

No. 708,168.

Patented Sept. 2, 1902.

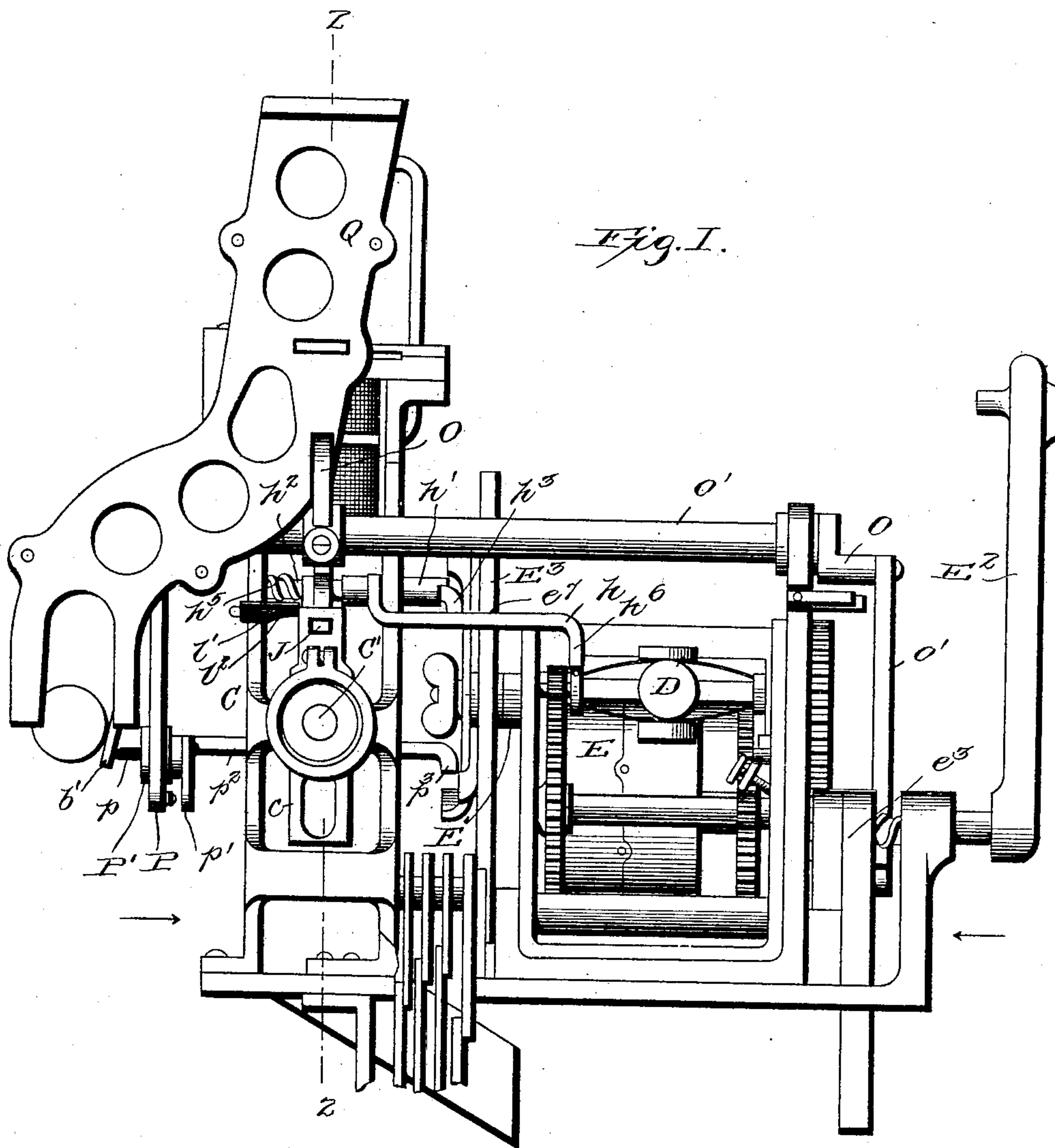
G. N. PIFER.

SHUTTER FOR AUTOMATIC PHOTOGRAPHIC APPARATUS.

(Application filed Mar. 11, 1902.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses  
P. L. Kocstane  
H. M. Hugin

