Aug. 12, 1958 M. APSTEIN ET AL 2,846,949

ARMING OF RIFLE GRENADES

Filed Feb. 14, 1956

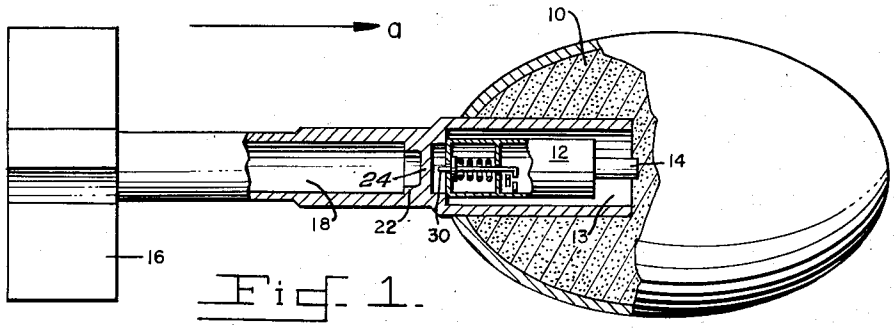


Fig. 1.

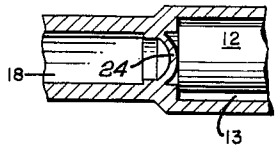


Fig. 2.

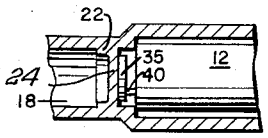


Fig. 3.

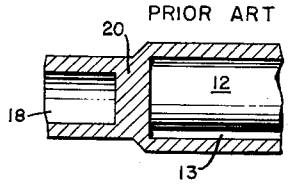


Fig. 4.

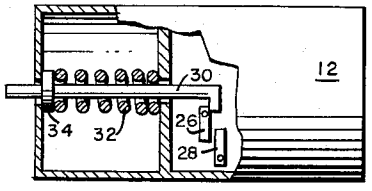


Fig. 5.

INVENTORS,
Maurice Apstein
Ronald E. Bowles
David G. Mitchell
Leo P. Rongus

BY
W. E. Thibodeau, A. W. Dew & J. P. Edgerton
ATTORNEYS.

United States Patent Office 2,846,949
Patented Aug. 12, 1958

2,846,949

ARMING OF RIFLE GRENADES

Maurice Apstein, Bethesda, and Romald E. Bowles, Silver Spring, Md., David G. Mitchell, Falls Church, Va., and Leo P. Rongus, Washington, D. C., assignors to the United States of America as represented by the Secretary of the Army

Application February 14, 1956, Serial No. 565,514

1 Claim. (Cl. 102—65.2)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to us of any royalty thereon.

This invention relates to arming rifle grenade fuzes by a combination of acceleration and gas pressures, the gas pressure operating through a deformable plate.

The problem of arming rifle grenade fuzes is complicated by the fact that relatively low acceleration forces are available for arming. Also it is desirable that they may be safely dropped from aircraft, without arming accidentally on landing. Further it is desirable that the entire arming be automatic and not depend upon the manual removal of an arming pin.

One prior solution has been to use a conventional set of acceleration actuated setback leaves held in place by a lock pin, the lock pin being removed by a piston-and-rod mechanism the piston of which was exposed to the propelling gas pressure. Such a piston-and-rod mechanism is shown in the patent to McCaslin, No. 2,479,582.

In the present invention the known piston-and-rod mechanism is replaced by a deformable plate. Construction is thus simplified, and the deformable plate provides a complete gas seal between the gas chamber and the fuze well.

An object of this invention is to provide automatic means that will permit arming of a rifle grenade fuze only when the grenade is launched from a rifle.

Other objects of this invention are to provide such a means with minimum assembly problems, utilization of present rifle grenade parts, single unit design, and that is inexpensive and reliable.

Further objects, aspects, uses and advantages of the invention will become apparent from the following description and the accompanying drawings, in which:

Fig. 1 is a partially cutaway view of a rifle grenade in accordance with the present invention.

