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(54) **APPARATUS FOR POSITIONING IN-WALL POWER**

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CPC *H01R 13/70* (2013.01); *H02G 3/12* (2013.01); *H01R 27/02* (2013.01); *H05K 5/06* (2013.01); *H01R 24/30* (2013.01); *H01R 2107/00* (2013.01)

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Related U.S. Application Data

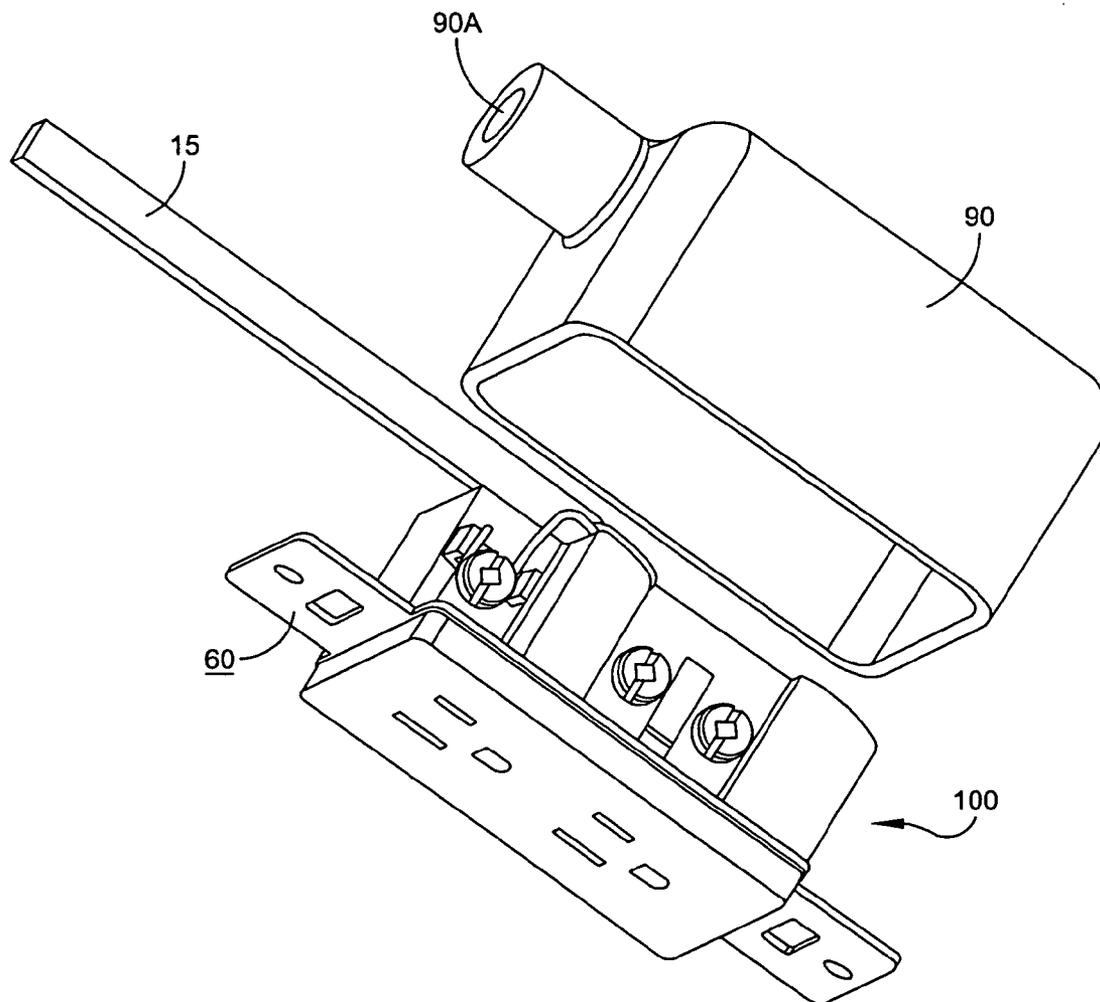
(63) Continuation of application No. 13/506,136, filed on Mar. 29, 2012, now Pat. No. 9,263,863.

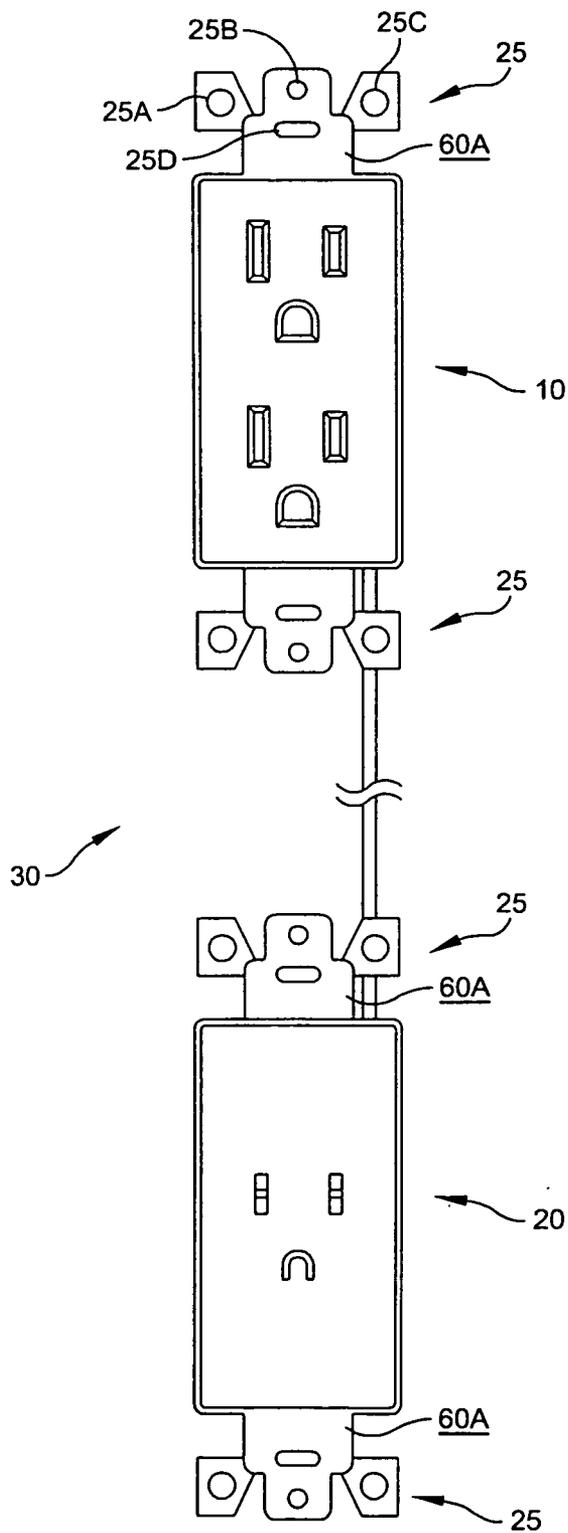
(57) **ABSTRACT**

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The present invention discloses a method and apparatus for locating a pre-wired electrically isolated power source. The invention includes a plurality of embodiments of encased receptacles that are rearward mountable to recessed electrical enclosures.





