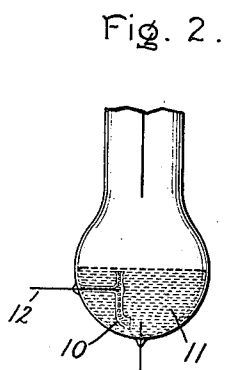
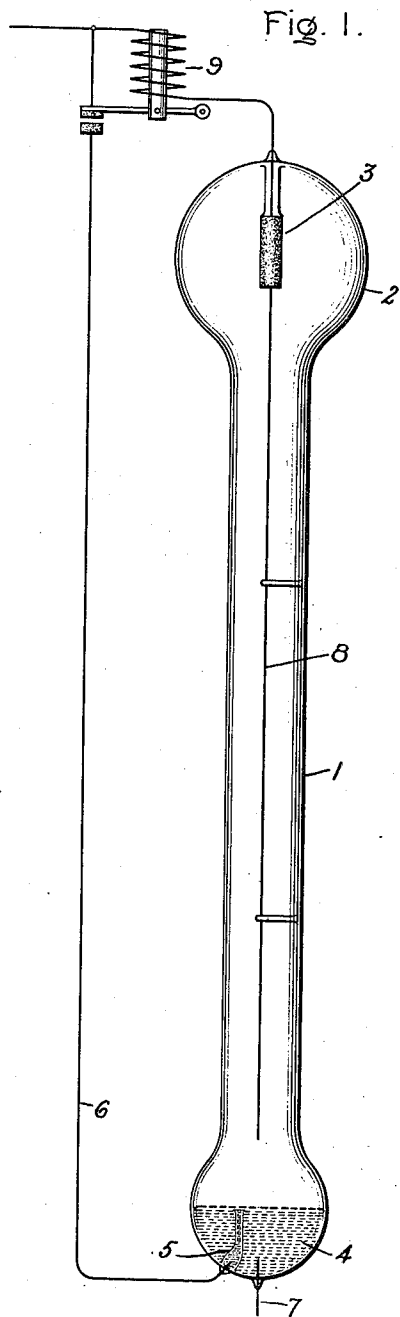


E. THOMSON.
VAPOR ELECTRIC APPARATUS.
APPLICATION FILED MAR. 14, 1904.

1,001,709.

Patented Aug. 29, 1911.



Witnesses:

George H. Tilden.
Allen Oxford

Inventor:

Elihu Thomson,

by *Albert S. Davis*

Att'y.

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

VAPOR ELECTRIC APPARATUS.

1,001,709.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed March 14, 1904. Serial No. 198,066.

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Vapor Electric Apparatus, of which the following is a specification.

My present invention relates to the starting of vapor electric apparatus such, for example, as mercury vapor rectifiers, lamps or the like.

The novel features characteristic of the invention are pointed out with particularity in the appended claims. The invention itself, however, will be better understood by reference to the following description taken in connection with the accompanying drawings, in which—

Figure 1 represents my invention as applied to the starting of a mercury vapor lamp while Fig. 2 represents a modification.

In Fig. 1 the highly exhausted envelop or container of the lamp is indicated at 1 and consists, as shown, of a tube of indefinite length provided at the top with a bulb 2 constituting a condensing chamber and containing one of the main electrodes or anodes 3 of iron, graphite or other suitable material. In the bottom of the envelop is a body of mercury 4 constituting a cathode. In order to start the lamp it is necessary to produce at the surface of the cathode an initial generation of negative ions or, in other words, produce a starting arc from the mercury body 4 in which the direction of current is such that the electrode is a cathode or of negative polarity. To accomplish this result I provide means for producing electrically a sudden disruption of the surface of the cathode. Various means may be employed for this purpose. Those which I illustrate, however, involve the idea of passing current through a constricted area of mercury forming a part of the electrode 4. This current is of such value as to produce a vaporization of mercury in this area and a consequent arc similar to that produced by the blowing of an ordinary or inclosed fuse. Thus at 5 I provide a tube connected with a suitable leading-in conductor, which tube is surrounded by the mercury 4 and is arranged so that its upper or only open end is just beneath the surface of the mercury 4.

The bore of this tube for a portion of its length is small so that when current is conveyed from the lead 6 through the mercury and out at the negative terminal 7 an almost explosive volatilization of mercury in the tube takes place. The sudden arc thus produced, as well as the shock communicated to the surface of the cathode, is sufficient to excite the cathode to activity and cause the arc in the main tube 1 to start. The starting may be assisted by a depending filament 8 of carbon or similar material. As soon as the arc starts the cut-out device 9 interrupts the current in the lead 6 and mercury is thus allowed to flow back into the tube 5 so that the lamp will then be ready for re-starting when necessary.

Instead of arranging the tube 5 with but one open end I may, if desired, fashion it so that both ends are open. Thus, for example, as in Fig. 2, I may use a small bore tube 10 with its upper end beneath the surface of the mercury electrode 11 and its lower end at a considerable depth below the surface. This allows a ready return of the mercury to the interior of the tube. The tube may be supported in any convenient manner as, for example, by means of the enameled or vitreous coated leading-in conductor 12. The tube may conveniently be made of fused quartz or it may be of metal coated inside and outside with a vitreous or other insulated coating provided, however, that the end of the leading-in conductor be bared so as to make suitable electrical connection with the mercury.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a vapor electric apparatus, the combination of a container, electrodes therefor, one at least of which is of mercury, means below the surface of said mercury electrode for confining a portion of said mercury within a constricted space, and means also below said mercury surface for passing current through said confined mercury so as momentarily to interrupt its continuity and produce a starting arc.

2. The combination of a container, electrodes therefor, one at least of which is of mercury, insulating walls for segregating a portion of the mercury into a small body of small cross section having an end just below the electrode surface and normally in con-

tact with said electrode and a current supply conductor connected to the other end beneath the electrode surface.

3. In a vapor electric apparatus, the combination of a container, electrodes therefor, one at least of which consists of a vaporizable material, and means entirely beneath the surface of the vaporizable electrode and electrically connected therewith for emitting ionized vapor to start said apparatus, and current connections to said starting means.
4. In a vapor electric apparatus, the com-

bination of a container, electrodes therefor, one at least of which is mercury, an insulating tube open at each end for confining a small thread of mercury, and means for vaporizing said mercury thread by the passage of current.

In witness whereof, I have hereunto set my hand this 11th day of March, 1904.

ELIHU THOMSON.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.