A. M. SAWYER.

IGNITING TIME FUSE FOR SHELLS.

No. 38,699. Patented May 26, 1863.

Fig. 2.

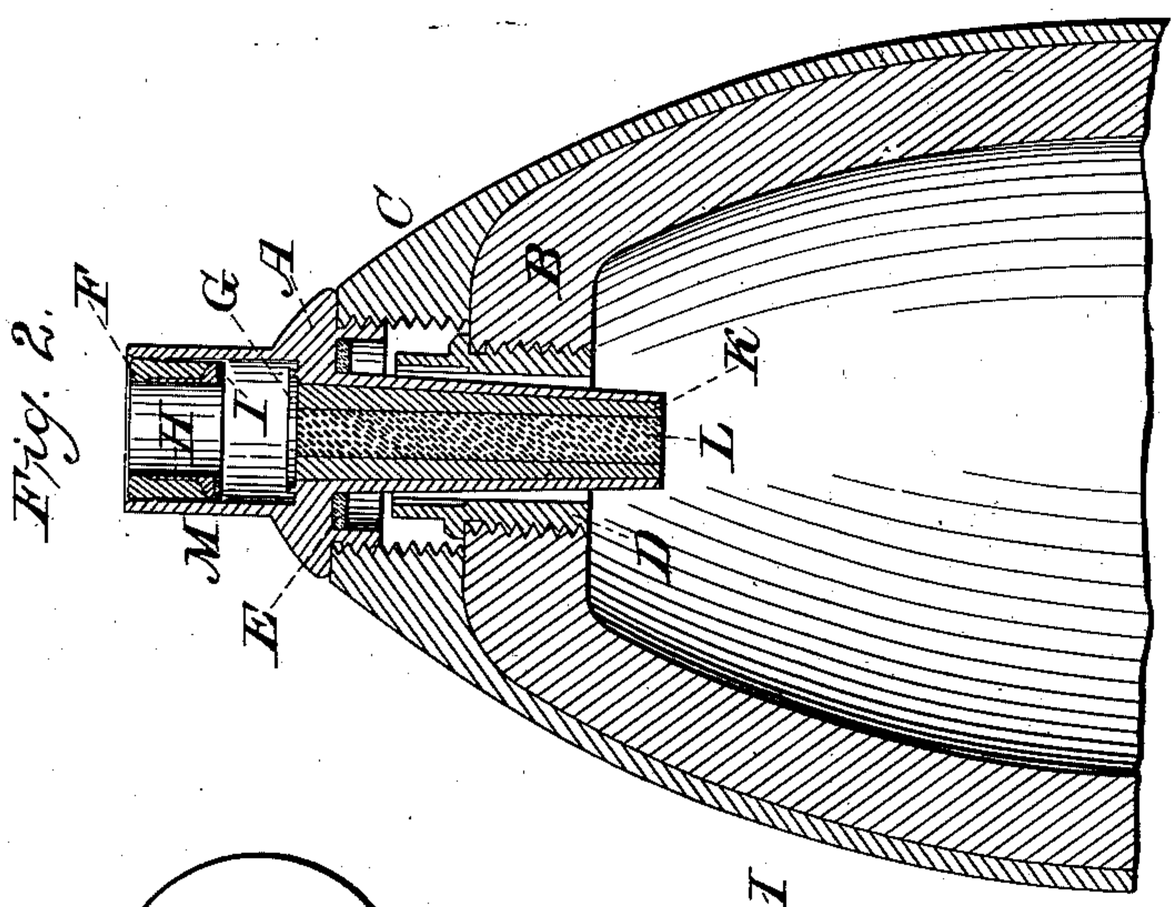


Fig. 3.

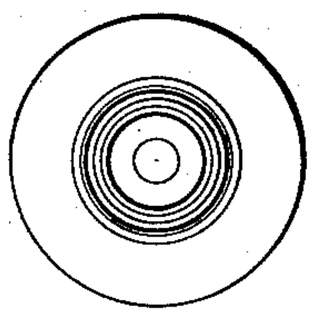


Fig. 4.

