July 29, 1941. F. R. MEGINNISS 2,250,644

LAMP AND SOCKET THEREFOR

Filed Oct. 9, 1937 2 Sheets-Sheet 1

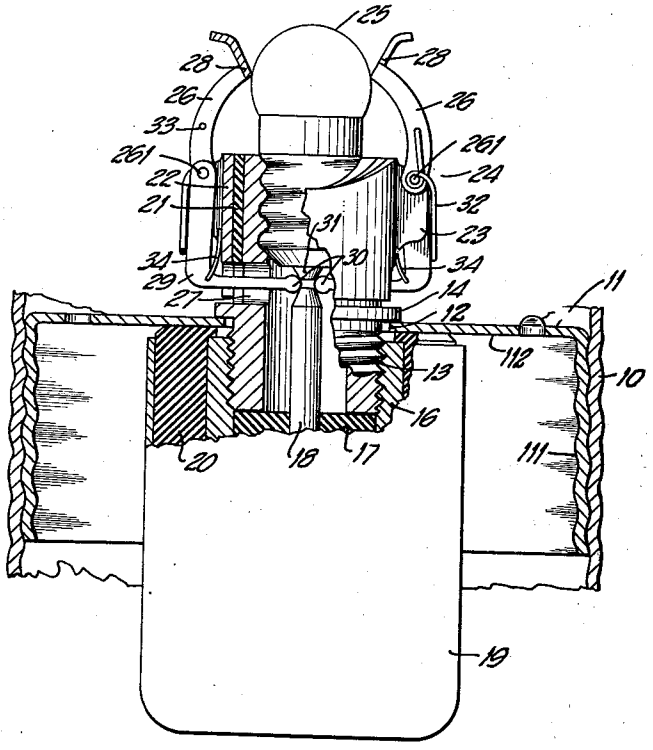


FIG. 1

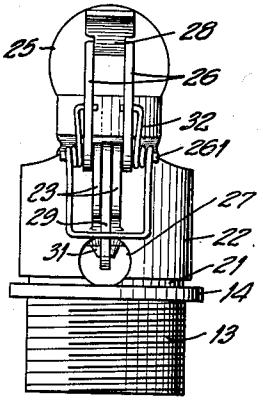


FIG. 2

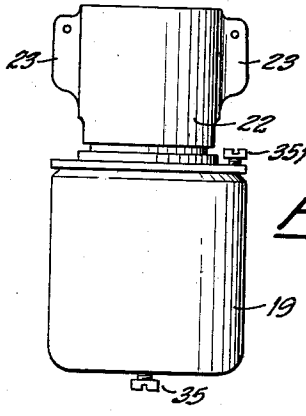


FIG. 1a

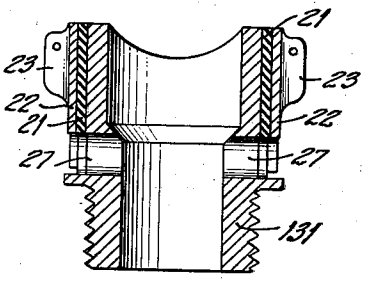


FIG. 3

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LAMP AND SOCKET THEREFOR

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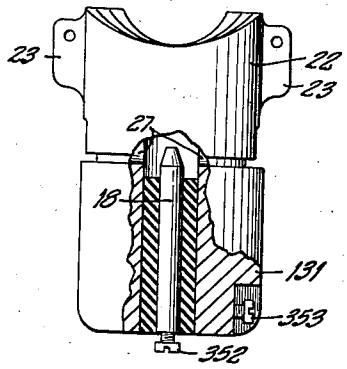


