June 26, 1945. W. E. ANDERSON 2,379,058

LAMP WITH MEANS TO IMPROVE LUMEN MAINTENANCE

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Fig. 1.

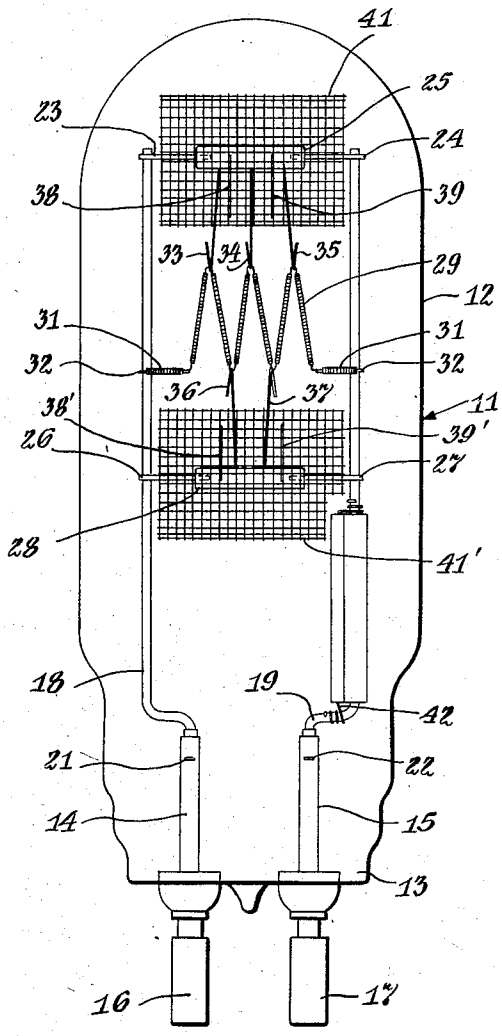
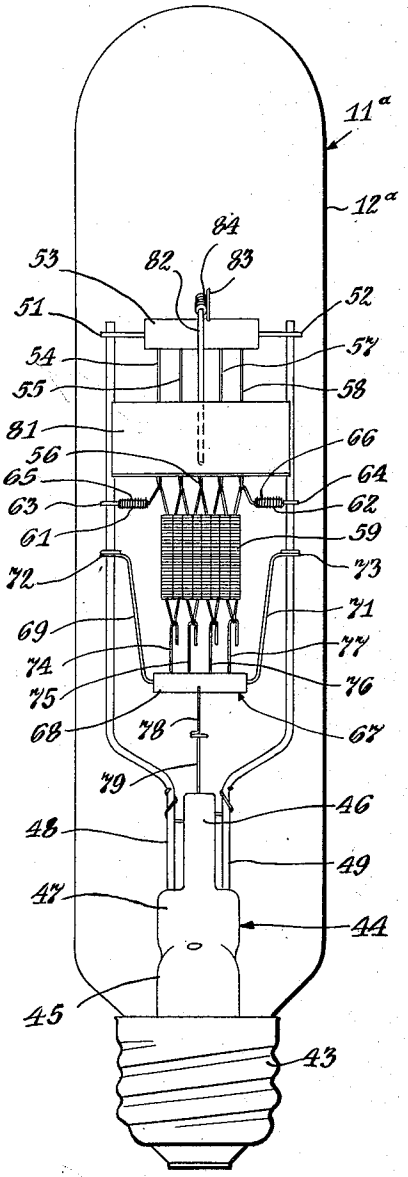


Fig. 2.



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LAMP WITH MEANS TO IMPROVE LUMEN MAINTENANCE

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6 Claims. (Cl. 176—16)

This invention relates to incandescent electric lamps and, more particularly, to such of the gas-filled type having means to reduce bulb blackening.

The principal object of my invention, generally considered, is to provide an electric lamp, and particularly one of the high wattage type, with an improved blackening collector in order to improve the lumen maintenance.

Another object of my invention is the employment of metal blackening-collectors, in the envelopes of incandescent electric lamps, which involve an improvement over those previously employed by comprising a metal of the pair consisting of chromium and aluminum.

A further object of my invention is the provision of a gas-filled lamp, particularly adapted for projection purposes, containing one or more screens or plates held in such a position with respect to the incandescible filament that they reduce bulb blackening as well as catch some of the blackening, which necessarily occurs, and prevent it from depositing on the inner surface of the glass envelope, thereby improving lumen maintenance.

Other objects and advantages of the invention, relating to the particular arrangement and construction of the various parts, will become apparent as the description proceeds.

Referring to the drawing illustrating my invention:

Fig. 1 is a side elevational view of an incandescent electric lamp of the medium bi-post type embodying my invention.

