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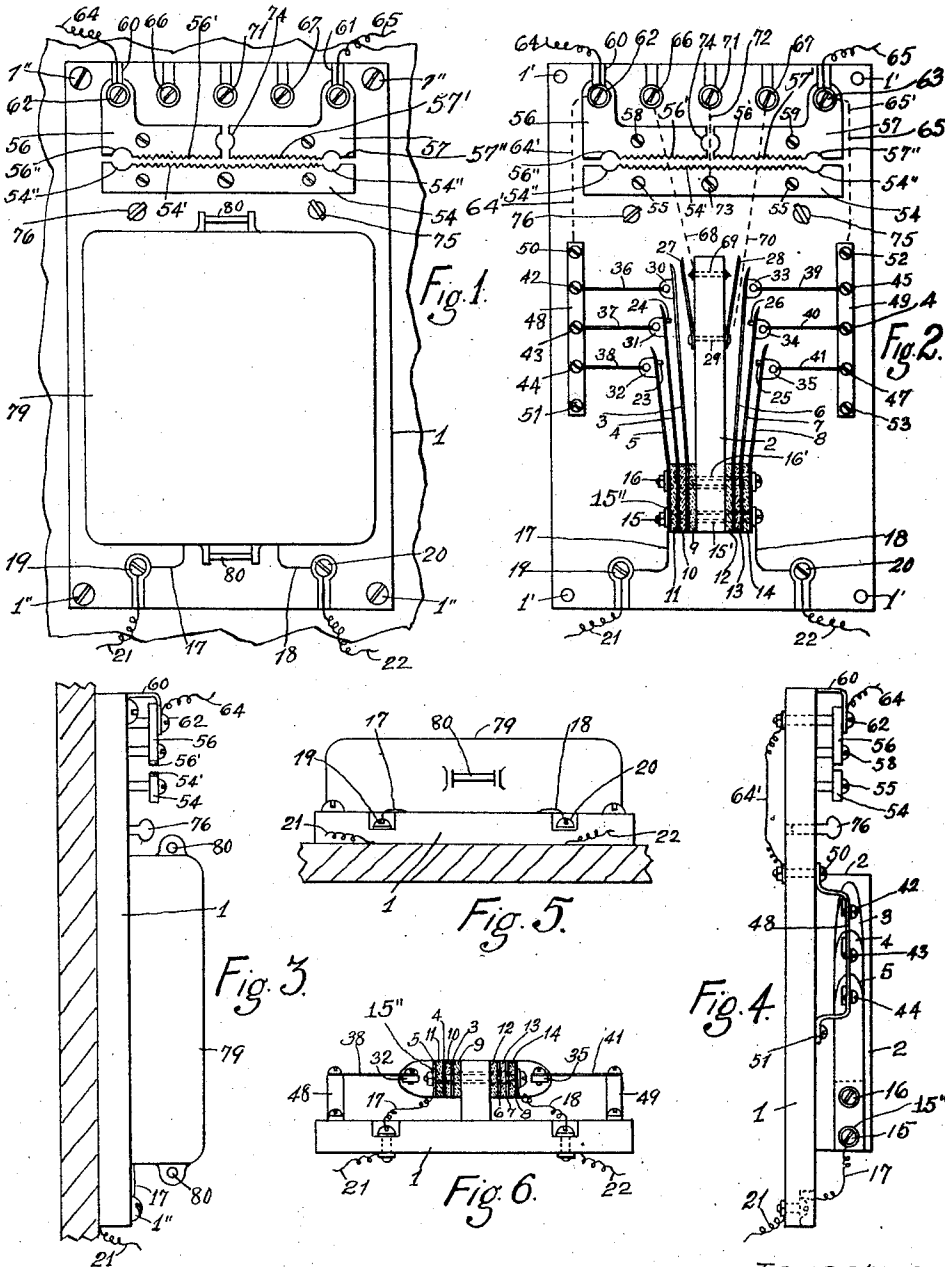
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L. R. RICARDO ET AL

