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C. F. & H. E. COWDREY.

ORDNANCE PROJECTILE.

APPLICATION FILED NOV. 10, 1904.

Fig. 1.

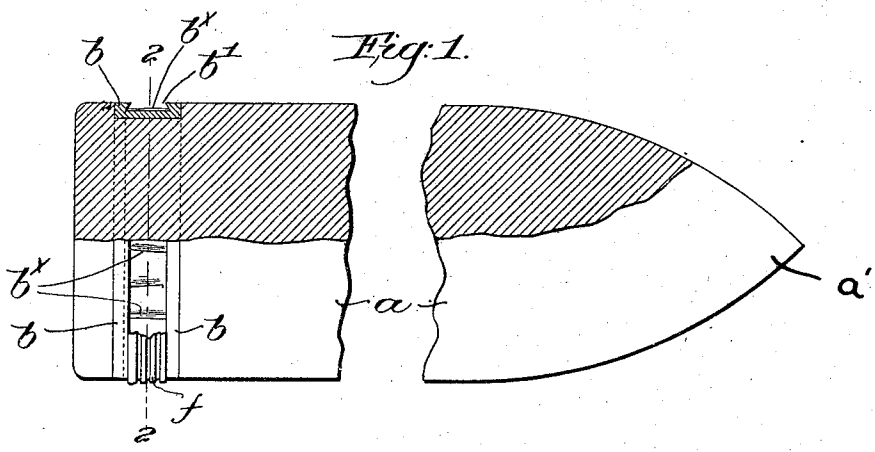


Fig. 2.

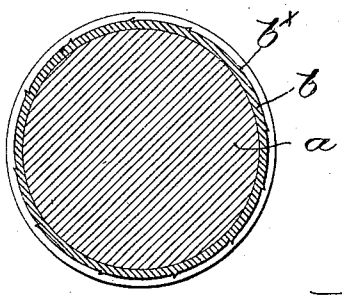


Fig. 3.

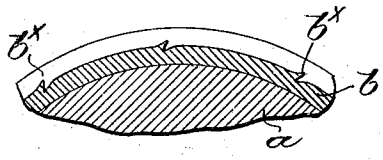


Fig. 4.

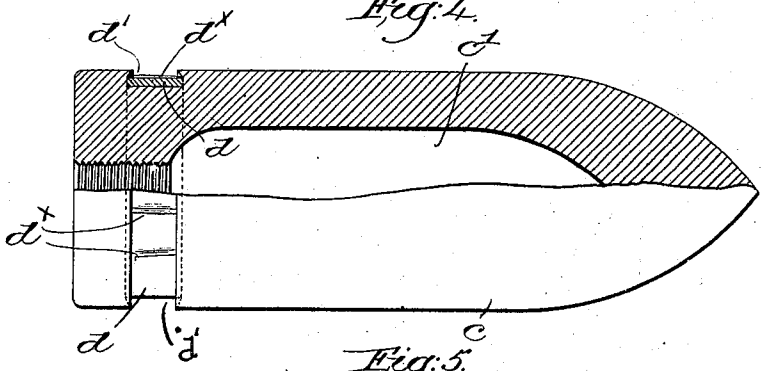
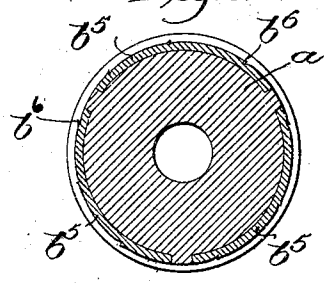


Fig. 5.



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No. 789,359. Patented May 9, 1905.

UNITED STATES PATENT OFFICE.

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ORDNANCE-PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 789,359, dated May 9, 1905.

Application filed November 10, 1904. Serial No. 232,110.

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 Ordnance-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 particularly to ordnance-projectiles made of cast-iron, whether solid or chambered, for the reception of a bursting charge; and it has for its object the production of simple and effective means to prevent slipping or turning of the soft-metal rifling-band.

The rifling-band, made of copper or soft metal, is usually compressed into an annular seat surrounding the projectile at a suitable distance from its base, depending somewhat on the shape and dimensions of the projectile, the side walls of the seat being undercut to retain the band therein. As is well known, the band expands into the rifling-grooves of the gun when the propulsive charge is ignited and imparts rotative motion to the projectile.

In a cast-iron projectile the annular seat is formed by suitable cutting-tools, and thereafter the bottom of the seat is roughened as much as possible to enable the soft metal of the band to take hold and be restrained from turning or slipping on the projectile when fired. If the band slips, the proper rotative motion will not be imparted to the projectile manifestly, and when it leaves the muzzle of the gun it will turn end over end or travel in an otherwise erratic manner. Considerable fault has been found with cast-iron projectiles on this account, as the seat-bottom cannot, owing to the character of the metal, be roughened or burred sufficiently to insure a firm hold on the rifling-band. Steel projectiles are practically free from this objection, because by means of a cold-chisel or other suitable tool a very considerable chip or bur can be cut from and turned up along the bottom of the band-seat, and it enters so deeply into the metal of the band that the latter cannot slip.

