W. F. GOODWIN.

Shell-Fuse.

No. 44,861. Patented Nov. 1, 1864.

Fig. 1.

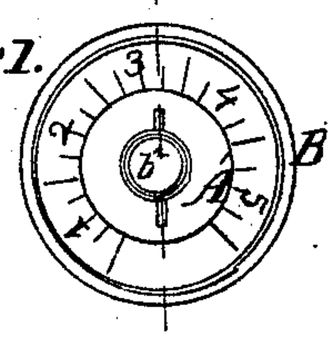


Fig. 4.

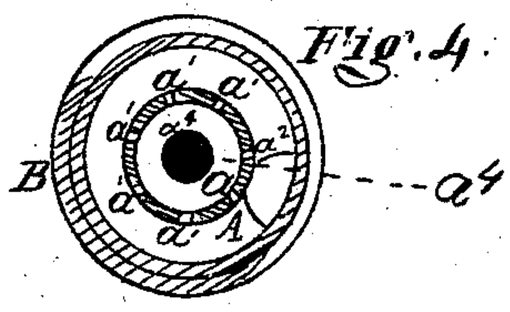


Fig. 2.

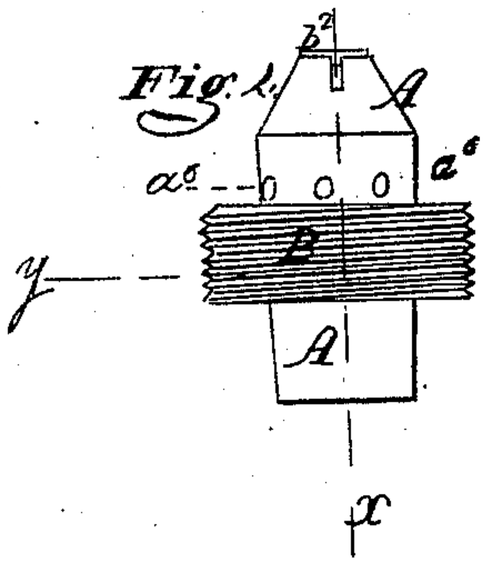


Fig. 3.

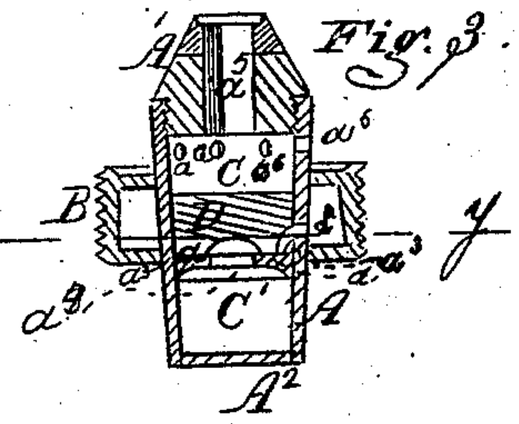
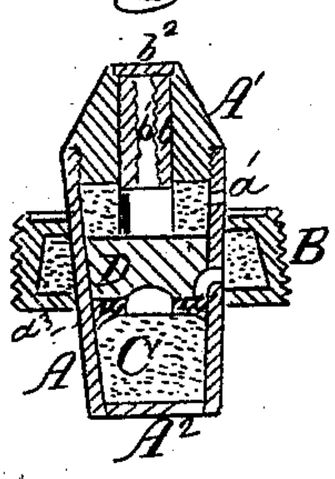


Fig. 5



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WM. F. GOODWIN, OF POWHATAN, OHIO.

IMPROVEMENT IN COMBINED TIME AND CONCUSSION FUSE.

Specification forming part of Letters Patent No. **44,861**, dated November 1, 1864.

To all whom it may concern:

Be it known that I, WILLIAM F. GOODWIN, of Powhatan, in the county of Belmont and State of Ohio, have invented a new and useful Improvement in Fuses; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front view of a fuse embodying my invention. Fig. 2 is a side view thereof. Fig. 3 represents a vertical longitudinal section of the fuse in its uncharged condition, showing the relation which the several parts bear to one another, the section being taken in the line *x x*. Fig. 4 is a transverse section in the line *y y*. Fig. 5 is a longitudinal section in the line *x x*, showing the fuse in its charged condition.

Similar letters of reference indicate corresponding parts in the several figures.

The subject of this invention is a combined time and concussion fuse, the peculiar construction and operation of which will be hereinafter fully explained.

In order that others skilled in the art to which my invention appertains may be enabled to fully understand and use the same, I will proceed to describe its construction and operation.

