

F. H. VON KELLER.
TILTING LAMP.
APPLICATION FILED SEPT. 22, 1905.

990,879.

Patented May 2, 1911.

Fig. 1

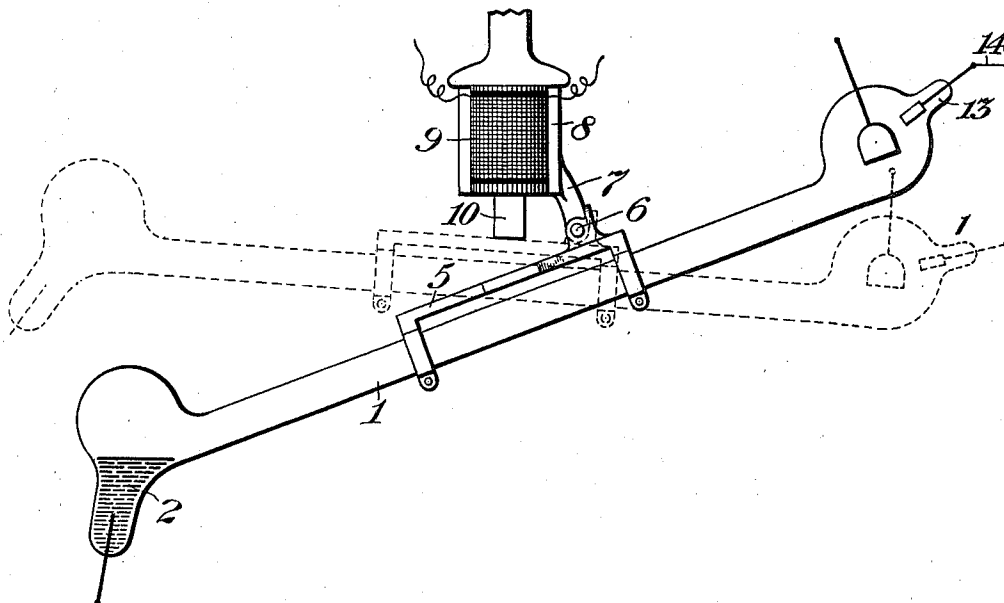
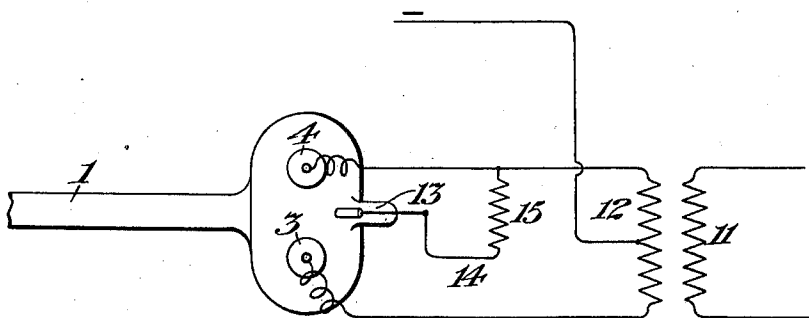


Fig. 2



Witnesses
Chas. Clagett
Thos. Brown

Frederick H. von Keller Inventor
By his Attorney
George H. Stockbridge

UNITED STATES PATENT OFFICE.

FREDERICK H. VON KELLER, OF NEW YORK, N. Y., ASSIGNOR TO COOPER HEWITT ELECTRIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TILTING LAMP.

990,879.

Specification of Letters Patent.

Patented May 2, 1911.

Application filed September 22, 1905. Serial No. 279,747.

To all whom it may concern:

Be it known that I, FREDERICK H. VON KELLER, a citizen of the United States, and resident of New York, county of New York, State of New York, have invented certain new and useful Improvements in Tilting Lamps, of which the following is a specification.

Single-phase alternating current vapor devices provided with a single negative electrode and two or more positive electrodes are sometimes started by tilting the apparatus so as to bring the negative electrode into positive connection with one or more of the main positive electrodes or with a supplemental positive electrode which is afterward cut out of operation. The starting of the device takes place when this connection is ruptured as by the separation of a conducting liquid, such as mercury, connecting the respective electrodes. Under these conditions it does not always happen that the rupture takes place at the right moment for constituting the electrode which is intended for the negative electrode of the apparatus a true negative electrode. For this reason it is sometimes necessary to tilt or tip the apparatus more than once in order to insure the proper starting thereof.

The present invention relates to means whereby it is made more certain that a single tilting of the device will initiate a flow of current through the apparatus in a proper direction. To this end the device is so constructed that several breaks occur whenever the mercury (if that be the selected conducting liquid) flows from the negative electrode to the positive electrodes, whereby the probability of at least one of the breaks being accomplished at the opportune moment is increased. In connection with this construction of apparatus I may employ a resistance which is interposed between the starting positive electrode and the other main positive electrode whereby when the apparatus has once started into operation it will remain in operation without danger of going out in case a closure of the circuit takes place after the original starting.

The accompanying drawings illustrate the invention herein described, Figure 1 being a side elevation of a mercury vapor lamp embodying my invention; and Fig. 2 being a diagram of the circuits employed in connection with the lamp.

