

W. E. BUTLER.
LIGHTNING ARRESTER.
APPLICATION FILED SEPT. 23, 1910.

1,007,770.

Patented Nov. 7, 1911.

Fig. 1.

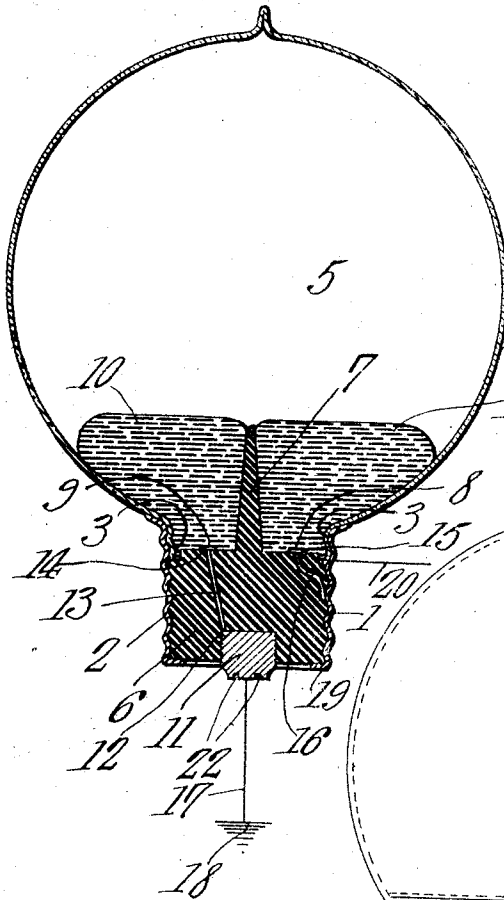


Fig. 3.

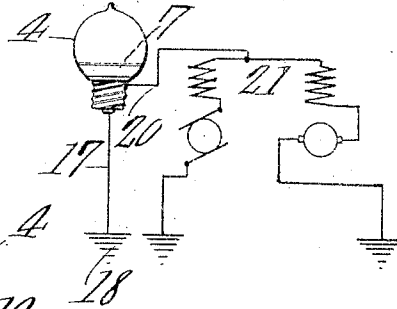
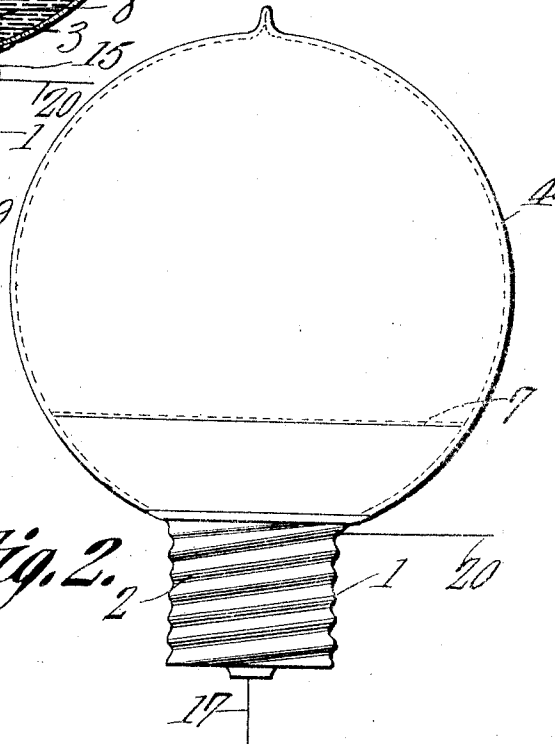


Fig. 2.



Witnesses

J. Donlin
R. H. Howell

William E. Butler, Inventor
by *C. A. Snow & Co.* Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. BUTLER, OF DAVID CITY, NEBRASKA.

LIGHTNING-ARRESTER.

1,007,770.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed September 23, 1910. Serial No. 583,483

To all whom it may concern:

Be it known that I, WILLIAM E. BUTLER, a citizen of the United States, residing at David City, in the county of Butler and State of Nebraska, have invented a new and useful Lightning-Arrester, of which the following is a specification.

This invention belongs to the art of arresters, and it more especially relates to a lightning arrester, adapted primarily for use on lines, over which currents of high voltage discharge, and the primary object of the invention is to produce a lightning arrester involving durable means, which will permit a lighting stroke to arc across the two electrodes of the arrester, considerably easier than if the electrodes were surrounded by the atmosphere.

The invention, in this regard, involves a further feature, which consists in the provision of a vacuum chamber of suitable dimensions, housing the electrodes. The electrodes are of mercury and are unstable, or in other words, they mingle together when the high voltage is discharged, and just so soon as the line is clear from the high voltage, the electrodes will separate and settle back in their respective cells upon each side of the partition, after which a line to the ground will be broken.

A further object of the invention is to make the vacuum chamber of the arrester of such dimensions, as to permit the mercury to vaporize without causing an explosion. It is to be remembered, however, that after the lightning stroke is off the line the vapor from the mercury is again absorbed by the mercury.

