March 13, 1945. J. H. CHURCH ET AL 2,371,151

PROJECTILE

Filed March 22, 1941

Fig. 1.

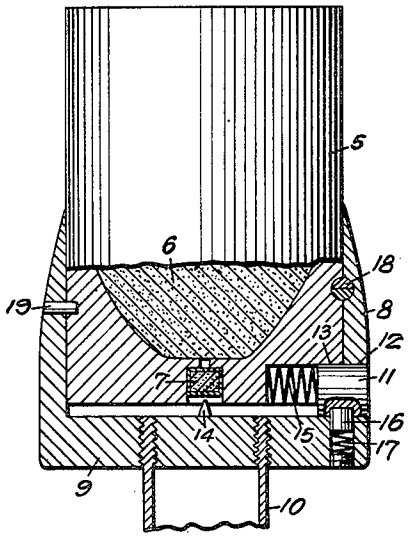


Fig. 2.

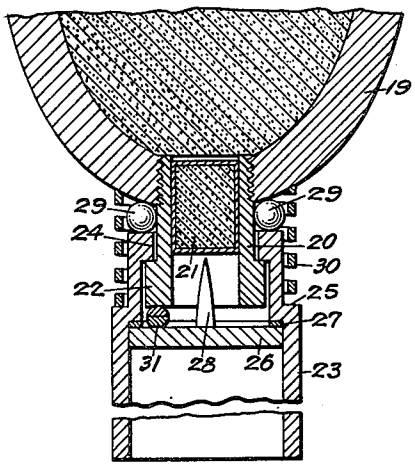


Fig. 3.

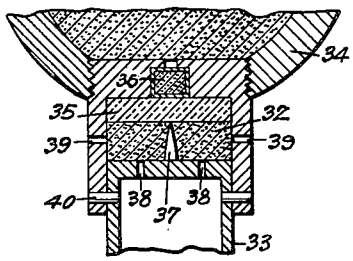


Fig. 4.

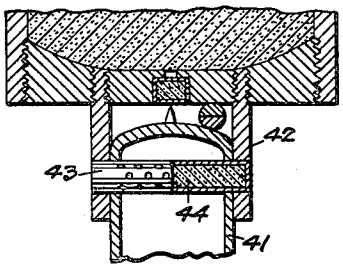


Fig. 6.

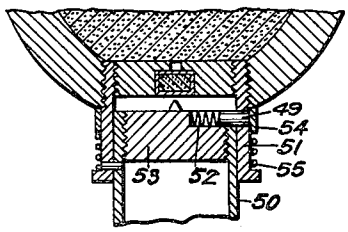
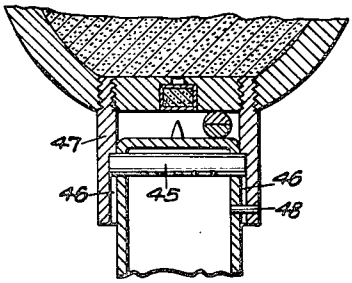


Fig. 5.



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PROJECTILE

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Application March 22, 1941, Serial No. 384,696

4 Claims. (Cl. 102—65.2)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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

This invention relates to a projectile.

Grenades projected from a rifle or discharged by means of the gases from a blank cartridge have a limited range and a low velocity. For this reason the conventional inertia firing pins have a slow action on impact.

The purpose of this invention is to provide a firing mechanism in which an outside element of the projectile may be coupled to the firing pin to increase its weight. Another object is to associate a safety member or unit with the firing mechanism in a novel manner.

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 drawing in which:

Fig. 1 is a longitudinal sectional view of the improved projectile;

Figs. 2 to 6 are longitudinal sections of modifications thereof.

Referring to Fig. 1 there is shown a projectile in the form of a rifle grenade which comprises a cylindrical casing or body 5 carrying an explosive charge 6 and primer 7. The body is slidably fitted in a cup whose side wall 8 may be of any height short of the front edge of the body and whose base 9 carries a tail member such as a rod or tube 10 which is adapted to be slidably mounted in or on a rifle barrel or similar device.

