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CIRCUIT BREAKING DEVICE FOR ELECTRICAL
BURGLAR ALARM SYSTEMS AND THE LIKE
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FIG. 2

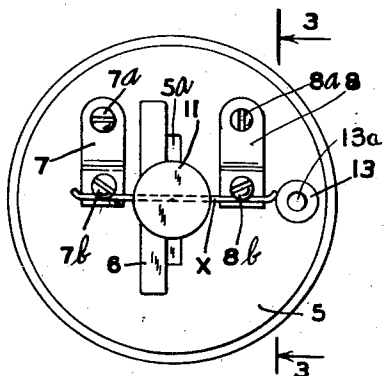


FIG. 1

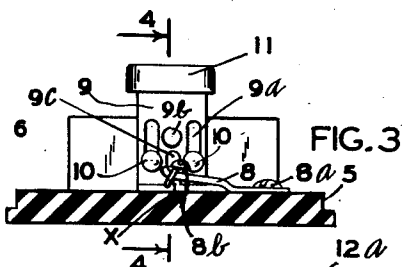
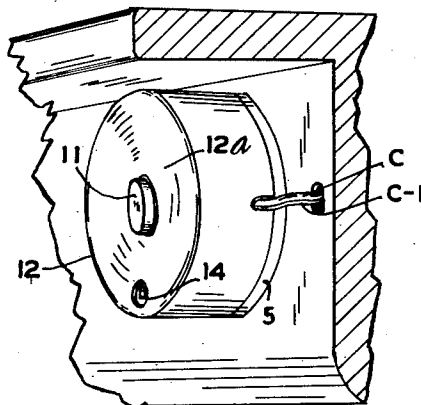


FIG. 4

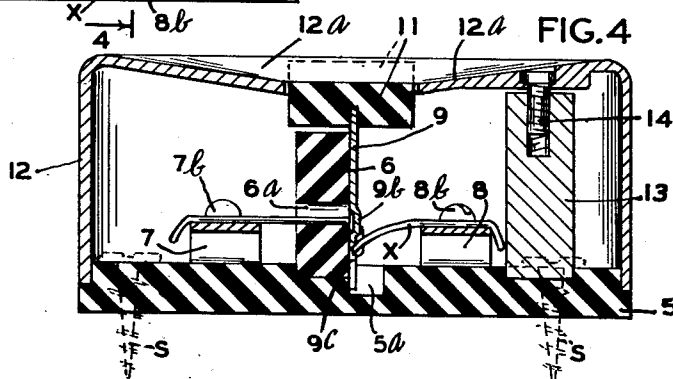
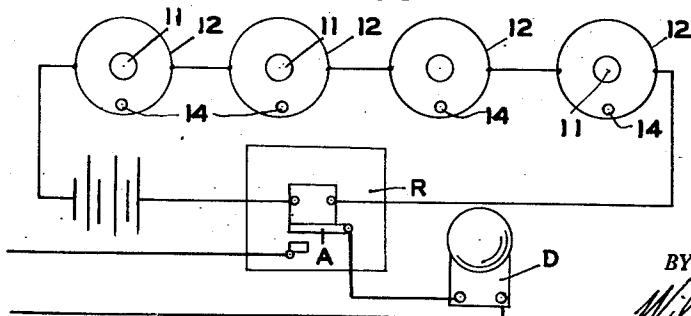


FIG. 5



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CIRCUIT BREAKING DEVICE FOR ELECTRICAL BURGLAR ALARM SYSTEMS AND THE LIKE

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7 Claims. (Cl. 200—61.08)

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This invention relates to electrical burglar alarm systems for protecting banks, stores and the like and relates particularly to an instantaneous, circuit-breaking device, a number of which may be used at the requisite locations to break at any one of said points, the normally closed holding or relay circuit which causes release and closing of the main alarm circuit at a remote point.

