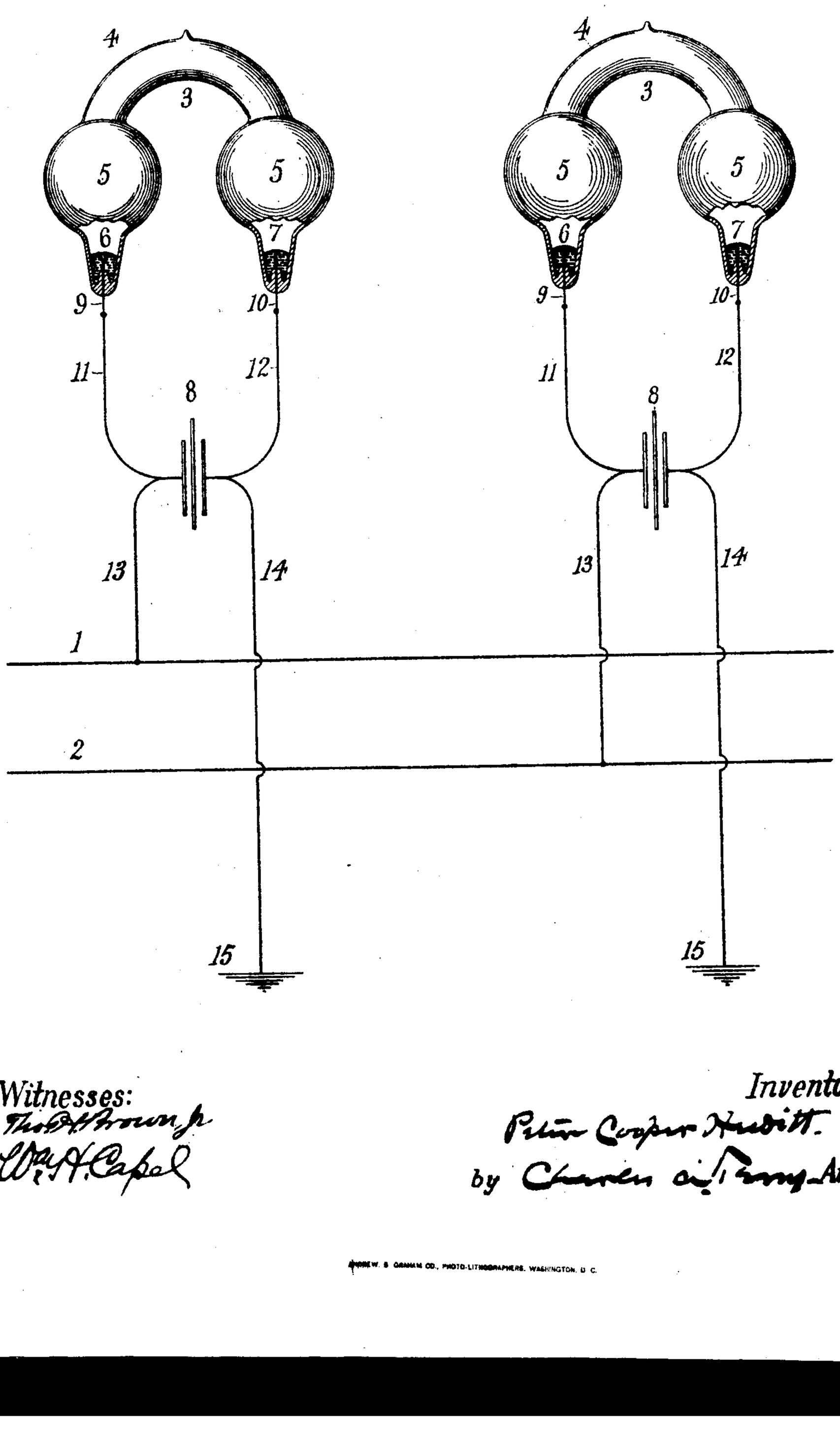
No. 799,049. PATENTED SEPT. 12, 1905.

P. C. HEWITT.

LIGHTNING ARRESTER.

APPLICATION FILED MAY 16, 1902.



Witnesses:
Thos. D. Brown Jr.
Wm. H. Capel

Inventor
Peter Cooper Hewitt.
by Charles A. Terry Atty

UNITED STATES PATENT OFFICE.

PETER COOPER HEWITT, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO COOPER HEWITT ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

LIGHTNING-ARRESTER.

No. 799,049. Specification of Letters Patent. Patented Sept. 12, 1905.

