

**No. 647,041.**

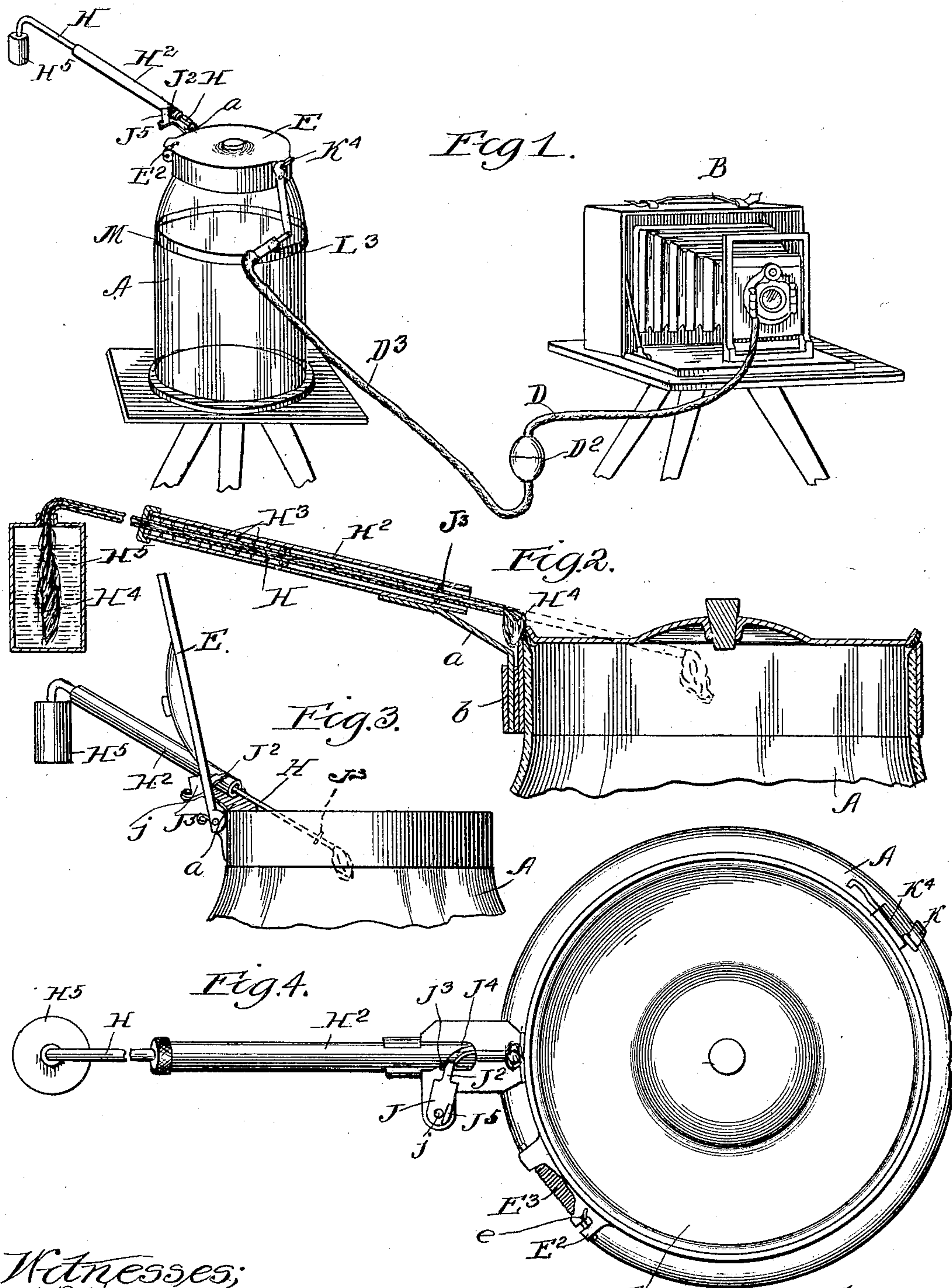
**Patented Apr. 10, 1900.**

**A. H. SPURR.**  
**FLASH LAMP.**

(Application filed July 3, 1899.)

**2 Sheets—Sheet 1.**

(No Model.)



