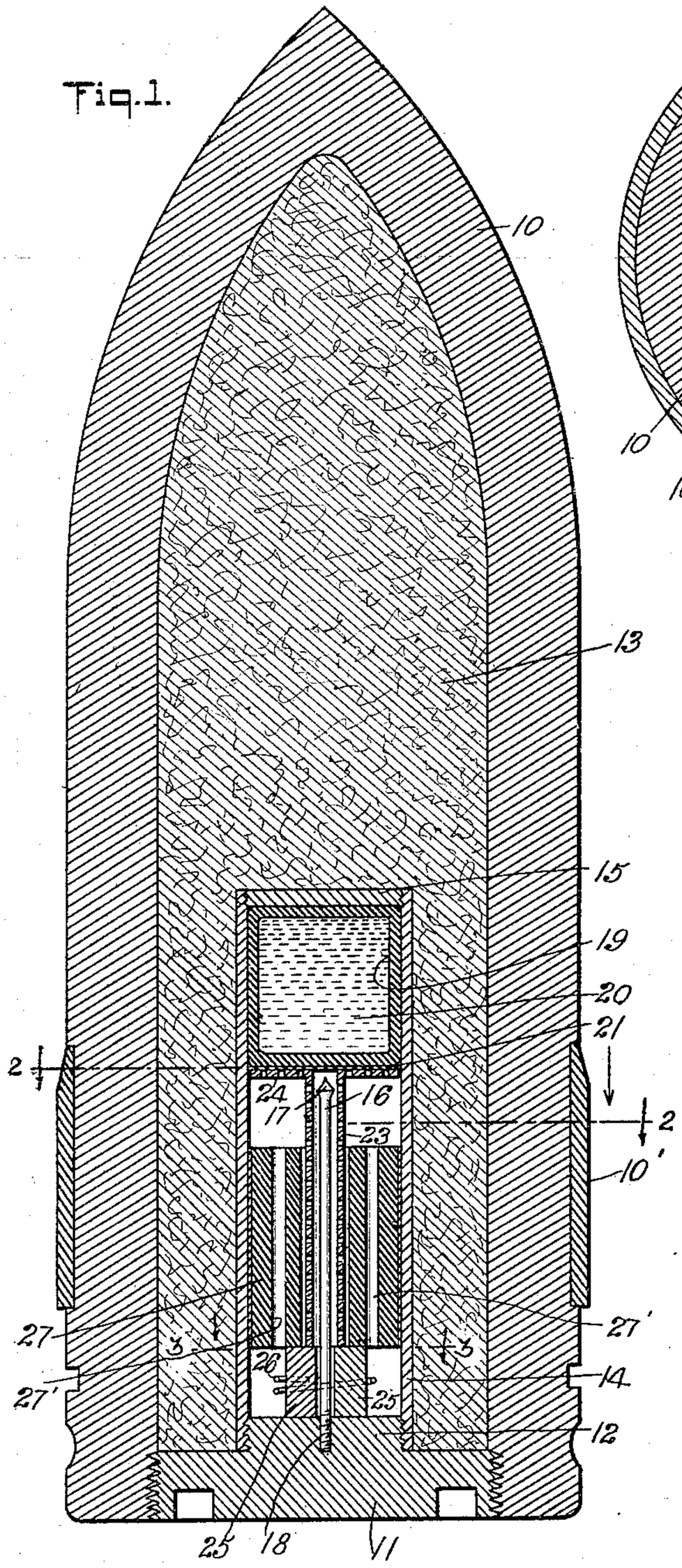
P. L. E. DEL FUNGO-GIERA.

CHEMICAL BASE DETONATOR.

APPLICATION FILED MAY 8, 1918.

1,298,467. Patented Mar. 25, 1919.

Fig. 1.



