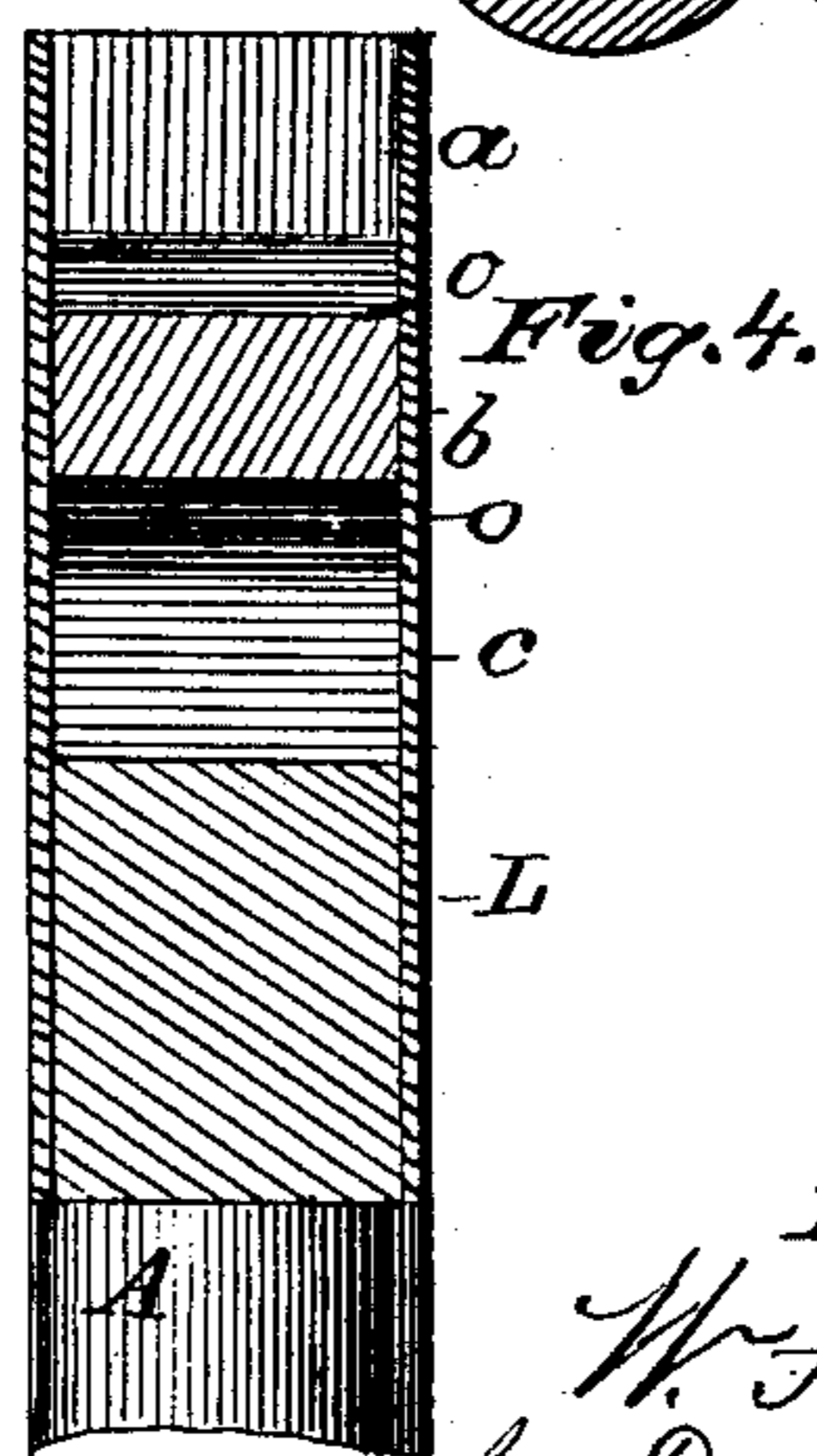
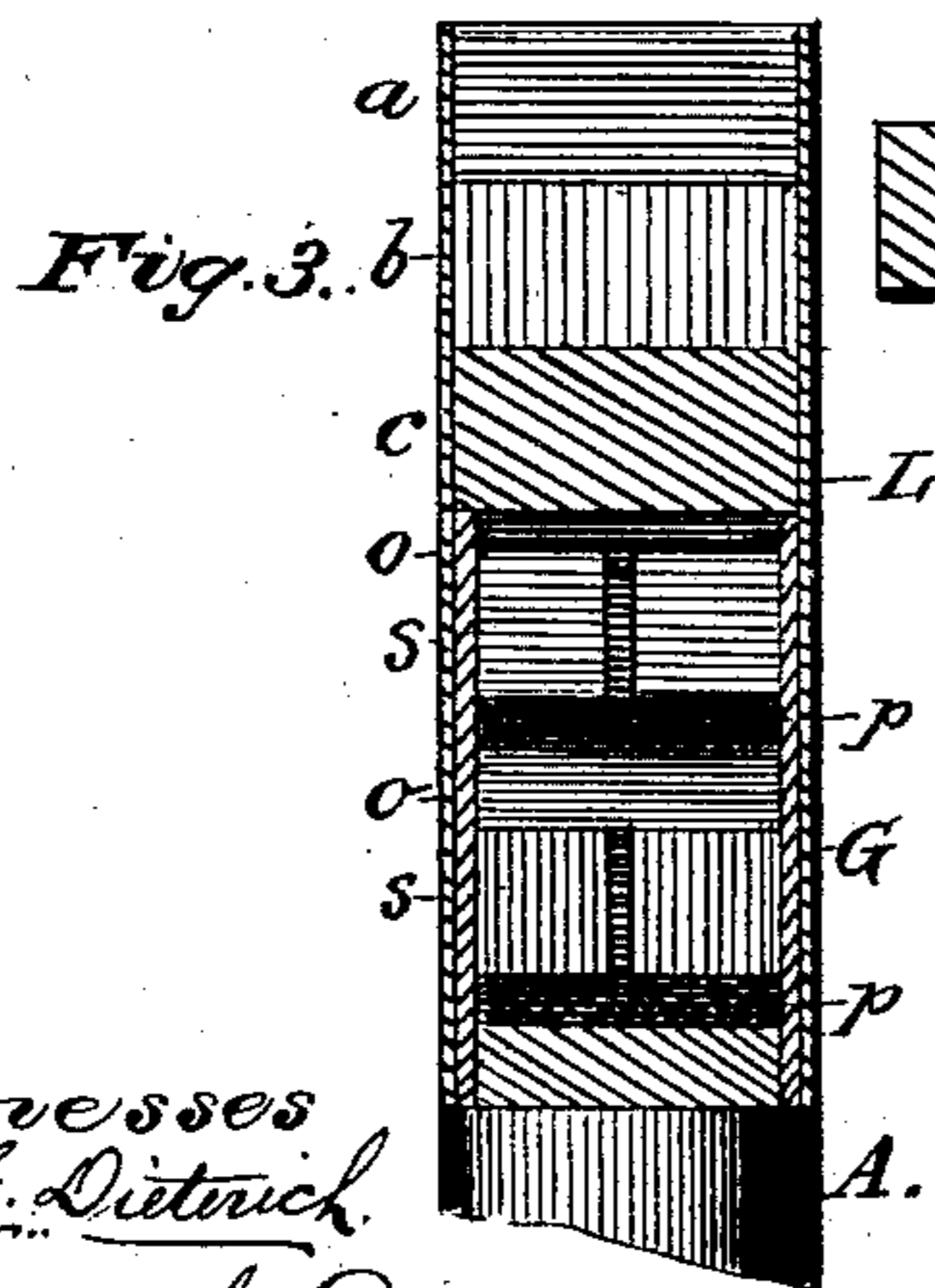