Fig. 2 is a fragmental section of the fuze well portion of Fig. 1 after firing.

Fig. 3 is a section of a modified fuze well in accordance with the present invention.

Fig. 4 is a showing of the fuze well of a typical prior-art grenade.

Fig. 5 is an enlarged schematic diagram of the fuze mechanism portion of Fig. 1.

As seen in the drawings a rifle grenade typically has an explosive charge **10**, a fuze **12** is a fuze well **13**, an initiating explosive **14**, stabilizing fins **16**, a tubular gas chamber **18** and (Fig. 4) a bulkhead **20** isolating the gas chamber from the fuze well.

We have adapted this grenade by modifying this bulkhead **20** so that it forms a deformable diaphragm, as represented by numeral **24** in Figs. 1, 2 and 3. That is, the strength of the diaphragm **24** is less than the strength of the side walls of gas chamber **18** so that the diaphragm is deformed by the gases which launch the grenade. In practice we have found that an aluminum plate 0.032 inch

thick and 0.665 inch in diameter works well. Internal flange **22** prevents chance deformation of the diaphragm **24** when the grenade is placed on a launcher. A fuze **12** is used which has conventional setback arming leaves **26** and **28**. Upon grenade acceleration forward—i. e., in the direction of arrow *a*—these leaves will cause the fuze to arm. Leaf **26** is locked in place by a pin **30**. When the pin is pushed forward by the bulkhead **24** it unlocks leaf **26** which falls in response to acceleration. This movement unlocks leaf **28** which falls in response to acceleration, in turn permitting the fuze to arm by mechanism not shown.

As may be seen, an acceleration opposite arrow *a* might cause pin **30** to move forward; however, this would be in the wrong direction to move the arming leaves and spring **32** acting against protuberance **34** would reset the fuze in a safe condition. Because of the strength of bulkhead **24** any acceleration force sufficient to deform it would destroy the grenade.

The result is an automatic arming device response only to a special combination of events—to wit, acceleration in a particular direction and high pressure on a particular area.

In the modification shown in Fig. 3, we use a deformable bulkhead **24** to activate arming pin **40** through a disc **35**.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in material, construction, and arrangement within the scope of the invention as defined in the appended claim.

We claim:

A rifle grenade comprising: an explosive charge at one end of said grenade, a cylindrical fuze well with one end in said charge, a gas chamber integral with the other end of said fuze well for receiving propelling gases, an integral deformable bulkhead forming a gas tight seal between said fuze well and said gas chamber, a coaxial cylindrical fuze in said well, vertically disposed first and second arming leaves in said fuze, the upper and lower ends of said first and second leaves being pivotally connected to said fuze, said first and second leaves being so arranged that their respective lower and upper ends engage each other when the first leaf is substantially vertical, the engagement between leaves preventing said second leaf from falling and arming the grenade, said first leaf when free to pivot and when subjected to acceleration in the direction of grenade propulsion disengaging from said second leaf permitting said second leaf to fall, an arming pin slidable within said fuze and having its longitudinal axis substantially coaxial with said fuze, one end of said arming pin providing a portion which extends at substantially a right angle to the horizontal axis of said pin, a spring operatively connected to said pin and holding said portion in locked engagement with said upper end of said first arming leaf thereby preventing said leaf from pivoting out of engagement with said second leaf, the other end of said pin extending adjacent said bulkhead, the propelling gases released on launching deforming said bulkhead in the direction of grenade propulsion thereby pushing the right angle portion of said pin out of locked engagement with said first leaf, said first leaf thereupon pivoting and disengaging from said second leaf in response to grenade acceleration, said second leaf then falling to arm the grenade.

References Cited in the file of this patent

UNITED STATES PATENTS

2,145,507	Denoix	Jan. 31, 1939
2,479,582	McCaslin	Aug. 23, 1949
2,586,437	Rabinow	Feb. 19, 1952