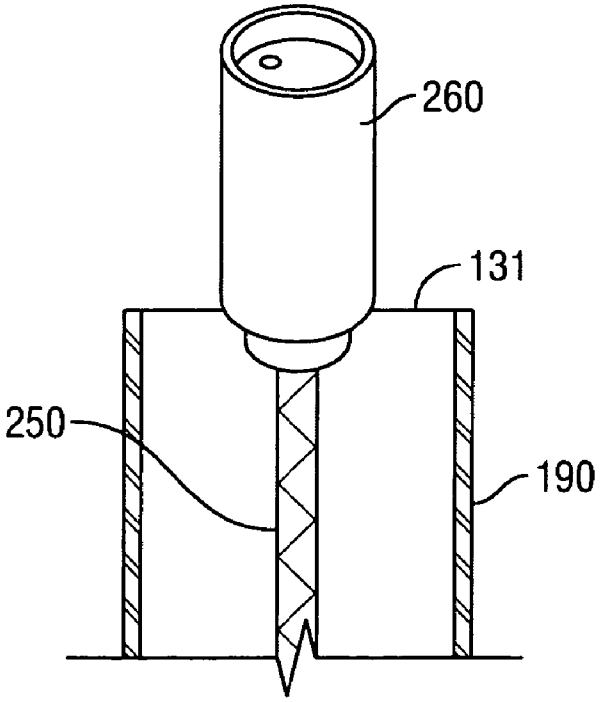
FIG. 6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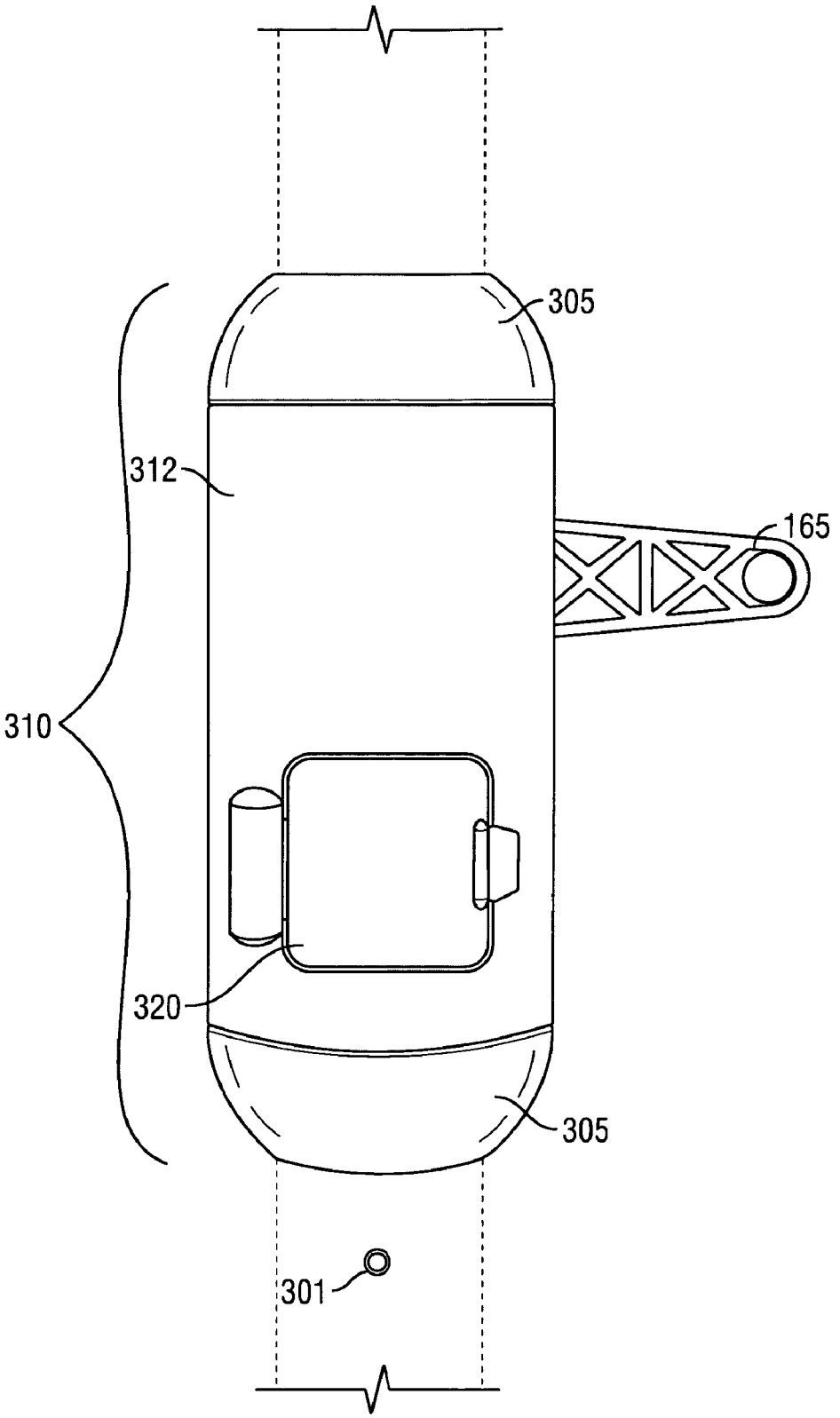

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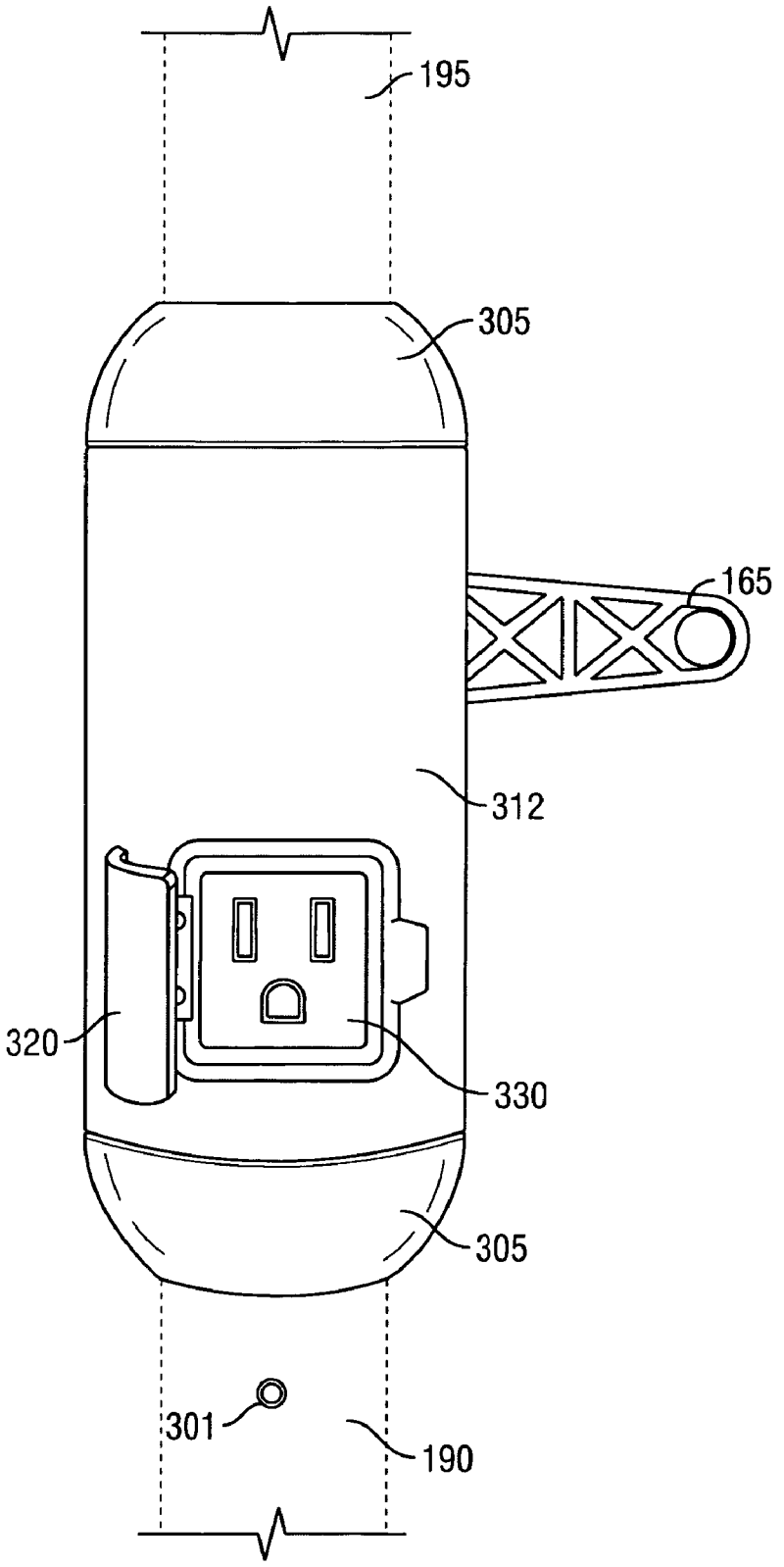

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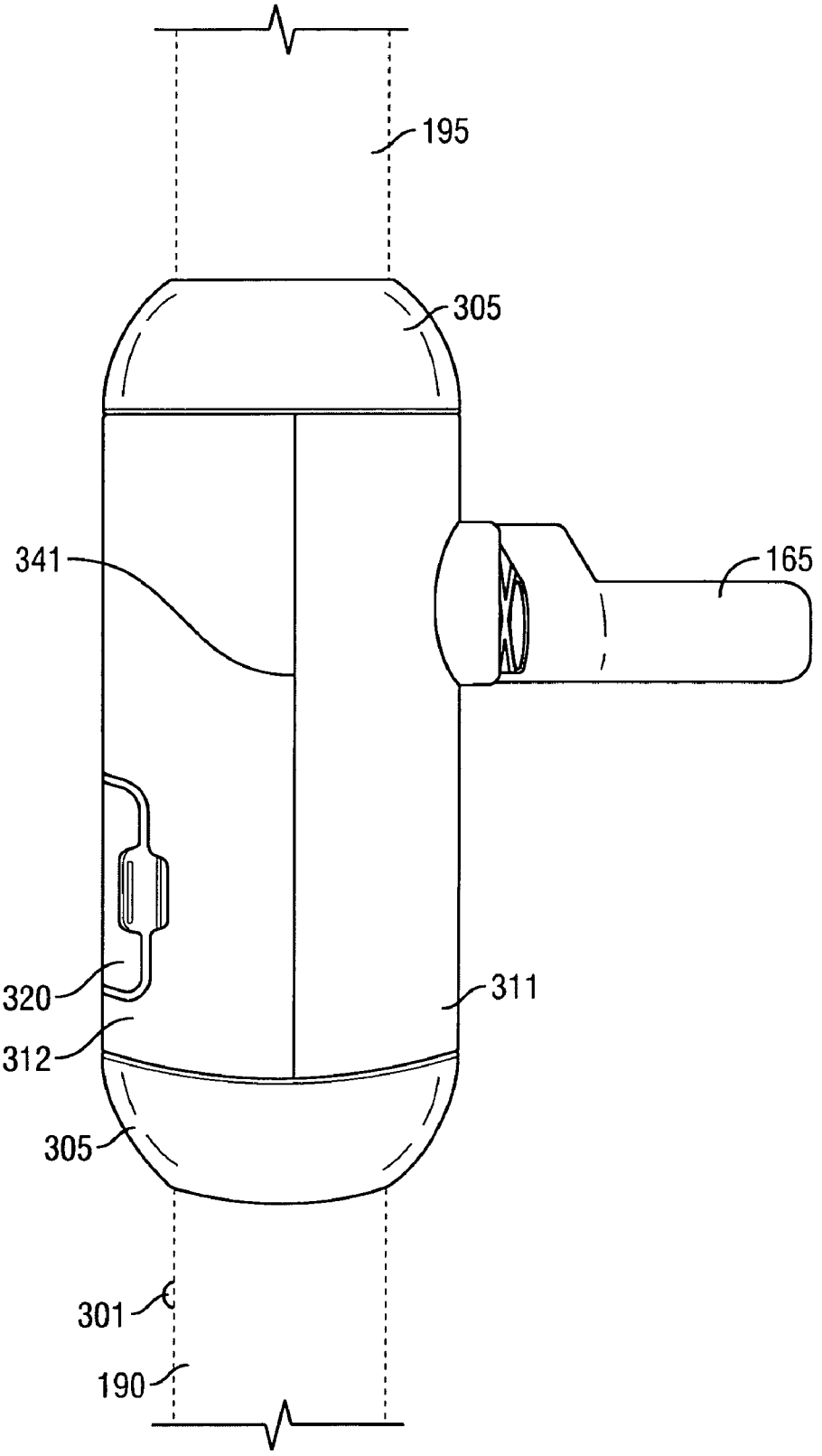

