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EXPLOSION-PROOF LAMP

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FIG. 1

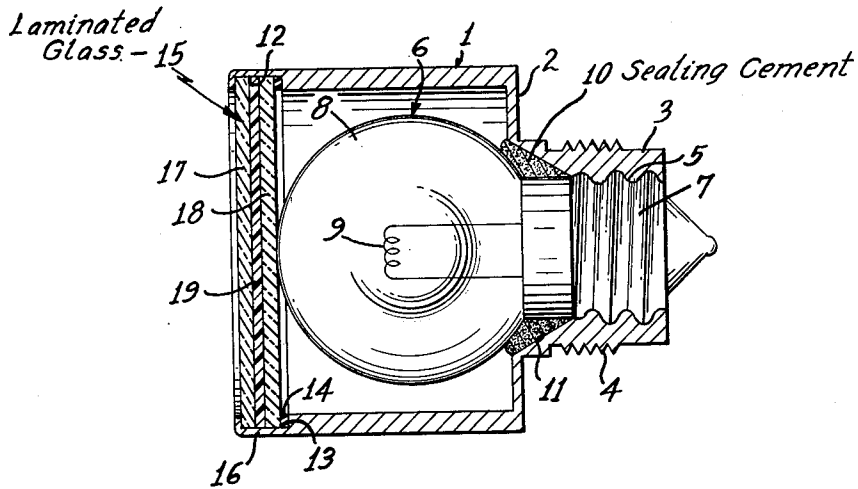
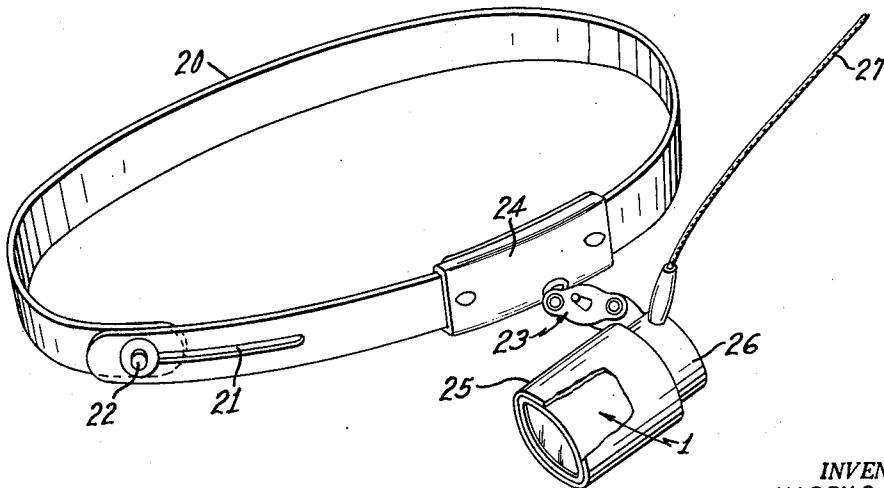


FIG. 2



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EXPLOSION-PROOF LAMP

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5 Claims. (Cl. 313—312)

The present invention deals with an explosion-proof lamp and, more particularly, with an incandescent explosion-proof lamp for use in a surgeon's headlight.

The object of an ordinary incandescent lamp employed in a physician's or surgeon's headlight results from the possibility that the lamp bulb may break and the incandescent filament may cause ignition of administered anesthetic gas. The importance of the problem is apparent since accidents during operations seriously endanger the lives of patients, and every additional safety precaution represents significant progress in the field.

According to the invention, an outer cylindrical metal envelope is mounted around an incandescent lamp bulb. A screw threaded base of the bulb is hermetically sealed through the top of this cylindrical envelope. The bottom closure is formed by a light transmissive glass disc and the space between the bulb and the envelope is filled with oxygen-containing gas, e.g., air. The metal is advantageously made of a material such as aluminum or plated brass, which has good heat-conducting properties to avoid heat build-up within the envelope. The glass disc closure is composed of laminated glass hermetically sealed to the envelope and in contact with the lamp bulb as hereafter more particularly described.

It is an object of this invention to eliminate the danger of explosion caused by fracture of a lamp bulb in areas in which explosive gases are present in the atmosphere. It is another object of the invention to increase the safety in operating rooms where anesthetic gases may be ignited by contact with the incandescent filament in a surgeon's headlight lamp when the lamp bulb is damaged. Other objects and advantages of the invention will become apparent from the description hereafter following and the drawings forming a part hereof, in which:

FIGURE 1 is a partly cross-sectional and a partly elevational view of the lamp according to the invention, and

FIGURE 2 is an isometric view of a surgeon's headlight provided with the explosion-proof lamp of FIGURE 1.

