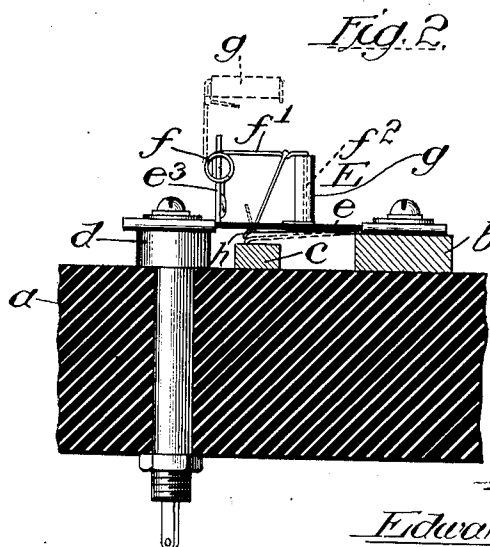
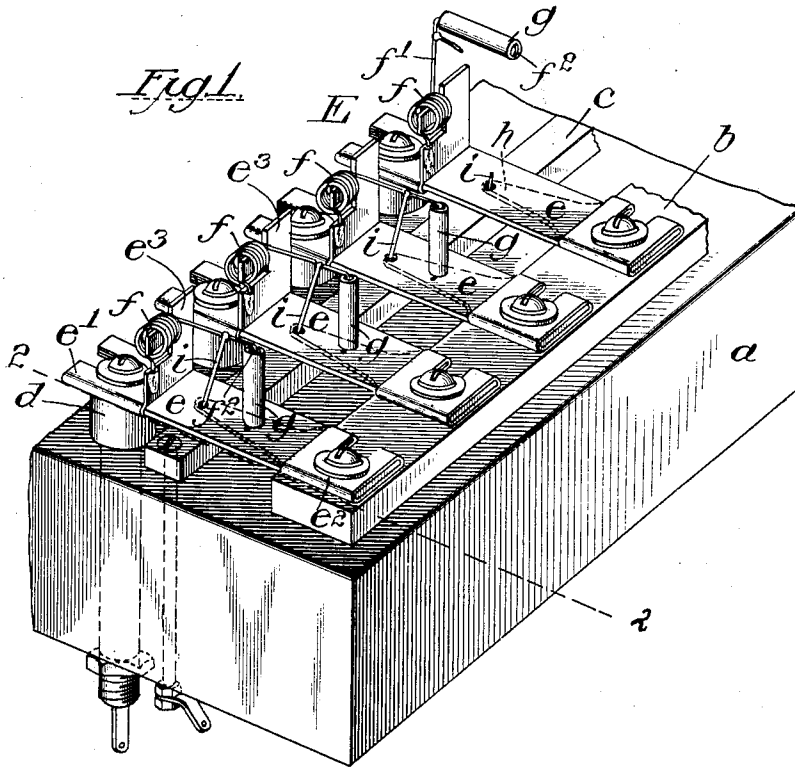


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E. B. CRAFT.
ALARM FUSE FOR TELEPHONE EXCHANGES.
APPLICATION FILED FEB. 5, 1904.



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ALARM-FUSE FOR TELEPHONE-EXCHANGES.

No. 817,959.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWARD B. CRAFT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Alarm-Fuses for Telephone-Exchanges, of which the following is a full, clear, concise, and exact description.

My invention relates to that class of protective devices which are used very generally in telephone-exchanges in order to guard the apparatus against abnormal currents which may be produced accidentally or otherwise.

In centralized energy systems it has been common to place fuses in the wires leading from the common battery to the different cord-circuits. These fuses have been mounted close together in an upright position upon slate panels, one terminal of a given fuse being connected with the common battery bus-bar and the other terminal of the same fuse being connected with the wire leading to a particular cord-circuit or a group of cord-circuits. These protective devices are inconspicuous, being, say, one and three-fourths inches long and three-eighth of an inch wide. It is desirable that when one of the fuses is blown the fact be readily ascertained by simple inspection.

