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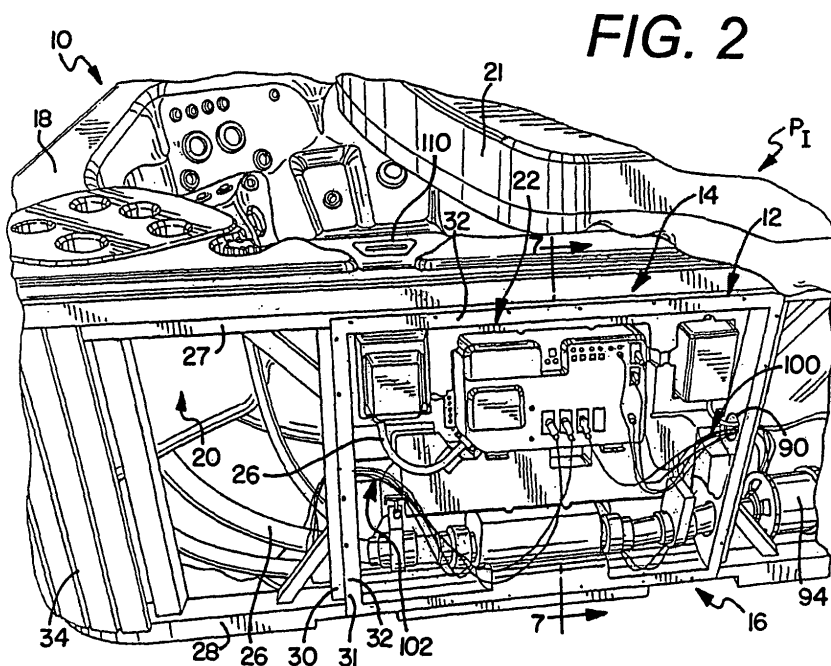
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(54) **Portable spa**

(57) The present invention is directed to a portable spa having a tray for centralized mounting of the various spa components. More specifically, the invention provides a portable spa or hot tub that utilizes a mounting tray for connection of the various spa components, including the ozonator, heater, control panel, and electrical connection interface. The tray is mounted to a support frame within a cavity residing between the spa tub and enclosure formed from exterior panels. The tray includes

an arrangement of bays, wherein each bay is specifically dimensioned to receive a particular spa component and secure the component in a force fit. The bay arrangement includes a first bay that receives an electrical connection interface box or junction box. The mounting tray also includes a second bay that receives the control panel, a third bay that receives an ozonator, and a fourth bay that receives a heater and valves. The first through fourth bays are arrayed about a central portion that is recessed from a flange of the tray.



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Application claims the benefit of U.S. Provisional Application No. 60/597,414, which was filed on November 29, 2005.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] N/A

TECHNICAL FIELD

[0003] The invention relates to a portable spa featuring centralized mounting of the various spa components. More specifically, the invention provides a portable spa or hot tub that utilizes a mounting tray for connection of the various spa components, including the ozonator, heater, control panel, and electrical connection interface, in one location.

BACKGROUND OF THE INVENTION

[0004] Portable spas, or hot tubs as they are also referred to, are well-known and can be found in both residential and commercial settings. While such conventional portable spas provide some benefits, they nevertheless have certain limitations. For example, the various components that are utilized to operate the spa, such as an ozonator, heater and control panel, are mounted throughout a cavity between the spa shell and the enclosure. As a result, a significant amount of conduit, lines and piping are needed to interconnect the various components. In addition, the mounting of these components in various locations of the cavity significantly increases the manufacturing and assembly costs, as measured from material and labor standpoints. Furthermore, residential owners of conventional spas find diagnostic and maintenance tasks to be difficult and time consuming, and prefer to have a service technician address the task, despite the associated costs and the delay resulting from the time required for the technician to travel to the owner's location. Thus, conventional spas suffer from a number of limitations as reflected in the manufacturing and servicing deficiencies.

[0005] The present invention is provided to solve the limitations of conventional portable spas discussed above and other problems, and to provide advantages and aspects not provided by prior portable spas. A full discussion of the features and advantages of the present invention is deferred to the following detailed description, which precedes with reference to the accompanying drawings.

SUMMARY OF THE INVENTION

[0006] The present invention is directed to a portable spa featuring centralized mounting of the spa components. More specifically, the invention provides a portable spa or hot tub that utilizes a support tray for mounting of the various spa components, including the ozonator, heater, control panel, and electrical connection interface. The tray is mounted to a support frame within a cavity of the spa by fasteners that extend through a peripheral flange of the tray. Exterior panels removably enclose the cavity and the mounting tray.

[0007] According to an aspect of the invention, the tray includes an arrangement of bays or receptacles, wherein each bay is specifically dimensioned to receive a particular spa component. A force fit is utilized to secure a component within a bay, wherein the force fit requires the bay to have dimensions, such as a periphery, that slightly exceeds dimensions of the component, such as the component periphery. The bay arrangement includes a first bay that receives an electrical connection interface box or junction box. The mounting tray also includes a second bay that receives the control panel, a third bay that receives an ozonator, and a fourth bay that receives a heater and valves. The bays comprise a side wall arrangement and a rear wall that results in the bay being cooperatively dimensioned with the component to achieve the force fit. The bays are arrayed about a central portion and are recessed from the central portion of the tray.

[0008] According to an other aspect of the invention, the mounting tray has an articulated rear surface resulting from the first, second, third and fourth bays. Because the bays extend rearward from the central portion, the respective rear walls are positioned rearward or behind the central portion and the flange. In an installed position, the flange resides in a first plane that is inward of a reference plane in which the exterior panel resides, the central portion resides in a second plane that is inward of the first plane, and the rear wall of the second bay resides in a third plane that is inward of the second plane.

[0009] Other features and advantages of the invention will be apparent from the following specification taken in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] To understand the present invention, it will now be described by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a prior art portable spa, showing various spa operating components scattered throughout the spa cavity;

FIG. 2 is a perspective view of a portable spa of the invention, showing a mounting tray and operating components connected thereto;

FIG. 3 is a perspective view of the mounting tray,

showing the operating components secured within bays of the mounting tray;

FIG. 4 is an exploded view of the mounting tray, showing the operating components exploded from the mounting tray;

FIG. 5 is a perspective view of a front side of the mounting tray;

FIG. 6 is a perspective view of a rear side of the mounting tray; and,

FIG. 7 is a cross-section of the mounting tray taken along line 7-7 of Fig. 3, showing the mounting tray and the operating components in an installed position.