Application filed May 16, 1902. Serial No. 107,606.

To all whom it may concern:

Be it known that I, PETER COOPER HEWITT, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

The characteristic possessed by the gas or vapor apparatus which has been patented to me in a number of United States patents—for instance, certain patents issued on September 17, 1901—namely, the characteristic of possessing a high initial resistance which has to be overcome before the apparatus will act as a true vapor-conductor—may be made use of in providing a lightning-arrester for electric circuits; and the object of the present invention is to disclose a mode of utilizing this characteristic for the purpose described.

The drawing illustrating the invention is a diagram of circuits and apparatus which may be employed for the purpose designated.

In the drawing, 1 and 2 represent main conductors connected with any suitable electrical apparatus. The gas or vapor apparatus is represented at 3, and consists in this instance of a tube 4, having enlargements 5 5 at its respective ends and provided with electrodes 6 and 7, of mercury or other suitable material. The leading-in wires 9 and 10 are respectively connected by conductors 11 and 12 with the opposite sides of a condenser 8. One side of the condenser 8 is also connected by a conductor 13 with one of the main conductors—as, for instance, that marked 1. The other side of the condenser is connected by a conductor 14 to the ground 15. A duplicate of this apparatus may also be connected in like manner to the main conductor 2, if desired.

The described vapor apparatus has the quality of possessing a high initial electrical resistance; but when this resistance is once overcome by a current of sufficiently high potential the vapor resistance decreases. Accordingly, an apparatus of this sort is peculiarly adapted to serve the purposes of the present invention.

A vapor which is well suited to serve as a conducting medium within a device of this class is mercury-vapor, and, as already stated, I may employ for the electrodes 6 and 7 masses of mercury. The vapor of mercury inclosed as described is adapted to be traversed by a current of high potential and under favorable conditions may continue to conduct current. In general, however, the apparatus is specially constructed for the purpose whenever the vapor is to conduct current continuously, means being provided for maintaining the apparatus at a normal temperature; but without such special construction, as in the present instance, should the temperature rise too high the vapor being heated to excess and becoming too dense ceases to conduct and the current ceases to flow.

Assuming that the line is adapted to carry a current of, say, five hundred volts, the vapor apparatus may be arranged to resist the action of such a potential, being so constructed as to permit current to pass only when it reaches a certain higher voltage, the limit of which can be adjusted practically at will. This limit will naturally be near the danger limit as respects the apparatus included in or connected with the main circuit. Should an excessive potential be impressed upon the main conductors either by a lightning charge or from any other cause, the moment it reaches the predetermined limit it will traverse the vapor apparatus and will be dissipated through a discharge or a succession of discharges through the apparatus to earth.

Provided the line itself has sufficient capacity it will be possible to dispense with the condenser 8 and connect the terminals of the apparatus one with one of the mains and the other with the ground without any condenser in the circuit.

In operation as soon as a lightning discharge shall have overcome the normal resistance of the apparatus the current will be immediately cut off at the first alternation, since the negative electrode reluctance immediately reëstablishes itself unless the flow is continued in the original direction. Accordingly the line-current will not follow the lightning discharge to earth and the circuit will not be grounded. When the apparatus is applied to direct-current circuits, the same effect of cutting off the flow of current will be brought about by the fact that the particular apparatus applied to the circuit is so designed as to de-

velop too much heat under the influence of the normal current in the circuit to permit current to flow.

I claim as my invention—

1. A lightning-arrester comprising an hermetically-sealed tube or container, a pair of electrodes therein at least one of which is vaporizable, and a gas or vapor intervening between the said electrodes.

2. The combination with an electric circuit carrying a current of predetermined normal potential, of a lightning-arrester comprising a pair of electrodes, at least one of which is of vaporizable material inclosed in an hermetically-sealed tube or container, a vapor in said tube or container having an initial resistance incapable of being overcome by the normal line-potential but capable of being broken down by an abnormal potential.

3. The combination with a pair of electrical conductors forming the mains of an electric circuit, of a lightning-arrester connected with each member of the pair, each lightning-arrester comprising a pair of electrodes at least one of which is vaporizable, inclosed in an hermetically-sealed tube or container and a vapor intervening between the electrodes, the vapor in each container possessing an initial resistance incapable of being overcome by the normal line-potential, but capable of being broken down by an abnormal potential.

Signed at New York, in the county of New York and State of New York, this 9th day of May, A. D. 1902.

PETER COOPER HEWITT.

Witnesses:

WM. H. CAPEL,

GEORGE H. STOCKBRIDGE.