Jan. 5, 1954

E. H. GREPPIN

EXPLOSION-PROOF LIGHT HAVING A PRESSURE RELIEVING POROUS ELEMENT

2,665,369

Filed April 8, 1949

2 Sheets-Sheet 1

Fig. 1

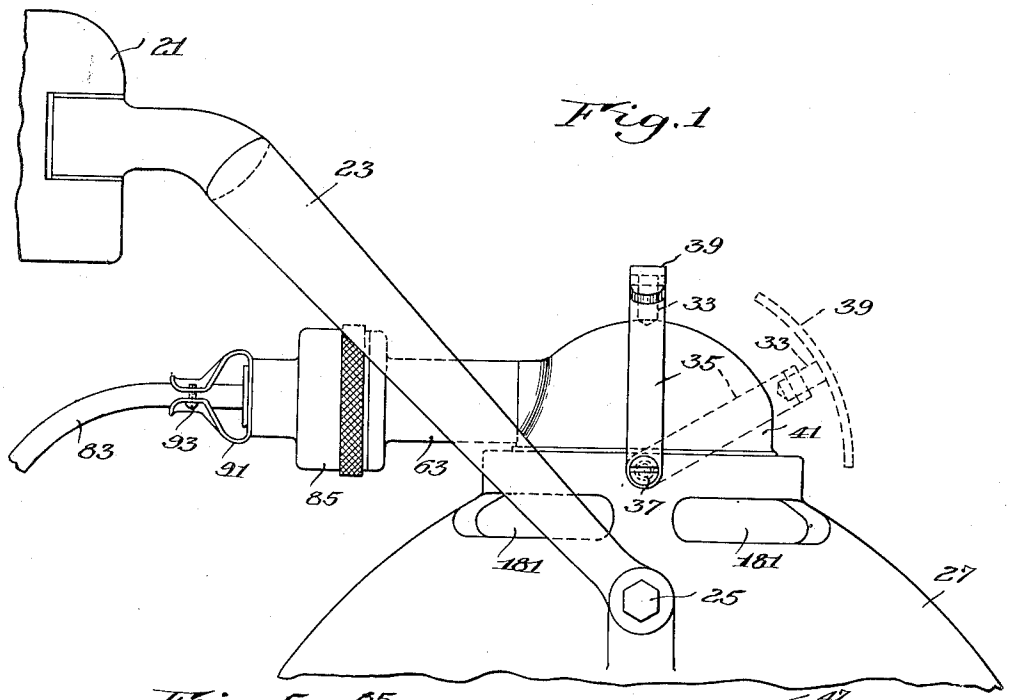


Fig. 5

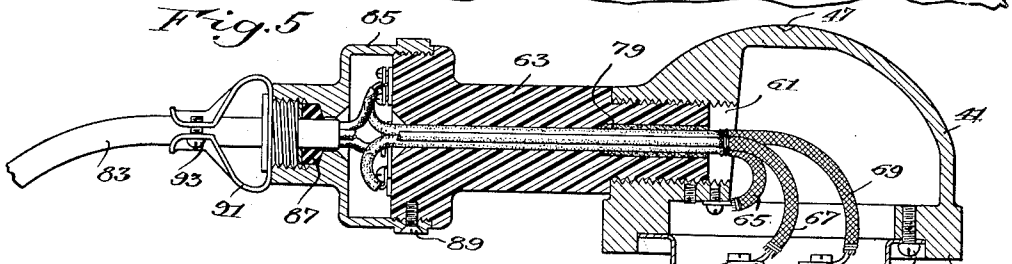


Fig. 9

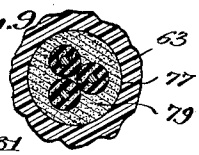


Fig. 7

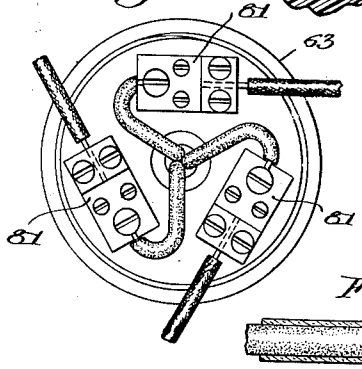
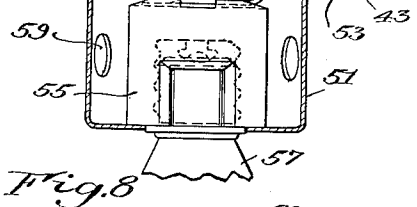


