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Dahl et al.

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(54) **SHELTER FOR PORTABLE ELECTRICAL INLETS/OUTLETS**

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Related U.S. Application Data

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(51) **Int. Cl.**

H01R 13/46	(2006.01)
H05K 5/02	(2006.01)
H02G 3/08	(2006.01)
H02G 9/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H05K 5/0247*** (2013.01); ***H02G 3/088*** (2013.01); ***H02G 9/00*** (2013.01)

(58) **Field of Classification Search**

USPC 174/549, 50, 520; 248/906; 361/600; 439/367, 369

See application file for complete search history.

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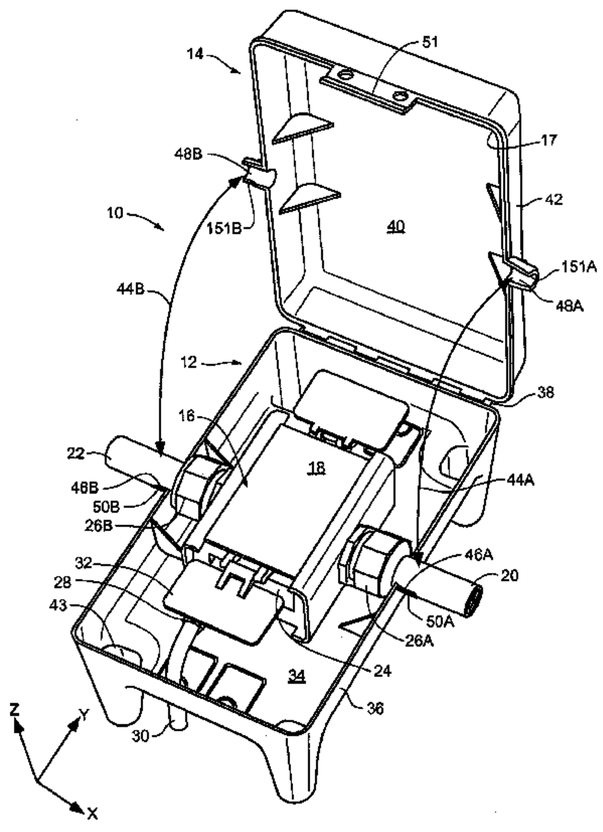
(57) **ABSTRACT**

A shelter for protecting a portable electrical inlet/outlet (PEIO) includes a base and a cover. In some examples, the base includes a platform to support a body of the PEIO, and the platform is configured to segregate the PEIO body from water that may accumulate. In some examples, the cover configured to mate with the base to substantially enclose the platform. Upon being inserted into the shelter, the PEIO may be protected from unwanted elements, such as rain, snow, unintended contact by humans or animals, or the like.

18 Claims, 14 Drawing Sheets



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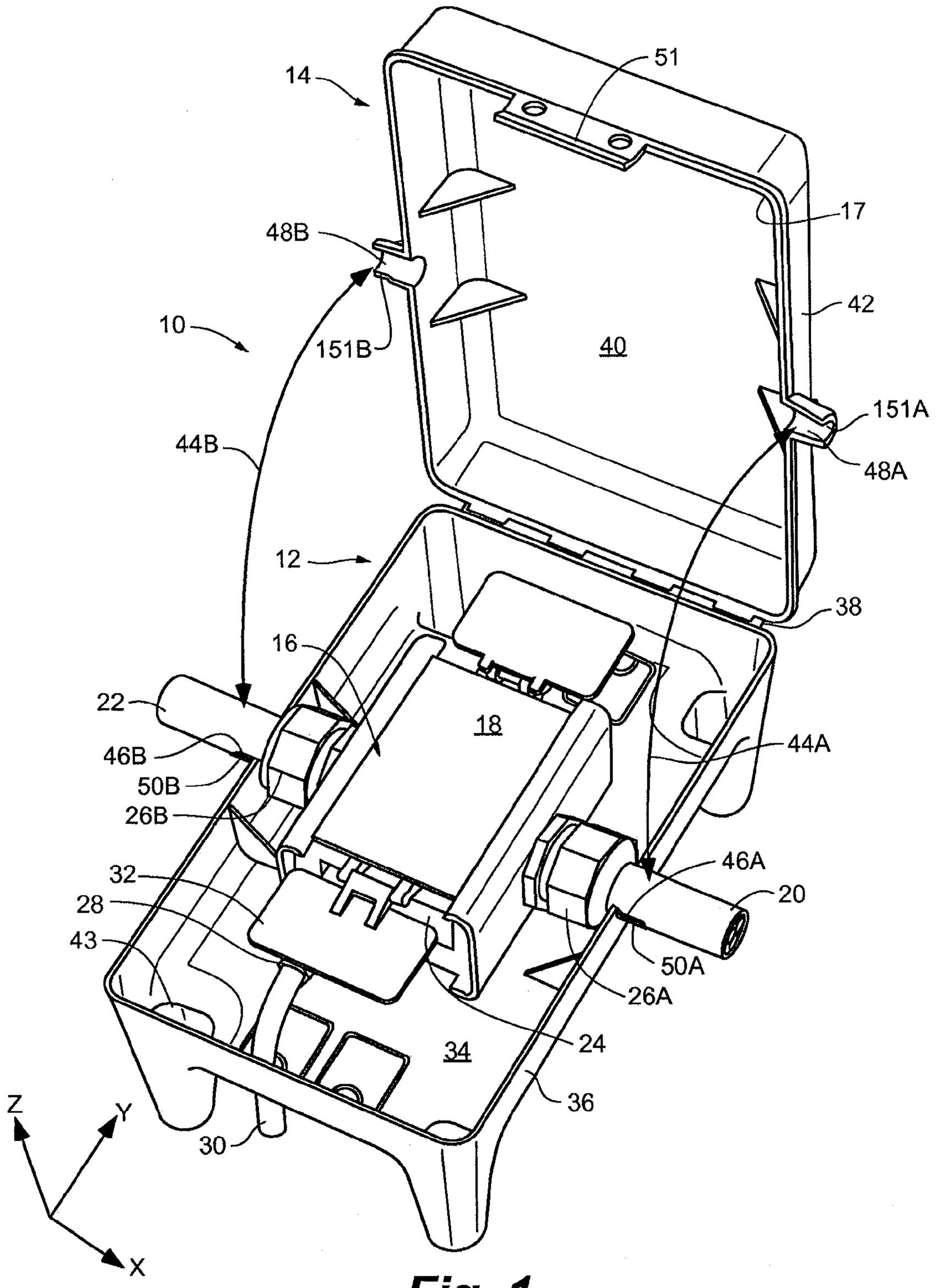
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Fig. 1

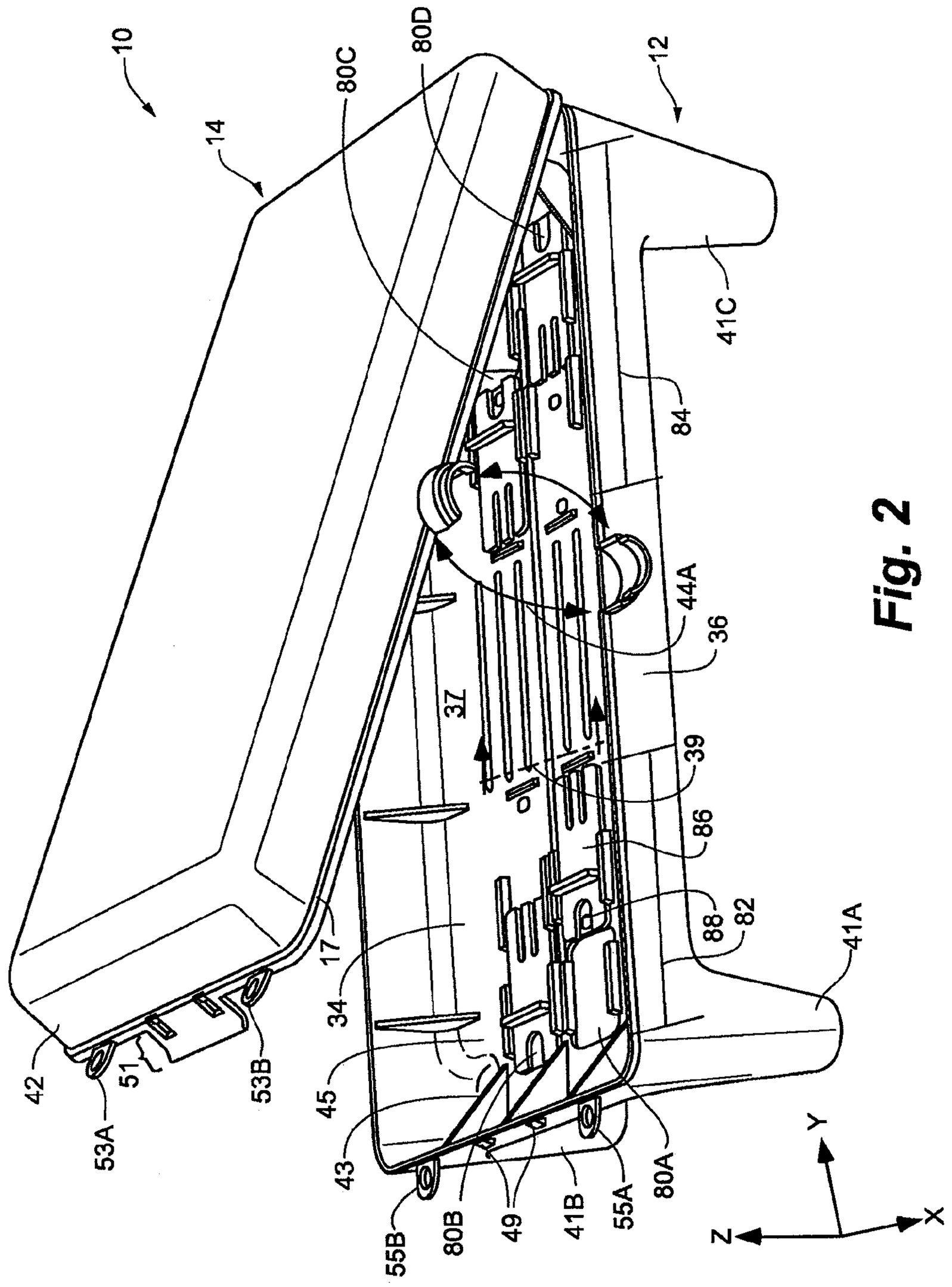
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Fig. 2

