J. O. HOLTON, Jr.

SELF ADJUSTING FUSE.

APPLICATION FILED JAN. 20, 1910.

986,463.

Patented Mar. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 1

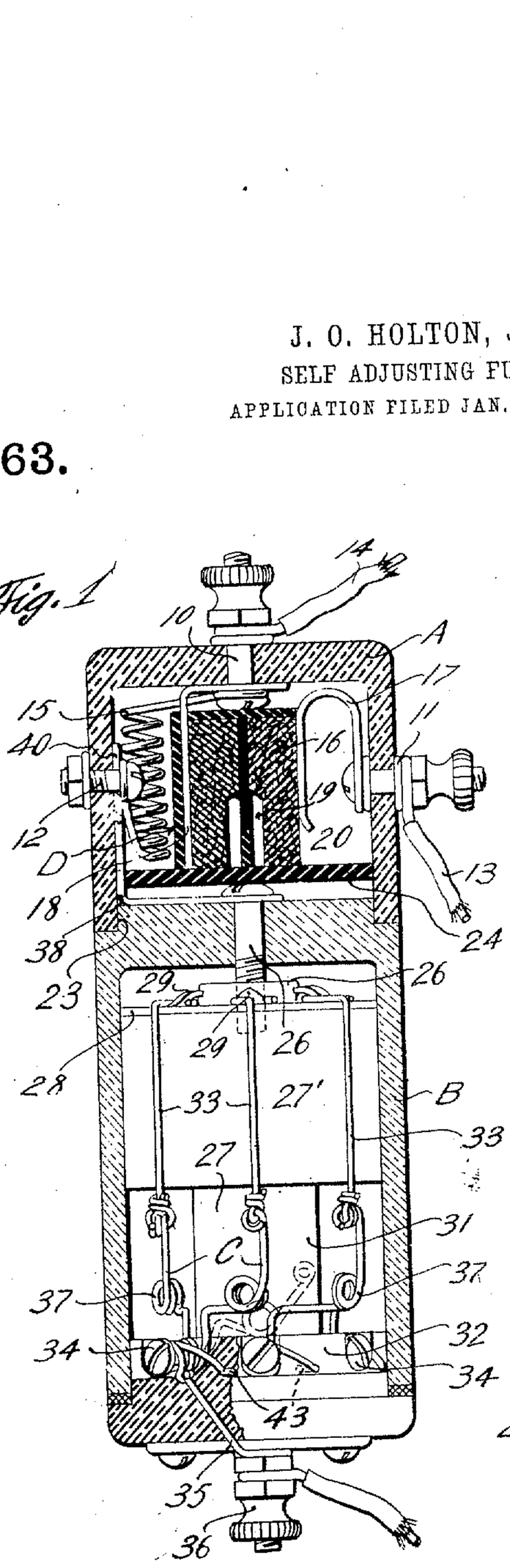


Fig. 2

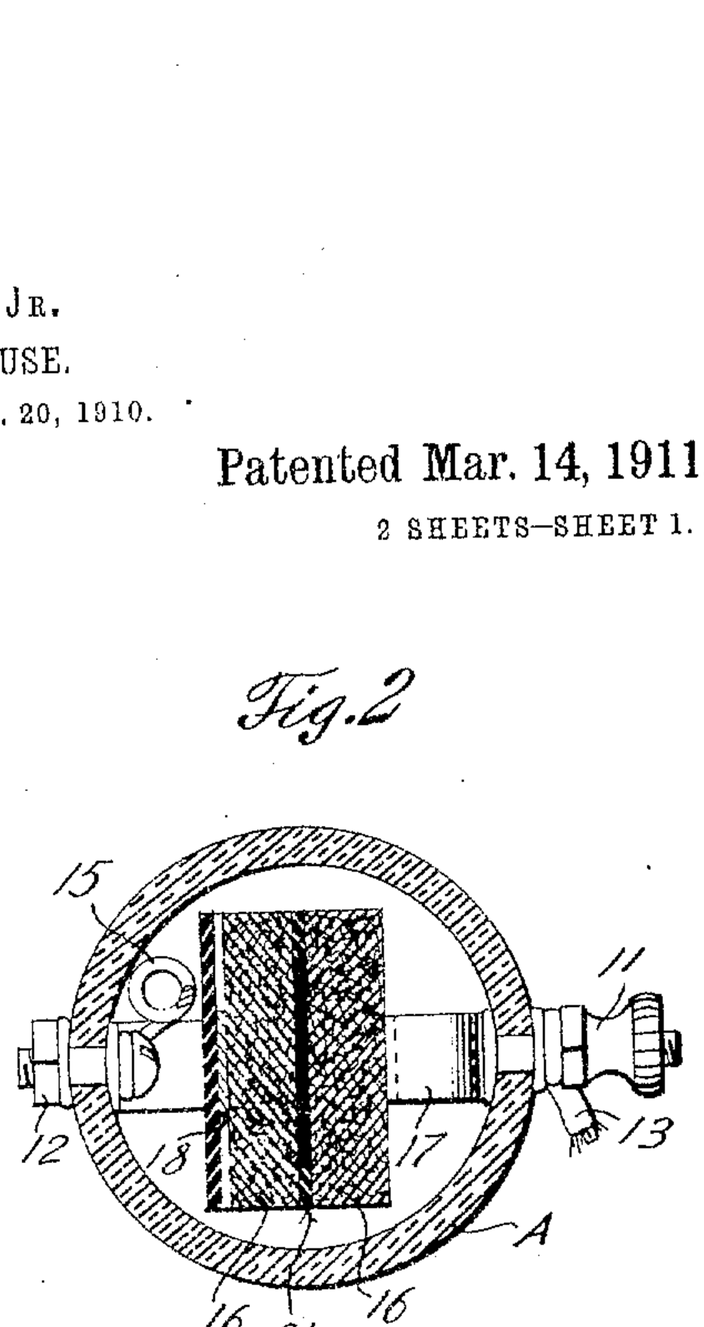


