No. 763,370.

PATENTED JUNE 28, 1904.

C. F. & H. E. COWDREY.

CHAMBERED PROJECTILE.

APPLICATION FILED DEC. 14, 1903.

NO MODEL.

Fig. 1.

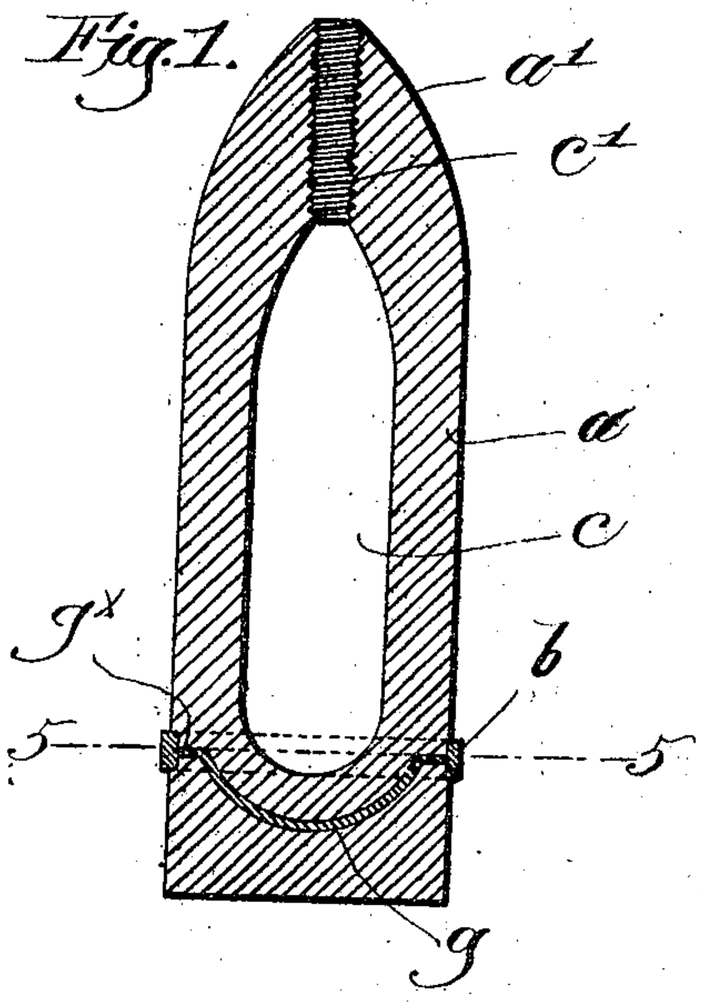


Fig. 2.

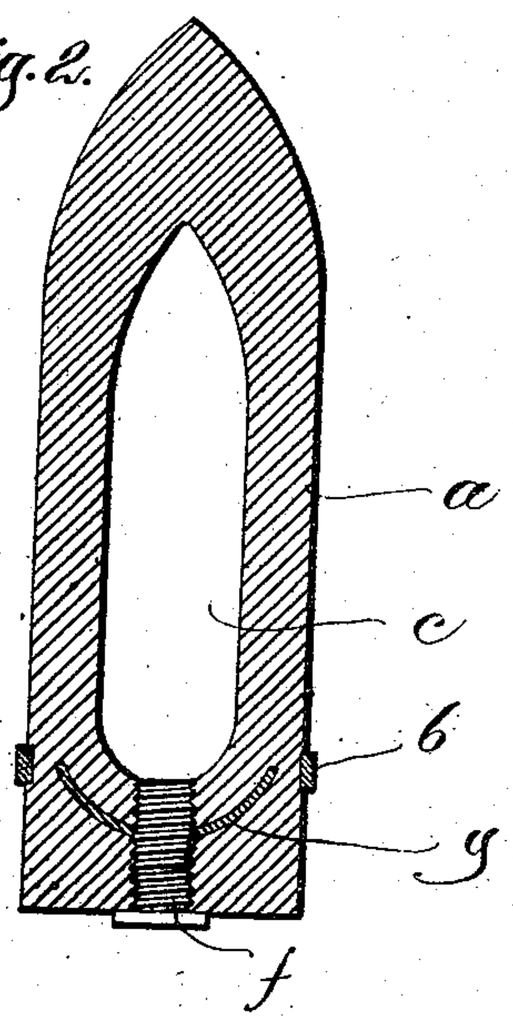


Fig. 3.

