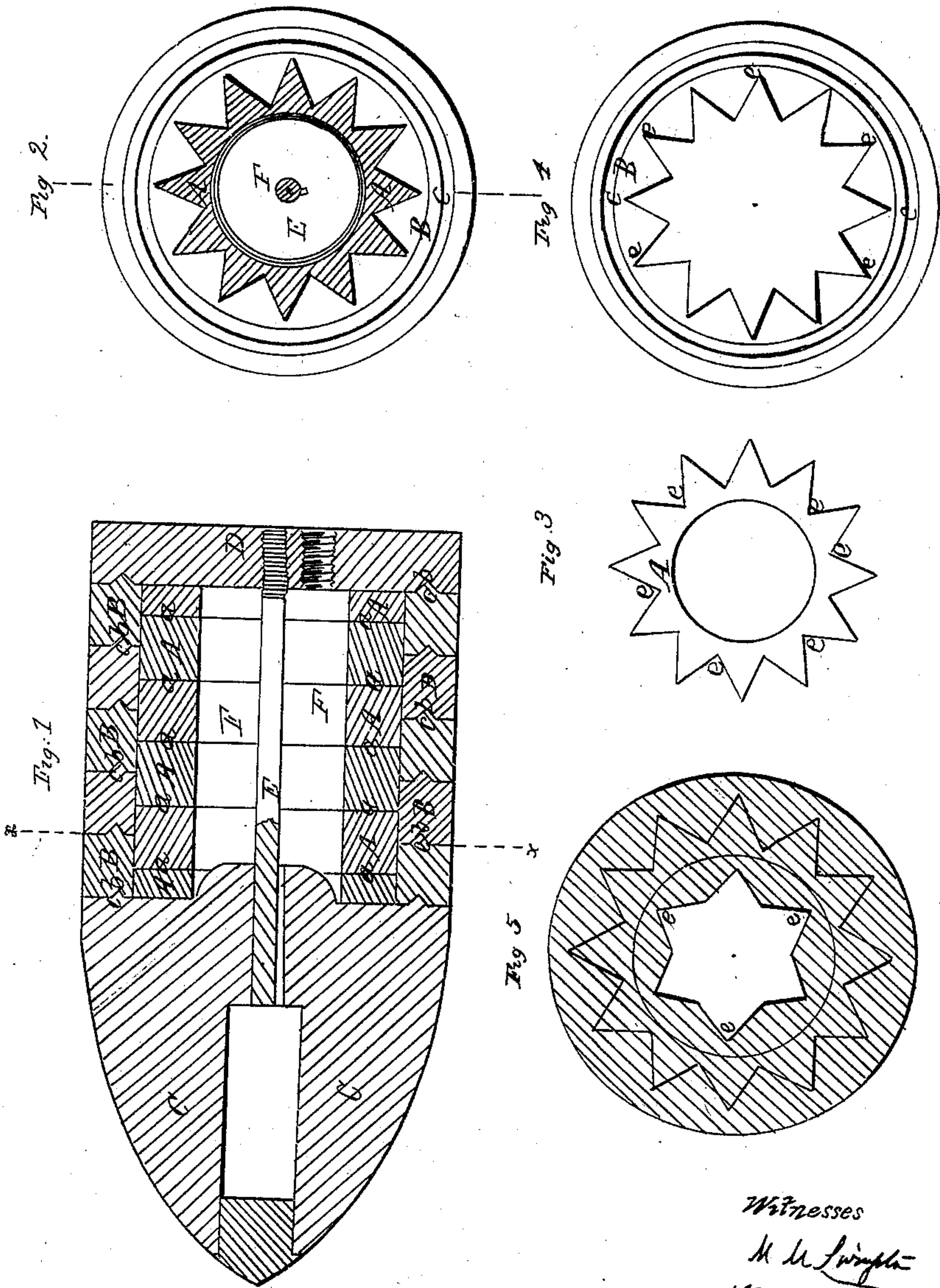


L. D. GERARDIN.

Shell.

No. 37,661.

Patented Feb. 10, 1863.



