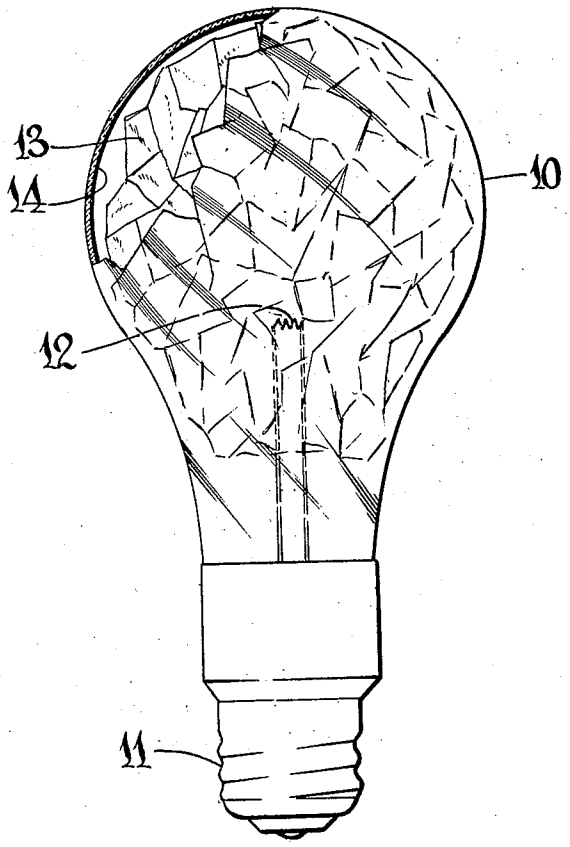
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FLASH BULB

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Arthur L. Stevens &
Herman J. D'Innocenzo,
INVENTORS

BY
Beau, Brooks, Buckley & Beau.
ATTORNEYS

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FLASH BULB

Arthur L. Stevens and Herman J. D'Innocenzo, Buffalo, N. Y., assignors to Pierce and Stevens, Incorporated, Buffalo, N. Y.

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3 Claims. (Cl. 67—31)

This invention relates to an improved type of flash bulb for photographic purposes or the like, and to improved methods and means for coating the interiors thereof.

It is now known that flash bulbs may be greatly improved by coating the interiors thereof with heat insulating and structurally reinforcing coating substance, whereby the bulbs may be of reduced wall thickness and less liable to failure under operating conditions. For this purpose certain types of lacquers or like substances have previously been applied to the bulb interiors, but the uses of previous coating substances for this purpose have been subject to certain serious disadvantages and objections. For example, certain cellulose derivatives, especially of the nitro cellulose type, have been employed previously for this purpose, but such materials have invariably been objectionable either from the standpoint of relatively high cost, lack of sufficient toughness or other strength or adhesion capabilities; tendency to char during the bulb-sealing process or during the flash, thereby impairing the light transmitting capacity of the finished product; inefficiency as a heat insulating medium for protection of the bulb glass; or the like. Consequently, it has been attempted to improve the qualities of the cellulose derivative compositions of the prior art by compounding them with plasticizers and resins or the like but this invariably makes the product more subject to charring under elevated temperature conditions, and thus the attainment of one objective is accompanied by introduction of another objectionable characteristic. In addition, such modified compositions are relatively expensive.

The primary object of the present invention is to provide an improved form of flash bulb comprising a glass-wall bulb interiorly coated in an improved manner with a substance novel in this art whereby improved flash performance is provided. Another object of the invention is to provide an improved flash bulb comprising structurally an outer glass shell interiorly lined with a structurally reinforcing substance which is relatively inexpensive and stable under the operating temperatures to be met with, and of high light transmitting efficiency, and otherwise unobjectionable from the standpoint of the manufacturer and the user. Other objects and advantages of the invention will appear in the specification hereinafter.

The figure of the drawing is an elevational view of a conventional flash bulb treated according to the principles of the present invention.

In the drawing the numeral 10 designates the conventional glass envelop having associated therewith a suitable connecting plug 11 of conventional form. An igniting filament is indicated at 12 and the numeral 13 designates the metal foil, usually aluminum or magnesium, which is employed for the propagation of actinic light by combustion of the metal. The numeral 14 designates an interior surface coating of a nature to be described below and applied in pursuance to the method of the present invention.