Fig. 2 is a side elevational view of a projection lamp and involving another embodiment of my invention.

In the Anderson patent, No. 2,183,952, granted December 19, 1939, there is disclosed a high powered gas-filled lamp of the medium bi-post type containing a collector screen which may be formed of metal and is designed to collect the material which vaporizes from the tungsten filament and thereby, to that extent, reduce bulb blackening and improved lumen maintenance.

In the Nutto patent, No. 2,181,522, granted March 21, 1939, there is described and claimed an incandescent electric lamp of the high powered or projection type, in the envelope of which are mounted imperforate plates formed of metal, such as nickel or molybdenum, for the purpose of decreasing the amount of metal evaporated from the filament during operation, as well as collecting the metal which does evaporate, to as great an extent as possible.

I have experimented in order to determine if lumen maintenance can be further improved by changing the character of the collector. My first test consisted in coating a nickel wire mesh with powdered aluminum applied as a paste. This test showed an advantage in lumen maintenance at 70% designed life for the coated screen in 500 watt, 120 volt, T20, medium bi-post general lighting lamps.

In another test I used a chromium-plated nickel wire screen which showed a still better lumen maintenance at 70% designed life.

Now referring to the drawing in detail, and first considering the embodiment of my invention illustrated in Fig. 1, there is shown a high wattage lamp 11, of the medium bi-post type, comprising an envelope 12 provided with a base 13 through which extend lead-in conductors 14 and 15 from terminal posts 16 and 17. The lead-in conductors 14 and 15 may be formed hollow to receive the conductors or support leads 18 and 19, the lower ends of which may be secured to said conductors 14 and 15 in any desired manner, as by crimping indicated at 21 and 22.

The free or upper ends of the conductors 18 and 19 are, in the present embodiment, connected by wires 23 and 24, the outer ends of which are spot welded thereto, and the inner ends embedded in a glass or other insulating portion 25. Intermediate portions of the conductors 18 and 19 are likewise connected by wires 26 and 27, the adjacent ends of which are embedded in a glass or other insulating portion 28.

The filament 29, illustrated as of the coil tungsten variety, is shown mounted between the conductors 18 and 19 and the insulators 25 and 28, the end sections 31 of said filament being fitted over stiffening wires 32, the filament and wires welded or otherwise secured to the conductors 18 and 19, and intermediate portions draped over hooks 33, 34 and 35, extending from the insulator 25 and hooks 36 and 37 extending from the insulator 28.

The insulators 25 and 28 also desirably carry wires or spuds which serve to support screens or plates for collecting material vaporized from the filament, thereby minimizing the blackening of the bulb. For this purpose the insulator 25 has spuds or support wires 38 and 39 which extend laterally therefrom, and to which the vaporized-metal-collecting screen 41 is secured, as by means of spot welding. The screen 41 may be inverted V shape as viewed from the side (not shown) and straddle the insulator 25 like the corresponding

screen 42d shown in Fig. 11 of the Anderson patent, above referred to.

In accordance with my invention, this screen desirably consists of wire of metal which has a relatively high melting point so as not to fail during operation of the lamp, metals of such a character being nickel, molybdenum and iron, said wire being coated or plated with chromium or aluminum. The chromium is desirably applied as plating, and aluminum, if used, is desirably pure as in the form of degreased aluminum flakes and applied with a harmless binder such as alcohol or amyl acetate.

The reference character 41' represents a screen generally similar to the screen 41, but inverted, and supported from the insulator 28, in a manner similar to the support of the screen 41, as by means of spuds 38' and 39'.

When the envelope 12 has been filled with an inert gas and sealed, the lamp as just described is one of the high wattage type suitable for projection or general lighting purposes. On account of carrying the necessary high current, failure of the filament is apt to result in a destructive arc between the adjacent ends of the said filament. In order to avoid such an arc I provide, in the present embodiment, a fuse 42 which may correspond with that described in connection with the first embodiment of said Anderson patent.

Referring now to the embodiment of my invention illustrated in Fig. 2, there is shown a lamp 11a comprising a bulb 12a with a base indicated at 43 and enclosing a mount 44. The mount of the present embodiment comprises a flare tube 45 sealed to the bulb and having an exhaust tube (not shown), an arbor 46 extending from the press 47, lead-in conductors extending through the press from the base 43 and connected with relatively rigid inner supporting leads 48 and 49 which may be formed of nickel or other suitable material, with their normally lower ends embedded in the press 47.

In the present embodiment, the normally upper or free ends of the supporting leads 48 and 49 are connected by wires 51 and 52, the outer ends of which are spot welded thereto and the inner ends of which are embedded in an insulating member or bridge 53, which may be a piece of glass cane.

