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2,452,072

EXPLOSIVE BULLET

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Fig. 1.

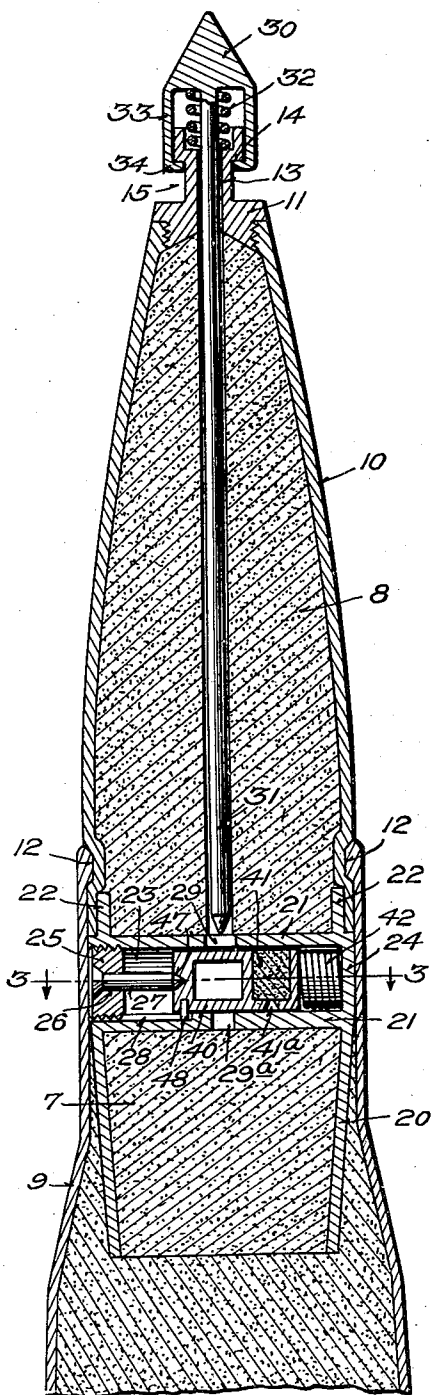


Fig. 2.

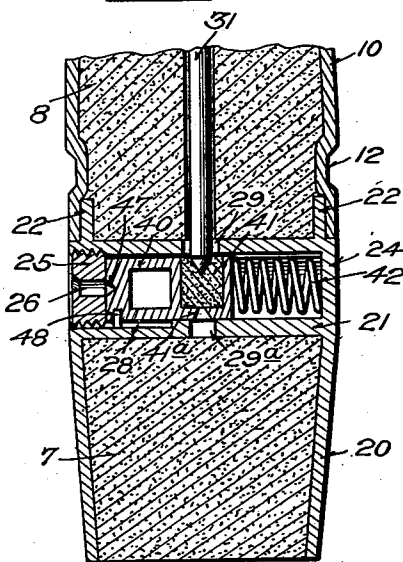
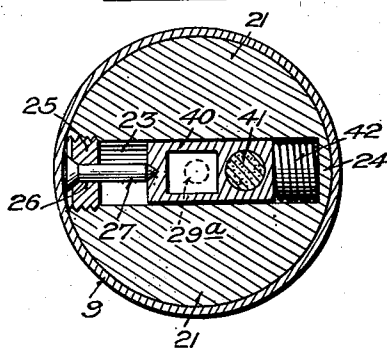


Fig. 3.



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EXPLOSIVE BULLET

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7 Claims. (Cl. 102—56)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to explosive projectiles, and more particularly to the fuse mechanism of such projectiles. One of the objects of invention is to devise a fuse mechanism which will be simple in operation and inexpensive to produce and which will positively detonate the explosive charge upon impact of the projectile with the target, and which is implemented with arming means rendering the projectile safe while in its cartridge case and while traversing the bore of the firing gun. A further object of invention is to provide means for destroying the projectile in the event it misses the target.

For the attainment of the foregoing and such other objects as may herein appear or be pointed out I have shown one embodiment of my invention in the accompanying drawing, wherein:

Fig. 1 is a longitudinal section of the improved explosive projectile, shown held in place of its cartridge shell (in unarmed condition);

Fig. 2 is a partial longitudinal section showing the fuse parts in armed and fired condition; and

Fig. 3 is a cross section through the fuse mechanism, on the line 3—3 of Fig. 1.

