E. RIMAILHO.

ARTILLERY PROJECTILE.

APPLICATION FILED JULY 18, 1914.

1,154,437.

Patented Sept. 21, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

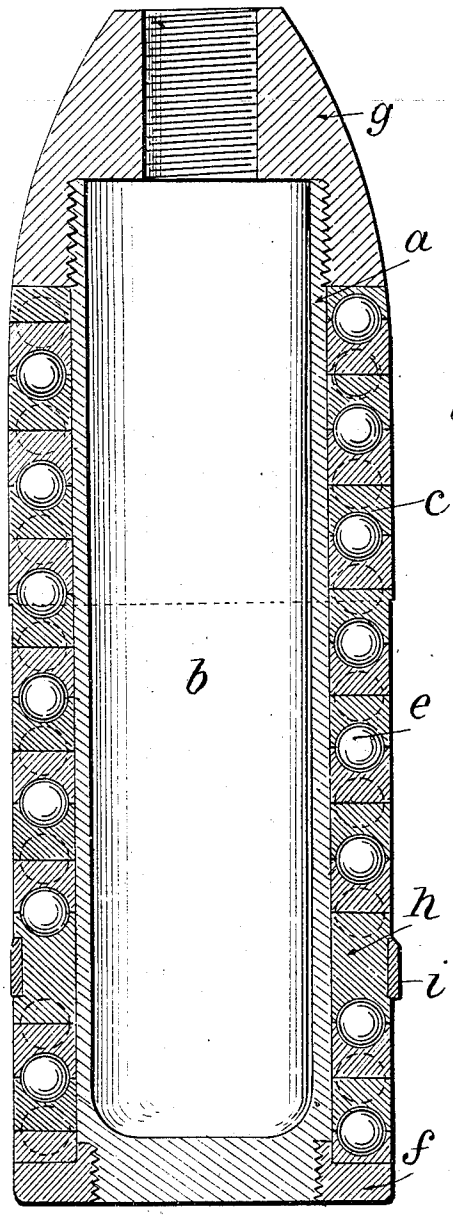
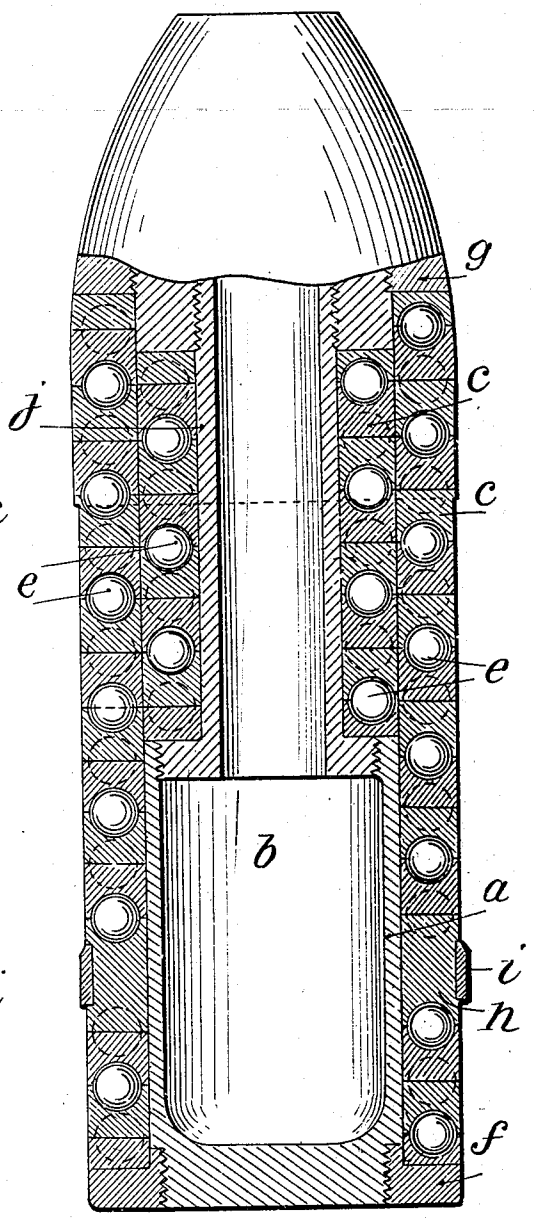


Fig. 4.



WITNESSES:

Chas. A. Leibman

J. C. Larsen

INVENTOR

Emile Rimailho

BY Munn & Co

ATTORNEYS

E. RIMAILHO.

ARTILLERY PROJECTILE.

APPLICATION FILED JULY 18, 1914.

1,154,437.

Patented Sept. 21, 1915.