Witnesses;  
J. B. Weir  
Ara D. Perry

*E. Inventor*  
*Arthur H. Spurr,*  
*By Chas. C. Buckley.*  
*Atty*

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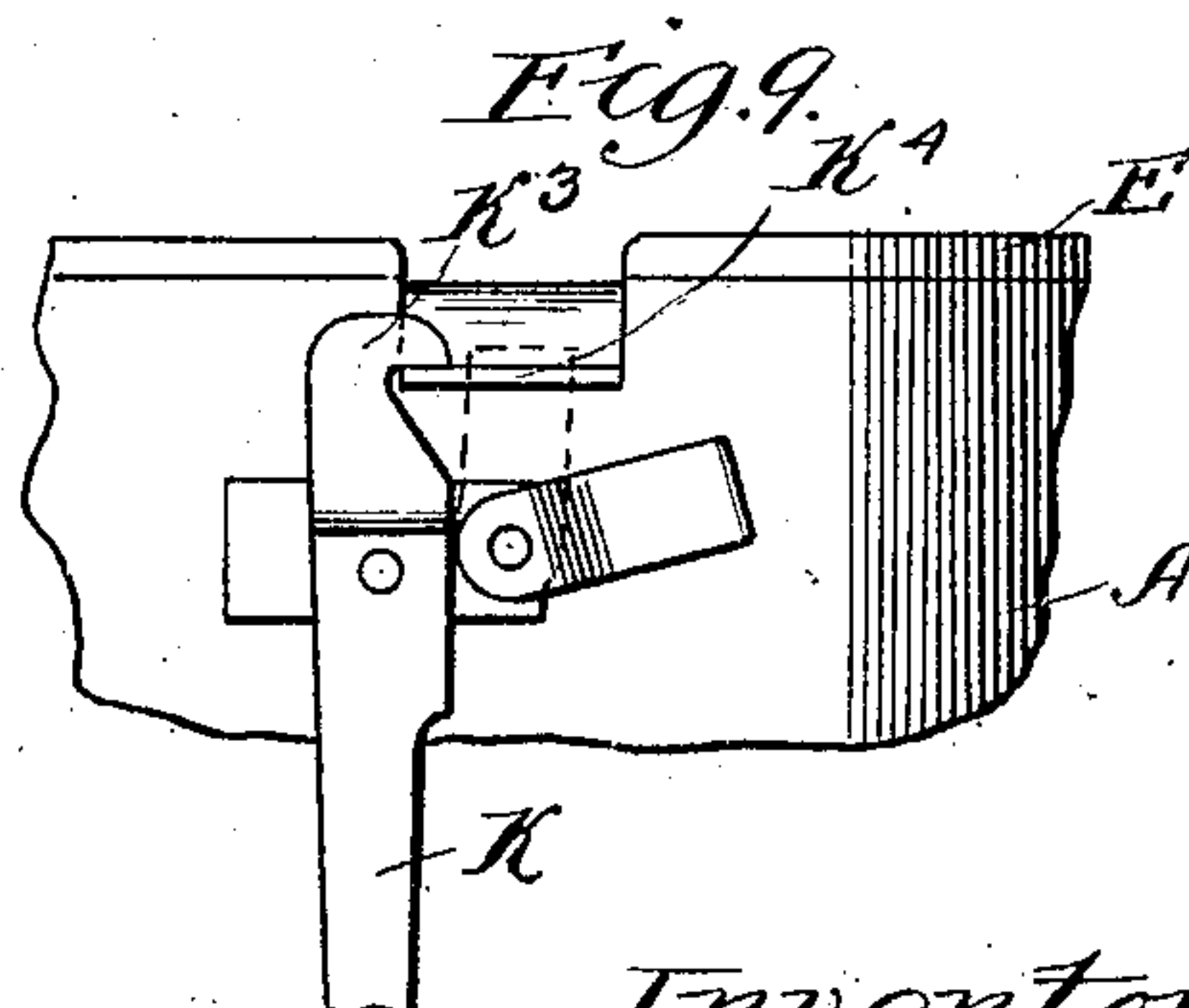
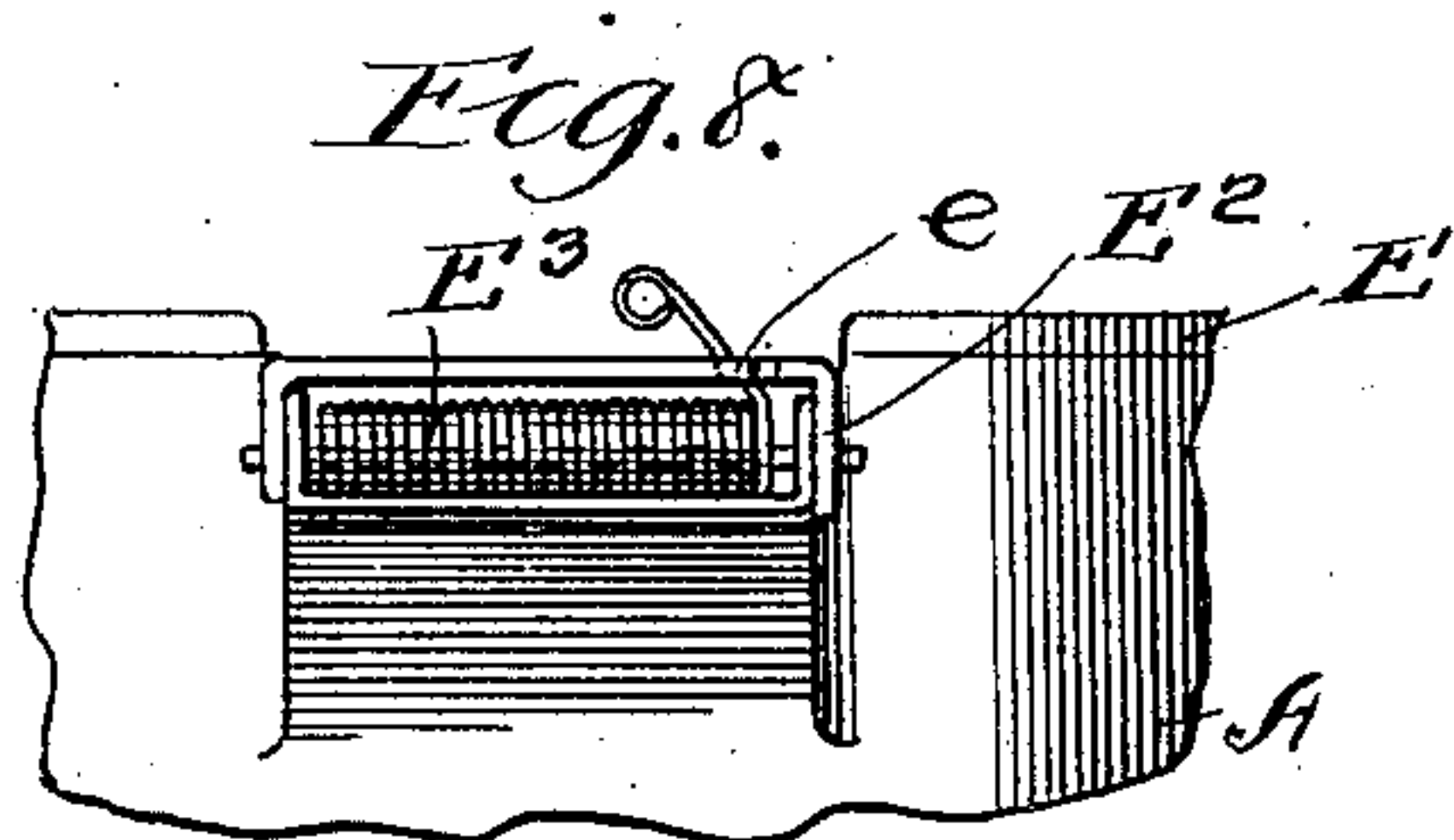
