

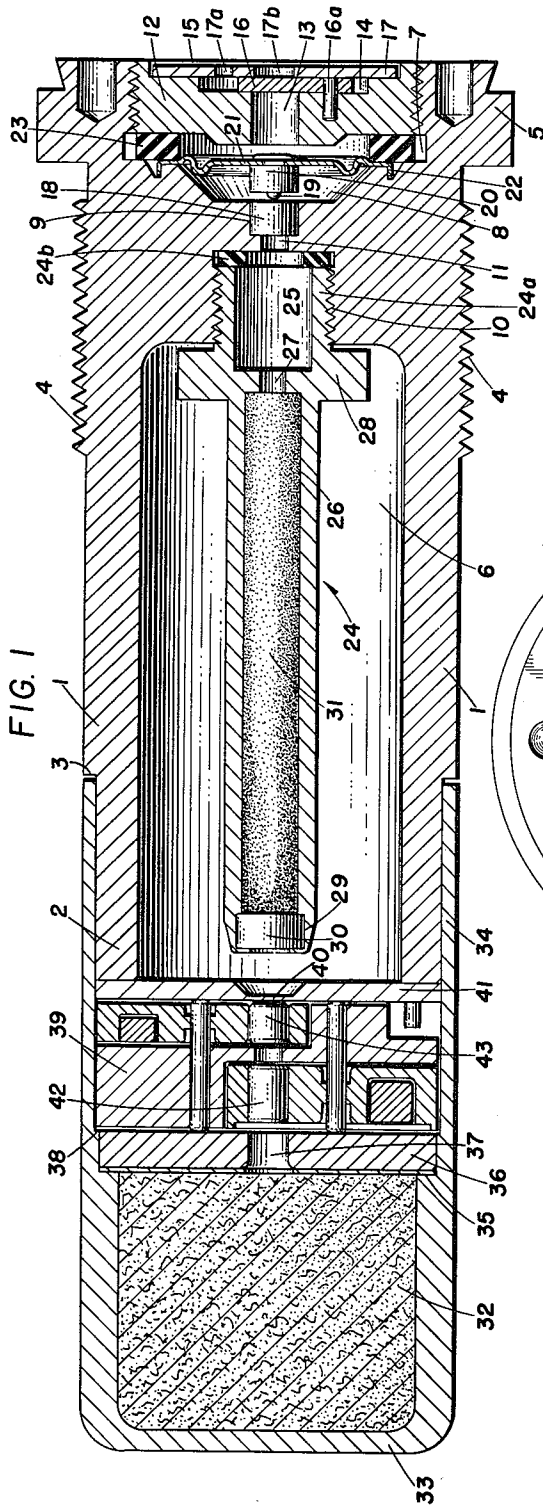
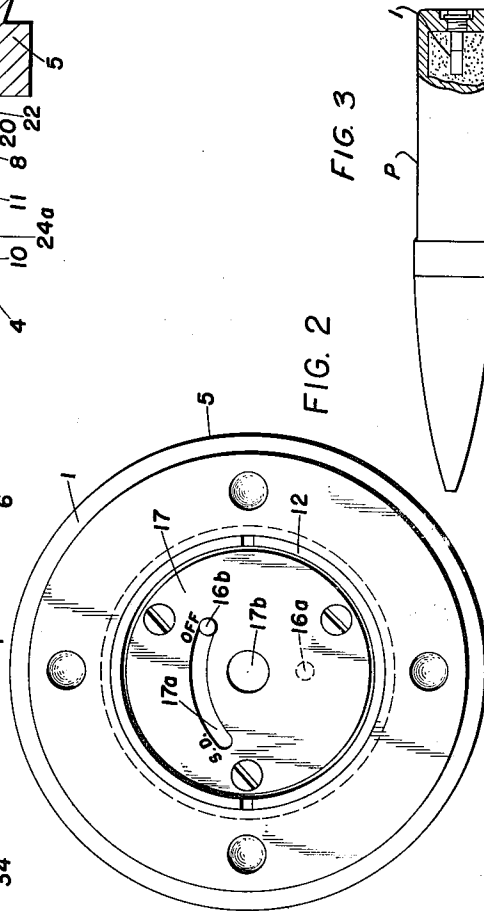
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ON-OFF SELF DESTRUCTION BASE FUZE

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ON-OFF SELF DESTRUCTION BASE FUZE

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The present invention relates generally to the art of fuzes for ordnance and more particularly to an improved self-destruction device for use with projectiles normally detonatable by radio proximity fuzes.

