(No Model.)

DE WITT C. HOOVER.

COMBINED SHUTTER AND DIAPHRAGM FOR PHOTOGRAPHIC CAMERAS.

No. 317,788. Patented May 12, 1885.

Fig. 1.

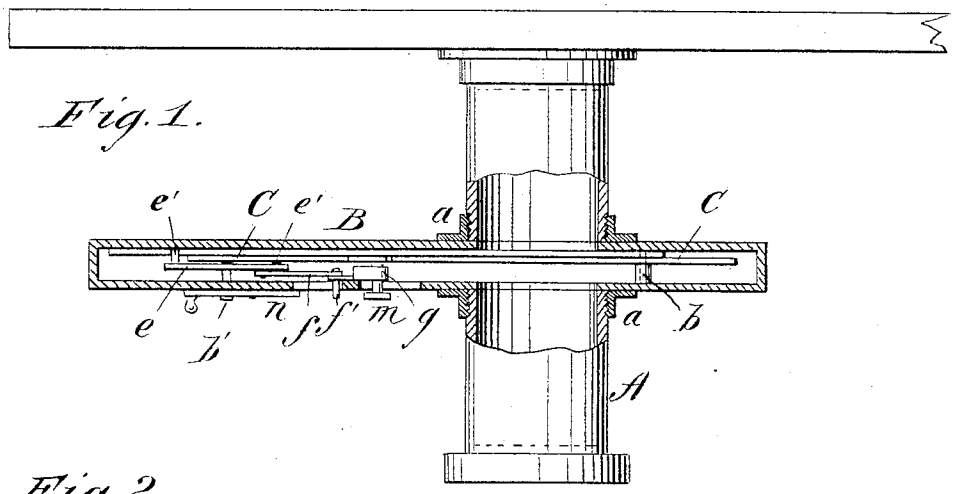


Fig. 2.

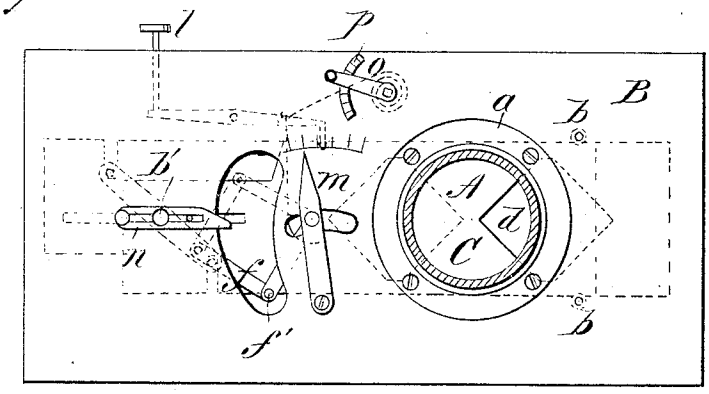
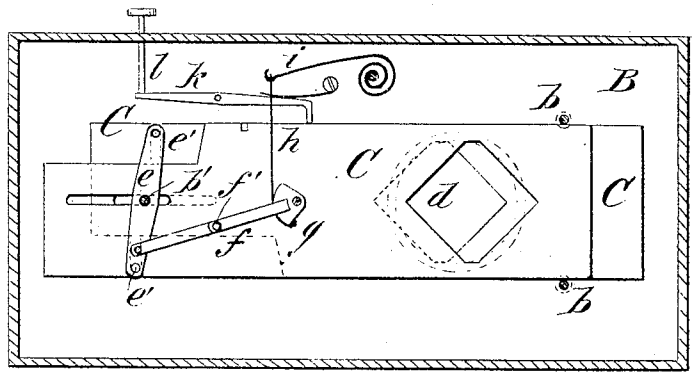


Fig. 3.



WITNESSES:

Dom Twitchell.

C. Sedgwick

INVENTOR:

DeWitt C. Hoover

BY Munn & Co

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

DE WITT C. HOOVER, OF BUFFALO, NEW YORK.

COMBINED SHUTTER AND DIAPHRAGM FOR PHOTOGRAPHIC CAMERAS.

SPECIFICATION forming part of Letters Patent No. 317,788, dated May 12, 1885.

Application filed June 12, 1884. (No model.)

To all whom it may concern:

Be it known that I, DE WITT C. HOOVER, of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Combined Shutter and Diaphragm for Photographic Cameras, of which the following is a full, clear, and exact description.

The object of my invention is to provide cameras with shutters for instantaneous work, constructed and arranged so that they serve also as adjustable diaphragms to give any desired size of opening, and the whole to form a permanent attachment to the lens-tube, thereby saving the necessity of numerous and separate diaphragms and a separate shutter. I make use of two shutters fitted to slide one on the other and in opposite directions, and they are operated by toggle-bars and spring-power of peculiar arrangement. I also provide adjustments whereby the openings are caused to coincide to a greater or less extent, according to the size of opening wanted, and in addition there are means for holding the shutters fixed with any extent of opening for time-work, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan view showing the lens-tube of a camera with my improvement applied. Fig. 2 is a front view with the tube in section, and Fig. 3 is a longitudinal section through the case or pocket containing the shutters.

