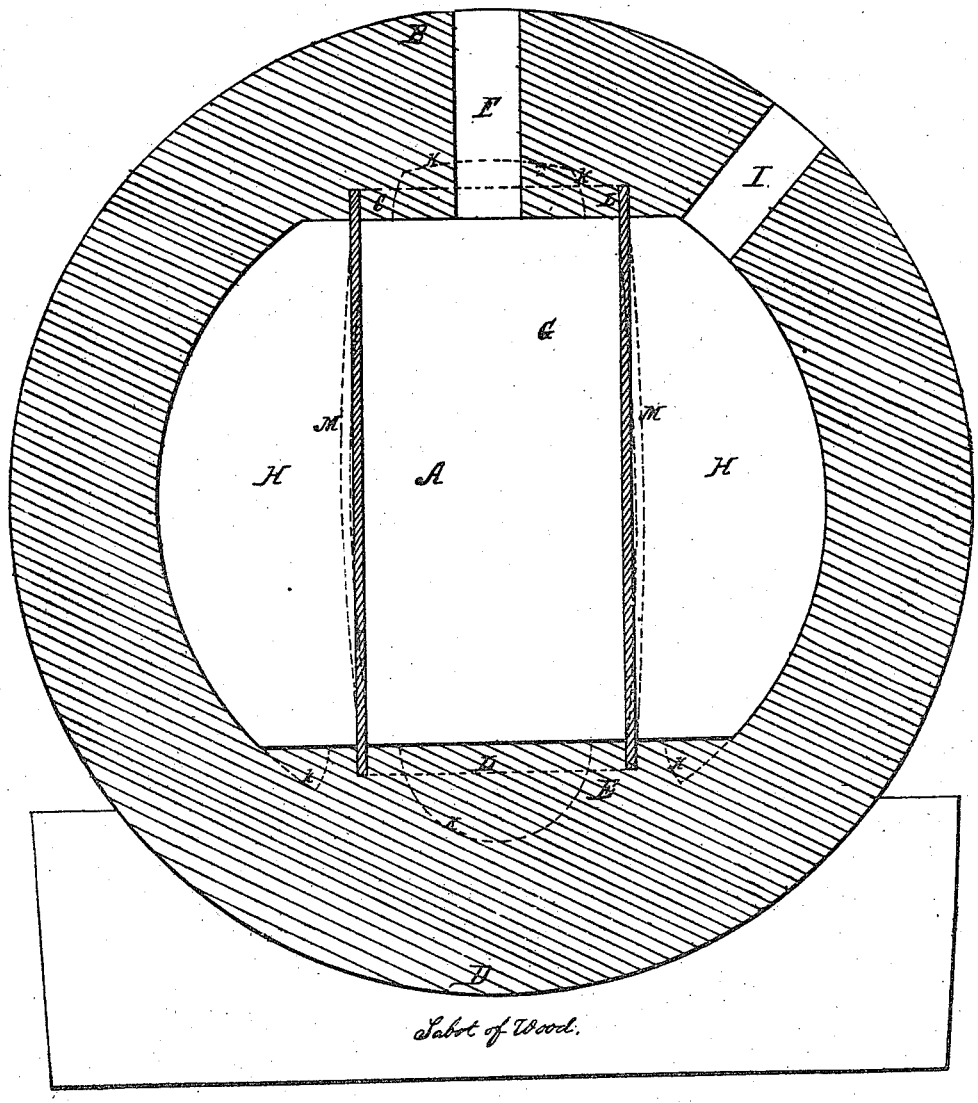
W. W. HUBBELL.

Shell.

No. 50,711. Patented Oct. 31, 1865.



Witnesses.

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WILLIAM WHEELER HUBBELL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN INCENDIARY SHELLS.

Specification forming part of Letters Patent No. **50,711**, dated October 31, 1865.

