No. 607,242. Patented July 12, 1898.

C. F. H. HUFF & O. C. HALE.

PHOTOGRAPHIC SHUTTER.

Application filed Jan. 27, 1898.

(No Model.) 2 Sheets—Sheet 1.

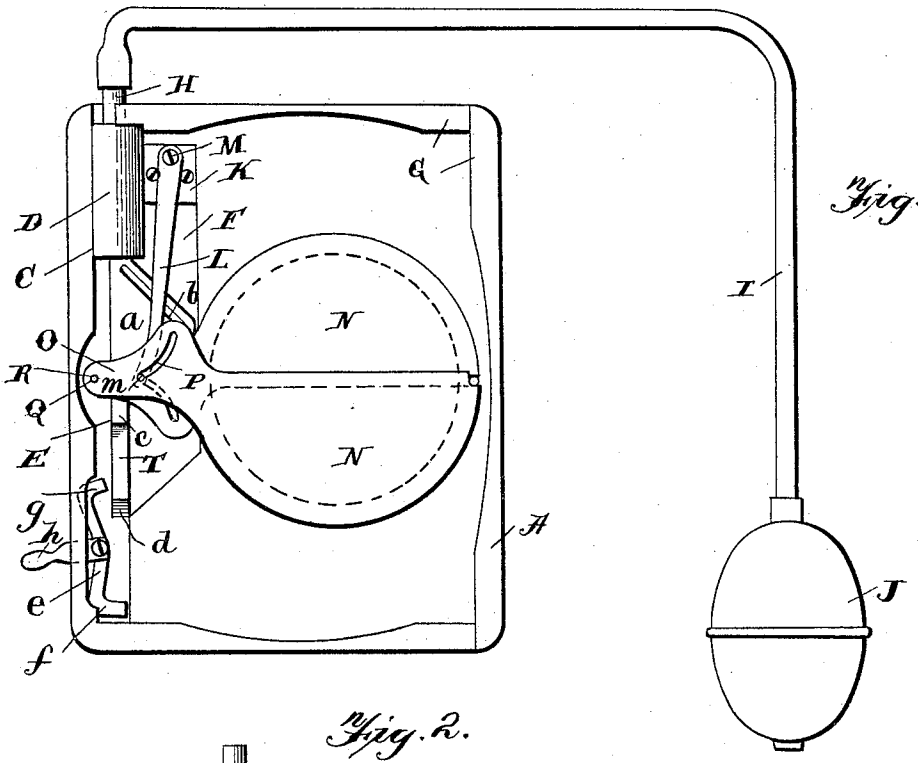


Fig. 1.

Fig. 2.

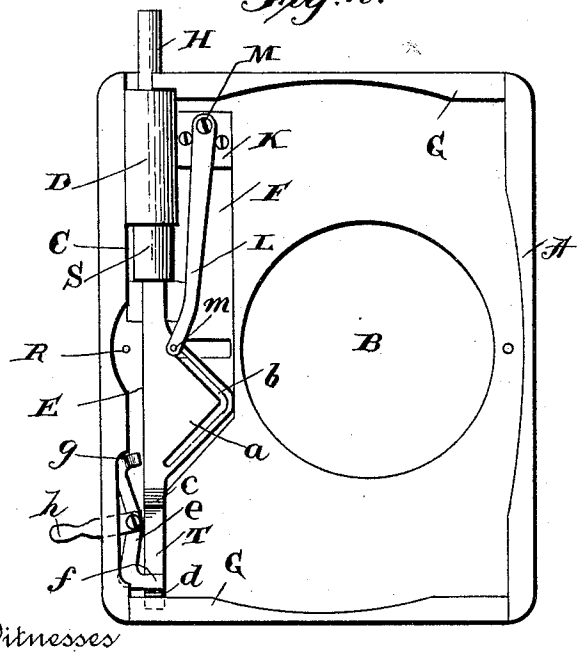
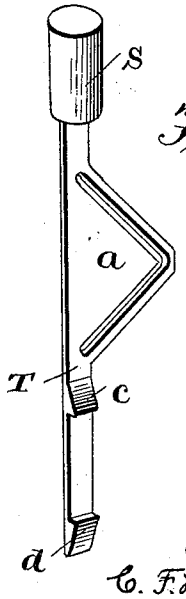


Fig. 3.



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Fig. 4.

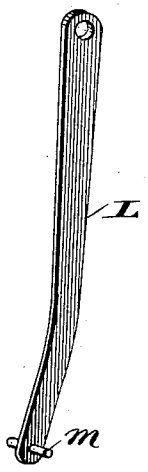


Fig. 5.

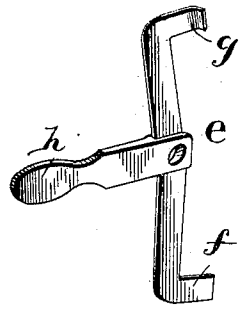


Fig. 6.

