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SELF-ENCLOSED SIGNALING REED RELAY FOR MOUNTING IN AN ELECTRICAL OUTLET BOX

Filed July 23, 1968

Fig. 1

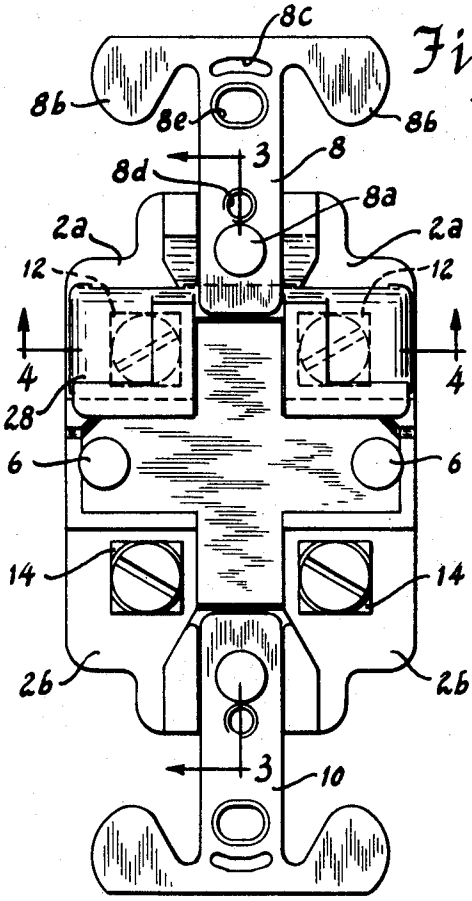


Fig. 2

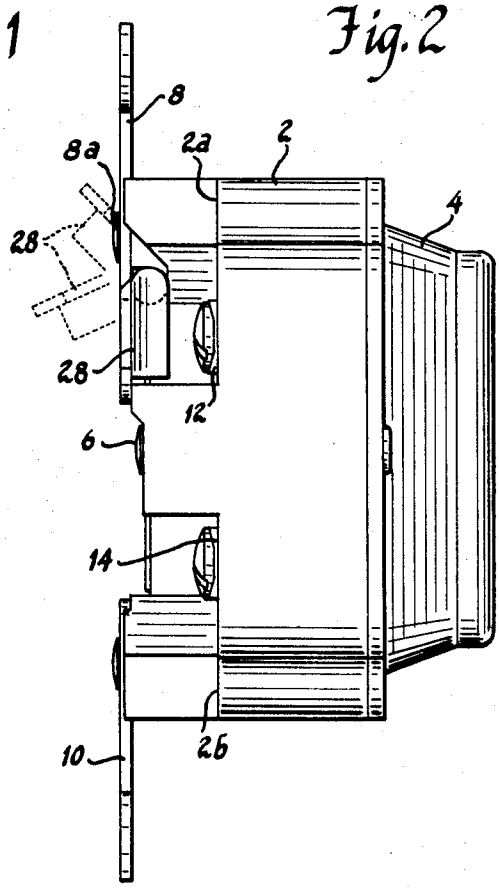


Fig. 3

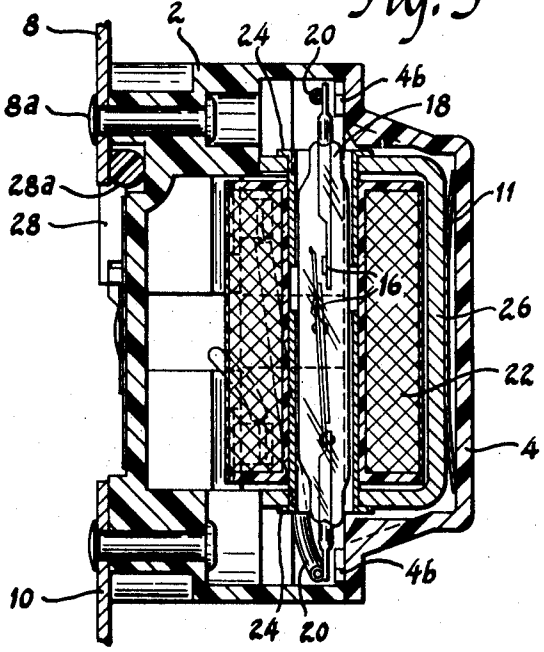
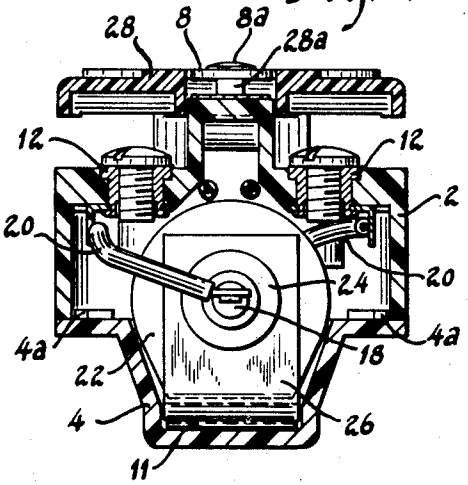


Fig. 4



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SELF-ENCLOSED SIGNALING REED RELAY FOR MOUNTING IN AN ELECTRICAL OUTLET BOX

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U.S. Cl. 335—202 9 Claims

ABSTRACT OF THE DISCLOSURE

A signaling reed relay comprising sealed reed contacts and an electromagnet for operating the contacts is enclosed in an insulating housing. This housing is provided with brackets adapting it for mounting in a conventional wall-mounted electrical outlet box. Terminals for both the operating coil and the contacts are on the front of the housing so that they are accessible when the outlet box cover is removed. The low D.C. voltage coil terminals are exposed. The higher power reed contact terminals are concealed by a snap-hinged cover for safety.

BACKGROUND OF THE INVENTION

This invention relates to the art of electrical signaling.

In certain types of electrical signaling such as in hospitals, for example, where patients in the rooms must signal with the nurse's station, it has been the practice to mount the switching or control devices such as relays on a control panel specially designed for that purpose. This control panel has been placed at some convenient location and electrical conductors run therefrom to both the nurse's station and the patient's rooms. It has been found desirable to simplify such signaling systems and the invention disclosed hereinafter makes a major contribution toward that end.

SUMMARY OF THE INVENTION

