2 Sheets—Sheet 1.

W. RICE.

Shell.

No 29,995

Patented Sept. 11, 1860

Fig. 1.

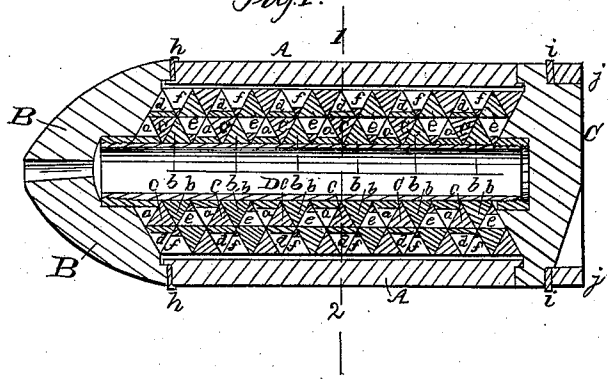


Fig. 3.

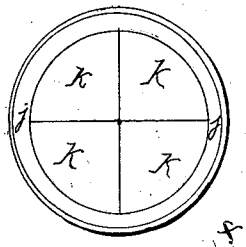


Fig. 2.

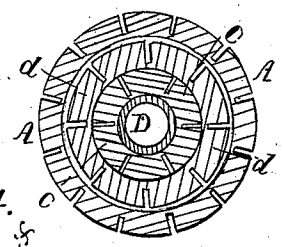
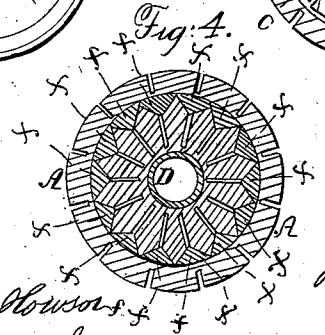


Fig. 4.



Witnesses
Henry Howson
Horace See,

W. W. Rice

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

W. RICE.

Shell.

No. 29,995

Patented Sept. 11, 1860

Fig. 1.

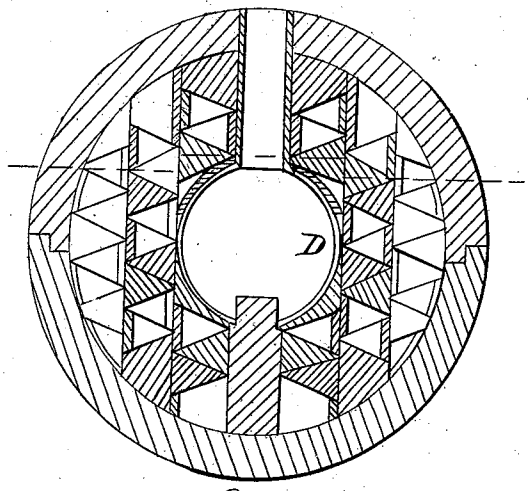
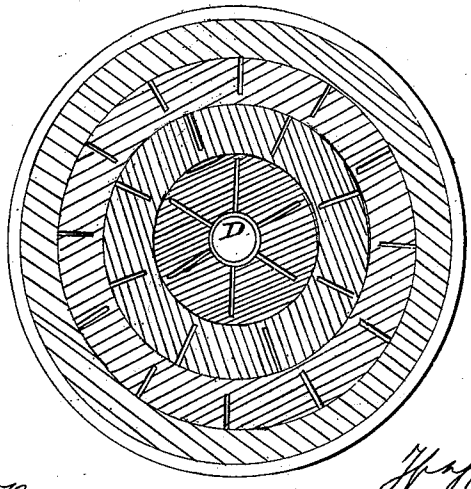


Fig. 2.



Witnesses { Henry Howson
Horace See.

W. Rice

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM RICE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN BOMB-SHELLS.

Specification forming part of Letters Patent No. **29,995**, dated September 11, 1860.

To all whom it may concern:

Be it known that I, WILLIAM RICE, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Bomb-Shells; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in charging an oblong or spherical shell with a system of partially-severed rings or strips of cast-iron, arranged within the shell round a chamber containing powder, and adapted to each other, substantially as set forth hereinafter, so as to form within the shell a compact mass of metal, which, the instant the explosion takes place, is shattered into a number of pieces, the latter being scattered with greater force and with more destructive effect than the detached pieces of metal with which shells are usually charged.