Fig. 3

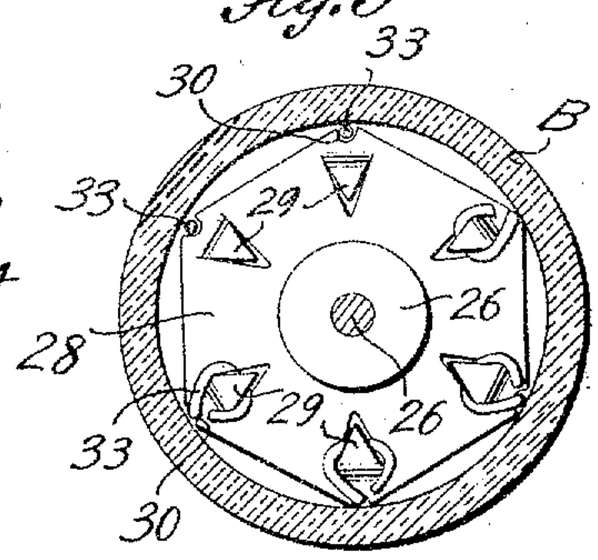


Fig 4.

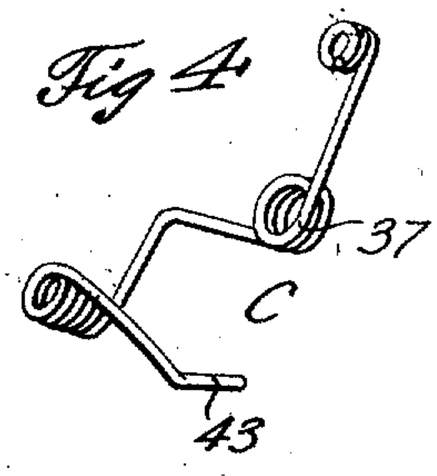
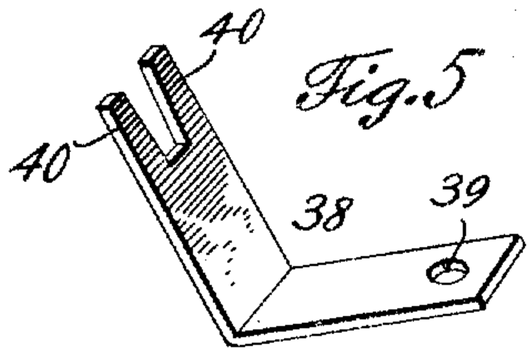


Fig. 5



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2 SHEETS—SHEET 2.