My invention contemplates a protecting device comprising an insulating-mounting having terminal pieces at the ends thereof, to one of which terminals is secured a spring, such as a coiled spring, the spring being preferably mounted upon a suitable supporting member carried by such terminal piece. The spring is arranged to be held under tension by a fuse-wire, preferably of German silver, which completes the electrical connection between the terminal pieces, being connected with the terminal piece opposite that to which the spring is secured. The spring carries a target, preferably tubular and of glass of distinctive color, which is maintained by the spring when under tension in a position such that it will be inconspicuous, the target being carried by the spring upon the parting of the fuse into a position of display.

The protective device embodying this invention is usually mounted upon a vertical panel, together with other similar protectors, and the tubular target, which is prefer-

ably employed, may be carried upon an angular portion of an extension-arm of the spring, so that when the spring is under tension the small end only of the target will be visible; but when the spring is released by the blowing of the fuse the target will be moved into a position such that the surface or side of the target will be brought into view, thus making a very efficient signal and one that will be easily noticed.

My invention will be more readily understood by reference to the accompanying drawings, wherein—

Figure 1 is a perspective view illustrating a number of protective devices embodying my invention mounted upon a fuse-panel. Fig. 2 is a sectional view on line 2 2 of Fig. 1.

The same letters of reference are used to designate like parts in both figures.

The slate panel *a*, which supports the protective devices, carries two bus-bars *b c*. The bus-bar *b* would in practice be connected with one pole of the central-office battery and is therefore termed the "battery" bus-bar. The bus-bar *c* would be connected with the other pole of the central-office battery or the opposite pole of a local-alarm battery and include in its circuit an alarm-signal, such as an electric bell or lamp adapted to be displayed when a fuse is blown and the alarm-circuit completed. This bus-bar is therefore designated the "alarm" bus-bar. A number of bolts or studs *d d* extend through the panel *a* and may each be connected with a conductor leading to a given cord-circuit or group of cord-circuits, as desired.

The body portion or frame of the protective device *E* consists of an insulating-mounting *e*, carrying at the ends thereof terminal plates *e' e'*. The terminal plate *e'* carries a supporting member or arm, preferably a right-angled extension or plate *e'*. A coiled spring *f* is mounted upon the supporting-plate *e'* and one end secured thereto by soldering or otherwise. The other end of said spring forms an arm *f'*, which extends for some distance above the insulating-strip and carries a target *g*, which may be a tubular glass bead. The target which I have used in practice consists of an opaque glass bead of distinctive color, preferably white. The portion *f'* of the arm *f'* upon which the tar-

get is mounted is preferably bent at the angle, as shown, so that the target when in its normal position may be as inconspicuous as possible. As the panel *a* is in practice disposed in a vertical plane, the small end only of the target would thus be seen when the spring is under tension.

A tension-spring *h* of usual construction is connected with the terminal *e*² and extends underneath the insulating-strip *e* and parallel therewith to a point above the alarm bus-bar *c*. The fuse-wire *i*, which may be of German silver, connects the end of spring *h* with the extension-arm *f*¹ of the coiled spring and serves to maintain both springs *f* *h* under tension. The fuse-wire *i* is preferably connected with the arm *f*¹ at a point between the coil and the target. With this arrangement the target-carrying portion is rendered entirely independent of the fuse-wire, so that the frame and target are undisturbed by the blowing of the fuse and a new fuse may be easily substituted, and, in addition, the target is given a wide range of movement when released.

The protective device *E* is adapted to be mounted upon the panel *a* and the terminals *e*¹ *e*² thereof suitably secured to the bolt *d* and battery bus-bar *b*, respectively, preferably by binding-screws passing through notches in said terminals.

When the fuse-wire *i* is parted, the springs *f* *h* are released. The coiled spring *f* in retracting moves the target *g* into a position of display, as shown at the right in Fig. 1, the entire side or surface of the target coming into view, and the tension-spring *h* moves into engagement with the alarm bus-bar *c*.

It will be observed that the target-fuse is adapted to be readily removed from the supporting-plate upon which it is mounted and new parts substituted therefor. These removable parts, comprising the fuse-wire, spring, and target, are conveniently kept in stock, so that when any fuse is blown a new target-fuse may be readily substituted.

