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DUAL RECEPTACLE FOR PRINTED TYPE CIRCUITRY

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2 Sheets-Sheet 1

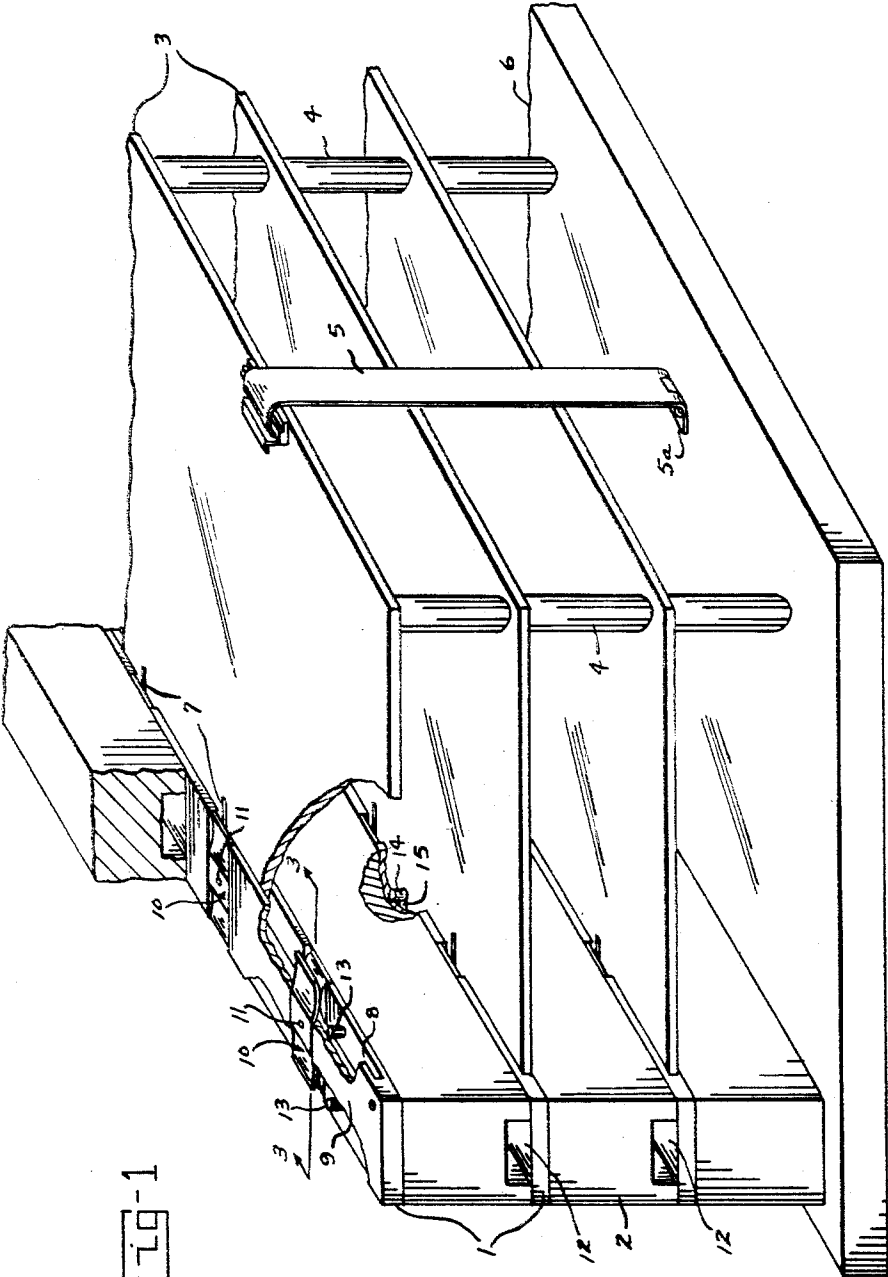


FIG-1

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2 Sheets-Sheet 2

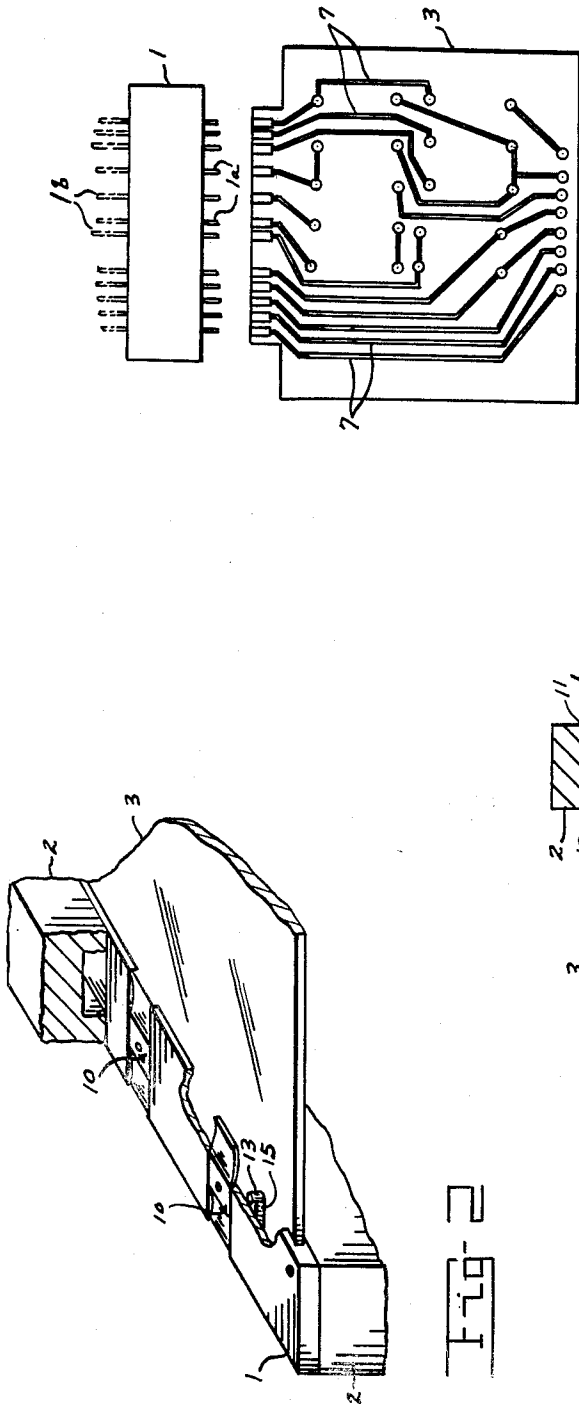


Fig-1

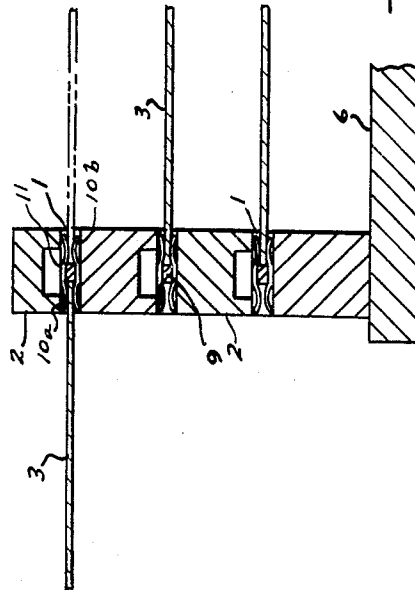


Fig-2

Fig-4

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DUAL RECEPTACLE FOR PRINTED TYPE CIRCUITRY

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3 Claims. (Cl. 317—101)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates generally to a receptacle for the printed type circuitry and, more particularly, to a dual receptacle that facilitates assembly, dynamic circuit evaluation, and service.

In the assembly of complex electronic equipment utilizing printed type circuitry, it has been found that usually large equipment is necessary since the printed panels used are generally well dispersed for the sake of both simplicity and ease of assembly and service. With the use of such large equipment, the advantage of miniaturization expected from the printed type circuitry is largely lost. As the size of equipment is further reduced, as through the stacking of a plurality of printed panels, assembly and service becomes even more difficult until the apparent advantages gained through miniaturization of printed circuits are largely offset, followed by a substantial increase in the cost of production, and the cost and time involved in circuit analysis and service.

It is an object of the present invention, therefore, to provide an improved receptacle to be used with the printed type circuitry.

It is a further object of the invention to utilize a simple and yet unique receptacle which facilitates assembly, dynamic circuit evaluation and service.

A still further object of the invention resides in a dual type receptacle having attaching means facilitating the attachment thereto of the terminal end of a printed panel.

Another object of the invention resides in the utilization of a plurality of stacked dual receptacles mounting a plurality of stacked printed panels and including novel means for facilitating removal and reversing of a selected panel for dynamic evaluation and service.

Other objects and advantages of the invention will become apparent from the following description, taken in connection with the accompanying drawings, in which like reference characters refer to like parts in the several figures:

Figure 1 is a perspective view, partly broken away, of the device of the instant invention, illustrating the stacked assembly of a plurality of dual receptacles and a plurality of printed panels mounted or plugged therein.

Figure 2 is a second perspective view, partly broken away, of a selected receptacle and printed panel of Figure 1, illustrating the slotted engagement therebetween.