Fig. 8



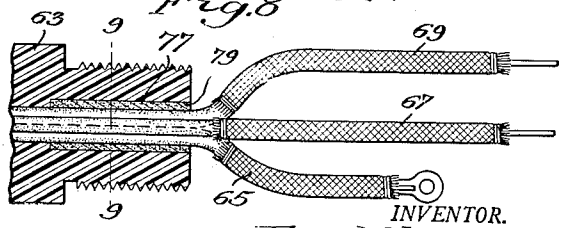
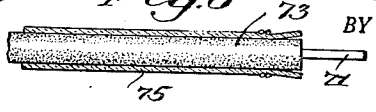


Fig. 6



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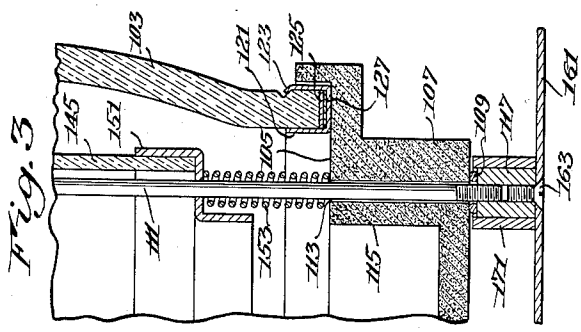


Fig. 3

Fig. 2

Fig. 4

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EXPLOSION-PROOF LIGHT HAVING A PRESSURE RELIEVING POROUS ELEMENT

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Application April 8, 1949, Serial No. 86,207

7 Claims. (Cl. 240—1.4)

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This invention relates to a light or illuminating unit, and has for one of its objets the provision of an improved light which may be safely used in an atmosphere containing explosive gases.

Another object of the invention is the provision of an explosion-proof light especially designed and constructed for satisfactory and efficient use in surgical operating rooms where the highest degree of safety and care is requisite.

Still another object is the provision of a light which may be easily and quickly disassembled for replacement of a burned out incandescent bulb.

A further object is the provision of an explosion-proof light which, in a simple and low-cost structure, fulfills all of the necessary requirements for approval by underwriter's laboratories and compliance with all applicable building codes.

These and other desirable objects are accomplished by the construction disclosed as an illustrative embodiment of the invention in the following description and in the accompanying drawings forming a part hereof, in which:

Fig. 1 is a side elevation of a light in accordance with a preferred embodiment of the present invention;

Fig. 2 is a vertical section taken centrally through the same, in a plane at right angles to the plane of Fig. 1;

Fig. 3 is a fragmentary vertical section similar to a portion of the lower part of Fig. 2, on a larger scale and showing additional details.

Fig. 4 is a perspective view of the porous member of the structure;

Fig. 5 is a section taken longitudinally through the bulb socket holder and other removable back parts of the light;

Fig. 6 is a diagrammatic view of one of the lead-in wires, partly in elevation and partly in vertical section;

Fig. 7 is an end view of certain wiring connections with the cover or cap removed;

Fig. 8 is a fragmentary section through part of the structure shown in Fig. 5, on a larger scale, with associated parts removed for the sake of clarity; and

Fig. 9 is a cross section taken substantially on the line 9—9 of Fig. 8.

The same reference numerals throughout the several views indicate the same parts.

