June 9, 1936. G. E. ROGERS 2,043,266

FUSE FOR PROJECTILES

Filed April 30, 1935

Fig. 1.

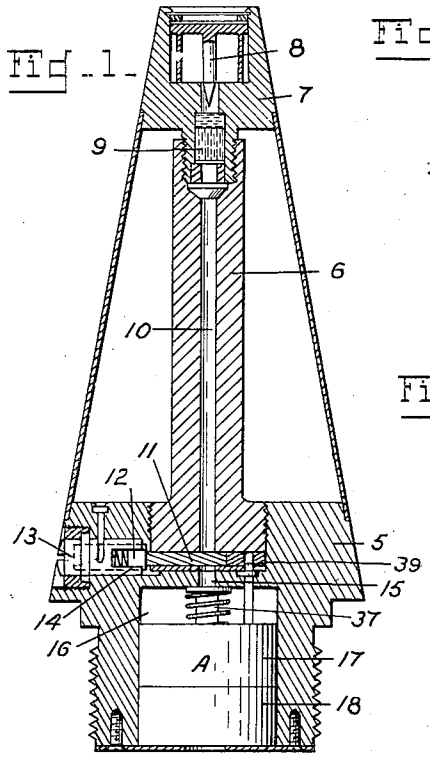


Fig. 2.

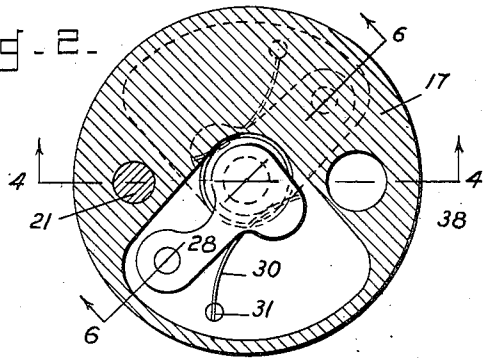


Fig. 3.

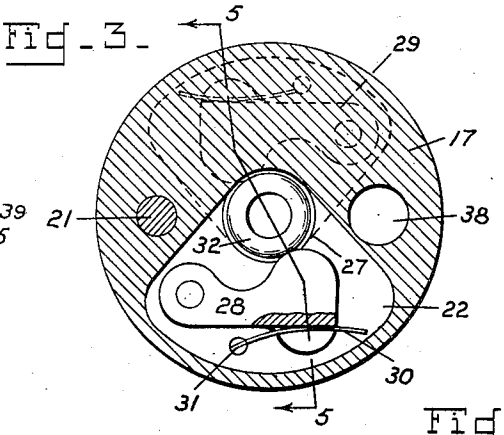


Fig. 4.

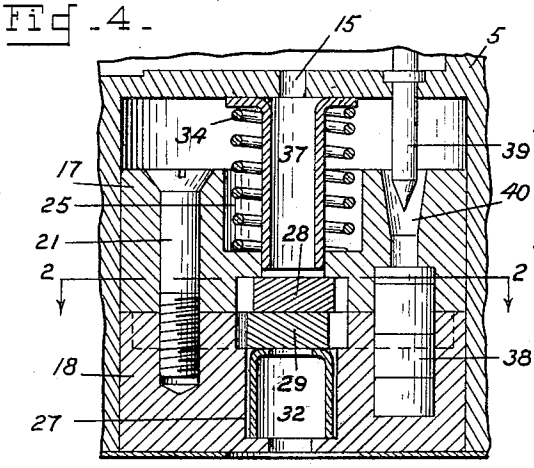


Fig. 5.

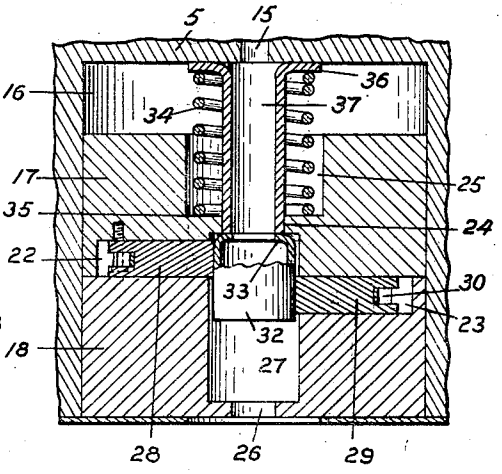
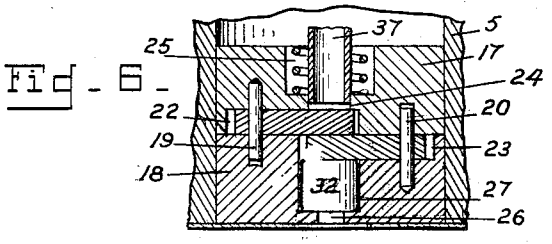


Fig. 6.



