

[54] **HAND HELD DEVICE FOR ACTIVATING A CHEMILUMINESCENT WAND**

[76] Inventor: **Gordon B. Holcombe**, 603 Santa Barbara Ave., Millbrae, Calif. 94030

[22] Filed: **July 22, 1974**

[21] Appl. No.: **490,892**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 350,946, April 13, 1973, Pat. No. 3,829,678.

[52] U.S. Cl. **240/52 R; 240/2.25; 240/6.4 W; 240/59**

[51] Int. Cl. **F21v 21/00**

[58] Field of Search. **240/2.25, 52 R, 1 R, 59, 240/6.4 W; 9/313**

[56] **References Cited**

UNITED STATES PATENTS

3,500,033 3/1970 Cole et al. 240/2.25

3,539,794 11/1970 Rauhut et al. 240/2.25
3,578,962 5/1971 Gerber 240/2.25
3,638,258 2/1972 Black 240/2.25 X

Primary Examiner—Richard L. Moses
Attorney, Agent, or Firm—Limbach, Limbach & Sutton

[57] **ABSTRACT**

A hand held device for activating a chemiluminescent wand of the type having a first chemical fluid in a flexible tube and a second chemical fluid in a frangible tube within the flexible tube, the apparatus has a bracket formed to retain one end of the wand, a lever portion extending obliquely from the bracket and designed to fit into the user's palm, and a fulcrum portion on the bracket which cooperates with the lever portion to thereby fracture the frangible tube in the wand causing the first chemical fluid to mix with the second chemical fluid and generate a chemiluminescence.

