E. M. SHINKLE.

HAND GRENADE.

APPLICATION FILED JUNE 22, 1916.

1,242,053.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

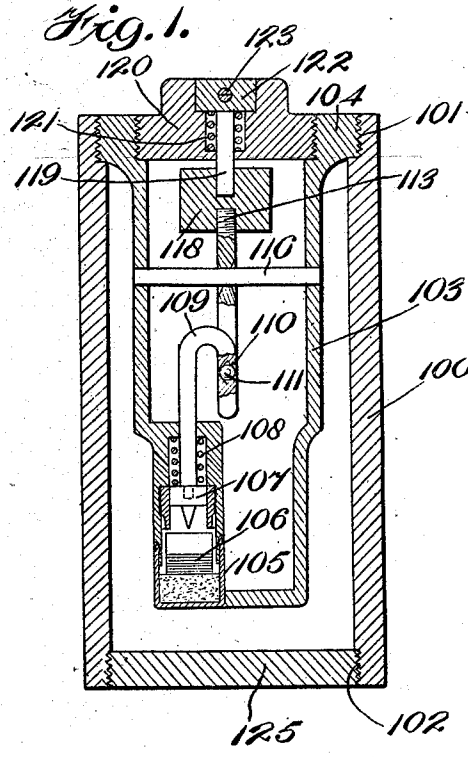


Fig. 2.

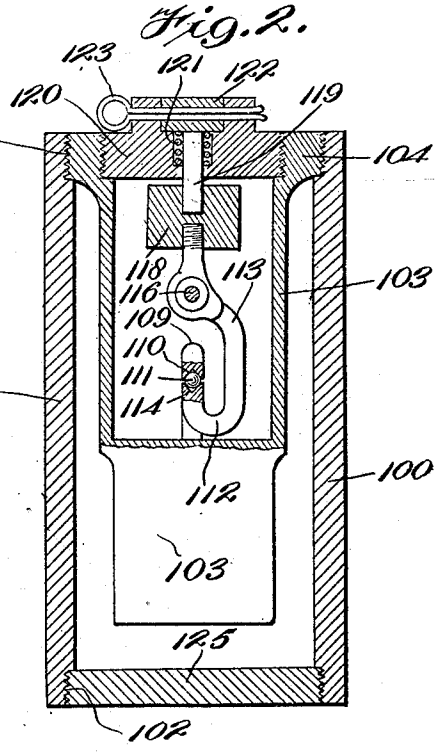


Fig. 3.

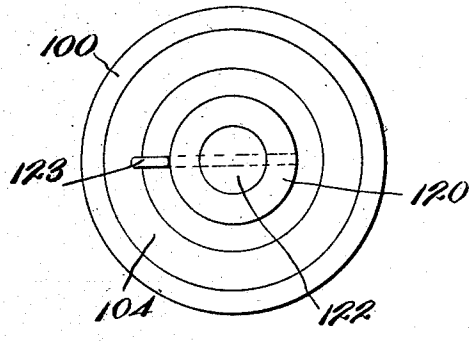
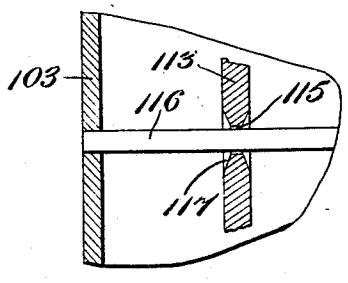