The improved explosive projectile is made up of two main parts, viz., a forward jacket member 10 and a rear thimble member 20. Forward jacket member 10 is provided at its tapered forward end with internal screw threads in which is screwed a plug fitting 11 to close that end. The rear, widened end of jacket member 10 is open. The rear end of the thimble member 20 of the projectile is likewise open, but its forward end is closed by a partition 21 of considerable thickness compared to the thin walls of members 10 and 20. The rear open end of jacket member 10 is secured to the thimble member 20, or rather to its partition 21, so that the partition forms a closure for the forward jacket member 10. Member 10 is secured, as by brazing or other joining process, to an annular flange 22 provided on partition 21.

The wall of forward member 10 constitutes the gilding metal jacket of the projectile which serves to take the rifling when fired. Near the rear end of the forward or jacket member 10 is provided an annular groove 12 in which the leading edge of the cartridge case 9 is crimped or rolled. The walls of jacket member 10 and the partition 21 of rear member 20 constitute a container for the explosive charge 8, plug fitting 11 being unscrewed

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at the mouth of the container during the filling operation. A central passage is prepared in the explosive charge 8 for a firing pin 31. Plug fitting 11 is likewise provided with a central passage 13 for the firing pin. Firing pin 31 extends from a nose piece 30 to a point close to partition 21 of rear member 20, the top surface of partition 21 being also pierced by a central hole 29 for the pointed end of the firing pin.

Disposed diametrically in the partition 21 is a drilled hole or bore 23 which is closed at one end by wall 24 and provided at its open end with internal threads in which is screwed a plug 25. Plug 25 is provided with a central hole 26; see esp. Fig. 2, through which is passed a pin 27 having a tapered head which is seatable in a countersunk mouth provided on the outside of plug 25.

The function of pin 27 is to normally maintain the detonating slide 40 in unarmed position, which is rightward of firing pin 31, see Fig. 1. Detonating slide 40 is of cylindrical shape and is slidably received in the bore 23 of the partition 21. To prevent rotation of slide 40 it is provided with a pin 48 slidably received in a keyway 28 in partition 21. Slide 40 is provided with a cavity 41 open at the top, which contains the primer detonator. A compression spring 42 interposed between the detonator slide 40 and the end wall 24 of bore 23, tends to urge the slide leftwardly to bring detonator cavity 41 under the central hole 29 of the partition 21 and in alignment with firing pin 31. However, this leftward urgency of the spring 42 to move the detonator slide to arming position is normally blocked by the pin 27. Arming pin 27 is pointed at its end to be received in a punch hole 47 provided in detonator slide 40. When the projectile is still held in its cartridge case as it is in Fig. 1, the head of arming pin 27 bears against the cartridge case 9 and thus interposes itself as a positive stop between the cartridge case wall and the detonating slide 40, maintaining the slide in disarming position with detonator cavity 41 to the right of firing pin 31. When the projectile leaves its cartridge case but while it is still within the gun barrel, the bore itself serves as a stop as the head of the arming pin 27 rides along the gun bore. The arming pin becomes free to be moved leftwardly out of the projectile, permitting detonator slide 40 to move leftward to arming position, Fig. 2, only when the projectile has passed beyond the muzzle of the gun.

Interposed between the nose piece 30 and the plug fitting 11 is a compression spring 32 which

urges firing pin 31 in a forward direction away from the detonator slide 40. Upon impact of nose piece 30 with the target, the firing pin is moved rearwardly to strike the primer detonator 41, Fig. 2, which is in arming position. The rear of nose piece 30 is in the form of a skirt 33 which provides a covering for spring 32. The edge of skirt 33 is flanged inwardly, the flange lip 34 thus formed abuts against a shoulder 14 formed in the plug fitting 11, which serves as a stop to the forward movement of nose piece 30 under urgency of spring 32. As clearly seen in Fig. 1 plug fitting 11 has an annular groove 15 encircled by the flange lip 34, and of sufficient length to provide for sliding movement of said lip 34 when nose piece 30 contacts the target.