In surgical operating rooms and similar locations, there is a special hazard due to the possibility of explosion of inflammable anaesthetic gases. In some cases, an explosion might be set off by an actual electric spark due to faulty or

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improperly designed electrical apparatus, such as an illuminating light or lamp, or by excessive heat resulting, for example, from a hot incandescent bulb in a relatively confined space. Anaesthetic gases exist in explosive concentrations only relatively close to the operating table, and it is possible to place many forms of electrical apparatus at some distance from the operating table so that no special explosion hazard is present. But it is frequently desired to have an illuminating light relatively close to an operating table, and so it is highly desirable that surgical lights or lamps, especially those of a portable or adjustable nature which might be moved close to the operating table, shall be explosion-proof to a very high degree.

In an illuminating lamp or light for use near an operating table, the hazard originates mainly, if not entirely, in the vicinity of the light bulb, arising mainly from the heat of the bulb and from the possibility of a spark between the bulb base and the socket, if the bulb is not screwed tightly into the socket. The previous approach to the problem of explosion-proof lights for surgical operating room use, has been to enclose the light bulb and its socket in an envelope or enclosure which is gas-tight or substantially gas-tight, and to make the envelope or enclosure sufficiently strong to withstand the explosion of explosive gases within such enclosure, without shattering any part of the envelope or enclosure. In contradistinction to this, the present invention approaches the problem from the entirely different standpoint of providing an envelope or enclosure around the bulb and its socket, which is not gas-tight but is purposely made porous so that if an explosion of inflammable gas occurs within the enclosure, the force of the explosion need not be contained within the enclosure, but will be vented through the porous wall. This enables a great reduction in the thickness, strength, and weight of the parts constituting the enclosure or envelope, which no longer need be sufficiently strong to withstand the expanding force of the explosion. The venting of the explosive force through a porous wall of the enclosure must, however, be so controlled and regulated that there is no possibility of transmitting the explosion to an explosive concentration of inflammable gases immediately around the enclosure. It is in this respect that the light is properly described as explosion-proof. This term does not mean that the light may not, under certain circumstances, cause an explosion of a concentration of gas in the enclosure imme-

diately around the light bulb, but it means that such explosion, if it does occur, will not be transmitted to or set off an explosion in any surrounding body of gas or what might be termed the circumambient gas.

Referring now to the drawings showing a preferred form of the present invention, there is shown in Figs. 1 and 2 a fragment of a mounting bracket 21 on which is adjustably mounted a yoke 23 having connection through pivot pins 25 to the main body 27 of the light or lamp. This main body 27, which may conveniently be called a bonnet, has at its rear a central opening 31 which removably receives the bulb socket and associated mounting parts, all constituting a unitary assembly normally held in place by a pressure screw 33 mounted centrally on a bail 35 pivoted on two screws or studs 37 threaded into the main body 27, as best seen in Fig. 2. The pressure screw 33 has a handle 39 by which it may be easily turned.

The bulb socket assembly comprises a hollow metallic casing 41 of generally hemispherical shape (Figs. 2 and 5) which may be referred to as a cap, having at its open side a marginal rim 43 adapted to be tightly seated in a stepped shoulder 45 at the back of the main casing or bonnet 27, and to be held therein by the pressure of the above mentioned screw 33, the conical point of which engages in a conical recess 47 at the top of the casing 41. A cup-shaped sheet metal element 51, of somewhat smaller diameter than the sealing rim 43 of the casing 41, is held to the casing by screws 53. Within this cup-shaped element 51 is mounted the bulb socket indicated in general at 55, which may be of any conventional rugged and heavy-duty construction, adapted to receive the screw base of the incandescent light bulb 57, the latter being preferably a special bulb providing high intensity illumination. The cup-shaped member 51 is provided in its side wall with a series of large vent holes 59 so that the force of any explosion originating within the hollow casing 41 or cup-shaped member 51 can escape through these vent holes 59 to the surrounding space.

