Sept. 13, 1966 D. G. ADAMS 3,272,125

THREE-WAY FUZE

Filed March 17, 1964

Fig. 1.

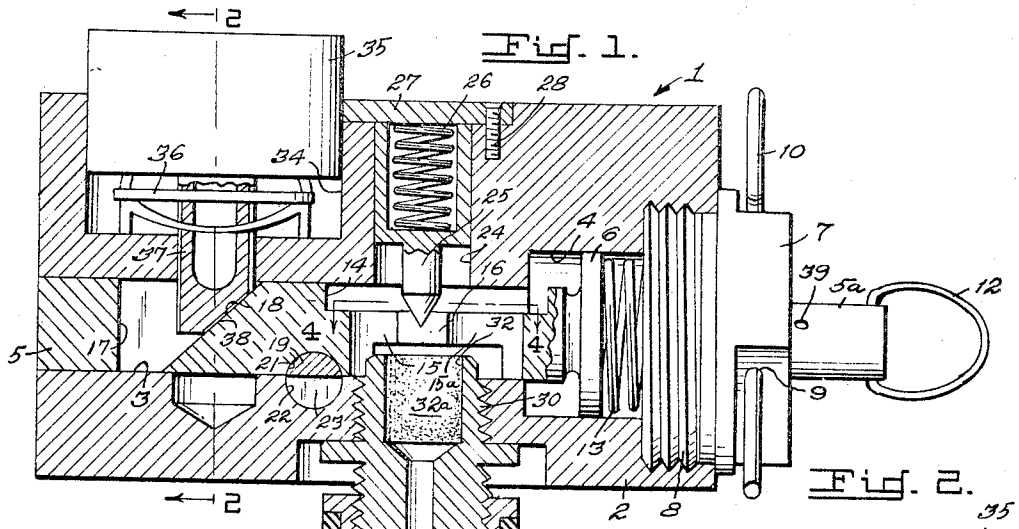


Fig. 2.

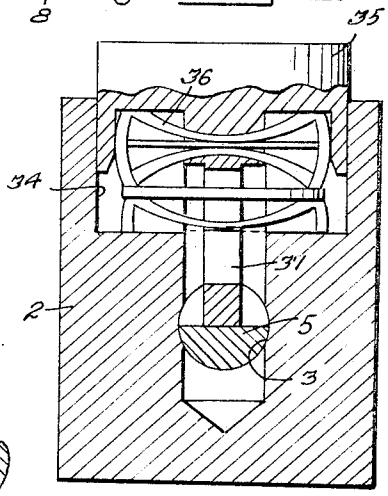


Fig. 3.

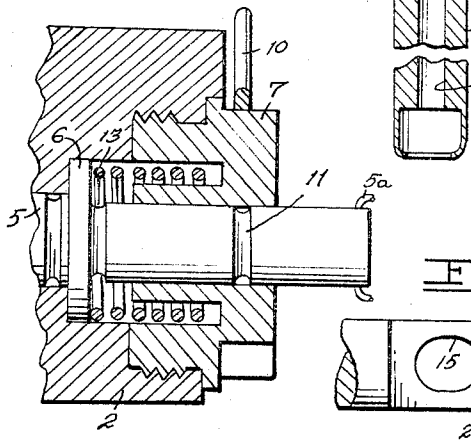


Fig. 4.

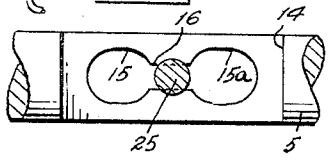


Fig. 5.

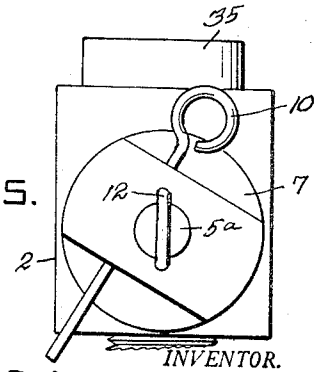
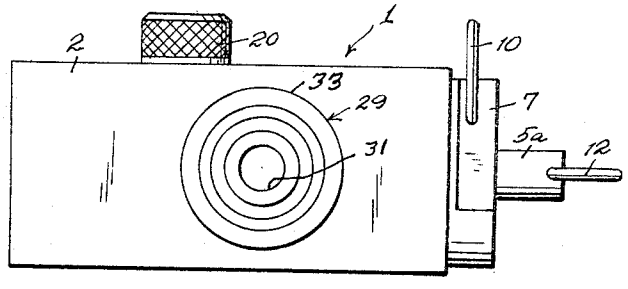


Fig. 6.



