

[54] **SPINNING BOMBLET FUZE**

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[22] Filed: **Aug. 9, 1973**

[21] Appl. No.: **386,933**

[52] **U.S. Cl.** 102/79

[51] **Int. Cl.** **F42c 15/26**

[58] **Field of Search**..... 102/79, 80

[56] **References Cited**

UNITED STATES PATENTS

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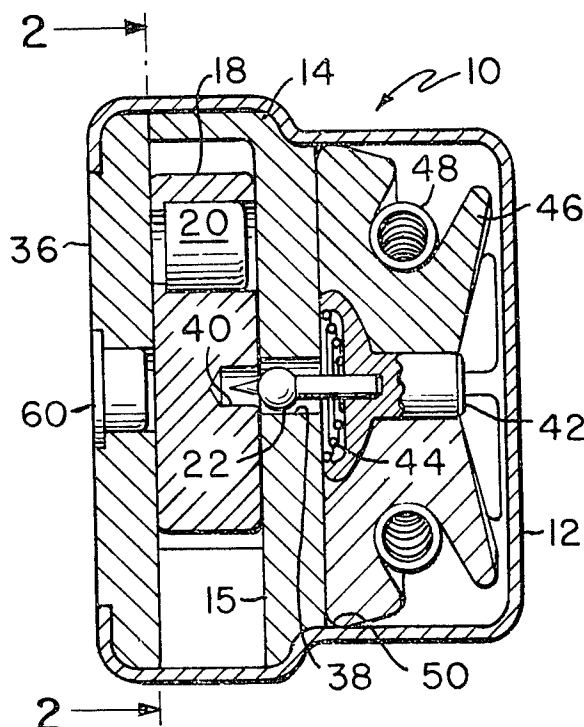
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[57] **ABSTRACT**

An improved spinning bombulet fuze incorporates a plurality of segment weights which act on the firing pin. A garter spring urges the weights radially inwardly to hold the firing pin in the safed position. Centrifugal force urges the weights outwardly to allow the firing pin to withdraw to an armed position wherefrom the firing pin can be driven by the weights into the detonator.

