F. DAVIES.

PERCUSSION FUSE FOR SHELLS OR PROJECTILES.

APPLICATION FILED JAN. 24, 1918.

1,302,902. Patented May 6, 1919.

Fig. 1.

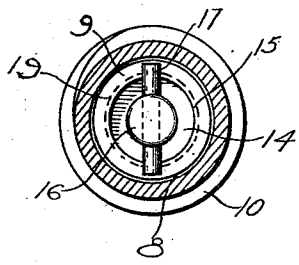


Fig. 2.

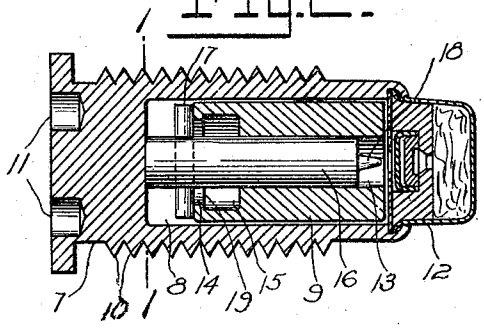


Fig. 3.

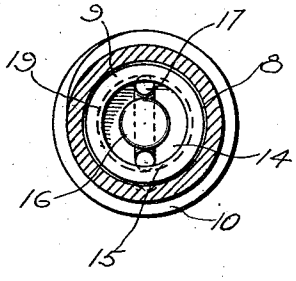


Fig. 4.

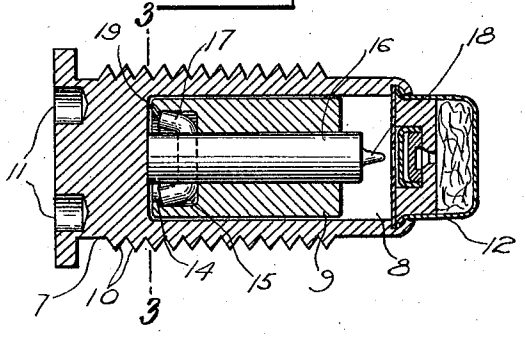


Fig. 6.

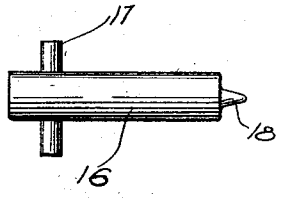
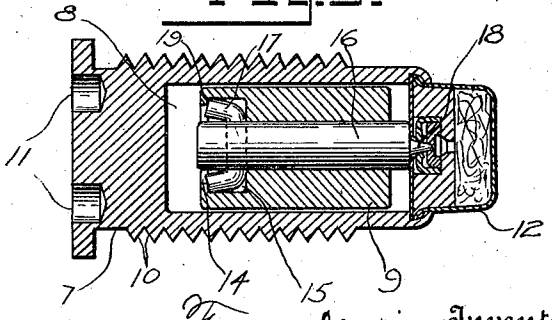


Fig. 5.



Francis Davies Inventor

By his Attorney

Clarence G. Campbell.

UNITED STATES PATENT OFFICE.

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PERCUSSION-FUSE FOR SHELLS OR PROJECTILES.

1,302,902. Specification of Letters Patent. Patented May 6, 1919.

Application filed January 24, 1918. Serial No. 213,491.

To all whom it may concern:

Be it known that I, FRANCIS DAVIES, a citizen of the United States, residing at 19 Fisher street, Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Percussion-Fuses for Shells or Projectiles, of which the following is a specification.

This invention relates to improvements in percussion fuses for shells or projectiles and is an improvement in that class of fuses known in the art as inertia operated fuses in which a firing pin and plunger are normally held in a safety or unarmed position and when the shell containing the fuse is fired from a gun are shifted to an armed position due to the set back of the parts.

There has been considerable trouble in this class of fuses due to the fact that the firing pin and plunger member are not always positively locked so that they will act as one piece and fire the primer when the impact comes as the shell or projectile hits anything while in flight. This difficulty is overcome by my invention.

