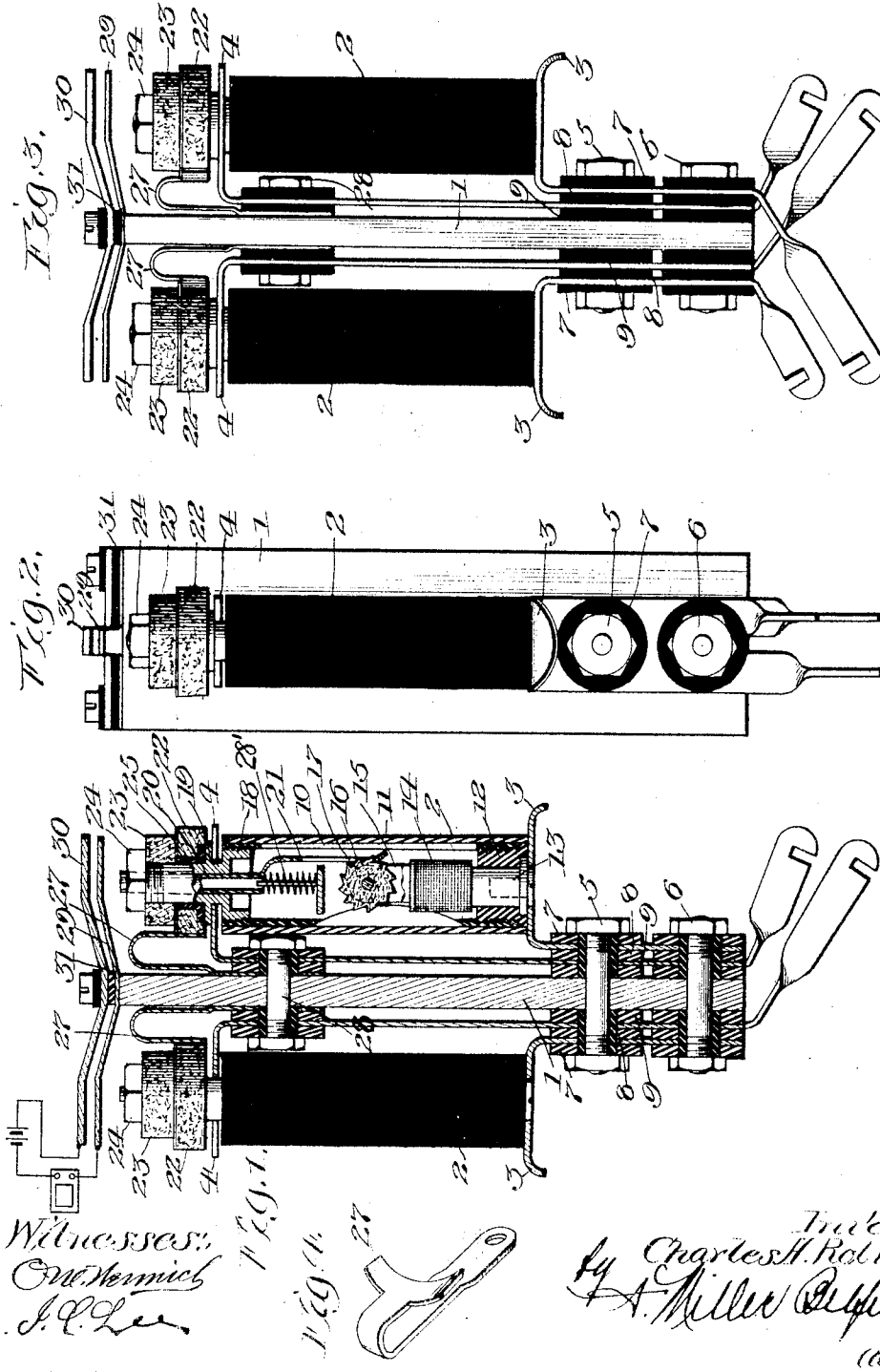


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ELECTRICAL CIRCUIT PROTECTOR.
APPLICATION FILED NOV. 30, 1906.

1,036,723.

Patented Aug. 27, 1912.



UNITED STATES PATENT OFFICE.

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ELECTRICAL-CIRCUIT PROTECTOR.

1,036,723.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed November 30, 1906. Serial No. 345,677.

To all whom it may concern:

Be it known that I, CHARLES A. ROLFE, 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 Electrical-Circuit Protectors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to protectors for protecting telephone, telegraph and like circuits against unduly strong currents; and it relates in particular to a form of self-soldering protector illustrated in Patent No. 867,212, granted to me September 24, 1907.

The principal object of the present invention is to simplify and cheapen the protector shown in the aforesaid application.

In the accompanying drawings, Figure 1 is a vertical section of a protector embodying my present invention; Fig. 2 is a side elevation of the same; Fig. 3 is an end elevation; Fig. 4 is the detail of construction.