DETAILED DESCRIPTION

[0011] While this invention is susceptible of embodiments in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

[0012] Fig. 1 depicts a conventional portable spa 500 that includes an external support frame 510 for a spa shell or tub 512, wherein a cavity 514 is defined there between. In general terms, the external support frame 510 comprises a plurality of horizontal frame members 516 and vertical frame members 517 to which the various operational components 515 that are utilized to operate the spa 500 are coupled. These operational components 515 include an ozonator 518 mounted to an upper horizontal member 516 in one region of the cavity 514, and an electrical connection interface 520 mounted to another horizontal member 516 in a second region of the cavity 514. A control panel 522 is mounted next to the ozonator 518 in a third region of the cavity 514, while a heater 524 and the associated piping reside in a fourth region of the cavity 514 between the ozonator 518 and the electrical interface 514. Because the components 515 are scattered within the cavity 514, a multitude of lines and piping/conduits run between the components 515 and thereby consume considerable space within the cavity 514. The assembly of the conventional spa 500 is both time consuming and inefficient for a number of reasons, including the fact that the components 515 are mounted in various locations throughout the cavity 514. In addition, running and securing connection lines and conduits between the dispersed components increases the assembly time and costs.

[0013] A number of side panels 526 are removably affixed to the support frame 510 to enclose the cavity 514 and the operational components 515 therein. To access the various components 515 within the cavity 514 for diagnostic or servicing purposes, the spa owner and/or the service technician must remove the side panels 526. Many residential owners of conventional spas 500 find

this task to be very time consuming and/or unappealing, and prefer to have such a service technician address the task despite the associated costs of a service visit. Even if the owner is willing to remove the side panels 526, the owner still faces the daunting task of searching the cavity 514 to find and assess the particular component 515 that is malfunctioning. Thus, the conventional spa 500 suffers from a number of deficiencies that adversely affect the assembly, long-term use, enjoyment and servicing of the spa 500.

[0014] Figs. 2-7 provide a portable spa 10 of the invention that includes a centralized mounting system 12 for the various spa components 14. The spa or hot tub 10 includes a support frame 16 for a spa shell or tub 18 and a cavity 20 defined there between. A removable cover 21 that fits over the shell 18 may be utilized when the spa 10 is not in use (see Fig. 2). As explained in greater detail below, the mounting system 12 comprises a mounting tray 22 that is affixed to a portion of the frame 16 and which contains a number of bays 24 that are cooperatively dimensioned to receive a particular component 14. The tray 22 may be injection molded from a polymer, or thermoformed from a plastic sheet. In contrast to conventional hot tubs 500 where the components 515 are scattered throughout the cavity 514, the mounting system 12 provides the inventive spa 10 with centralized mounting and connection of the various components 14. This aspect provides numerous benefits, including but not limited to, reduced assembly time of the spa 10 since the components 14 are affixed to a centralized location, instead of being scattered throughout the cavity 20. Material costs are also reduced because fewer connectors are required to secure the various spa components 14, and shorter lines and conduits 26 are needed between the components 14 and the tub 18. Furthermore, the time and cost to perform diagnostic and maintenance tasks are reduced since the spa owner and/or service technician perform such tasks at a single location - the mounting tray 22. In contrast, those maintaining and servicing the conventional spa 500 of Fig. 1 must proceed through a time consuming process that includes removing a number of side panels 524 and then working their way through the cavity 514 to find, evaluate and fix or replace the faulty component(s) 515.

[0015] In an installed position P₁ of Figs. 2 and 7, the mounting tray 22 is securely connected to the support frame 16 and the spa components 14 are affixed to the mounting tray 22 for operation of the spa 10. The mounting tray 22 is connected to an upper header 27 and a lower footer 28, and between two vertical members 30 of the support frame 16 by fasteners 31. In one embodiment where the header 26, footer 28 and vertical members 30 are fabricated from wood, the fasteners 31 are elongated screws. Preferably, the fasteners 31 extend through a peripheral region or flange 32 of the mounting tray 22. In most embodiments, the spa 10 has a substantially square or rectangular configuration, wherein the cavity 20 resides between the tub 18 and the support

frame 16. Thus, the cavity 20 has a configuration that corresponds to the overall configuration of the spa 10. To enclose the cavity 20, a plurality of removable panels 34 are connected to the support frame 16, including external to the mounting tray 22. The support frame 16 and the panels 34 collectively define an enclosure about the spa shell 18. Those panels 34 about the mounting tray 22 are adapted to provide access to the spa components 14 for diagnostic and/or servicing purposes. For example, hinges or sliding tracks can be utilized to allow for movement of those panels 34 in order to expose the mounting tray and spa components 14. Instead of the panel 34, a protective casing may enclose the tray 22 and the various components 14. The casing may include an opaque portion and a transparent portion, where the latter portion allows the owner and/or service personnel to observe the operating parameters of specific components 14. Preferably, the casing is moveable between a closed position and an open position, wherein the components 14 are accessible. A shroud, residing within the cavity 20, may extend rearward from the mounting tray 22 to enclose the area between the support frame 16 and the tray 22. Preferably, the shroud is formed from plastic and improves the aesthetic appearance of the area about the tray 22.

[0016] Referring to Figs. 2-7, the mounting tray 22 includes an arrangement of bays or receptacles 24, wherein each bay 24 is specifically dimensioned to receive a particular spa component 14 for connection of the component 14 to the tray 22. In one embodiment, a force fit is utilized to secure a component 14 within a bay 24, wherein the force fit requires the bay 24 to have dimensions, such as a periphery, that slightly exceeds dimensions of the component 14, such as its periphery. Unlike interference fits, the force fit between the bay 24 and the component 14 does not require the component 14 to overlap the bay 24. The force fit of a component 14 within a bay 24 obviates the need to use specialized tools to install or mount components 14. Moreover, a component 14 can be un-plugged and then easily removed from the respective bay 24 by hand, which increases the efficiency of installing replacement components 14. Preferably, each bay 24 is configured and sized to receive a single type of components 14, for example, a control panel, ozonator, a heater, or an electrical connection box or interface. More preferably, each bay 24 is configured and sized to receive a component 14 supplied by a particular manufacturer. Accordingly, the bays 24 can be configured to receive components 14 from original equipment manufacturers ("OEM"), and not non-OEM components which may suffer in quality and performance. OEM components 14 are preferred because they have been reviewed and approved by third-party compliance certifiers, such as UL, CE or ETL. Because the bays 24 are configured to receive OEM components 14, the likelihood that a service technician fabricates a mount or sub-mount for non-OEM components, often referred to as a "work-around," is significantly reduced. In the context of replac-

ing components, this cooperative dimensioning of the bay 24 ensures that the owner or service technician only installs the appropriate component to the tray 22. Further, a manufacturer may tailor the performance characteristics of each component 14 for specific trays 22 to extend the operational life of the component 14.