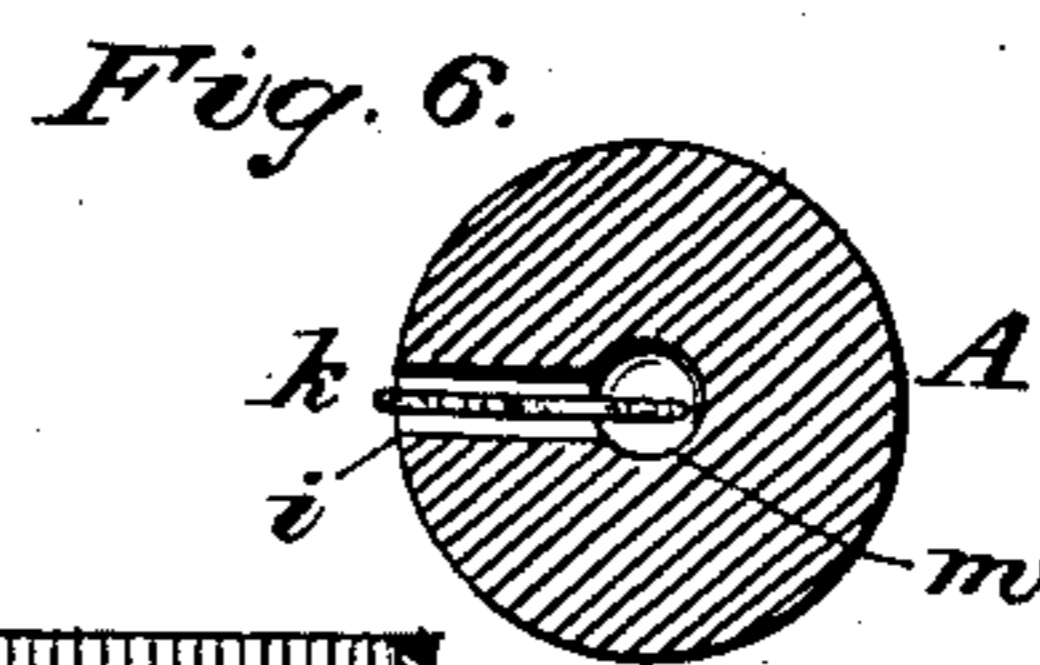
