H. J. JAEGER.

METALLIC FILAMENT LAMP FILLED WITH NITROGEN.

APPLICATION FILED MAR. 17, 1916.

1,256,568. Patented Feb. 19, 1918.

Fig. 1.

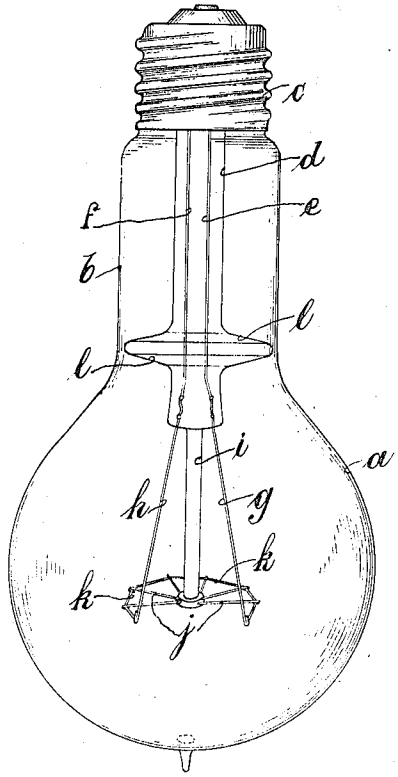


Fig. 2.

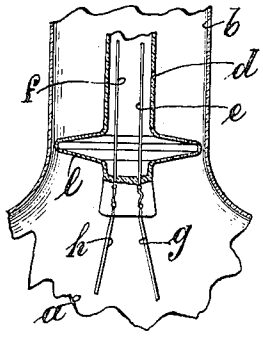
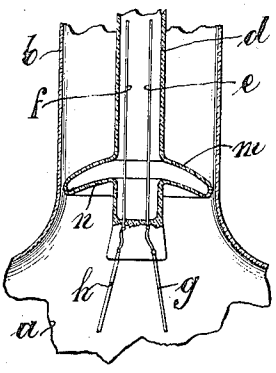


Fig. 3.



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METALLIC-FILAMENT LAMP FILLED WITH NITROGEN.

1,256,568. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed March 17, 1916. Serial No. 84,795.

To all whom it may concern:

Be it known that I, HERMAN J. JAEGER, a citizen of the United States of America, and a resident of Weekawken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Metallic-Filament Lamps Filled with Nitrogen, of which the following is a specification.

This invention has reference to improvements in incandescent electric lamps with metallic filaments which are filled with an inert gas, preferably nitrogen.

Heretofore metallic filament lamps have been produced containing as high a vacuum as possible. These lamps are practically free from any medium which may carry the heat from the incandescing metallic filament to the walls of the inclosing glass chamber. Accordingly such metallic filament lamps containing an exceedingly high vacuum remain relatively cool during operation. The efficiency of such lamps, although very high in comparison to carbon filament lamps is not as high as if an inert gas is contained within the globe in a more or less extenuated state. It has been found that metallic filament lamps filled with an inert gas such as nitrogen or argon are of higher efficiency than vacuum lamps consuming but a fraction of a watt per candle. Argon appears to be better for the purpose intended than nitrogen probably because it is heavier than nitrogen. It has an atomic weight of 39.6 and a density of 19.96, as compared to hydrogen. Therefore argon is preferably used if at disposal.

Inert gases when contained in a globe of an incandescent lamp become heated during operation and the heat causes a circulation of the gas. The circulating gas forms a medium for carrying the heat from the incandescent metallic filament to all parts of the lamp. As these lamps are usually mounted so that the neck of the lamp with the metallic base thereon is at the top the heat distributed by the circulating inert gas heats up the base and adjoining parts to an undesirable degree. For this reason means have been devised for preventing the heat transmitted by the circulating gas to reach the upper portion of the neck of the lamp and its base and the adjoining socket. For instance a mica disk, or an asbestos ring has been secured to the stem within the neck for protecting the base and socket from the heat. Such mica disk or asbestos ring requires an opening to be secured on the stem and mechanical elements to keep it in position which requires expense in material, time and wages and does not afford absolute guarantee of retaining these disks and rings in position during transportation. Separate solid glass disks through which the leads pass have also been employed, but solid bodies or disks easily become hot on account of the large quantity of material employed and the desired purpose is thereby defeated.

I have devised novel means for preventing radiating heat within the lamp globe to enter the neck and heat up the base which form a permanent, hollow part of the stem of the lamp and do not perceptively increase the cost of manufacture. Further the leads are not sealed into the said hollow part, or to make matters entirely clear the leads do not pass and are not sealed therein as in the solid devices heretofore employed. Another great advantage of the novel protective means is that it is an integral part of the stem having glass walls just as thin as the glass walls of the stem, or usually thinner because those means are blown out.

