

1,402,776.

Patented Jan. 10, 1922.

FIG. 1.

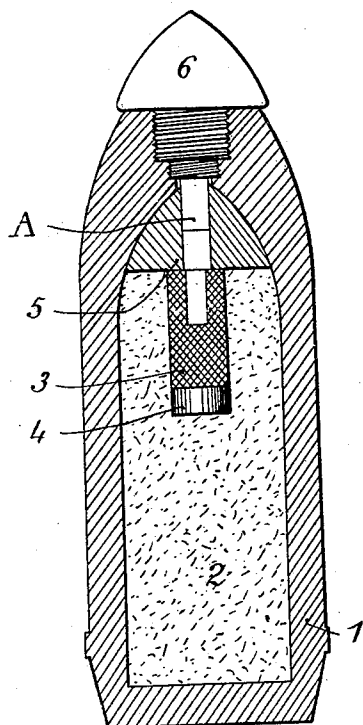
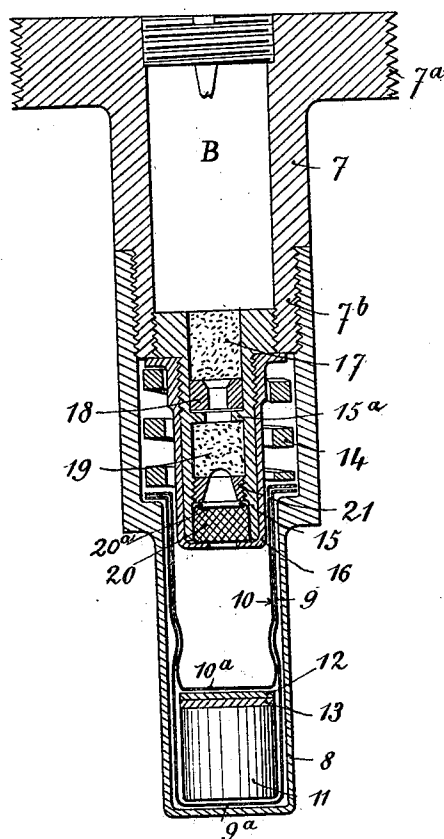


FIG. 2.



INVENTOR

A. J. Lefèvre

BY: *H. B. Wilson & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

ANDRÉ JOSEPH LEFÈVRE, OF PARIS, FRANCE.

SHELL FOR FIRING AGAINST ARMOR PLATING AND RESISTING TARGETS.

1,402,776.

Specification of Letters Patent.

Patented Jan. 10, 1922.

Application filed September 3, 1918. Serial No. 252,464.

To all whom it may concern:

Be it known that I, ANDRÉ JOSEPH LEFÈVRE, a citizen of the Republic of France, residing at 14 Rue Chaptal, Paris, in the Republic of France, have invented new and useful Improvements in Shells for Firing Against Armor Plating and Resisting Targets, for which I have filed an application in France dated Jan. 18, 1917, and of which the following is a specification.

Shells employed for firing against armor plates usually have a solid ogival nose and a fuse in their base. Such shells are more difficult to make than shells having an ogival fuse nose formed by upsetting the metal. On the other hand the majority of base fuses of the Navy pattern do not contain fulminate, and in order to avoid premature explosion, the effect of such fuses is limited to detonating the explosive (generally picric acid) by igniting a powder pellet which is itself ignited by a fuse of any kind, often provided with leaden retarding devices. In this manner complete detonations are obtained only in the case of shells of rather large calibre, say for instance about 15 centimetres.

The present invention has for its object to provide an improved shell having an ogival fuse nose with a fulminate fuse that will produce complete detonation even in the case of small calibres; this improved shell is designed for piercing armor plates and resisting targets and exploding behind the latter.

A constructional form of an improved shell according to this invention is illustrated by way of example in the accompanying drawings in which:—

Fig. 1 is an axial section, showing the fuse in elevation.

Fig. 2 is an axial section of the fuse, drawn to a larger scale.

1 is a shell body with thick walls, produced preferably by upsetting the metal. After the usual varnishing, an explosive 2 is poured into the shell body up to a suitable height. The explosive may consist for instance of tri-nitro-toluene which is practically unaffected by shock.

