

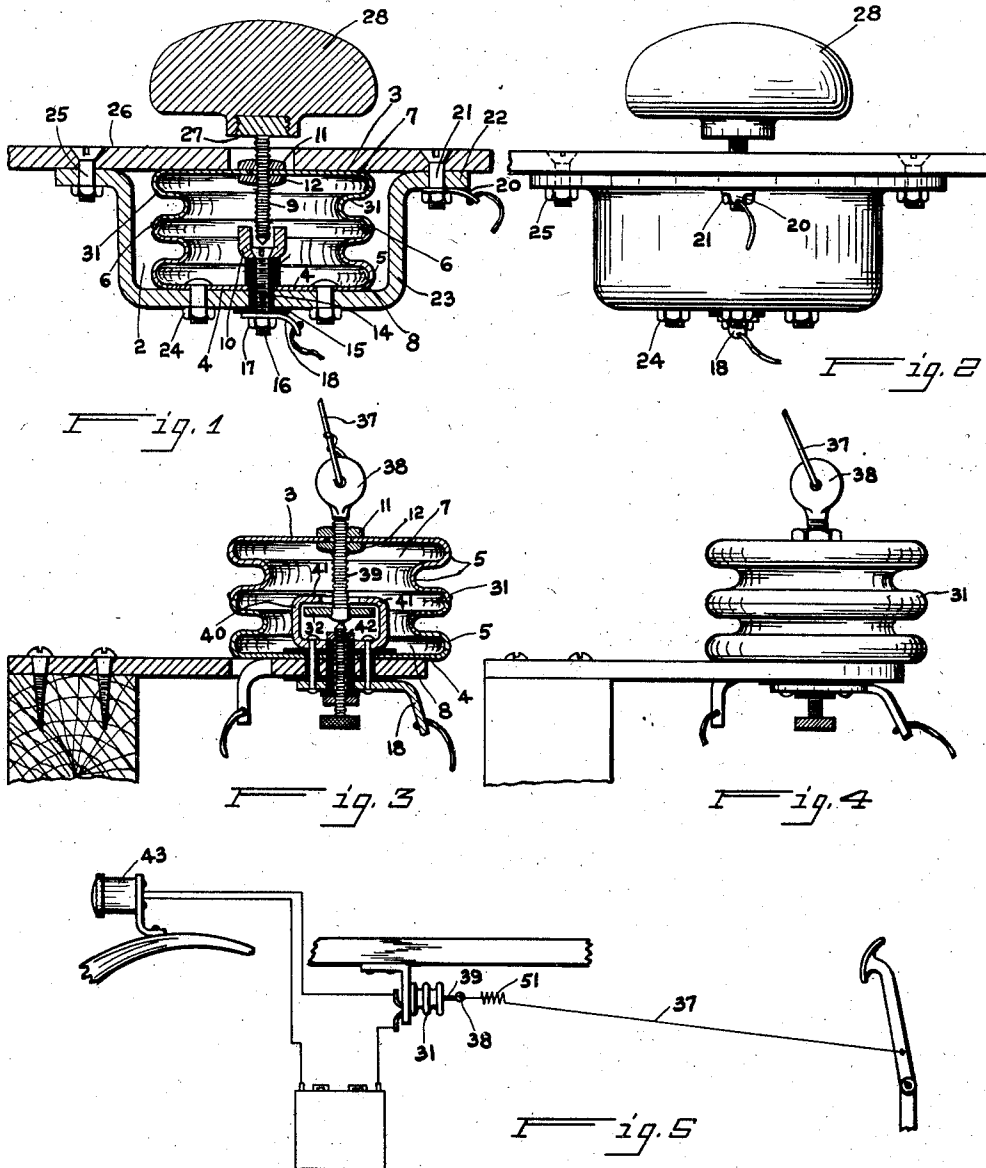
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ELECTRICAL CONTROLLER

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ELECTRICAL CONTROLLER.

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My invention relates to electrical controllers and particularly to that type of controllers which control the operation of electroresponsive devices by the opening or closing of a circuit in which said devices are included.

An object of my invention is to provide an electrical controller of the type mentioned, which is simple of construction and which will be reliable in operation.

Another object of my invention is to provide a certain controller of the above character, which will have its circuit controlling contacts entirely enclosed to prevent dirt, dust and moisture from affecting the electrical conductivity of the contacts.

Another object of my invention is to so enclose the contacts that the device may be used in the vicinity of explosive gases without igniting the same.

Other objects of my invention and the invention itself will become more apparent as the description of certain embodiments thereof, illustrated in the accompanying drawings and which form a part of this specification, progresses.

