

Feb. 3, 1942.

M. J. N. DE MARGITTA

2,272,059

PHOTOFLASH LAMP

Filed Jan. 26, 1940

Fig. 1.

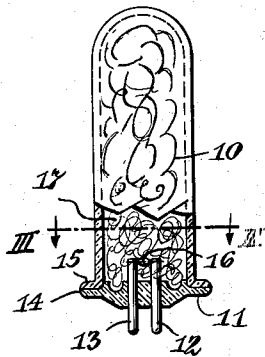


Fig. 5.

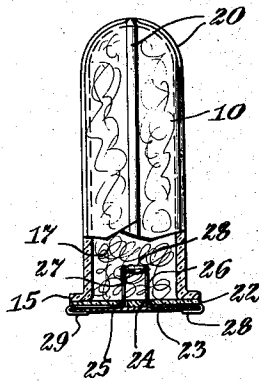


Fig. 7.

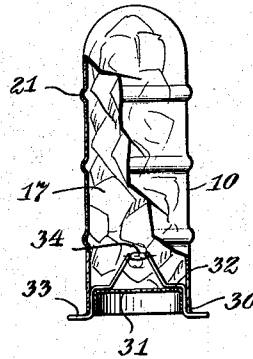


Fig. 2.

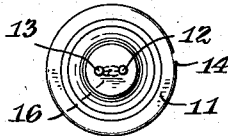


Fig. 6.

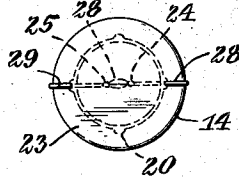


Fig. 8.

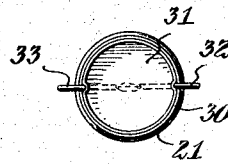


Fig. 3.

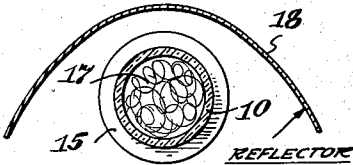


Fig. 9.

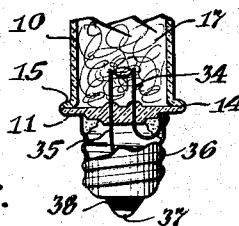


Fig. 10.

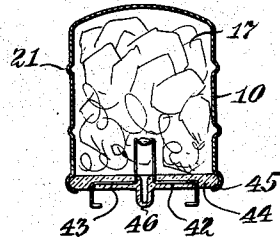


Fig. 4.

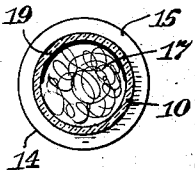


Fig. 11.

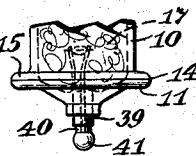


Fig. 12.

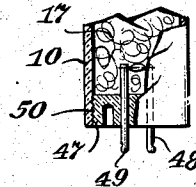


Fig. 13.

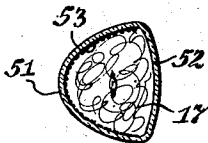


Fig. 14.

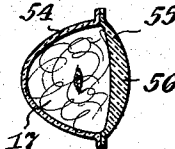
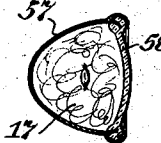


Fig. 15.



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PHOTOFLASH LAMP

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a corporation of Pennsylvania

Application January 26, 1940, Serial No. 315,738
In Hungary August 19, 1939

9 Claims. (Cl. 67—31)

This application is a continuation-in-part of my prior applications for improvement in Flash-lamps, Serial No. 298,276, filed Oct. 6, 1939, and Serial No. 302,023, filed Oct. 30, 1939.

The invention relates to lamps and especially to photographic flashlamps.

An object of the invention is to provide a container for a flashlamp that will not be dangerous if the container explodes.

Another object of the invention is to provide a flashlamp that will give a greater intensity of light without any dangerous bulb explosion.

A further object of the invention is to provide an effective flashlamp of very small size.

A still further object of the invention is to provide a flashlamp that will withstand casual shocks without special package protection.

Other objects and advantages of the invention will be apparent from the following description and drawing in which:

Figure 1 is a front view, partly in elevation and partly in cross-section of a preferred embodiment of the invention.

Figure 2 is an underneath view looking at the bottom of Figure 1.

Figure 3 is a cross-sectional view of the flashlamp of Figure 1 on line III—III thereof and showing said flashlamp in combination with a reflector.

