United States Patent [19]

Shefler et al.

[11] **3,745,324**

[45] **July 10, 1973**

[54] **TARGET MARKING DEVICE**

[75] Inventors: **Sydney Shefler**, China Lake; **Harold S. Duff**, Ridgecrest, both of Calif.

[73] Assignee: **The United States of America as represented by the Secretary of the Navy**, Washington, D.C.

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[21] Appl. No.: **152,462**

[52] **U.S. Cl.** **240/2.25**, 244/142, 102/35.6

[51] **Int. Cl.** **B64d 17/00**, F42b 13/38

[58] **Field of Search** ..... 102/35, 35.2, 35.4, 102/35.6, 37.8; 343/18 B; 244/142; 240/2.25; 252/188.3 CL

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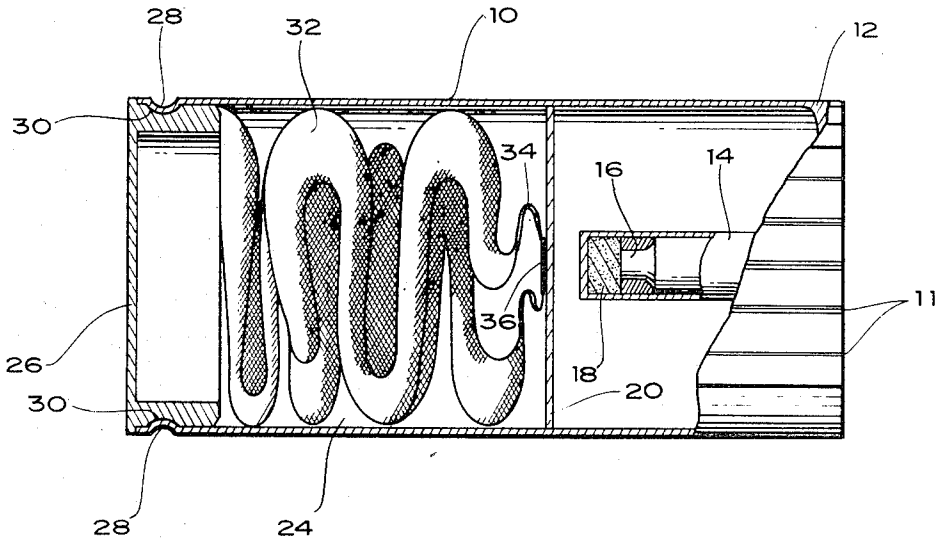
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Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—James M. Hanley
Attorney—R. S. Sciascia and Roy Miller

[57] **ABSTRACT**

A target marking device comprising a parachute or panel soaked in a chemiluminescent agent sealed inside a canister which upon rupture releases the canopy which falls to the target location where the agent reacts with oxygen in the air forming a glow visible from all quadrants, particularly at night.