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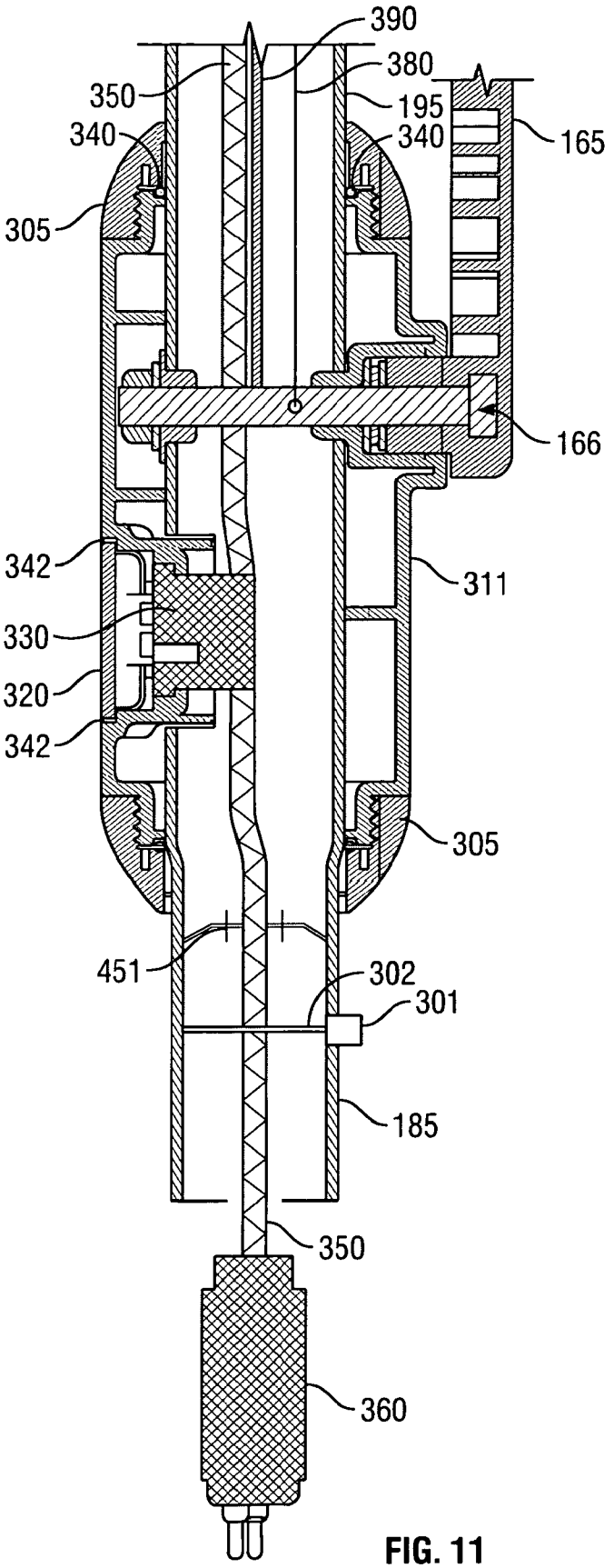
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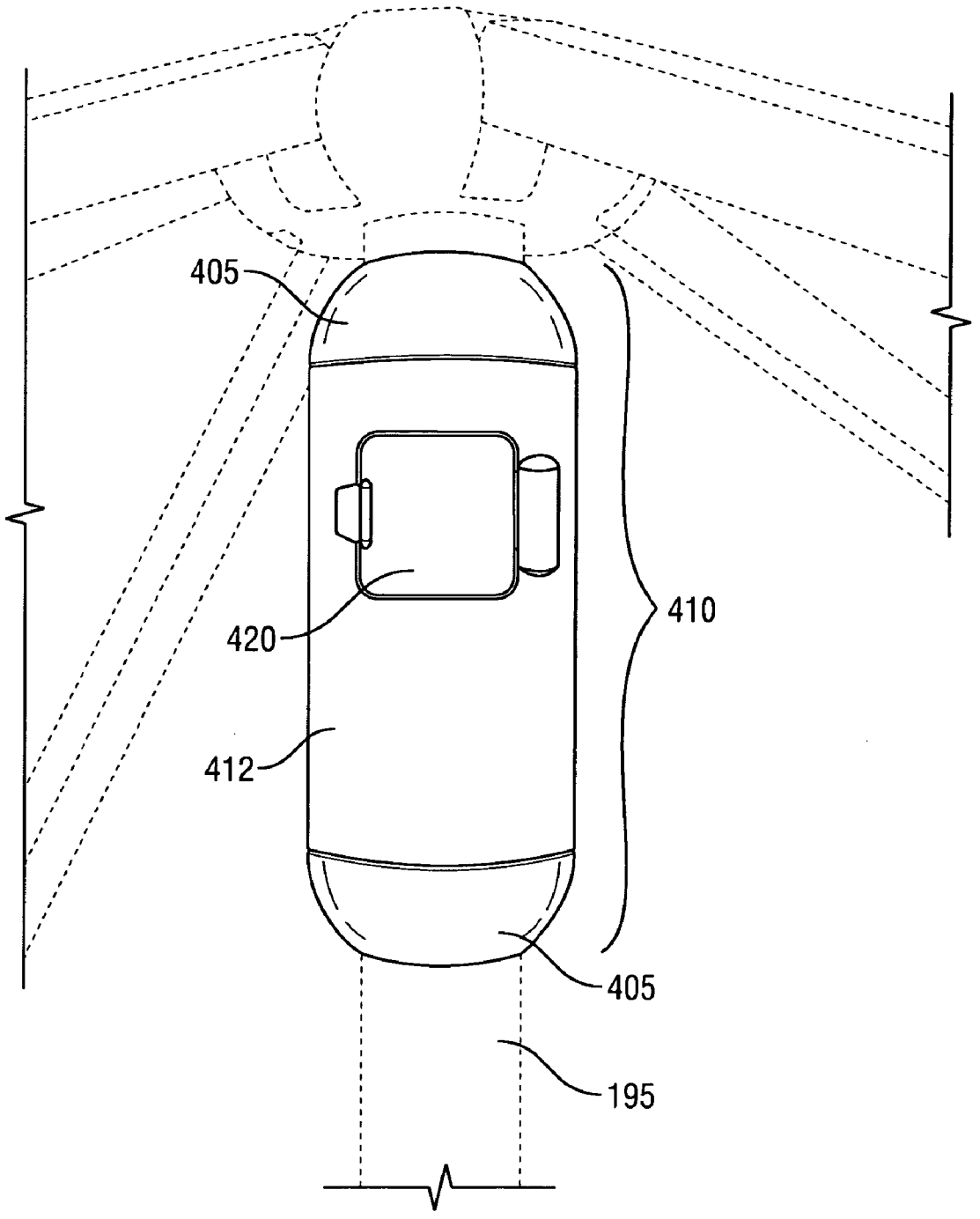
FIG. 11



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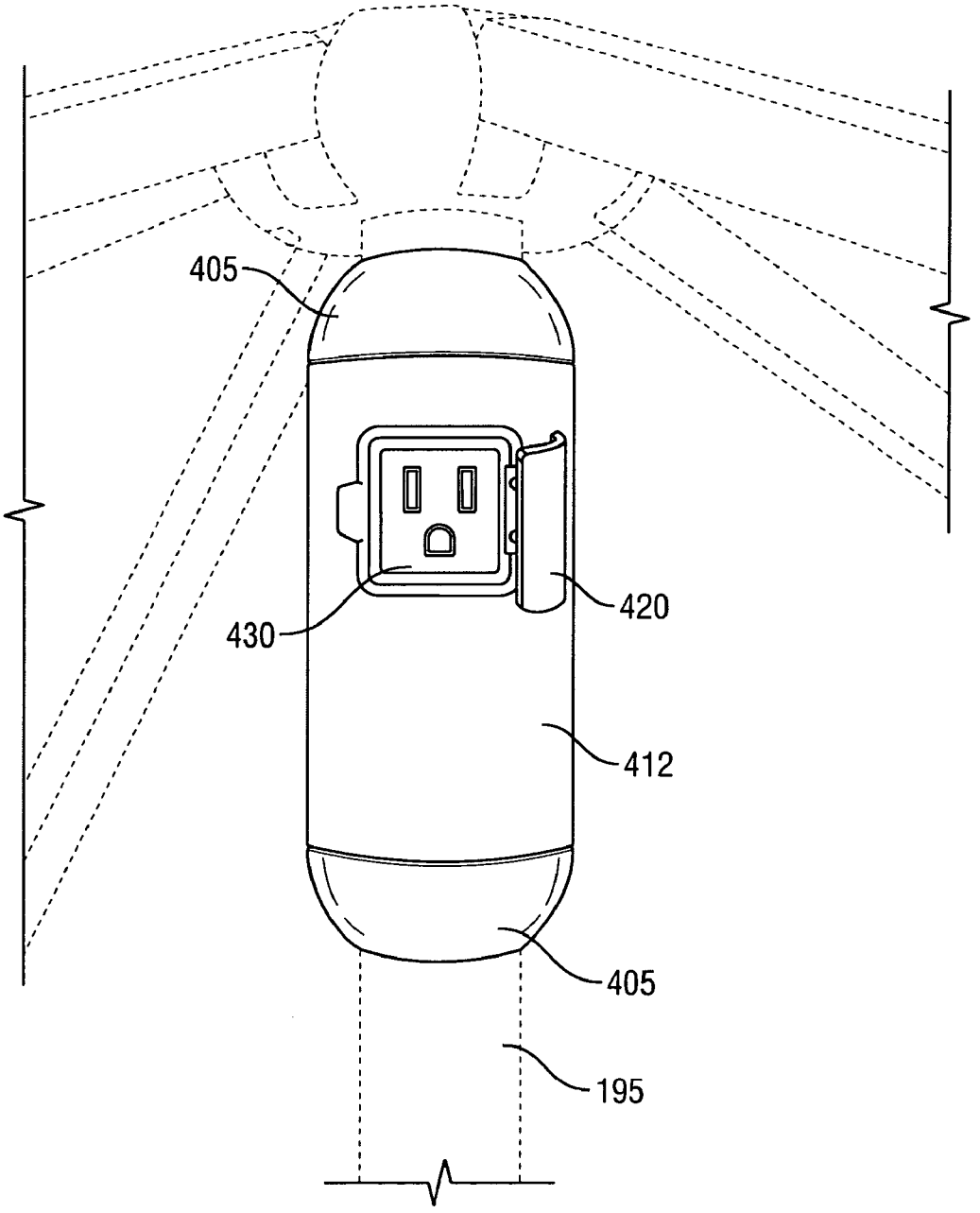

