J. H. WOODBERRY.

GRENADE OR BOMB.

APPLICATION FILED DEC. 10, 1918.

1,366,623.

Patented Jan. 25, 1921.

2 SHEETS—SHEET 1.

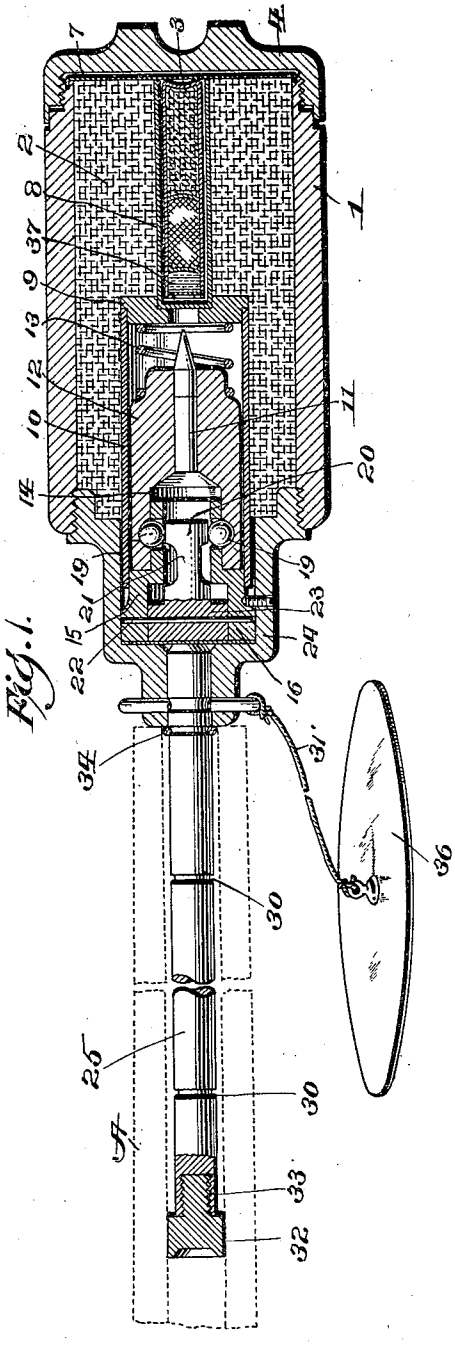


Fig. 1.

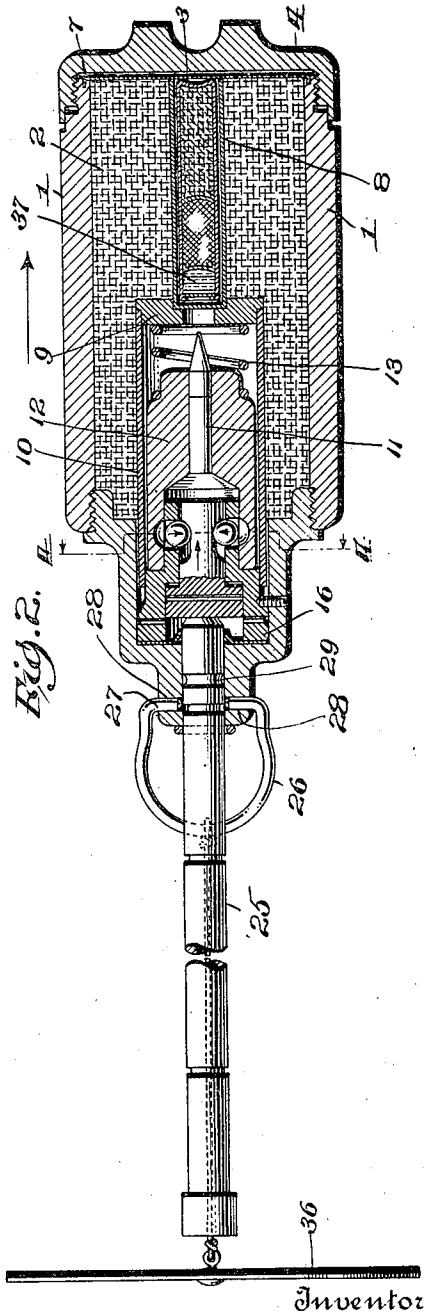


Fig. 2.