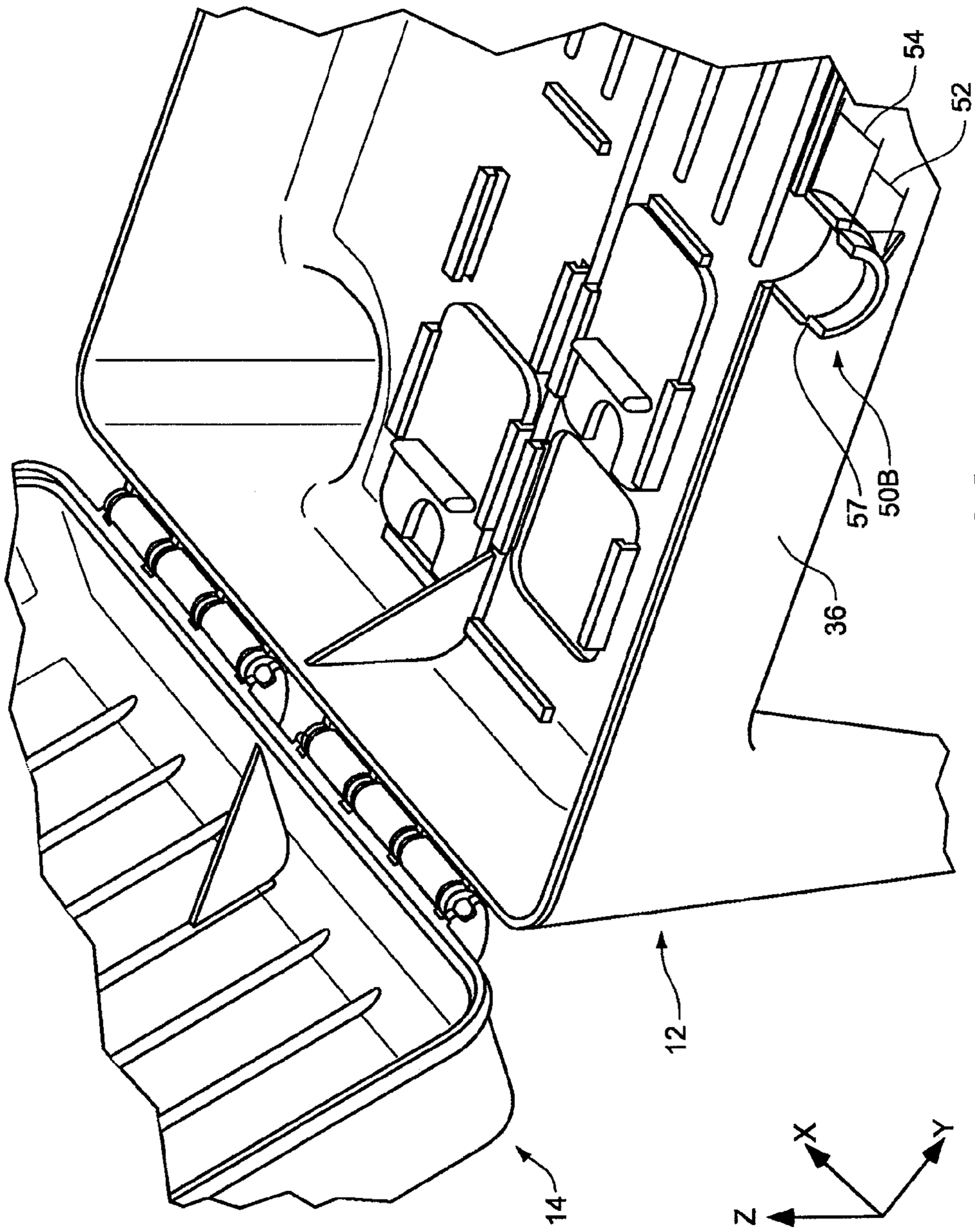

Fig. 3A

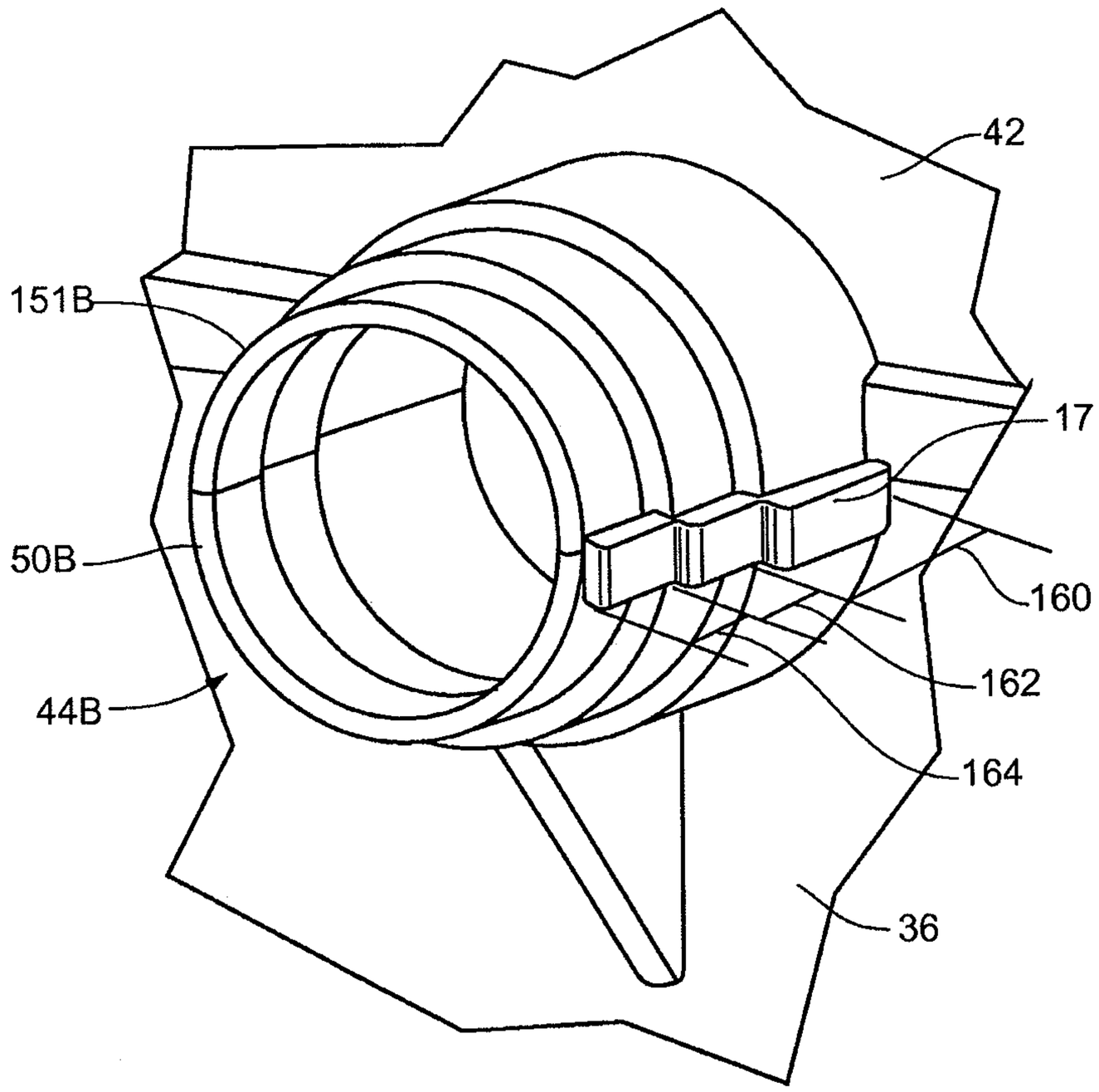

Fig. 3B

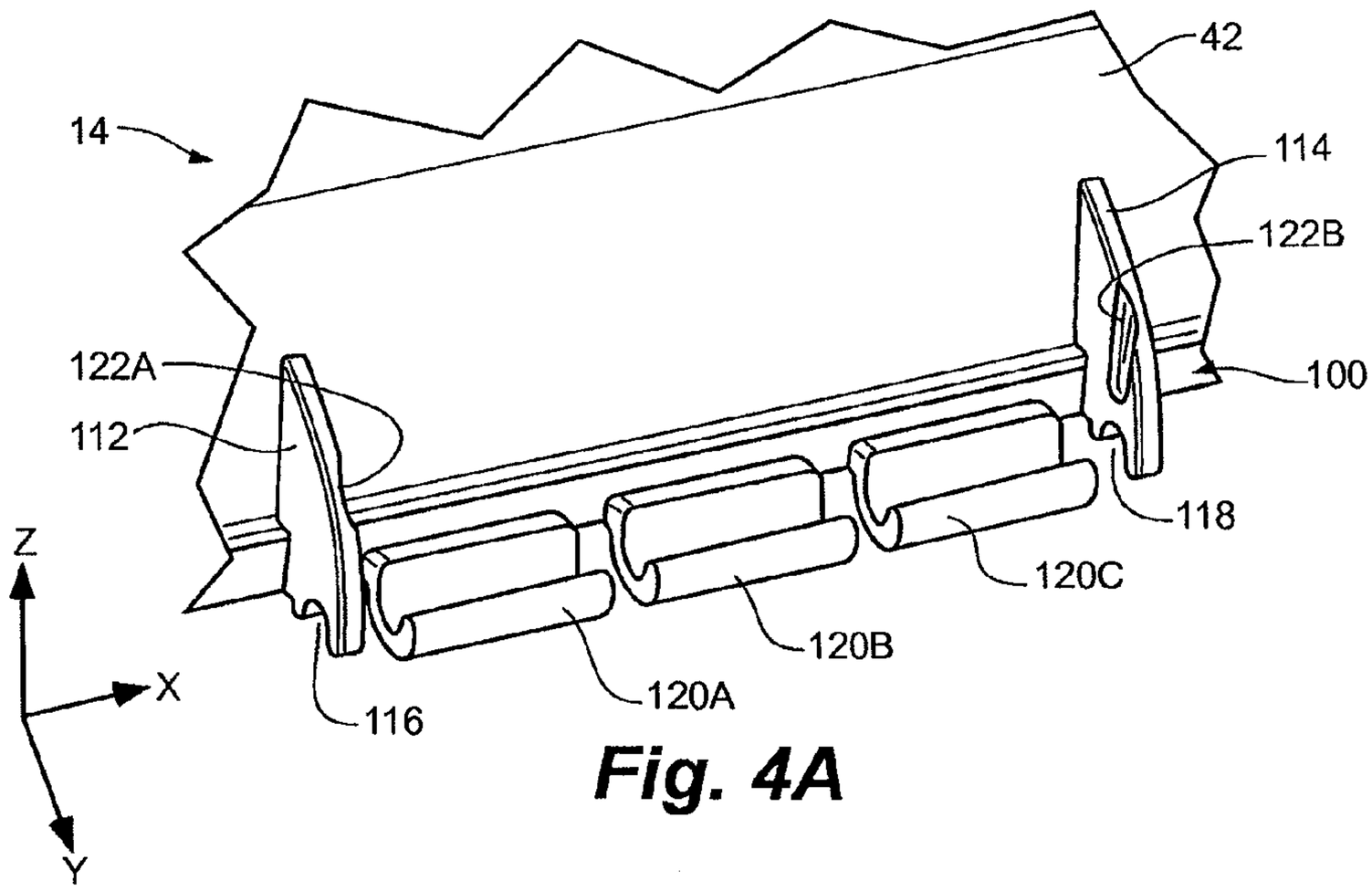
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Fig. 4A

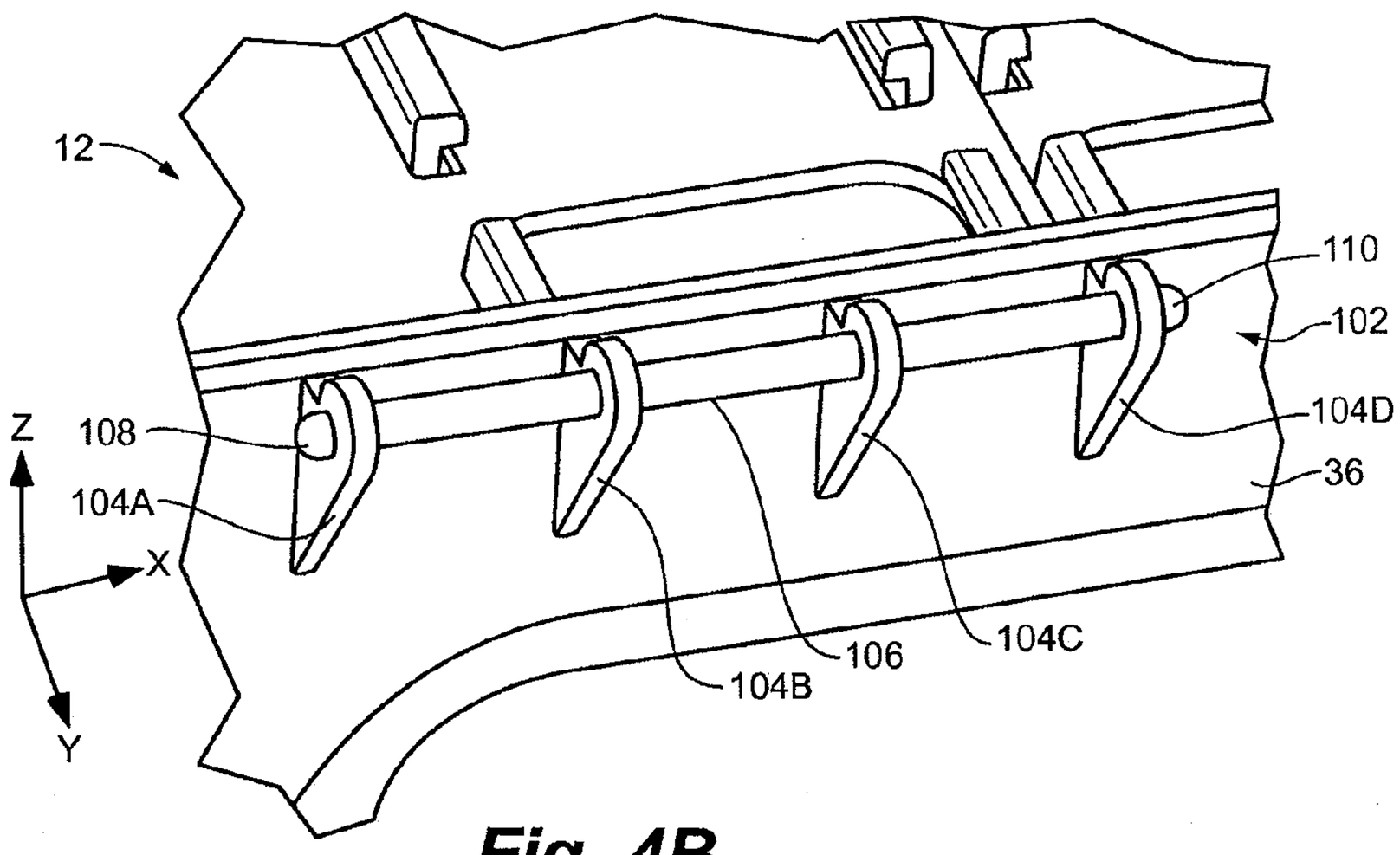
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Fig. 4B

