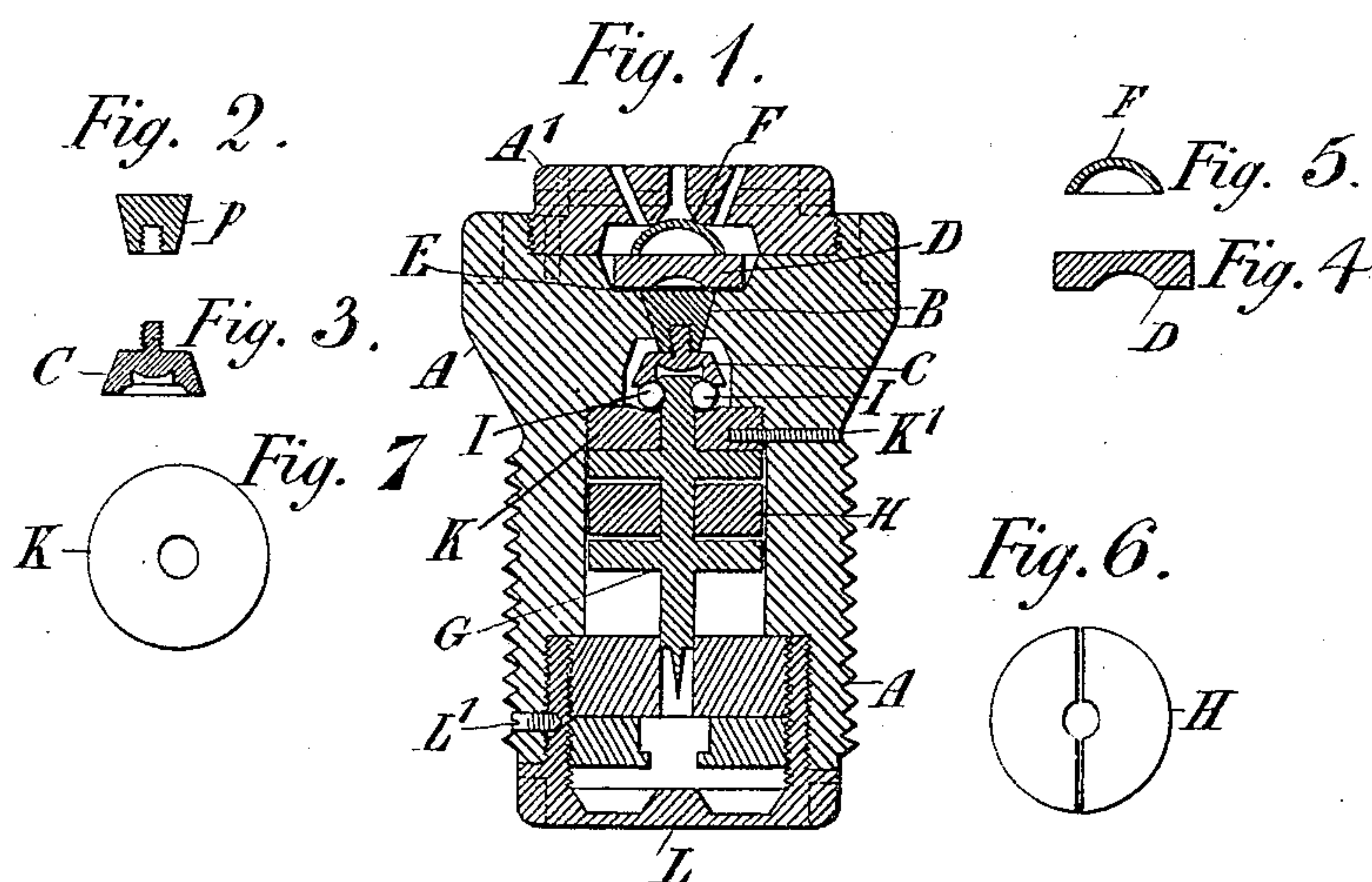


No. 811,252.

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H. C. SEDDON.
FUSE FOR PROJECTILES.
APPLICATION FILED JULY 7, 1905.



Witnesses
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FUSE FOR PROJECTILES.

No. 811,252.

Specification of Letters Patent.

Patented Jan. 30, 1906.