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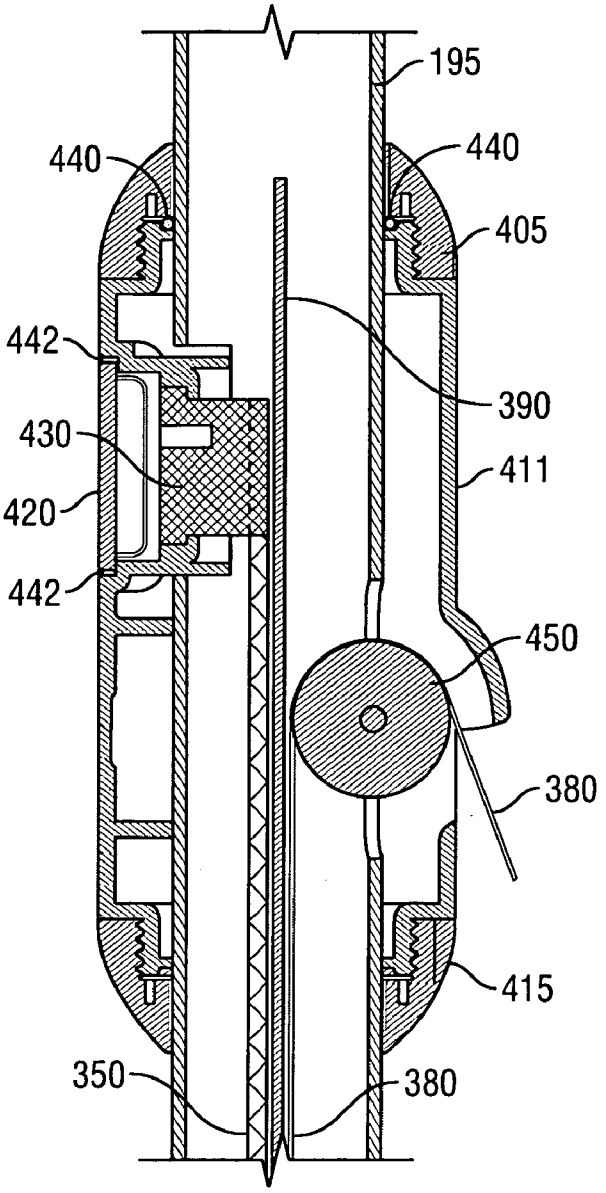
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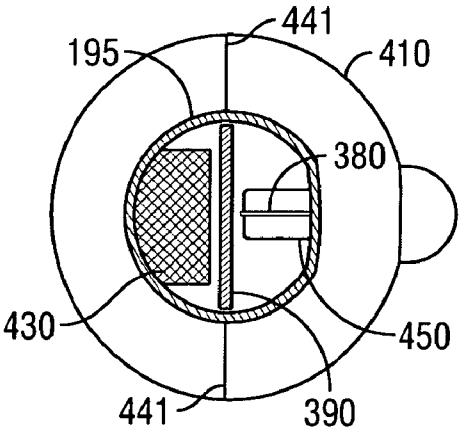
FIG. 14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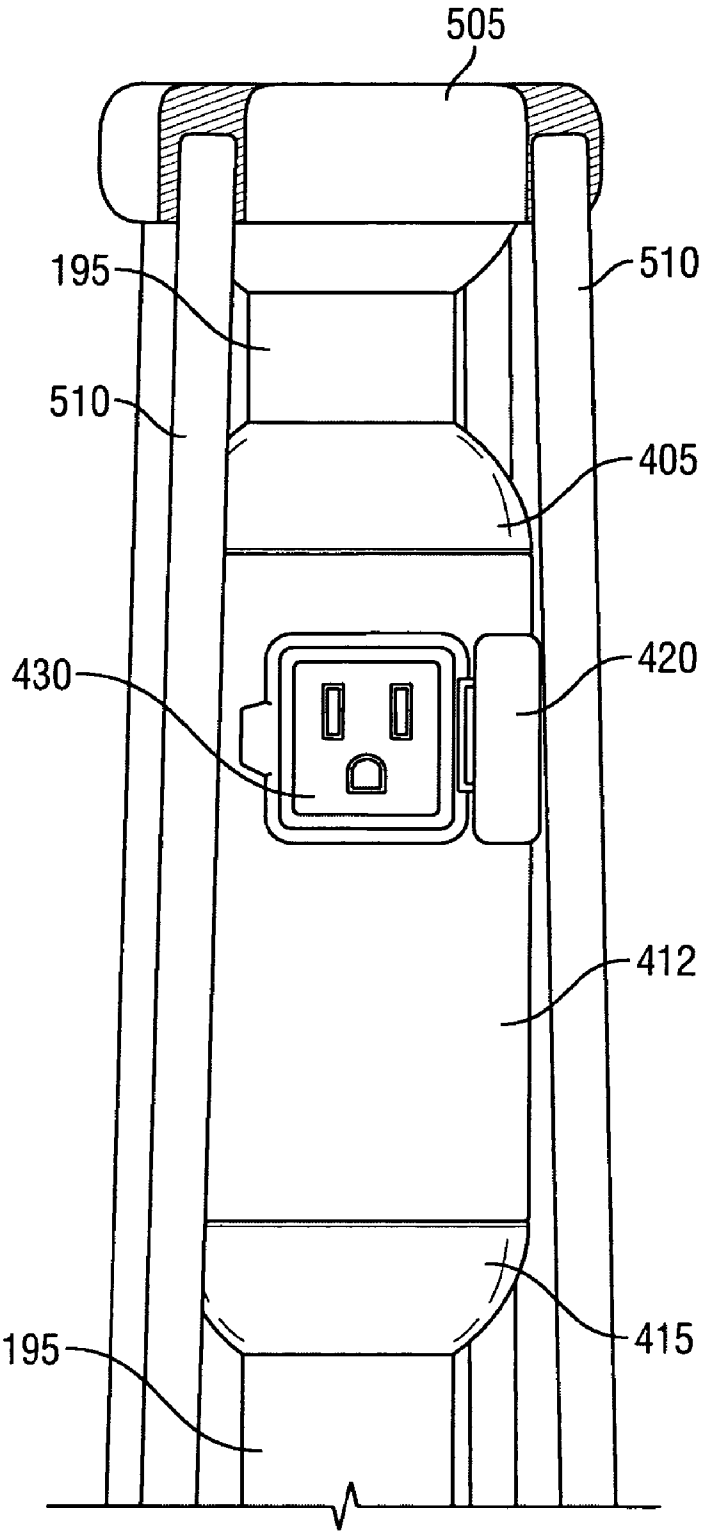

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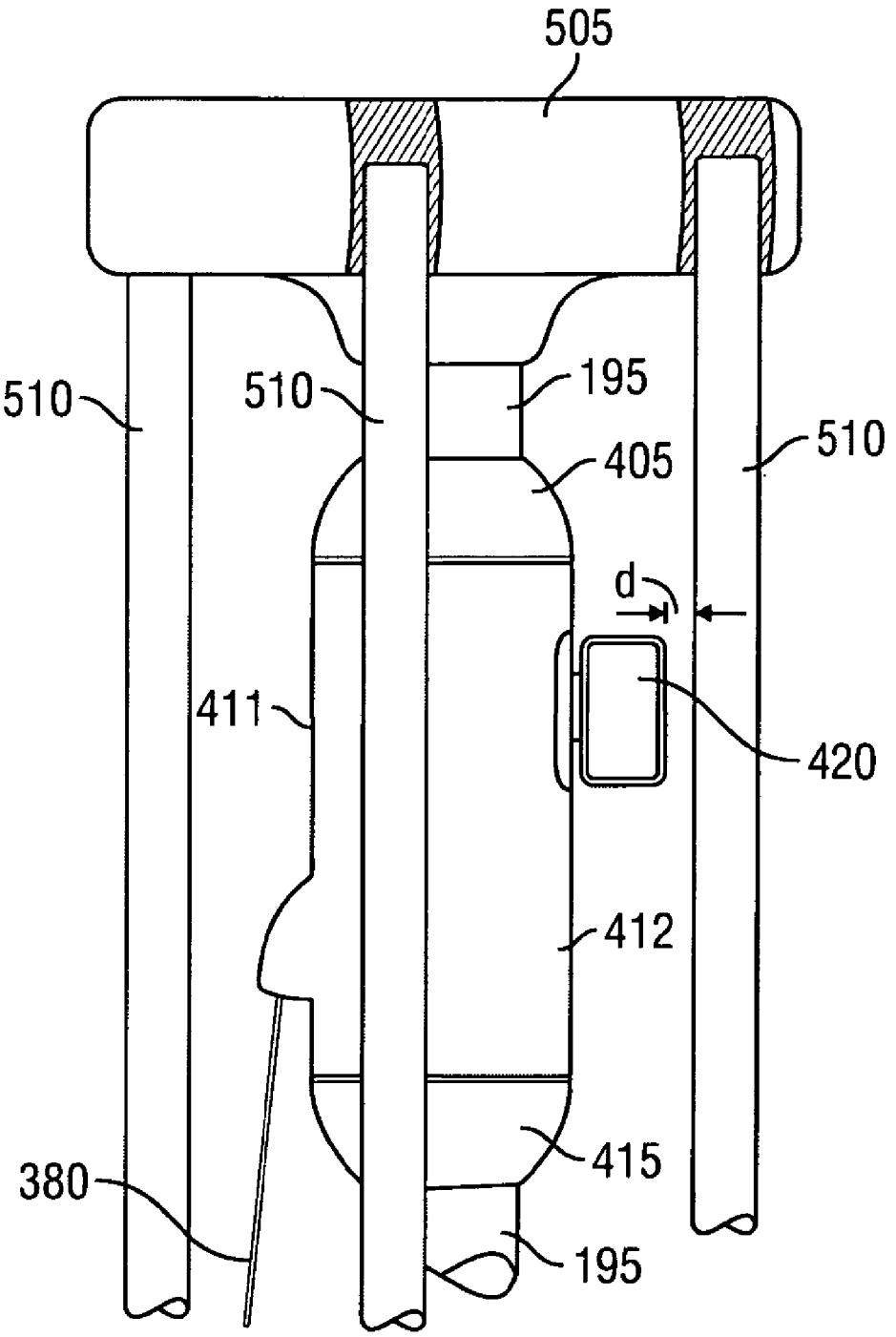

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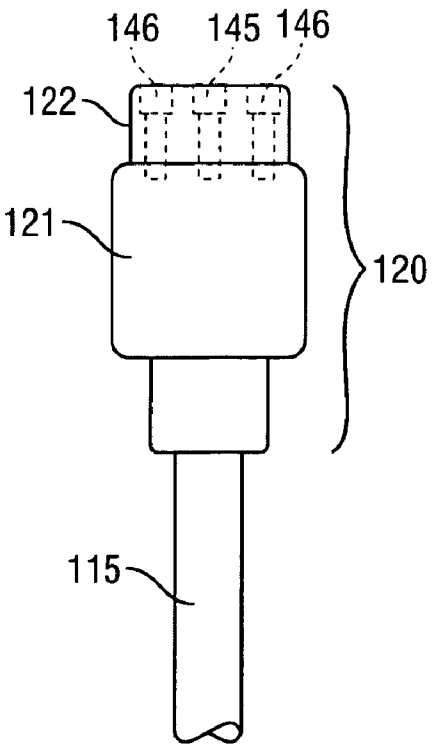

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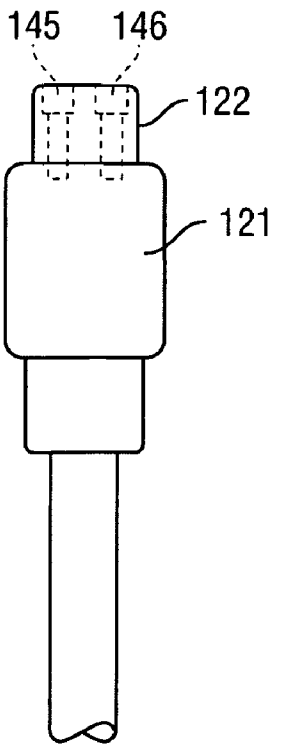

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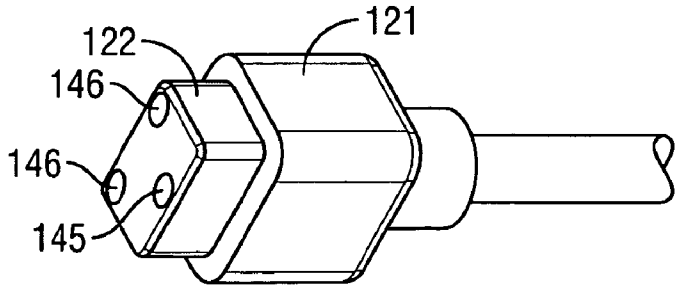

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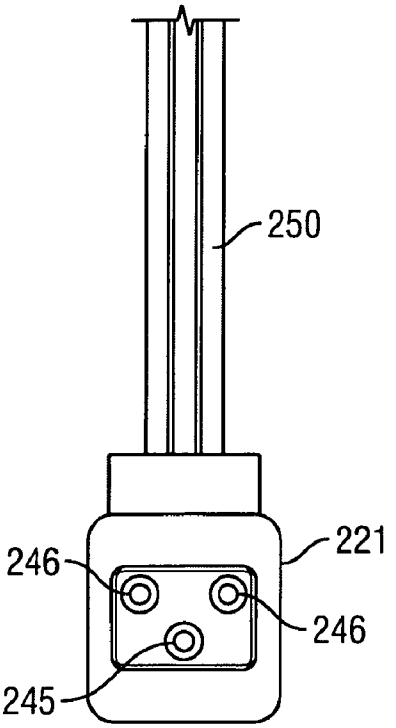

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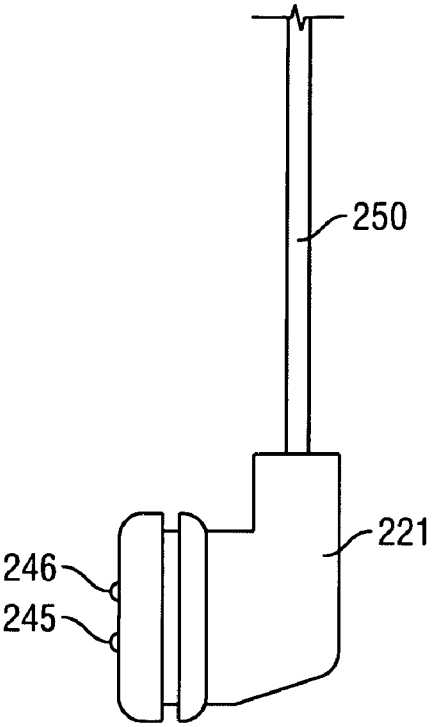

