

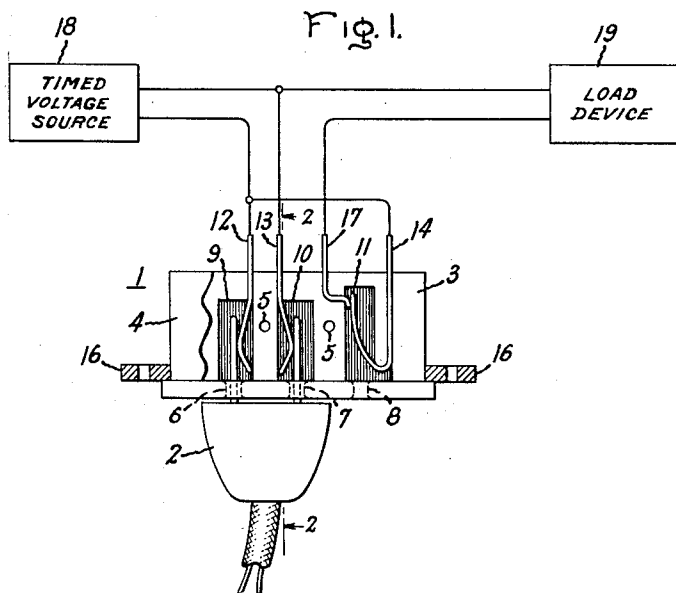
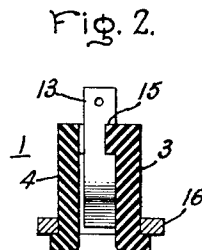
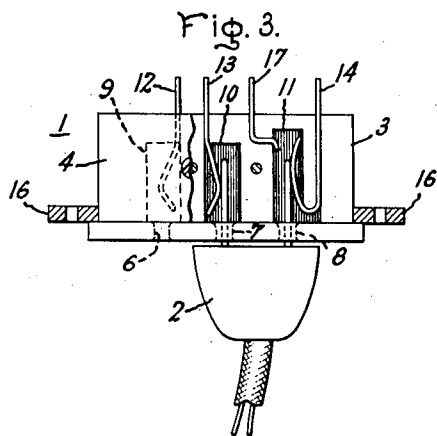
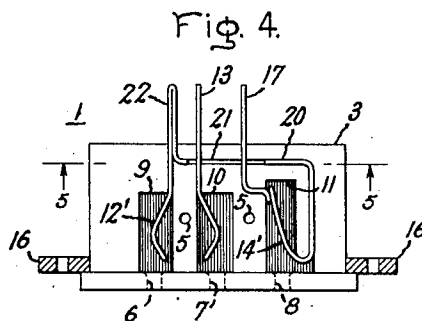
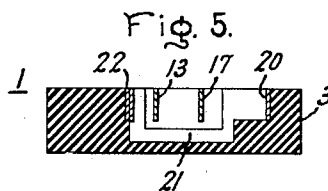
Oct. 16, 1956

L. P. CREIMAN ET AL

2,767,329

COMBINED RECEPTACLE AND SWITCH

Filed April 3, 1952



Inventors:
 Lyle P. Creiman,
 Eric O. Peterson,
 by *Merton D. Mone*
 Their Attorney.

1

2,767,329

COMBINED RECEPTACLE AND SWITCH

Lyle P. Creiman and Eric O. Peterson, Syracuse, N. Y.,
assignors to General Electric Company, a corporation
of New York

Application April 3, 1952, Serial No. 230,294

4 Claims. (Cl. 307—112)

This invention relates to a combined electrical plug receptacle and switch.

In radio receivers incorporating a time switch for switching the radio on and off, an electrical outlet or plug receptacle is often installed in the receiver cabinet to provide a timed voltage source for additional electrical appliances. In order to operate such additional appliances without operating the radio, separate switching means have been utilized in the past to de-energize the radio circuit. However, for such applications, a combined receptacle and switch circuit which is both inexpensive to manufacture and foolproof in use is very desirable.

It is an object of our invention to provide an improved switching circuit in which the switching operation is performed by the insertion of an electrical plug in one of alternative positions provided by an electrical outlet or receptacle.

It is a further object of our invention to provide a combined switch and plug receptacle having alternative plug positions for selecting the switching operation.

It is another object of our invention to provide an improved combined receptacle-switch of simple and economical design.

According to our invention an electrical plug receptacle with alternative plug positions for a two-prong plug is provided with three aligned prong socket openings spaced to permit insertion of the plug prongs in the center socket and either one of the end sockets. In order that voltage may be supplied to the plug prongs when the plug is inserted in either of the alternative positions, the prong contact members in the end sockets are connected in parallel to one voltage supply terminal and the prong contact member of the center socket is connected to the other voltage supply terminal. Insertion of the plug in one of the plug positions actuates a switch comprising an auxiliary electrode incorporated in one of the end sockets and engaging the prong contact member of that socket except when the prong contact member is displaced due to the insertion of a plug prong in that socket. A load device having one terminal connected to the auxiliary electrode and the other connected to the center prong contact member is accordingly energized from the voltage supply except when the electrical plug is inserted in the position in which one of the plug prongs enters the end socket containing the auxiliary electrode. The choice of the plug position thus determines whether a load device not connected in circuit with the plug and not affecting the voltage supplied to the plug prongs is energized.

