S. W. WOOD & E. T. THOMA.

COMBINATION SWITCH AND LIGHTNING ARRESTER.

APPLICATION FILED MAY 25, 1909.

946,418.

Patented Jan. 11, 1910.

2 SHEETS—SHEET 1.

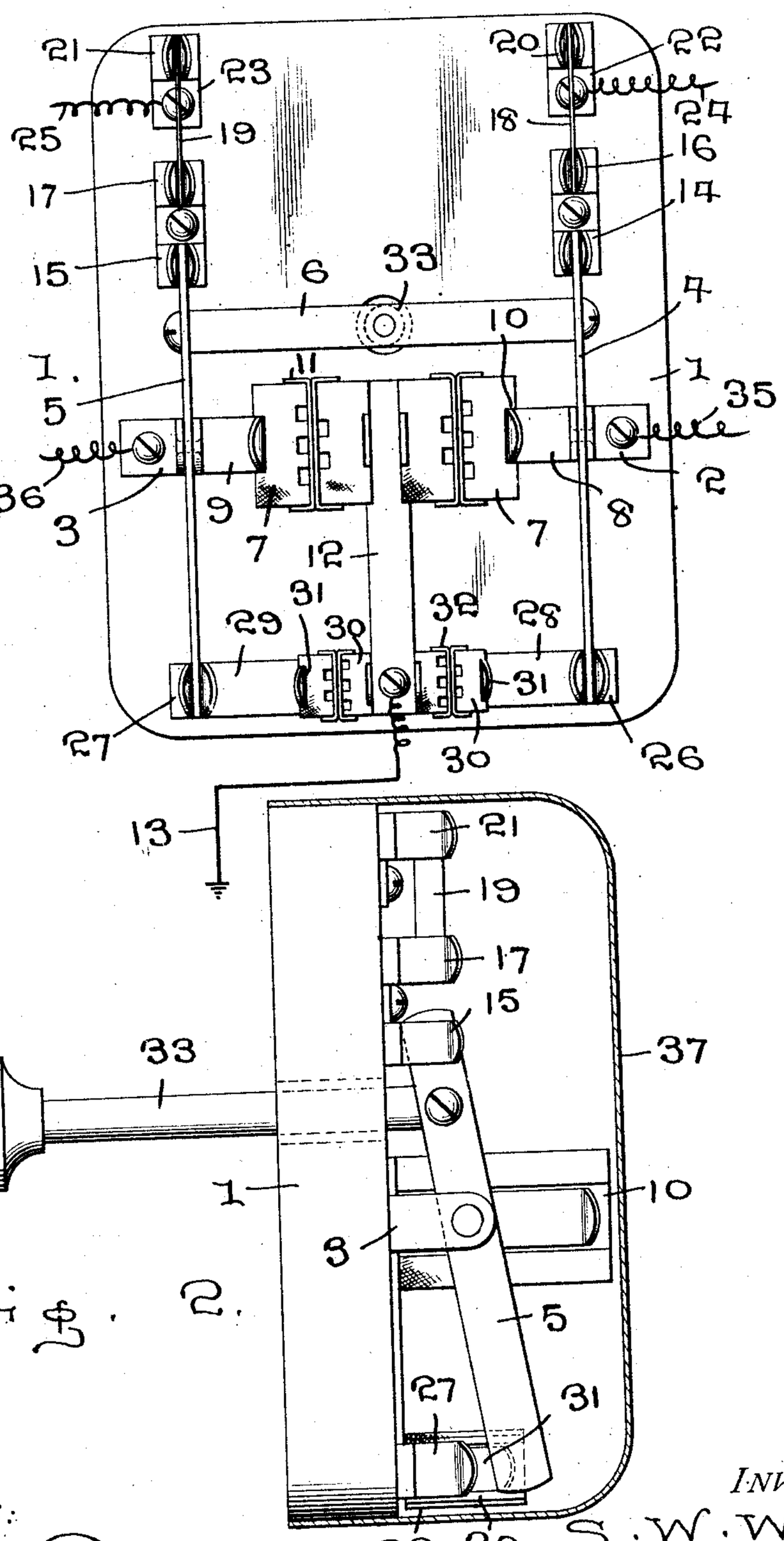

Fig. 1.

