

(No Model.)

2 Sheets—Sheet 1.

W. J. SMITH.
TIME FUSE.

No. 527,222.

Patented Oct. 9, 1894.

Fig. 1.

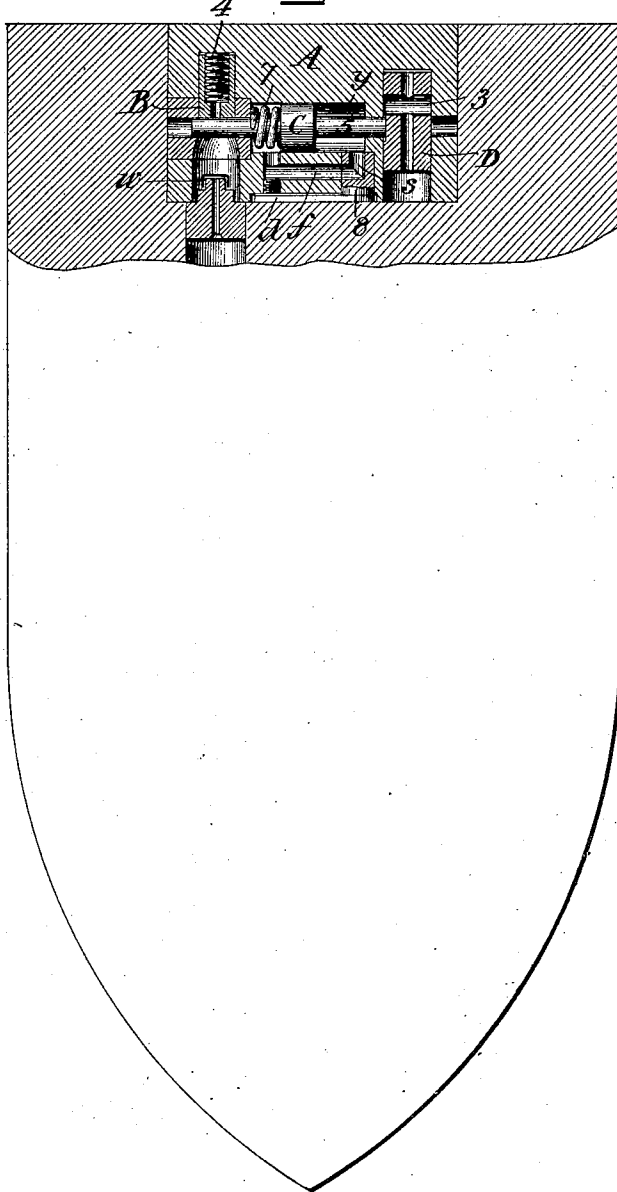
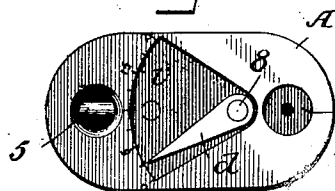


Fig. 2.



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Fig. 3.

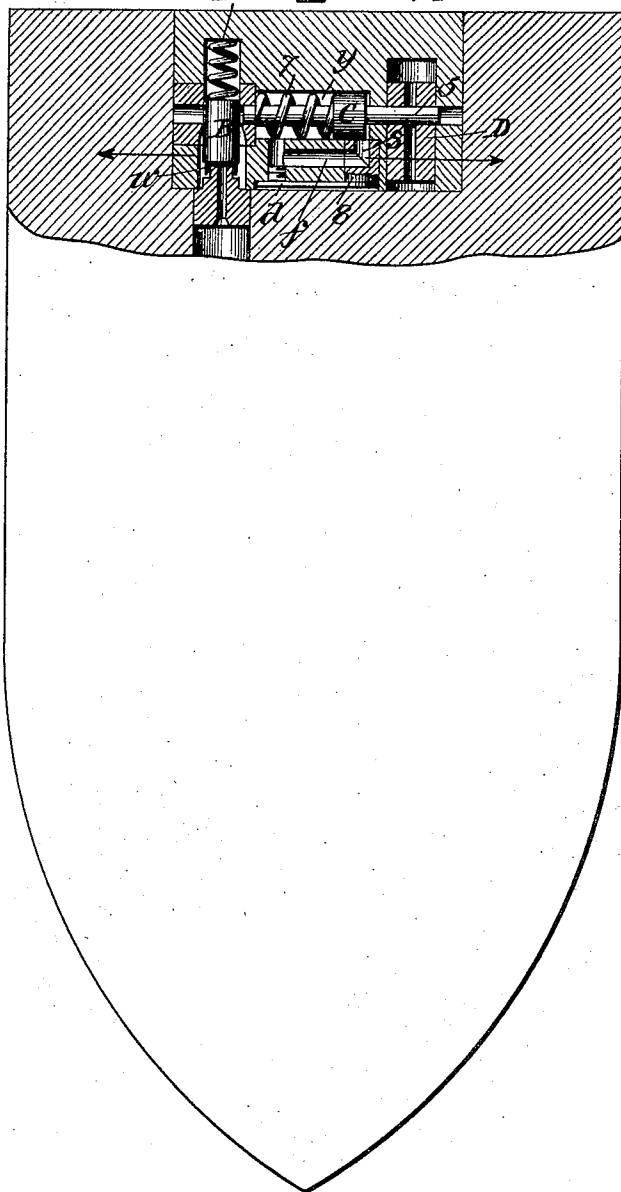
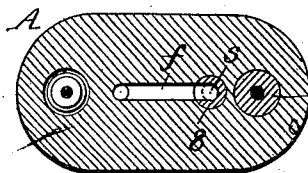