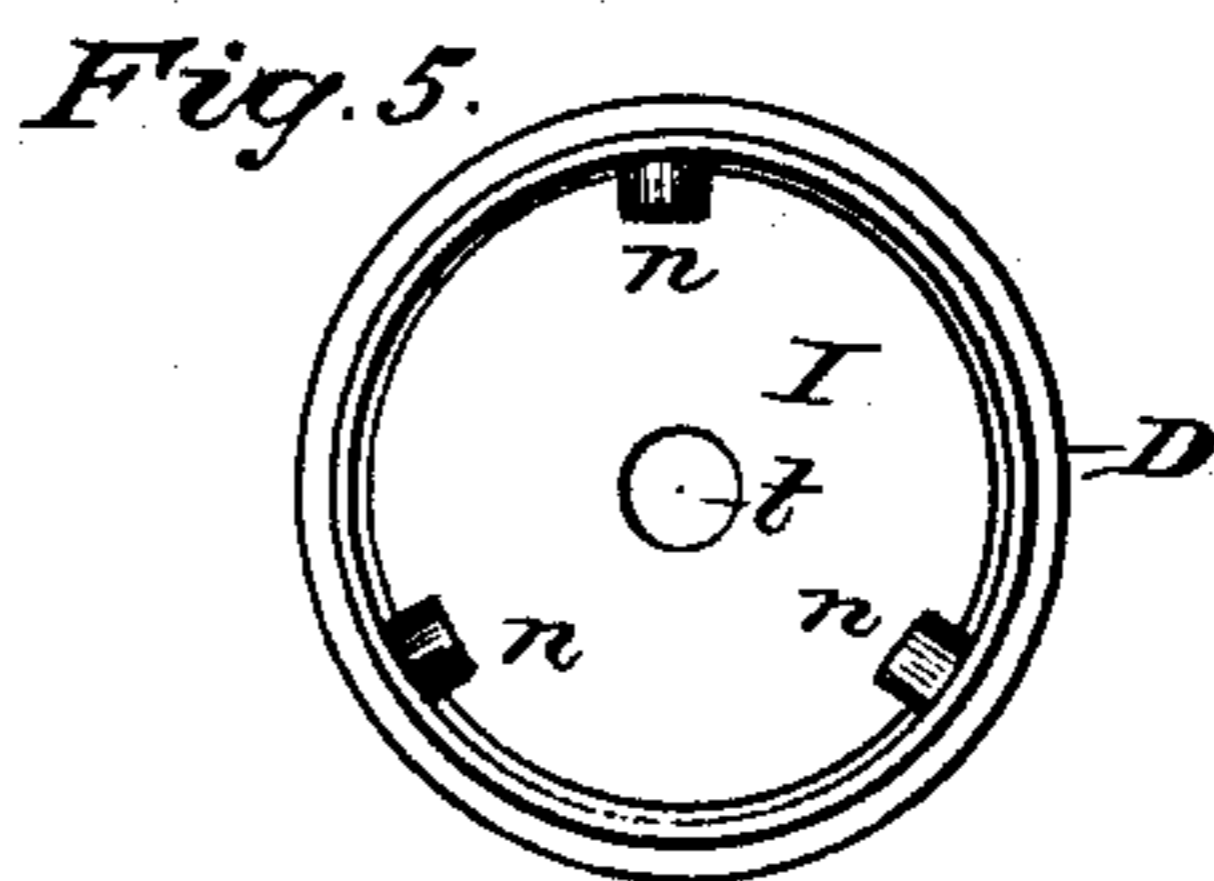
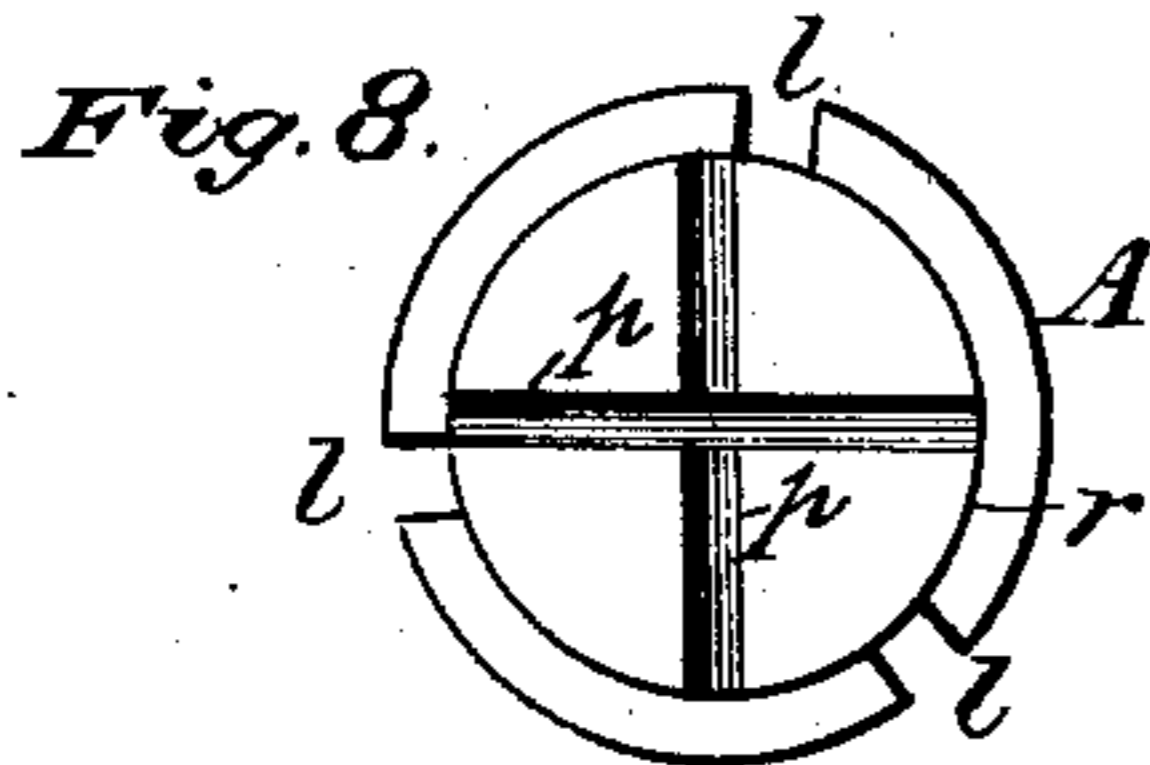