One of the principal objects of the invention is to provide a self-destruction device embodying means for effecting automatic detonation of the projectile, after a predetermined time period, in the event that the projectile is not exploded by its fuze.

As another object, the invention provides a self-destruction unit, the operation of which will be initiated by gas pressure from the propellant charge when the projectile is fired from a gun, with the result that the device will be entirely positive in operation.

Still another object of the invention resides in the provision of a unit of this sort that will be carried in the base of the projectile and that will, therefore, be entirely independent of the fuze mechanism for normally detonating said projectile.

Another object is to provide a device for automatically destroying a projectile, which device may be readily installed in or removed from said projectile.

And a further object is to provide a device of this character that may be manufactured in several models, for detonating projectiles at various predetermined time periods, these models being interchangeable so that any selected one may be employed, according to the requirements of use.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a longitudinal sectional view of the invention; and

Fig. 2 is a view of the device looking at the base end thereof.

Fig. 3 is an elevation, on a reduced scale and partly in section, showing the device mounted in the base of a projectile.

For purposes of clearness let it be assumed, in the following description, that the left end of Fig. 1 indicates the forward end of the device, and the right end thereof the rear of the device.

The improved self-destruction device comprises an outer casing or barrel 1 which is adapted to be fitted into the base end of an artillery projectile axially thereof, the projectile being indicated by the letter P (Fig. 3). The barrel 1 is formed with a reduced forward end portion 2 defining a shoulder 3, the purpose of which will be described in more detail hereinafter. The rear end portion of the barrel 1 is provided with a threaded course 4 to engage a like course in the projectile base, an enlarged flange 5 providing a stop for limiting inward travel of the barrel in the projectile. The barrel 1 is counterbored throughout the major portion of its length to define an expansion chamber 6.

The rear or base end of the barrel 1 is counterbored

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from its rear face and axially to define a chamber 7 having a threaded side wall and formed with an axially disposed depression 8 and a relatively small axial cavity 9. The cavity 9 communicates with a recess 10 in the forward end of the chamber 6 through a small axial bore 11.

To facilitate removal of the device from a projectile, the outer rim of the flange 5 is formed with an undercut annular groove and suitable spanner sockets to receive the studs of a conventional spanner wrench.

A plug 12 having an axial port 13 is screwed in the chamber 7 and the said plug is formed with two recesses 14 and 15 which communicate with each other and with the port 13. The recesses 14 and 15 receive, respectively, a gate 16 and a cover-plate 17. The gate 16 is pivotally mounted on a pin 16a and is provided with a stud 16b that is movable in an arcuate slot 17a in the plate 17. The plate 17 is formed with an axial opening 17b, which is normally aligned with the ports 13, the communication, however, between the opening 17 and the said port 13 being interrupted by the gate 16 when the device is in inoperative position.

A primer 18 is carried within the cavity 9 and is engageable by a pin or nib 19 on a stud 20, the said stud being mounted on a diaphragm 21 clamped within the chamber 7 at the mouth of the depression 8. As best seen in Fig. 1, the diaphragm is provided at its rim with projections 22, which engage in suitable sockets in the end wall of the chamber 7, and is clamped in place by the plug 12 and gasket 23.

A powder train sleeve assembly is shown generally at 24, and is provided with an enlarged externally threaded rear portion 24a, which is screwed into the recess 10, a gasket 24b being provided between the end of the portion 24a and the wall of the recess 10. The portion 24a is recessed to define a vent chamber 25. The assembly 24 includes a tubular powder train chamber 26 which communicates with the chamber 25 through a port 27, a hexagonal flange 28 being provided at the junction of the portion 24a with the chamber 26 for permitting easy mounting of the assembly within the chamber 6. At its free end, the chamber 26 is enlarged to define a detonator cavity 29, the extreme free end margin of the wall defining said cavity being turned inwardly to retain a lead azide detonator 30 in operative position. The tubular chamber 26 contains a powder train charge 31 which can be designed to burn for any predetermined time period, within limits. It has been found that a powder train requiring 28 seconds time for burning is satisfactory in some applications.

