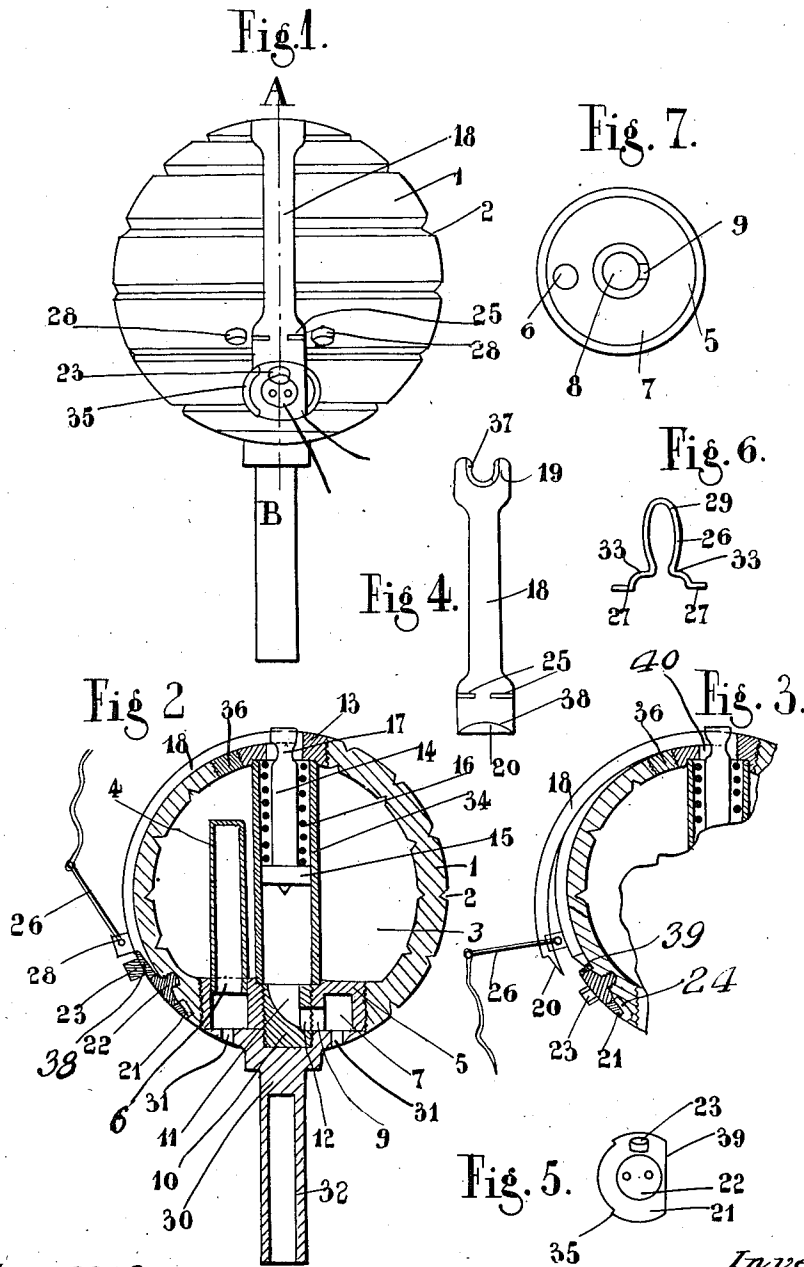


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GRENADE.

APPLICATION FILED SEPT. 25, 1913.

1,126,871.

Patented Feb. 2, 1915.



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# UNITED STATES PATENT OFFICE.

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## GRENADE.

1,126,871.

Specification of Letters Patent.

Patented Feb. 2, 1915.

Application filed September 25, 1913. Serial No. 791,880.

*To all whom it may concern:*

Be it known that I, LÉON ROLAND, captain, a citizen of Belgium, and resident of Liege, in the Kingdom of Belgium, have invented certain new and useful Improvements in or Relating to Grenades; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention has for its object a mechanical percussion grenade which can either be thrown by hand, from a sling or by means of a catapult, or by means of a gun or of a grenade projecting machine and which can be utilized instead of torpedoes, fougades or mines, and be thrown from airships or aeroplanes.

The grenade forming the object of the present invention, is characterized by the special combination of the safety devices operating in succession and affording the maximum security in the manipulation of the grenade which is compatible with the conditions in which appliances of this kind are employed. These successive safety devices are arranged in the following manner; the striker intended to fire the priming is retained in its cocked position by a movable lever, this lever is itself retained in this position by a bolt of special form. When this bolt is released from the lever in order to use the grenade, the movable lever prevents the striker from acting, because it is first of all retained owing to its special form by the hand of the person who manipulates the grenade, and when he has released it, by a safety catch. This catch is only disengaged from the lever, and releases it at the will of the operator, who has merely to exert traction upon a cord fixed to the catch.

