Aug. 25, 1925. 1,550,977

W. L. LUKENS

FUSE FOR PROJECTILES

Filed Oct. 21, 1921

FIG. 1.

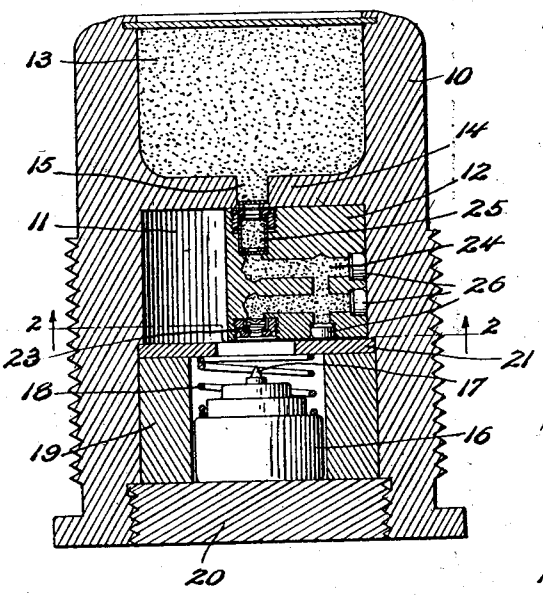


FIG. 2.

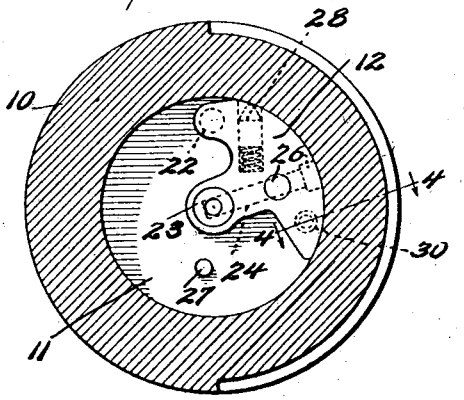


FIG. 3.

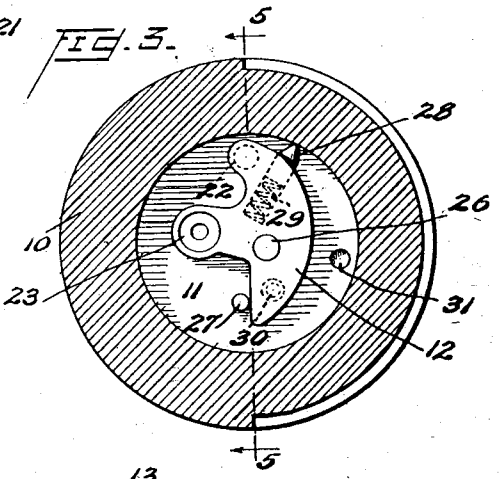
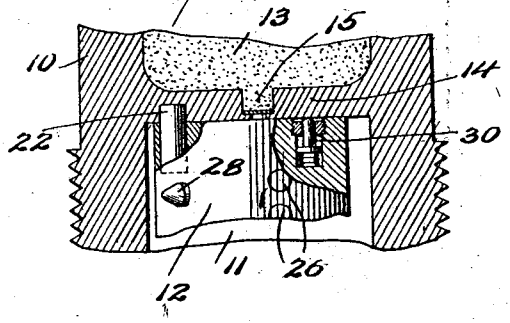


FIG. 5.



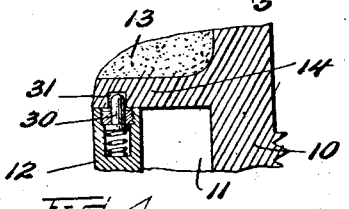


FIG. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM L. LUKENS, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO BETHLEHEM STEEL COMPANY, OF BETHLEHEM, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

FUSE FOR PROJECTILES.

Application filed October 21, 1921. Serial No. 509,342.

To all whom it may concern:

Be it known that I, WILLIAM L. LUKENS, a citizen of the United States, and residing at Bethlehem, Northampton County, State of Pennsylvania, have invented certain new and useful Improvements in Fuses for Projectiles, of which the following is a specification.

This invention relates to improvements in fuses for projectiles, and particularly to fuses which are normally unarmed and which are automatically armed on firing the projectile. A feature of the invention is the introduction of a delay train in a movable part of the fuse carrying the primer. The invention will be described in connection with the accompanying drawing in which:

Figure 1 is a section through the axis of the fuse, showing the parts in armed position;

Figure 2 is a section on the line 2—2 of Figure 1 looking forward in the direction of the arrows;

Figure 3 is a similar section showing the primer carrying block in unarmed position;

Figure 4 is a detail in section on the line 4—4 of Figure 2, and

Figure 5 is a view partly in section on the line 5—5 of Figure 3.