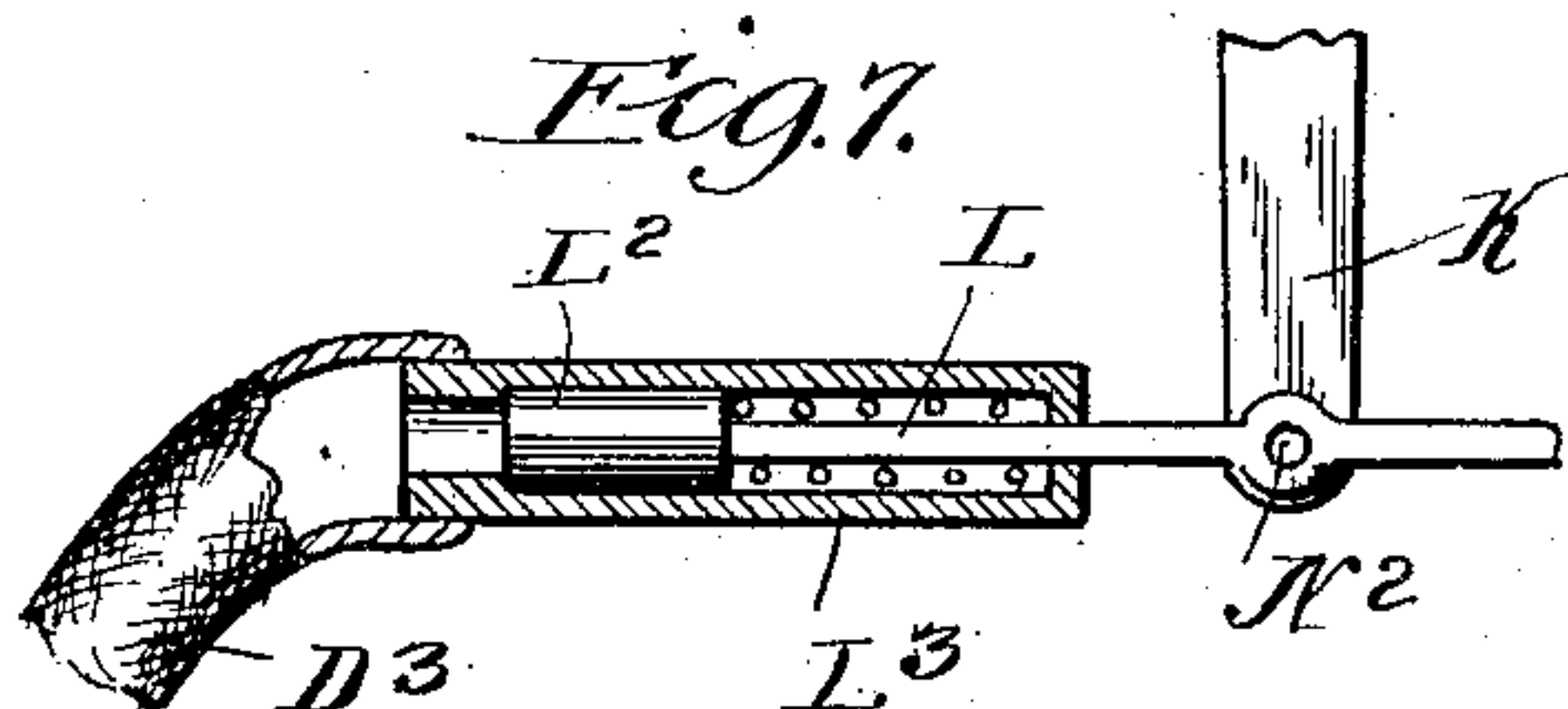
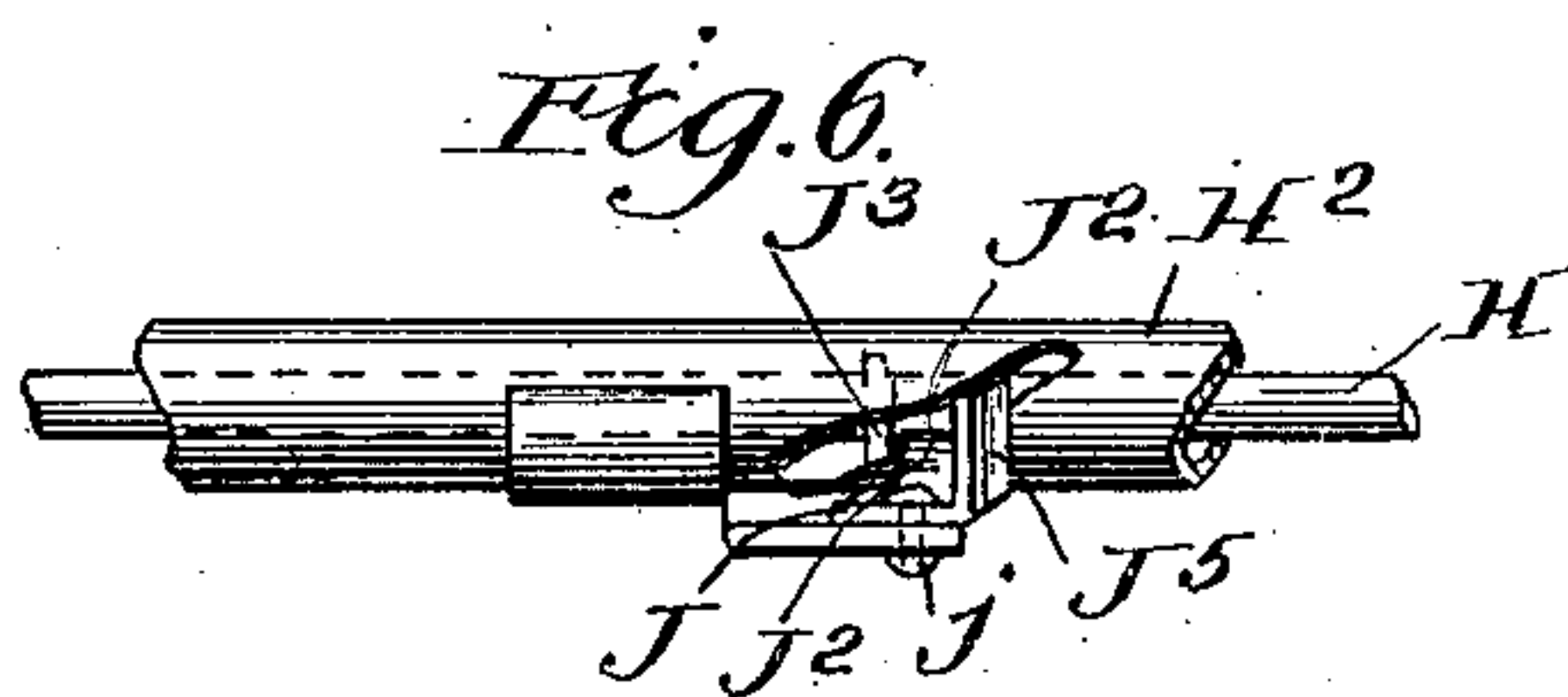