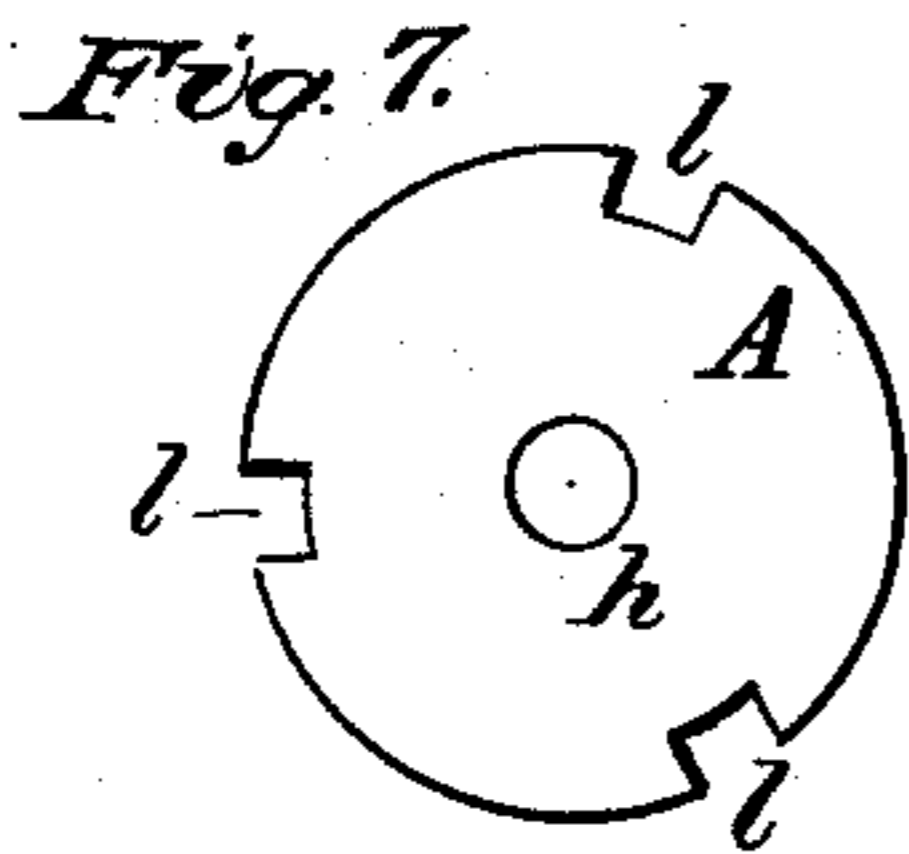
