W. T. BARNUM.

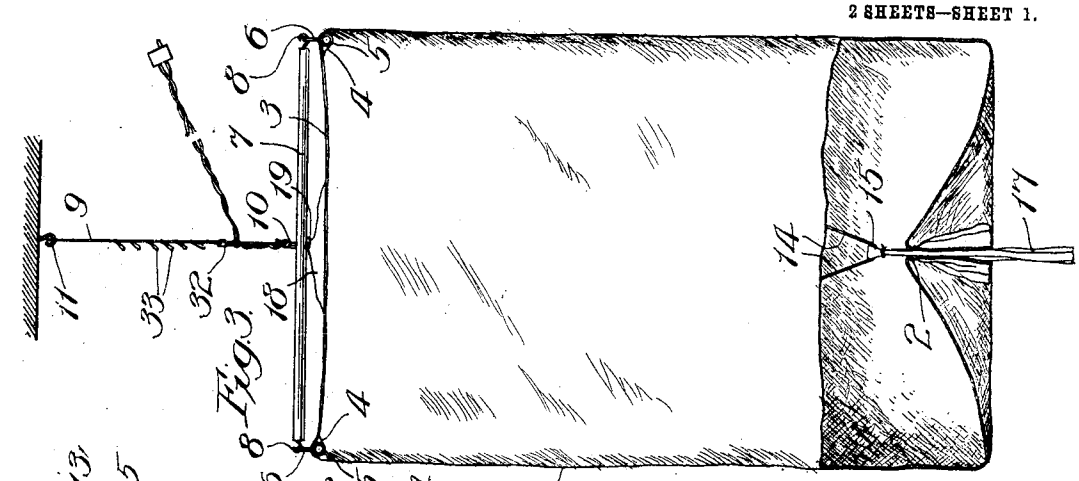
FLASH LIGHT APPARATUS.

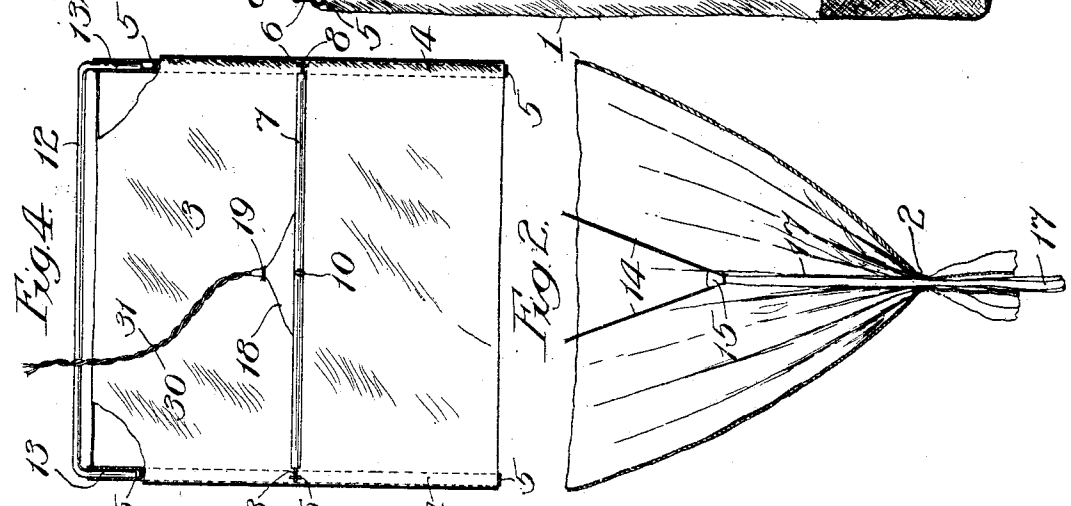
APPLICATION FILED JUNE 21, 1909.