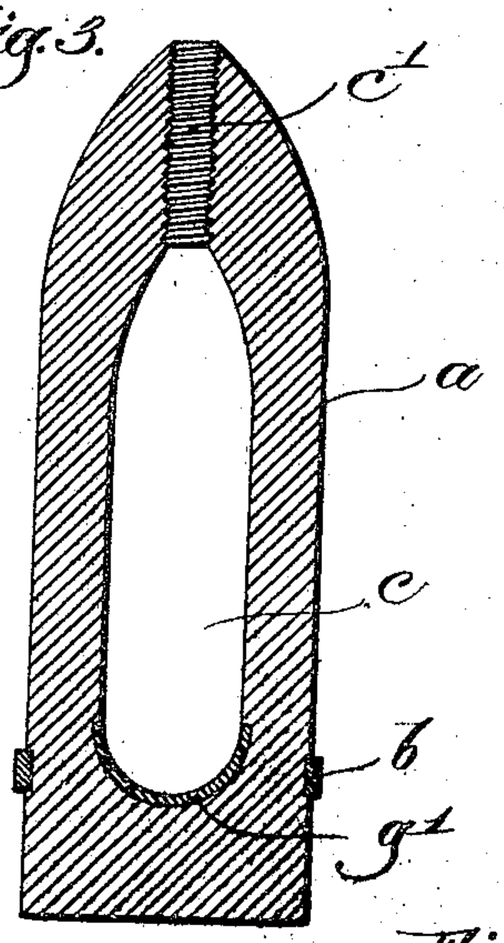


Fig. 4.

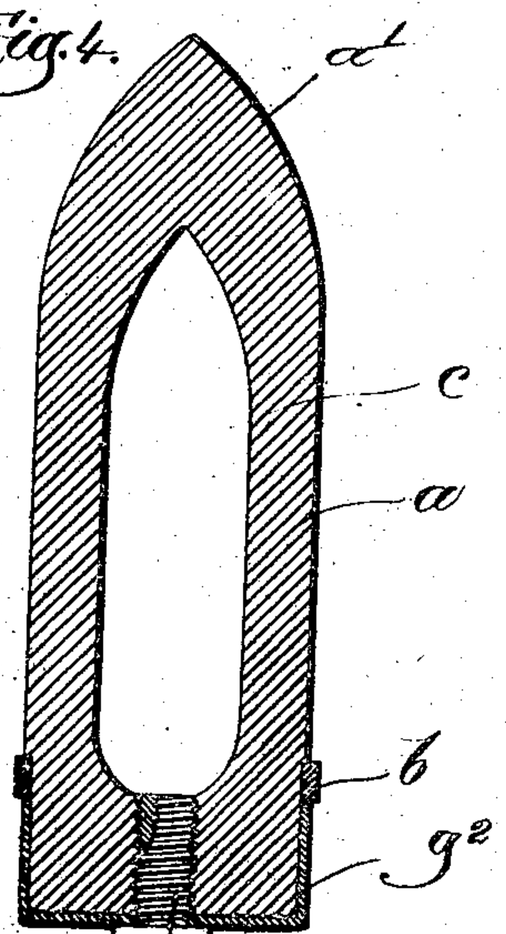
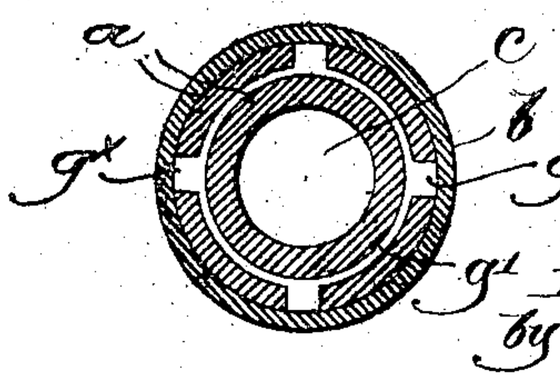


Fig. 5.



Witnesses:
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No. 763,370. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

CHARLES F. COWDREY AND HENRY E. COWDREY, OF FITCHBURG, MASSACHUSETTS

CHAMBERED PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 763,370, dated June 28, 1904.

Application filed December 14, 1903. Serial No. 185,016. (No model.)

To all whom it may concern:

Be it known that we, CHARLES F. COWDREY and HENRY E. COWDREY, citizens of the United States, and residents of Fitchburg, county of Worcester, State of Massachusetts, have invented an Improvement in Chambered Projectiles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to high-power ordnance-projectiles chambered to receive a bursting charge; and it has for its particular object the production of a cast-iron chambered projectile provided with means to prevent premature explosion of the bursting charge while the projectile is in the gun. It has been found that this accident rarely, if ever, takes place when using a steel projectile so far as concerns the highly-penetrative gases which are generated by the high-power explosives now used for the propulsive charge in the gun; but the occurrence is relatively so frequent with cast-iron projectiles that the employment thereof is looked upon with considerable disfavor by ordnance experts. From careful and numerous observations it appears that the gases generated by the combustion of the propulsive charge are so highly penetrative as to pass through the pores or interstices of the cast-iron forming the base of the projectile and ignite prematurely the bursting charge in the projectile.

Manifestly cast-iron projectiles are much cheaper than those made of steel and would be used in larger quantities were it not for the very dangerous objection referred to. In the course of our experiments to overcome such objection we have devised an effective gas-shield for the base of the chamber in the projectile of a metal impervious to gases generated by the combustion of the propulsive charge, the shield forming a component part of the projectile and adding but little to the cost thereof.

A chambered projectile made in accordance with our invention is (so far as concerns premature bursting by penetration of gases while in the gun) equal to a steel projectile of much greater cost and can be used with equal safety to gun and gunners.

Our invention is equally applicable whether the projectile be provided with a point-fuse or a base-fuse.