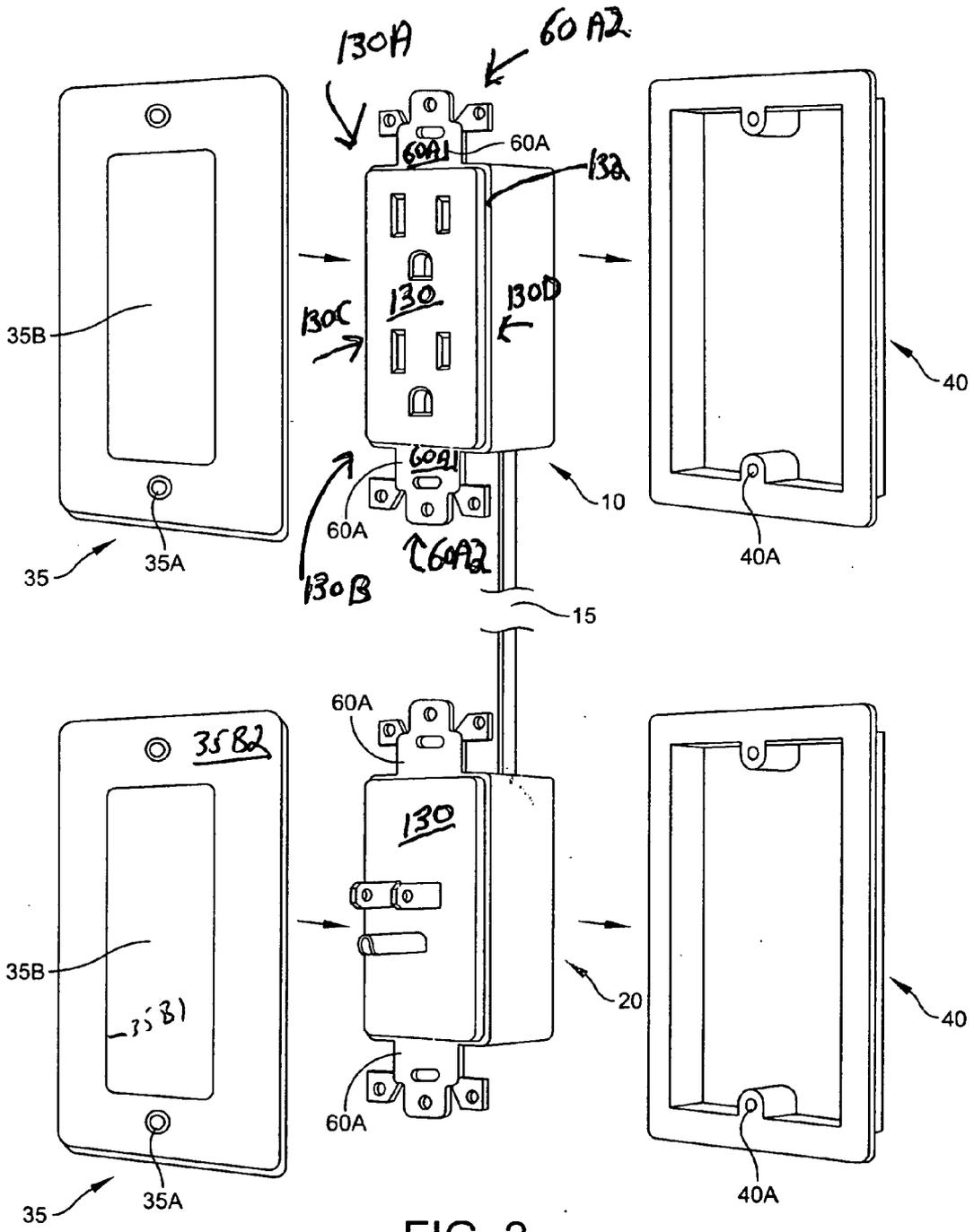


FIG. 2

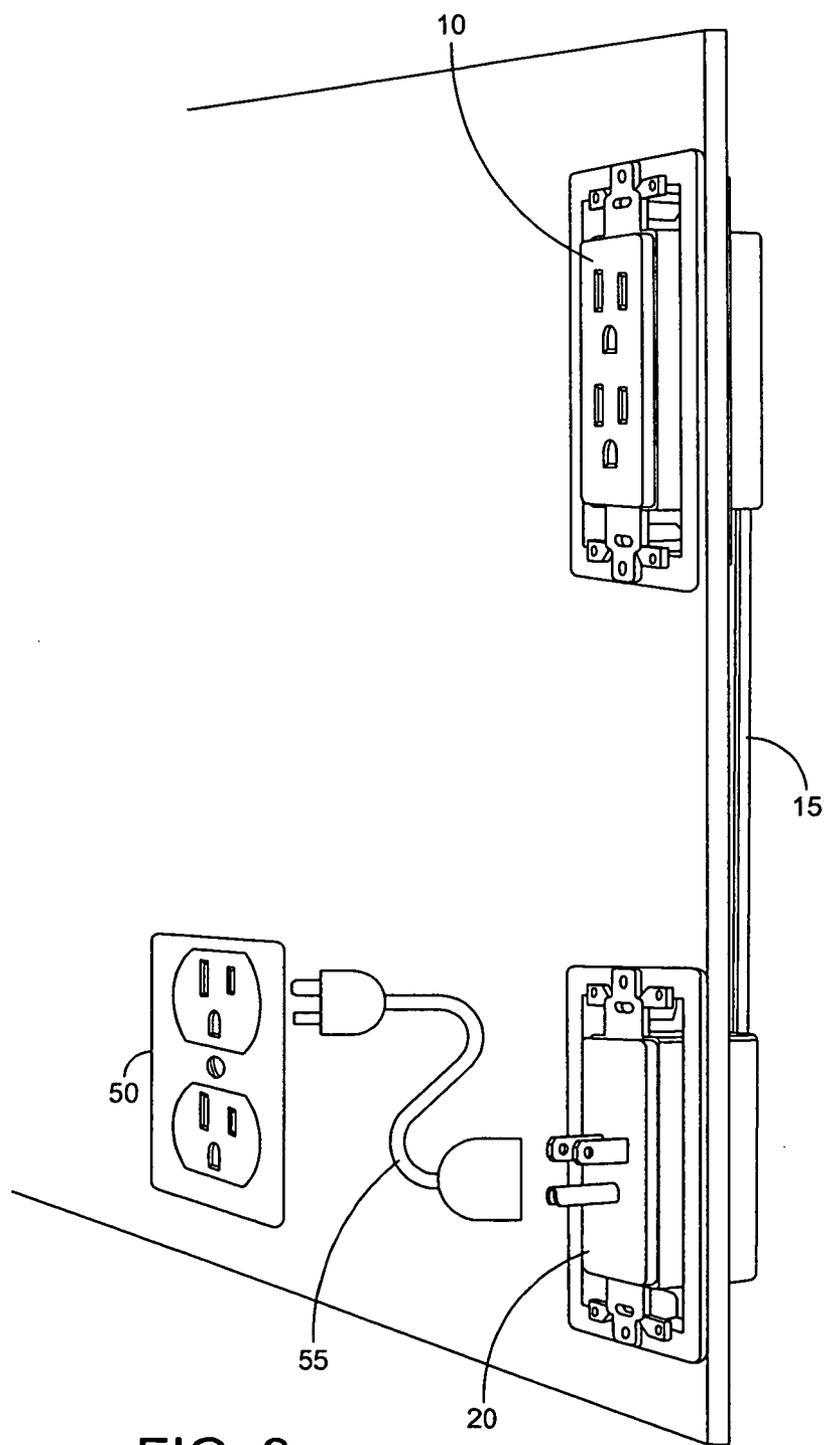


FIG. 3

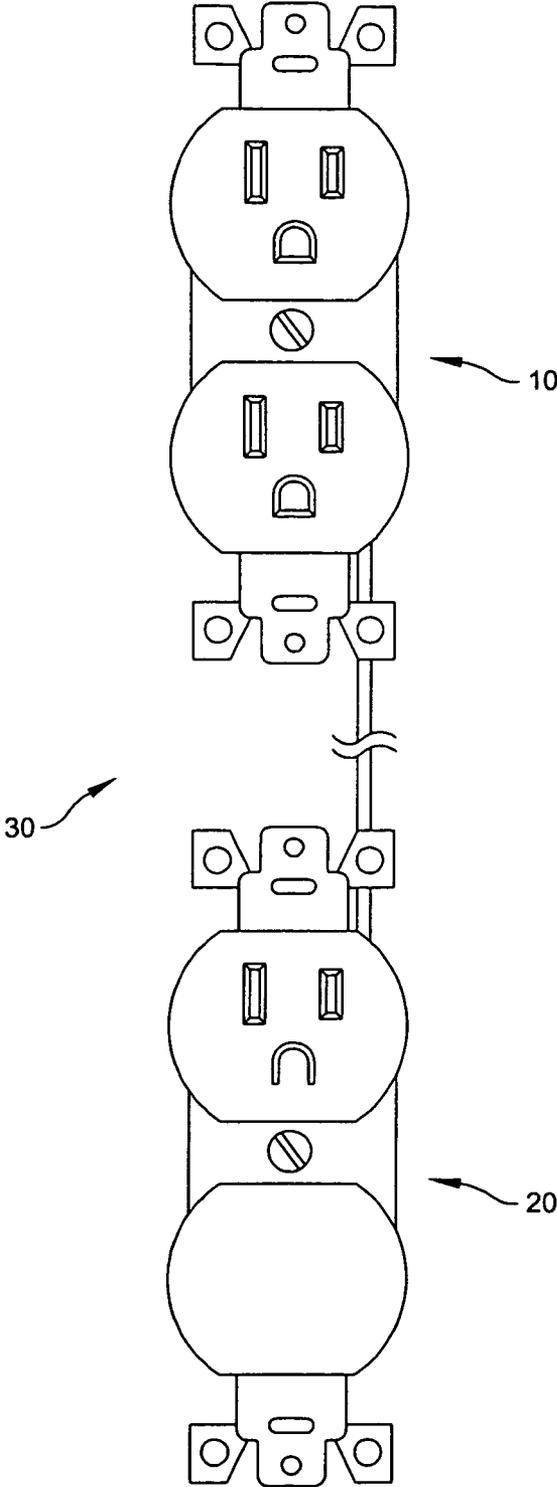


FIG. 4

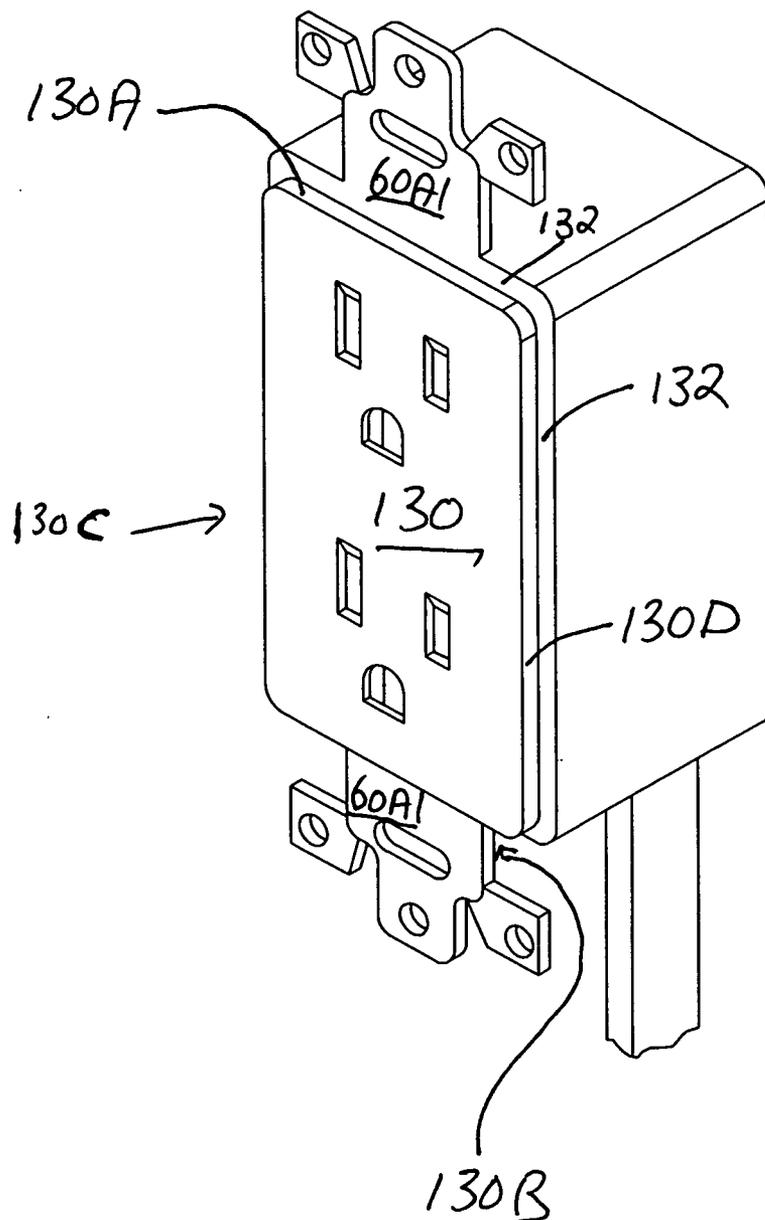


FIG. 5

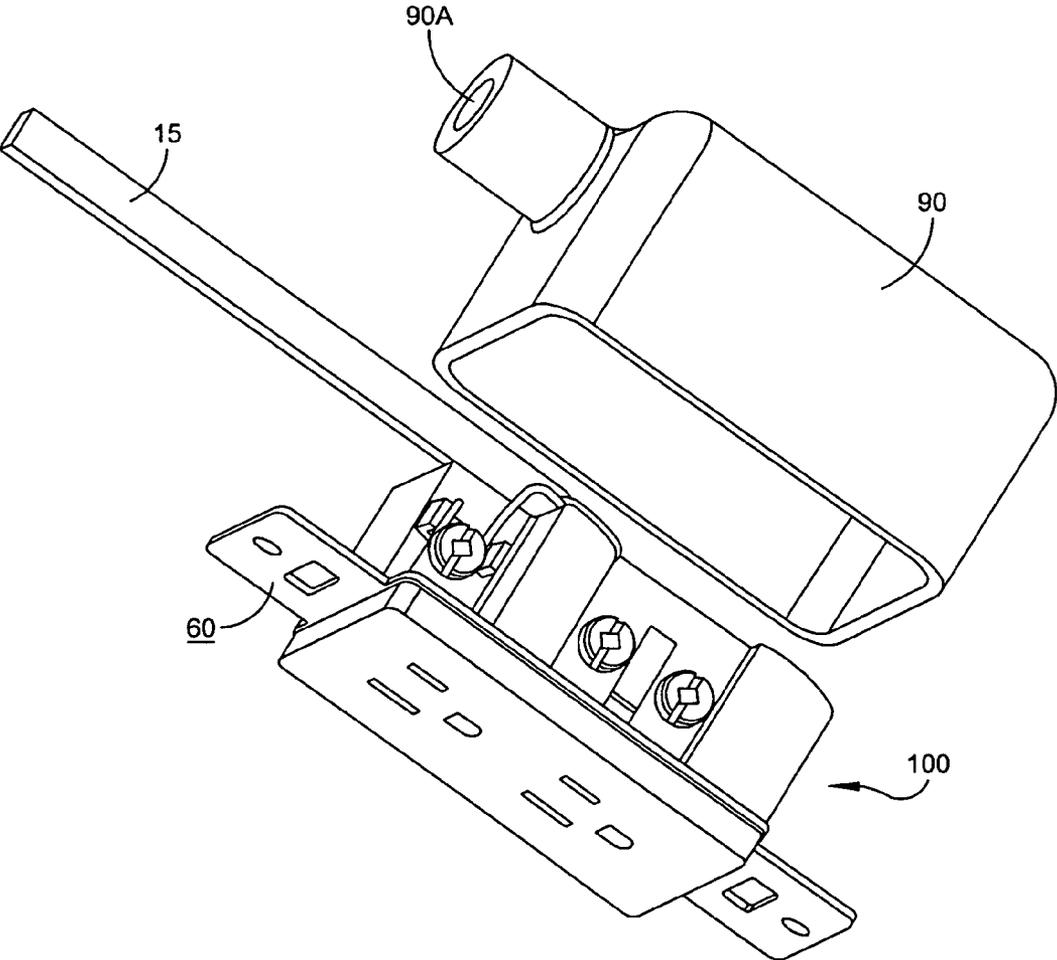


FIG. 6

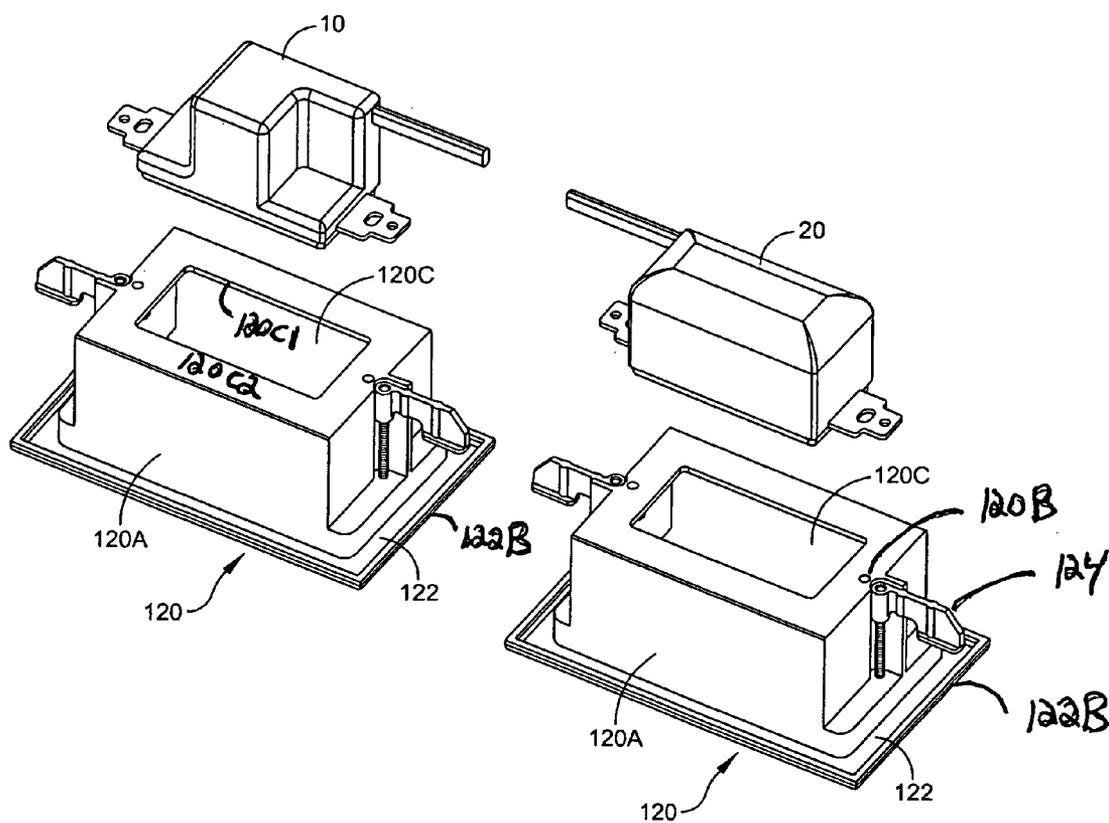


FIG. 7

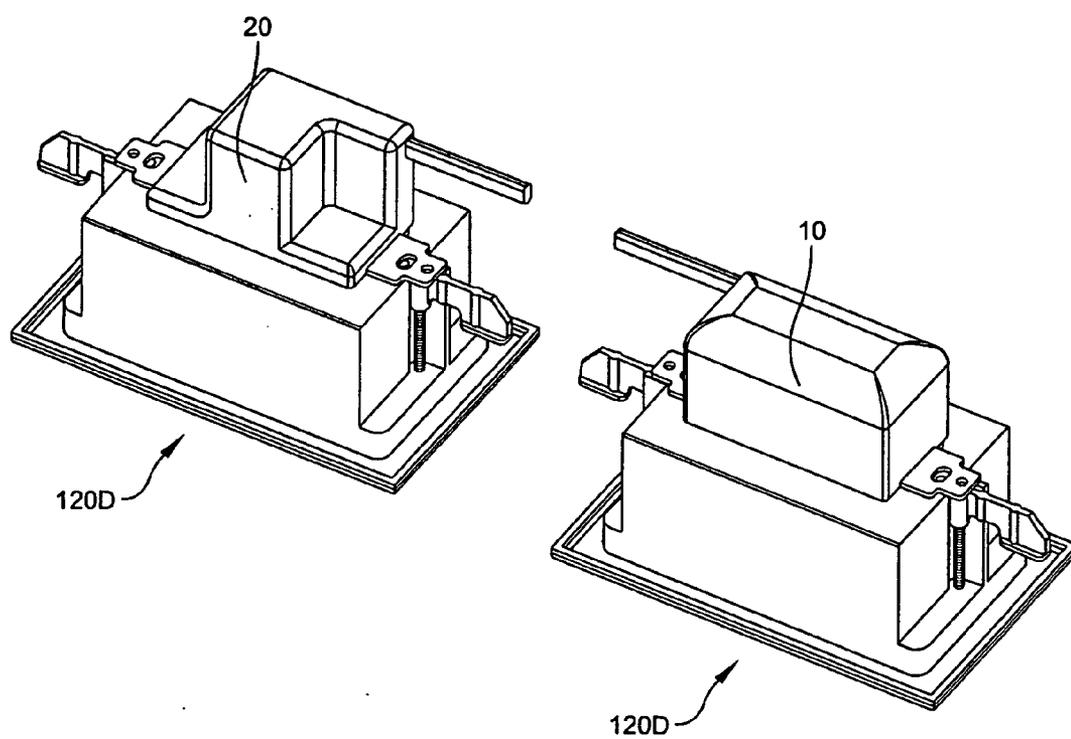


FIG. 8

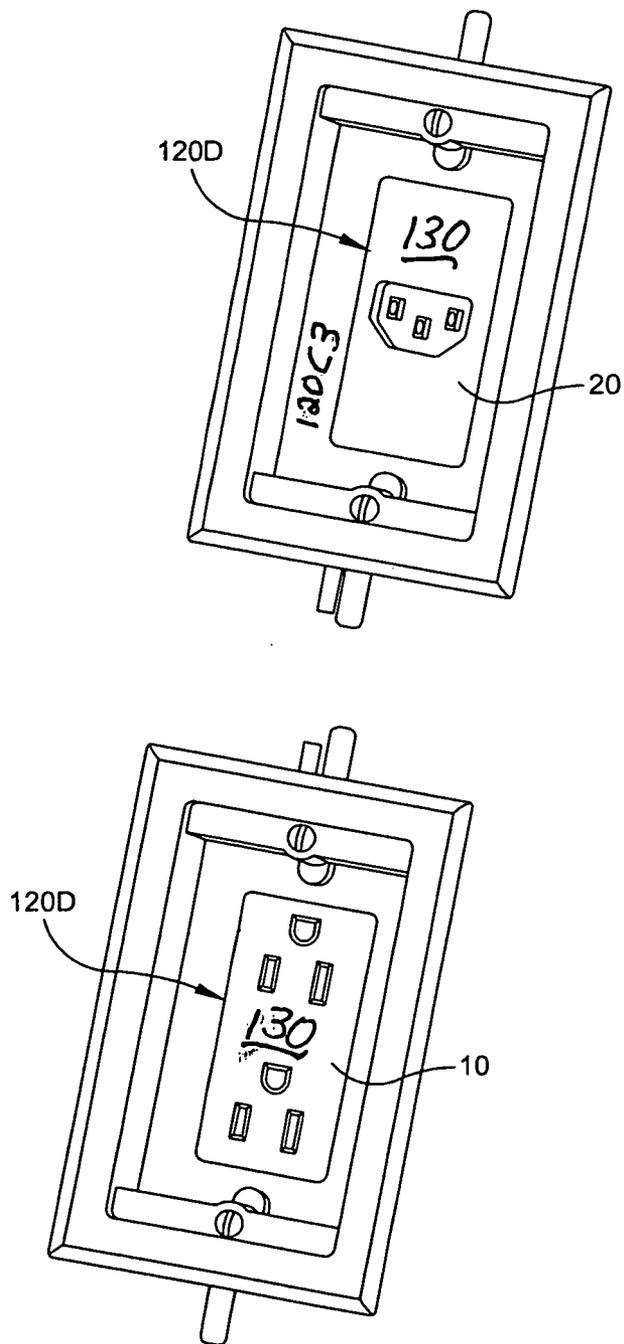


FIG. 9

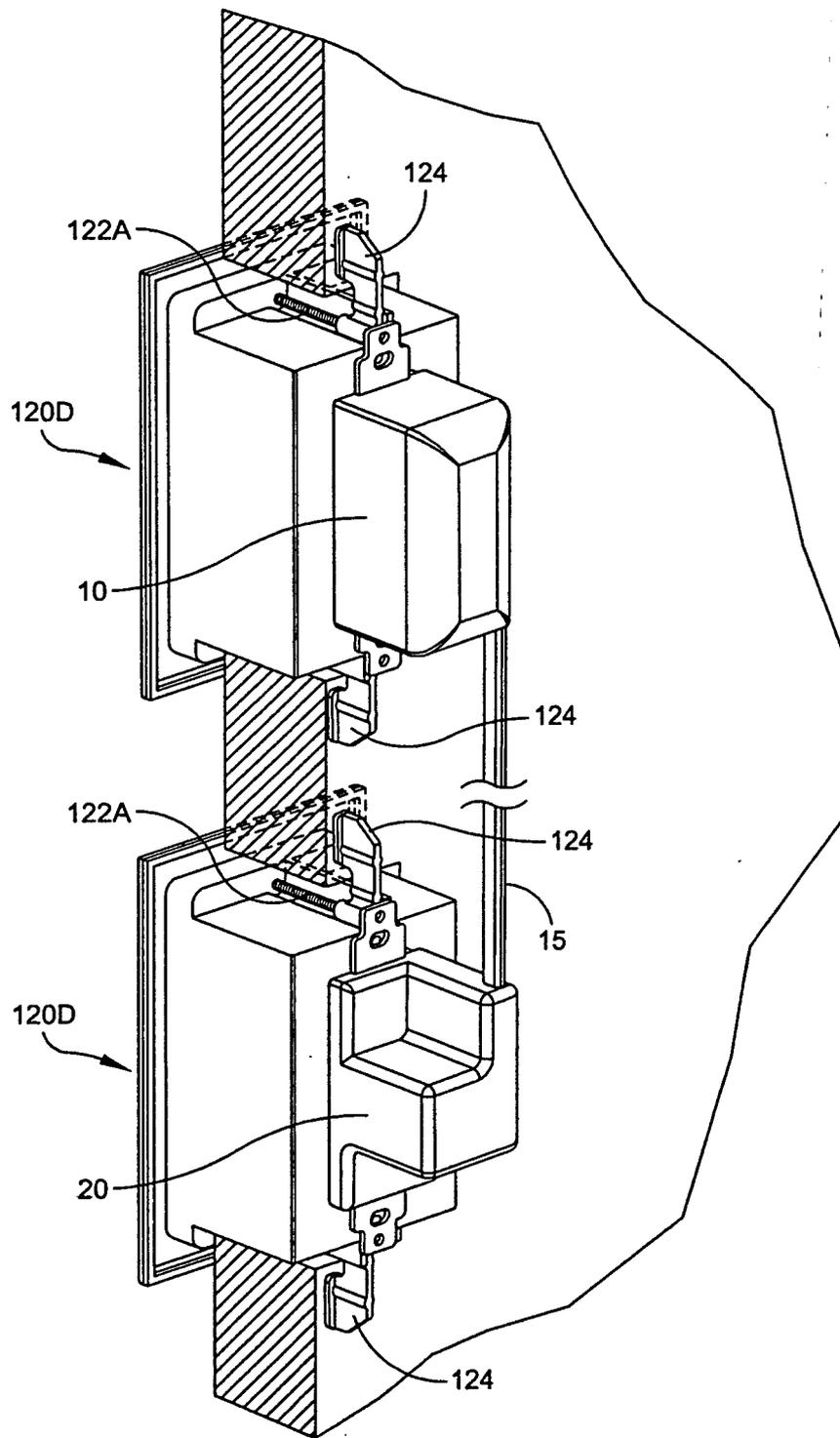


FIG. 10

APPARATUS FOR POSITIONING IN-WALL POWER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/516,768 filed 7 Apr. 2011, U.S. Provisional Application No. 61/630,677 filed 16 Dec. 2011, and U.S. Utility application Ser. No. 13/506,136 filed 29 Mar. 2012.

FIELD OF THE INVENTION

[0002] The present invention relates to a method and apparatus for locating a pre-wired electrically isolated power source. The invention includes embodiments of encased receptacles for positioning in-wall power.