Figure 4 is a cross-sectional view of a flashlamp with an inner reflecting surface.

Figure 5 is a modification, especially of the envelope, of Figure 1.

Figure 6 is a bottom view of the modification shown in Figure 5.

Figure 7 is a still further modification of Figures 1 and 5.

Figure 8 is a bottom view of Figure 7.

Figure 9 is a view, partly in cross-section and partly in elevation of a screw type base as applied to Figure 1.

Figure 10 is a modification of the envelope of Figure 7.

Figure 11 is a front elevation of a jack type base supplied to the flashlamp.

Figure 12 is a view, partly in elevation and partly in cross-section, of a modification of the lower portion of the embodiment of Figure 1.

Figures 13, 14 and 15 are cross-sectional views of three modifications of the flashlamp in which one wall is parabolic.

Figure 16 is a cross-sectional view of a modification of the base Figure 1 with a leak indicator member included.

Commercial flashlamps comprise a bulb or en-

velope of clear glass. It is apparent, because of the ignition of combustible material within this glass envelope, that there is always present a danger from exploding glass. These glass lamps must be carefully handled on account of danger of glass breakage. The bulging glass casing and package protection therefor makes difficult the transportation of a quantity of lamps in one's pocket.

It is one of the objects of my invention to eliminate the glass envelope and thus remove the danger of flying glass in the use of flashlamps. At the same time the size of the casing is reduced so that a number of lamps may be carried in a pocket.

It is also an object of my invention to provide a more intense flash of light which I accomplish by utilizing a pressure of active gas such as oxygen within the flashlamp container at a pressure greater than atmospheric. For such use a glass container would be very dangerous because the higher inside pressure would scatter the glass if the glass should crack.

I also desire, at the same time, to provide a very cheaply manufactured photoflash lamp and, at the same time, to reduce the size so that a large number of flashlamps may be conveniently carried. I accomplish these objects by making the container of a flashlamp of organic material of suitable translucence or transparency with adequate elastic and plastic properties. These materials comprise one or more of the class designated as plastics. These plastics preferably have a softening point somewhere between 150° and 300° F. and also a heat capacity, heat transfer and heat conductivity and dissipation so that there will be no explosion of the material that might result if this heat remained in the bulb.

The preferred material of these plastics is cellulose acetate, although the transparent or translucent plastics of the various resins such as urea-formaldehyde and phenol-formaldehyde may be used as well as those of the other plastics group of casein, pyroxylin, shellac and rubber. Some of the suitable plastics are sold under the trade-names of "Lucite," "Plastacell," "Plexiglass," "Bakelite BT-48-005."

In Figure 1 I have disclosed a preferred embodiment of my invention in which the container preferably comprises a closed end tubular member 10 of a plastic such as cellulose acetate, or one of the other plastics previously mentioned. Of course, other shapes may be utilized such as a square, triangular, oblong or other configuration.

Across the open end of this tubular portion is

a disc 11, having two conductors 12 and 13 sealed therethrough. This disc 11 may be of the same or other material than the tube 10. The material, however, should be capable of being sealed or cemented substantially vacuum tight at the periphery 14 of the disc to the flange 15 at the edge of the tube 10. Igniting means 16, such as a filament coated with zirconium, aluminum or phosphorous powder, is connected across the inner ends of the two conductors 12 and 13. The top of the disc may be coated with a reflecting coating or be opaque white so as not to absorb light energy.

Within the tube 10 is a combustible material 17, such as foil or fine wire of aluminum or magnesium, which is capable of being quickly ignited by the igniting means 16. Also within the container is a combustion supporting gas such as oxygen. The pressure of this gas is preferably in excess of atmospheric pressure and may be as much as 10 atmospheres. This additional pressure of oxygen provides a very intense flash of light when the metallic filling 17 is ignited. The size of the lamp can be made smaller. With higher pressures of oxygen, the thickness of the casing 10 may be of the order of a sixteenth of an inch. With oxygen at atmospheric pressure, the thickness of the casing may be as thin as .02 to .005 inch.

The flash bulb may be located in front of a curved reflector at 18, as illustrated in Figure 3. It is not necessary to utilize a separate reflector, and a reflecting surface 19, preferably of nickel or aluminum, can be placed upon a portion of the walls of the tubular portion 10, as illustrated in Figure 4.

While this reflector could be placed on either the outside or inside of the container, I have illustrated it on the inside wall in Figure 4. This surface may be a member moulded in the inner wall if desired.

