

(No Model.)

2 Sheets—Sheet 1.

C. & F. H. CLIFFORD.
PHOTOGRAPHIC FLASH LIGHT APPARATUS.

No. 560,778.

Patented May 26, 1896.

FIG. 1.

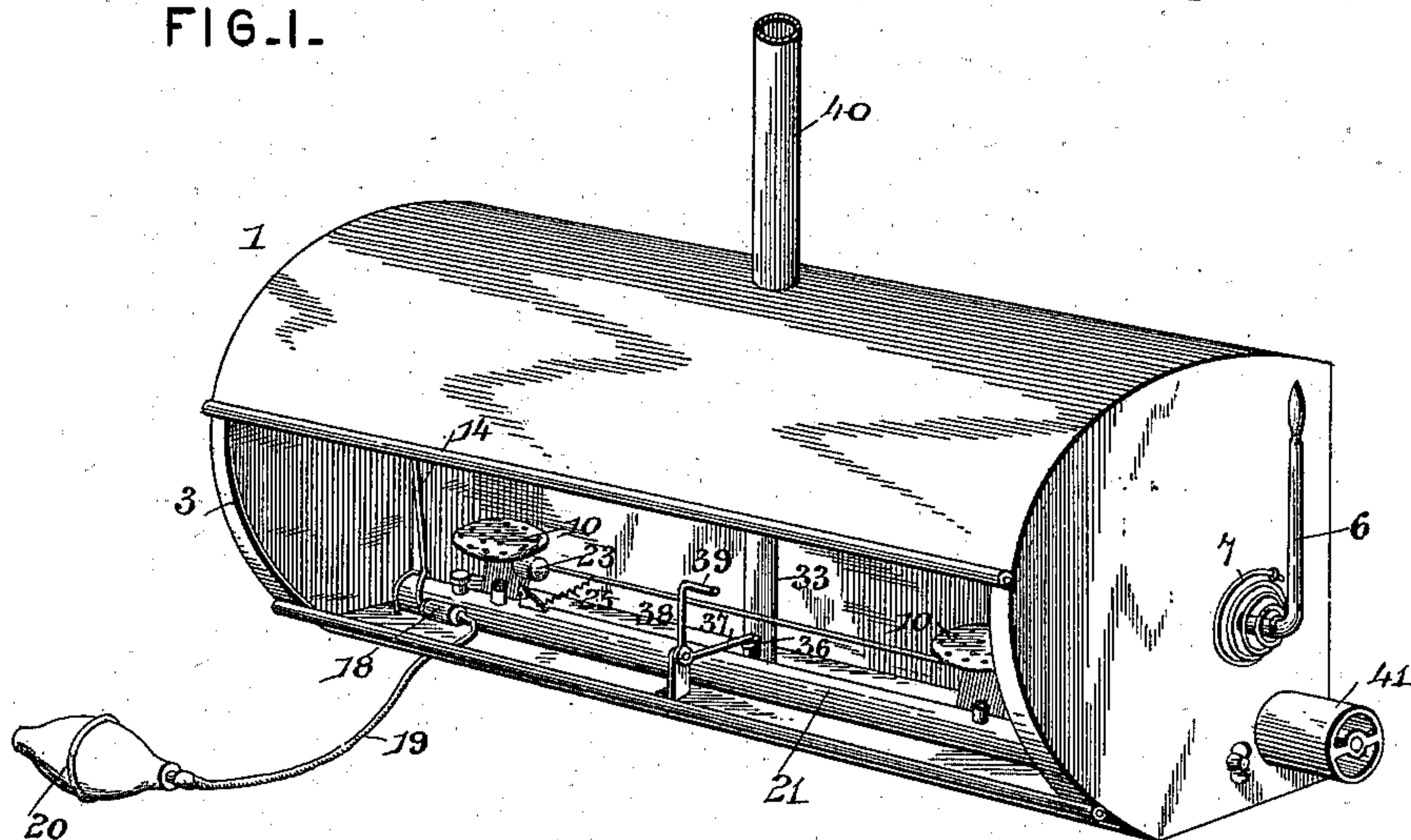


FIG. 4.