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

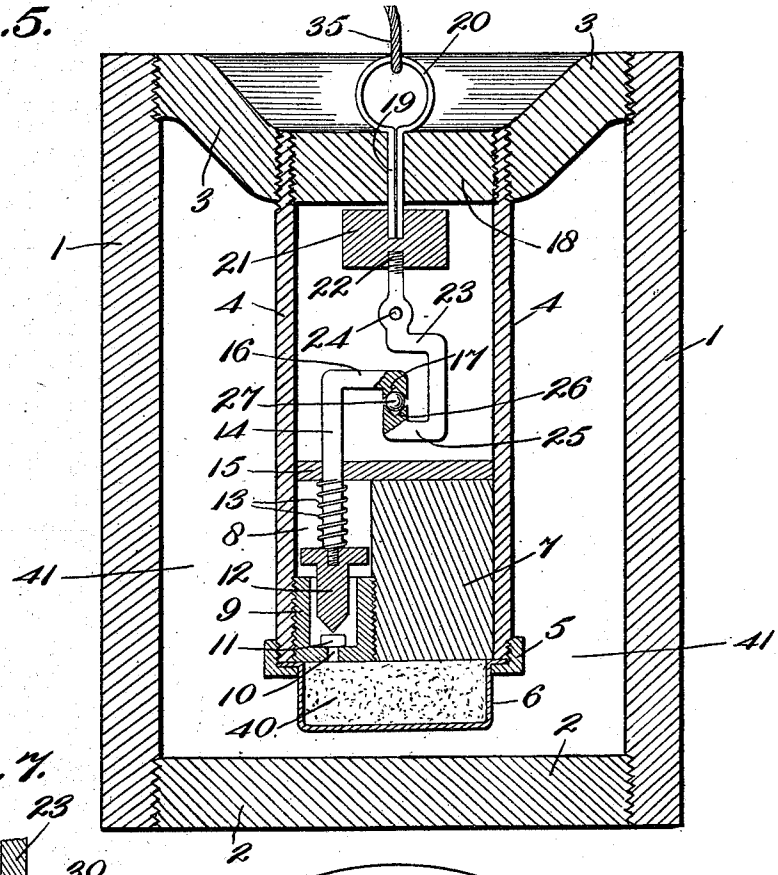


Fig. 7.

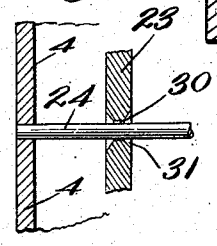
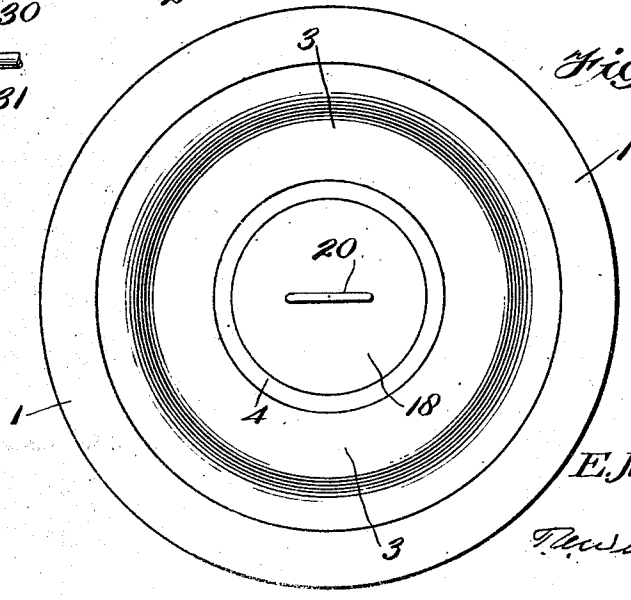


Fig. 6.



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UNITED STATES PATENT OFFICE.

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HAND-GRENADE.

1,242,053 Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed June 22, 1916. Serial No. 105,217.

To all whom it may concern:

Be it known that I, EDWARD M. SHINKLE, major, U. S. Army, and a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hand-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.

This invention relates to hand grenades and has for its object to provide a device of this character which will be simple in construction, safe to handle, and more efficient in action than those heretofore proposed.

With these and other objects in view the invention consists in the novel combinations of parts constituting an explosive hand grenade to be thrown by soldiers with their hands, all as will be more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—

Figure 1 is a sectional view of a hand grenade made in accordance with this invention;

Fig. 2 is a view similar to Fig. 1 but showing the parts from a different point of view;

Fig. 3 is a top plan view of the parts shown in Fig. 1;

Fig. 4 is a detail sectional view of a pivot suitable for use in connection with the trigger mechanism;

Fig. 5 is a sectional view of a somewhat modified form of the invention;

Fig. 6 is a top plan view thereof; and

Fig. 7 is a detail sectional view of a pivot suitable for use in connection with the trigger mechanism shown in Fig. 5.

Referring to the Figs. 1 to 4, 100 indicates any suitable casing preferably made of iron pipe screw threaded as at 101 and 102. 103 indicates any suitable casing screw threaded as at 104 to the said screw threads 101 of the pipe 100 and provided with the fulminate holder 105, the primer means 106 associated with said holder 105, the firing pin 107 and the firing spring 108. The firing pin 107 is preferably curved as at 109 and it is further provided with a socket 110 to accommodate the loose ball 111. Associated with the curved portion 109 of the firing pin is the curved portion 112 of the lever 113 also provided with a socket 114 adapted to register with the socket 110 and likewise accommodates the ball 111. The lever 113 is provided with a hole 115 which is larger than its pivot 116 carried by the casing 103 and which hole has preferably beveled sides 117 so as to provide the lever 113 with a sort of universal movement.