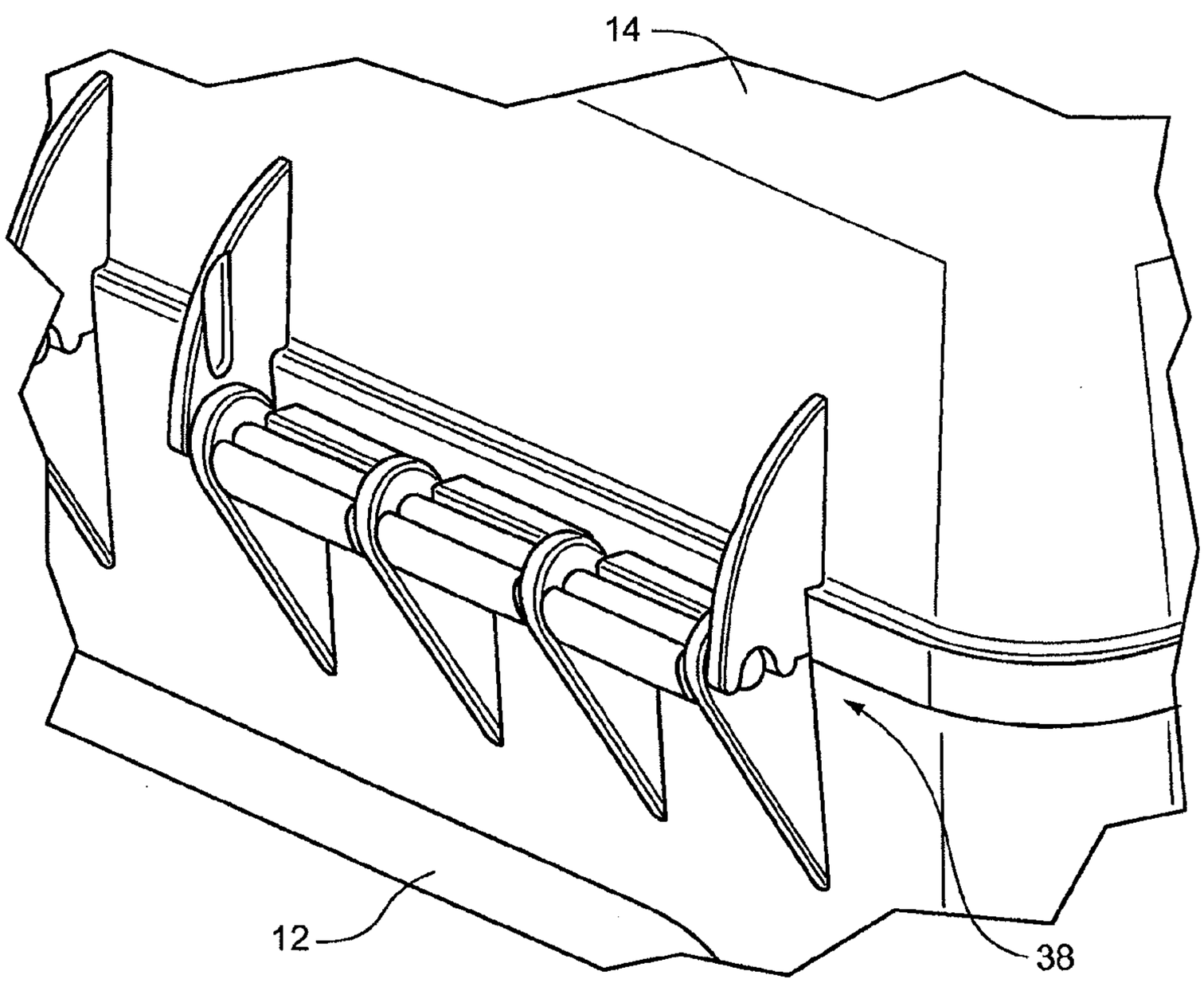

Fig. 5

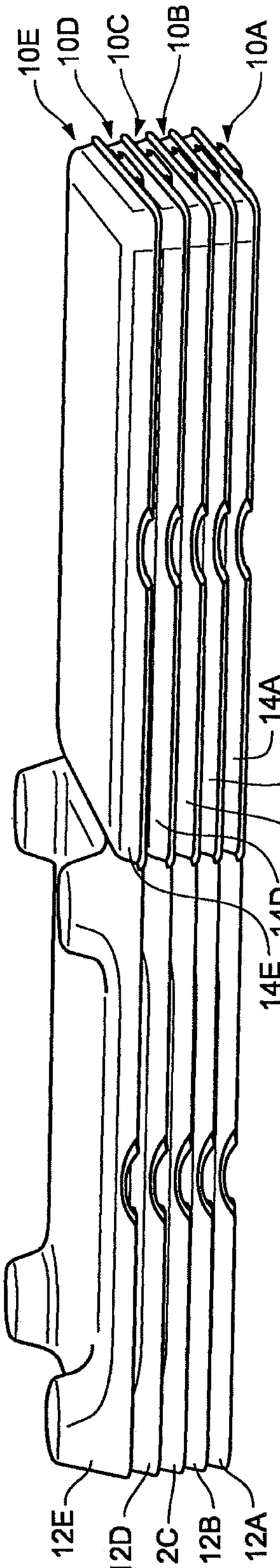

Fig. 6

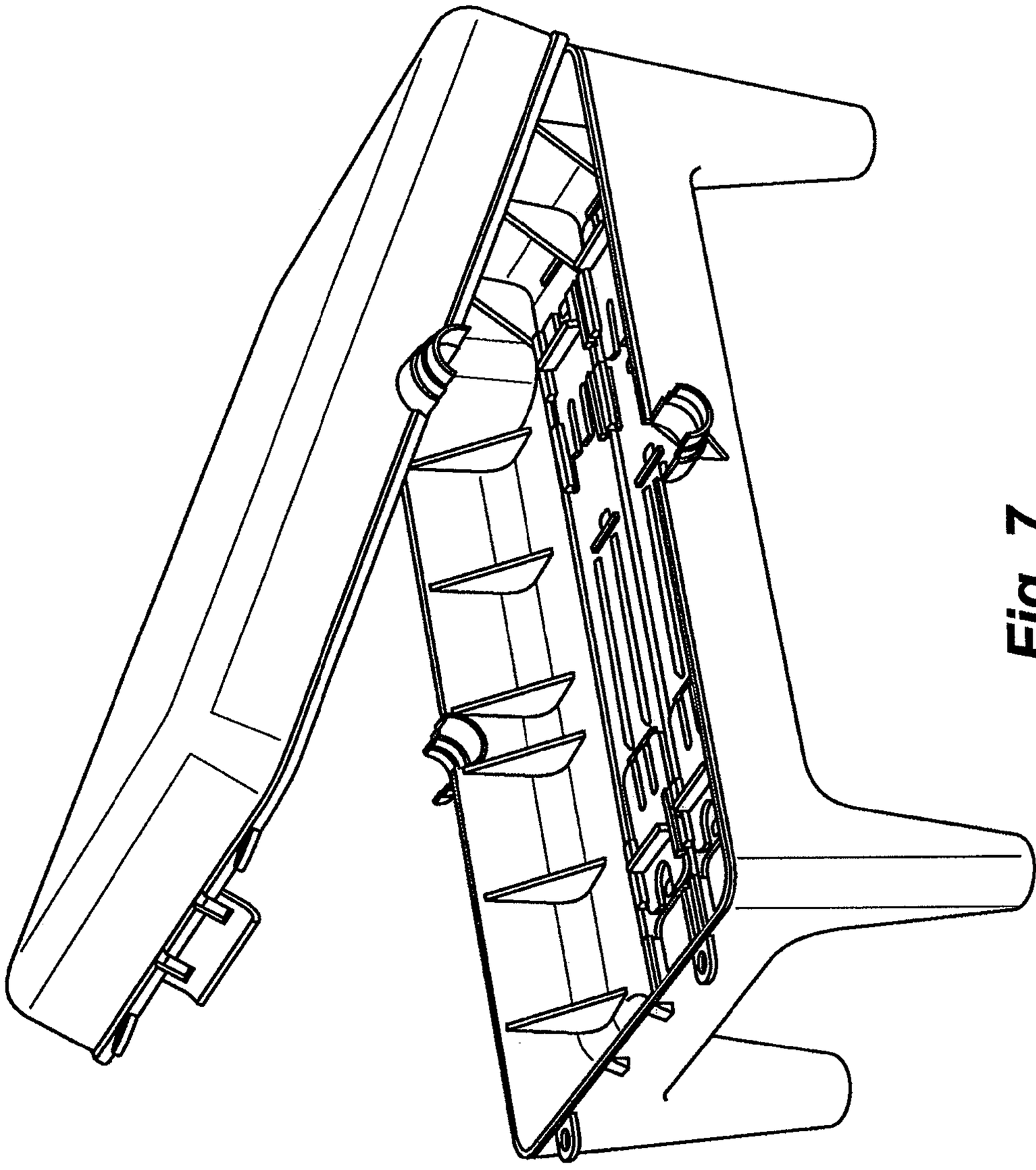

Fig. 7

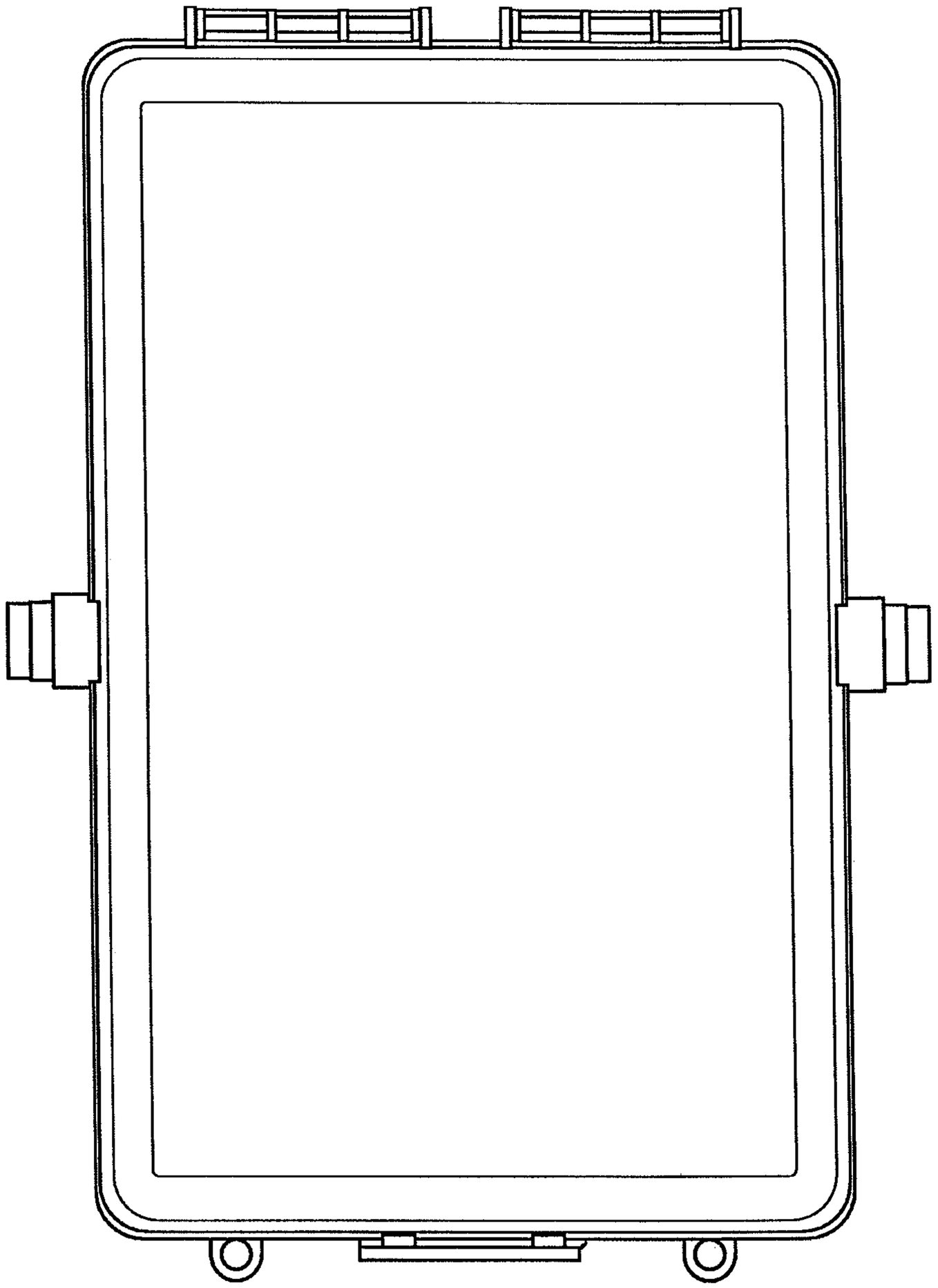

Fig. 8

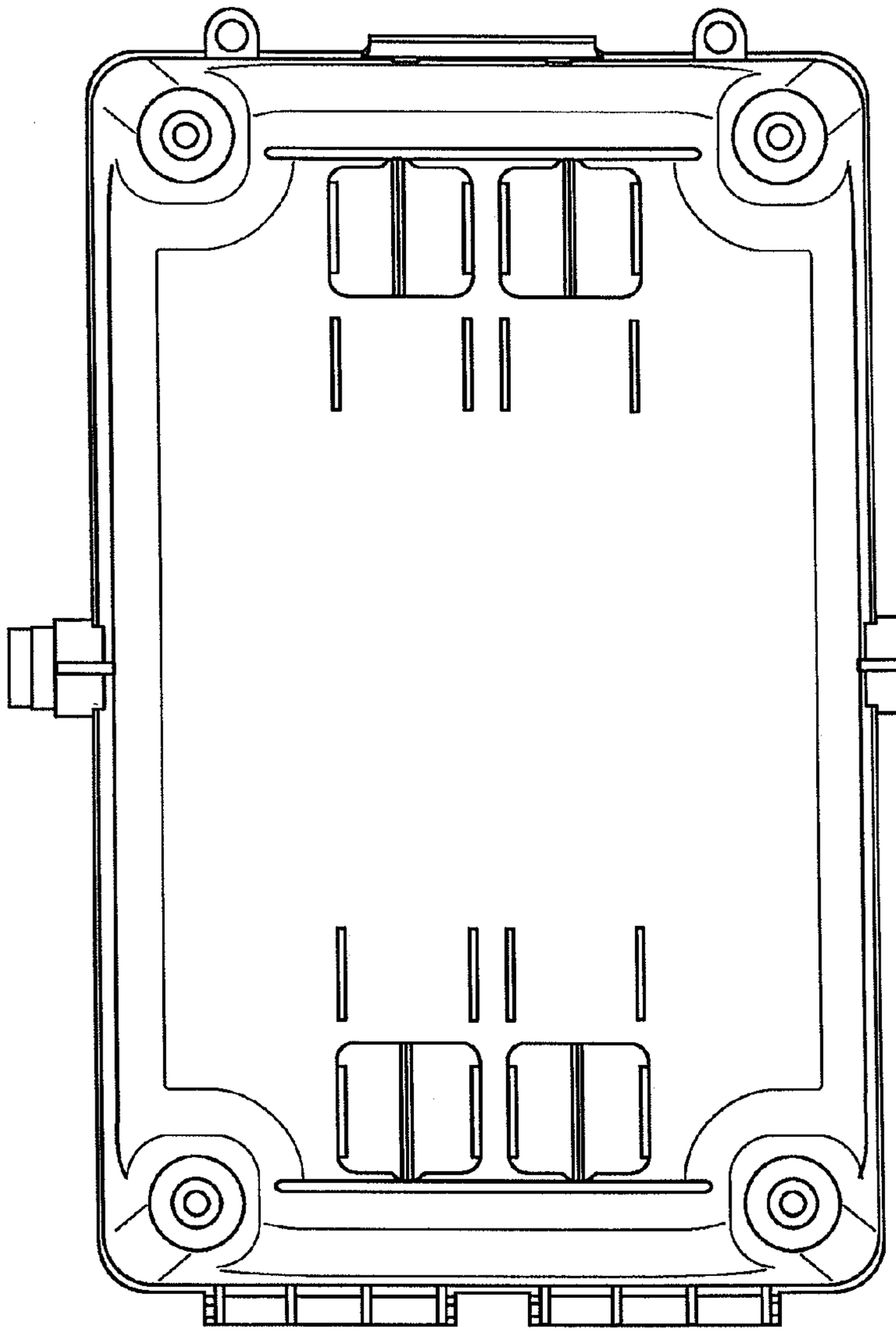

Fig. 9

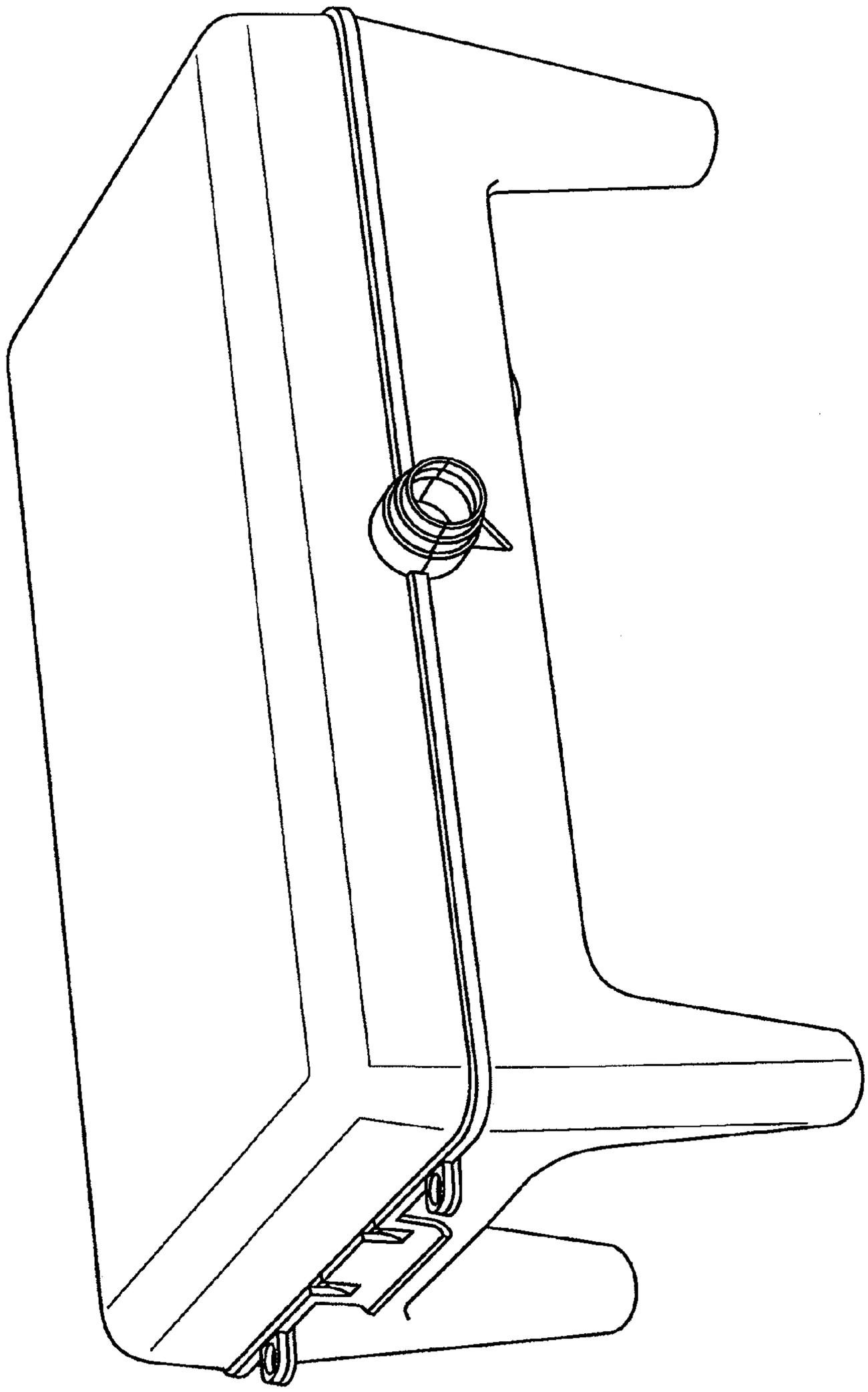

Fig. 10

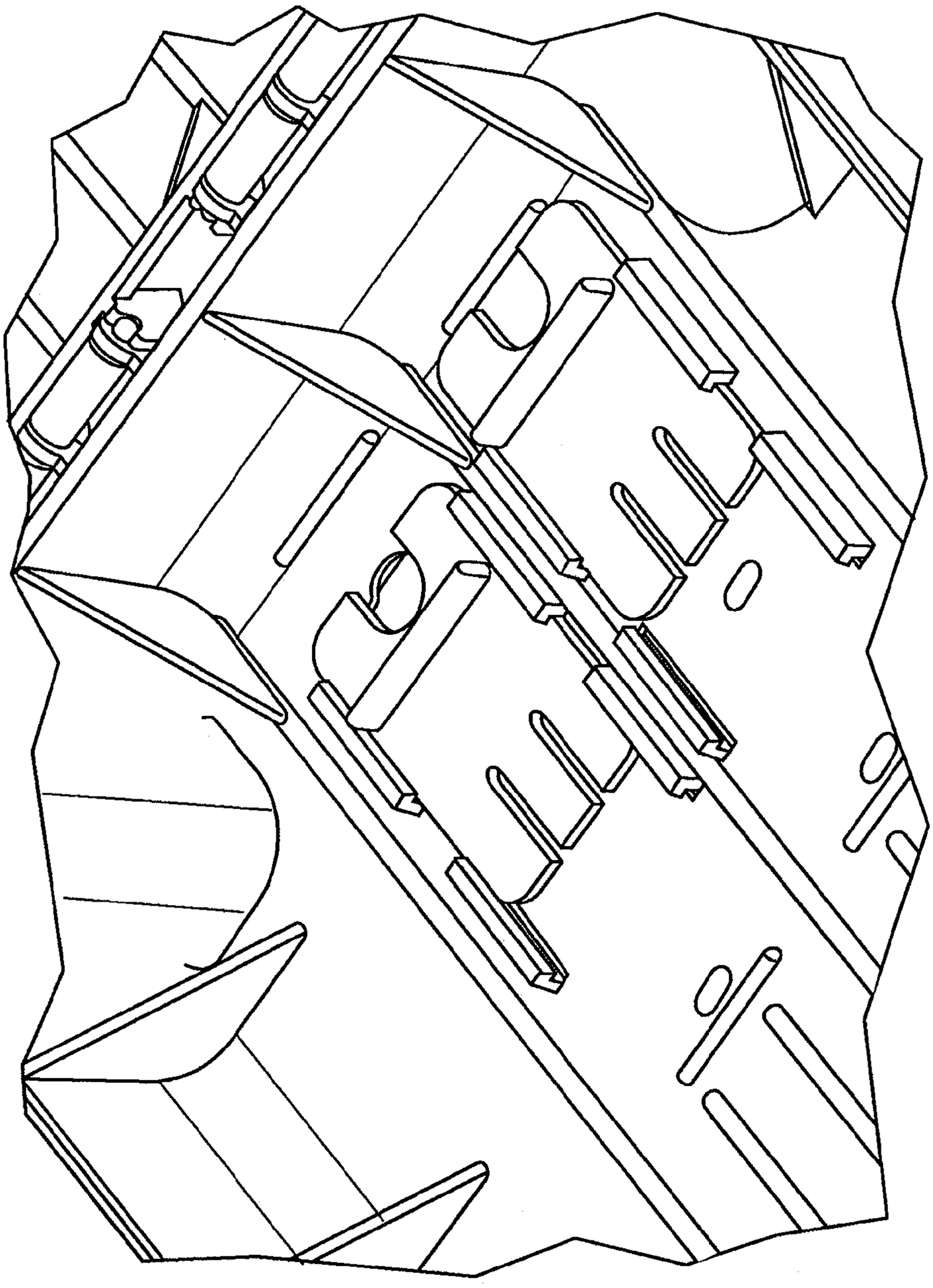

Fig. 11

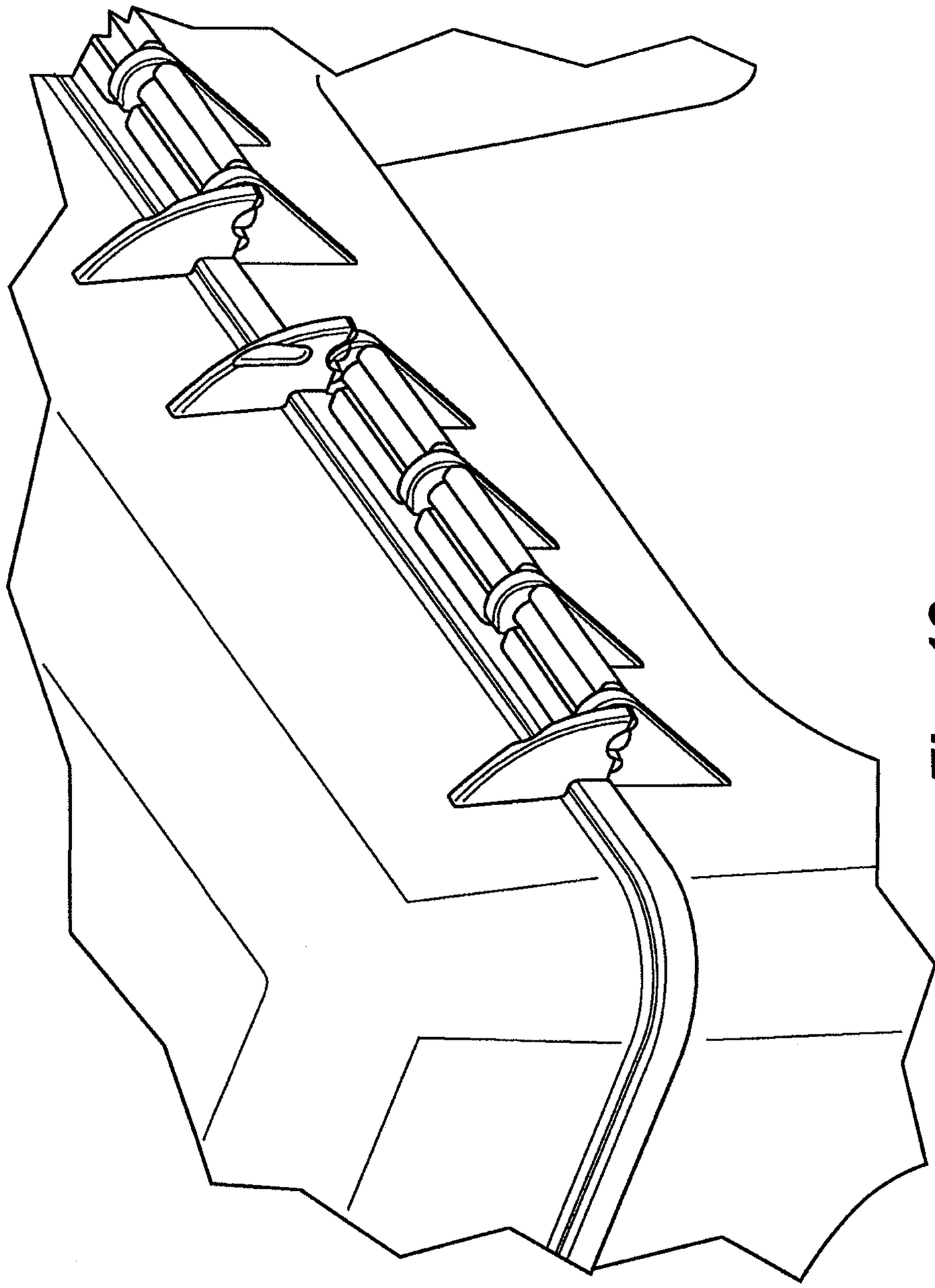

Fig. 12

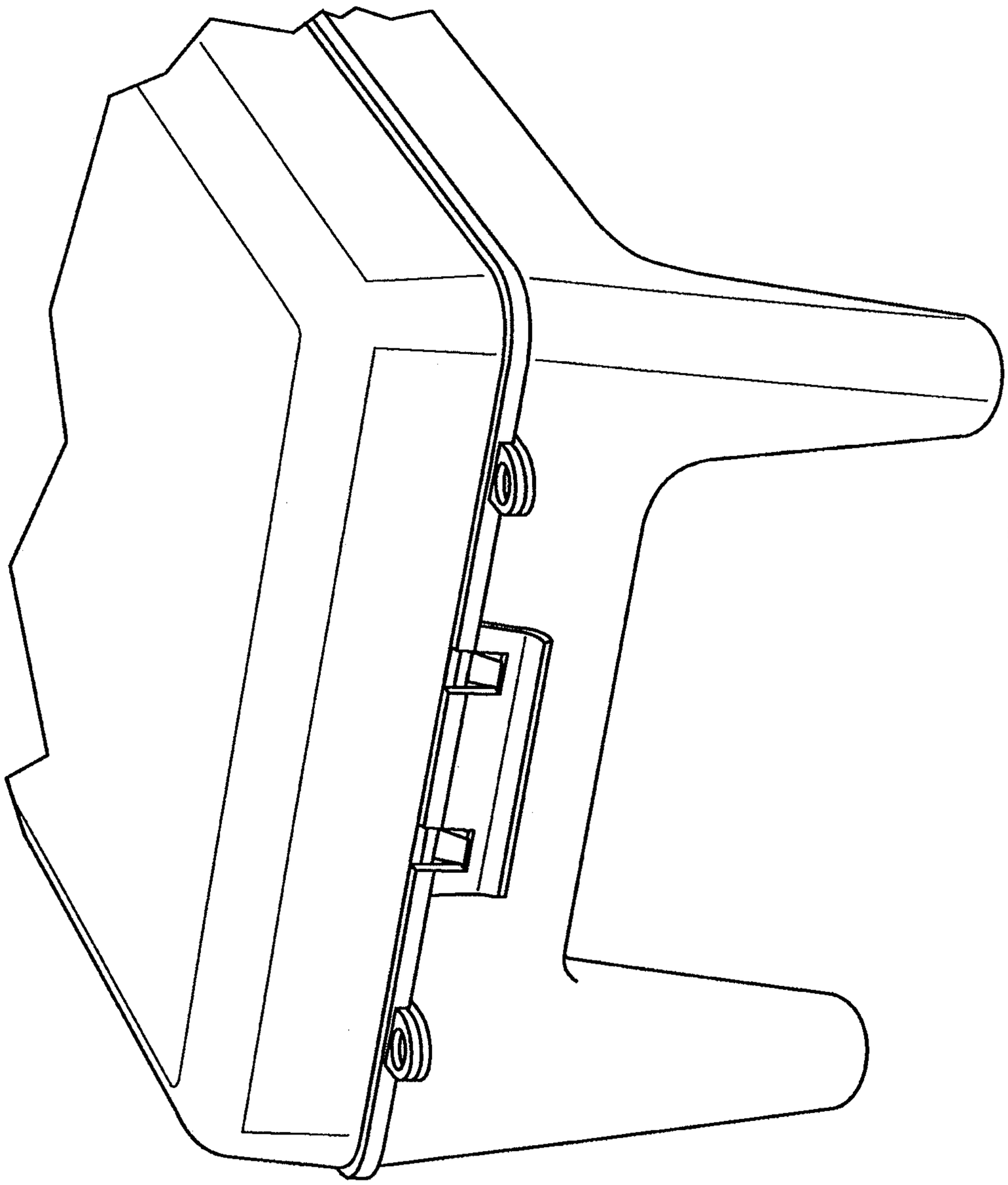

Fig. 13

SHELTER FOR PORTABLE ELECTRICAL INLETS/OUTLETS

CROSS REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of U.S. patent application Ser. No. 12/967,729, filed Dec. 14, 2010 now U.S. Pat. No. 8,476,540, which application is incorporated herein by reference.

TECHNICAL FIELD

This disclosure relates to electrical connectors and, more particularly, to shelters for electrical connectors.

BACKGROUND

Portable electrical inlets/outlets ("PEIO") are used in many settings in which access to electricity must be provided on a temporary basis. Examples of such settings include trade shows, concerts, and other similar events. During operation, a PEIO may supply electrical power from a readily available power source, such as a permanently mounted wall socket or a portable power generator, to one or more pieces of electrical equipment. For example, common types of PEIOs include extensions cords, power strips, and outlet splitters. An example of another type of PEIO used in some applications is a quad box. A quad box generally includes a power inlet cable, a power outlet cable, and one or more connectors for connecting electrical equipment to the quad box. In some applications, the power outlet cable of one quad box may function as the power inlet cable of another quad box to create a distributed power network.

PEIOs are often used in public settings, such as outdoor settings subject to inclement weather. Accordingly, a PEIO may be exposed to standing water, inclement weather, ground debris, kicking, and other deliberate or inadvertent physical contact during operation. Ensuring that a PEIO is kept clean, dry, and free from contact by people or animals may be useful for the safe and intended operation of a PEIO.

Prior attempts at sheltering PEIOs have been made. Examples can be found in the teaching of U.S. Pat. Nos. 6,250,946 and 4,702,541, and U.S. Design Pat. No. 284,465. Such attempts have been inadequate at suitably protecting PEIOs for a variety of reasons. Additionally, PEIOs that operate in an outdoor environment are often wrapped in a plastic bag (e.g., a garbage bag) that is taped in an attempt to protect the PEIOs from unwanted outdoor elements. This method of protection is not particularly effective nor is it especially aesthetically pleasing in a public setting.

