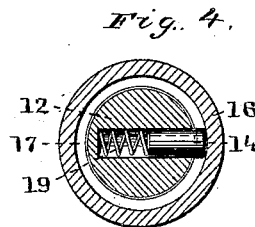
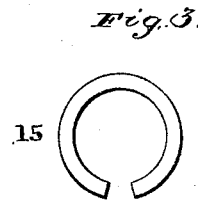
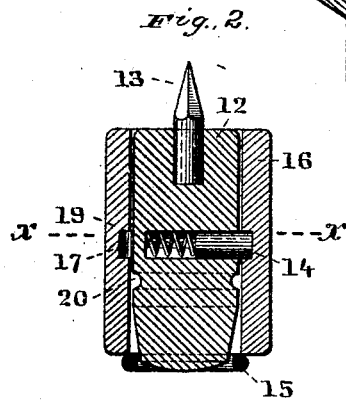
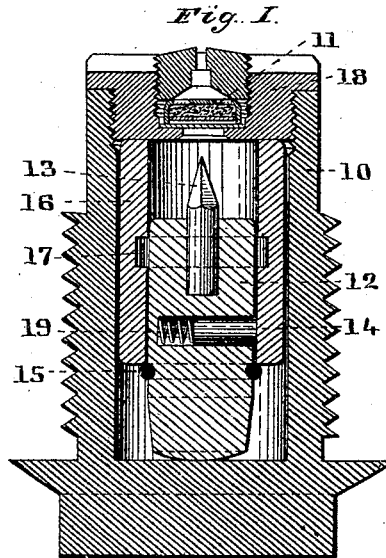


(No Model.)

W. J. DUNGAN.
PERCUSSION FUSE FOR PROJECTILES.

No. 523,110.

Patented July 17, 1894.



Witnesses
H. R. Edlin.
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UNITED STATES PATENT OFFICE.

WILLIAM J. DUNGAN, OF PHILADELPHIA, PENNSYLVANIA.

PERCUSSION-FUSE FOR PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 523,110, dated July 17, 1894.

Application filed April 4, 1894. Serial No. 506,333. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. DUNGAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Percussion-Fuses for Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

The present invention relates to the percussion fuse attachment for explosive projectiles and particularly to the igniter plunger or hammer, which, by reason of its momentum when the motion of the projectile is suddenly arrested, strikes the primer and produces the explosion. Igniter plungers of percussion-fuses of this class have heretofore been made with a central firing pin protected by an outer casing, which outer casing, by the firing of the projectile is thrown back to uncover the firing pin, and the object of the present invention is to provide an igniter plunger which shall be perfectly safe against accidental disengagement of the protecting collar from the firing pin, and which shall also admit of the combined weight of the protecting collar and the hammer proper being used as a hammer for exploding the fulminate at the proper time. The momentum of the mass of all the movable parts is thus employed to do the final work while the inertia of a portion thereof is employed to do the preliminary work of uncovering the firing pin.

By means of this invention safety in transportation and certainty and uniformity in action are secured for explosive projectiles and particularly for those fired with very low velocities, which by reason of the low velocity do not develop as much *vis inertiae* as projectiles fired with high velocities.

The invention consists of the improved device as hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a sectional elevation of a percussion-fuse for a projectile showing the several parts of

the igniter plunger in position prior to the firing of the projectile. Fig. 2 shows the several parts of the hammer in their relative positions subsequent to the firing of the projectile and with the firing pin uncovered. Fig. 3 is a detail view of the safety ring; and Fig. 4 is a transverse sectional view of the device taken on the line $x-x$.

The casing or fuse stock, 10, is of ordinary construction, and the primer is shown at 11, 60 with the aperture behind the same for the passage of the fire through to the powder chamber. The hammer proper consists of a central spindle 12 having a firing pin or nose 13 which penetrates the primer 11 and effects ignition at the proper time. The spindle 12 is fitted with a spring pressed radial locking pin 14, and also has an annular notch or groove 20, near the rear end of the spindle, which notch or groove forms a seat for an open ring 70 spring 15. This open ring is made of round spring wire and is held in its seat in the groove encircling the spindle, by its elasticity, the groove having a depth of a little less than one half of the diameter of the wire forming the open ring, and the end of the spindle in rear of the annular seat for the open ring, is made slightly tapering in order to assist the rearward movement of the ring when dislodged from its seat. A sleeve 16 of considerable thickness, so as to contain the requisite weight of metal, surrounds the spindle, and its normal position thereon is forward of the safety ring 15, the end of the sleeve extending beyond the point of the firing pin to guard it against accidental contact with the primer. 85 On the inside of the sleeve, 16, there is an annular recess 17, about midway of its length, with which the radially projected catch pin, 14, engages when the sleeve is thrown back into the position, shown in Fig. 2. It will be seen that the spindle and the sleeve, when in position in the case, just fill their chamber, the base of the spindle, 12, bearing against the rear end of the chamber, and the forward end of the sleeve, 16, just clearing the closing cap, 18. The sleeve rests on the safety ring 15, and the latter locks both the spindle and the sleeve and prevents any motion of one with respect to the other, except when a

sufficiently sudden impulse is given to the projectile, as by the act of firing the projectile from a gun, to bring into play the force of inertia and cause the safety ring to be forced back out of its seat.

The resistance offered by the open ring spring, of the sleeve to a longitudinal movement which would expose the point of the spindle, is represented by the static weight necessary to displace it, and this resistance bears a certain relation to the weight of the sleeve itself, and also to the inertia of the sleeve when a low velocity is imparted to a projectile having the device *in situ*, in a gun. When the projectile is fired from a gun the sleeve, 16, being loose on the spindle, dislodges the open ring spring 15 from its groove and pushes it back against the bottom of the containing chamber as shown in Fig. 2. In this position the annular recess 17 of the sleeve registers with the radial pin 14, carried by the spindle, and the latter is outwardly projected by its spring, 19, into the annular recess, locking the spindle and the sleeve together as one piece and uniting them into a combined mass, as regards longitudinal movement. There is thus formed an armed plunger igniter of suitable weight for its function. When impact of the projectile occurs, the combined spindle and sleeve thus interlocked, with the point of the former exposed, is projected by its momentum against the primer, 11; the point of the spindle penetrates the primer and ignition follows. The flame from the primer enters the powder chamber of the

projectile through the opening in the fuse stock and explodes the powder charge.

I claim as my invention—

1. The herein described igniter plunger for percussion-fuses for projectiles, consisting of a pointed spindle having an annular groove, in combination with an open ring spring seated in said groove, and a sleeve fitted on said spindle and projecting beyond its point and adapted to dislodge the ring from its seat, when the projectile is fired, as and for the purpose set forth.

2. In a percussion-fuse for projectiles a pointed spindle having a spring catch pin, in combination with a sleeve fitted on said spindle and projecting beyond its point and having an annular interior groove, whereby when the sleeve is rearwardly moved on the spindle to uncover the point it becomes automatically locked thereto in its retracted position, as and for the purpose set forth.

3. In a percussion fuse for projectiles a pointed grooved spindle having a radial spring locking bolt, in combination with an open wire ring encircling said spindle and seated in the groove, and a sleeve with an annular interior recess fitted on the spindle in advance of the ring and extending beyond the point of the spindle, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. DUNGAN.

Witnesses:

JABEZ H. GILL,
ROBT. T. CORSON.