Inventor  
G. N. Pifer  
by J. B. Fay  
Attorney

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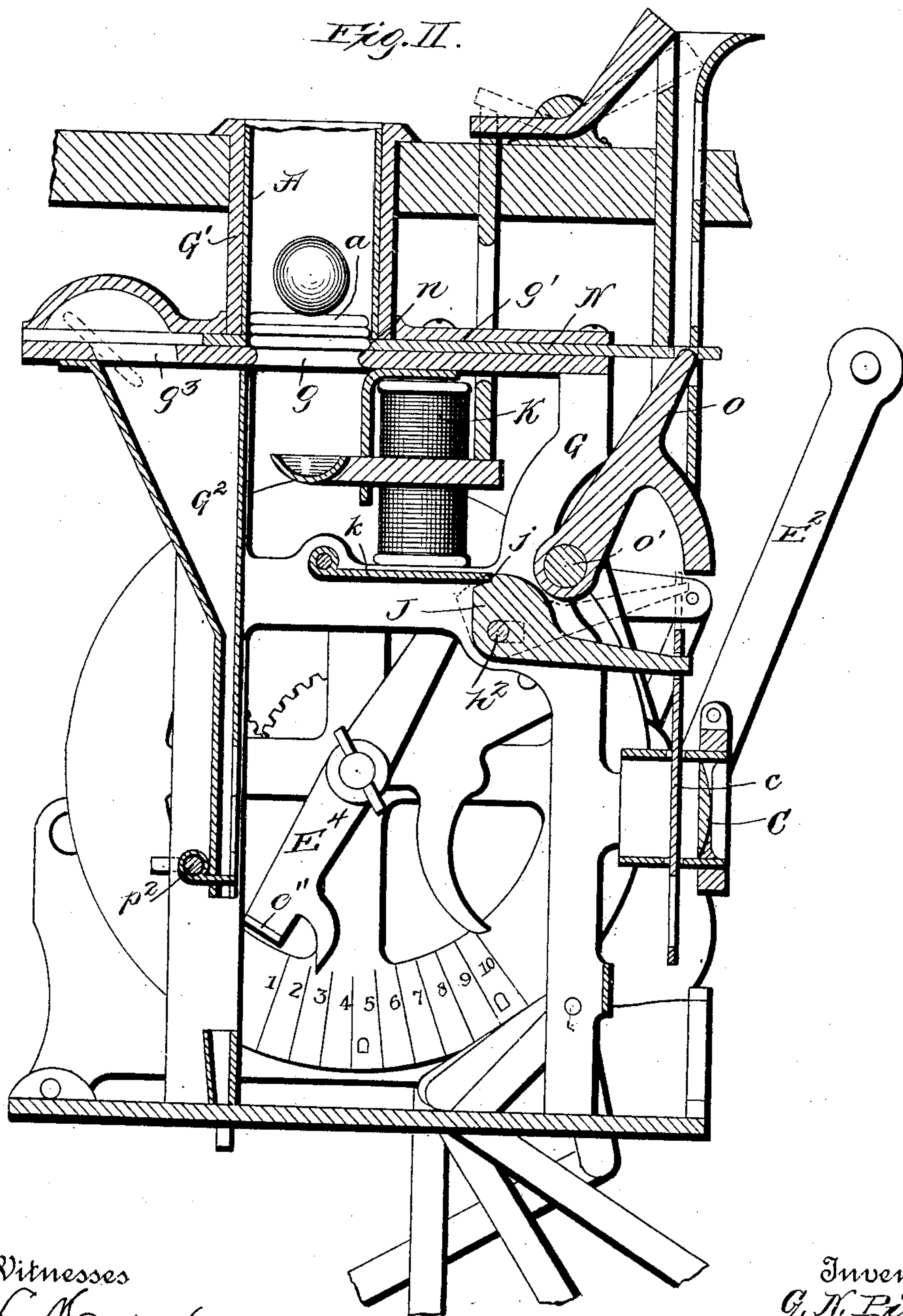
**G. N. PIFER.**

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Witnesses  
D. L. Mochman  
J. B. Mungis.

Inventor  
G. M. Pifer

by J. B. Fay  
Attorney

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Fig. III.

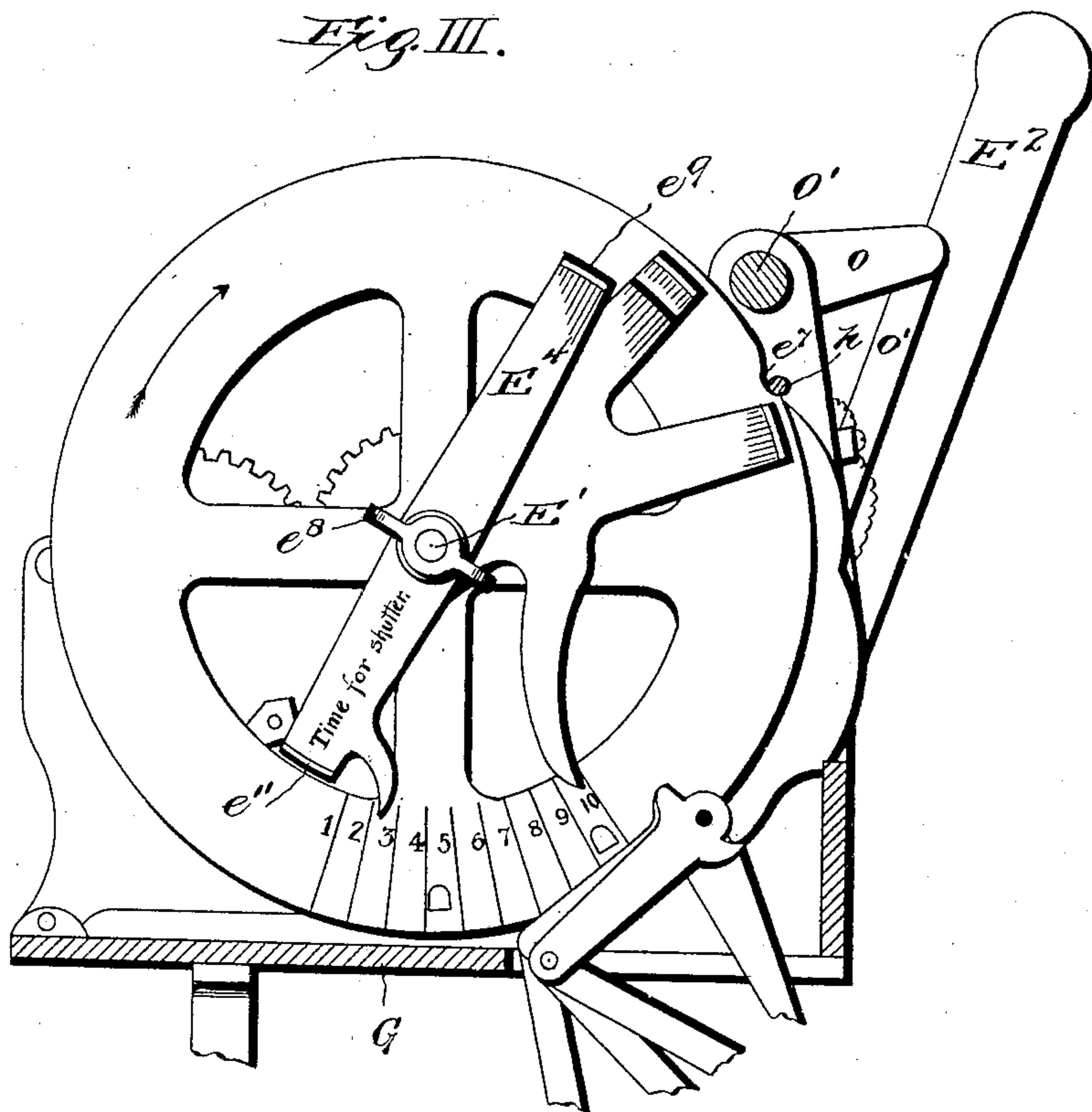


Fig. V.

