COMPATIBLE ELECTRICAL OUTLET SOCKET AND PLUG

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4 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to electrical outlets and plugs of the three-pronged type wherein one of the prongs constitutes a ground contact. The outlet includes double outlet socket pairs which may be employed with conventional plugs. In addition, the outlet includes two ground contact sockets positioned such that one of the ground contact sockets receives the ground prong of the three-pronged plug when the plug is received in one of the outlet socket pairs and the other of the ground contact sockets receives the ground prong of the three-pronged plug when the plug is removed and rotated 180° and received in the other of the outlet socket pairs. The internal connections of the sockets are such that regardless of the position in which the three-pronged plug is inserted, proper polarity will result so that no thought need be given to insertion of the three-pronged plug to insure proper polarity. The disclosure further relates to a unique three-pronged plug for use with the outlets.

This invention relates to electrical outlet sockets and plugs for use in business offices or residential dwellings and is particularly directed to such outlets employing a ground socket contact for use with a three-pronged plug. The invention also contemplates a unique design for a three-pronged plug usable with the electrical outlets of the invention.

There are presently available on the market, electrical outlets having double outlet socket pairs which will thus accommodate two conventional type plugs in a single outlet structure. In instances where polarity is important, there are also provided outlet sockets wherein a third socket is provided for the ground prong of a three-pronged plug. If a double set of outlet sockets is desired, the plug structure becomes somewhat bulky in that the first structure must be duplicated, thus providing an overall socket structure twice the size to provide a double outlet which will accommodate a three-pronged plug.

In addition to the foregoing, if a double socket outlet in a single casing is provided with a third ground contact socket, the three-pronged plug can only be inserted in one of the double outlet sockets and the other double outlet sockets can not be used.

With the above in mind, it is a primary object of the present invention to provide a unique double outlet socket in which the foregoing problems are overcome.

More particularly, it is an object to provide in a single casing structure a double outlet socket pair which can accommodate conventional plugs and yet is designed to receive a three-pronged plug wherein the three-pronged plug may be inserted in either one of the socket pairs and proper polarity maintained, all to the end that a compatible outlet structure is provided for both normal plugs and three-pronged plugs without any substantial increase in size over single outlet sockets for a three-pronged plug.

Still another object of this invention is to provide a unique three-pronged plug design for use with outlets provided in accordance with the present invention.

Briefer, these and other objects and advantages of this invention are attained by providing an electrical outlet having double outlet socket pairs for use with conventional plugs and a three-pronged plug wherein the outlet includes two ground contact sockets positioned such that one of the ground contact sockets receives the ground prong of the three-pronged plug when the plug is received in one of the outlet socket pairs and the other of the ground contact sockets receives the ground prong of the three-pronged plug when the plug is removed and rotated 180° and received in the other of the outlet socket pairs. To assure proper polarity regardless of the manner in which the three-pronged plug is inserted, a socket on one side of the outlet from one pair is internally connected to a socket on the other side of the outlet from the other pair, the remaining two sockets being connected together such that consistent polarity will result regardless of the manner in which the three-pronged plug is inserted.

In addition, the invention contemplates a unique grounded plug design wherein the ground prong and power prongs are in the same plane so that double the number of ground plugs may be used.

In the drawings:

FIGURE 1 is an exploded perspective view of a first embodiment of the electrical outlet of this invention for use with a conventional three-pronged plug;

FIGURE 2 is a schematic wiring diagram illustrating the internal connections of the sockets of the outlet of FIGURE 1;

FIGURE 3 is a perspective view of a new three-pronged plug design in accord with the invention;

FIGURE 4 is a front elevational view of a quadruplex outlet in accord with the invention;

FIGURE 5 is a wiring diagram illustrating the internal connections of all of the various sockets in the structure of FIGURE 4.

Referring first to FIGURE 1, there is shown an electrical outlet 10 including double pairs of outlet sockets 11, 12, and 13, 14 respectively. In accordance with the present invention, the electrical outlet 10 also includes two outlet ground sockets 15 and 16. These outlet ground sockets are positioned respectively between the outlet pairs 11 and 12 and the outlet pairs 13 and 14 and preferably have internal U-shaped walls oppositely disposed as shown.

From the description of the electrical outlet 10 thus far, it will be evident that conventional two-pronged plugs may be inserted in either the first pair of outlet sockets 11 and 12 or the second pair of outlet sockets 13 and 14 or two plugs may be used at the same time. However, the outlet 10 is also designed to receive conventional three-pronged plugs such as plug 17, as well as a uniquely designed three-pronged plug to be described.

Thus, as shown in FIGURE 1, the plug 17 includes conventional power prongs 18 and 19 and a ground prong 20. The ground prong 20 connects to an internal contact 21 which may be grounded in the usual manner or connected to an internal ground wire leading to the particular appliance through the cord 22.