The casing 41 has a lateral opening 61 internally screw threaded as best seen in Fig. 5. Into this opening is screwed a threaded end of a non-metallic tubular member 63 preferably of molded plastic or fibrous material, which carries three lead-in wires 65, 67, and 69. Because of the relatively high degree of heat in the immediate vicinity of the lamp bulb, it is not desirable to use rubber coated wires to connect to the bulb socket, but asbestos coated wires should be employed. These wires indicated in general at 65, 67, and 69 are asbestos coated wires, as best seen in Fig. 6, which diagrammatically illustrates a typical one of the wires as consisting of the central metallic wire 71, surrounded by an asbestos coating 73. That part of each wire which projects rightwardly beyond the tube 63 is further covered by a covering 75 of fiber-glass textile tubing. The wire 65, as seen in Fig. 5, has its end connected by a binding screw to the metallic casing 41, and serves as a ground wire to ground the casing 41 and all other metallic parts of the light structure which are connected to the casing 41 in use. The other two wires 67 and 69 lead to the two binding screws at the top of the bulb socket 55.

The opening or bore through the tubular member 63, through which the wires extend, is made of such diameter that the wires fit fairly snugly in it, except at its right hand or inner end, where this bore is enlarged as indicated at 77, to provide enough space around the wires to receive a tight sealing filling of suitable cement 79, such as asbestos cement, or a mixture of litharge and glycerine. This filling seals the wires where they pass through the tube 63, preventing any hot gas escape at this point in the event of an explosion.

Although the hemispherical casing 41 is made of metal, the tubular member 63 is preferably made of some material which has relatively low thermal conductivity, such as a plastic or fibrous composition. By the time the outer end of the tubular member 63 is reached, the temperature is sufficiently low so that asbestos coated wires are no longer required, and here the junction may be made with conventional rubber coated wires. On the left hand or outer flat face of the tubular member 63 there are mounted three metal blocks 81, and the outer ends of the three wires 65, 67, and 69 are respectively connected by suitable binding screws to these three metal blocks 81. A rubber covered three wire cord 83 has the ends of its three wires likewise connected by suitable binding screws to the same three metal blocks 81. A cap member 85 of insulating material has its smaller end or shank sealed by a rubber gasket 87 to the exterior surface of the rubber covered cord 83, and its larger end or mouth is internally screw threaded and is screwed tightly on external screw threads at the outer end of the tubular member 63, as seen in Fig. 5, and is held in tightly screwed or sealed position by the radial holding screw 89. This construction tightly seals the space surrounding the electrical connecting block 81 so that any spark accidentally originating in these connections could not transmit an explosion to any surrounding explosive gas. A metallic spring clip member or strain relief clamp 91 has a threaded portion screwed into the shank of the member 85, where it presses, through an interposed metal washer, against the gasket 87 and deforms the gasket into tight sealing contact with the members 83 and 85, and it also has a clamp portion tightly clamped on the exterior of the rubber covered wire 83 by the clamping screws 93, to hold the cord firmly so that it cannot pull out of the cap 85. The opposite end of the cord 83 leads, of course, to any suitable wall outlet or other electrical connection, suitably protected from explosion hazard in a manner not involved in the present invention. It should normally lead to a three wire plug, having a ground connection in addition to the two live wire connections.

When it is desired to replace the incandescent bulb 57 or otherwise service the electrical connections, this is done very simply by loosening the screw 33 by means of the handle 39, and then when the screw is loosened, the entire bail 35 may be swung over from the full line position to the dotted line position shown in Fig. 1. Thereupon the casing 41 may be lifted straight upwardly when viewed as in Figs. 1 and 2, carrying with it the bulb 57, which comes out through the opening 31 in the main member 27 of the lamp. After the bulb has been replaced, the casing 41 is put back by a reverse operation, and is tightly sealed against the main lamp frame or bonnet 27 by the pressure of the screw 33 engaged in the depression 47 on the casing 41 and tightly screwed against it.

The foregoing description covers what may be termed the back parts of the lamp or light, including the mounting of the bulb and the elec-

trical connections leading to the bulb. The explosion-proof front parts of the light structure will now be described.

