June 17, 1969 J. PISKORSKI ET AL 3,450,047

SPIN STABILIZED PROJECTILE WITH SELF-DESTRUCTIVE CAPABILITY

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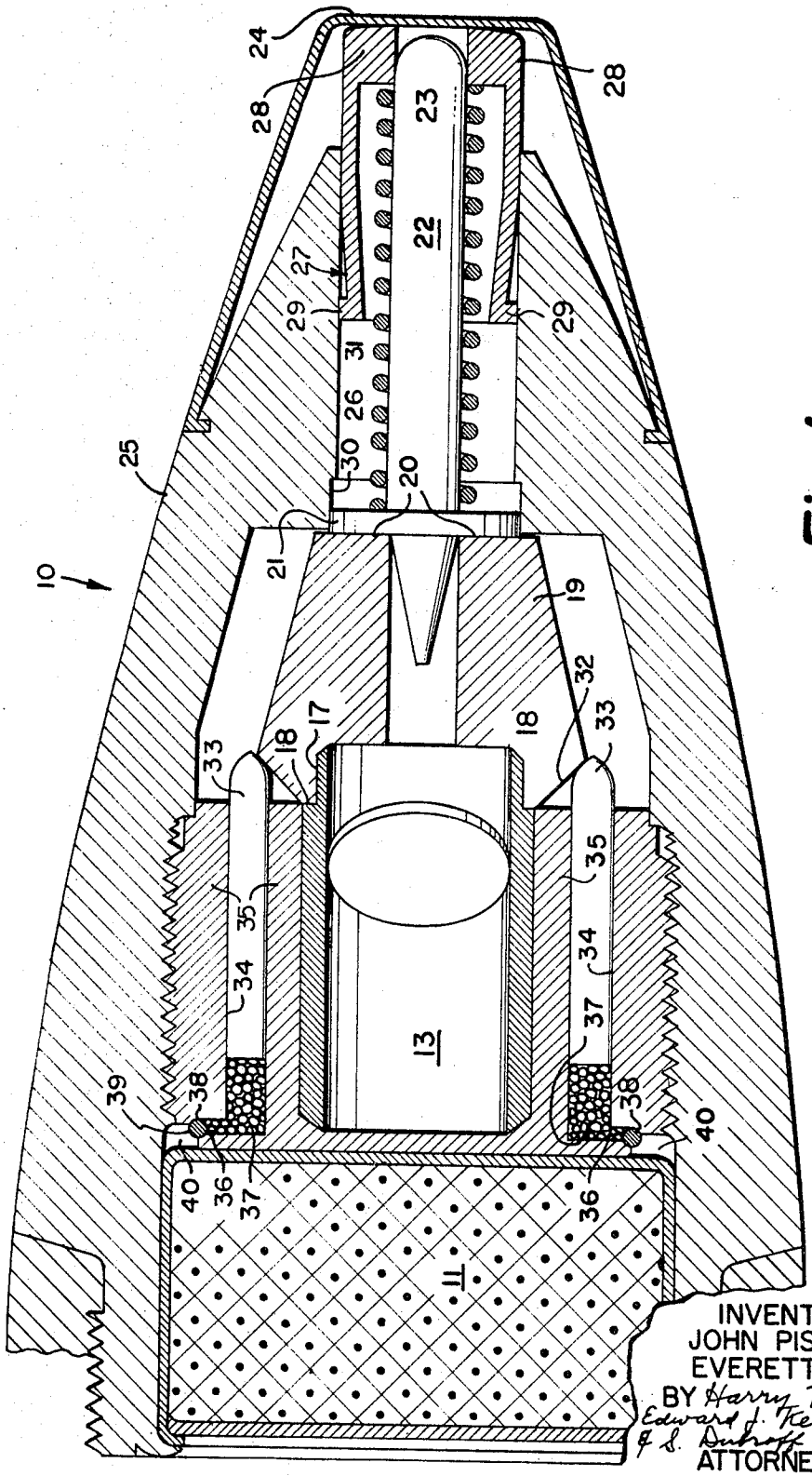