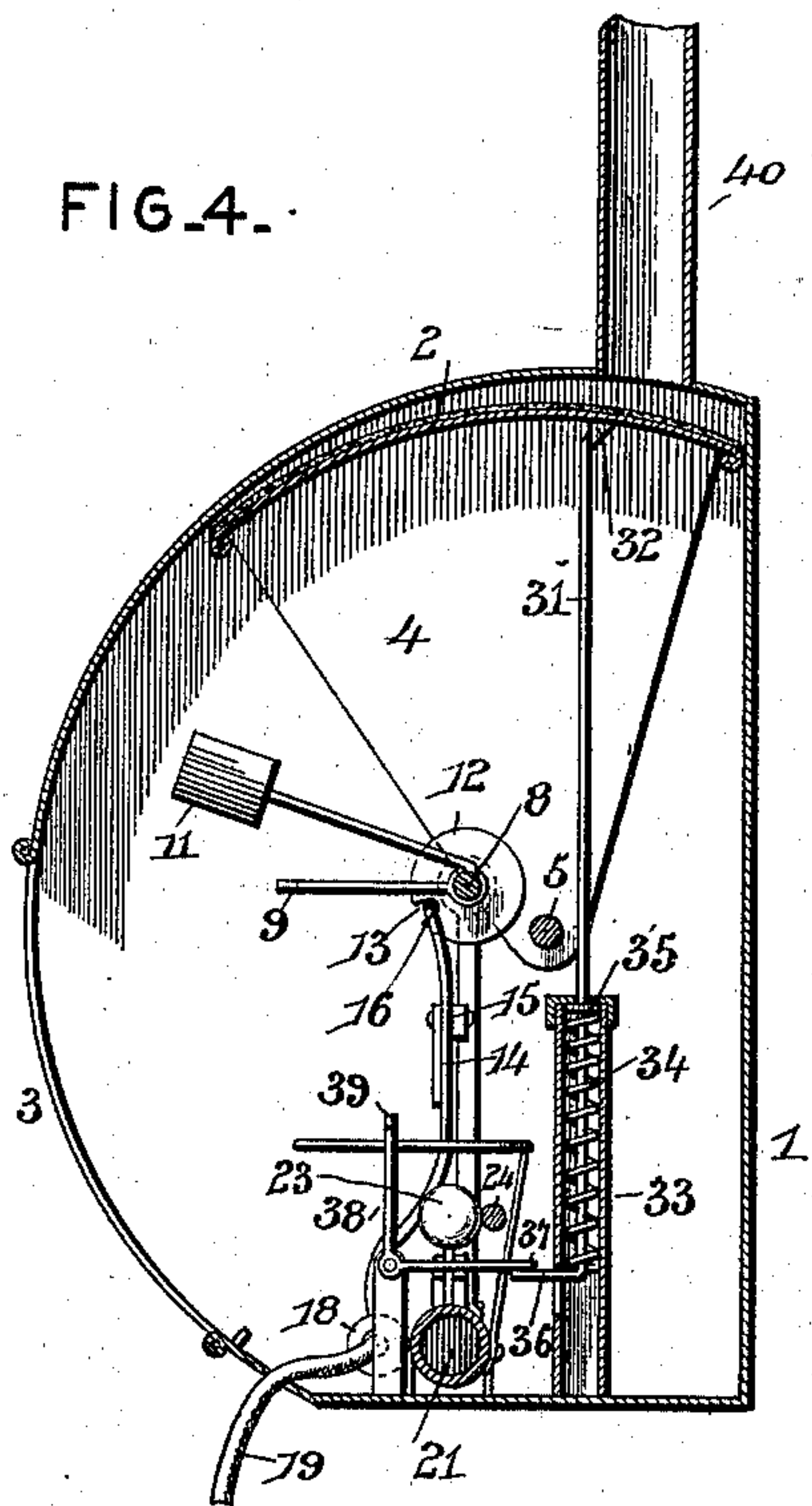
