J. B. SEMPLE.

FUSE.

APPLICATION FILED FEB. 10, 1915.

1,166,942.

Patented Jan. 4, 1916.

FIG. 1.

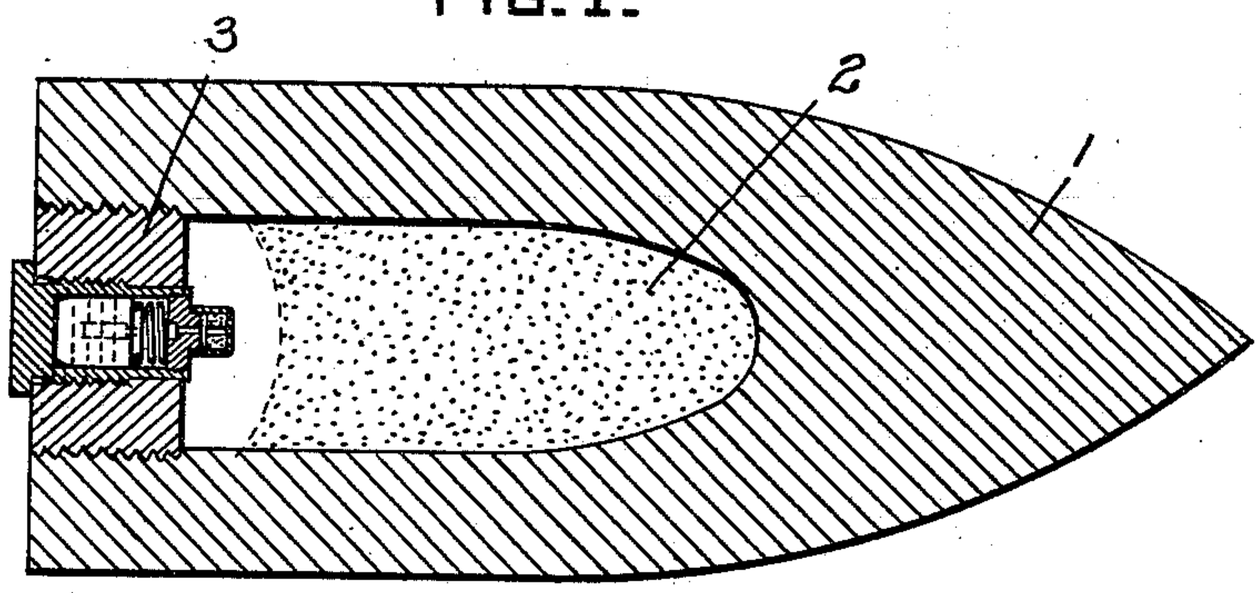


FIG. 2.

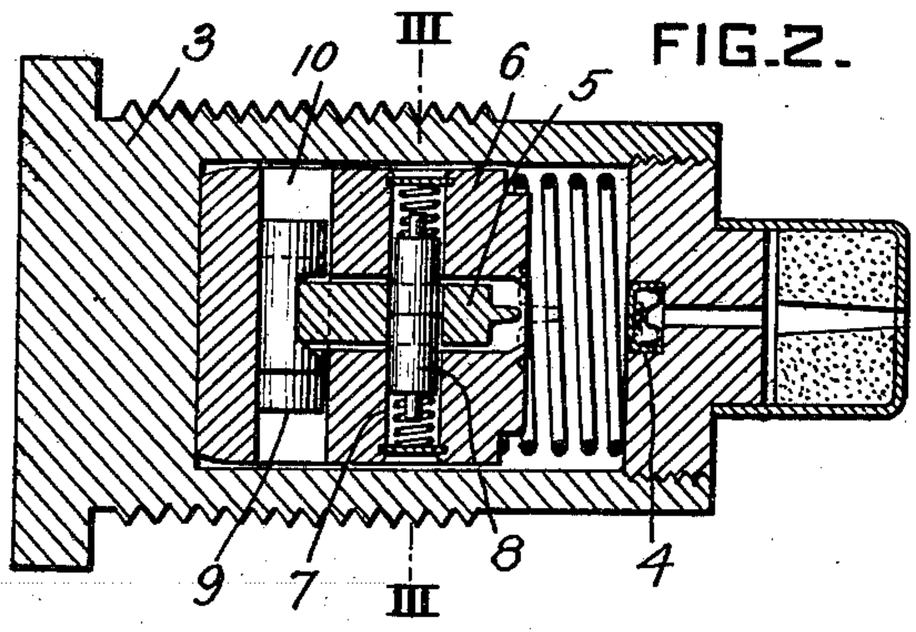


FIG. 3.

