

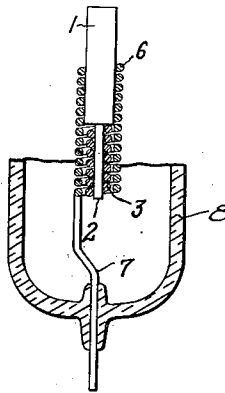
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ELECTRODE FOR HIGH-PRESSURE MERCURY-VAPOR DISCHARGE DEVICE

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ELECTRODE FOR HIGH-PRESSURE MERCURY-VAPOR DISCHARGE DEVICE

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This invention relates to high-pressure metal-vapor electric discharge (H. P. M. V.) devices of the type comprising an electrode structure wherein a starting and a running electrode (in the sense of British patent specification No. 472,658) are parts of the same mechanically integral body. Its object is to provide improved electrode structures of this kind, the chief qualities sought being small size and simplicity of construction.

It is pointed out in British patent specification No. 486,138 that, with some kinds of starting and running electrodes, it is possible to find conditions in which the discharge transfers itself partially, but not wholly, during the run up; the starting electrode continues to act as the cathode during one half of the cycle, but the associated running electrode acts as the anode during the other half. Electrodes in which such partial transference takes place are not within the scope of this invention.

According to the invention in an H. P. M. V. device of the type specified, the said electrode structure comprises (I) a rod of refractory conducting material (preferably tungsten or thoriated tungsten with tungsten powder), (II) an elongated body consisting wholly or partly of thermionically active material more easily vaporizable than the said refractory metal, (III) a porous sleeve-like metal body uniting parts I and II end to end. The parts I and II are preferably of nearly the same diameter. The part II may be composed of the known sintered mixture of alkaline earth compound; but preferably it is a helix, or a plurality of helices one inside the other, of refractory metal coated with or surrounding the active material. The porous metal body III is preferably a refractory metal helix; in order that it shall be distinguishable from a helix forming part of the part II, it must not be provided with a store of thermionically active material which is as easily vaporizable as that forming part or the whole of the part II, so that the part II is unnecessary.

The part I is the running electrode and is turned towards the discharge; the starting electrode is some part of the porous metal part III covering the body II or possibly the body II itself. The whole electrode may be supported from behind, preferably by means of a prolongation of the wire constituting part VI.

One embodiment of the invention is shown in an elevational, partly sectional view by way of example in the accompanying drawing. Here part I is a tungsten rod 1, 1.4 mm. in diameter

and 6 mm. long, the outer end being coated with a sintered mixture of thoriated tungsten powder; part II is a rod 2 of thermionically active material 0.8 mm. in diameter, supported by a helix 3 of tungsten wire, 0.3 mm. in diameter wound on a 0.8 mm. mandrel, the over-all length of part II being 4 mm.; part III is a helix 6 of tungsten wire .4 mm. in diameter, close-wound on a mandrel 1.4 mm. in diameter. This helix 6 covers the whole of the part II and extends 3 mm. along the part I, thereby uniting these parts firmly. The electrode structure is supported in the discharge envelope 8 by means of an extension 7 of the helix 6.

Such an electrode structure is suitable for H. P. M. V. lamps consuming 250 watts with 160 volts between running electrodes 35 mm. apart.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. An electric discharge device comprising a sealed envelope containing an ionizable medium and an electrode comprising a rod of refractory conducting material, an elongated body consisting wholly or partly of thermionically active material more easily vaporizable than the said refractory material and means supporting said rod and said elongated body in end-to-end relation, said means comprising a sleeve-like member of porous character which surrounds, and externally engages both the rod and the body.

2. An electric discharge device of the type adapted to operate with a relatively high vapor pressure comprising a sealed envelope containing a vaporizable metal and an electrode comprising a rod of refractory conducting material, an elongated body consisting wholly or partly of thermionically active material more easily vaporizable than the said refractory material, and means supporting said rod and said elongated body in end-to-end relation, said means comprising a refractory metal helix which surrounds both the rod and the body for a substantial portion of their lengths.

3. An electric discharge device of the type adapted to operate with a relatively high vapor pressure comprising a sealed envelope containing a vaporizable metal and an electrode comprising a rod of refractory conducting material and an elongated helix having in contact therewith thermionically active material more easily vaporizable than the said refractory material and a refractory metal helix uniting said rod and said elongated helix end-to-end.

4. An electric discharge device including a sealed envelope containing an ionizable medium and an electrode within the envelope, said electrode comprising a rod of refractory conductive material, an elongated helix having in contact therewith thermionically active material more easily vaporizable than the said refractory material, and means supporting said rod and said elongated helix in end-to-end relation, said means comprising a refractory metal helix which surrounds and externally engages both the rod and the elongated helix for a substantial portion of their lengths.

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