(No Model.)

F. BURROWS.

CAMERA SHUTTER.

No. 393,500. Patented Nov. 27, 1888.

Fig. 1.

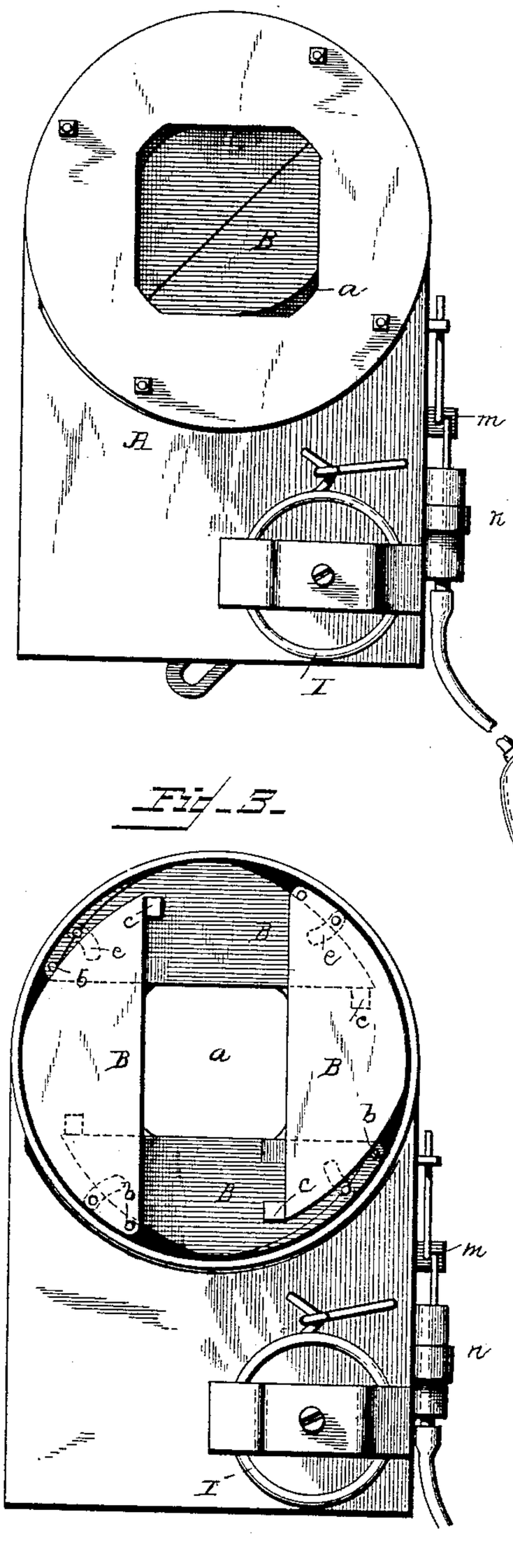

Fig. 2.

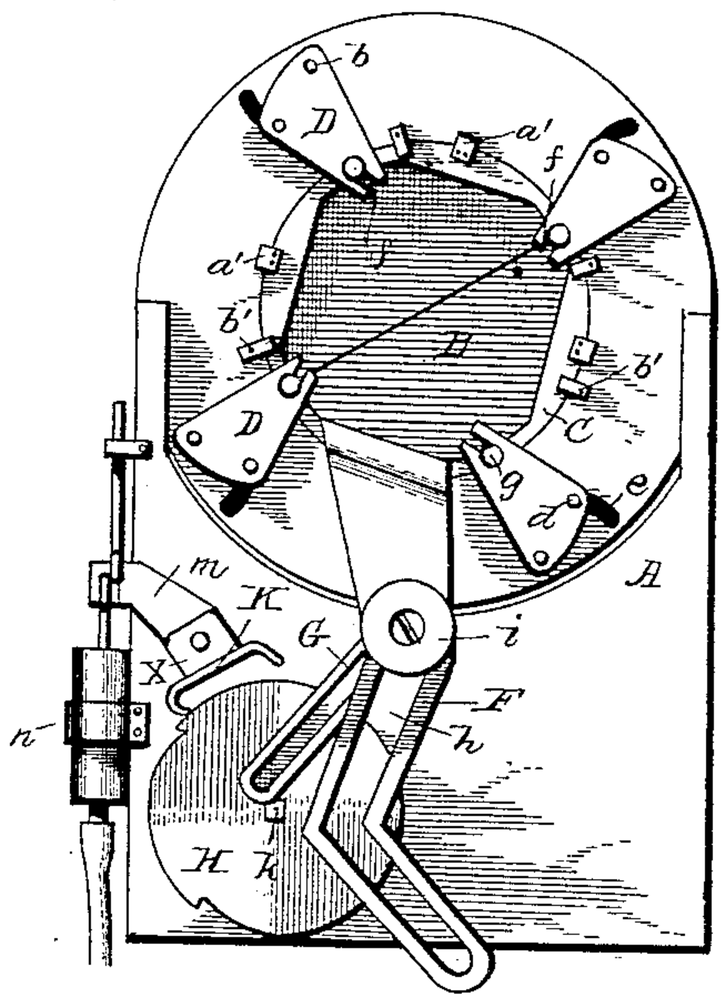

Fig. 3.

Fig. 4.

Witnesses,
Albert Speiden.
Alfred T. Gage.

Inventor,
Francis Burrows.
By his Attorney
Franklin H. Hough

UNITED STATES PATENT OFFICE.

