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BOMB, GRENADE, AND LIKE EXPLOSIVE PROJECTILE.

APPLICATION FILED SEPT. 18, 1916.

1,234,358.

Patented July 24, 1917.

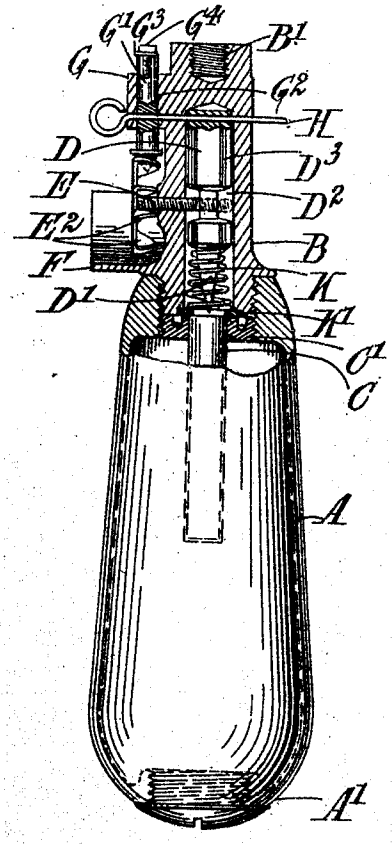


Fig. 1.

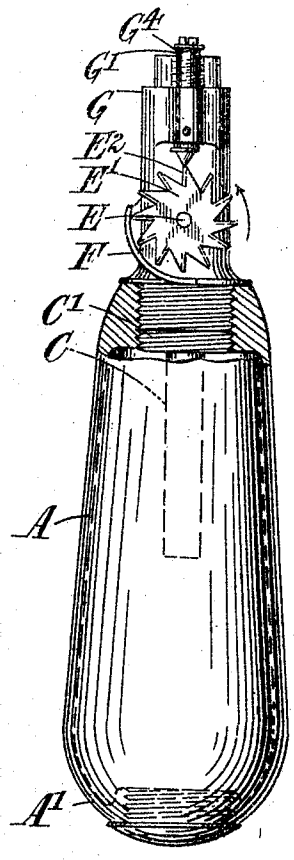


Fig. 2.

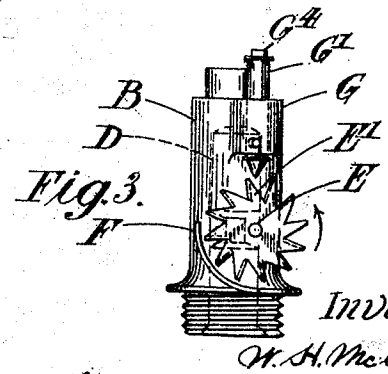


Fig. 3.

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)2. AMMUNITION AND
EXPLOSIVE DEVICES
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UNITED STATES PATENT OFFICE.

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BOMB, GRENADE, AND LIKE EXPLOSIVE PROJECTILE.

1,234,358. Specification of Letters Patent. Patented July 24, 1917.

Application filed September 18, 1916. Serial No. 120,815.

To all whom it may concern:

Be it known that I, WILLIAM HERBERT McCANDLISH, a subject of the King of England, residing at 638 Salisbury House, London Wall, London, England, have invented certain new and useful Improvements in Bombs, Grenades, and like Explosive Projectiles, of which the following is a specification.

This invention is for improvements in or relating to bombs, grenades and like explosive projectiles, and has for its object to provide an improved construction of safety device by which premature explosion of the projectile is prevented, and is applied to that type of bomb in which the explosion is brought about by a striker coöperating with a detonator which causes the explosion of the main body of explosive in the bomb.

According to this invention there is combined with the striker, a safety device which maintains it inoperative but which is directly actuated by a draft to release the striker. Locking means are preferably provided to hold the device against operation by a draft until required. The draft necessary for the operation of the device is provided by the passage of the bomb through the air.

The safety device according to this invention preferably takes the form of a pin screwed into a hold in the casing and engaging by its inner end a recess or projection on the striker to hold the latter withdrawn in its inoperative position; the pin is further formed at its outer end outside the casing with fan-blades or the like which rotate, and unscrewing the pin, withdraw it easily when subjected to a draft. The fan-blades may be of any ordinary or desired type, and the expression "fan-blades" is held to include cup-shaped blades or scoops of the kind which can be set in motion by a draft in any direction in the plane in which they rotate.

