No. 674,163. Patented May 14, 1901.

O. HARTMANN.

COMBINATION FUSE.

(Application filed Jan. 24, 1901.)

(No Model.)

Fig. 3.

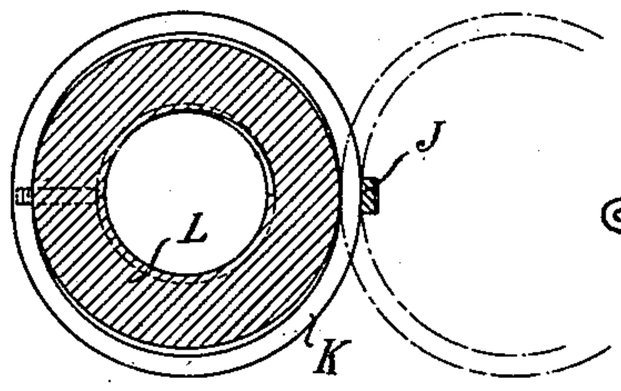


Fig. 5.

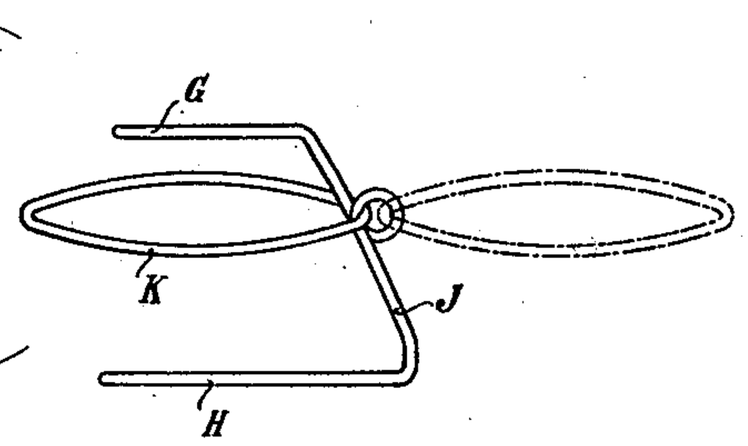


Fig. 1.

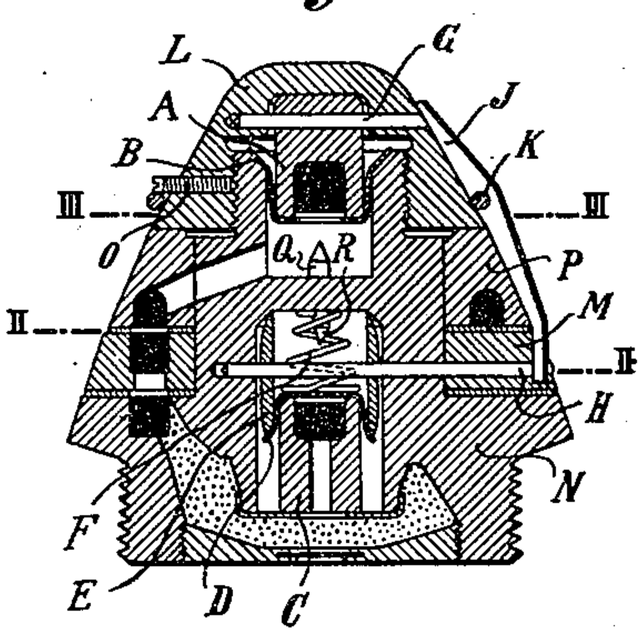


Fig. 4.

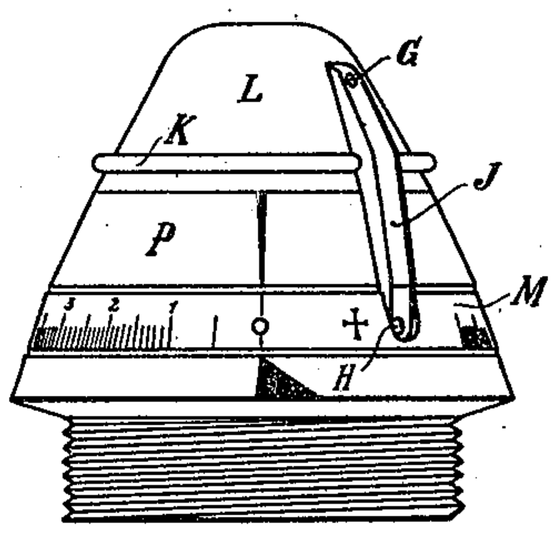
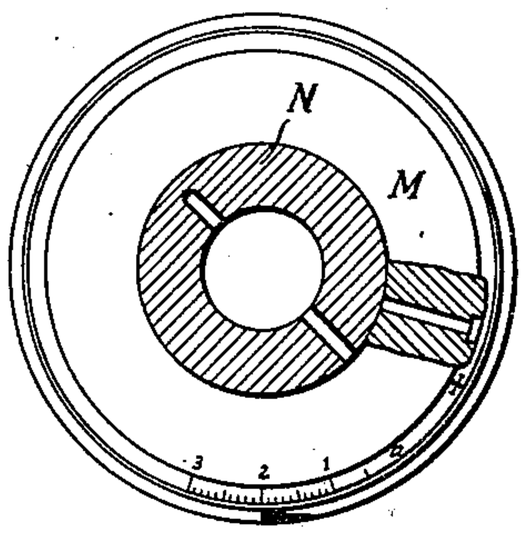


Fig. 2.



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UNITED STATES PATENT OFFICE.

OSCAR HARTMANN, OF ESSEN, GERMANY, ASSIGNOR TO FRIED. KRUPP, OF SAME PLACE.

COMBINATION-FUSE.

SPECIFICATION forming part of Letters Patent No. 674,163, dated May 14, 1901.