In most commercial burglar alarms now extensively used, the local telephone company supplies conductors and a "holding" circuit from the bank or store to the police department, utilizing low voltage in this relay or holding circuit. At the police department, usually mounted on suitable boards, are the alarm or signal devices for various banks and stores. The relay device in the holding circuit is usually also at the police department. The bank or store is equipped at strategic points such as the tellers' windows, vaults, etc., with a number of switches connected in series with the holding circuit and any one of which may open that circuit to cause the alarm to be given. Several different types of switches have been used of tumbler, jack and other principles, but to my knowledge, none of them have been satisfactory for accomplishing the combinative purposes in such burglar systems. The switches heretofore used either return or may be returned to the normal position for circuit closing and when operated, they do not in any way indicate that fact when inspection is made after an alarm is given. As a result, false alarms must be carefully checked by a skilled electrician and very material expense in the average bank is encountered, requiring inspection of each and every switch. The results of such checking are unsatisfactory because in many cases, an inadvertent clerk, who accidentally or otherwise gives a false alarm, usually resets the switch to avoid blame.

It is an object of my invention to provide a simple but positive circuit-breaking device for holding the circuit of an electrical burglar alarm system or the like, which when operated will physically cut or sever a small, relatively soft, replaceable, conductive element, thereby opening the circuit and positively indicating the location where the circuit was opened.

A further object is the provision of a simplified, comparatively inexpensive circuit breaker of the shear action type described, employing a movable element such as a button, which necessarily must stay in a depressed indicating position until the device is reset by removal of a small casing, retraction of the shearing element and replacement of the severed conductive element.

A still further object is the provision of a shearing, circuit-breaking device which may em-

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ploy a conductive, metallic blade for shearing a small fragment of soft wire, but nevertheless, makes provision for elimination of all chance of short circuits upon completion of the shearing operation.

These and other objects and advantages of my invention will be more apparent from the following description made in connection with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a perspective view of an embodiment of my circuit-breaking device employed in an electrical holding circuit for a bank and secured to a horizontal ledge in back of a teller's window;

Fig. 2 is a top plan view of the device with the casing or cover removed;

Fig. 3 is a cross section taken on the line 3—3 of Fig. 2;

Fig. 4 is a cross section taken along the line 4—4 of Fig. 3 with the depressed position of the shear blade shown in full lines and the normal position shown in dotted lines; and

Fig. 5 is an electrical diagram illustrating in general the electrical circuits of a burglar alarm system wherein my circuit-breakers are employed.

In the form of my invention illustrated, the various parts of the circuit-breaker are mounted upon a dielectric disc base 5 which may have two apertures formed diametrically therein for accommodating attachment elements such as the screws S. Rigidly secured to the base 5 is an upstanding dielectric block 6 which may traverse a substantial portion of the base and which as shown, is provided a short distance from its bottom with a transverse opening 6a to accommodate a short, shearable conductive element X which may be constructed of a soft metal wire such as lead, aluminum or the like. The shearable or severable element X may be readily installed across the inner ends of two electrical terminals 7 and 8. Each of these terminals as shown, is in the form of a strap having an attachment flange secured to the dielectric base 5 by binding screws 7a and 8a respectively, which also serve as binding posts for conductors C and C-1 of the series holding circuit. The inner and upwardly offset ends of the terminals 7 and 8 are turned at their extremities to form seats of proper dimensions to nicely hold the end portions of the shearable element X, and in this connection, binding screws 7b and 8b respectively are employed having threaded connection with the ends of straps 7 and 8. The edges of these screws bind against the end portions of element X clamping the same tightly against the said seats.

Slidably and frictionably mounted upon the

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upstanding block 6 is a shear blade 9 constructed of steel or other suitable cutting material and having as shown, a pair of longitudinal slots 9a which accommodate the shanks of headed pins 10, said pins being fixed perpendicularly to block 6 and retaining the blade 9 in frictional relation to the block. The outer end of the blade 9 has rigidly attached thereto a disc button or knob 11 which is disposed as shown, concentrically of the dielectric base of the device.

The element X is of sufficient length to more than span the two spaced terminal post straps 7 and 8 and in use, is threaded through the aperture 6a of the dielectric block and at this time of course, the blade 9 is disposed in raised position, as shown in Fig. 3 and as shown in dotted lines in Fig. 4.