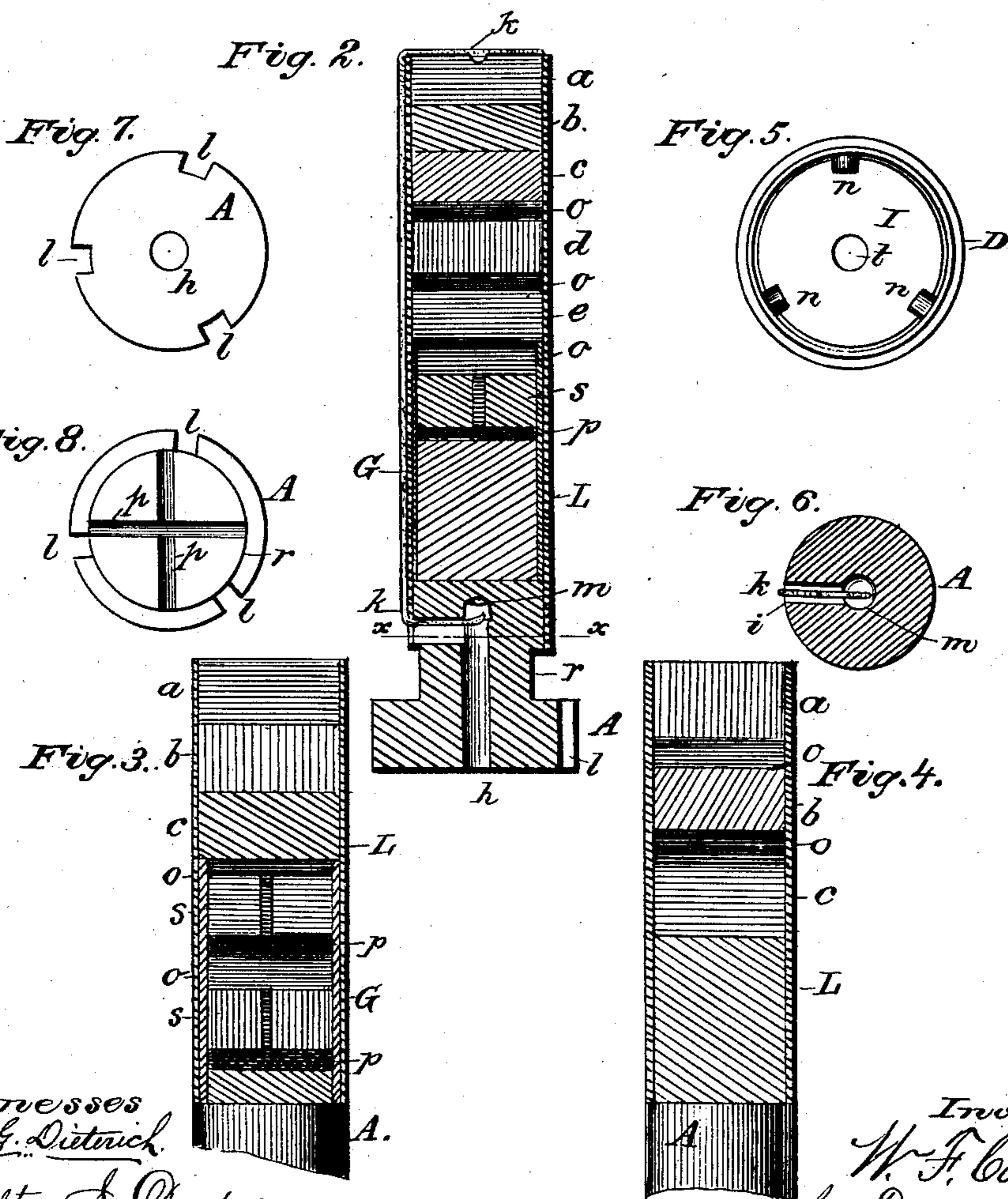
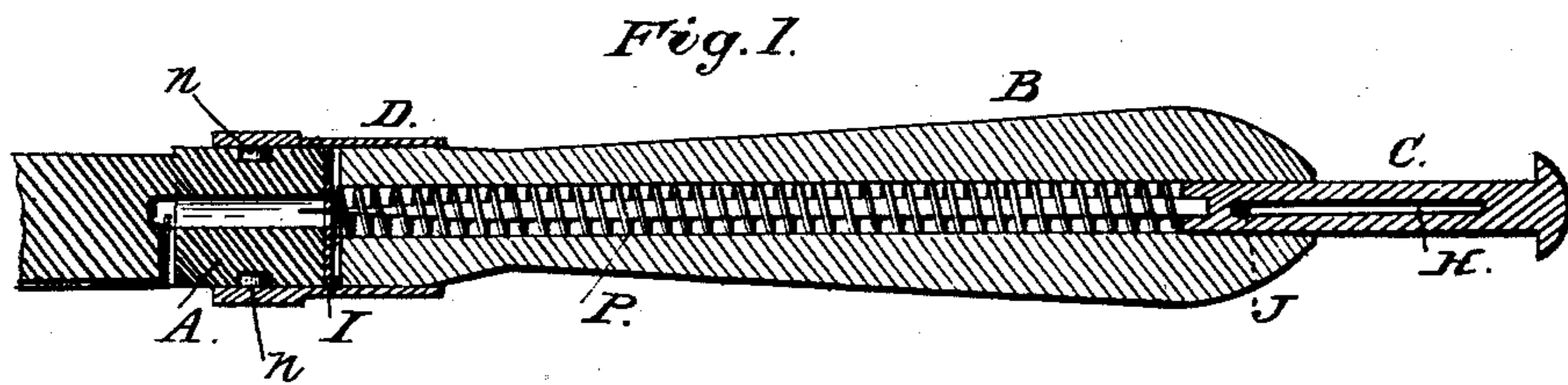


