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Putscher et al.

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[54] **PROJECTILE**

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[52] **U.S. Cl.** ..... **102/73 R,** 102/70 R

[51] **Int. Cl.** **F42c 1/00**

[58] **Field of Search** ..... 102/70 R, 73, 74, 76, 83, 102/77, 78, 79

[56] **References Cited**

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[57] **ABSTRACT**

A projectile fuze in which premature detonation is minimized, particularly during projectile flight through rain or heavy tropical storms. The projectile fuze nose portion has a shock absorbing end closure mounting the firing pin and its actuating impact responsive member which withstands raindrop impacts prior to target engagement. The end enclosure has preweakened members that facilitate deforming and dislodging of the closure on target impact to enable firing pin actuation.

3 Claims, 3 Drawing Figures

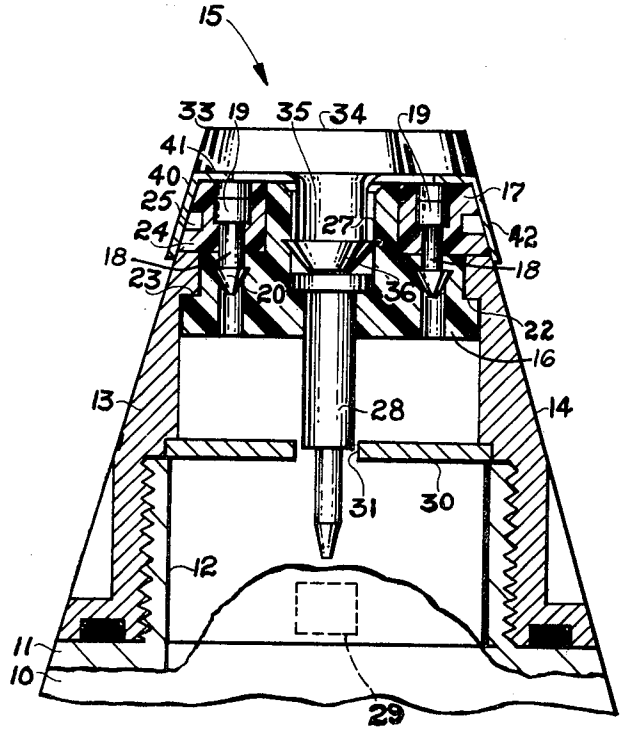


FIG.2

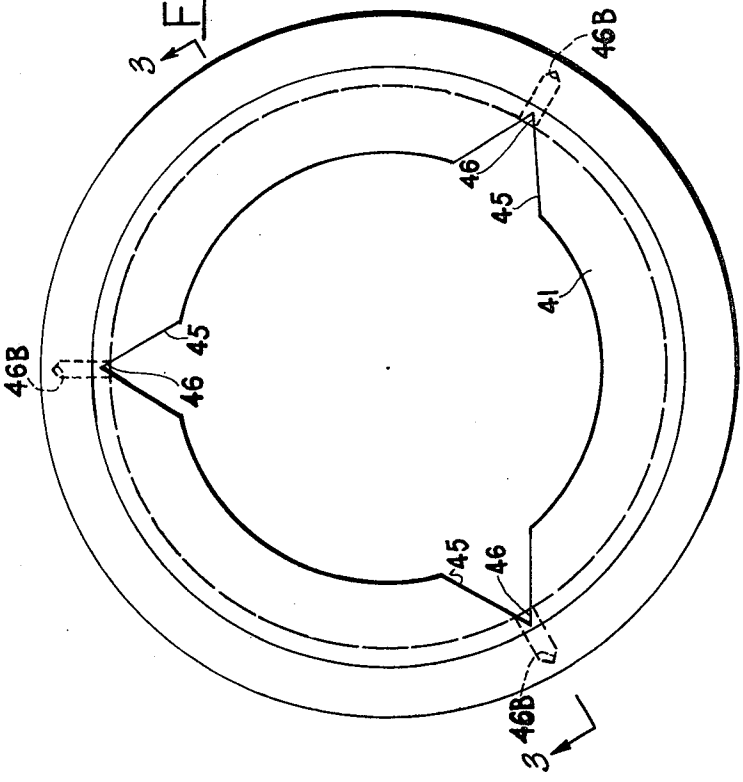


FIG.3

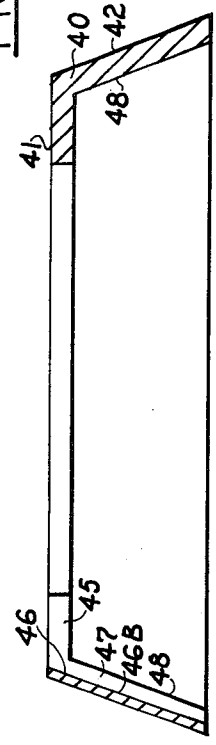
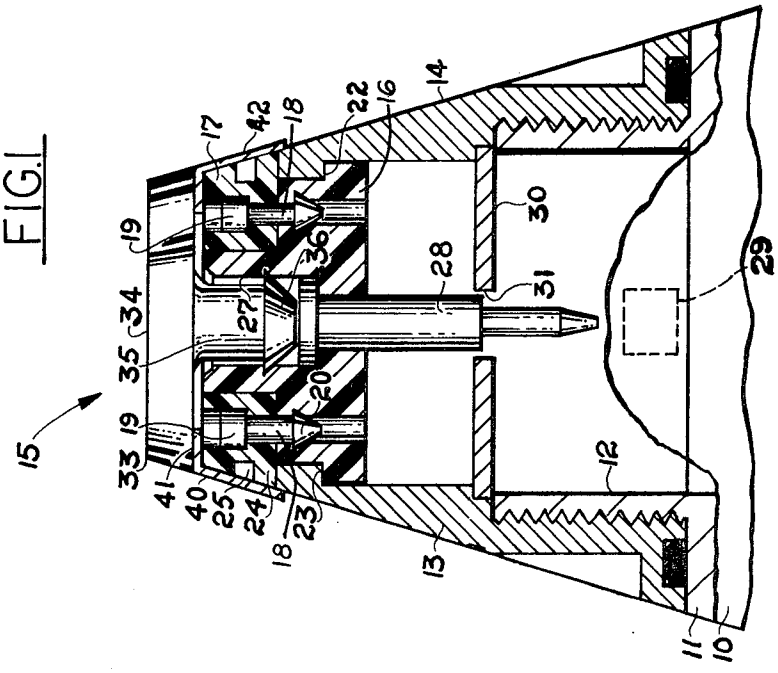


FIG.1



PROJECTILE

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

This invention relates to projectile fuzes, and more particularly to an impact sensitive projectile fuze.

Certain impact sensitive projectile fuzes have been detonated prematurely by heavy rain encountered during projectile flight.

One of the objects of the invention is to provide a projectile fuze arrangement in which premature detonation is minimized.

Another object of the invention is to provide such an arrangement that enhances the safety of friendly troops located under the line of fire.

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

FIG. 1 is an elevational view, partially broken away in section, of a projectile fuze embodying the principles of the invention.

FIG. 2 is an enlarged end view of the pre-weakened shield of the FIG. 1 arrangement.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2.

The projectile fuze has a main body portion 10 (FIG. 1) having an inwardly directed annular flange 11 and an externally threaded forwardly extending cylindrical portion 12 integral therewith by which the internally threaded nose portion 13 is secured. The nose portion 13 has a substantially conical lateral surface 14 and an end closure, generally shown at 15, extending across the forward portion of the nose 13.