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2,043,266

FUSE FOR PROJECTILES

Gilbert E. Rogers, Rockaway, N. J.

Application April 30, 1935, Serial No. 18,981

6 Claims. (Cl. 102—39)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a fuse for projectiles.

In fuses for artillery projectiles a common practice for assuring safety of the firing mechanism consists in providing one or more members which interrupt a flash passage and are movable to inoperative or armed position under the influence of centrifugal force during flight of the projectile. The situation frequently occurs, especially in low angle impact, that these members, when no longer subject to the influence of centrifugal force, resume their original unarmed or safety position, before the fuse can function.

The purpose of this invention is to provide interrupting members in a plunger, to provide means for opposing return of the interrupting members, and to utilize these elements for positively holding the plunger in a safe position until impact.

To these and other ends, the invention consists in the construction, arrangement and combination of elements described hereinafter and pointed out in the claims forming a part of this specification.

A practical embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a longitudinal sectional view of a fuse with parts in elevation.

Fig. 2 is a sectional view on the line 2—2 of Fig. 4 and showing the leaves in interrupting position.

Fig. 3 is a similar view with the leaves in inoperative position.

Fig. 4 is a longitudinal sectional view of the plunger taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view on the line 5—5 of Fig. 3.

Fig. 6 is a sectional view on the line 6—6 of Fig. 2.

Referring to the drawing by characters of reference, there is shown a fuse comprising a body 5, a flash tube 6 attached thereto and a nose 7 attached to the front end of the flash tube. The nose carries an instantaneous firing mechanism including a firing pin 8 and a primer detonator 9. The passage 10 in the flash tube is normally closed by a slide 11 which is held in place by a spring-pressed bolt 12, the slide and bolt being movable outwardly under the influence of centrifugal force. A rotatable setting sleeve 13 has one position of adjustment in which it prevents outward movement of the slide and it is provided with slots 14 in its inner end, which in another position of adjustment, permit outward movement of the slide, the slide moving into the slots. This type of setting device is convenient but it is not sufficiently safe against accidental and premature functioning. So much of the fuse as has been described has been used for some years and forms no part of the present invention.

The body 5 has an aperture 15 in alignment with the passage 10 of the flash tube and opening into a chamber 16 which contains a plunger A. The plunger is formed of two die-cast blocks 17—18 held in proper relative position by dowels 19 and 20 and held against separation by a machine screw 21. The adjoining faces of the upper block 17 and lower block 18 are formed with similar cavities, respectively 22 and 23, which are arranged in opposite relation when the parts of the plunger are assembled.

The upper block is provided with a central aperture 24 and a counterbore 25 and the lower block is somewhat similarly provided with a central aperture 26 and a counterbore 27. The apertures and counterbores are in alignment with the passage 10 and enable the flash from the primer detonator 9 to pass rearwardly out of the fuse and into a booster charge, not shown.

The central opening in the plunger is normally closed or interrupted by a pair of similar leaves, the leaf 28 being disposed in the cavity 22 and pivotally mounted on the dowel 19 and the leaf 29 being disposed in the cavity 23 and pivotally mounted on the dowel 20. A spring 30 carried by a pin 31 is supplied for each leaf and acts on the free end thereof to hold it against one wall of the cavity and in a position to interrupt the central opening as seen in Figs. 2, 4 and 6.

A tube 32 having an inturned flange 33 on its upper end is positioned in the counterbore 27 and is normally held therein by the lowermost leaf 29. When the leaves are moved outwardly under the influence of centrifugal force due to rotation of the projectile in flight, the tube creeps forwardly because of linear deceleration of the projectile and occupies the position shown in Fig. 5 where it positively holds the leaves in the open position and prevents their return to the interrupting position as a result of ground impact.

The plunger is normally held in the rear part of the chamber 16 by a helical spring 34 which is confined between the shoulder 35 of the counterbore 25 and the outwardly turned flange 36 of a tube 37, the flange 36 being seated against the body 5 and held there by the spring. The tube is disposed within the helical spring and

has its rear portion in the aperture **25** with its extremity adjacent the upper leaf **28**. By virtue of this arrangement the tube serves to positively prevent forward movement of the plunger when the leaves are in the closed or interrupting position.