In order to enable others to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, in drawing No. 1, Figure 1 is a longitudinal section of an oblong shell, illustrating my improved mode of charging the same; Fig. 2, a transverse section on the line 1 2, Fig. 1; Fig. 3, a view of the rear end of the shell; Fig. 4, a transverse section, illustrating a modification of my improved shell. In drawing No. 2, Figs. 1 and 2 represent my improvement as applied to spherical shells.

Similar letters refer to similar parts throughout the several views.

On reference to drawing No. 1, A represents the outer casing, B the head, and C the butt, of my improved oblong shell. The outer casing, A, consists of a hollow cylinder of cast-iron, with a series of grooves cut longitudinally from end to end, and nearly through the entire thickness of metal, as seen in Fig. 2.

D is a metal tube screwed at one end into a recess of the butt C, and at the opposite end into a recess of the head B of the shell, thus serving the double purpose of confining both the butt and head to the cylinder A and of forming a chamber for the charge of powder. Onto the tube D are fitted a series of cast-iron rings, *a a* and *b b*, each ring being of the angular form represented in Fig. 1, and so arranged that there shall be an annular space between the rings *a* and *b*, for the reception of an intermediate ring, *c*, which is of the angular form necessary to fit into the said intervening space. It will thus be seen that the rings *a*, *b*, and *c* form, when fitted together and adapted to each other, a hollow cylinder surrounding the tube D, and confined between the head B and butt C of the shell. Another system of angular rings, *d d*, *e e*, *f f*, arranged in a manner precisely similar to those above described, are fitted together, and form a hollow cylinder surrounding the inner cylinder of rings, and confined between the head and butt of the shell. Each ring of both sets is cut nearly through its entire thickness at several points, as seen in Fig. 2.

The cylinder A has at each end an annular lip or projection, fitting one lip into the butt and the other lip into the head of the shell, so that both the cylinder butt and head may be retained in their proper relative position. Between the cylinder A and head of the shell intervenes a washer, *h*, of lead or other soft metal, the edge of the washer being bent down over the end of the cylinder for the purpose described hereinafter. A shoulder is formed on the end of the butt C for the reception of the lead washer *i* and the iron collar *j*, which fits snugly into the butt. On the face of the butt are cut four recesses, *k*, abrupt on one side and inclined gradually on the other side, as seen in Fig. 3.

The tube in the above-described shell having been filled with powder, and a fuse communicating with the latter having been inserted through an orifice of the head, the whole is inserted into a smooth-bored gun having the requisite charge of powder. On the explosion of the latter taking place the force applied to the iron collar *j* will cause the lead washer *i* to expand and fit tight against the gun, thereby preventing the escape of explosive gases. At the same time the concussion against the butt of the shell will, through the inclined recesses *k k*, impart to it a rotary motion, which will be continued as it passes through the bore of the gun and after it leaves the mouth of the latter. The washer *h*, with its turned-down edge bearing against the bore of the gun, prevents the head and cylinder from coming in

contact with and abrading or otherwise injuring the surface of the bore. When the charge of powder within the shell is exploded, an immediate disruption of the tube D and a simultaneous breaking up of the rings and outer cylinder, A, takes place, the rings being broken at the points where they are partially severed, the outer cylinder being shattered by the effect of the explosion, and the disconnected pieces of the rings and casing being scattered with great force in every direction, and having the desired destructive effect on every object within their reach.

As the entire shell is packed closely with rings fitting to each other, and as each ring may be partially severed at any number of points, it will be evident that the contents, when exploded, may be scattered in a large number of pieces, the explosion having greater effect, owing to the compactness of the contents of the shell, than in shells charged with detached pieces of metal.

The shell may be charged with partially-severed rings arranged in a manner differing from that above described. In Fig. 2, drawing No. 1, for instance, the space intervening between the tube D and the outer cylinder, A, is fitted with rings partially severed and having pointed projections, the angular spaces on the inside of the outer cylinder being fitted with longitudinal strips *x*, partially severed at intervals.

A system of partially-severed rings may be applied to spherical shells, as seen in Figs. 1 and 2, drawing No. 2, which will be readily understood without further reference.

In applying my invention to this class of shell the rings, with the chamber containing the charge of powder, may be arranged in a compact mass, covered on the outside with a coating of clay or other suitable material, so as to form a core, which is placed in the mold and the outer casing cast around it, all expensive fitting being thus avoided.

I claim as my invention and desire to secure by Letters Patent—

Charging a shell with a series of partially-severed metallic rings or strips, arranged substantially as and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. RICE.

Witnesses:
HENRY HOWSON,
CHARLES D. FREEMAN.