BACKGROUND OF THE INVENTION

[0003] Providing electrical power behind a wall structure currently requires the use of a standard electrical receptacle and wiring to be mounted internal to an electrically isolated box to prevent access to the internal wiring. Typically, an electrician is required to complete the installation which requires connecting into existing power and locating the new electrical receptacle and box.

[0004] The electrical box includes a cover plate flush mounted to the exterior wall leaving an opening for the power receptacle.

[0005] More recently, some electrical appliances, particularly flat screen televisions, are mounted directly to the wall, so that externally connected plugs protruding out of the wall plate interfere with mounting the television in flat abutment with the surface of the wall.

[0006] There exists a need for an apparatus for positioning in-wall power which can be accomplished by a lay person without the need of an electrician, and which provides electrically isolated receptacles, that are pre-wired, which can be mounted either external to an electrical box, thereby creating space internal to the wall for isolating plugs and connectors, or directly to a wall when recessed receptacles are not necessary.

SUMMARY OF THE INVENTION

[0007] The foregoing and other problems are overcome, and other advantages are realized, in accordance with the disclosed, alternative embodiments of these teachings.

[0008] The power solution of the present invention comprises pre-wired electrically isolated female and male receptacles combined with an integrated enclosure that can be used in applications where power must be supplied to a remote unit, such as a flat panel