

[54] **SIGNAL FLARE**

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[73] Assignee: **The United States of America as represented by the Secretary of the Navy**

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[52] **U.S. Cl.**.....**102/87, 102/60, 102/66**

[51] **Int. Cl.**.....**F42b 11/16, F42b 13/34, F42b 13/40**

[58] **Field of Search**.....**102/87, 60, 6, 66, 90, 34, 102/49.3; 60/35.6 RS**

[56] **References Cited**

UNITED STATES PATENTS

3,070,955	1/1963	Kallin et al.....	102/87
2,967,484	1/1961	Tabor, Jr. et al.	102/87
2,986,999	6/1961	Fiedler et al.....	102/60

1,879,579 9/1932 Stolfa et al.....102/34

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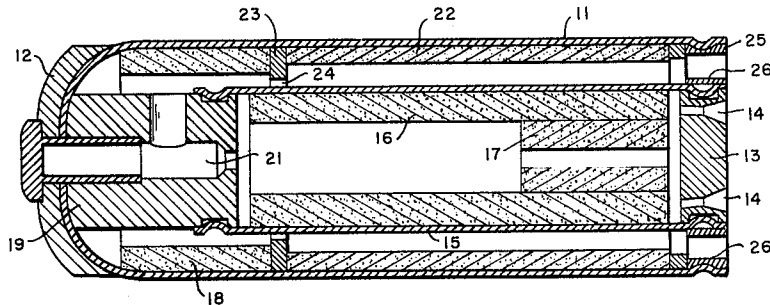
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[57] **ABSTRACT**

A signal flare having a container with a plurality of propulsion nozzles in the aft end and having a propellant charge therein. A flare propellant is provided in the forward end of the container and is arranged to be ignited by the burning of the propellant charge. A plurality of flare nozzles are also provided in the aft end of the signal container and a quantity of flare dye is positioned between the flare propellant and the flare nozzles. The contact of hot flare propellant gases with the flare dye causes ablation of the flare dye so that the dye colors the hot flare propellant gases which are dispersed through the flare nozzles.

4 Claims, 2 Drawing Figures



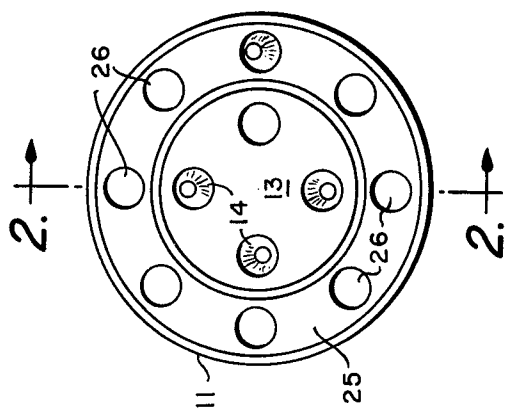


FIG. 1.

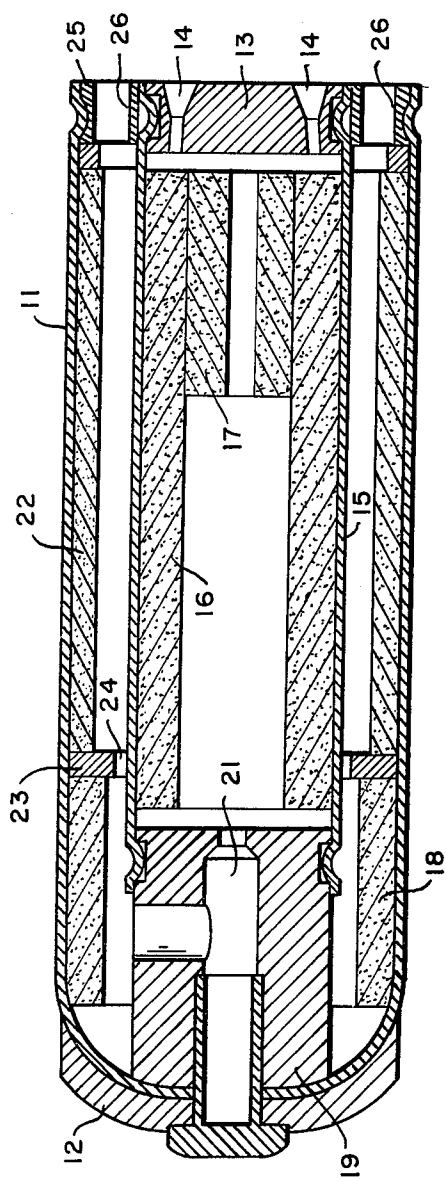


FIG. 2.

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SIGNAL FLARE

BACKGROUND OF THE INVENTION

The present invention relates to a signal flare and more particularly to a signal projectile which can be fired from a hand-held launcher to provide a trail of color smoke.