In Figure 5 I have illustrated longitudinal ribs 20 on the casing 10 for strengthening purposes in case a thinner wall or a higher pressure of gas is utilized. These ribs may also be transverse as indicated at 21 in Figure 7.

In Figure 5 I have also illustrated a modification of the base which may be applied to other types of flashlamps besides the particular one illustrated in the figure. The light weight of the casing and the small size permit small and cheap base construction disclosed in this and other figures.

The base comprises two layers, 22 and 23, of plastic material, the upper one having two holes 24 and 25 for the passage of the conductors 26 and 27 from the igniting device 28 through this first layer of plastic. These wires are then bent to the outside and the second disc 23 applied thereto. The ends 28 and 29 of these wires are then bent around the lower disc 23 and the assembly sealed by pressure or heat or both to the flange 15 of the container. Cement may also be used. The pressure and heat applied will embed the wires 26 and 27 in and between the two discs. These wires can be of very cheap flexible conducting material because of the lightness of the lamp, and the construction affords a very easily assembled device.

In Figure 7, the container 10 preferably does not have a flange around its periphery 30. The sealing member is preferably a dish-shaped member 31, and the two wires 32 and 33 connected to the igniting means 34 are compressed between the periphery 30 of the tube 10 and the

sealing member 31, by pressure or heat or both.

In case, however, it is desired to utilize a screw-threaded type base as commercially applied to illuminating lamps, the structure illustrated in Figure 9 can be utilized. The conductors 34 and 35 pass through the disc member 11 and one of these wires, such as 34, is connected to the metal screw-threaded portion 36, and the connection 35 extends to a metal tip 37, projecting from this screw base 36, and insulated therefrom by insulation 38.

The Jack type connection of the base is illustrated in Figure 11, wherein one conductor is connected to the conducting ring 39 insulated by 40, from the tip 41 connected to the other conductor.

A still further modification of the invention is disclosed in Figure 10, wherein the conductors 42 and 43 are molded in the plastics disc 44 and then the ribbed casing 10 is sealed thereto, by having its periphery 45 pressed or heated or both, to the edge of this disc. Cement may also be used. It will be noted that the wires 42 and 43 have a considerable portion of their length within the disc 44 so that they may be adequately supported therein, and also to provide widely spaced outside contacts. The use of this disc 44 in Figure 10 also permits the use of a tubulation 46 for exhausting the container and filling it with the desired gas.

It will be noted that the use of plastics for the casing 10, permits a short and wide diameter casing, as illustrated in Figure 10, as well as the long type casing, illustrated in Figures 1, 5, and 7.

In Figure 12 I have illustrated a base 47 with conductors 48 and 49 sealed therein, which base 47 may be screw-threaded as at 50, into the periphery of the casing 10, after the casing has been filled with the combustible material 17 and the gaseous filling.

In case the screw threads are not sufficiently vacuum tight, heat might be applied to the outer portion of the base to make the material flow into a homogeneous mass. Cement may also be used.

Because of the ready adaptability of the plastics to various shapes, I can utilize a wall of parabolic cross section 51, as illustrated in Figure 13, wherein another integral wall 52 is slightly curved to provide a slightly divergent light path for the light. This parabolic wall 51 can, of course, be coated with a reflecting surface, such as 53. While in Figure 13, I have illustrated the cross-sectional wall as being integral, it is, of course, apparent that the wall can be of the two parts 54 and 55, illustrated in Figure 14. The slightly curved wall 55, may have certain portions 56 of prism-like extensions in case it is desired to focus the light flash similar to the focusing of the light from automobile headlights.

It is also within the scope of my invention to provide a metallic reflecting parabolic member 57, illustrated in Figure 15, with a front plastics closing member 58, sealed thereto. While I have described the various types of lamps illustrated on the drawing as adapted to contain a gaseous atmosphere at higher than atmospheric pressure, it is apparent that the forms of these lamps may be also utilized with a gaseous filling of one atmosphere or less.

In Figure 16 the base 11 has a central opening 60 covered with a flexible membrane 61 which may also be of a material, such as the plastics previously mentioned, strong and air-

tight enough to hold the gaseous atmosphere of the lamp and yet flexible enough to bulge out into the opening of the hole under the higher than atmospheric pressure within the casing. If a leak occurs, this bulge will flatten and indicate a defective tube. With lamps containing atmospheric as well as above atmospheric pressure, the thinner member 61 proves a safety valve for letting out gas pressure when an excess of pressure occurs that might crack the bulb 10. The breaking of such a membrane would also indicate that the bulb had been used. Instead of a separate membrane, the wall of the lamp could be made thinner and weaker at a desired location.