The invention is illustrated as applied to a grenade to be fired from a gun in the accompanying drawing, in which:—

Figure 1 is an external elevation of the grenade. Fig. 2 is a section on the diametral plane A—B in the position in which the bolt is retaining the movable lever. Fig. 3 is a partial section on the same plane representing the position of the movable lever in which it is merely retained by the safety

catch, the bolt being disengaged. Fig. 4 is a front elevation showing the form of the movable lever. Fig. 5 represents the bolt. Fig. 6 shows the safety catch, and Fig. 7 is an underside plan view of the part carrying the fuse which transmits the flame to the charge.

The body of the grenade 1 is constituted by a hollow sphere the bursting of which is facilitated by the provision of the channels 2. The explosive charge occupies the hollow space 3 of this sphere.

The explosion of the internal charge is produced by a detonator housed in the tube 4, fixed in a screw 5 carrying the fuse and presenting at 6 a circular hole for the passage of the detonator. This screw 5 (see Fig. 7) presents an annular groove 7, the hole 6 already referred to which is eccentrically placed, a central hole 8 and an opening 9 in the inner wall of the groove 7. The screw is tapped in the hole 8 and threaded externally in such a manner as to screw into the body of the grenade. Inside the tapped portion 8, a screw 10 carrying the priming is mounted and includes a housing 11 for the priming and has a hole 12 adapted to register with the hole 9 in the screw, whereby the opening 12 is placed in communication with the groove 7. A fuse for transmitting the flame from the priming to the detonator passes through the holes 12 and 9 and occupies the grooves 7 and is connected at 4 with the detonator. The body of the grenade 1 carries diametrically opposite to the screw 10, a screw 13 having a channel in which the tube 34 is frictionally fitted to serve as a guide for the striker 14. The tube 34 is similarly fixed to the screw 5. The striker 14 has a shoulder 15 which serves as a support for a spiral spring 16 which also bears upon the screw 13. This striker is circular in section, and has a groove 17 therein. A movable lever 18 is housed in a corresponding slot in the sphere 1. At one of its extremities a fork 19 is provided which embraces the striker on a level with its groove 17, and retains it in cocked position. A housing of appropriate form is provided at the upper part of the screw 13 to receive the extremity 19 of the movable lever 18. The inner wall 37 of the fork of lever 18 is shaped in such a manner as to permit the disengagement of the striker 14 when the movable lever on being released at its oppo-

site end pivots around its point of support upon the screw 13 under the influence of the spring 16 of the striker. The movable lever 18 has its free end beveled on its outer face as shown at 20 which beveled portion terminates at its inner end in a vertical wall 38.

A bolt 21 pivoted around the screw 22 fixed to the sphere is able to rotate through an angle of 90°, its displacement being limited in any convenient manner for example by means of a lug fixed to the sphere and supported in a groove 35 in the bolt. The bolt 21 occupies a corresponding housing 24 in the sphere. It is circular, but presents a flat face 39. When it occupies the position represented in Figs. 1 and 2 it engages the beveled end 20 of the movable lever. When it occupies the position shown in Fig. 3, it is disengaged from this movable lever. The bolt is operated by means of a knob 23.

When the parts are in the position shown in Figs. 1 and 2, the portion of the bolt 21 which is near the knob 23 covers the plane 20 of the lever 18 and holds this lever in closed position. When the bolt 21 has been rotated through an angle of 90 degrees by means of the knob 23, that is to say, when the bolt is in the position shown in Fig. 3, the cut-away portion 39 is positioned from the beveled-portion 20 of the lever 18 and thus releases said lever. The striker 14 which is actuated by the spring 16 and which has its head engaged in the fork 19 of lever 18, causes said lever to rotate about the point 40 of the screw 13 until it is locked again by the safety catch 26. When the catch 26 is later removed from the grenade, the lever 18, actuated by the spring 16, continues to rotate about the point 40 until the head of the striker 14 slips from under the fork 19. To facilitate this disengagement of the striker, the fork 19 of the lever is provided with a cone-shaped face 37 on its inner wall.

It is advantageous to increase the friction of this bolt in its mounting in such a manner as to prevent it from rotating inopportunely for example by interposing a flat spring between the lower face of the bolt and the bottom of the cavity 24.

