

March 14, 1950

C. A. P. JOHNSON ET AL
ELECTRICAL APPARATUS

2,500,184

Filed June 4, 1945

2 Sheets-Sheet 1

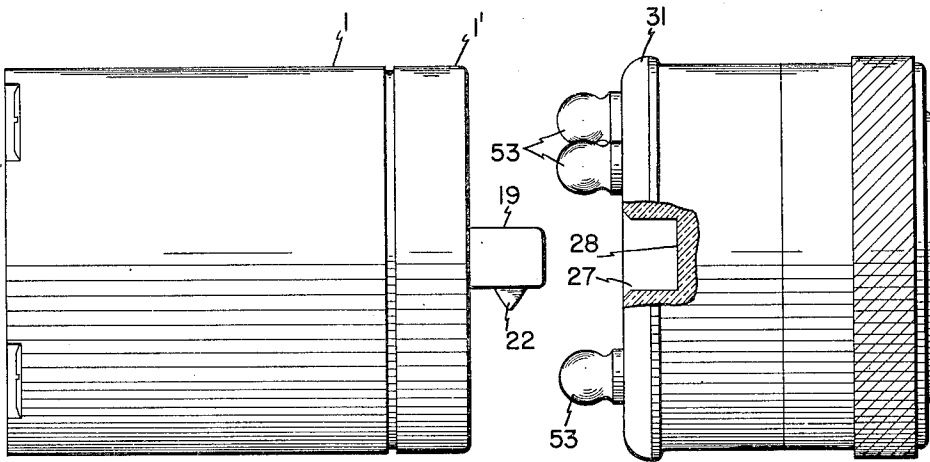


FIG. 1

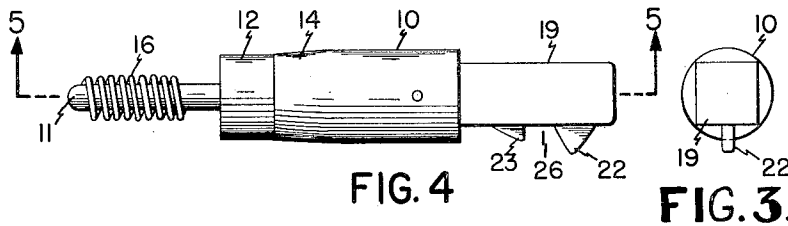


FIG. 4

FIG. 3.

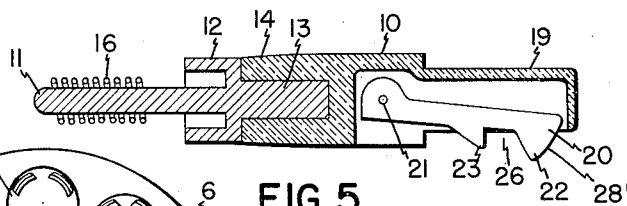


FIG. 5

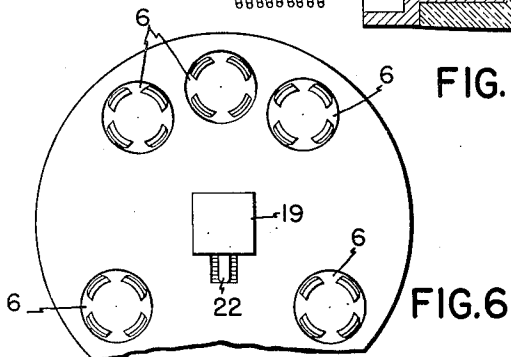


FIG. 6

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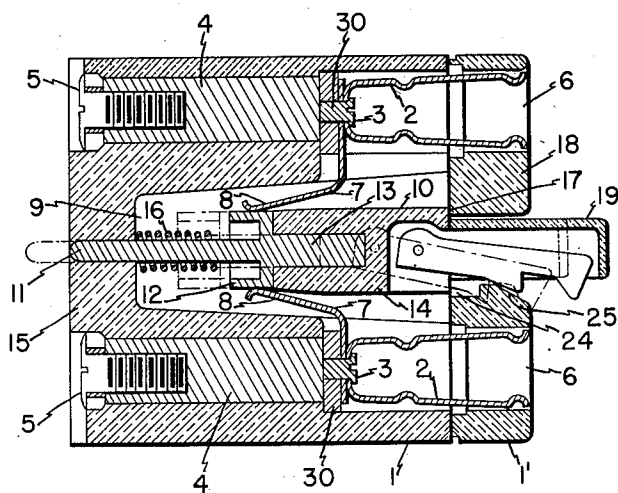


