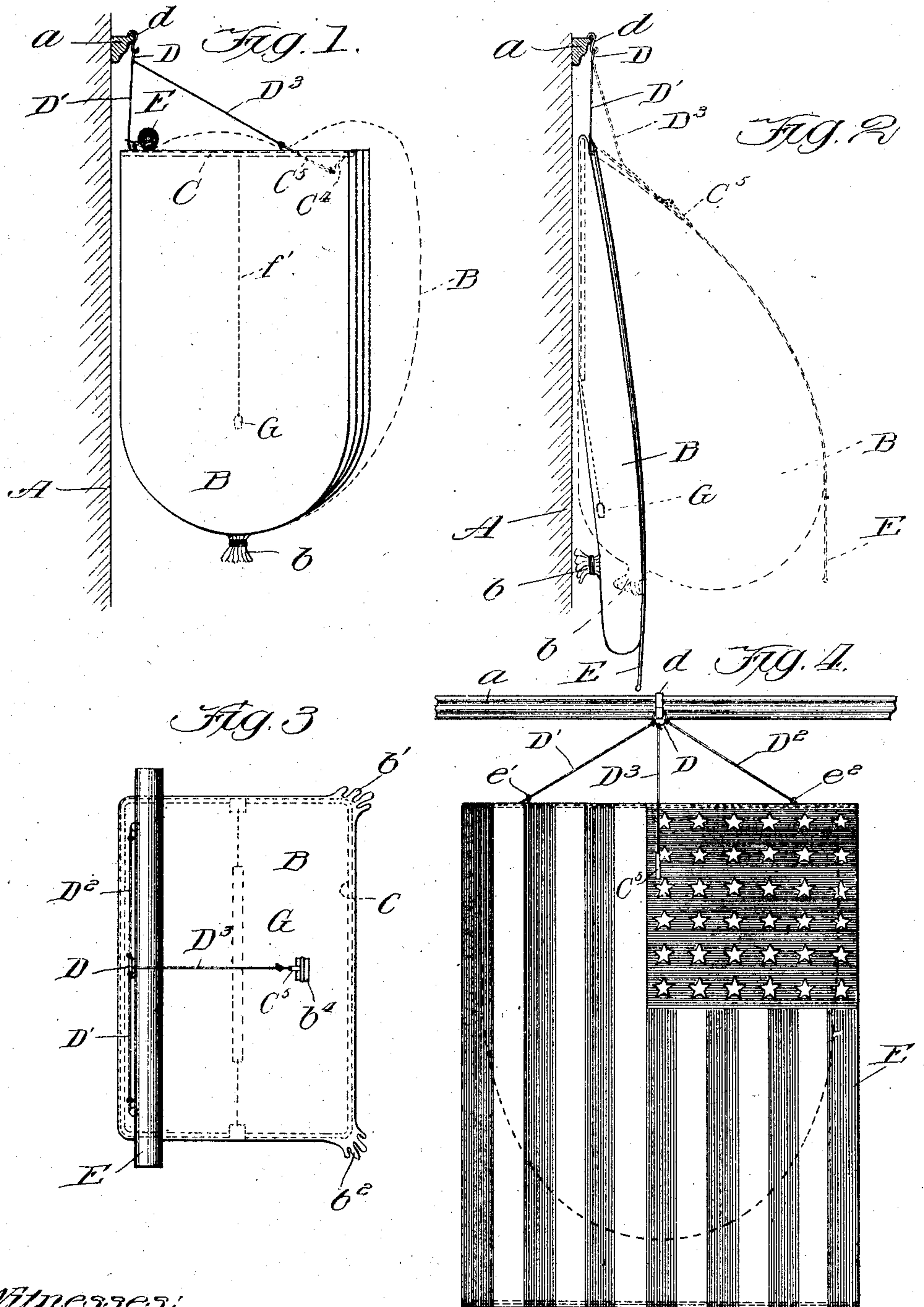


G. R. LAWRENCE.
APPARATUS FOR FLASH LIGHT PHOTOGRAPHY.

APPLICATION FILED APR. 30, 1906.

