

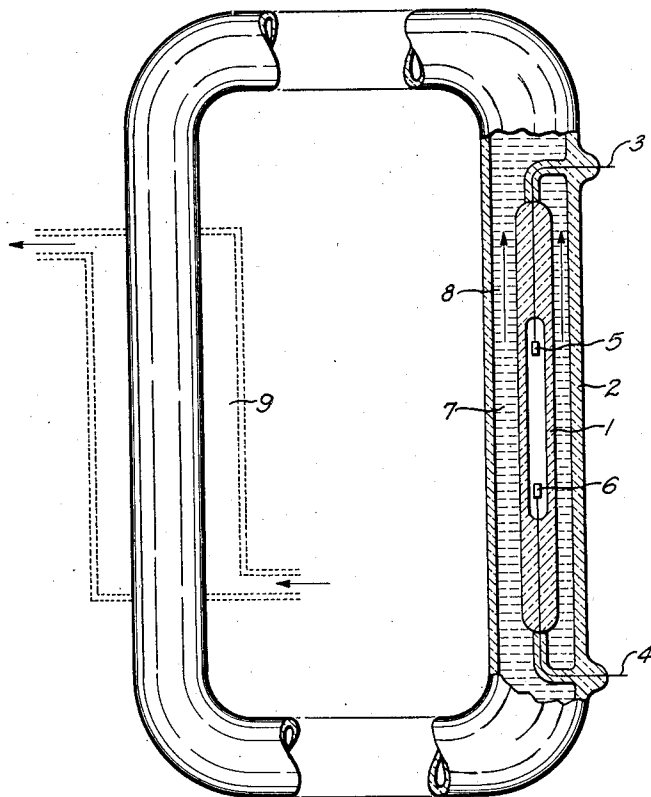
Nov. 3, 1942.

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2,300,892

LIQUID COOLED LAMP

Filed May 31, 1940



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UNITED STATES PATENT OFFICE

2,300,892

LIQUID COOLED LAMP

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Application May 31, 1940, Serial No. 338,262
In Japan June 2, 1939

2 Claims. (Cl. 176-122)

The present invention relates to super-high pressure vapor electric discharge lamp devices.

The object of the invention is to provide a simple self-contained fluid cooled super-high pressure lamp and in which the cooling fluid circulation means is of the closed system type and having distinct advantages over prior fluid cooled lamp devices used heretofore.

In the single figure of the drawing is shown partly in section the structure of an electric discharge lamp unit embodying the present invention.

Referring to the drawing, there is shown at 1 an electric discharge lamp tube of the usual super-high pressure type formed of quartz provided with lead wires 3 and 4 sealed through the ends of the tube and having electrodes 5 and 6 secured to the portions of said lead wires 3 and 4 projecting inside the lamp 1. In the interior of the lamp 1 there is provided a quantity of mercury and, when desired, a starting gas, and the lamp 1 will be modified according to the use and electrical characteristics desired. At 2 is shown an outer tube of quartz or suitable hard glass forming a closed circular passage, as clearly shown in the drawing, and enclosing the lamp 1, the closed tube 2 being filled with water, ethyl-alcohol, or other clear liquid 7 capable of producing high vapor pressure, it being understood that the lead wires 3 and 4 pass through insulating material extending from the wall 2 to the respective ends of the centrally mounted lamp 1 to prevent short-circuiting by the cooling fluid.

In the structure as above described, when a discharge is started in the lamp 1 in the usual manner, the temperature rises therein and the temperature of the liquid 7 also rises and the vapor pressure thereof increases as the pressure inside the lamp 1 increases, and consequently allowing for the difference in the inner and outer pressures exerted on the walls of said tube 1, thereby applying high heat and high pressure on said walls simultaneously and thus preventing breaks occurring in said walls, because of too great a difference in the temperatures and pressures at the lamp 1.

In operation, the liquid 7 heated by the discharge lamp 1 rises as indicated by arrows 8

causing a circulation of the cooling fluid past the lamp 1 by convection due to the heat arising in the lamp and the cooling of the circulating fluid in the remote parts of the tube 2. The cooling effect can be increased, of course, by forming a cooler portion of the tube 2 into worm or spiral form, and by the use of a blower fan, or a water jacket, indicated at 9, or a combination of all these, when desired.

The simple unit described is found to perform automatically the necessary pressure adjustment and circulating cooling action between the various parts and permitting the maintenance of the discharge in the lamp 1 safely at higher voltages with higher brightness, resulting in devices of higher efficiency than that of prior devices, and at the same time because of its simplicity and compactness lends itself readily to use in searchlights or movie projectors and the like, where housing space for a lamp unit is considerably limited.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A liquid-cooled high-intensity electric lamp unit comprising a closed and hermetically sealed endless tube forming an annular passage, a high-intensity electric lamp disposed within said tube and extending along a minor portion of the length of the said passage, at least a portion of the tube adjacent to the lamp being made of light-pervious material, and a cooling liquid filling said tube and adapted to be put in circulation through said tube by the heat transmitted thereto by said lamp.

2. A liquid-cooled high-intensity electric lamp unit comprising a closed and hermetically sealed endless tube forming an annular passage, a high-intensity electric lamp disposed within said tube and extending along a minor portion of the length of the said passage, at least a portion of the tube adjacent to the lamp being made of light-pervious material, and a cooling liquid filling said tube and adapted to be put in circulation through said tube by the heat transmitted thereto by said lamp, and supplemental cooling means at another portion of said tube for cooling the liquid therein.

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