FIG. 2

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UNITED STATES PATENT OFFICE

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ELECTRICAL APPARATUS

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2 Claims. (Cl. 200—51.10)

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The present invention relates to a co-operating electric plug and receptacle which may be used in a fixed position or on a portable line or cable and is particularly designed for use in connection with special annunciator systems as, for instance, the kind generally used in hospitals for bed patients in calling for aid and signaling the attention of attendants or nurses.

In most of such hospital systems the patient in the bed has an electric cord near the bed which ends in a push button. The cord is usually plugged into a wall receptacle which has electrical connection to a number of places. When the patient wishes to call or signal, he presses the push button and visual and audible signals are produced at various places as, for instance, in the nurses' office, in front of the patient's door (where a light usually appears), and in several other places.

In order to be assured that the patient may at all times signal for aid, special means have been employed to make certain that the circuit always remains in working order so that when the patient presses the button, the proper signals will be produced. One common difficulty experienced in the past has been that the cords and plugs come out or are pulled out of their receptacles with the result that when the patient signals, the cord is dead and no electrical connections are made. Various methods and devices have been employed in the past for producing a signal merely when the plug comes out of the receptacles, which is the general subject matter of the present invention, so that the attendants known when the plug has been disconnected.

The present invention has advantages over the devices in the prior art inasmuch as no rotating elements are used and the device is simply constructed and of a fool-proof nature.

In one form of the present invention, when the plug is inserted in the receptacle, a spring catch is released which frees a connecting jack member located in the receptacle so that when the plug is removed, the connecting member will move to complete an electrical circuit, providing the same signal that the patient would give if the push button at the bedside had been pressed.

In another form of the invention, the removal of the plug acts in a positive manner to pull out the connecting jack element so that the same circuit is completed.

The invention will be more fully understood from the specification annexed hereto when taken in connection with the drawings in which—

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Figure 1 shows the receptacle and plug, with a portion broken away, of the present invention.

Figure 2 shows a central section through the receptacle.

5 Figure 3 shows an end view as seen from the right of Figure 4.

Figure 4 shows a detail of Figures 1 and 2.

Figure 5 shows a section on the line 5—5 of Figure 4.

10 Figure 6 shows a fractional face view of the receptacle of Figure 1.

In the device shown in Figures 1, 2, 4 and 5, the receptacle comprises a casing 1 with a front plate or disc 1' attached together by long screws (not shown) passing through the wall. Both of the elements are of plastic or other suitable insulating material in which is mounted, preferably in circular arrangement, a plurality of receptor elements 2, 2, etc., which are fixed in the receptacle by means of riveting studs 3, 3 extending from the terminal rods 4, 4 electrically connecting the receptors to the terminal rods. These rods pass through the shell of the casing and have threaded into their ends, substantially flush with the back face of the receptacle, the terminal screws 5, 5. The receptors 2, 2 may be of the pronged type and are positioned in recesses 6, 6 formed in the front end of the casing which is the exposed end when the receptacle is mounted on a wall. Between the pronged receptors 2, 2 and the terminal rods to which they are held are washers 30 and spring contact fingers 7, all of which make electrical contact with each other, one contact finger being provided for each pronged receptor 2. As indicated in Figure 2, these spring contact fingers have a flat washer portion with a hole in the center by means of which it is clamped in face relation to the flat midsection of the pronged receptor 2 and an inclined finger portion 8, 8 which is bent toward the central axis of the receptor casing.