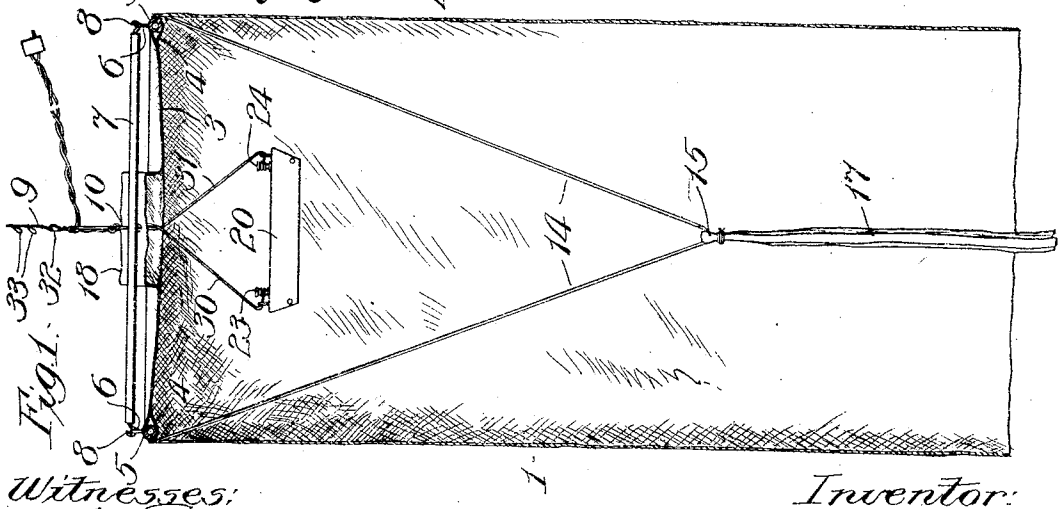
956,267.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.







Witnesses:
John Endres
Chas. H. Bull.

Inventor:
William T. Barnum.
By David N. Fletcher
Atty.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 5.

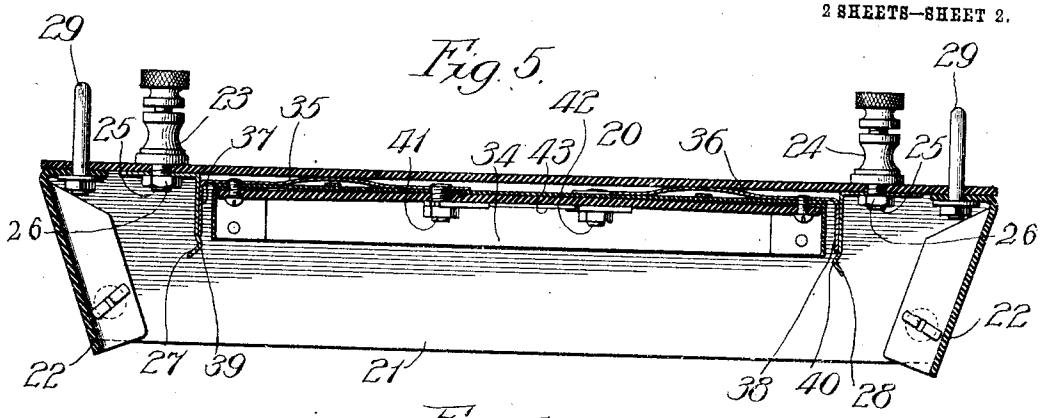


Fig. 6.

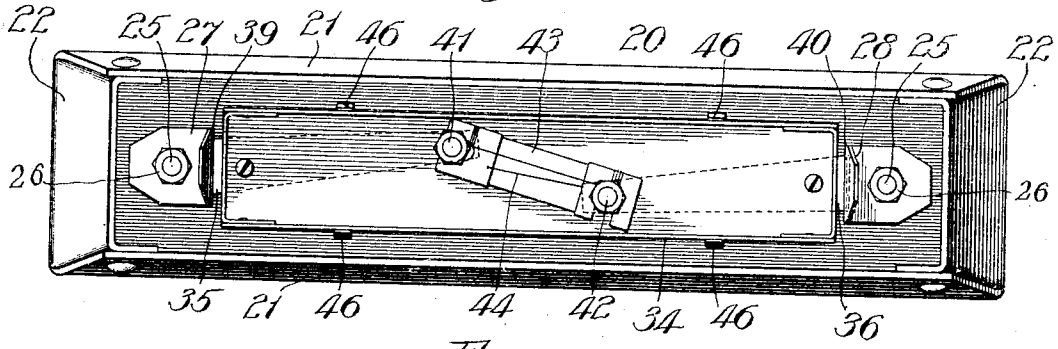


Fig. 7.