TV being hung on a wall (behind wall installation), or in a remote location where an integrated enclosure is necessary for installation and electrical isolation (trade show/outdoor exhibit where remote power is utilized on a temporary wall fixture).

[0009] For behind wall installations the invention may be combined with “Deep Box” mounting enclosures. The “deep box” enclosures allow for the input and output receptacles of the present invention to be mounted deep inside a wall for visual isolation of receptacle outlets and associated plugs/connectors that may also be present in the enclosure.

[0010] In a behind wall installation, the integrated enclosures containing the female and male receptacles are sepa-

rated behind a wall such that power can be supplied to the female end from an external source (such as an extension cord) which will supply power to a male receptacle mounted interior to the wall. The integrated enclosures for the receptacles are necessary to facilitate mounting in a variety of forms. Both the power input (female end) and power output (male end) integrated enclosures may contain a mounting frame for installation directly to a wall surface or onto any type of faceplate or in-wall enclosure, such as the “deep box” mounting enclosures of the present invention.

[0011] Alternatively, the integrated enclosures may be sold pre-mounted to any in-wall enclosure, including the “deep Box” enclosures disclosed in the present invention. Further, the integrated enclosed receptacles, interface wiring, and associated mounting frames or boxes (deep box or conventional electrical box) may be sold as a kit to facilitate easy installation. The electrical connection between the integrated enclosures may be separable via a snap plug or the like.

