United States Patent [19]

Gilliam

[11] 3,813,534

[45] May 28, 1974

[54] **CHEMICAL LIGHTING DEVICE HAVING INTERLOCKING AMPOULES**

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[22] Filed: **Sept. 14, 1973**

[21] Appl. No.: **397,554**

[52] **U.S. Cl.** ..... **240/2.25,** 206/47 R, 222/94

[51] **Int. Cl.** **F21v 9/16**

[58] **Field of Search** ..... 240/2.25; 222/94; 206/47 A

[56] **References Cited**

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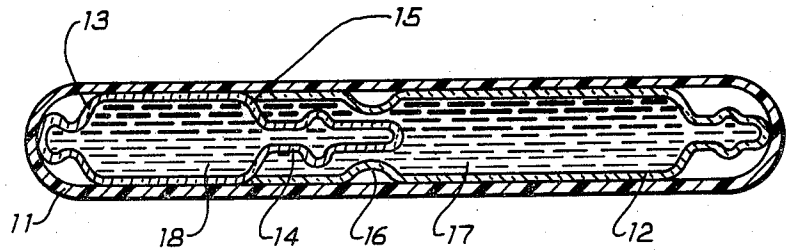
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[57] **ABSTRACT**

A chemical lighting device having an outer cylindrical sleeve of light transmitting material and a pair of interlocking frangible ampoules positioned within said outer cylindrical sleeve. A first ampoule containing an activator material has a reduced diameter portion that extends into a second ampoule containing a chemiluminescent material. The first ampoule is fuzed to the second ampoule and closes one end of the second ampoule. The second ampoule is provided with an indentation that surrounds the reduced diameter portion of the first ampoule so that the two ampoules can be broken simultaneously, and, upon mixing of the chemiluminescent material and the activator material, light is emitted through the outer sleeve.

1 Claim, 2 Drawing Figures



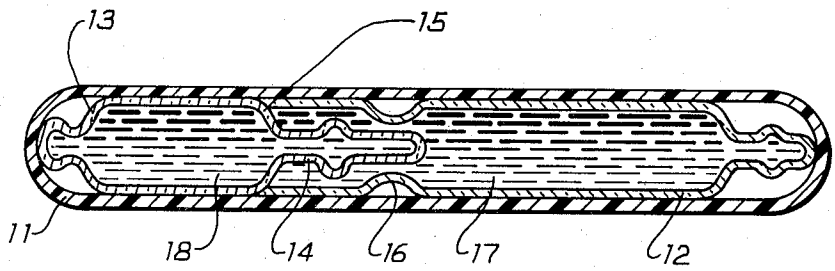


Fig. 1

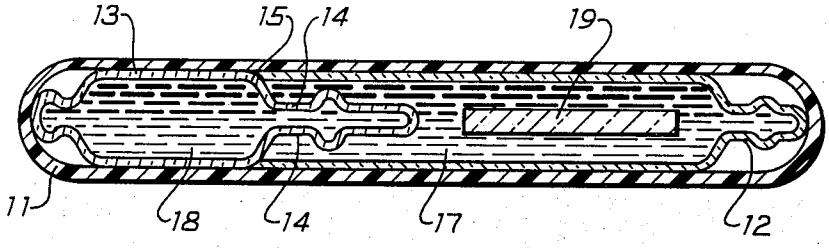


Fig. 2

CHEMICAL LIGHTING DEVICE HAVING INTERLOCKING AMPOULES

CROSS-REFERENCE TO RELATED APPLICATION

Patent application of Clarence W. Gilliam and Thomas N. Hall entitled, "Chemical Lighting Device," Ser. No. 295,335, filed Oct. 5, 1972.

BACKGROUND OF THE INVENTION

The present invention relates to a chemical lighting device and more particularly to a chemical lighting device which can be held in a hand and readily activated.

Various chemiluminescent peraminoethylene compounds have been used for lighting and marking purposes. One such use is described in U.S. Pat. No. 3,239,406, entitled, "Chemiluminescent Structures And Their Preparation," which issued Mar. 8, 1966, to Donald D. Coffman and Hilmer E. Winberg. This patent teaches the coating of flexible material, such as plastic strips, with tetrakis (dimethylamino) ethylene to provide a nocturnal marking tape. As tetrakis (dimethylamino) ethylene becomes luminescent upon exposure to air, the preparation of the tape is made under nitrogen and the saturated material is protected from air by covering with polyethylene film.