Fig. 2.

WITNESSES:

Thos. W. Riley

M. A. Newcomb.

INVENTORS

S. W. Wood

E. T. Thoma

BY

W. J. FitzGerald & Co

Attorneys

S. W. WOOD & E. T. THOMA.

COMBINATION SWITCH AND LIGHTNING ARRESTER.

APPLICATION FILED MAY 25, 1909.

946,418. **Patented Jan. 11, 1910.**

2 SHEETS—SHEET 2.

Fig 3.

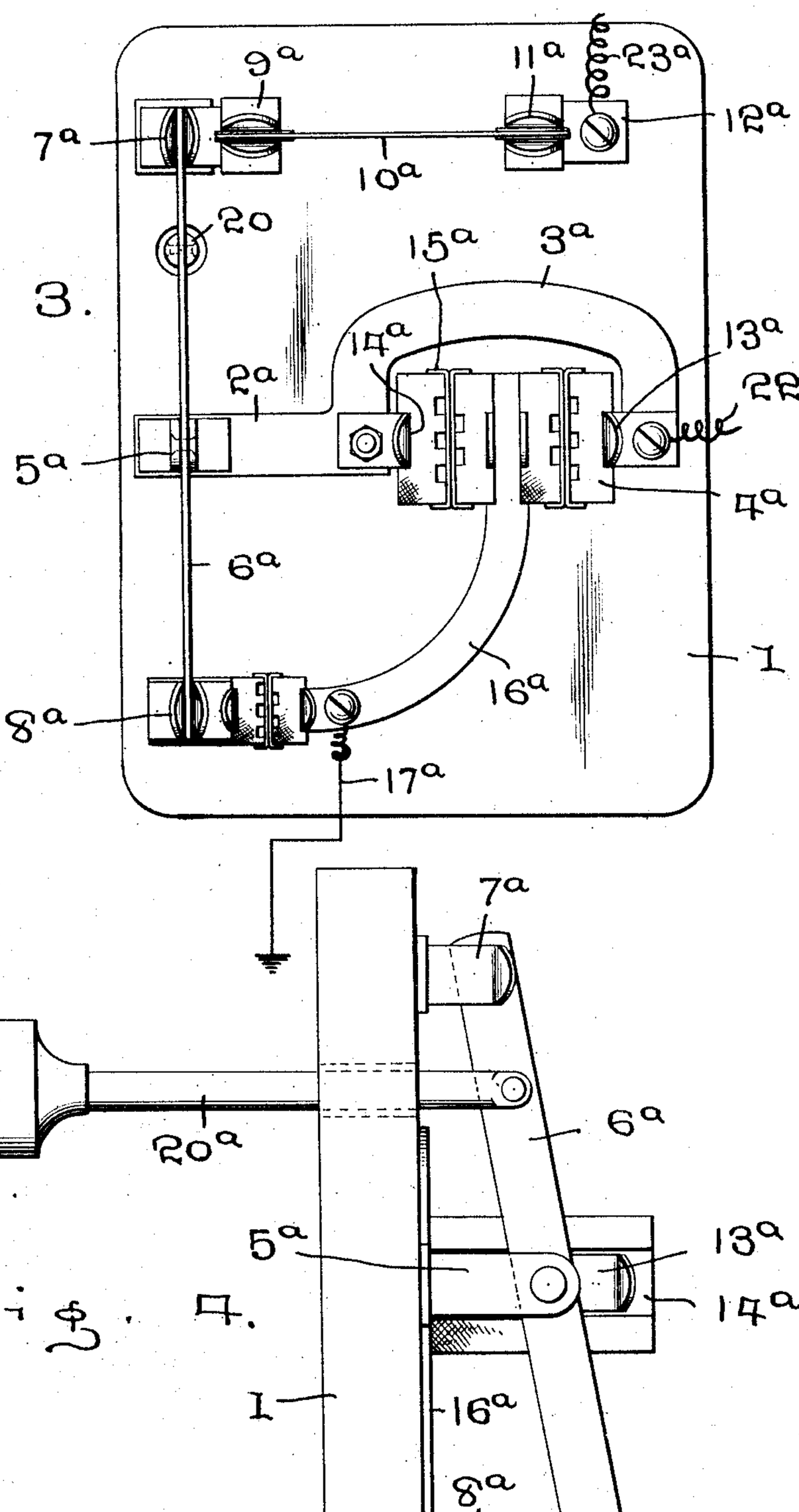

Fig. 4.