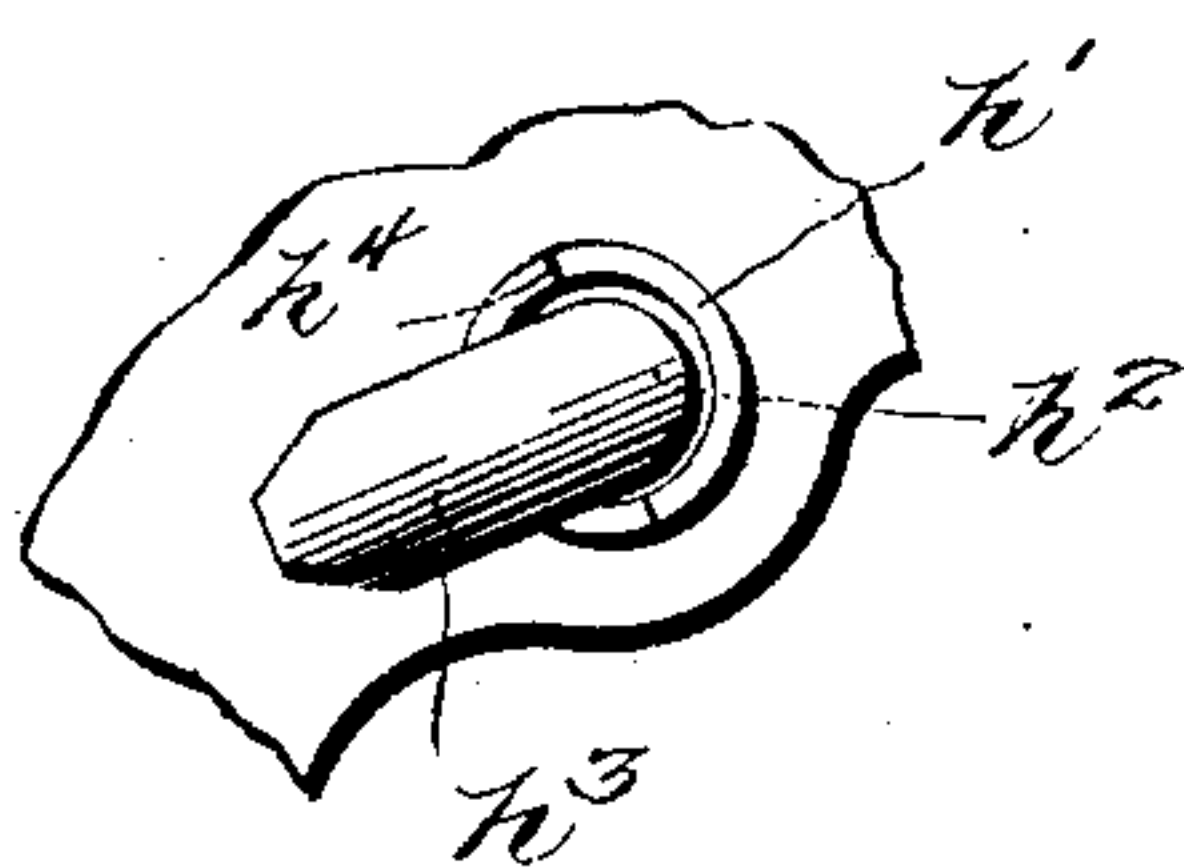
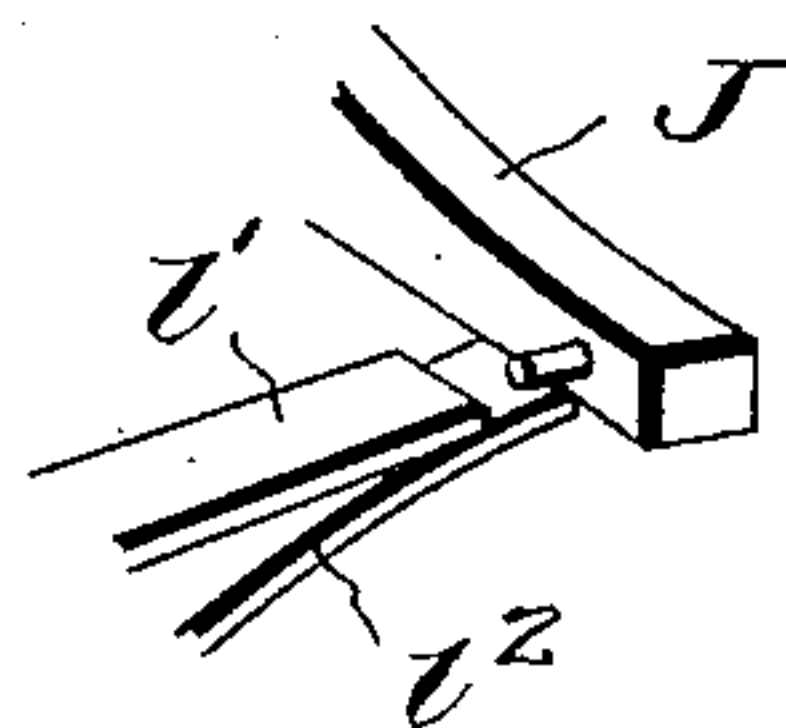


Fig. VI.



