(No Model.) 2 Sheets—Sheet 1.

C. C. PACKARD.

PHOTOGRAPHIC SHUTTER.

No. 451,880. Patented May 5, 1891.

Fig: 1.

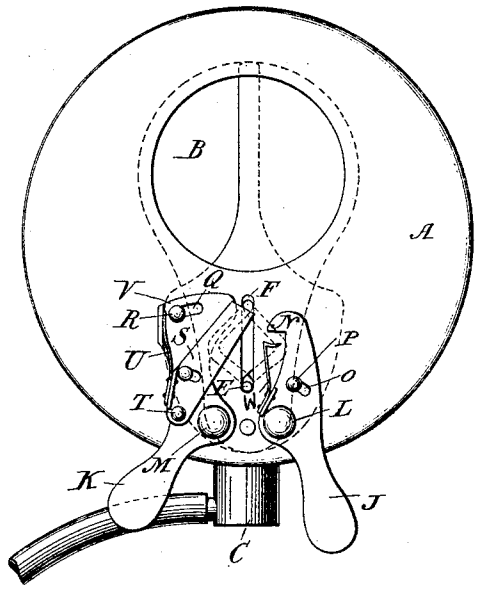
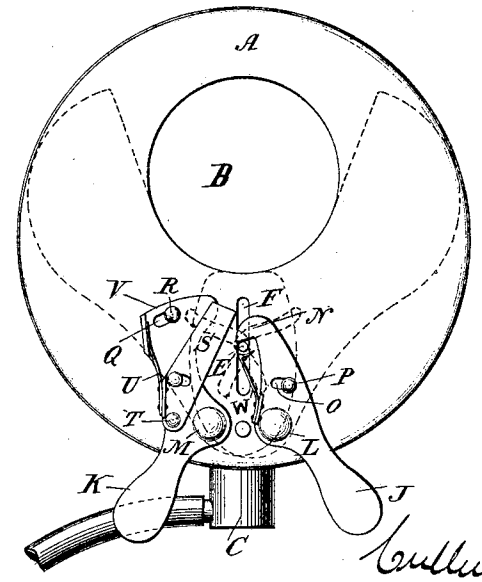


Fig: 2.



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D. Solis Ritterband

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. C. PACKARD.

PHOTOGRAPHIC SHUTTER.

No. 451,880. Patented May 5, 1891.

Fig: 3.

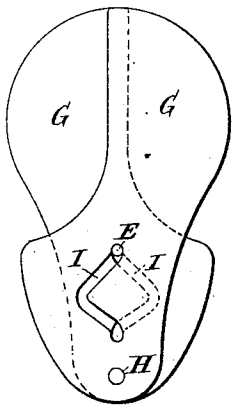


Fig: 4.

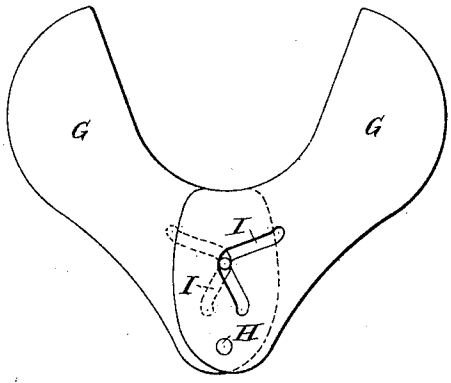


Fig: 5.