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM JOHN SMITH, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO
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TIME-FUSE.

SPECIFICATION forming part of Letters Patent No. 527,222, dated October 9, 1894.

Application filed October 25, 1893. Serial No. 439,120. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN SMITH, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Exploders for Projectiles, of which the following is a specification.

My invention relates to exploders for projectiles, and my invention consists of an exploder in which there is a spring actuated hammer, a lock therefor, a detent for said lock, and means for regulating the movement of the lock, all as set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 illustrates a projectile in part section sufficient to show my improved exploder. Fig. 2 is an inverted plan view of the case of the exploder. Fig. 3 is a view showing the parts in position after firing; Fig. 4, an enlarged section on the line 4—4, Fig. 1.

Within a case A, which is fitted neatly to an opening in the exterior of the projectile, is arranged a spring actuated hammer B, sliding in an opening beneath which is a nipple for the reception of a cap or other igniter *w*, and pressed toward said cap by a spring 4. A lock of any suitable character serves to hold the hammer B in position with the spring compressed so that on the release of the hammer by the action of the said lock, the hammer will be forced percussively against the cap, and explode the charge of the shell.

The lock that holds the hammer may be of any suitable character. As shown, it is a rod 3, sliding in an opening which crosses the opening in which the hammer slides and serving when beneath the hammer to hold it in position with the spring compressed.

With the lock 3 is combined a spring 7 which tends to throw the lock in a position to unlock the hammer, but as it is not desired that the lock shall thus be moved until the gun is fired and sometimes until the shell is to explode, I make use of a detent which holds the lock in place until the charge is to be exploded, or in the case of a time exploder, until the lock is to begin to move from beneath the hammer.

The arrangement of parts in connection

with a time exploder started in action on firing the gun is illustrated in a separate application for Letters Patent, Serial No. 439,039, filed on the 24th day of October, 1893, the special arrangement herein shown serving for an exploder in which the locking device is caused to release the device that locks the hammer on the striking of the shell against any object. In this construction the lock 5 is combined with a detent which tends to hold the lock in position with the spring 7 compressed until the said detent is disturbed by the concussion resulting from the contact of the projectile with an object.

Different detents may be employed to hold and release the lock 5. As shown, there is a cylindrical bolt D which slides in an opening transverse to the axis of the rod 5, and with a transverse opening 3, which, when the detent is in its normal position is out of line with the axis of the rod, but which will be brought into line with the rod when the detent is shifted by the concussion of the shell. As shown, the spring 7 is in a cylinder or chamber *y* and bears against a piston C upon the rod 5, tending to move the rod toward the detent D, which is in the form of a cylindrical block sliding in a cylindrical chamber in the block A, the face of the detent where the end of the rod 5 bears against it being flattened to prevent the detent from turning. There is also a longitudinal opening through the detent which will enable it to move freely from end to end of the chamber which is longer than the detent which is situated in it. These parts are so arranged that the detent will be shifted by the concussion. As shown, the head of the detent is toward the rear of the shell when the parts are in the position shown in Fig. 1, and when the shell strikes any object the momentum will cause the detent to move forward longitudinally in the shell and bring the opening 3 in line with the locking rod 5.

