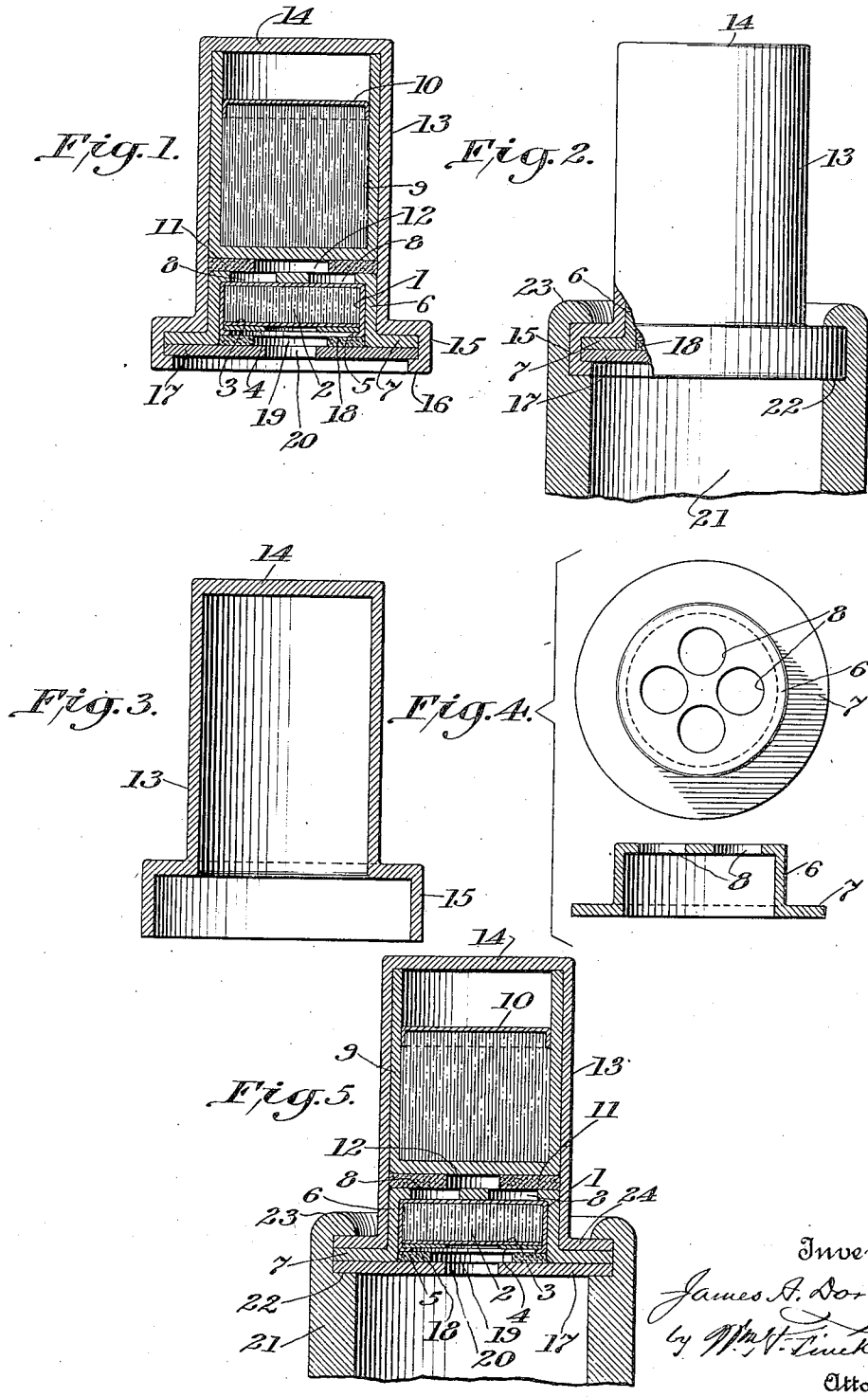


J. A. DORAN.
PRIMER DETONATOR.
APPLICATION FILED OCT. 30, 1918.

1,313,801.

Patented Aug. 19, 1919.



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JAMES A. DORAN, OF PROVIDENCE, RHODE ISLAND.