The movable lever comprises two notches 25 for the reception of the safety catch 26. This catch presents the form illustrated in Fig. 6. The two extremities 27 of this catch enter two holes formed in two studs 28 on the sphere 1. It is formed of steel wire so that it becomes deformed under the influence of a certain effort exerted upon its loop 29. Finally, a screw plug 30 is screwed onto the priming carrier 10 extending beyond the screw 5 and closes the grenade at its lower part. It is provided with vents 31 for the passage of the air necessary for

the combustion of the fuse. The screw plug 30 carries a tube 32 serving to fit the grenade upon a rod for firing it from a gun.

A charging screw 36 is housed in a mortise in the slot serving for the reception of the movable lever, and at the same time enables the screw 13 to be keyed in position.

In order to use the grenade, the striker being cocked, the bolt locking the movable lever, and the catch being in position, the bolt 21 is rotated through 90°, thereby releasing the movable lever 18. This lever is actuated by the spring of the striker by the intermediary of its fork 19 and rotates about its point of support, its lower end rising until the portions 33 of the catch entering the notches 25, again lock the movable lever in the position represented in Fig. 3. At this moment the striker is still retained in its upper position. A cord is fixed to the loop 39 or the catch, its other extremity being attached to a fixed point for example to the gun where it is held by the gunner.

The grenade having been discharged in any convenient manner, the cord becomes taut and at a certain moment, exerts upon the catch sufficient traction to deform it, and disengages it from the notches 25. The movable lever being released below, pivots around its point of support, and releases the striker 14, which under the influence of its spring 16 ignites the priming. The priming fires the fuse which in turn causes the explosion of the detonator and of the internal charge.

It is advantageous to make the cord of sufficient length to prevent the fall of the striker from taking place until the grenade is at a certain distance from the operator. The length of the fuse is determined in advance in accordance with the use to which the grenade is to be put in such a manner as to produce its explosion at a favorable point in its trajectory or on the ground. The form and dimensions of the grenade are such that when being manipulated, the operator's hand maintains the movable lever in its housing even when the bolt 21 is rotated in such a manner as to release the extremity 20 of the lever.

It will be noted that perfect security is afforded in using a ready-prepared grenade, this being due to the successive action of the following safety devices: 1. The bolt which acts up to the moment of actual use. 2. The hand of the operator acting until the moment at which the grenade is placed in the gun, or thrown by hand. 3. The catch locking the movable lever until the cord attached thereto is taut and exerts an adequate effort.

The grenade comprising a mortise screw 13, a striker 14, a spring 16, a tube 34, its screw 5 carrying the fuse and the tube 4 fixed by varnish, is charged by unscrewing

the charging plug 36 through the tapped hole in which the sphere is filled with the explosive utilized. The charging screw 36 is again arranged in position and by means of a rod the striker is cocked. The lever 18 is arranged in place and locked by the bolt 21 and by the catch 26. The screw 10 carrying the priming is then placed in position with its priming and the extremity of the fuse is then introduced into the screw 10 through the holes 9 and 12. After this operation has been effected a very slight rotation of the screw carrying the priming, wedges the fuse in these two holes and prevents it from becoming detached as a result of unintentional or inopportune tractional efforts. The second end of the fuse is then introduced into the tube 4 and the body of the fuse is lodged in the groove 7; this extremity carries a detonator. Finally the screw plug 30 is fixed. During all these operations absolute safety in manipulation is obtained because independently of the safety devices acting upon the movable lever, even if the priming becomes ignited the explosion cannot be produced until the moment at which the detonator is placed in the tube 4.

Independently of its use as a grenade fired from a gun or thrown by hand, the grenade forming the object of the present invention can also be used as a mine by placing it in the appropriate position with the bolt disengaged; by then exerting traction from a distance through the cord fixed to the

safety catch the grenade can be caused to explode.

#### Claims.

1. In a mechanical percussion grenade, the combination of a striker, of a spring actuating said striker, of a lever arranged upon the periphery of the grenade and provided at one end with a fork engaging the striker, of a bolt retaining the lever at its other end, of a safety catch pivoted on the body of the grenade and limiting the rotation of the lever when said bolt has been disengaged, and of a cord for removing the catch from the grenade for permitting said lever to rotate and release the striker.

2. In a mechanical percussion grenade the combination of a striker, of a spring actuating said striker, of a lever arranged upon the periphery of the grenade at the point where the grenade is held in hand, said lever being provided at one end with a fork engaging the striker, of a bolt retaining the lever at its other end, of a safety catch pivoted on the body of the grenade and limiting the rotation of the lever when said bolt has been disengaged, and of a cord for removing the catch from the grenade for permitting said lever to rotate and release the striker.

In testimony whereof I affix my signature in presence of two witnesses.

LÉON ROLAND.

Witnesses:

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