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ELECTRIC LAMP

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Fig. 1.

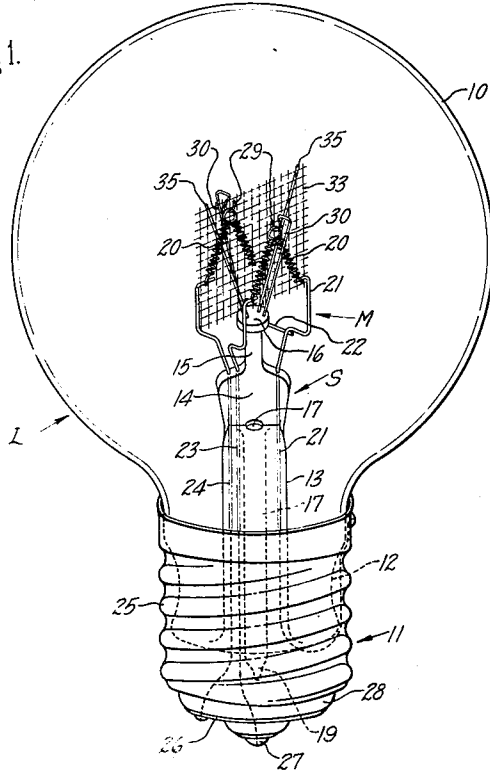
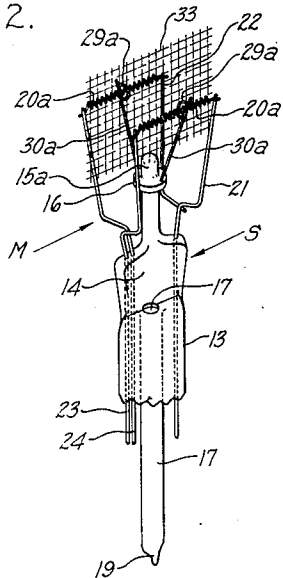


Fig. 2.



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UNITED STATES PATENT OFFICE

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ELECTRIC LAMP

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5 Claims. (Cl. 176—26)

This invention relates to electric filament devices such as lamps, and to the provision of plural filaments in them. The invention is concerned with preventing burnout of one filament from causing the burnout, destruction, or rupture of another filament in the same lamp, whether these filaments are operated concurrently, or only alternatively. The invention is especially useful in incandescent lamps for signalling purposes, or for special illumination of work which it is desired to carry on without risk of interruption that might result from the burning out of an ordinary incandescent lamp. Railroad block signals and highway traffic signals are examples of the first class, and spotlights for hospitals and surgical operating rooms are examples of the second class. The invention is hereinafter explained with particular reference to a lamp adapted for spotlight purposes. Various other features and advantages of the invention will appear from the description of a species or form of embodiment, and from the drawing.

Fig. 1 of the drawing affords a tilted or perspective view of a form of lamp conveniently embodying the invention; and Fig. 2 is a similar fragmentary view of a lamp mount for such a lamp, illustrating a modified construction.

The incandescent lamp L shown in Fig. 1 comprises a spherical vitreous envelope or bulb 10 provided with a lamp-mounting and contact terminal structure 11 around the end of the bulb neck 12. This structure 11 may be a base of shell and end contact type, here illustrated as a screw base. The axially arranged filament mount M of this lamp L includes a vitreous lead-seal and supporting structure S comprising the usual tubular stem 13 with the pressed seal 14 at its upper end, surmounted by a short pedestal rod 15 terminating in a button-like enlargement 16. The current lead wires from the contact terminals of the base B extend up through the press 14. An exhaust tube 17 inside the stem 13 is shown as opening through the press 14 and as having its lower end sealed off at 19. The bulb 10 may contain a gaseous atmosphere of more or less inert gas(es) such as nitrogen, argon, etc., at suitable pressure, generally approximating that of the surrounding atmosphere (or somewhat lower) when the lamp L is unlighted. As thus far described, the construction corresponds essentially to what is usual in lamps of modern wattage operating on lighting circuits carrying voltages of the order of 110–120 volts, either A. C. or D. C.

The mount M here shown comprises two separate coiled coil filaments 20, 20 arranged substan-

tially parallel to one another, and in such close proximity (although at opposite sides of the lamp axis) that burnout of one would tend to result in burnout, destruction, or injury of the other. The close proximity of the filaments 20, 20 is desirable or even necessary to give the desired light distribution from the lamp L with either filament in service. The immediate current connections to these filaments 20, 20 are formed by inward extensions of the current leads from the envelope seal 14. At the right of the mount M, Fig. 1, there is a single current lead 21 for the filaments 20, 20, extending upward above the member S and intermediately forked to opposite sides of the central plane between the filaments 20, 20. As here shown, one of the fork members is formed by offsetting the lead wire 21 itself, while the other consists of a suitably bent wire 22 welded to the wire 21 at the first bend of its offset. At the left of the mount M, there are separate lead wires 23, 24 for the two filaments 20, 20, extending upward from the seal 14 above the supporting member S, and intermediately offset to opposite sides of the central or axial plane between the filaments. Outside the seal 14, the leads 21, 23, 24 extend down through the stem 13 into the base 11, and are connected to its contact terminals. Besides its screw shell contact 25, to which the forked lead 21 is shown connected, the base 11 here illustrated has a flat annular end contact 26 to which the lead 23 is connected, and a center contact 27 to which the lead 24 is connected. These contacts 25, 26, 27 may be mechanically united and electrically separated by insulation 28 such as glass, as usual in ordinary two-contact Edison or Mogul screw bases, or as shown in Patent 2,160,431 to Buser.