3 SHEETS—SHEET 1.



Witnesses:

H. S. Kaidue
Bertha Natchanson

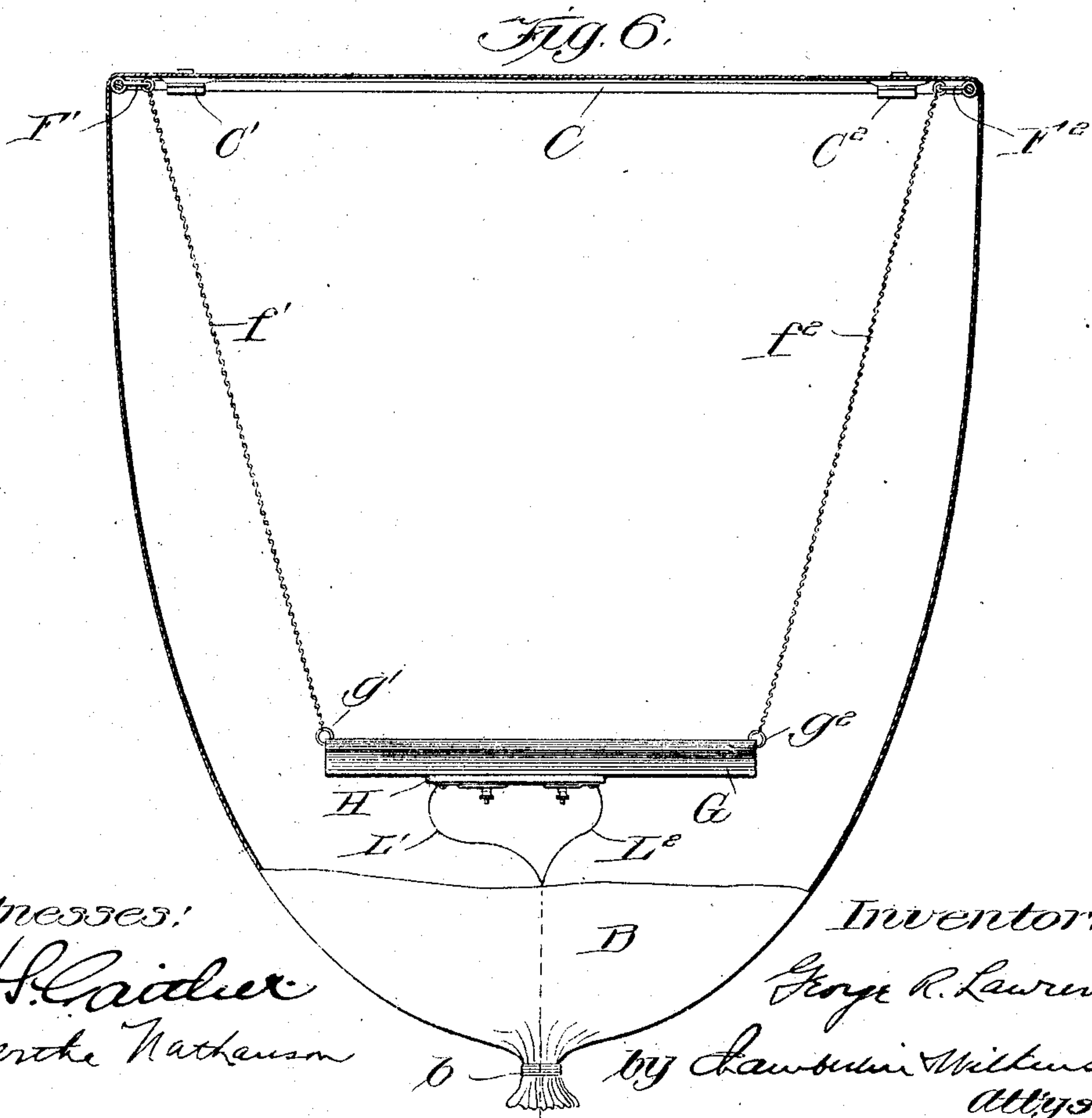
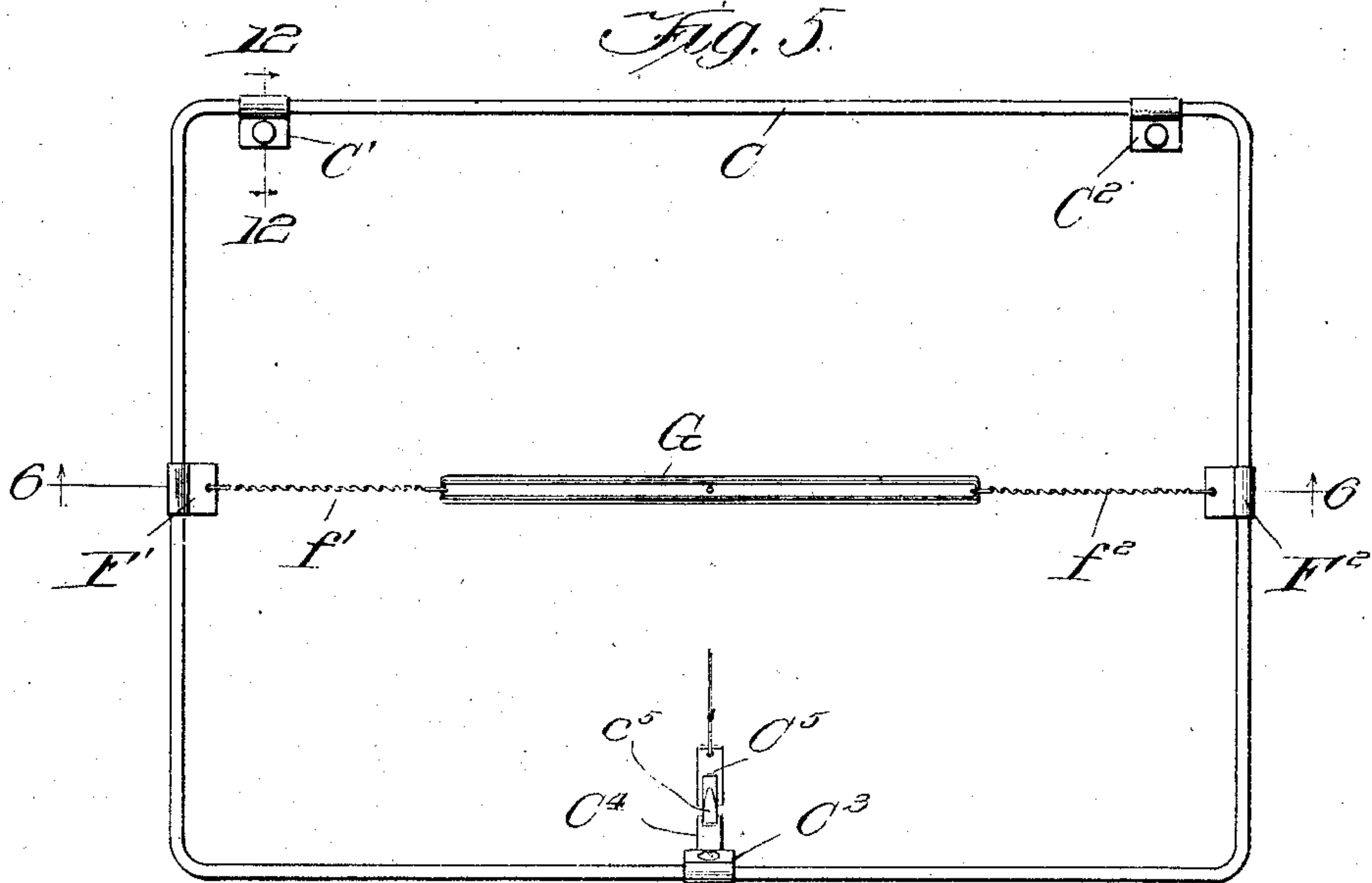
Inventor:

