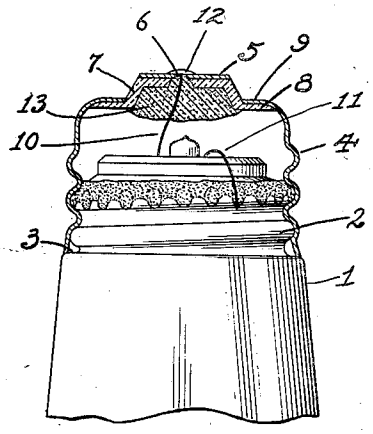
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LAMP WITH ARC PREVENTING FUSE

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LAMP WITH ARC PREVENTING FUSE

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5 Claims. (Cl. 176—30)

This invention relates to devices such as lamps, radio tubes and similar devices, and more particularly to an improved base structure for such devices.

It has been found that one of the most serious defects in lamps of the type having a fuse in the base is in the production of destructive arcs in the lamp base. This is true in the case of "mechanically based" lamps, that is to say lamps where the metal shell contact base is fastened to the lamp bulb without the use of cement or similar bonding materials, and more especially true where such mechanically based lamps have one or both of the lead-in wires of fuse metal. Thus in this latter type of lamp there is a considerable exposed area on the inner face of the metal shell, and when the fused lead-in wire blows, the resultant metallic vapors and ions tend to strike an arc to the exposed area of the shell. One method of reducing the possibility of such destructive arcing in the case of cement-based lamps is disclosed in application Serial No. 750,473, filed October 29, 1934. Another method that has been proposed is to provide the fused lead-in wire with a tubular covering of asbestos or the like. However, in practice it has been found that because of the practical difficulty of maintaining the tubular insulator in intimate contact with wire and with the eyelet in the lamp base, there is usually present an unobstructed path for the striking of an arc between the eyelet and the metal shell. I have found that in order to prevent such destructive arcing, it is necessary to insulate completely the eyelet from the interior of the shell.

Accordingly one of the principal objects of the present invention is to provide a lamp or tube having a fused lead-in wire, and wherein the chances of destructive arcing in the base are substantially eliminated.

A feature of the invention relates to a lamp having a metal shell contact base through which one or both of the lead-in wires pass, one of the lead-in wires having a portion adapted to act as a protective fuse, together with means for preventing destructive arcs within the metal shell.

Another feature of the invention relates to a mechanically based lamp, as distinguished from a cement-based lamp, wherein means are provided to prevent destructive arcing between the metal shell and the usual metal eyelet through which one of the lead-in wires passes.

Another feature relates to a lamp or tube having a contact base of the threaded metal shell and insulated metal button type, wherein the eyelet in the metal button contact is completely protected against the formation of destructive arcs interiorly of the shell.

A still further feature relates to the novel organization, arrangement and relative location of parts which go to make up a mechanically based lamp which is substantially entirely free from the dangers of destructive arcing in the base thereof.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

While the invention will be disclosed herein as embodied in one particular type of mechanically based lamp, it will be understood that this is done merely for purposes of explanation and not by way of limitation, and furthermore only those parts of the lamp are shown as are sufficient to enable the inventive concept to be thoroughly understood.

Referring to the drawing, numeral 1 indicates the neck portion of an enclosing envelope of any well known shape such as is employed in lamps, radio tubes or the like. Preferably, although not necessarily, the neck 1 terminates in a threaded butt 2, which has a series of threads molded therein, and is also provided with a uniform flat annular shoulder 3. Threaded on to the butt 2 is a correspondingly threaded metal shell 4 which has insulatingly fastened thereon a metal contact button 5 provided with an eyelet 6. In accordance with the usual practice, the button 5 is fused or otherwise fastened to a hollow glass plug 7 provided with a circular flange 8 fused or otherwise fastened to the bottom wall 9 of the shell 4, it being understood that the said wall 9 is provided with a circular opening to receive the plug 7.

One of the lead-in wires 10 passes through the eyelet 6 and is soldered thereto, thus closing said eyelet. The other lead-in wire 11 may be bent back over the rim of butt 2, and soldered or otherwise conductively connected to the shell 4. Any well known means may be provided for preventing relative turning movement between shell 4 and butt 2. Thus as indicated in the drawing, one of the threads of butt 2 is provided with a series of grooves which are adapted to be filled with a fusible metal which effectively bonds the butt to the metal shell. For a detailed description of this type of mechanical basing, reference may be had to application Serial No. 758,349, filed December 20, 1934.

In accordance with the present invention, one of the lead-in wires, preferably the wire 10, has a portion of its length constituted of fusible metal, so that when excessive current tends to flow through the lamp the said lead wire "blows" and breaks the circuit through the lamp. In lamps of this type as will be noted, there is a considerably large area on the inner face of shell 4 which is left exposed to the lead wire 10. Furthermore the eyelet 6 and the corresponding opening in plug 7 must be of considerable size in order to facilitate threading the wire 10 through the said eyelet. Consequently, when the solder 12 is applied, there is left exposed to the interior of

