J. H. DALE.

ELECTRIC INCANDESCENT LAMP.

APPLICATION FILED JAN. 20, 1915.

1,298,299. Patented Mar. 25, 1919.

Fig. 1.

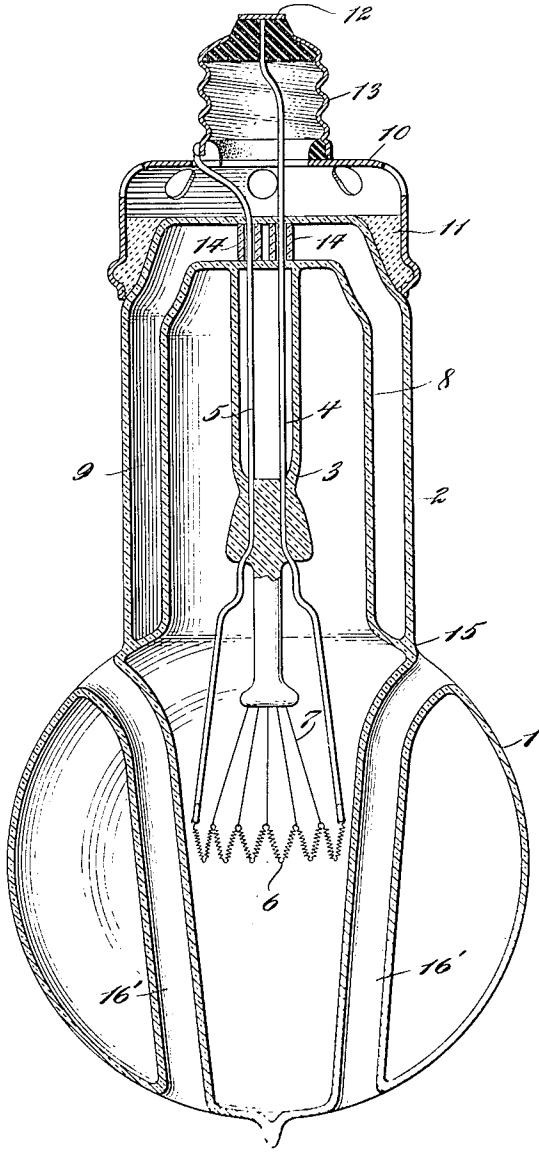
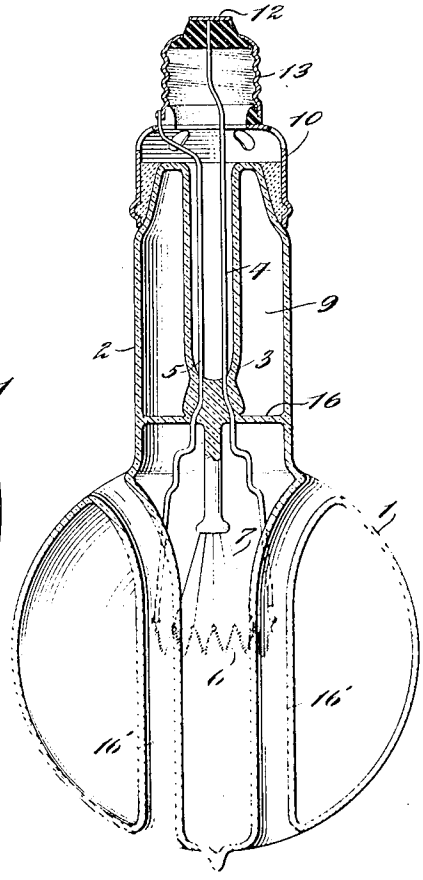


Fig. 2.



Witnesses:

Geo. C. Chaney.

Walds M. Chapin

Inventor

John H. Dale

By his Attorneys

Rosenbaum, Stickney & Borst

UNITED STATES PATENT OFFICE.

JOHN H. DALE, OF NEW YORK, N. Y., ASSIGNOR TO DALE LIGHTING FIXTURE CO., INC., A CORPORATION OF NEW YORK.

ELECTRIC INCANDESCENT LAMP.

1,298,299. Specification of Letters Patent. Patented Mar. 25, 1919.

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To all whom it may concern:

Be it known that I, JOHN H. DALE, a citizen of the United States, residing at the city of New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Electric Incandescent Lamps, of which the following is a full, clear, and exact description.