George R. Lawrence
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3 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE R. LAWRENCE, OF CHICAGO, ILLINOIS.

APPARATUS FOR FLASH-LIGHT PHOTOGRAPHY.

No. 881,595.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed April 30, 1906. Serial No. 314,406.

To all whom it may concern:

Be it known that I, GEORGE R. LAWRENCE, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Apparatus for Flash-Light Photography, and 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 the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to the art of photography, and more particularly to apparatus for use in making flash light photographs.

The taking of flash light photographs has heretofore been attended by objectionable effects owing to the smoke incident to the ignition of the powder which produces the flash light. The smoke fills the room and charges the atmosphere with disagreeable fumes. The apparatus heretofore used in producing the flash light has also been more or less unsightly.

The primary object of my invention is to provide an apparatus for producing the flash light necessary for indoor photographs by means of which the smoke resulting from the ignition of the powder will be prevented from charging the atmosphere and which will, in its operation, produce a pleasing appearance.

A further object of my invention is to provide a trough for containing flash light powder by means of which a minimum amount of powder will be necessary and which may be so adjusted as to ignite the powder by an electric current of any available voltage.

A still further object of my invention is to provide a flash light apparatus for use in photography which will be simple in construction, inexpensive in manufacture, and efficient in use.

The embodiment of my invention herein disclosed may be generally described as comprising a closed bag depending from a normally horizontal supporting frame, a trough for containing the powder suspended by the frame within the bag, means for automatically permitting the supporting frame to fall into a vertical position upon the ignition of the powder, an ornamental covering such as a flag arranged to automatically unroll and

cover the bag in which the explosion has occurred, and electrical connections for igniting the powder within the trough.

My invention will be more fully described hereinafter with reference to the accompanying drawings in which,—

Figure 1 is a side elevational view of the apparatus before the ignition of the powder; Fig. 2 a similar view after the ignition of the powder; Fig. 3 a plan view of the apparatus as shown in Fig. 1; Fig. 4 an elevational view of the apparatus as shown in Fig. 2; Fig. 5 is an enlarged plan view of the supporting frame; Fig. 6 a vertical sectional view on line 6—6 Fig. 5 showing the bag supported by the frame; Fig. 7 an enlarged elevational view of the trough for containing the powder; Fig. 8 a sectional view on line 8—8 Fig. 7; Fig. 9 a plan view of the under surface of the bottom of the trough; Fig. 10 a detail view of a fuse; Fig. 11 an enlarged sectional view of the means for permitting the bag to automatically collapse; Fig. 12 an enlarged sectional view on line 12—12 Fig. 5; Fig. 13 is an enlarged plan of the valve through the top of the bag, and Fig. 14 an edge elevational view of the valve.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference character A indicates a suitable support such as the wall of a room, while a indicates the bracket on the wall which may be the usual picture cornice.

B indicates a bag made of any suitable fabric which will be translucent and at the same time of such texture as to prevent the passage therethrough of smoke generated by the ignition of powder.

C indicates a supporting frame which may be conveniently formed rectangular and which is located within the top of the bag. The frame C is provided with clips C' C² preferably constructed as shown in detail in Fig. 12, such clips being secured to the rear rod of the frame adjacent its ends. Clamp screws c' c² extend through the fabric of the bag above the clips and into engagement with screw-thread holes in the clips. Washers such as indicated at c³ surround the clamp screws and between which and the heads of the screws are secured the lower ends of supporting cords D' D². The upper ends of the cords are united to a ring D which may en-

gage a supporting device such as the picture hook d which in turn is supported upon the cornice a .

Secured to the front rod of the frame intermediate of its ends is a clip C^3 which supports a downwardly inclined strip C^4 made of any rigid material. The lower end of the strip C^4 is provided with a hole c^4 engaged by a hook c^5 detachably connected to the lower end of a strip C^5 . The strip C^5 extends through a hole in the top of the bag and is provided with an opening to be engaged by a clasp d^3 . The clasp d^3 is connected by a cord D^3 to the ring D . The hook c^5 is secured at the lower end of the strip C^5 by some fusible adhesive so that the heat generated by the ignition of the powder will instantly melt the adhesive and permit the strip C^5 to separate from the hook.

In order that the smoke may be prevented from escaping through the hole in the top of the bag around the strip C^5 , a valve or flap b^3 is provided. This valve may be in the form of a rubber band surrounding a plate b^4 secured in any suitable manner to the exterior surface of the top of the bag. The plate b^5 is provided with a hole through which the strip C^5 extends and which will be instantly closed by the valve when the bag falls from around the strip as shown in Fig. 2.

G indicates a trough for supporting the flash light powder. This trough depends within the bag and is supported by the side rods of the frame C . Clips F' F^2 are secured to the side rods of the frame C and support the upper ends of chains f' f^2 , the lower ends of which are secured to the ends of the trough G by means of rings g' g^2 . The trough is narrow in width in comparison with its length and is provided with parallel side walls converging at their upper ends as shown in Fig. 8. A strip of insulating material H is secured beneath the trough and is provided with a hole h therethrough registering with a hole in the bottom wall of the trough. Secured beneath the insulating strip H are terminals with which are connected leads extending from an electric circuit. Each terminal comprises two plates between which an end of a fuse is adapted to be clamped.

K' & k' indicate the plates of one terminal united by a binding screw l' to which the lead L' is connected. A screw h' extends through the strip H and through the two parts K' & k' of the terminal. A clamping nut H' surrounds the screw h' and retains the terminal against the under surface of the strip H and also serves to clamp the two portions of the terminal together.

K^2 and k^2 indicate the two portions of the other terminal which are united by a binding screw l^2 to which is united the lead L^2 .

h^2 indicates a screw extending through the strip H for uniting the terminal thereto.