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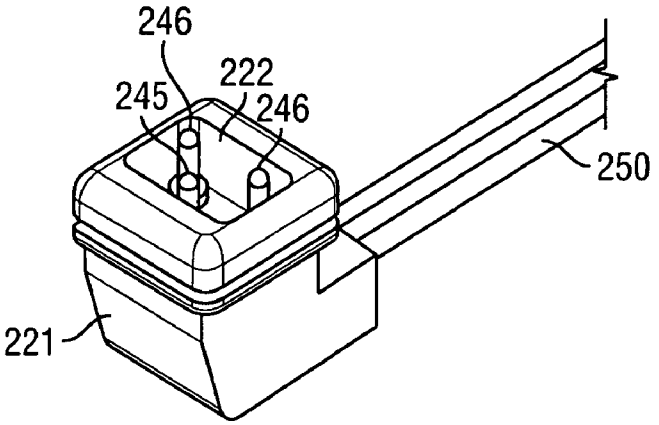

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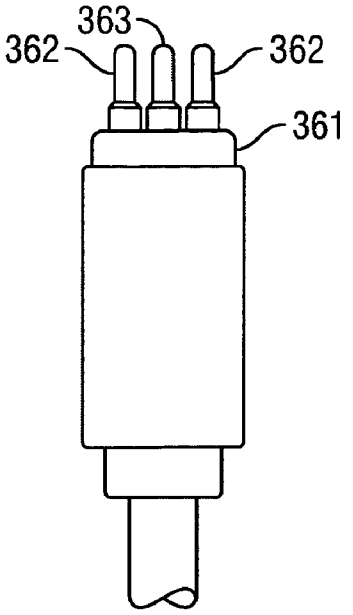

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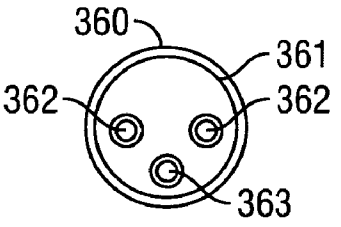

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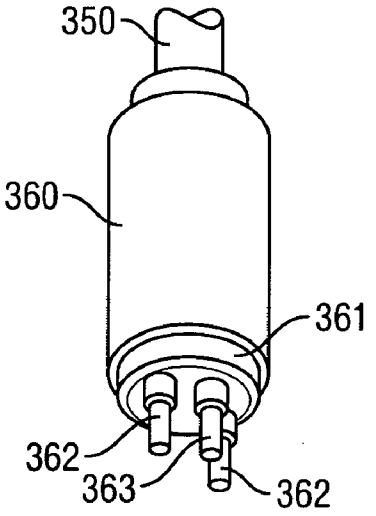

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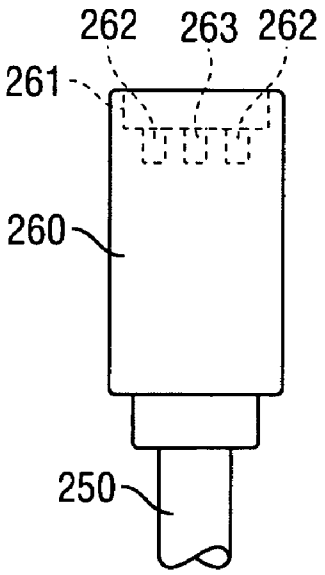
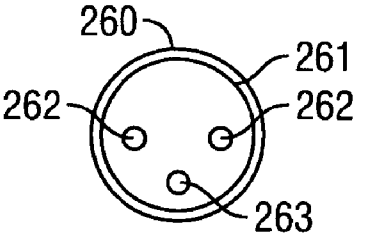


FIG. 27



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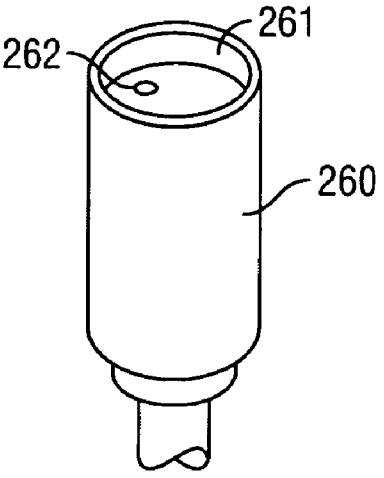
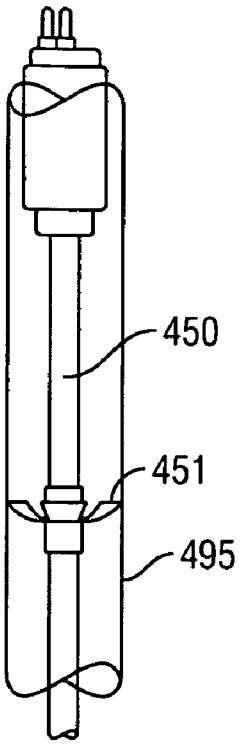


FIG. 29



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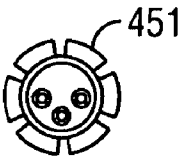

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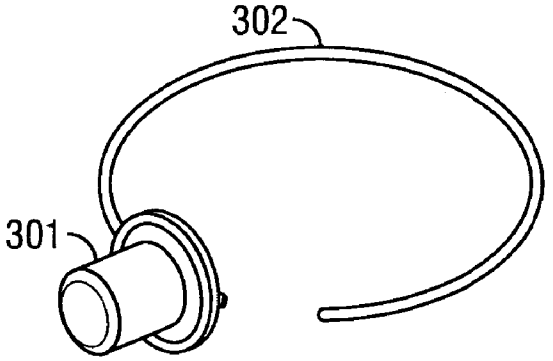

FIG. 32

POWERED PATIO POLE UMBRELLA

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a nonprovisional application which claims the benefit of U.S. Provisional Application No. 60/448,704, filed Feb. 18, 2003, entitled "Power Pole Patio Umbrella" and U.S. Provisional Application No. 60/541,526, filed Feb. 3, 2004, also entitled "Power Pole Patio Umbrella."

BACKGROUND OF THE INVENTION

The present invention generally relates to a patio pole umbrella. More particularly, the present invention relates to a powered patio pole umbrella with electrical outlets for powering appliances, lights, and other devices.

Patio pole umbrellas are currently in wide use by consumers in a variety of applications and settings. A patio pole umbrella is typically installed outdoors to provide shade on a sunny day or shelter from rain on an overcast day. Individuals may sit under the patio pole umbrella by itself, but frequently the patio pole umbrella is installed with a patio table or serving center.

When used with a patio table or serving center, a patio pole umbrella is typically installed with the pole of the umbrella rising up through a hole in the patio table or serving center. To help maintain the balance and vertical position of the patio pole umbrella, the bottom of the pole is sometimes set in a support base.

As an added convenience, the pole sometimes includes an umbrella crank handle for opening and closing the umbrella canopy. The umbrella crank handle is connected to a crank wire that runs up the pole and connects to the support structure of the umbrella canopy. To open and close the umbrella, a user rotates the umbrella crank handle. Rotation of the umbrella crank handle draws or releases the crank wire depending on the direction of rotation. Movement of the crank wire moves the support structure which in turn opens or closes the umbrella canopy.

To further enjoy time spent outdoors under a patio pole umbrella, individuals sometimes bring a radio, television, lights, or other electrical devices out near the patio umbrella. Because such devices require electricity, routing power cords to, from, and around the patio pole umbrella may become cumbersome. Multiple power cords lying around the patio pole take up usable space and present a potential hazard. Consequently, consumers may prefer to reduce the presence of power cords around a patio pole umbrella while still being able to run electrical appliances and other devices.

One way consumers may choose to hide a power cord is to strap the power cord to the surface of the pole of the patio pole umbrella. By securing the power cords near the pole, usable space around the pole is freed up and the potential for inadvertent contact with people is reduced.

For example, a design for a patio pole umbrella lighting system is disclosed in Rushing, U.S. Pat. No. 5,053,931. The system of Rushing shows lights attached to the ribs of an umbrella with zip ties. A power cord for the lights is trained down from the umbrella along the pole of the patio pole umbrella. The power cord is secured to the outside surface of the pole with zip ties.

Another example, is a design for an illuminated garden umbrella disclosed in Finkel, U.S. Pat. No. 2,087,537. The system of Finkle shows a light fixture situated in the top of a garden umbrella. A one-piece, continuous power cord for the light fixture is run from the light fixture to the base of the pole through the inside of the pole. The one-piece, continuous power cord exits the pole at the base of the pole.

While some consumers choose to strap a power cord to the pole, affixing the power cords to the pole in such a manner does not provide for mobility of the electrical devices attached to the power cords or flexibility in changing from the use of electrical one device to another. Also, affixing power cords to the pole does nothing to reduce the number of power cords running around the base of the patio umbrella. Thus, simply securing power cords near the pole of the patio pole umbrella does not provide an optimal solution to management of power cords and wires where an individual desires to alternate the use of various electrical devices near a patio pole umbrella.

For example, a consumer may have a patio pole umbrella installed in the center of a patio table in the backyard of the consumer's home. While sitting at the patio table out in the backyard, the consumer may desire to power a small cooler sitting beneath the table, listen to a radio sitting on the table top, and power a lamp secured up near the umbrella canopy. With a typical patio pole umbrella, the consumer could power the cooler, radio, and lamp in one of two ways: 1) the consumer could run a designated power cord for each device from a household outlet, across the yard, to the patio table; or 2) the consumer could run a single power cord across the yard to a typical household power strip laying on the ground and run power cords from the power strip to each of the cooler, radio, and lamp.

Having numerous power cords strewn across the yard, draped over the edges of the patio table, and hanging from above poses an inconvenient and hazardous situation. The more power cords that are running across the yard and on top of the table, the greater the chances that someone will accidentally stumble over a power cord and/or get snagged on a power cord. Not only could people get hurt by stumbling over the power cords or snagging the power cords, but the electrical devices attached to power cords could be damaged, as well.

For example, in the first scenario presented above, designated power cords may be run from household outlets to each of the cooler, the radio, and the lamp. Each of the power cords may be trained from the outlet, across the yard, to the patio table. The cord for the cooler would be trained on the ground. The cord for the radio sitting on top of the table would run across the table top, over the edge of the table and down to the ground level. The power cord for the lamp would hang down from the top of the umbrella to the table top, run across the table top, lay over the edge of the table, and then hang down to the ground.

In the second scenario, a single power cord may be run from a household outlet to a power strip lying on the ground. Power cords for each of the devices would then be run to the power strip instead of all the way back to outlets at the house. Similar to the first scenario, the cord for the cooler would be trained across the ground to the power strip. The cord for the radio sitting on top of the table would run across the table top, over the edge of the table, and down to the power strip. The power cord for the lamp would hang down from the top of the umbrella to the table top, run across the table top, lay over the edge of the table, and hang down to the power strip.

In either of the two scenarios above, the power cords are strewn all over the table top and hanging in the way of individuals trying to use the patio table. Essentially, the power cords are creating an obstacle course in the vicinity of the patio pole umbrella.

Additionally, the presence of water near electrical devices and cords is of great concern in the outdoor environment. In the above examples, moisture may permeate the junction between the extension cords and the appliance cords or may enter the power strip. Either condition may lead to potentially dangerous shock or electrocution conditions. Such a scenario becomes more likely when the cord or power strip are subjected to rain or are near a pool area where splashing may occur. Such use of extension cords in outdoor, water-exposed environments is specifically forbidden by must safety standards, including those promulgated by Underwriter's Labs (UL), for example.

In order to reduce the clutter associated with powering electrical devices under a patio pole umbrella and free up precious usable space, it may be desirable to have a patio pole umbrella with a wire management system for reducing the presence of power cords under the patio pole umbrella. It may also be highly desirable to have a patio pole umbrella with a wire management system that provides flexibility as to what types of devices may be provided power. It may also be highly desirable to have a patio umbrella with a wire management system that provides the convenience of being able to readily change the devices being powered with minimal effort. It may also be highly desirable to have a wire management solution that minimizes the risk of shock or electrocution and conforms with applicable safety standards. Additionally, it may be highly desirable for the consumer to have access to power outlets at the umbrella or umbrella/patio table in order to power electrical devices and/or appliances that the user may want to use. That is, the availability of power where the consumer needs it (e.g., at the patio table) may be highly desirable.