Fig. 9

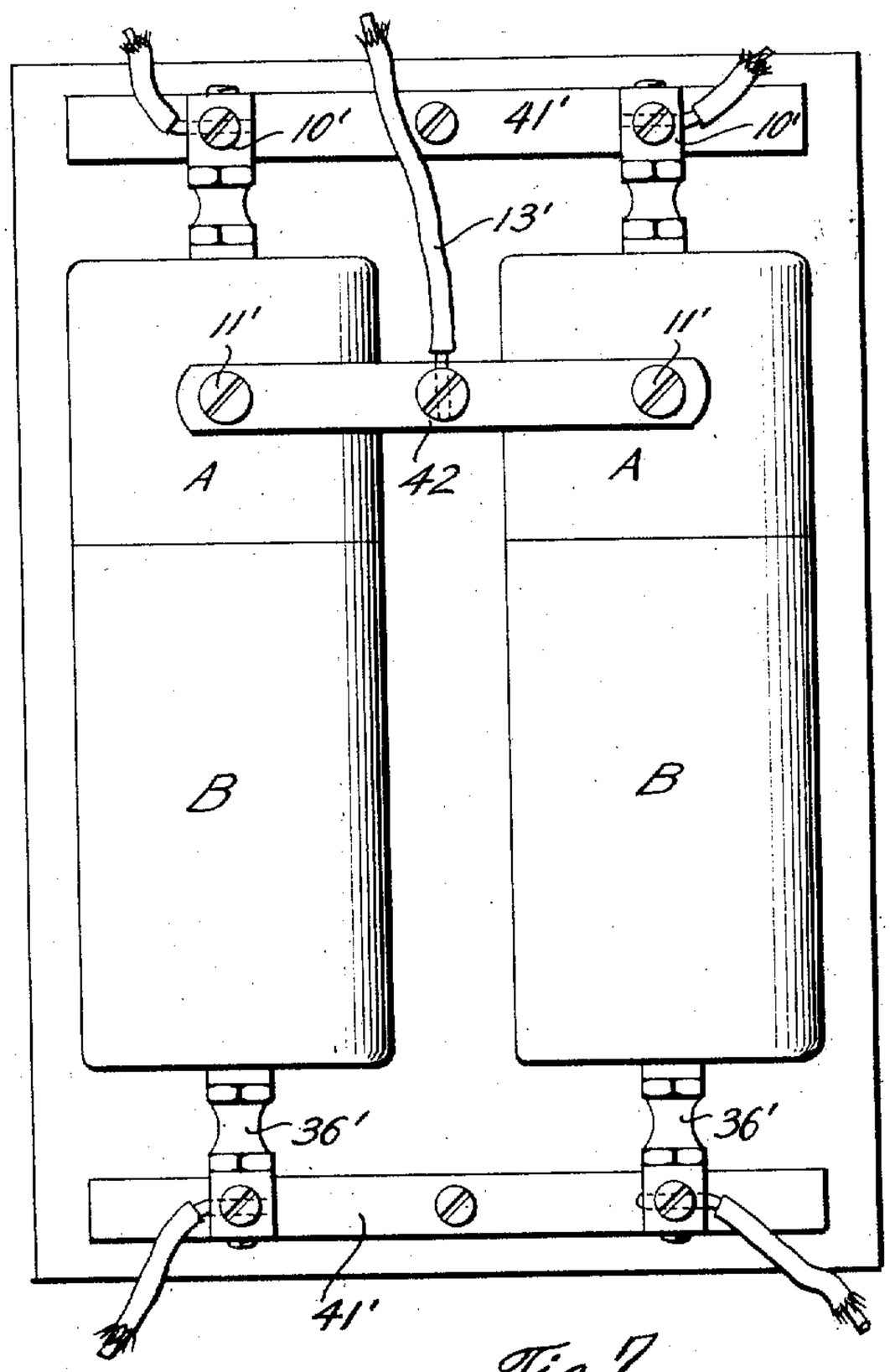
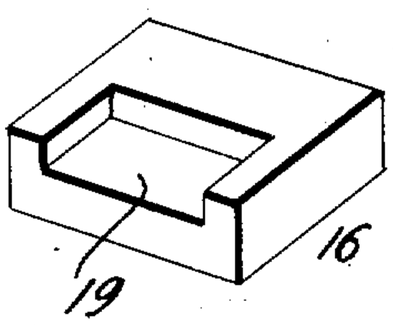