This invention relates to electrical signaling and more particularly to a signaling relay that is adapted to be mounted in a conventional electrical outlet box.

An object of the invention is to provide an improved signaling relay having low voltage operating means and being operable to control higher power to a load device.

A more specific object of the invention is to provide an improved signaling relay that is adapted to be mounted in a conventional electrical outlet box.

Another specific object of the invention is to provide an improved self-enclosed signaling reed relay for mounting in an ordinary wall-mounted outlet box.

Another specific object of the invention is to provide an improved signaling reed relay adapted to be mounted in an ordinary outlet box with an insulating housing having exposed low voltage terminals and high voltage terminals beneath a snap-hinged cover for safety.

Another specific object of the invention is to provide a signaling relay which has high reliability and does not overheat when mounted in an ordinary outlet box.

Other objects and advantages of the invention will hereinafter appear.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a self-enclosed signaling reed relay constructed in accordance with the invention;

FIG. 2 is a right side view of the relay of FIG. 1;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 1; and

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2, there is shown the exterior appearance of a self-enclosed signaling reed relay As shown therein, the relay is provided with a housing of insulating material. This housing consists of a base 2 and cover 4 held together by a pair of rivets 6. The base and cover cooperate to provide a completely enclosed compartment for housing an electromagnetically operable reed relay shown in FIGS. 3 and 4. A pair of brackets 8 and 10 are riveted to base 2 to extend upward and downward therefrom, respectively, for securing the relay in an outlet box.

