

Sept. 29, 1942.

H. M. BRAYTON

2,296,901

TRACER AND SELF-DESTROYING DEVICE

Filed Nov. 12, 1940

Fig. 1.

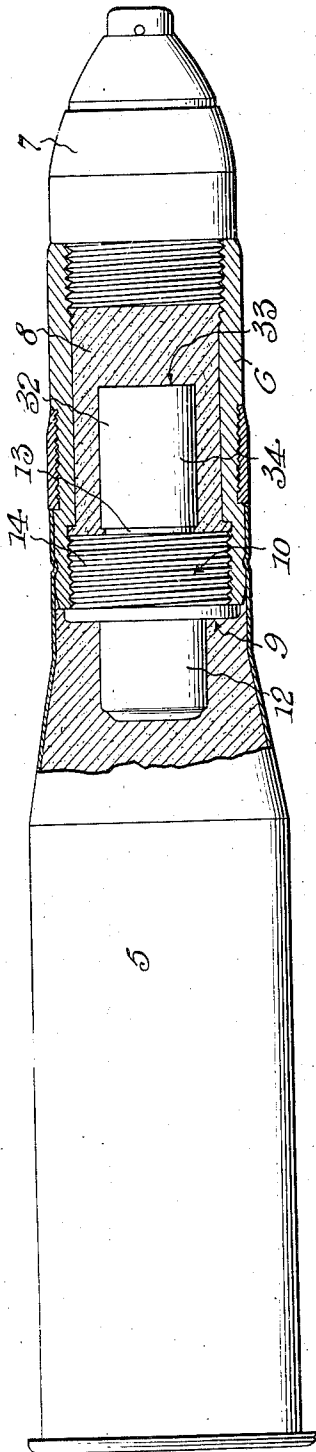


Fig. 2.

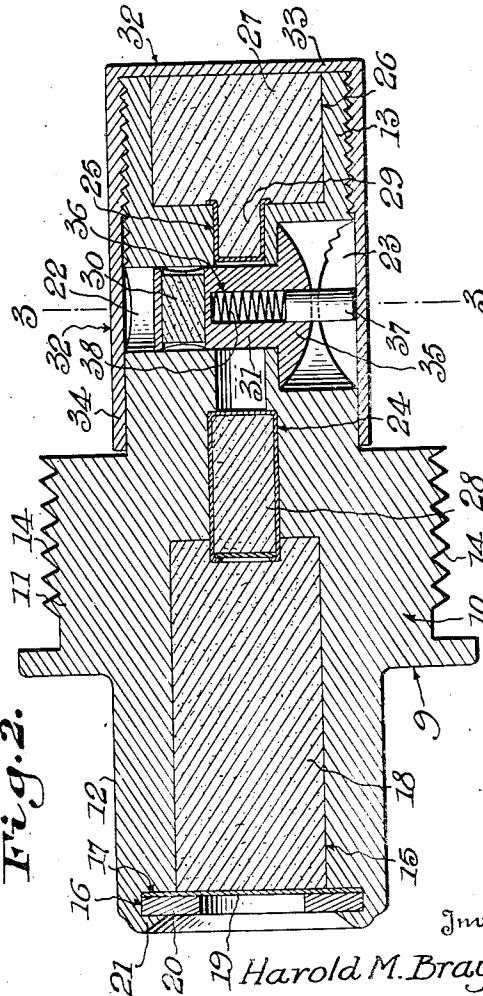
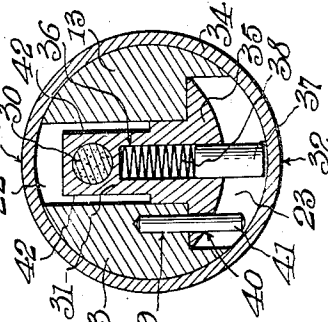


Fig. 3.



