Feb. 7, 1933. E. A. EVERETT 1,896,813

ELECTRIC DEVICE

Filed Dec. 24, 1928

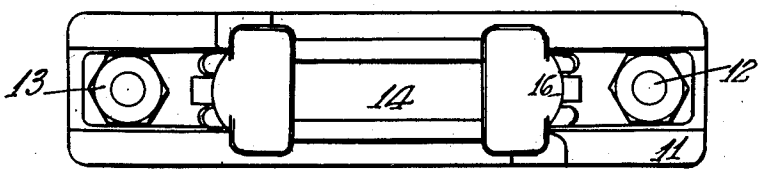


Fig. 1

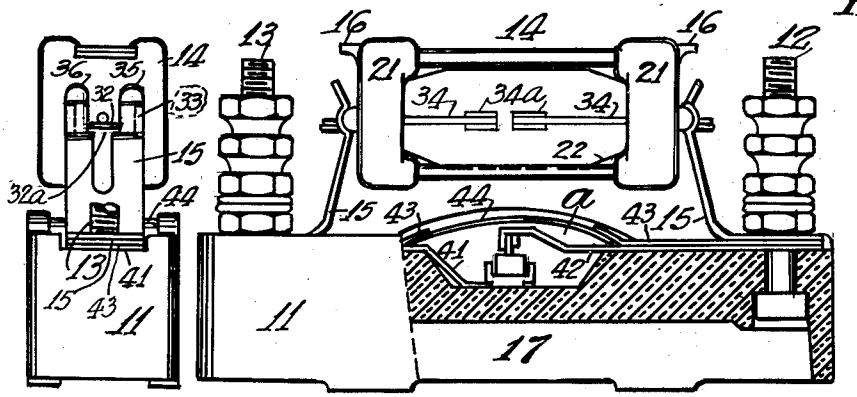


Fig. 2

Fig. 3

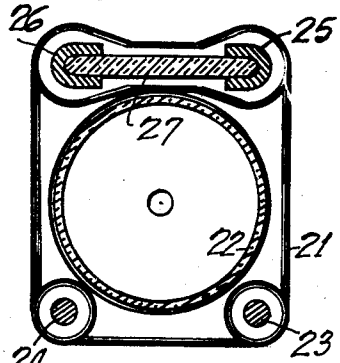


Fig. 4

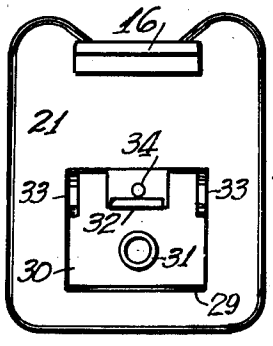


Fig. 5

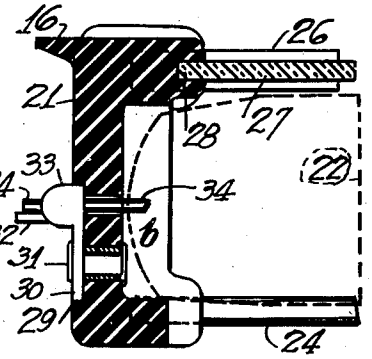


Fig. 6

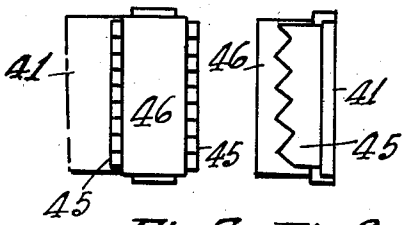


Fig. 7 Fig. 8

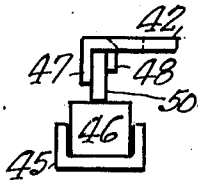


Fig. 9

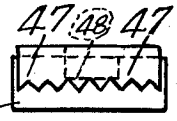


Fig. 10

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UNITED STATES PATENT OFFICE

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ELECTRIC DEVICE

Application filed December 24, 1928. Serial No. 328,270.

