April 22, 1941. W. R. CURTISS 2,239,035

ELECTRICAL SIGNAL DEVICE

Filed May 26, 1939 2 Sheets-Sheet 1

Fig. 1.

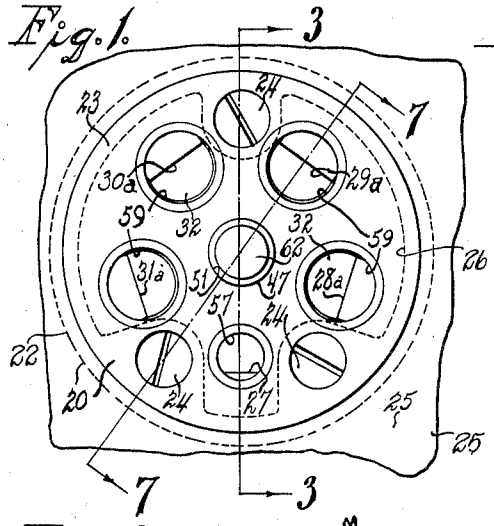


Fig. 2.

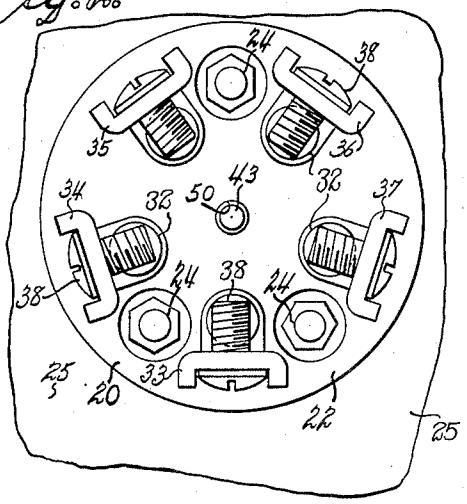


Fig. 3.

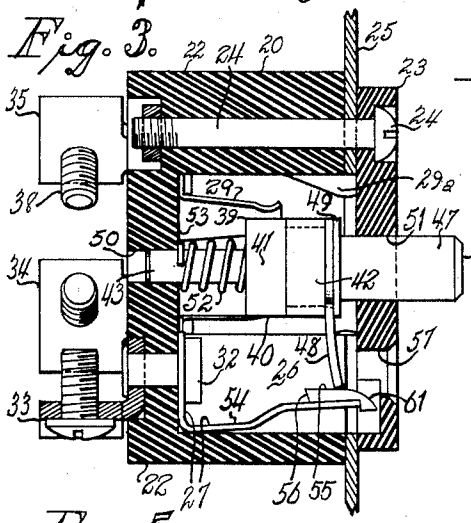


Fig. 4.

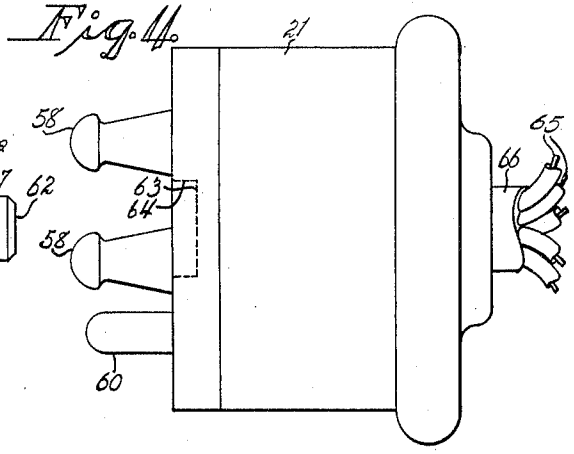
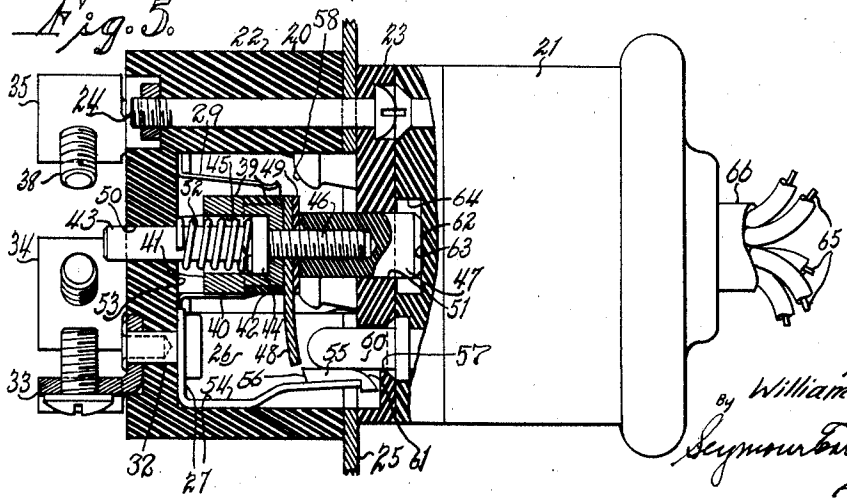