My device is also better adapted to stand the rumble, jolt or drop tests without arming, because the locking pin is not adapted to be sheared and will merely act as a spring member and keep the plunger and firing pin apart in the unarmed position. The plunger and firing pin can therefore not be locked together until the requisite number of pounds pressure required to do this is exerted by firing the shell from the gun. The firing pin is also always positively locked to the plunger by means of the locking pin which is not sheared, but sprung into a non-releasable position in the plunger.

My invention is illustrated in the accompanying drawing wherein,—

Figure 1 is a cross section on the line 1—1 of Fig. 2. Fig. 2 is a longitudinal section of my fuse showing the firing pin in an unarmed position. Fig. 3 is a cross section on the line 3—3 of Fig. 4. Fig. 4 is a longitudinal section of my fuse showing the firing pin locked to the plunger in armed position following the firing of the shell from the gun. Fig. 5 is a longitudinal section of my fuse showing the firing pin in locked position and piercing the explosive element as the shell hits an object while in flight. Fig. 6 is a detail of the firing pin.

In the drawings 7 is a casing having chamber 8 in which a plunger 9 is adapted to slide. The casing 7 is threaded at 10 and has wrench holes 11 whereby it may be screwed into position in the end of the shell or projectile. Clamped to the opposite end of the casing from the wrench holes 11 is an explosive element 12.

The plunger member 9 has a central passage 13 for its entire length and at the outer end, which lies nearer the wrench holes 11, a comparatively shallow passage 14 of much larger diameter than 13 and immediately adjacent to passage 14, another passage 15 of larger diameter than 14 and materially deeper. The joining of passage 14 to the passage 15 forms a locking shoulder 19.

A firing pin 16 adapted to loosely fit passage 13 is held therein against passing through by means of a locking pin 17 which rests against the outer end of the plunger 9. The firing pin 16 also has a pointed or piercing member 18 on the opposite end of the firing pin from the locking pin 17.

The percussion fuse having been assembled will normally be in the position shown in Fig. 2 and is then ready for insertion in the end of the shell or projectile in which it is to be used. This is accomplished by means of the threads 10 which engage threads in the end of the shell or projectile and a wrench may be used in the wrench holes 11 for turning the fuse down into position. In this assembled position the plunger 9 and the firing pin 16 will have a slight play. This is known as the unarmed or normal position and the firing pin 18 of the firing pin 16 is held by means of the locking pin 17 against projection beyond the plunger 9 in which it is thus incased as a guard member.

As the shell or projectile is fired from the gun in which it is used the sudden set back of the plunger 9 will bend the locking pin 17 sufficiently so that it will pass through the passage 14 into the passage 15 which is of larger diameter than 14 and will allow said locking pin to partially spring back so that its ends will be firmly pressed against the shoulder 19 thereby effecting a positive locking of the firing pin to the plunger and throwing the firing pin 18 into armed position as shown in Fig. 4. The locking pin will not shear and therefore the firing pin cannot go through the plunger farther than

shown in Fig. 4 and cannot go back as it is locked through the binding of the ends of the locking pins against the shoulder 19 as shown in Fig. 3.

As the shell or projectile is traveling in flight, the plunger and firing pin which is positively locked thereto will remain in the position shown in Fig. 4 because of the continuous set back to the plunger. As the shell or projectile hits something while in flight, the plunger and firing pin locked thereto are practically simultaneously thrown forward because of the impact causing the armed firing pin to pierce the explosive element igniting the same which in turn ignites the explosive contained in the shell or projectile, thereby causing the shell or projectile to explode.

I claim:—

1. In a percussion fuse for shells or projectiles the combination of a case having a chamber therein, an explosive element, a plunger body adapted to slide in said chamber having locking means, consisting of a retaining shoulder, a firing pin body extending into the plunger body, a resilient locking pin adapted to engage the retaining shoulder and to positively lock the firing pin to the plunger in an armed position.