BRIEF SUMMARY OF THE INVENTION

A preferred embodiment of the present invention provides a powered patio pole umbrella. Power is received by the powered patio pole umbrella from a wall outlet through a cord equipped with a ground fault circuit interrupter. The cord plugs into a bi-directional power hub located in the lower portion of the central pole of the powered patio pole umbrella, but displaced vertically upward from the ground. Power is then supplied from the bi-directional power hub to a plurality of other power hubs located vertically along the powered patio pole umbrella. The power hubs are sealed for moisture and the ground fault circuit interrupter is provided for additional safety

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a powered patio pole umbrella in accordance with an embodiment of the present invention.

FIG. **2** illustrates the powered patio pole umbrella shown in FIG. **1** installed in a patio table in accordance with an embodiment of the present invention.

FIG. **3** illustrates a bi-directional power hub in accordance with an embodiment of the present invention.

FIG. **4** illustrates the bi-directional power hub shown in FIG. **3** with outlet covers in an open position in accordance with an embodiment of the present invention.

FIG. **5** illustrates a longitudinal cross-sectional view of the bi-directional power hub shown in FIG. **3** in accordance with an embodiment of the present invention.

FIG. **6** illustrates a latitudinal cross-sectional view of the bi-directional power hub shown in FIG. **3** in accordance with an embodiment of the present invention.

FIG. **7** illustrates a separable female internal power connector within the patio pole umbrella in accordance with an embodiment of the present invention.

FIG. **8** illustrates a mid-level power hub in accordance with an embodiment of the invention.

FIG. **9** illustrates the mid-level power hub shown in FIG. **8** with an outlet cover in an open position in accordance with an embodiment of the present invention.

FIG. **10** illustrates a side view of the mid-level power hub shown in FIG. **8** in accordance with an embodiment of the present invention.

FIG. **11** illustrates a longitudinal cross-sectional view of the mid-level power hub shown in FIG. **8** with a separable male internal power connector within the patio pole umbrella in accordance with an embodiment of the present invention.

FIG. **12** illustrates a top power hub in accordance with an embodiment of the present invention.

FIG. **13** illustrates the top power hub shown in FIG. **12** with an outlet cover in an open position in accordance with an embodiment of the present invention.

FIG. **14** illustrates a longitudinal cross-sectional view of the top power. hub shown in FIG. **12** in accordance with an embodiment of the present invention.

FIG. **15** illustrates a latitudinal cross-sectional view of the top tube slightly above the top power hub shown in FIG. **12** in accordance with an embodiment of the present invention.

FIG. **16** illustrates the position of a support rib hub and support ribs in relation to the outlet cover of a power hub in accordance with an embodiment of the present invention.

FIG. **17** illustrates the size of a power hub and position of support ribs in relation to the outlet cover of the power hub in accordance with an embodiment of the present invention.

FIG. **18** illustrates a separable male input power connector in accordance with an embodiment of the present invention.

FIG. **19** illustrates a side view of the male input power connector shown in FIG. **18** in accordance with an embodiment of the present invention.

FIG. **20** illustrates a perspective view of the male input power connector shown in FIG. **18** in accordance with an embodiment of the present invention.

FIG. **21** illustrates a separable female input power connector in accordance with an embodiment of the present invention.

FIG. **22** illustrates a side view of the separable female input power connector shown in FIG. **21** in accordance with an embodiment of the present invention.

FIG. **23** illustrates a perspective view of the separable female input power connector shown in FIG. **21** in accordance with an embodiment of the present invention.

FIG. **24** illustrates a separable male internal power connector in accordance with an embodiment of the present invention.

FIG. **25** illustrates an end view of the male internal power connector shown in FIG. **24** in accordance with an embodiment of the present invention.

FIG. **26** illustrates a perspective view of the male internal power connector shown in FIG. **24** in accordance with an embodiment of the present invention.

FIG. **27** illustrates a separable female internal power connector in accordance with an embodiment of the present invention.

FIG. **28** illustrates an end view of the female internal power connector shown in FIG. **27** in accordance with an embodiment of the present invention.

FIG. **29** illustrates a perspective view of the female internal power connector shown in FIG. **27** in accordance with an embodiment of the present invention.

FIG. **30** illustrates a power cable restraint in accordance with an embodiment of the present invention.

FIG. **31** illustrates an end view of an internal power cable with a separable male internal power connector and the power cable restraint shown in FIG. **30** in accordance with an embodiment of the present invention.

FIG. **32** illustrates a pole section slip restraint in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates a powered patio pole umbrella **100** in accordance with an embodiment of the present invention. The powered patio pole umbrella **100** includes a power cord **115**, support base **125**, a powered bottom pole section **130**, and a powered top pole section **140**. The support base **125** includes a support aperture **126**. The powered bottom pole section **130** includes a pole connection aperture **131**, a bottom tube **190**, a bi-directional power hub **210**, an input power receptacle **221**, and a bottom power outlet **230**. The powered top pole section **140** includes an umbrella canopy **150**, an umbrella cap **160**, an umbrella crank handle **165**, a pole connection piece **185**, a top tube **195**, a pole section slip restraint **301**, a mid-level power hub **310**, a mid-level power outlet **330**, a top power hub **410**, and a top power outlet **430**. The power cord **115** includes an outlet plug **105**, a male power input connector **120**, and a ground fault circuit interrupter **110**.

The bottom tube **190** of the powered bottom pole section **130** slides into the support aperture **126** of the support base **125**. The pole section slip restraint **301** depresses into the pole connection piece **185** of the powered top pole section **140**. With the pole section slip restraint **301** depressed, the pole connection piece **185** slides into the pole connection aperture **131** of the powered bottom pole section **130**. The pole connection piece **185** is positioned within the pole connection aperture **131** such that the pole section slip restraint **301** aligns with a hole in the sidewall of the bottom tube **190**. The hole in the sidewall of the bottom tube **190** is sized to receive the pole section slip restraint **301** as the pole section slip restraint **301** is forced into the hole. Engagement of the pole section slip restraint **301** with the hole in the sidewall of bottom tube **190** prevents rotation and sliding of the top tube **195** with respect to the bottom tube **190**.

The female power input connector **120** of the power cord **115** is plugged into the input power receptacle **221** of the powered bottom pole section **130**. The outlet plug **105** on the other end of power cord **115** is plugged into an outlet that supplies electrical power.

The powered patio pole umbrella **100** may be used to provide safe and convenient access to a power supply for appliances and other electrical devices. For example, as further described in detail below, electrical devices may be plugged into the bottom power outlet **230**, the mid-level power outlet **330**, or the top power outlet **430** to reduce the hazards and inconvenience associated with running numerous power cords across a porch, room, or yard in order to plug electrical devices into remote sources of power.

FIG. **2** illustrates the powered patio pole umbrella **100** of FIG. **1** installed within a hole **108** in a patio table **107** in accordance with an embodiment of the present invention. On top of the patio table **107**, a radio **10** is shown plugged into the mid-level power outlet **330**. Clamped to the top tube **195**, a lamp **20** is shown plugged into the top power outlet **430**.

In operation, the female power input connector **120** of the power cord **115** is plugged into the input power receptacle **221** of the powered bottom pole section **130**. On the other end of the power cord **115**, the outlet plug **105** is plugged into a power outlet **106**.

The power outlet **106** provides electrical power from an AC power source to the outlet plug **105**. Electrical power flows from outlet plug **105** through the power cord **115** and the ground fault circuit interrupter **110** to the male power input connector **120**. Electrical power flows from the male power input connector **120** into the input power receptacle **221**. The input power receptacle **221** supplies electrical power to the bottom power outlet **230**, the mid-level power outlet **330**, and the top power outlet **430**.

To power the radio **10** or another electrical device sitting on top of the patio table **107**, the radio **10** or other electrical device may be plugged into the mid-level power outlet **330**. To power the lamp **20** or another electrical device positioned near the top of the powered patio pole umbrella **100**, the lamp **20** or other electrical device may be plugged into the top power outlet **430**.

As shown in FIG. **2**, plugging the radio **10**, the lamp **20**, and other electrical devices into the bottom power outlet **230**, the mid-level power outlet **330**, and the top power outlet **430** reduces hazards and congestion caused by power cords dangling from the umbrella canopy **150** and draping over the edges of the table **107**. Additionally, reduction of power cords dangling from the umbrella canopy **150** above and hanging over the edges of the table **107**, reduces the potential for injury to people through incidental contact with power cords.

For example, reduction of power cords dangling from the umbrella canopy **150** above or hanging over the edges of the table **107**, reduces the chances of people accidentally hooking a power cord with a body part or other object and accidentally dragging the electrical device off the table. Reduction of power cords above the surface of the table also creates more useable room for other items such as food and reading materials.

Additionally, as shown in FIG. **1**, the possibility of water infiltration creating a hazardous shocking condition have been greatly minimized. First, no joining of electric cords occurs at ground level. The outlet plug **105** and input power receptacle are both upwardly vertically displaced from the ground to minimize water penetration. Additionally, the presences of the ground fault circuit interrupter **110** minimizes the possibility of electrocution by being able to interrupt the power supplied if an electrocution condition is occurring.

FIGS. **3**, **4**, **5**, and **6** illustrate the bidirectional power hub **210** in accordance with an embodiment of the present invention. As shown in FIGS. **3**–**6**, the bi-directional power hub **210** includes bi-directional power hub end caps **205**, a bi-directional power hub faceplate **212**, a solid backplate **211**, a bottom outlet cover **220**, the input power receptacle **221**, an input power receptacle cover **225**, and the bottom power outlet **230**.

The bottom power outlet **230** and the input power receptacle **221** are mounted inside the bi-directional power hub **210**. The bottom outlet cover **220** and the input power receptacle cover **225** are attached with hinges to the bi-directional power hub faceplate **212**. The bi-directional power hub end caps **205** encircle the outer surface of the

bottom tube **190** and attach to the bi-directional power hub faceplate **212** and the solid backplate **211**.

More specifically, FIGS. **5** and **6** illustrate cross-sectional views of the bi-directional power hub **210** shown in FIGS. **3** and **4**. The longitudinal cross-sectional view of the bi-directional power hub **210** in FIG. **5** includes the bottom tube **190**, the bi-directional power hub end caps **205**, the solid backplate **211**, the bi-directional power hub faceplate **212**, the bottom outlet cover **220**, the input power receptacle **221**, the input power receptacle cover **225**, the bottom power outlet **230**, the bi-directional power hub end cap seal **240**, bi-directional power hub faceplate cover seals **242**, input ground terminal **245**, input power terminals **246**, and a bottom section internal power cable **250**. The latitudinal cross-sectional view of the bi-directional power hub **210** in FIG. **6** includes the bottom tube **190**, the solid backplate **211**, the bi-directional power hub faceplate **212**, the input power receptacle **221**, the input power receptacle cover **225**, a cover-closing device **226**, bi-directional power hub plate seals **241**, the bi-directional power hub faceplate cover seals **242**, the input power terminals **246**, and the bottom section internal power cable **250**.

The bottom section internal power cable **250** is connected to the input power receptacle **221** and the bottom power outlet **230**. The bottom section internal power cable **250** continues upward within the bottom tube **190** until it reaches the pole connection aperture **131** shown in FIG. **1** and illustrated in FIG. **7**. Near the pole connection aperture **131**, the bottom section internal power cable **250** connects to a female internal power connector **260**.

The input power receptacle **221** and the bottom power outlet **230** are positioned within openings in the sidewall of the bottom tube **190** and attached to the bi-directional power hub faceplate **212**. The bi-directional power hub faceplate **212** and the solid backplate **211** are positioned on opposite sides of the bottom tube **190** with opposing edges pressed together. Threads in the bi-directional power hub end caps **205** engage threads on the bi-directional power hub faceplate **212** and the solid backplate **211**. The bi-directional power hub end caps **205** are rotated until tightly seated with the bi-directional power hub faceplate **212** and the solid backplate **211**.

To prevent the intrusion of water, dust particles, and other undesired foreign objects into the bi-directional power hub **210**, the bi-directional power hub **210** includes the bottom outlet cover **220**, the input power receptacle cover **225**, the bi-directional power hub end cap seal **240**, the bi-directional power hub plate seals **241**, and the bi-directional power hub faceplate cover seals **242**. The bi-directional power hub end cap seal **240** is placed around the bottom tube **190** along the top of the bi-directional power hub faceplate **212** and the solid backplate **211**. As the bi-directional power hub end caps **205** are threaded onto the bi-directional power hub faceplate **212** and the solid backplate **211**, the bi-directional power hub end cap seal **240** is compressed between the bi-directional power hub end cap **205** and both the bi-directional power hub faceplate **212** and the solid backplate **211**. Compressing the bi-directional power hub end cap seal **240** forces the bi-directional power hub end cap seal **240** against the outer surface of the bottom tube **190** and forms a watertight seal.