Fig. 5.



Inventor
By William R. Curtiss
Seymour Earl Nichols
Attorneys

April 22, 1941. W. R. CURTISS 2,239,035

ELECTRICAL SIGNAL DEVICE

Filed May 26, 1939 2 Sheets-Sheet 2

Fig. 6.

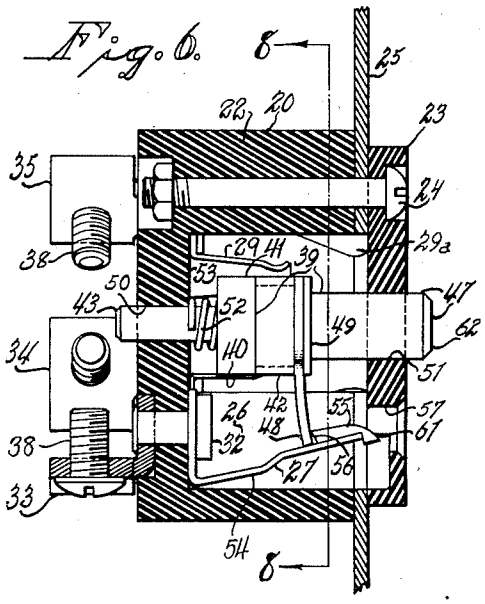


Fig. 7.

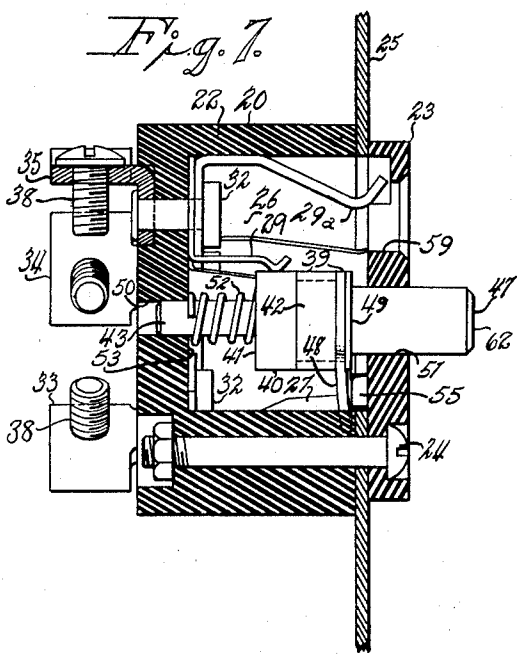


Fig. 8.

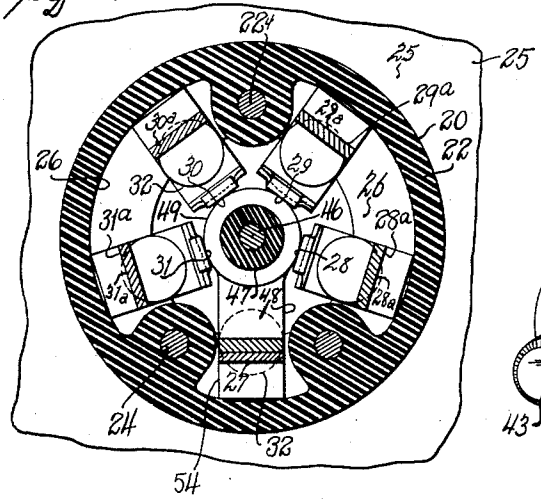


Fig. 9.