A booster charge is shown at 32 and is contained in a cap 33, the said cap being formed with an extended portion 34 which fits about the reduced portion 2 of the barrel 1 and has its free end engaging the shoulder 3. As will be seen the portion 34 of the cap 33 is of substantially reduced thickness so that its outer annular surface lies flush with the outer surface of said barrel 1. Intermediate the length of the cap 33 is a shoulder 35 which provides a seat for a separator plate 36 which overlies the booster charge 32, said plate 36 being formed axially with a discharge port 37. The wall of the cap 33 is formed with a second shoulder 38 against which bears the forward rim of a safety unit 39, which functions to prevent premature detonation of the booster in the event that the powder train 31 should be accidentally ignited.

The safety unit 39 is of a well-known type and need not be described in detail herein, other than to point out that it includes a pair of eccentrically-mounted weighted rotors which are moved by centrifugal force when the projectile is in flight for aligning a pair of bores in said rotors with each other, with a bore in the device and with the port 37 and a weakened portion 40 of a separator plate 41, which plate is disposed by the unit 39

and the end of the barrel 1. As shown, the port in one of the rotors is provided with an explosive pellet 42 of tetryl, while the port of the other rotor contains a lead azide pellet 43.

The operation of this invention will now be briefly described.

The device is inserted in the base of a projectile, and the projection 16b moved from the "off" position through the slot 17a to the self-destruction position, for moving the gate 16 to open position. The device is then ready for use. After the projectile is mounted in a shell and the shell is fired from a gun, a portion of the gas created by the blast of the propellant charge will pass through the port 13 and impinge upon the diaphragm 21, with the result that the diaphragm will be snapped forwardly for engaging the nib 19 of the stud 20 with the primer 18, for detonating said primer. The blast of the primer will discharge through the bore 11, into the vent chamber 25, through the port 27 and will ignite the powder train 31 in the tubular chamber 26. The powder train will burn for a known period of time, and after the passage of this time will fire the detonator 29. The blast of the detonator 29 will rupture the weakened portion 40 of the wall 41 and will discharge, in sequence, the pellets 43 and 42 for firing the booster charge 32 and destroying the projectile. It should be assumed, of course, that the safety device 39 will have functioned for aligning the pellets 42 and 43 with the port 37 and the weakened portion 40. It should also be pointed out that, if desired, a tetryl pellet can be positioned in the port 37.

From the above it will be understood that there has been provided a positive and highly effective means for causing the self-destruction of a projectile in the event that the chosen standard mechanism fails to function, and that said means operates entirely independently of said chosen standard fuze mechanisms.

The powder train described can be designed to burn for any predetermined time period, so that the self-destruction action may be caused to take place at any desired projectile height. Accordingly, it should be understood that devices according to the invention may be manufactured in quantity, some with powder trains adapted to burn for one predetermined time period and others for other periods, and when the shells are made ready for use, the device having a powder train adapted to

burn for the desired predetermined time period can be selected.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. The combination with an artillery projectile having a base, of a self-destruction fuze having a barrel fitted into said base, a booster, a cap mounting the booster on the barrel at its inner end, a safety unit in the cap between the booster and the barrel, a delayed action powder train in the barrel, a detonator for the booster, means mounting the powder train and detonator in the barrel, an igniter pellet for the powder train, means for discharging the igniter pellet, said means including a stud and a diaphragm mounting the stud, a plug closing the barrel at its outer end and having an axial opening confronting the diaphragm, a gate carried by the plug, and a cover plate closing the plug and having an opening in alignment with the axial opening, said gate being movable from a position interrupting said openings to a position clear of said openings for permitting blast gases, developed upon discharge of the projectile, to act on the diaphragm and discharge the igniter pellet for igniting the powder train, detonator and booster.

2. The combination recited in claim 1, including an arcuate slot in the cover plate, and a stud on the gate and movable in the slot, said stud and slot limiting movement of the gate.

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