The front face of the main body or bonnet 27 is provided with a flat annular seat of substantially larger diameter than that of the opening 31. The rear edge of the globe assembly rests on and is sealed to this annular seat. The globe assembly comprises mainly the globe 103, made of sturdy and heat resisting glass such as pyrex glass, together with various sealing accessories at both front and rear ends of the globe, as will be described more in detail hereafter. The front end of the globe assembly is seated against an annular seating surface 105 on the rear face of a porous wall member indicated in general at 107. This wall member is conveniently somewhat cup-shaped as indicated especially in Figs. 3 and 4, and has a rearwardly extending marginal flange surrounding the forward end of the globe. It is made of porous metal conveniently formed, by known processes of powder metallurgy, from a great multiplicity of tiny bronze spheres brazed together. The commercial product available on the market under the designation of Grade 2 of "Porex" is quite satisfactory for this purpose, although other porous metal structures may be used if preferred. The requirement is that the porous structure must be sufficiently strong mechanically to resist fracture by any mechanical impact which is likely to be encountered, and by any stresses placed upon the porous structure as a result of thermal expansion or contraction either in the porous structure itself or in associated parts which bear against the porous structure. Yet it should have a high degree of porosity, to such an extent that, for example, tobacco smoke can be blown right through the porous structure, but the porous structure should have a relatively fine porosity rather than a coarse porosity, so that it will act adequately as a firewall, dissipating the heat of any explosion occurring on one side of the porous wall to such an extent that there is no danger of igniting inflammable or explosive gases on the other side of the porous wall. The above mentioned material and other similar materials sold under different names, well fulfill these requirements.

The porous wall 107 is held in place by a plurality of tension rods 111 (preferably four in number) having their rear ends threaded into tapped openings in the body or bonnet 27 and having their forward ends extending through openings 113 (Figs. 3 and 4) formed in bosses 115 constituting part of the porous structure, the forward ends of the rods 111 being threaded to receive special nuts 117 having preferably circular outer surfaces, these nuts when tightened on the threads serving to bear against interposed washers 109 which in turn bear rearwardly against the porous body 107 and press the porous body rearwardly against the front edge of the globe assembly.

The rise in temperature caused by operation of the incandescent light bulb 57 will cause some lengthening of the rods 111 due to thermal expansion thereof, which will tend to loosen the globe assembly. Any great amount of looseness is objectionable in that it might produce a crack or crevice at the front or back edge of the globe assembly, sufficient to enable a gas explosion inside the globe assembly to ignite surrounding explosive gases. At the same time, the tension on the rods 111 must not be so great when the rods are hot, that upon contraction when cold they will force the porous body against the globe assembly with sufficient force to break it or chip the edges. To avoid these difficulties, the globe assembly is provided with special accessories at the front and rear edges of the globe, seen in general in Fig. 2 and shown in greater detail in Fig. 3.

Enbracing the front and rear edges of the glass globe 103 there are metal members 121 of channel-shaped or U-shaped cross section, the outer leg or flange of each of these channel members having its extreme marginal edge turned or spun slightly inwardly at 123 into a peripheral groove formed in the glass globe 103 as seen in Fig. 3, to hold the channel member 121 onto the glass globe. Within the channel member and at the end face of the glass globe, there are two flat annular washers 125 and 127. The washer 125, next to the glass, is of some relatively soft metal, such as copper or aluminum. The other washer 127, overlying the first mentioned washer, is of some slightly compressible material capable of withstanding the high heat of these parts, being preferably made of asbestos. One or more thicknesses of asbestos may be used. With this structure at both ends of the glass globe 103, there is sufficient resilience or elasticity in the structure so that the glass globe 103 remains held sufficiently tightly between the members 27 and 107 when the retaining rods 111 get hot, and yet the glass globe is not placed under too great a compressive force or stress when the retaining rods 111 become cold. The glass globe itself will, of course, expand to some extent as the temperature rises, and this expansion helps to keep the globe tight in the structure. But the coefficient of expansion of the glass globe is materially less than that of the metal retaining rods 111, so that the expansion of the glass itself would not be sufficient to maintain tightness, and the accessory washers and channel members above mentioned are highly desirable. It will be noted that the inturned edge 123 of each channel member does not abut against the opposite side wall of the groove in the glass, but is spaced therefrom as seen in Fig. 3, so that under compressive force the entire channel member 121 may slide to a slight extent in an axial direction along the glass globe 103.