2 SHEETS—SHEET 2.

Fig. 2.

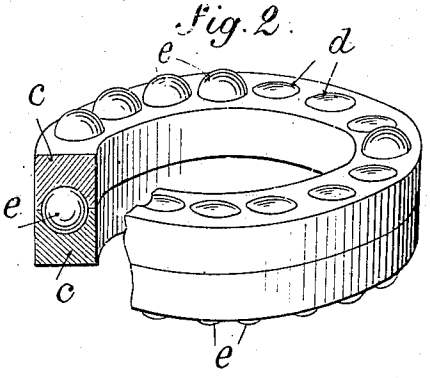


Fig. 3.

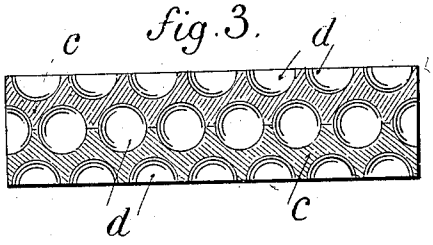
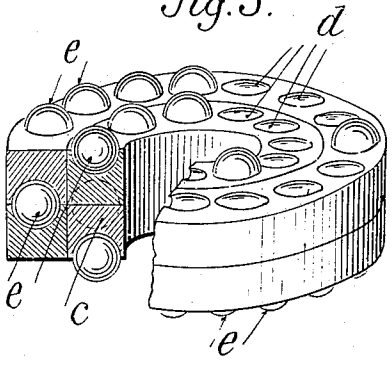


Fig. 5.



WITNESSES:

Chas A Lerbum

J. C. Larsen

INVENTOR

Emile Rimailho

BY Munn & Co

ATTORNEY

UNITED STATES PATENT OFFICE.

EMILE RIMAILHO, OF PARIS, FRANCE, ASSIGNOR TO COMPAGNIE DES FORGES ET ACIERIES DE LA MARINE ET D'HOMECOURT, OF PARIS, FRANCE.

ARTILLERY-PROJECTILE.

1,154,437. Specification of Letters Patent. Patented Sept. 21, 1915.

Application filed July 18, 1914. Serial No. 851,776.

To all whom it may concern:

Be it known that I. EMILE RIMAILHO, a citizen of the French Republic, and residing at 98 Rue de la Victoire, in Paris, France, consulting engineer, have invented certain new and useful Improvements in and Relating to Artillery-Projectiles, of which the following is a complete specification.

This invention relates to improvements in artillery projectiles or shells having an internal bursting charge preferably centrally situated.

In ordinary bursting projectiles for artillery the body or shell proper of the projectile has generally been made of steel comprising a central cavity for containing the bursting charge. On the explosion of this charge the shell bursts and is projected in the form of fragments of varying shapes and weights. These fragments which are of irregular geometrical form offer a great surface to the resistance of the air and also by reason of the differences in sizes of these fragments their useful effects are very irregular. It has already been proposed to determine before-hand the breaking-up of the shell by scoring or notching the shell or even by arranging pieces of metal of various shapes around the bursting charge. In such cases however, the resistance to rupture of the shell which is absolutely necessary in order that the explosion shall have its full effect, is not sufficiently great and the prepared fragments do not acquire or utilize the full available velocity. The same takes place and with stronger reason when the fragments or balls are intermingled with the explosive because not only is the velocity in such a case less than it should preferably be, but the balls or fragments are further deformed by the explosion.

The present invention now consists substantially in constituting the essentially or mainly operative parts of such projectiles by means of balls arranged around the outside of the shell proper and inclosed by rings which serve as devices for hooping the body of the shell, as devices for retaining the balls which have a tendency to fly out by centrifugal action, and as members designed to be broken up into projectiles which will unite with the balls proper and with the fragments of the walls of the shell proper. The bursting charge is arranged inside the walls of the shell and the said walls will oppose the desired maximum resistance to bursting according to the degree or extent of the hooping employed, so as to enable the explosion to produce its full effect and to impart the greatest possible velocity to the balls and fragments.

This invention is illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a longitudinal axial section of one form of the improved projectile, Fig. 2 is a perspective view partly broken away of two rings fitted together with some of their balls in position, Fig. 3 is an opened-out sectional side view of the two rings, Fig. 4 is a longitudinal axial section of another form of the improved shell, and Fig. 5 is a perspective view of a concentric arrangement of rings.

Referring first to Figs. 1, 2, 3, the body or shell proper *a* which may be for instance of cylindrical shape as shown, contains in its interior the usual bursting charge *b* and it carries on its outside a series of rings *c* fitted one upon or against the other. Each ring is formed on its flat upper and lower sides with a series of hemispherical recesses *d*, d^1 designed to receive balls *e* which, when the rings are fitted together, are inclosed by recesses of similar shape provided in the adjacent ring or rings.