Fig. 1

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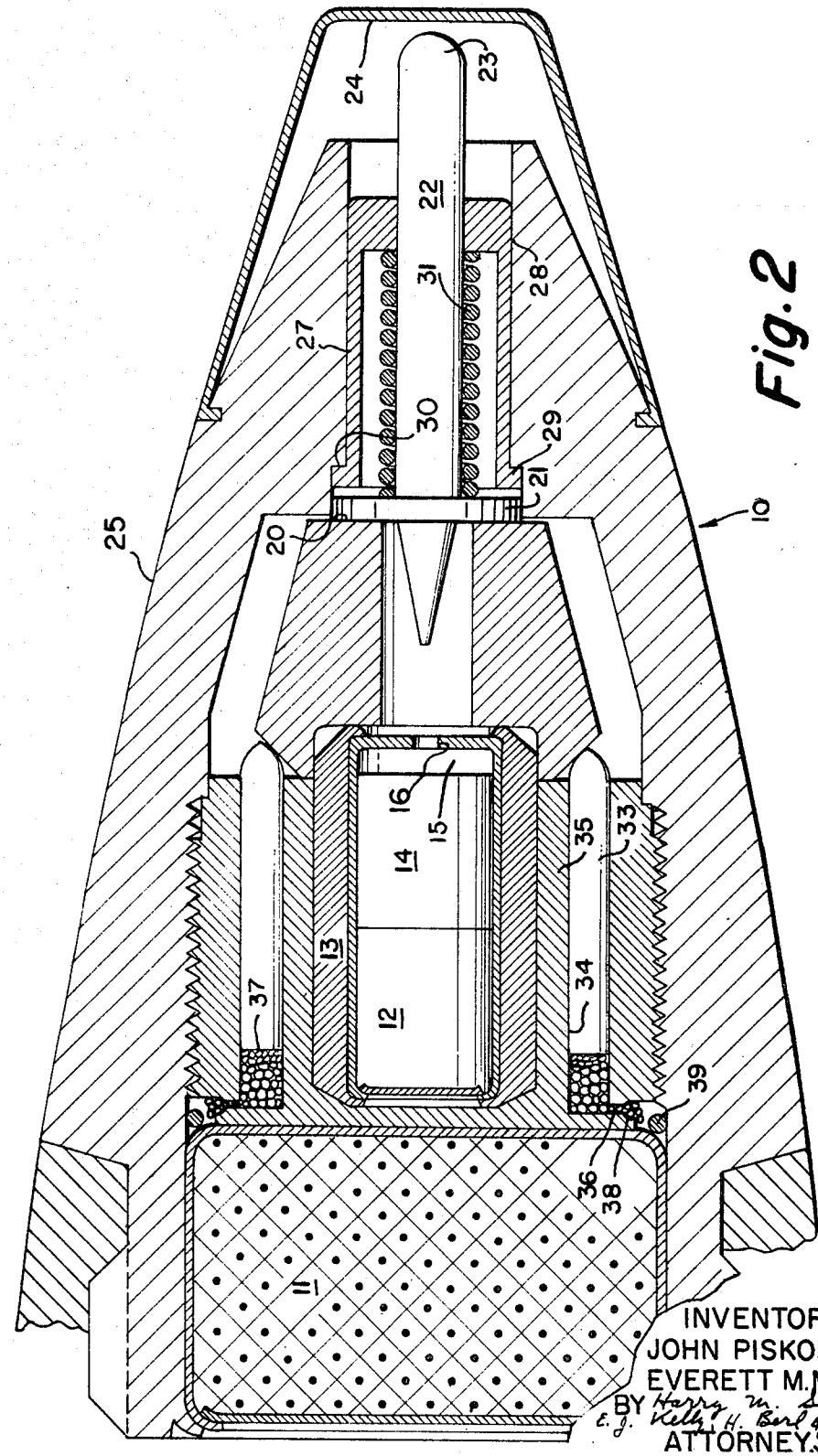


Fig. 2

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SPIN STABILIZED PROJECTILE WITH SELF-DESTRUCTIVE CAPABILITY

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U.S. Cl. 102—71 4 Claims

ABSTRACT OF THE DISCLOSURE

A spin stabilized projectile with a controlled self-destructive capability has a fuze structure which contains a firing pin that is cocked in response to a set-back force. Wedges in response to centrifugal force are moved out of the operative path of the firing pin in a predeterminedly safe manner by use of a controlling piston retarding arrangement.

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

This invention relates to a projectile and, more particularly, to a spin stabilized projectile having the capability of self-destruction.

Heretofore, prior self-destruction projectile fuze arrangements have included an explosive train and ignition or detonating means therefor that rendered the projectile unsafe for use in situations where friendly personnel in adjacent positions would become vulnerable or endangered thereby.

It is an object of the invention to provide an improved spin stabilized projectile with a controlled self-destruction capability.

Another object of the invention is to provide such a projectile which is reliable and satisfactorily overcomes the aforementioned safety hazard.

These and other objects, features and advantages will become more apparent from the following description and accompanying drawings in which:

FIG. 1 is a longitudinal sectional view of an unarmed projectile fuze embodying the principles of the invention.

FIG. 2 is a view similar to FIG. 1 with the fuze in an armed condition.

