Dec. 24, 1946. F. SHORT 2,413,004

GRENADE

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Fig. 1.

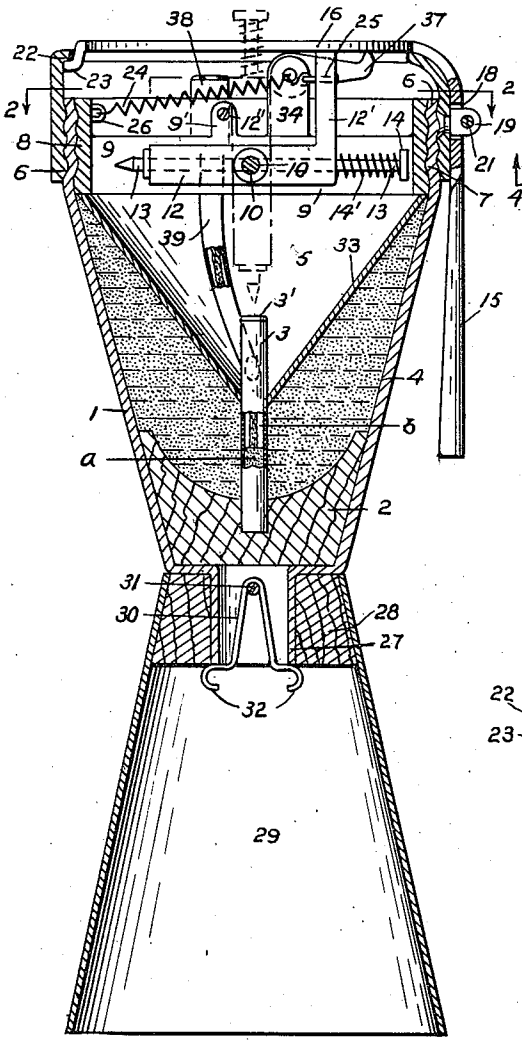


Fig. 2.

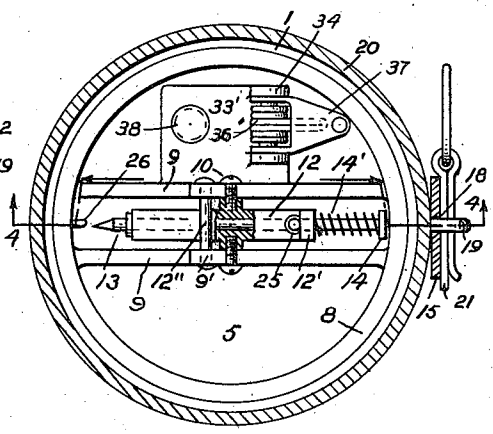
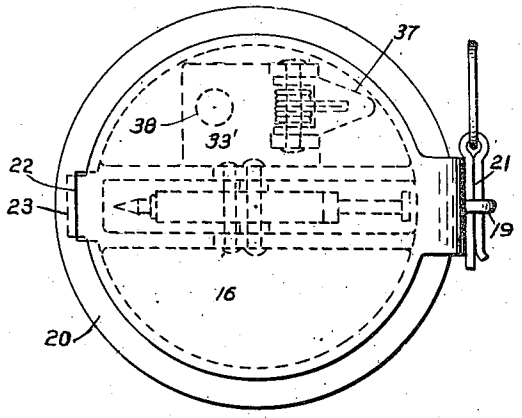


Fig. 3.



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Fig. 4.

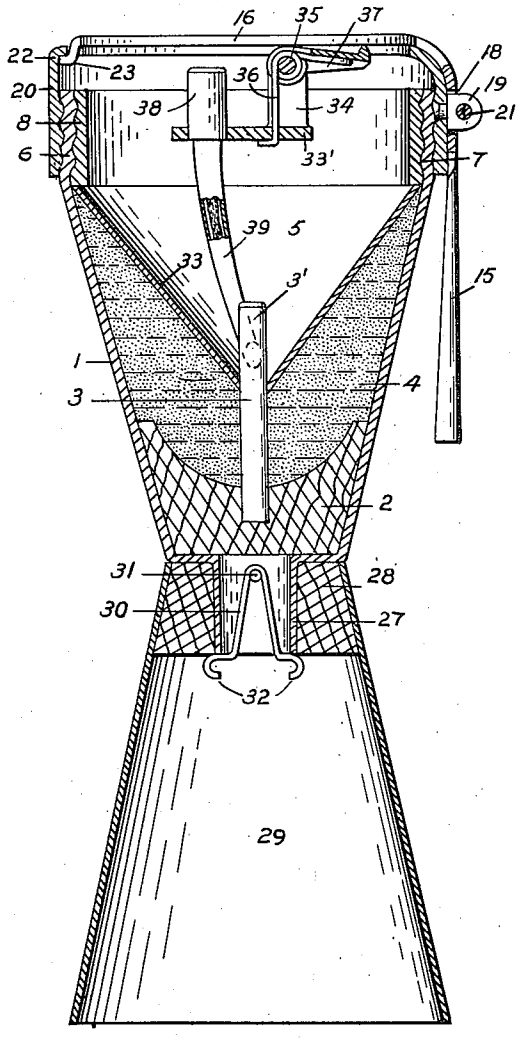


Fig. 5.