[0012] The integrated enclosures facilitate mounting of the power output and power input to a variety of electrical boxes including standard electrical boxes, flush mounted wall plates, and “deep boxes” disclosed in the present invention. Since the receptacles are encased and pre-wired, they are not required to be mounted internal to an electrical box for electrical isolation. This allows for the receptacles to be mounted externally to the electrical box enclosure, creating additional space within the box necessary for hiding connectors and the like. The encased receptacles may also be rough mounted to any wall surface.

[0013] The power input and power output integrated enclosure may be formed by overmolding, be a one piece boot, a two piece joinable encasement, or may comprise an integrated enclosure built around an overmolded connector. The receptacles are electrically connected within the integrated enclosure at the factory (pre-wired) and the electrical coupling between the enclosures can be ordered in specific lengths to meet the needs of a particular installation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The foregoing aspects and other features of the present invention are explained in the following description, taken in connection with the accompanying drawings, wherein:

[0015] FIG. 1 illustrates an embodiment employing the principles of subject invention denoting encased receptacles as encased power input and power output with an electrical interface as any length necessary for a particular installation.

[0016] FIG. 2 illustrates the embodiment of FIG. 1 having faceplates for connection to the encased receptacles.

[0017] FIG. 3 illustrates the embodiment of FIG. 2 illustrating the installation of the encased receptacles, electrical interface, and faceplates in a wall. Also illustrated is an existing power receptacle with an extension cord for routing available power to the encased power input receptacle via an extension cord.

[0018] FIG. 4 illustrates an alternative embodiment for the design of the encased receptacles 10 and 20.

[0019] FIG. 5 illustrates a perspective view of the encased receptacle of FIG. 2.

[0020] FIG. 6 illustrates a boot used to encase a receptacle.

[0021] FIGS. 7-9 illustrate an encased receptacle of the present invention in combination with a recessed electrical box.

[0022] FIG. 10 illustrates an encased receptacle of the present invention in combination with a recessed electrical box mounted to a wall.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] While certain embodiments of the present invention have been illustrated and described herein, the present invention should not be limited to such illustrations and descriptions. It should be apparent to those skilled in the art that changes and modifications may be incorporated and embodied as part of the present invention and are within the scope of the claims.

[0024] As seen in FIGS. 1-4, the integrated enclosure in the form of an encased power output 10 and encased power input 20 are illustrated as connected by an electrical coupling 15. Coupling 15 contains the electrical connections between power input 20 and power output 10, and may include solid copper conductors and combinations of hot, neutral and ground conductors encased in any electrical interface conduit as required by applicable building codes. FIG. 5 illustrates the encasement structure that applies to both the power input and power output.

[0025] The assembled In-Wall power apparatus 30 is purchased for particular applications with a fixed length electrical coupling 15. In the alternative, encased power input 20 and power output 10, can each contain a fixed length electrical coupling to be connected on-site. Each coupling may be a mating connector or bare wire to be connected during installation. Such an embodiment would facilitate selling components separately. The encased receptacle embodiment (both power input and power output) and coupling 15 are electrically insulated and pre-wired to meet applicable building codes and further to be installed by a laymen without the need for a licensed electrician.

[0026] As illustrated in FIGS. 1,2, and 5 the encased receptacles 10 and 20 further include mounting frames 60A. The frames may be overmolded, or externally affixed to receptacles 10 and 20. The mounting frames 60A have a first end 60A1 affixed to the receptacles 10 and 20 and a second end 60A2 that includes tabs 25 including tab connection holes 25A, 25B, 25C, and 25D. Although connection holes 25A-25D are disclosed other connection holes could be included in tab 25. The selection of holes 25A-25B in the embodiment of FIG. 1-4 is to illustrate the utilization of faceplates 35 and 40. Other mounting frames and tab configurations may be utilized to meet specific installation requirements. Encased standard NEMA, standard duplex, and non-standard custom receptacles require different dimensioned mounting frames and tabs.

[0027] FIG. 3 illustrates the power apparatus 30 of the present invention affixed to the surface of an exterior wall 45. In the present example, a hole would be cut in the wall for placement of receptacle 10 in an elevated location on the wall 45. Even without installing decorative faceplates 35 and 40, the receptacles 10 and 20 can be installed, as is, in wall 45 by screwing or nailing into the receptacles 10 and 20 via holes 25-thru 25D into wall 45. First, two holes would be made in wall 45. Next, Receptacle 20 would be "fished" down to the first hole and receptacles 10 and 20 would be secured within the openings. Preferably, receptacle 20 would be at floor level out of view and in the vicinity of a live power outlet 50 as illustrated in FIG. 3. Live power would then be supplied to receptacle 20 via a conventional extension cord 55. Power

would then be available to receptacle 10 for powering, for example, a flat panel TV (not shown) mounted over receptacle 10.

[0028] For a more decorative installation, faceplate 40 could be placed within the opening, connected to receptacles 10 and 20 via screw or nails through holes 25D and 40A, then faceplate 35 could be placed over receptacles 10 and 20 and connected over faceplate 40, via screws or nails through holes 35A and 25B. Receptacles 10 and 20 would be accessible through opening 35B of faceplate 35.

[0029] Referring to FIG. 2 and FIG. 5, and in the preferred embodiment, encased receptacles 10 and 20 include a front face 130 having a top 130A, a bottom 130B, and left and right side surfaces 130C and 130D. These side surfaces 130A, 130B, 130C and 130D extend rearward to an orthogonal lip extension surface 132 that defines a peripheral edge adjacent to top 130A, bottom 130B, and left and right side surfaces 130C and 130D. As illustrated in FIG. 5, mounting frame 60A first end 60A1 is substantially coplanar with orthogonal lip extension surface 132. As illustrated in FIG. 2, the peripheral edge 35B1 of faceplate 35, when engaged with receptacles 10 and 20, will rest on lip extension surface 132 to facilitate a flush coplanar mounting arrangement between front face 130 and faceplate 35 front surface 35B2.

[0030] FIG. 4 illustrates an alternative embodiment for the design of the encased receptacles 10 and 20.

[0031] In an alternative embodiment a molded boot 90 (FIG. 6) can be used to create an encased receptacle. In the above example, the boot 90 could be substituted for housing 75 in glued or sealed contact with mounting frame 60 of receptacle 100. As illustrated in FIG. 6, the boot 90 would include a rearward aperture 90A for routing interface coupling 15.

[0032] Other configurations of installations are possible, as described herein, such as recessed power input and power output within a walls interior surface.

[0033] An alternative application of the encased receptacles 10 and 20 is in combination with recessed electrical boxes 120 and is illustrated in FIGS. 7-10. It is understood that all embodiments of encased receptacles 10 and 20 described herein are mountable to all embodiments of the recessed electrical boxes described herein.