SUMMARY

The disclosure is directed toward shelters for protecting PEIOs from unwanted elements such as, e.g., moisture, debris, and contact by people or animals. In some examples, the shelters protect a PEIO by physically encasing the PEIO in a material resistant to physical and environmental elements. In some additional examples, the shelters include legs, a stand, or other features that elevate the shelter (and hence a PEIO positioned in the shelter) above a surface on which the PEIO is set. These elevating features can protect the PEIO from water should water accumulate on the surface on which the shelter is set. In the event that water enters a shelter, the shelter may include features to segregate the PEIO from water that accumulated inside the shelter. For example, the shelter may include features that elevate the PEIO above a floor of the shelter so that water passes around or under the PEIO without substantially contacting the water. As another example, the shelter may include a drain hole to drain accumulated water out of the shelter. The shelter may include additional or different features, as described herein.

In accordance with one example described herein, a shelter for protecting a PEIO from unwanted elements, where the PEIO includes a PEIO body, first and second PEIO cables, and at least two PEIO-component connectors is described. The shelter includes a base that includes a platform to support the PEIO body and at least one sidewall. The platform includes a main area and a raised rib structure configured to segregate the PEIO body from water that may accumulate in the main area. The at least one sidewall extends substantially around at least a portion of a perimeter of the platform. The shelter also includes a cover that is configured to mate with the base to substantially enclose the platform. According to the example, the shelter defines at least two PEIO-component-connector-cable holes configured to permit component cables to extend from an exterior of the shelter to the at least two PEIO-component connectors within the shelter. The shelter also defines a first PEIO-cable hole and a second PEIO-cable hole, the first and second PEIO-cable holes being configured to permit the first and second PEIO cables to extend from the PEIO body within the shelter to an exterior of the shelter.