Figure 3 is a cross-sectional view taken about on line 3—3 of Figure 1, illustrating additional details of the attachment between the inventive dual type receptacle in stacked relation and the stacked printed panels.

Figure 4 is a top view of the printed panel utilized with the invention of Figures 1—3, illustrating the relation between the terminal end of said printed panel and the inventive dual receptacle.

Referring specifically to Figures 1 and 2 of the drawings, a plurality of the elongated dual receptacles of the

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invention are indicated at 1 in vertically stacked relation with an elongated spacer 2 affixed between each adjacently mounted receptacle 1. A plurality of insulated printed type panels 3 are releasably and resiliently positioned in spaced and parallel relation at their terminal ends each in a respective receptacle 1 and at their opposite ends retained in horizontal relation by a pair of support legs 4 adjacent each corner thereof. As clearly seen, said support legs 4 extend through and are fixed at spaced locations in openings in all but the uppermost or top printed panel 3 with the latter resting on top of each support leg 4 and releasably held thereon by the spring type locking clamp 5 which locking clamp 5 is pivoted to the upper surface of the equipment chassis 6 by hinge means indicated at 5a. Each of said printed panels 3 incorporates a plurality of printed circuit leads on their upper surfaces indicated schematically at 7 in said Figure 1 and shown in detail in Figure 4 of the drawings. In addition, a plurality of electrical components (not shown) are incorporated on the bottom surface of each printed panel 3. Each of said dual receptacles 1 is composed of insulated material and incorporates a pair of relatively narrow elongated slots indicated generally at 8 and extending lengthwise on both sides thereof and separated by the insulated center strip indicated at 9 (see Figure 3). At spaced intervals, each dual receptacle 1 incorporates a pair of electrical spring contacts indicated generally at 10 and riveted to said center strip 9 by a rivet 11 which rivet 11 is also adaptable for utilization as the solder point for electrical interconnections. Each spacer 2 incorporates a channel in its bottom surface indicated generally at 12 which channel 12 extends throughout the length of said spacer 2 and is adapted for the insertion therein of wire harness to be electrically interconnected to the previously described rivet or rivets 11. It is noted that there is a spring contact 10 for each printed circuit lead 7 incorporated on printed panel 3. In addition, each dual receptacle has a pair of insulated polarizing pins 13 positioned at selected locations within the slots 8 on opposite sides of center strip 9. An additional insulated polarizing pin 14 is illustrated in operable engagement with the panel 3 located immediately below the uppermost panel 3 in a different location than polarizing pins 13. This latter arrangement represents an important feature of the subject invention in that each of said plurality of printed panels 3 incorporates polarizing pins as 13 or 14 in different locations relative to one another for the purpose of insuring that the respective panels 3 are not inserted in the wrong receptacle 1. As seen clearly in Figure 2 of the drawings, the top or uppermost printed panel 3 is shown partly broken away in engagement in one of the slots 8 of dual receptacle 1. Said panel 3 incorporates a relatively short slot 15 adjacent one side of its terminal end which slot 15 engages with one of said polarizing pins 13, said slot 15 being long enough to permit said terminal end to be fully seated against one side of the center strip 9. As stated hereinbefore, the remaining printed panels 3 and dual receptacles 1 incorporate similar pin and slot connections in staggered relation relative to each other to assure that the correct panel 3 is inserted in the correct receptacle 1.

With specific reference to Figure 3 of the drawings, it is noted that each of the spring contacts 10 consist of an upper contact element 10a and a lower contact element 10b affixed, respectively, to the upper and lower surfaces of center strip 9 by rivet 11 and extending in overlapping relation at right angles thereto. With this arrangement, the terminal ends of the printed panels 3 are inserted in the longitudinal slots 8 (see Figure 1) of respective dual receptacles 1 in slotted engagement with pins 13 and resiliently held therein between the upper and lower elements 10a, 10b of a plurality of spring con-

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tacts 10, there being one of said spring contacts 10 for the terminal ends of each circuit lead 7 printed on panels 3. Since the rivets 11 are also utilized as the solder point for electrical interconnections, printed circuit leads 7 are electrically connected therewith through spring contacts 10. If it is desired to examine a selected printed panel 3 from the standpoint of service or dynamic circuit evaluation of the electrical components mounted on the bottom surface thereof, it is only necessary to unplug or unsnap said panel 3 from its resilient engagement in said plurality of spring contacts 10 and longitudinal slot 8 of the particular dual receptacle 1, turn the panel 3 upside down, and snap it into the identical longitudinal slot 8 on the opposite side of said dual receptacle 1, as seen clearly in solid lines in Figure 3 for the uppermost panel 2, again, electrically interconnecting the terminal ends of the printed circuit leads 7 thereto by means of the spring contacts 10 on the opposite side of said dual receptacle 1. At this point, any test or service necessary may be accomplished on the electrical components and, afterwards, the panel 3 returned to its original position.

