

No. 756,399.

PATENTED APR. 5, 1904.

C. H. NICHOLS.
FLASH LIGHT APPARATUS.
APPLICATION FILED JULY 28, 1903.

NO MODEL.

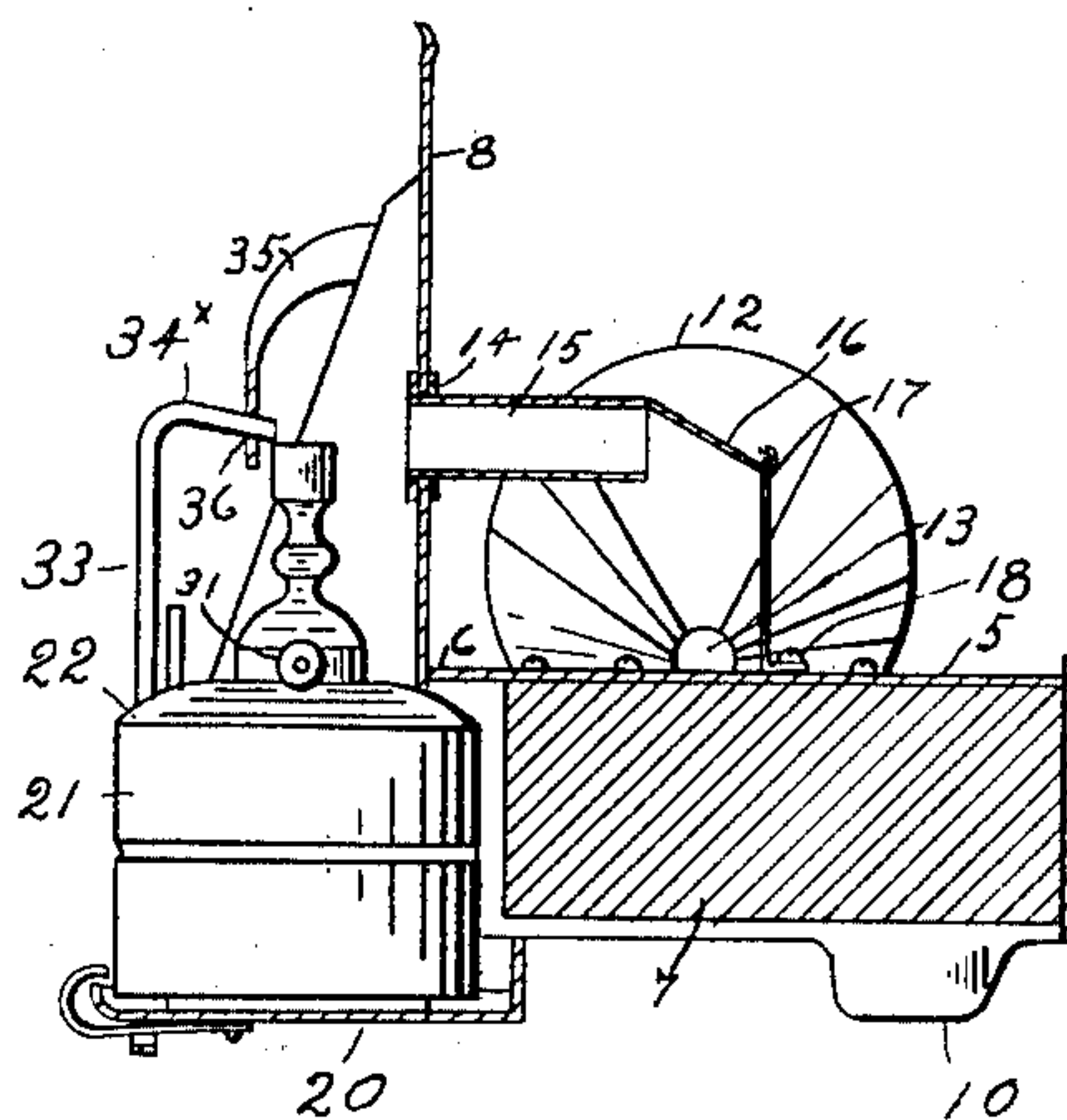
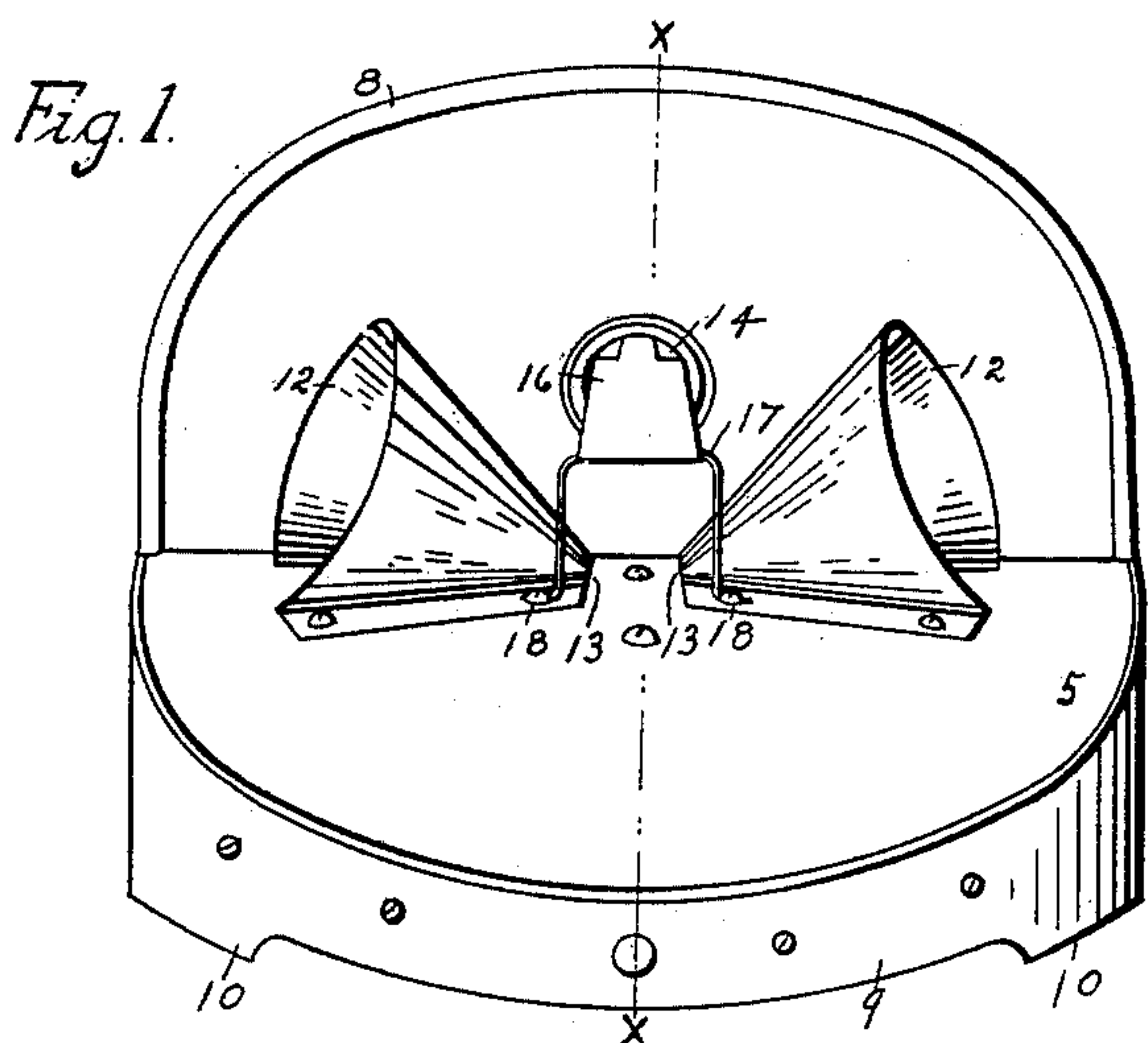