FIG. 4

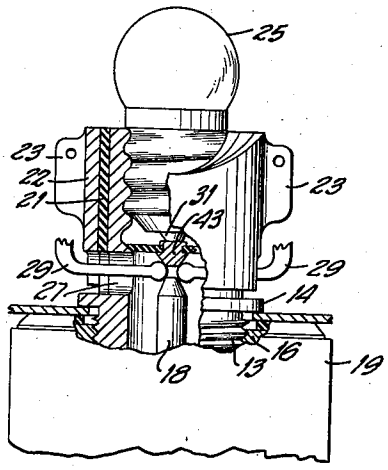


FIG. 9

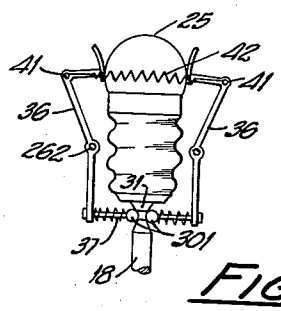


FIG. 5

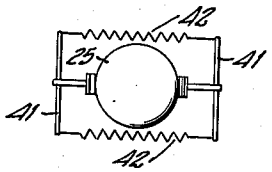


FIG. 6

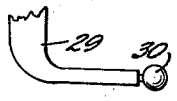


FIG. 10

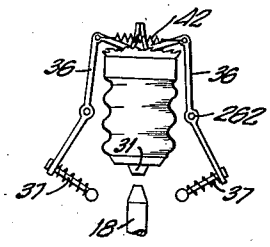


FIG. 7

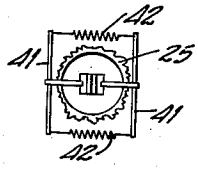


FIG. 8

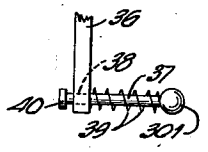


FIG. 11

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LAMP AND SOCKET THEREFOR

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Application October 9, 1937, Serial No. 168,258

7 Claims. (Cl. 240—11.3)

The lamp and socket embodying my invention is more particularly intended for use in an atmosphere of explosive gas such as mine gas, gasoline vapors and the like, where explosions are likely to result in loss of both life and property, although it will be understood that my invention is of general application and is not limited to this particular use. One of the most explosive gases, and one in which an incandescent lamp is commonly used, is a mixture of methane and air which has a low critical temperature. At the same time the operating temperature of the filament of a tungsten lamp is high, and greatly in excess of the critical temperature of the gas in which it may be used. In the case of a bulb fracture, therefore, it is highly important that the circuit of the lamp filament be promptly opened and that the temperature of the filament be quenched immediately to a point below the ignition temperature of the surrounding gas.

It has heretofore been proposed to retain an incandescent lamp intended for use in a gas of the foregoing character in its socket by means of a bail attached to the socket and passing over the end of the lamp, and to provide a spring for ejecting the lamp from its socket in case of fracture of the bulb. In the foregoing construction, however, the contact terminals included in the circuit of the lamp have been mounted on springs which must be fully extended before the lamp circuit is open, a feature which obviously prolongs the time required to open the lamp circuit. Furthermore, any quenching of the filament temperature has been dependent on the filament engaging the bail when the lamp was ejected due to bulb fracture and this was uncertain as the portion of the bail which engages the lamp bulb has been formed with reverse loops with the result that the filament in its forward movement was more likely than not to pass between the loops of the bail which, in that case would exert no quenching action whatever on the filament.

In accordance with my invention a movable element is mounted on the socket and is normally forced into engagement with the bulb of the incandescent lamp, thereby placing the bulb under stress and the filament of the lamp is disposed in the path of movement of the said element the filament engaging portion of which is formed of a mass of material, preferably metal, of good thermal conductivity and high thermal capacity. When the lamp is fractured, therefore, the said element is brought into contact with the lamp filament, thereby quickly quenching its temperature to a point below the ignition temperature of the surrounding gases. At the same time the said element actuates or controls contacts normally bridging a terminal contact in the lamp circuit and the lamp contact, the said contacts being moved out of bridging relation to the said terminals thereby opening the lamp circuit immediately on the fracture of the bulb and the resulting movement of the said element.

One of the objects of my invention, therefore, is the provision of means for promptly opening the lamp circuit in response to lamp fracture.

Another object of my invention is the provision of means for promptly quenching the temperature of the lamp filament in response to lamp fracture.