FRANCIS BURROWS, OF ELIZABETH, NEW JERSEY.

CAMERA-SHUTTER.

SPECIFICATION forming part of Letters Patent No. 393,500, dated November 27, 1888.

Application filed April 7, 1888. Serial No. 269,901. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS BURROWS, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Camera-Shutters; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in shutters for use in connection with a camera, and it is more particularly adapted for use in taking instantaneous photographs; and it has for its object to improve upon previous constructions of this character and to render the device more durable and efficient in operation.

The novelty in the present instance resides in the peculiarities of construction and in the combination, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the drawings, and then more particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a front elevation showing the slides closed. Fig. 2 is a rear elevation with the parts in the same position. Fig. 3 is a rear elevation with parts broken away and with the slides open. Fig. 4 is a similar view with the device set for taking instantaneous photographs.

I provide for the ready adaptation for either instantaneous work or for time exposure, as desired, which in practice will be found to be a very desirable feature. A movable ring is provided, which operates all of the slides and insures a perfect and simultaneous movement thereof.

A is a flat case adapted to be secured in any suitable manner to the inside of the front of a camera-box, either inside the tube or in front of the tube containing lenses, and having a central opening, *a*, opposite the camera-lens. This case is hollow at its upper portion, as shown, and between the two plates forming this case work the slides B. These slides are pivoted at *b* to the case, and their meeting faces are beveled slightly in opposite directions, so as to overlap each other when closed, and the free ends of the slides are formed with a thin tapered projection, *c*, which moves under the opposite slide and serves to guide and hold them in place, and also to modify the shape of the aperture. While I have shown four of these slides in the drawings, I do not intend to restrict myself to such number, as two or any multiple thereof may be employed as circumstances may require.

C is a movable ring fitted within the opening in the case, and is provided with lugs *a'*, which, with the lugs *b'* on the case, serve to guide the ring in its movements.

D is a plate pivoted on the pivot of the slide and fastened securely to the slide, and is provided with a pin, *d*, which works through a curved slot, *e*, in the case, and on the other side is connected with the slide, as shown. The other end of the plate is loosely connected with the movable ring, either by means of the slot *f* and key *g*, as shown in Fig. 4, or by the means shown in Fig. 3, which I consider as the equivalent of that shown in Fig. 4. Secured to the movable ring is the arm F, which projects upward, as shown, and is provided with a substantially V-shaped slot, *h*, and in this slot rides the shank of the thumb-screw *i*, which is carried by the slotted arm G on the ratchet-disk H. This disk is carried by the spindle *k*, projecting through the upper part of the case and attached by the spring I.

K is a double pawl adapted to engage one or the other of the notches of the ratchet-disk. This pawl is provided with an arm, *m*, which is designed to be actuated by means of the flexible tube and rubber bulb *n*, as is common in this class of devices.

X is a catch arranged to act on the pawl, as hereinafter described. The set-screw and parallel slots in the lever and arm of the disk are intended for the purpose of making the opening in the shutter of any desired size at will. This is a very important feature of the invention.

The thumb-screw in the arm of the ratchet-

disk is set nearer to the extremity of the slot, in order to produce a full-sized opening, and it is moved nearer to the center of the disk when a smaller opening is desired, as will be readily understood.

The operation of the device is as follows: The instrument is set full open by moving the thumb-screw to the angle of the slot in the lever, and upon compressing the rubber bulb the pawl engages the second notch and holds the shutter open. The instrument is set for an exposure by moving the thumb-screw to the extreme end of the slot, when, by releasing the pressure on the bulb, the vacuum so formed retracts the piston connected with the pawl and the pawl will engage the first notch. When the instrument is to be used for time exposure, the catch X is lowered, when, the bulb being compressed, the piston, and with it the pawl, will at once be caused to spring forward and disengage from the first notch and instantly catches in the second notch, where it serves to hold the shutter open until the pressure upon the bulb is removed, when the pawl is instantly disengaged from the notch and the closing of the shutters is completed. For instantaneous exposure the catch X is raised and the pawl simply leaves the first notch and the movement is completed without interruption.

Various modifications in the details of construction of the device may be resorted to without departing from the spirit of my invention.

What I claim to be new, and desire to secure by Letters Patent, is—

1. The combination, with the case, the movable ring, and the pivoted slides, of the slotted arm carried by said ring, the ratchet-disk, and the slotted arm on said disk and adjustably connected with the arm on the ring, substantially as described.

2. The combination, with the movable ring and the pivoted slides connected therewith, of the spring-actuated disk, the arm on said ring provided with a V-shaped slot, and the projection of the disk engaging said slot, as and for the purpose set forth.

3. The combination, with the case and the movable ring, of the pivoted slides and the plates D, pivoted on the pivots of the slides and connected with the ring, as set forth.

4. The combination, with the case having slot *e* and the movable ring, of the slides pivoted to said case, and the plates D, pivoted on the pivots of the slides, having a projection to engage said slot and connected with the ring, substantially as described.

5. The combination, with the case having slot *e* and the movable ring, of the slides pivoted to the case, and the plates D, pivoted on the pivots of the slides, having a projection engaging said slot and loosely connected with the ring, substantially as described.

6. The combination, with the case, the movable ring, the pivoted slides on said ring, and the slotted arm on the ring, of the ratchet-disk, the slotted arm on said disk, and the thumb-screw carried by the arm on the disk and engaging the slot of the arm on the ring, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS BURROWS.

Witnesses:
TUNIS BERRY,
WILLIAM R. PENN.