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D. H. TUCK

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EXPLOSION-PROOF LIGHTING EQUIPMENT

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Fig. 1.

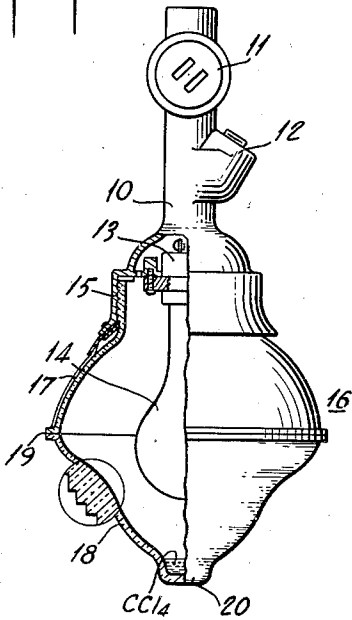


Fig. 2.

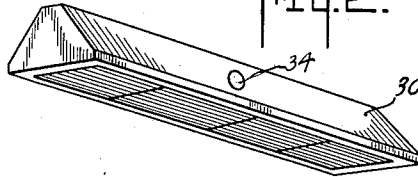
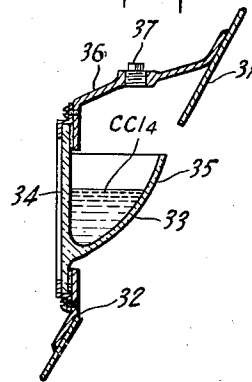


Fig. 3.



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EXPLOSION-PROOF LIGHTING EQUIPMENT

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4 Claims. (Cl. 240—11.2)

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The present invention relates to explosion-proof lighting equipment.

Lighting equipment designed for ordinary indoor use is not suitable for use in hazardous locations. There are two classes of locations where special precautions must be taken in the type of lighting equipment. One class of such locations is that in which flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are manufactured, used, handled, or stored in other than their original containers. This class may include such locations as some parts of dry-cleaning and dry-dyeing plants, pyroxylin plastic manufacturing plants, spray painting establishments, flammable-gas plants, varnish-manufacturing plants, distilleries, rectifying and blending plants producing whiskey and other alcoholic beverage liquors, plants producing industrial alcohol, and establishments or industries involving similar hazardous processes or conditions. The second class of locations is that in which (1) combustible dust is thrown, or is likely to be thrown, into suspension in the air in sufficient quantities to produce explosive mixtures or (2) those where it is impracticable to prevent such combustible dust from collecting in such quantities on or in motors, lamps, or other electrical devices that they are likely to become overheated because normal radiation is prevented. This class may include such locations as some parts of flour mills, feed mills, grain elevators, starch plants, sugar, cocoa and coal pulverizing plants, and establishments or industries involving similar hazardous processes or conditions.

Owing to the special construction necessary for such vapor-tight and dust-tight equipment the cost of the equipment is much greater than the cost of equipment having equivalent light sources, and in many cases the equipment necessary to take care of the hazardous conditions makes the lighting equipment far less efficient than it would be if it could be designed along more efficient lines. The loss in efficiency therefore may make it necessary to employ more of the more expensive equipment to obtain the lighting results required.

The present invention contemplates lighting equipment which is constructed along the conventional lines used in making dust tight equipment and provided with suitable means whereby a small amount of carbon tetrachloride may be retained as a liquid in the totally enclosed units. According to the present invention this carbon tetrachloride produces a mixture of vapors in air

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which is effective in preventing all possibility of explosion even when the fixture is charged with explosive gases such as acetylene, illuminating gas, gasoline, ether and the like.

To facilitate maintenance of the lighting units having the individual charges of carbon tetrachloride, these units have some form of liquid container which is visible externally of the unit, for example, a sump or well in the glass globe, a gauge glass, or a transparent container back of a transparent window in the side wall of the unit. This affords a tell-tale so that one can ascertain by simple inspection of the installed fixture that the fixture is actually safe. Explosion-proof fixtures heretofore available looked the same on inspection, whether they were safe or not.