With this structure, the area immediately around the hot incandescent bulb, including the area of the socket or base and the ultimate connections of the wires leading thereto, is isolated from the surrounding atmosphere. This isolated area includes the area directly within the glass globe 103, which communicates in turn, through the openings 59, with the area within the cup member 51, and upwardly through this member it communicates with the area within the hemispherical member 41. Such area is completely and tightly sealed from the circumambient atmosphere except where the area is enclosed by the porous wall or structure 107. At this porous point, the interior area is not sealed in the pressure sense, but is sealed or isolated in a safety sense. Any explosion of inflammable gases occurring within the globe 103 will, of course, cause a sudden explosive increase in volume of the gases within the globe, but the pressure thus produced may immediately escape through the porous wall 107, so that it is not necessary to make the glass globe and associated parts with any high degree of mechanical strength to withstand explosive forces, as would be necessary if the porous wall

were not used. Yet the porous wall or structure 107, although permitting quick passage of pressure through it, has the effect of so diffusing the heat of the interior explosion that the adjacent gases on the outside of the enclosed space are not heated to the ignition temperature, and no outside explosion will result.

The porous member 107 is opaque, so that no light rays pass directly forwardly from the light bulb 57, along the optical axis of the light. The light rays do, however, pass outwardly in lateral directions through the glass globe 103, which is at least translucent and preferably transparent. The issuing light rays fall upon a suitable reflector 135 mounted in the base or bonnet 27 by the screws 136. The reflector 135 is of any suitable form, preferably in the form of a brightly polished sheet metal member having the shape in cross section (Fig. 2) of a broken segment of an ellipse whose major axis coincides approximately with the optical axis of the light, that is, the vertical central axis when viewed as in Fig. 2. In other words, the reflecting surface is made up of a series of annular reflecting rings 137 each constituting a zone of an ellipsoid of revolution, successive zones being separated from each other by steps or lands 139 lying approximately in parallel planes perpendicular to the major axis of the ellipsoid and the optical axis of the light.

Preferably a heat absorbing and color correcting glass cylinder 145 surrounds the light bulb 57 within the glass globe 103. In order to have both heat absorbent and color correcting characteristics, the glass used for this cylinder 145 preferably has approximately the composition disclosed in United States Patent 2,437,516, granted March 9, 1948, for an invention of Ernest H. Greppin. The rear end of this glass cylinder is held against the front face of the main member 27, and the front end of the cylinder is held by a sheet metal ring 151 having a cylindrical flange encircling the forward end of the glass cylinder 145 and an annular flange abutting the forward end of the cylinder 145 and pressing rearwardly thereon, this annular flange having holes loosely encircling the rods 111 which support the porous member 107. Coiled compression springs 153 surround the rods between the member 151 and the porous member 107, thus pressing rearwardly on the member 151 to hold the glass cylinder in place, yet freely allowing slight movement of the metal member 151 along the rods 111 as the glass cylinder 145 changes its length due to temperature changes.