[0034] Referring to FIG. 7, the single gang recessed electrical box 120 includes an integrated face plate 122 with a flange 122B that extends outward beyond the periphery of box 120A. The box 120 includes wall mounting claws 124 that are adjustable to engage drywall or the like via positioning screws. The box includes connection apertures 120B for securing any of the various embodiments of encased receptacles discussed herein. Opening 120C includes peripheral edge 120C1 and is approximately dimensioned to slideably engage the top 130A, bottom 130B, and left and right side surfaces 130C and 130D of receptacles 10 and 20 to a point when orthogonal lip extension surface 132 rests against the rear surface 120C2 of box 120A.

[0035] Since the electrical receptacles are electrically isolated and pre-wired in one of the various forms described herein, they can be mounted external to recessed electrical box 120, as illustrated in FIGS. 8-10. This creates a deep opening within the wall, as illustrated in FIG. 10, and a receptacle face 130 in a flush mounted coplanar relationship with electrical box 120 interior surface 120C3 (FIG. 9).

[0036] As illustrated in FIG. 9, a larger front opening 120D is of sufficient length and width to allow access to the

mounted receptacles **10** located inward of opening **120D**. As illustrated in FIG. **10**, in the field, a hole would be cut in the wall at a dimension less than the periphery of face plate **122**, flange **122B**. Utilizing the engagement claws **124** against the interior wall mounting surface **45B** by turning the positioning screws **122A**, the claws would force the Flange **122B** against the wall for a secure fit.

I claim:

1. A power feed device, comprising:

An encased power input in communication with a mounting frame disposed thereon, said power input for receiving electrical power supplied thereto;

An encased power output in communication with a mounting frame disposed thereon, said power output for delivering power to an electrical device;

said encased power input and power output having an electrical interface therebetween, said power input and power output mounting frames for positioning said power input and said power output on a wall **1**, wherein said encased power input and said encased power output are electrically isolated and pre-wired within said encasements.

2. A power feed device as in claim **1**, wherein said encased power input has a front face substantially coplanar with said encased power input mounting frame and said encased power output has a front face substantially coplanar with said encased power output mounting frame.

3. A power feed device as in claim **1**, wherein said electrical interface comprises solid copper conductors.

4. A power feed device as in claim **1**, wherein said electrical interface further comprises a mating connector, said mating connector for disconnecting and connecting said electrical interface.

5. A power feed device as in claim **1**, wherein said received electrical power is supplied to said power input through an extension cord, said extension cord receiving power from an external source.

6. A power feed device for connection to a first and second recessed electrical box, said recessed electrical box having a first opening and a smaller second opening having a peripheral edge, each said first and second electrical boxes having an interior surface having sides that project generally rearward from said first opening up to a rear panel, said rear panel extending inward from each side of said interior surface, said rear panel comprising the smaller second opening, said rear panel having a first surface in communication with said interior surface and a second surface external to said first and second electrical boxes, said power feed device comprising:

an encased power input in communication with a mounting frame disposed thereon, said mounting frame having a first end integrated into said encased power input and a second end, said power input for receiving electrical power supplied thereto;

an encased power output in communication with a mounting frame disposed thereon, said mounting frame having a first end integrated into said encased power output and a second end, said power output for delivering power to an electrical device;

wherein said encased power input and encased power output comprise a front face having top, bottom, left and right side surfaces, said top, bottom, left and right side surfaces extending rearward to an orthogonal lip extension surface, said top and bottom orthogonal lip exten-

sion surfaces including said mounting frame first end in a substantially coplanar relationship with said orthogonal lip extension surfaces;

Said front face of said encased power input and encased power output for engagement into said rear panel second opening of said first and second electrical boxes up to a point when said rear panel exterior surface contacts said orthogonal lip extension surface;

said encased power input and power output having an electrical interface therebetween.

7. A power feed device as in claim **1**, wherein said encasement of said power input and said power output is a boot, said boot dimensioned to slide over and seal said power input and power output.

8. A power feed device as in claim **1**, wherein said encasement of said power input and said power output is an overmold, said overmold dimensioned to electrically isolate said power input and power output.

9. A power feed device comprising:

An encased power input in communication with a mounting frame disposed thereon, said mounting frame having a first end integrated into said encased power input and a second end, said power input for receiving electrical power supplied thereto;

An encased power output in communication with a mounting frame disposed thereon, said mounting frame having a first end integrated into said encased power output and a second end, said power output for delivering power to an electrical device;

wherein said encased power input and encased power output comprise a front face having top, bottom, left and right side surfaces, said top, bottom, left and right side surfaces extending rearward to an orthogonal lip extension surface, said top and bottom orthogonal lip extension surfaces including said mounting frame first end in a substantially coplanar relationship with said top and bottom orthogonal lip extension surfaces;

said encased power input and power output having an electrical interface therebetween.

10. A power feed device as in claim **9**, further including a faceplate mounted thereon, said faceplate having an opening for access to said power input and power output, said faceplate including an opening having a peripheral edge, said front face of said encased power input and encased power output for engagement into said faceplate opening up to a point when said faceplate peripheral edge contacts said orthogonal lip extension surface.

11. A power feed device as in claim **1** wherein said encased power input and said encased power output is selected from the group consisting of a standard duplex device, a standard nema device, or a non-standard device.

12. A kit for positioning remote power comprising:

An encased power input having an electrical extension cut to a specific length;

An encased power output having an electrical extension cut to a specific length;

Said encased power input and power output adapted to be mounted to a wall.

13. A kit for positioning remote power as in claim **12** further including a faceplate for mounting said power input and power output flush to a walls surface.

14. A kit for positioning remote power as in claim **12** further including at least one recessed box, said encased power input and encased power output adaptable for recessed

positioning within a wall interior, said power input and power output mounted externally to said at least one recessed box.

15. A kit for positioning remote power as in claim **12** wherein said electrical extensions include a mating plug.

16. A method of locating a power feed device, comprising the steps of:

Cutting a first power input hole in an exterior wall and a second power output hole in an exterior wall;

Feeding an encased power input, and encased power output, and an electrical coupling interface, throughout the interior of said wall;

Affixing said encased power input in said first power input hole and affixing said power output in said second power output hole.

17. A method as in claim **16**, further including the step of providing power to said encased power input.

18. A power feed device as in claim **1**, wherein said power input further comprises a male receptacle, said male receptacle receiving power from an external source, and said power output further comprising a female receptacle.

19. A power feed device as in claim **18**, wherein said external source is a powered extension cord.

20. A power feed device as in claim **1**, wherein said power input and power output are electrically coupled by hot, neutral and ground conductors.

* * * * *