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A. J. THOMPSON

1,962,106

MERCURY VAPOR LAMP

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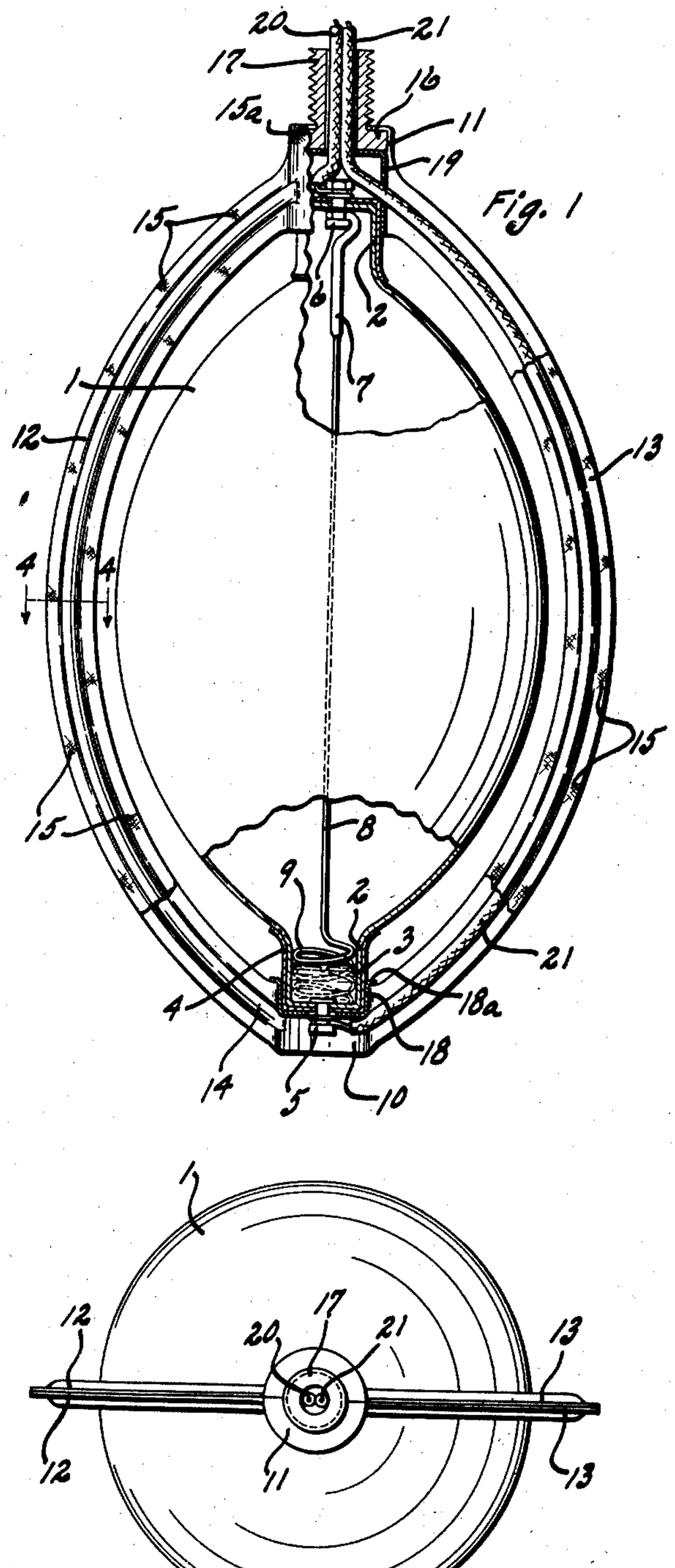

