

C. J. LINCOLN & E. E. WEIL.
HIGH TENSION CURRENT PROTECTOR.
APPLICATION FILED JULY 8, 1908.

982,281.

Patented Jan. 24, 1911.

2 SHEETS—SHEET 1.

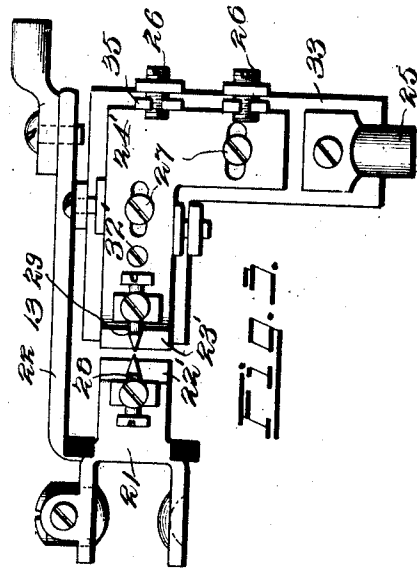
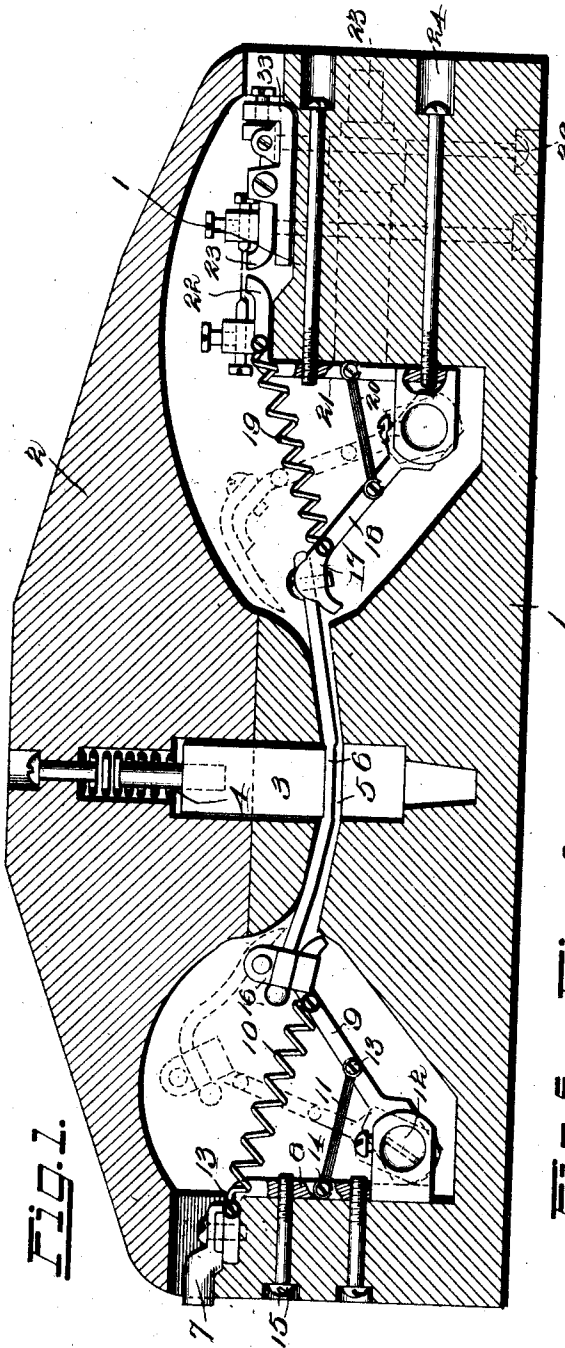


FIG. 3.

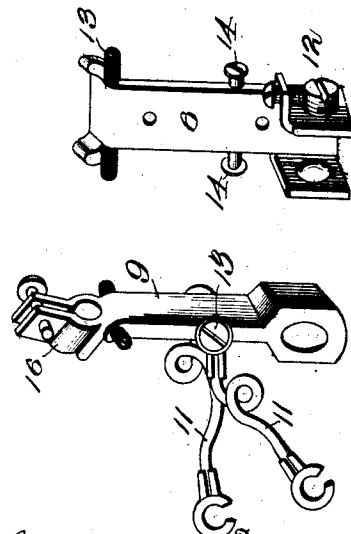


FIG. 5.

