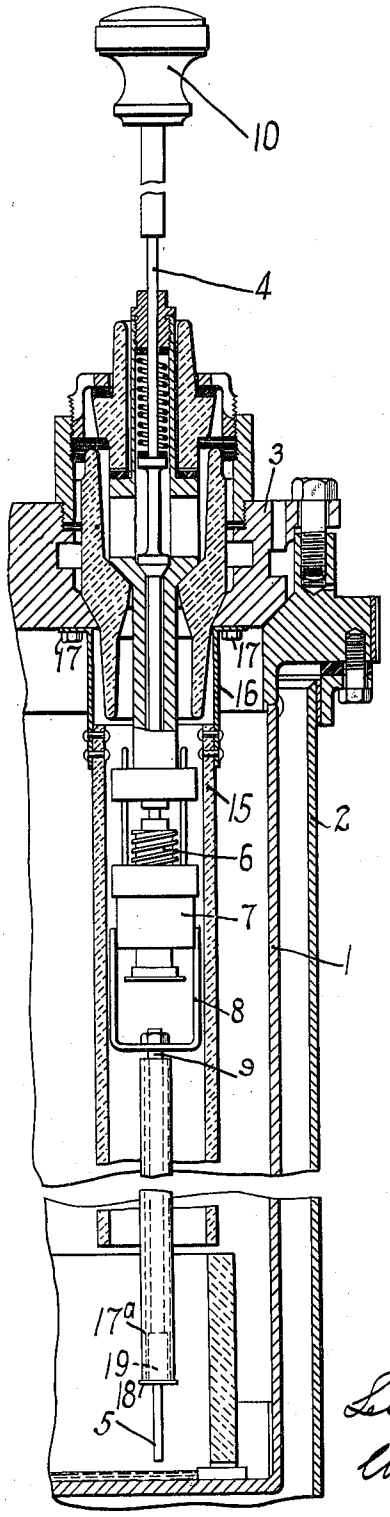
L. E. FROST.

VAPOR ELECTRIC DEVICE.

APPLICATION FILED FEB. 5, 1914.

1,159,922.

Patented Nov. 9, 1915.



WITNESSES:

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VAPOR ELECTRIC DEVICE.

1,159,922. Specification of Letters Patent. Patented Nov. 9, 1915.

Application filed February 5, 1914. Serial No. 816,711.

To all whom it may concern:

Be it known that I, LESLIE E. FROST, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Vapor Electric Devices, of which the following is a specification.

My invention relates to vapor electric devices, such as rectifiers, and it has special reference to metal case rectifiers of large capacity in which a movable auxiliary or keeping-alive electrode is employed.

One object of my invention is to improve the operation of vapor rectifiers by removing some of the causes of short circuits within the rectifier chambers.

Another object of my invention is to enable the auxiliary keeping-alive electrode to be operated at a greater distance above the vaporizable cathode than has heretofore been practicable.

The single figure of the accompanying drawing is a vertical sectional view, of a portion of a metal case rectifier constructed in accordance with my invention.

In the operation of mercury rectifiers in which a movable keeping-alive electrode is used, it is desirable that the electrode be maintained an appreciable distance from the vaporizable cathode, in order to avoid undue sensitiveness and also because, when such rectifiers are applied to locomotive service, the mercury, which ordinarily forms the cathode, will splash considerably and, in the case of single unit rectifiers, prevent rectification during the time when the mercury is in contact with the electrode.

It has been found in practice that the distance to which the keeping-alive electrode may be withdrawn from the surface of the mercury is limited by the danger of short circuits within the rectifier, and that this danger increases as the electrode is withdrawn. I have discovered that such short circuiting is due, in large measure, to the fact that, as the keeping-alive electrodes are usually supported and operated, current can pass not only from the end of the electrode but also from the exposed sides of the rod supporting the electrode and from the electrode-operating mechanism. I have further discovered that, if the electrode-supporting rod and the operating mechanism are shielded from exposure to the main rectifier arc, such discharges of current from the electrode rod and the operating mechanism are prevented. I may effect this shielding either by inclosing the rod and the operating mechanism in a protective sheath or by bringing the keeping-alive electrode into the tank at such a point that this stray current from parts of it other than the electrode point shall not interfere with the main anode. I, at present, prefer to adopt the first of these expedients, and I have shown, in the accompanying drawing, a suitable arrangement of parts embodying my invention.

Referring to the drawing, a casing 1 is shown, which may be provided with a spaced jacket 2 and a cover 3 having an opening through which extends a rod 4, from the inner end of which a keeping-alive electrode 5 is movably supported. A suitable seal is provided at the point where the rod 4 passes through the opening in the cover, for the purpose of making a vacuum-tight joint. I have shown an effective form of such seal, but its precise details form no part of my invention, and I therefore do not describe it in detail.

Any convenient means may be provided for operatively suspending the electrode 5 from the rod 4. As shown, such means comprises a screw 6 secured to the rod 4 and an internally threaded bushing 7 engaging the screw and carrying a forked support 8 from which is suspended a rod 9 that carries the electrode 5. The rod 4 may be rotated by means of a knob 10 or other suitable turning means secured to the end that projects above the cover. Any other convenient electrode-operating means may be substituted for that which I have shown, within the scope of my invention. Completely surrounding the electrode-operating mechanism is a sheath or tube 15, which may be of quartz or other suitable insulating material. This sheath may be bolted or otherwise secured to a collar 16, that is fastened by bolts 17 or otherwise to the under side of the cover 3. The sheath is of sufficient internal diameter to clear the operating parts and permit of their movement as the electrode is adjusted. If desired, additional shielding means may be provided for the rod 9. As shown, such shielding means comprises a second tube 17ª, which may be of quartz, completely surrounding the rod 9 and sup-

ported upon a flange 18 formed on a connector 19 by which the electrode 5 is attached to the rod 9.

I claim as my invention:

1. A vapor electric device comprising a vacuum casing containing a movable electrode, means within the casing for operating the electrode, and a shield of insulating material surrounding the said operating means.

2. A vapor electric device comprising a vacuum casing containing a movable electrode, means within the casing for operating the electrode, and a tubular shield of insulating material surrounding the said operating means.

3. A vapor electric device comprising a vacuum casing containing a movable electrode, means within the casing for operating the electrode, and a shield of quartz surrounding the said operating means.

4. A vapor electric device comprising a vacuum casing having a cover, a movable electrode within the casing, means within the casing for operating the electrode, and a tubular shield of insulating material suspended from the cover and surrounding the said operating means.

5. A vapor electric device comprising a vacuum casing having a cover, a movable electrode within the casing, means within the casing for operating the electrode, and a tubular shield of insulating material suspended from the cover and surrounding the said operating means and said electrode to a point adjacent the end thereof.

In testimony whereof, I have hereunto subscribed my name this 31st day of Jan. 1914.

LESLIE E. FROST.

Witnesses:
DAVID E. CARPENTER,
B. B. HINES.