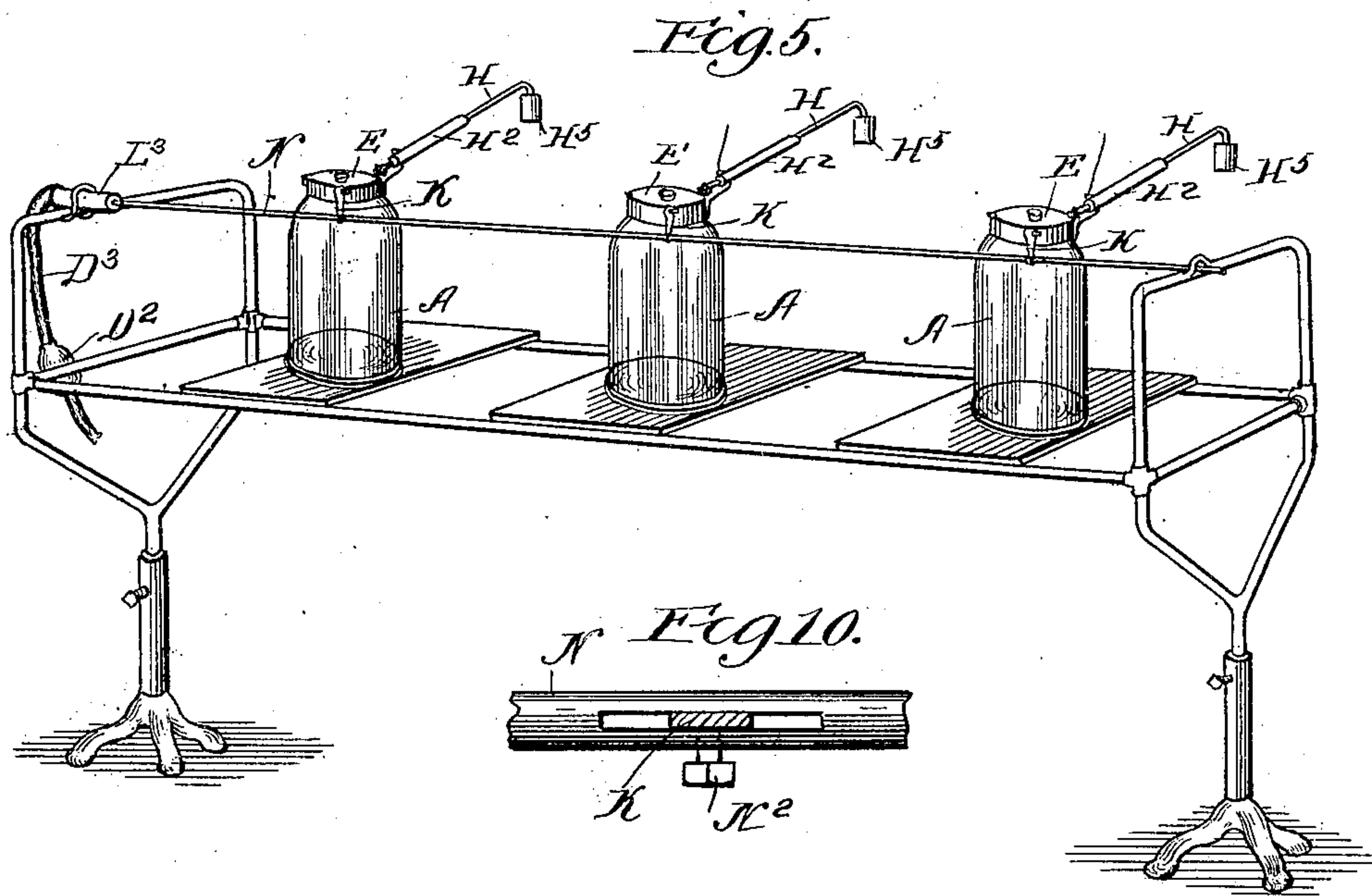
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Witnesses;  
J. B. Keir  
H. Perry