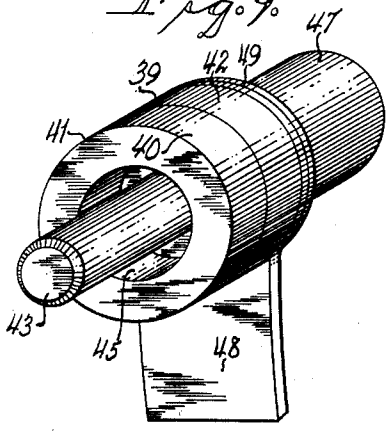
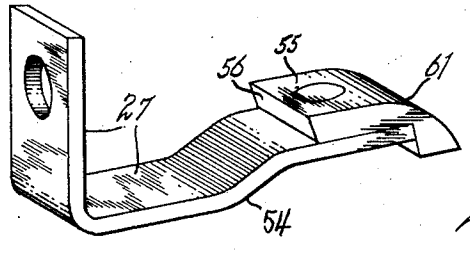


Fig. 10.



Inventor
William R. Curtiss
By Seymour Earle Nichols
Attorneys

Patented Apr. 22, 1941

2,239,035

UNITED STATES PATENT OFFICE

2,239,035

ELECTRICAL SIGNAL DEVICE

William R. Curtiss, Meriden, Conn., assignor to Connecticut Telephone & Electric Corporation, a corporation of Delaware

Application May 26, 1939, Serial No. 275,882

3 Claims. (Cl. 200—51)

This invention relates to improvements in electric signal devices of the type used in hospital nurse calling systems.

One object of this invention is to provide an improved electric signal device of the type referred to, having a push button adapted to be operated by a simple endwise push not requiring any instruction of the person who is to operate the same.

Another object of this invention is to provide an improved electric signal device of the type referred to, which has a latch which, when the push button is pushed to move the device to open-circuit position, holds the device in open-circuit position without such latch being accessible to release by human fingers, the release being accomplished automatically by connecting the plug to the receptacle.

Another object of this invention is to provide an improved electric signal device of the type referred to, formed of simple elements readily manufactured and readily assembled to produce an efficient, durable construction at minimum cost.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features of the said disclosure which are novel over the prior art.

In the accompanying drawings forming part of the present disclosure, in which one way of carrying out the invention is shown for illustrative purposes:

Fig. 1 is a front elevation of a receptacle made in accordance with the present invention;

Fig. 2 is a rear elevation of the receptacle shown in Fig. 1;

Fig. 3 is a central-longitudinal section on the line 3—3 of Fig. 1;

Fig. 4 is a side elevation of the plug;

Fig. 5 is a side elevation partly in section, of the receptacle and plug of Figs. 3 and 4 connected together;

Fig. 6 is a view the same as Fig. 3 except that the movable electric switch contact means is shown in the latched position;

Fig. 7 is a sectional view on line 7—7 of Fig. 1;

Fig. 8 is a sectional view on line 8—8 of Fig. 6;

Fig. 9 is a perspective view of the movable electric switch contact; and

Fig. 10 is a perspective view of a combined fixed electric switch contact and latch keeper which cooperates with the movable contact shown in Fig. 9.

In the description and claims, the various parts are identified by specific names for convenience, but they are intended to be as generic in their application as the prior art will permit.

Referring to the drawings showing the particular form of the invention chosen for illustration, the electric signal device primarily consists of a receptacle **20**, the plug **21** being adapted for cooperative use with the receptacle. The receptacle **20** includes a base **22**, preferably of insulation material, and a front cap **23**, also preferably of insulation material, connected together by bolts **24** with a carrier plate **25** clamped between the parts **22** and **23**.