Inventor

Harold M. Brayton

By *A. B. Wilson*
Attorneys

UNITED STATES PATENT OFFICE

2,296,901

TRACER AND SELF-DESTROYING DEVICE

Harold M. Brayton, Dover, N. J., assignor to
American Armament Corporation, New York,
N. Y., a corporation of Delaware

Application November 12, 1940, Serial No. 365,356

6 Claims. (Cl. 102—60)

The invention relates to tracers used in connection with anti-aircraft projectiles for tracing their trajectories, and its aims to generally improve upon the construction disclosed in my U. S. Patent No. 1,518,247, issued December 9, 1924, on a so-called "Tracer fuse."

In carrying out the above end, a further object is to provide a cup attached to the body of the device and effective to confine the booster charge and to also close the opening in which the interrupter of the firing train is mounted.

A still further object is to provide a novel structure and association of parts for normally holding the interrupter in unarmed position and for holding it against rotation.

Another aim is to make novel provision for holding the tracer charge in the body and insuring proper igniting, and burning thereof during flight.

Yet another object is to provide an improved construction insuring that the tracer charge shall invariably ignite the detonator.

A still further aim is to provide a novel construction in which the explosive charge in the projectile or shell may surround the booster charge to insure greater destruction of the entire assemblage if it fails to strike the target.

With the foregoing and minor objects in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawing.

Figure 1 is a longitudinal sectional view partly in elevation showing the association of the invention with a shell case, a shell or projectile, and a supersensitive percussion fuze.

Figure 2 is an enlarged longitudinal sectional view through the tracer and self-destroying device.

Figure 3 is a transverse sectional view on line 3—3 of Fig. 2.

A construction has been illustrated which has proven to be highly advantageous from numerous standpoints, and while said construction will be specifically explained, it is to be understood that minor variations may be made within the scope of the invention as claimed.

A shell case 5 has been shown connected with a shell or projectile 6 having a supersensitive percussion fuze 7 at its nose, the explosive charge of said shell or projectile being denoted at 8. The improved tracer and self-destroying device 9 is carried by the rear end of the shell or projectile 8, is effective to trace the trajectory of said shell or projectile, and is also effective to fire

the charge 8 in case the fuze does not fire same by striking the target. It is thus insured that the assemblage shall be so destroyed in the air that little if any injury can be caused by falling fragments.

The tracer and self-destroying device 9 includes an elongated body 10 having an intermediate portion 11 of relatively large diameter, a rear portion 12 of smaller diameter, and a front portion 13 which is also of smaller diameter, said portion 11 being provided with external screw threads 14 to be threaded into the rear end of the shell or projectile 6.

The body 10 is provided with a socket 15 formed principally in the reduced rear portion 12 but also extending somewhat into the intermediate portion 11, said socket 15 having an enlarged rear end 16, the inner wall of which constitutes a rearwardly facing shoulder 17. The socket 15 contains the tracer charge 18; a highly inflammable disk of thin sheet powder or other highly inflammable nitrocellulose compound lies against the rear end of the charge 18; and a washer ring 19 of metal lies against the rear side of said disk 18. This disk and washer ring are both located in the enlarged socket end 16 and they are held therein by an inwardly crimped flange 21 on the rear extremity of the body. By securing the tracer charge 18 in place in this manner, it is insured that it shall be properly ignited by the burning gases in the shell case 5 when the ammunition is fired, and it is insured also that said charge shall properly burn during flight.

The reduced front portion 13 of the body 10 is formed with a transverse diametrically extending opening 22 having an enlarged end 23, both ends of said opening being disposed at the periphery of said body portion 13, in the present disclosure. A longitudinal opening 24 extends from the opening 22 to the front end of the socket 15 above described, and another central opening 25 extends from said opening 22 to a recess 26 formed in the front extremity of the reduced forward portion 13 of the body. The recess 26 contains a booster charge 27, and the openings 24 and 25 contain two of the elements 28 and 29 of a firing train extending from the tracer charge 18 to the booster charge 27, the third element 30 of said train being carried by an interrupter 31 which is slidable in the opening 22. The element 28 is an appropriate detonator, and the elements 29 and 30 are leads of tetryl or other preferred material. The rear end of the detonator 28 projects beyond the opening 24 into the tracer charge 18 and it is thus insured that said detona-

tor will be fired by said tracer charge while the latter is vigorously burning, overcoming danger of said tracer charge failing to ignite said detonator.