Further features of the invention will be hereinafter described and the novel details pointed out in the claims. The description refers to two particular constructions of projectile which are illustrated in the accompanying drawings wherein—

Figure 1 is a side elevation, partly in section;

Fig. 2 is a view at right-angles to Fig. 1, and

Fig. 3 is a partial side elevation of a modified construction.

Like reference characters indicate like parts throughout the drawings.

Referring first to Figs. 1 and 2, which illustrate a bomb adapted to be discharged from a fire-arm, the body A of the bomb which is to be filled with an explosive, is of truncated conical form closed at its larger end by a hemispherical end wall. At the smaller end a central aperture is threaded to receive a plug B containing the igniting mechanism for the explosive. A suitable detonator is inserted in a tube C secured to a nut C^1 screwed into the end of the body A of the bomb. Within the plug B there is mounted a striker D formed at its end with a steel point D^1 which coöperates with the detonator contained in C to cause the explosion. The striker D is formed with an annular groove D^2, and a pin E engages this groove to limit longitudinal movement of the striker until it is required. The pin E is threaded and screwed into a radial hole in the plug B. At its outer end the pin carries a disk E^1 formed with fan-blades E^2 of any convenient shape. As illustrated, these blades are formed by cutting non-radial slits from the edge of the disk E^1 and bending down, about a radial line, the triangular portions thus formed, so that these portions provide a radially extending surface in the plane of the axis of the pin E.

Upon the plug B there is formed a curved wind-shield F which shields about half of the fan E^1 E^2 from any draft of air as is clearly seen from Fig. 2.

Toward one end of the plug B, there is a radially extending lug G which is bored to receive an adjustable stop G^1. As shown in Fig. 1, the end of this stop engages with the fan-blades E^2 and prevents rotation of the pin E. The stop G^1, however, can be moved upward into the position shown in Fig. 2, to clear the fan-blades.

One feature of this invention relates to the provision of means on the stop G^1 for holding it against any return movement once it has been disengaged from the fan-blades E^2. This is effected by a detent G^2 consisting of a springy piece of metal secured at one end to the stop G^1. It is con-

veniently secured by bending the end over as indicated at G^3, and holding it by a screw G^4. The stop G^1 is cylindrical and a flat is formed on it to accommodate the spring G^2. When the stop is moved into the position shown in Fig. 2, disengaged from the fan blades, the end of the detent G^2 clears the end of the lug or guide G and, moving outward radially from the center of the stop G^1, it is in a position to engage the end of the guide and prevent any return movement of the stop G^1.

In order to prevent any possibility of the safety devices being released before the proper time, and to permit the safe handling and transport of explosive projectiles as above described, an additional pin H is used. This pin is conveniently a piece of wire and it is threaded through the stop G^1, the plug B and the striker D in the manner indicated in Fig. 1. This wire has, of course, to be withdrawn before the projectile is to be used.

Among the details of construction, it may be noted that the striker D is provided with a light spring K which is supported on a washer K^1 secured in the end of the plug B. Also, the striker D is provided with longitudinal grooves D^3 on its surface to prevent any cushioning of the movement of the striker by air contained in the casing. The end of the plug B is provided with a screw-threaded aperture B^1 to receive a stick or rod which is inserted in the barrel of the fire-arm by which this projectile is discharged.

Another feature of the invention consists in the formation of the nose of the body A. As above stated, the nose is hemispherical as at A^1. This is the front end of the projectile when it is in motion, and the spherical formation tends to maintain the projectile with its longitudinal axis in the line of flight since this is the position in which it offers a minimum resistance to the air.

The operation of this bomb is as follows:—

When it is to be used, the pin H is withdrawn by hand and the projectile is discharged, for example from a rifle. The shock, on discharge, sets back the stop G^1 from the position shown in Fig. 1 to the position shown in Fig. 2. The fan E^1 E^2 is therefore released and the draft of air caused by the flight of the projectile, operating on one half of the fan, causes it to rotate in the direction indicated by the arrow in Fig. 2. The pin E is therefore screwed out from the recess D^2 in the striker D which, however, is retained in the position indicated in Fig. 1 by the light spring K. When the projectile hits its target, the striker D is thrown forward by the impact, compressing the spring K and operating on the detonator in the tube C. This is ignited and the main charge in the body A is exploded. When the stop G^1 has been set back on the discharge of the projectile, the detent G^2 engages the end of the guide G and prevents the stop G^1 moving forward again from any cause whatsoever, and locking the fan E^1 before it has completely unscrewed the pin E.