A casing 12 having an important functional relation in connection with the apparatus mounted therein is provided for my structure. The casing 12 as shown, is of generally cylindrical shape and of an internal diameter to nicely fit an annular shoulder formed in the upper portion of the peripheral edge of base 5. The casing is centrally and circularly apertured to accommodate the disc button 11 with fair clearance. The upper end 12a of casing 12 is concave, as shown, being of frusto conical shape. The length of the shear blade 9, the thickness of button 11 and working stroke of the shear blade is such related to the height of the casing and the frusto conical top 12a, to cause the disc button 11 after depression and operation of the shear blade to be approximately flush or very slightly below the edge defining the central opening in the top of the casing. Then, the blade and the device may not be reset until the casing 12 is removed from base 5. Suitable means are provided for securing the casing 12 to the base such as a post 13 fixed normally to base 5 and having a threaded socket 13a in the outer end thereof adapted to receive a screw 14 which extends through the top 12a of the casing and has its head detachably clamped thereagainst. The screw is preferably provided with a head having a peculiar shaped socket for engagement by a special wrench or key tool to release the same.

Shear blade 9 is provided as shown, approximately on its longitudinal center line and near the medial portion thereof with a depressed concave, convex portion 9b of substantially greater diameter than the diameter or cross sectional shape of the severable wire or other conductive element X. When the blade is depressed after the shear is made, the severed end of element X within the transverse passage 6a of the block is opposed to and will always be spaced from the said concave portion 9b of the blade.

In the form shown, shearing is effected by means of a sharpened slot portion 9c extending from the bottom of the blade upwardly to an adequate height. The edge at the upper end of this slot is sharpened for cutting and the slot straddles the severable element X. As shown, a straight recess or gutter 5a is provided in the base 5 to accommodate the lower end of shearing blade 9 in its down stroke.

In Fig. 5 I have illustrated simple typical circuits for operating an electrical burglar alarm wherein my circuit breakers are connected in series with the low voltage holding or relay circuit. The low voltage circuit normally energizes the coil of the relay R which normally retains the armature thereof in the upward position shown in Fig. 5. The armature A of the relay acts as a

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movable contact in the signal circuit which includes the electrically operated alarm device D and when said holding circuit is broken by cutting of a wire or conductor or by operation of any one of the several circuit breaking devices, the armature A closes the main circuit through the signalling device and an alarm is given. Thus, it will be seen that connected in series, the operation of any one of my devices utilized in the different points of a bank or a store will positively shear its related, replaceable, conductive element X, causing depression of the shear blade to a point where the disc button 11 may not be re-engaged or retracted to normal position until after the casing 12 is removed. In resetting the low voltage holding circuit after an alarm has been given, an inspector at the bank or other location may readily observe the several circuit breaking devices and will readily locate the particular device which was operated to give the alarm because of the depressed position of the disc button 11 within the top of casing 12. The casing 12 of the appropriate device may then be readily removed by releasing the attachment means such as the special screw 14; whereafter the sheared conductive element X may be quickly removed and a new element substituted and clamped beneath the heads of the screws 7b and 8b.

In the event of a false alarm purposely or inadvertently given, it is not possible to reset my device without detection of the particular location and device utilized, since the depressed position of the shear blade may be quickly observed by relation of its knob or button 11 to the related casing 12 and since further actual physical shearing of the soft conductive fragment X may be observed when the respective casing is removed from its base.

A special employee of a bank or store entrusted with the supply of replaceable elements X may thus readily determine the location from which an alarm was given and may readily reset the device and reestablish the holding circuit for the relay located at the Police Department or central station. A very material economy is thus effected by the use of my devices in burglar alarm circuits and the like, as well as the provision of a positive circuit breaker which when once operated may not be reset to reestablish the holding circuit until a special element is replaced.

My improved construction provides another very important advantage over switches and circuit breakers heretofore used in burglar alarm systems and the like. In existing systems, the contact points and other elements of the switch or circuit breaker corrode, whereby vibration from various sources will cause the normally closed circuit to be momentarily open, giving the alarm. With my structure, this is impossible since, until it is desired to operate a circuit breaker, the holding circuit is completed through integrated replaceable elements X.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. A circuit breaker for normally closed electrical circuits comprising a mounting having a mechanism for replaceably retaining a small piece of severable conductive material interposed in a circuit with at least a portion of said piece exposed, a dielectric shear-supporting element affixed to said mounting and projecting there-

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from, a shearing element slidably mounted on said dielectric supporting element and having a manipulating means at the outer end thereof responsive to light forces such as normal digital pressure, said shearing element being disposed in a relation transverse to said conductive piece whereby said piece may be instantly cut to open said circuit when said shearing element is depressed, said dielectric supporting element having a surface cooperating with said shear element to facilitate severing of said piece of severable conductive material.