Witnesses
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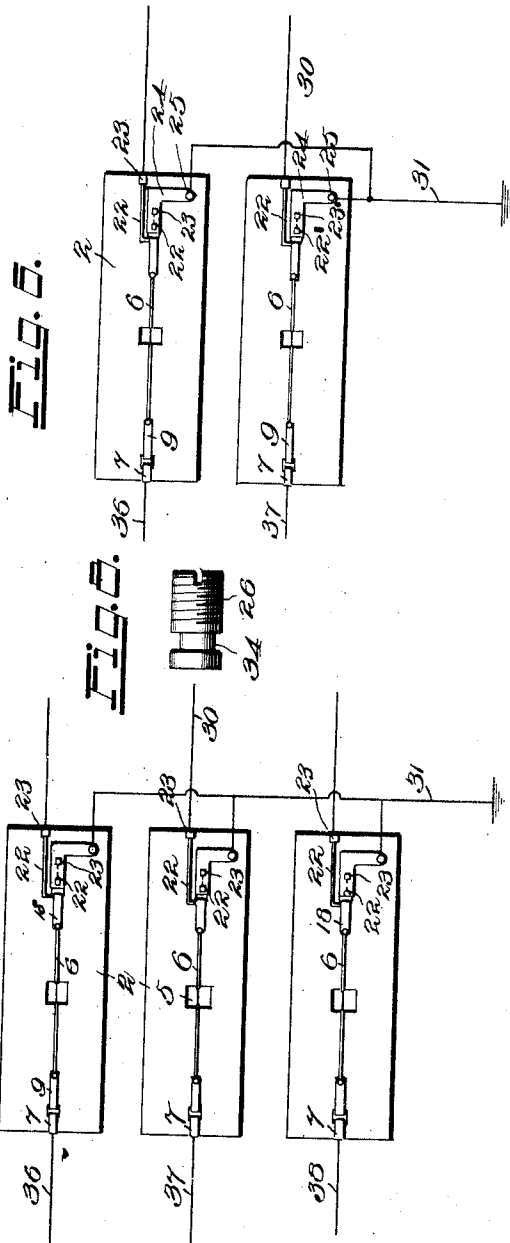
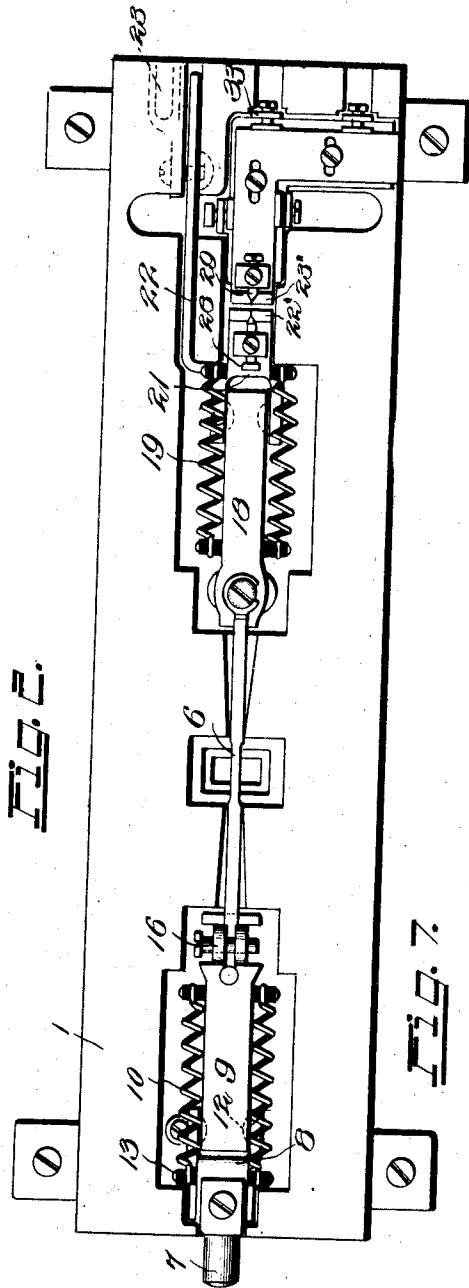
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UNITED STATES PATENT OFFICE.

CHARLES J. LINCOLN AND EDGAR E. WEIL, OF NEW ORLEANS, LOUISIANA.

HIGH-TENSION-CURRENT PROTECTOR.

982,281.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES J. LINCOLN and EDGAR E. WEIL, citizens of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in High-Tension-Current Protectors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to high tension current protectors, and has for its object the production of a protector that will be simple and certain in action, and comparatively inexpensive to manufacture.