3 Claims, 3 Drawing Figures



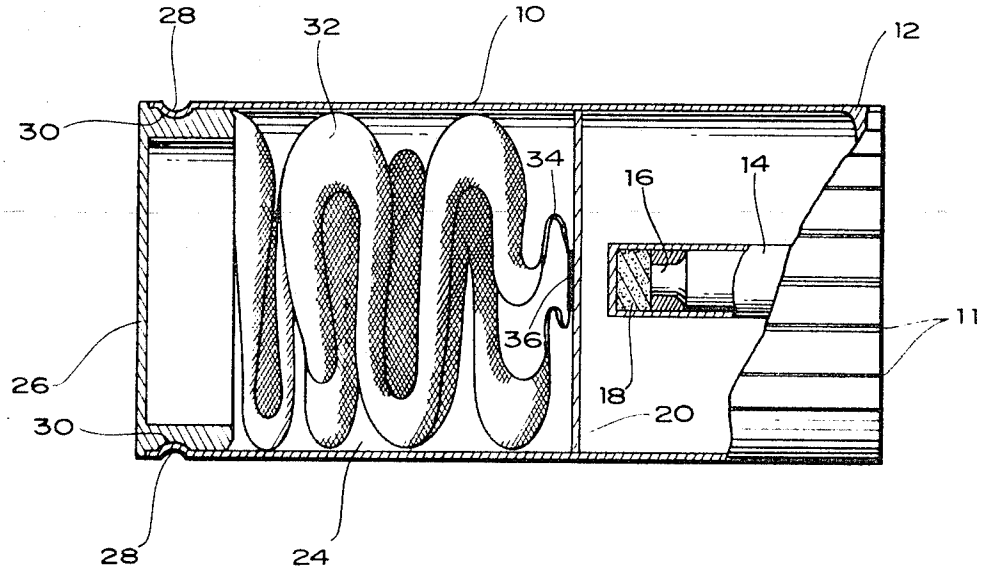


FIG. 1.

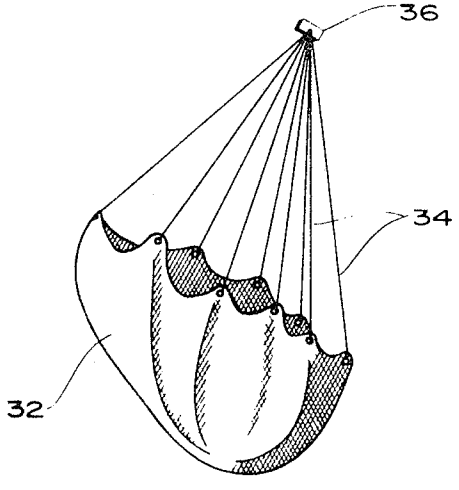


FIG. 2.

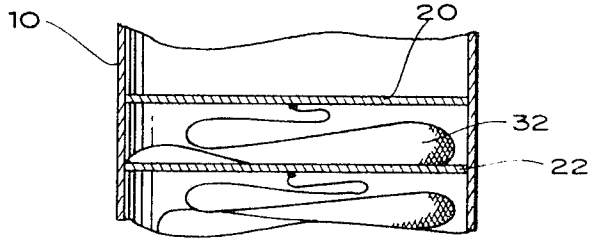


FIG. 3.

INVENTORS.
SIDNEY SHEFLER
HAROLD S. DUFF
BY: ROY MILLER
ATTORNEY.

TARGET MARKING DEVICE

BACKGROUND OF THE INVENTION

The present invention is for a nighttime target marking device.

It has been the practice in the prior art of nighttime target marking to use parachute flares, while phosphorus, or explosively disseminated chemiluminescent payloads. Parachute flares light up friendly surroundings as well as unfriendly; white phosphorus is short lived and spoils the pilot's night vision; and explosively disseminated payloads fall through the foliage of bushes and trees and are lost to sight. The present invention provides a nighttime signal which falls to the top of the foliage and is visible from all quadrants, for a long period of time.

DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevation of the subject invention, portions being shown in cross section taken along its longitudinal axis;

FIG. 2 is a perspective of the unleased marking canopy falling into a location area; and

FIG. 3 is a section of a portion of FIG. 1 showing an alternative form of the invention.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring now to the drawing an embodiment of subject invention is shown in FIG. **1**, comprising a cylindrical canister **10**, provided with scored wall as shown by numeral **11** and having an integral end wall **12**, which threadedly receives a tube **14** containing a time delay and impact fuze (not shown) which is initiated by a preset timing element indicated at **16**. Upon initiation, a suitable detonation within tube **14** initiates a powder charge **18** which produces gas under pressure. This structure is conventional for a disperser used for a different purpose.

The structure is modified by providing a thin walled partition **20** positioned adjacent to one end of fuze tube **14**. The edges of said partition **20** are fitted against the inner walls of canister **10** so as to form a space **24** between said partition and the end of the canister. The canister is plugged by an O-ring sealed end closure **26** retained in position by a plurality of dimples **28** which are deformed into an annular groove **30** in the closure.

