United States Patent

Lohkamp et al.

[15] **3,635,162**

[45] **Jan. 18, 1972**

[54] PRACTICE BOMB

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

[22] Filed: **July 9, 1970**

[21] Appl. No.: **53,609**

[52] **U.S. Cl.** .....**102/7.6**, 89/1.5 D, 102/4

[51] **Int. Cl.** **F42b 25/18**

[58] **Field of Search** .....244/327, 329; 89/1.5 D; 102/4, 102/7.6

[56] **References Cited**

UNITED STATES PATENTS

1,357,927	11/1920	Clarke	102/7.6
2,044,819	6/1936	Taylor	102/4
2,108,818	2/1938	Huff et al.	102/7.6
2,945,439	7/1960	Bilinski	102/4
3,343,486	9/1967	Patrick	102/7.6

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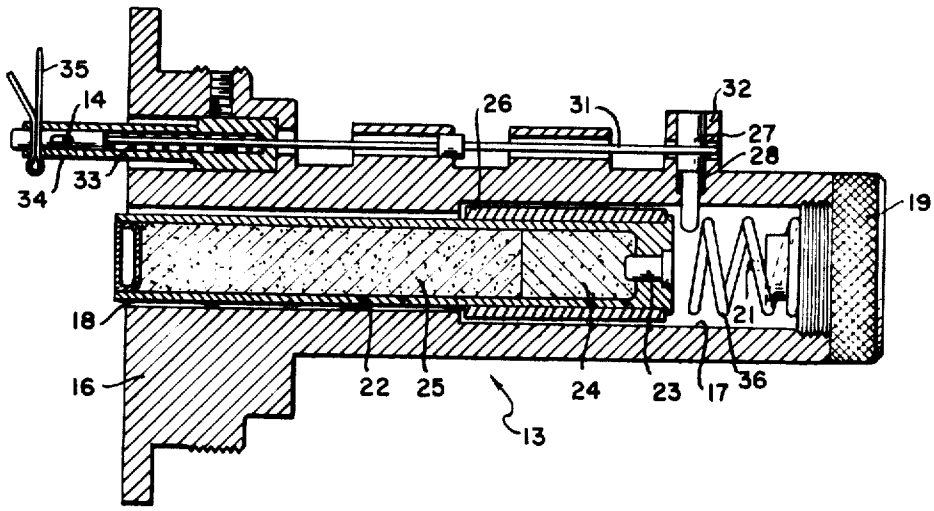
[57] **ABSTRACT**

A practice bomb having a signal cartridge for locating the point of impact of said practice bomb after an airdrop and having means for arming the practice bomb during flight of said practice bomb by actuation of an arming pin connected to foldable fins which open upon high velocity of said practice bomb.

4 Claims, 4 Drawing Figures



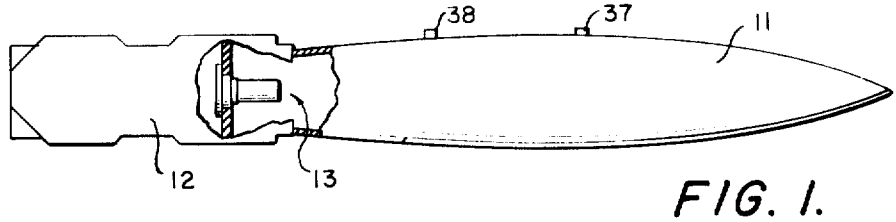


FIG. 1.