Referring to the drawings, Fig. 1 shows a side elevation of an embodiment of my invention;

Fig. 2 shows a longitudinal medial section thereof;

Fig. 3 shows a side elevational view of the second embodiment of my invention;

Fig. 4 shows a longitudinal medial section thereof;

Fig. 5 shows an elevational view illustrating an operating linkage for operating a device of the second embodiment of my invention from an automotive controlling pedal.

Referring now to the drawings, and in all of which like parts are designated by like reference characters, at 2 I show a casing herein illustrated as being formed of sheet metal and which I prefer to form of phosphor bronze, brass, steel or like metals, which are suitable for use as springs, the said casing 2 having, in the embodiment illustrated, a pair of circular and substantially flat end walls 3 and 4 and corrugated or folded side walls 5. The corrugated side walls 5 are preferably united integrally, as shown, with the end walls 3 and 4. This casing 2 may be formed in a number of different ways and of one or more primary

sectional parts, but in the embodiment illustrated, I have herein shown the casing as being formed from sheet metal in two pieces. There is a joint at an intermediate point of the side walls, such as illustrated at 6, this joint being preferably made fluid tight, in any manner, by a number of suitable ways, one being, as shown, by soldering together the lapped ends of the two sections, namely, the upper section 7 and the lower section 8. The casing 2 contains in each of its end walls 3 and 4 a central axial perforation, for the purpose of facilitating the mounting of electrical contact elements on the two end walls, one of the said contact elements, which is supported on the upper wall 3, being shown at 9 and the other contact elements which are supported on the lower wall being shown at 10.

Referring particularly to the first embodiment of my invention, although these contact elements may be of varying forms and still operate substantially as set forth for the purposes intended, I preferably form the contact making operations thereof in such a way that the end of the one element protrudes within an end of the other and so that the two elements present, in axial alignment, contact making portions of each element. Therefore, as illustrated, for the first embodiment of my invention, I provide a contact element 9 in the form of a threaded rod or screw, the end of the contact rod 9 projecting within the cup shaped contact element 10. The side portions of the end of the rod 9 are disposed so nearly adjacent the inner surface of the side walls of the contact element 10 that lateral displacement of the end of the rod 9 would cause it to engage with the said surface to make electrical contacting connection therewith. Also, at the same time, the axial alignment of the inside bottom wall of the contact element 10 and the end of the rod 9 permits an electrical contact to be made between these parts of the two elements upon longitudinal displacement of the rod 9 toward such bottom wall. In order to permit the contact rod 9 to be movable laterally and longitudinally so as to effect electrical contacting connection with the bottom and side wall inner surfaces of the contact element 10, I mount the rod 9 centrally of the top wall 3 of the casing 2 by passing the rod 9 through such wall at its central part and then clamping it into

position thereon by the clamping nuts 11 and 12 threaded on to the rod 9 and disposed on either side of the wall. At the same time, the clamping nuts close the opening through the end wall 3 which receives, in the first place, the rod 9.

In analogous fashion, I mount the cup shaped contact element 10 on the end wall 4 of the casing, but in the latter case I preferably, as illustrated, insulate the cup shaped element 10 from the metallic casing end wall 4 by means of insulating bushing 13, having a reduced end 14 and insulating washer 15. I carry the contact element 10 on the end wall 4 of the casing by means of a clamping screw 16 and a clamping nut 17, the head of the screw holding the element 10 in place on top of the bushing 13. The shank of the screw electrically connects the element 10 with an electrical terminal 18 on the outside of the casing and clamped between the nut 17 and the insulating washer 15. The other electrical terminal for the switching controller may be made as shown at 20, wherein the terminal 20 is clamped between the head of a screw 21 and a flange 22 by a casing support 23, said casing support having an intermediate portion to which the end wall 4 of the casing is secured by means of rivets 24. The casing support 23 is secured by means of the screws 21 and 25 to a plate 26 comprising a part of whatever support the controller is to be mounted on. The contact screw 9 is provided with a head 27, which is faced with an insulating button 28.

To operate the device of my invention, it is only necessary to depress the button 28, the pressure causing the end wall 3 to be flexed and also the side walls 31 to be collapsed. The yielding of the end walls and the side walls permits the end of the contact rod element 9 to engage with the inner surface of the cup-shaped element 10 and make electrical connection between the contact elements. If the downward pressure exerted on the button 8 is not directly axial of the rod 9, but is applied at an angle to axial alignment therewith, the flexibility of the end wall 3 will permit it to be distorted and bent, so that contact will be had between a side portion of the end of the line contact element 9 and an inner side wall of the contact element 10, the end of the contact rod in such case being laterally deflected against such inner side walls.