Witnesses  
T. L. Moers  
H. M. Fay

Inventor  
G. N. Pifer  
by J. B. Fay  
Attorney

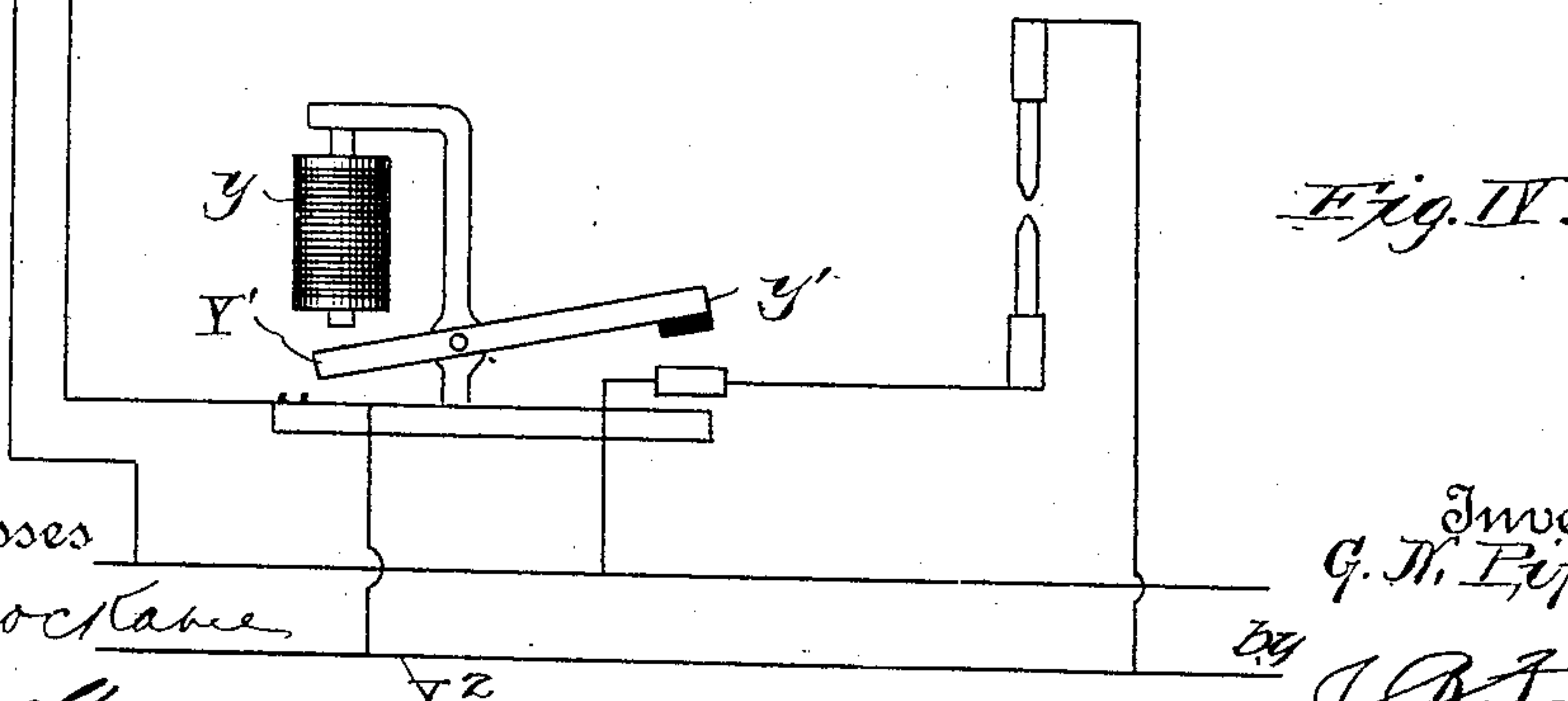