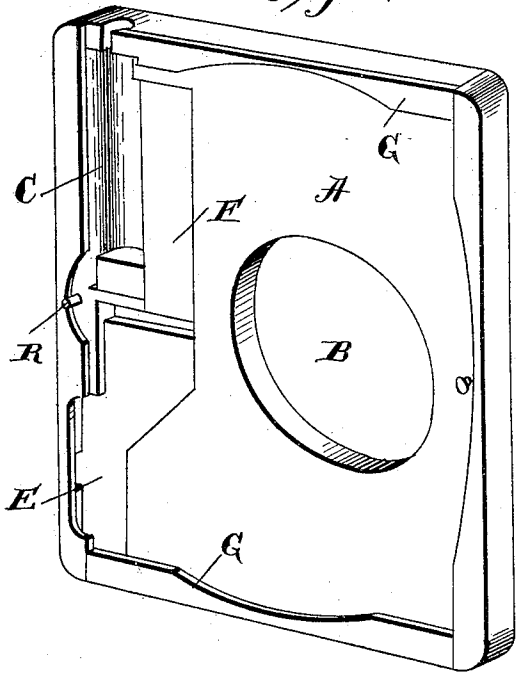
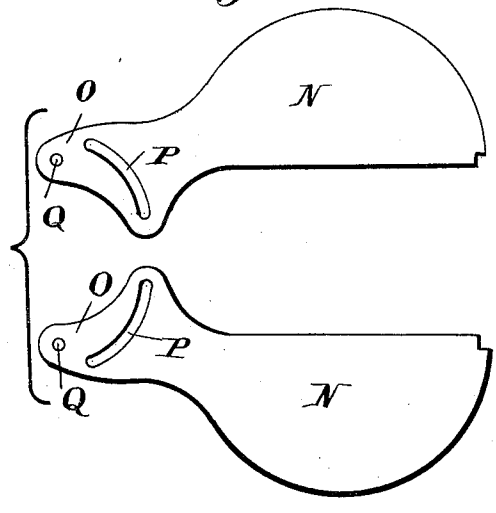


Fig. 7.



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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 607,242, dated July 12, 1898.

Application filed January 27, 1898. Serial No. 668,192. (No model.)

To all whom it may concern:

Be it known that we, CHAUNCEY F. H. HUFF and ORLANDO C. HALE, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Camera-Shutters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to improvements in camera-shutters, and pertains to that type of shutters in which air is used through the medium of a rubber bulb for actuating the parts.

The object of our invention is to provide an improved mechanism whereby the movement of the piston-rod one-half of its maximum distance will cause an opening of the shutter and its return movement a closing of the shutter, whereby a time exposure is made and whereby the maximum movement of the rod under a forced pressure from the bulb will cause an instantaneous exposure and a return movement of the piston-rod by the expansion of the bulb will cause a slow instantaneous exposure, according to the quickness of expansion of the bulb.

In the accompanying drawings, Figure 1 is an interior plan view of a shutter embodying our invention. Fig. 2 is a similar view with the shutter removed for exposing the operating mechanism. Fig. 3 is a detached perspective view of the piston and its rod. Fig. 4 is a detached perspective view of the shutter-actuating lever. Fig. 5 is a detached perspective view of the locking-lever. Fig. 6 is a perspective view of the shutter-supporting frame or base, the mechanism being removed.

Referring now to the drawings, A indicates the frame or base, having therein the lens or exposure-opening B in the usual manner. This base A is provided with a cavity C, which receives the cylinder D; an elongated recess E, in which the piston-rod and the shutter-actuating lever travel, and a recess F, in which the locking-lever operates, the whole face of the base or frame A being recessed or provided with a surrounding flange G in the usual manner to provide a space for the movements of the shutters, and a closing plate or base is placed over the base and secured thereto in the usual manner.

The cylinder D is secured in its recess at one corner of the base, with a projecting tube H, to which a rubber tube I and bulb J are connected. Projecting from one side of the cylinder D is preferably a plate or extension K, to which the upper end of the shutter-actuating lever L is pivotally connected through the medium of a screw M.

The shutters N are provided with extension portions O, which portions are provided with oppositely-extending arc-shaped slots P, the extremities of these extensions being provided with perforations Q, which receive a pivotal pin R, extending from the base A.