Fig. 1

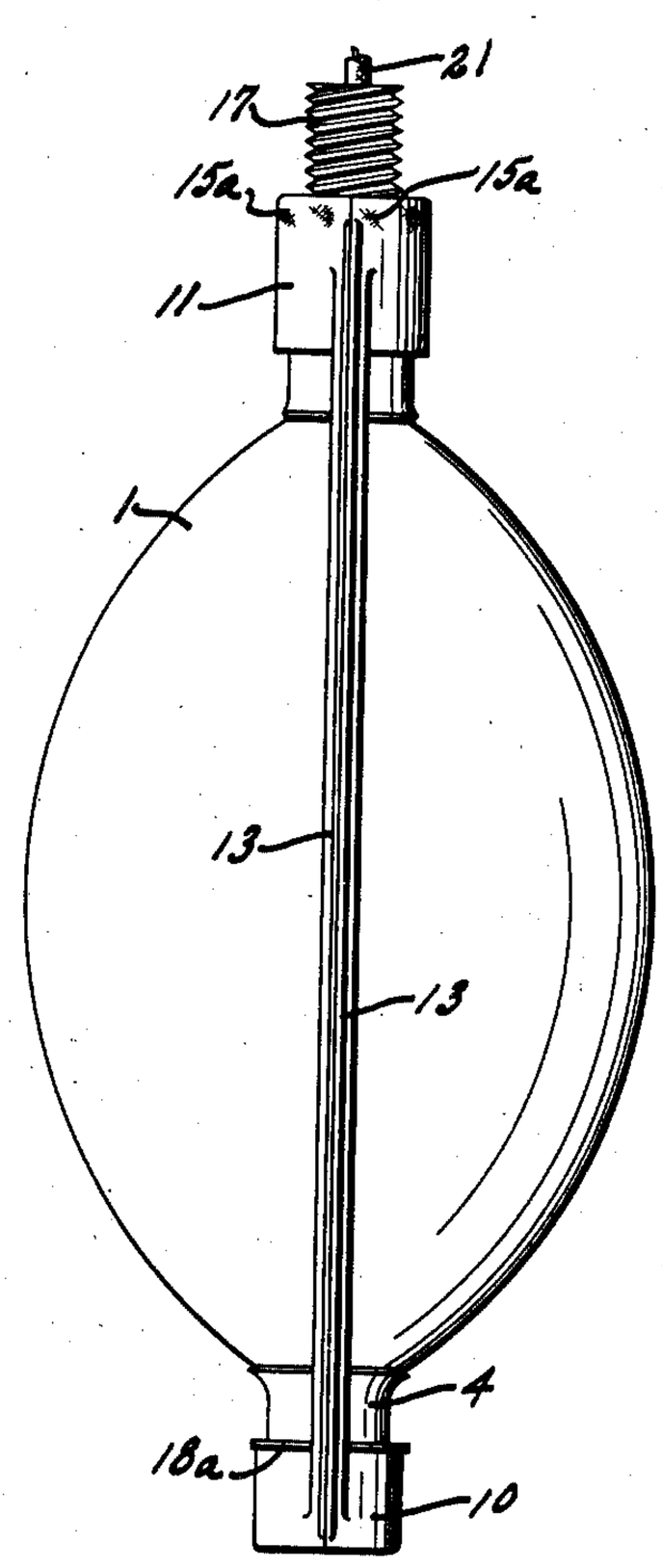

Fig. 2

Fig. 3

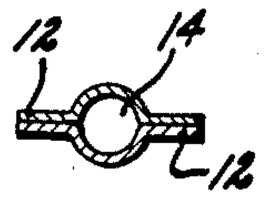

Fig. 4

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MERCURY VAPOR LAMP

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4 Claims. (Cl. 176—45)

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 attached by mercury or its vapor or depreciated by an arc in the latter.

The functioning of such a lamp depends upon current flow with arcuate characteristic through mercury vapor, which in turn depends upon the vaporization of mercury from the cathode. The flow once established, its maintenance presents no problem but "striking the arc" has heretofore required a special manipulation as by tilting the container to provide 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, an evacuated container with a pair of separated terminals, a mercury cathode associated with one of said terminals, and conductor means including a heater element, arranged in said container to connect said cathode with the terminal removed therefrom, whereby when the proper current is supplied to said lamp by way of said terminals, flow will be by way of said heater element until sufficient mercury is vaporized to support current flow, and thereafter substantial flow will be by way of said mercury vapor.

Reference is made to my copending application, Serial No. 588,394, filed January 23, 1932, wherein is disclosed another but comparable arrangement for operating a lamp of this kind.

Another object of the invention is to provide a form of container, made possible by the arc-producing arrangements of my two applications, which shall be of large luminescent body and be otherwise in advance of the prior art.

Still another object of the invention is to provide improved mounting means for the novel lamp disclosed herein.

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 Figs. 1, 2 and 3 are front, side and top views respectively, of an embodiment of the invention, parts being broken away in Fig. 1 to show details of construction; Fig. 4 is a detail section as in the plane of line 4—4, Fig. 1.

With reference now to the drawing, the lamp comprises a container 1 of glass or other light-conducting material, and which may preferably be of bulbous form with its extremities 2 extended cylindrically as indicated. The lower end 2 of the container forms a cavity within which is provided a quantity 3 of mercury sufficient to provide a supply of mercury vapor for the hollow of the container. A metal cap 4 is preferably provided outside the container and a terminal 5 is arranged through the end of the container to provide electrical connection with the mercury 3, and at the same time provide a seal for maintaining the vacuum in the container.

