H. H. COSTON.
Signal Cartridge.

No. 197,339. Patented Nov. 20, 1877.

Fig 1.

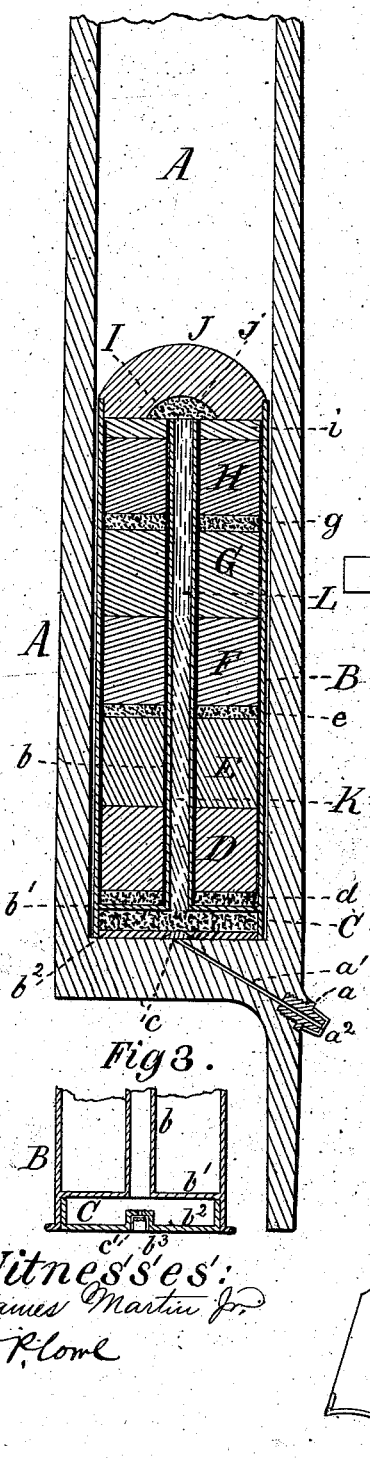


Fig 3.

Fig 6.

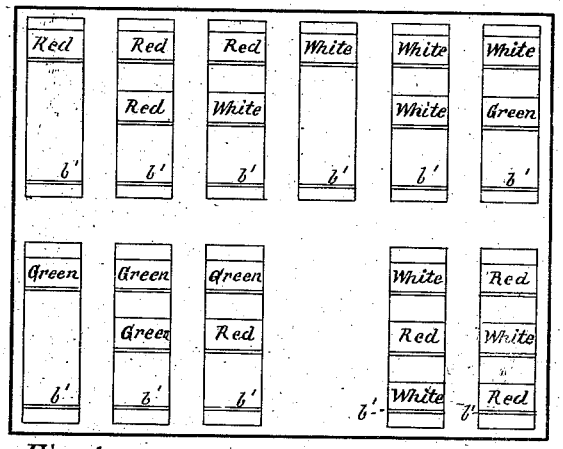


Fig 4.

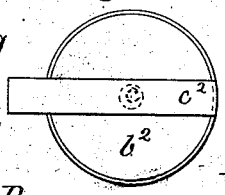


Fig 5.

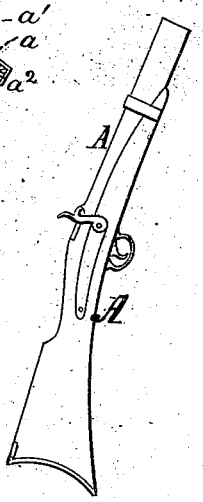
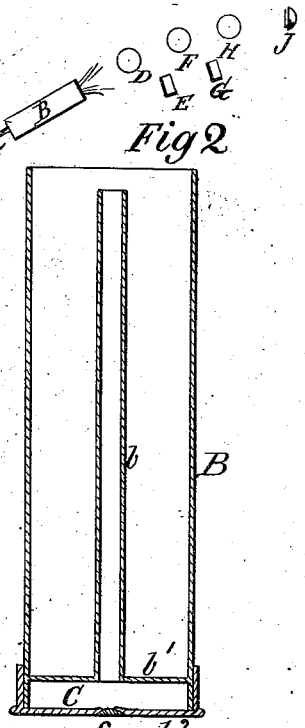


Fig 2.



Witnesses:
James Martin Jr.
D. R. Lowe

Inventor:
Henry H. Coston
by
Mason, Fenwick & Lawrence
attys.

UNITED STATES PATENT OFFICE.

HENRY H. COSTON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO MARTHA J. COSTON, OF SAME PLACE.

IMPROVEMENT IN SIGNAL-CARTRIDGES.

Specification forming part of Letters Patent No. **197,339**, dated November 20, 1877; application filed September 10, 1877.