The recesses in each face of one and the same ring are preferably shifted or staggered relatively to the recesses in the other face of the said ring (as shown in Figs. 2 and 3) in such a manner that each recess in the one face will be situated opposite a solid portion of the other face. This allows of reducing the height of each ring and consequently increasing the number of such rings upon the shell as well as the number of the balls. Further, by shifting the upper row of balls by an amount slightly greater than half the interval between two balls, the balls, instead of being arranged from the rear to the front of the shell along a number of generating lines equal to the number of the balls of one and the same ring, will be arranged along helical lines so that the balls will be projected in a greater number of radiating directions.

The pile of rings is maintained in place at one end by a base piece *f* which may be

for instance screwed upon the body of the shell, and at the other end by the ogival front part of the shell.

One ring *h* of the pile of rings is made sufficiently high to enable it to receive the usual copper check ring *i*, and the front part of the projectile is constructed so as to serve as a guide at the moment of discharge from the gun.

On the bursting of the shell, the body *a* is broken up and its fragments are projected in the usual manner. The rings *c* are likewise broken up along the recesses for the balls, which recesses constitute as many lines of rupture. The balls on being released from their recesses are likewise projected by the explosion.

The fragments of the body of the shell and the fragments of the rings are projected irregularly in the usual manner, whereas the balls *e*, owing to their regular form offer only a small area to the resistance of the air and can therefore be projected to very great distances. The arrangement of these balls thus increases the striking range of the projectiles owing to the power of the balls *e* of penetrating the air due to their regular geometrical shape.

Instead of a single row of balls, as shown in Fig. 1, two or more rows of balls may be arranged concentrically around the body of the projectile.

In the modification shown in Fig. 4 a number of concentric rows of rings are arranged on the front part of the projectile so as to inclose a reduced portion *j* of the shell proper. By reason of this arrangement, since there is a greater quantity of bursting charge in the rear portion of the shell, the rings arranged around the forward part of the shell will receive at the moment of explosion a double motion, namely, the balls and fragments of the rings will be projected not only at right angles to the axis of the shell but also in a forward direction.

The balls *e* may be made of any suitable metal, preferably of hard steel. The rings *c* may be made for instance of soft steel in which the recesses *d* for the balls *e* are formed by milling, pressing or any other suitable means. The number of the rings may vary along the height or length of the projectile, and the diameter of the balls may also vary. Two or more rows of balls may be arranged in the lateral direction. The base piece *f* may be formed in one piece in the shell body *a* or it may be screwed, soldered or welded thereto.

This invention is applicable to projectiles of all calibers and for guns of all kinds.

What I claim is:

1. A projectile, comprising a casing having an explosive chamber therein, a plurality of rings bearing on the outer surface of said casing, means for holding said rings on said casing, each of said rings being recessed on opposite faces, the recesses of adjacent rings registering with each other, and a ball in each pocket formed by complemental recesses.

2. A projectile, comprising a casing having an explosive chamber therein, a plurality of rings bearing on the outer surface of said casing and upon each other, means for holding said rings on said casing, each of said rings being recessed on opposite faces, the recesses of adjacent rings registering with each other and jointly forming pockets, and a ball in each of said pockets.

3. A projectile, comprising a casing having an explosive chamber therein, a plurality of rings bearing on the outer surface of said casing and upon each other, means for holding said rings on said casing, each of said rings being recessed on opposite faces, the recesses in one face being in planes between the planes of the recesses in the other face of each of said rings, and the recesses in adjacent rings jointly forming pockets, and a ball in each of said pockets.

4. A projectile, comprising a casing having an explosive chamber therein, and reduced in diameter for a portion of its length, a plurality of rings bearing on the outer surface of said casing, a plurality of rings bearing against the rings in the position of said reduced portion of said casing, said rings being recessed on adjacent faces to form pockets, and a ball in each of said pockets.

5. A projectile, comprising a casing having an explosive chamber therein, said casing and chamber being reduced in diameter in the forward portion thereof, a series of balls held in the outer surface of said projectile and adapted to be distributed laterally thereof in the explosion of said projectile, and a supplemental series of balls held within said first named series, forwardly of the enlarged portion of said casing, whereby said supplemental balls will be driven forwardly of said projectile in the explosion thereof.

In testimony whereof I have hereunto set my hand at Paris, (France), this 7th day of July, 1914.

EMILE RIMAILHO.

In the presence of two witnesses:
DENNIS C. TOOLE, Jr.,
LOUIS COQUILLAT.