the shell 4 a relatively large metallic area. It has been found that when the lead-in wire 10 "blows", the resultant metallic vapors, metallic particles and metallic ions, tend to strike an arc between the exposed area of shell 4, and the exposed area of the eyelet 6, and this is true even where the fused lead-in wire is provided with an insulator tube since there is always a space left between the wire and inner wall of the tube, and also a small space between the end of the tube and the eyelet. In accordance with the present invention, eyelet 6 is provided with a completely protective insulating filling, so that there is no exposed metal, apart from the lead wire itself, to which a destructive arc can strike. Preferably this protection is afforded by embedding the lead-in wire 10 in an insulating material 13 which completely fills the interior hollow portion of the glass plug 7, the depth of the filling 13 being preferably proportioned so that the length of the embedded wire 10 is related to the impressed voltage at which the lamp is designed to operate, for purposes about to be described. The insulator 13 is preferably of such material that it is capable of being bonded directly to the glass 7 upon the application of suitable heat, or if desired a coating of suitable insulating bonding material may be applied to the inner surface of the glass plug 7, so that upon the assembly of the insulator 13 and upon heating and drying, the said insulator 13 is integrally bonded to the glass 7 thus completely covering the otherwise exposed area of the eyelet 6. The insulator 13 may be prepared from the following materials: 85.0 gms. of marble flour, 3.5 gms. of rosin, 4.5 gms. of shellac, 7.0 gms. of resin and 10.00 cc. of alcohol. The resin is a heat hardening resinoid such for example as "bakelite" or "durite." It will be understood of course that any well known manner of applying the insulator 13 to the wire 17 may be employed. For example, the said insulator may be previously shaped to correspond to the shape of the hollow portion of plug 7, it being understood that the lead wire 10 has likewise been previously embedded in the said insulator 13. Preferably however, the material 13 is applied to the shell in a semi-plastic mass so that the wire 10 may be pushed readily through the mass and then soldered to the eyelet 10 in the usual manner. When the base is heated the wire is imbedded in the mass which solidifies and bonds itself intimately to the members 6, 7 and 10. It has been found that the best results are obtained if the insulating material 13 is such that upon being dried or baked it solidifies into a somewhat porous mass so as to cause the gas or hot vapors resulting from the blowing of the fuse, to be dispersed through the body of the porous mass before a destructive arc can be maintained.

With the above described arrangement, should the fuse lead-in wire 10 blow, the portion thereof which is not embedded in the insulator 13 fuses and if an arc should thereafter strike between the shell 4 and the exposed tip of the wire 10 where it enters the insulator 13, the current required to maintain this arc must pass through the remainder of the wire 10 which is embedded in the insulator. However before this arc can be destructive the remainder of the fuse in the insulator 13 will "blow" and because of the porous character of the insulator 13 the metallic vapors and gases are forcibly dispersed in non-linear paths through and into the pores of the insulator before they have a chance to follow up the previous path of the fuse. Preferably the thickness of the member 13 and consequently the length of the embedded fused wire and the porosity of said member 13 are chosen so that for the voltage involved, the arc cannot follow the previous path of the fuse. Thus the lamp is effectively protected against the formation of destructive arcs between the eyelet 6 and the shell 4.

Various changes and modifications may be made herein without departing from the spirit and scope of the invention. A continuation-in-part of the present application has been filed September 17, 1935, as application Serial Number 40,871.

The lamps of the following claims obviously include only those lamps which, in the absence of a fuse or similar protector, would be susceptible to arcing at burnout. For the purpose of this specification, a cement is defined as a material which can be applied to the base in a semi-plastic condition and which, on heating, solidifies into a porous mass intimately bonded to the surrounding materials.

What I claim is:

1. In combination a lamp having a metal shell base, a metal contact button normally partially exposed to the interior of the metal shell and insulatingly carried by said shell, a lead-in wire having at least part of its length formed of fuse wire, said lead-in being connected to said button, and insulator means of porous cement to insulate said button completely from the interior face of said shell, said fuse wire having a part only of its length directly embedded in said porous insulating cement.

2. An electric lamp comprising a bulb, a contact base affixed to said bulb, and lead-in wires from said base to said bulb, said base comprising a substantially cylindrical metal shell whose interior surface is exposed to the atmosphere inside the base, a cup-like glass plug closing off the end of said shell, a perforation through said plug, a metal contact button having an eyelet in registry with said plug, a lead-in wire attached to said eyelet and including a fuse wire directly embedded in a mass of porous, insulating, arc-quenching cement which insulates the eyelet from the atmosphere of the interior of the base by all paths except through the fuse.

3. An incandescent lamp comprising a bulb, a hollow metal shell base, the interior of whose metal shell is exposed to the atmosphere inside the base, a lead-in wire including a fuse and extending from said bulb to an eyelet contact carried insulatingly by said shell base, said fuse and eyelet being both inside a single sheath of insulating material to insulate them from the atmosphere of the interior of the base by all paths except through the fuse.

4. A lamp as in claim 3 in which the metal shell base is of the mechanical type.

5. An incandescent electric lamp comprising a bulb, a hollow metal shell base of the mechanical type in which the interior of the metal shell is exposed to the atmosphere inside the base, a lead-in wire including a fuse wire extending inside said base to an eyelet contact carried by an insulating plug forming part of said base, said fuse wire being directly embedded in a mass of porous, insulating, arc-quenching cement bonded to the insulating plug which carries the eyelet contact, said cement serving also to completely insulate the eyelet contact from the atmosphere inside the base.

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