The plunger is shown as carrying a delay powder train **38** which is adapted to be fired by a firing pin **39** fixed in the body **5** and extending into the chamber **16**. The firing pin is preferably partially disposed in an aperture **40** in the plunger where it serves as a guide for the plunger.

The plunger is normally in the rear position where it is held by the spring **34** and the tube **37** and the central opening of the plunger is interrupted by the levers **28** and **29**. When a projectile equipped with the fuse has been fired from a gun and is in flight the leaves move outwardly under the influence of centrifugal force. The tube **32**, being no longer opposed by the leaves, creeps forward due to linear deceleration of the projectile until it engages the tube **37**. The tube **32** is now in the position shown in Fig. 5 where it prevents return movement of the leaves.

On impact the plunger moves forwardly due to its inertia. The tubes **32** and **37** however cannot move forwardly and as a consequence the tube **37** replaces the tube **32** in holding the leaves in the outward position. The tubes also serve to conduct the flash from the primer detonator **9** rearwardly to the booster charge (not shown).

The forward movement of the plunger on impact also causes the delay train **38** to be fired in the usual manner. If the setting sleeve **13** has been adjusted to prevent movement of the slide **11** the flash from the primer detonator **9** cannot pass and only the delay firing mechanism will function.

The arrangement of the parts of the plunger unit permits of rapid and inexpensive production and assembly.

I claim:

1. In a fuse, a casing having a chamber, a plunger mounted in the chamber and comprising front and rear connected blocks having cavities in their adjoining faces and each having a central opening, a leaf pivotally mounted in each cavity, means for normally holding the leaves in position to interrupt the central openings and yielding when the leaves are moved outwardly to open position, a rear tube in the central opening of the rear block and having an inturned flange on its front end, said tube displaceable forwardly upon linear deceleration of the fuse to maintain the leaves in open position, a front tube partially disposed in the opening of the front block and having a flange on its front end engaging the casing, said tube opposing movement of the plunger when the leaves are in interrupting position and replacing the rear tube between the leaves when the plunger moves forwardly due to inertia, and a spring between the plunger and the flange of the front tube.

2. In a fuse, a casing having a chamber, a plunger in the chamber and having a central opening, a pair of pivotally mounted leaves in the plunger, means for normally holding the leaves in position to interrupt the central opening and yielding when the leaves are moved outwardly to open position, a tube in the rear of the leaves and displaceable forwardly upon linear deceleration of the fuse to maintain the leaves in open position, a tube in front of the leaves and engaging the casing, said tube opposing movement of the plunger when the leaves are in interrupting position and replacing the rear tube between the leaves when the plunger moves forwardly due to inertia, and a spring seated on the plunger and holding the front tube against the casing.

3. In a fuse, a casing having a chamber, a plunger in the chamber and having a central opening, a member normally interrupting the central opening and movable to open position under the influence of centrifugal force when the fuse is in flight, a tube in rear of the interrupting member and displaceable forwardly upon linear deceleration of the fuse to hold the interrupting member in open position, a tube in front of the interrupting member and engaging the casing, said tube opposing movement of the plunger when the interrupting member is in interrupting position and replacing the rear tube as a holding element when the plunger moves forwardly due to inertia, and a spring for holding the plunger in rear position.

4. In a fuse, a casing having a chamber, a plunger in the chamber and having a central opening, a member normally interrupting the central opening and movable to open position under the influence of centrifugal force when the fuse is in flight, a tube partially disposed in the central opening of the plunger and having a flange on its front end engaging the casing, said tube opposing movement of the plunger when the interrupting member is in interrupting position, and a spring between the plunger and the flange of the tube.

5. In a fuse, a casing having a chamber, a plunger in the chamber and having a central opening, a member normally interrupting the central opening and movable to open position under the influence of centrifugal force when the fuse is in flight, a tube in front of the interrupting member and engaging the casing, said tube opposing movement of the plunger when the interrupting member is in interrupting position, and a spring seated on the plunger and holding the tube against the casing.

6. In a fuse, a casing having a chamber, a plunger in the chamber and having a central opening, a member normally interrupting the central opening and movable to open position under the influence of centrifugal force when the fuse is in flight, a tube in front of the interrupting member and engaging the casing, said tube opposing movement of the plunger when the interrupting member is in interrupting position, and a spring for holding the plunger in rear position.

GILBERT E. ROGERS.