The center of the receptor casing is recessed, as indicated at 9, in the central region to provide for the center axial connecting jack 10, the rear end of which terminates in a pin 11 which projects through a central hole in the rear wall of the casing. The recess 9 extends to the front end through which the front portion of the central operating jack 10 projects. This jack automatically moves to make a circuit connection when the plug fitting into the face end of the receptacle has been removed. When this occurs, the jack 10 comes to the position shown in Figure 2. In this position the metallic cup or cylinder

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12 makes connection with all of the spring fingers 8, thus completing the electrical circuits to the various signal or annunciator stations. This cylindrical cup or connector is held to the insulating body 14 of the jack in a stem 13 which fits securely in the body 14 of the jack. The pin member 11, previously mentioned, extends from the center of the cup 12. A spring 16 surrounds the pin 11 and bears against the inside of the cup, thus forcing the whole jack 10 against the shoulder 17 of the inside of the wall 18 of the disc 1' in the cavity 9 in which the jack is positioned.

The central jack 10 is shown more in detail in Figures 4 and 5. At the front end of the jack there is provided a cover 19 which is open only at the bottom side. Within this cover there is pivoted a latch member 20 which is journaled by the pin 21 in the side walls of the body portion 14. The latch arm 20 is positioned substantially horizontal or inclined slightly downward, as indicated in Figure 5, with the projecting elements of the latch 22 and 23 facing downward. As indicated in Figure 2, the rectangular hole 24 in the wall 13 of the member 1' at the front of the receptacle is provided with an upwardly projecting tooth 25 which engages a corresponding recess 26 between the projecting elements 22 and 23 of the latch as the jack 10 is forced to the left to the position indicated in Figure 2.

When the jack 10 is forced to the left (referring to Figure 2) then the spring fingers 8 pass from the metallic surface of the cup 12 to the insulating surface of the body 14 of the jack and the connection of the annunciator or indicator circuits is broken. When once pressed to this position, the jack 10 will remain there. When, however, the plug 31 is put in place and the pins 53 engage the spring receptors 2, the wall 27 of the plug hits against the outer edge 28' of the latch projection 22 and forces it up, thus permitting the spring 16 to bring the member 10 against the rear wall 28 in the recess in the plug. When the plug is fully inserted, the jack 10 is in its extreme left position, dotted in Figure 2, and the circuit remains open. When the plug is removed, the member 10 will again move to the right and complete the electrical circuit, thus making the usual signal.

The plug may come out of the socket accidentally or be purposely removed. In this case the jack 10 will automatically spring out, completing the electrical circuits, as explained above. The attendant upon investigating will look at the receptacle and return the plug to its proper position which will thereby open the circuit again. If, however, it is not desired to return the plug to the socket, the cover 19 of the jack will be pressed inwardly until the latch catches and locks

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the jack in its inward position. This, too, will break the connection to the annunciator circuits. The latter expedient is used in cases where the rooms are being cleaned or for any other reason where the cord is disconnected.

The invention has been described in connection with a receptacle and plug showing five circuits. It is obvious that not all of these need be used and that the plug and receptacle may be used or designed with one or more receptors and connectors although, because of symmetry, the use of a plurality of receptacles is preferable.

Having now described our invention, we claim:

1. In a combination electrical receptacle and plug connector having a plurality of circuits with symmetrically placed receptor elements and a short circuiting jack mounted therein for axial reciprocal motion in said receptor, for shorting said circuits when the plug is removed, said jack having a casing formed at its forward end partially projecting from said receptacle with the lower face open, a latch member pivoted horizontally in the side walls of the casing with latching teeth projecting downward, an interlocking element formed in the wall of the receptacle just below said latch member for engagement therewith, whereby when said jack is pressed inward against a spring acting thereon in the opposite direction, the latch and interlocking member will lock to maintain the jack in its retained position.

2. In a combination electrical receptacle and plug connector having a plurality of circuits with symmetrically placed receptor elements connecting to a short circuiting jack mounted axially in the receptor for reciprocal movement inward against the action of a spring, said jack member being formed at the end with a hollow casing open at the bottom, said casing within having a latch arm pivoted horizontally in the rear thereof, said latch arm having a plurality of downwardly extending teeth formed therein and corresponding teeth elements formed at the opening of the receptacle through which the jack extends, said plug member having a centrally located recess adapted to engage the jack member and to raise said latch member for releasing the same when said plug member is withdrawn.

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