Nov. 3, 1925.

1,559,822

S. WILEY

TRACER FUSE

Filed June 30, 1924

Fig. 1.

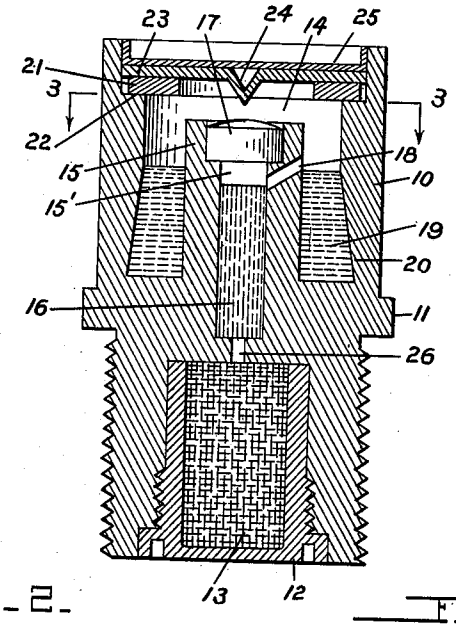


Fig. 2.

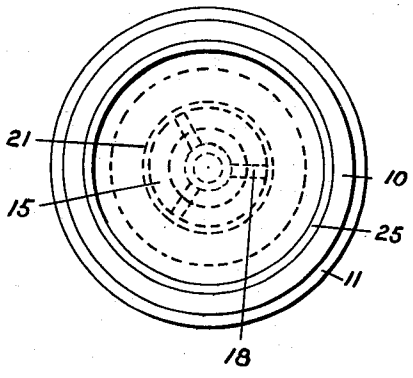
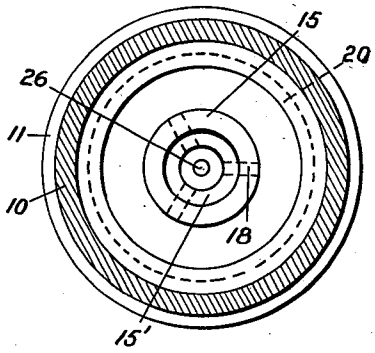


Fig. 3.



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UNITED STATES PATENT OFFICE.

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TRACER FUSE.

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(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 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.

In firing projectiles at aircraft and over friendly troops, it is customary to provide a projectile with an illuminating or smoke composition, which is consumed during the travel of the projectile to define a visible trajectory and enable an observer to compute corrections in range and deflection and to ascertain the clearance over friendly troops.

Devices of this character heretofore used in connection with detonating fuses utilize the tracer composition as a delay element in igniting the explosive charge. By virtue of the properties of the tracer composition which render it readily combustible upon application of heat and liable to flash to the detonating charge without delay the likelihood of premature explosions makes the use of such a fuse extremely dangerous. Furthermore, the variations in burning time of the tracer delay composition, due to atmospheric conditions and the disposition of the various ingredients of the composition, will explode the main charge at ranges not intended, thereby forming an erroneous basis for the calculation of the corrected firing data. Tracer shells are used intermittently or upon resetting of the gun for a new range, elevation, or deflection. As the delay element in the regular shells is composed of powder, having a uniform rate of combustion, it is desirable that the delay element of the tracer shell should be of the same composition to describe a true trajectory within limits of dispersion.

When using different tracer compositions for night and day firing as the delay element in a time fuse, it is necessary for the gunner to know the variations in rate of combustion of an illuminating composition used at night and a smoke tracer composition used in the day time. Should the tracer composition become dislodged during flight it will not only cease to function in describing the trajectory of the projectile but the explosive charge will not be fired.

In carrying out my invention, I employ a standard powder for relaying the flame of the primer to the detonator or to the main explosive charge, while my tracer composition is carried by the fuse spaced from the delay and explosive elements so that should the tracer become prematurely ignited it will not effect the explosive elements. During flight of the projectile the diaphragm firing pin is expelled from the fuse by the gases generated within the fuse and the tracer composition is prevented from becoming dislodged by reason of its wedged insertion within the fuse thus defining a visible trajectory until the shell is exploded.

