

No. 849,015.

PATENTED APR. 2, 1907.

E. OHL.
PROJECTILE.

APPLICATION FILED JUNE 7, 1906.

Fig.1

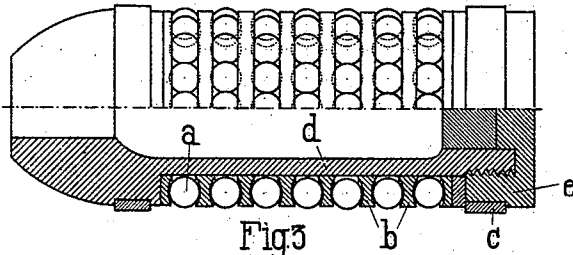


Fig.2

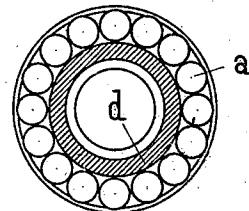


Fig.3

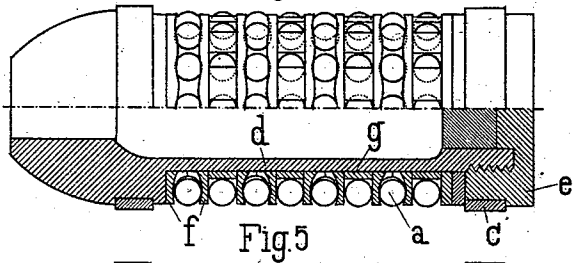


Fig.4

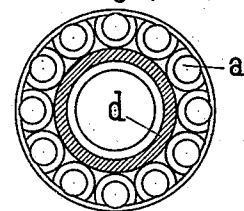


Fig.5

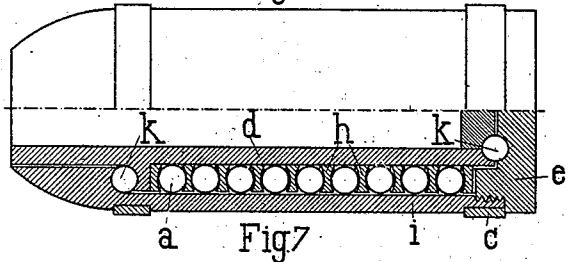


Fig.6

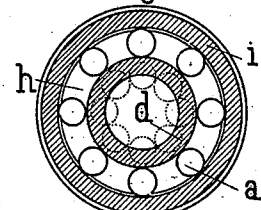


Fig.7

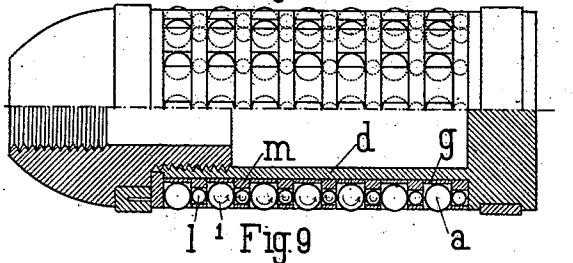


Fig.8

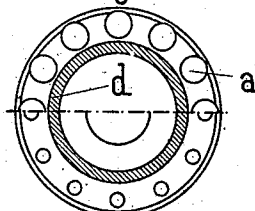


Fig.9

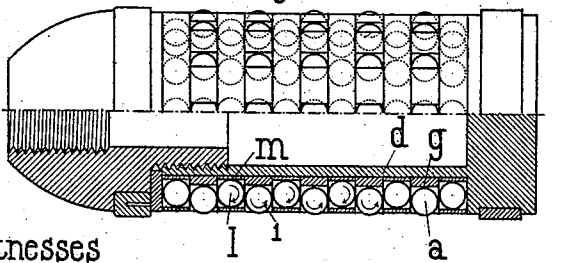
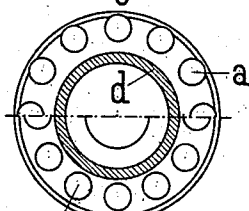


Fig.10



Witnesses

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UNITED STATES PATENT OFFICE.