Referring now to FIGURE 2, it will be noted that power to the outlet 10 may be provided by a first power line 23 connecting to one outlet socket 11 on one side of the outlet 10 as by the branch lead 24. This outlet socket is internally connected by the lead 25 to the outlet socket 14 constituting a socket of the other pair on the other side of the outlet 10. The remaining two sockets connect to the second power line 26 as by the line 27. The two grounded sockets 15 and 16 are connected together by the lines 28 and 29 to ground 30.

In the operation of the structure just described in FIGURES 1 and 2 with respect to the three-pronged plug 17, it will be noted that when the prongs 18 and 19 are received in the lower pair of socket contacts 13 and 14, the
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Further, it will be noted that the prong 19 receives energy from the positive power line 23 to the outlet 10 and the prong 18 receives negative power from the power line 26 to the outlet 10, the prongs being polarized positive and negative as indicated in FIGURE 1.

If now the three-pronged plug 17 is removed and rotated 180° so that the prongs 18 and 19 are received in the outlet socket pairs 12 and 11 respectively, the ground socket 16 is so positioned as to receive the ground prong 20 of the plug. In this position, it will be evident that the prong 19 still connects to the positive power line 23 and the prong 18 connects to the negative power line 26 so that the polarity is the same regardless of the position in which the three-pronged plug 17 is inserted into the outlet 10.

Referring to FIGURE 3, there is shown a unique three-pronged plug 31 for use with the outlets described in FIGURE 1. This plug includes a cord 32 connected to suitable power prongs 33 and 34 polarized as shown. A ground prong 35 extends from the plug body substantially in the same plane as the prongs 33 and 34. This ground prong is U-shaped in cross-section as shown.

Figure 3 shows the internal wiring for the various sockets described in FIGURE 4. Thus, the positive power line 49 connects to the socket contacts 37 and 43 on one side of the outlets and to socket contacts 40 and 46 of the other respective pair on the other side of the outlets. The remaining sockets of the respective pairs as shown and 45 internally connect to the remaining ones of the respective pairs 38 and 44 and thence to the negative power lead 50 as shown. The various ground sockets 41, 42, 47, and 48 all connect to ground 51.

It will be evident from the structure described in FIGURES 4 and 5 that the plug 17 of FIGURE 1 may be inserted in any one of the four socket pairs illustrated, the ground prong being received in a proper ground socket of the outlet depending upon the rotational position of the plug 17. Similarly, four plugs of the type shown in FIGURE 1 may be simultaneously received in the outlet.

In the particular embodiments illustrated, the ground sockets having U-shaped internal walls are adapted to mate with the U-shaped cross-section of the ground prong 35 of the plug 31 in FIGURE 3 to assure proper polarity.

However, the ground contact socket openings are compatible for use with conventional three-pronged plugs such as 17. It also should be understood that the center prong of the novel plug of FIGURE 3 need not be U-shaped, but in this event, other polarity determining means would have to be used such as making the positive power prong wider than the negative power prong and correspondingly dimensioning the power prong sockets.

From the foregoing description, it will be evident that the present invention has provided a unique electrical outlet and plug structure wherein all of the various objects are realized.

What is claimed is:

1. An electrical outlet having double outlet socket pairs for use with conventional plugs and a three-pronged plug, characterized in that said outlet includes two ground contact sockets positioned such that one of said ground contact sockets receives the ground prong of said three-pronged plug when said plug is received in one of the outlet socket pairs and the other of said ground contact sockets receives the ground prong of said three-pronged plug when said plug is removed and rotated 180° and received in the other of the outlet socket pairs, a socket on one side of said outlet being internally connected to a socket on the other side of said outlet from the other pair, the remaining two sockets being connected together such that proper polarity results whether said plug is inserted as initially described or rotated 180° and inserted.

2. An electrical outlet according to claim 1, further characterized by an additional set of double outlet socket pairs interconnected with each other in the same manner as said first mentioned outlet socket pairs and mounted in fixed relationship thereto, said additional outlet pairs being respectively connected to correspondingly positioned ones of said first mentioned socket pairs, and two additional ground contacts respectively positioned to receive the ground prong of said plug when received in one of said additional socket pairs and thence removed and rotated 180° and received in the other of said additional socket pairs.

3. An electrical three-pronged plug in combination with an outlet as defined in claim 1, characterized by a ground disposed between and in substantially the same plane as its power prongs, the ground contact sockets of said outlet being disposed between corresponding power sockets at said socket pairs whereby two three-pronged plugs may be simultaneously received in said outlet.

4. The subject matter of claim 3, in which said ground contact sockets of said outlet have U-shaped walls in cross-section oppositely oriented to each other, said ground prong having a U-shaped cross-section for mating engagement with said ground contact sockets only when the polarity of the remaining prongs match in position the polarity of the outlet socket pair receiving said plug.

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