The piston S, working within the cylinder D, is preferably a tube or cylinder, as shown, to which is connected a piston-rod T. This piston-rod T is provided intermediate its ends with an inwardly-extending projection *a*, preferably V-shaped in plan view, and this projection is provided with a V-shaped slot *b*. The shutter-actuating lever is provided at its free end with a pin *m*, extending from opposite sides thereof, as shown, one end of the pin extending into the V-shaped slot of the piston-rod and the opposite end of the pin extending into the arc-shaped slots of the shutters. The extremity of the piston-rod is provided with two cam-shaped stops, the inner one, *c*, having an upwardly-inclined surface and the outer one, *d*, having a downwardly-inclined surface, the projections having facing abrupt shoulders, as clearly illustrated. Intermediately pivoted to the base, at the edge thereof opposite the operating-cylinder D, is a T-shaped locking-lever *e*. The lower end *f* of the locking-lever is adapted to be forced outward through the medium of the stop at the end of the piston-rod and to fall in behind the locking-shoulder thereof to lock the piston-rod in its extended position. The opposite end *g* has its end turned outward for passing over the piston-rod between the two shoulders thereon, and thus adapted to engage the abrupt shoulder of the upper projection of the piston-rod, and thereby limit its movement to one-half of its entire movement. This locking-lever has an outwardly-projecting operating-handle *h*, by means of which it is turned upon its pivot for

throwing either its upper or lower end in or out of the line of travel of the piston-rod to coöperate with the upper and lower projections, respectively, upon the piston-rod.

The operation of our invention is as follows: Supposing the shutter to be closed and the piston-rod in its upward position, as shown in Fig. 1, and the locking-lever with its upper end thrown out of line of travel of the piston-rod, and thereby its lower end in the line of travel of the piston-rod, a quick compression of the rubber bulb will force the piston-rod its entire movement, thus causing the pin of the shutter-actuating lever to travel throughout the length of the V-shaped slot, which opens and closes the shutters, making an instantaneous exposure. The lower end of the locking-lever catching behind the lower projection of the piston-rod locks the rod in that position, so that it can neither rebound nor be drawn upward by the expanding of the rubber bulb, which would make a second exposure. With the piston-rod in its extended position the squeezing of the bulb and releasing it will draw the piston-rod upward, thus causing a slow instantaneous exposure, according to the capacity of the bulb to expand, as will be readily understood. When a time exposure is desired, the piston-rod is in its upward position, as shown in Fig. 1, and the locking-lever turned so that its upper end is in the line of travel of the piston-rod. A compression then of the rubber bulb forces the rod downward; but owing to the locking-lever engaging the inner or upper stop upon the piston-rod the said piston-rod can move only one-half of its distance, thus only moving one-half of the length of the V-shaped base-slot and opening the shutters. The releasing of the bulb and expansion draws the piston-rod back, and thus closes the shutters.

It will thus be seen from the above description that a complete movement of the piston-rod causes the opening and closing of the shutters, and that a half-movement of the piston-rod in one direction opens the shutters and its return movement closes the shutters, whereby a time exposure is made. A quick instantaneous exposure or a slow instantaneous exposure can be accomplished through the medium of the simple mechanism heretofore described.

While we here show a cylinder carrying a piston which serves as the motor for actuating the endwise-moving rod, it will be readily understood that any other known form of motor may be used for actuating the rod without departing from the spirit and scope of our claims.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A shutter comprising a movable actuating member provided with rigid parallel substantially V-shaped actuating-shoulders, the shutters provided with oppositely-extending substantially arc-shaped actuating-shoulders, a lever pivoted at one end and having its free end provided with projections engaging respectively between the parallel shoulders of the actuating member, and engaging the shoulders of the cutters, substantially as described.

2. A shutter comprising an endwise-moving rod provided with a substantially V-shaped slot, a shutter provided with substantially arc-shaped slots extending in opposite directions, an actuating-lever pivoted at one end and having its free end extending between the shutters and the rod and oppositely-extending projections engaging the slots of the rod and the shutters, substantially as described.

3. A shutter comprising an endwise-moving rod having a substantially V-shaped slot, the shutters having extensions provided with substantially oppositely-extending arc-shaped slots, the shutters pivotally supported at a point outside of the said arc-shaped slot, and an actuating member engaging the slots of the endwise-moving rod and the shutters, substantially as described.

4. A shutter comprising a cylinder, a piston within the cylinder having a piston-rod provided with a substantially V-shaped slot, the shutters having substantially arc-shaped slots and pivotally supported at a point outside of the said slots, an actuating member engaging the said rod and shutter slots, the rod having shoulders and a locking-lever for limiting the movement of the rod to one-half its distance, substantially as described.

5. A shutter comprising an endwise-moving rod provided with a substantially V-shaped slot, the shutters having substantially arc-shaped slots extending in opposite directions and pivotally supported, an actuating member engaging the slots of the rod and the shutters, the rod having two locking-shoulders, and a locking-lever having two locking members one for limiting the movement of the rod one-half of its distance and the other for locking the rod in its extended position, substantially as described.

6. A shutter comprising an endwise-moving rod having a substantially V-shaped slot, the shutters having substantially arc-shaped slots and supported at a point outside of the said slots, and an actuating member engaging the slots of the rod and shutters, the said rod having two locking-shoulders, a locking-lever having a yielding end adapted to be forced outward by one of the locking-shoulders and its opposite end adapted to move over the rod the parts coöperating for the purpose and in the manner described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHAUNCEY F. H. HUFF.
ORLANDO C. HALE.

Witnesses:
JOHN J. CUSHING,
LOUISE KELLER.