The novel features of our invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a longitudinal sectional view of a chambered projectile arranged for a point-fuse and having one form of our invention embodied therein. Fig. 2 is a similar view of a base-fuse projectile with our invention embodied therein. Fig. 3 is a longitudinal sectional view of a point-fuse projectile, showing a modified form of our invention. Fig. 4 is a like view of a base-fuse projectile with yet another form of our invention, and Fig. 5 is a transverse section on the line 5 5, Fig. 1.

The projectile *a*, having an ogival point or head *a'*, is made of cast-iron and provided with a chamber *c* to receive the bursting charge, the point having a threaded hole *c'*, Figs. 1 and 4, to receive the point-fuse plug, of any usual construction and not shown, the hole communicating with the chamber. The copper or soft-metal band or ring *b* is common to projectiles of this character to expand into the rifling-grooves of the gun in well-known manner and impart rotative movement to the projectile. The base of the chamber *c* is separated from the charge in the gun by the thickness of the material forming the base and sides of the projectile, and when the charge is fired the highly-penetrative gases then generated appear to pass through cast-iron with sufficient freedom to fire the bursting charge in the projectile. We have overcome this dangerously-objectionable feature of cast-iron chambered projectiles by interposing a gas-shield between the base of the chamber and the charge in the gun, the shield forming a component part of the projectile. To this end we form in any suitable manner a cup-like and relatively thin shield *g*, Figs. 1 and 2, of a metal having a melting-point not lower than that of cast-iron and impervious to gases generated by explosion of the propulsive

charge and which will form a perfect union with the cast-iron when molten. We have found that steel possesses the several requisites, and it is treated in any suitable manner to secure a perfect union with the cast-iron, with freedom from blow-holes or other imperfections. To this end we have attained highly-satisfactory results by cleaning and tinning the shield. The shield is placed in the mold and suitably supported, as if it were a core, and the molten cast-iron is then poured into the mold. As a result the base of the chamber *c* is surrounded by a shield impervious to gas and perfectly united with the cast-iron forming the body of the projectile. Inasmuch as the soft band or ring *b* prevents passage of the gases forward beyond it, we have found that it is not necessary to carry the shield beyond said band. When a point-fuse is used, as in Fig. 1, the shield is continuous around the base of the chamber *c;* but if a base-fuse is employed, as in Fig. 2, the shield has an opening through which the fuse-plug *f* passes. The use of such a base-fuse does not appear to interfere with the efficiency of the shield, as it fits so tightly that the gases cannot penetrate.

In the construction shown in Figs. 1 and 2 the gas-shield *g* is molded or embedded into the cast-iron; but it may be differently arranged, as in Fig. 3, wherein the shield g' is positioned to form a direct lining for the base of the chamber *c*, the cast-iron being molded around the outer surface of the shield. Yet another arrangement is shown in Fig. 4, the shield g^2 being external to the base of the projectile, the cast-iron being poured into it when the projectile is cast. Whatever the particular arrangement of the shield, the cast-iron when poured into the mold forms a perfect union therewith, and thereby makes the shield a component part of the projectile.

For convenience in supporting the shield in the mold it may be provided with radial ears $g^\times$, (see Fig. 5,) which are sustained in any suitable manner in the mold.

Our invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be modified in various ways by those skilled in the art without departing from the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A cast-iron, chambered projectile provided with a shield for the base of the chamber and impervious to gases generated by combustion of the propulsive charge.

2. A cast-iron, chambered projectile, and a gas-shield forming a part thereof around the base of the chamber, said shield being impervious to gases generated by the explosion of the propulsive charge.

3. A cast-iron, chambered projectile, and a relatively thin, metallic shield forming a part thereof surrounding the base of the chamber and impervious to gases generated by the explosion of the propulsive charge.

4. A cast-iron projectile having a chamber therein, and a steel shield surrounding the base of the chamber, to prevent the passage thereinto of gases generated by explosion of the propulsive charge.

5. A cast-iron projectile having a chamber therein, and a relatively thin gas-shield surrounding the base of the chamber and composed of metal having a melting-point higher than that of cast-iron.

6. A cast-iron projectile having a chamber therein, and a relatively thin, cup-like gas-shield, of steel surrounding the base of the chamber and embedded or molded in the cast-iron when the latter is in molten condition.

7. A cast-iron projectile having a chamber therein, and a relatively thin steel gas-shield surrounding the base of the chamber and united with the cast-iron when the latter is in a molten condition.

8. A cast-iron, chambered projectile provided with a rifling band of soft metal, and a metallic gas-shield surrounding the base of the chamber and extended forward to the band, said shield being impervious to gases generated by the explosion of the propulsive charge, to prevent the passage of such gases into the chamber.

9. A cast-iron, chambered projectile, and a gas-shield of steel surrounding the base of the chamber and united with the cast-iron when the latter is in molten condition, said shield being cleaned and tinned to secure a perfect union with the molten cast-iron.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES F. COWDREY.
HENRY E. COWDREY.

Witnesses:
CHAS. L. TENNEY,
G. M. WOODWARD.