July 14, 1931. G. E. ROGERS ET AL 1,814,059

FUSE

Filed March 3, 1931

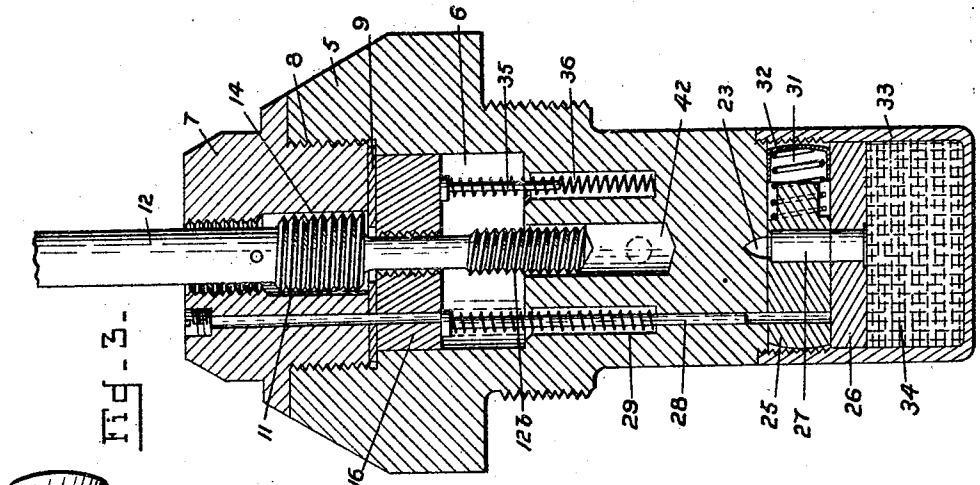


Fig. 3.

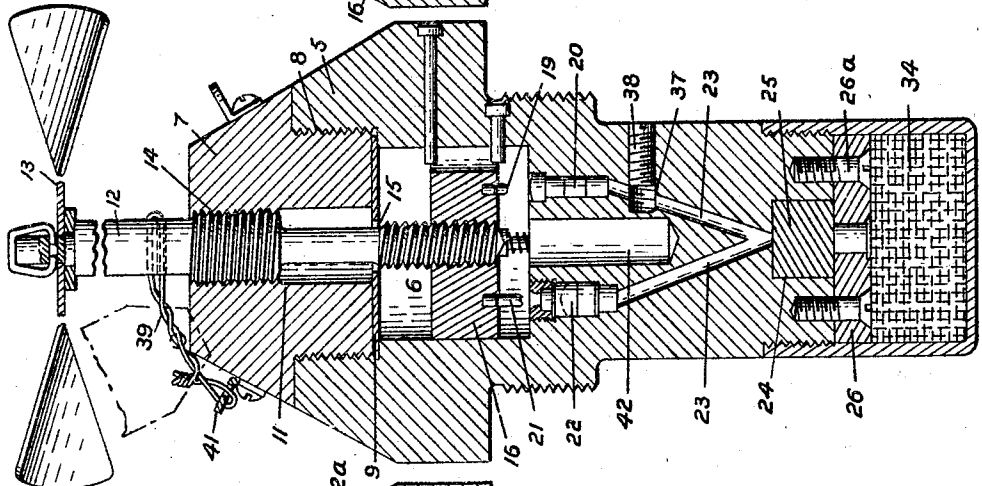


Fig. 2.