It is obvious that the alarm-fuse of my invention may be employed in the protection of circuits other than those particularly described in the foregoing. It is well adapted for use with telephone-line circuits, where it is customary to group the fuses of a number of lines in a small space.

Having thus described my invention, I claim—

1. A protective device comprising an insulating mounting-strip and terminal plates therefor, a spring secured to one of said terminals, a fuse-wire electrically connected with the other terminal and united with said spring to maintain the same under tension, and a target carried by said spring, said spring when under tension holding said target in an inconspicuous position, but being

adapted upon the parting of the fuse to move said target into a position of display.

2. In a protective device for electric circuits, the combination with an insulating supporting-strip and terminal plates carried at the ends thereof, of a coiled spring, a support therefor mounted upon one of said plates, one end of said spring being electrically connected with the aforesaid terminal plate, an extension-arm formed by the other end of said spring, a target carried by said arm, a fuse-wire electrically connected with the other terminal plate and united with said arm between the target and coil to maintain said spring under tension, said arm being adapted to be moved by the spring to bring the target into a position of display when the fuse-wire is parted.

3. A protective device comprising an insulating mounting-strip and terminal plates therefor, a spring secured to one of said terminal plates, a fuse-wire completing the electrical connection between said plates, and maintaining the spring under tension, an arm carried by said spring, and a tubular glass target carried by an angular portion of said arm, said arm when the spring is under tension maintaining the target inconspicuous, and being adapted upon the parting of the fuse to move said target into a position of display.

4. A protective device comprising an insulating mounting-strip *e* and terminal pieces *e*¹ *e*² therefor, a coiled spring *f*, a support *e*³ therefor, one end of said spring being electrically connected with the terminal *e*¹, an extension-arm *f*¹ formed by the other end of said spring, an opaque glass target *g* of distinctive color carried by an angular portion *f*² of said arm, and a fuse-wire *f*¹ maintaining said spring under tension and electrically connected with the terminal plate *e*², said fuse-wire being united with the arm *f*¹ between the target and coil; whereby when the fuse is parted the target is moved into a position of display by the recoil of said spring.

5. A protective device comprising an insulating supporting-strip, terminal plates carried at the ends thereof, a coiled spring, a metallic supporting-plate for said spring mounted upon one of said terminal plates at right angles thereto, one end of said spring being secured to said plate, an extension-arm carried by the other end of said spring, a leaf-spring secured at one end to the other terminal plate and extending parallel to the insulating-strip on the side thereof opposite said coiled spring, a fuse passing through said strip and connecting said leaf-spring and extension-arm to maintain the coiled spring under tension, and a target of distinctive color carried by an angular portion of said extension-arm and adapted to be moved into a position of display by said arm when the fuse is parted.

6. A protective device comprising an insulating supporting-strip, terminal plates carried at the ends thereof, a coiled spring supported by one of said plates, one end of said spring being connected with said plate, an extension-arm carried by the other end of said spring, a leaf-spring connected with the other terminal plate and extending parallel to said insulating-strip on the side thereof opposite said coiled spring, a fuse passing through said strip and connecting the ends of said springs to maintain the coiled spring under tension, and a target carried by an angular portion of said extension-arm independent of the current-carrying portion thereof, said target being adapted to be moved into a position of display by said arm when the fuse is parted.

7. A protective device adapted to be mounted in a vertical plane, comprising an insulating supporting-strip, terminal plates carried at the ends thereof, a coiled spring supported by one of said plates, one end of

said spring being connected with said plate, an extension-arm carried by the other end of said spring, a portion of said arm being bent to lie at right angles, a fuse-wire electrically connected with the other terminal plate and united with said extension-arm between the angular portion thereof and the coiled spring to maintain said spring under tension, and a tubular target carried by said angular portion and normally maintained in an inconspicuous position with its small end alone visible, said target being adapted to be moved by said arm to display its side surface when the fuse is parted.

In witness whereof I hereunto subscribe my name this 2d day of February, A. D. 1904.

EDWARD B. CRAFT.

Witnesses:

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ALFRED H. MOORE.