As shown in FIGS. 1 and 2, the base and cover are generally rectangular in shape. The base is provided with a cavity opening to the rear and the cover is provided with a cavity opening to the front and the two are provided with planar abutting surfaces at which they are clamped together and held by rivets to provide a compartment therein. For registering the cover against the base so that the rivet holes line up, the cover may be provided with internal ridges 4*a* shown in FIG. 4 snugly fitting within the side walls of the base. Similar ridges 4*b* may be provided on the cover snugly fitting within the upper and lower end walls of the base as shown in FIG. 3. Suitable abutments are molded within the base against which the relay frame is biased or clamped by the cover and a bowed leaf spring 11 between the bottom of the cover cavity and the relay frame.

The front face of the base is provided with two pairs of recesses molded therein for receiving the terminals. For this purpose, there is provided an upper pair of recesses 2*a* and a lower pair of recesses 2*b*. A pair of high voltage terminals 12 are secured in the upper pair of recesses and a pair of low voltage terminals 14 are secured in the lower pair of recesses. Each such terminal is secured by riveting or the like into a hole extending through the front wall of the base as shown in FIG. 4 so that it is accessible to a connection within the housing compartment and is also accessible to an external connection. For these purposes, each such terminal is provided within the compartment with a tab to which a conductor may be soldered or welded. Each such terminal is also provided with a threaded hole therethrough for receiving a screw whereby an external conductor is secured.

The signaling reed relay that is housed within the compartment comprises a reed switch and electromagnetic operating means therefor. As shown in FIGS. 3 and 4, the reed switch comprises a pair of normally open reed contacts 16 hermetically sealed within an elongated glass envelope 18. The terminals at the opposite ends of the glass envelope that are extensions of the reed contacts are connected by a pair of electrical wires 20 to high voltage terminals 12 as shown in FIG. 4.

The term "high voltage terminals" means that the reed switch contacts that are connected thereto are capable of controlling an external circuit powered from a high voltage such as the conventional 110 to 120 volts alternating current house wiring or the like. It can also control low level and dry circuit loads and therefore should not be construed to be limited to high voltage or high power loads.

The electromagnetic operating means for the reed switch comprises an operating coil **22** surrounding the glass envelope of the reed switch. A pair of flanged sleeves **24** of magnetic material extend through holes in opposite legs of a U-shaped magnetic frame **26** or yoke that straddles the coil and then into opposite ends of the coil around the glass envelope of the reed switch. The inner ends of these sleeves are spaced apart to leave an air gap to concentrate the magnetic flux at the gap between the contacting portions of the reed switch.

A safety feature provided in the reed relay is a snap-hinged cover **28** that conceals the high voltage terminals and that can be pivoted out of the way to provide screwdriver access to these terminals. This cover comprises a round connecting rod having integrally molded therewith on opposite ends a pair of laterally extending flaps overlying recesses *2a* in the base. The front face of the base is provided with a half-round recess in which the connecting rod is journaled and held in place by the lower end of the upper bracket **8**. To provide snap-hinged action, the round connecting rod of this cover has integrally molded thereon camming nibs *28a* which work against the small amount of resiliency of the overlying end of bracket **8** to provide snap action opening and closing of the cover. This cover may be detented to come to rest in either of the open positions shown in dotted lines in FIG. 2 to provide access to the screw terminals.

Brackets **8** and **10** are adapted for mounting the signaling reed relay in an ordinary outlet box. For this purpose, each bracket such as **8** is provided with a rivet *8a* by which it is secured to the base. Each such bracket is also provided with two wings *8b* which seat it in one type of outlet box. Cutout *8c* is provided in each bracket to facilitate twisting off the end portion and wings to adapt it for another type of outlet box. A threaded hole *8d* is provided in each bracket for securing the outlet box cover by screws in the normal way. A hole *8e* is provided in each bracket whereby the signaling reed relay is secured by a pair of screws to the outlet box.

The operation and use of the invention will be apparent from the following description. As can be seen, low voltage terminals **14** may be connected through the usual knockout opening in the outlet box to a low voltage D.C. power supply such as 24 volts or the like and to a manual switch. Such manual switch may be arranged to be placed at the bedside of a patient for signaling purposes. When the manual switch is pressed by the patient, coil **22** is energized and closes the reed switch contacts.