This invention relates to lightning arresters and more particularly to a combination of spark gap and vacuum type arresters and has for an object to provide an improved mounting for an evacuated tube containing arrester elements and for a spark gap arrester which may be assembled and disassembled without changing its characteristics. Other objects of the invention reside in the construction and arrangement of the parts as more fully described in the following specification and shown in the accompanying drawing, selected to illustrate one form of my invention and, in which, Fig. 1, is a plan view of an arrester constructed according to my invention, Fig. 2 is an elevation, partly sectioned, showing certain parts of the construction. Fig. 3 is an end elevation with the binding post omitted, Fig. 4 is an enlarged elevation taken from the inside of the vacuum tube mounting, Fig. 5 is a corresponding elevation of the vacuum tube mounting taken from the outside, Fig. 6 is a sectional elevation of the tube mounting, Fig. 7 is a plan view and Fig. 8 is a corresponding elevation of the spark gap portion of the arrester, Fig. 9 is an enlarged side elevation of the spark gap feature and Fig. 10 is a detail showing the spacer used to secure the spark gap.

The present arrester comprises a porcelain base upon which is detachably mounted a vacuum tube containing discharge electrodes. One form of tube for this purpose is filled with neon gas and the discharge is obtained by the ionization of this gas. This invention, however is directed to the mounting of the tube and is useable with any type of discharge electrodes. The mounting comprises a pair of similar end caps of moulded insulation spaced by a plurality of parallel bars. The ends of the tube project into recesses in the caps and the terminals from the tube connect to end plates on the caps through which the electrical connections are made.

In the base of the device and connected in multiple circuit with the vacuum tube electrodes is an arrester of the spark gap type in which the sparking electrodes are spaced by a plate of mica and are maintained at a uniform distance by spring pressure. The parts are loosely mounted so that they may be taken apart for cleaning purposes and reassembled without changing the relation of the sparking points.

In the drawing, 11 is the procelain base supporting the binding posts 12 and 13 and, through the clips 15, supporting the vacuum tube mounting 14. A recess is provided in the base at 17 which may be used to enclose a choke coil in certain types of the arrester.

The tube mounting comprises the end caps 21—21 which are spaced by the rods 23 and 24, Fig. 4, and by the channel bars 25 and 26. These members are driven into the end caps with a tight fit so that the entire mounting forms a rigid construction. The tube, 22, usually made of glass, enters the recesses at *b* Fig. 6 in the caps and is thereby protected and held in place between the bars 23, 24, 25 and 26. A transparent cover is provided at 27 between the channel bars 25 and 26 and with its ends entering the caps as at 28. These arresters are usually assembled in rows with the bases adjacent so that the tubes are not accessible from the sides. The window 27 forms a protection for the tube and permits of its easy inspection. The mounting is provided with a finger catch at 16 to facilitate its removal from the clips.

The outside of the caps are recessed at 29 to receive the contact plate 30 which is secured to the cap by the eyelet rivet 31. This plate has a pair of semi-circular lugs 33 projecting therefrom and a guide plate 32 bent outwards from the centre. The wire 34 connected with the discharge electrode is soldered to plate 32. It will be noted from Fig. 3 that clips 15 are forked at 35 and 36 and are curved to match the lugs 33.

When the mounting is inserted in the clips, the plate 32 slides between the forks 35—36 and prevents transverse movement of the mounting as the forks engage the lugs 33. The plate 32 acts as a stop for the downward movement of the mounting, but it will be observed that when the lugs 33 are in engagement with the clips, plate 32 is raised from engagement with the fork at 32*a* so as not to

interfere with the proper seating of the lugs in the forks.

An important feature of this invention applying to spark gap arresters in general is found in the construction in the recess *a* in base 11. The conducting member 41 is secured by binding post 13 to the base and the spring 42 is secured by binding post 12. These members are reinforced by the springs 43—43 which terminate at and engage the transparent cover 44 of the recess *a*. The clip springs 15—15 are also secured by the binding posts 12 and 13 as shown, thus connecting the members 41 and 42 in multiple circuit with the electrodes 34*a* in tube 22.