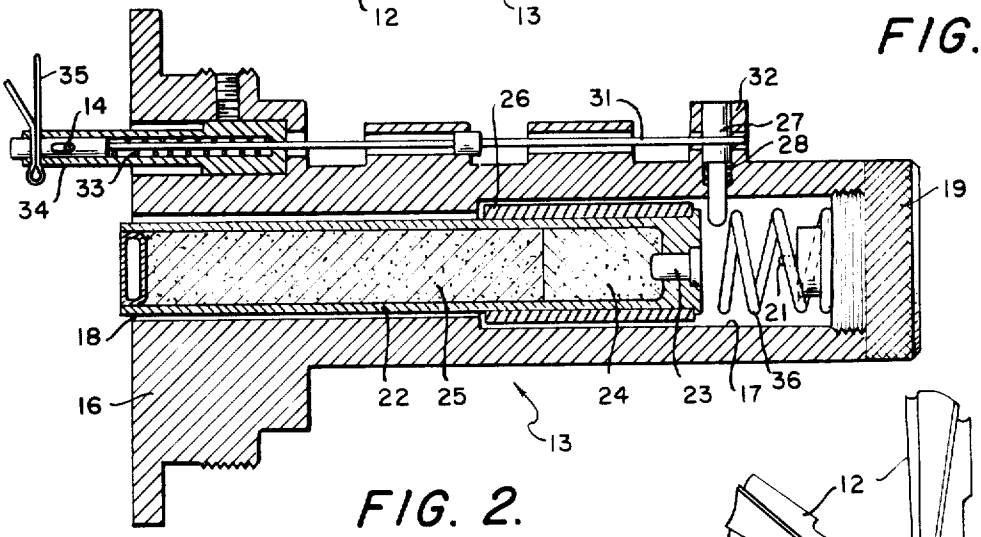


FIG. 2.

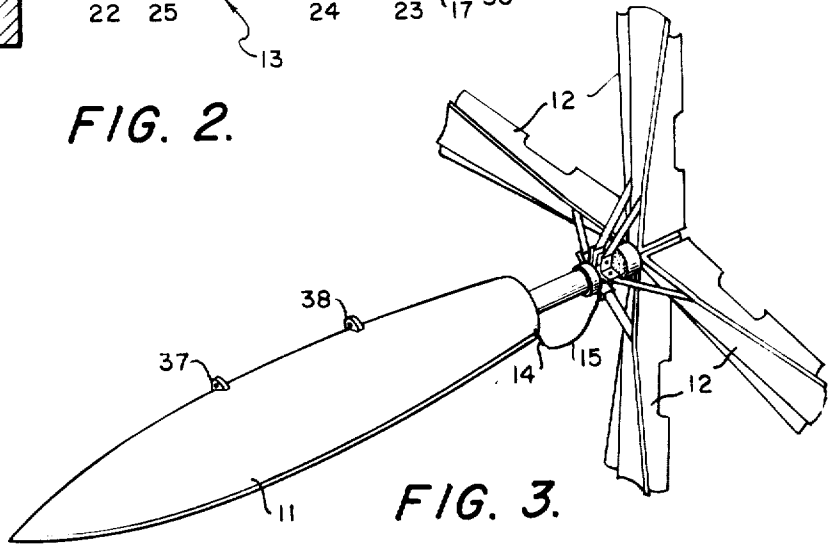


FIG. 3.

