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FLASH LIGHT APPARATUS FOR PHOTOGRAPHERS' USE.

Patented Apr. 30, 1895.



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(No Model.)

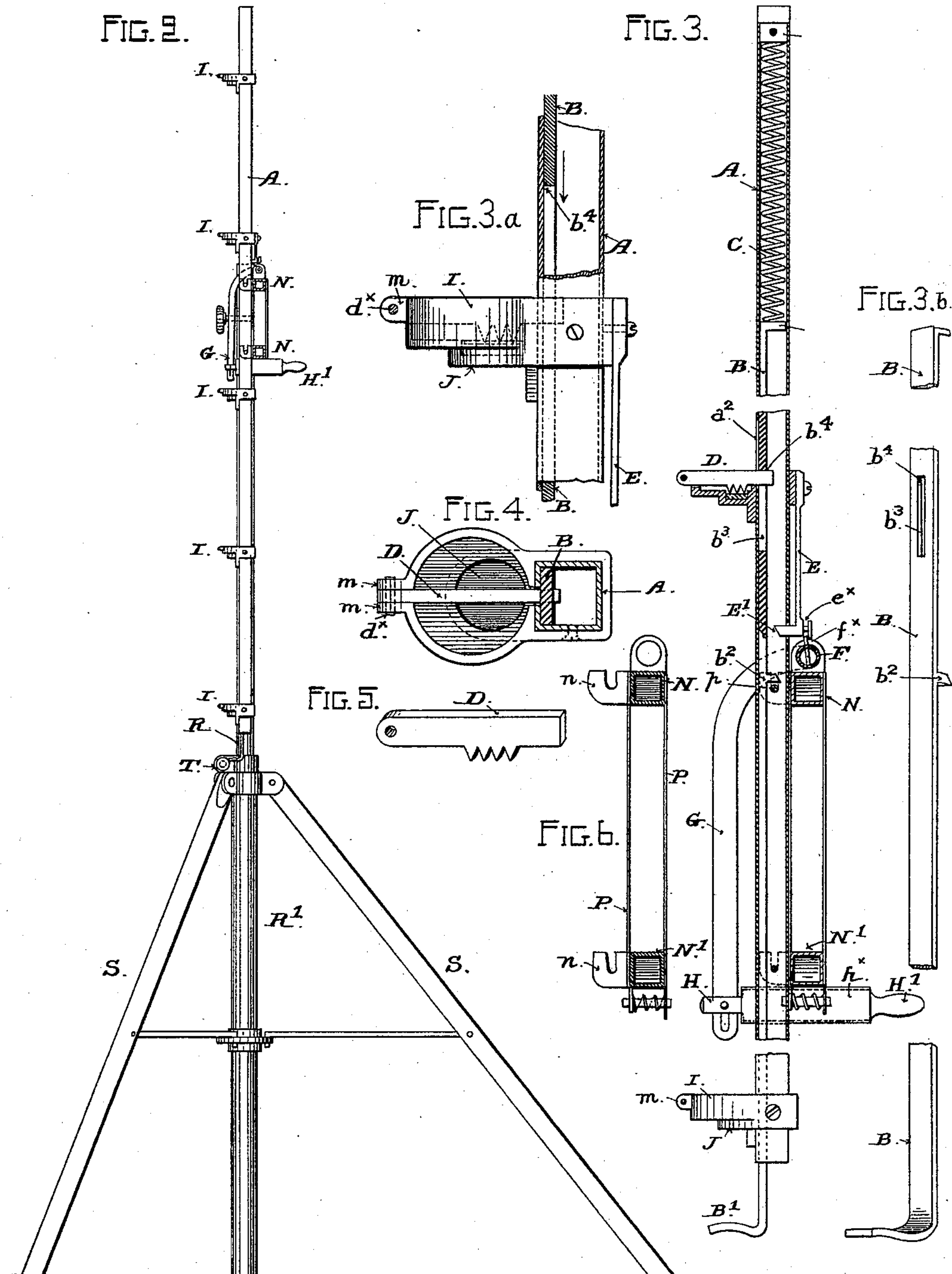
2 Sheets—Sheet 2.

W. B. FARWELL.

FLASH LIGHT APPARATUS FOR PHOTOGRAPHERS' USE.

No. 538,578.

Patented Apr. 30, 1895.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLARD B. FARWELL, OF SAN FRANCISCO, CALIFORNIA.

FLASH-LIGHT APPARATUS FOR PHOTOGRAPHERS' USE.

SPECIFICATION forming part of Letters Patent No. 538,578, dated April 30, 1895.

Application filed February 13, 1894. Serial No. 500,039. (No model.)

To all whom it may concern:

Be it known that I, WILLARD B. FARWELL, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Flash-Light Apparatus for Photographers' Use, of which the following is a specification.