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 drawing, in which,

Fig. 1 is a longitudinal sectional view of my invention in connection with a base detonating fuse;

Fig. 2 is a top plan view; and

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

Referring to the drawings by numerals of reference:

10 indicates a fuse body formed with an annular flange 11 adapted to seat a shell (not shown) in threaded engagement with the forward portion of the fuse body and a cartridge case (not shown) secured to the rearward portion. The forward portion of the fuse is bored and tapped for the reception of a cup 12, carrying a detonating charge 13.

The rear portion of the fuse body is formed with an annular well or chamber 14 to provide a centrally disposed exten-

sion 15 bored to form a chamber 15′ for the reception of the delay train 16 and counterbored to receive a primer 17. The walls of the extension 15 are formed with inclined ports 18 for communicating the flame from the primer to a tracer element 19, and may also act as a vent for the time fuse. The tracer mixture may be in the form of a ring wedged between the extension 15 and an inner rearwardly converging wall 20, of the fuse body. This construction prevents the tracer element from becoming dislodged.

Carried by a spacer ring 21, seated on an annular shoulder 22 in the rear end of the fuse body is a diaphragm 23, its center formed into a projecting cone 24, which constitutes the firing pin. The diaphragm is held in place by a closing disc 25.

A port 26 establishes communication between the delay train chamber 15′ to the detonator cup 12.

When a projectile equipped with my fuse is fired from a gun, pressure from the propelling charge compresses the diaphragm 23 until the firing pin 24 engages and fires the primer 17. The flash from the primer ignites the delay train 16 and at the same time the tracer composition 19 through the inclined ports 18. The gases generated by the burning delay train and tracer composition will eject the diaphragm and the closing disc thereby permitting the smoke or illuminant of the tracer composition to flow from the fuse and disclose a visible trajectory of the shell during flight. The delay element may be made for any desired length of time and when consumed it will ignite the detonator and explode the shell. The tracer composition is held against dislodgment by reason of its wedged insertion in the fuse, but even should it become accidentally displaced the delay train will complete its function in igniting the detonator.

By spacing the tracer composition from the time train the rate of combustion of the tracer element is immaterial and premature explosions within the gun are avoided.

I do not confine myself to the shape of the fuse herein described or to the manner of arranging and functioning the various elements, as there are various ways in which this may be done without departing from the spirit of my invention.

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 embodying a body, an annular flange formed on the body for defining a shell and cartridge case receiving portion, a cup carried in the shell receiving portion and adapted to enclose an explosive charge, a centrally disposed hollowed extension formed within the cartridge case receiving portion and spaced from its walls to form a chamber, said extension adapted to receive a time train element and to space a tracer element adapted to be carried in the chamber, a primer mounted on the extension, means for firing the primer, and means formed in the body and the extension for communicating ignition to the cup and to the chamber.

2. A fuse embodying a body, said body formed with a hollowed extension centrally disposed within the body and spaced from its walls to form a chamber, the extension adapted to receive a time train element and to space a tracer element adapted to be carried in the chamber, said extension provided with ports, a primer mounted on the extension, and means for firing the primer.

3. A fuse body provided with a hollowed extension centrally disposed within the fuse body and spaced from its walls to form a chamber, said extension adapted to receive a time train element and to space a tracer element adapted to be carried in the chamber.

4. A fuse provided with concentric chambers, a tracer element disposed in one chamber, a time train element disposed in the other chamber, said chambers being in communication and means for igniting the time and tracer elements.

5. A fuse provided with concentric chambers, a tracer element disposed in one chamber, a time train element disposed in the other chamber, and means for igniting the tracer and time elements.

6. A fuse embodying a fuse body, a time train carried by the fuse body, and a tracer element spaced laterally from the time train.

7. A fuse embodying a percussion cap, a time train and a tracer mixture associated therewith, and means for communicating the flash of the cap to the time train and tracer mixture including means for venting the time train.

8. A fuse body, a time train element disposed centrally in the body and a tracer element encircling said time train element and spaced therefrom.

SAMUEL WILEY.