As shown in Fig. 1, the coiled coil filaments 20, 20 are bent to inverted V form with short single-coiled lengths at their apices, where they are engaged and supported by end-hooks 29, 29 at the free ends of (molybdenum) wire supports 30, 30 whose other ends are fused into the button 16 and thus anchored. The supports 30, 30 may be of a gallows type, with their hooks 29, 29 at the extremities of the short horizontal gallows bars. As shown, these supports 30, 30 slope outward from anchorage points on the button 16 inside the planes of the V-filaments 20, 20 to points outside these planes above the apices of the V's.

Substantially in the axial mid-plane parallel with the filaments 20, 20, there is a diaphragm or screen 33 of light-pervious or light-transmitting character, preferably foraminous and

formed of wire screen mesh similar to fly-screen wire. It may be of nickel wire with a mesh size about corresponding to that of ordinary fly-screen, such as 14 to 16 per inch. This screen may be mounted and stiffened by welding it to (nickel) support wire(s) 35 having anchored end(s) fused into the button 16, two such wires 35, 35 being shown in Fig. 1 as diverging outward from one another and from the lamp axis.

Alternatively, the lower edge of the screen 33 may itself be fused into a rod extension 15a above the button 16—or at least the lower ends of some of its upright mesh wires—as shown in Fig. 2. Fig. 2 also shows straight uninterrupted filament coils 20a, 20a, instead of the V-filaments 20, 20 of Fig. 1, and as supports it shows mere straight wires 30a, 30a with pigtail looped ends 29a, 29a embracing the filament coils.

The more usual mode of use for the lamp L is to operate it with only one of its filaments 20 in circuit, holding the other in reserve as a stand-by, to be switched in immediately if the one in service burns out—as described in British Patent No. 311,370, for example—thus avoiding material interruption of important or critical work while a burned out lamp is removed from its socket and replaced with a new lamp. Or, on occasion, the lamp L may be operated with both the filaments 20, 20 in circuit, connected in parallel. However, it is essential (under either condition of operation) that the burning out of one filament 20 should not directly result in burning out, destruction, or rupture of the other, which would nullify the stand-by function of assuring that light from at least one filament shall remain available virtually without interruption. While experience has shown that such double burnouts often or generally occur in double filament lamps heretofore available, even with only one of the filaments in operation, this danger is largely or substantially obviated by the screen 33 in my lamp L when this screen is of adequate size and has sufficiently fine foraminous openings, as explained above. Without seriously interfering with light transmission from either filament 20 past the other, this screen 33 effectually breaks up or deflects surges of hot gas or vapor in the lamp L which result when a filament burns out, thus protecting the other filament from being fused, burned out, or ruptured by the gas surge.

To a degree, the protective action may involve a cooling of the hot gas by the screen 33 in a manner similar to the action of the screen in the old Davy safety lamp for use in mines; but the main effect seems to be rather a mechanical obstruction and slowing down or deflection of the rush of gas. The foraminous screen 33 also receives any deposits of solid matter from the ruptured filament, or condensations of hot vapor, without being thereby obscured against light transmission, as would be the case if the screen were a solid sheet of transparent or translucent material, like glass, quartz, or mica. This, of course, holds equally for deposits of matter that may be sputtered or vaporized from a filament 20 during normal operation at high incandescence, before any burnout occurs. Moreover, the foraminous metal screen 33 does not give out volatile matter or occluded gas, as a mica screen would be liable to do during lamp exhaust or

aging, as well as in regular operation of a lamp.

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

1. In a lamp of the character described, the combination of filaments mounted in a common atmosphere in such close proximity to one another that burnout of one tends to result in burnout of the other, a mounting and contact terminal structure for the lamp having contact terminal means connected to ends of the several filaments, and also separate contact terminals severally connected to the other ends of the several filaments, whereby the filaments can be connected in circuit either concurrently or alternatively, and a light-transmitting screen interposed between the filaments, whereby each filament is protected from burnout due to gas surge resulting from burnout of another filament without interference with light transmission from one filament past another.

2. In a lamp of the character described, the combination of filaments mounted in a common atmosphere in such close proximity to one another that burnout of one tends to result in burnout of the other, and a light-transmitting foraminous screen mounted and interposed between the filaments, whereby each filament is protected from burnout due to gas surge resulting from burnout of another filament without interference with light transmission from one filament past another.

3. A lamp filament mount comprising in combination a vitreous envelope seal and support member, a current lead sealed therethrough and forking to either side thereof, separate current leads also sealed through said member and diverging to opposite sides thereof, a filament connected between the current lead fork and the other current lead at each side of said member, and a wire mesh screen interposed between said filaments and supported from said member.

4. A lamp filament mount comprising in combination a vitreous envelope seal and support member, current leads sealed therethrough and extending to opposite sides thereof, a filament loop connected between the current leads at each side of said member, a wire mesh screen interposed between said filament loops and supported from said member, and intermediate supports for the bights of said filament loops upstanding from said member at opposite sides of said screen, between the currents leads to the opposite ends of said filament loops.

5. A lamp filament mount comprising in combination a vitreous seal and support member, a current lead sealed therethrough and forking to either side thereof, separate current leads also sealed through said member and diverging to opposite sides thereof, a filament loop connected between the current lead fork and the current lead at each side of said member, a wire mesh screen interposed between said filament loops and supported from said member, and galleys supports for the bights of said filament loops upstanding from said member and extending outward with respect to said screen to the outside of the corresponding filament loops, and then inward to engage the bights of said filament loops.

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