H^2 indicates a clamp nut on the screw h^2 for uniting the terminal to the strip H and also for clamping the two parts of the terminal together.

M indicates a fuse comprising a flexible support upon which is mounted a fusible wire m . The ends of the fuse are clamped between the two parts of the terminals in such a position that a portion of the wire m underlies the hole h leading from the bottom of the trough G . The fuse M is used when the current available for igniting the powder is of high voltage, but when the available current is low voltage the fuse is unnecessary as the terminal comprising the parts K' and k' may be rotated 180 degrees to the position shown in Fig. 9 in which the edge of the part K' is located adjacent the edge of the other terminal forming a spark gap beneath the opening h . If the terminals were arranged as shown in Fig. 9 when a high voltage current were used the arcing of the current would destroy the terminals consequently the fuse M is used to avoid such destruction of the terminals when a high voltage current is employed.

E indicates an ornamental covering for the bag when the latter collapses after the ignition of the powder. Such covering may be a flag which is provided with eyes e' e^2 through which the cords D' D^2 pass. When the apparatus is in the position shown in Fig. 1 the flag is rolled and supported above the bag at the rear thereof. Upon the dropping of the frame the flag unrolls and covers the bag presenting an attractive appearance in lieu of the unsightly bag which would otherwise be visible.

The operation of my apparatus is as follows: The powder is placed within the trough G and the trough suspended by the chains f' f^2 from the frame C . The bag B is then placed around the frame and its open bottom end tied as shown at b around the leads L' L^2 . The strip C^5 is projected through the opening in the plate b^4 on the top of the bag, the flexible valve b^3 permitting the passage of the strip through the plate. The clasp d^3 is then engaged with the end of the strip C^5 so that the frame will be supported in a horizontal position by means of the cord D^3 and by means of the cords D' D^2 the ends of which are secured beneath the clamp screws c' c^2 on the clips C' C^2 .

When it is desired to take a picture the circuit is closed through the leads L' L^2 which, when the terminals beneath the trough are in the positions shown in Fig. 9, gives a spark which ignites the powder, or if the terminals are in position shown in Fig. 7 the fusible wire m ignites the powder. The ignition of the powder produces a flash light necessary to take the picture, the light passing readily through the bag B . The

texture of the bag, however, confines the smoke within the same.

In order to prevent the force of the explosion rupturing the bag, it made full at the corners as indicated at b' b^2 in Fig. 3. Such fullness permits the bag to expand when the explosion takes place as indicated by dotted lines in Fig. 1. The heat generated by the explosion melts the soft solder or other fusible adhesive which secures the hook c^5 to the lower end of the strip C^5 , thereby permitting the front rod of the frame C to fall downwardly by gravity so that the bag assumes the position shown in Fig. 2. The powder is of such a composition that the smoke generated by its explosion immediately precipitates in the form of a powder permitting the bag to collapse to the position shown in full lines in Fig. 2. Immediately upon the frame C swinging downwardly the flag E unrolls in front of the bag.

In order that the hook c^5 may be located within the bag a sufficient distance, the strip C^4 extends downwardly in an inclined position as shown in Figs. 1 and 11. If it were not for the fusible adherent which unites the hook to the strip being located beneath the surface of the bag it would not be subjected to sufficient heat to be fused.

By providing the trough G of great length in comparison to its cross section, the powder when ignited forms an extended sheet of light thereby rendering it possible to use a smaller quantity of powder than is necessary with other forms of flash light pans. The converging side walls of the trough G also serve to minimize the amount of powder necessary to produce the desired volume of light as the restricted opening at the top of the trough impedes the free passage of the gas generated by the powder so that it is forced upwardly thereby increasing the area of the sheet of light produced by the explosion.

After the use of the apparatus for taking a picture it may be readily removed by merely disconnecting the ring D from the hook d . The apparatus may be readily prepared for re-use by merely uniting the hook c^5 to the strip C^5 by soft solder and by placing a new fuse M between the terminals when the current to be used is of high voltage. When the current available is of low voltage, it is unnecessary to use a fuse for the reason above explained.

When the heat generated by the explosion disconnects the hook c^5 from its supporting strip, the latter passes through the plate b^4 as the bag swings downwardly. Immediately upon the strip passing through the bag the resilient valve b^3 closes the opening through the plate b^4 so that the escape of smoke is prevented.