PRIMER-DETONATOR.

1,313,801.

Specification of Letters Patent.

Patented Aug. 19, 1919.

Application filed October 30, 1918. Serial No. 260,278.

To all whom it may concern:

Be it known that I, JAMES A. DORAN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a certain new and useful Improvement in Primer-Detonators, of which the following is a full, clear, and exact description.

The object of this invention is to provide a high explosive primer-detonator construction, especially for use in shells having base percussion fuses, by which such articles may be produced rapidly in quantity and in an economical way, without in the least impairing their efficiency but rather stabilizing it.

In the manufacture of shells, especially of minor caliber, it is customary to use a base fuse containing means adapted to explode the shell upon impact, and when such shells are filled with a charge of high explosive, it is necessary to supply the fuse with a powerful detonator. Great difficulty is being experienced in securing such a detonator, chiefly because of the very limited space available for it. It is, of course, very important that the detonator and primer should be so arranged and supported as to avoid any possible risk of either one exploding accidentally, as by reason of rough handling, jarring in transportation, dropping, etc. It is even more important to avoid the possibility of premature operation of the primer-detonator incident to the shock of firing, or "set-back", with its consequent effect of forcing the primer and detonator rearwardly.

Further, it is necessary to support the detonator and primer so strongly that either can injure the other, and it is equally important that there should be a free passage between them in order that the explosion of the primer may fire the detonating charge.

The present invention is designed to meet these conditions. From the manufacturing view-point, the invention consists of a primer-detonator made from sheet metal, the cupped portions being formed by drawing; and from the safety and efficiency view-points, the invention consists of a primer-detonator in which the detonator charge is self-contained and the primer charge likewise separately self-contained and these two separated by compressible washers and all

inclosed as a unit in a casing which may be closed about them, or closed within the end of the fuse body by crimping such end over them, the primer and detonator being so separated as to permit the exploding primer to fire the detonator, as I will proceed now to explain and finally claim.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a longitudinal section of the primer-detonator showing one form of assembly, wherein the casing is closed or crimped over the closing plate. Fig. 2 is an elevation showing the fuse end in section and crimped over the flange of the primer-detonator, part of which also is in section. Fig. 3 is a longitudinal section of the external or inclosing casing. Fig. 4 shows in plan and cross-section the primer cup or casing. Fig. 5 is a longitudinal section showing another form of assembly where the closing of the bottom of the primer-detonator is effected by the crimping of the end of the fuse over the casing.

The primer may be of any approved construction, but preferably comprises an open-ended shell 1 within which is the charge or fulminate 2, and this is supported upon a thin disk 3, beneath which is a centrally perforated disk 4, and when these parts are assembled the flange of the shell is crimped underneath, as at 5, so as to render the primer self-contained.

The primer is supported within a primer casing 6 of sheet metal, cupped substantially as shown and provided with the laterally extending flange 7, and having one or more perforations 8 in its head, so that the primer explosion can pass freely through it.

9 is a detonator cup, filled with the desired detonating compound, and having a cover 10 forced in the top to confine the compound in its cup.

The detonator is separated from the casing 6 by means of a yielding or compressible washer 11 having an opening 12.

13 is an external casing or container which holds all of the parts securely in assembled position, same having a closed head 14, and an open bottom made with a laterally extended cup 15, which, when the parts are assembled, has its bottom edge 16 crimped under the closing plate 17, which latter is arranged therein beneath the flange

7 and also beneath a compressible washer 18 which is interposed between said closing plate and the primer and has a central opening 19. The plate 17 has a central opening 20 alining with the opening 19 to permit the firing pin to pass through and puncture the primer.

The detonator cup is held in the casing tightly, with the felt or other yielding washer compressed by the flanged cup. The washers 11 and 18 serve as cushions so that jars of any kind cannot injuriously affect the detonator.

When the casing 13 is crimped as described, the complete assembly is so substantial and the primer and detonator so supported that neither abuse nor set-back pressure can cause either to explode.

As shown in Fig. 2, the assembled primer-detonator may be mounted in the usual fuse body 21 having its outer end 22 shouldered and flanged and the flange crimped over the laterally extending flange 15 of the casing, as shown at 23. The wall of the fuse body 25 being comparatively heavy compresses severely the flange of the detonator casing so that the assembly is thereby held with great rigidity.