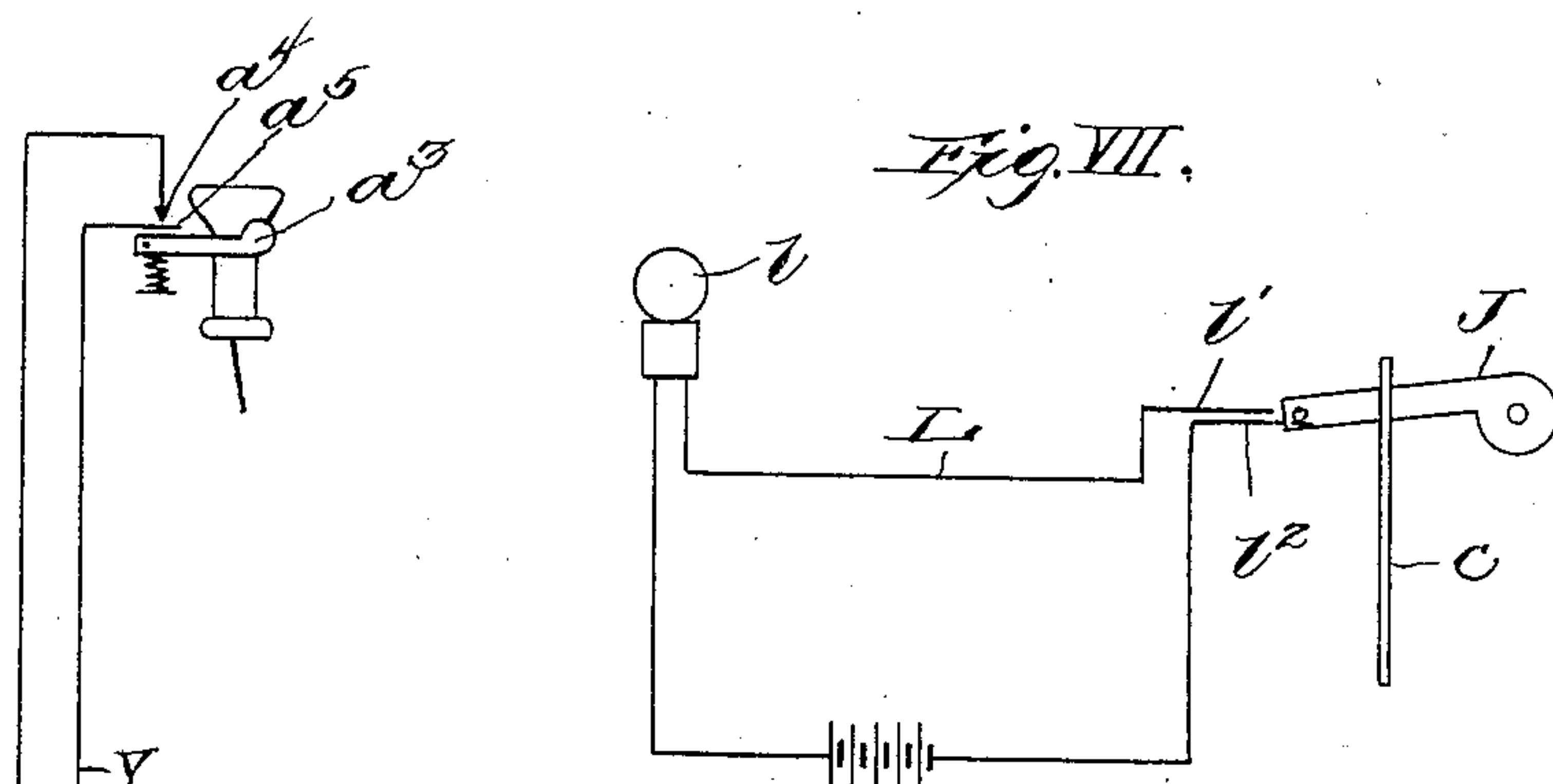
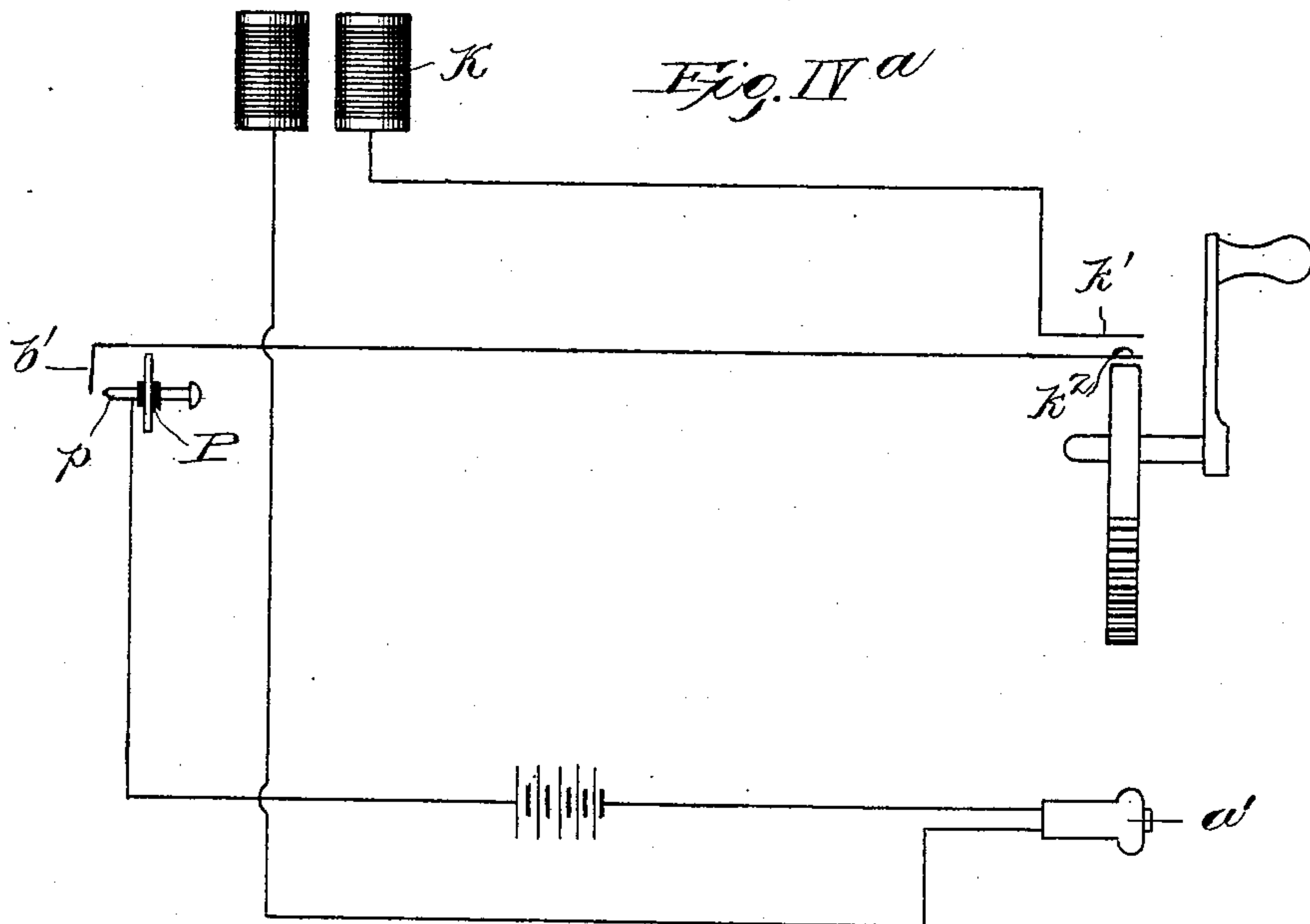
G. N. PIFER.