From the foregoing description it will be observed that I have invented an improved

apparatus for use in taking flash light photographs by means of which the desired light may be produced with a minimum amount of powder, and by means of which the smoke generated by the ignition of the powder is confined within a bag and thereby preventing the atmosphere being rendered disagreeable.

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

1. In a flash light apparatus, the combination with a translucent collapsible closure, of means for creating light within said closure, and means for automatically effecting the collapse of said closure upon the creation of the light therein.

2. In a flash light apparatus, the combination with a collapsible translucent closure, of means for creating light within said closure, means for automatically effecting the collapse of said closure upon the creation of the light therein, and a cover for automatically screening said closure upon its collapse.

3. In a flash light apparatus, the combination with a translucent bag, of a frame within said bag for supporting the same, means for supporting said frame in position to distend said bag, a support for powder depending from said frame within said bag, means for igniting the powder, and means for automatically permitting said frame to swing into position to collapse said bag upon the ignition of the powder.

4. In a flash light apparatus, the combination with a translucent normally closed bag, of a frame within said bag for supporting the same distended, hangers for supporting said frame in position to distend said bag, a support for powder within said bag, means for igniting the powder while surrounded by said bag, means for automatically disconnecting one of said hangers from said frame upon the ignition of the powder.

5. In a flash light apparatus, the combination with a translucent normally closed bag, of a frame within said bag for supporting the same, hangers for supporting said frame in position to distend the bag, a support for powder within said bag, means for igniting the powder while surrounded by said bag, and a fusible connection between one of said hangers and said frame.

6. In a flash light apparatus, the combination with a translucent bag, of a frame for supporting said bag, hangers for supporting said frame in position to distend said bag, one of said hangers extending through the bag to the interior thereof, a strip extending from said frame within said bag, a fusible connection between said strip and said hangers, means for supporting powder within said bag, and means for igniting the powder.

7. In a flash light apparatus, the combination with a closed bag consisting wholly of a flexible material a portion of which at least is translucent, of means for supporting
5 said bag in a partially collapsed condition, means for supporting a flash light charge within said bag, and means for igniting said charge while the bag remains closed, said bag being free to expand to its full extent
10 upon the ignition of the charge.

8. In a flash light apparatus, the combination with a closed bag made of a flexible material a portion of which at least is translucent, of means for supporting said bag with
15 a portion thereof collapsed, means for supporting a flash light charge within said bag, and means for igniting said charge while the bag remains closed, said bag being free to expand to its full extent upon the ignition
20 of the charge.

9. In a flash light apparatus, a trough for containing the powder having an opening in a wall thereof, a pair of electrical terminals supported on the outside of said trough
25 for igniting the powder through said opening, each of said terminals composed of two parts between which the end of a fuse is adapted to be secured, and means for relatively adjusting the two parts of each terminal to permit the insertion of the ends of
30 the fuse.

10. In a flash light apparatus, a trough for containing the powder having an opening in a wall thereof, a pair of electrical terminals supported on the outside of said trough
35 for igniting the powder through said opening, each of said terminals composed of two parts, means for relatively adjusting the two parts of each terminal to permit the insertion of the ends of a fuse, and means for adjusting one of said terminals relatively to
40 the other to vary the distance between said

terminals to produce a spark in lieu of employing a fuse.

11. In a flash light apparatus, the combination with a translucent bag, of a frame for supporting said bag distended, a trough for containing powder depending from said frame within said bag, means for igniting the powder, and means for automatically permitting said frame to collapse said bag upon the ignition of the powder.

12. In a flash light apparatus, the combination with a closed bag made of a flexible and translucent material, of means for supporting said bag partially expanded so as
5 to permit it to expand further upon pressure in the interior thereof, means for supporting a flash light charge within said bag, and means for igniting said charge while the bag remains closed. 6

13. In a flash light apparatus, a collapsible closed receptacle, a portion of which at least is translucent, means for supporting said receptacle in an expanded condition
65 which permits it to expand further under internal pressure, means for supporting a flash light charge within said receptacle, and means for igniting said charge while the receptacle remains closed. 70

14. In a flash light apparatus, a flexible closed bag a portion of which at least is translucent, means for supporting said bag in an expanded condition which permits it to expand further under internal pressure,
75 means for supporting a flash light charge within said bag, and means for igniting said charge.

In testimony whereof, I sign this specification in the presence of two witnesses.

GEORGE R. LAWRENCE.

Witnesses:

GEO. L. WILKINSON,
BERTHA NATHANSON.