(No Model.)

2 Sheets—Sheet 1.

W. J. SMITH.

TIME FUSE FOR PROJECTILES.

No. 527,250. Patented Oct. 9, 1894.

Fig. 1.

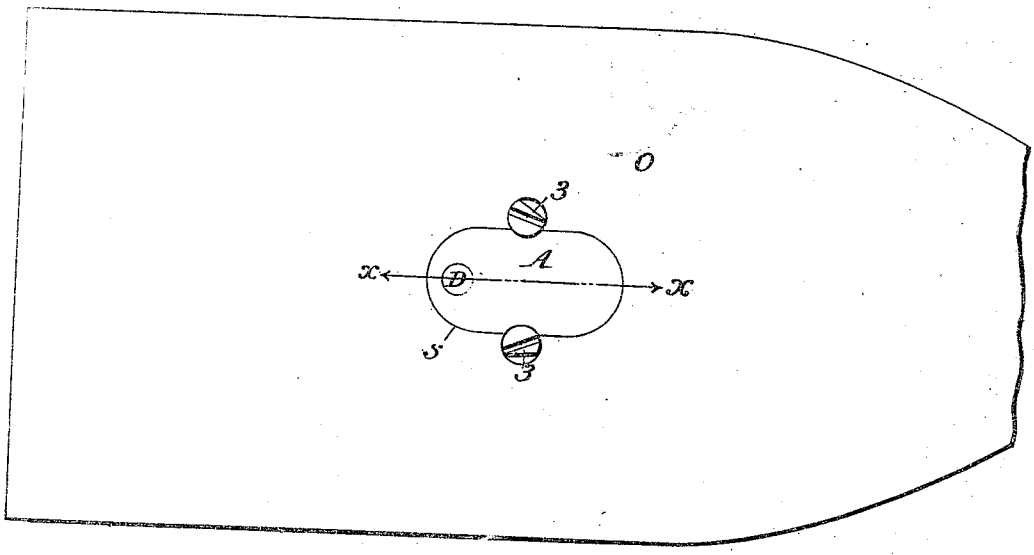


Fig. 2.

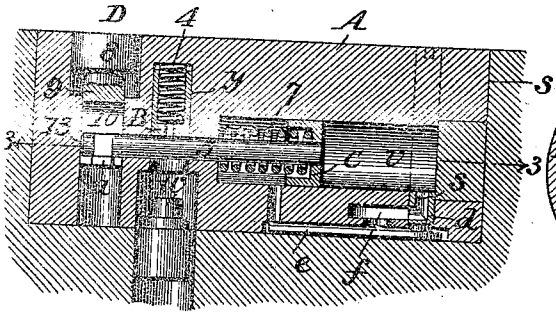


Fig. 3.

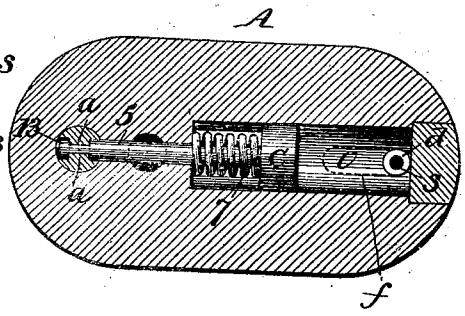
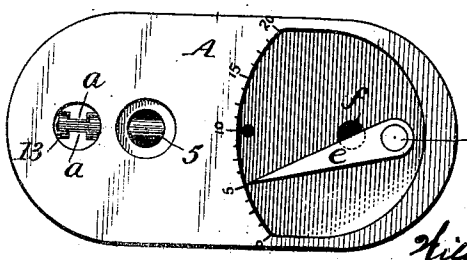


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

W. J. SMITH.

TIME FUSE FOR PROJECTILES.

No. 527,250. Patented Oct. 9, 1894.

Fig. 5.