INVENTOR.
Dale G. Adams
BY: Harry M. Saragovitz,
Edward J. Kelly &
Herbert Berl

United States Patent Office 3,272,125 Patented Sept. 13, 1966

3,272,125

THREE-WAY FUZE

Dale Gibson Adams, Sparta, N.J., assignor to the United States of America as represented by the Secretary of the Army

Filed Mar. 17, 1964, Ser. No. 352,694
4 Claims. (Cl. 102—70)

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

This invention relates to a three-way fuze and more particularly to a fuze designed to function upon pull, release or pressure or any combination thereof and is for use with booby traps such as anti-personnel mines or yet larger field mines.

An object of this invention is to provide a fuze functioning on pull, release or pressure or any combination thereof.

Another object is to provide a fuze having a single firing pin, said pin being operated upon pull, release or pressure.

A still further object is to provide a three-way fuze having fewer firing parts and providing greater economy thereby.

The specific nature of the invention as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

FIG. 1 is an axial sectional view of the fuze of the invention and is illustrated as unarmed;

FIG. 2 is a cross sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary detail section showing the piston at the pull end;

FIG. 4 is a detail section taken along line 4—4 of FIG. 1;

FIG. 5 is an end view of the fuze; and

FIG. 6 is a bottom view of the fuze.

Referring more particularly to the drawing in which reference character 1 designates the fuze generally:

Fuze 1 consists of a housing 2 having a longitudinal bore 3 which is counterbored as at 4.

A piston 5 is slidably mounted in bore 3. Piston 5 has a head 6 integral thereto which is slidable in counterbore 4.

The pull end 5*a* of piston 5 slides in a bearing nut 7 which is threadably engaged to housing 2 by threads 8. Nut 7 is bored as at 9 to receive a safety pin 10 which when inserted into bore 9 will engage a groove 11 (see FIG. 3) in piston 5 to prevent axial movement of the piston and accidental firing of the fuze. When the pull-push operation is desired, the pin is placed through a hole 39 in the pull end of piston 5. Pin 10 acts as a primary safety for the fuze.

A bail 12 secured to the pull end 5*a* of piston 5 permits attachment of a wire, etc. (not shown) for pulling the piston to fire the fuze.

Piston 5 is spring-loaded. A coil spring 13 biasing against head 6 and nut 7 urges piston 5 in a direction opposite to the pull.

Piston 5 is milled to form a recess 14 (see FIG. 4). The floor of this depression is slotted as at 15 and 15*a* and is shaped to form a restricted portion 16 for a purpose to be described later.

Piston 5 is provided with another recess as at 17 and the wall of this recess on the pull side of the piston is inclined at 45° as at 18 for a purpose also to be described later. Means for setting or locking piston 5 are provided and consists of a pin 19 having a knurled head 20.

Pin 19 is inserted through a bore which is formed partly in piston 5 as at 21 and housing 2 as at 22. Pin 19 also is provided with a cut out portion 23 so that pin 19 may be rotated to lock piston 5 against sliding movement or rotated to unlock the piston.

Housing 2 is bored as at 24 at right angles to bore 3. A firing pin 25 is slidable in bore 24 and is biased towards piston 5 by a coil spring 26 which biases against a cover plate 27. Cover plate 27 is retained in housing 2 by a screw 28. The point of firing pin 25 normally is restrained from axial movement by restriction 16 as seen in FIG. 1.

A means for carrying a detonator and for coupling the fuze to an anti-personnel mine, etc. is provided and consists of an extension generally indicated by 29. Extension 29 is threadably secured to housing 2 by threads 30 and is axially bored as at 31 and counterbored as at 32. Counterbore 32 is for the purpose of housing a detonating charge 32*a*. Bore 31 acts as a flash passage leading to a main charge of an anti-personnel mine (not shown). Bores 31 and 32 are in axial alignment with firing pin 25.

A standard base coupling 33 threaded to extension 29 is provided for securing the entire fuze assembly to an anti-personnel mine or the like (not shown).