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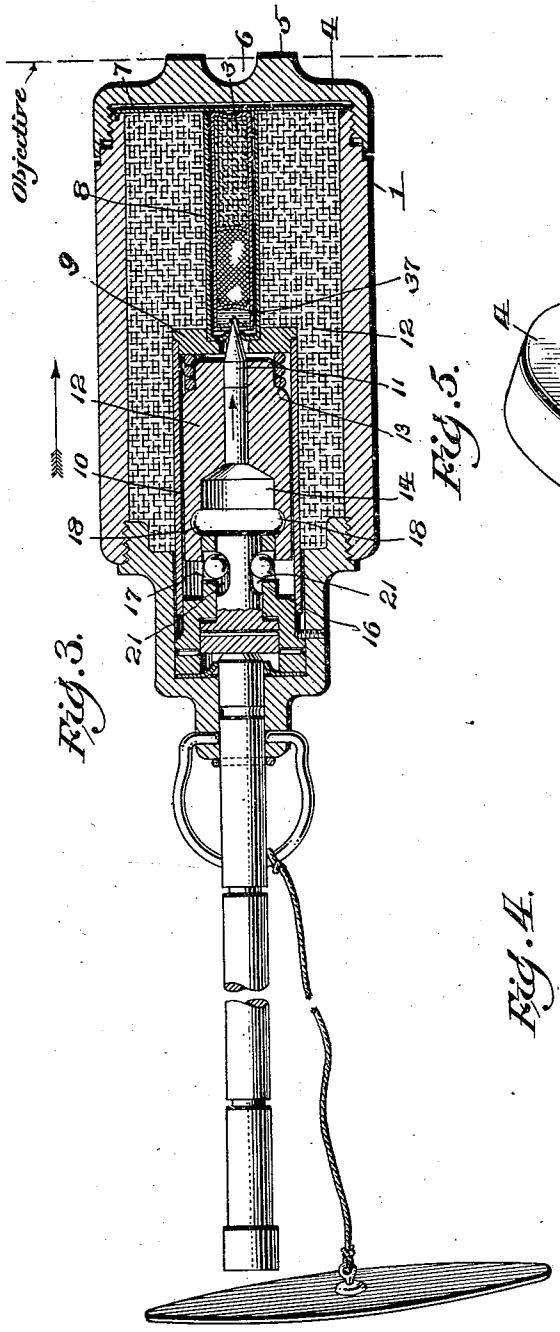


Fig. 3.

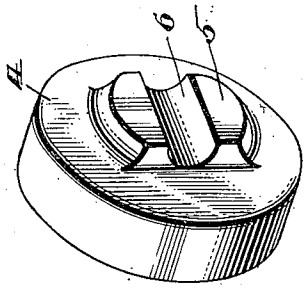


Fig. 5.

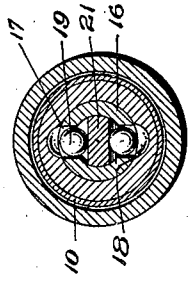


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN H. WOODBERRY, OF THE UNITED STATES ARMY.

GRENADE OR BOMB.

1,366,623. Specification of Letters Patent. Patented Jan. 25, 1921.

Application filed December 10, 1918. Serial No. 266,148.

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To all whom it may concern:

Be it known that I, JOHN H. WOODBERRY, major, Ordnance Department, United States Army, a citizen of the United States, stationed at Washington, District of Columbia, have invented an Improvement in Grenades or Bombs, of which the following is a specification.

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment of any royalty thereon.

This invention is applicable to grenades or bombs fired from rifles or other firearms which fire ammunition of a greater caliber than the bore of the arm; and has reference to rifle grenades containing high explosive charges, a removable detonator normally carried separately from the grenade, and a ball-release safety device or clutch for securing the plunger in a safe position during transportation and storage and for releasing the plunger by utilizing the shock of discharge of the propelling-charge at the instant of firing, so as to render the plunger operative upon impact.

Some of the objects of the invention are to provide a grenade possessing few parts, which is simple in construction and positive and sensitive in action and which insures safety during storage and handling incident to transportation of explosive devices.

Another important object is to provide means for insuring head-on flight and impact, said means preferably comprising a retarding tail carried by the grenade.

Another object is to provide novel means for securing the plunger in safe position during transportation and storage, and for releasing the plunger by utilizing the shock of discharge of the propelling charge at the instant of firing, so as to render the plunger operative upon impact.

With these and other objects in view, which will become apparent as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, claimed and illustrated in the accompanying drawings.

The invention is graphically illustrated in the accompanying drawings, which disclose an exemplary embodiment capable of carrying out the underlying principles thereof. The different views of the drawings may be briefly described as follows:

Figure 1 is a central, vertical, longitudinal, sectional view of a grenade embodying my improvements, showing the normal position of the parts thereof prior to discharging the rifle;

Fig. 2 is a similar view, showing the position of the parts immediately after discharge of the rifle;

Fig. 3 is a similar view, showing the position of the parts upon impact of the grenade with the objective;

Fig. 4 is a cross sectional view on the line 4—4, Fig. 2;

Fig. 5 is a detached detail perspective view of the end cap of the grenade.