The end closure includes a two-part annular nest or shock absorbing arrangement in which a polyurethane nest member 16 and forwardmost annular silicone nest member 17 are suitably apertured and secured together by a plurality of steel pins 18. Each pin 18 has a forward head portion 19 seated against an appropriate corresponding internal flange within the silicone nest 17 and a rearward conical tip portion 20 secured in a suitable corresponding dovetail shaped groove within the polyurethane nest 16. The nest arrangement is so dimensioned and shaped that on assembly the inwardly extending annular flange 22 on the projectile nose portion is closely received within the nest groove defined between annular flange 23 on nest member 16 and the rearwardly facing surface of the conically shaped peripheral portion 24 on nest member 17. The peripheral surface of nest portion 24 is in mating alignment with the nose conical lateral surface 14 and has a laterally opening annular groove 25 for a purpose to be described. Nest member 16 has a suitably flanged central longitudinal passage 27 that seats the head of firing pin 28 which is in longitudinal alignment with the projectile fuze detonator 29 (shown in phantom). A steel firing pin guide 30, which is staked at its rearward edge upon seated assembly in nose portion 13, has a central opening 31 that slidably receives the shank portion of firing pin 28.

An impact responsive member 33 has a laterally extending steel tip portion 34 provided with a black oxide coating and a shank portion 35 having a rearmost conically shaped annulus 36 that is in close alignment with

the firing pin head when secured in a suitable dovetail shaped annular groove formed in passage 27.

Extending transversely between the impact member laterally extending portion 34 and the forward nest member 17 is an annular pre-weakened shield 40 (FIGS. 1,2,3) of steel with a black oxide coating, the shield having a laterally extending ring portion 41 and a conically shaped portion 42 integral therewith and extending at a 112° angle therefrom. The length of the shield sidewall 42 is sufficient to overlie the nest conical peripheral surface of grooved portion 24 and a portion of the nose conical lateral surface 14. Preferably at 120° circumferentially spaced intervals on the shield ring portion 41, there is provided one of a plurality of V-shaped notches 45 (FIGS. 2,3). The sidewalls of each notch 45 are formed at a substantially 60° angle and extend into the juncture of shield portions 41 and 42 and the pair of notch apex portions 46 of each notch 45 intersect corresponding notch apex portions 46B of longitudinal notches 47 that are provided along the internal surface 48 of shield sidewall 42 at similar 120° peripheral spacings.

The end closure mounting is such that the impact member 33 is capably supported by the nest portions 16, 17 to withstand raindrop impacts during projectile flight prior to target engagement without actuating the firing pin. Upon target engagement by impact member 33, the pre-weakened sections of both the shield 40 and the forward nest 17 enable deformation of nest portion 24 for dislodging of the entire end closure pursuant to actuation of firing pin 28.

Various modifications, changes or alterations may be resorted to without departing from the scope of the invention as set forth in the appended claims.

We claim:

1. In a projectile fuze having a main body portion and a nose portion secured thereto, said nose portion having an end closure extending across the forward portion thereof, said nose portion having a conical lateral surface,

said end closure comprising,

shock absorbing means having a central longitudinal passage and a forward annular portion,

a firing pin and an impact responsive member for actuating said pin both mounted in said central passage, said impact member having a shank portion and a laterally extending forward portion,

said forward annular portion of said shock absorbing means having a pre-weakened section in abutment with an inwardly extending flange of said nose forward portion, said pre-weakened section having a conical peripheral surface in mating alignment with said nose conical lateral surface, and

an annular pre-weakened shield extending transversely between said impact member laterally extending portion and said shock absorbing forward annular portion, said shield overlying said conical peripheral surface and a portion of said conical lateral surface,

said impact member being adapted to withstand raindrop impacts during projectile flight prior to target engagement without actuating said firing pin.

2. The structure in accordance with claim 1 wherein said preweakened section includes an annular recess in said conical peripheral surface.

3. The structure according to claim 2 wherein said shield has a laterally extending ring portion and a conically shaped portion integral therewith, said ring portion having a plurality of notches, the internal surface of said conically shaped portion having a plurality of notches, corresponding ones of said ring portion notches and conically shaped portion notches being in alignment with each other.

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