A suitable cap 32 is threaded upon the reduced forward portion 13 of the body 10, said cap having a front wall 33 which confines the booster charge 27 in the recess 26, and a side wall or sleeve 34 which surrounds the reduced body portion 13 and closes the ends of the opening 22 above described, thereby confining the interrupter 31 in said opening and protecting said interrupter.

The interrupter 31 is provided with an enlarged head 35 in the enlarged end 23 of the opening 22, and said interrupter is formed with a central socket 36 which opens through the outer end of said head. A pin 37 extends slidably into the outer end of the socket 36 and the outer extremity of said pin abuts the wall or sleeve 34, and a coiled compression spring 38 is housed within said socket 36, said spring abutting the inner end of said socket and the inner end of said pin 37. The spring thus acts to hold the detonator 31 in unarmed position but permits same to move to armed position under the action of centrifugal force.

The portion 13 of the body 10 is formed with a smaller opening 39 parallel with the opening 22 and opening into the enlarged end 23 of this opening, and the head 35 of the interrupter 31 is formed with an opening 40 alined with said opening 39. A pin 41 is disposed in the two openings 39 and 40 to hold the interrupter 31 against rotation, and the outer end of this pin abuts the sleeve or wall 34, being held in operative position by means of said sleeve or wall.

Opposite sides of the interrupter 31 are preferably milled off as seen at 42 in Fig. 3, relieving some of the weight at one side of the axis of the device to insure proper movement of the interrupter to armed position under the action of centrifugal force.

When the projectile 6 with the nose 7 and the device 9 are fired from a gun, the tracer charge 18 is ignited by means of the highly inflammable disk 19 which is in turn ignited from the hot gases within the gun. If the projectile strikes a target, the supersensitive fuze 7 fires the explosive charge 8. If the projectile misses the target, however, the burning tracer charge 18 ignites the detonator 28 and the latter ignites the leads 30 and 29, thereby firing the booster charge 27 which in turn fires the explosive charge 8 of the projectile. Due to the novel construction employed, the forward portion of the body 10 and the sleeve or wall 34 are well within or surrounded by the explosive charge 8, insuring more thorough destruction of the assemblage and materially lessening the danger of anyone on the ground being injured from falling fragments.

Except for explosive or inflammable elements, suitable metal construction is employed throughout and I have found that a hard steel alloy, when used in constructing the interrupter 31, will prevent the detonator wave from being transmitted to the element 29 and the booster charge 27, should the detonator 28 fire prematurely from any cause.

Excellent results are obtainable from the exact details and proportions herein disclosed and I, therefore, prefer to follow same. However, attention is again invited to the possibility of making variations within the scope of the invention as claimed.

I claim:

1. In a tracer and self-destroying device, a body having a socket which opens through its rear end, said socket having an enlarged rear end and a rearwardly facing shoulder at the front extremity of the enlargement, a tracer charge in said socket and having its rear end in the same plane with said shoulder, a thin highly inflammable nitrocellulose disk within said enlarged rear end of said socket and lying against said shoulder and the rear end of said tracer charge, a washer ring lying against the rear side of said disk, and securing means for said washer ring.

2. In a tracer and self-destroying device, a body having a socket which opens through its rear end, said socket having an enlarged rear end and a rearwardly facing shoulder at the front extremity of the enlargement, a tracer charge in said socket and having its rear end in the same plane with said shoulder, a thin highly inflammable nitrocellulose disk within said enlarged rear end of said socket and lying against said shoulder and the rear end of said tracer charge, a washer ring lying against the rear side of said disk, and an inwardly crimped flange on the rear end of said body lying against the rear side of said washer ring.