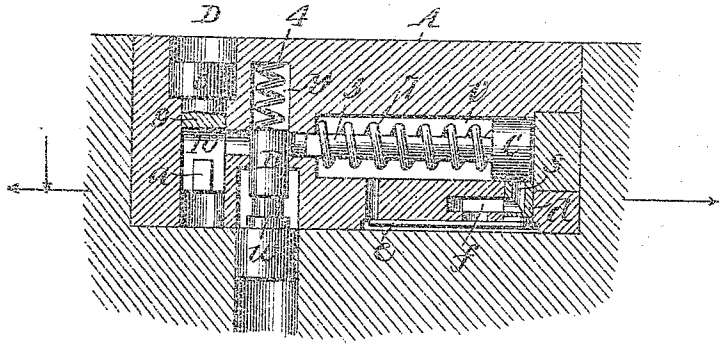
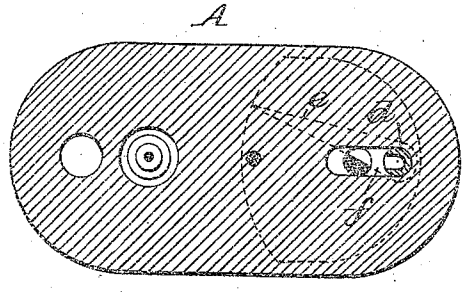


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TIME-FUSE FOR PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 527,250, dated October 9, 1894.

Application filed October 24, 1893. Serial No. 489,039. (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 Time-Exploders for Projectiles, of which the following is a specification.

My invention has for its object to explode the charge of a shell or other projectile at any time that may be predetermined on, and to this end my invention consists of a time exploding device in which a hammer is locked in position by a locking device controlled by a dash pot, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is an external view of a shell provided with my improved time exploding device. Fig. 2 is a longitudinal section on the line *x*—*x*, Fig. 1. Fig. 3 is a transverse section on the line 3—3, Fig. 2. Fig. 4 is an inverted plan view of the device. Fig. 5 is a view showing the parts in position after firing. Fig. 6 is a section on the line 6, Fig. 2.

O represents the body of the projectile which may be of any of the usual forms, and in the exterior of which is a recess *s*. In the recess *s* fits a case or block A which is detachably secured by means of bolts having mutilated heads 3, 3, that can be turned to the desired extent to engage recesses in the block, or to permit the latter to be removed and said case is provided with a hammer of any suitable character with a lock for holding the hammer in a retracted position against the action of the actuating spring of the hammer, and with a detent connected to hold and release the lock with a dash-pot for regulating the movements of the lock. All of these parts may be constructed and arranged in any suitable manner. As shown, the hammer B consists of a block sliding in a recess or channel *y* in the block A and bearing against a spring 4, which tends to throw the hammer inward and against a cap *w* suitably arranged, or against any other suitable exploder, the explosion of which will ignite the charge of the projectile. The lock or detent for the hammer is in the form of the rod 5 of a piston C, which piston moves in a cylinder *v* in one direction under the action of a spring 7, the rod 5 being of such a length that when the spring throws the piston to its full extent, the end of the rod will have passed from under the hammer B and the latter can then descend under the action of the spring 4 against the cap. Normally the piston C is pushed back so as to compress the spring, and so that the rod 5 will extend under and act as a lock or detent for the hammer B, and it is, of course, necessary to hold the parts normally in this position, and also to release the piston whenever it is necessary for the projectile to be exploded.

Any suitable detent may be employed for holding back the piston and for releasing it when the projectile is fired. As shown, the detent is in the form of a sliding bolt D having a head 8 and a stem 9, through which is a transverse opening 10, and below this opening are two webs *a*, *a*, on opposite sides of a slot adapted for the passage of a web upon the piston rod 5, which thus has a head 13 at the outer end, so that when the bolt D is in its elevated position, the head 13 will bear against the sides of the projections *a*, *a*, and the piston rod and its piston will be held in the position shown in Fig. 2, locking the hammer, but when the bolt is pressed inward to bring the opening 10 to coincide with the piston rod then the projections *a* will escape from contact with the head 13, and the piston can move inward under the action of the spring and release the hammer.