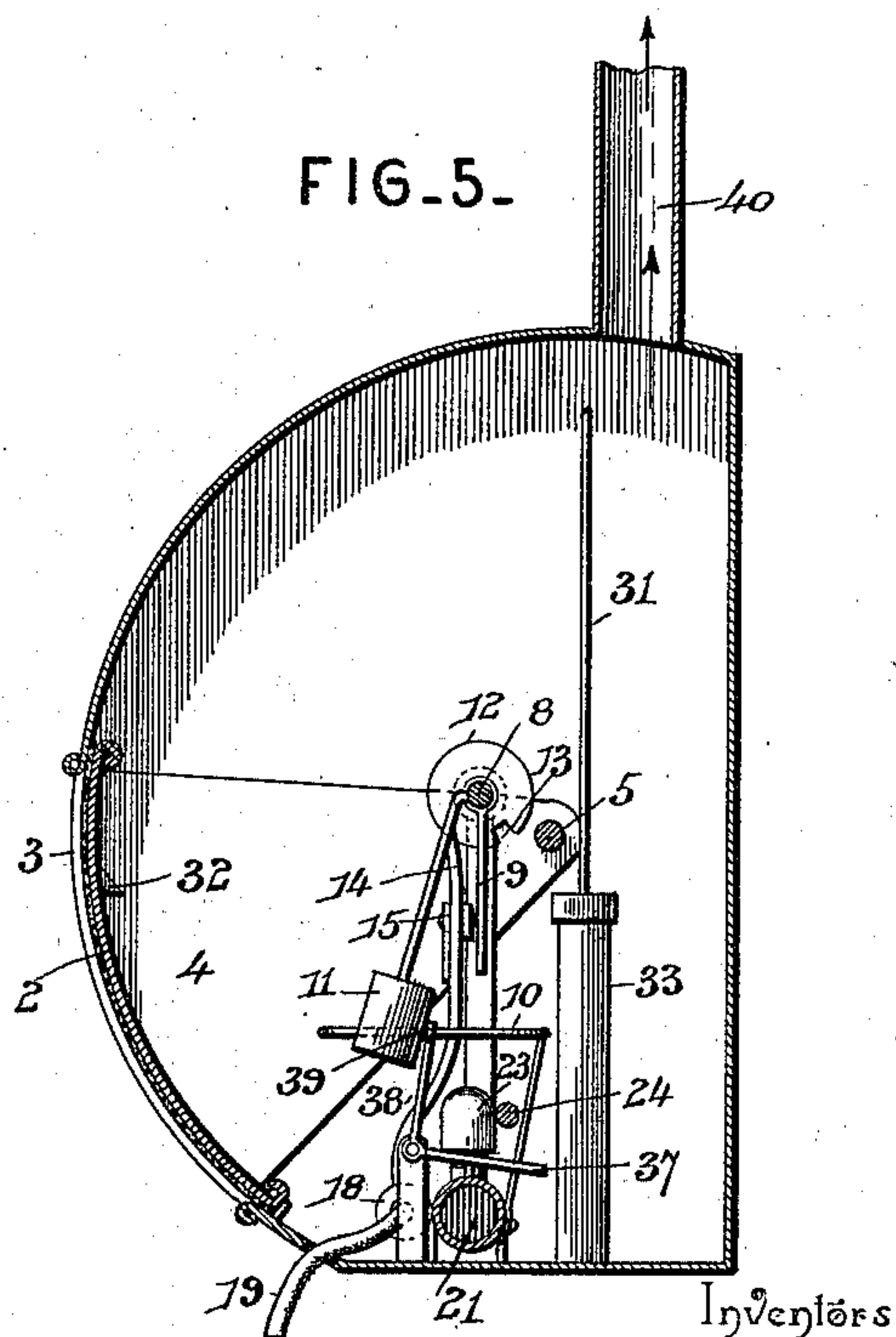