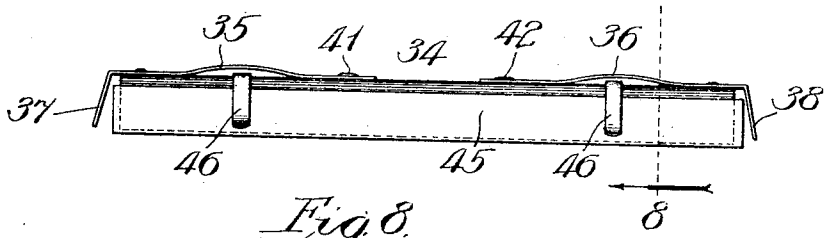
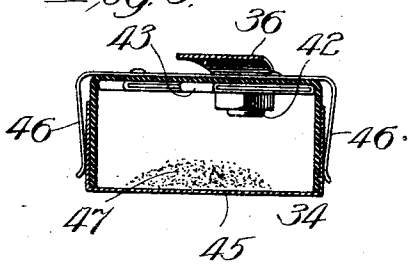


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM T. BARNUM, OF CHICAGO, ILLINOIS.

FLASH-LIGHT APPARATUS.

956,267. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed June 21, 1909. Serial No. 503,458.

To all whom it may concern:

Be it known that I, WILLIAM T. BARNUM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flash-Light Apparatus, of which the following is a description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding numerals of reference in the different figures indicate like parts.

An important difficulty heretofore experienced in the use of flash-light apparatus for photographing portrait groups or other objects in rooms having low ceilings or in other confined places, is that in order to protect the flash-light receptacle from ignition as well as to cause the proper spread of the flame, the lamp must be placed at so low a level that when the flash is made, the shadow of one object is liable to interfere with the proper lighting of another.

One of the principal objects of my invention is to overcome this difficulty by combining with a suitable closure capable of retaining the products of combustion, an inverted flash-lamp so constructed as to hold the usual flash-powder, and to enable the same to be ignited while directing the flash downwardly and at such outwardly diverging angles as to diffuse the illumination to the utmost without permitting the flame to be brought into actual contact with the walls of the closure.

Other objects are to so construct a collapsible framework in conjunction with a bag or closure formed from flexible material, a portion at least of which is adapted to transmit light, that they may be readily assembled for use or compactly folded, that the lamp may be easily inserted or removed from the top, that it may be supported independently of the frame and rendered vertically adjustable to any desired extent, and finally that simple means, adjustable from without, may be provided for causing the walls of the receptacle to be fully distended, and that in conjunction with a minimum number of rigid parts.

To these ends, my invention consists in the combination of elements hereinafter more particularly described and definitely pointed out in the claims.

In the drawings—Figure 1 is a vertical sectional elevation of a flash-light apparatus embodying the features of my invention, the bag or closure being represented as it would appear when suspended, but before being closed at the bottom, Fig. 2 is a like view of the lower portion of the bag as it would appear when first closed around and in frictional contact with the flexible adjustable support, Fig. 3 is a front elevation of the closure as it would appear when suspended ready for use, the lower portion being broken away to show the manner of adjustably supporting the bottom from within in order to insure a complete distension of the bag, Fig. 4 is a plan view thereof, partially broken away to show the manner in which the frame elements are detachably connected, Fig. 5 is a longitudinal vertical sectional view of the lamp and inclosed fuse, Fig. 6 is a bottom view thereof, Fig. 7 is a side view of the fuse showing means for holding the flash-powder therein when the lamp is inverted, and Fig. 8 is a sectional view thereof taken upon the line 8, Fig. 7, viewed in the direction of the arrow there shown.