Other novel features of my invention will appear in the specification and will be particularly pointed out in the claims.

My invention will best be understood by reference to the accompanying drawings in which I have illustrated certain embodiments thereof and in which—

Fig. 1 is a front elevation, partially broken away and in section illustrating a preferred embodiment of my invention in connection with an automatic switch used in connection with a flash light;

Fig. 1*a* is a front elevation illustrating a modification of my invention in which the lamp (not illustrated) and socket which may be the same as those illustrated in Fig. 1 are associated with a switch, the device being capable of use for other purposes than as a flash light.

Fig. 2 is a side view of the lamp and socket and the associated parts of Fig. 1;

Fig. 3 is a sectional view similar to Fig. 1 illustrating a modified form of socket for the reception of a lamp having a plain cylindrical base;

Fig. 4 is a front view, partially broken away and in section, illustrating my invention in a device having no inertia switch;

Fig. 5 is a diagrammatic view illustrating a modified form of my invention;

Fig. 6 is a plan view of Fig. 5;

Fig. 7 is a view similar to Fig. 5 illustrating the bulb fractured and the associated parts in the positions which they assume on the fracture of the bulb;

Fig. 8 is a plan view of Fig. 7;

Fig. 9 is a diagrammatic view illustrating a modification of the lamp terminal;

Fig. 10 is a detailed view illustrating one of the bridging contacts; and

Fig. 11 is a detailed view illustrating the details of a bridging contact of Fig. 5.

Like reference characters indicate like parts throughout the drawings.

Referring to the drawings, and first to Figs. 1 and 2 in which I have shown my invention embodied in a flash light, 10 is a fragmentary portion of the threaded end of the casing of a flash light in which is received the threaded base support 11 for the lamp and socket embodying my invention. The member 11 comprises a threaded skirt 111 which is received in the threaded end of the flash light casing, and an inwardly extending flange 112 provided with an opening 12 in which is received the lower threaded portion of the lamp socket 13 which is formed with an outwardly extending annular flange 14 which engages the upper side of the flange 112. In Fig. 1 I have illustrated my invention in connection with an inertia operated switch which may be of the same or similar character to that shown in my Patent No. 1,948,728, dated February 27, 1934, to which reference may be made for further details. The lower threaded portion of the socket 13 is received in a metallic sleeve 16 surrounding an insulating member 17 in which, in turn, is received the contact terminal 18 which is included in the lamp circuit. A casing 19 for the switch surrounds an insulating member 20 in which the lower portion of the sleeve 16 is received.

The upper portion of the socket 13 is surrounded by an insulating sleeve 21 and this is, in turn, surrounded by a metal sleeve 22 preferably split and provided at diametrically opposite sides with outwardly extending spaced flanges 23.

In accordance with my invention a movable element indicated generally at 24 is mounted on the lamp socket and comprises two devices similar in construction and operation mounted on opposite sides of the lamp 25, each device comprising an arm 26 mounted on a shaft or pintle 261 passing through the flanges 23. The lower portion of the arm 26 may conveniently be in the form of a yoke which is mounted on the shaft 261 on opposite sides of the flanges 23. The upper portion of the arm 26 which engages the lamp bulb is formed of a mass of material, preferably metal, of good thermal conductivity and high thermal capacity and is so mounted that the filament of the lamp is in the path of movement of the upper portion of the arm 26. The upper ends of the arms 26 are preferably flared outwardly in order that the incandescent lamp may conveniently be inserted, in operative position in the socket without the necessity of manipulating the arms 26. Each device also comprises an arm 29 angular in form and which is pivoted on the shaft or pintle 261 between the flanges 23. The lower inwardly extending portions of the arms 29 pass through openings 27 in the socket 13 and the inner ends thereof are provided with bulbular contact members 30 which when forced inwardly engage both the contact terminal 18 and the terminal 31 of the lamp to form a bridging connection therebetween.

