Dec. 20, 1932. D. COYNE 1,891,752

ELECTRICAL CIRCUIT CONTROLLER

Filed June 24, 1932

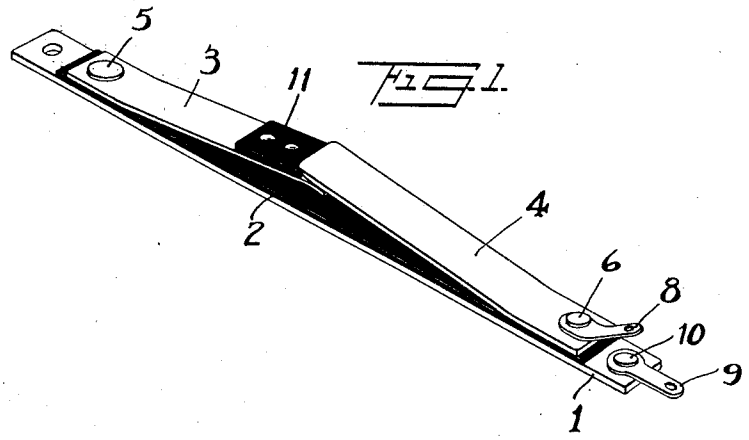


FIG. 1.

FIG. 2.

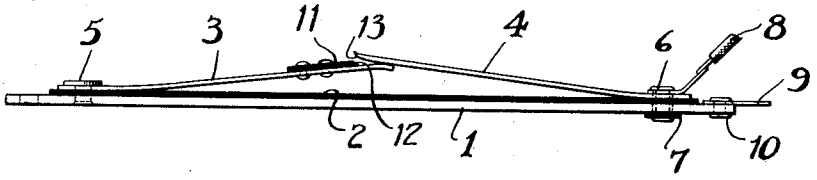


FIG. 3.

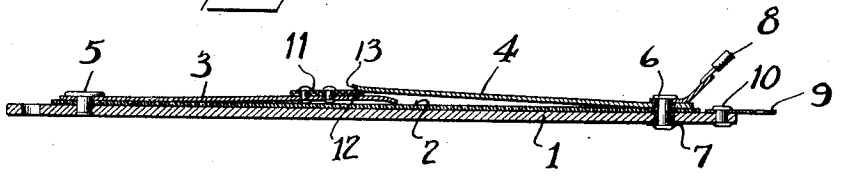
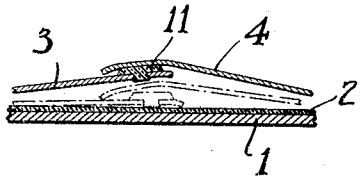


FIG. 4.



INVENTOR

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UNITED STATES PATENT OFFICE

DAVID COYNE, OF NEW YORK, N. Y.

ELECTRIC CIRCUIT CONTROLLER

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This invention relates generally to apparatus for opening or closing electrical circuits, and particularly to devices of that class which can be concealed in a flexible container, or under a flexible mat, and still be operable by pressure applied to the exterior of such container, or mat. One important field of use for such device is that of burglar alarm systems, in which the circuit breaker or closer must be concealed in a location where the intruder may unknowingly step on it and so set off the alarm, or in which it is desired that the user may send out an alarm by accidental pressure applied to a surface behind which the circuit breaker is concealed.

To this end the present invention comprises a circuit breaker composed of two yielding members serving as the terminals of any desired electrical circuit which may be broken or closed at the point of contact between them when they are simultaneously pressed in the same direction by a force applied to them at their point of contact one with another, and the best form of apparatus at present known to me embodying this particular form of invention is illustrated in the accompanying sheet of drawings in which

Fig. 1 is a perspective view of a circuit breaker with the parts in normal position closing the circuit.

Fig. 2 is a side elevation of the same.

Fig. 3 is a longitudinal vertical section taken on line 3—3 of Fig. 1 showing the parts in the position assumed when the circuit is broken, and

Fig. 4 is a detail illustrating a modification serving as a circuit closer.

Throughout the drawing like reference characters indicate like parts.

In the particular embodiment of the invention here shown, 1 is a metal base strip on one surface of which is superposed a strip of insulating material 2. Two leaf springs 3 and 4 with their adjacent ends in contact have their other ends fastened to the base strip 1, with the insulating strip 2 interposed between them and said base strip. As shown, the leaf spring 3 is so fastened by the rivet 5 which affords electrical connection from said spring 3 to the underlying metallic base strip 1, while the other leaf spring 4 is similarly fastened to the base strip by the rivet 6, but said rivet 6, while in contact with the spring 4, is insulated from the strip 1 by means of the insulating sleeve or thimble 7. The terminal 8 of one wire of an electrical circuit is shown clamped against spring 4 by rivet 6, and 9 represents a terminal of the other end of said exterior circuit which is clamped against the base strip 1 by the rivet 10.

With the parts in the position shown in Figs. 1 and 2, the circuit is obviously complete, the free end of the leaf spring 4 overlapping and resting on the free end of the leaf spring 3.