To these ends our invention consists in the novel construction and combinations of parts for protecting lives and property against abnormally high voltages on electric circuits as will be more fully hereinafter disclosed, and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals refer to like parts in all the views:—Figure 1 is a sectional elevational view taken through the center of our protector. Fig. 2 is a plan view with the cover removed. Fig. 3 is a detail plan view of the parts comprising the ground or shunt circuits. Figs. 4 and 5 are perspective views of detached connecting parts. Figs. 6 and 7 are diagrammatic views showing how a plurality of our protectors may be joined in circuits, and Fig. 8 is an enlarged detail view of a screw we employ.

1 represents the lower portion and 2 the cover, or upper portion, of any suitably shaped block made of any suitable insulating material; preferably, however, this block is shaped and channeled as shown, and is made of porcelain. Incased in the block is a plunger 3 under the control of the spring 4, which normally tends to force the plunger down and across the channel 5 as shown.

6 is a fuse in the channel 5 against which the plunger presses. This fuse is adapted to carry a somewhat larger current than the other fuses in the circuit, and may be made smaller at the point of contact with the plunger than at other places if desired.

7 is a terminal lug to which the line wire is connected, and is secured to the block in any suitable manner, while 8 is any suitable

conductor joining said lug with the pivoted arm 9; but preferably this conductor is of the shape shown in Fig. 4. A spring or springs 10 connect the arm 9 with an insulated pin or pins 13 on the block and tend to constantly force the same back into the dotted line position shown.

11 is a pair of flexible connections between the said arm and the conductor 8, which insure at all times a circuit past the pivot 12 of the arm; and the arm is provided with a pair of pins 13, and the conductor 8 a pair of pins 14 to receive the connections 11 as shown.

15 are any suitable fastenings for securing the conductor 8 to the block, and 16 any suitable means, preferably a clamp, for securing one end of the fuse 6 to the pivoted arm 9.

17 represents a clamp similar to clamp 16 for securing the other end of the fuse 6 to a pivoted arm 18, provided with an insulated spring or springs 19, and connections 20 similar to the spring 10 and connections 11, respectively; and this spring 19 likewise normally tends to force the arm 18 into its dotted line position shown in Fig. 1.

21 is a conducting strip for joining the arm 18 to the conductor 22, which leads to the other terminal lug 23 of the circuit; and 24 are any suitable fastenings for securing the parts to the block.

So far as now described if an abnormally heavy current should enter at the lug 7, traverse the fuse and leave at the lug 23, the fuse would blow and the parts of the same would separate under the action of the springs 10 and 19, all as is well known. In our invention, however, the plunger 3 would descend; and in the case of an abnormally high tension current on the line other actions would take place as will now be described.

The conductor 21 is provided with a knife-like extension 22', opposed to which is a similar knife-like extension 23' carried by the adjustable conducting piece 24', which through the lug 25 may be connected to the neutral wire of the system or to a suitable ground. The knife edges 22' and 23' form an air gap, which may be regulated by adjusting the plate 24' by means of the screws 26; and the said plate may then be secured in position by means of the screws 27. The knife edge 22' carries the needle pointed screw 28, and the knife edge 23' carries the

needle pointed screw 29, forming between them an adjustable air gap for the passage of a pilot spark.

With the construction just described added to the structure previously disclosed, should an abnormally high voltage be suddenly thrown on the line, a pilot spark would pass between the needle points 28 and 29, break down the air gap between the knife edges 22' and 23', and thereupon form a short circuit to the neutral wire 30, or ground 31, or both, see Figs. 6 and 7. If the high tension current is of a voltage not sufficient to break down the air gap between the knife edges, the fuse 6 will not blow at all, and the protector will be ready for operation again; but if a sufficient amperage passes the fuse will blow; its parts will be separated by the springs 10 and 19; and the plunger 3 will descend to physically break any arc that might form in the channel 5. In the meantime, of course, the excess of current has been diverted to the neutral wire, or to the ground. Of course, when the line is carrying a normal current, or one about great enough to blow the ordinary fuses, the fuse 6 will not blow, and the protector will remain ready to divert currents having abnormally high voltages in the manner stated.