Fig. 3 shows a slightly modified construction, in which the pin E is inserted to one side of the central diametral plane of the striker D, so that it passes down through the recess D^2, beside the central stem as indicated in dotted lines in Fig. 1. The benefit of this construction is that the length of the pin E can be very considerably increased, so that a larger number of revolutions of the fan E^1 is required before the striker D^2 is released. In other words, this construction enables the release of the striker to be retarded for a considerably longer period than is possible with the construction illustrated in Figs. 1 and 2, and this is sometimes particularly advantageous. Otherwise the construction and operation of the device are exactly similar to that already described.

It will be understood that various modifications may be made in the precise details of construction without departing from the spirit of the present invention as set forth in the appended claims. Thus, for example, with the cup-shaped blades above described, it might be possible to do without the windshield F. Also, if desired, two pins, similar to the pin E, may be provided on opposite sides of the striker, each provided with its own fan-blades to screw it into its releasing position. Finally, the detent G^2 may take any convenient form other than the particular form described and illustrated.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an explosive projectile the combination of a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a transverse pin screwed into said casing engaging said striker and having one end projecting from said casing, and fan-blades on the projecting end of said pin to rotate it when subjected to a draft of air, substantially as set forth.

2. In an explosive projectile the combination of a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a pin screwed into said casing engaging said striker to one side of its longitudinal axis and extending past the same, said pin having one end projecting from said casing and fan-blades on the said projecting end to rotate the pin when subjected to a draft of air, substantially as set forth.

3. In an explosive projectile the combination of a detonator, a striker coöperating

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therewith, a casing wherein said striker is situated, a pin screwed transversely into said casing engaging said striker and having one end projecting from said casing, fan-blades on the projecting end of said pin, and a wind-shield attached to said casing to protect the fan blades on one side of the pin from the air draft so that they may be rotated by the draft on the other side of the pin, substantially as set forth.

4. In an explosive projectile the combination of a body formed with a spherical nose, a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a transverse pin screwed into said casing engaging said striker and having one end projecting from said casing, and fan-blades on the projecting end of said pin to rotate it when subjected to a draft of air, substantially as set forth.

5. In an explosive projectile the combination of a body formed with a spherical nose, a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a transverse pin screwed into said casing engaging said striker and having one end projecting from said casing, and fan-blades on the projecting end of said pin to rotate it when subjected to a draft of air and a wind-shield attached to said casing to protect the fan blades on one side of the pin from the air draft so that they may be rotated by the draft on the other side of the pin, substantially as set forth.

6. In an explosive projectile, the combination of a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a pin screwed into said casing engaging said striker and having one end projecting from said casing, fan-blades on the projecting end of said pin to rotate it when subjected to a draft of air, an adjustable stop normally holding said fan-blades from rotation, a guide for said stop, a spring detent secured on said stop and lying normally within said guide but arranged to move laterally across the end of said guide when carried out therefrom by the movement of the stop into its disengaging position, substantially as set forth.

7. In an explosive projectile the combination of a detonator, a striker coöperating therewith, a casing wherein said striker is situated, a transverse pin screwed into said casing engaging said striker and having one end projecting from said casing, fan-blades on the projecting end of said pin to rotate it when subjected to a draft of air, an adjustable stop normally holding said fan-blades from rotation but movable to release them and a pin passing through said casing, striker and adjustable stop to maintain both striker and stop operative, and means for manually removing said pin, substantially as set forth.

8. In an explosive projectile, the combination of a body formed with a spherical nose, a detonator, a striker coöperating therewith, a casing for said striker, a pin screwed into said casing engaging said striker and having one end projecting from said casing, fan-blades on the projecting end of said pin, a guide on said casing, an adjustable stop in said guide normally holding said fan-blades from rotation, a spring detent secured on said stop and lying normally within said guide but arranged to move laterally across the end of said guide when carried out therefrom by the movement of the stop into its disengaging position, a pin passing through said casing and said stop and said striker and means for manually removing said pin to release the parts, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM HERBERT McCANDLISH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."