May 12, 1925. 1,537,208

S. WILEY

PERCUSSION FUSE

Filed Nov. 8, 1923

Fig. 1.

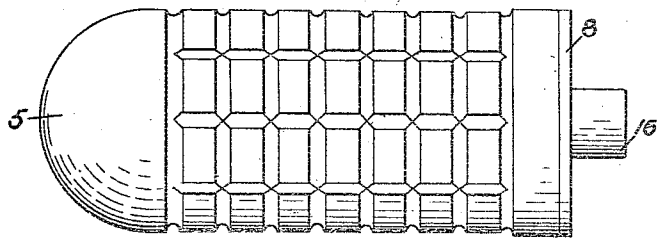


Fig. 2.

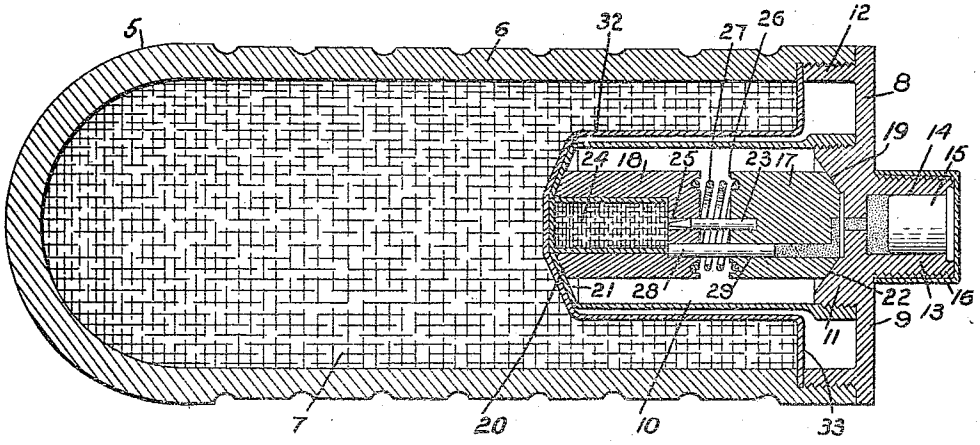
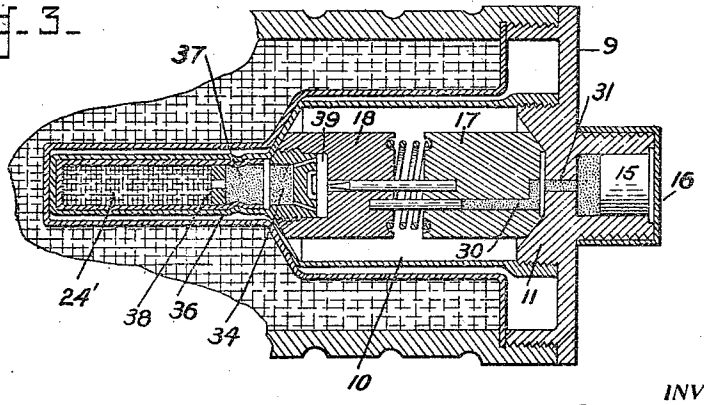


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PERCUSSION FUSE.

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(GRANTED UNDER THE ACT OF MARCH 3, 1883; 22 STAT. L. 625.)

To all whom it may concern:

Be it known that I, SAMUEL WILEY, a citizen of the United States, and a resident of Metuchen, county of Middlesex, and State of New Jersey, have invented an Improvement in Percussion Fuses, 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 to me of any royalty thereon, in accordance with the act of March 3, 1883.

The present invention relates to percussion fuses and particularly to that type of fuse adapted for use with hand and rifle grenades.

Heretofore, considerable difficulty has been experienced in the use of hand and rifle grenades due to the fact that these grenades are apt to explode prematurely, often inflicting serious injuries upon the troops using them.

The primary object of my invention is the construction of a grenade which will not explode until a safe time has elapsed in flight, i. e., until the projectile has moved a safe distance away on its trajectory.

A further object is the provision of a fuse which will explode the projectile regardless of the position of the same at the time of impact.

With the foregoing and other objects in view, my invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A particular embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a grenade equipped with my fuse;

Fig. 2 is a sectional view through the grenade and fuse; and

Fig. 3 is a sectional view of the grenade with a modified form of fuse, parts being broken away.

Referring to the drawings by numerals of reference:

I have shown at 5 a projectile which as illustrated is the ordinary type of rifle grenade. The grenade consists of a hollow casing 6 filled with any suitable explosive 7 and in the preferred embodiment of my invention is closed at its rear end by a fuse casing 8.

This fuse casing 8 includes preferably an outer member 9 and a thin walled container 10 which is screw threaded or otherwise secured to an inwardly extending projection 11 formed on the outer member.

