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B. R. BLISS ET AL

3,473,472

PHOTOFLASH CARTRIDGE

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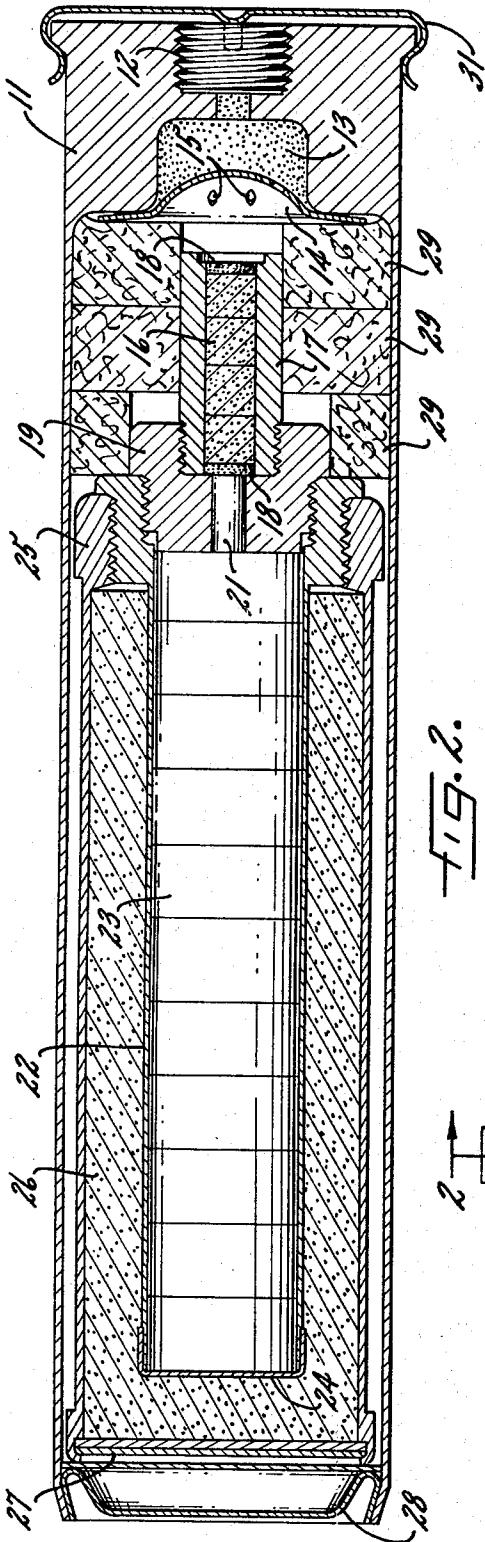


FIG. 2.

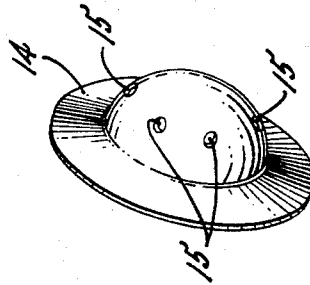


FIG. 4.

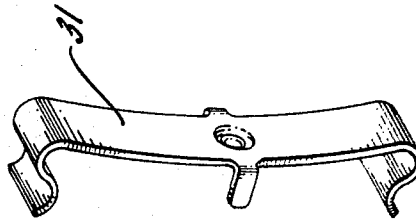


FIG. 3.

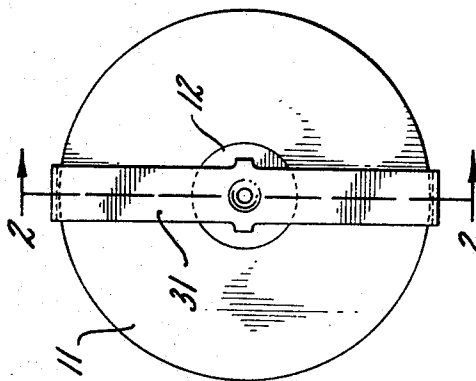


FIG. 1.

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1

2

3,473,472

PHOTOFLASH CARTRIDGE

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6 Claims

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to a flare cartridge and more particularly to a photoflash cartridge for providing illumination in support of night aerial photography.

The military services are presently using a photoflash unit that is ejected from an aircraft and, after a short delay, bursts to provide a high intensity flash. While heretofore known flash units are widely used, the flash duration is relatively long and thus the quality of a picture being taken is effected.

The present invention relates to a photoflash cartridge that is compatible with existing ejectors and which, after a fixed delay, explodes to provide a high intensity, short duration flash. An inner charge case is propelled or fired from a cartridge case and after a fixed delay a homogeneous explosive mixture is ignited that causes the inner charge case to explode and the surrounding flash composition to be rapidly ignited.

It is therefore a general object of the present invention to provide a photoflash cartridge which, upon ignition, will provide a high intensity, short duration flash.

Other objects and advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing wherein:

FIGURE 1 is an end view of a preferred embodiment of the present invention;

FIGURE 2 is a sectional view taken on line 2-2 of FIGURE 1;

FIGURE 3 is a perspective view of a shunting clip; and FIGURE 4 is a perspective view of a primer shield.

