(No Model.)

E. L. ZALINSKI.

SHELL FOR HIGH EXPLOSIVES.

No. 384,661. Patented June 19, 1888.

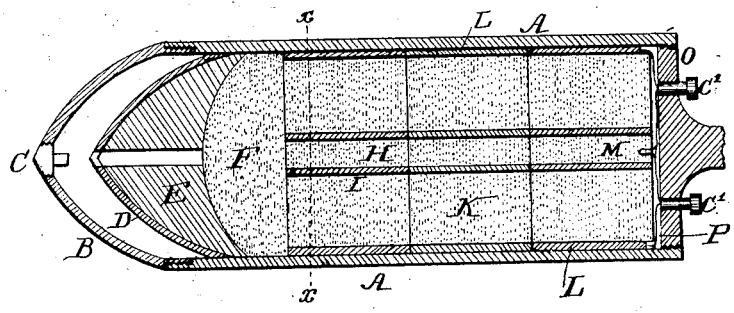


Fig. 1.

Fig. 2.

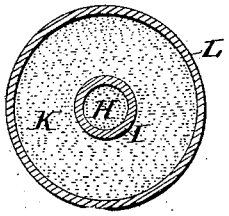


Fig. 3.

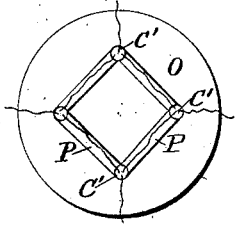
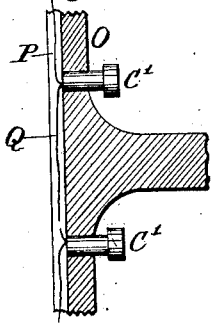


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDMUND L. ZALINSKI, OF THE UNITED STATES ARMY.

SHELL FOR HIGH EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 384,661, dated June 19, 1888.

Application filed October 31, 1887. Serial No. 253,891. (No model.)

To all whom it may concern:

Be it known that I, EDMUND L. ZALINSKI, United States Army, stationed at Fort Hamilton, State of New York, have invented certain new and useful Improvements in Shells or Torpedoes and Charges Therefor, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to shells or torpedo projectiles of the high-explosive class.

The object of the invention is to conduce to the safety in handling and effectiveness in use of high explosives.

In the market at the present time many grades of dynamite and similar high explosives may be found under the name of "rend-rock," "giant-powder," &c. I refer to such compounds of the higher grade which are liable to explosion from concussion under the general name "dynamite" in this specification. Nitro-gelatine—"gum-dynamite," as it is sometimes called—and kindred explodents of a powerful character are also well known in the market. Such explodents give a force which is greater or less, according to the manner of the detonation.

In shells charged with high explosives it is my object to delay or prevent the explosion of the charge by the concussion due to the impact of the projectile on a solid target and to cause the explosion entirely by the fuse and detonator, whereby the explosion may take place at the proper time and begin at the proper place to give the greatest results.

It is well known that the destructive effect of a shell charged with high explosives and thrown against a target is much greater when the charge is detonated from the rear than from the front. I have demonstrated by many trials that the effect is also much greater when the explosive is detonated by a proper detonator than when fired by the force of impact. Indeed, I believe the effect may be many times greater in the former than in the latter case.

I will now proceed to describe particularly an arrangement or combination of different explosive compounds in a projectile or torpedo, with the objects of preventing explosion by accident, by conducted heat from outside, or by impact on striking, and of producing the greatest destructive effect when properly detonated.

In the drawings, Figure 1 is a longitudinal section of the head of a projectile, shell, or torpedo charged after the manner of this invention. Fig. 2 is a cross-section on line *x x*, Fig. 1. Fig. 3 is a front face view; and Fig. 4, an enlarged section of part of the base-plate or cap of a projectile, showing grooves for wires.

A indicates the inclosing-casing or shell of a projectile or torpedo. This shell will preferably have a collapsible head or point, B, carrying an electric fuse, C. The interior partition D is preferably connected to firing-wires of the fuse or fuses C C′ C″.

The front of the projectile is filled with a cushion, E, of rubber, cotton, loose asbestus, or other elastic or compressible material, in order that the shock of impact when the projectile or torpedo strikes a hard target (as an armor-plate) may not explode the charge, so that the charge may be exploded by the fuse or fuses, the explosion beginning at the place and at the instant of time for which the fuse or fuses provide. In rear of the cushion E, I place a disk or section, F, of highly-camphorated nitro-gelatine or other similar explosive not very sensitive to explosion by shocks of concussion.

The body or main portion of the charge is made up in cylinders or sections formed in the following manner: A central core, H, of dynamite or similar high explosive quite sensitive to concussion is surrounded by a covering or casing, I, of asbestus-paper or other absorbent material. This absorbent material has preferably an alkaline substance in its composition, such as carbonate of magnesium. Surrounding the covering I there is an annulus, K, of nitro-gelatine or other similar high explosive less sensitive to shock than the core H of dynamite. This annulus or cylinder is in turn covered with asbestus, L, which is prepared, like the casing I, with an alkali. The object of this arrangement is that the highly-sensitive explodent H shall be protected by a covering of a less sensitive nature. The absorbent casing or covering L receives and the alkali neutralizes any free acid which may ooze out of the nitro compound which it incloses, thus removing an element of danger. The asbestus serves as a non-conductor of heat to prevent the overheating of the charge by

the friction of the shell in passing through the gun-barrel or in firing from a powder-gun.

The detonator M—say of fulminate of mercury—is embedded in the sensitive dynamite H. The dynamite is surrounded by the less sensitive but more powerful gelatine, K. The detonation of the mercury at M sets off the dynamite, which in turn acts as a detonator for the gelatine. The packing I serves as an absorbent for free acid from either the dynamite or the gelatine.

The plate O of the shell or projectile has grooves P to receive the wires E, extending from the batteries or circuit-breakers C'.

I claim—

1. In a projectile, a cylindrical core-section of high explosive, such as dynamite, an absorbent covering for the same, a surrounding annular body of less sensitive explosive, such as nitro-gelatine, an absorbent covering therefor, and an outer casing forming the body of the projectile, all in combination subtantially as described.

2. In a projectile, the combination of a casing, an absorbent envelope containing an alkali, and an inclosed explosive charge of nitro-gelatine or similar high-explosive compound, substantially as described.

3. In a projectile, the combination of a central core, such as dynamite, an envelope for the same containing an alkali, an explosive compound, such as nitro-gelatine, surrounding said envelope, and an inclosing-casing for the same forming the body of the projectile, whereby the explosive compounds are divided by an absorbent and acid-neutralizing partition, all substantially as stated.

4. In a projectile, the combination of a central core of dynamite or similar high explosive, a surrounding body of nitro-gelatine or similar high explosive of a less sensitive character, a covering of asbestus, and an outer casing constituting the body of the shell, whereby the more sensitive compound at the center is protected from the outside influence of concussion and conducted heat, substantially as described.

5. In a shell or torpedo, a charge of high explosive, consisting of a sensitive core, a surrounding body of a less sensitive explodent, and a front section of a still less sensitive character, and a detonator at the rear of the charge, all combined substantially as stated.

6. A shell or torpedo having a charge of high explosive more sensitive at the center, a rear fuse for firing said explosive, and a buffer interposed between the front of the explosive and shell-casing to prevent explosion of the charge by its own impact, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND L. ZALINSKI.

Witnesses:
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