Fig. 7

Fig 6



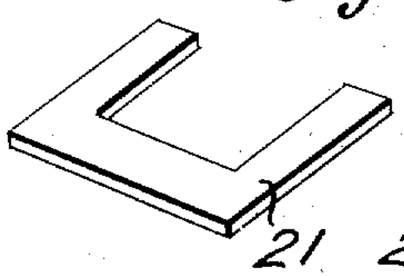
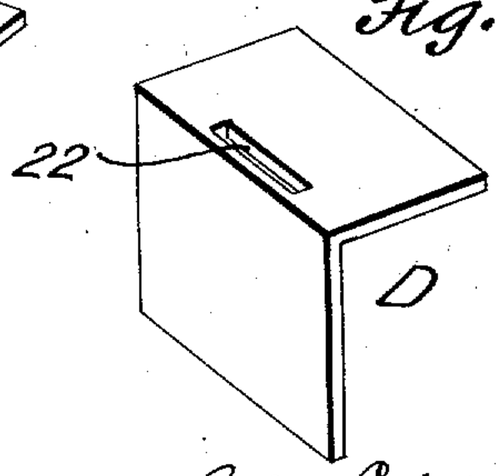


Fig. 8



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SELF-ADJUSTING FUSE.

986,463. Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed January 20, 1910., Serial No. 539,082.

To all whom it may concern:

Be it known that I, JAMES O. HOLTON, Jr., a citizen of the United States, residing at Monett, in the county of Barry and State of Missouri, have invented certain new and useful Improvements in Self-Adjusting Fuses, of which the following is a specification.

This invention relates to combined automatic fuse and lightning arresters, all of the advantages of each being combined in one compact and operative form.

Heretofore after all electrical storms, it has been necessary to go over the line, removing all carbons from the arresters in the telephone stations and pole boxes, and cleanse the same removing all carbon dust which accumulates from electrical currents running through the carbons. If this dust was not removed, the current would flow through the dust between the carbons and to the ground, causing the entire circuit to be grounded.

An object of the present invention is to completely eliminate these disadvantages of the old fuse blocks, and to provide a means whereby the carbons will automatically collect the dust in such a manner that the line will not be grounded.

A further object of this invention is to construct a successive fuse in combination with the lightning arrester that will doubly insure the circuit from increased potential and lightning.

The present invention is so condensed as to be used in the ordinary brackets, consequently eliminating all additional expense to attach the same to the present circuits.

The present invention also contemplates the provision of a combined lightning arrester and automatic successive fuse wherein the overcharge will be conducted to the ground during the replacement of the fuse destroyed by said overcharge, thus in no way impairing the remaining fuses. This is accomplished by the provision of a choke coil which furnishes impedance sufficient to deflect the overcharge to the ground lead while the automatic successive fuse is operating.

With the above and other objects in view, this invention consists of the construction, combination and arrangement of parts all as hereinafter more fully described, claimed and illustrated in the accompanying drawings, wherein:

Figure 1 is a central vertical section of a combined lightning arrester and automatic successive fuse constructed in accordance with the present invention; Fig. 2 is a horizontal section taken along line 2—2 of Fig. 1; Fig. 3 is a top plan view of the fuse block, the casing thereof being in section; Fig. 4 is a detail perspective view of one of the circuit continuing springs; Fig. 5 is a perspective view of the connection between the lightning arrester and the automatic successive fuse; Fig. 6 is a perspective of one of the carbons; Fig. 7 is a perspective view of the mica insulating plate; Fig. 8 is a similar view of the asbestos insulation separating the carbons from the choke coil; Fig. 9 is a front elevation of a modification of the present invention.

Reference being had to the accompanying drawings, A indicates in general the carbon chamber or cup retaining the lightning arrester elements. A binding post 10 is centrally located in the top of the porcelain chamber A, while similar members 11 and 12 are diametrically mounted on each side thereof, said binding post 11 having the ground lead 13 secured thereto, and the central binding post 10 having attached thereto the main line lead 14. A choke coil 15 is mounted in the casing to one side thereof and is secured at one terminal to the binding post 10 and at the other terminal to the binding post 12, said choke coil being of any suitable material, length and size.

The carbons 16 are placed in the chamber A directly under the binding post 10 and are secured therein by the U-shaped spring 17 bearing against one side thereof and connected to the binding post 11. The opposite side of the carbons bears against a spring 18, said spring being of L-formation and is secured at its upper terminal to the binding post 10, the opposite terminal thereof resting flush with and bearing against said carbons, said spring causing a substantial contact through the carbons 16, between the main line lead 14, and the ground lead 13. These carbons are constructed with the carbons having the coinciding recesses 19 formed therein, said recesses in combination

forming a chamber 20, said chamber being of such a construction that all carbon dust loosened by the electrical current will be contained therein, consequently eliminating short circuits.

