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FUZE SAFETY DEVICE
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Fig. 1.

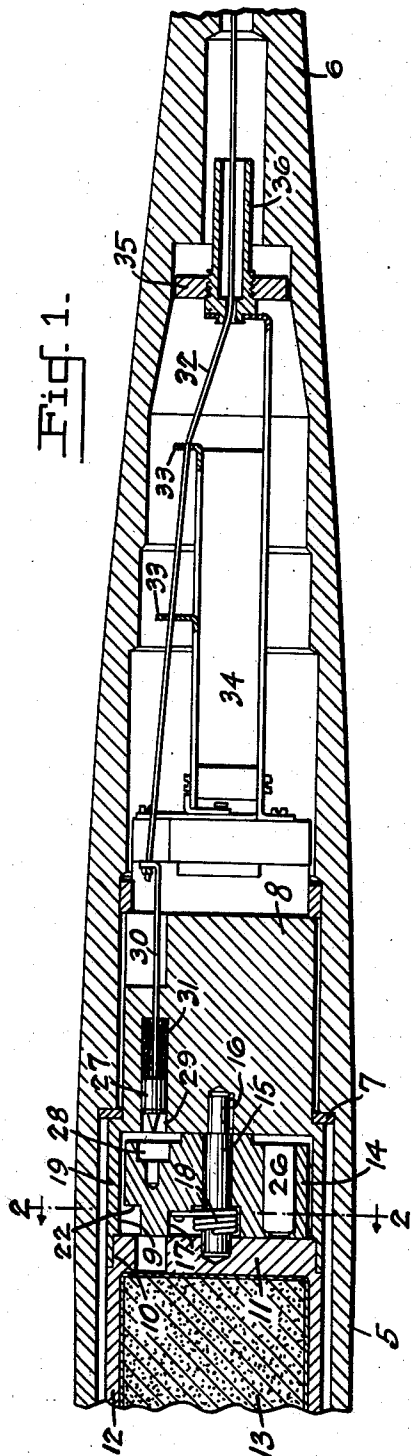


Fig. 1a.

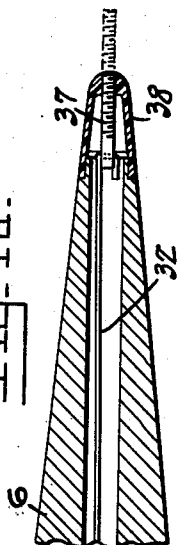
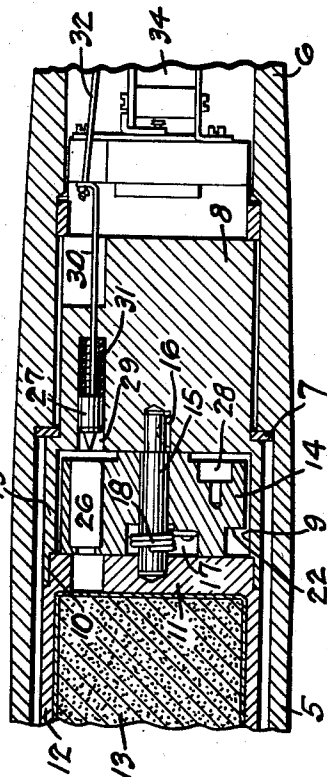
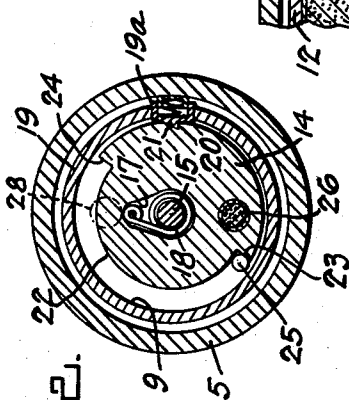


Fig. 2.



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FUZE SAFETY DEVICE

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2 Claims. (Cl. 102—86.2)

This invention relates to fuzes for explosive projectiles and more particularly to a safety device therefor which will render the fuze inoperative if dropped or otherwise mishandled.