[0017] The bay arrangement 24 includes a first bay 36 that receives an electrical connection interface box or junction box 38. Referring to Figs. 4 and 5, the first bay 36 is defined by an arrangement of side walls 40 and a rear wall 42 that collectively form a closed sleeve that secures the junction box 38 in a force fit. While four side walls 40 -- a top wall, a left wall, a right wall, and a bottom wall -- are shown to combine with the rear wall 42 to form the bay 36, as few as two side walls 40 may be utilized to form the bay 36. Thus, at least two side walls 40 are utilized to form the first bay 36. Alternatively, the rear wall 42 is omitted and the first bay 36 includes only the side walls 40, wherein the bay 36 has an open-ended sleeve configuration. Because the side walls 40 extend rearward from a central portion 44 of the tray 22, the first bay 36 is recessed from a central portion 44, which itself is recessed from the flange 32 that extends along the periphery of the tray 22. In one embodiment, the first bay 36 is recessed an amount such that a front portion of the junction box 38 resides forward of the central portion 44 and a rear portion of the junction box 38 resides aft or rearward of the central portion 44. Although not shown, electric leads, such as 220 volt leads, may be connected to the junction box 38 to provide power to the spa 10. The first bay 36 may include detachable panels or knock-outs 43, in either the side wall 40 or the rear wall 42, which provide openings that accommodate the electric leads. As explained above, the junction box 38 is secured within the first bay 36 by a force fit resulting from the cooperative dimensioning between the bay 36 and the box 38. The bay 36 may include additional means to secure the junction box 38. The securing means may be an elongated fastener (e.g., a screw or pin), a moveable latch, a deformable finger, or elastomeric seal. The finger flexes to allow for entry of the junction box 38 into the bay 36, but resists detachment of the box 38. The seal extends along the periphery of the bay 36 and also flexes to permit reception of the box 38 within the bay 36.

[0018] The mounting tray 22 also includes a second bay 46 that receives a control panel 48 in a force fit. Similar to the first bay 36, the second bay 46 comprises an arrangement of side walls 47 and a rear wall 49 that results in the bay 46 being cooperatively dimensioned with the panel 48 to achieve the force fit. Since the control panel 48 has a generally rectangular shape, the side wall arrangement 47 is similarly shaped and generally comprises a top wall portion, a bottom wall portion, and opposed side portions. As shown in Fig. 7, at least a top wall of the arrangement 47 engages an upper surface of the control panel 48 for retention of the panel 48 within the bay 46. The panel 48 has an overall depth and the bay 46 is preferably configured such that a substantial

portion of the panel depth resides within the second bay 46. The bay 46 may include supplemental engaging walls 49a extending from either a side wall 47 or a rear wall 49 and that correspond to panel 48 shapes, such as indents or recesses. Because the side walls 47 extend rearward from the central tray portion 44, the second bay 46 is recessed from the central portion 44. In one embodiment, the second bay 46 is recessed an amount such that a front portion of the control panel 48 resides forward of the central portion 44 and a rear portion of the control panel 48 resides aft of the central portion 44. The control panel 48 includes a microcontroller 48a for operational control of the spa 10, including the interaction between the various components 14. The panel 48 includes inter-connection elements or sockets 50 that accept wires 51 that electrically connect the various components 14 to the panel 48. A peripheral portion 45 of the tray 22 that is located between the flange 32 and the panel 48 includes an opening 45a (see Figs. 3 and 4) that accepts the wires 51. To secure the various wires 51, a wiring harness or clip may be utilized, and the central portion 44 has recessed channels 44a (see Fig. 5) that accept an extent of the wires 51. A detachable electric cable 54 extends between the junction box 38 and the control panel 48, wherein the cable 54 includes a plug 55 that electrically connects with a socket 39 in the box 38. To interrupt power to the spa 10 for servicing purposes, the spa owner or technician merely un-plugs the cable 54 from the junction box 38. The bay 46 and/or the panel 48 may include additional means to secure the control panel 48. The securing means may be a bracket 53 that extends from either the panel 48 or the bay 46 and a fastener (e.g., a screw or pin) extending there through. Additionally, the securing means may be hook and pile material (i.e., Velcro) 37 (see Fig. 7).

[0019] The control panel 48 may include a monitoring interface 52 that displays the operational condition of the spa 10 and the various components 14. The interface 52 can display error codes and/or status codes provided by the microcontroller 48a to aid with the diagnosis and servicing of the components 14. The control panel 48 is linked to a controller unit 110 that is mounted in the spa shell 18 and that includes a display window that displays the operational status of the tub 10. The controller unit 110 also includes means for adjusting the spa operating characteristics, wherein the adjusting means includes an array of buttons, a pointer or a control knob. When an operating parameter falls below a pre-set threshold or a component 14 requires maintenance or replacement, the controller unit 110 may display an error and/or status code. Preferably, the monitoring interface 52 also displays the error and/or status codes. Once the panel 34 is removed to provide access to the tray 22 and the component 14 mounted thereto, the owner or service technician simply un-plugs and removes the malfunctioning component 14 from the respective bay 24, and inserts a replacement component 14 into the bay 24, where it is secured therein by the force fit. No special tools are re-

quired to conduct the component replacement, which increases the efficiency of the process.

[0020] In one embodiment, the spa 10, namely the control panel 48, includes a wireless communication module 112 linked to the microcontroller 48a in the panel 48 to wirelessly communicate with a service center for remote monitoring and alerting. The communication module 112 comprises a transmitter and receiver or combined trans-receiver, and an encoder. When a spa component 14 malfunctions or fails, a notification condition occurs and the control panel 48, via the wireless module 112, sends a first wireless signal to the service center alerting qualified personnel of the notification condition. The control panel 48 may send a copy of the first signal to the spa owner's wireless device, such as a personal digital assistant, to further advise the owner of the notification condition. The service center receives and processes the first signal to assess the notification condition and determine whether a service visit and/or a replacement component 14 is necessary. Assuming that both are needed, the service center sends a second wireless signal to the spa owner's wireless device to schedule a service visit and/or advise of the shipment of a replacement component 14. Depending upon the severity of the notification condition, the service center sends a third wireless signal to the control panel 48 to adjust operating parameters to compensate for the component 14 in question, or to cease operation of the spa 10. The service center sends a fourth wireless signal to a service technician while in the field advising of the spa owner's location and the notification condition, such that the service technician can be routed directly to the spa 10 for a service visit. Once the service technician confirms receipt of the fourth signal, the service center sends a fifth wireless signal to the spa owner advising of the impending service visit. In the event that the notification condition only requires the shipment of a replacement component 14, and not a service visit, the service center sends a sixth wireless signal to the control panel 48 and/or the spa owner's wireless device advising of the shipment of the replacement component 14. The various signals described in this paragraph can be displayed with text and/or symbols by the monitoring interface 52 and the controller unit 110. The wireless module in the control panel 48 may utilize a proprietary networking protocol, or use a standard networking control protocol, such as Zigbee, Bluetooth, or IEEE 802.11.