Inventor:

Louis D. Grandin

*Witnesses*

M M Swingle  
Henry C. Brown



# UNITED STATES PATENT OFFICE.

LOUIS D. GERARDIN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO HIMSELF  
AND WM. HOWETH, OF SAME PLACE.

## IMPROVEMENT IN EXPLOSIVE PROJECTILES FOR ORDNANCE.

Specification forming part of Letters Patent No. 37,661, dated February 10, 1863.

*To all whom it may concern:*

Be it known that I, LOUIS D. GERARDIN, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Projectiles for Ordnance; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal section of an elongated projectile constructed according to my invention. Fig. 2 is a transverse section of the same in the plane indicated by the line *x x* on Fig. 1. Figs. 3 and 4 are face views of two kinds of rings of which the projectile is in part composed. Fig. 5 is a transverse section of a projectile, illustrating a modification of my invention.

Similar letters of reference indicate corresponding parts in the several figures.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The projectile represented in Figs. 1, 2, 3, 4 of the drawings, as an example of my invention, has the sides of the hollow portion of its body composed of two series of cast-iron rings, A A and B B, the head C composed of a single piece of cast-iron, and the base D of a solid plate, the whole connected and combined by means of a central screw-bolt, E, cast in the head C and screwing into the base D, or by any other suitable means. The several rings A A of the inner series have their interiors of circular form, that they may combine to form the central cylindrical cavity, F, which contains the charge of powder by which the rupture of the projectile is produced. The exteriors of the said rings are angularly corrugated in such manner as to give them the star shape shown in Figs. 2 and 3, and the sides of the said rings are made flat, that they may fit closely together, as shown at *a a* in Fig. 1. The several rings B B of the outer series have their exteriors of circular form and of such size that they combine to form the cylindrical portion of the exterior of the projectile, and their interiors are angularly corrugated, as shown in Figs. 2 and 4, to fit the

of the said rings B B has formed in it an annular concentric groove, *b*, and the other side has formed upon it an annular concentric tongue, *c*, and the head C and the base D have provided in them a similar tongue and groove, the said tongues and grooves fitting to each other, and serving, when the bolt E is screwed up tight, to keep the rings in proper relation to each other and to the head and base, and so preserving the proper form of the exterior of the projectile. Rings of thin sheet-lead or other soft metal may be applied between the several rings B B and between the said rings and the head C and base D, for the purpose of making water-tight joints, and thus preserving the charge in F in a dry state; or the joints may be made tight by the application of suitable cement between the rings.

The projectile represented in Fig. 5 is composed of three series of rings, A', B', and B<sup>2</sup>, the rings A' and B' being substantially like A and B, and the third ring, B<sup>2</sup>, being made with a circular exterior to fit the interior of A', and with an angularly-corrugated interior. The space within the rings B<sup>2</sup> constitutes the chamber for the charge of gunpowder by which the rupture of the projectile is to be produced.

Projectiles having their bodies constructed of rings, as herein described, may be charged in the usual manner through a suitable opening in the head or base, and the charge may be fired either by a time-fuse or percussion-fuse applied in any known or suitable manner. When the explosion of the charge takes place, the outward pressure upon the rings causes them to break in the angles *e e* of the several corrugations or notches, which are their weakest points, and where the contiguous surfaces of the inner and outer rings fit together with angular corrugations, the projecting portions of each entering the recesses or notches in the other, as in the case with A and B and with A' and B'. A wedge-like action takes place between the rings at many points simultaneously, and this also tends to break them in the angles, and hence every ring is almost certain to break in every one of its angles or notches *e e*, and the projectile is consequently burst into a number of pieces,

only limited by the number of rings and the number of notches or corrugations provided therein.

Having thus described my invention, I claim and desire to secure by Letters Patent—

Having the outer wall of the shell composed of a series of rings placed one upon the other,

and clamped together between the head and base plates, substantially as herein shown and described.

LOUIS D. GERARDIN.

Witnesses:

M. S. PARTRIDGE,  
M. M. LIVINGSTON.