Means for operating the fuze by pressure is provided and consists of a bore 34 disposed at right angles to bore 3. A pressure plate 35 is slidably mounted in bore 34 and is biased in a direction opposite from bore 3 by a pressure plate spring 36. Pressure plate 35 has an integral stem 37 extending therefrom and this stem has a 45° inclined surface 38 at its end which is in slidable contact with surface 18 of piston 5.

In use the fuze 1 is attached to a booby trap such as an anti-personnel mine, by coupling 33 which is screwed to the wall of the mine, not shown.

For operation by pull force, a wire, not shown, is attached to the bail 12 after safety pin 10 is removed from bore 9 and inserted in hole 39, which prevents piston 5 from moving leftwards as seen in FIG. 1. A pull on the wire, not shown, will pull piston 5 to the right to permit firing pin 25 to snap into slot 15 and fire detonator 32*a*.

While one hole 39 is shown, a series of holes at spaced intervals could be provided to regulate the timing of firing of the fuze.

For pressure operation upon plate 35, the fuze is arranged exactly as for pull. Hence, the fuze is also capable of pressure-pull combination in this condition.

For release operation and for pull-release and pull-pressure-release combinations, the pin 10 is placed in bore 9 where a portion of pin rides in groove 11.

For release operation alone, a predetermined amount of pressure is required on spring 36. This pressure will push pressure plate 35 down enough to force piston 5 to the right and shear pin 10, whereupon piston 5 is urged to the left to permit firing pin 25 to snap into slot 15*a* and fire detonator 32*a* in counterbore 32. Pressure plate 35, of course, is forced upwardly by beveled surfaces 18 and 38. The fuze in this condition is obviously capable of firing in pull-release-pressure simultaneously.

It will be apparent from the foregoing that a fuze has been provided that will replace three standard firing devices in use today, thereby reducing the quantity that must be manufactured and the resulting lowering of costs.

Variations and modifications may be effected without departing from the scope of the novel concept of the present invention as set forth in the appended claims.

What is claimed is:

1. A three-way fuze comprising a housing, an extension having a flash passage therethrough and secured

to said housing, a detonator in said flash passage, a coupler secured on said extension for attachment of said fuze to a mine, a spring biased firing pin slidable in said housing and disposed in alignment with said detonator, a spring biased piston slidable in said housing between said firing pin and said detonator and disposed normal to said firing pin, said piston extending beyond one side of said housing and being provided with a slotted portion substantially at its medial portion thereof, there being a restriction medially in said slotted portion normally holding said firing pin in a cocked position, and means whereby said fuze may be operated by pressure, pull or release force and associated with said piston whereby said piston is moved in either direction longitudinally to permit said firing pin to snap through on either side of said restriction and fire said detonator.

2. A three-way fuze as described in claim 1 wherein said means to permit operation of said piston by pressure force comprises a pressure plate slidable in said housing and disposed normal to said piston, said pressure plate having an integral stem, said stem having an inclined surface at its bottom end thereof, there being a recess in said piston, said recess having an inclined wall at the forward end thereof, said pressure plate acting upon a force applied thereon to cause said inclined bottom surface of said stem to bear against said inclined wall of said recess and slide said piston forwardly to permit said firing pin to ride off said restriction and snap through said slot to fire said detonator.

3. A three-way fuze as described in claim 1 wherein said means to permit operation of said fuze by said pull force comprises a hole in the pull end of said piston and

a removable pin for insertion in said hole whereby said piston is restrained against rearward movement when said pin is inserted into said hole so that said piston may be pulled to permit said firing pin to snap through said slot and fire said detonator.

4. A three-way fuze as described in claim 1 wherein said means to permit operation of said fuze by release force comprises, a pressure plate slidable in said housing and disposed normal to said piston, said pressure plate having an integral stem, said stem having an inclined bottom surafce, a spring encircling said stem and normally biasing said pressure plate away from said piston, there being a recess in said piston, said recess having an inclined wall adapted to slidably engage said inclined bottom surface of said stem, said pressure plate upon a predetermined force applied thereon to move towards said piston whereby said piston is first moved forwardly, and then rearwardly when said force is removed from said plate and said spring forces said pressure plate upwards to permit said firing pin to move off said restriction and snap into said slot and fire said detonator.

References Cited by the Examiner

UNITED STATES PATENTS

1,682,560 8/1928 Gruber ---------- 102—70 X

FOREIGN PATENTS

1,341,868 9/1963 France.

BENJAMIN A. BORCHELT, *Primary Examiner.*

G. H. GLANZMAN, *Assistant Examiner.*