A thin block of insulating material 11 is fastened to the outer surface of the leaf spring 3 near the free end thereof in such position that when both springs are simultaneously flexed toward the base strip 1, the free end of the spring 4 will ride up on the insulating block 11 and thereby be separated from the exposed free end of the spring strip 3. As the depressed free end of the spring strip 3 is prevented by the insulating strip 2 from coming in contact with the base strip 1, the circuit connection between terminals 8 and 9 is obviously broken, and if a closed circuit alarm apparatus (not shown) is included in said circuit it will be set into action as soon as the parts approach near enough to the position shown in Fig. 3 to separate the free ends of the two springs 3 and 4.

Preferably the insulating block 11 has an inclined edge surface 12 adapted to cooperate with the oppositely inclined under surface 13 of the end of the spring strip 4.

When pressure is removed from the spring strips 3 and 4 they spring back into the normal position shown in Figs. 1 and 2 restoring the contact between the ends of the spring strips 3 and 4 and closing the circuit through the circuit breaker.

Among the advantages of the invention may be mentioned its positive circuit breaking action, and its compact form which permits it to be placed in a recess within, or in the under face of, a floor mat of rubber or other flexible material so that it may be

concealed from sight but easily operated to break the circuit as soon as any pressure is applied to the exterior of the mat sufficient to flex the springs 3 and 4 approximately into the position shown in Fig. 3.

Various changes could be made in the details of construction shown without departing from the principle of the invention so long as two yieldingly supported members are employed, serving as terminals of the circuit which is normally closed while they are in contact, but which is broken at that point of contact as soon as the members are simultaneously moved toward their base of support.

By extending the overlapping spring 4 beyond the insulating block 11 and giving its extremity a downward bend almost sufficient to bring it in contact with the spring 3 when the parts are in normal position, the apparatus could be made to work as a circuit closer. By moving the insulating block 11 to the right (looking at Fig. 2) so that it would normally separate the springs 3 and 4, and then bending the free end of the spring 4 downward so that it would rest upon the spring 3 when the parts were depressed, but would be moved out of such contest when the parts were in normal position, the apparatus could be made to serve as a circuit closer instead of a circuit breaker as illustrated in Fig. 4.

Having described my invention, I claim:

1. An electrical circuit breaker adapted to be operated by external pressure applied directly to its circuit breaking elements, which circuit breaker comprises, in combination, two yieldingly supported conducting members having free ends normally resting one upon the other, but otherwise electrically insulated one from the other, means for connecting a circuit terminal to each such member, and electrically insulating means adapted on the joint movement of said members toward their yielding supports to be thereby inserted between said overlapping ends and so separate the same sufficiently to open the circuit.

2. An electrical circuit breaker adapted to be operated by externally applied pressure comprising, in combination, two yielding members having their adjacent ends normally resting one upon another, a supporting base to which said members are attached at points remote from their said ends which are in contact, means insulating the support portions of said members one from the other and means adapted to break the normal contact between said members when their ends in contact are jointly deflected toward said supporting base.

3. A combination such as defined in claim 2 in which said yielding members are leaf springs, with the free end of one overlapping the free end of the other, and in which said contact breaking means comprises a body of insulating material mounted on the outer surface of said second spring and adapted to slide under the free end of the other spring when both are deflected toward the base on which they are mounted.

4. An electrical circuit breaker comprising in combination, a base strip of conducting material, a strip of insulating material placed along one surface of the first mentioned strip, two leaf springs each having a portion fastened to that face of said base strip to which said insulating strip has been applied, and their free ends normally spaced away from said strips and one over-lapping the other, means electrically insulating the fastened end of one spring from said conducting strip, and means electrically connecting the fastened end of the other spring to said strip, and a thin block of insulating material mounted on the outer surface of the underlapping spring adjacent the projecting overlapping end of the other spring; whereby on the simultaneous deflection of said springs toward said base, said block of insulating material will slide under the overlapping end of the other spring and separate it from the spring by which said block is carried, thereby breaking the circuit from the said insulated spring to said base strip.

5. An electrical circuit controller adapted to be operated by external pressure applied directly to its circuit controlling elements, which circuit controller comprises, in combination, two yieldingly supported conducting members having free ends normally overlapping one another, but elsewhere permanently insulated one from the other, means for connecting a circuit terminal to each such member, and electrically insulating means adapted on the joint movement of said members toward their yielding supports to change the contact relation of said overlapping ends and so close or open the circuit.

6. An electrical circuit controller adapted to be operated by externally applied pressure comprising, in combination, two yieldingly supported members having their adjacent ends overlapping, a supporting base to which said members are attached at points remote from their said overlapping ends, means insulating the support portions of said members one from the other, and a body of insulating material located between said members and adapted to hold the same out of contact one with another when they are in normal position, but to permit contact between the same when their overlapping ends are jointly deflected toward said supporting base.

Signed at New York city, in the county of New York and State of New York, this 23rd day of June, A. D. 1932.

DAVID COYNE.