2. A circuit breaker for burglar alarm circuits and the like comprising a mounting having a mechanism for replaceably retaining a small piece of easily severable conductive material interposed in a circuit, a shearing element having a sharp edge shiftably mounted on said mounting in a relation transversely of said conductor piece, a second sharp edge adjacent the conductive piece and disposed oppositely with respect to the first mentioned sharp edge, means connected with said shearing element responsive to light forces such as normal digital pressure for facilitating projection thereof to bring said first and second sharp edges into shearing cooperation whereby said conductive piece will be instantly cut and said circuit opened and maintained in open position.

3. A circuit breaker for burglar alarm circuits and the like comprising a mounting having a mechanism attached thereto for replaceably retaining a small piece of easily severable conductive material interposed in a circuit, a severing element movably mounted in transverse relation to said conductive piece upon said mounting, said mounting having an element provided with an abutment surface disposed in close relation with said conductive piece and also having a dielectric surface disposed angularly to said abutment surface in a shearing relation with said severing element, and means connected to said severing element responsive to light force in the order of normal digital pressure for facilitating movement thereof to bring said severing element into opposed cooperative relation with said abutment surface whereby said conductive piece will be instantly severed and said circuit opened and maintained in open position.

4. A circuit breaker for burglar alarm circuits and the like comprising a mounting having a mechanism thereon for replaceably retaining a small piece of easily severable conductive material interposed in the circuit, a shearing blade shiftably mounted on said mounting and having a cutting edge disposed transversely of said small piece of conductive material, said shearing blade having an area disposed in spaced relation to said edge and offset from said edge for substantial alignment with a shorn end of said conductive piece whereby a non-conducting air gap will be established about said shorn end when said shearing blade has been shifted to cut the conductive piece.

5. A circuit breaker for normally closed electrical circuits comprising a mounting having a mechanism for replaceably retaining a small piece of severable conductive material interposed in a circuit with at least a portion of said piece exposed, a dielectric shear-supporting element affixed to said mounting and projecting therefrom, a shearing element slidably mounted on said dielectric supporting element and having a manipulating means at the outer end thereof responsive to light forces such as normal digital

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pressure, said shearing element being disposed in a relation transverse to said conductive piece whereby said piece may be instantly cut to open said circuit when said shearing element is depressed, said dielectric supporting element having a surface cooperating with said shear element, and further having a seat therein for reception of a medial portion of said conductive piece, said seat terminating adjacent said shearing element and having an external surface disposed substantially parallel to the said sliding movement of the shearing element to facilitate severing of said conductive piece.

6. A circuit breaker for burglar alarm circuits and the like comprising a mounting having a mechanism attached thereto for replaceably retaining a small piece of easily severable conductive material interposed in a circuit, a severing element mounted for shiftable movement through a predetermined path generally transversely to said conductive piece upon said mounting, said mounting having an element provided with an abutment surface disposed in close relation to said conductive piece and having also a side surface disposed substantially parallel to the predetermined path of said severable element, and means connected to said severing element responsive to normal digital pressure for facilitating movement thereof to bring said severing element into opposed cooperative relation with said abutment surface whereby said conductive piece will be instantly severed and said circuit opened and maintained in open position.

7. A circuit breaker for burglar alarm circuits and the like comprising, a mounting having a mechanism attached thereto for replaceably retaining a small piece of easily severable conductive material interposed in a circuit, a severing element supported from said mounting for inward shifting movement against said conductive piece retained in said mechanism, said severing element having a depressible, finger-actuated extension connected therewith, said extension extending generally transversely of and outwardly from said element, a casing detachably secured to said mounting and completely enclosing said mechanism and said severing element, said casing having an aperture in the outer portion thereof for very closely surrounding the periphery of said extension, the length of said extension in relation to the inward shifting movement of said severing element being such as to leave the extremity of said extension disposed a short distance outwardly of the apertured portion of said housing before actuation of said severing element and to position said extremity at least substantially flush with the edge defining said aperture when said extension is digitally depressed and actuated, and a special attachment lock requiring for release, application of a special key tool whereby dismantling of the device including release of said lock and removal of said casing is required in order to replace said conductive piece and in order to manually reset the severing element for reuse.

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