3. In a tracer and self-destroying device, an elongated cylindrical body having external screw threads between its ends for connecting it with the rear end of an explosive-containing shell, said body being reduced in diameter in front of said screw threads for reception in the shell-contained explosive, said body being also reduced in diameter behind said screw threads for reception in the propulsive charge of a shell case, said body being provided with a tracer charge socket which opens through its rear end, said socket extending well into the relatively large central portion of said body and having a front wall, a tracer charge in said socket and a highly inflammable closure disk for the rear end of said socket, said body being provided with a booster charge recess within the front end of its reduced front portion and open at the front extremity of said reduced front portion, a booster charge in said booster charge recess, said reduced front portion of said body having a diametrical opening behind said booster charge recess and also having a central longitudinal opening from said diametrical opening into said booster charge recess, a firing train element in said longitudinal opening, said body being provided with an additional longitudinal opening from said front wall of said tracer charge socket to said diametrical opening, a detonator in said additional longitudinal opening and projecting rearwardly from said front wall of said tracer charge socket into said tracer charge, a centrifugally armed interrupter slidable in said diametrical opening and having a firing train element for alinement with the aforesaid detonator and firing train element, yieldable means in said diametrical opening contacting with said interrupter and normally holding it in unarmed position, and a cap threaded upon said reduced front portion of said body, said cap having a front wall holding said booster charge in said booster charge recess, said cap having a side wall which closes said diametrical opening.

4. In a fuze, a body having a diametrically extending opening, said opening having an enlarged end which opens through the periphery of said body, a centrifugally armed interrupter having a major portion slidable in the smaller part of said opening, said interrupter also having an

enlarged head slidable in said enlarged end of said opening, the outer end of said head being spaced inwardly from the periphery of said body, said interrupter having a central elongated socket which opens through said outer end of said head, a sleeve secured around said body and closing said enlarged end of said opening, a pin extending from said head to said sleeve and having a portion of its length slidably received in said socket, the inner extremity of said pin being spaced from the inner end of said socket, the outer extremity of said pin being disposed against the inner side of said sleeve, and a coiled compression spring within said socket and abutting said inner end of said socket and said inner extremity of said pin to yieldably hold said interrupter in unarmed position.

5. In a fuze, a body having a diametrically extending opening, said opening having an enlarged end which opens through the periphery of said body, said body being provided with an outwardly facing shoulder at the juncture of said enlarged end of said opening with the smaller part of said opening, said body having a smaller opening parallel with said smaller part of the first mentioned opening, said smaller opening having a closed inner end and an outer end which opens through said shoulder, a centrifugally moved interrupter having a major portion slidable in said smaller part of said first mentioned opening, said interrupter also having an enlarged head slidable in said enlarged end of said first mentioned opening and spaced inwardly from the periphery of said body, said head having an eccentrically located opening aligned with said smaller opening of said body, a sleeve secured around said body and closing said enlarged end of said first mentioned opening, a pin extending slidably through said eccentrically located opening of said head and holding said interrupter against rotation, said pin extending snugly into said smaller opening of said body and abutting said closed inner end of this opening, the outer end of said pin being disposed against the inner side of said sleeve, and yieldable means acting

on said interrupter and normally holding the same in unarmed position.

6. In a fuze, a body having a diametrically extending opening, said opening having an enlarged end which opens through the periphery of said body, said body being provided with an outwardly facing shoulder at the juncture of said enlarged end of said opening with the smaller part of said opening, said body having a smaller opening parallel with said smaller part of the first mentioned opening, said smaller opening having a closed inner end and an outer end which opens through said shoulder, a centrifugally moved interrupter having a major portion slidable in said smaller part of said first mentioned opening, said interrupter also having an enlarged head slidable in said enlarged end of said first mentioned opening and spaced inwardly from the periphery of said body, said head having an eccentrically located opening aligned with said smaller opening of said body, said interrupter also having an elongated central socket which opens through said outer end of said head, a sleeve secured around said body and closing said enlarged end of said first mentioned opening, a pin extending slidably through said eccentrically located opening of said head and holding said interrupter against rotation, said pin extending snugly into said smaller opening of said body and abutting said closed inner end of this opening, the outer end of said pin being disposed against the inner side of said sleeve, an additional pin extending from said head to said sleeve and having a portion of its length slidably received in the aforesaid socket of said interrupter, the inner extremity of said additional pin being spaced from the inner end of said socket, the outer extremity of said additional pin being disposed against said inner side of said sleeve, and a coiled compression spring within said socket and abutting said inner end of said socket and said inner extremity of said additional pin to yieldably hold said interrupter in unarmed position.

HAROLD M. BRAYTON.