The parts arranged as above described may be used for an exploder where the explosion is to take place the moment the projectile strikes the object. In many cases, however, it is desirable that there shall be an interval of time between the striking of the shell and the explosion and to this end, I provide

means for retarding the movement of the lock even after the detent D has shifted in position to release the lock. To this end, I make use of a "dash pot." The dash pot may be constructed in different ways, but as shown, I utilize the piston C and the chamber y in which the piston and spring and rod 5 are arranged, placing a body of oil in the chamber, and connecting the opposite ends of the chamber by a by-passage f, and in order to regulate the flow and consequently the interval between the striking and explosion, I make use of a valve which more or less throttles this by-passage.

The valve may be of any suitable character. As shown, it is a plug 8 having an opening s which by the turning of the plug may be brought to coincide more or less with the channel f, and on the end of the plug is an arm or pointer d which extends to a graduated arc u, so that by setting the pointer to different positions and more or less throttling the channel f, the movement of the piston of the dash pot after the detent D has been shifted may be predetermined and regulated to any desired extent.

The liquid used may be oil, glycerine, water, mercury, or any other liquid which may be found to be available or desirable.

Although I have shown a hammer and a detent in the form of a cylindrical block sliding in an opening, it will be evident that the forms of these parts may be varied to a very considerable extent without departing from the main features of my invention; and although I have shown a dash pot of a certain form, it will be evident that different forms of dash pots or liquid retarding devices may be employed.

I do not limit myself to the particular means described of shifting the detent D, that is by the concussion, inasmuch as it may be shifted either by concussion or by direct action of the gases when the charge in the gun is fired and before the projectile leaves the gun, as set forth in my aforesaid other application for Letters Patent.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. An exploder for projectiles provided with a spring actuated hammer, a lock for holding the hammer in position with the spring compressed, a spring for moving the lock in one direction to release the hammer, and a detent for holding the lock in position with its spring compressed, substantially as set forth.

2. The combination in an exploder for projectiles, of a spring actuated hammer, a lock therefor, a detent for holding the said lock; a spring for actuating the lock, and a dash pot for regulating the movement of the lock, substantially as set forth.

3. The combination in an exploder for projectiles, of a spring actuated hammer, a lock, a spring for actuating the lock, a dash pot for regulating the movement of the lock, a detent for holding the lock, and a valve and passages arranged to regulate the flow of the liquid from the dash pot, substantially as set forth.

4. The combination with a projectile having a recess, of a case fitted to said recess, a cylinder in said case provided with a piston and piston rod, spring for moving the piston in one direction, an escape port and valve, and a liquid filling the cylinder on one side of the piston, a hammer and lock therefor connected with the piston, and a detent for locking the lock in its position with the actuating spring compressed, substantially as set forth.

5. The combination in an exploder for projectiles, of a spring actuated hammer, a lock, a spring for actuating the lock, and a detent consisting of a block arranged to move longitudinally in the shell on striking an object and constructed to release the lock when so shifted and a dash pot controlling the movement of said lock, substantially as set forth.

6. The combination in an exploder for projectiles, of a spring actuated hammer, a lock, a detent therefor, a spring acting on the lock, and a dash pot and valve for regulating the movement of the liquid from the dash pot, the said detent arranged to move longitudinally in the shell when the shell strikes an object, substantially as set forth.

7. The combination with a recessed shell, of a block or frame A containing a hammer and spring for actuating the same, a lock for holding the hammer in its retracted position, a spring for moving the lock in one direction, a dash pot for regulating the movement of the lock, and a detent consisting of a sliding block arranged to constitute a bearing for a part of the lock and to release the lock when the block moves forward, substantially as set forth.

8. The combination in an exploder for projectiles, of a case or block containing a spring actuated hammer, a sliding rod extending beneath said hammer when the spring is compressed and provided with a piston sliding in a cylinder, a spring bearing against said piston, a passage extending between the ends of the cylinder and provided with an adjustable valve, and a detent for the rod 5, arranged to move longitudinally in the shell, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM JOHN SMITH.

Witnesses:

C. C. MONSEN,
GEO. I. ARMSTRONG.