Fig. 3.

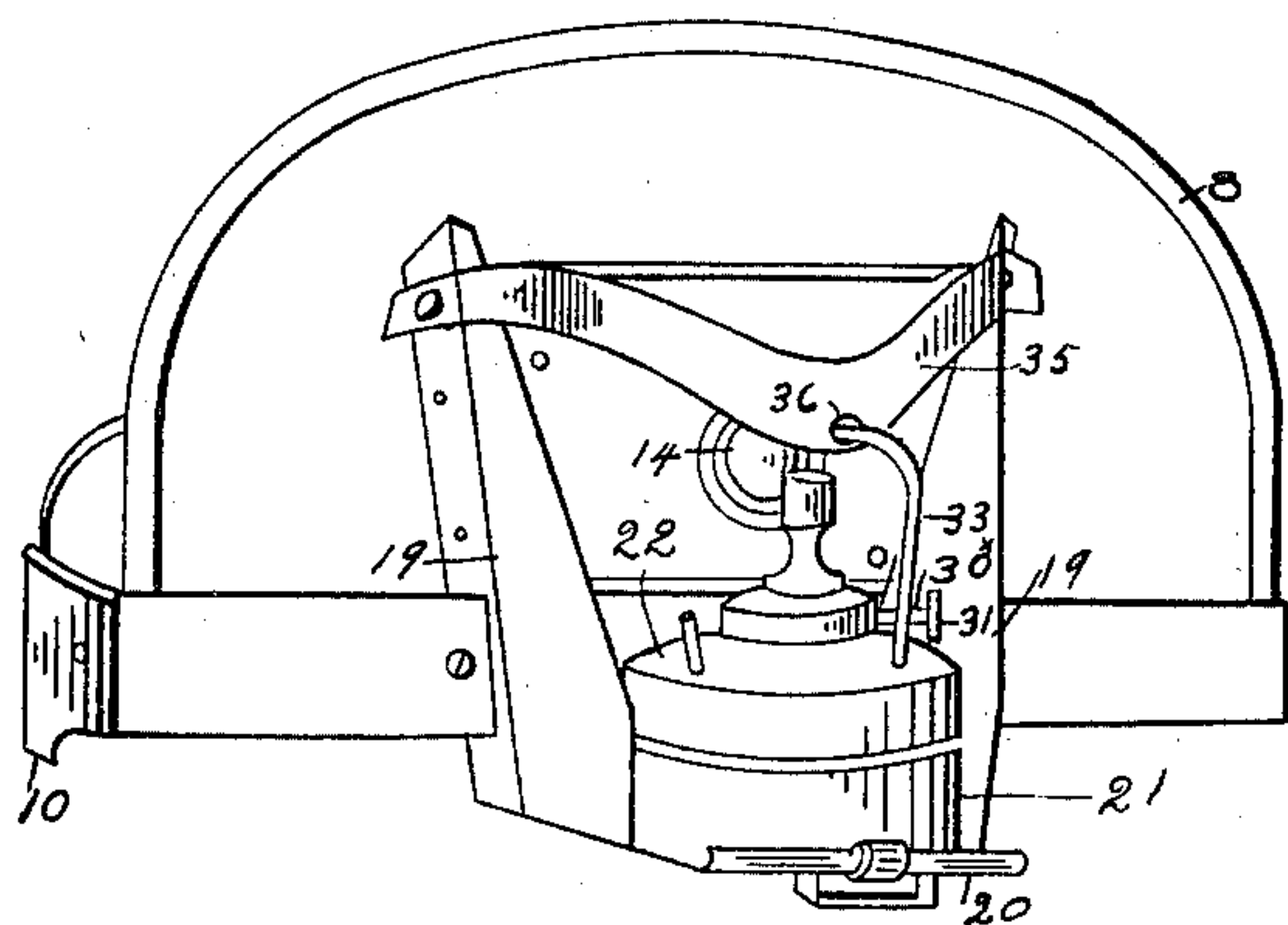