FIG. 5.



Witnesses

Jas. F. McLaughlin
E. J. [Signature]

By their Attorneys,

Charles Clifford
Fred H. Clifford

C. A. Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

C. & F. H. CLIFFORD.
PHOTOGRAPHIC FLASH LIGHT APPARATUS.

No. 560,778.

Patented May 26, 1896.

FIG. 2.

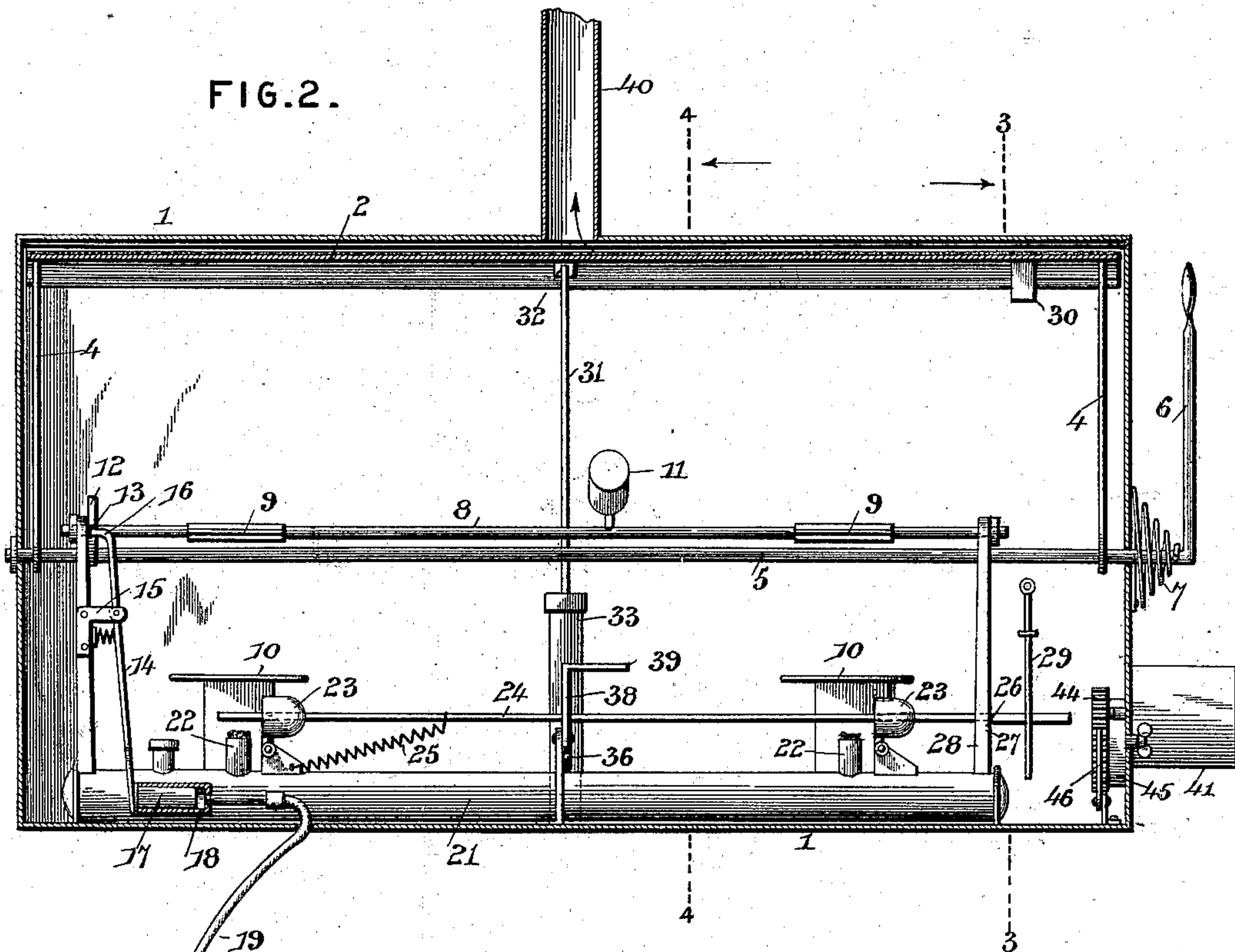
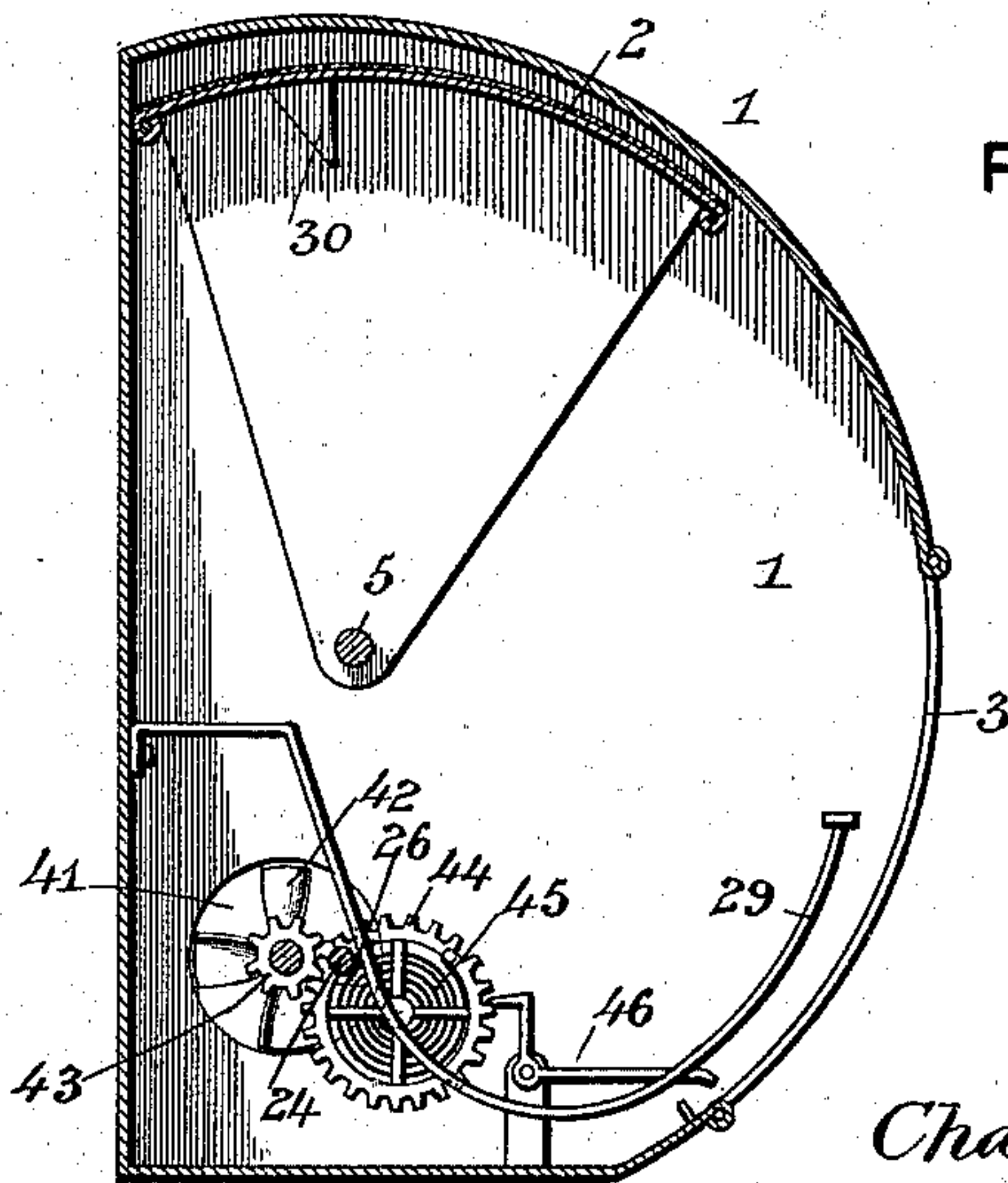


FIG. 3.