AUTOMATIC FUSE DEVICE

Filed May 18, 1923

2 Sheets-Sheet 1



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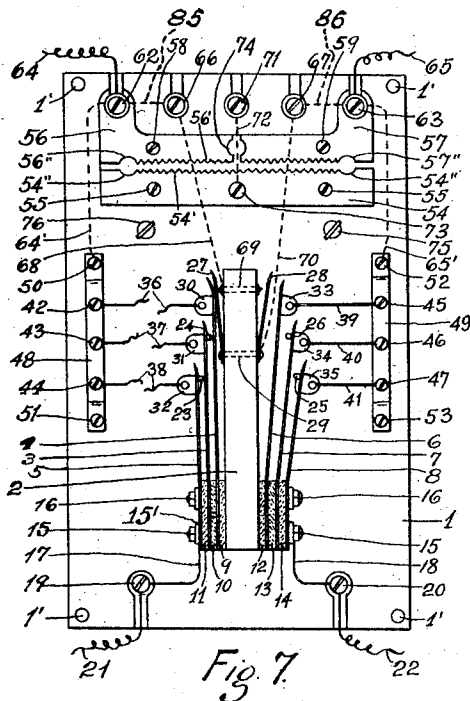
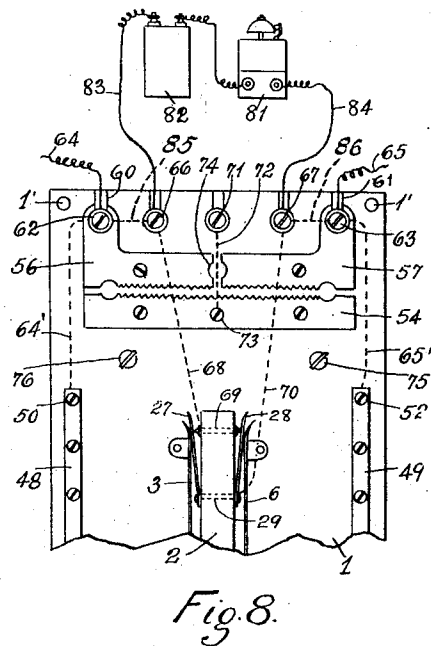
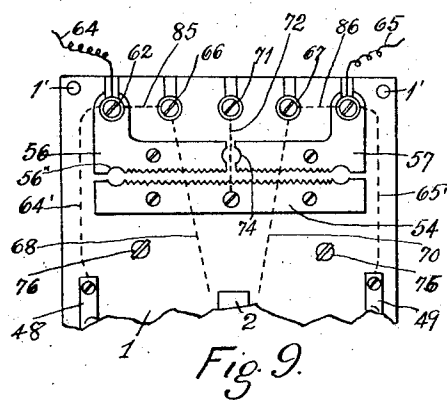
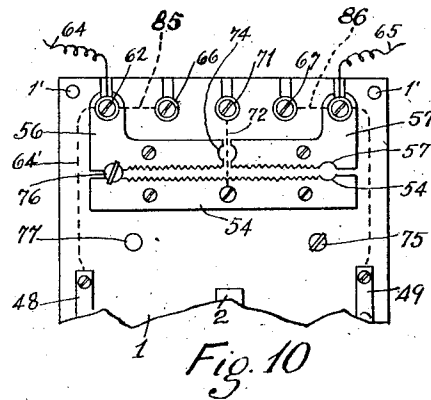
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AUTOMATIC FUSE DEVICE

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2 Sheets-Sheet 2



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Patented July 27, 1926.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC FUSE DEVICE.

Application filed May 18, 1923, Serial No. 639,952, and in Cuba October 2, 1922.

This invention relates to a protecting device in general and more particularly for telephone and telegraph apparatus and has, as one of its principal objects, to provide a device which, when placed between the exterior line and a connected apparatus, will prevent a current of excessive power, caused, for example by an electric discharge, from damaging the connected apparatus.

Another object of the invention is to provide a protector which includes more than one fuse for each line wire and is adapted to automatically establish a connection including a fuse, while successively cutting out a fuse, and permanently maintaining a connection between a fuse and the respective exterior line wire.

Another object of the invention is to provide a device that is applicable to apparatuses of telegraph and telephone centrals, simplifies supervision of the same, and prevents prohibitive installation costs.

Other advantages and considerations are contained in the specification, considered in connection with the attached drawings, in which like characters of reference, designate like parts; and wherein:—

Figure 1 is a plan view of the protecting device which is the object of the present invention, provided with an enclosing casing;

Figure 2 is a plan view, with the casing removed;

Figure 3 is a side elevation of the device with the casing in place;

Figure 4 is a side elevation of the device with the casing removed;

Figure 5 is an end elevation of the device with the casing in place;

Figure 6 is an end elevation of the device with the casing removed;

Figure 7 is a plan view of the device with the fuses of one line wire, melted;

Figure 8 is a partial plan view of one form of device as applied to a telephonic apparatus;

Figure 9 is a partial top view of another form of the device as applied to a telephonic apparatus;

Figure 10 is a partial plan view, illustrating a form to test operativeness of the device.