[0021] The mounting tray 22 further includes a third bay 56 that receives an ozonator 58 in a force fit. Similar to the first and second bays 36, 38, the third bay 56 comprises an arrangement of side walls 57 and a rear wall 59 that results in the bay 56 being cooperatively dimensioned with the ozonator 58 to achieve the force fit. In one embodiment, the third bay 56 is recessed an amount such that a front portion of the ozonator 58 resides forward of the central portion 44 and a rear portion of the ozonator 58 resides aft of the central portion 44. The bay 56 and/or the ozonator 58 may include additional means

to secure the ozonator 58 within the bay 56. For example, the ozonator 58 has at least one mounting bracket 62 (see Figs. 3 and 4) that is received within a lobe 64 (see Figs. 4 and 5) of the third bay 56, wherein a fastener (e.g., a screw or pin) joins the two structures.

[0022] Below the first, second and third bays 36, 46, 56, the mounting tray 22 includes a fourth bay 66 that receives a heater element 68, at least one valve 70 and piping or conduit 72. In one embodiment, a first valve 70a controls the flow of water into the heater 68 and a second valve 70b controls the flow of water exiting the heater 68 is provided. Accordingly, the first valve 70a and the associated piping 72 form an inlet assembly, and the second valve 70b and the associated piping 72 form an exit assembly. Collectively, the heater element 68, the first and second valves 70a, b and the piping 72 form a heater assembly connected to the tray 22 by the fourth bay 66. Referring to Figs. 4 and 5, the fourth bay 66 extends between the side walls 74 of the mounting tray 22 and includes an opening 76 in each side wall 74 that accepts an extent of the conduit 72. The fourth bay 66 also includes a rear wall 78, that is preferably curvilinear, and a bottom wall 80. At its intermediate portion, the fourth bay 66 has a retaining element 82 extending from the rear and bottom walls 78, 80, and that engages and secures the heater 68 in a force fit. The retaining element 82 features a curvilinear engaging surface 84 and a frontal rib 86 that collectively cradle the generally cylindrical heater 68. In one embodiment, the rib 86 is resilient and flexes when the heater 68 makes contact with the rib 86 as it is inserted into the bay 66. Near the ends of the fourth bay 66 and flanking the retaining element 82, a channel 88 extends upward and towards the first, second and third bays 36, 46, 56. Each channel 88 is configured to accommodate the valve 70, including the lever 71 used to actuate the valve 70. Preferably, the channel 88 is large enough to allow the spa owner and/or the service technician to grasp and actuate the lever 71. Accordingly, the levers 71 can be actuated to control water inlet and outlet flow, whereby the heater 68 can be removed, serviced and replaced under a modular approach without removing the associated conduit lines 72 and the valve(s) 70. As shown in Figs. 1, 3 and 5, the channel 88 leads to a second opening 90 in the side wall 74, which accepts the various wires and leads extending between the components 14. For example, a first wire group 100 extends between the control panel 48 and a pump 94 and through one of the openings 90 (see Fig. 1). Similarly, a second wire group 102 extends through the opening 90. As such, the openings 90 allow for the interconnection of components 14 mounted in the tray 22 with other components residing in the cavity 20.

[0023] As shown in the embodiment of Figs. 6 and 7, the mounting tray 22 has an articulated rear surface 92 resulting from the first, second, third and fourth bays 36, 46, 56, 66. Because the bays 36, 46, 56, 66 extend rearward from the central portion 44, the respective rear walls 42, 49, 59, 69 are positioned rearward or behind the cen-

tral portion 44 and the flange 32. These attributes are depicted in Fig. 7, where the tray 22 and some components are in the installed position P_i . In the installed position P_i , the tray 22 is secured to the support frame 16, namely the upper header 27 and the lower footer 28, by fasteners 31 extending through the flange 32. Referring to Fig. 7, the flange 32 resides in a first plane that is inward of a reference plane in which the panel 32 resides, the central portion 44 resides in a second plane that is inward of the first plane, and the rear wall 49 of the second bay 46 resides in a third plane that is inward of the second plane. Preferably, the first, second and third planes are substantially vertical planes that are perpendicular to the header 27 and the footer 28. As shown in Fig. 7, both the control panel 48 and the heater 78 reside between the first and third planes. Furthermore, there is an appreciable clearance or gap G between the spa tub 18 and both the components 14 and the rear wall 49.

[0024] In another embodiment, tray 22 is mounted horizontally and not vertically as shown in Figs. 1-7. In this embodiment, the tray 22 is oriented substantially parallel to the ground supporting the spa 10, below the tub 18 and within the cavity 20. The support frame 16 includes a slider mechanism that operably supports the tray 22 such that the tray 22 is horizontally moved between an open position wherein the tray 22 is positioned external to the cavity 20, and a closed position wherein the tray 22 is positioned within the cavity 20. In the open position, the components 14 can be mounted to and/or removed from the tray 22. In the closed position, the components 14 reside within the cavity 20 for operation of the spa 10. The slider mechanism may include elongated rails that slidably engage each other to allow for movement between the open and closed positions. The slider mechanism may also include a pivoting mechanism that pivots the tray 22 and the components 14 upward to a generally vertical orientation to facilitate removal and installation of the components 14.

[0025] In another embodiment, the tray 22 has a peripheral flange 22 and a central portion 44 residing therein. The central portion 44 includes at least one connector that secures a component 14 to the tray 22. Unlike the bays 24 described above, the connector extends forward and is not recessed from the central portion 44. The connector comprises a single bracket member that engages and secures the component 14 to the central portion 44. The component 14 may feature a housing with a receptacle that receives an extent of the bracket member, and a fastener may be utilized to further secure the component 14. Alternatively, the connector comprises a bracket assembly that is affixed to a front surface of the central portion 44 and that engages at least one surface of the component 14. For example, the bracket assembly includes a first L-shaped bracket member and a second L-shaped bracket member, wherein the bracket members are spaced a distance apart to define a cavity cooperatively dimensioned with a component 14. The component 14, such as the control panel 48 or the ozonator 58, is

inserted within the cavity whereby the upper and lower bracket members engage portions of the component 14. When the first and second bracket members are vertically arranged, the first bracket member engages an upper surface of the component 14 and the lower bracket member engages a lower surface of the component 14. The engagement provided by the first and second bracket members retains the component 14 within the bracket cavity. A fastener, such as a threaded screw, pin or deformable finger, can be implemented to further secure the component 14 within the bracket and to the tray 22. Because the connector extends from the front surface of the tray 22, the component 14 also protrudes from or extends forward of the front surface. Preferably, the connector is dimensioned such that an inner surface of the component 14 contacts the front surface of the central portion 44.