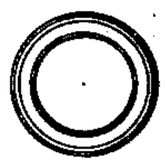
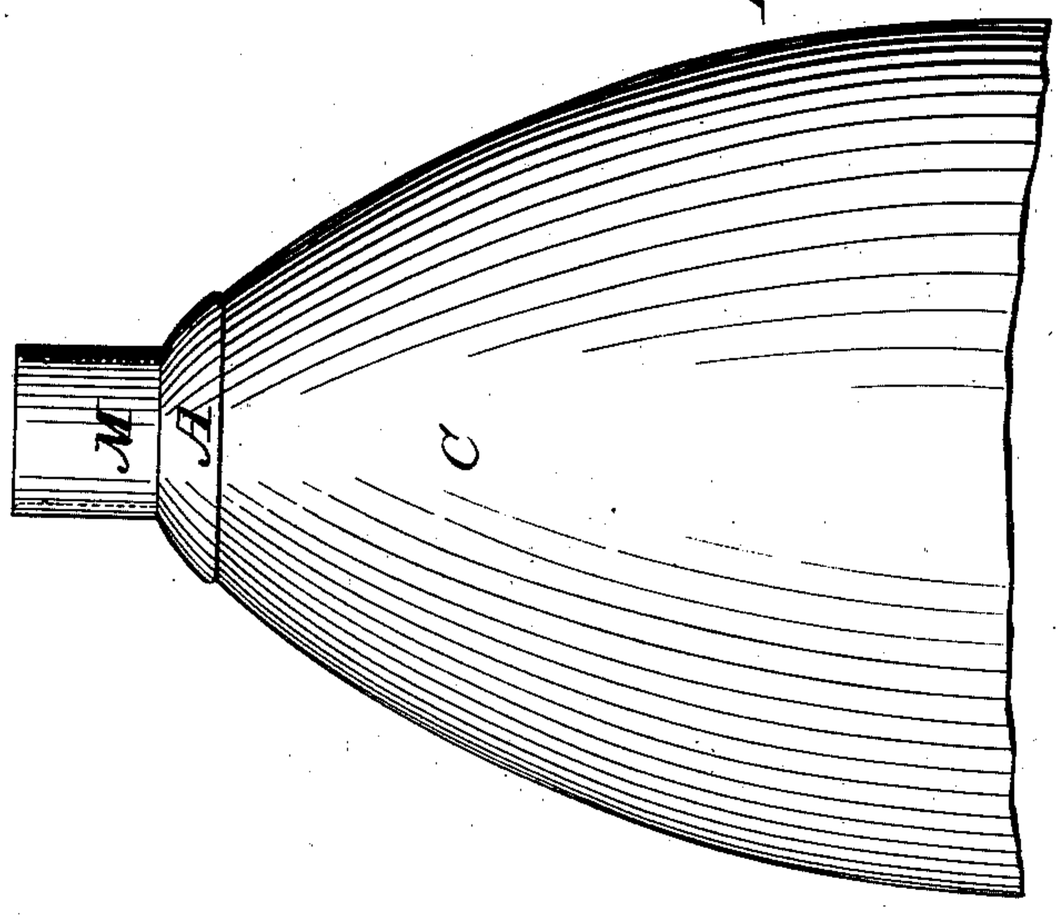


Fig. 5.

Fig. 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

ADDISON M. SAWYER, OF FITCHBURG, MASSACHUSETTS.

IMPROVEMENT IN IGNITING TIME-FUSES OF SHELLS.

Specification forming part of Letters Patent No **38,699**, dated May 26, 1863.

To all whom it may concern:

Be it known that I, ADDISON M. SAWYER, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Fuses for Igniting Ordnance Shells; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation thereof, taken in connection with the accompanying drawings, making a part of this specification, in which—

Figure 1 represents in elevation the fuse applied to a cylindro-conical "Sawyer's" shell. Fig. 2 represents the same in section. Fig. 3 represents the fuse-stock in plan. Fig. 4 represents the fulminating-primer in plan, and Fig. 5 a vertical section of the same.

The subject-matter of my invention relates to the manner of constructing and applying a detonating-primer for igniting a time-fuse in an ordnance shell, so that the fuse shall be ignited at the instant of the explosion of the gun by the shock of the discharge, and is designed more particularly to be used in rifled guns where, from the absence of windage, the fuse cannot well be lighted by the flame that escapes past the shell in the gun.