A is the lens-tube, made in two portions or cut in two so as to receive the shutter case or pocket B between the two lenses. The ends of the tube are threaded and carry clamping-rings *a a*, that have flanges projecting on the back and front sides of the pocket for screws that hold the pocket B in place.

C C are the sliding shutters, fitted to move on pins *b b b'*, and each having an aperture, *d*, preferably of a rectangular or rhomboidal shape, and so placed that they first come together at the angles, and the opening increases until the apertures coincide fully. Upon the pin *b'* is hung a lever, *e*, having at its ends pins *e' e'*, that enter notches of the respective shutters, so as to move them in opposite directions, and to the lever *e* is pivoted one end of the jointed toggle-bars *f*, the other end of the toggle-bars being rigidly connected to a pivoted quadrant, *g*. From the quadrant a cord, *h*, passes to the end of a coiled spring, *i*, that is attached on an arbor fitted in the side of case B, so that the recoil of the spring tends to turn the quadrant and operate the shutters, as hereinafter specified.

k is a spring-catch engaging a notch in one shutter for holding them both in the closed position, and *l* is a press-button for releasing the catch. The quadrant *g* is pivoted on an arm or pointer, *m*, which is hung on the face of case B, and the side of the case is slotted to allow movement of the pivot-pin, so that by moving the pointer to the right or left the toggles *f* are straightened more or less, and the length of movement thus regulated according to the scale above the pointer, which indicates the size of opening. The joint-pin *f'* of the toggles projects through a slot in the front of the case, and on the case is a slide, *n*, fitted to move on the pin *b'*, so that it may be projected into the path of pin *f'* for holding the toggles in a straightened position and with the apertures open when the instantaneous mechanism is not used.

For adjusting the tension of the spring *i*, there is an arm, *o*, on its arbor engaging a toothed segment, *p*, that holds the arm in position as adjusted.

In operating these shutters, when a full-sized opening is desired the pointer *m* is moved to the left, as shown, thereby bending the toggles to the greatest extent. The catch *k* is then released by pressing down the button, and the spring turning the quadrant the toggles first straighten, thereby moving the shutters and causing the apertures *d* to come together. The further movement of the quadrant bends the toggles to the opposite side and closes the aperture by returning the shutters to their first position. Before being used again the spring is reset by pressing down the pin *f'*, thereby carrying the toggles to their proper position. The same operation takes place when the shutters are used as a diaphragm to give a smaller opening. In that case the pointer *m* is moved to the right more or less, thereby bringing the toggles nearer a straight

line, so that when they are fully straightened by the spring the apertures *d* do not come together fully, and the size of opening is reduced, as illustrated in Fig. 3.

For time-work the pointer *m* is moved according to the size of opening desired, and the slide *n* moved out to hold the toggles straight and with the aperture open. By moving the shutters until the apertures coincide and then returning them by a reverse movement, it is practicable to regulate the size of opening, which is not possible when the apertures pass by each other, as has been the case heretofore when two shutters have been used.

It will be seen that these combined shutters and diaphragms are a permanent fixture on the camera, and being capable of use for instantaneous or for time work with any size of opening separate diaphragms are not needed.

With a single-lens camera the case or pocket B may be attached to the outer end of the tube.

I do not limit myself to the construction in detail as described, as the mechanism may be varied and the device for releasing the shutters may be arranged for operation in any desired manner.

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

1. The combination, in a camera, of two sliding and apertured shutters or diaphragms fitted for movement in opposite directions, a spring having connections for moving the shutters to cause coincidence of their openings, and devices for adjusting or limiting the length of movement of the shutters, whereby the shutters are moved to the desired size of opening and the opening closed by a return movement, substantially as described.

2. In a camera, the combination, with the sliding shutters, of toggle-bars and a spring fitted to cause the movement of the shutters in opposite directions and then reverse the movement, substantially as described.

3. In a camera, the combination of apertured shutters C C, lever *e*, toggles *f*, and an operating-spring, substantially as shown and described.

4. In a camera, the combination of apertured shutters C, lever *e*, toggles *f*, and adjustable quadrant *g*, substantially as described.

5. In a camera, the toggles *f*, quadrant *g*, lever *e*, and arm *m*, carrying the quadrant, combined with sliding shutters having apertures, substantially as described.

6. The combination, in a camera with sliding shutters, of toggle-bars, and a rotating quadrant for moving the shutters, and means for adjusting the quadrant, substantially as and for the purpose specified.

7. In a camera, the slide *n*, combined with the operating-toggles of sliding shutters for holding the shutters open, substantially as described.

DE WITT C. HOOVER.

Witnesses:
STEPHEN B. BUTTS,
WILLIS S. MURDOCK.