[0026] Further, the first and second bracket members may be moveable wherein a primary bracket segment pivots or rotates about a secondary bracket segment that remains stationary. In this manner, the bracket member is moveable between an open position wherein the primary bracket segment is positioned to allow for insertion of the component 14 into the cavity, and a closed position wherein the primary bracket segment is pivoted into engagement with the component 14. The bracket segments may be spring loaded and include cooperative engaging structures, such as teeth or textured surfaces, that enhance the securement of the component 14. In a most preferred embodiment, the central portion 44 includes a plurality of connectors, wherein each connector is dimensioned to engage and secure a particular type of component 14, such as the electrical interconnection interface 38, the ozonator 48, the control panel 58, and the heater assembly 68.

[0027] While the specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention, and the scope of protection is only limited by the scope of the accompanying Claims.

Claims

1. A portable spa 10 comprising:

a tub 18 residing within a support frame 16, the support frame comprising an arrangement of horizontal frame members 27, 28 and vertical frame members 30;

a plurality of operating components 14 including an electrical junction box 38 and a control panel 48; and,

a mounting tray 22 affixed to the support frame, the mounting tray having a flange 32 and a central portion 44, the central portion having both a first bay 36 that connects the electrical junction box 38 to the tray and a second bay 46 that con-

nects the control panel 48 to the tray.

2. The portable spa of Claim 1, wherein the first bay 36 is defined by at least two side walls 40 that extend rearward from the central portion 44 of the tray, the side walls 40 forming a sleeve that receives the junction box 38 in a force fit.
3. The portable spa of Claim 2, wherein the first bay 36 also includes a rear wall 42 that is positioned rearward of the flange 42.
4. The portable spa of Claim 1, wherein the operating components 14 further includes an ozonator 58 and the mounting tray 22 further includes a third bay 56 that connects the ozonator 58 to the tray 22.
5. The portable spa of Claim 4, wherein the third bay 56 is defined by at least two side walls 57 that extend rearward from the central portion 44 of the tray, the side walls 57 forming a sleeve that receives the ozonator 58 in a force fit.
6. The portable spa of Claim 1, wherein the operating components further includes a heater 68 and the mounting tray further includes a fourth bay 66 that connects the heater 68 to the tray 22.
7. The portable spa of Claim 6, wherein the fourth bay 66 extends between opposed side walls 74 of the tray 22, and wherein each tray side wall 74 includes an opening 76 that accepts a conduit 72 leading to one side of the heater 68.
8. The portable spa of Claim 7, wherein the heater 68 includes a water flow valve 70 and the fourth bay includes a channel 88 that accepts a valve lever 71.
9. The portable spa of Claim 1, wherein a disconnectable cord 54 electrically connects the junction box 38 with the control panel 48.
10. The portable spa of Claim 1, wherein the control panel 48 includes a wireless communication module 112 for remote monitoring of the operating components 14.

FIG. 1
PRIOR ART

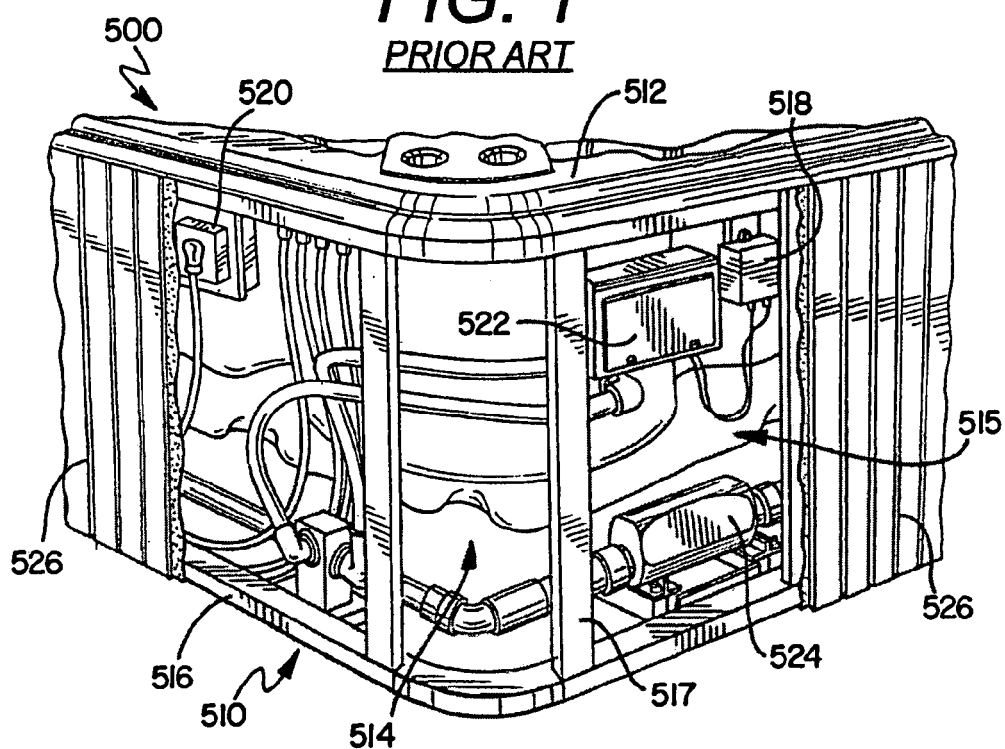
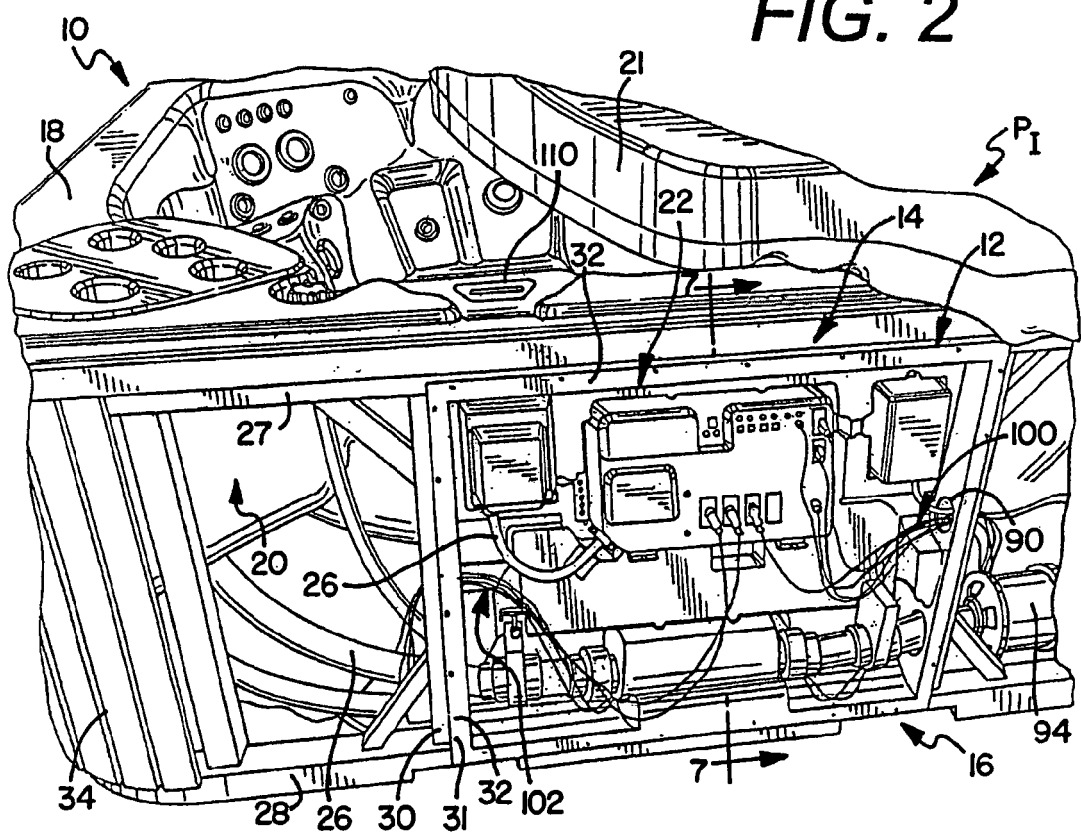