Inventor  
Arthur H. Spurr,  
by Chas. C. Bulkley, Atty



# UNITED STATES PATENT OFFICE.

ARTHUR H. SPURR, OF CRESTON, IOWA.

## FLASH-LAMP.

SPECIFICATION forming part of Letters Patent No. 647,041, dated April 10, 1900.

Application filed July 3, 1899. Serial No. 722,671. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR H. SPURR, a citizen of the United States of America, and a resident of Creston, Union county, Iowa, have invented a certain new and useful Means for Producing Artificial Light for Use in Photography, of which the following is a specification.

My invention relates to certain improvements in means for creating an artificial light for use in the exposure of sensitive plates in photography.

Heretofore in photographic work it has been usual to create such artificial light by what is known as the "flash-light" method, consisting in igniting a chemical compound in a powdered state, which flashes instantaneously and produces a momentarily-existing artificial light, during the existence of which the plate is exposed. This flash-light is accompanied by a loud report and is followed by a disagreeable odor and a large volume of smoke.

One object of my invention is to produce an artificial light without noise and without such disagreeable odor and accompanying volume of smoke and which light shall be of a superior character.

My invention has certain other objects in view; and it consists in certain features about to be described, and pointed out in my claims, reference being now had to the accompanying drawings, in which—

Figure 1 is a perspective view of a camera and light-producing apparatus. Fig. 2 is an enlarged central sectional view of the top portion of the reservoir and of the ignition device. Fig. 3 is an elevation of the top portion of the apparatus, showing the engagement of the trigger by the lid of the reservoir. Fig. 4 is a plan view of the apparatus. Fig. 5 is a perspective view of a series of light-producing devices coupled together. Fig. 6 is a detail perspective view of the triggering arrangement for releasing the wick-carrier rod. Fig. 7 is an enlarged central longitudinal section of the pneumatic connection for operating the pivoted trigger of the reservoir-lid. Fig. 8 is a detail view showing the spring connection on the reservoir lid or cover. Fig. 9 is a detail view of the pivoted trigger. Fig. 10 is a detail of the separable connection be-

tween the cover-trigger lever and the operating-rod.

In carrying out my invention I provide a transparent reservoir or receiver in which an inflammable gas is stored. This gas is confined in the reservoir until it is desired to create an artificial light, when the gas in the reservoir is ignited, and the illuminating-gas then creates an artificial light within the reservoir, which radiates through the transparent sides of the reservoir, and thus establishes an area of light within which the sensitive photographic plate is exposed. In the development of the apparatus for effectively carrying out this main feature of my invention I have provided certain combinations of parts, details of construction, and arrangements, which are also a part of my invention.

The transparent reservoir or receiver A is made of glass or other suitable transparent material and is in the form of a jar, as shown. In this reservoir A an inflammable and illuminating gas is stored, and as it is desirable to produce a light rich in active rays I prefer to use a nitric-oxid gas rendered inflammable by carbon bisulfid, although I do not limit myself to such a gas. When this gas is ignited, a light is generated, the rays of which radiate through the transparent sides of the reservoir. Within the area of light so generated the photographic plate is exposed.

It is desirable to provide means whereby the shutter may be operated concurrently with the production of the artificial light or the exposure effected at the same time or slightly in advance of the production of light. To accomplish this result, I provide the arrangement shown in Fig. 1. The camera B has its shutter connected in the usual manner with the pneumatic operating device comprising the flexible tube D and the compression-bulb D<sup>2</sup>. This bulb is also connected with the light-producing apparatus, by means of the tube D<sup>3</sup>, in a manner to be described, and as this apparatus is adapted to operate automatically to ignite the gas in the reservoir A when the bulb B is compressed the shutter is operated to expose the plate as the gas is ignited.