An object of the invention is to provide a device in which the firing pin is connected to a nose cap and held in safe retracted position until the nose cap is fractured.

Another object of the invention is to provide a device having a rotor movable from safe to armed position and having means therein to receive the projected firing pin if the nose cap is fractured while the rotor is in safe position to render the fuze inoperative.

Another object of the invention is to provide a device having a nose cap which is sensitive to light impact.

Other objects and advantages will be apparent from the following detailed description and the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a portion of a projectile showing the fuze in safe unarmed position.

Fig. 1a is a longitudinal sectional view of the forward end of the ogive of the projectile illustrated in Fig. 1.

Fig. 2 is a cross sectional view on the line 2—2 of Fig. 1, looking in the direction of the arrows, and

Fig. 3 is a fragmentary longitudinal section view showing the fuze of Fig. 1 in armed position.

Referring now to the drawings, the numeral 5 identifies a projectile casing or jacket having an elongated ogive 6. Positioned within the casing 5 near the base of the ogive 6 and coaxially spaced therein by means of a flat ring 7 is a first support 8. The rearward end of the support 8 is formed with a bore 9 and a counterbore 10 in which is seated the forward end 11 of a booster cup 12, containing a booster charge 13.

A rotor 14, in the bore 9, is mounted on a shaft 15 to rotate when in flight through an angle of 180° by time-controlled or other delay mechanism well known and therefore not shown. For the sake of convenience and simplicity of explanation rotor 14 is shown as rotating freely on the shaft 15. At its rear end the shaft 15 is supported in the forward end 11 of the booster cup in coaxial alignment with the longitudinal axis of the projectile. The forward end of the shaft 15 is reduced in diameter and is secured against rotation in the first support 8 by a key 16 fitted in keyways in the shaft and in the support. At its rear end the rotor is formed with a recess 17 which houses a helical spring 18, secured at one end to the shaft 15 and pinned to the forward wall of recess 17. The helical spring is tensioned so that it tends to rotate the rotor in a counterclockwise direction as viewed in Fig. 2. The rotor 14 is surrounded by the circumferential wall 19 of bore 9 previously mentioned as formed in the rear end of the first support 8, and carries therein a centrifugally operated spring pressed detent 19a. See Fig. 2. A notch 20 is formed in the rotor 14 for seating a tooth 21 formed on the detent 19a to hold the rotor against the bias of its spring 18. Formed in the rotor, at its rearward end is a circumferential groove 22, shown as 180° in angular extent and terminating at its

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respective ends in shoulders 23 and 24. A pin 25 secured in the end wall 11 of the booster cup projects forwardly into the groove 22 adjacent the shoulder 23, when the rotor is in unarmed position, and is abutted by shoulder 24 to stop and hold the rotor in armed position.

A primer 26 in the rotor is so positioned when the latter is in unarmed position as to be remote from a firing pin 27, and moves with the rotor 14 to a position in registry with the pin when the rotor pivots to armed position under the urge of spring 18 as controlled by the delay or timing mechanism, not shown. A recess 28 is formed in the forward face of the rotor, and in unarmed position is in registry with the firing pin 27. The firing pin slides in a bore 29 in the first support 8 and has an elongated forwardly extending rod 30 axially secured thereto. A firing pin spring 31 is confined in the bore 29 forwardly of the firing pin and surrounds the rod 30 to urge the pin rearwardly. Secured to the forward end of the rod 30 is a length of flexible wire, cord or cable 32 which extends forwardly through spaced guides 33 on an enclosure 34 which houses time delay and rotor release mechanism forming no part of the present invention and hence not shown. A second support 35 is secured to a forward extension of the enclosure and carries a tube 36 for guiding the flexible wire 32 to a screw threaded tensioning rod 37. The rod 37 is pierced at its rearward end to receive the forward end of the flexible wire 32 (see Fig. 1a), and is of a greater length initially, as shown by the dotted lines in the drawing, Fig. 1a, to facilitate the installation of a frangible nose cap 38.