My invention relates principally to a novel mechanism or mechanical device for firing charges of an illuminating powder or mixture, and secondly to an improved apparatus for firing simultaneously a number of charges in a series or battery to illuminate a considerable area of space.

The novel mechanism or device above mentioned forming a feature of my said invention consists, essentially, of a rod or post, constructed of tubular form principally for the purpose of obtaining suitable strength and lightness, a number of pans or receptacles for flash-light powder fixed at intervals apart along said post, an exploding device of novel character adapted by its construction to fire a fulminate without noise, a spring-impelled hammer arranged to impart a blow to the exploder, and a holding and releasing mechanism actuated by hand to release the hammer.

The invention includes, also, certain novel construction and combination of a number of these rods or parts with pans or receptacles for the flash-light mixtures and an exploding-mechanism to each pan, with a frame, or supporting means, having features of adjustment and mechanism for operating the whole number of exploders in the apparatus at the same moment of time, substantially as hereinafter described.

The following description explains the nature of my said invention and the manner in which I have constructed, combined and applied the same in producing an improved flash-light apparatus for photographers' use, reference being had by letters to the accompanying drawings, in which—

Figure 1 represents in front elevation an apparatus of thirty flash-lights constructed according to my invention. Fig. 1^a is a view in detail of the parts of the post and the adjustable frame at the hinge-joint that connects the top of the frame to the post. Fig. 2 is a side elevation taken from the right-hand

side of Fig. 1. Fig. 3 is a side view in detail and on an enlarged scale of one of the uprights or posts, the flash-pans or receptacles, and the hammer and connected operating mechanism. Fig. 3^a is a view in section of the hammer and firing mechanism, showing the parts set ready for action. Fig. 3^b is a view of the hammer of the firing mechanism. Fig. 4 is a plan or top view of a flash-pan and the exploding-point. Fig. 5 is a perspective view of the exploder removed from the pan. Fig. 6 is a view in vertical cross-section of the supporting-frame with the flash-pan and the rods or carriers removed.

A— indicates a hollow pole or rod containing a sliding-bar —B— extending at one end outside and beyond the part —A— and terminating in or furnished with a handle —B'—, with a coil-spring —C— behind the opposite end within the pole. By pushing back the projecting end of the sliding-bar into the part —A— the coil-spring is compressed, so that by its reaction when the bar is released it will impel the bar with the desired force in the opposite outward direction. This part, which I have termed the hammer, is the striker or means to strike a blow on an exploding piece —D— on the outside of the rod. It is therefore held in position with the spring under compression ready for action by means of a catch and a trigger to operate the catch, so that it can be released and caused to strike the exploder at any time, through the agency of the trigger. The catch before mentioned is formed of a spring-arm —E— attached to the rod —A— on the outside at one end and furnished or formed with a finger or catch —E'— on the opposite end standing inward substantially at a right angle to the body —E— of the spring-arm and projecting into the hollow of the rod —A— through a perpendicular slot. On the sliding bar —B— is a detent —b²— standing outward and in the path of the catch —E'— to engage with the same when the bar is pressed upward, and both the catch —E'— and the detent —b²— are chamfered on the end, so that they readily pass each other when the slide-bar is pressed upward, but in the contrary direction of movement the bar is arrested by the detent striking the catch —E'—, and the bar is thereby held up, with the spring in a state of compression.

—F—G—H— are parts of a trigger for drawing the catch away from the detent before mentioned to release the spring-bar. The part —F— is a rock-shaft having a stud, or projection, — f^x — setting into a groove or recess — e^x — in the back of the catch —E'—, or projecting from the rock-shaft in front of a shoulder formed on the catch for that purpose, and the part —G— is a curved lever secured to the rock-shaft at one end and attached by the other end through the connecting medium of a slot and a pin to the end of a sliding pin or bar —H— which forms the remaining part. The pin, or last-mentioned part, is held in a stationary, tubular guide or socket — h^x — with both ends projecting outside the socket and a handle H' is formed on one end for pushing back the pin H in the guide. Such movement of the part —H— in the tubular guide throws out the lower end of the lever and consequently turns the rock-shaft —F— to which the lever is connected. The sliding-bar thus actuated by means of the spring and the catch and the trigger before mentioned is slotted at — b^3 — and the free end of the exploding piece —D— is inserted through a long slot — a^2 — in the hollow rod and into the slot — b^3 — as shown in Fig. 3, so that the shoulder — b^4 — at the upper end of the slot comes in contact with the top of the part D when the bar —B— is released.