Various well-known commercial cements may be used instead of the welding described. This group of cements includes solvents or liquids polymerizing later and the cemented parts may be dried under mechanical or gas pressure perhaps with the help of some heat.

My preferred flashlamp having an oxygen filling at a pressure higher than one atmosphere has also the advantage of being filled with wire or sheet metal heavier than the lamp with low or atmospheric pressure. The diameter of aluminum or magnesium wire can be increased with pressure or, if sheet material is utilized, the thickness of this sheet material can be increased. Concentrated coils and spun or woven material can be used with a suitable high pressure. A diameter or thickness of combustible material greater than .002 inch or of the order of .002 inch can be utilized.

The reason is that the heat generated on a unit surface increases with oxygen pressure and the maximum cross-section of combustible material is limited by its cooling effect versus the heat generated in its proximity. If the heat generated on the surface is increased, the cross-sectional area can be increased also. The effect is a temperature increase and a combustion time decrease which results in a narrow high peak lamp.

This advantage of thicker combustible material is in addition to the faster combustion with absence of time lag and to the decreased volume and dimensions of the lamp made possible by the increased oxygen pressure.

It is apparent that many modifications may be made in the preferred embodiments illustrated, and accordingly, I desire only such limitations to be imposed upon my invention as are within the spirit and scope of the following claims.

I claim:

1. A flashlamp comprising a casing member, a base member sealed to said casing member, conductors sealed through said base member, combustible metal and a combustion supporting gas at substantially more than atmospheric pressure in said casing member, means connected to said conductors for igniting said combustible metal, said casing member comprising a translucent self-supporting material from the group of cellulose acetate, urea-formaldehyde, phenol-formaldehyde, casein, pyroxylin, shellac and rubber.

2. A lamp comprising a light-passing self-supporting sealed container from the group of organic plastics characterized by translucency and flexibility, said container having therein a combustible material and a combustion-supporting gas at a pressure substantially more than atmospheric, and means for igniting said gas and pro-

ducing light within and emanating from said container, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

3. A lamp comprising a light-passing self-supporting sealed container from the group of organic plastics characterized by translucency and flexibility, said container having therein a combustible metal and a combustion-supporting gas at substantially more than atmospheric pressure within said container, and means for instigating combustion of said metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

4. A lamp comprising a light-passing self-supporting sealed container of cellulose acetate characterized by translucency and flexibility, a combustible metal and a combustion-supporting gas at substantially more than atmospheric pressure within said container, and means for instigating combustion of said metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

5. A lamp comprising a light-passing self-supporting sealed container from the group of organic plastics characterized by translucency and flexibility, a reflecting coating on a portion of the wall of said container, a combustion-supporting gas at a pressure substantially more than atmospheric pressure within said container, means for combining with said gas and thereby producing light within and emanating from said container, and means for instigating said combining, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

6. A lamp comprising a light-passing sealed container, said container comprising a closed-end tubular self-supporting member from the group of organic plastics characterized by translucency and flexibility, a second self-supporting member from this same group sealed across the open end of said first member, conductors sealed through said second member, combustible metal in said container, and means in said container connected to said conductors for igniting said combustible metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

7. A lamp comprising a container of a closed-end tubular light-passing self-supporting member from the group of organic plastics characterized by translucency and flexibility, reinforcing ribs in said tubular member, a second member from this same group sealed across the open end of said first member, conductors sealed through said second member, combustible metal in said container, and means in said container connected to said conductors for igniting said combustible metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

8. A lamp comprising a container of a closed-end tubular light-passing self-supporting member from the group of organic plastics characterized by translucency and flexibility, a second self-supporting member from this same group sealed across the open end of said first member, a gaseous filling of a combustion-supporting gas

substantially above atmospheric pressure in said container, conductors sealed through said second member, combustible metal in said containers, and means in said container connected to said conductors for igniting said combustible metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

9. A lamp comprising a container of a closed-end tubular light-passing self-supporting member from the group of organic plastics characterized by translucency and flexibility, reinforcing ribs in said tubular member, a second mem-

ber from this same group sealed across the open end of said first member, a gaseous filling of an active gas substantially above atmospheric pressure in said container, conductors sealed through said second member, combustible metal in said container, and means in said container connected to said conductors for igniting said combustible metal, said gas pressure tending to retain the container inflated to maximum volume and obtaining increased light intensity upon ignition.

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