118 represents a weight carried by the lever 113 and 119 represents a pin adapted to hold said weight stationary. The pin 119 passes through the screw closure 120 carrying a spring 121 adapted to force out the head 122 of the pin 119 when the said head 122 is released as by withdrawing the locking pin 123. The said locking pin can be conveniently withdrawn by the thumb or finger when the grenade is thrown or a lanyard, (not shown), can be attached thereto if desired. A convenient method of manipulation, however, is to withdraw the said pin 123 and hold the thumb firmly on the head 122 so as to keep the pin 119 firmly seated in the weight 118 until the grenade is thrown, whereupon the said pin 119 will be forcibly withdrawn from the weight 118 by means of the spring 121 and the weight 118 thus released during the flight of the grenade. As soon as the grenade strikes, no matter what portion of the body 100 contacts, the weight being free to move in any direction, will bring the cavity 114 out of register with the cavity 110, whereupon the ball 111 will escape from between the cavities 114 and 110 and the firing spring 108 will carry forward the firing pin 107 and explode the fulminate in the casing 105. Between the casings 100 and 103 is carried the high explosive or other material which is set off by the fulminate in the casing 105, and the closure 125 conveniently holds said explosive in place.

The modified form of the invention is

similar to the preferred form just disclosed and may be described as follows:—

1 indicates any suitable outer casing to which is secured the end or bottom member 2 and the top closure 3. Carried by the top closure 3 is the housing, inner casing or tube 4, preferably exteriorly screw threaded at its lower end to accommodate the ring member 5 adapted to hold a cup, or fulminate holding member 6, and 7 indicates a plug fitting the lower end of the casing 4, said plug provided with a bore 8 adapted to accommodate the hollow plug or primer housing 9 conveniently screw threaded or otherwise secured to said plug 7 as indicated.

The said hollow plug 9 is provided with an orifice such as 10 leading into the fulminate holder 6 as shown, and above said orifice is a percussion cap, primer, or other igniter 11, all as will be clear from the drawings. Above the said cap 11 is a firing pin or other plunger mechanism 12 adapted to forcibly contact with the cap 11, as by means of the spring 13, and secured to said firing means 12 is the stem or rod 14 carrying said spring 13. The said firing pin 12 is conveniently guided in its movements as by passing the stem 14 through a disk or other guide 15, and said stem 14 is further conveniently provided with the offset end 16 having a cone or other shaped depression 17, all as will be clear from the drawings.

Closing the upper end of the casing 4 is a plug 18 through which passes a safety wire 19 provided with a loop 20 as illustrated, and said wire 19 conveniently enters the metal piece 21 to which is secured, as at 22, the trigger member 23 pivoted as at 24, and provided with the offset 25 provided with the cone shaped or other depression 26 adapted to register with the cone shaped depression 17, as illustrated.

Between the depressions 17 and 26 is located the ball 27 so that pressure exerted by the spring 13 will be transmitted from the walls of the depression 17 to the ball 27, and from the ball 27 to the walls of the depression 26, on to the trigger member 23 and pivot member 24 supported in the casing or housing 4, all as will be clear from the drawings.

The hole 30 in the trigger member 23 through which the pivot 24 passes is enlarged as best illustrated in Fig. 3, so that the said member 23 is very loosely supported on the said pivot 24 and said hole 30 is further preferably beveled out as shown at 31, so that the said trigger member 23 may approximate a universal movement around the said pivot 24.

A lanyard 35 is conveniently attached to the eye member 20 of the wire 19, so that when the grenade is thrown from the hand, the other end of the lanyard may be retained by the soldier and the wire 19 suddenly withdrawn from the weight 21 and the latter left free to turn around the pivot 24 in any direction in which gravity or its momentum may force it when the grenade strikes.

The turning of the weight 21 and the trigger member 23 around the pivot 24 will withdraw the cone 26 out of register with the cone 17 whereupon the ball 27 will drop from between the two cones and the spring 13 will force the striker 12 into contact with the primer 11 and thus ignite the fulminate or other explosive 40 in the holder 6. The space 41 is filled with an explosive or detonating charge and the ignition, explosion or detonation of the material 40 will set off the charge in said space 41 all in a manner well known.

It will now be obvious that by the constructions illustrated, I am enabled to do away with the streamers or other guides that are frequently employed in connection with hand grenades and which entail certain well known objections in use, and especially very serious objections when used in connection with trench warfare.

It will also be clear that I am enabled by this invention to do away with the time train which has been heretofore proposed, and which is usually ignited when the grenade is thrown and later becomes a source of danger under certain conditions. In fact, as is well known grenades provided with time trains are frequently thrown back into the trenches whence they came, and are thus used by the enemy against the attacking parties.

It is further apparent that both the constructions disclosed provide a grenade which may be perfectly safe in handling and in shipping as well as in storage and they provide a grenade that will explode on striking no matter what portion of its body may be the first to strike.