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(Application filed Mar. 11, 1902.)

(No Model.)

4 Sheets—Sheet 4.



Witnesses  
*T. L. Mookabee*  
*H. M. Hargis*

Inventor  
*G. N. Pifer,*  
*J. B. Fay,*  
 Attorney



# UNITED STATES PATENT OFFICE.

GEORGE N. PIFER, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN AUTOMATIC PHOTOGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

## SHUTTER FOR AUTOMATIC PHOTOGRAPHIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,168, dated September 2, 1902.

Application filed March 11, 1902. Serial No. 97,735. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE N. PIFER, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Shutters for Automatic Photographic Apparatus, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to shutters for coin-controlled machines for automatically producing a photographic likeness, its object being to provide a device of this character which will assist in the proper operation of the apparatus to which it is applied with absolute accuracy and reliability.

Said invention consists of means hereinafter described, and specifically set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying my invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a front elevation of a portion of the mechanism employed in a machine for automatically producing photographic likenesses embodying my invention, such machine being described in detail in my application, Serial No. 85,730, filed December 13, 1901. Fig. II represents a vertical transverse axial section of such mechanism, taken upon the plane indicated by the line 2 2, Fig. I, viewed in the direction indicated by the arrow at the right of such figure. Fig. III represents a side elevation of a portion of such mechanism viewed in the direction indicated by the arrow at the left of Fig. I. Fig. IV illustrates diagrammatically a bell-circuit controlled by the shutter of the camera employed in connection with my invention. Fig. IV<sup>a</sup> illustrates diagrammatically the coin-controlled circuit employed in my invention. Figs. V and VI represent detail views of portions of the mechanism on enlarged scale. Fig. VII repre-

sents a diagrammatic view of an electric-light circuit employed in my invention.

The interior or operating mechanism consists generally of a plate-magazine M, Fig. II, a camera C, including a lens C', a motor E and gear for engaging same, coin-controlled means for controlling the operation of said motor, plate-feeding means, means for operating the camera-shutter, and a series of finishing-baths and mechanism for transporting the photographic plate from one to the other of such baths and finally ejecting same from the device, such plate-feeding, shutter-operating, and plate-carrying means being operated by said motor or controlled by means connected therewith. Only so much, however, of the mechanism as pertains to the shutter and its related parts will be herein described. The camera employed consists of a lens, a sliding shutter therefor, and means for receiving and holding the plate at the focal plane, such camera being, as described in my above-named application, inclosed in a suitable light-type casing. (Not shown in this application.) In order, however, to fully comprehend the relation and operation of the shutter, it will be necessary to briefly describe the operation of the motor and the means intermediate thereof and the shutter, as well as the operation of the coin-controlled mechanism.

The motor E is energized by means of a suitable handle or lever E<sup>2</sup>, whereby an operating wheel or disk E<sup>3</sup> may be operated to rotate. Said wheel has provided upon its periphery a notch e<sup>7</sup>, in which rests a stop-arm or detent h of the mechanism for controlling the motor's operation. (See Fig. I.) This is most expeditiously effected by providing such detent with a downwardly-extending arm h<sup>6</sup>, which is adapted to engage and disengage a governor D' to stop same, such engagement thereby stopping the motor or permitting same to rotate on such disengagement, thereby permitting the motor to operate. Such detent is secured to a sleeve h', loosely and oscillatorily mounted upon the oscillatory rod h<sup>2</sup>, Fig. I, mounted in the frame of the machine. Secured upon said rod is an arm J, Fig. III, at the outer end of which is at-



5 attached the lens opening and closing the shutter  $c$ . Said arm is provided with a shoulder  $j'$ , which is engaged by a hinged armature  $k$  of the magnet  $K$  when the shutter is closed, as shown in Fig. III. Such engagement is maintained by a helical spring  $h^5$ , Fig. I, secured to the rod  $h^2$  and frame, respectively. Said spring is set in tension, so as to raise the shutter to its open position when the armature  $k$  is lifted from its engagement with the arm  $J$ , as shown in dotted lines in said Fig. III. Sleeve  $h'$  actuates the detent  $h$ , as will hereinafter appear. It is therefore seen that the armature  $k$ , arm  $J$  and its actuating means, and detent  $h$  constitute means for controlling the operation of said arm, the latter actuating the detent, such magnet also controlling the operation of the shutter-operating means. This latter means hence actuates that part of the controlling mechanism which directly controls the motor's operation—that is, the detent. The inner end of rod  $h^2$  is formed with a projecting lip  $h^3$ , Fig. I, and the adjacent end of sleeve  $h'$  is provided with a recess  $h^4$ , which permits the rod  $h^2$  to be oscillated within the limits prescribed by said notch and independently of said sleeve, so that the movement of the said rod attending the upward movement of arm  $J$  is attended by an upward movement of detent  $h$ , whereby the latter is released from the notch  $e^7$  and the motor is permitted to operate, the recess  $h^4$  being located so as to permit such action to be effected. This described construction allows the rod  $h^2$  and arm  $J$  to be moved back and the shutter to be closed independently of the detent  $h$ .

An electrical alarm-circuit  $L$ , Fig. II, is provided, containing a bell  $l$ , located at a convenient point from whence it may be readily heard, and includes a pair of contacts  $l'$  and  $l^2$ , Fig. IV, located in the vicinity of the shutter-operating arm  $J$ , these contacts being out of engagement when the shutter is in its closed position. One of said contacts is located in the path of movement of said arm, so that on the upward movement of the latter electrical connection is effected, the circuit closed, and the alarm sounded during the time the shutter occupies its open position. Such circuit and its relationship with the shutter are diagrammatically illustrated in said Fig. IV.