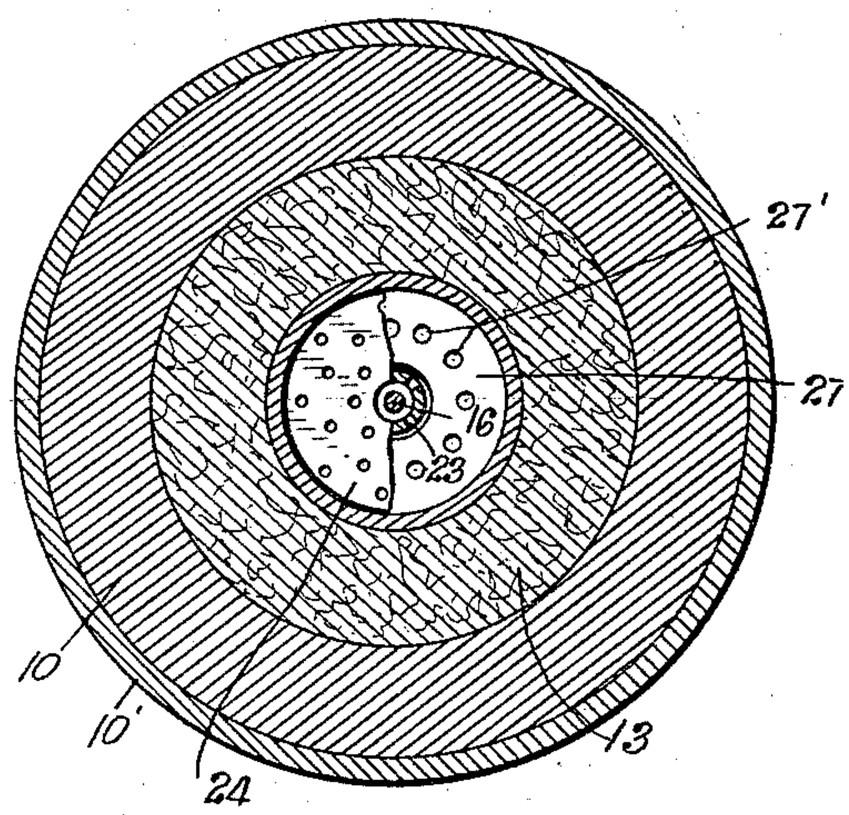


Fig. 2.

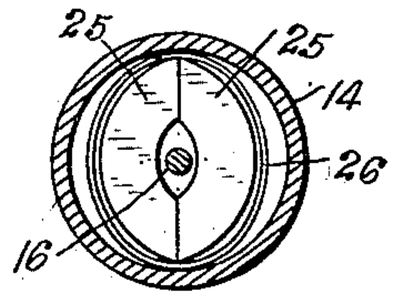


Fig. 3.

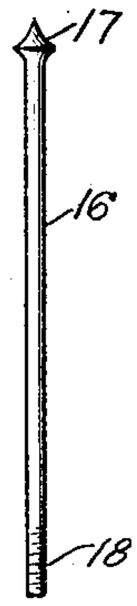


Fig. 4.

WITNESSES

Geo. A. Beeler

INVENTOR

Philippo L. E. del Fungo-Giera

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

PHILIPPO L. E. DEL FUNGO-GIERA, OF PELHAM, NEW YORK.

CHEMICAL BASE-DETONATOR.

1,298,467. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed May 8, 1918. Serial No. 233,305.

To all whom it may concern:

Be it known that I, PHILIPPO L. E. DEL FUNGO-GIERA, a citizen of Switzerland, and a resident of Pelham Woods, Pelham, in the county of Westchester and State of New York, have invented a new and Improved Chemical Base-Detonator, of which the following is a full, clear, and exact description.

This invention relates to high explosives and has particular reference to ordnance shells charged with T. N. T. or the like requiring unusual means or facilities for detonation.

Among the objects of the invention is to provide improvements in shells having base detonators and accommodating T. N. T. or the like adapted to be fired as a result of chemical action following impact.

Another object of the invention is to provide a high explosive shell adapted to be fired chemically, the same being provided with means to safeguard the handling of the shell and preventing premature explosion of the shell even after it is fired.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which

Figure 1 is a vertical central sectional view of a shell equipped with my improvements, the parts being in normal idle position.

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; and

Fig. 4 is a detail view of the firing pin.

Referring now more particularly to the drawings, I show a shell 10 of the standard United States Government design having a base plug 11 having standard threaded engagement with the otherwise open end of the shell and being provided with an externally threaded hub or lug 12 on its inner surface. The interior of the shell is filled mainly with a block of cast T. N. T. 13. The shell is fitted with any suitable soft metal band 10′ around its base end.