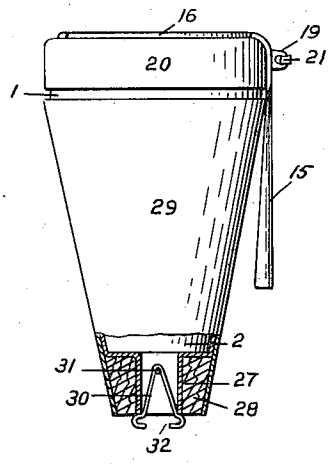
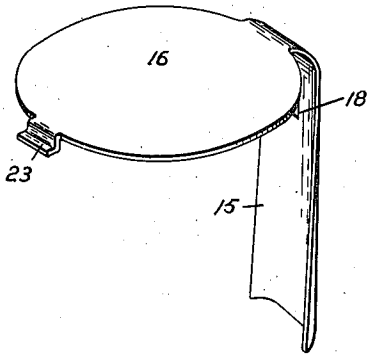


Fig. 6.



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Patented Dec. 24, 1946

2,413,004

UNITED STATES PATENT OFFICE

2,413,004

GRENADE

Frank Short, Canton Center, Conn.

Application March 1, 1943, Serial No. 477,583

3 Claims. (Cl. 102—64)

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

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

This invention relates to hand grenades.

The object of the invention is to provide a simple and effective weapon of this class in which the firing mechanism is remote from the primer when the grenade is in unarmed condition, but which will be quickly brought into armed condition, when the safety cover is removed.

Another object is to provide a grenade that in use under some conditions of warfare, comprises a comparatively large part that performs an important function, may be telescoped upon the main body of the grenade when being carried or to facilitate shipment, or when the weapon is used under conditions where it is not desirable to use a tail device.

The invention contemplates a combination of a novel striking device with a well known striker, and a combination with a well known grenade fuse with a novelly arranged fuse, the object being to assure the explosion of the grenade regardless of the position in which it lands.

Fig. 1 is a central vertical section of the grenade some of the parts being in section, the detonator shell being partly broken away.

Fig. 2 is a sectional plan about on the line 2—2 of Fig. 1.

Fig. 3 is a plan view.

Fig. 4 is a vertical section of about the line 4—4 of Fig. 2.

Fig. 5 is a view partly in section, showing the grenade body proper enveloped in what, in use, is the tail cone or tail of the device useful in certain kinds of warfare.

Figure 6 is a perspective view of the throw-off cover of the grenade.

On the drawings the numeral 1, designates the main body of the grenade, which may be made of heavy cardboard or plastic. The body is preferably conoidal in shape and contains at its lower end a block 2, which may be of wood or plastic, the block fitting snugly in the body and supporting a detonator 3 having a primer 3' the detonator extending through the solid explosive charge 4 in which there is a chamber or space 5 to permit the operation of the firing pin assembly, the parts of which will presently be described.

The upper end of the body 1 is formed with annular corrugations 6 that cooperate with similar corrugations 7 on the outer periphery of a metallic ring 8, having formed integrally therewith, cross bars 9 between which is pivoted at

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10 an L-shape member 12, in which is supported and works the firing pin or striker 13 provided with a head 14 between which and the member 12 is interposed a spiral spring 14', keeping the firing pin normally away from the primer 3' on the detonator 3.

As illustrated, the pivoted member 12 and the firing pin are in unarmed position by reason of the contact between the arm 12' of said member and the underside of the safety cover 16 of the safety lever 15. The safety lever is apertured at 18 for the passage of an eye 19, on the periphery of a clamping ferrule 20, the eye receiving a cotter pin 21, which, as usual, is removed before the grenade is thrown. The ferrule 20, has an inturned annular lip 22 under which extends a narrow tongue 23 opposite the point of mounting of the safety lever on the ferrule, the lip and tongue acting as a fulcrum for the safety lever and cover when they are thrown off. The means for throwing or kicking off the cover and lever, comprises a spiral spring 24, attached at one end to an eye 25 on the arm 12' and at the other to a similar eye 26 on the inner periphery of the ring 8, the spring exerting a constant and strong pull tending to rock the member 12 together with its firing pin, on the pivot 10, which movement of said member kicks the cover off when the lever 15 is released in throwing the grenade. Obviously, when the spring 24, acts to erect the member 12, the member brings with it the firing pin 13, and positions it as shown in dotted lines Figure 1, wherein the said member will engage a stop pin 12'' in ears 9' on the bars 9.

The lower part of the body 1, is reduced in diameter to form a cylindrical sleeve 27, against which is suitably fitted an annular truncated ring 28 of wood or plastic material. To the outer periphery of this ring is secured in any suitable manner, the upper end of a truncated tail cone 29, which may be conveniently made of wood or plastic. This cone is retained in place by a catch spring 30 through the upper loop of which passes a pin 31 secured to the sleeve. The spring as shown, has laterally extending arms 32, that fit under the lower surface of the ring 28 and hold the grenade body and tail cone together, it being only necessary to compress the springs sufficiently to permit its arms to pass through the sleeve 27 to remove the cone.