In the course of our experiments to make the cheaper cast-iron projectile as efficient in respect to non-slipping of the rifling-band as is the more expensive steel projectile we have devised means whereby the bottom of the seat, in whole or in part, can be formed of steel or other suitable metal having a higher melting-point than cast-iron, and in which the holding chip or bur can be formed similarly to the mode employed in a steel projectile. To this end we embed or mold in the cast-iron while the latter is in a molten condition a curved portion of steel, concentric with the projectile axis and so located that when the band-seat is cut the steel will be exposed at its bottom, and the requisite chipping or burring is effected in any suitable manner in the exposed steel.

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 half longitudinal section and elevation, broken out between its base and point, of a solid projectile having one form of our invention embodied therein, the rifling-band being omitted on the upper half of the projectile and broken off on the lower half to more clearly show the bur. Fig. 2 is a cross-section on the line 2 2, Fig. 1. Fig. 3 is an enlarged segment on the said section-line. Fig. 4 is a view of a chambered projectile similar to Fig. 1 and showing our invention applied thereto in a slightly different form, and Fig. 5 is a transverse sectional detail showing the steel insert in segmental portions.

Referring to Fig. 1, the solid projectile a, having an ogival point or head a', is made of cast-iron, and in accordance with our invention an annular or curved portion b of a metal having a higher melting-point than cast-iron, such as steel, is introduced into the mold at the point at which the rifling-band is to be located and concentric with the longitudinal axis of the projectile. The steel is treated in any suitable manner to secure a perfect union

with the cast-iron with freedom from blow-holes or other imperfections, and we have found that by cleaning and tinning the steel most satisfactory results are produced. The steel portion so treated is properly positioned in the mold, and the molten cast-iron is then poured into the same, the thickness of the steel and its width being such that the band-seat can be cut wholly in the steel. When the projectile is removed from the mold, the steel will be found perfectly united with the cast-iron, and then the seat b' is cut in the steel in usual manner with its sides undercut, as is usual. It will be seen by reference to the sectional portion of Fig. 1 that the entire seat b' is formed in the steel, there being a considerable thickness thereof at the bottom of the seat. A cold-chisel or other suitable tool is then used to form chips or burs $b^{\times}$ on the bottom and transversely of the seat, the burs being made to incline opposite to the direction the rifling-band would tend to slip. The burs are clearly shown in Figs. 2 and 3, and as they are formed in the steel they can be made heavy and strong enough to withstand any turning tendency to which the rifling-band may be subjected. The burring will vary in depth and spacing with the diameter of the projectile. When the rifling-band f is expanded in the seat, the burs enter and positively engage the same and positively hold it securely in its seat without any possibility of turning or slipping. The inserted steel portion may be made as a continuous ring or the ends of the ring may be separated, and, if desired, the steel insert may be made in the form of segments, as at b^5, Fig. 5, embedded in the cast-iron while the latter is in molten condition, as before. When the band-seat is cut, the burs b^6 are formed in the steel portions, as shown.

Instead of making the inserted steel large enough in cross-section to form the bottom and sides of the band-seat it may be made materially thinner, as shown at d, Fig. 4, wherein the projectile c is chambered at c', the steel portion being so placed in the mold that it will be completely surrounded on all sides by the cast-iron. The seat d' is then cut in the cast-iron deep enough to expose the steel at its bottom, and the chips or burs $d^{\times}$ are formed in this steel bottom as before. Whichever mode of procedure may be adopted, the steel molded in the cast-iron is exposed at the bottom of the band-seat throughout the whole or a part of its extent, and the burring is formed in the exposed steel, so that the rifling-band will be engaged thereby and held from slipping or turning on the projectile. At a cost but little more than that of an ordinary cast-iron projectile we are thus enabled to obtain all the advantages, so far as securing the rifling-band is concerned, of the expensive steel projectile.

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

1. A cast-iron projectile having an annular seat for the rifling-band of soft metal, and steel-holding means located at the bottom of the seat and united with the cast-iron when the latter is in molten condition, to engage and prevent slip of the band.

2. A cast-iron projectile having an annular seat for the rifling-band of soft metal, and a seat-bottom composed of metal having a higher melting-point than cast-iron and provided with burs or projections to engage and prevent slip of the band.

3. A cast-iron projectile having an annular portion of steel embedded or molded in the cast-iron when the latter is in molten condition, a seat for the band being formed in the projectile concentric with such steel portion and having its bottom formed thereby, and burs or chips turned up in the steel to engage the soft-metal band and prevent slip thereof.

4. A cast-iron projectile having embedded or molded therein while the cast-iron is in molten condition a steel holding portion having exposed burs or projections to engage the soft-metal rifling-band and prevent slip thereof.

5. A cast-iron projectile having an annular seat with undercut sides to receive the rifling-band of soft metal, and a steel ring embedded in the cast-iron when the latter is in molten condition and forming the bottom of the seat, having burs formed therein to enter the band and prevent slip thereof.

6. A cast-iron projectile having an annular portion of steel united with the cast-iron when the latter is in molten condition, and concentric with the longitudinal axis of the projectile, a seat for the rifling-band being formed in the steel, and burs or chips turned up in the steel at the bottom of the seat to engage and prevent slip of the rifling-band.

7. A cast-iron projectile having an annular seat for the rifling-band of soft metal, and a ring-like steel backing exposed at the bottom of the seat and having transverse burs to engage and prevent slip of the band.

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:
GERTRUDE M. WOODWARD,
CHARLES L. TENNEY.