In the cavity formed in the upper part of the explosive there is placed a shell-charge detonating cartridge 3 composed for instance of picric acid. A hot-paraffined felt washer 4 is placed at the bottom of the cavity for the purpose of suitably fixing the said cartridge in place.

A recess is formed in this cartridge, and in

this recess there is inserted the lower end of a fuse A shown in detail in Fig. 2. The internal space in the shell above the explosive is filled with an inert material 5 such as paraffined salt or paraffined sawdust, in order to prevent ignition due to the heating of the metal if the ogival fuse nose should become deformed by its impact against the plate or other obstacle.

Finally a hard steel nose piece or piercing cap 6 having no void space, the diameter of whose base is slightly greater than that of the truncated end of the shell body is secured into said truncated end; the edge of said base being rounded in order to prevent its being rendered brittle by the hardening process.

The fuse A comprises a fuse body 7 having a screwthreaded enlargement 7^a for screwing into the fuse hole of the shell, and a tube 8 for carrying the fuse detonator screwed on a screwthreaded portion 7^b of the body 7. In the tube 8 are two tubes 9 and 10 fitting one in the other; these tubes have bottoms 9^a and 10^a between which the fuse detonator 11 is enclosed.

For the purpose of avoiding the premature explosion of the fuse detonator 11, a felt washer 12 or a felt washer 13, or the two together, or any other soft or elastic cushion is placed between the fuse detonator 11 and the bottom 10^a.

For the same purpose there may be interposed between the tube 10 and the fuse body 7 a powerful spring 14 having for instance a force of about a hundred kilogrammes, capable of absorbing a large portion of the momentum of the fuse detonators 9, 10, 11 and of deadening the action of the latter in the case of shock.

15 is an auxiliary fuse detonator carrier tube fixed in the inner end of the fuse body, covered by a sleeve 16. Inside the tube 15 are placed igniting powder 17, a retarder 18, a powder relay 19 and an auxiliary fuse detonator 20. The relay 19 is kept pressed against a shoulder 15^a of the tube 15 by a screw-threaded ring 21.

The fuse body 7 contains at B an inertia fuse mechanism that may be of any type and is therefore not shown.

At the moment of impact the powder 17 is ignited in the usual manner and the fuse detonator 11 is detonated by means of the retarder 18, relay 19 and auxiliary fuse detonator 20. Owing to the retarder 18 and

also to the use of the washers 12, 13 and spring 14 which prevent premature ignition, detonation will take place after a lapse of time after the impact sufficient to enable the shell to penetrate to a generally sufficient extent.

A shell, of 75 m.m. for instance, constructed as described, is able to pierce with a remaining speed of about 300 metres a plate of chrome-nickel steel having a thickness of about 38 m.m., and detonate behind the said plate.

Without departing from the nature of this invention the auxiliary fuse detonator 20 may be replaced by two auxiliary fuse detonators arranged in series, but generally a single auxiliary fuse detonator of about 3 decigrammes covered with a disc of paper 20^a of about 0.2 m.m. thick, will be sufficient. Without any auxiliary fuse detonator the combustion of a simple powder relay such as 19 would not be sufficient to detonate the fuse detonator 11 at a distance through the retarding washers 12, 13.

Although the improved shell is designed more particularly for firing against armour plates and resisting targets, it is to be understood that it may be used also against any other targets for the purpose of perforating them and detonating after having passed completely through them or penetrated them for a considerable depth. The shell body may be of a steel less hard than the nose piece, but hardened and tempered, which is a usual method in manufacture by chasing.

Claims—

1. A shell with a nose fuse, comprising the combination of a shell body having a fuse hole in its nose, a hard steel nose piece fixed in the hole in the shell nose, and explosive in the shell body, a cartridge in the front portion of the explosive, a retarding washer of soft material located between the bottom end of the cartridge and the explosive, a fuse fixed in the hole in the shell nose with its rear end extending into the said cartridge, and an inert material in the shell body in front of the explosive and around the fuse.

2. In a shell for firing against armour plates, a fuse comprising a fuse body, a main fuse detonator carrier tube and an auxiliary fuse detonator carrier tube both fixed to the said fuse body, said auxiliary fuse detonator carrier tube being located in front of said main fuse detonator carrier tube, two tubes fitting one inside the other located in said main fuse detonator carrier tube, said two tubes each having a closed end, a detonator and one or more retarding washers between the closed ends of said two tubes, a powerful retarding spring between the front ends of the said two tubes and said fuse body, an auxiliary detonator in said auxiliary deto-

nator carrier tube, and means for igniting said auxiliary detonator by the effect of the impact of the shell against a target.