(Model.)

W. F. COSTON.
Pyrotechnic Signal.

No. 237,092.

Patented Feb. 1, 1881.



Witnesses
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UNITED STATES PATENT OFFICE.

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PYROTECHNIC SIGNAL.

SPECIFICATION forming part of Letters Patent No. 237,092, dated February 1, 1881.

Application filed November 4, 1880. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM F. COSTON, of New York, in the county of New York and State of New York, have invented certain Improvements in Pyrotechnic Signals and Holders, of which the following is a specification.

My invention relates to pyrotechnic signals; and the invention consists in the combination of one or more colored lights arranged to be exhibited or burned on the vessel's deck or from the ground with one or more colored stars to be shot up into the air and burned while aloft.

It further consists in a novel construction of base-block for the signal, and in a new style of holder and striker for holding and igniting the same, and in a novel arrangement for the fuse, all as hereinafter more fully described.

Figure 1 is a longitudinal section of the holder and striker with a section of a signal attached. Fig. 2 is a longitudinal central section of a signal made on my plan; and Figs. 3 and 4 are similar views, showing the colored lights differently arranged. Fig. 5 is a front end view of the holder. Fig. 6 is a transverse section of the base-block on the line *x x* of Fig. 2. Fig. 7 is a bottom-plan view of the base-block; and Fig. 8 is a top-plan view of the signal, showing the grooves for reception of the end of the fuse.