I— indicates a pan or shallow receptacle fixed on the rod —A— to hold the powder or mixture to be fired. To the rim of this pan is attached by a hinge-joint — d^x — one end of the exploder —D— in such position that the piece sets over and across the center of the pan when at rest, in which position it lies across a cup or depression —J— in the bottom of the pan, while its free end sets through the slot in the hollow rod —A— and into the cutaway part of the slide-bar —B—, as shown in Figs. 3 and 3^a. On the rim of the pan are ears — m — — m — between which the end of the piece —D— is held by a pin d^x ; holes being made in the ears, and an eye in the part —D— for that purpose. This piece —D— is of peculiar construction in having its head, or acting portion, or that part which comes in contact with the fulminate, composed of, or provided with, one or more pointed teeth or separate points, instead of being composed of a flat surface. I have found by experiment and practical use that if the striking part of this piece or exploder—meaning thereby the part which impinges against the fulminate with the necessary force to explode it—be composed of one or more separate, sharp points in place of a continuous flat surface the desired exploding or firing effect will be produced with little or no report and with practically no noise; and consequently, a considerable number of separate charges can be fired at the same moment of time without producing any detonation. For this purpose I have constructed the bar —D— that forms the exploder of my firing-mechanism with sev-

eral separate acutely-pointed teeth, resembling in shape the teeth of an ordinary hand-saw, and projecting from the lower edge of the bar that forms the exploder and at such point in the length of the hammer-piece that the points rest directly upon the fulminate lying in the cup-shaped depression of the flash-pan. An exploder of this character will explode a paper-cap or similar fulminate without detonation; and a considerable number can be set off simultaneously without producing any explosive noise. Ordinarily, a single tooth or point resting on the fulminate and struck with suitable force will be found to work well; but to secure the best and most certain results the number of teeth or points should be increased. I have obtained the best results when the piece is provided with three or four teeth, or points, although a less number of points will work well in most cases. With firing-mechanism of this construction a number of flash-pans fixed on a single rod can be fired simultaneously by the movement of one hammer bar; and also, by arranging a number of rods with their flash-pans and with individual firing-mechanism within a suitable supporting-frame at regular distances apart across the frame, an apparatus can be produced for illuminating a space of considerable area. In Figs. 1 and 2 I have illustrated such an apparatus composed of six hollow rods or carriers each having five flash-pans and their firing mechanism, and all the rods fixed at regular intervals of distance apart across the frame, but at the same time so attached to the frame that they can readily be removed for packing and transporting the apparatus, or for employing at pleasure the whole number or less than the whole number of the flash-lights.

The frame is constructed, like the pan-carrying rods —A—, of tubular rods, or bars, and is capable of being folded into small compass after the rods —A— are detached. Its principal parts are the horizontal parallel arms —N—N'— joined by diagonal braces —P— —P—, an upright-post, or standard, —R— to the top of which the horizontal frame of bars —N— is attached by a long hinge-joint, and a folding-tripod composed of the tubular socket —R'— the pivoted folding legs —S— —S— and a clamp —T— on the upper end of the socket to hold the post —R— at different points of elevation in the socket R'. By disconnecting the frame —N— —P— from the upright —R— and unshipping that part from its socket on the tripod, the parts can be folded and packed into small compass and as readily set up again for operation.

The hinge-connection between the horizontal frame and its supporting-post —R— is formed by a long pin or rod —W— fixed across the top in horizontal position projecting at both sides beyond the post, and ears or lugs —W'— on the top bar —N— of the frame having eyes or sockets to take the ends of the rod —W—. On this connection the frame is

free to move in an arc within limits, so that it can be set from the vertical into different angular positions by moving the bottom bar —N'— outward, or away from the post —R—.

5 By this adjustment it will be seen that the rods —A—, which are secured to the frame in perpendicular position, can be set at different degrees of inclination from the vertical, simply by swinging the frame —N— —P— on its point of attachment —W—W'— outward or
10 away from the post —R—. Such adjustment is made by means of a set-screw —y— working through a threaded socket in the post —R—, with a milled head on the front for
15 turning it, and with its point bearing against the diagonal braces —P—P— at their point of intersection. This construction is shown in detail in Figs. 1 and 1^a.

Each one of the rods —A— —A— is fastened to both bars —N—N'— by means of
20 pins or studs *p* on the sides of the rod and two ears or brackets —*n*—*n*— with open slots to receive the projections —*p*— on the rod; the space between the ears corresponding to
25 the width or external measurement of the rod —A— at the projections before mentioned, making a tight fit of the rod between the ears when that part is set in place. This construction is seen in Figs. 1^a, 3 and 6. If a long pin
30 be set through the hollow rod with the ends projecting outside as shown in Figs. 1 and 3, it will also form a stop for the detent —*b*²—.

