

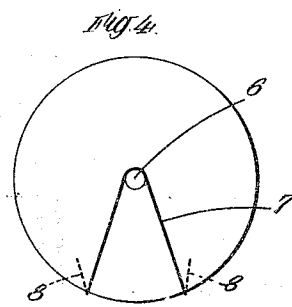
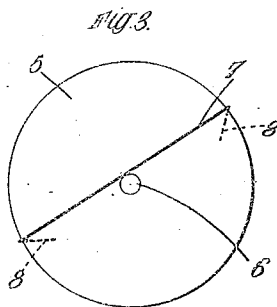
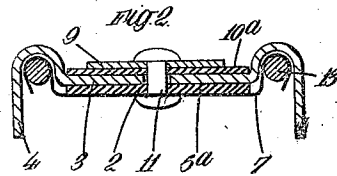
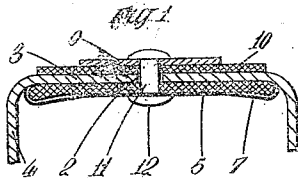
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H. P. MARTIN ET AL

AMMUNITION

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UNITED STATES PATENT OFFICE.

HELMUTH PAUL MARTIN AND OWEN DAVID LUCAS, OF WESTMINSTER, LONDON, ENGLAND, ASSIGNORS TO M. L. EXPERIMENTAL LIMITED, OF WESTMINSTER, ENGLAND.

AMMUNITION.

Original application filed September 3, 1920, Serial No. 408,056. Divided and this application filed October 14, 1922. Serial No. 594,454.

To all whom it may concern:

Be it known that we, HELMUTH PAUL MARTIN and OWEN DAVID LUCAS, both subjects of the King of Great Britain, residing at Vickers House, Broadway, Westminster, in the county of London, England, have invented certain new and useful Improvements in Ammunition, of which the following is a specification.

This invention relates to electrically fired ammunition and has for its object to provide an improved form of primer or detonator for this purpose.

In the accompanying drawings:—

Figure 1 is a section drawn to a larger scale of a cap adapted for use when it is desired to fire the cartridge with a hot wire.

Figure 2 is a view similar to Figure 1 showing a modified form of the cap.

Figure 3 is a diagrammatic end view shewing a position of the hot wire bridge.

Figure 4 is a plan shewing another position of the hot wire bridge.

A hole 2 is provided in the base 3 of the ordinary copper cap 4. A disc of paper 5 with a small central hole 6 has the filament 7 attached to it in such a way that it is stretched across the face of the paper, the two ends 8—8 being fastened diametrically opposite on its under side; the paper may have been previously impregnated with shellac, paraffin wax, or other suitable insulating and water-proof material. This disc is then dropped in position with the ends of the filament downwards inside the cap. A small copper disc 9 of diameter less than that of the cap with a small central hole is then placed over the cap 4 on the outside, another disc of impregnated paper 10 being interposed between it and the cap. The whole is then riveted together by a suitable rivet 11 on the outside of the cap and with a head 12 pressing on the centre of the filament above the paper disc on the inside, thus forming the central insulated contact. The said rivet is smaller in diameter than the hole 2 so that there is no electrical contact between the rivet and the cap.

It will be seen that by this method two paths are provided for the current from the

central rivet head to the two lengths of wire on opposite sides of the paper disc, and thence to the body of the cap itself.

In the form shown in Figure 2 the cap is recessed at the base so as to leave an annular trough inside the cap in which the German silver wire lies as described below. A hole 2 is punched centrally in the base 3 of the copper cap 4. A mica disc 5^a also provided with a central hole but of smaller diameter than that in the cap, is placed inside the cap. A ring 13 of German silver or other suitable material, is formed to make a spring fit when pressed into the inside of the cap. A wire 7 of tungsten of diameter about .0015 inches or of platinum silver of about .0025 inches is stretched across the top of the cap and the spring ring 13 is then pressed down, carrying the wire with it, the ends of which are then cut off flush. This leaves the wire stretched centrally across the base of the cap, and resting on the top of the mica disc 5^a. Another mica disc 10^a with a similar central hole is then fitted on the outside of the cap over the rivet. A copper washer 9 of smaller diameter than the mica, with central hole is placed on the top of the mica washer 10^a; a small rivet 11 is now dropped through the hole in the cap with the head of the rivet (which is flattened) inside the cap, and in such a way that the fine wire lies under the rivet head, and the whole riveted together. It will be seen that as the mica disc 5^a inside the cap has a hole smaller than that in the base of the copper cap 4, the rivet 11 is prevented from touching the copper cap 4, being held centrally by the mica disc 5^a. The copper washer 9 at the back of the cap forms the insulated contact to the centre of the fine wire 7, from which point the current travels radially through the two halves of the wire to the German silver ring 13, the body of the copper cap and thus to the cartridge.