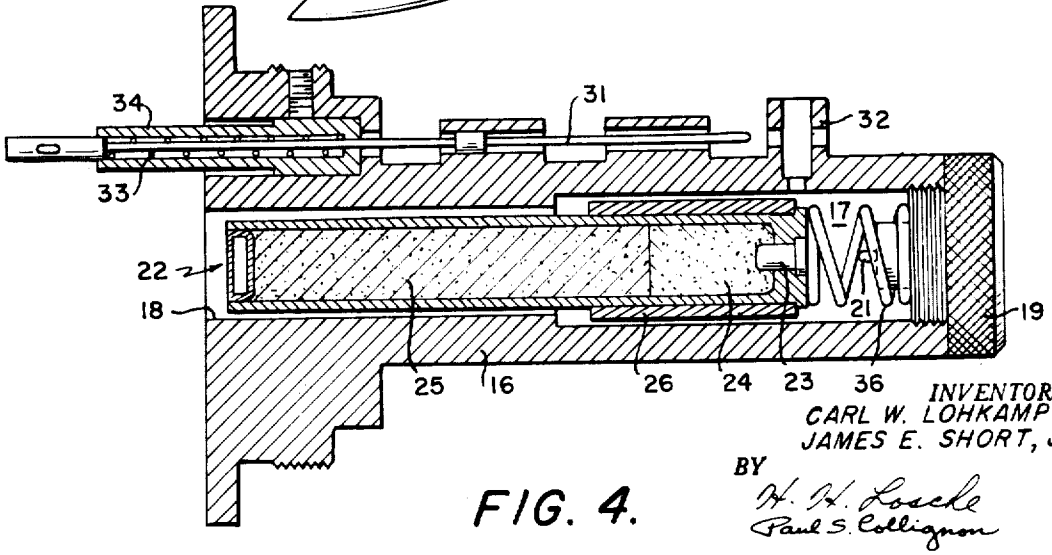


FIG. 4.

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PRACTICE BOMB

STATEMENT OF GOVERNMENT INTEREST

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.

BACKGROUND OF THE INVENTION

The present invention relates to a practice bomb which will provide a visual indication of the point of impact after an air-drop, and more particularly to a practice bomb which becomes armed during flight to provide maximum safety prior to launch from an aircraft.

Practice bombs which do not contain a large quantity of high explosives are in general training use by the various military departments. Practice bombs are relatively inexpensive, as compared to high-explosives bombs, and these bombs usually carry a small explosive charge to mark the point of impact of the practice bomb. Although the explosive charge in most practice bombs is not sufficiently large, various safety precautions must be taken to prevent accidental discharge of these bombs. A premature detonation of a practice bomb on shipboard, for example, could cause fuels or high explosives to ignite and create a large peril to the ship and to those aboard. In order to prevent such an occurrence, most practice bombs are maintained in a safe or unarmed condition until the practice bomb separates from the launching aircraft.

By way of example, in U.S. Pat. No. 2,108,818, which issued Feb. 22, 1938, to Sargent P. Huff and Arthur Adelman, there is shown a practice bomb which remains in an unarmed condition until the practice bomb separates from the aircraft. A wire, which has one end attached to the aircraft, prevents movement of a bolt that extends between a firing pin and a cartridge. Upon launch of the practice bomb, the wire remains with the aircraft, and the bolt moves to permit arming of the practice bomb.

The main objection to arming devices which arm weapons upon separation of the weapon from the carrying vehicle is that inadvertent launchings always drop armed weapons. For example, should either a high explosive or practice bomb fall from an aircraft while taxiing across the deck of an aircraft carrier, a highly dangerous condition arises if the bomb becomes armed due to the mere separation of the bomb from the aircraft. As many practice bombs detonate on impact, it is highly probable that practice bombs of the type shown in the aforesaid patent, would detonate if they were inadvertently dropped while an aircraft were taxiing.

SUMMARY OF THE INVENTION

The present invention relates to a practice bomb which has foldable fins which unfold due to the high velocity of the bomb during a drop. A signal cartridge is provided in the bomb and is designed to be detonated upon impact of the bomb. The signal cartridge is maintained in a safe or unarmed condition, however, until the fins are unfolded. Thus a short fall, such as might occur during taxiing of an aircraft, will not be sufficient to arm the practice bomb of the present invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view, partially broken away, showing a preferred embodiment of the present invention;

FIG. 2 is a sectional view showing a signal cartridge and arming mechanism in a safe condition;

FIG. 3 is a view showing a practice bomb in a descent stage; and

FIG. 4 is a sectional view similar to FIG. 2 of the drawings only showing an armed condition.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, there is shown a practice bomb having a bomb case 11, foldable fins 12 and an impact-marking section 13. As best shown in FIG. 3 of the drawing, fins 12 are designed to be opened by action of the airstream as the practice bomb free falls from a launching aircraft. An arming pin 14 is provided to maintain the impact-marking section 13 in a "safe" or unarmed condition. A cable 15 connects arming pin 14 with fins 12 so that when fins 12 are unfolded pin 14 is withdrawn from section 13.