The means for automatically opening the gas-reservoir A and igniting the gas therein



comprises a lid or cover E, pivoted or hinged at E<sup>2</sup> upon the reservoir and acted upon by a spring E<sup>3</sup>, which tends to open the cover or lid on its hinge, and thus afford access to the interior of the reservoir. Removably secured upon the upper portion of the reservoir, by means of the lug a, engaged in the sleeve b, is the ignition device, which consists of a wick-carrier rod H within the sleeve H<sup>2</sup>, a spring H<sup>3</sup> normally tending to press the wick-carrier rod toward the reservoir. One end of the wick H<sup>4</sup> is within the reservoir H<sup>5</sup>, containing alcohol or other suitable inflammable liquid, and the other or ignition end is adjacent to the gas-reservoir. The wick-carrier rod H is held retracted against the pressure of the spring H<sup>3</sup> by means of the triggering device, Fig. 6, consisting of a trigger J, having a tongue J<sup>2</sup>, which engages a projection J<sup>3</sup> on the wick-carrier rod, this tongue extending into an oblique slot J<sup>4</sup> in the sleeve H<sup>2</sup>, and as the tongue is engaged against one side of the slot and engages the projection of the wick-carrier rod this rod is held in a retracted position. The trigger J is loosely pivoted at J and has an upwardly-extended arm or abutment J<sup>5</sup>, adapted to be engaged by the lid or cover of the reservoir when it is forcibly thrown back into an open position. The lid or cover E is held shut also by means of a triggering device comprising a trigger-lever K, pivoted at K<sup>2</sup> to the latching head K<sup>3</sup>, engaging a lug K<sup>4</sup>, projected from the lid or cover. If it is desired to hold the lid permanently closed, the button K<sup>5</sup> may be brought into engagement with the lug K<sup>4</sup>, as shown by the dotted lines in Fig. 9.

The pneumatically-operated connection for triggering the lid or cover is shown in Fig. 7, and it consists of a piston-rod L and piston-head L<sup>2</sup>, movable within the cylinder L<sup>3</sup>, the piston-rod being connected to the trigger-lever K. A spring L<sup>5</sup>, bearing on the piston-head L<sup>2</sup>, normally tends to preserve the latch connection between the trigger-lever K and the lid or cover-lug K<sup>4</sup>. As one end of the cylinder L<sup>3</sup> is connected to and communicates into the tube D<sup>3</sup>, when the bulb D<sup>2</sup> is compressed the air-pressure acts upon the piston-head L<sup>2</sup>, overcomes the opposed spring-pressure, and thrusts the piston in a direction which unlatches the trigger-lever and releases the lid or cover, which latter is then violently thrown backward on its pivot by the spring E<sup>3</sup>. In the backward movement of the lid or cover it strikes violently against the trigger-lever arm J<sup>5</sup>, which releases the wick-carrier rod H, and as the end of the wick H<sup>4</sup> is now lighted an igniting-flame is quickly advanced into the now-open end of the gas-reservoir, thus igniting the gas in the reservoir and establishing an area of light and also concurrently exposing the sensitive plate in the camera, as the pressure generated by the compression of the bulb also actuates the shutter.

The pneumatic triggering piston and cylin-

der are held upon the side of the reservoir by a band M.

A yielding pressure device consisting of the coiled spring E<sup>3</sup> for opening the lid or cover is connected at one of its ends in an engaging notch e, and upon releasing this end from such engagement the spring is disconnected from the cover, so that the latter may be readily manipulated.

By means of the arrangement now described I provide means for automatically establishing an area of artificial light, within which the sensitive plate is exposed, and control the generation of the light from the same point of operation for control of the shutter.

By providing a transparent reservoir containing a gas capable of ignition to produce artificial light I am able to obtain photographs under conditions prohibited when the ordinary flash-light is produced by igniting a compounded powder. Thus the photographing of expensive and delicate draperies in the night-time is frequently prohibited because of injury to the draperies from the smoke and gas of the flash-light. The loud detonating report is also a source of annoyance. All this is avoided by my invention, as the cover or lid of the reservoir may be immediately closed to prevent the escape of the gas, is smokeless and noiseless when ignited, and is largely confined within the reservoir, the generated light therein radiating through its transparent sides. Again, the reservoirs are capable of being stored or charged with the gas and are in readiness for instant use. Further, a gas may be and preferably is used which is rich in active rays. As the gas is stored in these transparent reservoirs, a battery of reservoirs may be employed, as shown in Fig. 5. Under such conditions a plurality of reservoirs A are assembled and mounted upon a suitable table or supporting-frame and connected together in whole or part by an operating-rod N, which is laterally thrust or moved by a pneumatic device similar to that employed to trigger the lid or cover of the reservoir. When the bulb D is compressed, the piston L, connected to the rod N, imparts a lateral movement to the rod, and as the triggers K, holding the lids or covers of the reservoirs, are secured to this rod its lateral thrust operates to release the several lids or covers, each of which opens and triggers its respective ignition device to produce the artificial light. In this way I produce a more intense or wider area of artificial light by automatically igniting the contents of a plurality of reservoirs simultaneously. This result may also be accomplished concurrently with the operation of the shutter.