The protector shown in the drawings, comprises a support 1 which is conveniently in the form of a flat metallic plate preferably a nickel or bronze composition. This board or plate is sufficiently long and high to accommodate and support a considerable number of protective devices arranged in rows on opposite sides thereof. I have shown two protective devices 2, 2, one on each side of this board.

Each protective device 2 is mounted on two metal strips 3, 4, whereof the strip 3 supports the lower end, and the strip 4 the upper end of said protector. The strips are bolted to the board by means of bolts 5, 6, and insulating material such as hard rubber or fiber 7, 8 and 9 is arranged in connection with said strips to insulate them from one another and from the board 1. The ends of both strips 3 and 4 are bent outwardly to substantially right angles at the board.

Each protective device consists of a tube or shell 11 of insulating material such as hard rubber, and containing a metal sleeve 10 which fits removably in the shell 11. A plug 12 of insulating material is fitted tightly as by screwing into the lower end of the metal sleeve 10, and a metal spindle 13 is fitted in the plug 12.

A heat coil 14 is mounted upon the spindle 13, and provided with a fork 15 carrying a

star-wheel 16 provided with solder 17 for automatically resoldering said star-wheel in position after operation. The upper end of the metal sleeve 10 is provided with a metal plug 18 having a shank 19 which extends up beyond the upper end of said sleeve 10. Within the shank 19 is arranged a sliding tubular member 20 which has a prong 21 extending down and arranged to engage the teeth of the star wheel 16. A pair of graphite rings or disks 22 and 23 is arranged upon the shank 19 and held in position by a nut 24 on the end of the same. The ring 22 is mounted upon a collar 25 of insulating material such as hard rubber, and the ring 23 directly upon the shank 19. A disk 26 of insulating material is interposed between the rings 22 and 23. These two graphite rings 22 and 23 form electrodes which are insulated from one another, and whereof the electrode 22 is also insulated from the cartridge forming the protector. A strip spring 27 is also mounted upon the support 1 as by a bolt 28 which also holds the upper end of the strip 4 in position. The strip 27 is bolted against the board 1 so as to be in contact therewith, and has its upper end bent down and in contact with the electrode 22, whereby such electrode becomes a ground electrode, being always connected with the board 1 and thereby to ground. Upon the top of the board are mounted cross strips 29 and 30, whereof the strip 29 is a spring strip, and the strip 30 rigid. The strip 29 is in contact with the board 1 but the strip 30 insulated therefrom by means of insulation 31. The strip 30 is connected with a local circuit and battery for giving an alarm, and the strip 29 with ground in as much as it is connected with the board 1.

The operation of the device is as follows: When an unduly strong current traverses the circuit, the coil 14 softens the solder 17 and allows the spring 28' to retract the plunger 20 and thereby open the circuit. At the same time the end of the plunger strikes the strip 29 and thereby grounds the circuit and closes a local circuit to give an alarm. After operation the solder 17 hardens, thereby automatically resoldering the protector in condition for another operation, whereupon the plunger 20 is pushed in to cause engagement of the prong 21 with the wheel 16, thereby resetting the protector. Should

lightning intrude upon the circuit, it will jump from the electrode 23 to the electrode 22 and thence to ground.

It will be seen that the device is simple, compact and involves but few parts

It will be understood that changes and modifications can be made without departing from the spirit of the invention.

What I claim is:

1. A heat cartridge comprising a cylindric body of insulating material, containing circuit-opening mechanism, and having a projection at one end and a pair of annular lightning arrester electrodes, having apertures fitted over said projection, and a nut at the outer end of the projection for holding the electrodes in position, one of the electrodes being in contact with said projection, and the other being insulated therefrom, and also from the first-mentioned electrode.

2. In apparatus of the character described, a lightning arrester comprising a pair of carbon electrodes with a suitable dielectric interposed therebetween, an electrothermal device associated with the said arrester, said lightning arrester having a hole therethrough, and a contact member extending from the electrothermal device through the lightning arrester, said contact member being utilized to control a circuit upon the operation of the said device.

3. An electrothermal protector of the character described comprising a heating element, a sleeve inclosing the heating element and in which the latter is operable upon excessive heating, a terminal extending from the heating element, and means on the said terminal adapted to be acted upon to operate the heating element in the said sleeve to reset the protector for operation when same is properly heated.

4. The combination of a board; a line strip arranged lengthwise of said board; a heat cartridge held firmly in a vertical position at its lower end by said strip; a second strip arranged lengthwise of said board, said second strip having one of its ends projecting from said board and having an open slot in said end; a plunger projecting from the upper end of said cartridge and passing through said slot; a resilient ground contact mounted upon the top of said board and projecting therefrom immediately above said plunger; means for forcing said plunger upward upon the operation of said cartridge; and a local circuit electrode mounted on said board directly over said ground contact.

5. The combination of a board; a pair of line strips arranged lengthwise of said board on each side thereof; a heat cartridge supported by the upper ends of each of said pairs of strips; a plunger projecting from the upper end of each of said cartridges; a resilient ground contact member extending

across the upper end of said board, each end of said member projecting from said board and being positioned immediately above one of said plungers; a local circuit electrode mounted on said board and extending outwardly on both sides thereof immediately over said member; and means for forcing said plunger upwardly when said cartridge is operated.