Referring now to the drawing which shows a preferred embodiment of the present invention, a cartridge case 11 is provided that is adaptable for fitting into a military type ejector. Cartridge case 11 is substantially closed on one end which is provided with a threaded hole so that an electric primer 12 can be threadedly connected therein. The opposite end of cartridge case 11 is open. The closed end of cartridge case 11 is provided with a counterbore that is filled with an expelling charge 13, such as black powder. Expelling charge 13 is adjacent the primer 12 and is retained in position by means of a primer shield 14. As shown in FIGURE 4 of the drawing, primer shield 14 is provided with a plurality of small holes 15 that upon ignition of the black powder, permits a flame to pass through the primer shield to ignite a delay composition 16 that is compressed into a delay holder 17.

By way of example, the delay composition 16 might be comprised of about 82.2 percent, by weight, of barium chromate, about 7.8 percent, by weight, of boron, and about 10 percent, by weight, of diatomaceous earth (99% SiO₂). By filling a one-quarter inch diameter bore delay holder 17 with about a one inch length of the foregoing described delay composition, a delay of approximately one second is achieved. By increasing the percent of barium chromate and reducing the percent of boron, the delay period can be increased. As shown in the drawing,

the delay composition is divided into 4 increments and an ignition mixture 18 is pressed on each end. By way of example, the ignition mixture 18 might be comprised of about 90 percent, by weight, of barium chromate and about 10 percent, by weight, of boron.

Delay holder 17 has an end portion of its outside diameter threaded and this threaded portion engages with a detonator holder 19 which is provided with a bore that holds a detonator 21. One end of detonator 21 is contiguous with the end of ignition mixture 18. Detonator holder 19 also has a portion of its outside diameter threaded and a pellet tube 22 is threadedly attached to holder 19.

Pellet tube 22 contains a plurality of explosive pellets 23 which, by way of example, might be RDX Composition CH-6, which is described in Military Specification MIL-R-21723. RDX Composition CH-6 is a homogeneous explosive mixture of about 97.5 percent RDX (Type B, Class A, as outlined in MIL-R-398C), about 1.5 percent calcium stearate, about 0.5 percent graphite, and about 0.5 percent polyisobutylene. A pellet tube cap 24 is provided to close the outer end of pellet tube 22.

Pellet tube 22 has its inner end threaded and a charge case 25 is threadedly attached thereto. A photoflash composition 26 is contained within case 25 which, by way of example, might be comprised of about 60 percent potassium perchlorate and about 40 percent atomized aluminum powder. A closing disc 27 is provided to close the end of charge case 25 which is then crimped or spun-over at its outer end, and likewise, cap 28 is provided to close the outer end of cartridge case 11. Gas checks 29 are provided in the forward end of cartridge case 11.

In operation, shunting clip 31 is retained in the position shown in FIGURES 1 and 2 of the drawing until just prior to placing the photoflash cartridge in an ejector, at which time clip 31 is removed. Shunting clip 31 is provided for safety reasons and prevents primer 12 from being accidentally fired. Upon the application of current to primer 12, primer 12 will ignite and, in turn, ignite the expelling charge 13 which will expell charge case 25 out of the outer end of cartridge case 11. At the same time, delay composition 16 is ignited and after a delay of about 1 or 2 seconds the delay composition causes detonator 21 to ignite which detonates the explosive pellets 23. The explosion of pellets 23 detonates the photoflash composition 26 to provide a high intensity flash of short duration.

It can thus be seen that the present invention provides an improved photoflash cartridge which is readily assembled and which, upon detonation, provides improved illumination for use in aerial photography.

What is claimed is:

1. A photoflash cartridge comprising:

- a cartridge case having a closed end and an open end,
- an expelling powder charge within said cartridge case adjacent said closed end,
- a delay fuze within said cartridge case adjacent said expelling powder charge,
- a first inner container within said cartridge case containing an explosive charge,
- a detonator positioned between said delay fuze and said explosive charge,
- a second container within said cartridge case encircling said first container and containing a charge of photoflash composition, and
- a cap closing the open end of said cartridge case.

2. A photoflash cartridge as set forth in claim 1 wherein a metallic shield is disposed between said expelling powder charge and said delay fuze, said shield having a plurality of holes therein for permitting passage of flame.

3

3. A photoflash cartridge as set forth in claim 1 wherein one end of said second container is threadedly attached to one end of said first container.

4. A photoflash cartridge as set forth in claim 1 wherein said explosive charge is comprised of about 97.5 percent RDX (Type B, Class A), about 1.5 percent calcium stearate, about 0.5 percent graphite and about 0.5 percent polyisobutylene.

5. A photoflash cartridge as set forth in claim 1 wherein said photoflash composition is comprised of about 60 percent potassium perchlorate and about 40 percent atomized aluminum powder.

6. A photoflash cartridge as set forth in claim 1 wherein an electric primer is threadedly attached in said closed end of said cartridge case.

4

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