Upon the inner end of the operating-shaft  $E'$  is adjustably secured, by means of a thumb-nut  $e^8$ , Figs. I and III, an arm  $E^4$ . The end of such arm which is uppermost when the operating-wheel and notch  $e^7$  are engaged by the detent is provided with an offset lip  $e^9$ , whose path of revolution intersects the lip  $h^3$  when the rod  $h^2$  occupies the position coincident with the raised or open position of the shutter  $c$ , whereby it is seen that the rod may upon the rotation of the operating-wheel be turned back by the engagement of said lip  $e^9$  and the lip  $h^3$  and the shutter thereby closed, so as to exclude the light from the lens.

Upon the upper portion of the frame  $G$  is secured a tubular magazine-seat  $G'$ , in which the magazine  $A$  is telescoped. Immediately below the lower end of said seat is a square aperture  $g$  of less diameter than the plates  $a$  in the magazine. Transversely of the bottom of the said seat is a slideway  $g'$ , through which the plates may be removed successively, as will hereinafter be described. In said slideway is a slide  $N$ , having an opening  $n$ , adapted to receive the plates. In the rear end of said slideway is formed a semicircular opening  $g^3$ , so arranged that the plates are discharged therefrom into a chute  $G^2$ , leading downwardly and provided with means for stopping such plates at the required focal plane behind the lens of the camera, such operation being more fully described in my above-named application, Serial No. 85,730. The front end of said slide  $N$  is engaged by a lever  $O$ , which is secured to an oscillatory shaft  $O'$ , journaled in the upper front portion of the frame, Figs. I and III. The right-hand end of said shaft is provided with a crank-arm  $o$ , to which is attached a connecting-rod  $o'$ , whose lower end is attached to a segment  $e^3$ , operated by lever  $E^2$ . The connections between the segment and the slideway are arranged in a manner such that the opening  $n$  will fall immediately below the magazine when the operating-lever  $E^2$  is occupying its uppermost position—that is, that position it occupies at the beginning of its energizing stroke. The oscillation of the lever  $E^2$ , as is seen, is attended by the reciprocation of the slide  $N$ . The length of travel of said slide is such as to carry a plate from the magazine over the opening  $g^3$  and permit such plate to drop through such opening.

At the front end of the device is provided a coin-duct  $Q$ , such duct being flared at its upper end, so as to permit of the ready introduction of a coin therein. The lower part of said duct is curved toward one side—the left, as illustrated in Fig. I—to avoid intercepting the light which is required to enter the lens. At the bottom of said duct and laterally of the coin-path is a pair of electric contacts, one of which consists of an elastic strip  $b'$  and the other of which consists of an adjustable screw  $p$ , secured to an oscillatory arm  $P$ , suitably journaled upon the frame and connected with and operated by a rod  $P'$ , whose rear end is connected with an arm  $p'$ , Fig. I. Secured to a rock-shaft  $p^2$  is a shaft extending transversely to the right and has its extremity formed with an angularly-projecting lip  $p^3$ , which normally intersects the path of the lower end of the shutter-operating arm  $E^4$ , which latter is provided with a laterally-projecting lip  $e^{11}$ , Fig. I, adapted to engage the projecting lip  $p^3$ , oscillates the rock-shaft  $p^2$ , and through the medium of the rod  $P'$  oscillates the arm  $P$ . Normally—that is, when no coin is located in the bottom of the coin-duct—the position of arm  $P$  is such as to bring the screw-contact  $p$  directly to the right of the



spring-contact  $b'$ , but not into contact therewith. Upon introducing a coin into the coin-duct and permitting it to fall to the lower end thereof it strikes contact  $b$  and moves same into contact with the screw-contact  $p$ . The latter is, however, placed at a distance such as to prevent contact  $b$  from permitting the coin to pass through and out of the duct, as shown in Fig. I. The coin is thus held suspended by the two contacts in contact with each other. It is hence seen that the oscillation of the arm  $P$  would disengage the two contacts and permit the coin to drop through the coin-duct.

The rock-shaft  $p^2$  is journaled immediately behind the chute  $G^2$ , Fig. II, and upon it is secured a valve  $P^2$ , which normally holds the plate which has been discharged, as previously described, from the slideway through the aperture  $g^3$ , its location being such as to effect such holding, so as to bring the plate's sensitized surface into the focal plane of the camera directly behind the lens. It is hence seen that the breaking of contact of the two contacts  $b'$  and  $p$  is attended by a release of the plate from the bottom of the chute as a result of the engagement of the lips  $e^{11}$  and  $p^3$  when such plate is resting upon the valve  $P^2$ . The said two contacts, as diagrammatically illustrated in Fig. IV<sup>a</sup>, are placed in the same electrical circuit with the magnet  $K$ , and in this same circuit are placed two other contacts  $k'$  and  $k^2$ , Fig. I, in a position such that they will be brought into contact with each other by the segment  $e^3$  at the end of the energizing stroke of the operating-lever  $E^2$ . A third pair of contacts are included in this same circuit and are located in the handle  $R$ , Fig. IV<sup>a</sup>, which, as described in my above-named application, Serial No. 85,730, is located upon the outside of the casing and connected by means of a suitable flexible connection, whereby it may be removed from the supporting-hook and carried about. These contacts, normally open, are caused to engage by means of an ordinary push-button. Suitable batteries  $S$  are provided and suitably located for providing the electrical current in the circuit described. It is also seen that by reason of the fixed relationship existing between the means for operating the shutter-closing mechanism—that is, the lips  $e^9$  and  $e^{11}$ —the plates cannot be discharged from the focal plane until the exposure is complete, such discharge always occurring after the shutter is closed.