Referring to the drawing, 10 indicates a fuse stock, which, as shown, is adapted to be screwed into a threaded opening in the base of a projectile.

In the middle of the fuse stock is a chamber 11 carrying the movable primer block 12, to be presently described. In the forward part of the stock is a chamber 13 carrying a booster charge, the chamber 13 being separated from the chamber 11 by a partition 14 provided with a perforation 15 through which the booster charge is ignited. As shown the opening 15 is in the axial center of the fuse stock.

In the base of the fuse stock there is a plunger 16 carrying a firing pin 17. The plunger may be of any approved type adapted to move forward on impact of the projectile to cause the firing pin to detonate the primer. The plunger is normally held in the rear part of the plunger cavity by a restraining spring 18. As shown, the plunger housing consists of a cylindrical block 19 retained by a plug 20 screwed into the base of the fuse stock, the forward part of the housing consisting of a circular plate 21 having a central opening through which the firing pin may pass to detonate the primer.

The primer carrying block 12 is freely movable laterally in the cavity 11 but is not movable longitudinally therein, being substantially the same axial length as the cavity. The block is pivotally mounted on an eccentrically arranged pivot. As shown, it is carried by a substantial pivot pin 22 (Figure 5), the position of the pivot pin being indicated in dotted lines in Figures 2 and 3.

The primer block 12 is provided with a primer seat 23 and with a circuitous channel 24 for a delay train, the channel beginning at the primer seat and terminating at a detonator charge 25 adapted to ignite the booster charge in chamber 13. The delay train channel 24 may be formed in any suitable manner. As shown, it is formed by boring lateral and longitudinal channels, the ends of which are closed by suitable plugs 26.

When the fuse is armed, the primer and the detonator are in line respectively with the firing pin and the opening 15 to the booster charge so that on impact, the firing pin will strike the primer and ignite the delay train and the latter will fire the detonator and ignite the booster charge. The primer block 12 normally stands in the position shown in Figure 3 with its free side against a pin 27 in the partition 14. It is held in this position yieldingly by a plunger 28 which is carried by the primer block and pressed by a spring 29 against the wall of the cavity 11. The primer block is further held in its unarmed position, yieldingly, by a spring pressed locking pin 30 which bears against the partition 14. When the projectile is fired, the rotation of the projectile is imparted to the fuse stock, while the primer block 12 is retarded by its inertia and caused to move relatively to the position shown in Figures 1 and 2, that is, to the armed position. It is locked in this position by the pin 30 which enters the opening 31 in the partition 14. When the projectile is suddenly retarded on impact against any object, the plunger moves forward, driving the firing pin into the primer. The delay train then burns for a few moments, more or less, according to its length and composition, and then ignites the detonator 25 which in turn

ignites the booster charge in cavity 13. The booster charge, as is well known, ignites the bursting charge of the projectile.

The primer block 12 may be variously shaped but the form shown in the drawing is preferred. It will be noted that one side of the primer block is arc-shaped and of the same radius as the cavity 11. This formation gives to the primer block a large bearing surface to resist the impact when the block is thrown to the armed position, as the projectile is leaving the gun.

Having thus described my invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a fuse for projectiles, the combination with a fuse stock having a plunger in its rear end, provided with a firing pin, of a primer block pivotally mounted in said stock and provided with a delay train, a primer seat at one end of the delay train and a detonator at the other end thereof, the said primer block being adapted to move in its cavity upon rotation of the projectile to bring the primer seat in line with the firing pin.

2. In a fuse for projectiles, the combination with a fuse stock having a cylindrical cavity and a plunger located in the rear of the cavity and provided with a firing pin of a block eccentrically pivoted in said cavity and provided with a primer seat and means for yieldingly holding said block in unarmed position with the primer seat out of line with the firing pin, said means comprising a spring plunger mounted in the primer block and bearing on the wall of the cavity.

3. In a fuse for projectiles, the combination with a fuse stock having a cylindrical cavity and a plunger located in the rear of the cavity and provided with a firing pin of a block eccentrically pivoted in said cavity and provided with a primer seat and means for yieldingly holding said block in unarmed position with the primer seat out of line with the firing pin, said means comprising a spring plunger mounted in the primer block and bearing on the wall of the cavity and a fixed stop for determining the unarmed position of the block.

4. In a fuse for projectiles, the combination of a fuse stock having at its forward end a chamber for a booster charge and having a centrally arranged chamber for a primer block separated from the booster chamber by a centrally perforated partition and having at its rear end a plunger carrying the firing pin, of a primer block eccentrically pivoted in said primer block chamber and provided with a primer seat at its rear end, a detonating charge at its forward end and an intermediate delay train, said primer block being movable to armed position by centrifugal force to bring the primer seat and detonating charge into line with the firing pin and the perforation in said partition, respectively.

In testimony whereof I hereunto affix my signature.

WILLIAM L. LUKENS.