The object of this invention is to produce signals adapted to distinguish any particular vessel or line of steamers, and which, while exhibiting the special arrangement of colored lights which may be adopted by any line of steamers from the deck of the vessel, shall also exhibit an aerial signal peculiar to that particular vessel or line of steamers, so that it may be seen on the opposite of a high headland or other intervening object.

Fig. 2 represents a signal made on this plan, *a, b,* and *c* indicating material for producing in succession lights of different colors, and next below them is a non-luminous fuse, *o*, which produces an interval of time without any signal, then another colored light, *d*, then another interval-fuse *o*, another colored light, *e*, then another interval-fuse *o*, which extends at the center down to a layer of powder, *p*, above which latter is placed the aerial signal

or colored star *s*, which latter is surrounded by a case, *G*, attached to the base-block *A*, and is of sufficient length to confine the gases produced by the burning of the powder, so as to throw the star *s* up into the air.

In Fig. 3 there is shown the same arrangement of the successive colored lights *a, b,* and *c*, with two of the aerial signals or stars *s*, each having a charge of powder, *p*, arranged below it for throwing them up into the air, as before described, there being an interval-fuse, *o*, located between the first three lights and the first star *s*, and another below the first charge of powder, so as to cause an interval or brief space of time to elapse after the first three lights have been displayed before the first star or aerial signal is shot up, and then another interval before the second star or aerial signal is sent up.

In Fig. 4 there are represented three colored lights, *a, b,* and *c*, with two non-luminous fuses *o o* located between the lights, so that there shall be a brief interval of time after one light has been displayed before the succeeding one is shown, the object of these intervals being to enable the different lights of which the signal may be composed to be more distinctly seen and distinguished each from the other. The non-luminous fuse *o* is made of a composition which burns slowly and with little or no light, its object being not only to conduct the fire from one colored composition or light to another, but more especially to produce by its slow combustion a decided interval of time between the colored lights, and to do this without producing any light that would be likely to obscure or in any manner interfere with the exhibition or recognition of the different colored lights used in the signal. Such compositions, being well known to those skilled in the art, need not be specifically described, especially as different materials may be used to form them. The layers of these interval-fuses will be made of the thickness required in order to burn a given number of seconds, and thus the intervals may be varied at will, they being, for instance, five, ten, or fifteen seconds in duration. By thus separating the colored lights from each other by the intervention of the non-luminous interval-fuse or composition, the col-

ored lights are rendered much more clear and distinct, as the lapse of time between the colors permits the impression made by one color upon the eye to pass away before the next color is presented to the eye, thereby greatly assisting in the correct reading of the signals and the prevention of mistakes.

In making the signals the colored lights may be arranged in any desired order, and there may be any desired number of them; and so, too, they may be arranged to operate in immediate succession, or at intervals, or partly in succession and partly at intervals, as may be desired, and so, too, of the aerial signals or stars. By this plan signals may be made to designate any particular line of steamers or vessels, and also any particular vessel of the line, if desired. For instance: Suppose the line to use as their distinctive mark a flag composed of the colors red, white, and blue, with a red star. The signal for such line would be made so as to show either successively or at intervals the colored lights red, white, and blue, and then a red star to be shot up into the air. It is not necessary to use the identical colors used in the flag, as other colors may be agreed upon; but it is very desirable to do so, because those colors will be more readily recognized as the distinguishing mark of that particular line of vessels. If, now, it be desired to go further and designate each separate vessel of the line, it may readily be done by agreeing beforehand upon some special mark for each vessel—such, for instance, as a particular color to be burned at an interval after the completion of the regular signal designating the line; or, by numbering the vessels one, two, three, &c., the signals may be prepared for each vessel with a corresponding number to be exhibited after the signal designating the line. This designation of the separate vessels of the same line is not, however, often required.

Heretofore it has been customary, in cases where a highland intervenes between the vessel and the port, to have a lookout stationed on the highland, to whom signals were displayed from the deck of the vessel, and who, in turn, repeated the signal for the port, thus requiring two sets of signals and double time. By the use of my improved signal I obviate this difficulty, as in such case the signal may be made with the distinguishing colors of the particular line entirely aerial; or they may be made double, the first to show from the deck, and then the second set, being a duplicate of the first, being aerial, the aerial signals in either case showing above the highland, and at once announcing at the port what line the vessel belongs to.