The base **22** has a hollow interior **26** in which are a plurality of spring electric switch contacts **27, 28, 29, 30** and **31** (Figs. 3, 5, 6, 7 and 8) connected by rivets **32** respectively to electric connectors **33, 34, 35, 36** and **37** having clamp screws **38** for the connection thereto of electric wires (not shown), one of which leads to an electric power source and the others of which may lead to various usual electric light and buzzer signal devices. The spring electric switch contacts **28, 29, 30** and **31** respectively have spring contact portions **28***a*, **29***a*, **30***a* and **31***a* which may be integral, or formed as separate members as shown in the drawings. While the spring electric switch contacts **27, 28, 29, 30** and **31** have a certain amount of transverse spring or movability to them, they may for convenience be called fixed electric switch contacts to distinguish them from a movable electric switch contact means **39** which in the particular construction illustrated, comprises an annular contact or contact surface **40** (Fig. 5) of a metal bushing **41** which has an insulation ring **42** seated on a reduced-diameter portion of the bushing **41**. A pin **43** has a flange **44** which seats against the end wall of the recess **45** and has a reduced threaded extension **46** on which is threaded an insulation push button **47** which clamps the metal latch arm or latch **48** and a washer **49**. The left end of the pin **43** slides in a hole **50** in the base **22**, and the push button **47** slides in a hole **51** in the front cap **23**. A coil spring **52** on the pin **43** presses expansively against the flange **44** of the pin **43** and the end surface **53** of the interior of the base **22** to normally push the push button **47** to its extreme position to the right shown in Fig. 3.

While the metal fixed contact **27** which performs both the functions of a contact and of a latch keeper for the metal latch-arm **48**, could be made in a single integral piece, it is illustrated

in the drawings as being formed by riveting a spring-arm member 54 to an end-piece 55, to conveniently form a latch-keeper shoulder 56.

With the parts of the receptacle 20 shown in the closed-circuit position illustrated in Fig. 3, the electric power may, for example, enter at the connector 36 (Fig. 2) and pass through the fixed spring-contact 30 (Fig. 8) to the ring-contact 40 of the movable-contact means 39 and then pass out through the fixed spring-contacts 28, 29 and 31 to actuate the usual light- and buzzer-signals (not shown). Electricity also passes through the latch-arm 48 to the fixed spring contact 27 and then to one of the signal devices which it operates (not shown). If desired, the inner portion of one of the spring-contacts such, for example, as 31 may be omitted or bent back out of contacting position with the ring contact 40, so that the buzzer (not shown) will not be actuated by the current passing through the wire (not shown) connected to the connector 37 when the push button 47 is in the position shown in Fig. 3.

When the push button 47 is given a straight push in toward the left from its position shown in Fig. 3, the coil-spring 52 is compressed and the latch arm 48 moves past the latch-keeper shoulder 56, whereupon the spring contact 27 springs toward the latch arm 48 and causes the latter to be engaged by the latch-keeper shoulder 56, as shown in Fig. 6. In this position, the fixed contacts 28, 29, 30 and 31 rest upon the insulation ring 42 and, therefore, no power is transmitted to any of the signal devices. As the combined fixed spring contact and latch keeper 27 is not readily accessible through the small hole 57 in the front cap 23, the spring-contact 27 cannot be reached to be pushed down manually to release the latch-arm 48, thus guarding against unauthorized or unintentional release of the latch arm 48 and thus preventing unauthorized movement of the parts to the positions shown in Fig. 3 which sends in the various light- and buzzer-alarm signals.

The plug 21 has four identical plug-contacts 58 which are adapted to extend through the four holes 59 in the front cap 23 and engage the spring-contact portions 28*a*, 29*a*, 30*a* and 31*a* when the plug 21 is forced to the left from the position shown in Fig. 4 to that shown in Fig. 5 to connect it to the receptacle 20. When the plug and receptacle are thus connected together, the combined latch-release and plug-contact 60 passes through the hole 57 in the front cap 23 and engages against the cam-surface 61 of the fixed contact 27 to thus depress the contact 27 from the position shown in Fig. 3 to that shown in Fig. 5, and at the same time, the end 62 of the push button 47 is engaged by the inner surface 63 of the recess 64 in the plug 21 and pushed from its position in Fig. 3 to the position shown in Fig. 5, the plug and receptacle being held together against the action of the spring 52, by the spring engagement of the contact portions 28*a*, 29*a*, 30*a* and 31*a* behind the button-shape ends of the plug contacts 58. If the plug is assembled with the receptacle when the parts are in the positions shown in Fig. 6 instead of Fig. 3, then when the plug-contact 60 depresses the contact 27, the latch-arm 48 is freed from the latch-keeper shoulder 56, and the push button 47 is restrained from moving to the right by engagement of the end 62 of the push button against the inner surface 63 of the recess 64 in the plug 21.

