

UNITED STATES PATENT OFFICE

DAVID COYNE, OF NEW YORK, N. Y.

ELECTRIC CIRCUIT BREAKER AND BURGLAR ALARM

Application filed April 2, 1932. Serial No. 602,681.

This invention relates generally to concealed circuit breakers for electrical circuits, but more specifically is designed to produce a circuit breaker of a type especially adapted for use on fire escapes and other places where the apparatus is exposed to the action of the weather. In substance the novel structure disclosed consists of a waterproof mat of elastic material having one or more cavities therein, and a plurality of electrical contacts so arranged in each cavity that when the mat is in normal shape the circuit will be closed, but when pressure is applied to the exterior of the mat at one or more points such cavity will be partly or wholly collapsed and at least some of the contacts therein contained so separated by the consequent deformation of the mat as to open the circuit and sound a remotely placed, electrically operated alarm of the type set off by the opening of its circuit. Such a concealed circuit breaker can also be placed at any desired point in the building interior or in an elevator or in a motor car, where it would blend with the surrounding furnishings or decorations so as to be entirely unobtrusive, but still be capable of convenient operation by the foot, knee, elbow or other portion of the body of a person who is being held up by a bandit or, for other reasons, desires to send out an alarm without attracting the attention of persons present. The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying sheet of drawings in which

Fig. 1 is a vertical longitudinal section on line 1—1 of Fig. 2.

Fig. 2 is a horizontal view from below taken on line 2—2 of Fig. 1, the bottom sealing sheet of the mat having been removed and all the electrical circuit connections being also shown in diagram.

Fig. 3 is a detail vertical section similar to Fig. 1 on a larger scale showing a deformed portion of the mat.

Fig. 4 is a perspective diagram showing an embodiment of the invention including a fire escape, and

Fig. 5 is a detail section showing a modification.

Referring to the drawing, 1 indicates the mat, generally, in one face of which are formed a series of recesses 2, 2. In the walls of each such recess in the embodiment of the invention shown in Figs. 1, 2 and 3 are partially embedded a series of electrical contact members (preferably metal) in such manner that their projecting portions will normally be in contact so as to create a closed circuit through the series, but so set in the mat that when the adjacent portion of the latter is deformed in such manner as to collapse the recess sufficiently, two or more of said contact elements will become separated and break the circuit at that point. As there shown, these contact members consist of rivet-like structures, the shanks 3, 3, of which are embedded in the upper portion 11 of the mat 1 in positions substantially radial to the curve of the surface of the wall recess 2, and near enough together so that their heads 4, 4, will then be in contact. One outer element of each group is connected to one terminal of an electrical circuit 5, while the other outer element is connected to the other terminal of such circuit which includes any efficient form of electrically operated alarm apparatus 6, adapted to go into action whenever circuit 5 is open. 7 indicates a battery or other source of current also included in circuit 5.

If the mat section 11 is made of rubber composition the foregoing described elements will be sufficient to form a simple, operative embodiment of my invention, but preferably the elastic resistance of the walls of the recesses 2, 2, to deformation is reenforced by the use of a wave-like spring strip 8, of steel or similar elastic material, the crests of the waves of which are located in the deepest portions of the recesses 2, 2. When such spring strips are used the preferred arrangement of the contact elements is to locate them in openings 9, 9, cut in the strips 8, 8, and to cause a portion of the body of the mat section 11 to protrude through each of these openings or slots 9, 9, thereby forming mat projections 10, 10, interlocking therewith, and to set the contact elements in this portion of the mat, all as shown in the drawing. This ensures the insulation of the contact elements from the spring strips in a very simple and effective

and economical manner if the mat is made of rubber or other insulating material, although a more efficient body of electrically insulating material, could be used for the purpose at these points, if found desirable. Also, for purposes of concealment and protection of the contact elements, I prefer to fasten a sealing sheet 12 to that face of the mat section 11 in which the recesses are formed, and if the mat is made of a rubber composition this sealing sheet may readily be vulcanized to it so as to form a water-tight and air-tight protection for the contact elements.

In practice the recesses and the contained groups of contact elements in this form of the invention would usually be arranged in a series of parallel lines, as indicated in Fig. 2, and by staggering the groups in alternate rows with those in the other rows a very even distribution of contact groups throughout the mat is secured as there shown. All of these groups would be connected in series with the alarm 6 and the source of current 7, so that the moment pressure is applied to the mat above any of these recesses, and the deformation of the upper mat wall and of the recess beneath, indicated in Fig. 3, is produced, such deformation will separate the heads 4, 4, of the contact element one from another (or at least separate one pair) and thereby open the circuit and give the alarm.

In the modification shown in Fig. 5 another form of circuit breaker is illustrated in which the recesses in the upper mat section 11 are located in longitudinally arranged pairs, one of each of which, as shown at 22, may be larger than the other member 23 of the pair. In this arrangement the spring metal strip may have its undulations similarly proportioned and also form one terminal of the circuit breaker, the other terminal having the form of a stationary contact member 19 placed in recess 23. The wave-like spring strip has pairs of similarly unequal undulations 28 and 18, the contact 19 being located below and normally touching the under side of the crest of the smaller strip undulation 18. The lower strip 14 is made of some rigid insulating material, such as bakelite or vulcanite and the spring strip is rigidly fastened to it by rivets 15, 15, at the ends of each pair of undulations, but the spring strip is only loosely held to 14 at each point between a larger and smaller undulation by a sliding connection such as would be afforded by pin 20 passing through a slot 21. Preferably the crest and one side portion of each larger undulation is reenforced, as by a spring section 17 welded thereto, or by otherwise making this portion thicker than the rest. Also preferably, a space 24 is left in recess 25 in mat section 11 above the smaller undulation 18, so that the undulation 18 may freely bulge upward.