Inventors

Charles Clifford
Fred H. Clifford

By their Attorneys.

Ca Snow & Co.

Witnesses

Jas. K. McLathran
B. D. J. [Signature]

UNITED STATES PATENT OFFICE.

CHARLES CLIFFORD AND FRED H. CLIFFORD, OF MUSCATINE, IOWA.

PHOTOGRAPHIC FLASH-LIGHT APPARATUS.

SPECIFICATION forming part of Letters Patent No. 560,778, dated May 26, 1896.

Application filed June 10, 1895. Serial No. 552,296. (No model.)

To all whom it may concern:

Be it known that we, CHARLES CLIFFORD and FRED H. CLIFFORD, citizens of the United States, residing at Muscatine, in the county of Muscatine and State of Iowa, have invented a new and useful Photographic Flash-Light Apparatus, of which the following is a specification.

Our invention relates to flash-light apparatus, the object in view being to provide means for confining the smoke and gases resulting from the combustion of actinic powder in the production of flash-light photographs; furthermore, to provide means for extinguishing the light produced by the burners simultaneously with confining the smoke, and, furthermore, to provide means for conducting the products of combustion from the apparatus, and auxiliary means for forcing said products through the conductor.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a flash-light apparatus embodying our invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a transverse vertical section on the line 3 3 of Fig. 2. Fig. 4 is a transverse vertical section on the line 4 4 of Fig. 2, showing the parts in their set positions. Fig. 5 is a similar view on the same plane, showing the parts in their sprung position.

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

1 designates a casing, which may be of any preferred cross-sectional construction, that adopted by us and illustrated in the drawings being approximately semicircular, and said casing is provided with a shutter or closure 2, which is adapted to close an opening 3, formed in the casing. In the construction illustrated one shutter only is employed; but it is obvious that we do not limit ourselves to the use of a single shutter, as a plurality of the same may be employed.

The shutter is provided with sector-shaped ears 4, secured to a pivot-rod 5, extending longitudinally through the casing and mounted

at its extremities in suitable bearings in the ends thereof, said pivot-rod being extended at one end to form a handle 6, by which the shutter may be opened from the exterior of the casing. Attached to the pivot-rod is an actuating-spring 7, the tendency of which is to close the shutter when the latter is released.

8 represents a rock-shaft carrying powder-pans 9, adapted to discharge actinic powder upon the perforated flash-pans 10 arranged therebeneath, said rock-shaft being provided with a weight 11, by which it is turned to cause the powder-pans 9 to discharge their contents upon the flash-pans. The means employed for holding the weight 11 in its elevated position, and hence the powder-pans 9 in position to retain their contents, include a disk 12, secured to the rock-shaft 8 and provided with a notch 13 for engagement by a catch-lever 14, pivoted at an intermediate point upon a bracket 15. This catch-lever is provided with a nose 16 to fit in said notch 13, and the other arm of the lever is attached to a plunger 17 in a cylinder 18. Communicating with this cylinder is a flexible tube 19, forming part of a pneumatic bulb 20. By compressing the bulb air is forced into the cylinder 18 to actuate the plunger 17 and thereby withdraw the nose of the catch-lever from engagement with the notch 13, thus liberating the rock-shaft and allowing it to be actuated by the weight 11.

Communicating with the reservoir 21 in the casing are the burner-tips 22, for which are provided pivotal caps 23, adapted to fit over the tips to extinguish the lights employed for igniting the actinic powder. These caps are connected by an operating-rod 24, having an actuating-spring 25, and said rod is provided at one end with a shoulder or projection 26 for engagement with a fixed stop 27, the fixed stop in the construction illustrated in the drawings consisting of the side of a bracket 28, which supports one end of the rock-shaft 8. It is desirable to extinguish the lights at the burner-tips 22 when the shutter closes, and to accomplish this we employ a spring-arm 29, arranged in such a position with relation to the rod 24 as to engage the latter when depressed at its free end and thereby disengage the shoulder 26 of said rod from the stop 27, whereby the spring 25 actu-

ates the rod to close the caps, and in order to depress said free end of the spring-arm 29 we employ an ear 30 on the shutter.