In addition to the bi-directional power hub end cap seal **240**, the bi-directional power hub **210** includes the bi-directional power hub plate seals **241**. The bi-directional power hub plate seals **241** are sandwiched between the shared edges of the bi-directional power hub faceplate **212** and the solid backplate **211**. As the bi-directional power hub end caps **205** are threaded onto the bidirectional power hub faceplate **212** and the solid backplate **211**, edges of the bi-directional power hub faceplate **212** and the solid backplate **211** are forced together and compress the bi-directional power hub plate seals **241** to form a watertight seal.

To cover the bottom power outlet **230** and the input power receptacle **221** when not in use and reduce the intrusion of water and other particles, the bottom outlet cover **220** and the input power receptacle cover **225** are provided. The bottom outlet cover **220** and the input power receptacle cover **225** are positioned over the bottom power outlet **230** and the input power receptacle **221**. The bottom outlet cover **220** and the input power receptacle cover **225** are attached to the bi-directional power hub faceplate **212** with hinges. To insert a plug into either the bottom power outlet **230** or the input power receptacle **221**, the bottom outlet cover **220** or the input power receptacle cover **225** may be rotated into the open position as shown in FIG. **4**. When a plug is removed from the either the bottom power outlet **230** or the input power receptacle **221**, the bottom outlet cover **220** or the input power receptacle cover **225** is rotated into a closed position as shown in FIG. **3**.

To assist in closing the bottom outlet cover **220** and the input power receptacle cover **225**, cover-closing devices **226** are attached to each of the bottom outlet cover **220** and the input power receptacle cover **225**. The cover-closing devices **226** are anchored to the bi-directional power hub faceplate **212**. The cover-closing devices **226** exert a force on the bottom outlet cover **220** and the input power receptacle cover **225** that causes the outlet cover **220** and the input power receptacle cover **225** to rotate into the closed position.

To further prevent moisture, dirt, and other foreign objects from entering through gaps between the bi-directional power hub faceplate **212** and edges of both the bottom outlet cover **220** and the input power receptacle cover **225**, a bidirectional power hub faceplate cover seal **242** may be installed around the edges of the bottom outlet cover **220** and the input power receptacle cover **225**. With the bottom outlet cover **220** and the input power receptacle cover **225** in the closed position, the bidirectional power hub faceplate cover seals **242** fill the gaps between the bidirectional power hub faceplate **212** and edges of both the bottom outlet cover **220** and the input power receptacle cover **225**.

Consequently, the coverage and seals provided by the bi-directional power hub end cap seal **240**, the bi-directional power hub plate seals **241**, the bidirectional power hub faceplate cover seals **242**, the bottom outlet cover **220**, and the input power receptacle cover **225** help prevent moisture and other materials from entering the bi-directional power hub **210**.

FIGS. **8**, **9**, **10** and **11** illustrate the mid-level power hub **310** in accordance with an embodiment of the present invention. As shown in FIGS. **8**–**11**, the mid-level power hub **310** includes an umbrella crank handle **165**, mid-level power hub end caps **305**, a handle backplate **311**, a mid-level power hub faceplate **312**, a mid-level outlet cover **320**, and a mid-level power outlet **330**.

The mid-level power outlet **330** is mounted inside the mid-level power hub **310**. The mid-level outlet cover **320** is attached with a hinge to the mid-level power hub faceplate **312**. The mid-level power hub end caps **305** encircle the outer surface of the top tube **195** and attach to the mid-level power hub faceplate **312** and the handle backplate **311**.

The umbrella crank handle **165** is used to open and close the umbrella canopy **150** on top of the powered patio pole umbrella **100**. The umbrella crank handle **165** seats in a hole in the handle backplate **311** of the mid-level power hub **310**.

To open and close the umbrella canopy **150**, an individual rotates the umbrella crank handle **165**. Rotation of the umbrella crank handle **165** controls a canopy crank wire that is connected to a support structure of the umbrella canopy **150**.

FIG. **11** illustrates a longitudinal cross-sectional view of the mid-level power hub **310** shown in FIGS. **8**–**10**. The longitudinal cross-sectional view of the mid-level power hub **310** in FIG. **11** includes the umbrella crank handle **165**, the pole connection piece **185**, the top tube **195**, the pole section slip restraint **301**, a pole section slip restraint ring **302**, the mid-level power hub end caps **305**, the handle backplate **311**, the mid-level power hub faceplate **312**, the mid-level outlet cover **320**, the mid-level power outlet **330**, the mid-level power hub end cap seal **340**, a top section internal power cable **350**, a male internal power connector **360**, a canopy crank wire **380**, and an internal separation device **390**.

The male internal power connector **360** from the powered top pole section **140** is plugged into the female internal power connector **260** from the powered bottom pole section **130** shown in FIG. **7**. The male internal power connector **360** is connected to the top section internal power cable **350**. The top section internal power cable **350** is trained inside the powered top pole section **140**. Beginning at the male internal power connector **360**, the top section internal power cable **350** runs inside the pole connection piece **185** and the top tube **195** to the mid-level power outlet **330**. The top section internal power cable **350** is connected to the mid-level power outlet **330**. The top section internal power cable **350** continues upward from the mid-level power outlet **330** towards the top of the powered patio pole umbrella **100**.

The mid-level power outlet **330** is positioned within an opening in the sidewall of the top tube **195** and the mid-level power outlet **330** is attached to the mid-level power hub faceplate **312**. The mid-level power hub faceplate **312** and the handle backplate **311** are positioned on opposite sides of the top tube **195** with opposing edges pressed together. Threads in the mid-level power hub end caps **305** engage threads on the mid-level power hub faceplate **312** and the handle backplate **311**. The mid-level power hub end caps **305** are rotated until tightly seated with the mid-level power hub faceplate **312** and the handle backplate **311**.

To prevent the intrusion of water, dust particles, and other undesired foreign objects into the mid-level power hub **310**, the mid-level power hub **310** includes the mid-level outlet cover **320**, the mid-level power hub end cap seal **340**, the mid-level power hub plate seals **341**, and the mid-level power hub faceplate cover seals **342**. The mid-level power hub end cap seal **340** is placed around the top tube **195** along the top of the mid-level power hub faceplate **312** and the handle backplate **311**. As the mid-level power hub end caps **305** are threaded onto the mid-level power hub faceplate **312** and the handle backplate **311**, the mid-level power hub end cap seal **340** is compressed between the mid-level power hub end cap **305** and both the mid-level power hub faceplate **312** and the handle backplate **311**. Compressing the mid-level power hub end cap seal **340** forces the mid-level power hub end cap seal **340** against the outer surface of the top tube **195** and forms a watertight seal.

In addition to the seal, all power hubs, including the mid-level power hub may be equipped with a drain in the bottom power hub end cap **305**. The drain may allow any moisture entering the power hub to exit the power hub under the force of gravity.

In addition to the mid-level power hub end cap seal **340**, the mid-level power hub **310** includes the mid-level power hub plate seals **341**. The mid-level power hub plate seals **341** are sandwiched between the shared edges of the mid-level power hub faceplate **312** and the handle backplate **311**. As the mid-level power hub end caps **305** are threaded onto the mid-level power hub faceplate **312** and the handle backplate **311**, edges of the mid-level power hub faceplate **312** and the handle backplate **311** are forced together and compress the mid-level power hub plate seals **341** to form a watertight seal.

To cover the mid-level power outlet **330** when not in use and reduce the intrusion of water and other particles, the mid-level outlet cover **320** is provided. The mid-level outlet cover **320** is positioned over the mid-level power outlet **330**. The mid-level outlet cover **320** is attached to the mid-level power hub faceplate **312** with a hinge. To insert a plug into the mid-level power outlet **330**, the mid-level outlet cover **320** may be rotated into the open position as illustrated in FIG. **9**. When a plug is removed from the mid-level power outlet **330**, the mid-level outlet cover **320** is rotated into a closed position as illustrated in FIG. **8**.

To assist in closing the mid-level outlet cover **320**, a cover-closing device **226** like that used in the bi-directional power hub **210** is attached to the mid-level outlet cover **320**. The cover-closing device **226** is anchored to the mid-level power hub faceplate **312**. The cover-closing device **226** exerts a force on the mid-level outlet cover **320** that causes the mid-level outlet cover **320** to rotate into the closed position. **84** To further prevent moisture, dirt, and other foreign objects from entering through gaps between the mid-level power hub faceplate **312** and edges of the mid-level outlet cover **320**, a mid-level power hub faceplate cover seal **342** may be installed around the edges of the mid-level outlet cover **320**. With the mid-level outlet cover **320** in the closed position, the mid-level power hub faceplate cover seals **342** fill the gaps between the mid-level power hub faceplate **312** and edges of the mid-level outlet cover **320**.

Additionally, all outlet covers may alternatively be equipped with a seal, such as an elastic washer seal, around the perimeter of the outlet cover with further minimize water intrusion. Alternatively or in addition to the above, the outlet covers may be equipped with a drain at the bottom of the outlet covers to allow water to drain out in cease water enters the outlet cover.

The internal separation device **390** is positioned inside the top tube **195** between the top section internal power cable **350** and the canopy crank wire **380** to prevent contact between the top section internal power cable **350** and the canopy crank wire **380**. The internal separation device **390** is preferably an good insulator that is rigidly positioned between the internal power cable **350** and the canopy crank wire **380**. Although the internal power cable **350** is preferably already insulated, the internal separation device adds an additional measure of protection to safeguard the consumer.

For example, to open and close the umbrella canopy **150**, the umbrella crank handle **165** is turned. Turning the umbrella crank handle **165** rotates the crank bolt **166**. As the crank bolt **166** is rotated, the canopy crank wire **380** wraps or unwraps from around the crank bolt **166**. Friction between the moving canopy crank wire **380** and the top section internal power cable **350** may damage the top section internal power cable **350** and/or the canopy crank wire **380**.

For example, friction between the canopy crank wire **380** and the top section internal power cable **350** may damage insulation coatings on the top section internal power cable **350** and expose conductors inside the top section internal power cable **350**. Contact between exposed conductors

inside the top section internal power cable **350** and other parts of the powered patio pole umbrella **100** may unintentionally electrify portions of the powered patio pole umbrella **100**. Contact between a person and the unintentionally electrified portions of the powered patio pole umbrella **100** may shock or electrocute the person. Consequently, the internal separation device **390** is positioned between the top section internal power cable **350** and the canopy crank wire **380** to prevent contact between the top section internal power cable **350** and the canopy crank wire **380**.

FIGS. **12**, **13**, **14** and **15** illustrate a top power hub **410** in accordance with an embodiment of the present invention. As shown in FIGS. **12** and **13**, the top power hub **410** includes top power hub end caps **405**, a top power hub faceplate **412**, a top outlet cover **420**, and a top power outlet **430**. As shown in the longitudinal cross-sectional view of FIG. **14** and the latitudinal cross-sectional view of FIG. **15**, the top power hub **14** also includes a wire guide backplate **411**, a top power hub end cap seal **440**, top power hub plate seals **441**, top power hub faceplate cover seals **442**, and a wire guide **450**.

The top power outlet **430** is connected to the top section internal power cable **350** trained inside the top tube **195** from the mid-level power outlet **330**. The top power outlet **430** is positioned within openings in the sidewall of the top tube **195** and attached to the top power hub faceplate **412**. The top outlet cover **420** is attached with a hinge to the top power hub faceplate **412**. The top power hub end caps **405** encircle the outer surface of the top tube **195** and attach to the top power hub faceplate **412** and the wire guide backplate **411**.

The wire guide **450** is located within a hole in the sidewall of the top tube **195**. The wire guide **450** is attached to the sidewall of the top tube **195**. Inside the top tube **195**, the canopy crank wire **380** is trained from the crank bolt **166** shown in FIG. **11** to the wire guide **450**. The canopy crank wire **380** and the wire guide **450** are separated from the top section internal power cable **350** by the internal separation device **390**. The canopy crank wire **380** drapes over the wire guide **450** and exits the top power hub **410** through an opening in the wire guide backplate **411**.

The top power hub faceplate **412** and the wire guide backplate **411** are positioned on opposite sides of the top tube **195** with opposing edges pressed together. Threads in the top power hub end caps **405** engage threads on the top power hub faceplate **312** and the wire guide backplate **411**. The top power hub end caps **405** are rotated until tightly seated with the top power hub faceplate **312** and the wire guide backplate **411**.

To prevent the intrusion of water, dust particles, and other undesired foreign objects into the top power hub **410**, the top power hub **410** includes the top outlet cover **420**, the top power hub end cap seal **440**, the top power hub plate seals **441**, and the top power hub faceplate cover seals **442**. The top power hub end cap seal **440** is placed around the top tube **195** along the top of the top power hub faceplate **412** and the wire guide backplate **411**. As the top power hub end caps **405** are threaded onto the top power hub faceplate **412** and the wire guide backplate **411**, the top power hub end cap seal **440** is compressed between the top power hub end cap **405** and both the top power hub faceplate **412** and the wire guide backplate **411**. Compressing the top power hub end cap seal **440** forces the top power hub end cap seal **440** against the outer surface of the top tube **195** and forms a watertight seal.