The rear member 20, open at its rear end as described, contains tracer composition 7. The improved projectile is capable of self-destruction when it misses the intended target. This feature of self-destruction is achieved by the tracer composition 7. For this purpose the rear side of partition 21 is provided with a central aperture 29a opening into the bore 23, and the floor of the detonator cavity 41 is provided with a small hole 41a. Hence when slide 40 has been moved by spring 42 to arming position, as shown in Fig. 2, the hole 41a in the detonator cavity of the slide will be aligned with the central aperture 29a in partition 21. In the event that the projectile misses the intended target, the tracer composition 7 will continue to burn until it reaches aperture 29a whereupon the primer detonator 41 will be ignited by the tracer flame through the apertures 29a and 41a, and set off explosive 8 to destroy the projectile.

I claim:

1. An explosive projectile comprising, in combination, a jacket member provided at its open forward end with internal threads and open at its rear end, a thimble member closed at its forward end by a partition of substantial thickness and open at its rear end, the said partition being provided with an annular rim for securement of the said open rear of the jacket member, a plug fitting provided with external threads for screwing into the said threaded forward end of the jacket member and provided with a central passage, a firing pin extending through the said central passage to a point close to the said partition of the thimble member, explosive charge filling the said jacket member, a nose piece secured to the forward end of the firing pin extending beyond the said plug fitting and provided with a rearwardly extending skirt having an inwardly directed flange, the said plug fitting having an annular groove receiving the said skirt flange for a limited extent of sliding movement of the firing pin and its said nose piece, a compression spring interposed between the said nose piece and the plug fitting normally maintaining the firing pin in forward position, the said partition of the thimble member being provided with a diametrically oriented bore closed at one end and provided with internal threads at its open end, a slide member within the said bore provided with a punch hole in its end facing the mouth of the bore and with a cupped receptacle near its other end, primer detonating charge filling the said receptacle, the forward face of the partition of the thimble member being provided with a central aperture aligned with the said firing pin and opening into the said bore, a compression spring interposed between the said sliding member and the closed end of the bore urging the said sliding

member towards the mouth of the bore to bring the said detonator receptacle into alignment with the said firing pin aperture of the partition, a screw plug for closing the mouth of the bore provided with a central hole and countersunk in its outer face, an arming pin extending through the said plug hole and pointed to be received in the said punch hole of the detonator slide member and provided with a head seated in the said countersunk opening of the plug, the said arming pin being adapted by abutment of its said head with the cartridge shell and with the gun bore to hold the detonator slide in disarming position with the detonator receptacle out of alignment with the firing pin, the rearward face of the partition of the thimble member being provided with a central aperture opening into the said bore, the bottom of the detonator receptacle being provided with a small aperture alignable with the said rearward aperture of the partition when the detonator slide is in arming position, tracer charge filling the said thimble member and adapted upon burning to the partition when the projectile has missed its target, to ignite the detonator through the aligned partition aperture and the detonator receptacle aperture to destroy the projectile.

2. An explosive projectile comprising, in combination, a jacket member provided at its open forward end with internal threads and open at its rear end, a thimble member closed at its forward end by a partition of substantial thickness and open at its rear end, the said partition being secured to the said open rear of the jacket member, a plug fitting provided with external threads for screwing into the said threaded forward end of the jacket member and provided with a central passage, a firing pin extending through the said central passage to a point close to the said partition of the thimble member, explosive charge filling the said jacket member, a nose piece secured to the forward end of the firing pin extending beyond the said plug fitting and provided with a rearwardly extending skirt having an inwardly directed flange, the said plug fitting having an annular groove receiving the said skirt flange for a limited extent of sliding movement of the firing pin and its said nose piece, a compression spring interposed between the said nose piece and the plug fitting normally maintaining the firing pin in forward position, the said partition of the thimble member being provided with a diametrically oriented bore closed at one end, a slide member within the said bore provided with a cupped receptacle, primer detonating charge filling the said receptacle, the forward face of the partition of the thimble member being provided with a central aperture aligned with the said firing pin and opening into the said bore, a compression spring interposed between the said sliding member and the closed end of the bore urging the said sliding member towards the mouth of the bore to bring the said detonator receptacle into alignment with the said firing pin aperture of the partition, an arming pin in the said bore adapted by abutment with the cartridge shell and with the gun bore to hold the detonator slide in disarming position with the detonator receptacle out of alignment with the firing pin, the rearward face of the partition of the thimble member being provided with a central aperture opening into the said bore, the bottom of the detonator receptacle being provided with a small aperture alignable with the said rearward aperture of the partition when the detonator slide

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is in arming position, tracer charge filling the said thimble member and adapted upon burning to the partition when the projectile has missed its target, to ignite the detonator through the aligned partition aperture and the detonator receptacle aperture to destroy the projectile.