Power terminals **12** may be connected through the 110–120 volt hospital power branch lines to a signaling device such as a lamp or buzzer at the nurse's station and/or a lamp above the patient's door so that whenever the patient presses the switch, the nurse is signaled. Both the D.C. and A.C. power supplies may be common to a plurality of signaling systems of the aforementioned type.

As will be apparent, the invention disclosed avoids the necessity of separate control panels and allows mounting of the signaling control relays in conventional outlet boxes within the walls of the hospital or other building.

While the apparatus hereinbefore disclosed is effectively adapted to fulfill the objects stated, it is to be understood that the invention is not intended to be restricted to the particular preferred embodiment of self-enclosed signaling reed relay for mounting in an electrical outlet box disclosed, inasmuch as it is susceptible of various modifications without unduly departing from the scope of the appended claims.

I claim:

1. A self-enclosed signaling relay adapted to be mounted in a conventional electrical outlet box comprising:

an insulating housing having a compartment therein;

a signaling relay comprising a switch and electromagnetic operating means therefor enclosed within said compartment;

a pair of mounting brackets rigidly secured to said housing and extending in opposite directions therefrom and provided with means adapting it for mounting in an outlet box and for securing an outlet box cover thereto;

and terminals connected to said switch and said electromagnetic operating means and mounted on the front of said housing so as to be accessible when the outlet box cover is removed.

2. The invention defined in claim **1**, wherein said switch comprises:

a reed switch having normally open contacts and a glass envelope enclosing the same;

and said normally open contacts being connected to a pair of said terminals on the front of said housing.

3. The invention defined in claim **2**, wherein said housing comprises:

a cover for said pair of terminals;

and means on said housing mounting said cover to be held thereon by one of said brackets for snap-movement away from said pair of terminals to afford access thereto;

said cover normally overlying said pair of terminals for safety and requiring movement away therefrom before access can be had to said pair of terminals since this pair of terminals and the reed switch connected thereto are adapted to control a power circuit.

4. The invention defined in claim **2**, wherein said electromagnetic operating means comprises:

an operating coil surrounding said reed switch and adapted when energized from a low D.C. voltage to close said normally open contacts;

and a magnetic frame including a pair of tubular magnetic members surrounding said glass envelope with a gap therebetween adjacent the contacting portions of said reed switch;

and a magnetic yoke connecting said tubular magnetic members outside said operating coil;

and said operating coil being connected to another pair of said terminals on the front of said housing.

5. A self-enclosed signaling relay adapted to be mounted in a conventional electrical outlet box comprising:

an insulating two-part housing having a compartment therein;

a reed relay including a reed switch and electromagnetic means for operating said reed switch securely held in said compartment when the two parts of the housing are secured to one another;

a pair of low voltage terminals mounted on the front of said housing so as to be accessible when the cover of the outlet box is removed;

means connecting said electromagnetic means to said low voltage terminals;

a pair of high voltage terminals mounted on the front of said housing;

means connecting said reed switch to said high voltage terminals;

a pivoted cover preventing access to said high voltage terminals when the cover of the outlet box is removed and requiring pivoting of said pivoted cover out of the way;

and brackets secured to said housing adapting it for mounting in an electrical outlet box.

6. The invention defined in claim **5**, wherein said housing comprises: a rounded groove in which a portion of said pivoted cover is journaled and held therein by an overlying end portion of one of said brackets.

7. The invention defined in claim **6**, wherein said pivoted cover comprises: camming nibs integrally molded on said journaled portion thereof for cooperation with the small amount of resiliency of said overlying bracket to provide snap-action movement to open and closed positions.

8. The invention defined in claim 5, together with: a spring within one part of the housing resiliently biasing said reed relay toward the other part of the housing to immobilize the same therein.

9. The invention defined in claim 8, wherein said spring comprises: a bowed leaf spring between said reed relay and the compartment wall of the housing.

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