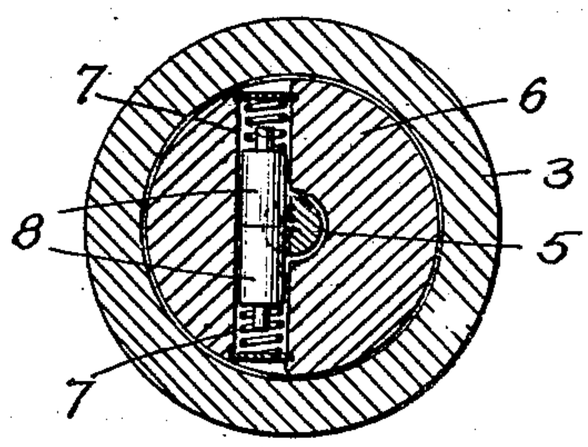


FIG. 4.

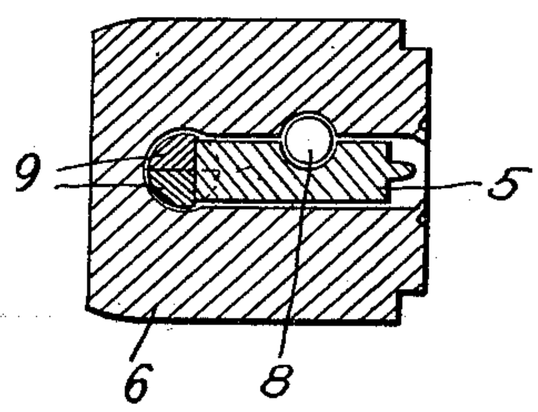
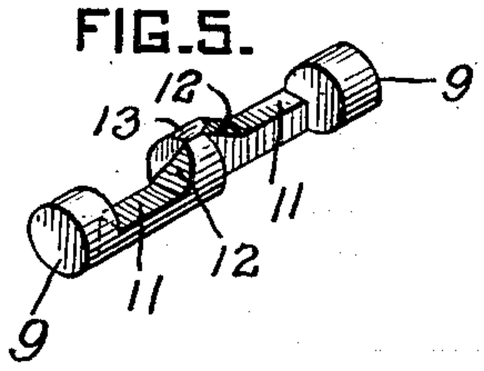


FIG. 5.



WITNESSES

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FUSE.

1,166,942. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed February 10, 1915. Serial No. 7,267.

To all whom it may concern:

Be it known that I, JOHN B. SEMPLE, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Fuses, of which improvements the following is a specification.

My invention relates to fuses for firing bodies of explosive material and is particularly adapted for use in explosive projectiles fired from rifled guns.

It is illustrated in the accompanying drawings, in which—

Figure 1 shows in longitudinal central section a projectile equipped with a fuse of my invention; Fig. 2 shows, on the same plane of section and on larger scale, the fuse-stock detached; Fig. 3 is a transverse section, on the plane indicated by the line III—III, Fig. 2; Fig. 4 is a view in longitudinal section, on a plane at right angles to that of Fig. 2, the plunger with the parts which it carries and with which it is equipped detached from the stock which carries it. Figs. 2, 3, and 4 show the firing-pin and the controlling and operating parts in unarmed position in the plunger. Fig. 5 is a view in perspective of the centrifugal bolts which first drive the firing-pin, when released by the locks which normally hold it unarmed, from unarmed to armed position, and which when the firing-pin is armed support it in armed position.

The projectile to which the invention is here applied and for which it is primarily intended is indicated by the numeral 1; 2 is the body of explosive with which the projectile is charged; and 3 is the stock, centrally arranged in the rear wall of the projectile, which carries the fuse. The fuse consists essentially of a percussion cap 4 and a firing-pin 5, the one stationary and the other movable in the stock 3. As shown, the cap is stationary and the firing-pin is borne in a movable block or plunger 6.

In order to guard against the premature firing of the percussion cap, the firing pin is made movable in the member which carries it (which member and the cap are made movable, one with respect to the other) from an unarmed to armed position. The construction as thus far explained is shown and described in United States Letters Patent No. 775,861, granted me November 22, 1904. It is with the particular means for controlling the firing pin in its movement from unarmed to armed position and for holding it in armed position when once it has been brought thereto, that my present invention has to do.