In another example, a system includes a PEIO, a shelter, and a component cable. The PEIO includes a PEIO body, a first PEIO cable, a second PEIO cable, and at least two PEIO-component connectors. The shelter includes a base that includes a platform to support the PEIO body and at least one sidewall. The platform includes a main area and a raised rib structure that is configured to segregate the PEIO body from water that may accumulate in the main area. The at least one sidewall extends substantially around at least a portion of a perimeter of the platform. The shelter also includes a cover configured to mate with the base to substantially enclose the platform. The shelter defines a first PEIO-cable hole, a second PEIO-cable hole, and at least two PEIO-component-connector-cable holes. According to the example, the PEIO is positioned such that the PEIO body is adjacent the raised rib structure of the shelter, the first PEIO cable extends from the PEIO body through the first PEIO-cable hole to an exterior of the shelter, the second PEIO cable extends from the PEIO body through the second PEIO-cable hole to the exterior of the shelter, and the component cable extends from one of the at least two PEIO-component connectors through one of the at least two PEIO-component-connector-cable holes to the exterior of the shelter.

In another example, a method is described that includes providing a shelter that includes a base and a cover. The base includes a platform to support the PEIO body, the platform including a main area and a raised rib structure configured to segregate the PEIO body from water that may accumulate in the main area, and at least one sidewall extending substantially around at least a portion of a perimeter of the platform. The shelter also includes a first PEIO-cable hole, a second PEIO-cable hole, and at least two PEIO-component-connector-cable holes. According to the example, the method includes inserting a PEIO that includes a PEIO body, a first PEIO cable, a second PEIO cable, and at least two PEIO-component connectors into the shelter, and mating the cover of the shelter to the base of the shelter to substantially enclose the PEIO body within the shelter.

The details of one or more examples are set forth in the accompanying drawings and the description below. Other

features, objects, and advantages will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF DRAWINGS

The following drawings are illustrative of particular examples of the present disclosure and therefore do not limit the scope of the disclosure. The drawings are not to scale (unless so stated) and are intended for use in conjunction with the explanations in the following detailed description. Examples will hereinafter be described in conjunction with the appended drawings, wherein like numerals denote like elements.

FIG. **1** is a perspective view of an example portable electrical inlet/outlet and an example shelter configured to receive the portable electrical inlet/outlet in accordance with examples of the present disclosure.

FIG. **2** is a perspective view of an example of the shelter of FIG. **1** without the portable electrical inlet/outlet.

FIGS. **3**A and **3**B are perspective views of different example portions of the example shelter of FIG. **2**.

FIGS. **4**A and **4**B are perspective views of example hinge features that may be used on shelters in accordance with examples of the present disclosure.

FIG. **5** is a perspective view of an example hinge assembled from the example features of FIGS. **4**A and **4**B.

FIG. **6** is a perspective view of multiple shelters in a stacked arrangement in accordance with examples of the present disclosure.

FIG. **7** is perspective view of an example of the shelter of FIG. **1** without the portable electrical inlet/outlet.

FIG. **8** is a perspective top view of the example shelter of FIG. **7**.

FIG. **9** is a perspective bottom view of the example shelter of FIG. **7**.

FIG. **10** is a perspective side view of the example shelter of FIG. **7**.

FIG. **11** is a perspective view of an example portion of the example shelter of FIG. **7**.

FIG. **12** is a perspective view of an example hinge on the example shelter of FIG. **7**.

FIG. **13** is another perspective side view of the example shelter of FIG. **7**.

DETAILED DESCRIPTION

The following detailed description is exemplary in nature and is not intended to limit the scope, applicability, or configuration of the invention in any way. Rather, the following description provides practical illustrations for implementing exemplary embodiments of the present invention. Examples of constructions, materials, dimensions, and manufacturing processes are provided for selected elements, and all other elements employ that which is known to those of skill in the field of the invention. Those skilled in the art will recognize that many of the examples provided have suitable alternatives that can be utilized.

PEIOs can distribute power from a readily available power source, such as a permanently mounted wall socket or a portable power generator, to one or more pieces of electrical equipment. For example, a PEIO may include a connector for electrically connecting to a power source as well as one or more component connectors (e.g., plug receptacles) to which electrical equipment can be electrically connected. Because a PEIO can be used for power distribution, PEIOs are often used at public events, such as trade shows, concerts, and other similar events. Depending on the type of event, a PEIO may be used in an outdoor setting. Accordingly, a PEIO may be exposed to standing water, inclement weather, ground debris, kicking, scratching, and other inadvertent physical contact during operation.

This disclosure describes a shelter for a PEIO. The shelter may protect the PEIO from unwanted elements such as, e.g., debris and unintended contact by people or animals. The shelter may also protect the PEIO from moisture that could otherwise create a short circuit. For instance, in one example, the PEIO includes a platform that includes a raised rib structure that is capable of segregating the PEIO from water that may accumulate in a main area of the platform. In another example, the PEIO includes an elevating portion that extends downwardly from a platform and that is capable of elevating the platform from a surface on which the shelter is set. Upon inserting the PEIO into the shelter, the elevating portion can elevate the PEIO above a surface. Should water accumulate on the surface on which the shelter and the PEIO is positioned, the elevating portion may prevent the PEIO from being exposed to water.

In an additional example, the shelter includes a cover that can be mated with a base to substantially enclose a platform that supports the PEIO. Depending on the configuration of the shelter, the shelter may substantially enclose the PEIO within a confined space that is bounded on all sides by the shelter. In such a configuration, the shelter may help protect the PEIO from inadvertent physical contact, such as being kicked, being stepped on, or the like.

Different views of an example shelter will be described in greater detail with reference to FIGS. **2**-**6**. However, an example PEIO and an example shelter will first be described with reference to FIG. **1**.

FIG. **1** is conceptual view of an example shelter **10** in accordance with this disclosure. Shelter **10** includes base **12** and cover **14**. Base **12** is configured to support PEIO **16**. PEIO **16** can be positioned onto base **12**, and cover **14** can be positioned over base **12** to substantially encase PEIO **16** within shelter **10**. Shelter **10** may help protect PEIO **16** from a variety of unwanted elements including, e.g., unintended contact by people or animals, and inclement weather. For example, as described in greater detail below, shelter **10** may include features that help protect PEIO **16** from moisture that may otherwise short circuit PEIO **16**. In one example, shelter **10** includes a rib structure (FIG. **2**) that is configured to segregate PEIO **16** from water that may accumulate in a main area of base **12**. In another example, PEIO includes an elevating portion (FIGS. **1** and **2**) that extends downwardly and that is configured to elevate base **12** from a surface on which shelter **10** is set. Shelter **10** may include additional or different features, as described below.

Shelter **10** is configured to support PEIO **16**. In general, PEIO **16** may be any device that includes a power inlet that is configured to electrically connect with a power source, and a power outlet that is configured to electrically connect with an electrical component. In the example of FIG. **1**, PEIO **16** is generally illustrated in the style of a quad box. A quad box may be a junction box that electrically connects at least one electrical inlet to a plurality of different electrical outlets (e.g., two, three, four or more electrical outlets). In some examples, a quad box may include a plurality of modular PEIO-component connectors (described in greater detail below), each of which may be replaced, e.g., to repair or reconfigure the quad box.

Because PEIO **16** is generally illustrated in the style of a quad box in FIG. **1**, the remainder of the present disclosure generally refers to an example configuration of shelter **10** that is designed to receive a quad box. However, other configura-

tions of shelter **10** are possible in accordance with the present disclosure and it should be appreciated that the disclosure is not limited to any particular type of PEIO. For example, PEIO **16** may be an extension cord, a power strip, or an outlet splitter, each of which can include a power inlet (e.g., male connector) and one or more power outlets (e.g., female connector).

In the example of FIG. **1**, which generally depicts a quad box-style PEIO, PEIO **16** includes a PEIO body **18**, a first PEIO cable **20**, a second PEIO cable **22**, and at least one PEIO-component connector **24**, which in the example of FIG. **1** is illustrated as four PEIO-component connectors (collectively "connectors **24**," only one of which is labeled for clarity). First PEIO cable **20** electrically connects PEIO body **18** to a power source such as, e.g., a permanently mounted wall socket or a portable power generator. First PEIO cable **20** may directly connect PEIO body **18** to a power source (e.g., without any intervening components) or indirectly connect PEIO body **18** to a power source (e.g., through another PEIO body). Second PEIO cable **22** electrically connects PEIO body **18** to another PEIO body (not illustrated) to create an in-line series of PEIO boxes connected to a common power source. Depending on the configuration of PEIO **16**, first PEIO cable **20** and second PEIO cable **22** may each be permanently attached to PEIO body **18**, or one or both of first PEIO cable **20** and second PEIO cable **22** may be detachable from PEIO body **18**. For example, as seen in FIG. **1**, first PEIO cable **20** and second PEIO cable **22** may be detachably connected to PEIO body **18** via threaded connectors **26**A and **26**B, respectively, although any suitable mechanical fixation element (e.g., clasp, bolt, screw) may be used to detachably connect first PEIO cable **20** and second PEIO cable **22** to PEIO body **18**. For instance, PEIO body **18** may include male electrical connectors (e.g., two or three-prong electrical connectors) and first PEIO cable **20** and/or second PEIO cable **22** may include corresponding female electrical connectors which can be friction fit over the male connectors of PEIO body **18**.

First PEIO cable **20** and second PEIO cable **22** can have any suitable dimensions and can be configured to carry any suitable amount and type of electricity. In different examples, first PEIO cable **20** and second PEIO cable **22** can carry single-phase alternating current (AC), three-phase AC, or direct current (DC). In some examples, first PEIO cable **20** and second PEIO cable **22** are each capable of electrically conveying at least conventional 110 volt/120 volt electricity from a standard wall socket. In some additional examples, first PEIO cable **20** and second PEIO cable **22** are each capable of electrically conveying higher voltages such as, e.g., **220** volt single-phase AC current, or 208 volt three-phase current. In yet additional examples, first PEIO cable **20** and second PEIO cable **22** are each configured to electrically convey less than or equal to approximately 600 volts.

PEIO **16** also includes PEIO-component connectors **24**. Each component connector of PEIO-component connectors **24** is capable of electrically connecting to a component that operates on electrical energy. For instance, in the example of FIG. **1**, each component connector of PEIO-component connectors **24** is a port defined by PEIO body **18** (e.g., a female connector) that is configured to receive a corresponding plug **28** (e.g., male connector) disposed at a distal end of a component cable **30**. In some examples, each component connector of PEIO-component connectors **24** may be designed to receive a multi-prong plug such as, e.g., a two or three-prong electrical plug found on some standard extension cords, or a four or five-prong electrical plug found in some commercial applications. Each component connector of PEIO-component connectors **24** may be the same as each other component connector of PEIO-component connectors **24**, or at least one component connector of PEIO-component connectors **24** may be different than at least one other component connector of PEIO-component connectors **24**. For example, as noted above, PEIO **16** may include modular PEIO-component connectors that can be reconfigured, e.g., by replacing one style of PEIO-component connector with a different style of PEIO-component connector. Other configurations of PEIO-component connectors **24** are contemplated, however, and any suitable PEIO-component connector may be used in accordance with the disclosure. For instance, in another example, each connector of PEIO-component connectors **24** may be a protruding connection extending from PEIO body **18** (e.g., a male connector configured to receive a corresponding female connector).

In the example of FIG. **1**, PEIO **16** includes four PEIO-component connectors **24**. Specifically, PEIO **16** includes two, outwardly-facing, side-by-side PEIO-component connectors arranged on one side of PEIO body **18** and two different, outwardly-facing, side-by-side PEIO component connectors arranged on an opposing side of PEIO body **18**. As a result, PEIO **16** provides two sets of oppositely facing PEIO-component connectors. The number, type, and arrangement of PEIO-component connectors **24** may vary, e.g., based on the type of electrical components that PEIO **16** is intended to supply power for. For example, PEIO **16** may include fewer PEIO-component connectors (e.g., one or two), more PEIO-component connectors (e.g., five or more), or a different physical arrangement of PEIO-component connectors than illustrated in FIG. **1**.

As seen in the example FIG. **1**, in some applications, each PEIO-component connector or each set of PEIO-component connectors of PEIO **16** may include a cover **32** that rotates relative to PEIO body **18**. Such cover **32** may protect each PEIO-component connector from dirt, debris, or the like when plug **28** is not inserted into the component connector.

Each PEIO-component connector of PEIO **16** may be electrically connected to a component cable, such as component cable **30**. In general, component cable **30** is an electrically conductive cable that includes an electrically insulative exterior. Depending on the configuration of PEIO **16**, component cable **30** may be a standard extension cord that plugs in to PEIO body **18** at one of PEIO-component connectors **24** and that extends to a component that operates on electrical energy, or component cable **30** may be non-standard cable that is capable of conducting electrical energy.

In operation, PEIO **16** can distribute power from a power supply to one or more electrically connected components. In one example, power enters PEIO body **18** via first PEIO cable **20** and is split between each PEIO-component connectors of PEIO-component connectors **24** and second PEIO cable **22**. In such an example, PEIO body **18** may house various hardware to, e.g., split, step-up, and/or step-down the electricity entering PEIO body **18**. In another example, first PEIO cable **20** encases electrically isolated wires that are separately electrically connected to each of PEIO-component connectors **24** and second PEIO cable **22**. PEIO **16** may have other configurations as well.

To help protect PEIO **16** from unwanted elements, PEIO **16** may be positioned in shelter **10** in accordance with this disclosure. Shelter **10** can assume different configurations; however, in the example of FIG. **1**, shelter **10** includes base **12** and cover **14**. Base **12** includes platform **34** and sidewall **36**. Platform **34** provides physical support for PEIO body **18** when PEIO **16** is inserted into shelter **10**. Sidewall **36** extends substantially around the perimeter of platform **34** to define a cavity that is configured to receive PEIO **16**. Cover **14** is

configured to mate with base **12** to substantially enclose platform **34**. Specifically, in the example of FIG. **1**, cover **14** is pivotally mounted to base **12** via hinge **38** and is configured to mate with an upper surface of sidewall **36**. Although in other examples, cover **14** may not be affixed to base **12** (e.g., via hinge **38**) but can instead be simply placed on top of base **12**. In FIG. **1**, PEIO **16** can be inserted into base **12**, and cover **14** can close over PEIO body **18** to help protect PEIO body **18** within a bounded cavity defined by platform **34**, sidewall **36**, and cover **14**. By positioning PEIO body **18** between base **12** and cover **14**, shelter **10** may provide protection to substantially the entire PEIO body, e.g., to prevent damage from dropping, scratches, or other physical abuse. Further, as will be described in greater detail with respect to FIG. **2**, shelter **10** may include various features to help prevent PEIO body **18** from being exposed to moisture during operation.

As shown in FIG. **1**, shelter **10** receives PEIO **16** by positioning PEIO body **18** on platform **34**. Platform **34** physically supports PEIO body **18** within shelter **10**. Platform **34** may define any suitable size and shape, and the size and shape of platform **34** may vary, e.g., based on the size and shape of PEIO body **18**. For example, platform **34** may define a planar surface or a non-planar surface, as described in greater detail below with respect to FIG. **2**. In some examples, PEIO **16** mechanically attaches to platform **34**, e.g., by mechanically attaching a bottom surface of PEIO body **18** to platform **34**. For instance, a mechanical fixation element such as, e.g., bolts, screws, adhesive, or the like may be used to mechanically attach PEIO **16** to platform **34**. In other examples, PEIO **16** is supported on platform **34** without being mechanically affixed to platform **34**. For instance, in the example shown in FIG. **1**, PEIO **16** is positioned on platform **34** and cover **14** may rotate closed over PEIO **16** to friction fit PEIO **16** between base **12** and cover **14**. Such an arrangement may prevent PEIO **16** from moving out of alignment with base **12** after PEIO **16** is positioned within shelter **10**.