Resilient means are also provided for simultaneously forcing the bulb engaging portions 28 of the arms 26 into engagement with the lamp bulb and forcing the contact bulb 30 into bridging relation between the contact terminal 18 and the lamp terminal 31. In the embodiment of my invention illustrated such means comprises a single spring 32 the upper ends of which are spaced, bent inwardly and received in openings 33 in the two legs of the arms 26 while the lower portion engages the outer lower end of the arm 29, as best indicated in Fig. 2, the spring being so biased as normally to force the arms 26 into contact with the lamp bulb and to force the lower ends of the arms 29 inwardly to bring the contacts 30 into bridging relation between the contact terminal 18 and the lamp terminal 31. Leaf springs 34 are also mounted on the socket and engage the arms 29 and are biased to force the lower ends of the arms 29 outwardly and to bring the bulbular contacts 30 out of bridging relation between the contact terminal 18 and the lamp terminal 31.

The operation of the device illustrated in Figs. 1 and 2 is as follows: In normal operation, the arms 26 engage the lamp bulb 25 in the manner indicated and the contact bulb 30 is maintained in bridging relation between the contact terminal 18 and the lamp terminal 31. In case the bulb is fractured, the arms 26 are moved by the springs 32 into engagement with the lamp filament thereby quenching the same. When the arms 26 are moved inwardly due to the bulb fracture, the tension in the springs 32 is reduced sufficiently to permit the leaf springs 34 to force the lower ends of the spring 32, which are now under reduced tension, outwardly, thereby opening the lamp circuit between the contact terminal and the lamp terminal.

While I have illustrated and described my invention in connection with a flash light, it is to be understood that it is of general application, and when not used in a flash light the skirt 111 of the supporting base and the outer portion of the inwardly extending flange 112 would be omitted, a terminal 35 being connected to the switch and a second terminal 351 connected to the supporting base in the manner illustrated in Fig. 1*a*.

In the embodiment of my invention illustrated in Fig. 3 the inner wall of the lamp socket 131 is plain instead of threaded as in Fig. 1, the lamp being retained in position by the arms 26.

In the embodiment of my invention illustrated in Fig. 4 the socket is used without the inertia operated switch of Fig. 1. Contact screws 352 and 353 are connected to the contact terminal 18 and to the socket 131, respectively, and the device could be used as a "trouble" lamp or for any other desired purpose, it being understood that any suitable source of electric energy and any desired switch would be included in the lamp circuit.

In Figs. 5 to 8 and 11, I have illustrated a modification of my invention in which the movable element comprises two one-piece arms 36 pivotally mounted at 262 on the socket, and having lamp engaging portions as in the arrangement illustrated in Fig. 1. On the lower end of each of the arms 36 is mounted a contact member comprising a stem 37 passing through an opening 38 in the arm 36 and provided at its inner end with a bulbular contact 391 similar to that shown in Fig. 10. In order to provide a yielding contact between the bulbular member 391 and the contact terminal and the lamp contact, a loose connection is provided between the arm 36 and the bulb 391, a spring 39 being interposed between the arm and the bulb. The free end of the stem 37 is preferably provided with a head 40 which limits the inward movement of the stem. The free ends of the members 36 are provided with cross arms 41, the ends of which are connected by springs 42 (Figs. 6 and 8) which yieldingly force the bulb engaging portions of

the arms 36 into yielding engagement with the bulb. On the fracture of the bulb, the upper ends of the arms 36 are forced into engagement with the filament to quench the same and at the same time the contacts 301 are moved out of engagement with the contact terminal and with the lamp terminal in the manner already described in connection with Figs. 1 and 2.

The device embodying my invention overcomes serious defects which have been present in certain constructions comprising a bail for opening the lamp circuit when the bulb is fractured. Bails have hitherto been used which were relatively heavy and having little elasticity and which did not compensate for variations which occur in lamp bulbs. In case the length of the lamp bulb is in excess of the standard then, the bulb is placed under a stress and is likely to fracture prematurely. In case the bulb is of less length than the standard, on the other hand, then the lamp is loose and does not make proper contact. In accordance with my invention, the lamp is at all times forced inwardly by the movable elements which engage the lamp bulb above the maximum diameter.