Another group of chemiluminescent compounds are made by adding a fluorescer to an oxalate-ester compound and then activating the mixture with an oxidizing material. U.S. Pat. No. 3,612,857, entitled, "Location Marker For Producing Luminous Display," which issued Oct. 12, 1971, to Dave Beatty and James Reinhart, describes a location marker which is a cloth streamer saturated with a mixture of bis(2,4,5 Trichloro-6-carbobutoxyphenyl) oxalate, anthracene cyanacryl terpolymer, and bis(2-ethylhexyl) phthalate in benzene. The activator fluid used to activate the chemiluminescent mixture is hydrogen peroxide in dimethyl phthalate.

In the above-identified patent application, a chemical lighting device is shown and described which can be held in the hand and activated. An outer cylindrical sleeve of light transmitting material contains first and second ampoules which are kept separated in the cylindrical sleeve. One ampoule contains a chemiluminescent material and the second ampoule contains an activator fluid. Each ampoule is provided with a reduced neck portion which facilitates breaking the ampoule. When both ampoules are broken, the chemiluminescent material and activator fluid are mixed and light is obtained and transmitted through the cylindrical sleeve.

SUMMARY OF THE INVENTION

The present invention relates to a hand-held chemical lighting device having interlocking ampoules within an outer sleeve of light transmitting material. One ampoule has a reduced diameter portion which extends into a second ampoule and the two ampoules are fused together so that the first ampoule closes the second ampoule. One ampoule contains a chemiluminescent material and the second ampoule contains an activator fluid, and when the ampoules are broken and the materials are mixed, light is obtained and transmitted through the outer sleeve. A weight, such as a cylindrical rod, is provided in one ampoule so that if a device is launched from a launcher, the weight will break the other ampoule to allow the materials to mix.

It is therefore a general object of the present invention to provide an improved chemical lighting device which can be activated manually by hand or which can be automatically activated during launch.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal sectional view of a preferred embodiment of the present invention; and

FIG. 2 is a longitudinal sectional view, similar to FIG. 1, having a weight therein for breaking a frangible ampoule.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, there is shown a tubular outer sleeve 11 made of a material which will transmit light, such as clear radiation-crossed-linked polyolefinic plastic tube. Two ampoules 12 and 13 of frangible material, such as glass, are positioned within outer sleeve 11. Ampoule 13 has a reduced diameter portion 14 that extends into ampoule 12 and the shoulder 15 of ampoule 13 is fuzed by heating to ampoule 12 so that ampoule 12 is sealed. Ampoule 12 is provided with a reduced diameter portion 16, which might also be scored to facilitate breakage, and this reduced diameter portion 16 is positioned opposite to the reduced diameter portion 14 of ampoule 13 so that breakage of ampoule 12 at reduced diameter portion 16 will also cause breakage of portion 14 of ampoule 13.

Ampoule 12 contains a chemiluminescent material 17 which, by way of example, might be a mixture of an oxalate ester, such as bis(2,4,5-trichloro-6-carbopentoxyphenyl) oxalate, and a fluorescer, such as 9,10,-bis(phenylethynl) anthracene. Ampoule 13 contains an activator 18, such as hydrogen peroxide.

When it is desired to activate the chemical lighting system described herein, sleeve 11 is bent in the region of reduced diameter portion 16 and ampoules 12 and 13 will break at about the same time. Mixing of the chemiluminescent material and the activator produces light that passes through sleeve 11.

Referring now to FIG. 2 of the drawing, there is shown an embodiment of the invention which is designed to activate the lighting system upon firing from a launcher. A weight 19 which, by way of example, might be a cylindrical glass rod, is provided within ampoule 12 and, upon launching, the inertia of weight 19 causes ampoule 13 to strike weight 19 which breaks ampoule 13 and permits the chemiluminescent material 17 and activator 18 to mix.

It can thus be seen that the present invention provides an improved chemical lighting device having interlocking ampoules which can be broken simultaneously to permit mixing of the chemical therein. Also, one ampoule can be broken during launch to permit mixing of chemicals.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood, that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:

1. A chemiluminescent light device comprising, an outer sleeve of light transmitting material,

first and second frangible ampoules positioned in said outer sleeve and fused together with said first frangible ampoule providing a closure for one end of said second ampoule and said first ampoule having a reduced diameter portion extending into said second ampoule, said second ampoule having a reduced diameter portion surrounding said reduced diameter portion of said first ampoule, said reduced diameter portion of said second ampoule being scored to break upon flexure of said outer sleeve whereby said reduced diameter portion of said first frangible ampoule will also break,

a chemiluminescent fluid in one of said frangible ampoules, and

activator fluid in said other frangible ampoule, said chemiluminescent fluid and said activator fluid being mixed upon breakage of said first and second frangible ampoules.

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