In the drawings, the device is shown as mounted on a rectangular base plate 1 made of insulating material and having, in its corners, holes 1' for adequately fastening it by means of screws 1". At one end of the

plate, centrally and lengthwise thereto, is secured a rectangular block 2 of insulating material. To each side of one end of block 2 is fixed, at their ends, three leaf spring contacts 3, 4, 5 and 6 and 7 and 8, placed one over the other, the free ends of such springs being slightly curved outwardly. Said springs are separated from each other by means of insulating plates 10, 11, 13, and 14, and from the block 2, by insulating plates 9 and 12. These parts are secured together by means of bolts 15 and 16, which pass through tubular insulating covers 15' and 16' within apertures in the block 2. Wires 17 and 18 are connected respectively, at one end, to the springs 5 and 8, outside of the insulating tube 15', and in the case of wire 17, between the plate 5 and an insulating washer 15" (see Fig. 2), which washer fits over the insulating tube 15'; and at the other end to binding posts 19 and 20, to which are connected wires 21 and 22 connecting up the apparatus that the device is destined to protect.

The length of the springs 3, 4, 5 and 6, 7, and 8 varies, the longest being the inner springs 3 and 6, followed in length by the intermediate springs 4 and 7, and by the shortest springs 5 and 8 on the outside. On the interior faces of springs 4, 5, 7, and 8 are projecting contact blocks 23, 24, and 25, 26. Within the free ends of the inner springs 3 and 6, at each side of block 2, are placed leaf springs 27 and 28, joined together by a conducting pin 29, across the front part of block 2, the free ends of the springs 27 and 28 being curved slightly inwardly.

The springs 3, 4, 5, 6, 7 and 8, are provided on their exterior faces at the free ends, with lugs 30, 31, 32, 33, 34 and 35, to which are connected the ends of the fuses 36, 37, 38, 39, 40 and 41, the other ends of which fuses are connected to binding posts 42, 43, 44, 45, 46 and 47 placed on conducting handle-shaped brackets 48 and 49, fixed lengthwise of base 1 and on either side of the same by means of bolts 50, 51, 52, and 53 passing through the horizontal flanged ends of each bracket. The fuses, connected to the springs 3—8, hold them separated from one another, and from the small plates 27 and 28, maintaining a spring tension in the same.

Near the front of base 1, a long narrow plate 54 is fixed by means of screws 55 which hold it somewhat above the base (Fig. 4) the

plate 54 having one of its edges serrated as indicated at 54' and on which edge, near the ends of the plate, are semicircular notches, 54''. Immediately opposite plate 54, and spaced a slight distance therefrom, are placed two angular plates 56 and 57, fixed to the base by means of screws 58 and 59, which hold them also, a distance above base 1 equal to that of the adjacent plate 54. The shorter branches of plates 56 and 57 are directed away from plate 54, and their longer branches are in line and slightly separated from each other, and have at their ends, opposed semicircular notches 74, the said plates having those edges corresponding to the serrated edge of plate 54, likewise serrated, as shown at 56' and 57'. They present near their outer ends, semicircular notches 56'' and 57'', corresponding with the notches 54'' in plate 54, and forming plug sockets therewith, an object to be later explained.

The ends of the short branches of the plates 56 and 57 are secured to brackets 60 and 61 by means of bolts 62 and 63, the heads of which constitute binding posts to which are connected, above, wires 64 and 65 which connect to the exterior line and below by wires 64' and 65', with the lower heads of bolts 50 and 52.

At the end of the base 1, are connected respectively to 62 and 63 by wires 85 and 86, binding-posts 66 and 67, the post 66 being connected by means of a wire 68 with one end of a bolt 69 passing through the front end of block 2, the post 67 being connected by means of a wire 70 with one head of bolt 29, which secures the small plate contacts 27 and 28.

Between the binding-posts 66 and 67 is a post 71, of a ground line, which, by means of a wire 72, that passes between the separated ends of the larger branches of the angular plates 56 and 57 connects with a post 73 in the center of plate 54.

By means of pins 75 and 76, as should be clear to experts in the art to which this invention appertains, distinct proofs of the operation of the exterior line are obtained by using the pins to complete a circuit through the exterior line by connecting up plate 54 with plates 56 and 57, the normal functioning of the apparatus however, requiring holding these pins in their inoperative positions, each in a bore, as 77 (Fig. 10) in base 1.

The more delicate parts of the apparatus are protected by means of a casing 79, provided with handles 80.