3. An explosive projectile comprising, in combination, a jacket member provided at its open forward end with internal threads and open at its rear end, a partition of substantial thickness closing the rear end of the jacket member, a plug fitting provided with external threads for screwing into the said threaded forward end of the jacket member and provided with a central passage, a firing pin extending through the said central passage to a point close to the said partition of the thimble member, explosive charge filling the said jacket member, a nose piece secured to the forward end of the firing pin extending beyond the said plug fitting and provided with a rearwardly extending skirt having an inwardly directed flange, the said plug fitting having an annular groove receiving the said skirt flange for a limited extent of sliding movement of the firing pin and its said nose piece, a compression spring interposed between the said nose piece and the plug fitting normally maintaining the firing pin in forward position, the said partition of the thimble member being provided with a diametrically oriented bore closed at one end, a slide member within the said bore provided with a cupped receptacle, primer detonating charge filling the said receptacle, the forward face of the partition of the thimble member being provided with a central aperture aligned with the said firing pin and opening into the said bore, a compression spring interposed between the said sliding member and the closed end of the bore urging the said sliding member towards the mouth of the bore to bring the said detonator receptacle into alignment with the said firing pin aperture of the partition, an arming pin in the said bore adapted by abutment with the cartridge shell and with the gun bore to hold the detonator slide in disarming position with the detonator receptacle out of alignment with the firing pin.

4. An explosive projectile adapted for insertion in a cartridge case comprising, in combination, a jacket provided with a central passage at its nose end and open at its tail end, an explosive charge in the forward end of the jacket and a tracer charge in the tail end, a partition separating said charges, a detonator slide in the partition and having a detonator therein, a firing pin extending through said nose passage to a point close to the detonator slide, an impact head carried by the forward end of the firing pin, spring means normally holding the firing pin away from the detonator, spring means in the partition normally urging the slide to a position to bring the said detonator into line with the firing pin, an arming pin arranged to be interposed between the detonator slide and a cartridge case to hold the detonator in the slide out of alignment with the firing pin before firing and thereafter engaging the barrel of the gun to hold the slide in such position until the projectile clears the gun barrel, means carried partly by the slide and partly by

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the partition whereby communication is established between the explosive charge in the projectile and the tracer charge, so that the explosive charge is ignited by the tracer charge should the target be missed, to destroy the projectile.

5. An explosive projectile adapted for insertion in a cartridge case, a transverse bore adjacent the tail end of said projectile, a detonator slide in said bore having a detonator therein, a firing pin extending through the nose of the projectile to a point adjacent the slide, means for normally holding said firing pin away from said slide, said pin being adapted to be operated upon impact to strike the detonator, spring means in the bore normally urging the detonator into alignment with the firing pin, and an arming pin with one end in engagement with slide and the other constructed and arranged for engagement with the cartridge case before firing, and thereafter engaging the barrel of the gun to hold the slide in unarmed position until the projectile clears the gun barrel.

6. An explosive projectile and cartridge case comprising, in combination, a jacket secured to said cartridge case, a detonator slide transversely disposed in said jacket, and having a detonator therein, a firing pin longitudinally disposed in the jacket and extending to a point close to said detonator slide, spring means urging said detonator slide to a position to bring the detonator therein in alignment with the firing pin, and a freely slidable arming pin in said jacket interposed between the detonator slide and the cartridge case to maintain the detonator slide in unarmed position before firing, and to thereafter engage the barrel to hold the slide in such position until the projectile is clear of the gun barrel.

7. An explosive projectile comprising, in combination, a jacket having an opening in its forward end for the passage of the firing pin, and an open tail end, a partition adjacent the open end of the jacket, an explosive charge in the jacket in advance of the partition and a tracer charge in the rear of said partition, a detonator-containing slide in said partition, a firing pin in said passage and extending to a point close to the detonator and arranged to strike said detonator upon impact of the projectile, expendible means for holding the detonator normally out of line with said pin, means carried partly by the slide and partly by the partition whereby communication is established between the detonator and the tracer charge so that the explosive charge will be ignited by the tracer charge should the target be missed, to destroy the projectile.

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