Many varieties of flares and flare guns are used, particularly by the military, for signalling. Small hand-held launchers are carried by some military personnel, particularly aircraft pilots, to facilitate signalling when they need to show their position on the ground or in water. One such hand-held launcher and flare cartridge is shown in U.S. Pat. No. 3,044,360, which issued Dec. 1, 1960, to Russell O. Stefan and Anton G. Lang. In this patent there is shown and described a flare gun equipped with a flare cartridge. The flare cartridge has a die-formed metal body which includes a thin cylindrical gun barrel 48 which is open at its upper end and has at its lower end a thin head from which an externally threaded nipple extends. This nipple has a bore in which a primer cap is seated. The flare cartridge also includes a flare projectile which includes a thin cylindrical metal casing which is closed at its upper end and open at its bottom end. A solid powder charge and solid flare charge are pressed in the flare cartridge with the solid powder charge being adjacent the primer. The flare charge is selected from chemicals which will produce different colors when ignited and burn with a bright, hot flame.

In U.S. Pat. No. 3,102,477, which issued Sept. 3, 1963, to Russell O. Stefan and Anton G. Lang, there is shown a rocket signal device similar to the above-described patented device. In this later dated patent, however, the described device has a fuse charge which is ignited in a manner to delay its burning and thus assure that a substantial portion of the mass of the fuse will remain unconsumed during a considerable portion of the upward flight of the projectile. This delay feature contributes to the momentum aiding in the ascent of the projectile and also defers the ignition of the signal charge until the projectile has reached an altitude where it will be an effective signal.

Various devices have been employed in the past to provide means for following the path of an aircraft or a missile. For example, in U.S. Pat. No. 2,986,999, which issued June 6, 1961, to Willy A. Fiedler et al., there is shown a parasitic tracking flare capable of being externally mounted adjacent the nozzle of an aircraft's jet motor and ignited by the hot motor exhaust gases. The flare is attached to some external appendage of the missile by a suitable mount to avoid a missile design change.

SUMMARY OF THE INVENTION

The present invention relates to a signal flare which is designed to be launched from a hand-held launcher. The signal flare is comprised of a body which contains a quantity of propellant which, upon burning, provides gases for propelling the flare. A small quantity of flare composition is provided in the forward end of the flare body and is ignited from the burning propellant. Combustion gases from the flare composition pass rearwardly through an orifice plate and contact flare dye which vaporizes to color the combustion gases from the flare composition. The colored combustion gases pass out of the body through flare nozzles to provide colored smoke as the flare travels.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an end view of a preferred embodiment of the present invention showing motor and flare nozzles; and FIG. 2 is a sectional view taken on line 2—2 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, there is shown a signal flare having an outer container 11 to which a weight 12 is attached to facilitate passage of the signal flare through a canopy of

vegetation, such as the foliage of a jungle. Weight 12 is attached as by riveting to the forward end of container 11 and the aft end of container 11 is closed by plate 13 which has a plurality of nozzles 14 therein. An inner container 15 is provided inside container 11 and contains a quantity of propellant 16. An igniter composition 17 is provided to initiate burning of propellant 16. By way of example, propellant 16 might be a cellulose ester propellant composition such as is disclosed in U.S. Pat. No. 2,966,405, which issued Dec. 27, 1960, to Arthur W. Sloan and Lester L. Weil.

A quantity of flare composition 18 is provided in the forward end of container 11, and support bracket 19, to which inner container 15 is secured, is provided with a passageway 21 in order that flare composition 18 might be ignited by the heat and flames produced from the burning of propellant 16. By way of example, flare composition 18 might be of the same composition as propellant 16. A quantity of dye 22 is provided in the space between container 11 and inner container 15 and an orifice plate 23, which separates flare composition 18 and dye 22, is provided with a plurality of openings 24. By way of example, dye 22 might be alpha methyl amino antraquinone. The space between container 11 and inner container 15 is closed at the aft end by ring plate 25 which is provided with a plurality of flare nozzles 26.

OPERATION

The signal flare of the present invention is launched by igniting igniter composition 17, as by lighting a fuze passed through one nozzle 14, which, in turn, ignites propellant 16. The gases formed by burning propellant 16 pass through nozzles 14 to drive the signalling flare. Nozzles 14 are canted which causes the signal flare to rotate in flight thereby providing additional stability.

Heat and flames from propellant 16 pass through passageway 21 and ignite flare composition 18. The smoke and hot gases from flare composition 18 pass through openings 24 in orifice plate 23 and into the space between container 11 and inner container 15. The hot gases from flare composition 18 causes ablation of dye 22 and dye 22 colors the smoke and gases from flare composition 18. The colored smoke and gases pass through nozzles 26 in ring plate 25 to provide a colored smoke trail during flight of the signal flare.

I claim:

1. A signal flare comprising:

an outer cylindrical container having a closed forward end, an inner cylindrical container positioned inside said outer cylindrical container and having its aft end closed by a plate having at least one propulsion nozzle therein, a quantity of propellant within said inner cylindrical container, a quantity of flare composition and a quantity of dye contained between said inner and outer cylindrical containers, a passageway connecting said inner container and the space between said inner container and said outer container whereby said flare composition can be ignited by burning said propellant, and a ring plate positioned at the aft end between said inner and outer cylindrical containers, said ring plate having at least one nozzle therein for emitting colored smoke during flight of said signal flare.

2. A signal flare as set forth in claim 1 having an orifice plate separating said flare composition and said dye, said orifice plate having an orifice therein whereby smoke produced by burning said flare composition passes through said orifice and is colored by said dye.

3. A signal flare as set forth in claim 1 having a quantity of igniter composition for igniting said propellant.

4. A signal flare as set forth in claim 1 wherein said dye is alpha methyl amino antraquinone.

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