Interposed between the carbons 16 is the mica insulation 21, said mica plate being substantially similar to the cross section of a channel bar, the base thereof extending through the chamber 20 dividing the same and the flanges extending upwardly between the sides of the carbons, consequently forming a slight gap at the upper side of the carbons. It is known that lightning and electricity will jump slight gaps and at times very large gaps, as a result the electricity of high potential entering one of the carbons could jump to the other carbon, at which time the carbon dust loosened thereby will be received in the chamber 20, the carbon dust falling in the chamber 20 is separated by dropping on each side of the partition formed by the base of the mica filament or insulation 21, and is insulated thereby, there being no direct connection at any time between the carbons 16.

An L-shaped strip of asbestos is interposed between the carbons and the binding post 10 and extends down one side thereof forming an insulation between the choke coil 15 and the carbons 16 adjacent thereto. A slot 22 is provided adjacent the bend in the asbestos insulation and provides a means whereby the spring 18 may extend therethrough and bear directly against the carbon, consequently the current will always be in line with one of the carbons. Should the potential be increased by lightning or other causes, the electricity will jump the gap at the upper extremity of the carbons and the surplus thereof will flow through the spring 17, the binding post 11, and to the ground through the lead 13.

A glass fuse chamber B is disposed below the carbon chamber A and has at its upper extremity a reduced portion 23, adapted to be received in the lower extremity of said chamber A, said fuse box and carbon chamber being separated by the asbestos insulation 24. A screw 25 passes through the upper extremity of the glass box B and is received in the brass plate 26 carried at the upper side of the fuse block 27. A hexagonal copper plate 28 is interposed between the brass plate 26 and the fuse block 27, said copper plate being provided with a series of outwardly bent teeth or lugs 29. The fuse block 27 is constructed in two portions, the upper portion thereof 27′ being provided with a series of vertical slots 30 and is connected to the base portion 32 thereof by the reduced portion 31. A series of fuse wires 33 are placed in the slots 30 and are connected at their upper extremities with the teeth 29, the lower extremities thereof being connected to the successive fuse operating springs indicated in general as C. Located in the base portion 32 and directly under the slots 30 are a series of screws 34 which have no connection with each other and which form a means of securing one terminal of the springs C. One of the screws 34 is connected by a wire 35 to the binding post 36, which completes the main circuit. The springs are approximately L-shaped and are secured at one terminal to one of the screws and extend upwardly and over the next adjacent screw to the right, having superposed above said screw a coil 37. The wire then extends vertically and is secured to the lower extremity of the fuse wires 30. From this construction it will be seen that upon disconnecting one of said fuse wires from the spring, the spring will drop due to the presence of the coil 37 and the angularly bent arm 43 bearing on the base 32, forming a connection between the screw to which one terminal is attached and the screw adjacent thereto on the right. From this description it will be seen that the current which flows through the brass plate 26 to the hexagonal copper plate 28 will flow to any one of the teeth, and consequently the fuse connected thereto which is connected to the screw that is in turn in operative connection with the binding post 36. Should the fuse forming the conductor of the current for any reason become melted, the spring connected thereto will drop causing the fuse and spring next adjacent thereto to the right to be brought into the circuit, and consequently provide an instantaneous connection. The fuse block may be constructed to carry any number and quality of fuses, said fuses being of any size and standard. The fuse block is connected to the binding post 12 of the carbon chamber by an L-shaped connection 38, the base thereof having an opening 39 therein through which the screw 29 passes, the vertical section thereof being bifurcated, forming the arms 40, said arms being clamped between the terminal of the choke coil 15 and the side of the porcelain cup A. Thus it will be seen that under ordinary circumstances the current will enter the present invention through the lead 14, pass through the coil 15 into the connection 38, and thence to the screw 25 and the fuse connected to the binding post 36 where it continues to the telephone or instrument in combination with which it is operated.

From the foregoing it will be noted that, should lightning strike a line before it enters the carbon compartment A, the choke coil will present resistance enough to the potential of the current to deflect the surplus thereof through the spring 18 to the

carbons 16, causing the current to jump the gap therebetween and flow out to the ground as heretofore described, any dust formed thereby being collected in the insulated chamber 20. However, should the potential be sufficient to force an overflow current through the choke coil 15 and into the fuse block, the same will burn out one of the fuses, and as the increased potential will be only instantaneous, the circuit will be completed immediately by the successive fuse mechanism.