WITNESSES:

Thos. W. Riley

M. A. Newcomb

INVENTORS

S. W. Wood

E. T. Thoma

BY

W. J. Fitz Gerald & Co

Attorneys

UNITED STATES PATENT OFFICE.

SAMUEL W. WOOD AND EDWIN T. THOMA, OF LOOKEBA, OKLAHOMA.

COMBINATION SWITCH AND LIGHTNING-ARRESTER.

946,418. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed May 25, 1909. Serial No. 498,341.

To all whom it may concern:

Be it known that we, SAMUEL W. WOOD and EDWIN T. THOMA, citizens of the United States, residing at Lookeba, in the county of Caddo and State of Oklahoma, have invented certain new and useful Improvements in Combination Switches and Lightning-Arresters; 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 new and useful improvements in combination switch and lightning arresters and more particularly to that class adapted to be used in connection with telephone or telegraph instruments and our object is to provide means for preventing the instrument from becoming injured by lightning.

A further object is to provide means for operating a switch for disconnecting the main wire from the telephone.

A further object is to provide carbons and bridge the current around said carbons and a further object is to convey the current passing through the carbons to the ground and a still further object is to provide carbons between the bridged circuit and the ground wire.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claims.

In the accompanying drawings forming part of this application, Figure 1 is a plan view of our improved lightning arrester, showing a double switch and telephone connection. Fig. 2 is an edge elevation thereof showing the cover thereof in section. Fig. 3 is an elevation of a single switch and 'phone connection, and, Fig. 4 is an edge elevation thereof.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates a base, which is preferably constructed of slate, porcelain or similar nonconducting substance and to said base are attached posts 2 and 3, said posts being preferably placed adjacent the opposite edges of the base, the upper ends of said posts being bifurcated to receive switch levers 4 and 5, respectively, said levers being pivotally secured to the posts.

The levers 4 and 5 are connected together adjacent one of their ends by means of a bridge plate 6, whereby an electric current may pass from one lever to the other through the bridge plate, while immediately between the posts 2 and 3 are placed a plurality of carbon blocks 7, said blocks being held in position on the base by attaching to the posts 2 and 3, spring plates 8 and 9, respectively, which engage channels 10 in the outer faces of the outer blocks 7 and direct inward pressure thereon, the tension of the spring plates being such as to securely hold the blocks in place.

The meeting faces of the blocks 7 are preferably corrugated to increase the resistance thereof and between the plates are located insulating strips 11, which strips, however, are very thin and between the two central blocks is secured one end of a bar 12, while to the opposite end of said bar is attached a ground wire 13, whereby any current passing through the carbon blocks and the bar 12 will be conducted direct to the ground.

The ends of the lever 4 engaging the plate 6 are adapted to engage spring jacks 14 and 15, when said ends are moved inwardly and to these spring jacks are attached spring fingers 16 and 17, respectively, between which are introduced one end of fuses 18 and 19, respectively, the opposite ends of said fuses being likewise introduced between spring fingers 20 and 21, respectively on posts 22 and 23, respectively, and to these posts are attached 'phone wires 24 and 25. The opposite ends of the levers 4 and 5 are also adapted to engage spring jacks 26 and 27, respectively, when said ends are moved inwardly, the operation of moving said ends into engagement with the jacks 26 and 27 disengaging the opposite ends of the levers from the jacks 14 and 15 and by providing the jacks 26 and 27 with extensions 28 and 29, respectively, the current will be conveyed from the levers through the jacks and into the ground wire 13.