FIG. 2



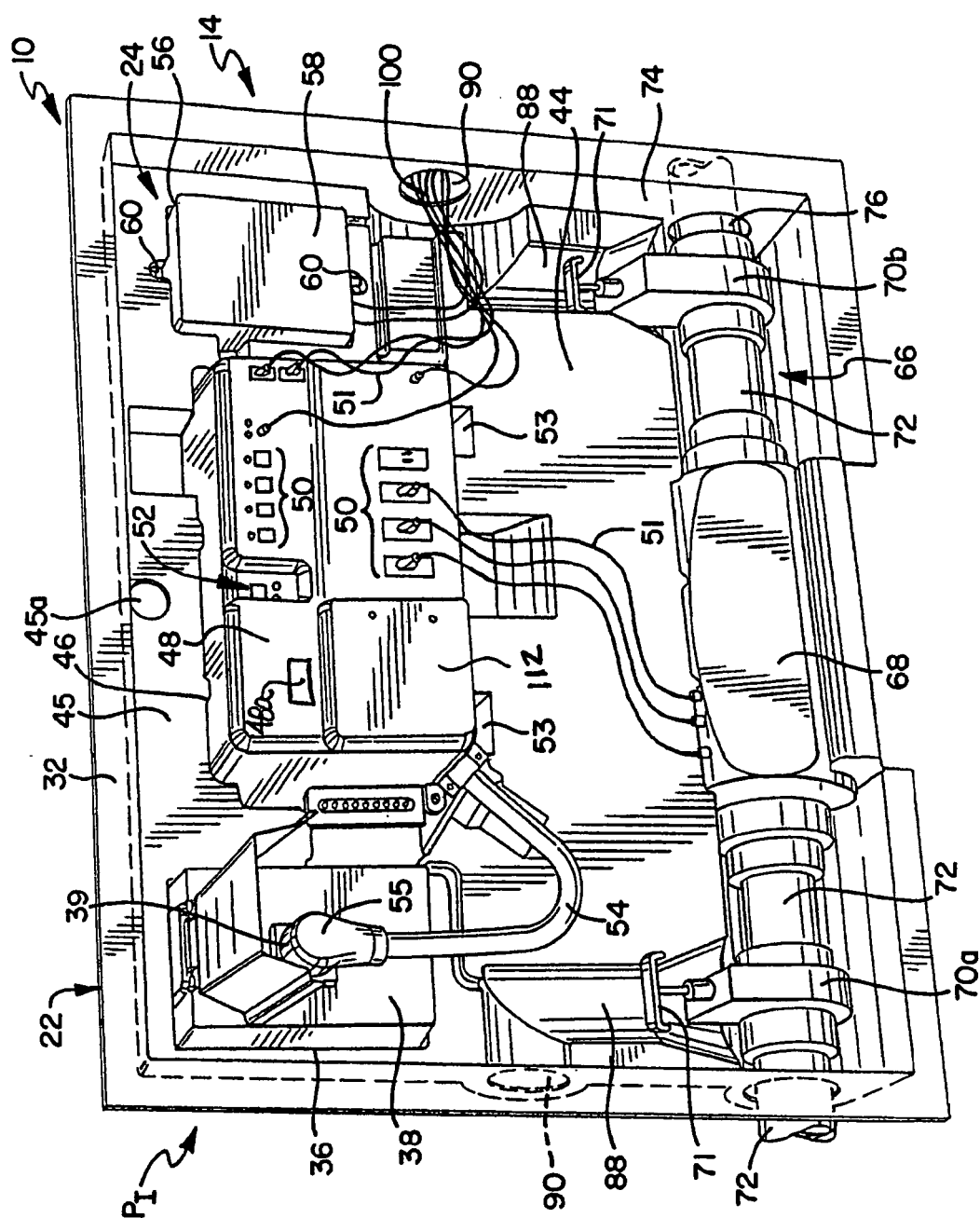
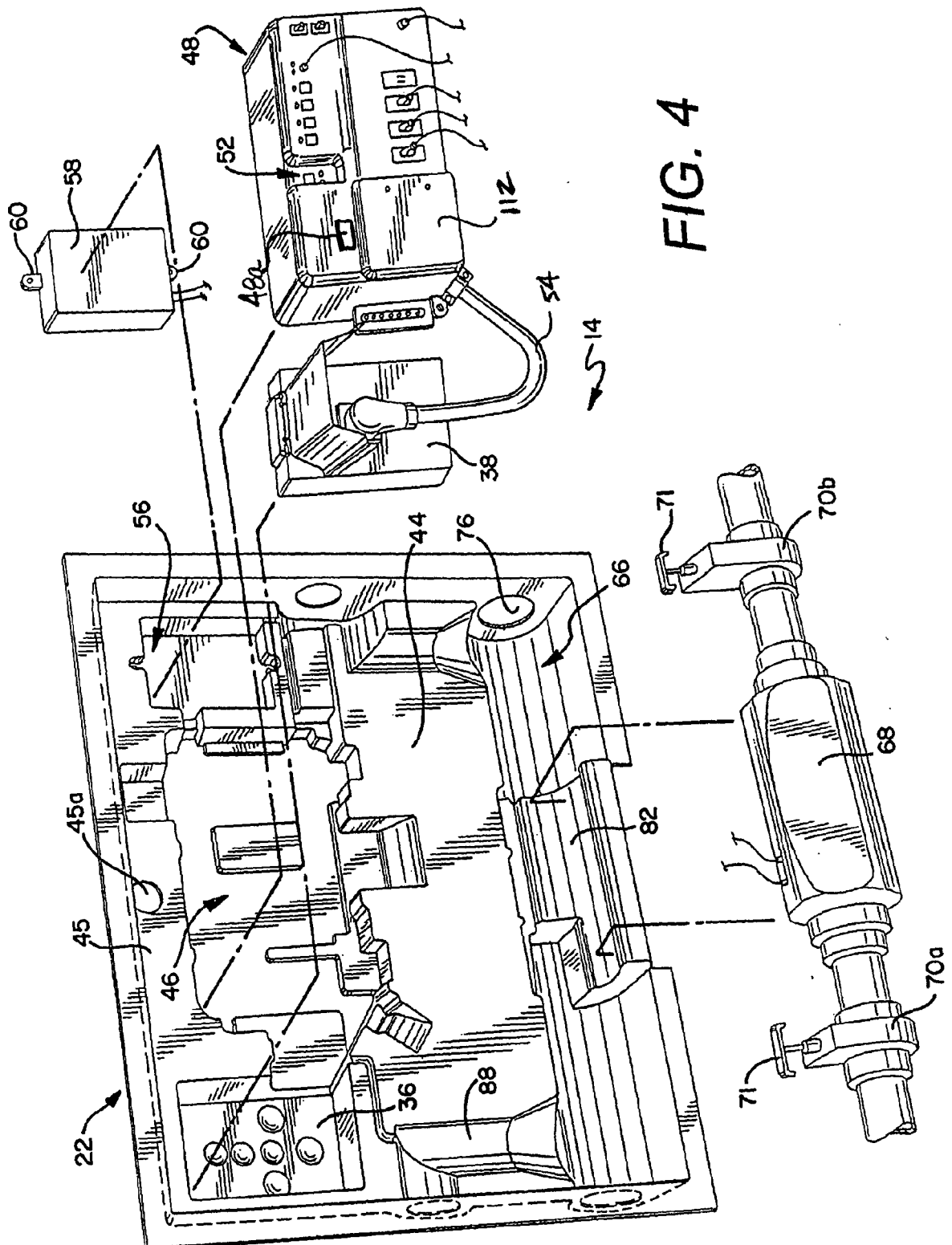