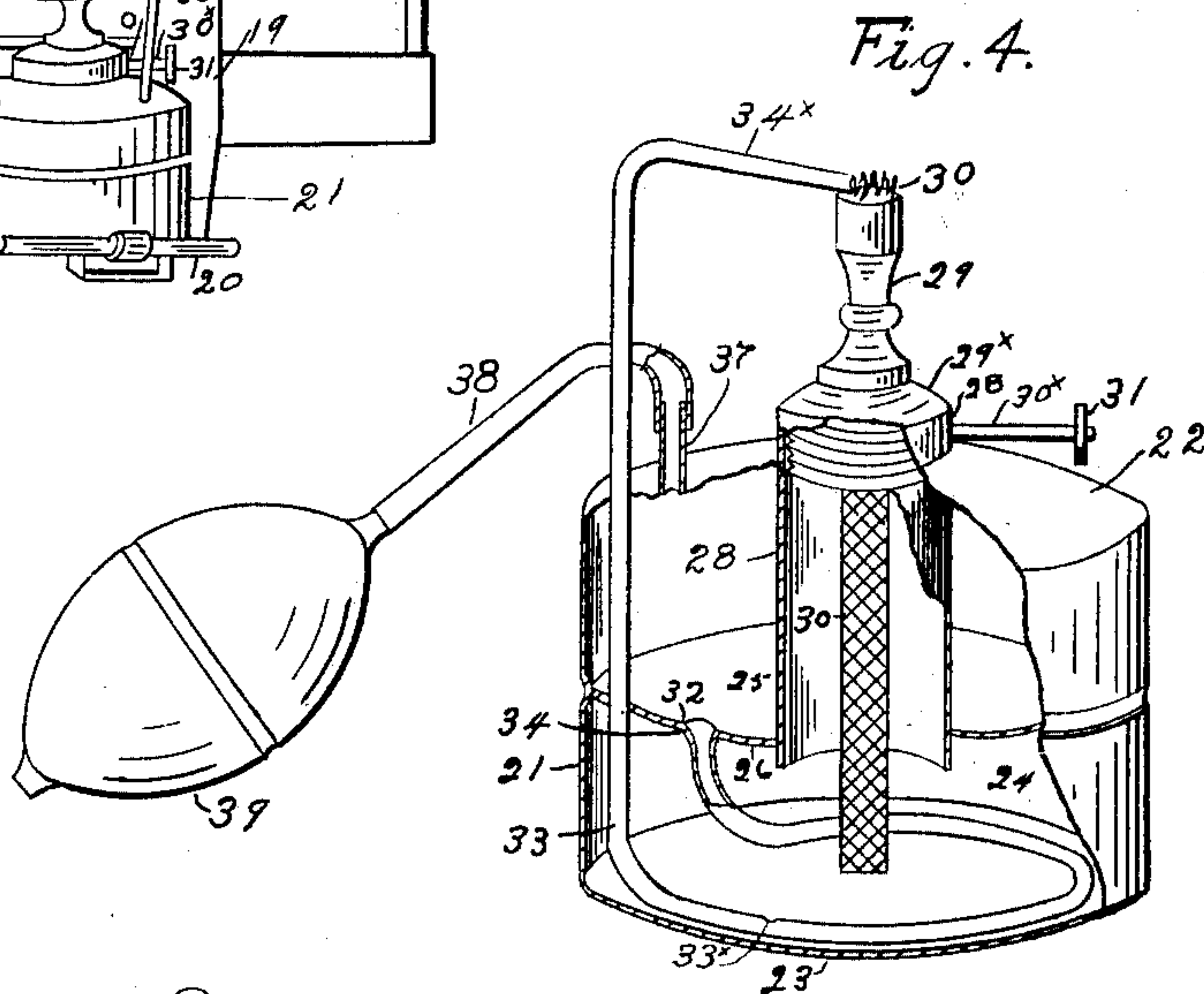