Positioned between the extensions 28 and the lower end of the bar 12 are auxiliary carbon blocks 30, which are held in position by means of spring fingers 31, which are arranged in pairs on opposite sides of the bar 12, the meeting faces of the auxiliary blocks being likewise corrugated and separated by insulating strips 32 and by this means the current in the levers 4 and 5 will be held against passing into the ground wire 13 when the voltage is normal, but should the voltage become abnormal, it will pass through the

auxiliary blocks and into the ground wire 13 through the bar 12.

The switch levers 4 and 5 are adapted to be operated from the interior of a building and to accomplish this result, a push rod 33 is extended through an opening in the base 1 and is provided on its inner end with a button 34, by which means the push rod 33 may be readily operated to change the position of the levers and as the push rod is attached to the plate 6 at its longitudinal center, both of the levers will be simultaneously operated.

For better safety, the base 1 and parts attached thereto are preferably placed on the exterior of the building, the line wires 35 and 36 being attached to the posts 2 and 3, respectively and to properly protect the parts on the base, a housing 37 is introduced thereover and as said housing entirely surrounds the base, the interior thereof will be waterproof, thus thoroughly protecting the parts within the casing.

In Figs. 3 and 4 we have shown the device applied to use in connection with a single telephone and in this construction the base has secured thereon a bridge 2^a, one portion of which is provided with an arch 3^a, between the ends of which arch are disposed carbons 4^a. One end of the bride 2^a is provided with a standard 5^a, the upper end of which is bifurcated to receive a switch 6^a, said switch being pivotally mounted to the standard and extended beyond each side thereof, one end of the switch being adapted to engage a spring jack 7^a, while the opposite end thereof is adapted to engage a similar spring jack 8^a, the object of which spring jack will be hereinafter set forth. Attached to the spring jack 7^a are spring fingers 9^a, between which is adapted to be secured one end of a fuse 10^a, the opposite end of said fuse being positioned between spring fingers 11^a carried by posts 12^a. The carbons are retained in position between the ends of the arch by attaching to said ends, spring arms 13^a, which are adapted to engage notches 14^a in the two outside carbons and direct inward pressure thereon, thereby securely clamping the carbons in position on the base and in order to increase the resistance of the carbons, the meeting edges thereof are corrugated and insulating strips 15^a are introduced between the carbons and in order to conduct the current to the ground from the carbons, a bar 16^a is placed between the two central carbons and extended downwardly therefrom, a ground wire 17^a being attached to the lower end of the bar 16^a and to the ground in the usual manner. An auxiliary carbon block 18^a is placed between the end of the bar 16^a and the spring jack 8^a, said auxiliary carbons being adapted to form a resistance to a current passing between the spring jack and bar, the meeting faces of said auxiliary blocks being corrugated and non-conducting strips 19^a are introduced between said auxiliary blocks to increase the resistance thereof. In this construction, a rod 20^a is extended through the base 1 and pivotally attached to the switch bar 6^a at a point between the standard 5^a and the spring jack 7^a, the free end of the rod having a button 21^a thereon, by which means the rod may be moved longitudinally to operate the switch 6^a. In this form of device, the line wire 22^a is attached to one end of the arch 3^a, while the telephone wire 23^a is attached to the post 12^a.

In operation, the switch levers 4 and 5, when the telephone is in use for conversational purposes, are seated between the spring jacks 14 and 15, the circuit then extending from the line wires 35 and 36 through the posts 2 and 3, levers 4 and 5, spring jacks 14 and 15, thence through the fuses 18 and 19 engaged by the fingers 16 and 20 and 17 and 21, respectively, and into the telephone wires 24 and 25. While in this position, should a heavy voltage enter from the line wires, the fuses 18 and 19 will be burned out or destroyed, thereby breaking connection between the telephone and line wires, while the circuit between the line wires will be maintained from one switch lever to the other through the medium of the bridge plate 6.

To obviate the possibility of the fuses being destroyed, as in case of lightning striking the line wires, the switch levers 4 and 5 are to be disengaged from the spring jacks 14 and 15, which is accomplished by pushing inwardly on the rod 33, this operation moving the opposite ends of the levers 4 and 5 into engagement with the spring jacks 26 and 27, so that when the voltage is increased by the lightning striking the line wires, it will pass through the levers into the extensions 28 and 29 and into the ground wire 13.