The means for locking the shutter in its open position include a bolt 31, arranged at its upper end in operative relation with a stop 32 on the shutter and at its lower end in a barrel or sleeve 33, inclosing an actuating-spring 34. This actuating-spring bears at its upper end against the collar 35 on the bolt and thereby holds it normally in engagement with the stop 32. The lower end of the bolt is provided with an extension or arm 36, arranged in the path of an arm 37 of a bell-crank lever, the other arm 38 of said bell-crank lever having a lateral extension 39, which is arranged in the path of the weight 11. Hence when the rock-shaft is released to cause the discharge of the actinic powder from the pans 9 upon the flash-pans the weight 11 descends until it strikes the lateral extension of the arm 38 of the bell-crank lever, thus depressing the arm 37 of said lever and with it the bolt 31, thereby releasing the shutter and allowing it to be closed by its actuating-spring 7.

Communicating with the interior of the casing is a conductor 40, adapted to lead to the exterior of the room or building to convey the fumes of the actinic powder from the casing, whereby the flash-light apparatus may be used successively a number of times without annoyance to the occupants of the room and without the necessity of removing the apparatus after operation, and in connection with this conductor we preferably employ fan mechanism in communication with the interior of the casing to drive the products of combustion through the conductor. In the construction illustrated in the drawings said fan mechanism includes an inlet-tube 41, in which are located a fan 42, a pinion 43 on the spindle of the fan, meshing with a gear 44, which is adapted to receive rotary motion from an actuating-spring 45, and a pawl 46, arranged in engagement, normally, with the gear 44 to lock the fan against movement. One arm of the lever 46 projects into the path of the lower edge of the shutter in the construction illustrated, whereby when the shutter descends to close the opening in the casing it encounters said arm of the lever 46 and releases the fan mechanism.

From the above description it will be seen that immediately following the release of the rock-shaft to discharge the actinic powder upon the flash-pans the spring-actuated shutter is released and descends to close the opening in the front of the casing, said shutter being released by the engagement of a weight on said rock-shaft with the bolt by which said shutter is normally held in its open position. As the shutter reaches the limit of its downward movement the ear carried thereby encounters a spring-arm which is arranged in operative relation with the spring-actuated rod connecting the burner-caps, thereby releasing said rod and allowing the caps to be

closed down to extinguish the lights, and, furthermore, said shutter encounters a trip-lever which releases the fan mechanism which operates to drive the fumes of the actinic powder from the casing through the conductor to the exterior of the building.

It is obvious that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described our invention, what we claim is—

1. In a flash-light apparatus, a casing having a shutter or closure, and means for closing the shutter subsequent to the flash to confine the products of combustion, substantially as specified.

2. In a flash-light apparatus, the combination with a flash-pan and means for depositing powder thereon and igniting the same, of a casing having a shutter or closure, and means for closing the shutter subsequent to the flash to confine the products of combustion, substantially as specified.

3. In a flash-light apparatus, the combination with a flash-pan and means for depositing powder thereon and igniting the same, of a casing inclosing the flash-pan and having a shutter provided with actuating means whereby it is closed automatically upon being released, and means for holding the shutter in its open position, substantially as specified.

4. In a flash-light apparatus, the combination with a flash-pan and means for depositing powder thereon and igniting the same, of a casing inclosing the flash-pan and provided with a shutter, means for closing the shutter subsequent to the flash, and a conductor communicating with the interior of the casing to convey the fumes therefrom, substantially as specified.

5. In a flash-light apparatus, the combination with a flash-pan and means for depositing powder thereon and igniting the same, of a casing inclosing the flash-pan and having a shutter, means for closing the shutter subsequent to the flash, a conductor communicating with the casing to convey the fumes therefrom, and fan mechanism to cause a forced draft through the casing, substantially as specified.

