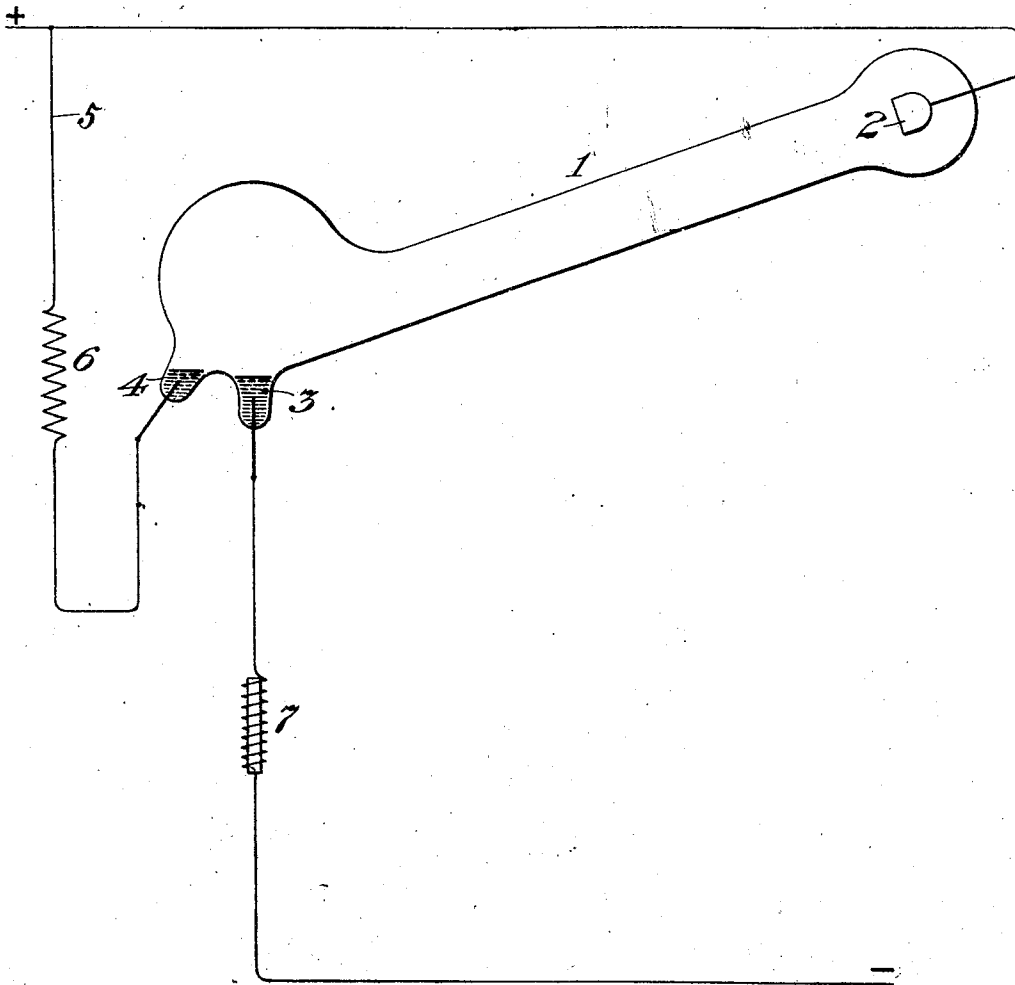


P. H. THOMAS.
 STARTING DEVICE FOR VAPOR APPLIANCE.
 APPLICATION FILED MAY 9, 1904.

958,445.

Patented May 17, 1910.



Witnesses
 Chas. Clagett
 W. H. Capel

Percy H. Thomas Inventor
 By *Wm. H. Clagett* Attorney
 Charles A. Terry

UNITED STATES PATENT OFFICE.

PERCY H. THOMAS, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO COOPER HEWITT ELECTRIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STARTING DEVICE FOR VAPOR APPARATUS.

958,445.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed May 9, 1904. Serial No. 207,014.

To all whom it may concern:

Be it known that I, PERCY H. THOMAS, a citizen of the United States, and resident of East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Starting Devices for Vapor Apparatus, of which the following is a specification.

I am aware that it has been proposed to start a vapor electric apparatus by the effects produced upon a reactance device by the cutting out or extinguishment of a similar apparatus in shunt with the first.

The present invention relates to another method of starting somewhat like that above described, and which is applicable to cases for which the other method of starting might prove unsuited.