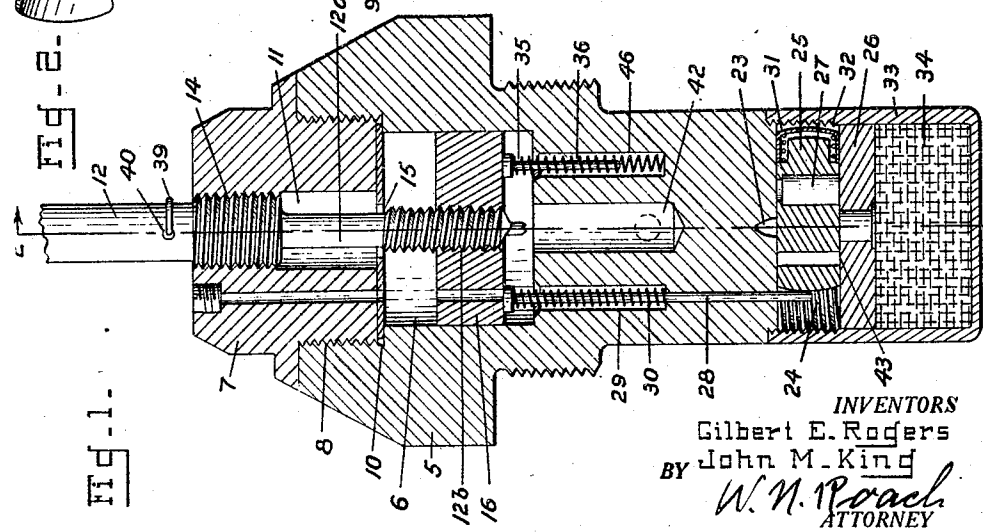


Fig. 1.

INVENTORS
Gilbert E. Rogers
BY John M. King
W. N. Roach
ATTORNEY

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UNITED STATES PATENT OFFICE

GILBERT E. ROGERS, OF ROCKAWAY, AND JOHN M. KING, OF DOVER, NEW JERSEY

FUSE

Application filed March 3, 1931. Serial No. 519,772.

(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 us of any royalty thereon.

This invention relates to a fuse and, more particularly, it has reference to a nose fuse for aerial drop bombs.

The principal object of the invention is to provide a fuse in which a novel arming mechanism holds a firing mechanism in safety in both the unarmed and armed positions and insures interruption of an explosive train until the projectile equipped with the fuse is in flight.

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 drawings, wherein:

Fig. 1 is a longitudinal sectional view of the improved fuse showing the parts in the normal unarmed position;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1; and

Fig. 3 is a view similar to Fig. 1, showing the parts in the armed position.

Referring to the drawings by numerals of reference:

The fuse consists of a body 5 having a large cavity 6 which is closed when the head 7 is partially inserted therein and attached by threaded engagement 8 to the body. A diaphragm 9 seated on an annular shoulder 10 in the side walls of the cavity is held in place by the head.

Passing through an axial bore 11 in the head is a striker 12 whose outer extremity carries a vane assembly 13. The shank of the striker is in threaded engagement 14 with the outer half of the bore 11 when the fuse is in the normal unarmed position shown in Fig. 1. A reduced spindle 12*a* on the striker passes through an aperture 15 in the diaphragm and has a threaded extremity 12*b* normally disposed in the cavity 6 where it carries a plunger 16. The threads on the extremity 12*b* have a greater pitch than the threads 14 on the shank of the striker 12 for a purpose which will be explained hereinafter.

The plunger is formed with a longitudinally extending slot 17 (Fig. 2) in which the ends of pins 18—18 carried by the body 5 are engaged for the purpose of preventing rotational movement of the plunger. The plunger carries a plurality of firing pins, in the present instance, two being shown. The firing pin 19 is in alignment with an instantaneous powder train 20 and the pin 21 is in alignment with a delay powder train 22. Both of the powder trains are carried in the body 5 and each one is in communication with one of a pair of converging flash passages 23—23.

Formed in the lower or inner end of the body is a transverse passage 24 in which is mounted a slide or carrier 25 confined by a plate 26 secured to the body by screws 26*a*. A detonator 27 in the carrier is normally out of alignment with the converged flash passages when the carrier is held at one end of the passage by means of a rod 28. The rod 28 is positioned in a longitudinally extending aperture 29 in the body and is maintained in the path of movement of the carrier against the action of a spring 30 by means of the plunger 16. The carrier is also provided with a spring 31 for moving it to armed position when not opposed by the rod 28. The spring 31 is seated in a cup 32 disposed in the passage 24 and retained by a large cup 33 threaded to the body and carrying a booster charge 34.

A rod 35 positioned in the body diametrically opposite to the rod 28 is caused to bear against the block 16 by a spring 36.

A threaded passage 37 in the body intersects the flash passage 23 leading from the instantaneous powder train 20 and permits the selective insertion of a screw plug 38 to obstruct the passage 23.

In the normal unarmed position the parts of the fuse are arranged as shown in Figs. 1 and 2 and the striker 12 is positively held against rotation by means of a wire 39 passing through an aperture 40 in the striker

and also through a bracket 41 secured to the head 7.

When a bomb equipped with a fuse is mounted in the rack of an airplane the wire 39 is replaced by the well-known release wire of the launching mechanism.