As shown in Fig. 5, instead of cupping the lower end of the casing 13, it may be made with a laterally extended flange 24, and the assembly of the parts and the securing of the primer-detonator in the fuse body may be simultaneously effected by the crimping of the open end of the fuse body over the flanges.

The construction of the primer-detonator is such that it permits the metal parts to be made by the drawing process from sheet metal, and this results in a greatly reduced cost as compared with the usual process of turning the parts from a solid rod. Furthermore, the construction permits the manufacturer to produce very large quantities quickly as well as economically.

The preferred construction is that first described, where the primer and detonator are separately assembled in their own casings, inasmuch as thereby the assembly of the primer-detonator in the fuse body is greatly facilitated.

The invention is susceptible of variations in details of construction and modification of parts.

What I claim is:—

1. A primer-detonator, having an external casing, a detonator cup arranged therein and containing a detonating compound, a primer cup arranged in the casing next to the detonator cup and containing the primer, a cushion interposed between the cups, and means to secure the parts in fixed relation.

2. A primer-detonator, having an external casing provided with a laterally extending bottom cup, a detonator cup arranged in

said casing and containing a detonating compound, a primer cup arranged in the casing next to the detonator cup and containing the primer and having a laterally extending flange fitting within the cup of the casing, and a support for the primer cup also fitting within said casing cup, the said casing cup crimped about and engaging said flanges and support.

3. A primer-detonator, having a casing, a detonator inclosed therein, a primer arranged beneath the detonator, a cup separating the two, and means to hold these parts in position against accidental displacement.

4. A primer-detonator, having a primer and a detonator, a casing inclosing them, and a supporting flanged cup interposed between the detonator and primer and having a perforated head.

5. A primer-detonator, having an external casing, a detonator and a primer arranged therein, and a supporting flanged cup interposed between the detonator and primer, the said cup carrying the stress of set-back exerted on the detonating charge.

6. A primer-detonator, having an external casing closed at one end and open at the other and provided at such open end with a plate which carries the stress of set-back exerted on the primer.

7. A primer-detonator, having an external casing, a detonator and a primer arranged therein, a supporting member for said detonator, a cushion arranged between the detonator and said supporting member, a cushion arranged next to the primer, and a primer supporting member arranged next to said last-named cushion.

8. A primer-detonator, having a casing closed at the top and flanged at the bottom, a detonator arranged within the casing, a compressible washer arranged beneath the detonator, a primer cup arranged next to the washer and provided with a lateral flange, a primer arranged within said cup, a compressible washer arranged beneath the primer, and a closing plate beneath said washer and the flange of the cup.

9. A primer-detonator, having a casing closed at the top and having a laterally extended bottom flange, a detonator arranged within the casing, a compressible washer arranged beneath the detonator, a laterally flanged primer cup arranged next to the washer, a primer arranged within said cup, a compressible washer arranged beneath the primer, and a closing plate located in the casing beneath said washer and the flange of the cup, the flange of the casing being crimped beneath the closing plate.

10. A primer-detonator, having an external casing provided with a laterally extending bottom flange, a detonator cup arranged in said casing and containing a detonating compound, a primer cup arranged in the

casing next to the detonator cup and containing the primer and having a laterally extending flange complementary to the casing flange, a cushion interposed between the cups, and a bottom support for the primer, combined with a fuse body crimped over the flange of the casing.

In testimony whereof I have hereunto set my hand this 28th day of October, A. D. 1918.

JAMES A. DORAN.

Witnesses:

BARBARA F. BRENNAN,
NELLIE R. DORAN.

Correction in Letters Patent No. 1,313,801.

It is hereby certified that in Letters Patent No. 1,313,801, granted August 19, 1919, upon the application of James A. Doran, of Providence, Rhode Island, for an improvement in "Primer-Detonators," an error appears in the printed specification requiring correction as follows: Page 1, line 39, for the word "either" read *neither*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of October, A. D., 1919.

[SEAL.]

M. H. COULSTON,
Acting Commissioner of Patents.

Cl. 102—43.