In the example of FIG. **1**, base **12** includes at least one sidewall **36**, which is illustrated as four interconnected sidewalls that surround a substantially rectangular-shaped platform **34**. Sidewall **36** extends upwardly (i.e., in the Z-direction indicated on FIG. **1**) from platform **34**. Sidewall **36** may help protect the sides of PEIO body **18** from unintended contact and may also define a surface that can mate with cover **14**. In some examples, as illustrated in FIG. **1**, sidewall **36** extends around substantially the entire perimeter of platform **34** (i.e., in the X-Y plane indicated on FIG. **1**). In other examples, sidewall **36** extends around less than the entire perimeter of platform **34**. For example, base **12** may include a plurality of discrete sidewall segments that are physically separated from one another around platform **34**. In yet other examples, base **12** may not include sidewall **36**. In such an example, PEIO **16** may be positioned on platform **34** and cover **14** may be configured (e.g., sized and shaped) with a cavity that may be arranged over PEIO **16** such that cover **14** mates with base **12** around a perimeter of platform **34**.

While base **12** is illustrated as defining a substantially rectangular shape, in other examples base **12** can define other shapes. Base **12** can define any polygonal (e.g., square, hexagonal) or arcuate (e.g., circular, elliptical) shape, or even combinations of polygonal and arcuate shapes. The specific shape of base **12** may vary, e.g., based on the specific shape of PEIO **16**.

In operation, base **12** of shelter **10** may be placed on a surface that is exposed to unwanted elements from above (i.e., in the Z-direction indicated on FIG. **1**) such as, e.g., rain, snow, or inadvertent contact. For this reason, shelter **10** may include a cover that mates with base **12** to help protect PEIO **16** from above. Shelter **10** may include any suitable cover including, e.g., a cover that mates with base **12** such that there is substantially no separation gap between the cover and base **12**. Such a cover may prevent unwanted elements from entering shelter **10** from the sides of the shelter (i.e., in the X-Y plane).

In the example of FIG. **1**, cover **14** includes top surface **40** and at least one cover-sidewall **42**, which is illustrated as four interconnected cover-sidewalls that surround a substantially rectangular-shaped top surface. Cover-sidewall **42** extends downwardly (i.e., in the Z-direction indicated on FIG. **1**) from top surface **40**. Top surface **40** may be planar as illustrated in FIG. **1** or non-planar (e.g., domed, peaked, or the like). A non-planar top surface **40** may help repel unwanted elements from top surface **40** and may help prevent water or debris from collecting on top surface **40**.

As with sidewall **36** of base **12**, cover-sidewall **42** may help protect the sides of PEIO body **18** from unintended contact when PEIO **16** is inserted into shelter **10**. In some examples, as illustrated in FIG. **1**, cover-sidewall **42** extends around substantially the entire perimeter of top surface **40** (i.e., in the X-Y plane indicated on FIG. **1**). Cover **14** may define a size and shape that substantially corresponds to a size and shape of base **12**. In such an example, cover **14** may mate with base **12** when an edge of cover-sidewall **42** is positioned adjacent an edge of sidewall **36** of base **12**. In other examples, cover **14** does not include cover-sidewall **42**. For example, cover **14** may instead be a planar sheet. In such an example, top surface **40** of cover **14** may be positioned directly adjacent base **12** to encase PEIO **16** within shelter **10**.

In some examples, cover **14** may include a lip that extends over an edge of base **12** when cover **14** is mated to base **12**. For instance, in the example of FIG. **1**, cover **14** includes lip **17** (also illustrated in FIG. **2**) that extends around a perimeter of cover-sidewall **42** and that projects outward (i.e., in the X and Y-directions) and downward (i.e., in the Z-direction) from a bottom edge of cover-sidewall **42**. When cover **14** is mated with base **12**, lip **17** extends down over sidewall **36** of base **12** so that any rain that falls on cover **14** flows off cover-sidewall **42** without entering shelter **10** at the junction between cover **14** and base **12**.

As discussed above with respect to base **12**, cover **14** can define shapes other than the substantially rectangular shape illustrated in FIG. **1**. For example, cover **14** can define any polygonal (e.g., square, hexagonal) or arcuate (e.g., circular, elliptical) shape, or even combinations of polygonal and arcuate shapes. The specific shape of cover **14** may vary, e.g., based on the specific shape of PEIO **16** and/or the specific shape of base **12**.

The specific dimensions of shelter **10** may vary, e.g., based on the specific dimensions of PEIO **16**. That being said, in some examples, shelter **10** may include cover **14** that is between approximately 25 centimeters and approximately 45 centimeters long (i.e., in the Y-direction), such as approximately 35 centimeters, between approximately 16 centimeters and approximately 36 centimeters wide (i.e., in the X-direction), such as approximately 26.5 centimeters, and between approximately 1 centimeter and approximately 10 centimeters tall (i.e., in the Z-direction), such as approximately 4.5 centimeters. In some examples, shelter **10** may include base **12** that is between approximately 25 centimeters and approximately 45 centimeters long (i.e., in the Y-direction), such as approximately 35 centimeters, between approximately 16 centimeters and approximately 36 centimeters wide (i.e., in the X-direction), such as approximately 26.5 centimeters, and between approximately 1 centimeter and approximately 25 centimeters tall (i.e., in the Z-direction),

such as approximately 11.5 centimeters. These dimensions are merely examples, however, and other dimensions are both contemplated and possible.

Shelter **10** may be subject to different physical abuses during the service life of the shelter. At various times, shelter **10** may be dropped, kicked, scratched, abraded, or otherwise abused. Shelter **10** may protect PEIO **16** from these and other physical abuses. As such, shelter **10** may be constructed of a robust material able to withstand different physical forces without breaking. In various examples, shelter **10** may be constructed of a metal material (e.g., steel, aluminum, copper), a thermoplastic material (e.g., polystyrene, polyethylene, polypropylene, polyvinyl-based materials), a thermosetting plastic material (e.g., Bakelite, epoxy resin-based materials), or the like. In one example, shelter **10** is constructed of polypropylene, which may remain flexible and which may be substantially resistant to UV-radiation in outdoor applications. Other materials for shelter **10** are both possible and contemplated.

As described above, PEIO **16** includes first PEIO cable **20** and second PEIO cable **22**. When PEIO body **18** is positioned within shelter **10**, first PEIO cable **20** and second PEIO cable **22** may electrically connect PEIO body **18** to components located outside of shelter **10**. For this reason, shelter **10** may include one or more apertures that define openings for physically and/or electrically connecting PEIO body **18** to features located outside of shelter **10**. The number and arrangement of the different apertures may vary, e.g., based on the specific configuration of shelter **10** and the specific configuration of PEIO **16**. However, with respect to the example of FIG. **1**, shelter **10** defines a first PEIO-cable hole **44**A and a second PEIO-cable hole **44**B (which in FIG. **1** are denoted by labeled double-headed arrows, indicating that first PEIO-cable hole **44**A and second PEIO-cable hole **44**B are defined when cover **14** is mated to base **12**). First PEIO-cable hole **44**A is configured (e.g., sized and shaped) to permit first PEIO cable **20** to extend from PEIO body **18** to an exterior of shelter **10**, while second PEIO-cable hole **44**B is configured (e.g., sized and shaped) to permit second PEIO cable **22** to extend from PEIO body **18** to an exterior of shelter **10**.

First PEIO-cable hole **44**A and second PEIO-cable hole **44**B can be arranged at any suitable location on shelter **10**. In different examples, first PEIO-cable hole **44**A and/or second PEIO-cable hole **44**B may be defined entirely by base **12** of shelter **10**, entirely by cover **14** of shelter **10**, or in yet another location of shelter **10**. For instance, in the example of FIG. **1**, first PEIO-cable hole **44**A and second PEIO-cable hole **44**B are located at an interface between base **12** and cover **14**. Specifically, base **12** defines a first base-PEIO-cable partial-hole **46**A and a second base-PEIO-cable partial-hole **46**B, which are lesser portions of first PEIO-cable hole **44**A and second PEIO-cable hole **44**B, respectively. Cover **14** defines a first cover-PEIO-cable partial-hole **48**A and a second cover-PEIO-cable partial hole **48**B that correspond to first base-PEIO-cable partial-hole **46**A and second base-PEIO-cable partial-hole **46**B, respectively. First cover-PEIO-cable partial-hole **48**A and second cover-PEIO-cable partial hole **48**B are lesser portions of first PEIO-cable hole **44**A and second PEIO-cable hole **44**B, respectively. When cover **14** is mated with base **12** (e.g., brought into adjacent alignment) first base-PEIO-cable partial hole **46**A aligns with first cover-PEIO-cable partial hole **48**A to create first PEIO-cable hole **44**A, while second base-PEIO-cable partial hole **46**B aligns with second cover-PEIO-cable partial hole **48**B to create second PEIO-cable hole **44**B. With this arrangement, first PEIO cable **20** and second PEIO cable **22** can extend from PEIO body **18** to an exterior of shelter **10** through first PEIO-cable holes **44**A and **44**B, respectively. Moreover, first PEIO cable **20** and second PEIO cable **22** may be friction fit between base **12** and cover **14** in such an arrangement, which may prevent PEIO **16** from moving out of alignment with respect to base **12** after PEIO **16** is positioned within shelter **10**.

Shelter **10** can define a first PEIO-cable hole **44**A and a second PEIO-cable hole **44**B of any suitable size and shape. In some examples, as described in greater detail with reference to FIGS. **3**A and **3**B, shelter **10** can define a first PEIO-cable hole **44**A and/or a second PEIO-cable hole **44**B that is adjustable to accommodate PEIOs with different size cables. An adjustable cable hole may provide a tighter fit between a cable and shelter **10** than a non-adjustable cable hole, which may reduce the ingress of unwanted elements into shelter **10** through the cable hole.

In some examples, shelter **10** includes a support surface adjacent to first PEIO-cable hole **44**A and/or second PEIO-cable hole **44**B that functions to support first PEIO cable **20** and/or second PEIO cable **22**, respectively. FIG. **1** illustrates an example of shelter **10** that includes example support surfaces.

In the example of FIG. **1**, shelter **10** includes base-PEIO-cable partial-support **50**A and **50**B (collectively "supports **50**") that extend substantially orthogonally from sidewall **36** of base **12**. Base-PEIO-cable partial-supports **50** are aligned with first and second base-PEIO-cable partial-holes **46**A and **46**B, respectively. First PEIO cable **20** and second PEIO cable **22** can extend through first and second base-PEIO-cable partial-holes **46**A and **46**B, respectively, and be supported by base-PEIO-cable partial-supports **50** in the region of base **12** adjacent sidewall **36**.

When configured as shown in FIG. **1**, cover **14** includes complementary cover-PEIO-cable partial-supports **151**A and **151**B (collectively "supports **151**") that extends substantially orthogonally from cover-sidewall **42** and that are aligned with first and second cover-PEIO-cable partial-holes **48**A and **48**B, respectively. When cover **14** is mated with base **12**, cover-PEIO-cable partial-supports **151**A and **151**B align with base-PEIO-cable partial-supports **50**A and **50**B. As a result, when first PEIO cable **20** is extended through first PEIO-cable hole **44**A and second PEIO cable **22** is arranged through second PEIO-cable hole **44**B, first and second PEIO cables **20** and **22** are supported in the negative Z-direction (i.e., downwardly) by base-PEIO-cable partial-support **50**A and **50**B and in the positive Z-direction (i.e., upwardly) by a cover-PEIO-cable partial-supports **151**A and **151**B. Such support may help reduce or eliminate cable chafing or cracking in the region adjacent cable connectors **26**A and **26**B over the service life of PEIO **16**.

While shelter **10** in the example of FIG. **1** includes support surfaces on both base **12** and cover **14**, it should be appreciated that in other examples according to the disclosure, a shelter may include support surfaces that extend only from base **12** or extend only from cover **14**. The arrangement and location of support surfaces in these examples may be dictated by the arrangement and location of PEIO-cable holes **44**A and **44**B on the shelter.

Shelter **10** may include a variety of different features that may help protect PEIO **16** from unwanted elements. For instance, in some applications, PEIO **16** may be used in an outdoor environment subject to inclement weather such as rain and snow. When PEIO **16** is exposed to moisture from inclement weather, the moisture may cause short circuits that reduce the electrical integrity of PEIO **16**. To reduce or eliminate water accumulation adjacent PEIO **16** in these applications, shelter **10** may include moisture management features.

FIG. **2** is a conceptual illustration of one example of shelter **10**, generally described above with respect to FIG. **1**, which includes example moisture management features. In FIG. **2**, like reference numerals between FIGS. **1** and **2** refer to like elements. Further, for ease of description, PEIO **16** is not illustrated within shelter **10** in the example of FIG. **2**.

In the example of FIG. **2**, platform **34** of shelter **10** includes a main area **37** and a raised rib structure **39**. Raised rib structure **39** may segregate PEIO **16** (FIG. **1**) from moisture that may accumulate on main area **37**. Raised rib structure **39** extends upwardly (i.e., in the Z-direction) from main area **37** of platform **34**. Accordingly, PEIO body **18** (FIG. **1**) can be positioned on raised rib structure to elevate PEIO body **18** above main area **37** of platform **34**. Should water accumulate on main area **37** of shelter **10**, raised rib structure **39** can segregate PEIO body **18** from the accumulated water, which may reduce or eliminate the possibility of a short circuit between PEIO body **18** and component cable **30**.

Depending on the configuration of shelter **10**, raised rib structure **39** may be a single rib (i.e., a single elevating feature that functions to elevate PEIO body **18** above main area **37**), or a plurality of rib features. For instance, in the example of FIG. **2**, raised rib structure **39** includes six ribs that are arranged in parallel alignment and that are substantially equally spaced from one another. It should be appreciated, however, that the disclosure is not limited in this respect, and other configurations of rib structure **39** are both possible and contemplated.

Independent of the specific configuration of rib structure **39**, in some examples, rib structure **39** may elevate PEIO body **18** at least 2 millimeters above main area **37**. When PEIO body **18** is elevated at least 2 millimeters above main area **37**, the likelihood that PEIO body **18** will be immersed in water within shelter **10** may be reduced or eliminated. It should be appreciated though that rib structure **39** may elevate PEIO body **18** to heights other than 2 millimeters, and the disclosure is not limited to a rib structure that elevates a PEIO body to any particular height.

PEIO **16** may be placed on a surface that is subject to occasional standing water such as, e.g., a golf course, an outdoor concert venue, or the like. In these applications, the electrical integrity of PEIO **16** may be compromised if PEIO **16** is immersed in the standing water. For this reason, shelter **10** may include at least one elevating portion that can elevate PEIO **16** above the surface on which the shelter is placed. Should water thereafter accumulate on the surface, the elevating portion of the shelter may prevent PEIO **16** from being immersed in water.

In the example of FIG. **2**, shelter **10** includes four legs **41**A-**41**C (only three of which are labeled for clarity and which are collectively referred to as "legs **41**") that function to elevate shelter **10** above a surface on which the shelter **10** is placed. Legs **41** extend downwardly (i.e., in the negative Z-direction) from platform **34** of base **12**, and each leg of legs **41** is arranged adjacent a different corner of platform **34**. Each leg of legs **41** is substantially the same height (i.e., in the Z-direction) such that legs **41** elevate platform **34** and maintain platform **34** in a generally parallel relationship with a surface on which shelter **10** is set.