Each of the five wires 65 of the cable 66 is connected to one of the plug contacts 58, 60, and the other ends of the wires 65 are connected to a call button (not shown) of any desired or usual type used in hospitals or the like, and intended primarily to be pressed by a patient to operate a signal to call a nurse. With the receptacle and plug engaged together, as shown in Fig. 5, the ring-contact surface 40 is out of engagement with the fixed contact-members 28, 29, 30 and 31 and the latch arm 48 is out of contact with the fixed contact 27, but inasmuch as the plug contacts 58 and 60 are in engagement with the contact portions 55, 28*a*, 29*a*, 30*a* and 31*a* of the fixed contact-members, a pressure by the patient on his call-button will send current through the wires 65 and through the various fixed contacts to the various signal devices to call the nurse. If through accident or otherwise the plug 21 is pulled away from its engagement with the receptacle as shown in Fig. 5, the push button 47 is thereupon released, whereupon the coil spring 52 pushes the movable-contact means 39 towards the right, to the position shown in Fig. 3, whereupon electric current flows through all of the fixed contacts and actuates the nurse-calling signal devices. When the nurse comes to the patient's room, she sees that the signal has been caused by an accidental removal of the plug, and replaces the plug in its position shown in Fig. 5, thus restoring the signal device to open-circuit condition for operation again by the patient.

Whenever a given receptacle is not needed for use, as, for instance, during the time the room is to be painted, the plug 21 and its attached cable can be removed from the receptacle and the push button 47 of the latter can be pushed in from the position shown in Fig. 3 to that shown in Fig. 6 to open-circuit position, with the knowledge that the push button 47 will not become unauthorizedly or accidentally released.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. An electric signal device including: a receptacle having a plurality of fixed electric switch contacts, movable electric switch contact means, spring means acting to move said movable contact means to close the circuit through said fixed contacts, a push button adapted by a simple endwise push to move said movable contact means to open-circuit position against the action of said spring means, and spring-pressed latch means located within said receptacle and acting to automatically latch said movable contact means in open-circuit position when said movable contact means is moved to open-circuit position, said receptacle having a latch-release opening, said latch means not being releasable by manipulation of said push button and not being engageable by human fingers but being releasable by an instrument inserted through said latch-release opening.

2. An electric signal device including: a receptacle having a plurality of fixed electric switch contacts, movable electric switch contact means, spring means acting to move said movable contact means to close the circuit through said fixed contacts, a push button adapted by a simple endwise push to move said movable contact means to open-circuit position against the action

of said spring means, and latch means acting to automatically latch said movable contact means in open-circuit position when said movable contact means is moved to open-circuit position; and a plug adapted to be connected to said receptacle and having electric plug contacts adapted to be engaged with said fixed contacts, latch-release means adapted to unlatch said latch means when said plug contacts are moved into engagement with said fixed contacts, and restraining means adapted to prevent said unlatched movable contact means from being moved by said spring means to closed-circuit position while said plug contacts are engaged with said fixed contacts, said spring means acting to move said movable contact means to closed-circuit position when said plug is disconnected from said receptacle.

3. An electric signal device including: a receptacle having a plurality of fixed electric switch contacts, movable electric switch contact means, spring means acting to move said movable contact means to close the circuit through said fixed contacts, a push button adapted by a simple endwise push to move said movable contact means to open-circuit position against the action of said spring means, and latch means acting to automatically latch said movable contact means in open-circuit position when said movable contact means is moved to open-circuit position; and a plug adapted to be connected to said receptacle and having electric plug contacts adapted to be engaged with said fixed contacts, one of said plug contacts constituting latch-release means adapted to unlatch said latch means when said plug contacts are moved into engagement with said fixed contacts, and restraining means adapted to prevent said unlatched movable contact means from being moved by said spring means to closed-circuit position while said plug contacts are engaged with said fixed contacts, said spring means acting to move said movable contact means to closed-circuit position when said plug is disconnected from said receptacle.

WILLIAM R. CURTISS.