Referring now to FIGS. 2 and 4 of the drawing, the impact-marking section 13 has a body 16 having central bores 17 and 18 therein. A firing pin device 19 threadedly engages and closes one end of bore 17 and has a firing pin tang 21 on the inner end thereof. A signal cartridge 22 having a primer 23, a quantity of pistol powder 24, and a quantity of phosphorus composition 25 is provided in signal cartridge 22. An inertia sleeve 26 is positioned around the outside of signal cartridge 22 and provides additional momentum for signal cartridge 22 on impact of the practice bomb. An arming stop pin 27 is slidably mounted through the wall of body 16 and, as shown in FIG. 2 of the drawing, protrudes into bore 17 between the forward end of signal cartridge 22 and the end of firing pin tang 21. It can readily be seen that, when in position as shown in FIG. 2 of the drawing, arming stop pin 27 prevents primer 23 in signal cartridge 22 from engaging firing pin tang 21. A spring 28 is provided for biasing arming stop pin 27 outwardly, however, movement of arming stop pin 27 is prevented until rod 31 is withdrawn from engagement with arming stop pin 27 and boss 32 on body 16. A spring 33 in sleeve 34 is provided for withdrawing rod 31 from engagement with arming stop pin 27, however, movement of rod 31 is constrained by cotter pin 35 and arming pin 14. As best shown in FIG. 4 of the drawing, a spring 36 is provided around firing pin tang 21 to separate signal cartridge 22 from firing pin tang 21 until the time of impact of the practice bomb.

OPERATION

During storage and prior to loading onto a launching aircraft, cotter pin 35 is kept in position and keeps the practice bomb in a "safe" condition. The practice bomb is attached to the aircraft by means of lugs 37 and 38 with fins 12 being in a closed position, as shown in FIG. 1 of the drawing. After loading into the bomb shackles, cotter pin 35 is removed, however, the practice bomb is still in a "safe" condition, as arming stop pin 27 prevents contact between primer 23 in signal cartridge 22 and arming stop pin 27, is, in turn, retained in position by rod 31.

Upon release of the practice bomb by the launching aircraft, the airstream causes fins 12 to open and arming pin 14 is withdrawn by cable 15 which is attached to fins 12. Upon removal of arming pin 14, spring 33 actuates rod 31 and rod 31 is withdrawn from engagement with arming stop pin 27. Spring 28 then moves arming stop pin 27 outwardly thereby clearing the path of signal cartridge 22. As signal cartridge 22 is preferably loosely fitted in bores 17 and 18 of body 16, signal cartridge 22 moves forward and contacts spring 36, which prevents primer 23 from engaging firing pin tang 21.

Upon impact of the practice bomb with the ground, or some target, the momentum of signal cartridge 22 causes primer 23 to strike firing pin tang 21 and detonation of primer 23 causes ignition of pistol powder 24 which, in turn, ignites phosphorus composition 25 to provide a visual indication of the point of impact of the practice bomb.

We claim:

1. A practice bomb comprising,

a bomb case,

fins pivotally attached to said bomb case and adaptable for opening upon launching of said practice bomb,

a firing pin stationarily mounted in said bomb case,

marking means slidably mounted within said bomb case and engageable with said firing pin for indicating the point of impact of said bomb case, and

arming means connected to said fins for arming said practice bomb upon opening of said fins.

2. A practice bomb as set forth in claim 1 wherein said marking means comprises a signal cartridge having a primer, a quantity of smokeless powder and a quantity of phosphorus composition whereupon impact of said practice bomb said primer strikes said firing pin thereby igniting said smokeless powder which in turn ignites and expels said phosphorus composition.

3. A practice bomb as set forth in claim 2 wherein said arming means includes an arming stop pin positioned between said firing pin and said signal cartridge for preventing ignition of said signal cartridge until said fins open.

4. A practice bomb as set forth in claim 2 wherein an inertia sleeve is attached to said signal cartridge to facilitate movement of said signal cartridge upon impact of said practice bomb.

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