The cup is normally connected to the body by means of a bolt 11 which is inserted in an aperture 12 in the wall 8 and partially in a passage 13 in the body and serves to space the base 9 from the body to maintain a firing pin 14 carried by the base in safe relation with respect to the primer 7. A spring 15 normally tends to eject the bolt which is restrained by a set-back pin 16 mounted in the base and held in engagement with the bolt by a spring 17.

The body 5 is also maintained in spaced relation to the base of the cup by means of a pin 18 removable before firing and placed in any convenient position. A shear pin 19 also connects the body and cup and couples the members in spaced relation during flight.

In operation when the projectile is impelled, as by the gases of a blank cartridge fired in a rifle, the pin 16 sets back, and the bolt 11 is ejected at the commencement of flight. On impact the body 5 is arrested and the cup and tube continue forwardly to drive the firing pin into the primer.

In the modification shown in Fig. 2 the body 19 has a tapered read end. A sleeve 20 threaded in the rear end and carrying a primer 21 has an external flange 22 spaced from the rear end of the body. A tube 23 having an internal flange 24 forwardly engaging the flange 22 is formed with an annular shoulder 25. A disk 26 fitted within the tube is seated on a packing ring 27 seated on the shoulder and is adapted to receive the force of the propelling gases. A firing pin 28 disposed in front of the disk may be carried thereby.

One or more coupling members, herein shown as balls 29, are disposed between the flange 24 and the body 19 and transmit the impelling force from the tube to the body. The balls are caged by a set-back sleeve, herein shown as a helical member 30 with spaced convolutions, formed of a non-resilient material such as copper which will remain permanently collapsed after set-back. At the commencement of flight the pressure exerted by the tube may act to temporarily hold the balls in place and when pressure is relieved by the drag of the tube the balls will fall clear so that on impact the tube will continue forwardly to drive the firing pin into the primer. A safety pin 31, removable before firing, may readily be installed.

On inclined impact the whipping action on the tail will cause it to incline with respect to the axis of the projectile and this tilting will be sufficient to enable the firing pin to penetrate the primer.

In Fig. 3 a combustible material 32 such as black powder is used to transmit the impelling force from the tube 33 to the body 34. A disk 35 of asbestos is interposed between the powder 32 and the primer 36 and this disk is penetrated by the firing pin 37 when the powder is consumed and no longer constitutes a barrier. Flash passages 38 are formed in the end of the tube and vents 39 may be provided for the products of combustion. Shear pins 40 are provided to maintain the coupling during flight.

In Fig. 4 the tube 41 is coupled to a sleeve 42 by a hollow apertured pin 43 containing a combustible 44.

In Fig. 5 the hollow pin 45 has its ends disposed in grooves 46—46 of the sleeve 47 and a shear pin 48 connection is also provided.

In Fig. 6 the bolt 49 connects the tube 50 and sleeve 51 and is urged outwardly by a spring 52 mounted in a plug 53 closing the front end of the

tube. A set-back sleeve, 54 confining the bolt is normally held in place by a spring 55.

We claim:

1. A projectile comprising a main body portion carrying a primer, firing means comprising an adapter for attachment to a discharging member and including a firing pin, and detent means between said main body portion and said firing means holding the firing pin of the latter spaced from the primer, said detent means comprising a combustible material, and being accessible to the gases of propulsion.

2. A projectile comprising a main body portion carrying a primer, firing means comprising an adapter for attachment to a discharge member, and coupling means between said main body portion and said firing means holding the latter spaced from the primer, said coupling means comprising a tubular metal pin containing a combustible material and having openings for ignition thereof and for exhaust of the product of combustion.

3. A projectile according to claim 2 in which said projectile comprises a hollow tail and said firing means comprises a tube fitted therein.

4. A projectile comprising a main body portion carrying a primer, an adapter for attachment to a discharging member and comprising firing means for the primer, a shearable coupling between said adapter and said main body portion holding said firing means spaced from said primer and a combustible material between said adapter and said primer.

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