To all whom it may concern:

Be it known that I, WILLIAM WHEELER HUBBELL, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful improvement in fire-shells or bombs to discharge from heavy ordnance into the vessels or works of an enemy for the purpose of setting them on fire and forcing their evacuation; and I do hereby declare that the following is a full, clear, and exact description thereof, and that the drawings hereto annexed are sections through the center of the same, showing the internal structure of the shell and its filling, in which the improvement consists.

Figure 1 represents the shell without the filling, and Fig. 2 represents the shell with the filling.

Like letters indicate like parts in both figures.

I have heretofore, as early as 1840, invented a double-chambered shell of cast-iron, the specification of which will be found in the file of my patent of January 22, 1856, No. 14,133, in the Patent Office, and also in the Public Documents of the 35th Congress, Miscellaneous Document of the House of Representatives, No. 121; and I am aware that others since that time have proposed, and in some cases patented, double-chambered shells.

My improvement at present consists in casting the shell with an internal wrought-iron tube or chamber extending in the direction of the axis of the shell or gun, and joined at both ends with the cast-iron or outer shell by casting the metal for about three or four tenths of an inch both inside and outside of both ends of the tube, or on either side of the tube, so as to form two chambers, one inside of and surrounded by the other, the inner one cylindrical to contain the fire and suffocating composition, and separable so as to ignite and throw out its contents when the outer shell explodes with destructive force; and this tube also strengthens both the rear and front of the shell, so that it may be made thinner than otherwise at the sides without fracturing in the gun, and also of the same weight as explosive shells used by the same gun, so as to preserve uniformity of range with them in an action. This construction of my shell also is adapted to the use of any liquid or moist material for any purpose, either asphyxiating or otherwise, in explosive shells, though, such compounds having failed thus far in the navy in shells differently constructed, I have, in order to perfect and make my shell-casting useful, invented a compound or filling adapted to accomplish the result, and keep on sea-service.

The results attained by my invention are threefold: first, an explosive destructive effect; second, setting the enemies works on fire; third, throwing out suffocating fumes to drive the enemy out of their bomb-proof sand forts or other works.

The letters A A designate the wrought-metal tube or cylinder. Wrought-iron about a tenth of an inch thick may be used, though any other metal that will withstand the heat of casting the iron onto it may be used; but wrought-iron I recommend as the best metal for the central or inside tube or chamber.

B is the front part of the shell, and C is its re-enforce, securing the front end of the tube.

D is the rear part of the shell, and E is its re-enforce, securing the back part of the tube.

F is the opening out of which the sand is removed which is in the hollow of the tube when the shell is being cast onto it and fills its hollow G.

H is the hollow of the shell outside of the tube, and I is the hole out of which its core of sand is removed.

The segments or re-enforces C and E, to support the tube without inserting it in the regular thickness of and weakening the shell, may be flat-based, as shown in black lines in Figs. 1 and 2, or they may be curved, as shown by the red lines K of the drawings, Fig. 1. The cores of sand both inside and outside of the tube are molded with the tube in place between them, and its ends L L project out as far as intended to cast the metal of the shell around them. The tube, as shown in the black lines in Fig. 1, is a cylinder, and, as shown by the red lines in Fig. 1 and the black lines in Fig. 2, is enlarged toward the middle M M, for the double purpose of holding the cores of sand more firmly in casting and to allow the tube to yield in the cooling of the casting. Rifle or elongated shells can also be cast with this wrought-iron chamber or tube, secured in the same manner and for the same purposes.

This inner tube, being of wrought-iron, is an important advantage, for, although secured in the shell by casting the iron onto it, and with a sand core both inside and outside of it, the sand does not adhere in a scale to it, as is the case with cast-iron; and the filling, both inside and outside, although undergoing violent abrasion, owing to its inertia against the cylinder when the shell starts in the gun and flight, yet does not get overheated and create fire and premature explosion, as is the case with cast-iron, or the scale of sand which remains thereon, and has heretofore made incendiary shells impracticable.