To practice the invention it is preferred to employ a relatively thin-walled form of glass bulb shell fabricated of any presently known suitable form of glass material such as has previously been used in connection with the manufacture of flash bulbs or the like. Before insertion of the lighting filament and sealing of the bulb, the interior of the shell is sprayed with a liquid composition comprising isobutyl methachrylate in a suitable solvent such as combination of toluol and naphtha. More specifically, the naphtha ingredient of the composition above referred to may be of the grade commercially designated as petroleum naphtha having a boiling range of 55–100° C. and a specific gravity between .695 and .700 at 20° C.; and the relative proportions of the ingredients of the composition may be specifically; polymerized isobutyl methachrylate—18%; toluol—62%; naphtha—20%.

In the case of the specific formula set forth just above the solvent mixture has a boiling point of around 70 degrees C., thereby providing relatively rapid drying of the coating composition when applied to the glass bulb. It will be understood that the specific formula given hereinabove may be varied somewhat to provide satisfactory results, and it has been found, for example that the isobutyl methachrylate ingredient of the coating composition may constitute between 15% and 25% of the ingredients, with satisfactory results. It has also been determined by experiment that the toluol ingredient may be replaced by xylol, and that satisfactory results may also be obtained if the naphtha is replaced by benzol. Also, other ketones and esters may be employed if desired within the concept of this invention.

The composition of the invention provides, in its initial liquid state, a smooth flowing material which is adapted to be sprayed against the in-

terior of the bulb shell to provide a smooth and uniformly thick coating thereon which immediately sets and thus avoids draining or the production of drawing irregularities such as would result in non-uniform thickness of the final coating. It has been found that the coating so provided is of improved heat insulating capacity, and is inherently tenacious with respect to the bulb shell. Consequently, an efficient heat insulating and structural reinforcing coating may be provided through use of a thicker application of coating material; and thus, in addition to using a relatively inexpensive mixture for the purpose, less coating material is required and further economy is effected. The coating material of the invention is water-white and thereby transmits all possible light rays. It is stable in the presence of temperatures equal to those experienced during the flashing operation and does not char during the flashing process. The material may be baked at temperatures as high as 375° C. without discoloration or other deleterious effect, and therefore does not become charred during subsequent sealing of the bulb. The decomposition and reaction products of the coating substance are non-discolored, and therefore maximum light output of the flash bulb is permitted, even during high peak performance. The superior adhesive properties of the coating composition provides, in combination with the glass of the bulb shell a substantially integral structure, and the setting-up characteristics of the coating composition are such that the setting process is accompanied by introduction of minimum stresses in the glass bulb shell.

Because the finished coating portion of the integral glass and coating structure is of thermoplastic nature the heating of the interior coating portion of the structure does not permit stresses to be transferred from the coating element to the glass shell portion. The coating element of the finished bulb structure is substantially stable to light and aging, and does not turn yellow under either direct light or ultra-violet rays. It is an efficient heat insulator, and thereby protects the glass portion of the bulb structure; and in all respects the composite structure of the invention is of improved characteristics from the standpoint of the user and is relatively simple and inexpensive to manufacture. The flash bulbs of the invention are clearly distinguishable from flash bulbs of the prior art such as are interiorly coated with nitro cellulose derivative compositions which are subject to deterioration under aging or heat applying processes. For example, such coatings of the prior art are subject to decomposition at about 135° C., and are thereby difficult to employ with satisfactory results in view of the temperatures required to subsequently seal the bulbs. The coating composition of the invention is also superior, for example, to polymers of the vinyl type which "spider web" when it is attempted to spray them; whereas the coating composition of the invention is adapted to be either sprayed or flushed on the glass shell surfaces to provide the uniformly coated composite structure hereinabove described.

We claim:

1. A flash bulb having a casing comprising a composite integral structure having an outer glass shell and a continuous adherent inner shell comprising isobutyl methacrylate, combustible material in said casing, and combustion supporting material likewise in said casing.

2. A flash bulb having a casing comprising a composite integral structure having an outer glass shell coated interiorly with a continuous adherent, interiorly-exposed layer of isobutyl methachrylate resin, and combustible material and combustion supporting material in said casing.

3. A flash bulb having a casing comprising a composite integral structure having an outer glass shell and an interior continuous adherent coating of a methachrylate resin, and combustible material and combustion supporting material in said casing.

ARTHUR L. STEVENS.
H. J. D'INNOCENZO.