3. In a fuse for a shell for firing against armour plates, the combination of a fuse body, a fuse detonator carrier tube, two tubes fitting one in the other, each having a closed end, a fuse detonator and one or more retarding washers between the closed ends of said two tubes, and a powerful spring located between the front ends of said two tubes and the said fuse body.

4. In a fuse for a shell for firing against armour plates, the combination of a fuse body, a main fuse detonator carrier tube, a main fuse detonator in the latter, shock-absorbing means for keeping said main fuse detonator in place, an auxiliary fuse detonator carrier tube fixed in said fuse body, an auxiliary fuse detonator in said auxiliary carrier tube, said auxiliary fuse detonator being located some distance in front of said main fuse detonator, and means for igniting said auxiliary fuse detonator by the effect of the impact of the shell against a target.

5. A shell for firing against armour plates and resisting targets comprising the combination of a shell body, whose nose end is truncated and which has a fuse hole in its nose, a nose piece of hard steel having no void space, having a rounded edge and a diameter greater than the diameter of the truncated nose end of the shell body and secured in said truncated nose end; a fuse in the fuse hole in the nose of the shell body; and an explosive in the shell body.

6. A shell for firing against armour plates and resisting targets, comprising the combination of a shell body, whose nose end is truncated and which has a fuse hole in its nose, a steel nose piece harder than the shell body, having no void space, having a rounded edge and a diameter greater than the diameter of the truncated nose end of the shell body and secured in said truncated nose end; a fuse in the fuse hole in the nose of the shell body; and an explosive in the shell body.

7. A shell for firing against armour plates and resisting targets, comprising the combination of a shell body whose nose end is truncated and which has a fuse hole in its nose, an ogive-shaped nose piece of hard steel having no void space, having a rounded edge and a diameter greater than the diameter of the truncated nose end of the shell body and secured in said truncated nose end; a fuse in the fuse hole in the nose of the shell body; and an explosive in the shell body.

8. In a shell the combination of a shell body whose nose end is truncated and which has a nose fuse, and an approximately conical nose piece of hard steel having no void space and secured in the shell nose, the base

of said nose piece having a rounded edge and a diameter greater than the diameter of the truncated nose of the shell body.

9. In a shell for firing against armour plates, a fuse comprising a fuse body, a main fuse detonator carrier tube and an auxiliary fuse detonator carrier tube both fixed to the said fuse body, said auxiliary fuse detonator carrier tube being located in front of said main fuse detonator carrier tube, two tubes fitting one inside the other, the two being located in said main fuse detonator carrier tube, said two tubes each having a closed end, a detonator and one or more retarding washers between the closed ends of said two tubes, a powerful retarding spring between the front ends of the said two tubes and said fuse body, an auxiliary detonator in said auxiliary detonator carrier tube, and means for igniting said auxiliary detonator by the effect of the impact of the shell against a target.

10. In a fuse for a shell for firing against armour plates, the combination of a fuse body, a fuse detonator carrier tube, a tube having a closed end, a fuse detonator and one or more retardating washers between the closed ends of said two tubes, and a

powerful spring located between the front end of said tube and the said fuse body.

11. In a fuse for a shell for firing against armour plates, the combination of a fuse body, a main fuse detonator carrier tube, a main fuse detonator in the latter, shock absorbing means disposed in front of the said main detonator carrier tube, an auxiliary fuse detonator carrier tube fixed in said fuse body, an auxiliary fuse detonator in said auxiliary carrier tube, said auxiliary fuse detonator being located a considerable distance in front of said main fuse detonator, said shock absorbing means being sufficiently powerful to maintain said main detonator constantly at a distance from the auxiliary detonator even at the instant of the shock of the projectile against the obstacle, and means for igniting said auxiliary fuse detonator by the effect of the impact of the shell against a target.

In testimony, that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ANDRÉ JOSEPH LEFÈVRE.

Witnesses:

JOHN F. SIMONS,
EUGÈNE WATTIER.