Referring to the drawings, 1 represents generally a bag of flexible non-combustible material, all of which, by preference, is translucent, said bag being open at the lower end as shown in Fig. 1, but provided with any suitable means, such for example, as a tie-string 2, Figs. 2 and 3, for closing it. The top 3, of the bag, is preferably rectangular and is provided with hems 4, 4, across two edges, said hems being preferably open at both ends for the insertion of metal frame-tubes 5, 5, each of which is provided at the middle with an eye or loop 6. A cross-bar 7, is provided with hooks 8, 8, or other suitable detachable connections at its respective ends for engagement with the loops 6. A suspending cord 9, Figs. 1 and 3, is attached to a loop upon the middle of the cross-bar, by means of which cord the closure may be suspended from a hook 11 upon the ceiling or elsewhere. A connecting bar 12, Fig. 4, having end portions 13, 13 bent at right angles to the body and adapted to fit within the ends of the tubes 5, 5, as shown, serves as a detachable connection for said tubes to hold them apart and maintain parallelism between them, thereby keeping the top of the closure under tension and in proper form to cause the walls thereof to hang smoothly.

Cords 14, Figs. 1, 2 and 3, are secured to the respective corners of the closure at the

top and are caused to converge near the lower portion of the closure at 15, where they are connected with a tape or ribbon 17, the lower end of which extends somewhat below the level of the bottom of the bag. The purpose of the cords 14 and ribbon 17 is to so support the bottom of the bag as to cause it to be fully distended. Were it to be merely tied, as at 2, Fig. 2, the lower portion of the body would hang in folds which would not only interfere with the dispersion of light, but might bring parts of the walls too near to the flame. Upon tying the body of the bag, however around the ribbon, as shown in Fig. 2, and then pushing the tied portion upwardly as shown in Fig. 3, the walls of the receptacle will be fully distended and will hang smoothly throughout. The friction of the fabric upon the ribbon will be sufficient to hold the parts in place.

The top 3 is provided with a central opening or slit which is surrounded by an outwardly extended flap or pocket 18, preferably provided with a draw-string 19, to enable it to be tightly closed when the receptacle is ready for use, as hereinafter stated. The object of the opening is to provide for the insertion of a flash-lamp, which will now be described.

The flash-lamp consists of a body or casing generally designated by 20, Figs. 1, 5 and 6, formed from any suitable non-combustible material, said casing being closed at the top and open at the bottom with inwardly slanting or converging side walls 21 and end walls 22. I prefer to make said casing rectangular with a much greater length than width, the material preferred being compressed fiber, which is not only a non-conductor of electricity, but possesses great strength and durability. Attached to the top of the lamp near the respective ends, are binding posts 23, 24, the threaded portions 25 of which pass through the wall and are secured by means of nuts 26 to flat metal contact springs 27, 28, which are bent downwardly at right angles to the casing as shown, for the purpose hereinafter stated. Eyes or loops 29, 29, are attached to the top of the casing and electrical conductors 30, 31, Fig. 1, are passed through said loops and thence to the binding posts, to which they are secured. Said conductors are passed upwardly through the opening in the bag and are provided with a hook 32 adapted to engage any one of a series of loops 33 upon the suspending cord 9, thereby enabling the height of the lamp 20 to be adjusted within the inclosure.

The main case 20 is provided with a detachable fuse-case, generally designated by 34, which is considerably narrower than the case 20, and of a length to permit it to be inserted therein between the contact springs 27, 28. Said fuse-case is closed at the top and sides but open at the bottom and is provided with flat metal springs 35, 36, the outer ends of which are bent, as shown at 37, 38, so as to engage and press against the contact springs 27 and 28, being yieldingly held against detents 39, 40, in the latter as more clearly shown in Fig. 5. The inner ends of the parts 35, 36, are attached to binding-posts 41, 42, which are extended through the casing to form metallic connections for a fuse 43, of well known construction, consisting of the usual flat metal contact plates mounted upon an intervening non-conductive material and connected by means of a wire 44, Fig. 6, of such low amperage as to be fused by a passing current.