Application filed January 24, 1901. Serial No. 44,525. (No model.)

To all whom it may concern:

Be it known that I, OSCAR HARTMANN, engineer, a citizen of the German Empire, residing at 11 Bahnhofstrasse, Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Combination-Fuses, of which the following is a specification.

This invention has reference to improvements in combination-fuses, and has for its object to secure the movable parts of the time-fuse, as well as of the percussion-fuse, during transportation by a safety device adapted to be readily removed by hand before loading. This safety device consists, essentially, of two safety-pins, one of which engages the time-plunger containing the fulminate, and the other the movable parts of the percussion-igniter, said two pins being connected by a cross-bar.

The nature of the invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a longitudinal section of a combination-fuse provided with my improved safety attachment. Fig. 2 is a cross-section on the line 2 2, Fig. 1, seen from above, and the time-ring being displaced. Fig. 3 is a cross-section on the line 3 3, Fig. 1, seen from below. Fig. 4 is a side elevation of the fuse and attachment. Fig. 5 is a perspective view of a modified form of the safety attachment.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

The construction and mode of action of the combination-fuse herein shown are well known and will only be described so far as their connection with the safety device is concerned. The prepared powder within the fixed ring P and the loose ring M of the time-fuse is ignited at the moment of firing by the time fulminate-hammer A, which by its inertia overcomes the resistance of the retaining-spring B and strikes the firing-pin Q. Simultaneously with the motion of the fulminate-hammer the check-ring E of the percussion-fuse is thrown backwardly over the percussion fulminate-hammer C against the resistance of the retaining-spring D. On impact of the projectile the fulminate-hammer C, held against forward movement only by the helical spring F, is thrown forward, together with the spring D and check-ring E, against the firing-pin R, thereby causing instantaneous ignition of the bursting charge of the shell. The improved safety device consists of two pins G and H, connected by a cross-bar J in any suitable manner. The longitudinal axes of the several parts lie within one and the same plane. For the sake of brevity the device embodying the two safety-pins and the cross-piece will be designated as a "duplex" pin. To the cross-bar is hinged a spring-ring K, which is adapted to secure the duplex pin to the fuse after its insertion, while permitting ready removal of the same. In the fuse itself are formed two bores adapted, respectively, for the reception of the pins G and H and said bores being within a plane passing through the axis of the fuse and through the bridge of the loose powder-ring M and both bores being at right angles to the axis. The bore adapted for the reception of the upper pin G passes into the screw-cap L above the upper end of the body N, through the fulminate-hammer A, and terminates in the opposite side of the cap. The bore for the lower pin commences at the bridge of the loose powder-ring M, passes through the adjacent body N of the fuse, and through the check-ring E, terminating in the opposite part of the body. A screw O is inserted into the screw-cap, and the point of this screw enters the body of the fuse, thereby securing the screw-cap against turning, while its head serves as an abutment for the ring K of the duplex pin. Figs. 1 and 4 show the combination-fuse when in condition for transportation. The pins G and H of the duplex pin rest in the corresponding bores of the fuse, while the cross-bar J lies against the outer surface of the fuse. The spring-ring K embraces the screw-cap L with lateral play, as shown in Fig. 3, and engages with the lower side of the head of the screw O. It will be readily seen that with the duplex pin in the position shown in said figures the fulminate-hammer A, the check-ring E, and the ring M are held in place, while the fulminate-hammer C is held

;ainst movement in the direction of the fir-
g-pin. The duplex pin is secured in its po-
tion relatively to the fuse by the ring K.
To place the fuse ready for action, the ring
is compressed laterally until it clears the
ad of the screw O and is then turned into
e position shown by dotted lines in Fig. 3.
ıe duplex pin is then pulled out of the fuse
' means of the ring K. The fuse is now
ady for firing after making the required ad-
stment of the powder-ring.
It is desirable to drill the hole for the lower
fety-pin H at a position of the powder-ring
which corresponds to the position for firing
se-shot—that is, in the position in which
e bursting charge is ignited just beyond
e mouth of the gun. The advantage de-
ved therefrom is that whenever case-shot
'ing is indicated, and which calls for the
ıickest readiness for firing, the projectile is
ady at once after removal of the duplex pin.
It will readily be understood that when a
ıange is made in the position of the ring M
ee Fig. 2) for time explosion the corre-
ıonding bores in the fuse-body are thrown
ıt of alinement, and consequently the cham-
ers containing the prepared powder are ef-
ctively closed, and earth or water are pre-
ıted from penetrating into the interior of
ıe igniter on impact, which would render
e action of the igniter doubtful.
The pins G and H and the cross-bar J may
'idently be made in one piece, and such a
ınstruction I have shown in Fig. 5, in which
e pins and cross-bar are made of one piece
of wire bent into the requisite form and the cross-bar being provided with an integral ear formed by properly bending the wire and into which ear the flexible ring K is hung.

What I claim as new is—

1. A combination-fuse provided with a safety device for transportation comprising two pins adapted to engage respectively with the time-plunger and with the movable parts of the percussion-igniter and a cross-bar connecting said pins, substantially as described.

2. A combination-fuse provided with a safety device for transportation comprising two pins adapted to engage respectively with the time-plunger and with the rotary powder-ring, and a cross-bar connecting the two pins, substantially as and for the purpose set forth.

3. A combination-fuse provided with a safety device for transportation comprising two pins adapted to engage respectively with the time-plunger and with the rotary powder-ring for holding the latter in position for firing case-shot, so that the opening leading to the percussion-fuse is closed off in any other position of the powder-ring and the entrance of smut or grit into the percussion-igniter is prevented, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OSCAR HARTMANN.

Witnesses:
ALFRED WRATZKE,
WILLIAM ESSENWEIN.