Unless the voltage is greater than the ordinary voltage, the parts of the device will not be affected and neither will the current be grounded, as the auxiliary carbon blocks will resist the current and prevent the same from passing to the ground wire, thus maintaining an uninterrupted circuit under ordinary circumstances.

In order to ground the circuit under unusual heavy voltage, as when the levers 4 and 5 are still engaged with the spring jacks 14 and 15 and the fuses destroyed, the current is forced through the carbon blocks 7 and into the bar 12, from whence it passes direct into the ground wire 13. The carbon blocks 7, however, are so arranged as to require a heavy voltage to force the current through the blocks and into the bar, thus preventing the circuit from being grounded under ordinary circumstances.

By bridging the current and placing the resistance as shown between the line wire

and ground wire, it will be readily seen that the breaking of the circuit of the line and telephone wires will not interfere with or interrupt the circuit in the line or other telephones on the line and it will likewise be seen that when the levers are disconnected from the telephone wires, they will act as a return for what is commonly known as sneak currents in view of the auxiliary carbon blocks between the levers and ground wire. It will likewise be seen that the telephones will be fully protected from injury from excess voltage by disconnecting the levers from the telephone wires or by providing the fuses as shown and it will likewise be seen that the parts of the device are protected from injury from the excess voltage by providing the ground wire and the resistance as shown.

What we claim is:

1. In a device of the class described, the combination with telephone wires and line wires, of a nonconducting base, a lever pivoted adjacent to its longitudinal center, pivot-supporting means for said lever, spring-jacks engaged by the ends of said lever, additional spring-jacks, one juxtaposed with relation to one of the first referred to spring-jacks, a fuse between the last referred to spring-jacks and the telephone wires, a bridge member, means effecting connection between said bridge member and said lever, carbon blocks interposed between said telephone wires and line wires, a conductor bar connected to said carbon blocks, a ground wire attached to said conductor bar and an auxiliary carbon block arranged between said lever and the ground wire.

2. A device of the class described, comprising telephone wires and line wires, a nonconducting base, levers pivoted adjacent their longitudinal centers, posts secured to said base and forming supports for the pivots of said lever, spring-jacks at each end of said levers, additional spring-jacks one juxtaposed with relation to the first referred to spring-jacks, fuses between the last referred to spring-jacks and the telephone wires, a bridge member effecting connection between said levers, carbon members interposed between said telephone wires and said line wires, a conductor bar connected to said carbon blocks, a ground wire connected to said conductor bar, and auxiliary blocks arranged between said levers and the ground wire.

3. A device of the class described, comprising line wires and telephone wires, a base member, posts secured to said base member for said wires, levers pivoted adjacent to their longitudinal centers to said posts, spring-jacks at the ends of said levers, additional spring-jacks, one juxtaposed with relation to the first referred to spring-jacks, and fuses between the last referred to spring-jacks and the telephone wires, a bridge member effecting connection between said levers, carbon blocks interposed between said telephone wires and line wires, a conductor bar connected to said carbon blocks, a ground wire attached to said conductor bar, an auxiliary carbon block arranged between said levers and said ground wire, and means for actuating said levers as in effecting the engagement of said levers with the first referred to spring-jacks in making and breaking the circuit.

4. A device of the character described comprising telephone wires and line wires, a nonconducting base, posts secured to said base, levers pivoted adjacent their longitudinal centers upon said posts, spring-jacks engaged at the ends of said levers, additional spring-jacks, one juxtaposed with relation to one of the first referred to spring-jacks, fuses between the last referred to spring-jacks and the telephone wires, spring-plates, a bridge member effecting connection between said levers, carbon blocks interposed between said spring-plates and said levers, a conductor bar connected to certain of said carbon blocks, thin insulating strips interposed between said carbon blocks, a ground wire attached to said conductor bar, auxiliary carbon blocks arranged between said levers and said conductor bar, additional thin insulating strips interposed between said auxiliary carbon blocks, said carbon blocks also having corrugated surfaces of contact with said strips.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

SAMUEL W. WOOD.
EDWIN T. THOMA.

Witnesses:
FRANCES M. METTS,
W. E. HOAGLAND.