7 Claims, 7 Drawing Figures

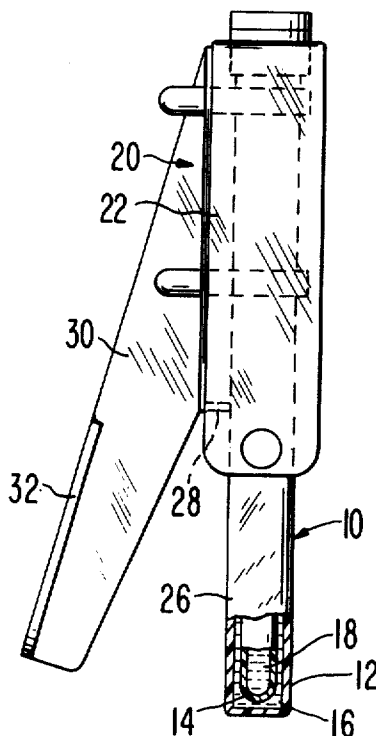


FIG. 1

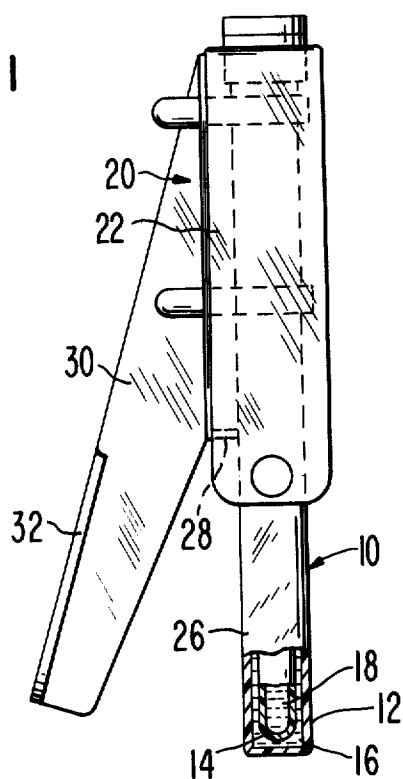


FIG. 2

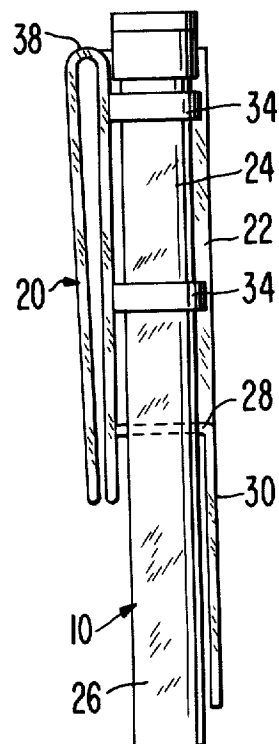


FIG. 3

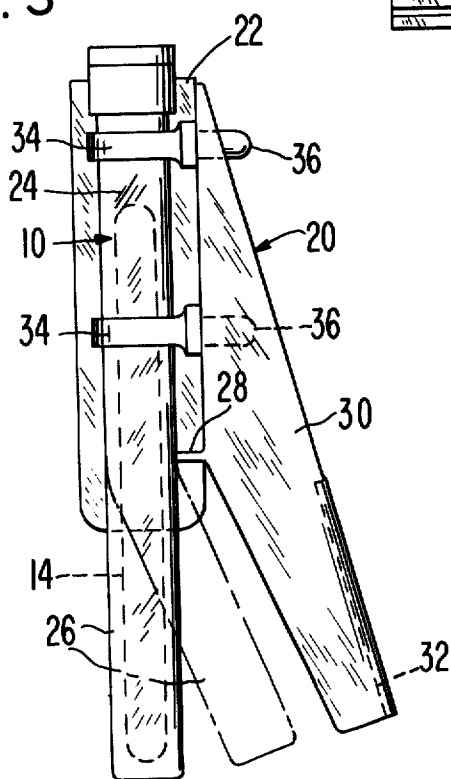


FIG. 5

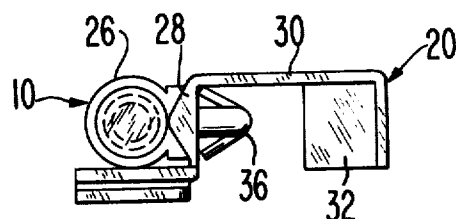


FIG. 4

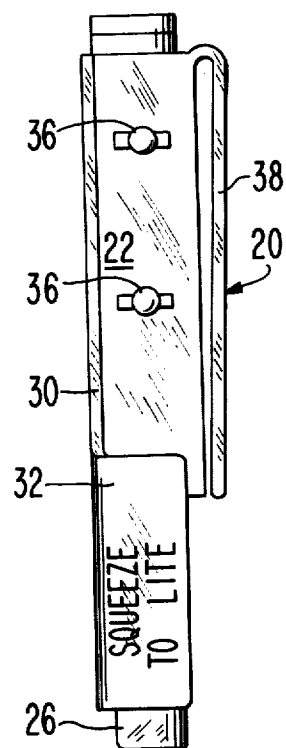


FIG. 6

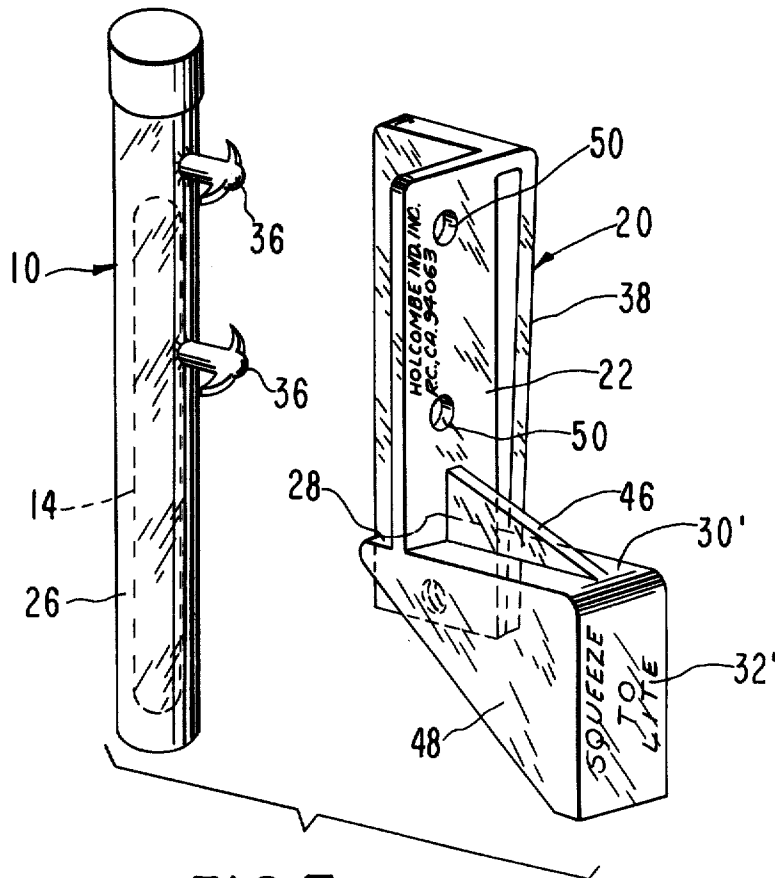
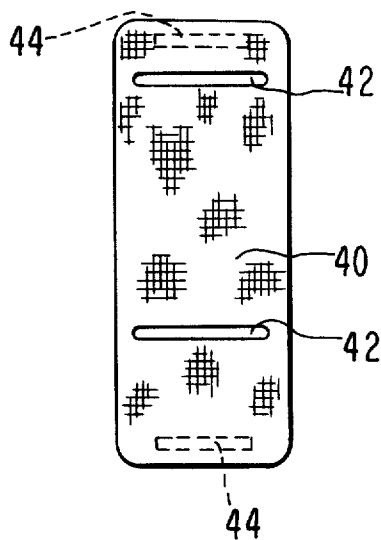


FIG. 7

HAND HELD DEVICE FOR ACTIVATING A CHEMILUMINESCENT WAND

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of applicant's co-pending application entitled **APPARATUS FOR ACTIVATING A CHEMILUMINESCENT WAND**, filed Apr. 13, 1973, and issued Aug. 13, 1974, as U.S. Pat. No. 3,829,678.

BACKGROUND OF THE INVENTION

Certain chemical reactions produce the emission of light in a process known as chemiluminescence. Certain chemicals which exhibit reactant chemiluminescent properties are described by Laszlo J. Bollyky et al., in U.S. Pat. No. 3,597,362 issued Aug. 3, 1971.

A practical application of chemiluminescence is for emergency lighting where incandescent, arc or other potentially hazardous types of lighting are to be avoided. Chemiluminescent reactions generate illumination without producing high temperatures or electrical potentials hazardous to combustible environments.

An appropriate functional container for reactant chemiluminescent chemicals is disclosed by Heinz K. W. Voight, et al. in U.S. Pat. No. 3,576,987 issued May 4, 1971. This patent describes a luminous wand having a flexible outer casing containing a frangible or breakable inner tube. Reactant chemiluminescent chemicals are separated and contained within the inner tube and between the inner tube and outer casing. When the inner tube is broken by bending the outer casing, the chemicals mix and luminescence is produced.

A container as described in the reference can be improved by lining the outer flexible casing with a thin impervious material such as glass to protect the fluid confined between the inner tube and outer casing. Experience has shown that a flexible tube without an impervious liner is subject to migration of moisture from environments where moisture is generally a problem causing a loss in the effective illumination of the wand. The "shelf-life" or "in-situ" life of an unactivated wand can be substantially increased by the impervious liner. Generally, an impervious material is also frangible. Therefore, when a wand is constructed with a frangible liner, it too will break when the outer flexible tube is deformed for the purposeful breaking of the inner tube for activating the wand. However, for definitional purposes the outer casing will be deemed a flexible casing. It is to be understood that this term will also include a flexible tube with a frangible liner.