The outer member, in the preferred embodiment of my invention, is formed with an annular flange 12 which is adapted to be screwed directly into the inner wall of the grenade itself, and with an outwardly projecting portion 13 which extends in a direction opposite to the projection 11. This outwardly projecting portion is recessed as at 14 to receive a primer cap 15. A cover 16 is provided which is screw threaded or otherwise secured upon the projection 13 and protects the primer cap from accidental ignition.

The container 10 is adapted to extend within the projectile and houses the actuating members of the fuse which include two normally separated blocks 17 and 18 formed with conoidal shaped ends 19 and 20. The blocks 17 and 18 are adapted to move freely within the limits of the inclined planes formed by the conoidal seats 21 and 22 formed in the casing 10 and the inwardly projecting portion 11 of the outer member 9.

One block, as for instance, the block 17 is provided with a striker 23 and the other block, as for instance, block 18 with a recess 24 adapted to receive a detonator or other exploding charge and with an opening 25 communicating with the recess 24 and within which the striker is adapted to reciprocate.

Any suitable means may be employed for maintaining the blocks apart in flight, as shown, seats 26 are formed on the opposite inner faces of the blocks 17 and 18 which are adapted to receive the ends of a coil spring 27 which is interposed between the blocks and normally serves to maintain the blocks apart.

For preventing arming of the fuse until a predetermined time in flight has elapsed one of the blocks, as for instance 18, is provided with a pin 28 which reciprocates in an opening 29 formed in the other block.

This opening 29 is filled for a portion of its length with a delay charge 30 and is so shaped as to communicate at its outer end with an opening 31 formed in the projection 11 of the outer member. The charge 30 is packed sufficiently tight so as to prevent movement of the pin, under all conditions, until the whole of the charge has been consumed.

A thin walled partition 32 is interposed between the container 10 and the explosive 7. This partition is shattered by the effect of detonation so that the explosive charge may be readily ignited. This partition is formed with an annular flange 33 and is maintained in place by the outer member 9.

The operation of my device is as follows:

When the grenade is thrown or discharged the primer 15 is exploded which serves to ignite the charge contained within the opening 31 and through that charge the delay 30. The blocks 17 and 18 are normally maintained apart in flight by the spring 27 interposed between said blocks. Moreover, the pin 28 cooperating with the delay charge 30 serves absolutely to prevent any relative movement of the blocks with respect to one another until the delay charge which may be of any desired length has been consumed. Explosion of the projectile is therefore prevented until a predetermined time which is measured by the length of the delay has expired. After the delay charge has been consumed, the fuse is armed. If the projectile then strikes an object the blocks 17 and 18 are thrown against one another by the force of inertia and against the opposition of the spring 27. When the blocks are brought together the striker explodes the detonator 24 or exploding charge and the grenade itself is then exploded. By providing conoidal ends for the blocks and conoidal seats to receive the same the fuse is made operative no matter in what position the projectile may strike.

When a delay at the moment of impact is desired greater than that provided by the fuse shown in Fig. 2, a fuse such as shown in the modification in Fig. 3, may be employed. This fuse is of essentially the same type as that heretofore described. However, for the detonator or exploding charge 24, a fulminate cap 39 and a delay 34 may be substituted, and the casing or container 10 may be provided with an extension 36 adapted to receive a detonator 24′ and if desired a delay 37 which may be separated from the detonator proper by an apertured partition 38.

With either type of fuse, the projectile cannot be exploded until it has moved a safe distance on its trajectory.

The grenade illustrated is of the type ordinarily used with rifles but may readily be converted into a hand grenade by the addition of the customary lever.

While I have described my fuse as useful with hand and rifle grenades it is by no means limited to this use, inasmuch as it may readily be employed with any type of projectile in which it is desired to positively prevent explosion of the projectile until a predetermined time in flight has elapsed. The fuse, moreover, may be located in any part of the projectile and is not necessarily limited to its employment as a base fuse.

I claim:

1. A fuse for projectiles embodying an outer member provided with a flange adapted to be threaded into the projectile, a container dependent from said outer member and adapted to extend within the projectile, a primer in the outer member, a plurality of normally separated blocks capable of relative axial movement mounted in the container, resilient means interposed between the blocks to maintain the blocks apart in flight, an exploding charge in one of the blocks, a striker in the other of the blocks adapted to be thrown against the exploding charge on impact, a pin in one of said blocks, a delay charge in the other of the blocks, said pin and charge adapted to cooperate to prevent relative movement of the blocks until a predetermined time in flight has elapsed, said delay charge being adapted to be ignited by the primer.

2. A fuse for projectiles embodying an outer member adapted for attachment to a projectile, a container carried by the outer member, a primer in the outer member, normally separated blocks capable of relative axial movement mounted in the container, firing means carried by the blocks and operated on relative movement thereof, and means for maintaining the blocks against relative movement until a predetermined time of flight has elapsed, said means including a delay charge adapted to be ignited by the primer.

SAMUEL WILEY.