In carrying out the present invention based on the use of carbon tetrachloride for preventing explosions it is not necessary to design the equipment strong enough to withstand the pressures developed from internal explosions. The carbon tetrachloride prevents any explosion so that there is no need of designing to protect against an internal explosion. While the carbon tetrachloride will form vapors and some of the vapors may escape so that in time the lighting equipment needs to be rechecked to see that it is still safe such routine inspection may be carried on at the same time as other inspection of the equipment. In some cases the escape of carbon tetrachloride vapors into the surrounding air would be objectionable on account of the odor so that such equipment would not be suitable, but the presence of such a vapor would be a ready indication of leakage from the lighting equipment, and this would call for checking the condition of the fixture and possibly replacing the carbon tetrachloride lost. In most locations, however, where explosion proof equipment is employed there are various disagreeable odors so that the addition of minute quantities of carbon tetrachloride to the air would be inconsequential.

The accompanying drawings show, for purposes of illustrating the present invention, three embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a vertical sectional view with parts in elevation through a pendent incandescent lamp type of lighting equipment;

Figure 2 is a perspective view of a fluorescent lighting unit; and

Figure 3 is an enlarged vertical sectional view through the wall of the equipment of Figure 2.

In the arrangement shown in Figure 1 the fitter 10 is in the form of a one piece casting with explosion proof junction box and connection piece at the top as indicated at 11 and a seal-off fitter as indicated at 12. The fitter supports a lamp socket 13 and lamp 14 in the usual manner and is threaded as indicated at 15 to receive the upper threaded end of an enclosing globe 16. This globe may be of any suitable form and shape. It is here shown as having a glass reflector 17 and a prismatic glass refractor 18 welded together at 19. The enclosing globe has a well 20 at the bottom sufficient to hold a small quantity, for example, 2-3 oz. of carbon tetrachloride.

In the arrangement shown in Figure 2 and 3 the fluorescent lighting luminaire 30 is of any suitable dust tight totally enclosing construction. While the receptacle for the carbon tetrachloride might be placed in the fixture in various manners, a convenient arrangement for supporting the carbon tetrachloride is indicated in the drawings. Here the side wall 31 of the luminaire body is provided with an opening indicated at 32. Figure 3, and opposite this opening is carried a container 33 for carbon tetrachloride. This container may conveniently have a vertical wall 34 and a pocket forming well 35. This container is made of transparent glass and is secured to a mounting member 36 which may conveniently be in the form of a casting of a proper contour to fit the wall of the fluorescent fixture. It is provided with a plug 37 to facilitate refilling the container.

Lighting equipment such as indicated in Figures 1, 2 and 3 will be rendered completely explosion proof by reason of the presence of the carbon tetrachloride vapors in it. Experiments have shown that such fixtures cannot be blown up by generating a spark discharge inside the fixture when the fixture is filled with air and gasoline, ether, or other flammable gases.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the particular forms shown are but a few of these forms, and various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A lighting fixture for use in hazardous locations, comprising an explosion proof fitter, a totally enclosing globe having a substantially gas tight joint between it and the fitter, an electric lamp in the globe, a light transmitting liquid receptacle within the globe, and carbon tetrachloride in the receptacle and observable through the receptacle from beneath the fixture.
2. A lighting fixture for use in hazardous locations, comprising a pendent incandescent lamp, a substantially gas and dust tight fitter supporting the lamp, a light transmitting enclosing globe about the lamp and secured to the fitter with a substantially gas tight joint therebetween, a well in the bottom of the globe and liquid carbon tetrachloride in the well and observable through the well from beneath the fixture.
3. A fluorescent lighting fixture for use in hazardous locations, comprising an open mouthed, dust and gas tight metal housing, a light transmitting closure across the mouth of the reflector, a transparent container carried by a housing wall, the wall having a window for observing the container, and carbon tetrachloride in the container.
4. A lighting fixture for use in hazardous locations, comprising an electric light source having an enclosing envelope, a substantially gas tight housing for the light source, a light transmitting liquid receptacle opening into the housing and carbon tetrachloride in the receptacle, whereby carbon tetrachloride vapors may mix with the air in the housing, a portion of the housing being light transmitting so that the contents of the receptacle are visible therethrough from beneath the fixture.

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