ELECTRIC TRANSLATING APPARATUS.

1,286,316.


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To all whom it may concern:

Be it known that I, Peter Cooper Hewitt, a citizen of the United States, and resident of Ringwood Manor, county of Passaic, State of New Jersey, have invented certain new and useful Improvements in Electric Translating Apparatus, of which the following is a specification.

I have found that in gas or vapor apparatus wherein electrodes within a container are insulated from each other with respect to the container and wherein a gas or vapor of suitable character and density is adapted to pass current between the electrodes under the application of electric potential to the state existing at the negative-electrode before the final broken-down state is reached. By the "broken-down" state, I mean the final low resistance state where the current enters the negative electrode at a spot with a flame projecting from it. The "current-passing" state occurs at low voltage and, in certain instances, is capable of passing considerable current without breaking down or reducing the negative electrode resistance to the final state, that is to say, without bringing about the final state where the flame appears. This state before the final state I will call the leakage state. I make use of this property of gas or vapor apparatus in carrying out the present invention, which is designed to pass current through such an apparatus at a definite low voltage. The present invention is designed to constitute an improvement on the inventions set forth in my United States Patents Nos. 690,952, and 690,953, both issued on January 14th, 1902. In the patents referred to, one of which has apparatus claims and the other method claims, I have mentioned the use of attenuated nitrogen as the gas within the container and have said that with iron electrodes separated a distance of about one and one-half inches, the lamp may be started with a direct current having a pressure of 750 volts, or less. By means of the present invention I am able to reduce the necessary voltage for passing current to a far lower limit, as will be stated farther on in the present specification.

A simple illustration of my invention is shown as comprising a tube, 1, of glass, electrodes, 2 and 3, preferably of metal and may be of very high melting point such as tungsten, and lead wires, 4 and 5, connected with a suitable source, 6, of electrical supply. Within the container, 1, I enclose a quantity of boron fluoride, of suitable quantity and density or of other gas having the desired electrical characteristics with respect to the electrodes for starting the passage of current through the lamp or container at a definite low voltage. I have used boron fluoride in a lamp of the character described and have started the same at a pressure of 40 volts. Helium may also be employed and will start on a pressure of say 100 to 200 volts and nitrogen will pass current at 750 volts and less.

Care should be taken in the manufacture of the electrodes. In the case of boron fluoride, as an example, the electrodes may be of platinum and I may employ electrodes whose resistance may represent a drop of 85 volts, or less, with a five volt drop, more or less, in the gas between them, when the containing tube is a short one. By lengthening the gas column for special purposes, as, for instance, for use as a lamp having a required pressure of 65 to 100 volts to pass the required current, useful lighting may be obtained; but other purposes wherefor the resistance in the gas or vapor is useful may be served by providing suitable length for the gas or vapor column.

The negative electrode resistance may act as a steadying resistance for the device, say 25 per cent. leakage resistance at the negative, 10 per cent, at the positive and 65 per cent. vapor resistance. The resistance may be varied by the material and surface of the electrodes which varies the respective resistances at them and the vapor resistance may be governed by the distance between the electrodes.

The desired variations may be provided for by varying the electrodes as compared with each other in respect to size and temperature and, also, by varying the density of the gas or vapor. The temperature of an electrode passing current is greater with larger current and with the same current with diminished surface area and the electrodes may be used as a source of light solely by constructing them of suitable thinness and surface area. In this way energy other-
wise a loss so far as light is concerned may be made useful as light yielding by means of the electrode reactions.

A translating device of the character described above is useful in the arts where the properties of a conducting gas or vapor are desirable, either alone or in connection with electromagnetic or electrosstatic effects, particularly when used for effecting the electro-

motive-force required to pass current as the device is extremely sensitive to such action and responds with great rapidity.

I claim as my invention:

1. A vapor lamp comprising an air-tight transparent container, suitable electrodes therein, lead wires joined to the electrodes and leading to an outside circuit, the said lamp containing boron fluorid adapted to become luminous on the passage of current between the electrodes.

2. An electric translating device comprising a container, suitable electrodes therein, lead wires joined to the electrodes and leading to an outside circuit, the said device containing boron fluorid.

Signed at New York in the county of New York and State of New York this 16th day of October, A. D. 1913.

PETER COOPER HEWITT.

Witnesses:

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Thos. H. Brown.