My invention consists, in the first place, in constructing upon the exterior part of the fuse-stock, and immediately adjacent to the time-fuse, an open socket, or its equivalent, for holding a detonating-primer to ignite the time-fuse, which is actuated by the joint action of its own inertia and the first impulse of the discharge of the projectile, the construction of the socket and primer, respectively, being such that the primer may be placed in the socket at the time of placing the shell in the gun, and thus avoid all risk of accidental explosion, which might occur if the primers were carried in the fuse-stock, as is the case with all fuses of which I have any knowledge, heretofore constructed, in which the time-fuse was lighted by a fulminating-primer.

My invention also consists in the manner of constructing the primer and of holding it in its socket, so that it shall not be either accidentally displaced or ignited, and, also, so that it shall not obstruct the free burning of the time-fuse, nor fire the shell in the gun by the direct action of the fulminating-powder of the primer, as will be hereinafter explained.

A is the fuse-stock. It is of the form known as the "combination-fuse," or a fuse-stock containing both a time-fuse and a percussion-fuse.

B is the cast-iron body of a "Sawyer" shell, so called, and C is its soft-metal covering.

D is the plug, which acts as a striker for exploding the fulminating-powder E, placed in the cap of the fuse-stock, as shown, and operates in the same manner as is described in the patent of Sylvanus Sawyer, dated November 13, 1855.

K is the time-fuse case, inserted in the fuse-stock in the usual manner, and L the fuse-powder.

M is a small cylindrical socket upon the exterior of the fuse-stock, to receive the fulminating-primer H, for igniting the time-fuse. The outer or forward part of the socket is slightly beveled upon the inside, at F, to receive the corresponding beveled part of the primer, as is shown more clearly at F in Fig. 5. The socket M, just within the beveled part, is made of a larger diameter, so that when the beveled part F of the primer has been forced past the stricture of the socket it will move freely. The primer is made of an annular form, as seen in Fig. 4, of brass and lead, as shown in the drawings, the brass part having an annular recess at I for holding the fulminating-powder, the lead being cast upon it, both to give it more weight within small compass, and also because of its malleability, to enable the projecting beveled part F to be compressed and pass through the stricture of the socket M, as before stated. The slight inclination of the beveled surfaces of the socket and primer, where they come in contact, enables the primer to become fixed in the socket by merely pressing the primer into it. The shells are intended to be carried into the field loaded and with their fuses in place; but the primers are to be carried by the gunners, and placed in the socket after the shell is placed in the muzzle of the gun, before ramming it home, so that all possible accident from the explosion of the shell by the premature ignition of the primer is prevented. When the gun is fired, the fuse-stock, being driven forward with the shell by a sudden impulse, is, by the inertia of the primer, driven past it, and brings the fulminating-powder in the recess T in contact with the annular projection G on the fuse-stock and around the exposed end of the time-fuse, which ignites it with

certainty. The central opening through the primer permits the flame from the fuse to escape freely, and also permits the escape of the explosive gases from the fulminating-powder of the primer, which otherwise might drive the fuse into the shell and explode it in the gun.

Although I have described and represented the socket for holding the primer as a hollow cylinder, with the primer inserted within it, I do not wish to confine myself merely to this form, as it may be variously modified and still embrace the same principles—as, for instance, the primer may be placed upon the outside of the socket in a manner similar to the percussion-cap of a musket—and other modifications of a like nature may be made, and still retain the essential characteristics of my invention—which are, first, that the socket or receptacle for the primer shall be open or exposed, so that the primer may be placed and confined in or upon it without any mechanical adjustment; second, that the striking-surfaces which explode the fulminating-powder of the primer shall be kept asunder until the discharge of the gun; and, third, that the gases from the burning of both the fuse and the primer shall have free escape.

I am aware that it has been proposed to ignite a time-fuse by a fulminating-primer which was fired by the shock of the explosion of the gun, as is seen in the English patent to Wm. G. Armstrong, dated October 1, 1858, No. 779, and therefore do not claim the principle, broadly; but in that case the primer was placed within the fuse-stock and permanently connected therewith, rendering it liable to accidental explosion.

What I claim is—

The employment, in combination with a time-fuse, of an open socket and a detachable fulminating-primer, or their equivalents, co-operating, as described, for the purpose of igniting the time-fuse by the discharge of the gun, substantially as described.

A. M. SAWYER.

Witnesses:

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