The spring-impelled bars of all the rods —A— in this apparatus are released simultaneously and strike their exploders at the
35 same moment by a single movement of one trigger, the arrangement and connection of which with the bars of all the rods will be understood from Figs. 1, 1^a and 3. A rock-shaft is mounted on the upper bar —N— of
40 the frame extending directly behind all the rods —A—, and is provided with a pin or projecting finger *f*^{*} to engage the free end of the spring-arm —E—, the construction and
45 operation of which have already been described; so that when the rock-shaft is moved it sets off the whole set of catches —E—E²— at the same moment, releasing instantaneously all the bars —B—. This movement of
50 the rock-shaft is produced by the lever —G— secured at its upper curved end to the rock-shaft, and the push-pin or plug —H— before described, held in the tubular socket or guide H in the lower bar N' of the frame and connected to the lower end of the lever G by a
55 slot and pin. All the flash-pans in the apparatus are fired, therefore, by pushing out the lower end of the lever before mentioned, for which purpose the push-pin H is connected
60 to the lever as a simple and effective means of working this firing-mechanism. An apparatus constructed of these parts can be separated and packed into small compass for stowing away or carrying about from place to
65 place, and as readily set up for operation. In preparing it for action the spring-bars in all the tubular rods are pressed back to com-

press the springs and the flash-pans are charged by first placing in each pan a paper-cap, or fulminate-disk, or other similar character of fulminate, in the depression under
70 the firing-points of the exploder, then setting that piece down so that it rests upon the fulminate, and finally filling the pan with the flashing-powder or mixture. When all the
75 pans are charged in this manner the firing-points rest upon the cap ready for action, and when struck by the spring-impelled hammer they are forced into the cap with practically
80 no perpendicular movement and without scattering or disturbing the flashing powder in the pan. This action, as well as the noiseless operation, is due mainly to the peculiar construction of the firing point —D— and the
85 manner of imparting the blow to it.

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

1. The combination, with a flash-pan, of the exploding-bar attached at one end to the pan,
90 extending across the cavity of the pan and having one or more exploding-points projecting from the under side and a hammer-bar or means adapted to impart a blow upon the opposite end of the exploding-bar constructed
95 for operation substantially as described.

2. A flash-pan having a receptacle for the flashing-mixture and a cup or depression in the bottom of the receptacle to contain a fulminate-cap, in combination with an exploder-
100 bar setting across the pan having teeth or points projecting from its under side over the said cup and resting on the fulminate therein, and means for imparting a blow upon the exploder-bar, constructed for operation, sub-
105 stantially as described.

3. The combination of the slotted tubular rod A slotted sliding bar B, spring C, catch E E' and detent *b*² and means for drawing said
110 catch away from the detent, to release the said bar with one or more flash pans I fixed on said rod, an exploder bar D attached at one end to the pan outside the rod and the opposite end projecting through a slot into the tubular rod
115 and through a slot in the sliding bar within said rod, substantially as described for operation as set forth.

4. The combination, with a cup or receptacle to contain a fulminate, of an exploder having one or more points or teeth adapted
120 to rest upon the fulminate in the cup and a hammer or means for imparting a blow upon the exploder to force its points into the fulminate, substantially as described.

5. An exploder adapted to fire a fulminate
125 without noise constructed of a bar with one or more sharp teeth or acutely pointed projections on the under side of the bar to rest upon the fulminate, in combination with a hammer or means arranged for operation
130 above the bar to impart a blow upon the bar, substantially as described.

6. The combination in a suitable frame, of the perpendicular rods A each having a slid-

ing spring impelled hammer bar B, a spring catch E E' and a detent b^2 to hold the bar and its spring in a state of compression, a series of flash-pans arranged on each rod in line one
5 above another, an exploder in each pan extending across the pan to explode a fulminate therein one end of the exploder being inserted through a slot in the rod and projecting in line with a shoulder or striking part b^3 on the hammer-bar and the rock-shaft T, means connect-
10 ing said shaft to the spring-catch E E' of all the hammer-bars and the lever G and push pin H as a means for operating said rock-shaft to release the hammer-bars of all the rods simul-
15 taneously, substantially as described.

7. The herein described portable flash-light apparatus, consisting of the frame composed of the bars N N' P, standard R and tripod R' S the detachable tubular rods A

flash-pans I I arranged in series one above 20 another on said rods an exploder D to every flash-pan a hammer-bar B in each rod common to all the exploders on the rod, and adapted to strike the whole set or number thereof simultaneously, a spring C and a
25 spring catch E E' arranged to engage and hold back the hammer bar against the spring C, and releasing mechanism for operating the whole number of spring-catches comprising the rock-shaft F with stops F' to engage 30 the catches the lever G and the push pin H constructed for operation as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WILLARD B. FARWELL. [L. S.]

Witnesses:

EDWARD E. OSBORN,

GEO. T. KNOX.