A sheet 45, of tissue-paper or other fragile non-inflammable material, is placed across the bottom or opening of the fuse-case in the manner best shown in Fig. 8, and its edges folded upwardly against the side-walls of said case beneath the springs 46, which serve to hold it in place, thereby providing means for retaining the flash-light powder in proximity to the fuse when the case is inverted. Any suitable material may be employed provided it may be easily destroyed by the flash, but it should be rendered non-fusible in order to prevent the formation of sparks.

The apparatus may be operated in the following described manner: The rod 7 is first connected with the loops 6, as shown in Fig. 4, when the rod 12 is connected with the tubes 5. The fuse 43 having been adjusted as shown in Fig. 6, the case is turned bottom upward and the requisite quantity of flash-light powder poured therein. The tissue paper 45 is then adjusted as described to form a closure, when the fuse-case is inserted within the main shield 20 with the contact springs in engagement. The lamp is then inverted, projected through the pocket 18 and the hook 32 connected with a loop in the suspending cord 9, when the part 18 is gathered and tied around the electrical conductors. The bag having been suspended to a suitable support then hangs as indicated in Fig. 1, with the lamp near the top. The lower end of the bag is then gathered around the ribbon 17, tied as shown in Fig. 2, and finally adjusted by being pushed up upon the ribbon as shown in Fig. 3, thereby causing the bag to hang fully distended and without folds. The apparatus is then ready for the flash. When adjusted as described, the flash-light powder 47 lies upon the tissue paper 45, as indicated in Fig. 8. The electric terminals are connected with any suitable source of electricity, not shown, and provided with a suitable circuit closing device. Upon closing the circuit the fuse is burned, the powder ignited and the flash is directed downwardly. The incline of the walls 21 and 22 of the shield is such as to

limit the outward spread of the flame thereby preventing it from being brought into direct contact with the walls of the closure, which, although treated with the usual fire-resisting chemicals, cannot be made proof against the intense heat of the flash-light when brought into direct contact with it.

The advantages of my improved apparatus are too obvious to require extended mention. The fact that the lamp may be placed at the very top of the closure if desired, enables it to be used in confined spaces, while its construction permits it to be easily and quickly adjusted and compactly folded into a light and portable package.

Having thus described my invention, I claim:

1. In a device of the class described, the combination with a closure formed from flexible material, a portion at least of which is adapted to transmit light, of a knock-down frame consisting of parallel members upon the opposite edges of the top of said closure, a detachable connecting member adapted to form a rigid connection at its ends with the ends of said parallel members respectively, a cross-bar and means for detachably connecting the same with said parallel members midway between the ends of the latter.

2. In a device of the class described, the combination with a closure formed from flexible material, a portion at least of which is adapted to transmit light, of a knock-down frame consisting of parallel tubes upon opposite edges of the top of said closure, a detachable connecting rod having portions adapted to enter the ends of said tubes, a detachable cross-bar, and means for connecting the same with said tubes substantially midway between the ends.

3. The combination with a closure formed from flexible material, a portion at least of which is adapted to transmit light, of a frame for distending the same at the top, a plurality of flexible cords attached to the upper part of the closure, the same converging downwardly, means for frictionally connecting the same with the lower end of the closure when the latter is gathered and means for gathering the lower part of said closure around said connecting means to hold the two in frictional contact, whereby the gathered portion may be arbitrarily adjusted to any desired height and temporarily held in place to prevent the formation of vertical folds and hold the closure fully expanded.

4. The combination with a closure formed to permit the passage of light, of an inverted flash-lamp, means for suspending the same within the closure independently thereof, and means without the closure for adjusting the height of said lamp with reference to the closure.

5. The combination with a closure formed to permit the passage of light, of an inverted flash-lamp supported therein and provided with downwardly and inwardly inclined shields for limiting the spread of the flame.

6. The combination with a closure formed to permit the passage of light, of an inverted flash-lamp supported therein, means for igniting flash-light material in said lamp from without said closure, frangible means for closing the bottom of said lamp to retain therein the flash-light material when the lamp is inverted, and means for temporarily securing said retaining means in place.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses, this 19th day of June 1909.

WILLIAM T. BARNUM.

Witnesses:
D. H. FLETCHER,
CARRIE E. JORDAN.