To all whom it may concern:

Be it known that I, HENRY H. COSTON, of the city and county of Washington, and District of Columbia, have invented new and useful Aerial Signals, or Cartridges, or Shells, adapted to be projected from guns or other fire-arms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal central section of a gun-barrel as it appears when loaded with one of my signals, or shells, or cartridges. Fig. 2 is a section of the shell or cartridge as it appears before it is loaded or filled, showing, also, a modified construction of the bottom, adapting it for breech-loading fire-arms. Fig. 3 is a central section of the lower part of said shell, showing another modification of a bottom and a modification of the firing device. Fig. 4 is a bottom view of one of my signal-cartridges. Fig. 5 is an illustration of the operation of my invention. Fig. 6 is a chart of one of the signal-codes made for the use of my signals.

My invention relates to an improvement on the stationary "Coston telegraphic night-signals," as now used in the United States and French naval service.

The nature of my invention consists, first, in a signal which shows colors while burning in the air, according to a given code, applied within a case which is adapted for being placed in a gun or other fire-arm, and for having its contents ignited by the spark or fire of the gun-cap or concussion produced by a firing-pin upon a cap or priming, and when thus ignited has its signal composition projected into the air and set on fire by powder within the case.

It consists, second, in a signal which shows one or more colors while burning in the air, constructed within a case which is adapted for being placed in a gun or other fire-arm, and for having its contents ignited by the direct fire of an exploded cap or primer on the gun-nipple, or on the end of the signal-case, and when thus ignited is, with the case, projected into the air, and while in the air has its burning signaling composition discharged from the case, so as to signal according to a given code.

It consists, third, in a pyrotechnic signal shell or case, which is constructed to contain the signaling composition and protect it from injury, and which shell is adapted for use either in a muzzle-loading or a breech-loading fire-arm.

It consists, fourth, in a pyrotechnic signal-shell having its propelling-charge of powder capable of ignition from the ordinary percussion-cap, or firing-pin, or priming of a fire-arm, which charge, when ignited, sets on fire the signaling composition.

It consists, fifth, in a signal shell or case with a capped or otherwise primed main propelling-charge, and a fuse or quick-match, or similar connection for communicating the fire, in proper time, to other charges, for igniting and propelling the signaling composition.

It consists, sixth, in a shell, as hereinafter described, properly constructed to keep the said charges and their communicating composition in place.

It consists, seventh, in arranging the said charges for propelling and igniting the signaling composition, and the blocks of the said signaling composition, with movable partitions of incombustible material, whereby the several blocks or charges of signaling composition are ignited successively, and are kept properly apart when ignited, and thus are prevented from blending.

It consists, eighth, in a shell provided with diaphragm for separating the powder-charges, said diaphragm being sufficiently strong to sustain the shocks of the explosion on both sides.

It consists, ninth, in a shell containing the signaling composition, and an explosion-chamber for its propelling-powder.

By my invention I am enabled to protect the signaling composition and the igniting-fuse and propelling and expelling charges from injury at all times, and am also enabled to fire the signals either from a muzzle-loading or a breech-loading fire-arm, in any direction, and to any desired altitude.

In the drawings, A represents a gun, having a barrel with a diameter of bore adapted for the size of the signals, and an ordinary lock, hammer, nipple *a*, and vent *a*^{1}. B is the case of a signaling cartridge or shell, preferably made of metal, and of cylindrical shape. It

has a central tube, *b*, and near the bottom a diaphragm, b^1. The bottom b^2 of the cartridge may be made of pasteboard when in the form represented in Fig. 1, or of tin or other suitable metal, when made in forms as in Figs. 2 and 3 of the drawings. The chamber C, formed between the diaphragm b^1 and the bottom b^2, is filled with powder, and the center of the bottom b^2 provided either with fulminate *c*, as shown in Figs. 1 and 2, or with a gun-cap, c^1, placed in a receptacle, b^3, formed in the bottom b^2, as in Fig. 3, for the purpose of igniting the powder. In the first two cases the fulminate is ignited by the firing of the cap a^2. The third, as in Fig. 3, is especially adapted for the use of breech-loading guns with central firing-pins. I intend, in practice, to adopt any mode suitable for igniting the powder in the chamber C.

The bottom b^2 (shown in Fig. 2) is made the shape and size of an ordinary cartridge-bottom for a breech-loader, and is slipped over the lower end of the case B, and thus serves to centrally steady the case in the explosion-chamber of the gun. The fulminate *c* is protected, during transportation of the shell, by a strip of water-repellent fabric or paper, c^2, which is torn off before the signals are to be used. Above the diaphragm b^1 another charge of gunpowder, *d*, is placed. Above the powder *d*, I place a block of composition, D, for a green light. Above the green light a block, E, of light incombustible material is placed, and above this a charge of gunpowder, *e*; then a block, F, of white-light composition; then a block of incombustible material, G; then a charge of gunpowder, *g*; then a block, H, of red-light composition; then a loose diaphragm, *i*, of incombustible matter; then a charge of fulminate, or gun or rifle powder, I; and, lastly, a protecting-cap, J, of wood or other suitable material, which is partly fitted into the case B, and is provided with a chamber, *j*, for the powder-charge I.

The diaphragm b^1 and the tube *b* are formed of one piece, or of two or more pieces very carefully united, so as to afford no leakage to the fire of the exploding powder below, or of the burning fuse in the tube *b*. The tube terminates at the top of the diaphragm *i*, and it is, part of its length, charged with fuse composition K, while the remaining upper part contains a quick-match, L.