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To all whom it may concern:

Be it known that I, HENRY COOPER SEDDON, late of the Royal Engineers, a subject of the King of Great Britain, residing at 25 Comeragh road, West Kensington, in the county of Middlesex, England, have invented certain new and useful Improvements in Fuses for Projectiles, of which the following is a specification.

According to this invention the base-plate, which is provided with holes, is screwed into the base of the fuse, so that it presses against the bottom of a cup-shaped piece of metal, which in turn presses a pressure-plate against an abutment in the fuse. The under side of the pressure-plate is slightly cupped, and a washer to act as a gas-check is inserted between it and the abutments. Beneath the pressure-plate is a conical hole in the fuse, into which a conical stopper fits and is retained there by the pressure-plate, the under side of the stopper being hollow to receive the tail of the firing-pin and so formed as to retain a series of balls in contact with the firing-pin, a lip on it, and a plug screwed into the fuse.

When the gun is fired, the gas-pressure passing through the holes in the base-plate flattens down the cup beneath it, and so makes room for the pressure-plate and conical stopper to move back, freeing the firing-pin. As, however, the gas-pressure acts on the pressure-plate, which holds the conical stopper in position until the projectile is not only clear of the muzzle of the gun but beyond it, a premature explosion in the bore becomes an impossibility.

The cup-shaped piece of metal which normally holds the parts in place may be employed in other forms of fuse.

Figure 1 is a longitudinal section of a fuse made according to this invention. Figs. 2 to 7 are detached views of the various parts.

This fuse consists of the following parts: the body A; the base-plug A'; the conical stopper B, Fig. 2, with a cupped end C, Fig. 3; the pressure-plate D, Fig. 4; the gas-check E; the pressure-cup F, Fig. 5; the firing-pellet G with the centrifugal split ring H, Fig. 6; the centrifugal balls I; the ball-chamber plug K, Fig. 7, with set-screw K', and the front plug L, containing the detonating-cap and powder-chamber.

The base-plug A', which is screwed into the base of the fuse and secured by a set-screw, is pierced with holes to allow the gas on dis-

charge to pass through and act on the pressure-cup F and pressure-plate D, the holes being covered at both ends with suitable watertight disks.

The conical stopper B, which may be of manganese-bronze, is ground true, so as to be perfectly water and gas proof. The cupped portion C, which is screwed into its front end after the stopper is in position, fits over the centrifugal balls I, causing them to grip the tail of the firing-pellet without itself touching it. The stopper when adjusted over the balls is held in position by the pressure-plate and cap behind it.

The pressure-plate D is slightly recessed at the bottom in order to guard against any excessive pressure on the base of the conical stopper causing it to jam.

The gas-check E consists of a thin copper disk placed between the pressure-plate and the conical stopper.

The pressure-cup F, which is of copper, is jammed down onto the pressure-plate in screwing the base-plug home, thus securely holding the conical stopper in position.

The screw-plug K, secured by a set-screw K', closes the ball-chamber. It is slightly dished to the center on the ball-chamber side to facilitate getting the balls in position when putting the fuse together.

The firing-pellet G, which can be made of Muntz metal, runs on a cylindrical axis to give it more freedom of movement under the cross-blow of a graze contact. The front end of the cylindrical axis is fitted with the firing-needle, which may be of steel, while round the tail end is a slight groove into which the centrifugal balls fit. The body of the pellet has two collars, their outer edges just running clear of the sides of the pellet-chamber. Between these the centrifugal split ring H is held in position.

The centrifugal ring H is a loose ring fitting round the axis of the firing-pellet between its two collars. It is made in two halves, which flying apart under the rotary motion cling with more or less force, according to the weight given them, to the sides of the pellet-chamber, thus preventing any creeping forward of the pellet during flight, while on the projectile receiving the slightest check they run forward, adding their momentum to that of the body of the firing-pellet.

A convenient number of metal balls, which may be of manganese-bronze or nickel-steel, fit into the groove round the tail end of the

firing-pellet, which runs back through the ball-chamber plug K into the ball-chamber. These balls so long as the conical stopper is held down firmly grip the tail end of the firing-pellet, preventing its forward movement; but when the stopper and with it the cup C are no longer held in position the pellet G becomes free to move forward on graze or impact by reason of the balls by their outward tendency causing the parts B and C to move backward or other causes mentioned herein-after.

The detonating-cap and powder charge are contained in the screw-plug L, which closes the front end of the fuse and is secured by a securing-screw L'. The detonating-cap is held in the inner screw-plug, which closes the powder-chamber.

