Dec. 9, 1924. 1,518,247

H. M. BRAYTON

TRACER FUSE

Filed July 25, 1924

Fig. 1.

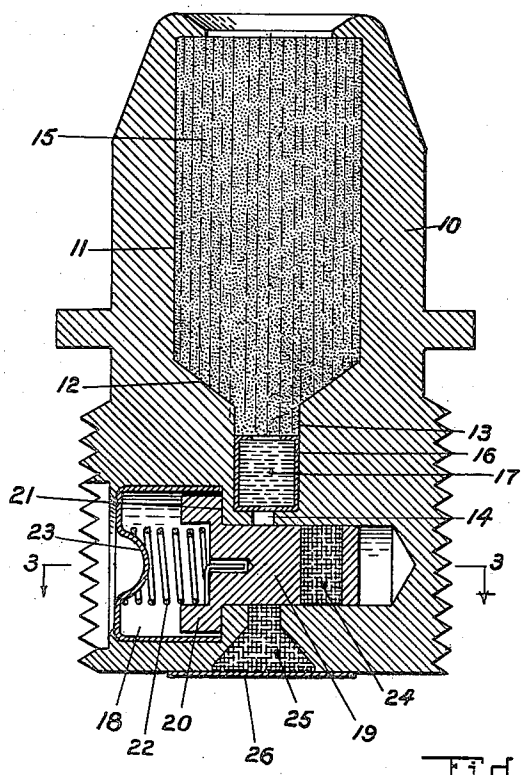


Fig. 2.

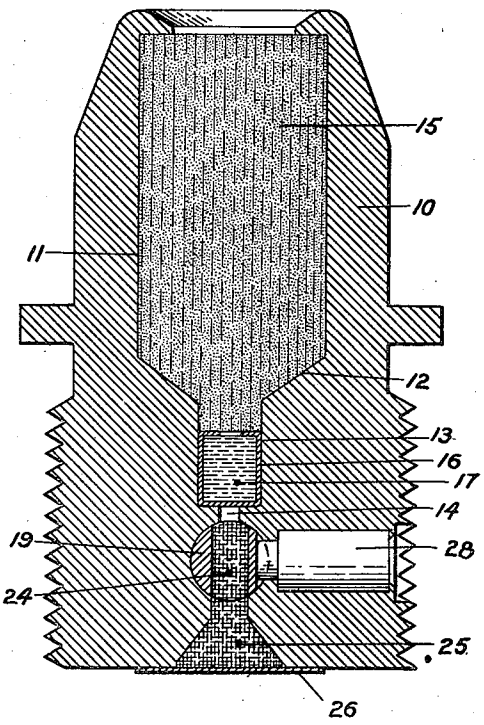
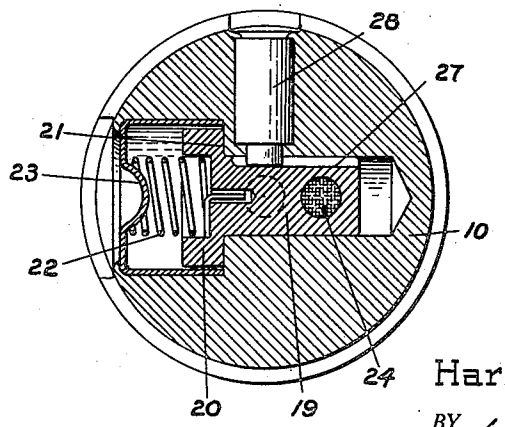


Fig. 3.



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UNITED STATES PATENT OFFICE.

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TRACER FUSE.

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

To all whom it may concern:

Be it known that I, HAROLD M. BRAYTON, a citizen of the United States, and a resident of Dover, county of Morris, and State of New Jersey, have invented an Improvement in Tracer 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 subject of this invention is a tracer fuse.

When firing projectiles against aircraft, it is necessary to provide a relatively large number with a tracer composition to enable the gunner to observe the trajectory of the shell for the purpose of effecting the required adjustments of the sighting mechanism of the gun to the rapidly moving target.

Since this class of firing is generally conducted over friendly territory it is desirable that mechanism be provided to insure the destruction of the shell before its return to earth in the event of failure to hit the target.

It has been attempted to utilize the flame from the tracer composition for igniting the explosive charge in the shell but this practice, as at present employed, is extremely dangerous in that the high pressure in the powder chamber frequently forces the hot gases through or around the tracer composition to ignite the explosive charge before the shell has left the bore of the gun.

The impracticability of loading the tracer composition so as to eliminate premature functioning is compensated for in the present invention in which there is provided a laterally sliding member carrying an element of an interrupted powder train which is prevented from being made continuous until the sliding member is free to move under the action of centrifugal force after the shell has attained a predetermined rotational velocity in flight. Means are also provided to insure proper axial alignment of the movable element of the interrupted powder train.