Referring, now, in detail to the drawings;

1 is a grenade-body, which, as shown, is preferably a cylindrical shell having threaded ends, said body forming the principal fragmentation envelop containing the explosive charge 2, which is detonated, in the usual manner, by the explosion of the detonator 3. The forward end of the grenade is normally closed by an end cap 4, which is threaded on the grenade-body, as shown. To enable the cap to be readily screwed onto and off of the grenade-body, the cap is provided with a boss 5, having a groove 6, in which latter may be inserted a suitable tool, and, for this purpose, the stem of the grenade may be used.

To prevent moisture from entering the high explosive charge 2, and also to prevent said charge from spilling when the cap 4 is removed a disk 7 is shown as tightly fitting over the end of the grenade body, 1.

The detonator 3, together with the primer

37, is removably carried within the grenade body, and, for this purpose, may be slipped into and out of a lining or casing 8, carried axially within the grenade-body 1. This casing 8 may be situated in the end wall 9 of a fixed tube 10 within the grenade-body. The detonator 3 is shown as a commercial blasting-cap, containing a suitable primer 37, to insure detonation. However, it is well known that the primer is not essential, and that the fulminate of the blasting cap itself may be stabbed directly by the firing-pin 11, to produce detonation; consequently, the primer may be omitted, if desired.

The firing-pin 11 is carried by a plunger 12, reciprocating within said tube 10, a coiled spring 13 being disposed between the head of said plunger and the end wall 9 of the tube 10, and tending to force the plunger rearward, thus preventing premature explosion, due to the operation of the plunger while the grenade is in flight.

Said plunger 12 is provided with a hollow rear portion 14, which slides on a hollow cylindrical, open ended fixed member 15, provided with a hollow head 16. The member 15 is provided with apertures, 17, in which and the peripheral groove 18, in the hollow portion 14 of the plunger 12, are normally situated locking-balls 19, 19, constituting ball-clutches, thus locking the plunger to said fixed member 15 against movement. Slidable in the hollow member 15 is an auxiliary plunger 20, provided, intermediate the ends thereof, with longitudinally-extending grooves or pockets 21, 21. In the normal rearward position of said plunger 20, the grooves 21, 21 are out of registry with said balls 19, 19, as shown in Fig. 1, thus preventing release of the plunger.

For the purpose of yieldingly retaining the auxiliary plunger 20 in said rearward position, the shear pin 22 passes transversely through the head 23 of said plunger and through the head 16 of said stationary member 15.

By the locking means described, the plunger 12 is held in safe position during transportation and storage.

In the rear end of the grenade body 1, or that end opposite the cap 4, is screwed a hollow nose 24.

Detachably carried by the rear end of said nose is a stem or rod, 25. Any suitable means may be provided for detachably securing the stem to the nose. I have shown in the drawings my preferred means, comprising a rod or wire 26, of spring material, bent into the form of a loop, the bent terminals 27, 27, projecting into transverse openings 28, 28 in the rear end of the nose 24, and normally engaging a circumferential groove 29, in the stem 25.

The stem 25 is desirably of lesser diameter than the bore of the rifle with which it is intended to be used, as shown in Fig. 1, and, if said stem be of lesser diameter, I provide the same with a head 32, preferably detachably secured to the end thereof, as by a screw threaded connection 33 as shown in Fig. 1, said head constituting a piston-head. To support the stem, 25 in the rifle-barrel A, at the muzzle thereof, suitable means may be provided; in this instance, I have shown a split ring 34, of spring material, engaging the proper groove 30 on the stem.

The stem is assembled with the grenade by projecting the same into the rear end of the grenade, and, as soon as the groove 29 comes into register with the ends 27, 27, of the loop member 26, said ends spring into said groove, thus yieldingly holding said stem in position.

The invention comprises means for insuring true head-on flight and impact, when the grenade is discharged from the rifle. The drawings disclose my preferred form, comprising a flexible disk 36, preferably of fabric of suitable diameter to produce the desired air resistance. The disk may be conveniently secured to the loop 26, as by means of a flexible connection, such as a string 31. The disk 36 and the cord 31 may be appropriately termed the tail of the grenade.

Means are provided for predetermining the range of the grenade: It will be noted that a short insertion of the stem 25 in the rifle barrel "A" gives rise to a lower internal pressure and, consequently, a shorter range, than when the stem is inserted farther into the rifle-barrel.