While shelter **10** is illustrated as including four elevating legs **41**, in different examples, shelter **10** may include more elevating portions (e.g., five or more legs), fewer elevating portions (e.g., three or less legs), or a different arrangement of elevating portions. For instance, in one example, shelter **10** may include three legs arranged in a tripod arrangement. In another example, shelter **10** may two legs arranged on opposing side of base **12**. In yet another example, shelter **10** may include a single elevating portion centered about raised rib structure **39** and extending downwardly from platform **34**. It should be appreciated that the foregoing description of elevating portions are merely examples, and the disclosure is not limited to a shelter that includes any particular number or arrangement of elevating portions. Rather, any suitable feature or combination of features that function to elevate shelter **10** above a surface on which the shelter set may be used in accordance with the disclosure.

In some examples, the at least one elevating portion of shelter **10** may be configured to support a threshold amount of weight. For example, in different configurations, the at least one elevating portion of shelter **10** may support at least 50 pounds such as, e.g., at least 100 pounds, or at least 200 pounds. In the event that someone would stand on top of shelter **10** (e.g., when cover **14** is mated with base **12**), the shelter may support that person's weight without breaking.

Independent of the specific arrangement of the at least one elevating portion of shelter **10**, in some examples, the at least one elevating portion of shelter **10** may elevate platform **34** at least 3 inches above a surface on which the shelter is set. When platform **34** and, correspondingly PEIO body **18**, is elevated at least 3 inches above a surface on which the shelter is set, the likelihood that PEIO body **18** will be immersed in standing water on the surface may be reduced or eliminated. For example, depending on the specific configuration of shelter **10** and PEIO **16**, when platform **34** is elevated at least 3 inches above a surface on which the shelter is set, electrical connects to PEIO body **18** may be elevated at least 4 inches above a surface on which the shelter is set, further increasing the separation distance between the electrical contacts and any surface water that may accumulate.

In different examples, the at least one elevating portion of shelter **10** may elevate platform **34** more than 3 inches above a surface on which the shelter is set (e.g., at least 6 inches, at least 8 inches), or less than 3 inches above a surface on which the shelter is set (e.g., approximately 1 inch, approximately 2 inches), and the disclosure is not limited in this respect. For instance, in some examples, shelter **10** includes an adjustable at least one elevating portion (e.g., adjustable legs) that can be extended to a plurality of different heights depending on the specific application for shelter **10**. Alternatively, shelter **10** can be set on a separate base if additional height is desired beyond the height of a fixed-height elevating portion.

When shelter **10** is configured with sidewall **36** as shown in FIG. **2**, water may accumulate within base **12**. To remove water from base **12**, shelter **10** may include a drain aperture that allows accumulated water to flow out of base **12**. The drain aperture may be separate from any cable apertures defined in shelter **10** so that water does not flow along the length of an electrical cable when flowing out of base **12**.

In some examples, shelter **10** may include a drain aperture that is defined in sidewall **36** of base **12**. In other examples, shelter **10** may include a drain aperture defined in platform **34** of base **12**. For example, as illustrated in FIG. **2**, each leg of legs **41** defines a lumen that is connected to a drain aperture **43** (only one of which is labeled for clarity) extending through platform **34**. Should any water accumulate on platform **34**, the water may flow through drain aperture **43** (which is also identified on FIG. **1** for ease of reference), though a lumen defined by one of legs **41**, and out the bottom of the leg and onto the surface on which shelter **10** is set. In this manner, water may exit shelter **10** without substantially contacting electrical connections between PEIO body **18** (FIG. **1**) and one or more of the cables electrically connected to PEIO body **18**.

In some examples, at least a portion of platform **34** may be sloped toward drain aperture **43** to preferentially direct any water that may accumulate on platform **34** out of shelter **10**. For example, platform **34** may be domed or peaked adjacent raised rib structure **39** so that when PEIO body **18** is placed on raised rib structure **39**, water preferentially flows away from raised rib structure **39** toward drain aperture **43**. In another example, as illustrated in FIG. **2**, a region **45** of platform **34** that is directly adjacent to drain aperture **43** may be sloped toward drain aperture **43**. In still other examples, platform **34** can be sloped in a different configuration than as illustrated in FIG. **2**. The different configurations may be dictated by the shape of shelter **10**, the configuration of an elevating portion of shelter **10**, or different considerations including, e.g., the shape of PEIO body **18**, which may be positioned in shelter **10**.

As described above with respect to FIG. **1**, shelter **10** may include a variety of different apertures that define openings for physically and/or electrically connecting PEIO body **18** to features located outside of shelter **10**. Further, PEIO **16** in the example of FIG. **1** includes PEIO-component connectors **24** that are configured to be electrically connected to an electrical component located outside of shelter **10**. For this reason, shelter **10** may include one or more apertures that define openings to extend component cable **30** from PEIO-component connectors **24** disposed within an interior of shelter **10** to an exterior of shelter **10**.

In the example of FIG. **2**, shelter **10** defines at least one PEIO-component-connector-cable hole, which in FIG. **2** is illustrated as four PEIO-component-connector-cable holes **80**A-D (collectively "PEIO-component-connector-cable holes **80**"). The PEIO-component-connector-cable holes **80** define openings that allow component cables to extend between a PEIO body positioned within shelter **10** and an electrical component located outside of shelter **10**. For instance, during setup, PEIO body **18** (FIG. **1**) may be positioned on platform **34**. Component cable **30** can be introduced (e.g., from either the bottom or top of base **12**) through one of PEIO-component-connector-cable holes **80** and connected to one of PEIO-component connectors **24**. When arranged according to this example process, component cable **30** will be connected to one of PEIO-component connectors **24** and will extend through one of PEIO-component-connector-cable holes **80** to an exterior of shelter **10**.

The number, size, and arrangement of PEIO-component-connector-cable holes **80** may vary, e.g., based on the specific configuration of shelter **10** and the specific configuration of PEIO **16**. With respect to the example of FIG. **2**, however, PEIO-component-connector-cable holes **80** are defined in platform **34** of base **12**. Specifically, two PEIO-component-connector-cable holes **80**A and **80**B are defined in a first portion **82** of platform **34**, and two different PEIO-component-connector-cable holes **80**C and **80**D are defined in a second portion **84** of platform **34**, where the first portion **82** of platform **34** is separated from second portion **84** of platform **34** by raised rib structure **39**. Such a configuration may allow component cables to be connected to PEIO-component connectors **24** on PEIO **16** (FIG. **1**), which includes two, outwardly-facing, side-by-side PEIO-component connectors arranged on one side of PEIO body **18** and two different, outwardly-facing, side-by-side PEIO component connectors arranged on an opposing side of PEIO body **18**. That being said, in different examples, PEIO-component-connector-cable holes **80** may be defined within sidewall **36** of base **12**, within cover **14** of shelter **10**, or yet another location of shelter **10**.

Shelter **10** may include one or more features to adjust the dimensions of PEIO-component-connector-cable holes **80** (e.g., to increase or decrease the diameter of the holes). In some examples, each PEIO-component-connector-cable hole **80** may be adjusted after inserting a component cable through the hole until there is substantially no separation gap between the component cable and the PEIO-component-connector-cable hole. A smaller separation gap between a PEIO-component-connector-cable hole and a component cable may decrease the likelihood that unwanted elements (e.g., rain, snow) may enter an interior of shelter **10** through the separation gap.

In the example of FIG. **2**, each PEIO-component-connector-cable hole is covered by a PEIO-component-connector-cable-hole cover **86** (only one of which is labeled for clarity). In use, PEIO-component-connector-cable-hole cover **86** can move between a first position in which a PEIO-component-connector-cable hole is open and a second position in which the PEIO-component-connector-cable hole is substantially closed. For example, with reference to FIG. **2**, an operator can slide PEIO-component-connector-cable-hole cover **86** in the X-Y plane to an open position, extend component cable **30** (FIG. **1**) from an interior of shelter **10** to an exterior of shelter **10**, and slide PEIO-component-connector-cable-hole cover **86** in an opposing direction in the X-Y plane to a substantially closed position.

In a different example, PEIO-component-connector-cable-hole cover **86** may be hingedly mounted to base **12** instead of mounted to slide between an open and a closed position. A hingedly mounted PEIO-component-connector-cable-hole cover may rotate between an open position and a substantially closed position (e.g., in the Y-Z plane) to allow component cable **30** to be extended between an interior of shelter **10** and an exterior of shelter **10**. Other configurations of PEIO-component-connector-cable-hole cover **86** are possible.

Independent of the specific arrangement of PEIO-component-connector-cable-hole cover **86**, PEIO-component-connector-cable-hole cover **86** may define a cutout **88** (FIG. **2**) that corresponds to a size and/or shape of component cable **30**. Cutout **88** may help prevent component cable **30** from being compressed when PEIO-component-connector-cable-hole cover **86** is moved to a substantially closed position. In some examples, the portion of PEIO-component-connector-cable-hole cover **86** that defines cutout **88** may be positioned over platform **34** when PEIO-component-connector-cable-hole cover **86** is closed and there is no component cable extending through the PEIO-component-connector-cable hole. For example, in FIG. **2**, the portion of PEIO-component-connector-cable-hole cover **86** that defines cutout **88** may slide beyond PEIO-component-connector-cable hole **80**A (i.e., to the left of the illustration in the Y-direction) when moved in a closed position. This arrangement may prevent water or debris from entering shelter **10** when PEIO-component-connector-cable-hole cover **86** is closed and there is no component cable extending through cutout **88**.

Upon placing PEIO body **18** (FIG. **1**) on base **12** and positioning cover **14** over base **12**, it may be useful to physically connect cover **14** to base **12**, e.g., to form an integral assembly that resists detachment except with user assistance. Physically attaching cover **14** to base **12** may prevent PEIO body **18** from inadvertently coming out of shelter **10** during use or transport. For instance, in the example of FIGS. **1** and **2**, cover **14** of shelter **10** includes a cover-latch member **51**, and base **12** includes a complementary base-latch member **49**. As shown, base-latch member **49** is a pair of protrusions that extend outwardly from sidewall **36** of base **12**. Also as shown, cover-latch member **51** is a protrusion that extends outwardly

(e.g., in the X-Y plane) from cover-sidewall **42** and that defines a pair of holes that are configured to receive the protrusions defined by base-latch member **49**.

Cover **14** latches to base **12** when cover-latch member **51** is engaged with base-latch member **49** (e.g., when the protrusions of latch member **49** are inserted into the holes of latch member **51**). When engaged, latch members **49** and **51** may prevent cover **14** from detaching from base **12** until, e.g., a user applies sufficient force to overcome the resistance of the latch members. In different examples, different latch members may be used in addition to, or in lieu of, latch members **49** and **51**. In one example, a latch member like cover-latch member **51** is included on the base **12**, and a latch member like base-latch member **49** is included on the cover **14**. Additional examples of latch members may include, but are not limited to, screws, bolts, claps, or the like.

In some situations, it may be useful to lock cover **14** to base **12** in addition to or in lieu of frictionally latching the two components together. Locking cover **14** to base **12** may prevent a passerby from accessing PEIO **16** (FIG. **1**) after the PEIO is locked in shelter **10**. In the example of FIG. **2**, cover **14** is locked to base **12** on one side by hinge **38**. On the opposing side of hinge **38**, cover **14** includes cover-locking apertures **53**A and **53**B, and base includes base-locking apertures **55**A and **55**B. When cover **14** mates with base **12**, cover-locking apertures **53**A and **53**B align with base-locking apertures **55**A and **55**B to define two locking apertures extending through cover **14** and base **12**. A locking member can be inserted through one or both of the locking apertures to lock cover **14** and base **12** together. Example locking members may include padlocks, zip ties, and the like. In this manner, cover **14** can be locked to base **12**.

As briefly discussed above with respect to FIG. **1**, shelter **10** may include an adjustable first PEIO-cable hole **44**A and/or an adjustable second PEIO-cable hole **44**B. In some examples, an adjustable cable hole may be adjusted (e.g., by increasing or decreasing the diameter of the cable hole) until there is substantially no separation gap between a PEIO cable and a PEIO cable hole when a PEIO cable is inserted into shelter **10**. A smaller separation gap between a PEIO cable and a PEIO-cable hole may decrease the likelihood that unwanted elements (e.g., rain, snow) may enter an interior of shelter **10** through the separation gap.

Shelter **10** can include any suitable feature that is capable of adjusting (e.g., increasing or decreasing) the dimensions of first PEIO-cable hole **44**A and/or second PEIO-cable hole **44**B. FIG. **3**A shows an example of second base-PEIO-cable partial hole **46**B, which was described above with respect to FIG. **1**. In the example of FIG. **3**A, base-PEIO-cable partial-support **50**B defines a plurality of different sizes (i.e., diameters) at different distances away from away from sidewall **36** (i.e., in the X-direction). Specifically, base-PEIO-cable partial-support **50**B defines a first portion **54** that extends from directly adjacent sidewall **36** to a first distance **57** away from sidewall **36**. First portion **54** of base-PEIO-cable partial-support **50**B defines a first size. Base-PEIO-cable partial-support **50**B also a second portion **52** that extends from first portion **54**. Second portion **52** of base-PEIO-cable partial-support **50**B defines a second size less than the first size.

Cover-PEIO-cable partial-support **151**B (illustrated on FIG. **1**) defines a plurality of different complementary sizes (i.e., diameters) at different distances away from cover-sidewall **42**, such that different sized PEIO-cable openings are defined at different distances away from cover-sidewall **42**. Accordingly, when cover **14** is mated with base **12**, cover-PEIO-cable partial-support **151**B and base-PEIO-cable partial-support **50**B define a first sized opening at a first distance (i.e., in the X-direction) away from shelter **10** and a second sized opening at a second distance (again, in the X-direction) away from shelter **10**. The first sized opening is larger than the second sized opening.

In examples in which PEIO **16** includes a comparatively small second PEIO cable **22**, the cable can be inserted through the first and second sized openings defined, together, by cover-PEIO-cable partial-support **151**B and base-PEIO-cable partial-support **50**B so that the separation gap between the cable and the openings is defined as the difference between the cross-sectional size (e.g., in the Y-Z plane) of the cable and the cross-sectional size of the smaller second opening. By contrast, in examples in which PEIO **16** includes a comparatively larger second PEIO cable **22**, the portions of cover-PEIO-cable partial-support **151**B and base-PEIO-cable partial-support **50**B that define the second smaller opening can be removed, e.g., by cutting or breaking the portion, so that the cable opening is defined by the larger first sized opening. In this manner, shelter **10** can be configured with an adjustable PEIO-cable hole.

In some examples, cover-PEIO-cable partial-support **151**B and base-PEIO-cable partial-support **50**B may include a weakened portion between first portion **54** and second portion **52** (e.g., at weakened portion at distance **57** on FIG. **3**A). A weakened portion may allow the second portion of the PEIO-cable hole to fracture from the first portion (e.g., upon application of hand pressure) without substantially affecting the length or diameter of the first portion.

FIG. **3**B shows another example of second PEIO-cable hole **44**B with adjustable dimensions in accordance with the disclosure. In the example of FIG. **3**B, base-PEIO-cable partial-support **50**B and cover-PEIO-cable partial-support **151**B define a plurality of different sizes (i.e., diameters) at different distances away from away from sidewall **36** and cover-sidewall **42**, respectively. Specifically, base-PEIO-cable partial-support **50**B and cover-PEIO-cable partial-support **151**B each define a first portion **160** that extends from directly adjacent sidewall **36** and cover-sidewall **42**, a second portion **162** that extends from first portion **160**, and a third portion **164** that extends from second portion **162**. First portion **160** defines a first size, second portion **162** defines a second size less than the first size, and third portion **164** defines a third size less than the second size. In use, a cable can be inserted through the first, second, and third sized openings defined by cover-PEIO-cable partial-support **151**B and base-PEIO-cable partial-support **50**B so that the separation gap between the cable and the openings is defined as the difference between the cross-sectional size of the cable and the cross-sectional size of the smallest (i.e., the third) opening. Alternatively, one or more portion of base-PEIO-cable partial-support **50**B and cover-PEIO-cable partial-support **151**B can be removed to define larger sized cable openings.