It will of course be evident that if the piston C could move instantly under the action of the spring when the bolt D was thrown inward, as it will be by the force of the gases on exploding the charge in the gun, the projectile would be exploded almost simultaneously with the gun. It is therefore necessary to control the movement of the piston C, and to this end I fill the cylinder *v*, at one side of the piston with liquid making practically a "dash pot" which consists of the said piston C and cylinder *v* and an opening for the escape of oil, glycerine or other liquid with which the cylinder is filled.

In order to make an adjustable time exploder I provide means whereby the opening *s* for the escape of the liquid may be con-

trolled. Thus, the valve *d* is perforated to form the opening *s*, to allow for the passage through it of the liquid from the cylinder into a passage *f* communicating with the opening *s* when the valve is properly set, and a flat pointer *e* on the end of the valve may be used to turn the valve to cause the opening *s* to correspond more or less with a passage *f*. The extent to which the pointer and the valve are turned will determine the size of the escape opening, the valve being closed when the pointer is in its extreme position in one direction. By experiment the number of seconds that it takes for the piston C to move to its full extent when the passage is opened to different degrees is determined, and by graduating the line over which the end of the pointer travels the latter may be set in position so as to regulate, as may be desired, the time which the locking rod 5 will take to move to a sufficient extent to release the hammer.

The pointer *e* is properly adjusted before the frame A is applied to the shell, after which the parts will occupy the positions shown in Fig. 2. The shell or projectile is then inserted in the gun, and when the gun is fired, the force of the explosion will throw in the bolt D and release the stem 5, after which the piston C will move inward under the action of the spring 7, but only so fast as the escape of the liquid from the cylinder *v* will permit, and after the piston has moved inward to its full extent, the hammer B will be released and will be thrown forcibly against the cap or other fulminating device or explosive, and the charge in the projectile will be exploded.

Any suitable provision may be made for the escape of the liquid from the cylinder. As shown, passages are made so that it can pass back from the channel *f* to a channel leading behind the piston C, thereby slightly compressing the air which will be in these passages and in the space behind the piston. This, however, will not interfere with the action of the parts to any material extent.

It will be seen that the piston C in connection with the body of fluid against which it operates acts practically as a dash pot to limit the movement of the device that locks the hammer; that the speed of the piston is regulated by regulating the escape passage for the fluid, and it will be evident to anyone skilled in the art that there are numerous devices which could be substituted for those shown with like effect, and that the construction of the hammer and of the detent for holding the same might be varied in many ways, and yet secure the same result. It is further evident that the valve controlling the flow from the cylinder might be adjusted from the outside of the shell avoiding the necessity of removing the case A for this purpose, as for instance, extending the stem of the valve to the face of the case as indicated in dotted lines, Fig. 2. It will be evident however that the construction described is a very advantageous one, as the case A is almost a solid block having only the openings bored in it to form the cylinder *v*, and the openings for the reception of the hammer B and bolt D, and slotted to form the escape channel from the valve; and that as the case A contains all the parts, it may be readily removed from the projectile, adjusted with extreme care, and then placed in position without any possibility of getting out of adjustment.

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

1. An exploder for projectiles consisting of a case provided with a dash-pot, a spring for actuating the piston of the dash-pot, a hammer, and a spring for actuating the same, a locking device for the hammer connected to be operated by the piston of the dash-pot, and a detent for the locking device having its end exposed to be acted on by the force of the explosion of the charge in the gun, substantially as set forth.

2. The combination of a case provided with a hammer and a spring for operating the same, a dash-pot, an adjustable valve for regulating the flow of liquid from the dash-pot, a lock for the hammer connected with the piston of the dash pot, and a detent for said lock with one end exposed to the action of the gases on the explosion of the charge of the gun, substantially as set forth.

3. The combination of the case A, its cylinder, piston, spring and adjustable valve, a piston rod extending from the piston, a hammer bearing on the said piston rod, and a spring for actuating the hammer, and a detent for said rod consisting of a bolt, the head of which is exposed outside of the case, 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:
CHAS. MCGROARTY,
THOMAS J. WALSH.