Sept. 11, 1928. 1,683,783

C. J. KELLOWAY

COMBINED LIGHTNING ARRESTER AND RESISTANCE UNIT

Filed Jan. 22, 1923

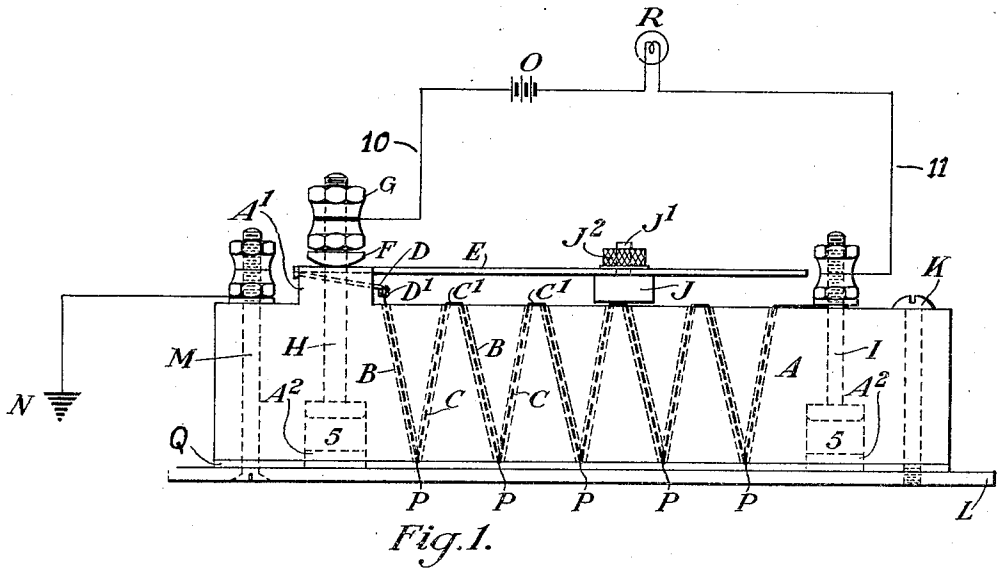


Fig. 1.

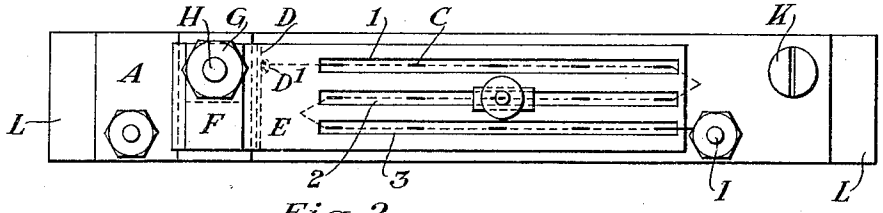


Fig. 2.

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Patented Sept. 11, 1928. 1,683,783

UNITED STATES PATENT OFFICE.

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COMBINED LIGHTNING ARRESTER AND RESISTANCE UNIT.

Application filed January 22, 1923. Serial No. 614,201.

My invention relates to combined lightning arresters and resistance units.

I will describe one form of unit embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a view, partially diagrammatic, showing in front elevation, one form of unit embodying my invention and one form of electrical circuit for use therewith. Fig. 2 is a top view of the unit shown in Fig. 1.

Similar reference characters refer to similar parts in each of the views.

Referring to the drawing, the reference character A designates a block of insulating material such as porcelain or glass. This block A is provided with a plurality of holes B through which a conductor C is threaded. The holes are so disposed that the conductor passes successively from the lower to the upper side and from the upper side to the lower side of the block A, thus permitting portions of the conductor C to be exposed on two surfaces of the block. As here shown there are three rows of holes B, and the conductor is threaded through these holes in such manner that the conductor comprises three rows connected in series. One end of conductor C is connected with a suitable binding post H by means of a plate D to which this conductor is fastened by a screw D'. The other end of the conductor C is connected with a second binding post I. The stems of these two binding posts H and I are provided with heads which are inserted in suitable recesses A^2 in the bottom of the block A which recesses are thereafter filled with sealing compound as at 5, Fig. 1.