The operation of the apparatus is as follows:

Assuming the parts to be in the position shown in Figure 2, and the device placed between the line and an apparatus to be protected, the current flows by way of the conductors 64 and 65, assuming the conductor

64, as positive flow will be through 64', conductor bracket 48, fuse 38, spring 5, conductor 17, and wire 21, to the apparatus and back from the apparatus, on the opposite side of base 1, to conductor 65.

In case a current of too great power be produced, due, for instance, to an electric discharge, in a corresponding exterior line, the discharge would be received, and its effect diminished, in the plate 56, and upon the fuse 38 being melted, contact 5 will be released and will establish contact with the contiguous spring 4 by means of the contact block 23, and current can then circulate through fuse 37 and the two connected plates 5 and 4, and to the wire 21, which leads to the apparatus, as before, and return to conductor 65. On the melting of fuse 37, due to a second excess current, the two plates 4 and 5 which are in contact, will establish connection with the contiguous plate 3, and the current will then flow through fuse 36 and the three plates in contact, 3, 4 and 5, and to the line 21 and return to 65. Furthermore, should the third fuse 36, also melt from a similar cause, referring to a telegraphic circuit, the plate 3 will contact with the small plate 27, and this, in its turn, with the bolt 69, thus circulating the exterior current from the binding-post 64 through 85, to 66, passing by wire 68 across the bolts 69 and 29, continuing by the wire 70 to the binding-post 67 and thence to 63 by means of wire 86, as shown in Figure 9, the circuit thus remaining direct between the other stations, but leaving this particular apparatus short circuited from the protecting device.

When dealing with centrals or telephonic apparatuses, as in Figure 8, a bell or alarm device 81 can be connected, with its dry cell 82, by means of wires 83 and 84, with binding-posts 66 and 67 and on the last fuse of either of the two lead in wires burning, the circuit and the bell or alarm 81 gives notice to the employee to replace the fuses.

By means of the pegs 75 and 76, distinct tests of the functioning of the exterior line, of the device, and of the central or apparatus in combination with which it is used, are effected.

Thus, if the existence of any interruption in either of the wires 64 or 65 of the exterior line is suspected, in the telegraphic circuit, and assuming it be in wire 64, a metallic plug is introduced in the bore formed by the semi-circular notches 56'' and 54'', and if any current exists between wire 65 and the apparatus, this proves that wire 64 is interrupted, and vice versa if it is the wire 65.

It is evident that many variations can be introduced in the combination of the parts of this device, without departing from the basic idea of the invention, and therefore, I limit myself protection for what is de-

scribed only in so far as is necessitated by the following claims.

Claims:—

1. A protecting device, comprising, a base,
5 an insulating block on the base, a plurality
of leaf spring contacts of varying lengths
placed one over the other and insulated from
each other, and secured to each side of the
block, the contacts decreasing in length from
10 the block outwardly, conductor brackets,
fuses for the contacts, connected between
the brackets and the contact free ends and
holding said free ends out of contact with
each other against their inherent spring ten-
15 sion, a connection between each bracket and
the external line, and between each outer
contact and electrical apparatus to be pro-
tected, a serrated edged conductor plate
fixed to the base, and two opposed, spaced,
20 serrated edged plates fixed to the base, the
two opposed plates being connected to the
external line, a conducting pin in the block,
two conducting spring plates fastened to the
block and inside of the leaf spring contacts
25 by a second conducting pin, two contacts
fixed to the base and connected, one to the
conducting pin, and the other to the second
conducting pin, a contact on the conductor
plate connected to ground, and a contact on
30 the base connected to the contact on the con-
ductor plate, the conducting spring plates
connecting with the longest leaf springs up-

on the melting of the longest leaf springs' fuses.

2. A protecting device comprising a base, 35
an insulating block on the base, a plurality
of leaf spring contacts of varying lengths
placed one over the other and insulated from
each other and secured to each side of the
block, the contacts decreasing in length 40
from the block outwardly, conductor brack-
ets, fuses for the contacts connected between
the brackets and the contact free ends and
holding said free ends out of contact with
each other against their inherent spring ten- 45
sion, a connection between each bracket and
the external line and between each outer
contact and electrical apparatus to be pro-
tected, a conducting pin in the block, two
conducting spring plates fastened to the 50
block inside of the leaf spring contacts by
means of a second conducting pin, two con-
tacts connected to the external line and fixed
to the base and connected one to the con-
ducting pin and the other to the second con- 55
ducting pin, the conducting spring plates
connecting with the longest leaf springs on
the melting of the fuse of the longest leaf
spring.

In testimony whereof, we have signed our 60
names to this specification.

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