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PROJECTILE.

No. 849,015.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed June 7, 1906. Serial No. 320,619.

To all whom it may concern:

Be it known that I, EDWARD OHL, a subject of the German Emperor, and residing at Strassburg, Germany, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

My invention relates to a projectile having rotary spheres or balls to diminish the friction in the barrel.

The new projectile differs from prior ones of the same type by the balls being mounted in separate bearings pushed over the projectile. If desired, the balls may also be located in special intermediate rings, such as are frequently used for ball-bearings. If the rings are given such a position relatively to one another that the balls will present helical lines around the projectile, it is obvious that the projectile will turn on its longitudinal axis during its travel through a smooth barrel.

In the accompanying drawings, Figure 1 is an elevation, and the lower half a longitudinal section, of the new projectile. Fig. 2 is a cross-section through Fig. 1. Figs. 3 and 4 are similar views of a modified construction of the projectile. Figs. 5 and 6 are similar views of a second modification, and Figs. 7 and 8 are like views of a third modification; Figs. 9 and 10, like views of a fourth modification.

Referring more particularly to Figs. 1 and 2, *a* are balls projecting from the shell *d* and mounted between rings *b*. The latter have recesses on both sides, so that the balls, assembled at the periphery of the shell, are held by them. The rings *b* themselves are held by the base or cap *e*, which is provided with the guide-ring *c* and screwed to the shell *d*.

In the modification shown in Figs. 3 and 4 rings *f* and *g* are employed in such manner that the balls *a*, assembled at the periphery of the shell, are separated from each other. For this purpose the rings *g* are provided with round recesses. The rings *f* are provided with swellings on the one side which is concave, whereby the balls are kept apart. The other side of the rings *f* is flat and serves to bear against the balls located in the rings *g*.

By shifting the rings *f g* the annular rows of balls may be caused to lie on the shell so as to present the appearance of a helix. These projectiles naturally may be constructed only with rings *f* or only with rings *g*. In the latter case washers may be interposed between each two rings in order to prevent contact of the several balls of each longitudinal row.

Referring to the projectile illustrated in Figs. 5 and 6, the balls lie on the periphery of the shell between rings *h*, which are similar to the rings *b* in Figs. 1 and 2. Around the shell *d*, however, a second shell or casing is provided, turning on two ball-bearings *k*. When, therefore, the projectile travels along the rifled barrel of the gun, the outer shell *i* will turn on its balls *k*, while the inner shell *d* will only slide along without any rotary motion. In the gun-barrel, consequently, there is to be imparted a moment of rotary inertia to the light outer shell only.

In the projectile shown in Figs. 7 and 8 the balls *a* and *l* are located in rings *g* and *m* in such manner that the centers of the balls lie on a common cylindrical surface. The balls *a* are of larger diameter and project from their rings *g* so as to afford guidance to the projectile in the barrel. The balls *l* are located in cylindrical apertures in the rings *m* and contact with the balls *a*. In this manner the balls *a*, which on the gun being fired commence to rotate in the direction of the arrows, cause the adjacent balls *l* to rotate in the opposite direction. The balls *a* and *l* thus roll on each other, so that the total amount of friction is relatively small.

Figs. 9 and 10 show a projectile in which the balls *a* and *l* are of equal size. The center of the balls *l* in the rings *m*, however, lies on a cylinder surface of smaller diameter than that of the balls *a*. Thus the latter guide the projectile in the barrel, the rotation of the balls being the same as just above described.

What I claim as new, and desire to secure by Letters Patent, is—

1. A projectile having a shell, rings surrounding the same, rotary balls held by said rings, and a casing surrounding the balls and the shell and rotating on the latter on ball-

bearings, substantially as and for the purpose set forth.

2. A projectile, rings surrounding the same, and rotary balls held by the said rings, those
5 balls of each alternate annular row projecting beyond those of the intermediate rows, substantially as and for the purpose set forth.

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

EDWARD OHL.

Witnesses:

ALBERT NEUNINGER,
BENJAMIN F. LIEFELD.