The shape of the hollow cone 29 and the grenade body is the same, thus permitting the cone to be removed from its relationship to the body as shown in Figure 1, and inverted or reversed

and slipped over the body as shown in Figure 5, rendering the whole device more compact for carrying or shipping or for use where the tail cone is not necessary or desirable. It will be noted that in this changed relative position between the cone and grenade body that the retaining spring remains in the sleeve as before, with its arms **32** in readiness to support and retain the cone in its nested relation with the grenade body, the arms in this case engaging the narrow end of the ring **28**, instead of the wider end.

In Figure 1 part of the detonator shell is broken away, showing the detonating arrangement preferred, in which the main part of the detonating charge *a* is comparatively low down in the main explosive charge, and ignited by medium such for instance as a Bickford fuse *b*. I desire it understood however, that I do not limit myself to the use of any particular fuse, as the kind will be used best suited and most appropriate to grenade practice, as dictated by the exigencies of the case.

To better define the chamber **5**, and stabilize with certainty the explosive charge, and to make the weapon more effective upon explosion, I prefer to provide a conical lining **33** of metal, which by the explosion of the main charge is formed into a destructive slug to increment the other disseminated parts.

Having described in detail one set of parts and explained the manner of their operation, which ordinarily will result in the explosion of the grenade, I will now describe the additional means for surely exploding it, regardless of the position in which it may land, or whether it lands at all.

The numeral **33'** designates a platform which is preferably made integral with one of the cross bars **9**, there being two ears **34** integral with the platform for the passage of the pin **35** upon which is mounted the usual spring **36** with one end extending through an aperture in the platform and the other located beneath the hammer **37**. The throw of the hammer under the influence of the spring **36**, when the cover flies off, brings it into contact with the primer **38** secured in the platform. Connected with this primer is a second fuse **39** which may be of any suitable kind, but preferably of the Bickford type. This fuse is cut into the detonator **3'** at a point a suitable distance below the detonator's upper end as shown.

For the explosion of the grenade by the firing pin **13** contacting with the primer **3'**, the grenade must strike head down which, guided by the lighter appendage in the way of the guide cone **39**, it will ordinarily do. However, with the additional mechanism of which the hammer **37** is a part, an explosion will be assured regardless of whether or not the firing pin head **14** strikes an object, because when the grenade leaves the hand or other instrumentality by which it is thrown and is on its way, it will obviously be doubly armed.

In throwing the grenade, it is grasped around the body, the grasp including the safety lever **15**. The cotter pin having been first removed, the

grenade is thrown and the safety and protective cover is kicked off by the joint action of the arm **12** under the influence of its spring **24**, and the hammer **37**, under the influence of its spring. If the grenade strikes head down or in position to operate the firing pin **13**, the fuse in the detonator **3** will be immediately ignited and will explode the charge in the predetermined time for such action, but should it fall on its side, or in some position other than that in which the firing pin will be operated, the other fuse **39** will have simultaneously been ignited and is standing guard against the failure of its companion fuse.

I claim:

1. A grenade comprising a body having a chamber therein, an explosive charge, a primer carrying detonator in said charge with its primer end in the chamber, a throw-off cover for the chamber, a pivoted member in the chamber, a spring-backed firing pin slidable in said member and having a portion extendable beyond the said body and adapted to operate the firing pin upon impact, said pivoted member being in contact with the cover to hold said member and firing pin in unarmed position, and spring means normally urging the pivoted member and its firing pin to armed position against the resistance of the throw-off cover.

2. A grenade comprising a body partially filled with an explosive charge, a primer carrying detonator positioned to detonate said charge, a firing pin mechanism in the body and including a spring-backed firing pin pivotally mounted in said body and positioned transversely thereof, said firing pin having a portion extendable beyond the grenade body to operate the firing pin upon impact, a throw-off cover for the body, connections between the firing mechanism and the cover whereby the firing pin is held in unarmed position by said cover, and spring means urging the firing pin into axial alignment with the detonator against the resistance of said throw-off cover.

3. A grenade comprising a body having a charge chamber, an explosive charge in said chamber, a primer and detonator axially disposed in said chamber, a rockable member in the chamber positioned normally transversely of said body, a spring-backed firing pin slidably mounted in said member and having a portion extendable beyond the chamber in armed position and adapted to operate the firing pin upon impact, a throw-off cover for the chamber, an extension on said rockable member in engagement with the cover to maintain said rockable arm in unarmed position, means urging said member into axial alignment with said primer, a second primer in the chamber having a fuse connecting with said detonator, a hammer pivotally mounted adjacent to last mentioned primer and held inoperative by engagement with the throw-off cover, and spring means normally urging said hammer to armed position against the resistance of said throw-off cover.

FRANK SHORT.