As illustrated in FIG. **3**B, cover-PEIO-cable partial-support **151**B may include lip **17** (described above with reference to FIG. **1**) that extends over base-PEIO-cable partial-support **50**B when cover **14** is mated to base **12**. Lip **17** may prevent water flowing off of cover **14** from entering shelter **10** at the junction between cover **14** and base **12**.

While the forgoing description of FIGS. **3**A and **3**B of an adjustable PEIO-cable hole was generally described with respect to second PEIO-cable hole **44**B, it should be appreciated that PEIO-cable hole **44**A of shelter **10**, or yet another aperture defined in shelter **10**, may be configured with one or more of the described features.

As previously described, shelter **10** in the example of FIG. **1** includes hinge **38**. Hinge **38** connects base **12** to cover **14** so that cover **14** can pivotally rotate relative to base **12**. FIGS. **4**A

and **4**B are exploded views of one example type of hinge that shelter **10** may use. In particular, FIG. **4**A is an exploded view of an example hinge section **100** affixed to cover-sidewall **42** of cover **14**, while FIG. **4**B is an exploded view of corresponding example hinge section **102** affixed to sidewall **36** of base **12**. As will be described, hinge section **100** of FIG. **4**A is configured to receive hinge section **102** of FIG. **4**B to create hinge **38**. FIG. **5** is a conceptual illustration of hinge **38** after assembly.

When configured as shown in FIG. **4**B, hinge section **102** includes at least one support structure, which in the example of FIG. **4**B is illustrated as four support structures **104**A-**104**C (collectively "support structures **104**"), that connect hinge pin **106** to sidewall **36** of base **12**. Support structures **104** permanently affix hinge pin **106** to sidewall **36** and align hinge pin **106** parallel to sidewall **36**. Hinge pin **106** defines a first end projection **108** projecting from support structure **104**A (i.e., in the X-direction) and a second end projection **110** projection from support structure **104**D (i.e., in the X-direction opposite first end projection **108**). Hinge pin **106** and first and second end projections **108** and **110** of hinge pin **106** can be inserted into hinge section **100** (FIG. **4**A) to assemble hinge **38**.

Hinge section **100** (FIG. **4**A) defines at least one hinge pin receptacle for receiving hinge pin **106** during assembly, which, in the example configuration of FIG. **4**A, is a plurality of hinge pin receptacles. Hinge section **100** includes a first hinge pin receptacle-support structure **112** and a second hinge pin receptacle-support structure **114**. First hinge pin receptacle-support structure **112** defines a first projection receptacle opening **116**. Second hinge pin receptacle-support structure **114** defines a second projection receptacle opening **118**. Hinge section **100** also includes at least a third hinge pin receptacle interposed between first hinge pin receptacle-support structure **112** and second hinge pin receptacle-support structure **114**, which in the example of FIG. **4**A is illustrated as three additional hinge pin receptacle-support structures **120**A-**120**C (collectively "support structures **120**").

First and second hinge pin receptacle-support structures **112** and **114** extend first and second projection receptacle openings **116** and **118**, respectively, away from cover-sidewall **42**. Further, first and second hinge pin receptacle-support structures **112** and **114** each orient first and second projection receptacle openings **116** and **118**, respectively, in the negative Z-direction indicated on FIG. **4**A. First hinge pin receptacle-support structure **112** is configured to receive first end projection **108** of hinge pin **106** (FIG. **4**B) during assembly of hinge **38**. Second hinge pin receptacle-support structure **114** is configured to receive second end projection **110** of hinge pin **106** (FIG. **4**B) during assembly of hinge **38**.

Hinge pin receptacle-support structures **120** define receptacle openings that open in the positive Z-direction indicated on FIG. **4**A (i.e., in an opposite direction than first and second projection receptacle openings **116** and **118**). Hinge pin receptacle-support structures **120** are configured to receive a portion of hinge pin **106** (FIG. **4**B) extending between first end projection **108** and second end projection **110** of hinge pin **106** during assembly of hinge **38**.

During assembly, hinge section **102** can be inserted in negative Z-direction indicated on FIG. **4**A into hinge section **100** to create hinge **38**. Specifically, first and second end projections **108** and **110** of hinge pin **106** can be inserted into first and second projection receptacle openings **116** and **118**, respectively, while the portion of hinge pin **106** extending between first end projection **108** and second end projection **110** can be inserted into receptacle opening defined by hinge pin receptacle-support structures **120**. Because first and second projection receptacle openings **116** and **118** open in one direction while receptacle opening defined by hinge pin receptacle-support structures **120** open in an opposite direction, hinge pin **106** can be supported by opposing forces, which may prevent hinge section **100** from separating from hinge section **102**.

Unlike hinge assemblies that require separate parts (e.g., a removable hinge pin) or tools to assemble, the example hinge **38** described with respect to FIGS. **4**A and **4**B may not require separate parts or tools to assemble. Instead, the pin and receptacle features of hinge **38** are permanently affixed to base **12** and cover **14**, respectively, and can be inserted into one another without specialized tools. In applications where shelter **10** is assembled in the field, such an example hinge may save time and expense associated with complicated or laborious assembly.

In some examples, hinge **38** may include one or more features to assist assembly. For instance, in the example of FIG. **4**A, first and second hinge pin receptacle-support structures **112** and **114** include assembly guides **122**A and **122**B, respectively. Assembly guides **122**A and **122**B define corresponding channels that taper (e.g., in the X and/or Y-directions) in the negative Z-direction. First and second end projections **108** and **110** of hinge pin **106** (FIG. **4**B) can be inserted into assembly guides **122**A and **122**B, respectively, during assembly of hinge **38**. As first and second end projections **108** and **110** are pressed in the negative Z-direction, the tapering on assembly guides **122**A and **122** may cause first and second hinge pin receptacle-support structures **112** and **114** to be displaced in opposing directions (i.e., in opposing X-directions). In this manner, first and second end projections **108** and **110** can be inserted between first and second hinge pin receptacle-support structures **112** and **114** and into first and second projection receptacle openings **116** and **118**, respectively.

While hinge **38** was described as being configured with hinge section **100** affixed to cover-sidewall **42** of cover **14** and hinge section **102** affixed to sidewall **36** of base **12**, it should be appreciated that in other examples, hinge section **100** can be affixed to sidewall **36** of base **12** and hinge section **102** can be affixed to cover-sidewall **42** of cover **14**. Other configurations and arrangements of the various features of hinge **38** are contemplated.

In some examples, hinge **38** is configured so that cover **14** can pivotally rotate at least 180 degrees relative to base **12** between an open position and a closed position. Such a configuration may provide ready access to platform **34** of base **12**, e.g., for inserting and removing PEIO **16** from shelter **10**.

A shelter in accordance with the disclosure can assume a variety of different configurations, as described above. In some examples, a shelter according to the disclosure may be configured to be stacked in a nested arrangement with a plurality of similarly configured shelters. When configured to be stacked in a nested arrangement, multiple shelters may be stored and/or transported within a confined space.

FIG. **6** is a conceptual drawing of an example stacked arrangement for shelters **10**A-**10**E. Each shelter of shelters **10**A-**10**E may define the configuration of shelter **10**, described above with respect to FIGS. **1**-**5**. As seen in the example of FIG. **6**, covers **14**A-**14**E of shelters **10**A-**10**E are rotated open approximately 180 degrees relative to bases **12**A-**12**E. Further the base of one shelter (e.g., **12** A) is inserted into the base of another shelter (e.g., **12**B), while the cover of one shelter (e.g., **14**A) is inserted into the cover of another shelter (e.g., **14**B). In this manner, each shelter of shelters **10**A-**10**E is stacked on top of one another to define a nested stack of shelters. In some examples, this configuration

of shelters may allow multiple shelters to be stored and/or transported within a confined space.

FIGS. **7-13** illustrate several different views of an example shelter that includes features illustrated and described with respect to shelter **10** above. FIG. **7** is perspective view of the example shelter. FIG. **8** is a perspective top view of the example shelter of FIG. **7**. FIG. **9** is a perspective bottom view of the example shelter of FIG. **7**. FIG. **10** is a perspective side view of the example shelter of FIG. **7**. FIG. **11** is a perspective view of an example portion of the example shelter of FIG. **7**. FIG. **12** is a perspective view of an example hinge on the example shelter of FIG. **7**. FIG. **13** is another perspective side view of the example shelter of FIG. **7**.

In the foregoing detailed description, the invention has been described with reference to specific examples. However, it may be appreciated that various modifications and changes can be made without departing from the scope of the invention as set forth in the appended claims. Thus, some of the features of preferred embodiments described herein are not necessarily included in preferred embodiments of the invention which are intended for alternative uses.

What is claimed is:

1. A shelter for a portable electrical inlet/outlet (PEIO) comprising:

a base that includes a platform that physically supports a PEIO body, and

a cover that mates with the base to substantially enclose the platform and protect the PEIO body from unwanted elements,

wherein the shelter defines a first PEIO-cable hole and a second PEIO-cable hole, wherein the first PEIO-cable hole allows a first PEIO-cable to extend from the PEIO body within the shelter to an exterior of the shelter and the second PEIO-cable hole allows a second PEIO cable to extend from the PEIO body within the shelter to the exterior of the shelter,

wherein the shelter defines at least one PEIO-component-connector-cable hole that allows a component cable to extend from the exterior of the shelter to at least one PEIO-component connector carried by the PEIO body within the shelter, and

wherein the base further comprises at least a plurality of legs that extend downwardly from the platform, the plurality of legs elevate the platform and maintains the platform in a generally parallel relationship with a surface on which the shelter is set each of the legs having lumen defined therein, the lumen being connected to a drain aperture extending through the platform, such that the drain aperture drains water accumulating on the platform through the lumen out onto the surface on which the shelter is set.

2. The shelter of claim **1**, wherein the platform further comprises a raised rib structure that segregates the PEIO body from any water accumulates on the platform.

3. The shelter of claim **2**, wherein the raise rib structure comprises a single rib.

4. The shelter of claim **1**, wherein the shelter comprises at least four legs extending downwardly from the platform.

5. The shelter of claim **1**, wherein the at least one PEIO-component connector receives a multi-prong plug.

6. The shelter of claim **1**, wherein the at one PEIO-component connector comprises at least two PEIO-component connectors.

7. The shelter of claim **1**, wherein the base further comprises a sidewall extending substantially around a perimeter of the platform to define a cavity that receives the PEIO body.

8. The shelter of claim **1**, wherein the cover rotates closed over the PEIO body to friction fit the PEIO body between the base and the cover.

9. The shelter of claim **1**, wherein the first PEIO-cab e hole and the second PEIO-cable hole are adjustable in size to accommodate different size PEIO cables.

10. The shelter of claim **9**, wherein the shelter further comprises a first PEIO-cable support surface that supports the first PEIO cable and a second PEIO-cable support surface extending substantially orthogonally from the first PEIO-cable support surface and that supports the second PEIO cable, wherein the first PEIO-cable support surface and the second PEIO-cable support surface each have a first portion that defines a first diameter and a second portion that defines a second diameter, and wherein the second portion fractures from the first portion upon application of a force without substantially affecting a length or a diameter of the first portion.

11. The shelter of claim **1**, wherein the base further comprise at least one sidewail extending upwardly from the platform, with a first base-PEIO-cable partial-hole and a second PEIO-cable partial hole being defined in the base-sidewall, and wherein the cover comprises at least one cover-sidewall extending downwardly, with a first cover-PEIO-cable partial-hole and a second cover-PEIO-cable partial-hole defined in the cover-sidewall, wherein when the cover mates with the base, the first cover-PEIO-cable partial-hole aligns with the first base-PEIO-cable partial-hole to create the first PEIO-cable hole and the second cover-PEIO-cable partial-hole aligns with the second base-PEIO-cable partial-hole to create the second PEIO-cable hole.

12. The shelter of claim **11**, wherein the at least one PEIO-component-connector-cable hole is defined in the platform of the base.

13. A system comprising:

a portable electrical inlet/outlet (PEIO) that includes a PEIO body, a first PEIO cable, a second PEIO cable, and at least one PEIO-component connector;

a PEIO shelter that comprises:

a base that includes a platform and a plurality of legs, wherein the platform supports the PEIO body and the plurality of legs extend downwardly from the platform, the plurality of legs elevate the platform and maintain the platform in a generally parallel relationship with a surface on which the PEIO shelter is set, and

a cover that mates with the base to substantially enclose the platform and thereby protect the PEIO body from unwanted elements;

wherein the shelter defines a first PEIO-cable hole, a second PEIO-cable hole, and at least one PEIO-component-connector-cable hole; and

a component cable,

wherein the PEIO is positioned with the PEIO body supported on the platform, the first PEIO cable extending from the PEIO body through the first PEIO-cable hole to an exterior of the shelter, the second PEIO cable extending from the PEIO body through the second PEIO-cable hole to the exterior of the shelter, and the component cable extending from the at least one PEIO-componet connector through the at least one PEIO-component-connector-cable hole to the exterior of the shelter and each leg having a lumen defined therein, the lumen being connected to a drain aperture extending through the platform, such that the drain aperture drains water accumulating on the platform through the lumen out onto the surface on which the shelter is set.

14. The system of claim 13, wherein the platform further comprises a raised rib structure that segregates the PEIO body from any water accumulates on the platform.

15. The system of claim 13, wherein the at least one PEIO-component connector comprises at least two PEIO-component connectors, each of the at least two PEIO-component connectors receiving a multi-prong plug, and the at least one PEIO-component-connector-cable hole comprises at least two PEIO-component-connector-cable holes.

16. The system of claim 13, wherein the base further comprises a sidewall extending substantially around a perimeter of the platform to define a cavity into which the PEIO body is inserted, and the cover is rotated closed over the PEIO body to frictional fit the PEIO body between the base and the cover.

17. The system of claim 13, wherein the shelter further comprises a first PEIO-cable support surface that supports the first PEIO cable and a second PEIO-cable support surface extending substantially orthogonally from the first PEIO-cable support surface and that supports the second PEIO cable, wherein the first PEIO-cable support surface and the second PEIO-cable support surface each have a first portion that defines a first diameter and a second portion that defines a second diameter, and wherein the second portion fractures from the first portion upon application of a force without substantially affecting a length or a diameter of the first portion.

18. The system of claim 13, wherein the base further comprise at least one sidewall extending upwardly from the platform, with a first base-PEIO-cable partial-hole and a second PEIO-cable partial hole being defined in the base-sidewall, and wherein the cover comprises at least one cover-sidewall extending downwardly, with a first cover-PEIO-cable partial-hole and a second cover-PEIO-cable partial-hole defined in the cover-sidewall, wherein the cover is mated with the base, with the first cover-PEIO-cable partial-hole aligned with the first base-PEIO-cable partial-hole to create the first PEIO-cable hole and the second cover-PEIO-cable partial-hole aligned with the second base-PEIO-cable partial-hole to create the second PEIO-cable hole.

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