In order to properly adjust the air gap so that the ordinary commercial currents of 110 or 220 volts may not be diverted, and, yet, currents of a higher voltage will be diverted, we provide the screws 32' shown in full lines in Fig. 1, for raising and lowering the plate 33 carrying the knife edge 23'; so the latter as well as the needle point 29 has a vertical as well as a horizontal adjustment. The screws 26 shown in Figs. 3 and 8 for adjusting the plate 24 are provided with channels 34 into which the lugs 35 of the said plate fit, and thereby the plate may be positively moved back and forth in a horizontal direction.

32 represents screws or other fastening means for holding the parts together.

In Fig. 6 two protectors are shown joined to the feed wires 36 and 37, and provided with short circuits to the neutral wire 30, and ground 31.

In Fig. 7, three protectors are illustrated joined to the feed wires 36', 37 and 38, and likewise provided with short circuits to the ground 31 and neutral wire 30.

It will be observed that our protector is not intended to take the place of the ordinary fuse at all, but is to be used in connection with fuses of a smaller current carrying capacity than the fuse 6, so that under ordinary conditions the fuse 6 will not blow; but when a transformer breaks down for instance, or a cross occurs between high and low tension wires, or a lightning current gets on the line, this protector will cause an

opening of the circuit conveying current into a building, and thereby protect the same from the effects of such high tension currents. It is well known that ordinary fuses cannot be depended on to do this, for the reason, among others, that such high tension currents may arc over the fuse gaps. In other words this invention provides a protection which is three fold in its nature:—The fuse itself will blow when the air gap breaks down; the springs 10 and 19 so widen the arc gap as to prevent an arc from forming; and the plunger physically shuts off any arc that might form. It will also be observed from Figs. 6 and 7 that the neutral wire is grounded and that the connections are such that the current due to a cross on the outside between one or more lead wires with a high tension wire can immediately find its way to ground; or there will be a dead short circuit when the air gap breaks down, leaving the buildings in which the protectors are placed clear of high tension voltages. This protector is adapted for circuits of all kinds, and in practice the usual rubber fittings to keep the block airtight will be supplied.

We do not wish to be limited to the exact details of construction and mode of operation above disclosed, for it is evident that both may be varied by those skilled in the art without departing from the spirit of our invention.

What we claim is:—

1. In a device of the character described, a spark gap comprising a pair of knife edges and a pair of needle points located in close proximity to said knife edges, said knife edges and said needle points being separated by an air gap, substantially as described.

2. In a device of the character described, a spark gap provided with a pair of knife edges, leaving an air gap between, and also provided with a pair of needle points and with means for adjusting one of said knife edges toward and away from the other, substantially as described.

3. In a device of the character described, a spark gap comprising a pair of knife edges separated so as to leave an air gap between them, a pair of needle points in proximity to said knife edges, and means for horizontally and vertically adjusting one of said knife edges, substantially as described.

4. In a high tension current protector, the combination of circuit terminals, a fuse and connections between said terminals, a ground connection leading from a point between said terminals to the ground, and provided with a pair of knife edges and a pair of needle points located in close proximity to said knife edges, said knife edges and said needle points being separated by an air gap, substantially as described.

5. In a high tension current protector, the

combination of circuit terminals, connections, including a fuse, between said terminals, a ground connection connected to the circuit between said terminals, said ground connection being provided with a pair of knife edges, leaving an air gap therebetween, and also provided with a pair of needle points and means for adjusting one of said knife edges toward and away from the other, substantially as described.

6. In a high tension current protector, the combination of a block, a pair of circuit terminals secured to said block, connections between said terminals, including a fuse, a ground connection leading from said first named connection to the ground, comprising a pair of knife edges separated so as to leave an air gap between, and a pair of needle points in proximity to said knife edges, and means for horizontally and vertically adjusting one of said knife edges, substantially as described.

7. In a high tension protector, an adjustable air gap comprising knife edges; needle points connecting with said edges; the plate

24; adjusting screws for moving said plate horizontally; and the screws 27 for fixing said plate in position after it is adjusted, substantially as described.

8. In a high tension protector and adjustable air gap comprising the knife edges 22 and 23; the needle points 28 and 29 adjustable toward each other and carried by said knife edges; the plate 24 carrying said knife edges 23, and provided with lugs 35; the adjusting screws 26 for moving said plate horizontally provided with the channels 34 for receiving said lugs 35; means for adjusting said plate vertically, and the screws 27 for fixing said plate in position after it is adjusted horizontally, substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

CHARLES J. LINCOLN.
EDGAR E. WEIL.

Witnesses:

ROBT. P. UPTON,
J. M. WINTERS.