2. In a percussion fuse for shells or projectiles the combination of a case having a chamber therein, an explosive element, a plunger body adapted to slide in said chamber and having three communicating central passages the smallest extending through the plunger the second at one end and of larger diameter but of slight depth and adjacent to the second the third of slightly larger diameter than the second and of material depth, a firing pin body normally extending through the second and third passages and into the smallest, a locking pin passing through the firing pin at right angles to its longitudinal axis and of greater length than the diameter of the central passages.

3. In a percussion fuse for shells or projectiles the combination of a case having a chamber therein, an explosive element, a plunger body adapted to slide in said chamber and having locking means, consisting of a retaining shoulder formed in said plunger, a firing pin body extending into the plunger body, a locking pin adapted in coöperation with the locking means to lock the firing pin to the plunger in an armed position.

4. In a percussion fuse for shells or projectiles the combination of a case having a chamber therein, an explosive element, a plunger body adapted to slide in said chamber and having a central passage therethrough, a second shallow one of larger diameter and a third one of larger diameter than the second and materially deeper thereby forming locking means, a firing pin body extending into the plunger body, a resilient locking pin adapted in coöperation with the locking means to lock the firing pin to the plunger in an armed position.

5. In a percussion fuse for shells the combination of an explosive element, a casing having a chamber, a plunger adapted to slide in said chamber having a central passage its entire length, a second passage at the outer end of the plunger of slight depth and larger diameter than the first passage, a third passage adjacent to the second of larger diameter and materially deeper, a retaining shoulder formed by the juncture of the second and third passages, a firing pin extending into the plunger, a locking pin passing through the firing pin at right angles to its longitudinal axis and longer than the diameter of the three plunger passages.

6. In a percussion fuse for shells the combination of an explosive element, a casing having a chamber, a plunger adapted to slide in said chamber having a central passage its entire length, a second passage at the outer end of the plunger of slight depth and larger diameter than the first passage, a third passage adjacent to the second of larger diameter and materially deeper, a retaining shoulder formed by the juncture of the second and third passages, a firing pin extending into the plunger, a locking pin passing through the firing pin at right angles to its longitudinal axis and longer than the diameter of the three plunger passages and adapted to lock the plunger and firing pin together.

7. In a percussion fuse for shells the combination of an explosive element, a casing having a chamber, a plunger adapted to slide in said chamber having a central passage its entire length, a second passage at the outer end of the plunger of slight depth and larger diameter than the first passage, a third passage adjacent to the second of larger diameter and materially deeper, a retaining shoulder formed by the juncture of the second and third passages, a firing pin normally sheathed in the plunger and held against arming by a resilient locking pin passing through the firing pin at right angles to its longitudinal axis.

8. In a percussion fuse for shells the combination of an explosive element, a casing having a chamber, a plunger adapted to slide in said chamber having a central passage its entire length, a second passage at the outer end of the plunger of slight depth and larger diameter than the first passage, a third passage adjacent to the second of larger diameter and materially deeper, a retaining shoulder formed by the juncture of the second and third passages, a firing pin, a resilient locking pin carried by said firing pin and adapted to normally retain it in sheathed position and upon firing to engage

the retaining shoulder and lock the firing pin to the plunger in armed position.

9. In a percussion fuse for shells the combination of an explosive element, a casing having a chamber, a plunger adapted to slide in said chamber having a central passage its entire length, a second passage at the outer end of the plunger of slight depth and larger diameter than the first passage, a third passage adjacent to the second of larger diameter and materially deeper, a retaining shoulder formed by the juncture of the second and third passages, a firing pin, a locking pin carried by said firing pin and adapted to normally retain it in sheathed position and upon firing to lock the firing pin to the plunger in armed position, springing the locking pin into a locked position with the ends of said pin rigidly bound against the shoulder formed by the juncture of the second and third passages.

10. In a percussion fuse for shells or projectiles the combination of a case having a chamber therein, an explosive element, a plunger body adapted to slide in said chamber, and having a locking shoulder, a firing pin body extending into the plunger body, a locking pin adapted in coöperation with the locking shoulder to lock the firing pin to the plunger in an armed position.

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

FRANCIS DAVIES.

Witnesses:
G. A. ANDERSON,
FRANK WAGNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."