The spin stabilized projectile fuze shown generally at **10** (FIGS. 1 and 2) is provided with a booster charge of explosive **11** juxtapositioned a lesser detonating charge **12** (FIG. 2) that is positioned within a rotor element **13** rearwardly of ignition mix train means **14, 15** and an appropriate primer **16** offset from the central longitudinal rotor axis. The rotor **13** is rotatably biased by centrifugal force induced by projectile spin and has forward slots **17** by which it is normally held in a pre-set latched or locked condition by a mating lug portion **18** on at least one of a plurality of wedge members or blocks **19, 19** that are radially slidable outwardly in appropriate groove means (not shown) within the fuze.

The forward face **20** of the wedge means **19, 19** is normally in the rearward path of the laterally extending radial flange **21** on firing pin **22** whose forward end portion **23** is adjacent but longitudinally spaced from an impact crushing nose cap **24** suitably secured to the projectile fuze body **25**. Slidably mounted in the body axial passage **26** is an annular set-back sleeve **27** having a forward internal flange **28** that slidably receives firing pin **22** and a rearward external flange **29** adapted to spring outwardly to engage with body counter-bore **30** when the projectile launching set-back force causes rearward movement of sleeve **27** against the bias of spring **31** that extends about

the pin **22** between its flange **21** and sleeve flange **28**. Spring **31** has sufficient energy to normally urge sleeve flange **28** forwardly against nose cap **24** and pin flange **21** rearwardly against wedge means **19, 19** and upon set-back, the spring **31** is compressed (FIG. 2) to cock or load the pin **22** for rearward primer striking motion after the primer has moved to an aligned position and predetermined controlled radial movement of the wedges **19, 19** to release the firing pin flange **21**.

The rearward, inclined camming surface **32** on each wedge **19** is tapered inwardly from its outer portion that initially contacts the forward noses of each of two solid cylindrical pistons **33** slidably mounted in appropriate bores **34** formed in the rotor-carrying body **35**. Body **35** has a pair of radially extending exhaust ports **36** communicating with the rearmost portion of bores **34** that contain a predetermined amount of piston retarding means or glass beads **37**. The ports **36** terminate in a corresponding concave surface portion **38** of a peripheral groove extending a major distance around the base portion of body **35** and normally seating a C-shaped spring **39** to seal ports **36** and maintain a predetermined pressure by the piston retarding means **37** upon the abutting surface of piston **33**.

As the projectile is launched, its acceleration caused set-back force moves sleeve **27** to its spring compressing locked position and dislodges (FIG. 2) C-spring **39** from groove means **38**, enabling the piston retarding means **37** to slowly escape out orifice means **36** into a suitably provided annular space **40** while it controls the rearward movement of piston **33** now being cammed by wedges **19, 19** which are under the influence of centrifugal force within the spinning projectile.

When rearward piston movement has been sufficient to enable wedges **19** to move radially a sufficient distance such that wedge lug **18** is withdrawn from rotor slot **17**, the rotor aligns the primer **16** (FIG. 2) with the firing pin to thus arm the weapon. The arming delay is such as to assure a predetermined distance of projectile travel as a pre-requisite to arming whereby adjacent friendly personnel may not be subjected to an otherwise hazardous explosive.

Further radial movement of the wedges **19** to a point where they no longer restrain the firing pin flange **21** will enable the energy stored firing pin **22** to strike the primer **16** for ignition of the detonation train.

After arming but before self destruction of the projectile, its point-detonating functioning would occur where the nose cap **24** were crushed by impact with a target and, with the flange **21** sheared off, the firing pin **22** were driven into the detonator.

We claim:

1. In a spin stabilized projectile having a fuze with a destructive booster charge and a detonator therefor:

a firing pin longitudinally aligned with and for striking said detonator when said detonator is in an armed position,

a spring biasing said firing pin rearwardly away from a nose portion of said projectile,

a set-back sleeve slidably mounted for rearward movement to compress said spring against a flange on said firing pin,

a wedge normally in the rearward path of said firing pin flange and movable radially outwardly by centrifugal force away from said path, a rear camming surface on said wedge,

a cylinder positioned rearwardly of said wedge and having an opening in its rearward portion and a piston slidably mounted in its forward portion and positioned against said camming surface, said piston being moved rearwardly in response to radially outward movement of said wedge,

piston retarding means in the rearward portion of said cylinder,

means normally closing said opening and responsive to a set-back force to move to an open position for meteringly releasing said retarding means from said cylinder.

2. The structure of claim 1 wherein said retarding means is in the form of glass beads.

3. The structure of claim 1 in which said normally closing means is a C-shaped spring.

4. The arrangement in accordance with claim 2 wherein an impact crushing nose cap normally engages a forward portion of said sleeve and is adjacent but longitudinally spaced from a forward portion of said firing pin.

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