14 indicates a detonator casing of tubular form and preferably cylindrical, having threaded engagement upon the lug 12 and so carried upon the inner surface of the base 11 and otherwise surrounded by the T. N. T. The forward end of the casing 14 is provided with a closure disk 15 fitted in any suitable manner therein as by screw threads.

16 is a firing pin having an enlarged head 17 and screw threaded at 18 at its rear end into the base 11 or lug 12 and so held in fixed position thereby. The point or head of the firing pin 17 extends forward but stops short of the forward end of the casing 14, the space between the point and the disk 15 being filled with a cartridge formed of hard paraffin or the like 19 carrying a charge of a suitable chemical such as sulfuric acid 20. A disk 21 of tinfoil or other thin metal is interposed between the cartridge 19 and the point of the firing pin, serving to hold the cartridge in fixed position up to the moment of impact of the shell, and just below or at the rear of this disk 21 is a guard of copper or brass shown as comprising a central tubular stem 23 and a disk 24 at its forward end which normally in idle position or for transportation purposes is positioned against the disk 21 and so supports the cartridge of acid free from the point of the firing pin. The rear end of the tubular portion 23 of the guard is normally supported upon a centrifugal support comprising two arc-shaped members 25 closely surrounding the base end of the pin and held normally close together around the pin by means of a light coil spring 26.

27 indicates a cylindrical block of highly compressed detonator compound having a central bore through which the firing pin and stem 23 of the guard extend. Any suitable detonating compound adapted to be acted upon by the sulfuric acid and so create a sudden and enormous pressure within the T. N. T. may be employed, but I suggest for this purpose a compound consisting of military gun cotton, carbon, chlorate of potash, and bismuth. I provide preferably also a series of longitudinal parallel bores 27′ to facilitate the distribution of the acid throughout the block.

The action of my improved detonator for base detonator shells may be briefly described as follows: With the parts constructed and arranged as indicated in Fig. 1 the rotation of the shell incident to the firing from the gun throws immediately the centrifugal

blocks 25 away from each other setting the guard free to drop back until the disk 24 thereof lies close over the front end of the detonator block 27, thus exposing the point or head of the firing pin so as to act through the disk 21 and directly upon the paraffin cartridge 19. In this position the parts are carried until the shell strikes a relatively solid object causing an impact, the result of the impact being to collapse the interior parts of the shell or otherwise cause the point or head of the firing pin to make a large puncture directly through the back end of the cartridge 19 setting the acid free to flow over and through the perforated disk and stem of the guard and into or through the bores 27′ of the detonator block 27 quickly firing the detonator block and in turn firing the T. N. T. If the shell strikes a solid object such as masonry, solid earth, or a fortification, the side walls thereof being relatively thin spring outward or the shell as a whole so collapses as to cause the cartridge 19 to be impaled upon the pin 16. Or when the shell strikes any relatively solid object the T. N. T. rebounds carrying backward with it the cartridge causing it to be impaled upon the pin.

I claim:

1. The herein described base detonator shell filled with high explosive, automatic arming means carried at the base of the shell and chemical means made active at impact for firing the high explosive.

2. In a base detonator shell, the combination with a shell and a charge of high explosive therein, of a detonator casing carried by the base end of the shell, a mass of detonator compound within the casing, and a chemical within the casing adapted to cooperate with the detonator compound as a result of impact.

3. In a base detonator shell, the combination with a shell having a charge of high explosive therein and a base block inclosing the explosive, of a detonator casing carried by the base block and otherwise surrounded by the high explosive, said casing being of tubular construction, a cartridge of chemical reagent carried in one end of the casing, a mass of detonator compound carried adjacent to the other end of the casing, means normally separating the chemical reagent from the detonator, means set into operation by the movement of the shell to withdraw the means normally separating the chemical from the compound, and means to cause the direct coöperation between the chemical and the compound as a result of impact.

4. In a high explosive shell, the combination with a mass of high explosive and a detonator compound to fire the same carried at the base of the shell, of a cartridge of chemical reagent to ignite the detonator, means normally carrying the chemical holding it out of contact with the detonator, and a member serving to set free the chemical as a result of the impact of the shell.

5. In a high explosive shell, the combination of a block of cast T. N. T., a chemical reagent, and detonator means carried at the base of the shell acted upon by the reagent to fire the T. N. T. as a result of impact of the shell.

PHILIPPO L. E. DEL FUNGO-GIERA.