The depth to which the stem shall be inserted into the rifle-barrel A may be determined by graduations on the stem, and in this instance, these graduations take the form of circumferential grooves, 30, equidistantly spaced on the stem 25.

Having thus fully described the construction of the device, the operation may be briefly described as follows:

The normal position of the parts is as shown in Fig. 1, in which the ball-release safety-device 19 is operative to hold the plunger in the rearward or safe position, during transportation and storage, and in which the auxiliary plunger 20 is held, by the shear pin 22, in the rear position thereof, so as to hold the ball clutches 19, 19 in locking position.

For the purpose of transportation and storage, the detonator, 3, with the primer 37, is withdrawn from the grenade-body; but, when it is desired to use the grenade, the end cap, 7, is removed and the detonator, with the primer, slipped into position in the grenade-body, and the cap again screwed

in place. The stem 25 of the grenade may be used to unscrew and screw the cap.

Also for purpose of storage and transportation the stem 25 is detached from the grenade. When it is desired to use the grenade, the stem is slipped into the grenade, the termials of the spring member 26 springing into the end groove 29 of the stem, as shown in Fig. 1; and, it having been determined the range at which it is desired to have the grenade explode, the stem 25 is inserted in the rifle barrel A to the corresponding graduation 30, on the stem.

The grenade is propelled by the shock of discharge of the propelling-charge of the rifle at the time of firing, said propelling charge being usually a blank cartridge, or a cartridge with the bullet removed. Upon firing the rifle, the stem is driven into the position shown in Fig. 2, pushing the auxiliary plunger, 20, inward, bringing the recesses or pockets 21, 21 thereof into register with the balls 19, 19, thus releasing the plunger 12, and arming the grenade. In the flight of the grenade, the tail assumes the position shown in Fig. 2, insuring a true head-on flight and impact.

Upon impact, the plunger 12 is driven forward in the usual manner, against the resistance of the spring 13, thus exploding the grenade by the penetration of the firing-pin, 11, into the primer 37.

Many changes will suggest themselves; but all such modifications as come within the scope of the patent claims constitute no departure from the spirit of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a rifle grenade, the combination, with the grenade-body, of a plunger, a stationary member internally carried by said grenade-body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, and a stem projecting into said grenade-body and contacting with said auxiliary plunger to move the same to release said clutch.

2. In a rifle grenade, the combination, with the grenade-body, of a plunger, a stationary member internally carried by said grenade-body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, and a stem projecting into said grenade body and yieldingly held therein against movement, said stem contacting with said auxiliary plunger and movable to push the same to release said clutch.

3. In a rifle grenade, the combination, with the grenade-body, of a concussion-plunger, a stationary member internally carried by the grenade-body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, a stem projecting into said grenade body and contacting with said auxiliary plunger to move the same to release said concussion plunger, and a member, of spring material, yieldingly holding said stem against longitudinal movement.

4. In a rifle grenade, the combination, with the grenade-body, of a concussion plunger, a stationary member internally carried by the grenade-body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, a stem projecting into said grenade body and contacting with said auxiliary plunger to move same to release said concussion plunger, and a wire loop, of spring material, yieldingly holding said stem against longitudinal movement.

5. In a rifle grenade, the combination, with the grenade body, of a concussion plunger, a stationary member internally carried by the grenade body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, a stem projecting into said grenade-body and contacting with said auxiliary plunger to move the same to release said concussion plunger, a member, of spring material, yieldingly holding said stem against movement, and a grenade-tail carried by said member and operable to insure head-on flight and impact of said grenade.

6. In a rifle grenade, the combination, with the grenade-body, of a concussion plunger, a stationary member internally carried by the grenade-body, a ball-clutch for normally locking said plunger to said stationary member and thus maintaining said plunger in unarmed relation, an auxiliary plunger normally holding said ball-clutch in operative position, a stem projecting into said grenade-body and contacting with said auxiliary plunger to move the same to release said concussion plunger, a member, of spring material, yieldingly holding said stem against movement, and a grenade-tail carried by said member and operable to insure head-on flight and impact of said grenade, said tail comprising a disk and a flexible connection between said disk and said member of spring material.

7. In a grenade designed to be fired from a rifle or other firearm, the combination, with the grenade-body containing explosive material, of a plunger within said grenade-body adapted to explode said material, and means operable to arm the plunger upon firing the rifle, including a stem projecting into said grenade-body and yieldingly held against longitudinal movement, said stem being insertible in the rifle barrel.

8. In a rifle grenade, a retarding tail carried thereby and operating to insure true head-on flight thereof, said tail comprising a disk and a flexible connection between said disk and the grenade.

JOHN H. WOODBERRY.