The fuse is so constructed that no external force or jolting can in any way affect it, as the whole of its internal mechanism is firmly fixed until the gas-pressure within the gun has not only acted but ceased to act upon it. The gas-pressure passing through the holes in the base-plug of the fuse flattens down the copper pressure-cup F. Say the minimum pressure in the guns with which the fuse will be used is six tons per square inch, this pressure-cup would be made to withstand a pressure of five tons per square inch. Thus nothing but the enormous gas-pressure on the discharge of gun could possibly flatten it out, and so make room for the pressure-plate D and conical stopper B to move back and free the balls which grip the tail end of the firing-pellet.

As the gas-pressure acts on the pressure-plate which holds the conical stopper in position until the projectile is not only clear of the muzzle of the gun, but a certain distance beyond it, a premature explosion in the bore becomes an impossibility. This is a point of supreme importance, as apart from other causes guns exposed to a hail of small projectiles from the quick-firers of the present day will be constantly liable to deformations in the bore and at the muzzle, which would give rise to premature explosions with every other kind of percussion-fuse. As soon as the projectile has passed beyond the influence of the gas - pressure one or more of the following forces coming into play will cause the conical stopper inside the fuse to move back, leaving the firing-pellet free to move forward and detonate the powder charge: (a) The difference in air - pressure within the fuse and in the vacuum formed at the base of the projectile in flight; (b) the centrifugal force of the balls under the rotary motion tending to push back the capped end of the stopper; (c) any unsteadiness in the flight of the projectile tending to loosen and set back the stopper; (d) should the conical stopper not set back under the above forces during flight, the firing-pellet on the slightest impact would

move forward, pushing the stopper back in dragging its tail through the balls. The firing-pellet will by its own weight when the fuse is held vertical pull its tail through the balls, pushing back the conical stopper, with cupped end and pressure-plate, provided base-plug A' is unscrewed, so that no pressure is exerted by pressure-cup on pressure-plate or when the pressure-cup is flattened out on discharge of gun. It is thus evident that while the position of the parts as assembled remains unchanged the pellet cannot be released and the fuse is thus incapable of acting prematurely either in the gun or before firing and that thus a great advance in safety is obtained.

The firing-pellet is prevented from creeping forward during flight by the two halves of the centrifugal split ring clinging to the inner surface of the pellet-chamber. On graze or impact the centrifugal split ring runs forward with the body of the pellet and the needle striking the detonation-cap fires the fine-grained powder.

What I claim is—

1. In a fuse, the combination of a hollow case provided with perforations through which the powder-gases can pass and a compressible cup inside the case exposed to the pressure of the gases and normally holding the parts in place.

2. The combination of a fuse-body having a conical hole in it, a conical plug fitting the hole, a compressible cup normally preventing the rearward movement of the conical plug, a perforated plug abutting against the cup, a firing-pellet and a connection between the pellet and the conical plug whereby the pellet is prevented from moving forward until the conical plug has moved rearward.

3. The combination of a fuse-body having a conical hole in it, a conical plug fitting the hole, a compressible cup normally preventing the rearward movement of the conical plug, a perforated plug abutting against the cup, a firing-pellet, a stem fixed to the pellet and having around it a circumferential groove, a partition fixed in the body and having through it a hole for the passage of the stem, a cup fixed to the end of the conical plug and balls in the groove and surrounded by this cup and abutting against the partition.

4. The combination of a fuse-body having a conical hole in it, a conical plug fitting the hole, a pressure-plate abutting against the plug, a compressible cup abutting against the pressure-plate and normally preventing the rearward movement of the conical plug, a perforated plug abutting against the cup, a firing-pellet, and a connection between the pellet and the conical plug whereby the pellet is prevented from moving forward until the conical plug has moved rearward.

5. The combination of a fuse-body having a conical hole in it, a conical plug fitting the

hole, a pressure-plate abutting against the
plug, a compressible cup abutting against the
pressure-plate and normally preventing the
rearward movement of the conical plug, a
5 perforated plug abutting against the cup, a
firing-pellet, a stem fixed to the pellet and
having around it a circumferential groove, a
partition fixed in the body and having
through it a hole for the passage of the stem,
a cup fixed to the end of the conical plug, and 10
balls in the groove and surrounded by this
cup and abutting against the partition.

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Witnesses:

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