I have accomplished the result set forth by providing two circuits within the same chamber, one the normal operating circuit of the vapor lamp or converter, and the other a supplemental circuit having a negative electrode in common with the first named circuit, and having a separate positive electrode and such adjustment of the apparatus that the current on being started by any convenient method in the supplemental circuit, will be unable to support itself, and will drop out or be extinguished thereby producing a reactance which starts the current in the main circuit. In this case, a choke coil is used in the lead of the common negative, and a resistance is employed in the lead to the supplemental positive electrode, which resistance is not included in the main circuit through the apparatus. In other words, the current in the supplemental circuit is cut down to a low amperage, and is thereby rendered unstable, thus causing the cessation of the current in the supplemental circuit and the starting of the current between the main electrodes.

When an apparatus is constructed in the manner above described, it is possible to use for initially breaking down the negative electrode resistance any of the usual methods employed for this purpose. For example, I may establish a mechanical contact between the common negative and the supplemental positive electrode and may break this contact by any suitable means, whereupon current will be established, as is now well understood, between the common negative electrode and the supplemental positive elec-

trode, thereby breaking down the negative electrode resistance. Under these conditions a considerably smaller voltage will be sufficient, upon the cutting out of the current in the supplemental circuit, to establish a flow of current through the normal path between the main electrodes.

The invention is illustrated in the accompanying drawing which shows a vapor apparatus having a main positive and a supplemental positive electrode and a common negative electrode.

In the drawing, 1 is a container of glass or other suitable material, and 2 and 3 are, respectively, the main positive electrode and the main negative electrode. The supplemental positive electrode is shown at 4, and a shunt circuit, 5, is shown as extending from the main circuit leading to the positive electrode; the said shunt circuit including a resistance, 6. In the circuit extending from the negative electrode I show a reactance device 7.

The apparatus may be started into operation by tilting the container 1 so as to bring the electrodes 2 and 4 into contact and then tilting the container back again so as to break the contact thus established. Current will then flow between the supplemental positive electrode 4 and the main negative electrode 3 through the resistance 6. The conditions of operation thus initiated are; however, unstable, and the current flow between the electrodes 4 and 3 will cease after a very brief period. It is often found that a current will be established between the main electrodes 2 and 3, owing to the fact that the negative electrode resistance at 3 has already been broken down and the starting of the apparatus under its normal conditions will then have taken place.

The exact manner in which the flow of current is established between electrodes 2 and 3 with the apparatus described in this case is not entirely clear but it seems probable that by the vigorous action of the coil 7, which is required to maintain the flow of current in electrode 3, which is kept near the going-out point before the starting point, as described in the specification, an agitation or expulsion of charge is produced in the vacuum which renders easier the starting of the current to the electrode 2. It may be well to mention the well-known fact that when current in a negative electrode of this

character is maintained at a value near the going-out point, very vigorous action is required of the choke coil used to sustain its flow. At any rate it is found, in practice, 5 that when such supplementary current, as described, is maintained near the going-out point the starting between the main electrodes is greatly facilitated.

I claim as my invention:—

10 1. The method of starting a vapor electric apparatus comprising a hermetically sealed and completely exhausted container, an anode and a vaporizable reconstructing cathode therein, which consists in overcoming 15 the negative electrode starting reluctance separately from the vapor path starting resistance, storing energy externally and utilizing a portion of this stored energy to overcome the vapor starting resistance 20 through the partial interposition of negative electrode starting reluctance within the apparatus.

2. The combination with a supply circuit and a vacuum vapor electric apparatus including a hermetically sealed and completely exhausted container, a main anode 25 and a vaporizable reconstructing cathode therein, of a supplemental anode also therein, connections between the two anodes and one main of the source and between the cathode and another main of the source and an inductance traversed by the current in both 30 anodes together with means for controlling

and rendering unstable the current flowing through the supplemental electrode. 35

3. In a vapor electric apparatus, a main positive electrode, a main negative electrode, an inductance device in series therewith, adapted to supply high potential impulses on unstable current, a supplemental 40 positive electrode, in shunt to the main positive electrode, and means for establishing an initial flow of current between the supplemental positive electrode and the main negative electrode, the shunt circuit being such 45 that the conditions of flow of current established therein are unstable, whereby on the sudden diminution of current in the said shunt, a flow will be established between the main electrodes. 50

4. The method of starting a gas or vapor electric apparatus requiring more than the normal voltage to establish current flow through the normal path, which consists in utilizing the rise of potential resulting from 55 the tendency of an unstable current within the chamber to drop out for overcoming the resistance of the vapor columns in the normal path.

Signed at New York, in the county of 60 New York, and State of New York, this 4th day of May, A. D. 1904.

PERCY H. THOMAS.

Witnesses:

WM. H. CAPEL,

GEORGE H. STOCKBRIDGE.