The spark gap discharge is obtained between the conducting members 41 and 42. A receptacle is mounted on spring 41 in which the block of resistant material 46 is placed. This receptacle 45 may terminate in discharge points as indicated. The spring 42 overlaps 41 and has a jaw in its end formed by 47 and finger 48, preferably punched integral from 42. In this jaw a plate of mica 50 is clamped and arranged to rest upon 46 by the spring pressure of 42. The mica plates 50 are punch with precision and when assembled as shown insure a uniform spacing between the sparking points of 47 and the block 46. It will be noted that the apparatus may be dis-assembled and reassembled and the spring pressure on plate 50 will always insure the proper spacing of the discharge points 47 from the block and thus insure that the arrester will discharge at a predetermined voltage. It is to be noted that springs 41 and 42 may move longitudinally, relative to each other, as by changes of temperature, without varying the sparking relation between 47 and 46. The spring engagement of 42 with 46 and the sliding movement of 50 on 46 thus secures important results.

A material commonly used for the resistant block 46 is a compound of carborundum and carborundum may be used in the present instance, however, there are other compounds of resistant materials which are aqually suitable for this purpose. The term carborundum is used herein in a generic sense to embody all equivalent substances.

It is apparent that the mounting may outlast the tube to a considerable extent so that it may be desirable to replace tubes in the mounting. This can quite easily be done by disconnecting the wires 34 from the plates 32 and removing one of the caps from the spacing bars. A new tube can then be inserted and the mounting reassembled.

It is to be understood that variations in the construction of the invention may be made without departing from the spirit and intent thereof.

Having thus described my invention, I claim:

1. In an electric device, the combination, a base, a pair of clips supported by said base, a device comprising a glass tube with a pair of caps and bars spacing said caps, said caps detachably supported by said clips and conductors in said tube electrically connected with said clips through said caps.

2. In an electric device, the combination, a base, a pair of clips supported by said base, a device comprising a tube of insulation with a pair of caps and channel bars spacing said caps, said caps detachably supported by said clips, a transparent cover for said tube supported by the channels of said bars and conductors in said tube electrically connected with said clips through said caps.

3. In an electric device, the combination, a base, a pair of clips supported by said base, a device comprising a pair of caps, said caps spaced by channel bars supported by said clips, a conductor electrically connected with said clips through said caps and a transparent cover for said conductor supported by the channels of said bars.

4. In an electric device, the combination, a base, clips supported by said base and a pair of caps with a conductor supported between said clips, said caps being provided with end plates each having a plurality of projecting lugs to engage matched portions of said clips.

5. In an electric device, the combination, a base, a pair of clips each having forked ends supported by said base, a container with a conductor, a pair of caps for said container supported between said clips, an end plate for each cap connected with said conductor, each end plate having a lug engaging each forked end of the clip and having a guide member sliding between the forks of the clips.

6. In an electric device, the combination, a base, a pair of clips each having forked ends supported by said base, a container with a conductor, a pair of caps for said container supported between said clips, an end plate for each cap connected with said conductor, a pair of lugs projecting from each end plate, the forked ends of said clips being formed to match said lugs and a guide member for holding said lugs in register with said forked ends.

7. In an electric device, the combination, a base, a pair of clips each having forked ends supported by said base, a container with a conductor, a pair of caps for said container supported between said clips, an end plate for each cap connected with said conductor, lugs projecting from said end plates engaging the forked ends of said clips and means for preventing transverse movement of said caps relative to said clips.

8. In an electric device, the combination, a base, a pair of clips on said base, a vacuum tube with conductors therein, end caps of insulation for said tube, bars rigidly spacing

said end caps, a transparent cover for said tube supported by said bars and end plates for said caps engaging said clips and connected with said conductors.

9. In an electric device, the combination, a base, a pair of clips on said base, a hollow container with a conductor therein, end caps of insulation for said container, a plurality of members rigidly spacing said caps, metallic end plates on said caps engaging said clips and connected with said conductor.

10. Articles of manufacture comprising a contact plate having a pair of spaced lugs projecting at right angles therefrom and a member projecting between said lugs and a forked contact spring engaging said contact plate having each leg formed to lock with one of said lugs when said projecting member passes between the legs of the fork.

In testimony whereof I affix my signature.

EDWARD A. EVERETT.