If it is desired to ignite the contents of only one reservoir or of a pair of reservoirs, for instance, of the battery, the connection between the operating-rod N and the reservoir or reservoirs to be cut out is removed by loosening the set-screw N<sup>2</sup>, which removably con-



nects the trigger to the rod. Thus the quantity of light produced may be regulated as is found necessary in practice.

5 The word "translucent" is generally understood to include a body which will permit the passage of light, but which is not necessarily transparent. The word "transparent" is generally understood to mean a body which permits the passage of light and which also  
10 permits objects to be seen through it. I have selected the word "diaphanous" as a term applied to my reservoir as distinguished from "opaque," meaning to include a transparent or translucent reservoir.

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

1. Means for subjecting the sensitive plate of a photographic apparatus to the action of  
20 artificial light consisting in a diaphanous gas-containing reservoir, having a suitable gas therein capable of illumination, and means for opening the reservoir to permit ignition of the gas as the sensitive plate is exposed.

25 2. A device for exposing the sensitive plate of a photographic apparatus, and also produce an artificial light comprising a pneumatic device connected with and operating the shutter, a diaphanous gas-reservoir, normally  
30 sealed, and pneumatically-operated means for opening the reservoir, together with an ignition device which is operated to ignite the gas of the reservoir as the shutter is operated to expose the plate.

35 3. An apparatus for exposing the sensitive plate of a photographic apparatus and also produce an artificial light at or about the same time as the said exposure, consisting of a pneumatic generating member for generating  
40 a pneumatic pressure, a diaphanous reservoir containing an illuminant gas, means for opening the gas-reservoir, and pneumatic connections between said means and the pneumatic generating member and also between  
45 said member and the shutter, together with an ignition device operated when the reservoir is uncovered, whereby the sensitive plate is exposed and the gas ignited from one and the same point of manual operation.

50 4. In a photographic apparatus a diaphanous gas-reservoir, an illuminant gas therein, a cover pivoted thereon, a yielding pressure

device tending to open the cover, a holding-trigger for the cover, a pneumatic member  
55 for generating an air-pressure to operate the trigger and release the cover, an ignition device which is brought into a position to ignite the gas in the reservoir when the cover is released and a camera-shutter, together with  
60 pneumatic connections between the shutter and the pneumatic member.

5. In a photographic apparatus, a device for producing artificial light consisting of a diaphanous gas-reservoir, a movable cover  
65 therefor, an ignition device, the igniting flame of which is near the reservoir, said ignition device comprising in construction a holding-trigger, a flame-carrying member withheld by said trigger, means whereby said  
70 trigger is released when the gas-reservoir is opened and a yielding pressure device for advancing the flame-carrier.

6. In a photographic apparatus, a device for producing artificial light consisting in a diaphanous gas-reservoir, a movable cover  
75 therefor, an ignition device, the igniting flame of which is near the reservoir, said ignition device comprising in construction a holding-trigger, a flame-carrying member withheld by said trigger, means whereby said  
80 trigger is released when the gas-reservoir is opened a yielding pressure device for advancing the flame-carrier, and a camera-shutter, together with a lock for the cover and a pneumatic device for concurrently operating said  
85 lock to release the cover and also actuate the shutter.

7. In a photographic illuminating device, the combination with the shutter of a camera,  
90 of a plurality of diaphanous reservoirs containing an illuminating-gas, a pneumatic device for operating the shutter to expose the plate, a trigger for each of the covers of said reservoirs, a connecting member between  
95 said pneumatic device and the triggers and means for connecting any one or more of said triggers to the connecting member, together with an ignition device for each reservoir.

Signed by me at Chicago, Cook county, Illinois, this 30th day of June, 1899.

ARTHUR H. SPURR.

Witnesses:

CHAS. C. BULKLEY,  
LUCY M. BULKLEY.