In addition to the top power hub end cap seal **440**, the top power hub **410** includes the top power hub plate seals **441**. The top power hub plate seals **441** are sandwiched between the shared edges of the top power hub faceplate **412** and the wire guide backplate **411**. As the top power hub end caps **405** are threaded onto the top power hub faceplate **412** and the wire guide backplate **411**, edges of the top power hub faceplate **412** and the wire guide backplate **411** are forced together and compress the top power hub plate seals **441** to form a watertight seal.

To cover the top power outlet **430** when not in use and reduce the intrusion of water and other particles, the top outlet cover **420** is provided. The top outlet cover **420** is positioned over the top power outlet **430**. The top outlet cover **420** is attached to the top power hub faceplate **412** with a hinge. To insert a plug into the top power outlet **430**, the top outlet cover **420** may be rotated into the open position as illustrated in FIG. **13**. When a plug is removed from the top power outlet **430**, the top outlet cover **420** is rotated into a closed position as illustrated in FIG. **12**.

To assist in closing the top outlet cover **420**, a cover-closing device **226** similar to that used in the bidirectional power hub **210** is attached to the top outlet cover **420**. The cover-closing device **226** is anchored to the top power hub faceplate **412**. The cover-closing device **226** exerts a force on the top outlet cover **420** that causes the top outlet cover **420** to rotate into the closed position.

To further prevent moisture, dirt, and other foreign objects from entering through gaps between the top power hub faceplate **412** and edges of the top outlet cover **420**, top power hub faceplate cover seals **442** may be installed around the edges of the top outlet cover **420**. With the top outlet cover **420** in the closed position, the top power hub faceplate cover seals **442** fill the gaps between the top power hub faceplate **412** and edges of the top outlet cover **420**.

In an alternative embodiment, there may be a plurality of bottom power outlets **230**, mid-level power outlets **330**, and/or top power outlets **430**. Also, there may be a plurality of bi-directional power hubs **210**, mid-level power hubs **310**, and/or top power hubs **410** spread throughout the length of the powered top pole section **140** and the powered bottom pole section **130**. Also, the bottom power outlet **230**, the mid-level power outlet **330**, and the top power outlet **430** may be installed in power hubs that are separated from other components such as the input power receptacle **221**, the umbrella crank handle **165**, and the wire guide **450**.

In an alternative embodiment, a ground fault circuit interrupter **110** similar to that shown in FIG. **1** may be installed in a power hub on the patio pole umbrella **100**. For example, a ground fault circuit interrupter **110** may be installed in the bi-directional power hub **210**, the mid-level power hub **310**, or the top level power hub **410**. The ground fault circuit interrupter **110** may be installed in the power hubs **210**, **310**, and **410** in place of or in addition to the ground fault circuit interrupter **110** installed in the power cord **115**.

FIGS. **16** and **17** illustrate the top power hub **410** shown in FIGS. **12**–**15** with a support rib hub **505** and support ribs **510** in accordance with an embodiment of the present invention. The support ribs **510** support the umbrella canopy **150**. The support rib hub **505** is positioned on the end of the top tube **195**. The support ribs **510** are connected to the support rib hub **505**. The top outlet cover **420** and the top power outlet **430** are positioned between the support ribs **510** when the umbrella canopy **150** is in the closed position.

In operation, the umbrella crank handle **165** shown in FIGS. **1**, **2** and **8**–**11** is rotated to open and close the umbrella canopy **150**. As the umbrella canopy **150** is closed, the support ribs **510** that support the umbrella canopy **150** are drawn inward towards the powered top pole section **140** of the powered patio pole umbrella **100**. As the support ribs **510**

are drawn inward towards the powered top pole section **140**, plugs of devices plugged into the top power hub **430**, such as the lamp **20** shown in FIG. **2**, may be damaged if the support ribs **510** crush or bend the plug. Similarly, the top outlet cover **420** may be damaged by the support ribs **510** when the umbrella canopy **150** is lowered.

To prevent damage to the top outlet cover **420** and plugs of devices that are plugged into the top power outlet **430** while the umbrella canopy **150** and the support ribs **510** are being lowered, the top power outlet **430** and the top outlet cover **420** may be positioned to avoid contact with the support ribs **510**. For example, as shown in FIG. **16**, the top power outlet **430** and the top outlet cover **420** may be positioned relative to the support ribs **510** such that the top outlet cover **420** and the top power outlet **430** are situated between the support ribs **510** and do not contact the support ribs **510** when the umbrella canopy **150** is opened and closed.

In the alternative, the size of the support rib hub **505** may be such that the support ribs **510** do not contact the top power outlet **430** or the top outlet cover **420** when the umbrella canopy **150** is opened or closed. For example, as shown in FIG. **17**, the diameter of the support rib hub **505** may be such that the support ribs **510** never get closer than a predetermined minimum distance to an open top outlet cover **420**. In FIG. **17**, the top outlet cover **420** is in the open position and all of the support ribs **510** are prevented from getting closer than a minimum distance designated as "d" from the open top outlet cover **420**.

Consequently, devices plugged into the top power outlet **430** may be conveniently left plugged in when the umbrella canopy **150** is lowered without incurring damage from the support ribs **510** or other portions of the support structure. **105** FIGS. **18**, **19**, **20**, **21**, **22**, and **23** illustrate an embodiment of a power input connector **120** and an input power receptacle **221** in accordance with an embodiment of the present invention. The power input connector **120** includes a power input connector base **121**, a power input connector face **122**, female input power terminals **146**, and a female input ground terminal **145**. The input power receptacle **221** includes an input power receptacle cavity **222**, a male input ground terminal **245**, and male input power terminals **246**.

The power input connector base **121** is connected to the power chord **115**. The power input connector face **122** is connected to the power input connector base **121**. The female power input terminals **146** are attached to conductors within the power chord **115** that carry electricity from the power outlet **106**. The female power input terminals **146** are positioned inside the power input connector face **122**. The female input ground terminal **145** is also positioned inside the power input connector face **122**.

The input power receptacle **221** is connected to the bottom section internal power cable **250**. The input power receptacle cavity **222** is located within the input power receptacle **221** and sized to receive the power input connector face **122** of the power input connector **120**. The male input power terminals **246** are attached to conductors within the bottom section internal power cable **250**. The male input power terminals **246** are positioned inside the input power receptacle cavity **222**. The male input ground terminal **245** is also positioned within the input power receptacle cavity **222** and connected to a ground conductor within the bottom section internal power cable **250**.

In operation, the power cord **115** provides electrical power to the powered patio pole umbrella **100** from an AC power source. For example, the outlet plug **105** on the end of power cord **115** is plugged into a power source **106** as shown in FIG. **2**. The power input connector **120** is plugged into the input power receptacle **221** to provide a conductive path for power to flow from the power source **106** to the input power receptacle **221** of the powered patio pole umbrella **100**.

As the power input connector **120** is plugged into the input power receptacle **221**, the power input connector face **122** is inserted into the input power receptacle cavity **222**. After the power input connector face **122** is inserted into the input power receptacle cavity **222**, the male input power terminals **246** are seated within the female input power terminals **146**. Similarly, the male input ground terminal **245** is seated within the female input ground terminal **145**. Contact between the male input power terminals **246** and the female input power terminals **146** allows electricity to flow from the female input power terminals **146** to the male input power terminals **246**. Contact between the male input ground terminal **245** and the female input ground terminal **145** furnishes a conductive path to an established ground for the powered patio pole umbrella **100**.

FIGS. **24**, **25**, **26**, **27**, **28** and **29** illustrate the male internal power connector **360** and the female internal power connector **260** in accordance with an embodiment of the present invention. The male internal power connector **360** includes a male internal power connector face **361**, male internal power connector terminals **362**, and a male internal ground terminal **363**. The female internal power connector **260** includes an internal power connector cavity **261**, female internal power connector terminals **262**, and female internal ground terminal **263**.

The female internal power connector **260** is connected to the bottom section internal power cable **250**. The internal power connector cavity **261** is located within the end of the female internal power connector **260**. The female internal power connector **262** and the female internal ground terminal **263** are connected to conductors in the bottom section internal power cable **250**. The female internal power connector terminals **262** and the female internal ground terminal **263** are located on the bottom surface of the internal power cavity **261**.

The male internal power connector **360** is connected to the top section internal power cable **350**. The male internal power connector terminals **362** and the male internal ground terminal **363** are connected to conductors in the top section internal power cable **350**. The male internal power connector terminals **362** and the male internal ground terminal **363** are located on the male internal power connector face **361** of the male internal power connector **360**.

In operation, the male internal power connector **360** is plugged into the female internal power connector **260**. The connection between the female internal power connector **260** and the male internal power connector **360** provides a conductive path for power to be transferred between the bottom section internal power cable **250** and the top section internal power cable **350**.

As the male internal power connector **360** is plugged into the female internal power connector **260**, the male internal power connector face **361** is inserted into the internal power connector cavity **261**. After the male internal power connector face **361** is inserted into the internal power connector cavity **261**, the male internal power connector terminals **362** are seated within the female internal power connector terminals **262**. Similarly, the male internal ground terminal **363** is seated within the female internal ground terminal **263**. Contact between the male internal power connector terminals **362** and the female internal power connector terminals **262** allows electricity to flow from the female internal power

connector terminals **262** to the male internal power connector terminals **362**. Contact between the male internal ground terminal **363** and the female internal ground terminal **263** furnishes a conductive path to an established ground for the powered top section **140** of the powered patio pole umbrella **100**.

As shown in FIGS. **24**–**29**, the relative positions of the male internal power connector terminals **362**, the male internal ground terminal **363**, the female internal power connector terminals **262**, and the female ground terminal **263** are such that the male internal power connector **360** is prevented from plugging into the female internal power connector **260** unless corresponding power terminals and ground terminals are properly aligned.

For example, the male internal power connector terminals **362** in FIG. **25** are positioned on opposite sides of the periphery of the male internal power connector **360**. The male internal ground terminal **363** is positioned along the periphery of male internal power connector **360** perpendicular to an axis running through both of the male internal power connector terminals **362**. Likewise, the female internal power connector terminals **262** in FIG. **28** are positioned on opposite sides of the periphery of female internal power connector **260**. The female internal ground terminal **263** is positioned along the periphery of female internal power connector **260** perpendicular to an axis running through both of the female internal power connector terminals **262**. With the male internal power connector terminals **362**, the female internal power connector terminals **262**, the male internal ground terminal **363**, and the female internal ground terminal **263** in this configuration, the male internal power connector **360** is prevented from being inserted into the female internal power connector **260** unless the terminals are properly aligned.

In alternative embodiments, the male internal power connector terminals **362**, the female internal power connector terminals **262**, the male internal ground terminal **363**, and the female internal ground terminal **263** may be positioned in a different configuration. For example, the male internal power connector terminals **362** and the male internal ground terminal **363** may be positioned along a single axis running across the face of the male internal power connector **360** with the male internal ground terminal **363** located between the two male internal power connector terminals **362**. Likewise, the female internal power connector terminals **262** and the female internal ground terminal **263** could be similarly positioned to received corresponding male internal power connector terminals **362** and the male internal ground terminal **363**.

In another alternative embodiment, the locations of the male internal power connector **360** and the female internal power connector **260** may be switched. The male internal power connector **360** may attached to the bottom section internal power cable **250** and the female internal power connector **260** may be attached to the top section internal power cable **350**.

FIGS. **30** and **31** illustrate a power cable restraint **451** in accordance with an embodiment of the present invention. The power cable restraint **451** is attached to a power cable **450**. The power cable **450** and the power cable restraint **451** are inserted inside a tube **495**.

In operation, the power cable restraint **451** contacts the inner surface of the tube **495**. Lateral movement of the power cable **450** inside the tube **495** is prevented by the contact between the power cable restraint **451** and the inner surface of the tube **495**. Longitudinal movement of the power cable **450** inside the tube **495** is prevented by friction between the edges of the power cable restraint **451** and the inner surface of the tube **495**. Consequently, the power cable **450** is prevented from shifting around inside the tube **495**.