It is apparent from what has been above stated that the contacts 9 and 10 are protected from the outside air carrying moisture and dust, as well as from explosive or inflammable gases or water or other fluids in which the casing may be immersed.

After the contacts are made and the pressure upon the button 28 is relieved, the contacts will be broken, due to the inherent re-

siliency of the material comprising the casing end walls and side walls, causing these walls to regain their normal unstressed form and the end walls carrying the contacts to open circuit position, as illustrated.

Referring now to that embodiment of my invention illustrated in Figs. 3 to 5, inclusive, the operation of the same generally is closely like that of the first embodiment, except that in the second embodiment I show a contact set comprising a disk 32 carried on the end of a rod 39, the rod 39 being secured by clamping nuts 11 and 12 to an end wall 3 of the casing.

In place of the cup shaped element 10, I provide a cup shaped element 40 having inward flanges 41 at its upper portion, as shown. Also, in place of the push button 28, I terminate the rod 39 in a ring 38 to which a wire or cord 37 may be secured. In this embodiment, the contacts are closed by a pull on the wire 37 communicated to the rod 39 and pulling the contact disk 32 into contacting engagement with the flanged portion 41 of the element 40. Also, if the pull on the wire or cord 37 is at an angle to a direction axial of the rod 39, the periphery of the disk 32 may be brought to engagement with the inner side walls of the element 40. As in the first embodiment, the inherent resiliency of the end wall 3 and the side walls 31, or either of them, or both, causes the contacts to be restored to normal position as in the embodiment illustrated.

In Figs. 3 to 5, inclusive, I also show a third contact element 42 comprising a screw passing centrally through the wall 4 of the casing and insulated therefrom normally making contact with the central part of the end of the contact rod 39, which carries the disk 32. This contact is broken whenever the rod 39 is moved in such a direction as to close the contacts 32-41. I comprehend in my invention either "making" or "breaking" contacts, or both, in either of the embodiments of my invention. The illustrations of both kinds in the drawings are for the purpose of disclosing one way of accomplishing such "making" or "breaking" functions. Other equivalent arrangements are known and comprehended in my invention.

Fig. 5 shows how the device of the second embodiment may be mounted on an automotive vehicle and motion communicated by means of the wire 37 from a brake pedal of an automobile or other automotive vehicle. The circuit arrangement shown is for displaying a so-called stop light 43 whenever the brake pedal is actuated to brake the vehicle. This is only a single use to which devices comprehended in my invention may be put, and is shown principally to illustrate a method of causing a pull to be exerted on a wire 37 to operate

the contact set of the device to accomplish a useful function. A yieldable spring 51 is shown in the wire connection.

Having thus described my invention in two embodiments, I am aware that numerous and extensive departures may be made in the embodiments herein illustrated and described, but without departing from the spirit of my invention.

I claim:—

1. In an electric switch the combination with a substantially closed casing having longitudinally collapsible side walls and oppositely disposed end walls, of an electrical circuit switch contact carried by each of the end walls, and operating means for the switch secured to one of the end walls and adapted when actuated by force applied parallel to the axis of the side walls or obliquely thereto to effect such distortion of the side walls as will actuate the set of contacts, said actuating means adapted for connection to an actuating cable or the like, said contacts being so disposed and connected to the said end walls that contact will be had between them only upon exercise of a predetermined pulling pressure on the cable.

2. In an electric switch the combination with a substantially closed casing having longitudinally collapsible side walls and oppositely disposed end walls, of an electrical circuit switch contact carried by each of the end walls, and operating means for the switch secured to one of the end

walls and adapted when actuated by force applied parallel to the axis of the side walls or obliquely thereto to effect such distortion of the side walls as will actuate the set of contacts, said actuating means adapted for connection to an actuating cable or the like through which actuating pressure may be applied in a direction oblique to the axis of the container walls to close the said contacts, and a second set of contacts adapted to be opened thereby prior to closure of the first set of contacts.

3. In an electric switch, a hermetically sealed cell, a pair of normally separated contacts disposed within the cell, said cell having corrugated inherently resilient extensible metallic side walls, and end walls forming a closure for the ends of the side walls, said contacts supported within the casing, a base for one of the end walls, adapted to be secured to a support, to support the cell thereon, and switch actuating means movable responsive to a pulling effort exerted on the other end wall for actuating said contacts to effect engagement therebetween, said side walls, by their inherent resiliency, retracting after such pull to recover their nonextended form to reopen the contacts, and circuit conducting means accessible exteriorally of the casing for including said contacts in an electrical circuit controllable thereby.

In testimony whereof I hereunto affix my signature this 3rd day of February, 1925.

WILLIAM B. CHURCHER.