In the accompanying drawings, A may represent the main body or stock of the fuse, the end A′ of which may be made detachable to render the interior of the fuse accessible in charging the same with powder, &c. The stock A has fitted upon it a flat hollow cylinder, B, (or Bormann time-fuse,) the periphery of which is formed with screw-threads to adapt it to be secured in customary manner in a corresponding opening in the shell which the fuse is designed to ignite.

In the stock A is a transverse partition, *a*, whereby two compartments or chambers, C C′, are formed. The chamber C is adapted for the reception of a sliding disk or block, D, which, when in position represented in Figs. 3 and 5, closes a series of small apertures, *a′*, in the stock A, leading from the interior of the cylinder B (or time-fuse) to the chamber C, for the purpose to be explained. a^2 is an aperture, also leading through the wall of A and from the interior of the cylinder B (or time-fuse) to the chamber C′, to admit of which communication a small recess, *d*, is made in the disk D, and an aperture, a^3, in the partition *a*. The chambers C and C′ have no communication with each other when the disk D is in contact with the partition *a;* but the said chambers are thrown into communication through an opening, a^4, in the partition *a*, when the disk assumes an advanced position, which it does when the shell strikes the thing at which it may be thrown or elsewhere, by reason of tapering form of the disk D and chamber C, the forward movement of the disk D being intercepted by the head A′ of the stock A. This head A′ is provided with a central aperture, a^5, which is occupied by a sliding sleeve, *b*, which in turn has a central longitudinal aperture, in which fits a stem, *b′*, the latter having a head, b^2, which fits within a corresponding countersink in the head A′. The periphery of the stem *b′* and the interior of the sleeve in which it is fitted are serrated or roughened. Between the stem *b′* and sleeve *b* is placed a fulminate or compound, which will ignite by the friction produced between the roughened surfaces by the inertia of the sleeve *b*, causing the same to hold back relatively to the stem *b′* when the shell is started, the said stem being held in an immovable condition by the head b^2, thus constituting a friction-primer of well-known form. The cylinder or time-fuse B is indexed upon its outward face, as represented in Fig. 1, and the composition within the same is ignited by the gases generated by the explosion of the gun-charge acting through a hole punched therein at the point indicating the number of seconds. The powder is intended to burn before the fire reaches the hole a^2, communicating with the chamber *c′*. It will be understood that the end A′ of the fuse A projects forward from the exterior of the shell, while the other end is inclosed by the shell. As soon as the powder within the chamber C is ignited, the piece A^2 is blown out, so as to open communication with the shell or projectile, which of course explodes when the piece A^2 is dislodged. The chamber C is made sufficiently large to contain between the disk D and the head A′ a quantity of powder in the form of an annular cake, as indicated in Fig. 5.

In addition to performing the important

functions hereinafter described, this cake of powder serves to retain the disk D in proper position during the handling of the shell, so that if, by the direct action of the gases, the powder in the cylinder B be ignited, the channel a^2 a^3 d will permit it to ignite that within the chamber C′, as previously explained. The escaping gas from the windage in the gun ignites the powder in the chamber C through apertures a^6, and the fire emitted therefrom through the same holes, a^6, will enter the cut in the face of the cylinder or time-fuse B and insure the ignition of the same, if this be not produced by the direct action of the gases from the windage. As soon as the projectile strikes, the disk D moves forward, in order to open the holes a' and allow the fire from the cylinder or time-fuse B to pass through all the holes a' and the opening a^4 in the partition a, if the said cylinder or time-fuse B has not burned quickly enough to reach the charge in the shell. If the escaping gases by the windage of the gun should ignite neither the time-fuse B directly nor the powder in the chamber C, the friction-primer b cannot fail to ignite the same. As soon as the discharge of the gun takes place and the shell begins to move forward, the inertia of the sleeve b causes a backward movement of the same relative to the shell. The friction thus produced ignites the fulminate between the sleeve and its stem. This friction-primer ignites the powder in the chamber C, which communicates its fire to the time-fuse B through the apertures a^6 and the cut made in the front face of said cylinder.

A preparation of wax or other adhesive material may be used instead of or in addition to the powder in the chamber C, for the purpose of retaining the disk D in place before the fuse is used, such wax being melted by the explosion of the projecting charge, so as to release the disk at the instant the projectile leaves the gun. The friction-primer b b' b^2 is to be inserted into its receptacle in the head A′ at the time the fuse is to be used, being kept separately therefrom at other times to preclude the possibility of accidental explosion. It is only used when the nature of the gun and of the projectile might prevent the ignition of the fuse by the action of the escaping gases from the windage in the gun.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the annular or Bormann time-fuse B, the chambers C C′, the solid sliding disk D, and the apertures a' a^2 a^3, all arranged and operating as and for the purposes specified.

2. In combination with the above, the friction-primer b' b b^2 and apertures a, constituted and adapted to operate substantially as set forth.

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