In addition to the above-described mechanism I also provide means operating in connection therewith for producing an artificial actinic light, preferably an electric-arc light. To this end I provide in proximity to the hook  $a^3$  two contacts  $a^4$  and  $a^5$ , of which  $a^5$  is of the spring variety and located so as to normally open and break a magnet-circuit  $Y$ . An armature  $Y'$ , operable by magnet  $y$  in said circuit, is provided with a switch member  $y'$  of a switch in an arc-lamp circuit  $Y^2$ , normally open. The contact  $a^5$  is located so

as to become engaged by the handle  $R$  to disengage contact  $a^4$  when the said handle is hung in the hook  $a^3$ . Upon removal of the said handle from the hook contacts  $a^4$  and  $a^5$  engage and complete the circuit  $Y$ , whereby the magnet becomes excited and attracts the armature  $Y'$ , thus closing the switch and the circuit  $Y^2$  and lighting the arc-lamp. Such lamp is placed in a location such as to properly illuminate the subject when in proper position before the camera.

The above-described mechanism operates as follows: A coin of the proper size having been dropped into the coin-chute and the operating-lever  $E^2$  having been pulled down to energize the motor, the coin drops downwardly until it is arrested by the contacts  $b'$  and  $p$ , contact between such contacts being thereby established and contact being also established, as described in my above-mentioned application, between the contacts  $k'$  and  $k^2$ . Such operation of the lever also removes the lowermost plate from the magazine, carries same backwardly, and permits it to drop through the aperture  $g^3$  and fall upon the valve  $P^2$ , which holds it in the required focal plane. These operations are all performed before the exposure takes place. The magnet-circuit is now completed by pressing the push-button in the handle  $R$ . Such completion of the circuit effects the attraction of the armature, which is followed by the release of the arm  $J$ , which latter is then free to be moved upwardly by the spring  $h^5$ . Upon so moving, such arm carries with it the shutter  $c$ , the rod  $h^2$ , and hence the detent  $h$ . The said detent disengaging the motor-governor, the motor is permitted to rotate, whereupon the operating-wheel is started in its rotation, the exposure of the plate meanwhile taking place. Such starting of the motor through the consequent return of the segment effects the disengagement of the contacts  $k'$  and  $k^2$ , which insures the breaking of the magnet-circuit and the return of the armature to its original position independently of the operator in the event that he should not release the push-button in the handle. Meanwhile the described lifting of the shutter permits the contacts  $b'$  and  $p$  to engage and close the bell-circuit, the bell therein being thereby caused to ring during such exposure and apprising the subject of the duration of such exposure in order that he may remain immovable during such period. After the lapse of time determined by the angular position of arm  $E^4$  lip  $e^4$  engages lip  $h^3$  and turns back rod  $h^2$ , thereby returning the shutter  $c$  to its closed position and breaking the bell-circuit, thus effecting a discontinuance of the ringing of the alarm. The rotation of the operating-wheel continues, detent  $h$  riding upon its periphery, and thus being held out of engagement with the governor. Immediately following the above-described operation lip  $e^{11}$  engages the offset lip  $p^3$ , opens valve  $P^2$ , thereby permitting the exposed plate to drop



downwardly and be discharged into the developing fluid, as described in my above-named application, such discharge, as previously noted, always occurring after the shutter is closed.

Other modes of applying the principles of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention—

1. The combination of means for discharging a plate from a focal plane, a lens-controlling shutter, and an operating-wheel embodying means for operating said discharging means and for closing said shutter, said operating means and closing means being relatively fixed.

2. The combination of means for discharging a plate from a focal plane, a lens-controlling shutter, and an operating-wheel provided with relatively fixed lips respectively adapted to operate said discharging means and to close said shutter.

3. The combination of a shutter, a motor-operated wheel, and an angularly-adjustable arm on said wheel for closing said shutter.

4. The combination of a shutter, a motor-operated wheel, and an angularly-adjustable arm on said wheel for closing said shutter, said wheel being provided with a series of indicating-marks, whereby the angularity of said arms and hence the time of exposure may be indicated.

5. The combination of means for discharging a plate from a focal plane, a lens-controlling shutter, and a motor-operated angularly-adjustable arm, one end of said arm being adapted to close said shutter and the other to engage and operate said discharging means.

6. The combination of an operating-wheel and motor therefor, a shutter, a spring-actuated shaft connected with and adapted to open said shutter, a sleeve, a stop-arm for controlling the operation of said wheel mounted

upon said sleeve, the latter forming a bearing for said shaft, said sleeve provided with means for engaging said shaft when moved in one direction and for disengaging same when moved in the opposite direction, said wheel provided with means for engaging said shaft whereby said shutter may be closed independently of said stop-arm.

7. The combination of an electrical circuit containing a magnet, armature and means for opening and closing the circuit, a spring-actuated arm, a shutter connected with such arm, said armature adapted to hold such shutter in a closed position against the action of the spring, whereby upon the movement of the armature said spring may be caused to actuate the shutter to open.

8. The combination of an electrical circuit containing a magnet, armature and means for opening and closing the circuit, a motor, a spring-actuated arm, a shutter and motor-controlling means connected with such arm, said armature adapted to hold such shutter in a closed position against the action of the spring, and means connected with the motor for closing such shutter.

9. In automatic photographic apparatus including a motor, the combination with means for controlling the operation of the motor and embodying an exterior movable element, of a light-circuit, said movable element adapted to control said light-circuit.

10. In automatic photograph apparatus including a motor, the combination with an electric-light circuit, of electrical means for controlling the operation of said motor, and embodying an exterior movable element which is provided with means for controlling the electrical circuit in said motor-controlling means, said movable element being adapted to control said light-circuit.

Signed by me this 8th day of March, A. D. 1902.

GEORGE N. PIFER.

Attest:

FRANK D. BLACKISTONE,  
A. E. MERKEL.