Fig. 2.



WITNESSES:

Charles N. Manning
John C. Duffy

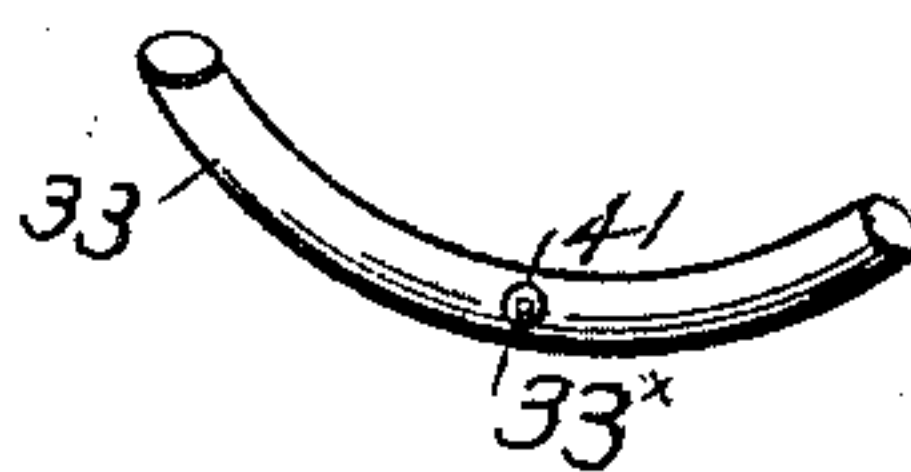


Fig. 5.

INVENTOR
Charles H. Nichols
BY
Richard Manning
ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. NICHOLS, OF ST. LOUIS, MISSOURI.

FLASH-LIGHT APPARATUS.

SPECIFICATION forming part of Letters Patent No. 756,399, dated April 5, 1904.

Application filed July 28, 1903. Serial No. 167,269. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. NICHOLS, a citizen of the United States of America, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Flash-Light Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to apparatus for the diffusing of light in instantaneous photography from the explosion of a quick-burning powder, and is an improvement upon the apparatus for which Letters Patent of the United States were granted to me on the 9th day of September, 1902, and numbered 708,909.

The object of the present invention is to communicate the pressure of the air to the fluid-secreting and blast tube from an air-chamber and avoid direct connection with the pneumatic blast device; second, to afford resistance to the force of the flame upon the flame-guide, and, third, to prevent the accidental displacement of the open end of the blast-tube from its position adjacent to the flame.

The invention consists in the novel construction and combination of parts, such as will be first fully described and then specifically pointed out in the claims.

In the drawings, Figure 1 is a front view of the improved flash-light apparatus. Fig. 2 is a rear view in perspective of the same. Fig. 3 is a vertical sectional view taken at right angles to the line xx on Fig. 1. Fig. 4 is a detail enlarged view of the lamp, a portion of the side being broken away to show the air-chamber and the fluid-secreting and blast tube and the pneumatic tube leading within the chamber. Fig. 5 is a detail view of a portion of the blast-tube, showing the non-corrosive opening.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the drawings the numeral 5 indicates the flash-pan upon which the explosive powder is

deposited, and comprises a flat plate the outer edge of which is preferably in a single outwardly-curved line and the inner edge 6 in a straight line, forming a semi-elliptical plane or figure. The flash-pan is secured to the upper surface of a base or block 7 of considerable thickness and of like formation, the outer curved edge being upon a line vertically with the edge of the flash-pan, the rear straight edge of the flash-pan extending a short distance rearwardly from the line of the rear straight edge of the block. With the rear edge of the flash-pan 5 is connected rigidly the lower edge of an upright shield or plate 8. The upper edge of the plate 8 is curved in the arc of a circle. Upon the outer curved surface of the base-block 7 is secured a face-plate 9, the upper edge portion of which extends a short distance above the level of the flash-pan and retains the unexploded fulminate dispersed by the explosion upon the pan. From the lower edge of the face-plate extend downwardly below the line of the under surface of the base-block the extensions 10, which form supports for said base-block. Upon the flash-pan are secured the cone-shaped receivers 12 12, which are arranged in position parallel with and a short distance forwardly of the shield or plate 8 and with their apexes toward each other and spaced apart. In these apexes of the receivers are openings 13. In the upright plate or shield 8 is an opening 14 a short distance above the level of the pan, in which is fitted one end of a flame-guiding tube 15, the outer end of which tube is above the apexes of the separate receivers 12 12 and the spaces for the train of fulminate between said apexes and also a slight distance rearwardly of a vertical line extending through said apexes.

With the upper edge portion and outer end of tube 15 is connected the upper end of a flame-deflecting plate 16, which extends outwardly and downwardly, the lower end of the plate being supported by a straight piece of wire 17, around which the lower end of the plate 16 is bent outwardly upon itself to form a loop. The ends of the wire are bent at right angles and extended downwardly to the flash-pan and secured thereto by the screws 18 18.