As mentioned above, chemiluminescent wands have a wide variety of uses, particularly in emergency situations, but also including such uses as a light source for working in areas where there is a high risk of explosion if a spark or flame were present. In all such uses, it is necessary in order that the wand be used effectively that the user be provided with means for conveniently activating the wand and for attaching it to his person or to some other object.

Since in emergency situations the user will not be able to follow elaborate instructions it is desirable that the operation of the activating device be readily apparent to the user upon seeing the activating mechanism. Still another problem is that the activating device, while holding the wand securely, must also not obstruct the light emitted from the wand.

SUMMARY OF THE INVENTION

The above and other problems are overcome by the apparatus according to the invention for activating such a chemiluminescent wand having a first chemical in an inner frangible tube and a second chemical in an outer flexible casing encompassing the inner tube, the apparatus of the invention comprising a bracket for restraining one end of the wand and allowing the other end of the wand to extend free from the bracket, the bracket including a fulcrum portion which bears against the wand intermediate its opposite ends, and a lever arm rigidly connected to the bracket at an oblique angle and extending toward the free end of the wand. The lever arm, the fulcrum portion and the free end of the wand all reside substantially in the same plane. The user of the apparatus activates the wand by squeezing together the free end of the wand and the lever arm thereby bending and fracturing the inner frangible tube of the wand over the fulcrum portion and generating chemiluminescence.

In the preferred embodiment the bracket further includes a clip attached to the bracket. The clip is oriented in a plane parallel to the plane containing the lever arm, the free end of the wand and the fulcrum portion so that the wand is maximally exposed when the bracket is clipped to an opaque object.

The means for restraining the one end of the wand include a pair of flexible, plastic loops. The loops are made of strips of material whose ends are barbed. The barbed ends are removably engagable in holes in the bracket. The bracket and lever arm are transparent and may be made of thermoformed plastic, extruded plastic, or any other type of resilient, inexpensive material.

It is therefore, an object of the present invention to provide a hand held device for conveniently activating a chemiluminescent wand.

It is another object of the invention to provide a hand held device for activating a chemiluminescent wand wherein the device further serves to provide a means for attaching the wand to the user or to some other object.

The foregoing and other objectives, features and advantages of the invention will be more readily understood upon consideration of the following detailed description of certain preferred embodiments of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a rear view of the wand activating apparatus of the invention;

FIG. 2 is a left side view of the device depicted in FIG. 1;

FIG. 3 is a front view of the device depicted in FIG. 1;

FIG. 4 is a right side view of the device depicted in FIG. 1;

FIG. 5 is a bottom view of the device depicted in FIG. 1;

FIG. 6 is a plan view of a reflectively coated cloth mounting strip; and

FIG. 7 is a perspective view of a second embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1, 2 and 3, a round, chemilumi-

nescent wand 10 is shown (in solid line) first retained in an unbroken or inactivated state and then (in hidden line) partially displaced to a broken or luminescent state. The wand 10 comprises a flexible outer casing 12 which contains an inner frangible tube 14 of glass concentrically located to form two separated chambers, one formed within the inner tube 14 and the other formed between the inner tube and the outer casing. A chemiluminescent chemical 16 is contained in one of the chambers and an activator chemical 18 is contained in the other chamber. Chemical interaction and resultant luminosity occurs when the inner frangible tube 24 is broken allowing the chemicals to intermix.

Activation of the chemiluminescent reactants 16 and 18 in the wand is accomplished by the wand retaining device 20 which comprises a bracket 22 for restraining one end 24 of the wand and allowing the other end 26 of the wand to extend free from the bracket. The bracket 22 has an ell shaped cross-section so as to form a vee shaped space for holding the wand 10. The bracket includes a fulcrum portion 28 which bears against the wand 10 intermediate its opposite ends 24 and 26. The fulcrum portion 28 is in the form of a lip which is bent inwardly into the vee shaped space contained by the bracket.