When the bomb is dropped, the air resistance causes the vane assembly 13 to rotate the striker which is threaded into the fuse head until brought up against the diaphragm 9, as shown in Fig. 3. In this position the threads on the striker are disengaged from the threads in the fuse head. At the same time the extremity 12*b* of the striker moves into the aperture 42 formed in the body. Since the plunger 16 is held against rotation by the pins 18—18, and since the pitch of the threads on the extremity 12*b* is greater than the pitch of the threads 14 to provide a differential screw, the plunger will be constrained to be retracted towards the diaphragm in which position it is held by the spring-pressed rods 28 and 35, as shown in Fig. 3. When the striker is arrested by the diaphragm the threads on the extremity 12*b* will preferably be clear of the plunger with the outermost end thread in sufficient proximity thereto to prevent the firing pins carried by the plunger from actuating the powder train in the event of failure of the rods 28 and 35 or their springs.

The rod 28 in following the plunger releases the carrier 25 and the detonator 27 is moved in to register with the flash passages 23. On impact the striker is driven in, shearing the diaphragm and forcing the plunger home to set off both the powder trains. The rod 28 being likewise driven in is received in the aperture 43 in the carrier and thereby insures the retention of the carrier in the armed position.

When it is desired to have the fuse function with a delay action the screw plug 38 is threaded in to obstruct the flash passage leading from the instantaneous powder train.

We claim:

1. A fuse comprising a body formed with a cavity, a frangible diaphragm in the cavity, a head secured in the mouth of the cavity and confining the diaphragm, a plunger in the cavity, firing pins carried by the plunger, means for holding the plunger against rotation, powder trains in the body in line with the firing pins, converging flash passages leading from the powder trains, a carrier mounted transversely in the body, a detonator in the carrier, means for moving the carrier to armed position to align the detonator with the converging flash passages, a rod mounted in the body, a spring normally urging the rod against the plunger and out of the path of the carrier, and a striker having a shank threaded in the head and a reduced spindle passing through the diaphragm and threaded in the plunger to hold the plunger in and maintain the rod in the path of the carrier, the pitch of the threads on the spindle being greater than the pitch of the threads on the shank of the striker whereby to retract the plunger as the striker is threaded inwardly.

2. A fuse comprising a body formed with a cavity, a frangible diaphragm in the cavity, a head secured in the mouth of the cavity and confining the diaphragm, a plunger in the cavity, means for holding the plunger against rotation, a carrier mounted transversely in the body, means for moving the carrier to armed position, a rod mounted in the body, a spring normally urging the rod against the plunger and out of the path of the carrier, and a striker having a shank threaded in the head and a reduced spindle passing through the diaphragm and threaded in the plunger to hold the plunger in and maintain the rod in the path of the carrier, the pitch of the threads on the spindle being greater than the pitch of the threads on the shank of the striker whereby to retract the plunger as the striker is threaded inwardly.

3. In a fuse, a casing, a plunger mounted for movement longitudinally of the casing, means for holding the plunger against rotation, a carrier mounted for movement transversely of the casing, a rod in the casing of sufficient length to extend in the path of movement of both the plunger and carrier, a spring urging the rod into contact with the plunger, a striker threaded in the casing and having a spindle threaded in the plunger to hold the plunger in position in order to maintain the rod in the path of the carrier, the pitch of the threads on the spindle being greater than the pitch of the threads on the striker whereby to retract the plunger, and frangible means for arresting inward movement of the striker.

4. In a fuse, a casing, a plunger mounted for movement longitudinally of the casing, means for holding the plunger against rotation, a carrier mounted for movement transversely of the casing, a rod in the casing of sufficient length to extend in the path of movement of both the plunger and carrier, a spring urging the rod into contact with the plunger, and means operable during flight for retracting the plunger.

5. A fuse, including a body formed with a cavity, a frangible diaphragm in the cavity, a head secured in the mouth of the cavity and confining the diaphragm, a plunger in the cavity, means for holding the plunger against rotation, a striker threaded in the head and having a reduced spindle passing through the diaphragm and threaded in the plunger, the pitch of the threads on the spindle being greater than the pitch of the threads on the striker, and means operable

during flight to thread the striker into the fuse until it is arrested by the diaphragm.

6. A fuse, including a casing, a plunger mounted in the casing for longitudinal movement, means for holding the plunger against rotation, a striker threaded in the casing and having threads of greater pitch engageable with the plunger.

7. A fuse, including a casing, a plunger mounted in the casing for longitudinal movement, means for holding the plunger against rotation, a striker threaded in the casing and having threads engageable with the plunger.

GILBERT E. ROGERS.
JOHN M. KING.