During continued use of the operating light, the porous metal member 107 gets quite hot, although it never reaches a temperature sufficient to ignite any explosive gases on the outside thereof. However, to avoid accidental contact of the surgeon's or nurse's hand with the hot member 107, a protecting plate 161 of slightly larger diameter than the member 107, is mounted in front of the member 107 and spaced forwardly therefrom to leave a substantial air space between them. This plate 161 is held in place by screws 163 which are screwed into the forward ends of the nuts 117 on the rods 111. The plate is made of thin sheet metal which readily radiates heat, and because of this fact plus the forward spacing of this protecting plate from the porous metal member 107, the protecting member 161 is materially cooler than the porous member and is not objectionably hot to the accidental touch. The plate serves the additional purpose of discouraging misguided attempts of maintenance employees to paint or otherwise tamper with the porous member 107. A coating of paint on the surface of this member would tend to fill up the pores of this member and thus defeat the purpose of the porosity. But when the porous member 107 is hidden behind the protecting plate 161, which latter plate can be made of attractive appearance, there is no incentive to paint or tamper with the porous member.

To discourage attempts to turn the nuts 117 on the rods 111, such nuts, as already mentioned, are made with exterior surfaces of circular cross section, and the nuts themselves are surrounded in turn by sleeves 171 which turn freely on the nuts 117. Thus if anyone attempts to tamper with the structure by inserting the jaws of a pair of pliers behind the plate 161 and trying to turn the accessible members, all that will happen will be that the sleeves 171 will turn freely on the nuts 117 without disturbing the rather inaccessible nuts themselves, so that the delicate factory adjustment of these nuts with just the right degree of force or torque is not disturbed.

Large vent holes or slots 181 are formed through the bonnet 27 just outside the rear end of the globe 103, and the inner edge of the reflector 135 is spaced from the globe, thus enabling free circulation of an airstream over the outer surface of the globe, for cooling purposes.

A light constructed as herein disclosed is suitable for use in locations designated in the National Electrical Code Handbook as locations of Class 1, Group C, being atmospheres containing ethyl ether vapors.

It is seen from the foregoing disclosure that the above mentioned objects of the invention are admirably fulfilled. It is to be understood that the foregoing disclosure is given by way of illustrative example only, rather than by way of limitation, and that without departing from the invention, the details may be varied within the scope of the appended claims.

What is claimed is:

1. A light including a supporting member, an electric bulb socket for holding an electric bulb in a position projecting forwardly from said supporting member, a light-transmitting globe laterally surrounding a bulb held in said socket and having its rear end seated substantially tightly against said supporting member, a porous metal closure member extending across and closing the front end of said globe, a plurality of rods extending approximately parallel to each other within said globe, each of said rods having its rear end secured to said supporting member and each rod having near its forward end means engaging said porous closure member and drawing rearwardly on said closure member to seat it firmly against the front end of said globe, a heat absorbing and color correcting glass cylinder surrounding said bulb and within said globe, a carrier ring slidable longitudinally on said rods for carrying the forward end of said cylinder, and coil springs surrounding said rods between said carrier ring and said porous closure for pressing rearwardly against said carrier ring to keep it snugly engaged with said cylinder.

2. A light including a supporting member, an electric bulb socket for holding an electric bulb in a position projecting forwardly from said supporting member, a light-transmitting globe laterally surrounding a bulb held in said socket and having its rear end seated substantially tightly against said supporting member, a porous metal closure member extending across and closing the

front end of said globe, a plurality of rods extending approximately parallel to each other within said globe, each of said rods having its rear end secured to said supporting member and each rod having near its forward end means engaging said porous closure member and drawing rearwardly on said closure member to seat it firmly against the front end of said globe, each of said rods extending through said porous closure member and projecting forwardly beyond the front face thereof, said means on each rod for engaging said closure member comprising a nut threaded on the forwardly projecting part of the rod.

3. A construction as defined in claim 2, in which each of said nuts has an approximately cylindrical external surface, and further including an approximately cylindrical sleeve surrounding and freely rotatable on each said nut to impede unauthorized tampering with said nut.

4. A construction as defined in claim 3, further including a protecting plate extending across the front of said porous closure member and spaced forwardly therefrom, and screws extending through said protecting plate and threaded into said nuts to hold said protecting plate in place, said protecting plate serving to hold said sleeves in place on said nuts.