In the drawings, 1 is the container of a mercury vapor lamp, 2 is the negative electrode thereof, and 3 and 4 are the positive electrodes. The latter may be of iron or other solid material, while the former is in the present instance of mercury. A starting electrode, 13, is also provided which is usually made similar in character to the electrodes 3 and 4. All the electrodes are suitably connected to the external circuit by means of lead-wires. The lamp is supported upon a frame, 5, pivoted at 6 to a support, 7, extending from the frame, 8, of an electro-magnet, 9, having a core or pole-piece, 10. The frame is itself of magnetic material and when the magnet is energized it is drawn upward into the dotted line position in Fig. 1 whereby a portion of the mercury constituting the electrode 2 is caused to travel through the tube 1 and into contact with the electrode 3, or an extension thereof. It will be seen that the container at the positive end of the apparatus is formed so as to cause successive ruptures of contact between the starting electrode 13 and the mercury forming the stream of mercury so that a plurality of breaks takes place thus increasing, as stated above, the likelihood of at least one of the breaks being made at the opportune moment. Thus, since the contact through the mercury between the negative electrode, 2, and the starting electrode, 13, is due to the stream of mercury in the act of flowing from the latter to the former electrode, the effective makes and breaks at or near the starting electrode must occur before this stream is interrupted, that is before the excess mercury has wholly passed out of the negative electrode receptacle. Once this excess mercury has come to rest at the positive end of the lamp it has no further starting effect until it has been returned to the negative.

By referring to Fig. 2 it will be seen that the lamp is supplied from an alternating current source consisting of the primary, 11, and the secondary, 12, of a transformer, the terminals of which are joined to the electrodes 3 and 4. An intermediate point of the secondary 12 is connected through the magnet 9 to the negative electrode 2. The starting electrode 13 is connected by a conductor, 14, through a resistance, 15, through a wire leading from one terminal of the secondary 12 to the electrode 4. When the apparatus is tilted into the dotted line position

in Fig. 1, the mercury flowing over from the pocket containing the electrode 2 splashes against the starting electrode 13 and appears to cause a number of successive breaks after making its initial contact. In most cases, it is found that on one or the other of the ruptures the apparatus is successfully started. Assuming now that a rupture has been made in the mercury stream at the proper moment, the current will pass through the break to the true negative end of the apparatus and this current will be transferred by the resistance 15 to the main electrode 4, and the lamp will not be put out by reason of any subsequent connection inside the apparatus. At the next alternation the electrode 3 will supply current delivered from the secondary 12 and so on.

The resistance, 15, serves the functions of preventing the extinguishing of the apparatus after an initial start during the tilting operation. In the first connection between the stream of mercury and the pin 13 after the initial starting of the lamp a complete metallic circuit is established from the negative electrode 2 to the source 12 through the pin 13 and the wire 14, so that during the alternation when current is not passing through the positive electrode 3 all passage of current through the vapor ceases and the negative electrode resistance is no longer broken down at any point within the container; consequently, the starting operation must be repeated. The insertion of the resistance 15 in the conductor 14 prevents this short-circuit between the negative electrode 2 and the pin 13, allowing current to flow to the positive electrode 4 or the positive electrode 3 at appropriate times as though the connection between the negative electrode and the source were not made through the electrode 13.

The same invention may be applied to other forms of vapor apparatus besides mercury vapor lamps, as will be readily understood.

While the apparatus is shown and described as being so tilted as to make and break electrical connection between the negative electrode and the starting electrode, yet it is a fact that the starting operation appears to be caused by the rupture of the circuit, thus described and the invention is not necessarily confined to an apparatus in which both a plurality of breaks takes place. In other words, assuming a normal connec-

tion between a negative electrode and the starting electrode by means of a bridge of mercury, the invention would be carried out by any arrangement which caused a succession of breaks by a tilting of the apparatus sufficient to interrupt the bridge a number of times.

The operation in actual practice being extremely rapid is difficult to follow with the eye but seems to be due to a series of actual connections and disconnections between the mercury and the supplemental electrode. On the other hand, trial has actually shown the apparatus and method herein described to be very effective for starting and it is intended to claim substantially this device whether the actual physical phenomena include positive makes and breaks or the splashing action and the breaking up of the normal flow of the jet causes the actual starting of the apparatus.

I do not claim herein the broad idea of utilizing a plurality of interruptions of the circuit between the negative electrode and a starting positive electrode afterward transferring the current flow from the starting electrode to a working positive electrode, as this broader invention was made by another. What I do claim is clearly set forth in the accompanying claim.

I claim as my invention:—

In a vapor device of the tilting type having a plurality of positive electrodes and a negative electrode of conducting liquid, wherein the device is started into operation by the rupture of a stream or layer of conducting liquid connecting the negative electrode and one or more of the positive electrodes, means for repeatedly making and interrupting the continuity of the circuit of said conducting liquid during a single tilting of the device, and means for preventing the extinguishment of the device on the re-establishment of the metallic circuit through the device, such means consisting of a resistance interposed between one side of the circuit supplying the device and one of the positive electrodes.

Signed at New York, in the county of New York, and State of New York, this 11th day of September, A. D. 1905.

FREDERICK H. VON KELLER.

Witnesses:

WILLIAM CONLEY,
WM. H. CAPEL.