C. A. L. TOTTEN.

PYROTECHNIC SHELLS.

No. 187,570. Patented Feb. 20, 1877.

Fig. 1.

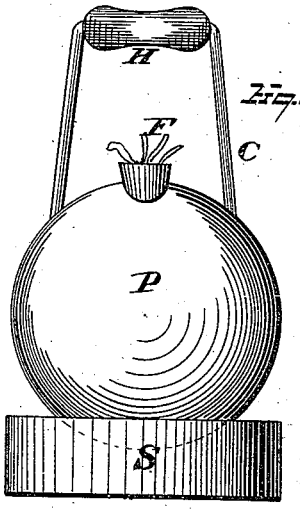


Fig. 2.

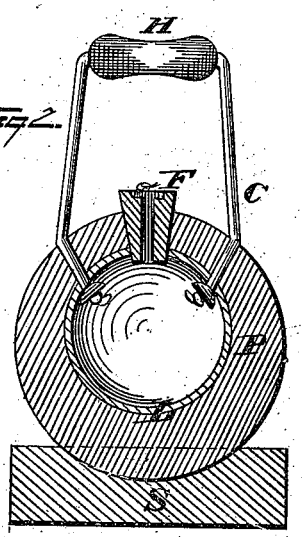


Fig. 5.

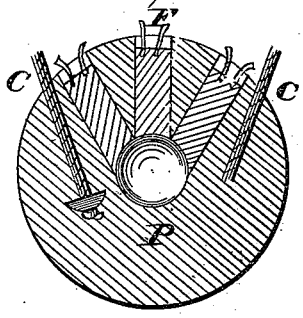


Fig. 3.

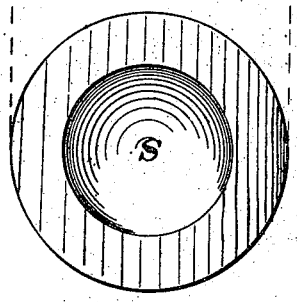
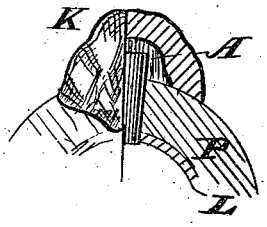
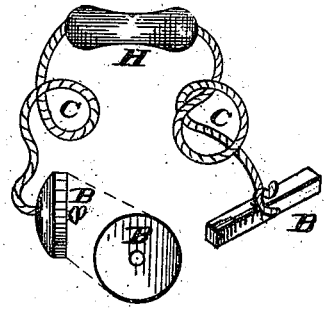


Fig. 4.





WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES A. L. TOTTEN, OF UNITED STATES ARMY.

IMPROVEMENT IN PYROTECHNIC SHELLS.

Specification forming part of Letters Patent No. **187,570**, dated February 20, 1877; application filed January 9, 1877.

To all whom it may concern:

Be it known that I, CHARLES A. L. TOTTEN, of the United States Army, have invented certain new and useful Improvements in Ornamental and Signal Fire-Works; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to fire-works; and consists in shells or cases made of plaster-of-paris, surrounding a core or interior case, and provided, where necessary, (as in the case of mortar-shells,) with sabots of the same or other suitable material, of a convenient handle, anchored by a new device, and facilitating transportation, and of a safety-cap, also of plaster, and covering the fuse until broken away for use.

The valuable features of this invention are, first, cheapness both of manufacture and material; second, the ease and rapidity with which the cases may be constructed, it requiring only some ten or fifteen minutes for the plaster to thoroughly set; third, in the much greater weight of the resulting shell, whereby the maximum range of the projectile is greatly increased; fourth, the strength and endurance of the case itself; fifth, the safety-cap, which may be used to protect the fuse until required for use, and then easily broken off.

In order to distinguish clearly between my way of forming a shell-case and the old one, it should be stated that to make a paper shell (the kind in use now) a former was covered with dry paper, and then lozenge-shaped pieces were pasted over it until two or three thicknesses had been put on. It was then laid aside to dry, usually requiring a day. The former was then taken out by cutting the case into halves, the empty halves replaced together, and the process of building up the sides of the hollow shell carried on by a long and tedious operation, extending over several days, it having to be stopped to allow the thicknesses of paper to dry.

The manufacture of cases constructed upon my principle, herein described, is similar to that of making any casting of plaster-of-paris. The mold may be most conveniently made of the same material, (plaster-of-paris,) and will be ready for use in a few minutes after setting. The surface of the mold should be smooth, and before use be coated with a film of oil or soap-suds, to prevent the casting from sticking. When ready to take the mold the plaster-of-paris is mixed with a sufficient quantity of water to give it the consistency of thick cream. It is carefully stirred to remove lumps, and then run into the molds. A short sinking-head is desirable to secure a sufficient quantity of plaster. After remaining in the mold some ten minutes, the shell may be removed to a room to dry off the surplus water, and the same mold again used.

The advantage most apparent is, that the shell is cast entire, and at one operation. The fuse-plug itself, and similar cases, may be molded of this material, and thus the manufacture be unique in the employment of a cheap and eminently suitable material for the shell and all its parts. Where simply long range is required for signal purposes, the shell may be cast solid, and provided with one or more bores to receive a colored composition and a bursting-charge.

When a sabot is required it may be most conveniently made of plaster-of-paris, and joined to the shell by filling the dish of the sabot with soft plaster-of-paris, setting the shell in it, and allowing the paste to bind the two together; or shell and sabot may be cast as one.

Referring to the drawings, Figure 1 is a general view of the shell, fuse, handle, and sabot. Fig. 2 shows a cross-section of the same through the center of the cavity. Fig. 3 is a top view of the sabot, and shows its dish. Fig. 4 shows the handle and its anchoring attachment; Fig. 5, a sectional and outside view of the plaster safety-cap and fuse. Fig. 6 is a cross-section of a plaster shell made almost solid, the three bores being filled with a bright signal color, and the small cavity with a bursting-charge.

The letters correspond in the drawings, and are to be interpreted as follows: P represents the plaster shell; F, the fuse; H, the handle; C, a piece of strong cord, rope, or wire; B, the buttons or stops; S, the sabot; L, the interior case; K, the safety-cap; A, a cover of paper

over the fuse to protect it while the plaster cap is setting.

The interior cavity may be formed by molding the plaster around a case of tin, lead, paper, &c., or, as in iron castings, by using a core of clay and sand. I designate shells made in this way by the name of "college cases," after the Massachusetts Agricultural College, where I invented and have used them.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. College cases made of plaster-of-paris, surrounding an interior case or core, substantially as and for the purposes within described.

2. The handle, anchored as herein described.

3. The safety-cap, of paper and plaster, to protect the fuse until required for use, as herein described.

4. The plaster sabot, and its method of attachment to the shell, as herein described.

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Witnesses:

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