Depending from the insulator 53 are a plurality of supporting members 54, 55, 56, 57 and 58, the number depending on how many coil sections the filament 59 includes. In the present embodiment the coil filament comprises 8 tungsten sections which are connected by intersection loops and staggered so that four are disposed in one normally vertical plane and four in a normally vertical plane parallel thereto, and so spaced that in plan they lie at the vertices of isosceles triangles.

The upper uncoiled portions of the connected sections of the filament 59 are draped over the hooked ends of the members 54 to 58, inclusive, as illustrated, and the extreme coiled end sections 61 and 62 forced over connecting members 63 and 64, the outer ends of which are desirably spot welded to the supporting leads 48 and 49, respectively. Outer coils 65 and 66 may be screwed over the coiled end portions 61 and 62 for short-circuiting the turns thereof to improve the uniformity of rating.

In order to hold the filament 31 in position between the leads 48 and 49, and at the same time avoid undue strains due to expansion and contraction of the metal parts of the lamp, I provide a light bridge assembly 67, which desirably comprises an insulating portion 68, preferably formed of glass cane, and end wires 69 and 71, the inner ends of which are embedded in the insulator 68 and the outer ends of which normally extend diagonally outward and upward and are formed with eyes or loops 72 and 73 to receive and slide on the supporting leads 48 and 49, respectively.

The bridge device 67 is normally suspended from the filament 59 by having members 74, 75, 76 and 77, the lower ends of which are embedded in the insulator 68 and the upper ends of which are bent to hook over the loops formed between the lower portions of the coil sections of the filament 59.

The insulator 68 is desirably provided with a bottom guide 78, slidably cooperating with a wire 79 extending upwardly from the arbor 46, in order to prevent undesired tilting of the bridge device when the lamp is inclined from its normal, vertical base-down, position.

Inasmuch as the lamp illustrated is of a type in which the filament is operated at a very high temperature to give a great amount of light with a relatively short life, said filament is desirably surrounded by inert gas and metal plate means used to reduce vaporization thereof. In the present embodiment, these means comprise a pair of plates 81, shown imperforate, which plates are of metal such as nickel, molybdenum or iron, which has a sufficiently high fusing point to avoid melting during normal lamp operation. The surfaces of said plates are coated with chromium or aluminum, like the surfaces of the wires of the screen described in connection with the first embodiment. In edge elevation the plates 81 may appear as shown in Fig. 2, and in perspective as shown in Fig. 1 or Fig. 4, of the Nutto patent previously referred to.

These plates are desirably mounted so as to normally extend above and lie on either side of the filament, as illustration in Fig. 2 supplemented by the showing of said Nutto patent. For that purpose said plates are secured to the ends of a wire 82, as by spot welding, which wire is looped over the insulating bridge member 53 and supported therefrom as by spot welding to a spud 83 extending upwardly from approximately the midportion thereof. In order to improve the connection between the wire 82 and the spud 83, the curved upper portion of said wire desirably has first applied thereto a metallic flux which may consist of a coil 84 of relatively fine wire. The plates 81 may otherwise be constructed and disposed as specifically described in said Nutto patent, referred to, except for the coating or plating of chromium or aluminum thereover.

From the foregoing it will be seen that I have devised an incandescent electric lamp in which improved means are provided for reducing the amount of metal vaporized during the operation and also for collecting the metal which does vaporize, thereby preventing to a large extent its deposition on the bulb and improving the lumen maintenance throughout life.

Although preferred embodiments of my invention have been disclosed, it will be understood that modifications may be made within the spirit and scope of the appended claims.

I claim:

1. An incandescent electric lamp comprising an envelope, a stem, interior supporting leads extending from said stem in said envelope, a filament mounted between said leads, and a blackening collector supported in said envelope, said collector being formed of nickel coated with ma-

terial of the group consisting of plated chromium and degreased aluminum flakes.

2. An incandescent electric lamp comprising an envelope, a stem, interior supporting leads extending from said stem in said envelope, a filament mounted between said leads, and a blackening collector supported in said envelope, said collector being formed of nickel plated with metallic chromium.

3. An incandescent electric lamp comprising an envelope, a stem, interior supporting leads extending from said stem in said envelope, a filament mounted between said leads, and a blackening collector supported in said envelope, said collector being formed of nickel coated with degreased aluminum flakes.

4. A blackening collector for incandescent electric lamps and formed of nickel coated with a material of the group consisting of plated chromium and degreased aluminum flakes.

5. A blackening collector for incandescent electric lamps and formed of nickel plated with chromium.

6. A blackening collector for incandescent electric lamps and formed of nickel coated with degreased aluminum flakes.

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