A parachute **32** fabricated from nylon or other suitable material and provided with a plurality of guy lines **34** is folded into space **24**. Guy lines **34** are attached to a weight **36** of predetermined size which is suitably secured to the center portion of partition **20** by cement, glue, etc. Parachute **32** comprises a fabric which is saturated with an oxyluminescent compound and guy lines **34** may likewise be soaked with the same material so as to glow upon exposure to the atmosphere. The compounds used consist essentially of one of the peraminoethylenes and others known to emit light when they come in contact with the oxygen of the atmosphere. With minor adjustment to the dispenser or container other chemiluminescent materials may be used, such as oxalic type esters described in U.S. Pat. No. 3,539,794 which issued Nov. 10, 1970.

In operation of the device, initiation of the powder charge pressurizes one side of the partition which acts as a piston pushing against the end closure **26** forcing it out of engagement with the detents, the partition

continuing to move to the now open end of the canister, ejecting the parachute. The parachute falls to the target location and marks the target whether the target is under a forest canopy or in a clear area. If the target is under a canopy the parachute or panel signal will still be visible from the air as it will hang on top of the canopy or shelter which may be tree tops, weeds, etc. The signal is visible from all quadrants.

As shown in FIG. **3** if it is desired to eject a plurality of parachutes some saturated with a chemiluminescent material for nighttime marking and others with a dye compound for daytime signals, a plurality of lightweight partitions designated **20** and **22**, may be installed in the canister whereby a series of such markers may be dispensed therefrom. The parachute or panel can be a banner, flag, or ribbon and still have the capability of remaining on top of an overhanging protection or shelter, and thereby mark a target. Dyes used for daytime markers usually are alizarin orange or alizarin yellow because they are more easily visible.

The chemiluminescent compounds used to soak nylon, birdseye, cotton, muslin, polypropylene and other compatible materials included the following peraminoethylenes:

tetrakis(N-pyrolidinyl)ethylene;

1,1^1,3,3^1-tetramethyl-$\Delta^{2,2^1}$-bi(imidazolidine);

1,1^1,3,3^1-tetraethyl-$\Delta^{2,2^1}$-bi(imidazolidine);

1,1^1-diethyl-3,3^1-dimethyl-$\Delta^{2,2^1}$-bi(imidazolidine);

tetrakis(dimethylaminomethyleneamino)ethylene; and

tetrakis(dimethylamino)ethylene.

Tetrakis(dimethylamino)ethylene was used in most of the tests because it is commercially available.

What is claimed is:

1. A target-marking device comprising:

a cylindrical canister having an integral end wall;

a rupturable fuze and gas generator tube sealingly secured to said end wall;

a cup-shaped plug closing the other end of the canister and O-ring sealed thereto;

detents deformed from the wall of the canister into the plug for retaining said plug in the canister;

a thin-walled circular partition disposed adjacent said tube being slidably movable relative to the inner surface of the canister;

a parachute provided with guying lines disposed within the space between said partition and the plug; said parachute being fabricated of a material saturated with a chemiluminescent agent;

a weight of predetermined size attached to the guying lines of said parachute and disposed within the space between said partition and the plug;

the construction of said device being such that when the gas generator tube ruptures one side of the partition is pressurized causing the partition to push against the parachute and weight forcing the end plug out of the canister and releasing the parachute and the attached weight.

2. The device in accordance with claim **1** wherein the parachute is composed of polypropylene saturated with a chemiluminescent agent selected from the group consisting of tetrakis(dimethylamino)ethylene, tetrakis(N-pyrolidinyl)ethylene, 1,1^1,3,3^1-tetramethyl-$\Delta^{2,2^1}$-bi(imidazolidine), 1,1^1,3,3^1-tetraethyl-$\Delta^{2,2^1}$-bi(imidazolidine), 1,1^1-diethyl-3,3^1-dimethyl-$\Delta^{2,2^1}$-bi(amidazoli-

dine), and tetrakis(dimethylaminomethyleneamino) ethylene.

3. The device in accordance with claim 1 including a second partition disposed between the first partition and said plug separating the canister into two compartments, one containing a parachute saturated with a chemiluminescent agent and the other containing a parachute coated with a marking dye.

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