In order to render the present invention entirely clear reference is had to the accompanying drawing in which:

Figure 1 represents in slightly perspective view a metallic filament lamp filled with nitrogen, embodying in desirable form the present improvements.

Fig. 2 illustrates in fractional elevation the portion of the lamp to which the improvement is applied.

Fig. 3 is a like view showing a modified form of the device.

Similar letters of reference denote like parts in all the figures.

The lamp illustrated in Fig. 1 comprises a globe *a* having a neck *b* which is provided at its upper end with the base *c*. Within the neck and globe there is the hollow stem

d which carries the leads *e*, *f* and the filament supports *g*, *h*. A glass rod *i* is fused to the solid end portion of the stem as usual. The rod *i* carries anchors *j* for the filament *k* which is secured with its ends to the supports *g*, *h*. As herein stated the lamp is filled with an inert gas and for convenience sake nitrogen will be referred to only in the following description. In order to prevent that the nitrogen gas heated by the incandescent filament rises up to the neck *d* and base *c* I have provided a hollow glass rim *l* on the stem which is produced by the fusion of the glass and blowing and thus forms an integral part of the stem. When the stem is made and the wires are sealed in, the hollow glass rim is easily produced on the stem practically without any loss of time and without using any additional material. Thus the rim *l* being made of glass and forming an integral portion of the stem is made of heat non-conducting material. The hollow rim, forming an integral part of the stem can never be displaced or removed and therefore forms an absolutely reliable shield against radiating heat.

The location of the hollow rim *l* is material for attaining the maximum effect. As shown on the drawing the hollow glass rim is located at the end of the neck where the globe commences. It therefore closes off the globe and the circulating gas when heated by the incandescent filament passes in an upward direction and strikes against the circular rim. The higher the gas rises the farther it gets away from the incandescing filament and therefore is cooling off while newly heated gas portions will rise. The somewhat cooled off gas portions are deflected by the glass rim in a downward direction and sink until they come again in contact with the incandescent filament. Thus a radiation of the heated gas takes place within the globe without affecting the gas in the neck to a perceptible degree. For this reason the neck and the base remain cool and are not damaged by the heat. The neck and base of the lamp are protected by the hollow glass rim which is integral with the stem, in a more effective manner than by a mica disk or asbestos ring which can never be made to form an integral part of a glass stem and therefore is liable to distortion and dislocation, especially during transportation.

In Fig. 3 of the drawing a modified form of a hollow glass rim is shown. This hollow rim has an upper convex portion *m* and a lower concave portion *n* whereby an easier passage of the heated gases is effected considering that the rim is circular in shape.

It is of course understood that the glass rim leaves sufficient space between its circumference and the adjoining glass wall to effect an easy evacuation of the lamp and an easy filling with nitrogen. During the sealing of the stem into the lamp the glass rim keeps the stem in a rather straight position whereby the sealing is easier and quicker effected than with a simple stem which shakes to and fro during sealing.

I claim as my invention:

1. A metallic filament lamp filled with an inert gas comprising a globe, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having means formed integrally therewith for deflecting the circulating hot inert gas during the operation of the lamp and protecting thereby its base.

2. A metallic filament lamp filled with nitrogen comprising a globe, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having means formed integrally therewith for deflecting the circulating hot nitrogen during the operation of the lamp and protecting thereby its base.

3. A metallic filament lamp filled with an inert gas comprising a globe, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having a hollow rim formed integrally therewith for deflecting the circulating hot inert gas during the operation of the lamp and preventing the hot gas from heating the base of the lamp to an undesirable degree.

4. A metallic filament lamp filled with nitrogen comprising a globe, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having a hollow rim formed integrally therewith for deflecting the circulating hot nitrogen gas during the operation of the lamp keeping thus its base relatively cool.

5. A metallic filament lamp filled with an inert gas comprising a globe with neck, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having a hollow rim formed integrally therewith and located where the neck and globe meet for deflecting the circulating hot inert gas during the operation of the lamp.

6. A metallic filament lamp filled with nitrogen comprising a globe with neck, a hollow stem with leads and an incandescing filament in connection with the leads, said stem having a hollow rim formed integrally therewith and located where the neck and globe meet for deflecting the circulating hot nitrogen gas during the operation of the lamp.

7. In a metallic filament lamp filled with nitrogen a glass hollow stem carrying the leads and an incandescing filament, said glass stem being provided with a hollow glass rim formed integrally therewith and

adapted to deflect the circulating hot nitrogen gas during the operation of the lamp.

8. In a metallic filament lamp filled with an inert gas, a hollow glass stem with the leads sealed therein at its inner end portion, and an incandescing filament on said leads, the said glass stem being provided with a very thin hollow glass rim formed integrally therewith by fusing that glass section of the stem and blowing up the thin rim.

Signed at New York, N. Y., this 16th day of March 1916.

HERMAN J. JAEGER.

Witnesses:
L. C. SCHMIDT,
SOPHIE GRIB.