5. An electric lighting fixture for use in potentially explosive atmospheres, said fixture comprising a body having a central opening of sufficient clear diameter so that an incandescent electric bulb may pass through it, a removable cap for closing and tightly sealing said opening, an electric bulb socket mounted on and supported from said cap and faced forwardly so that a bulb placed in said socket will project forwardly within said body, a transparent globe of approximately cylindrical shape having its side walls substantially impervious to gas and having its rear end tightly sealed to said body in a substantially gas tight manner, a metal closure plate extending across and tightly sealed to the forward end of said globe to form a front closure for said globe, said metal plate having a multiplicity of minute pores therein sufficiently small to prevent free flow of air through the metal plate while allowing relief of pressure through said pores in the event of an explosion of the atmosphere within said globe, and an externally accessible retainer for retaining said cap in tightly closed relation to said body, so that when it is necessary to replace a burned-out bulb, said retainer may be released and said cap and socket may be moved rearwardly to obtain access to a bulb for replacement without disturbing said globe and metal plate.

6. An electric lighting fixture for use in potentially explosive atmospheres, said fixture comprising a main body with a forwardly dished margin and with a forwardly faced electric bulb socket mounted approximately centrally in said body so that a bulb placed in said socket will project forwardly within said body, a transparent globe of approximately cylindrical shape having its side walls substantially impervious to gas and having its rear end tightly sealed to said body in a substantially gas tight manner, a metal closure plate extending across and tightly sealed to the forward end of said globe to form a front closure for said globe, said metal plate having a

multiplicity of minute pores therein sufficiently small to prevent free flow of air through the metal plate while allowing relief of pressure through said pores in the event of an explosion of the atmosphere within said globe, a dished reflector surrounding said globe and mounted on said body and projecting forwardly therefrom, the forward end of said reflector being open, and a protecting and heat-radiating plate of sheet metal secured to and spaced forwardly from said metal closure plate, said protecting plate being of larger diameter than said closure plate and serving to prevent accidental contact with said closure plate through the open forward end of said reflector.

7. An electric lighting fixture for use in potentially explosive atmospheres, said fixture comprising a body having a central opening of sufficient clear diameter so that an incandescent electric bulb may pass through it, a removable cap for closing and tightly sealing said opening, an electric bulb socket mounted on and supported from said cap and faced forwardly so that a bulb placed in said socket will project forwardly within said body, a transparent globe of approximately cylindrical shape having its side walls substantially impervious to gas and having its rear end tightly sealed to said body in a substantially gas tight manner, a metal closure plate extending across and tightly sealed to the forward end of said globe to form a front closure for said globe, said metal plate having a multiplicity of minute pores therein sufficiently small to prevent free flow of air through the metal plate while allowing relief of pressure through said pores in the event of an explosion of the atmosphere within said globe, a dished reflector surrounding said globe and mounted on said body and projecting forwardly therefrom, the forward end of said reflector being open, a protecting and heat-radiating plate of sheet metal secured to and spaced forwardly from said metal closure plate, said protecting plate being of larger diameter than said closure plate and serving to prevent accidental contact with said closure plate through the open forward end of said reflector, and an externally accessible retainer for retaining said cap in tightly closed relation to said body, so that when it is necessary to replace a burned-out bulb, said retainer may be released and said cap and socket may be moved rearwardly to obtain access to a bulb for replacement without disturbing said globe and metal plate.

ERNEST H. GREPPIN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
321,166	Williams	June 30, 1885
1,985,922	Gelb	Jan. 1, 1935
2,069,950	Greppin	Feb. 9, 1937
2,280,402	Greppin	Apr. 21, 1942
2,295,339	Ericson	Sept. 8, 1942
2,447,048	Baker	Aug. 17, 1948
2,530,135	Tornblom	Nov. 14, 1950

FOREIGN PATENTS

Number	Country	Date
275,626	Germany	June 23, 1914
640,249	France	Mar. 24, 1928