This invention relates to electric incandescent lamps, the object being to provide a construction therefor, which will prevent the conveyance of an injurious amount of heat from the source of light of the lamp to the lamp base. The base of an incandescent lamp ordinarily comprises a metallic shell secured to the glass wall of the lamp by cement or otherwise, the shell inclosing the ends of the leading-in wires of the lamp which are soldered to the contact parts associated with, or forming a part of, the base. The base also sometimes contains insulating material applied to the conductors and cementitious materials, which are subject to injury by excessive temperatures. In the ordinary or original form of incandescent lamp, wherein the filament burns in a vacuum, excessive heat is not conveyed to the base of the lamp because of the slowness by which the heat from the filament traverses the vacuum chamber and the glass walls of the bulb, but in some of the modern types of incandescent lamps, a non-combustion supporting gas, such as nitrogen, is used in the bulb of the lamp instead of the vacuum, and it has been found in the operation of these lamps that an excessive amount of heat is conveyed to the lamp base and that such heat is often sufficiently great to destroy the insulating or cementing materials in the base and even to melt the solder of the joints thereof. This heating effect in the nitrogen lamp seems to be due to the presence of nitrogen itself, which becoming heated rapidly circulates within the bulb and raises the temperature of the glass walls more rapidly than it can radiate to the external atmosphere. My invention is especially applicable to the nitrogen type of lamp, although not necessarily confined to this lamp, since it may perform a useful function whenever the base of a lamp must be kept at a comparatively low temperature. I accomplish the object of the invention by introducing a heat insulator between the wall of the lamp and the metallic base, which insulator comprises a vacuum chamber, and in carrying out the invention, I preferably use the wall of the neck of the lamp, as one wall of the vacuum chamber, and provide a special wall or diaphragm inside of the neck which separates it from the chamber in which the filament element is positioned. The metallic base is secured by cement or otherwise to this wall of the neck which forms a part of the vacuum chamber and is thereby insulated from the heat developed inside of the lamp.

In the accompanying drawings:

Figure 1 is a vertical central section of my improved lamp; and

Fig. 2 is a similar view of a lamp showing a modified form of heat insulating vacuum chamber.

The lamp proper comprises the bulb 1, having, as customary in nitrogen lamps, an elongated integral neck 2. Within the lamp there is an axial column or post 3, projecting toward the center of the bulb, through which the two leading wires 4 and 5 extend. These wires project from the column to the middle zone of the bulb, and support between them an incandescent filament 6 of suitable form which is additionally supported by wire braces 7 also springing from the column 3, or an extension thereof. Within the neck of the lamp there is formed a glass wall or diaphragm 8 made integral with the lamp bulb and spaced apart from the neck 2, thus forming an annular chamber 9, which chamber is exhausted of all air and gas when the lamp is made. The lamp base 13 has secured thereto the depending metallic cup-shaped portion or skirt 10, having a plurality of openings to permit a movement of air through the skirt and cool its interior, is positioned over the end of the neck 2, the walls of which form a part of the vacuum chamber and secured thereto, as usual, by means of cement 11 or in any other suitable way. The base contains an insulated center contact 12 and a threaded shell or side contact 13 to which the ends of the two conductors 4 and 5 are respectively soldered. These conductors in order to reach the contacts preferably pass through glass tubes 14 bridging the space between the two walls of the vacuum chamber, in which walls they are hermetically sealed.

It will be seen that the heat generated by

the incandescent filament 6 which is communicated to the nitrogen within the lamp, which in turn, we will assume, circulates within the interior chamber of the lamp, causes the inner wall or diaphragm 8 of the vacuum chamber to become heated. This heat however, is not communicated directly to the base of the lamp, but is prevented from reaching the base by the vacuum chamber 9. As the heat from the inner wall 8 of the vacuum chamber will pass comparatively slow to the outer wall or neck 2, and as the heat conducted upward through the wall 2 from the point 15 where it joins the bulb 1, will be at a slow rate, it is evident that the radiation into the atmosphere from the neck 2 will be sufficient to prevent any undue communication of heat to the lamp base with the result that the lamp can be operated without danger of destroying the base or causing short circuits and the evil results arising therefrom.

In the form of my invention shown in Fig. 2, the vacuum chamber is formed by providing an integral glass diaphragm 16 across the neck of the lamp near the point where it joins the bulb. Thus, the upper or outer part of the normal lamp neck is converted into a sealed chamber which may be exhausted and thereby serve as a heat insulating chamber, as before described, the lamp base being secured direct to the wall of this chamber as shown. By making the lamp neck substantially the same length as in the former case, it will be seen that the heat from the bulb will have to travel the same considerable distance along the wall 2 to reach the lamp base and that the vacuum will perform its function in the same way as, and even with greater efficiency than, in the former construction.

My invention, however, is not confined, in its broad aspect, to either of the forms illustrated, since it is obvious that other modifications can be devised to bring about the insertion between the wall of the lamp proper and the base, of an insulating vacuum chamber, which is the substance of my invention the scope of which is defined in the annexed claim.

The drawing illustrates a cooling device for the bulb 1, comprising tubes 16′ passing through the bulb chamber and opening to the atmosphere below and above, whereby a current of air will circulate through the tubes and thus carry away considerable heat generated in the bulb and prolong the life of the filament. This feature of the lamp, while being a part of my invention, is not claimed herein, but is made the subject of a separate patent dated November 14, 1916, numbered 1,204,653.

I claim:

An electric incandescent lamp comprising a chamber containing a filament element, a base for the lamp, a depending annular skirt having openings secured to said base and constituting a cooling chamber and a vacuum chamber located between the skirt and the filament chamber.

In witness whereof I subscribe my signature in the presence of two witnesses.

JOHN H. DALE.

Witnesses:

WALDO M. CHAPIN,

JOSEPH A. BUCKLEY.