FIG. 3



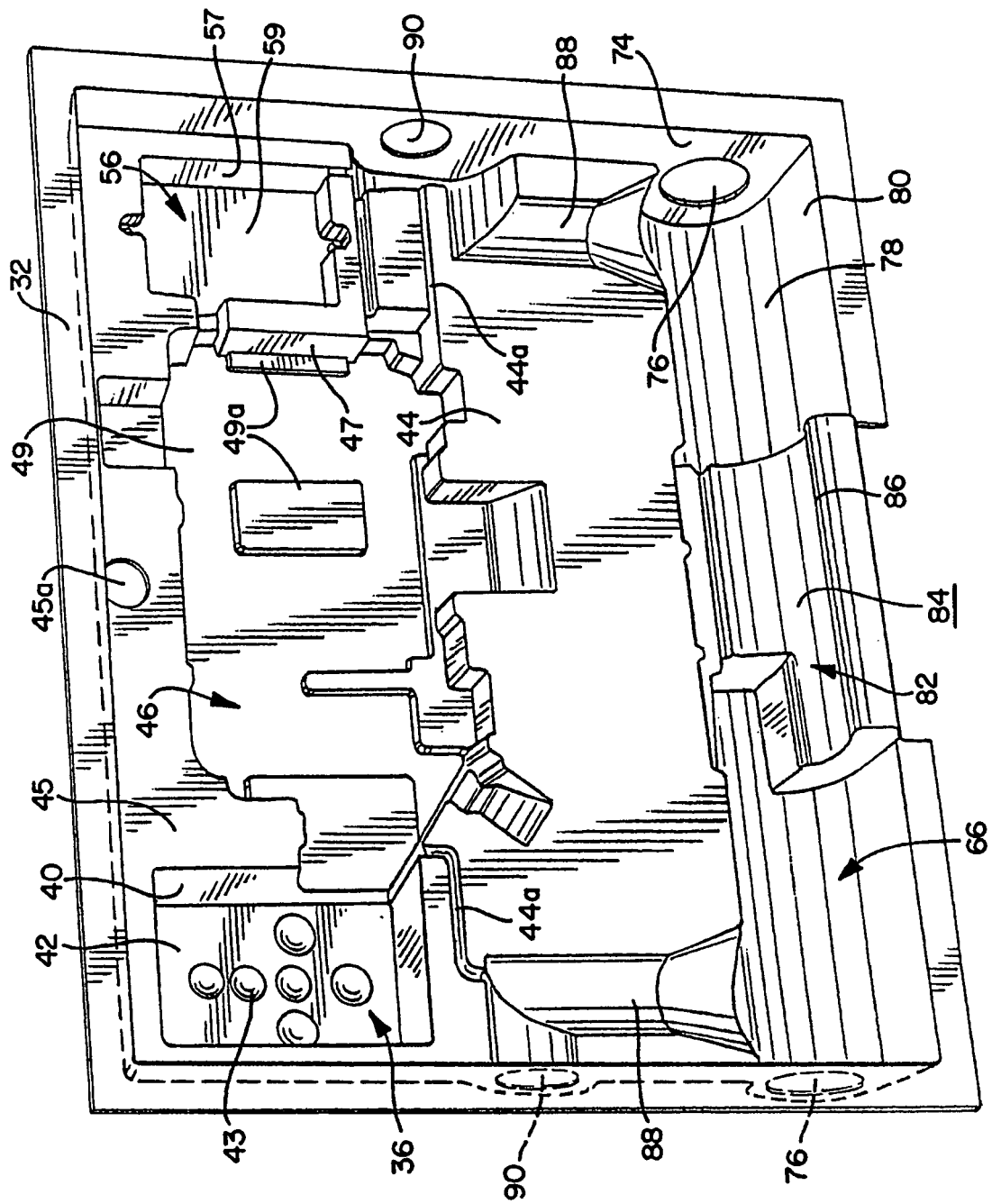


FIG. 5

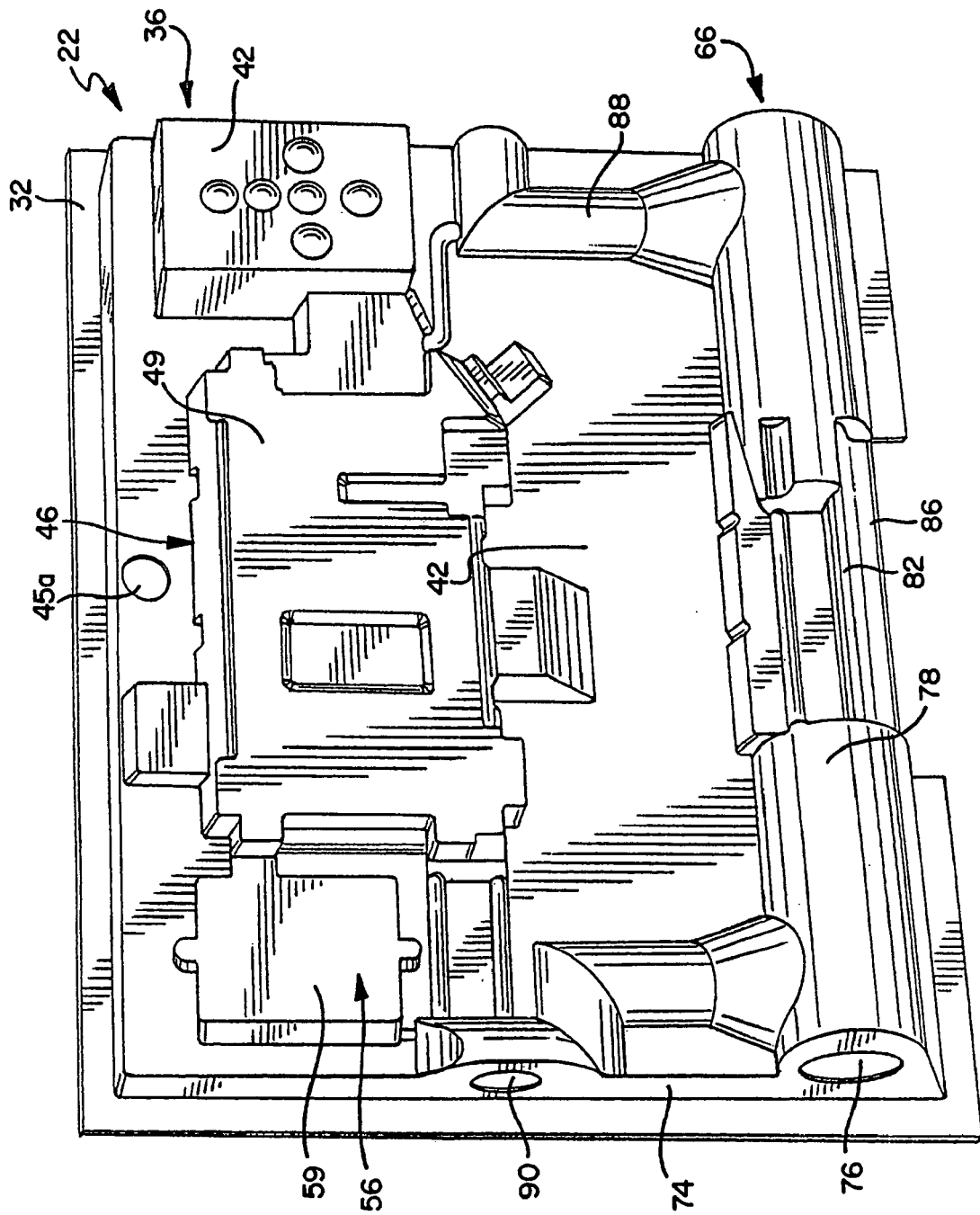
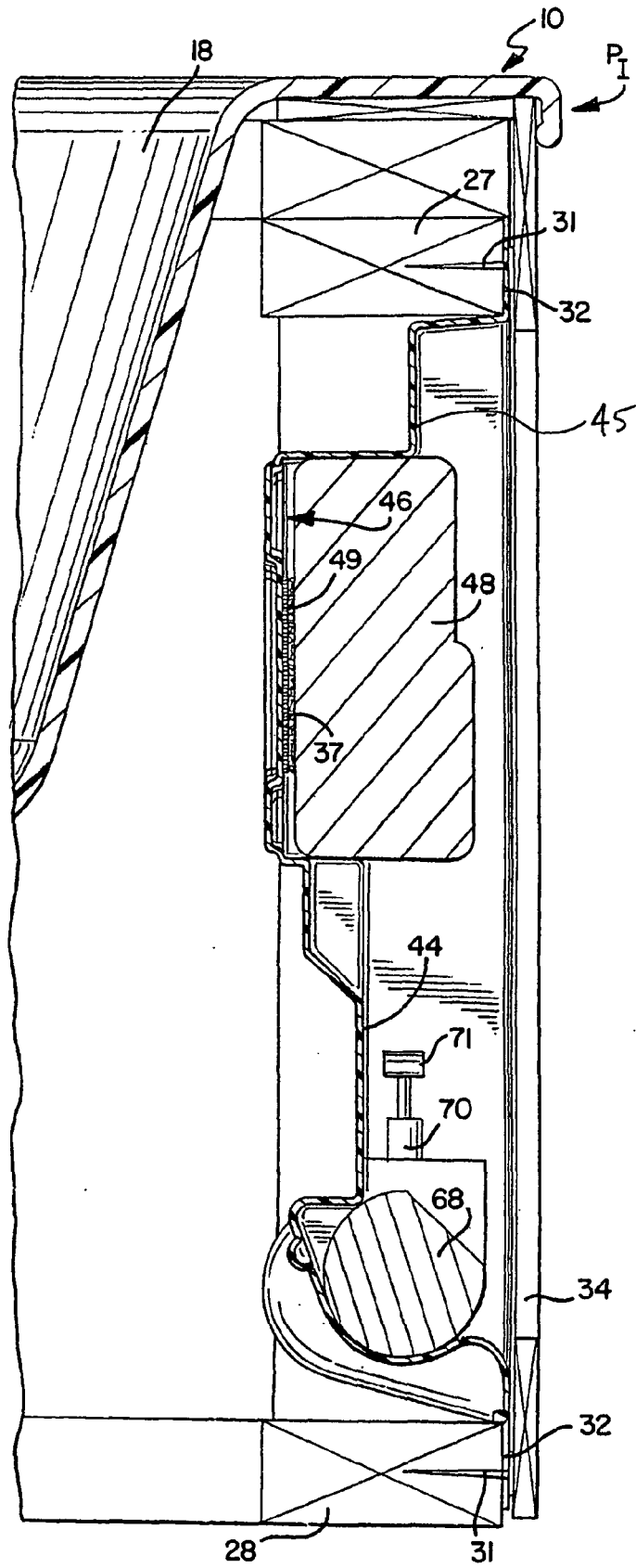


FIG. 6

FIG. 7





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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		4 April 2007	Knoflachner, Nikolaus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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04-04-2007

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