Upon the rear side of the shield 8 are the

separate outwardly-extended plates 19 19, which form side supports for the flash-lamp. The inner edges of the plates 19 19 are bent outwardly at right angles and secured rigidly to the shield or plate 8. The lower ends of the plates 19 19 extend downwardly to a position horizontally with the lower ends of the extensions 10 10 on the face-plate 9 on the base 7, and said lower ends of plates 19 19 are inclined inwardly in a slight degree. The outer edges of the plates 19 19 are inclined outwardly and downwardly from the shield 8. Connected rigidly with the lower ends of the plates 19 19 is a horizontal support or plate 20, which extends from one plate 19 to the other and also outwardly a short distance from the outer edges of the supports 19 19.

Upon the plate 20 between the supports 19 19 is arranged the flash-lamp 21, which consists of a cylindrical reservoir or vessel, the side of which is adjacent to the rear edge of the base-block 7 and the top 22 extending to a position a short distance below the line of the inner edge 6 of the flash-pan 5. The interior of the flash-lamp is divided horizontally in two chambers 24 and 25 by the diaphragm 26, the lower chamber 24 containing the ignitable fluid, such as alcohol, the upper chamber forming an air-chamber. Through the top 22 of the reservoir 21, at a point equidistant from the sides of said reservoir, extends downwardly a tube or cylinder 28 of considerable size, the lower end of which tube extends through the diaphragm 27 into the chamber 24 and to a position a short distance above the bottom 23 of the reservoir. The upper end of tube 28 is screw-threaded externally and extends a short distance above the upper surface of the top of the reservoir, and upon said end is a removable alcohol-burner 29, the upper end of which burner is upon a line horizontally with the opening 14 in the shield or plate 8, the lower end having an enlarged portion fitted to the screw-threaded end of tube 28. Within the burner 29 is a wick 30, extending downwardly into the alcohol in chamber 24 within the tube 28, which is hermetically connected with the top 22 and the diaphragm 26. In the burner 29 is the usual wick-adjusting feed-rod 30, upon which is a circular head 31.

In the diaphragm 26 is an opening 32. With the under side of the diaphragm and extending around the opening is connected hermetically one end 34 of the fluid-secreting and blast tube 33, said end of the tube being expanded in a degree larger than the other portion of the tube, or cup-shaped, which permits of a drainage back of the alcohol which may rise from suction within the chamber. The other end of the blast-tube 33 is extended downwardly to the bottom 23 of the reservoir and thence extended in a single coil upon said bottom, thence extended upwardly along the inner surface of the side of the reservoir

through the top 22 and to a height a slight degree above the upper end of the burner 29, thence bent at right angles at 34 and extended in a transverse direction to the burner, the said bent portion 34 terminating at a point in a vertical line with the inner side of said burner and being directed toward the opening 14 in the plate 8. In the coil of the blast-tube 33 near the bottom of the reservoir is a small perforation 33*. In order to support the bent portion 34 of the blast-tube from accidental displacement, an outwardly-curved plate 35 is secured at each end to the rear side of the plate 8 near the flanges in the plates 19 19, in which supporting-plate 35 is an opening 36, which permits the passage of the bent portion 34 of the blast-tube. With the top 22 of the reservoir 21 is connected one end of an air-supporting tube 37, the other end of which tube extends a short distance upwardly, and with the said end is connected one end of a flexible rubber tube 38 of suitable length, the outer end of said tube being connected with an air-suction and blast-air-compression bulb 39.