6. The combination of a lightning arrester and a heat cartridge, said arrester comprising a pair of carbon electrodes, said electrodes having holes therethrough; a contact-producing member extending from within the cartridge through said holes, said member being utilized to close a circuit when said heat cartridge is operated.

7. In apparatus of the character described, a ground plate, a metal strip mounted thereon, a lightning arrester comprising two carbon rings, one of which is electrically connected with the ground plate, a thermally-operated device held in close proximity to the lightning arrester, and means for operating the thermally-operable device upon excessive heating, and a pin projecting from the said thermally-operable device through the electrodes of the lightning arrester to engage said metal strip when the thermally operable device is operated, for purposes substantially as described.

8. The combination of a lightning arrester and a circuit breaker, said arrester comprising a pair of electrodes insulated from each other and having holes therethrough; said breaker having a neck extending through said holes; a contact-producing member extending from within the cartridge through said neck and being in contact therewith; one of said electrodes being in contact with said neck, said member being adapted to close a circuit upon the operation of a circuit-breaker.

9. A circuit-breaker comprising a casing of insulating material; circuit-opening mechanism contained in said casing; a neck projecting from one end of said breaker; and a pair of lightning-arrester electrodes fitted over said neck, said electrodes being insulated from each other, one of said electrodes being in contact with said neck; and means at the outer end of said neck for clamping the electrodes to said breaker.

10. A circuit-breaker comprising a casing of insulating material; circuit-opening mechanism contained in said casing; a neck projecting from one end of said breaker; and a pair of lightning-arrester electrodes fitted over said neck, said electrodes being insulated from each other; one of said electrodes being in contact with said neck; means at the outer end of said neck for clamping the electrodes to said breaker; a contact-producing member extending from within said breaker through said neck and

in contact with said neck, said member adapted to close a circuit when said mechanism is operated and being normally connected with a terminal of said breaker.

11. In apparatus of the character described, a lightning arrester comprising a pair of carbon rings with a suitable dielectric interposed therebetween, a cylindrically-shaped member having a neck extending through said rings, a heat cartridge contained in said member and normally held against operation by heat-susceptible material, a pin extending from the said cartridge through said flange and neck in the lightning arrester, and means for operating the heat cartridge within the said cylindrically-shaped member upon excessive heating, to operate the said pin through the lightning arrester and control a circuit.

12. The combination of a lightning arrester and a heat cartridge, said arrester comprising a pair of annular carbon rings insulated from each other; a contact-producing member extending from within the cartridge through said rings, said member being utilized to close a circuit upon the operation of the heat cartridge.

13. The combination of a lightning arrester and a heat cartridge, said arrester comprising a pair of annular carbon rings; a contact-producing member extending from within the cartridge through said rings, said rings being insulated from each other, and one of said rings being connected with said member, said member being normally connected with the terminals of said cartridge, and said member being utilized to close a circuit upon the operation of the heat cartridge.

14. In an apparatus of the character described, a ground plate; a metal strip mounted upon said plate, a lightning arrester comprising two annular carbon electrodes, one of said electrodes being connected with said plate, a circuit-breaker associated with said arrester and a plunger projecting from said breaker through said electrodes and adapted to engage said metal strip to close a circuit when said circuit-breaker is operated.

15. An electric heat cartridge carrying annular carbon lightning-arrester electrodes, line strips for the cartridge, and a ground

strip for one of said electrodes, a portion of said cartridge passing through the opening in the other electrode and electrically connecting the said other electrode to one of said line strips.

16. The combination with a conducting support of a pair of line strips secured to but insulated from said support, a heat cartridge mounted in said line strips and having one of its terminals projecting through a pair of carbon electrodes, said electrodes being insulated from each other, and one of said electrodes being insulated from said cartridge, and a ground strip secured to said support and connected with said insulated electrode.

17. An electric heat cartridge comprising a cylindrical body containing a circuit-opening mechanism and having one of its ends provided with a terminal passing through a lightning-arrester, said arrester comprising two annular carbon electrodes, said electrodes being insulated from each other, and one of said electrodes being insulated from said terminal, a line strip connected to said terminal, a ground strip connected to said insulated electrode, and a line strip connected to the other terminal of said cartridge.

18. In an apparatus of the character described, a ground plate, metal strips insulated from each other mounted upon the upper edge of said plate, one of said strips electrically connected to said plate, a circuit-breaker mounted on said plate, a neck extending upward from said breaker, a lightning arrester comprising two carbon rings insulated from each other, said rings encircling said neck, one of said rings being in contact with said neck, and a plunger extending from said circuit-breaker through said neck and in contact therewith, said plunger being normally in contact with the terminals of said breaker and being adapted to close the circuit when said circuit-breaker is operated.

In witness whereof, I hereunto subscribe my name this 9th day of November A. D., 1906.

CHARLES A. ROLFE.

Witnesses:

A. MILLER BELFIELD,
I. O. LEE.