Because the power cable restraint **451** prevents the power cable **450** from shifting around inside the tube **495**, the power cable restraint **451** may be used inside the bottom tube **190** and top tube **195** of the powered patio pole umbrella **100** to prevent the bottom section internal power cable **250** and top section internal power cable **350** from sliding and shifting inside the bottom tube **190** and the top tube **195**. By preventing the bottom section internal power cable **250** and the top section internal power cable **350** from sliding and shifting, the male internal power connector **360** and the female internal power connector **260** may be prevented from sliding into the bottom tube **190** and the top tube **195** and making the male internal power connector **360** and the female internal power connector **260** unreachable. Also, restraining movement of the bottom section internal power cable **250** and the top section internal power cable **350** with the power cable restraint **451** assists in maintaining predetermined spacing between both the bottom section internal power cable **250** and the top section internal power cable **350** and other components inside the bottom tube **190** and the top tube **195** of the powered patio pole umbrella **100**.

FIG. **32** illustrates a pole section slip restraint **301** in accordance with an embodiment of the present invention. The pole section slip restraint **301** is attached to a pole section slip restraint ring **302**.

In operation, the pole section slip restraint **301** and the pole section slip restraint ring **302** are positioned inside the pole connection piece **185** of the powered top pole section **140** as shown in FIG. **11**. The pole section slip restraint ring **302** is installed inside the pole connection piece **185** with the top section internal power cable **360** trained through the opening of the pole section slip restraint ring **302**. The pole section slip restraint **301** is inserted in a hole in the sidewall of the pole connection piece **185**.

As described above with respect to FIG. **1**, the pole section slip restraint **301** depresses into the pole connection piece **185** of the powered top pole section **140**. With the pole section slip restraint **301** depressed, the pole connection piece **185** slides into the pole connection aperture **131** of the powered bottom pole section **130**. The pole connection piece **185** is positioned within the pole connection aperture **131** such that the pole section slip restraint **301** aligns with a hole in a sidewall of the bottom tube **190**. The hole in the sidewall of the bottom tube **190** is sized to receive the pole section slip restraint **301** as the pole section slip restraint **301** is forced into the hole by pressure supplied by the pole section slip restrain ring **302**. Engagement of the pole section slip restraint **301** with the hole in the sidewall of bottom tube **190** prevents rotation and sliding of the top tube **195** with respect to the bottom tube **190**.

Consequently, the pole section slip restraint **301** prevents damage to the bottom section internal power cable **250** and the top section internal power cable **350** that would result from twisting if the top tube **195** was allowed to rotate with respect to the bottom tube **190**. Also, the pole section slip restraint ring **302** provides a force that keeps the pole section slip restraint **301** positioned within the hole in the sidewall of the bottom tube **190** while also accommodating the bottom section internal power cable **250** and the top section internal power cable **350** that are trained inside the bottom tube **190** and the top tube **195**.

Thus, the powered patio pole umbrella **100** provides a safer wire management system for providing electrical

power to devices used outdoors without impairing the overall operability of a patio pole umbrella.

That is, rather than extending numerous extension cords across a yard or patio and/or positioning power strips around an umbrella, a consumer may safely and conveniently plug electrical devices into power outlets provided by the powered patio pole umbrella **100**. To reduce the risks of shock or other hazards associated with using electricity in an outdoor environment, the powered patio pole umbrella **100** includes numerous safety features.

For example, incidental contact with power cords is reduced by routing a single power cord from a power outlet to a powered patio pole umbrella **100**. While an input power receptacle **221** may be positioned in the support base **125** for the powered patio pole umbrella **100**, the input power receptacle **221** is positioned in the powered bottom pole section **130** of the powered patio pole umbrella **100** to raise the location of the input power receptacle **221** above the level of the ground. By positioning the input power receptacle **221** further from the ground, exposure of the input power receptacle **221** to moisture and contaminants at the ground level is reduced.

To further reduce exposure of electrified components to moisture and contaminants, the power patio pole umbrella **100** has been provided with various water seals and protective covers. For example, the power hubs **210**, **310**, and **410** have been provided with cap seals **240**, **340**, and **440** to prevent moisture and particles from leaking into the power hubs **210**, **310**, and **410**. Also, the power hubs **210**, **310**, and **410** have been provided with outlet covers **220**, **320**, and **420** along with cover seals **242**, **342**, and **442** to prevent the entrance of moisture and particles into the power outlets **230**, **330**, and **430** and other parts of the power hubs **210**, **310**, and **410**.

Alternatively, the power hubs **210**, **310**, and **410** may be equipped with a drain in the lower cap seal **240**, **340**, **440**, to allow the exit of moisture under the force of gravity. Also, the outlet covers **220**, **320**, and **420** may include a drain at the bottom of the outlet cover to allow the drainage of water under the force of gravity.

In addition to the ground fault circuit interrupter **110** shown near the outlet **106**, a ground fault circuit interrupter **110** similar to that shown in FIG. **1** may be installed in a power hub on the patio pole umbrella **100**. For example, a ground fault circuit interrupter **110** may be installed in the bi-directional power hub **210**, the mid-level power hub **310**, or the top level power hub **410**. The ground fault circuit interrupter **110** may be installed in the power hubs **210**, **310**, and **410** in place of or in addition to the ground fault circuit interrupter **110** installed in the power cord **115**.

The power hubs **210**, **310**, and **410** have also been incorporated into the powered patio pole umbrella **100** without impairing the operability of the powered patio pole umbrella **100**.

For example, an umbrella crank handle **165** is included with the powered patio pole umbrella **100** for raising and lowering the umbrella canopy **150**. The umbrella canopy **150** may be raised and lowered without damaging electrical components within the powered patio pole umbrella **100** or having to unplug devices plugged into the powered patio pole umbrella **100**.

To protect power cables **250**, **350** and other electrical components within the powered patio pole umbrella **100**, the moving parts associated with raising and lowering the umbrella canopy **150** are separated from the electrical components by an internal separation device **390**. The internal separation device **390** prevents the power cables **250**, **350** and other electrical components from contacting the moving parts and being damaged due to abrasive and corrosive effects. Thus, by separating the power cables **250**, **350** and other electrical components from the moving parts, there is less chance for conductors within the power cables **250**, **350** and other components to become exposed and accidentally electrify unintended portions of the powered patio pole umbrella **100**.

Additionally, some portions of the powered patio pole umbrella **100** and some devices on the powered patio pole umbrella **100** are protected from damage by predetermined positioning or sizing of portions of the umbrella canopy support structure. For example, the power hubs **210**, **310**, and **410** may be aligned with gaps between the canopy support ribs **510** or other portions of the canopy support structure. Also, the canopy support rib hub **505** may be increased in size and/or portions of the canopy support structure may be bent in order to prevent contact between the canopy support structure and portions of the power hubs **210**, **310**, and **410** such as the outlet covers **220**, **320**, and **420**.

Additionally, the central pole of the powered patio pole umbrella **100** including the powered bottom pole section **130** and the powered top pole section **140** may be composed of a pole having a greater diameter than the pole depicted in FIGS. **1** and **2**. For example, the powered bottom pole section **130** and the powered top pole section **140** include hub areas having a greater diameter than other areas along the pole as shown in FIGS. **1** and **2**. Alternatively, the diameter of the powered bottom pole section **130** and the powered top pole section **140** may be made to equal the diameter of the hub section and maintain that diameter the length of the pole. The overall effect of the change in pole diameter may be to decrease the appearance of the electrical outlets while at the same time providing better moisture proofing. That is, the hubs are eliminated and consequently the hub seals at top and bottom need not be relied upon.

Thus, the powered patio pole umbrella **100** provides safety and convenience not provided by prior art patio pole umbrellas. A consumer may easily assemble a powered patio pole umbrella **100** and plug the powered patio pole umbrella **100** into an outlet **106**. Electrical devices may be conveniently plugged into the power outlets **230**, **330**, and **430** provided by the powered patio pole umbrella **100** without a need for long extension cords. Also, precious usable space is freed up by plugging cords into power outlets **230**, **330**, and **430** on the pole rather than hazardously draping and hanging cords on and above a patio table **107**.

When a consumer is done using the powered patio pole umbrella **100**, the inconvenience of having to unplug lights and put away extension cords is eliminated. The powered patio pole umbrella **100** is moisture resistant and may be safely left connected to a power source **106**. Similarly, lights may be left plugged into the top outlet **430** even if the umbrella canopy **150** is lowered because clearance is provided between the top outlet **430** and the canopy support structure so that plugs and outlet covers will not be damaged.

Thus, a powered patio pole umbrella **100** provides a safe and convenient wire management system that frees up usable space under the powered patio pole umbrella **100** and reduces clutter associated with power cords of electrical devices. The powered patio pole umbrella **100** also provides flexibility as to what types of devices may be supplied with power. The powered patio pole umbrella **100** also provides a system where devices powered by the powered patio pole umbrella **100** may be easily swapped and changed.

While the invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its scope. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A patio pole umbrella including:
an umbrella canopy;
a pole for supporting said umbrella canopy; and
a power hub affixed to said pole,
wherein said power hub includes an electrical outlet supplying AC electricity to an electrical device
wherein said hub includes an input power receptacle receiving AC electricity.

2. The patio pole umbrella of claim **1** wherein an electrical connector is introduced into said input power receptacle to provide electrical power to said electrical outlet.

3. The patio pole umbrella of claim **2** wherein said electrical connector is removable from said input power receptacle.

4. The patio pole umbrella of claim **2** wherein said electrical connector is connected to an electrical cord including a circuit interrupter.

5. The patio pole umbrella of claim **4** wherein said circuit interrupter is a ground fault circuit interrupter.

6. The patio pole umbrella of claim **1** wherein said pole is supported by a base resting on a surface and said power hub is positioned vertically upward from said surface along said pole.

7. The patio pole umbrella of claim **1** wherein said pole is not permanently fixed in a single location.

8. The patio pole umbrella of claim **1** wherein said electrical outlet is at least partially coverable by a movable door attached to said power hub.

9. The patio pole umbrella of claim **1** further including at least one additional electrical outlet for providing AC electricity to an electrical device;
wherein said additional electrical outlet is positioned at a different vertical height along said pole from said power hub.

10. The patio pole umbrella of claim **1** wherein said pole comprises more than one vertical section.

11. The patio pole umbrella of claim **10** wherein at least two of said vertical sections include an additional electrical outlet for providing AC electricity to an electrical device.

12. The patio pole umbrella of claim **11** wherein an internal electrical connection is provided between said at least two vertical sections to provide power to said additional electrical outlets.

13. The patio pole umbrella of claim **12** wherein said internal electrical connection is comprised of a plurality of electrical connectors that are physically connected to provide electrical power to said additional electrical outlets.

14. The patio pole umbrella of claim **10** wherein said pole includes an internal separator to axially separate the interior of said pole into at least two sections.

15. The patio pole umbrella of claim **14** wherein electrical current carrying elements are placed in one of said sections to isolate said electrical current carrying elements from the remainder of the interior of the pole.

16. A movable outdoor furniture article including:
a pole for supporting a canopy of an umbrella; and
a power hub;
wherein said power hub is incorporated into said pole; and
wherein said power hub includes
an electrical outlet providing AC electricity to an electrical device; and
an input power receptacle receiving electrical power;
wherein an electrical connector is introduced into said input power receptacle to provide electrical power to said electrical outlet.

17. The movable outdoor furniture article of claim **16** wherein said electrical connector is removable from said input power receptacle.

18. The movable outdoor furniture article of claim **16** wherein said electrical connector is connected to an electrical cord including a circuit interrupter.

19. The movable outdoor furniture article of claim **18** wherein said circuit interrupter is a ground fault circuit interrupter.

20. The movable outdoor furniture article of claim **16** wherein said pole is supported by a base resting on a surface and said power hub is positioned vertically upward from said surface.

21. The movable outdoor furniture article of claim **16** wherein said movable outdoor furniture article is not permanently fixed in a single location.

22. The movable outdoor furniture article of claim **16** wherein said electrical outlet is at least partially coverable by a movable door attached to said power hub.

23. The movable outdoor furniture article of claim **16** wherein said input power receptacle is at least partially coverable by a movable door attached to said power hub.

24. The movable outdoor furniture article of claim **16** further including at least one additional electrical outlet for providing AC electricity to an electrical device;
wherein said additional electrical outlet is positioned at a different vertical height along said pole from said power hub.

25. The movable outdoor furniture article of claim **16** wherein said pole comprises more than one section.

26. The movable outdoor furniture article of claim **25** wherein at least one of said sections includes an additional electrical outlet for providing AC electrical power to an electrical device.

27. The movable outdoor furniture article of claim **25** wherein at least two of said sections include an additional electrical outlet for providing AC electricity to an electrical device.

28. The movable outdoor furniture article of claim **27** wherein an internal electrical connection is provided between said at least two sections to provide power to said additional electrical outlets.

29. The movable outdoor furniture article of claim **28** wherein said internal electrical connection is comprised of a plurality of electrical connectors that are physically connected to provide electrical power to said additional electrical outlets.

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