1 Claim, 4 Drawing Figures



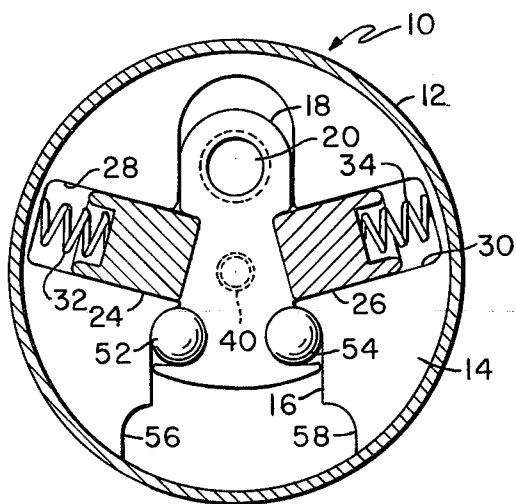


Fig 2

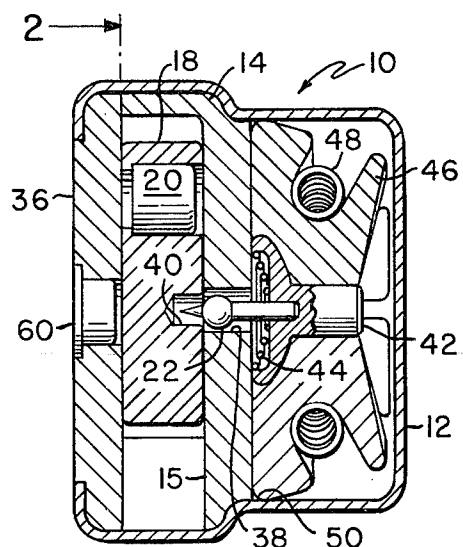


Fig 1

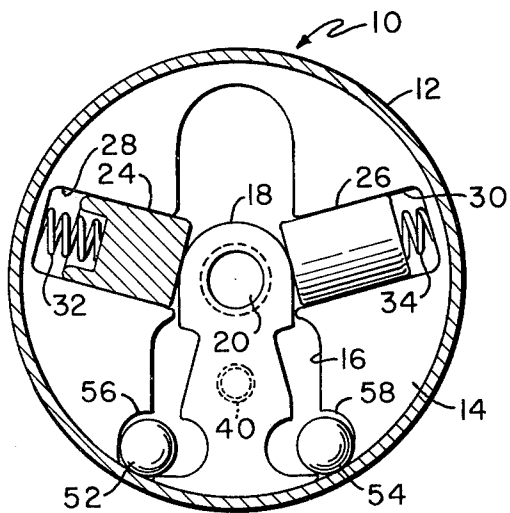


Fig 4

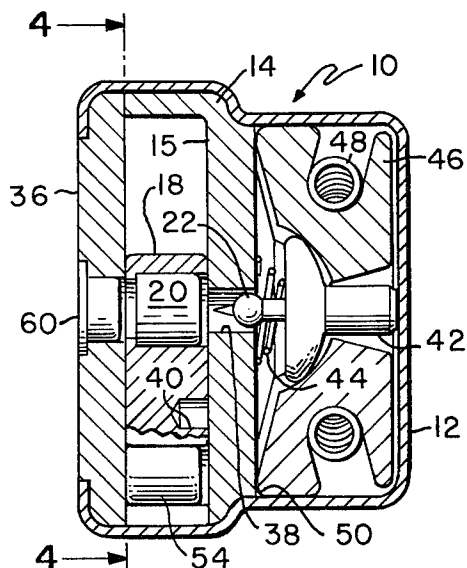


Fig 3

SPINNING BOMBLET FUZE

BACKGROUND OF THE INVENTION

This invention relates generally to fuzes and more particularly to a fuze for use in spinning munitions which are armed utilizing centrifugal forces. Numerous centrifugal-inertia type fuzes are in existence. Examples of such fuzes will be found in U.S. Pat. No. 3,264,995 to Libby and Webb and U.S. Pat. No. 3,730,101 to Schultz. Many of these fuzes have complex mechanisms and many moving parts. It is, of course, well established that there is a greater chance for nonarming due to malfunction as the number of parts, and in particular moving parts, increases. Accordingly, it is an object of this invention to provide a firing mechanism for a spinning fuze which is simple and highly effective.

A further object of this invention is to provide a fuze for use in a spinning munition wherein the device utilizes no stored energy which could inadvertently fire the munition.

A still further object of this invention is to provide a fuze for a spinning munition wherein a plurality of weights and a garter spring initially place the munition in the safe condition, said weights in response to centrifugal force then permitting the fuze to arm and finally drive the firing pin into the detonator.

SUMMARY OF THE INVENTION

This invention provides an improved fuze for spinning munitions. The fuze is of simple and economical construction, operates in response to centrifugal forces and is fail safe in operation. The spinning fuze comprises a firing pin assembly which is held in engagement with a slider by a plurality of weights in the safe position. Spring means urges the weights radially inwardly. The weights move outwardly against said spring means in response to centrifugal force due to the spinning of the munition thereby permitting the firing pin to be withdrawn from the slider. The slider is moved in response to centrifugal force to the armed position and locked. The firing pin is driven into the detonator by the weights to initiate detonation of the munition.

Other objects, details, uses and advantages of this invention will become apparent as the following description of the exemplary embodiment thereof presented in the accompanying drawings proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings show a present exemplary embodiment of this invention in which:

FIG. 1 is a cross-sectional view of the fuze of this invention taken in the safe position;

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

FIG. 3 is a cross-sectional view similar to that of FIG. 1 showing the fuze in the armed position; and

FIG. 4 is a view taken along line 4—4 of FIG. 3.

DESCRIPTION OF ILLUSTRATED EMBODIMENT

Reference is now made to FIGS. 1 and 2 of the drawings which illustrate an exemplary embodiment of the improved fuze of this invention, which is designated generally by the reference numeral 10. The fuze 10 comprises an outer fuze housing 12 which encloses the components of the fuze. Mounted within the housing 12 is a slider housing 14. The slider housing 14 is

formed with a channel 16 in which a slider 18 is placed for sliding movement therealong.

The slider 18 is seen to be formed with an unbalanced mass. A detonator 20 is mounted at one end of the slider 18. In the safe position, the detonator 20 is maintained in an out of line position with the firing pin 22. The slider 18 is held in the safe position by a pair of slider locks 24 and 26 which are mounted for sliding movement in channels 28 and 30, respectively. The locks 24 and 26 engage shoulders formed in the slider 18 to prevent movement of the slider. Springs 32 and 34 respectively bias the slider locks 24 and 26 into locking engagement with the slider 18. An end cap 36 closes the end of housing 12 and acts as one surface to define channel 16. It is thus seen that the slider 18 and slider locks 24 and 26 are supported for sliding movement between the base 15 of slider housing 14 and the end cap 36.

The base 15 of slider housing 14 is formed with a central bore 38 (FIG. 1) through which the firing pin 22 projects. The slider 18 is formed with a bore 40 therein which in the safe position is axially aligned with the bore 38. Thus, in the safe position the firing pin 22 will project into the bore 40 of the slider 18. Thus, if by some accident the slider locks 24 and 26 should become disengaged from the slider 18 the slider 18 would still be prevented from sliding movement along the channel 16 by the firing pin 22.