According to FIGURE 1, the explosion-proof lamp of the invention comprises a cylindrical envelope 1 composed, for example, of aluminum, brass, or the like. The walls of the envelope 1, at one end thereof, extend inwardly toward the axis of the envelope and form a shoulder 2 with a tubular extension member 3 of smaller diameter than the envelope extending axially outward of the envelope and outwardly of the shoulder 2. The outer surface of the tubular member 3 is threaded as at 4. The tubular extension member 3 is also internally threaded as at 5 to engage a lamp bulb base.

A lamp 6 comprising a threaded base 7 and a bulb 8 containing an incandescent filament 9 is mounted internally of the envelope 1 with the threaded lamp base 7 engaging the internal threads 5 of the tubular extension 3. When the lamp base 7 is suitably positioned in the tubular extension 3, a sealing cement 10 is placed into a space 11 between the base and the tubular extension 3 and thereby sealing the lamp base to the tubular extension 3.

The outer end of the envelope 1 is provided with an internal annular recess 12 forming an internal abutment or shoulder 13. A gasket ring 14 is mounted in the re-

cess 12 in abutment with the shoulder 13. A light-transmissive laminated glass disc 15 is mounted in the recess 12 against the gasket 14. The terminal recess 12 provides for a reduced end portion on the envelope 1 which extends beyond the glass disc 15 and is spun over the glass disc whereby the glass disc is effectively mounted at the end of the envelope 1.

In mounting the glass disc 15 it is so positioned that the disc is in direct contact with the bulb 8 of lamp 6. The glass disc 15 is assembled in an air or oxygen-containing atmosphere so that after it is assembled the space between the lamp bulb 8 and the envelope 1 contains an oxygen-containing gas hermetically sealed therein by means of the sealing cement 10 and gasket 14.

The laminated glass disc 15 is composed of two layers 17 and 18 of light transmissive glass with a thin flexible light-transmissive plastic membrane 19 cemented therebetween.

The laminated glass disc is of particular significance to the invention in that when the disc receives an impact having a force sufficient to fracture the lamp bulb, such impact is transmitted directly to the lamp bulb and fractures the lamp bulb with or without fracturing the glass disc itself. Should the impact be sufficiently strong to fracture the laminated glass layers 17 and 18, the flexible membrane still protects the internal space of the cylinder 1 against the admission of a combustible gas therein.

Since the bulb 8 is fractured either with or without the attendant fracturing of the glass disc, the hermetically sealed oxygen-containing gas in the space between the bulb and envelope contacts the filament 9 and instantaneously destroys the filament by burning the filament in the presence of the oxygen-containing gas, whereby the electrical circuit is completely interrupted and the otherwise incandescent filament is no longer operative to ignite combustible gases. The burning of the filament and the interruption of the lamp circuit takes place instantaneously so that should the glass disc have received an impact sufficiently strong to fracture the glass and also to cause a leakage through the plastic membrane, the instantaneous destruction of the filament would safeguard against explosion before a sufficient amount of explosive gas could enter the space to cause an explosion.

FIGURE 2 illustrates a conventional surgeon's headlight equipped with the explosion-proof lamp shown in FIGURE 1. The headlight comprises a headband 20 having a longitudinal slot 21 formed in one end thereof and a button member 22 mounted on the other end thereof, whereby the button member is insertable in the slot 21 with the band being adjustable by means of the slot 21. The headband carries a universal joint 23 mounted on a sleeve 24 affixed to the headband. A housing 25 is connected to the universal joint 23. In the drawing, the housing is illustrated partly broken away to show the envelope 1 mounted therein. A socket member 26 is mounted on the housing 25 and the threads 4 of the tubular extension 3 are adapted to be received by the socket. A cable 27 is provided to supply current to the lamp through the socket 26.

Various modifications of the invention are contemplated within the scope of the appended claims.

What is claimed is:

1. An explosion-proof lamp comprising an incandescent light bulb having an electrically conducting base mounted thereon, an outer envelope encompassing the bulb and forming a space therebetween, first closure means at one end of the envelope, the base being mounted in and hermetically sealed through said first closure means, a second closure means hermetically sealed to the other end of the envelope, the second closure means comprising a laminated light-transmissive disc, the disc

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being in direct contact with the bulb and formed of a plurality of glass layers having a flexible light-transmissive membrane therebetween, and an oxygen-containing gas filling said space.

2. An explosion-proof lamp according to claim 1, comprising a tubular member extending axially outward of said first closure means, the base being hermetically sealed in said tubular member.

3. An explosion-proof lamp according to claim 1, wherein said oxygen-containing gas is air.

4. An explosion-proof lamp according to claim 1,

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wherein said outer envelope is a cylindrical metal envelope.

5. An explosion-proof lamp according to claim 4, comprising an internal annular recess in one end of said envelope, gasket means in said recess, said laminated disc mounted in said recess and abutting said gasket.

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