The opposite extremity 2 of the container is similarly provided with a sealed terminal 6.

Conductor means are arranged to provide a high resistance circuit between the terminals 5 and 6 and may preferably include an upper section 7 of low resistance, and therebelow a heater section 8 of high resistance preferably terminating in convolutions 9 extending well below the liquid level of the mercury 3 and serving to position the lower end of the member 8 in the lower extremity of the container 1.

The container being properly evacuated, when the proper current at the proper voltage is applied to the terminals 5 and 6, a circuit will be had between the terminals by way of the conductor sections 7 and 8. The latter and particularly the unsubmerged convolutions 9 thereof, provides a heater element which causes vaporization of the mercury 3. The mercury vapor rises generally along the conductor until it reaches the section 7 thereof. Thereupon a vapor conductor is completed, which ultimately has sufficient capacity to support current flow, the mercury acting as the cathode element as usual in mercury vapor lamps. With formation of the arc thus formed a large part of the flow between terminals will be had by way of the mercury vapor and as the arc is built up by further vaporization of the mercury, more and more flow will be by way of the vapor and less by way of the conductor, the resistance of the section 8 of which is relatively high as compared with that of the mercury vapor. Thus, when the lamp is in operation there is a divided circuit partly through the conductor but largely through the mercury vapor in parallel relation therewith.

That the lamp may have suitable support in

its operating position, I provide mounting means therefor. The principal parts of the mounting means are a pair of opposed sockets 10 and 11, and arms 12 and 13 joining the sockets and bowed outwardly as in Fig. 1 to clear the container 1, the mount being thus generally in the form of a frame about the lamp.

This frame may be made of sheet metal in two pieces, each piece including one-half part of both sockets and both arms, the plane of division between the pieces being vertical and central of the lamp. As shown in Fig. 4 the arms have grooves cooperable to form a passage 14 connecting the hollows of the sockets 10 and 11. The pieces are secured to form an integral whole as by spot welding at intervals as indicated at 15.

The cavity of the upper socket 11 is of sufficient depth to take the head 16 of a threaded nipple 17 by which the frame may be hung. The nipple and frame are rigidly secured as by welding as indicated at 15*a*.

An insert 18 of non-conductive material is set into the lower socket 10. Its depth is such that when its flanges 18*a* are seated, the bottom of the insert will be above the level of the passages 14 in the frame. The insert has an opening to clear the terminal 5.

The upper socket is similarly provided with an insulating insert 19 having a perforation at its end registering with the passage opening in the nipple 17, and having a lateral opening registerable with the passage 14. The depth of the upper socket, and its spacing relative to the lower one is such that the upper extremity of the lamp may first be inserted in the upper socket, the lower extremity of the lamp then swung over and into the lower socket, so that both extremities of the lamp are positioned in the frame.

Connection to the lamp is had by way of its mount, in the following manner: One conductor 20 is led through the nipple 17 and has connection with the terminal 6. This connection must be made before the lamp is positioned in its mount. The other conductor 21 is led through the nipple, through the passage 14 in one of the arms of the frame and thence connected with the lower terminal 5. This connection once made positively maintains the lamp secured in it mount. Access for making this connection is had through the bottom end of the lower socket 10, which is open.

What I claim is:

1. In a lamp of the class described, an evacuated container with a pair of separated terminals, a mercury cathode in conductive relation with one of said terminals, and conductor means arranged in said container to connect said cathode with the terminal removed therefrom and including a convoluted heater element adjacent said cathode and there positioned by cooperation with that part of said container which holds the mercury of said cathode.

2. In a lamp of the class described, a container with a pair of separated terminals, a mercury cathode in conductive relation with one of said terminals, and conductor means including a heater element, arranged in said container with a substantial portion immersed in the mercury of said cathode, to continuously connect said cathode with the terminal removed therefrom, whereby when the proper current is supplied to said lamp by way of said terminals, flow will be by way of said heater element until sufficient mercury is vaporized to effect an arc, and thereafter substantial flow will be by way of said arc.

3. In a lamp of the class described, an evacuated container with anode and cathode terminals, a mercury cathode in conductive relation with the cathode terminal, and conductor means leading within said container from the anode terminal to said cathode and having a part substantially immersed in the mercury of the latter, said conductor means including a heater element.

4. In a lamp of the class described, an evacuated container with anode and cathode terminals, a mercury cathode in conductive relation with the cathode terminal, and conductor means leading within said container from the anode terminal to said cathode and having a heater part extending substantially into the mercury of said cathode.

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