It is previously stated in this specification, that this arrester is more especially applicable to lines having a grounded line. It is evident, however, that this invention may be applied in conjunction with electrical installation, in which there is no grounded line. When the invention is so utilized, there are two arresters with their downwardly extending connections (which in the first instance connect directly with the ground,) joined together, and with a connection between their junction and the ground. In the drawings, however, there is only one form of the invention disclosed, but in practical fields this form may require certain alterations, and provided the alterations are comprehended by the appended claims, the applicant is entitled to them.

The invention comprises further features and combinations of parts, which will be hereinafter set forth, illustrated in the drawings, and pointed out in the appended claims.

In the drawings, Figure 1 is a view, in section, of the lightning arrester, in circuit with the grounded line, and showing the connection between it and the ground. Fig. 2 is an elevation of the lightning arrester. Fig. 3 is a diagrammatic view of an electrical installation, illustrating the arrester in circuit therewith.

Referring to the drawings, 1 denotes an open-ended metal shell, which is formed with screw-threads 2. The upper portions of these threads receive a threaded annular flange 3 of the glass globe 4 (which forms the vacuum chamber 5 of the arrester). The greater portions of the threads 2 engage the threads of the cylindrical insulating member 6. The upper surface of the member 6 is provided with a partition member 7, which divides the lower portion of the vacuum chamber 5 into two cells 8 and 9, in which mercury 10 is placed. It will be noticed, however, that in the drawings the partition 7 at its upper edge is wider than the diameter of the threaded annular flange 3 of the globe. In the manufacture of this arrester, the glass globe 4 may be blown about this partition 7, so therefore it is not impracticable to provide a partition of the dimensions disclosed. Before the shell 1 is threaded to the annular flange of the globe, the insulating member 6 is arranged in position in the shell.

11 represents a conductor block, which is threaded into the insulating member 6. Connected to the block 11 at the point 12, and extending therefrom and through the member 6, is a conductor rod 13, the upper end of which is provided with a contact plate 14. This contact plate 14 is arranged in the bottom of the cell 9, in order to cooperate with the mercury therein.

Located in the bottom of the cell 8 is a contact plate 15, from which a conductor rod 16 downwardly extends. By this conductor rod 16 connections are obtained between the shell 1 and the mercury in the cell 8.

The conductor block 11 has a conductor 17 extended between it and the ground, as at 18.

The shell 1 has an annular flange 19, with which the bottom of the member 6 engages.

20 denotes a conductor wire, which is connected between the shell 1, and the grounded line of electrical installation 21 (which is clearly shown in Fig. 3), in order that when a stroke of lightning strikes the line 21, the stroke is permitted to pass over the conductor wire 20 on to the shell 1, to the mercury in the shell 8, by way of the conductor 16. When the stroke of lightning reaches this point, the mercury electrodes in the cells 8 and 9 merge across the partition. This is due to the fact that the electrodes are arranged through capillarity oval-shaped above the upper edge of the partition 7. When the two electrodes are brought together in this manner, the lightning stroke passes straight to the ground, by way of the conductor rod 13, the conductor block 11 and the wire 17. When the conductor 20 of the grounded line of electrical installation is clear of the lightning stroke, the electrodes in the cells 8 and 9 again separate.

The conductor block 11 is provided with depressions 22, to receive a spanner, by which the block is screwed home.

The invention having been set forth, what is claimed as new and useful is:

1. In a lightning arrester, an inclosure; mercury in the inclosure; a shell connected with the inclosure; an insulating member within the shell, adapted to divide the mercury into spaced electrodes; means for connecting one electrode with the ground; and means for connecting the other electrode with the shell.

2. In a lightning arrester, an inclosure; mercury within the inclosure; a shell adapted to engage the inclosure; an insulating member within the shell, adapted to separate the mercury into spaced electrodes; means for connecting one electrode with the

shell; a conducting element in the insulating member and accessible for connection with a conductor, from the exterior of the arrester; and a connection between the other electrode and the conducting element.

3. In a lightning arrester adapted for use in connection with electrical installation, an inclosure having a vacuum chamber and provided with cells, said inclosure having an annular flange, a threaded shell connected to the flange, and mercury electrodes arranged in the cells, insulating means carried by the shell for separating the electrodes and insulating one from the other, thus providing the arcing poles, and a connection between the poles, the electrical installation and the ground.

4. In a lightning arrester adapted for use in connection with electrical installation, an inclosure having a vacuum chamber and provided with cells, said inclosure having an annular flange, a threaded shell upon the flange, mercury electrodes in the cells, insulating means carried by the shell for separating the electrodes and insulating one from the other, thus providing the arcing poles, a conductor block threaded to the insulating means, a connection between the block and one of the poles, a connection between the other pole and the shell, and connections between the conductor block and the ground, and a connection between the shell and the electrical installation.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM E. BUTLER.

Witnesses:

W. F. DELANEY,
J. K. MASTEK.