The firing pin 22 is mounted in a firing pin mass of housing 42. A spring 44 acts between the base 15 and the mass 42 to urge the mass 42 axially away from base 15. Axial movement of the mass 42 is prevented by a plurality of weights 46 which are urged radially inwardly by resilient means such as garter spring 48. The interior surface of the weights 46 and the exterior surface of the mass 42 are complementally formed so as to mate together. The outer peripheral edges 50 of the weights 46 are rounded so as to permit a rocking action of the weights so that the weights can be moved radially outwardly, as will be explained hereinbelow.

In operation, the fuze 10 is secured in a known manner to a munition. Upon firing of the projectile or the dropping of a bomblet, the fuze will be spun about the axis defined by the firing pin 22. When the fuze 10 spins the centrifugal forces will act upon the weights 46. At that point where the centrifugal force overcomes the force of the garter spring 48 the weights 46 will move radially outwardly against the spring 48 to the position as shown in FIG. 3. The spring 44 can now urge the mass 42 axially away from the base 15 thereby withdrawing the firing pin 22 from the bore 40 of the slider 18. This completes the arming of the firing pin and allows complete arming of the fuze to take place. However, if sufficient spinning forces are not generated to arm the safing and arming mechanism, i.e., unlock the slider for movement, the firing pin 22 will be driven back into the bore 40 without detonation of the fuze.

When the fuze 10 reaches the arming spin rate, the slider locks 24 and 26 will overcome the biasing force of springs 32 and 34, respectively, whereupon the slider locks 24 and 26 will move outwardly along the channels 28 and 30 to unlock the slider 18. Due to the unbalanced mass of the slider 18, the slider will move along the channel 16 to the armed or in line position as shown in FIGS. 3 and 4. Centrifugal force will urge the locking rollers 52 and 54 to move outwardly from the slider 18 to engage locking shoulders 56 and 58, re-

spectively, of the slider housing 14 to lock the slider 18 in the armed position. This action completes the arming of the fuze. Thus, as is seen in FIG. 3, the detonator is in an axial in line position with the firing pin 22 and a suitable means, such as a lead cup 60 mounted in the cap 36. The lead cup 60 detonates the high explosive of the munition in a known manner upon detonation of the detonator 20. Upon impact with the target, the weights 46 can move radially inwardly or rock about the rounded edge 50 thereby acting against the mass 42 to drive the firing pin 22 in an axial direction into the detonator and cause functioning of the munition.

It can be seen that the fuze hereinabove described utilizes no elements having stored energy associated therewith which could inadvertently cause an arming and firing of the fuze. The weights 46 and spring 48 initially hold the firing pin in the safe position and, due to centrifugal force, permit the firing pin to be urged to the armed position. Upon impact, the weights drive the firing pin into the detonator.

While the invention has been described wherein firing occurs upon impact, it is obvious that the fuze can be made to fire on despin as well as impact by taking into consideration the restraining force of the garter spring.

While a present exemplary embodiment of this invention has been illustrated and described, it will be recognized that this invention may be otherwise variously embodied and practiced by those skilled in the art.

- What is claimed is:
1. A spin armed fuze for use in munitions comprising:
 - a slider housing, said housing being formed with a channel therein;
 - a slider mounted in said channel for sliding movement therealong;
 - first locking means engaging said slider for locking said slider in the safed position, said locking means being responsive to centrifugal force to unlock said slider;

- a firing pin mass;
- a firing pin being secured to said mass and axially projecting therefrom and extending through said slider housing;
- said slider being formed with a bore therein for receiving said firing pin in the safed position;
- a detonator carried in said slider maintained in an out of line position relative to said firing pin in the safed position;
- a spring mounted between said firing pin mass and said slider housing for retracting said firing pin from said slider bore before the arming spin rate is reached whereupon said slider will move along said channel to position said detonator in line with said firing pin;
- a plurality of centripetally responsive weights complementally formed relative to said mass, the outer peripheral edge of said weights being rounded to permit a rocking action thereabout such that said weights can be rocked radially outwardly; and
- a garter spring encircling in engaging fashion the outer periphery of said weights, said spring being in biasing contact with said weights and urging said weights inwardly into engagement with said mass so as to overcome said retracting spring and hold said firing pin in the safed position, said weights overcoming the force of said encircling spring and rocking radially outwardly in response to the centrifugal forces generated before the fuze reaches the arming spin rate, said weights rocking outwardly about said rounded edge a sufficient distance to permit said mass to be urged in an axial direction a sufficient distance to remove said firing pin from said slider bore and wherein upon impact said weights will rock inwardly thereby acting against said mass to drive said firing pin into said detonator.

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