The firing-pin 5, as shown, is arranged in an axial runway in plunger 6. A transverse passageway 7 is formed, partly in plunger 6, partly in firing-pin 5; which passageway is continuous and uninterrupted when, but only when, the firing-pin is in retracted or unarmed position. The arrangements of this passageway will be clearly understood on comparing Figs. 2, 3, and 4 of the drawings. In this passageway is arranged a pair of spring-held centrifugally opening locking-bolts 8. Normally, when the firing-pin is retracted and the passageway 7 uninterrupted, these bolts abut one against another, in the manner clearly shown in Figs. 2 and 3; and, while ordinarily the meeting plane of these locking bolts will be coincident or substantially coincident with the center of rotation of the structure as a whole when fired from a rifled gun, the continuity of the passageway and the abutment of the spring backed bolts permit them to respond as a single unitary body to small and accidental side shocks, and thus accidental premature unlocking is guarded against. At the same time, the springs will always bring the bolts back to normal position after they have yielded to such accidental shocks; and in normal position they are ready when submitted to the centrifugal force exerted upon them by the projectile in flight, to separate and recede from so much of the passageway as lies in the firing-pin 5, and by so receding to leave the said firing-pin free to advance to armed position.

From the foregoing explanation it will be apparent that the precise arrangement shown of passageway for the locking-bolts is not important; it being important only that the passageway be formed in part in the body of the firing-pin, and that the disposition of the passageway itself be such as to permit the bolts 7 to function in described manner.

To the combination of parts already described are added means for causing the firing-pin, when released by the receding of the locking-bolts, to advance from unarmed to armed position and for maintaining the firing-pin in armed position when once that position has been attained.

In its broader aspect my invention contemplates the use of any means to serve the ends last defined; but, more specifically, it includes certain preferred means to that end. These preferred means consist of a pair of oppositely acting centrifugally movable bolts 9 movable in a transverse runway 10 in the plunger at the rear end of the axial runway in which the firing-pin moves. These bolts 9 are at their outer ends relatively heavy and toward their inner ends they are each of them provided with a notch 11, an inclined surface 12, and a portion 13 extending transverse to the direction of pin movement. The inner ends of these two bolts 9 overlap and, as the drawings show, they may at their outer ends be cylindrical in shape and at their inner ends semi-cylindrical. The structure as a whole thus becomes a single extensible cylinder and elongates in a cylindrical runway. The extent of overlapping of the inner ends of these bolts will change as they perform their intended function. Normally, when the parts are assembled, the firing-pin being locked in its unarmed position, the bolts 9 will be overlapped to the extent indicated in Fig. 2, the bottom surfaces 11 of the two notches corresponding one with another, and the firing-pin 5 itself extending into the two notches so registering one with another.

So long as the firing-pin is locked in the position shown in Fig. 2 the bolts 9 will, manifestly, be positively held against any functional movement in their runway. When, however, the projectile is fired from a rifled gun the same centrifugal force which effects the withdrawal of bolts 8 from locking engagement with firing-pin 5 exerted upon the bolts 9, whose centers of gravity lie away from the center of the runway and well out toward their extremities, will tend to cause them to move outwardly. This tendency, when once the firing-pin is free of locks 8, will become effective; the two inclined surfaces 13 engaging the rear end of the firing-pin 5 will carry it forward in plunger 6 to armed position, as the two bolts 9 move outward; and, finally, when the bolts 9 reach the outward limit of their movement, the firing-pin will be resting upon and supported by the transversely extending portion 13 of the two bolts 9, now brought to registry as indicated in Fig. 5. Thereafter, so long as the projectile rotates, the firing-pin will be maintained positively armed, and upon striking will function by striking percussion cap 4.

While, manifestly, a single bolt 9 would be effective to accomplish the ends described, manifestly also a pair of bolts has this advantage—that, though a lateral shock, such for example as is sustained when a flying projectile strikes and ricochets from the surface of the ocean, may displace one of the bolts, one and the same shock cannot displace both.

I claim as my invention:

1. The combination in a percussion fuse of a supporting body, a firing-pin movable in said body from an unarmed to armed position, a pair of yieldingly-held centrifugally-opening locking-blocks abutting one upon another in a passageway extending without interruption through the body of the plunger and through the unarmed firing-pin, and a pair of centrifugally-operating firing-pin-arming and supporting bolts.

2. In a percussion fuse, the combination of a supporting body, a longitudinal runway therein, two transverse runways intersecting said longitudinal runway, a firing-pin movable in said longitudinal runway and provided with a recess registering in the range of firing-pin movement with one of said transverse runways, a pair of centrifugally-opening locking-bolts in one of said transverse runways, and a pair of centrifugally acting arming-bolts in the other of said transverse runways.

In testimony whereof I have hereunto set my hand.

JOHN B. SEMPLE.

Witnesses:
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