In operation pressure on the upper surface

of the mat over recess 22 will straighten out more or less the longer undulation 28 of the spring strip and shove its left hand support point to the left, which action is made possible by the pin and slot connection 21, 21. This will cause the smaller undulation portion 18 of the spring strip to lengthen and bulge upward, thus breaking the circuit by separating it from contact 19. The reinforcement 17 prevents the right hand portion of undulation 28 from buckling under any such pressure, instead of swinging downward, without other deformation than a possible slight flattening action, and so bodily shifting the left hand portion of strip forming that undulation to the left, as desired and above described.

In use such a mat could be placed on one or more of the fire escape platforms 13 of a building, as shown in Fig. 4, with the alarm mechanism 6, 6, inside the building, or in a police station house, or watchmen's office, with the result that when a "second story man" tries to sneak up the fire escape to find a window which can be forced, he would almost inevitably step on one of the mats and sound the alarm. In the same way, one or more small mats could be set in the interior facing of a motor car body at points where they could be reached by the knee or elbow of an occupant who was under surveillance by a gunman, and the same thing could be done in hotel elevators so that the operator could unobtrusively lean against the mat when he desired to send in an alarm without taking his hands down from over his head. Similarly one or more such mats could be concealed under a desk in an office, to serve as an alarm or as call apparatus for operation whenever the desk user wishes to have his mail brought in as a hint to a lingering caller whom he desires to get rid of without appearing to be rude.

Other constructions of mat and other arrangements of separable contact members could be employed without departing from the underlying principle of the invention, as hereinbefore described and explained, so long as the same functions were retained wholly or substantially to produce substantially the same results.

Having described my invention, I claim:

1. As a new article of manufacture an electrical circuit breaker composed of a mat of flexible material having a cavity in its interior with a pair of electrical contacts located in said cavity in such relation that while normally closed one on the other they may be separated, and contact opened, by movement of one wall of such cavity tending to collapse it.

2. An article such as defined in claim 1 in which a plurality of cavities are provided arranged in pairs and in which the contact elements comprise a pair one of which is fixed

said strip is reenforced to prevent local buckling action when it is pressed downward for the purpose set forth.

Signed at New York city, in the county of New York and State of New York this 25th day of March, A. D. 1932.

DAVID COYNE.

- in the bottom of one cavity of each such pair while the other is in the form of a wave-like spring strip substantially conforming in outline to the upper walls of the cavities and fixed at the outer ends of the pair of cavities, but having a sliding bearing at the juncture thereof, whereby a depression of that undulation of said spring located in the cavity not provided with a fixed contact produces a separation of it from the fixed contact member located in the other cavity. 75
3. An article such as defined in claim 1 in which a plurality of cavities are provided arranged in pairs and in which the contact elements comprise a pair one of which is fixed in the bottom of one cavity of each such pair while the other is in the form of a wave-like spring strip substantially conforming in outline to the upper walls of the cavities and fixed at the outer ends of the pair of cavities, but having a sliding bearing at the juncture thereof, the cavity containing said fixed contact member being of lesser dimensions than the other, whereby a depression of that undulation of said spring located in the cavity not provided with a fixed contact produces a separation of it from the fixed contact member located in the other cavity. 80
4. An article such as defined in claim 1 in which a plurality of cavities are provided arranged in pairs and in which the contact elements comprise a pair one of which is fixed in the bottom of one cavity of each such pair while the other is in the form of a wave-like spring strip substantially conforming in outline to the upper walls of the cavities and fixed at the outer ends of the pairs of cavities, but having a sliding bearing at the juncture thereof, the cavity containing said fixed contact member being of lesser dimensions than the other, but having a free space above the spring undulation located therein to permit a free, upward, bulging movement thereof, whereby a depression of that undulation of said spring located in the cavity not provided with a fixed contact produces a separation of it from the fixed contact member located in the other cavity. 85
5. In an electrical circuit breaker, a rigid base of insulating material from which a fixed contact member projects upwardly and serves as one circuit terminal, combined with a wave-like spring strip serving as the other circuit terminal and being fastened to said base at the outer extremities of each pair of undulations, while having a sliding bearing on said base at the junctures of each such pair of undulations, the under surface of one strip undulation normally resting on said fixed contact; whereby when the other undulation of said spring strip is depressed, the first mentioned one will bulge upward and separate it from said fixed contact member. 90
6. A combination such as defined in claim 5 in which said second undulation portion of said strip is reenforced to prevent local buckling action when it is pressed downward for the purpose set forth. 95
- Signed at New York city, in the county of New York and State of New York this 25th day of March, A. D. 1932. 100
- DAVID COYNE. 105
- 75 110
- 80 115
- 85 120
- 90 125
- 95 130