

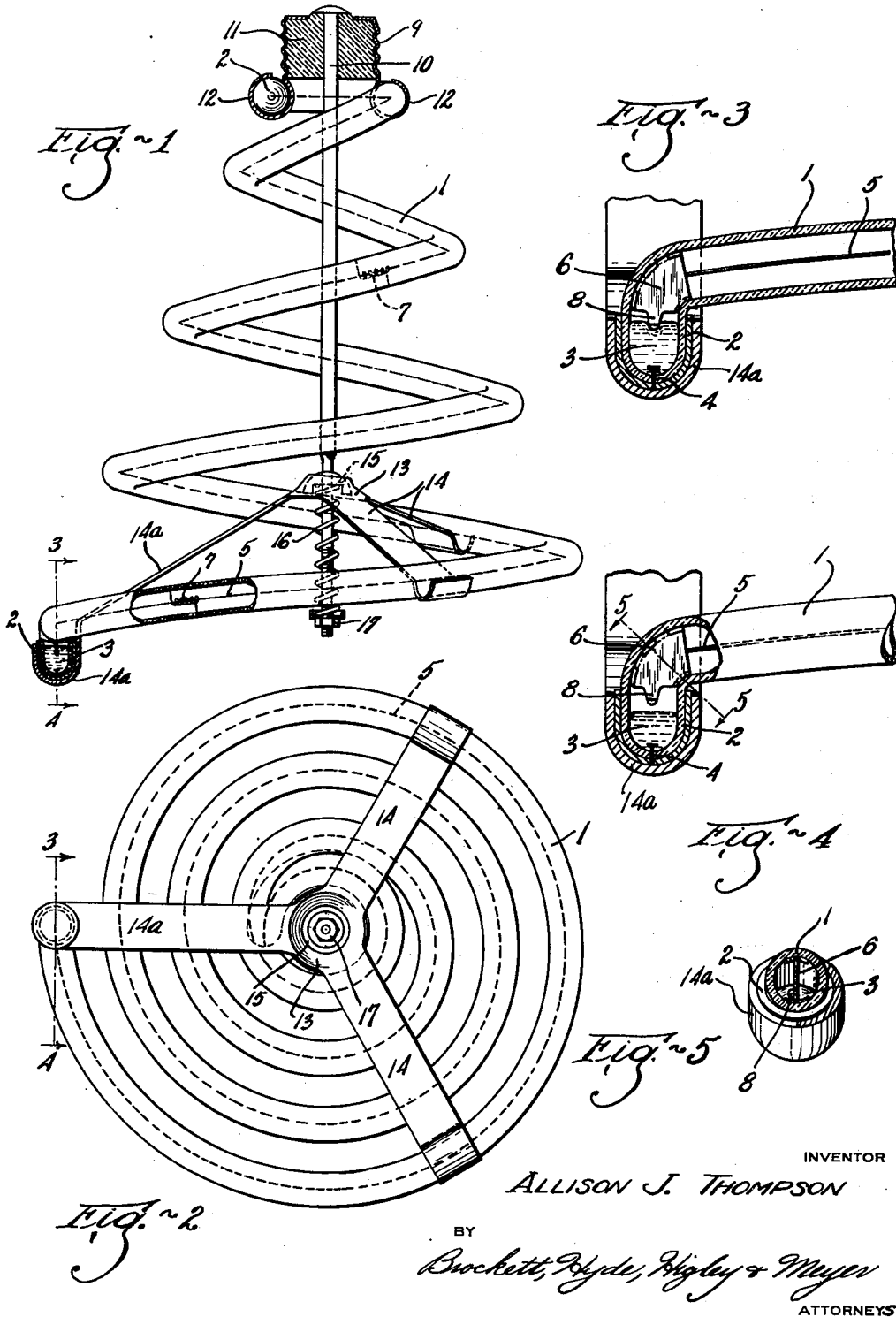
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MERCURY VAPOR LAMP

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MERCURY VAPOR LAMP

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1 Claim. (Cl. 176—49)

This invention relates to mercury vapor lamps wherein the luminous element is mercury vapor, in a highly evacuated tube of glass or quartz, formed between a mercury cathode and an anode of metal not attacked by mercury or its vapor or depreciated by an arc in the latter.

The functioning of such a lamp depends upon current flow of arcuate character through mercury vapor which in turn depends upon vaporization of mercury from the cathode. Once sufficient vaporization be attained to support flow, its maintenance presents no problem, but striking the arc has heretofore required special manipulation as by tilting the container to produce an instant contact of the cathode with the anode. Provision for this starting operation has in turn materially limited the form and size of the container by which are determined these characteristics of the luminescent source.

The object of this invention is to remove such limitations, and more specifically to this end to provide means for producing mercury vapor within the container, dependent merely upon supply to the lamp of proper current at the proper voltage.