In Fig. 9 I have illustrated a further modification of my invention for obviating any difficulties which may be due to variations in thickness of the lamp contact 31 which is usually formed of a drop of solder and the thickness of which may vary. In the embodiment here illustrated, an additional contact member 43 is supported on the socket and is interposed between the contact terminal 18 and the lamp terminal 31. A contact terminal 43 of suitable thickness may be installed to produce the desired space between it and the contact terminal 18 and thereby compensate for any variation in thickness in the lamp terminal 31.

The device embodying my invention opens the lamp circuit immediately and also promptly quenches the lamp filament in response to the fracture of the bulb. It will also be evident that no tools are necessary in the assembly and disassembly of the lamp.

While I have described my invention in its preferred embodiment it is to be understood that the words which I have used are words of description rather than of limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broadest aspects.

What I claim is:

1. In combination, an incandescent lamp, a socket therefor, a movable element engageable with the bulb of said lamp, resilient means associated with said element for normally forcing the same into engagement with said bulb, the filament of said lamp being disposed in the path of movement of said element whereby said element moves into engagement with said filament to quench the same on the fracture of said bulb.

2. In combination, an incandescent lamp, a socket therefor, two arms pivotally mounted on said socket and engageable with the bulb of said lamp on opposite sides and above the maximum diameter thereof, the filament of said lamp being disposed in the path of movement of said arms, and resilient means for normally forcing said arms into engagement with said filament on the fracture of the lamp bulb.

3. In combination, an incandescent lamp, a socket therefor, a movable element mounted on said socket and having a bulb engaging portion and an electrically conducting portion, a contact terminal included in the circuit of the lamp, means for normally forcing said bulb engaging portion of said element into contact with the bulb of said lamp and the contact portion thereof into conducting relation between said contact terminal and the lamp terminal, and means responsive to the fracture of said bulb for forcing said movable element into engagement with the lamp filament and the conductive portion thereof out of conducting relation to said terminals.

4. In a device of the character described, an incandescent lamp, a socket therefor, a movable quenching element pivotally mounted on said socket, a contact terminal located adjacent to and spaced from the lamp terminal, a terminal bridging element pivotally mounted on the same axis as said quenching element, a common means for forcing said quenching element into contact with the lamp bulb and said bridging element into conducting bridging relation between said contact terminal and the lamp terminal, and means responsive to the fracture of the light bulb for moving said bridging element out of bridging relation between said contact terminal and said lamp terminal.

5. In a device of the character described, an incandescent lamp, a socket therefor, a movable quenching element pivotally mounted on said socket, the lamp filament being disposed in the path of movement of said element, a contact terminal located adjacent to and spaced from the lamp terminal, a terminal bridging element pivotally mounted on the same axis as said quenching element, a common means for forcing said quenching element into contact with the lamp bulb and said bridging element into conducting bridging relation between said contact terminal and the lamp terminal, and means responsive to the fracture of the light bulb for moving said bridging element out of bridging relation between said contact terminal and said lamp terminal and said movable element into contact with the lamp filament.

6. A device of the character described, including a socket adapted to receive the base of an electric lamp, a movable member having a portion adapted to engage the bulb of a lamp held in said socket, spring means for holding said member in contact with the lamp bulb and adapted to move said member upon the breaking of the bulb of the lamp, contact members included in an electric circuit through said lamp, one of which is movable with said movable member, and adapted to be disengaged from a co-operating contact member upon the breaking of the bulb of said lamp to open the circuit of said lamp.

7. A device of the character described, including a screw socket into which the base of an electric lamp is adapted to be screwed to be stationarily held therein, a movable member having a portion adapted to engage the bulb of a lamp held in said socket, spring means for holding said movable member in contact with the lamp bulb and adapted to move said member upon the breaking of the bulb of the lamp, circuit contact members included in an electric circuit through said lamp, one of said contact members being movable with said movable member and adapted to be disengaged from a co-operating contact member upon the breaking of the bulb of said lamp to open the circuit of said lamp.

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