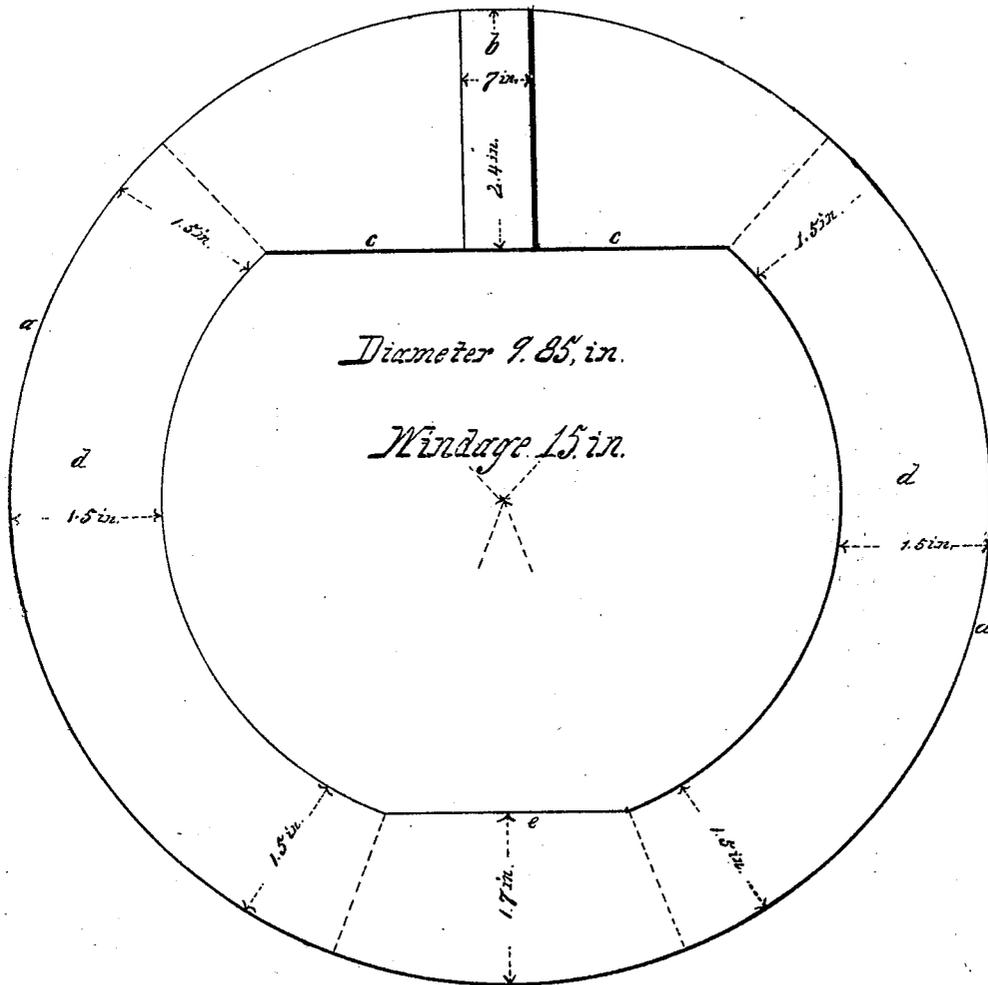


W. W. HUBBELL.

Shell.

No. 19,505.

Patented Mar. 2 1858.



WITNESSES—
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WM. W. HUBBELL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ECCENTRIC EXPLOSIVE SHELL.

Specification forming part of Letters Patent No. 19,505, dated March 2, 1858.

To all whom it may concern:

Be it known that I, WILLIAM W. HUBBELL, of the city of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Spherical Eccentric Explosive Shells; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part hereof.

The nature of my invention consists in my manner of arranging the metal of the shell so as to obtain the combined results of re-enforcing the maximum point of resistance to the action of the cartridge, making the shell light and yet very strong, maintaining in proportion to the strength and weight the largest amount of powder-space, diminishing the weight of the shell in proportion to its strength, diminishing thereby the strain on the gun in discharging the shell, and causing it to fly with a higher velocity than a heavier shell of the same strength, describe a less curvature in its flight, and be therefore more liable to strike and not overshoot an enemy's vessel in an action—in short, making the shell most effective in strength to resist the cartridge, in weight to fly most direct, in strength to penetrate an object, contain most powder, effect its most complete combustion, fracture with most uniformity, and explode, therefore, with most power, for the weight of metal used to form the shell, by combining a flat-based segment or bridge-piece in the center of the hindmost part, opposite the fuse-hole, with the flat-based segment uniformly around the fuse-hole, the sides or walls of the shell being thinner, and the entire external surface of the shell smooth and spherical in form, it being an improvement on my eccentric shell patented 22d January, 1856, and reissued 19th January, 1858.

In the accompanying figure, exhibiting a sectional view through the center of the shell, *a* is the smooth spherical external surface. *b* is the fuse-hole, surrounded uniformly by the flat-based segment or re-enforce *c c*. *d d* are the thinner walls or sides of the shell. *e* is the flat-based bridge-piece or re-enforce opposite the fuse re-enforce, being the maximum and strong point of resistance to the action of the cartridge.

The drawing, Figure 1, exhibits a ten-inch shell. The sizes for the other guns are as follows: For a thirty-two pounder gun, thickness of re-enforce in front through center of fuse-hole equals 1.65 inch; thickness of re-

force or bridge opposite center of fuse in hindmost part of shell equals 1.25 inch; thickness of the sides or walls of the shell equals 1.05 inch; diameter of the shell equals 6.25 inches; windage of the shell in the gun equals .15 inch. For an eight-inch gun as follows: Thickness of re-enforce in front through center of fuse-hole equals 2.1 inches; thickness of re-enforce or bridge opposite center of fuse in hindmost part of shell equals 1.5 inch; thickness of the sides or walls of the shell equals 1.3 inch; diameter of the shell equals 7.85 inches; windage of the shell in the gun equals .15 inch. For a nine-inch gun as follows: Thickness of re-enforce in front through center of fuse-hole equals 2.2 inches; thickness of re-enforce or bridge opposite center of fuse in hindmost part of shell equals 1.6 inch; thickness of the sides or walls of the shell equals 1.4 inch; diameter of the shell equals 8.85 inches; windage of the shell in the gun equals .15 inch. For an eleven-inch gun as follows: Thickness of re-enforce in front through center of fuse-hole equals 2.6 inches; thickness of re-enforce or bridge opposite center of fuse in hindmost part of shell equals 1.9 inch; thickness of the sides or walls of the shell equals 1.7 inch; diameter of the shell 10.85 inches; windage of the shell in the gun equals .15 inch. For a twelve-inch gun as follows: Thickness of re-enforce in front through center of fuse-hole equals 2.8 inches; thickness of re-enforce or bridge opposite center of fuse in hindmost part of shell equals 2.1 inches; thickness of the sides or walls of the shell equals 1.9 inch; diameter of the shell equals 11.85 inches; windage of the shell in the gun equals .15 inch. These proportions may be varied without changing the essential combination, in all cases preserving the flat-based segment or bridge-piece in the center of the hindmost part opposite the fuse-hole, combined with the segment uniformly around the fuse-hole, and the thinner walls or sides of the shell, with the entire external surface of the shell smooth and spherical in form.

What I claim is—

The combination of the flat-based segment or bridge-piece behind, the flat-based re-enforce around the fuse-hole, and the thinner sides or walls of the shell, with the external surface of the shell smooth and spherical, as described.

Witnesses: WM. W. HUBBELL,
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