More specifically, the invention embraces in a lamp of the class described having a mercury cathode in an evacuated container, an anode having a heater element with a terminal arranged with reference to the mercury level to make contact with said cathode dependent upon said level, whereby when the proper current is supplied to said lamp, flow will be by way of said heater element and said contact until sufficient mercury is vaporized to support arcuate current flow, and thereafter said contact will be broken and flow will be substantially entirely by way of said vapor.

Still another object of the invention is to provide a form of container, made possible by the described heater element, which shall be of large luminescent body.

The exact nature of this invention together with further objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawing, in which Fig. 1 is a side elevation of an embodiment of the invention, parts being broken away to show details of a construction; Fig. 2 is a bottom view of the same; Figs. 3 and 4 are enlarged details as in the plane of line 3—4, Figs. 1 and 2, illustrating the relation of the parts shown as respectively before and after operating vaporization; and Fig. 5 is a sectional detail as in the plane of line 5—5, Fig. 4.

With reference now to the drawing, 1 is the

evacuated container, of glass, quartz, or the like, tubular, with its ends closed; and which may be arranged with convolutions as indicated. The ends of the tube are capped by cup-like pieces 2, of metal cemented in position; and the lowermost extremity of the tube is vertically disposed as by the bend indicated, where the tube is convoluted as shown.

A cathode 3, simply a quantity of mercury, is provided in the lower end of the container; and has electrical connection with its cap 2 as by a lead 4 extending through and fused in the end of the container.

An anode 5 has similar electrical connection with the cap 2 of the opposite, upper end of the tube. This anode includes and principally comprises a heater element extending along within the hollow of the container to a point adjacent the cathode. The heater element comprises generally merely a wire filament of high electrical resistance. That the lower end of the anode may be fixed, it is provided with a terminal 6 of sheet metal bridging across the tube and secured by its location at the bend of the tube and by the oppositely bent tabs indicated. That the heating element will be maintained clear of the sides of the container, it may be gripped by a number of spacers 7, each spacer having prongs extending to bear against opposite sides of the tube.

The terminal 6 may have a contacting projection 8 with a bend at its extremity as shown. The location of this contactor 8 relative to the volume of the mercury of the cathode, and the volumetric capacity of the container, is such that when the parts are cold as when the lamp is not functioning, contactor 8 will project into the mercury as in Fig. 3 to complete a metallic circuit between the two electrodes, but when sufficient of the mercury has been vaporized to fill the container and support an arc therethrough, the container of course being previously evacuated, the mercury level will have been lowered as in Fig. 4 to open the metallic circuit.

For support of the container I may provide a base having an outer threaded element 9, and a central element 10 rigidly associated therewith but insulated therefrom by a filler 11 of non-conductive material. The outer element 9 of the base has an apron 12 providing a seat for the uppermost convolution of the container 1 and establishing electrical connection with the anode by the bearing of the upper cap 2 in this apron.

The other element 10 of the base may be simply a metal rod extending downwardly through the convolutions of the container and carrying a

spider 13. This spider has arms 14, preferably three in number, one of these arms 14a having its extremity cup-shaped as indicated, to receive the cap 2 at the lower end of the container 1. Thus a circuit is established between the cathode and the inner base element 10, by way of the spider arm 14a.

The spider is yieldably mounted upon the element 10, and free to tilt thereon, so that it may adjust itself to fit the lowermost convolution of the container 1. For this purpose the hub part of the spider has a spherical surface to seat upon a corresponding surface of a nut 15 yieldably urged upwardly by a spring 16 backed by a nut 17 on the extremity of the rod.

Operation will be apparent. When the proper current is initially supplied to the lamp, the latter being cold, a metallic circuit will be had between the cathode and anode and including the heater element 5, contact being had between the terminal 6 and the mercury of the cathode. The heater element acts as a filament giving off sufficient heat to vaporize the mercury of the cathode, leading the vapor upwardly along the hollow of the container 1 until ultimately the container is completely filled

with the vapor at pressure sufficient to support current flow and thus establish an arc. By this time the vaporization of the cathode has lowered its level sufficiently to break its connection with the terminal 6 of the heater element. The circuit is thereafter solely through the mercury vapor as long as the proper current is supplied to the lamp. Upon interruption of this current condensation of the vapor raises the liquid level of the cathode to re-establish connection with the terminal 6.

What I claim is:

In a lamp of the class described having an elongated evacuated container with a bend, a mercury cathode in one end of said container, said bend being located adjacent said cathode, an anode having a connection in the other container end and including a heater element extending therefrom along said container with a terminal adjacent said cathode, and means securing said terminal with reference to the mercury level to make contact with said cathode dependent upon said level, and unaffected by expansion of the heater element, said means having parts for the purpose bearing against the container sides at said bend.

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