To these and other ends, my 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 my invention is illustrated in the accompanying drawings, in which,

Fig. 1 is a longitudinal sectional view of the tracer fuse;

Fig. 2 is a longitudinal sectional view taken at right angles to Figure 1; and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Referring to the drawings by numerals of reference:

A body 10 adapted for threaded insertion in the base end of a shell is formed with a cavity 11, having converging forward walls 12 to form a smaller cavity 13, which is in communication with a flash duct 14.

A tracer composition 15 loaded in the cavity 11 holds a cup 16 carrying a detonating charge 17 in place in the cavity 13.

The body 10 is formed with a transverse passage 18, open at one end, in which is mounted a bolt 19 having an enlarged head 20 for engaging a shoulder 21 in the passage. The bolt is held in innermost or unarmed position against the shoulder 21 by a spring 22 seated in a recess of the head 20 and confined by a cup-shaped member 23 securely held in the opening in the passage.

The bolt carries one element 24 of a powder train, the other element 25 being stationarily disposed axially of the fuse and held in place by a disc 26. When the bolt is in unarmed position, as shown in Figure 1, the continuity of the elements in the powder train is interrupted and will remain interrupted until the shell attains a predetermined rotational velocity during flight at which time the bolt under the action of centrifugal force moves laterally to overcome the tension of the spring 22 and to position the powder element 24, axially of the fuse.

To insure proper alignment of the movable powder element 24 with the stationary powder element 25 and the flash duct 14, the bolt is formed with a squared side 27 extending throughout a portion of its length

and adapted during lateral movement of the bolt to be contacted by the squared end of a pin 28 to prevent rotation of the bolt. The pin 28 may be stationarily secured in the body 10 in any convenient manner.

When a projectile equipped with this fuse is discharged from a gun, the flame from the propellent charge ignites the tracer composition which functions in a well-known manner to describe a visible trajectory in flight. The projectile is ordinarily equipped with a percussion fuse which serves to ignite the explosive charge on impact with a target. However, in the event of failure to hit the target the destruction of the shell is accomplished through the tracer composition which when entirely consumed detonates the detonator, which in turn ignites the powder train to relay the flame to the explosive charge. As stated in the premises the bolt has been moved laterally during flight through the action of centrifugal force to properly align the movable element of the powder train.

While in the foregoing there has been illustrated and described such combination and arrangement of elements as constitute the preferred embodiment of my invention, it is nevertheless desired to emphasize the fact that interpretation of the invention should only be conclusive when made in the light of the subjoined claims.

I claim:

1. A fuse including a body, said body formed with a cavity, a tracer composition disposed in the cavity, a detonator adjacent the forward end of the tracer composition, a centrifugally movable bolt mounted transversely in the body, said bolt formed with a squared side, an element of a powder train carried by the bolt, an element of a powder train carried by the body, the continuity of said elements being normally interrupted, and a pin carried by the body and engaging the squared side of the bolt to prevent rotation of the bolt during lateral movement thereof.

2. A fuse including a body, said body formed with a cavity, a tracer composition disposed in the cavity, a detonator adjacent the forward end of the tracer composition, a centrifugally movable bolt mounted transversely in the body, an element of a powder train carried by said bolt, an element of a powder train stationarily carried by the body, the continuity of said elements being normally interrupted.

3. A fuse including a body, said body formed with a cavity, a tracer composition disposed in the cavity, a centrifugally movable bolt mounted transversely in the body, an element of a powder train carried by said bolt, an element of a powder train carried by the body, the continuity of said elements being normally interrupted.

4. A fuse including a body, a tracer composition carried in one end of the body, a powder charge carried in the other end of the body, a centrifugally movable bolt mounted transversely in the body between the tracer composition and the powder charge, and a powder charge carried by the bolt and adapted to be aligned with the tracer composition and the first mentioned powder charge when the bolt is moved to armed position.

5. A fuse including a body, a tracer composition carried in one end of the body, a powder charge carried in the other end of the body, a member movable during flight mounted in the body, and a powder charge normally carried by said member in unarmed position and movable therewith to armed position.

6. A fuse including a body, a combustible charge carried in both ends of said body, and a safety member including a combustible charge interposed between the combustible charges and adapted to be moved during flight to align the charges.

7. A fuse including a body, a tracer composition carried by the body, an interrupted powder charge in the body adapted to be moved to uninterrupted position during flight.

8. Means for causing destruction of a shell in flight, including a fuse body, a tracer composition carried by the body and adapted to be ignited by the flame of a propelling charge, and a powder charge for relaying ignition to the forward end of the fuse, said powder charge being normally interrupted and adapted to be aligned during flight.

9. A safety device for fuses embodying a centrifugally movable bolt, said bolt formed with a squared side and means engaging the squared side of the bolt for preventing rotation of the bolt during its movement.

HAROLD M. BRAYTON.