

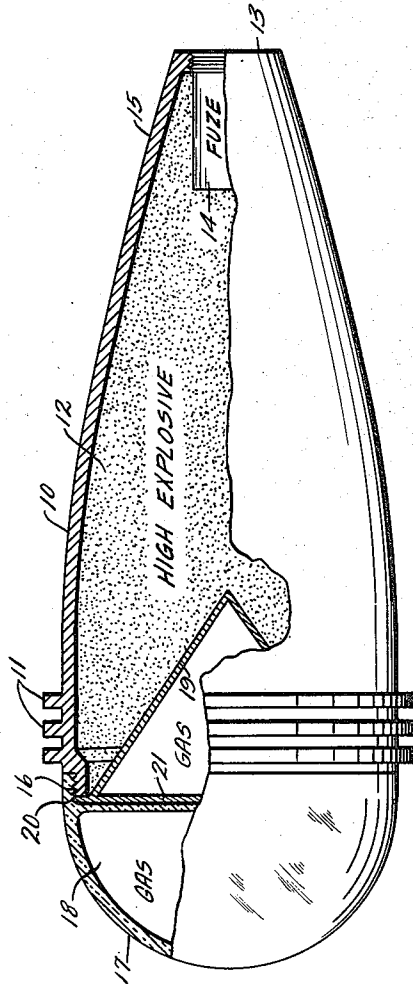
July 15, 1952

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2,603,155

SHOCK WAVE ACTUATED PHOTOFLASH BOMB

Filed June 12, 1947



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## UNITED STATES PATENT OFFICE

2,603,155

## SHOCK WAVE ACTUATED PHOTOFLASH BOMB

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Application June 12, 1947, Serial No. 754,300

2 Claims. (Cl. 102—60)

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This invention relates to a photoflash bomb useful for military and other purposes, in which the flash is generated by the shock wave of a high explosive acting upon a volume of gas carried by the bomb. The term "bomb" or shell includes projectiles, flares and torpedoes.

One object of the invention is to provide a device of this character for photographic use. The extremely short but brilliant flash generated has less tendency to produce blurred pictures than those taken with metal-oxidant-using devices. Metal-oxidant systems give flashes many times as long as are produced by the present invention.

Another object is to provide a system in which the color of the flash may be predetermined within limits, while obtaining the extreme shortness of flash just mentioned.

Another object is to provide a photoflash bomb which may be detonated at a selected time, thus providing the flash when the bomb is in a pre-selected position in relation to the camera.

Another object is to provide a photoflash bomb or shell that will not become unsafe due to leakage therein of moisture. It is well known that metal-oxidant compositions, if they become moist, tend to initiate spontaneous chemical oxidation reactions which may become explosive.

In the drawing, 10 is the metallic body of the bomb or projectile. 11 are driving bands for use when the assembled device is to be shot from a piece of ordnance. 12 is a filling of high explosive, for example, trinitrotoluene or shell penta-nitro-erythrol. At the base 13 of the bomb is a detonator 14 which is preferably radio-controlled. Such radio-control may be of the conventional proximity-fuse type or it may be a radio remote control, also of conventional type. The after part 15 of the bomb may be shaped to give the desired flight characteristics. While a conventional boat-tail shaped projectile is here shown, the shape may be varied to suit requirements.

Attached to the front of the body 10 by any desired means such as threads 16, there is a glass or transparent plastic nose 17. Within the nose 17, which may and preferably is hermetically sealed, there is a filling 18 of a gas, the molecule of which contains not more than two atoms. Argon, hydrogen, helium, krypton, neon and xenon or air are examples of such gases. As high a molecular weight as possible is preferred provided that the molecule contains not more than two atoms, but preferably contains only one. The gases mentioned, will, in their excited states re-

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sulting from an explosive shock wave, radiate light of the same colors which they radiate when exposed to electrical discharge. The volume of light is much greater, however. Bomb samples weighing from  $\frac{1}{2}$  to 1 pound produced an estimated  $400 \times 10^6$  peak candlepower lasting for not more than  $10^{-4}$  second when air was used. Argon is however the preferred gas. It seems evident therefore, that smaller bombs may be able to do the work that requires much larger conventional bombs at present. Argon is believed to produce twice as much light as air when subjected to identical high-explosive shocks.

In order to enhance the photoflash effect by creating a higher explosive pressure on the gas 18, it is preferred to use the explosive charge 12 in the form of a hollow cone at its forward end. Such construction enables the well-known Munroe effect to be obtained. In order that the charge 12 may be poured or cast into this preferred form, a second gas container 19 which is conical and which contains a second gas filling 18, preferably of the same gas as the nose charge 12, is employed. It is provided with a flange 20 which is held between the nose 17 and the body 15. The flange 20 is a continuation of a seal 21 which is employed if the second gas charge 18 is to be hermetically sealed within the cone 19. Such construction is preferred. In this way both a larger gas volume and a higher explosive pressure, leading to a more brilliant flash, are obtained.

While the prior art shows blasting gelatin packed in a container in which there is nitrogen, argon or helium, it would be impossible thereby to utilize the effect which we obtain, assuming that the prior art unwittingly obtained it.

A process of photography is involved in our invention. For night photography, we set up the camera, focus it upon the object we wish to photograph, open the shutter in substantially total darkness or behind the protection of a filter, shoot the bomb of our invention toward or over the target and detonate the bomb by proximity fuse action or remote radio control to illuminate the target. After the effect has registered on the photographic film or plate, we close the shutter or have it closed automatically.

The invention claimed is:

1. A photoflash bomb or shell comprising a body, a fuze in the base of said body, a filling of high explosive in said body in contact with said fuze, said high explosive filling having at its forward end a conical depression centered on its longitudinal axis, and in said depression a trans-

parent container hermetically containing a substantial volume of argon gas, said container being attached to the said bomb body.

2. A photoflash bomb or shell comprising a body, a fuze in the base of said body, a filling of high explosive in said body in contact with said fuze, said high explosive filling having at its forward end a conical depression centered on its longitudinal axis, a transparent container hermetically containing a substantial volume of argon gas in said conical depression and a nose for said bomb or shell comprising a transparent container attached to the said bomb or shell body, said container hermetically enclosing a substantial volume of argon gas.

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