The shell is charged or filled for service in the following manner: The hollow or chamber of the tube A (or inside of this tube) is filled with the burning and suffocating composition and the means of igniting them, all of which I will presently describe; and the outer hollow or chamber of the shell H H is filled with gunpowder to explode the outer or cast-iron part of the shell with destructive effect, and also ignite the inner composition. The reason of this arrangement of the filling of the shell is so that the explosive power may act direct on the walls of the outer shell without its fire or gas being impaired by the inner composition and without consuming the inner composition too soon; that the explosive power and effect shall drive an enemy from their guns, and the ends or segments B and D will become separated from the tube A by the fracture of the shell-casting, and release the inner composition of the tube, ignited by the fire of the exploding powder, which composition, by its igniting and suffocating effects will drive the enemy from their boom-proof shelters; and thus the shell is adapted to capture the modern boom-proof sand forts which resist shells merely explosive in effect. The fuse to explode the shell must, of course, be inserted in the hole I of the gunpowder-chamber, and the hole F of the composition-chamber may be either plugged up with a tight screw or fitted with a longer-timed fuse than that of the hole I, to insure a double chance of ignition and explosion.

The firing and suffocating composition of the tube A is made and adjusted in the inner chamber in the following manner, referring to Fig. 2: Take fat pine wood, or pitch-pine wood very full of pine-fat. This is split up into pieces about the length of the chamber and about a quarter of an inch square, roughly split and cut, so as to leave small splints for the fire to take hold of, N N. Wind around each of them a strand of quick-match, made in the usual manner of cotton yarn and meal-powder, leaving small spaces between the strands. Dip each one in melted sulphur, so that the sulphur shall adhere to both the quick-match and wood P P. Put as many of these splints N N thus prepared into the inner chamber as it will receive loosely, with their ends bearing on the bottom of the chamber at E, as shown, leaving a space or chamber for gunpowder, Q, in the middle. Then prepare and pour into and among the prepared splints a mixture of sixteen parts of sulphur, six parts of charcoal, and seventy parts of niter O O, well mixed, and afterward moisten them with alcohol, and press a punch or round-pointed stick into the aperture F down to form the chamber Q, and press the composition solid. Set the shell in a warm place to dry, and when thoroughly dry fill the central chamber, Q, with gunpowder, and close the opening F with a plug or fuse, as described. The explosion of the shell will fracture the connection between the inner and outer chambers and ignite the gunpowder in the chamber Q, which ignites the meal-powder of sulphur, niter, and charcoal, and ignites the quick-match, which fires and consumes the sulphur, with the fat pine wood, producing a powerful fire and suffocating fumes of sulphur. By inserting these splints in strips and sealing or cementing them, as specified, any violent abrasion is avoided when the shell starts in the gun, as each piece bears on its own end against the rear part of the inner chamber.

The fat pine may be dispensed with and quick-match dipped in melted sulphur be used to fill the chamber when the fumes of the sulphur more than the fire are desired, as has become necessary in bombarding bomb-proof sand forts. White pine saturated with petroleum may, if necessary, be substituted for fat pine.

What I claim is—

1. Casting the cast-iron of the shell onto a wrought-iron tube to form an inner and outer chamber separable when the explosion occurs, as and for the purpose described.

2. The composition or filling of wood, quick-match, sulphur, and meal or gunpowder in the inner chamber of wrought-iron, constructed and applied as described.

3. The firing-chamber of gunpowder *g*, surrounded by the burning composition for ignition as described.

4. The quick-match and sulphur prepared and used in the inner chamber, or in any equivalent manner, in the explosive shell, within a wrought-iron chamber, as described.

5. The combination of the exploding or gunpowder chamber H H with or around the firing-chamber of wrought-iron, constructed and secured as described, so as to combine the explosive destructive effect with the firing or suffocating effect in a practical manner, as set forth.

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Witnesses:
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