The described charges of the case B are loosely fitted in place around the tube *b*, so that an igniting-channel for the passage of the burning powder between the tube and the blocks is formed, and so that they may easily leave the case when exploded.

The colors or colored compositions D F H are arranged according to a code for signaling between different parties, and I have shown in Fig. 6 a chart of a code for this purpose. In this chart the colored compositions are named, and the blank spaces between them and above the diaphragm b^1 signify incombustible compositions for separating the signaling compositions, while the double lines signify rifle-powder charges. Fig. 5 is intended to illustrate the operation when the shell containing the signaling composition is fired bodily from the fire-arm. In this figure, A represents a gun from which the case B is discharged, which case itself is represented discharging at a proper elevation, first the cap J, and then the lights H F D, and the incombustible blocks F G between them.

The special mode of signaling illustrated in Fig. 5 possesses great advantages over the stationary signals, because the point signaled from cannot be discovered by the enemy.

Operation: The tape c^2 is removed from the bottom of the shell B, and the gun A charged with the shell. A percussion-cap, a^2, is then exploded on the nipple *a* of the gun, the fire of which cap ignites the fulminate *c* in the bottom b^2 of the case B. This causes the powder in the chamber C to explode and force the case or shell B out of the gun and up into the air, leaving the bottom b^2 behind. The said explosion ignites also the fuse K, which assists the signal-shell in ascending to the proper height, and then ignites the quick-match L. The quick-match L ignites the powder-charge I, which explodes and throws off the cap J, and ignites the other powder-charges *g e d* by passing between the outside of the tube *b* and the inside of the composition blocks, and thus the signal-composition blocks H F D are ignited, and which, having been expelled from the case at a great elevation, are clearly seen at a great distance.

The material used for the case B, tube *b*, diaphragm b^1, and other parts of the cartridge may be any suitable metal, alloy, or composition. The ignition of the powder-charge in the chamber C may be effected by any other suitable devices than the percussion-cap and firing-pin.

The incombustible blocks E G, whereby the signal-lights are kept at proper distances apart, may be made of clay or any suitable composition, and of any proper thickness.

I have described signals constructed in shells or cases, which are projected into the air with the signals therein, and the signals afterward expelled therefrom. I, however, do not confine my invention to such signal-shells, as the construction of a capped or primed shell with signals in it was not known prior to the invention thereof by myself, as I believe.

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

1. An aerial pyrotechnic signal applied in a case having a priming or cap, which is ignited by the aid of the gun within which it is placed, and is elevated into the air by the explosion of gunpowder contained within the signal-case, and which, when in the air and burning outside of its case, serves for signaling according to a given adopted code, substantially as described.

2. A pyrotechnic signal which shows one or more colors while burning in the air, applied

within a case which is adapted for being placed in a gun or other fire-arm, and for having its contents ignited by the direct fire of an exploded cap or primer on the gun-nipple, or on the end of the signal-case, and when thus ignited is, with the case, projected into the air, and, while in the air, has its burning signaling composition discharged from the case, so as to signal according to a given code, substantially as set forth.

3. A pyrotechnic signal shell or case having a percussion cap or priming on its bottom, and containing signaling composition or compositions, and made of metal or other material impervious to water, said signal-shell being made either with or without a flange, and adapted for use either in a muzzle-loading or a breech-loading fire-arm, and is expelled, either in part or whole, from the fire-arm when its charge of gunpowder is ignited, substantially as described.

4. A pyrotechnic signal-shell having its propelling-charge of powder capable of ignition from the ordinary percussion-cap or firing-pin of a fire-arm, which charge, when ignited, expels the case, either in whole or in part, and sets on fire the signaling composition, substantially as described.

5. A primed or percussion-capped shell having a charge of gunpowder for its own propulsion, a fire communicating and propelling fuse, a quick-match, and a set of gunpowder-charges for the propulsion and ignition of a set of signal-lights, substantially as and for the purpose set forth.

6. The shell or case B, having the removable bottom b^2, the diaphragm b^1, the tube b, and the cap J, substantially as set forth.

7. In a projectile-case, B, and forward of a rigid diaphragm, b^1, the signaling compositions D F H, the intermediate incombustible partitions E G *i*, and the gunpowder-charges *d e g* I, arranged substantially as and for the purpose set forth.

8. In the signal-carrying projectile-case B, the diaphragm b^1, whereby the gunpowder-charge for propelling the projectile in the air and the gunpowder charge or charges for propelling the signals into the air are kept separate from each other while not ignited, substantially as set forth.

9. A signal or signal compositions placed in a capped or primed case above a charge of powder, and kept apart from said charge of powder by means of a transverse separating device integral with the case, substantially as described.

Witness my hand, in the matter of my application for a patent for aerial signals, or cartridges, or shells projected from guns or other fire-arms, this 4th day of August, A. D. 1877.

H. H. COSTON.

Witnesses:

CLARENCE PETERS,

CHAS. BENNER.