Instead of mica we may employ any other thin insulating material and we may employ other suitable material for the detonating wire instead of tungsten or platinum silver, such as platinum iridium and the like, the object being to obtain a wire of such diame-

ter that with the voltage applied it shall be heated to as high a temperature as possible in the shortest time, say about $\frac{1}{5000}$

of a second. We find that with the wire given about 4 volts will operate the cap, but we use 8 volts by preference.

The copper rivet may have provided on either side two projections which are turned up at right angles to the shaft of the rivet, when the latter is riveted in position, the wire is then dropped over the head of the rivet instead of under it, and the projections are pressed down inwards across the head of the rivet and over the top of the wire, thus making a secure contact with the rivet head.

The German silver spring ring may have two barbs cut diametrically opposite one another, under which the wire is placed, the barbs being then pressed down, thus gripping the wire and holding it securely; the ring before being fitted to the cap has a gap which is taken up when the ring is pressed into the cap, thus causing the tungsten wire to become slack.

We have found that a suitable filament is one either of tungsten or platinum silver, and a suitable thickness may vary between .005 and .0025 inches diameter; the object of this fine filament is that a short length of it is heated as instantaneously as possible by the passage of the current to such a high temperature that it is volatilized, the action in detonating the fulminate being thus extremely rapid.

What we claim and desire to secure by Letters Patent of the United States is:—

1. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a washer of insulating material inserted from the front end of the cap, a contact element passing through said washer and through the base of said cap out of contact with said base and a wire which passes over the front surface of said washer and is electrically connected at one point to said contact element and at another point to said cap.

2. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a washer of insulating material inserted from the front end of the cap, and arranged with its rear surface in contact with the base of said cap, a contact element passing through said washer and through the base of said cap out of contact with said base and a wire which passes over the front surface of said washer and is electrically connected at one point to said contact element and at another point to said cap.

3. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a washer of insulating material

inserted from the front end of the cap, a contact element passing through said washer and through the base of said cap out of contact with said base and serving to fasten the washer to said base, and a wire which passes over the front surface of said washer and is electrically connected at one point to said contact element and at another point to said cap.

4. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a washer of insulating material inserted from the front end of the cap, a contact element in the form of a rivet passing through said washer and through the base of said cap out of contact with said base and serving to fasten the washer to said base, and a wire which passes over the front surface of said washer and is electrically connected at one point to said contact element and at another point to said cap.

5. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a washer of insulating material inserted from the front end of the cap, a contact element in the form of a rivet passing through said washer and through the base of said cap out of contact with said base and serving to fasten the washer to said base, and a wire which passes over the front surface of said washer and is electrically connected at its middle to said contact element and at its ends to said cap.

6. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a contact passing through the base of said cap, means for insulating said contact from the base, these means including a non-conducting washer arranged in contact with the inner surface of the base, a wire one part of which is electrically connected to said contact, and a device fitting in an annular recess in the base of said cap and holding another part of said wire in contact with said base, the portion of the wire between said parts being insulated from the base by said washer.

7. For use in a cartridge, an electrically ignited primer comprising in combination a metal cap, a contact passing through the base of said cap, means for insulating said contact from the base, these means including a non-conducting washer arranged in contact with the inner surface of the base, a wire one part of which is electrically connected to said contact, and a spring ring fitting in an annular recess in the base of said cap and holding another part of said wire in contact with said base, the portion of the wire between said parts being insulated from the base by said washer.

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