In constructing these signals I make a base-block, A, of wood or similar cheap material, as shown in Fig. 2, to which the case L, of paper or similar material, is secured after it has been filled with the various compositions, the aerial signal being inclosed in a separate case, G, which is inserted into the case L before the

latter is secured to the base-block. In the center of the base-block a longitudinal hole, *h*, is bored to receive a percussion-cap, *m*, which is placed therein with its mouth outward, as represented in Fig. 2. Another hole, *i*, is bored from one side of the block inward until it intersects the hole *h* just below the point where the cap *m* rests, as represented in Fig. 2. A piece of fuse or quick-match, *k*, has one end inserted into the hole *i*, and is secured in close proximity to the cap *m*, so as to be ignited thereby, from whence it extends upward along-side of the signal, and has its upper end secured in a transverse groove, *p*, made for that purpose across the top of the signal, as shown in Fig. 2.

In pressing the composition to form the signal I use a die having projections on its face so arranged as to form a series of these grooves, *p*, two or more in number, and crossing each other on the end of the signal, as shown in Fig. 8, so that when the composition is secured to the base-block A some one of these grooves will be in the proper position to receive the end of the quick-match *k*. By this means much time and trouble is saved.

In order to secure the signal to its holder, I make a circumferential groove, *r*, near the lower end of the block A, as shown in Fig. 2, or, what is the same in effect, make the block with a projecting radial flange at its lower end. In either case there are three vertical grooves, *l*, which extend from the bottom of the block up to the groove *r*, or through the radial flange, as shown in Figs. 7 and 8.

The holder and striker consists of a handle, B, which may be of wood, with a short metal tube secured to and projecting a short distance from one end, as shown in Fig. 1. Three studs, *n*, project inward a short distance from the sides of this tube D, as shown more clearly in Fig. 5, and below them, within the tube, is located a plate, I, as shown in Figs. 1 and 5, which rests upon the end of a spiral spring, P, as shown in Fig. 1. The striker C consists of a metallic rod inserted in a hole extending longitudinally through the handle B, its front end being pointed or made small enough to enter the cap *m*, while its rear end is provided with a button or knob for striking it with the hand. It is held in place by a pin, J, which passes transversely through the handle and through a slot in the striker C, this slot being of the proper length to permit the striker to move far enough to hit the cap *m* in the base-block A. The spiral spring P at its rear end bears against a shoulder on the striker C, thus keeping the striker pressed back when at rest. In this case I have shown the spring P as operating both on the striker C and on the plate I, the last coil of the spring, where it bears against the plate I, being made much larger in diameter, to prevent the plate from tipping sidewise. If preferred, separate springs may be used; but it is simpler and cheaper to make the one spring answer both purposes. This

holder and striker is simple, cheap, and very efficient.

It will be understood that by the term "colored light" is meant a light which presents a positive color other than and different from the light which is produced by the burning of the mealed powder, niter, &c., ordinarily used in Roman candles and similar pyrotechnics.

Having thus described my invention, what I claim is—

1. A pyrotechnic signal having one or more colored lights arranged to burn and be exhibited from the hand or at the surface, with one or more aerial signal-lights arranged to be thrown into the air and exhibited while aloft.

2. A pyrotechnic signal containing two or more signal-lights, with one or more intervening composition non-luminous fuses, substantially as and for the purpose set forth.

3. A pyrotechnic signal having its base-block A provided with a radially-projecting flange with longitudinal grooves *l*, or equivalent means for securing it to the spring holder and striker, substantially as shown and described.

4. As an improvement in pyrotechnic sig-

nals, the base-block A, provided with the transverse hole *i*, with the central longitudinal hole, *h*, extending beyond the transverse hole far enough to form a recess for the reception of the cap *m*, said cap being inserted therein with its mouth outward, with the quick-match *k*, having one end located below the mouth of the cap, and extending from thence out through the transverse hole and up alongside of the case to the outer end of the signal, as shown and described.

5. A pyrotechnic signal provided with a series of radial grooves, *p*, formed in the outer end of the composition for the reception of the quick-match, substantially as shown and described.

6. The combined holder and striker, consisting of the handle B, having the projecting tube or socket D, provided with the lugs *n* and plate I, and the striker C, with the spring P, all arranged to operate substantially as described.

WM. F. COSTON.

Witnesses:

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