It is clear, therefore, that conductor C, thus threaded through the insulating block A, may be considered as a resistance unit, and the portions C' of this conductor which protrude from the upper surface of block A may be used as taps to vary the resistance of the unit. This is accomplished as follows:

The connecting plate D rests on the top surface of a lug A' on block A, which surface is bevelled so that this plate slopes as indicated in Fig. 1. A flat spring member E is provided near one end with a hole to accommodate the stem of binding post H. The member E is held in place adjacent plate D by means of a block F having a rounded lower surface which block is forced into engagement with spring member E by the nut G of binding post H. The spring member E is also provided with a plurality of longitudinally extending slots 1, 2 and 3. A contact shoe J is provided with a stem J' which may be inserted in any one of these slots and may be restrained in any given position by means of a nut J^2 threaded on this stem J'. Since the upper surface of the lug A' is bevelled, shoe J is forced into contact with the taps C' with considerable pressure when nut G is tightened.

It is clear that by moving shoe J to the right or left in the proper slot of member E any desired amount of resistance may be cut in or out, thus making it possible to effect a wide range of resistance within the limit of the conductor C.

The porcelain block A is mounted upon a base plate L by means of screw K and the stem of a binding post M. Interposed between base plate L and block A is a thin sheet Q of some suitable material having a very high resistance such as carborundum. As shown in the drawing, this carborundum sheet makes electrical contact with conductor C at each point P.

In operation any required portion of the conductor C is included in an electrical circuit, as in series with a source of energy such as a battery O and an electro-responsive device as a lamp R. This connection is effected by binding posts H and I. Base plate L, which is in contact with the under side of carborundum sheet Q, is connected to the ground by means of binding post M.

Under the influence of direct current or alternating current of relatively low frequency and voltage, the zig-zag or tortuous shape of conductor C has relatively little effect so that the tendency of such currents to flow through the high resistance plate Q to ground is negligible. A lightning discharge, however, being an oscillating current of relatively high frequency and voltage, seeks the shortest path to ground even if the resistance of such path is comparatively high, and so when such a discharge enters the unit from either wire 10 or 11 it passes through the first strand of conductor C which it encounters and then goes directly through plate Q to ground. Such a discharge is thus dissipated without causing damage to the other apparatus in circuit with the protective device.

Combined lightning arresters and resistors constructed in accordance with my invention are particularly adapted for, though in no

way limited to, application to railway signaling circuits for protecting the signaling apparatus against failure due to burned out resistors during and as a result of electrical storms in the vicinity.

Although I have herein shown and described only one form of unit embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a block provided with two terminals for connection with an electrical circuit, a conductor of resistance material supported by said block and having its ends connected with said terminals, adjustable means for shunting out any desired portion of said conductor, a member of relatively high resistance in contact with a plurality of points along said conductor, and means for connecting said member with ground.

2. In combination, an insulating block provided with a plurality of holes therein, a resistance wire threaded through said holes thereby allowing portions of said wire to form taps protruding from two faces of said block, means for selectively engaging said taps on one said face for varying the effective length of said wire, an electrical circuit including said means and a portion of said wire, and a sheet of carborundum having one side in contact with the said taps on the remaining face of said block and its other side connected with the ground.

3. In combination, a block of insulating material, a conductor threaded through said block and protruding therefrom on two opposite faces, movable contact apparatus adapted to engage with said conductor on one face of said block, and means for connecting said conductor on the other side of said block with ground through a high resistance.

4. In combination, an insulating block having an upstanding lug thereon, a resistor inserted in said block and protruding at intervals therefrom to form taps, a spring member supported by said lug and adjacent said resistor, and a contact shoe interposed between said member and said block and adapted to engage said taps, a conducting plate connected with the ground, and a member of high electrical resistance interposed between said plate and said block and making contact with said plate and said resistor.

5. In combination, a block provided with two terminals for connection with an electrical circuit, a conductor of resistance material threaded through said block to provide a relatively tortuous path for electric current and having its ends connected with said terminals, adjustable means for shunting out any desired portion of said conductor, a member of relatively high resistance in contact with a plurality of points along said conductor, and means for connecting said member to ground, whereby a high voltage discharge entering said conductor from either end finds a relatively direct path through said member to ground.

6. In combination, a block provided with two terminals for connection with an electrical circuit, a conductor of resistance material supported by said block and having its ends connected with said terminals, a movable shoe electrically connected with one said terminal and arranged to contact with any one of a plurality of points along said conductor whereby a variable amount of the conductor may be shunted, a member of relatively high resistance in contact with a plurality of points along said conductor, and means for connecting said member with ground.

In testimony whereof I affix my signature.

CHARLES J. KELLOWAY.