As clearly seen in Figure 4 of the drawings, a typical printed panel 3 of the type utilized with the invention is shown with the plurality of completed printed circuit leads 7 terminating in the terminal end of printed panel 3, the latter being in position for plugging into dual receptacle 1. Said dual receptacle 1 is shown with a plurality of apparent solid lead lines at 1a extending from one side thereof merely to represent the respective normal location of spring contacts 10, there being one for each printed circuit lead 7. On the opposite side of said dual receptacle 1, these apparent lead lines are indicated in "phantom" at 1b merely to represent the respective corresponding locations of spring contacts 10 utilized on the opposite side of receptacle 1 when said panel 3 is plugged therein for dynamic evaluation and/or service.

Thus, a new and unique dual type receptacle for use with printed type circuitry has been developed in the present invention in which simple and improved means have been incorporated for ease of assembly, high compactness, and effective dynamic circuit evaluation and service. Moreover, a dual receptacle 1 has been effected whereby the printed type panel indicated at 3 may be plugged into either side and still remain electrically interconnected to a common wiring terminal and, in addition, ease of service and dynamic evaluation is accomplished through physical relocation and not electrical relocation.

I claim:

1. A stacked assembly for mounting a plurality of printed panels comprising a plurality of electrically interconnected receptacles positioned in the same plane in vertically stacked relation, a plurality of alternately disposed spacer elements mounted between each adjacently positioned receptacle and providing support therefor and a plurality of spaced pairs of upper and lower electrical spring contact elements having rivet means for attachment to each of said receptacles and adaptable for electrical interconnection and resiliently holding the terminal ends of each of said receptacles in engaged position therebetween to facilitate the removal and reversal of said panel to insure dynamic circuit evaluation, each of said plurality of spacer elements incorporating a channel on its bottom surface adjacent a respective receptacle assembled thereto adapted to receive a wire harness electrically interconnected between said interconnecting means and an adjacently mounted printed panel.

2. A plurality of dual receptacles stacked in an as-

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sembly for receiving a plurality of printed circuit type panels in spaced, vertically stacked relation with a spacer unit affixed between and in contact with each adjacently mounted receptacle and electrically interconnected therebetween, each of said dual receptacles comprising an insulated elongated receptacle having a relatively narrow longitudinal slot on either side thereof separated by a longitudinally disposed, central insulated strip for interchangeably receiving in abutting relation thereto a respective printed circuit type panel on either side thereof, spring contact means positioned in each of said longitudinal slots and extending transverse thereto, and a common wiring terminal attached to said spring contact means, said spring contact means comprising a plurality of spaced electrical spring contacts and terminal means mounting each of said spring contacts, said spring contacts consisting of upper and lower relatively elongated spring elements electrically interconnected to said insulated strip extending in overlapping relationship from one to the other of said longitudinal slots and resiliently retaining the ends of said panels therebetween.

3. A stacked assembly for mounting a plurality of printed type panels comprising a relatively enlarged main supporting base, a pair of relatively elongated, vertically extending support legs affixed to the upper surface of said main base adjacent to one side thereof and disposed in substantially spaced relation thereon, a first spacer element mounted on the side of said main supporting base remote from said pair of support legs, a first elongated receptacle mounted on top of said first spacer element, a second spacer element mounted on top of said first elongated receptacle, a second elongated receptacle mounted on top of said second spacer element, a third spacer element mounted on top of said second elongated receptacle, a third elongated, uppermost receptacle mounted on top of said third spacer element, said receptacles being electrically interconnected and incorporating oppositely disposed, relatively elongated slot means on each side thereof, a panel adapted to incorporate printed circuitry on the upper surface thereof and a plurality of electrical components on the lower surface thereof in slidable engagement at the terminal ends thereof within said oppositely disposed, relatively elongated slot means for support on one side thereof, said support legs providing support for said panels on the opposite ends thereof, means releasably retaining the opposite ends of said panels on said main supporting base comprising a plurality of spaced pairs of upper and lower spring contacts positioned in each of said receptacles at predetermined spaced intervals in electrical engagement with a central, insulated strip dividing said pair of slots and electrically interconnected, and a pair of insulated polarizing pins positioned within each of the pair of slots for engagement within a relatively short slot in a selected printed panel to insure that the correct panel is inserted within the correct receptacle.

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