The features of our invention which we believe to be novel are set forth with particularity in the appended claims. Our invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawing, in which Fig. 1 is a side view, partially in sections, of a receptacle-

2

switch connected in circuit in accordance with our invention with a plug in one of the plug positions, Fig. 2 is a sectional view along line 2—2 of Fig. 1, Fig. 3 is a side view partially in section of the receptacle-switch with a plug in the alternative position, Fig. 4 is a side view, partially in section, of a modification of the receptacle-switch construction, and Fig. 5 is a section along line 5—5 of Fig. 4.

Referring now to Fig. 1, a receptacle-switch 1 is shown incorporating our invention and also shown inserted in the first of the alternative plug positions is a two-prong electrical plug 2. The housing 3 of the receptacle-switch may be suitably molded from a plastic or other insulating material as a rectangular block having exposed openings or recesses for the conductive contact members. A cover plate 4, shown in Fig. 2 is employed to cover the recessed portions of the housing and is fastened to the housing 3 by screws or rivets in the holes 5 shown in the housing of Fig. 1. Three aligned and equally spaced plug prong guide openings 6, 7 and 8 are provided in the front of the receptacle housing, the front of the receptacle being the lower surface as oriented in Fig. 1. The prong guide openings respectively communicate with housing recesses 9, 10, and 11 in which prong contact members 12, 13 and 14 are respectively positioned. The prong contact members, which are preferably made of resilient metal strips, each have one end extending through the back or upper portion of the housing 3 to provide external connection terminals. The intermediate portions of the prong contact members are securely anchored in the housing. As shown in Fig. 2, the prong contact members may have a recessed portion 15, fitting into the adjacent housing portions to prevent the members from endwise displacement. A mounting means, such as a bracket 16, is secured to the housing 3 for fastening the receptacle-switch in a desired location.

In the first plug position shown in use in Fig. 1, the prongs of the plug 2 are shown inserted in the end and center sockets defined respectively by recesses 9 and 10, with the prongs engaging contact members 12 and 13 respectively to provide electrical contact. As shown in the drawing, the prong contact members 13 and 12 are both bent or curved so that the end portions of the contact members near the front of the receptacle are not axially aligned with the inserted plug prongs. The plug prongs when inserted slide over the outer surface of the bent contact member portions, laterally displacing them and thus assuring that the prong contact members are resiliently biased against the plug prongs. As further indicated in Fig. 1, prong contact members 12 and 13 are bent or curved in opposite directions with respect to each other, the lower or front end portions of the contact members being suitably bent inwardly towards each other so that the plug prongs each slide over the outer surface of the curved portions, tending to force the prong members together. In this way the contact pressures on the plug are equalized so as to prevent misalignment of the plug in the receptacle.

The contact member 14 in the third socket defined by the recess 11 is shaped so that insertion of a plug prong causes it to break contact with an auxiliary electrode 17. As shown in the drawing, this may be suitably arranged by positioning the prong contact member 14 in the housing 3 with the prong contact portion entering the socket recess 8 near the front or lower portion of the recess and extending diagonally towards the back portion of the recess 11. A plug prong when inserted through the guide 8 intercepts the prong contact member 14 and laterally displaces its free end at the back or upper end of the socket recess as the sliding contact is made. An auxiliary electrode 17, which may be suitably made of a conductive strip or of wire is also embedded in the housing 3

3

with one end extending from the back or upper portion of the housing to provide a terminal connection and with the other end extending slightly into the back or upper end of the socket recess 11 to make contact with the free end of the prong contact member 14, as shown in Fig. 1.

Referring briefly to Fig. 3, it may be seen that when the electrical plug 2 is inserted in the second or alternative position so that its prongs engage prong contact members 13 and 14, the free end of prong contact member 14 is laterally displaced by the contact pressure of the plug prong, thus breaking the contact between the member 14 and auxiliary electrode 17. The plug prong, however, does not itself make electrical contact with the auxiliary electrode 17, as it contacts only the prong contact member 14. Contact member 14 is preferably arranged so that the contact pressure on one plug prong balances that on the other plug prong, the contact members 13 and 14 being spread apart by the insertion of the plug prongs between them.

Referring again to Fig. 1, the prong contact members 12 and 14 of the end sockets are shown connected in parallel to one terminal of a voltage source 18 and the contact 13 of the center socket is shown connected to the other terminal. It is thus apparent that for either plug position, that is, either as shown in Fig. 1 or Fig. 3, that voltage is supplied to the prong contact members in such a way that the choice of the plug position does not affect the voltage at the plug prongs for the operation of any device or circuit for which the receptacle may be the voltage supply. As further shown in the circuit of Fig. 1, one terminal of a load device 19 is also connected to the center prong contact member 13 and the other terminal is connected to the auxiliary contact member 17. When no plug is inserted in the receptacle or when the plug is in the position shown in Fig. 1, the auxiliary electrode 17 is connected to the voltage source through the prong contact member 14 and hence the load device 19 is energized. However, when the plug is inserted in the position shown in Fig. 3, the switch contacts provided by the auxiliary electrode 17 and the prong contact member 14 are separated to open the load device circuit. As mentioned before, this switching operation does not in any way effect the voltage supplied to the plug prongs.