The operation of the invention is as follows:

After the fuze mechanism has been assembled, the flexible wire 32 is attached to the forward end of the rod 30 on the firing pin 27 and passed through the guides 33 and the guide tube 36. The forward end of the flexible wire 32 is attached to the rear end of the tensioning rod 37. Thereafter the assembled fuze together with the wire 32 and the rod 37 are inserted into the ogive 6 of the projectile. The wire 32 is of a length which will cause the rod 37 to protrude an appreciable or practicable distance beyond the forward end of the ogive. The nose cap 38 is then screwed on the rod 37 and the outer end of rod 37 held by any suitable means, such as pliers, until such tension has been placed upon the wire 32 by rotation of the nose cap as will retract and hold the firing pin 27, against the bias of the spring 31, to cause the firing pin to assume the position as seen in Figs. 1 and 3. A suitable weather-proof cement is applied between the nose cap and the ogive. After the nose cap has been rotated to properly position the firing pin the protruding end of the tensioning rod is cut off flush with the end of the nose cap. During flight of the projectile the rotor 14 will be released by the detent 19a in response to centrifugal force and the primer 26 will be rotated into registry with the firing pin 27 as shown at Fig. 3 and detonation thereof will result on fracture of the frangible nose cap by impact with a target and the resultant release of tension on the wire 32. The wall of the nose cap is of a thickness which will fracture on contact with thin walled targets and it will be noted that the nose fractures or collapses upon the application of a force in a direction longitudinally of the projectile caused by impact with the target.

In the event that the projectile is dropped or otherwise mishandled in unarmed position Fig. 1, and the nose cap is fractured tension on the wire 32 will be relieved and the firing pin will be projected into the recess 28 in the rotor, locking the fuze in safe or unarmed position.

While I have disclosed a form of the invention presently preferred by me, various changes and modifications will occur to those skilled in the art after a study of the present disclosure. Hence the disclosure is to be taken in an illustrative rather than a limiting sense, and it is my de-

sire and intention to reserve all modifications falling within the scope of the subjoined claims.

Having now fully disclosed the invention, what I claim and desire to secure, by Letters Patent is:

1. In a fuze for an explosive projectile having an elongated hollow casing, a first support in the casing having a bore offset from the axis of projectile spin and parallel therewith, a spring pressed firing pin slidable in the bore and having a forwardly extending rod, a second support in the casing forward of said first support, an axially disposed guide tube in said second support, a frangible nose cap on the forward end of the projectile, an axially disposed tensioning rod in said nose cap screw threadedly connected in the forward end thereof and having a transversely extending opening in its rear end, a flexible length of wire passed through said guide tube and having its rear end secured in said forwardly extending firing pin rod and its forward end secured in the transverse opening in the rear end of the screw threaded tensioning rod, and a rotor movable from a safe to an armed position and having a recess therein in axial alignment with said firing pin in safe position to receive said spring pressed firing pin when said frangible nose cap is fractured accidentally.

2. In a fuze projectile detonating on impact, a hollow casing having an ogive and defining a chamber opening forwardly through said ogive, a fuze body fixed within said chamber in the rearward portion of said ogive, a rotor pivoted in said body, stop means between said rotor and fuze body limiting said rotor to rotation from a first safe position to a second armed position, first spring means urging said rotor into second position, means between said rotor and body releasably holding said rotor in

first position and released in response to firing of said projectile, a firing pin positioned in said body forwardly of said rotor and slidable from a first forward position free of said rotor, to a second rearward position engaging said rotor, second spring means urging said pin into second position, there being a holding recess in said rotor in alignment with said pin when said rotor is in first position and in which said pin may engage to hold said rotor in its said first position, said rotor being adapted to contain a primer in position to align with said firing pin when said rotor is in its said second position only, a frangible nose cap rotatable on said casing and closing said chamber, a rod centrally threaded to said nose cap, and an elongated flexible cable connecting said rod and pin and tensionable in response to turning of said nose cap to hold said pin in its said first position against the urge of said second spring means.

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