In operation the fulminate is placed upon the flash-pan within the receivers 12 12 and near the apexes, a train of the fulminate extending through the openings 13 13 of these apexes and beneath the flame-deflecting plate 16. The chamber 24 in the reservoir 21 of the flash-lamp is supplied with alcohol in the proper quantity, preferably to a height below the tube or cylinder 28, the alcohol being admitted by the removal of the burner 29 through the tube 28. The alcohol enters the opening 33* and is secreted in the blast-tube. The wick 30 is then ignited. Pressure being given the pneumatic bulb 39, air is supplied to the air-chamber 25 in the reservoir until the pressure is sufficient to force the alcohol secreted in the blast-tube through the discharge end, and being quickly ignited the flame is directed through the tube 15, the plate 16 deflecting the flame upon the explosive powder upon the flash-pan, the powder being exploded thereby and also the powder in the receivers 12 12, the receivers spreading the flame, and a wide area of illumination is obtained. In the supply of the air to the air-chamber 25 should the release of the pressure from the pneumatic action of the bulb 39 cause the alcohol to rise in the tube and enter the air-chamber during the operation of the lamp it will readily drain out. The air being supplied to the top of the chamber from the bulb, the pressure of air acts as a check to the alcohol, and consequently none can enter the air-supply tube, thus obviating the necessity of a check-valve in said tube. The reservoir is held in place on the horizontal support 20 by a spring-catch 40, which being depressed permits the withdrawal of the lamp from its support. The opening 33* in the blast-tube is made small in size, the opening being made, as seen in

Fig. 5, in the first instance larger in size and this opening filled with solder, as seen at 41, and in the solder is drilled the smaller opening 33. This guards the opening from cor-
5 roding.

It is obvious that the flash-lamp may be employed independently of the other parts of the apparatus and for other uses, as in soldering metals or in reducing them for analysis
10 or in instances where an intense flame is required.

Such modifications of the invention may be employed as are within the scope of the invention.

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

1. A flash-lamp comprising a reservoir and a burner, a fluid-secreting and blast tube having air-inlet and fluid-discharge ends, and a
20 portion of said tube intermediate said ends extending within the reservoir and provided with a fluid-induction opening, the discharging end of said tube extending upwardly and
25 disposed transversely to the burner, an air-receiver with which the air-inlet opening of said tube is connected, and a pneumatic blast device connected with the air-receiver.

2. A flash-lamp comprising a reservoir having a chamber for the ignitable fluid, and a
30 separate chamber for air, a diaphragm separating one of said chambers from the other, a burner and a fluid-secreting and blast tube having air-inlet and fluid-discharging ends, said air-inlet opening being connected with
35 the air-chamber, and a portion of said tube intermediate said ends extending within the reservoir and provided with a fluid-induction opening and the discharging end of said tube
40 extending upwardly and disposed transversely to the flame of the burner, and means for supplying air under pressure to said air-chamber.

3. A flash-lamp comprising a reservoir having a chamber for the ignitable fluid, and a
45 separate chamber for air, a diaphragm extending transversely to the reservoir separating

one chamber from the other and having an opening therein, a tube or cylinder having its lower end extending through the top of said reservoir and through said diaphragm, 50 and a burner at its upper end, a fluid-secreting and blast tube having air-inlet and fluid-discharging ends, and the inlet end of said tube extending within the chamber for the ignitable fluid, connected with the opening in 55 the diaphragm, said portion of the tube within said chamber having a fluid-induction opening, the discharging end of said tube extending upwardly and disposed transversely to the flame of the burner, and a pneumatic 60 blast device connected with the top of said reservoir.

4. In a flash-light apparatus, the combination with the flash-pan, an upright shield having an opening therein, a flame-guiding tube 65 arranged opposite said opening, a flame-deflector at the outer end of said tube and a support for the outer end of said flame-deflector.

5. In a flash-light apparatus, a flash-pan, an upright shield having an opening therein, a 70 flame-guiding tube arranged above the plane of the pan, opposite said opening, a flame-deflecting plate on the outer end of said tube, inclined outwardly and downwardly, and a support for the outer end of said plate extend- 75 ing to the said pan.

6. In a flash-light apparatus, an upright shield having an opening therein, a flash-lamp and a support for said lamp on the said shield, a blast-tube extending from the lamp in the 80 direction of said opening and a support for said tube connected with said shield.

7. In a flash-lamp, a reservoir, a blast-tube having air-inlet and fluid-discharging ends, and a portion of said tube extending within 85 the reservoir, provided with a non-corrosive fluid-induction opening.

CHARLES H. NICHOLS.

Witnesses:

LOUIS E. BAYER,
F. J. HILTMAN.