The voltage source 18 may advantageously be a timed voltage source in which a time switch is employed to automatically open or close the voltage supply circuit and the load device 19 may be a radio receiver controlled by the timed voltage source to be automatically turned on or off at desired intervals. In such an application the receptacle-switch may be suitably fastened to a panel of the radio cabinet so that the timed voltage source may be utilized for appliances other than the radio receiver which is permanently connected in circuit. The advantages of such an arrangement are obvious where it is desired to operate an electrical appliance whose voltage supply line is connected to the receptacle by an electrical plug without simultaneously operating the radio. Economy and simplicity are both maintained as separate receptacles or a separate switch are unnecessary.

In the modification of the receptacles shown in Figs. 4 and 5, the prong contact members 12' and 14', respectively corresponding to the members 12 and 14 of Fig. 1, are internally shunted to simplify the external wiring connections to the contact terminals brought out at the rear of the receptacle housing 3. A single resilient conductive strip 20 may be employed having one end portion 12' serving as one of the end socket prong contact members and the other end portion 14' serving as the other end socket prong contact member. As further shown in Fig. 5 an intermediate transverse portion 21 of the contact strip 20 connects the two end portions and is embedded in the rear or top portion of the housing 3. This portion is formed to avoid contact with conductive members 13 and 17. A single external contact portion 22 is provided for the strip 20, this portion suitably being a section of the

4

strip folded upon itself and extending behind the housing. The connections to the receptacle terminals may be wired as shown in Fig. 1 and the operation is the same.

While we have shown and described specific embodiments of our invention and modifications thereof, it will, of course, be understood by those skilled in the art that other modifications may be made without departing from the principles of the invention. We therefore contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, an electrical plug receptacle comprising an insulating body having three aligned prong sockets spaced so that the center socket and either end socket may receive the prongs of a two-prong plug to thereby provide alternate plug positions, each of said sockets having a contact member adapted to contact a plug prong inserted in the socket, and an auxiliary switch member normally in contact with the contact member of one of said end sockets, said contact member of said one end socket being spaced from said auxiliary member by the insertion of a plug prong in such said one end socket, means for connecting the contact member of said center socket to one terminal of a voltage supply and of a load device, means for connecting said contact members of said end sockets to the other terminal of said voltage supply, and means connecting said auxiliary switch member to the other terminal of said load device, whereby the voltage supply circuit to said load device is opened when a plug is inserted in the position provided by said center socket and said one end socket.

2. In combination, an electrical plug receptacle comprising an insulating body having three prong sockets spaced so that the center socket and either end socket may receive the prongs of a two-prong plug to thereby provide alternate plug positions, each of said sockets having a contact member adapted to contact a plug prong inserted in the socket, and an auxiliary switch member normally in contact with the contact member of one of said end sockets, said contact member of said one end socket being spaced from said auxiliary member by the insertion of a plug prong in such said one end socket, means for connecting the contact member of said center socket to one terminal of a voltage supply and of a load device, means for connecting said contact members of said end sockets to the other terminal of said voltage supply, and means connecting said auxiliary switch member to the other terminal of said load device, whereby the voltage supply circuit to said load device is opened when a plug is inserted in the position provided by said center socket and said one end socket.

3. A plug receptacle comprising in combination a housing of insulating material having a first prong socket, a second prong socket and a third prong socket, said first and third prong sockets being equidistant from said second prong socket, an auxiliary electrode mounted so as to extend through said housing into said first prong socket, a first contact member mounted so as to extend through said housing into said first prong socket, the portion of said first contact member lying within said first prong socket extending from the open end of said first prong socket to said auxiliary electrode, this portion of said first contact member being made of resilient material, a second contact member extending through said housing into said second prong receptacle, the portion of said second contact member within said second prong socket being bent so as to provide for resilient contact with any prong that may be inserted therein, a third contact member extending through said housing into said third prong receptacle, the portion of said third contact member within said third prong receptacle being bent so as to provide resilient contact with a prong when the latter is inserted therein.

4. A plug receptacle as set forth in claim 3 wherein said first contact member is electrically connected to said third contact member by a connection within said housing.

References Cited in the file of this patent

5

UNITED STATES PATENTS

402,829 Hopkins ----- May 7, 1889

1,669,784
2,039,194
2,089,165
2,439,270

843,939
256,663

Scofield ----- May 15, 1928
Simon ----- Apr. 28, 1936
Oliver ----- Aug. 3, 1937
Sharp ----- Apr. 6, 1948

FOREIGN PATENTS

France ----- Apr. 11, 1939
Switzerland ----- Mar. 1, 1949