In Fig. 9 is illustrated a construction wherein the present invention is applicable to a return circuit, showing the same attached to brackets of the ordinary usual construction. The binding post 10′ is connected to a porcelain bar 41, the lower binding post 36′ being attached to a similar porcelain bar 41′. The ground binding post 11′ is connected by a conducting bar 42 from which the ground lead 13′ extends. This construction permits double safety to be supplied to a circuit, both circuits having admittance to one ground wire. A construction of this nature also may be used in a single circuit by disconnecting one of the fuse boxes.

It is to be understood that in the foregoing description where glass is mentioned, any other suitable nonconductor may be employed and that where brass is specified, any other suitable conductor may be used. It is also to be understood that the several parts may be made of any suitable sizes or proportions. The construction is not to be limited in reference to specific details except as may be required by the state of the art and the claims hereinafter specified.

Having thus described my invention, what is claimed as new is:

1. An automatic successive fuse comprising a fuse block having a central reduced portion, a copper plate having a series of teeth formed therein carried on the upper end of said fuse block, a series of fuses carried by the upper portion of said fuse block, each fuse being connected to one of said teeth, a plurality of screws carried by the lower portion of said fuse block, each screw being disposed directly below one of said fuses, a plurality of angular springs secured to said screws and having the free terminals thereof secured to the terminal of the fuse disposed directly over the next adjacent screw, said spring adapted to bear on said screw when released by said fuse, means whereby the current may be conducted from one of said screws to the binding post of the main line lead, and means whereby the current may be conducted from a lightning arrester to said copper plate.

2. An automatic successive fuse comprising a circular fuse block having a central reduced portion, and a series of slots in the upper end thereof, a copper disk mounted on the upper terminal of said fuse block provided with a series of outwardly projecting lugs formed therefrom, a series of fuses contained in said slots secured at their upper terminals to said lugs, a series of screws carried in the lower portion of said fuse block, one of said screws being connected to the main line lead; a plurality of angular springs secured at one terminal thereof to said screws and provided with a centrally disposed coil, the free terminal thereof being secured to the fuse superposed above the next adjacent spring, and means whereby said copper disk may be connected with a lightning arrester.

3. An automatic successive fuse, comprising a fuse block having a central reduced portion, a series of fuses carried in the upper part of said fuse block, a series of screws carried in the lower portion of said fuse block, one of said screws being connected to the main line lead, and a series of springs interposed between said fuses and screws, each spring adapted to drop on the next adjacent screw when the fuse connected thereto melts.

4. An automatic successive fuse comprising in combination, a plurality of fuses, a plurality of L-coil springs supported by said fuses, one of said springs being connected to an outlet lead, and means whereby each of the remaining springs may coöperate with said last named spring upon the melting of its supporting fuses.

5. An automatic successive fuse comprising a stationary fuse block having a central reduced portion, a series of fuses carried by the upper portion of said fuse block, a series of screws carried in the lower portion of said fuse block, each screw being directly under the fuse, angular springs attached to said screws at one terminal and secured at the opposite terminal to the fuse directly over the next adjacent screw, each of the said springs having a coil therein adapted to bear on the next adjacent screw, and means whereby the current is conducted from one of said screws to the main line lead.

6. In a protector for electrical circuits, comprising in combination with main line leads, a fuse block, a distributer plate carried by the upper terminal of said fuse block, and connected to one of the remaining line leads, a plurality of fuses mounted in said fuse block having their upper terminals connected to said distributing plate, a spring supported by each fuse, one of said springs being connected to the remaining lead line lead, the remaining springs coöperating with the last named spring upon the melting of the supporting fuse.

7. In a protector for electrical circuits,

comprising in combination with main line leads, of a fuse block interposed therebetween, a distributing plate carried by the upper terminal of said fuse block, having a series of upwardly extending teeth formed therefrom, a series of fuses mounted in said block having their upper terminals connected to said teeth, a connection whereby said plate may be in circuit with one of said main line leads, and a spring supported by each fuse, one of said springs being connected to the remaining line leads, the remaining springs adapted to coöperate with said last named spring upon the blowing out of each fuse successively.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES OLIVER HOLTON, Jr.

Witnesses:
H. L. Brown,
Arthur Suttles.