6. In a flash-light apparatus, the combination with a flash-pan and means for depositing powder thereon and igniting the same, of a casing inclosing the flash-pan and having a shutter, means for closing the shutter subsequent to the flash, a conductor communicating with the casing, and a fan mechanism operatively connected with and adapted to be released by the shutter to cause a forced draft through the casing, substantially as specified.

7. In a flash-light apparatus, the combination with a flash-pan and means for igniting powder thereon, of a powder-pan arranged above to deposit actinic powder thereon, means for holding the powder-pan in position

to retain the powder, manually-operated devices for releasing the powder-pan, a casing having a shutter provided with actuating means whereby it is closed when released, a locking device for the shutter to maintain it in its open position, and connections between the powder-pan and said locking device whereby when the former is released the latter is disengaged from the shutter, substantially as specified.

8. In a flash-light apparatus, the combination with a casing having an opening, a flash-pan arranged within the casing, and means for igniting powder on the pan, of a spring-actuated shutter adapted to close said opening in the casing when released, a locking-bolt for holding the shutter in its open position, a powder-pan for depositing powder upon the flash-pan, a weight for actuating said powder-pan when released, a lever arranged at one end in the path of said weight and operatively connected at the other end with the locking-bolt, and connections for holding the powder-pan in its elevated position, substantially as specified.

9. In a flash-light apparatus, the combination with a casing having an opening, a shutter adapted when released to close the opening in the casing, a flash-pan, means for igniting powder on the flash-pan, and a powder-pan adapted to deposit powder upon the flash-pan, of a latch for engaging a disk on the spindle of the powder-pan to hold the latter in its elevated position, a locking device for holding the shutter in its open position, a lever connected with said locking device and arranged in the path of an arm on the spindle of the powder-pan, a cylinder having a piston arranged in operative relation with the latch, and a pneumatic bulb in communication with the cylinder and adapted to be compressed to communicate motion by the piston to the latch, substantially as specified.

10. In a flash-light apparatus, the combination with a casing having an opening, a shutter adapted to close said opening when released, a flash-pan, means for depositing powder upon the flash-pan, and igniting devices including a burner, of an extinguishing-cap for the burner, a spring-actuated rod connected to the cap and provided with a shoulder engaging a stop, and connections between the shutter and said rod whereby the latter is released when the shutter is operated to close the opening in the casing, substantially as specified.

11. In a flash-light apparatus, the combination with a casing having an opening, a shutter adapted to close said opening when released, a flash-pan, means for depositing powder upon the flash-pan, igniting devices including a burner, an extinguishing-cap for the burner, a spring-actuated rod connected to the cap and provided with a shoulder engaging a stop, a spring-arm arranged in operative relation with said rod, and means carried by the shutter for engaging said arm and thereby releasing the rod to allow it to actuate the cap, substantially as specified.

12. In a flash-light apparatus, the combination with a casing having an opening, a shutter adapted to close said opening when released, a flash-pan, igniting devices including a burner and an extinguishing-cap therefor, means for depositing powder upon the flash-pan, and operating devices for releasing the shutter, of connections between the shutter and the extinguishing-cap, whereby the latter is operated to cover the burner upon the closing of the shutter, substantially as specified.

13. In a flash-light apparatus, the combination with a casing having a shutter and a conductor communicating with the interior of the casing, flash-producing mechanism arranged within the casing, and connections between the flash-producing mechanism and the shutter whereby the latter is closed subsequent to the flash, of fan mechanism adapted to produce a forced draft through the casing and including a trip-lever adapted to lock the fan mechanism against movement and having an arm arranged in the path of the shutter, whereby when the shutter is closed it actuates said trip-lever and releases the fan mechanism, substantially as specified.

14. In a flash-light apparatus, the combination with a casing having a shutter, flash-producing mechanism arranged within the casing, and connections between the flash-producing mechanism and the shutter, whereby the latter is closed subsequent to the flash, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CHARLES CLIFFORD.
FRED H. CLIFFORD.

Witnesses:

CLARA ENSMINGER,
CHAS. W. KEMBLE.