A flat lever arm 30 is rigidly connected to one side of the bracket 22 at an oblique angle and extends toward the free end 26 of the wand 10. The lever arm 30 includes a gripper portion 32 which is bent perpendicularly from the arm 30 in a direction generally towards the bracket 22. The lever arm 30, the fulcrum portion 28 and the free end 26 of the wand all reside in substantially the same plane.

The wand end 24 is restrained in the bracket 22 by a pair of flexible strips 34 which are looped about the wand end 24. The ends 36 of the strips 34 are barbed and protrude through holes in the bracket 22. The barbs may be compressed so that the strips 34 are removable from the bracket 22.

In operation, the user of the apparatus activates the wand by squeezing together the free end 26 of the wand and the lever arm 30 thereby bending and fracturing the inner frangible tube 14 of the wand over the fulcrum portion 28 and generating chemiluminescence.

The bracket 22 further includes a U-shaped clip 38 attached to the bracket 22 and oriented in a plane parallel to the plane containing the lever arm 30 and the free end 26 of the wand. The clip 38 is integrally formed with the bracket 22 and serves to mount the bracket 22 and the wand 10 on clothing or any other object having a thin flat surface over which the clip may be inserted.

Referring now more particularly to FIG. 6, a cloth strip 40 is provided with cut out slots 42 at its upper and lower ends which receive the clip 38. The strip 40 also contains fastening devices 44 such as magnets, for example, on its backside. The strip may be sewn or adhesively affixed to clothing, lifejackets, liferafts or attached by means of the fastening devices to hard objects such as a car fender, for example.

The bracket 22 and the lever arm 30 are preferably made of a transparent material such as plastic. The strip 40 is preferably given a reflective coating so that the maximum amount of light will be emitted from the wand 10 and will not be absorbed by the mounting structure. An instruction, such as "SQUEEZE TO

LITE", for example, may be printed on the exposed surface of the gripper portion 32.

Referring now more particularly to FIG. 7, a modified form of the embodiment is illustrated. The basic construction of this device is the same as the embodiment of FIG. 1 and the same reference numerals have been applied to the same features. The primary modification is that the lever arm 30' is ell shaped and attaches to the side of the bracket 22 beneath the fulcrum 28 at a right angle. A web 46 extends between the lever arm 30' and the bracket 22 for support. A pair of triangularly shaped webs bridge the side edges of the legs of the lever 30' to rigidify the lever arm 30'. The wand 10 has integrally molded barbs 36 which engage in holes 50 in the bracket 22 to hold the wand firmly to the bracket. This overall construction simplifies the manufacture and assembly of the device.

The terms and expressions which have been employed here are used as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described, or portions thereof, it being recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. Apparatus for activating a chemiluminescent wand having a first chemical in an inner frangible tube and a second chemical in an outer flexible casing encompassing the inner tube, the apparatus comprising:

a bracket for restraining one end of the wand, and allowing the other end of the wand to extend free from the bracket, the bracket including a fulcrum portion which bears against the wand intermediate its opposite ends, and

a lever arm rigidly connected to the bracket and extending toward the free end of the wand, the lever arm, the fulcrum portion and the free end of the wand all residing in the same plane, whereby a user of the apparatus activates the wand by squeezing together the free end of the wand and the lever arm thereby bending and fracturing the inner frangible tube of the wand over the fulcrum portion and generating chemiluminescence.

2. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the bracket and lever arm are made of a transparent material.

3. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the bracket further comprises a clip attached to the bracket and oriented in a plane parallel to the plane containing the lever arm, the free end of the wand and the fulcrum portion.

4. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the bracket further comprises at least one flexible loop around the restrained wand end, and means for removably engaging the loop to the bracket.

5. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the wand has a pair of integrally formed, projecting barbs at one end and the bracket has a pair of spaced apart holes for receiving and engaging the barbs to secure the one end of the wand.

6. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the lever arm is flat and is rigidly connected to one side of the bracket at an oblique angle.

7. A chemiluminescent wand activating apparatus as recited in claim 1 wherein the lever arm is ell shaped and is rigidly connected to the bracket beneath the fulcrum portion.

* * * * *