It will still further be seen that the lock and support to the firing pin afforded by the pin 119 and wire 19 and pivots 116 and 24 are sufficient to prevent any movement of the weights during flight or under the influence of any centrifugal force that may be generated due to the rotation of the grenade. These supports after the locking means are withdrawn, are ample to prevent the balls from leaving their position after the flight has commenced, and therefore, the firing pins are held in their safe positions, during flight and until a shock due to the striking of a solid object is had.

In other words, the parts may be so designed in each case that the locking of the firing pin may be entirely safe for storage and handling, while during flight, after the

said pin is partially unlocked due to the release of the weight, the pivot may be as sensitive as desired, and therefore no matter in what position the grenade may strike, the ball 27 will jump out of its sockets and the firing pin will strike the primer.

It is further evident that the variables that allow of an adjustment for sensitiveness in the size of the ball, the shape and depth of the cone shaped bearings for the ball, the strength of the firing spring, the mass of the weight, and the relation between the distance from the pivot to the center of gravity of the weight permit the manufacturer to attain any degree of sensitiveness which may be desired, and therefore, it is evident that the parts may be readily so designed that the mechanism will never operate under the influence of centrifugal force no matter what may be its instantaneous axis of rotation during flight. These are important features of the invention and so far as I know, they are new in hand grenades.

On the other hand, the insensitiveness of the device can as readily be made to be such that the mechanism will always operate on striking soft earth when thrown a reasonable distance. It therefore will be clear that the limits between the insensitiveness and the sensitiveness thereof are so far apart that the mechanism can be readily made to meet all the requirements of an entirely safe hand grenade as well as one that will be positive in its operation. The parts illustrated are conveniently made largely of standard steel piping but of course, may be made of any other suitable material.

It is obvious that those skilled in the art may vary the details of the construction, as well as the arrangement of parts without departing from the spirit of the invention and therefore it is not desired to limit this invention to the above disclosure except as may be required by the claims.

What is claimed is:—

1. In a hand grenade the combination of a container; a percussion firing means inside said container; a pivoted means adapted to move in three directions and to control said firing means; a safety means adapted to hold said pivoted means in a safety position; and means to release said safety means when the grenade is thrown, substantially as described.

2. In a hand grenade the combination of a container; a spring controlled firing means inside said container; means comprising a loose ball and pin for positively holding said firing means in its safety position during storage; shipment and throwing of said container; and means for removing said pin and partially unlocking said firing means during the flight of said container, substantially as described.

3. In a hand grenade the combination of a casing; a spring controlled firing means inside said casing; means comprising a loose member, holding devices for said member, and a lock for said devices for positively holding said firing means in its safety position during storage, shipment and throwing of said casing; means for withdrawing said lock and freeing said holding devices partially unlocking said firing means during the flight of said casing; and means for releasing said loose member from said holding devices, and completely releasing said firing means upon the impact of said casing substantially as described.

4. In a hand grenade the combination of a container; a spring controlled member constituting a firing means; a pivoted trigger means adapted to control said firing means; a weight adapted to move said trigger means in a plurality of directions; and a locking member adapted to control the action of said weight, substantially as described.

5. In a hand grenade the combination of a container; a spring controlled member constituting a firing means; a trigger member controlling said firing means; a loose member held between said spring controlled and said trigger members; a weight actuated member controlling said trigger member; and a locking member controlling said weight actuated member, substantially as described.

6. In a hand grenade the combination of a container; a spring controlled member constituting a firing means; a trigger member controlling said firing means; a loose member held between said spring controlled and said trigger members; a weight actuated member comprising a weight controlling said trigger member; and a locking member comprising a slidable piece and a lanyard controlling said weight actuated member, substantially as described.

7. In a hand grenade the combination of an outer casing adapted to hold an explosive; an inner casing adapted to house a firing mechanism; a spring controlled firing pin carried by said inner casing; a trigger member carried by said inner casing; a loose ball held between said pin and said trigger member; a weight connected to said trigger member adapted to move the same and release said ball when said outer casing strikes an object; a member positively locking said weight and trigger member against movement; and means for withdrawing said last named member while said outer casing is in flight, substantially as described.

8. In a hand grenade the combination of a container, a firing means inside said container; a pivoted trigger means comprising

a loosely held ball for normally controlling said firing means; a weight adapted to move said trigger means in a plurality of directions and means to restrain the action of said weight, substantially as described.

9. In a hand grenade the combination of a container; a percussion firing means inside said container; means comprising a spring controlled pin for normally locking said firing means in its safety position; a readily detachable pin for holding said spring controlled pin in its locking position; and means comprising a weight adapted to release said firing means when the flight of said container is arrested, substantially as described.

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

EDWARD M. SHINKLE.

Witnesses:
CLAUDE B. THUMMEL,
FREEMAN M. BOWLEY.

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