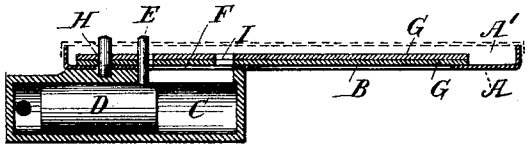
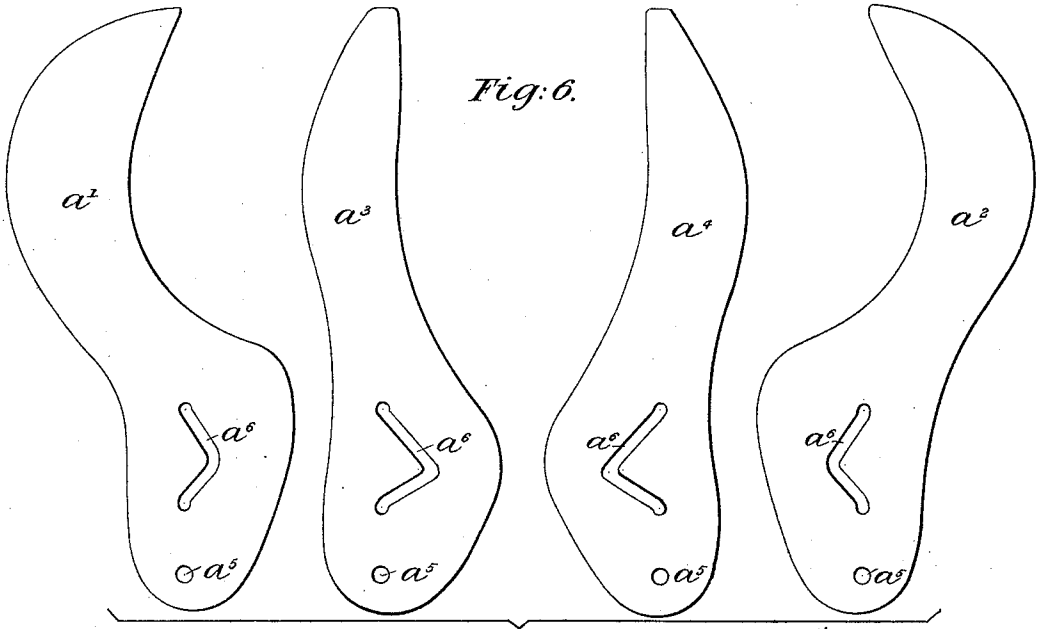


Fig: 6.



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UNITED STATES PATENT OFFICE.

CULLEN C. PACKARD, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO E. & H. T. ANTHONY & COMPANY, OF NEW YORK, N. Y.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 451,880, dated May 5, 1891.

Application filed November 2, 1889. Serial No. 329,065. (No model.)

To all whom it may concern:

Be it known that I, CULLEN C. PACKARD, a citizen of the United States, and a resident of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Photographic Cameras, of which the following is a specification.

My invention relates to improvements in photographic shutters of the class known as "pneumatic shutters;" and it consists in the peculiar construction and arrangement of the parts, whereby, through the action of the pneumatic or equivalent engine, the shutters are operated either for an instantaneous or for a time exposure.

That which constitutes the invention will be best ascertained by a consideration of the drawings and description of the parts, as hereinafter set forth.

In the several figures of the drawings the same reference-letters indicate the same parts.

Figure 1 illustrates a view of the rear side of the shutter-case, showing the levers which control the position of the shutters, and also showing the wings of the shutters closed in dotted lines. Fig. 2 shows a like view, the levers being in their position to make a time-exposure and the wings being open for such an exposure. Fig. 3 shows a plan view of the wings closed. Fig. 4 shows a plan of the wings of the shutter open. Fig. 5 shows a sectional view of one half of the shutter-case, the other half appearing in dotted lines, showing the engine and the shutters in position within it. Fig. 6 shows the preferred construction of the wings of a four-wing shutter made upon the plan of my invention.

A A′ are the two halves of the shutter-case. They may be circular, as shown, and made of metal or of other preferred form and material.

B is the exposure-aperture, which is of course made in the two halves of the case.

C is the pneumatic engine. It may be made of any preferred form, but preferably has an inwardly-sliding piston-tube D, with a lateral finger E therefrom, which works through a slot F in the side of the case upon which the engine is attached.

G G are the wings of the shutter. They are or may be superposed one upon the other, as usual in such cases in use. They are pivoted upon a pivot H.

I are what I call "two-way slots," made in each of the wings of the shutter. By "two-way" I mean that the slot in each is arranged at two angles relative to the line of movement of the pin E, which operates within them, so that as the pin advances from one end of the slot F in the case A or A′, as the case may be, toward the other end the shutters will be first moved in one direction and will then be moved in the reverse direction—that is to say, they will first, during the movement of the pin through that portion of the slot in each wing which lies in one direction, be moved correspondingly, and then when the pin moves through the other part of the slot which lies at the other angle or direction the wings will all be moved in the reverse direction. This form of slot is fully illustrated in Figs. 3, 4, and 6, to which attention is specially called.

J K are two levers, which are pivoted at L and M, respectively, to one of the sides of the shutter-case. The lever J has an undercut or hook-like part N upon it and is provided with a slot O, through which a pin P, which is fast to the side of the case, plays, and the lever K has also a slot Q and a pin R, fastened to the case, which also plays through it. The lever K has also a stop S, which is pivoted to the lever by a pivot T and rocks thereon.

U is a spring, which normally presses the stop S forwardly, as shown in Fig. 1. The free end of the spring U takes a bearing against a flange or stud V, formed on the upper part of the lever K. These levers are adapted to rock on their pivots L and M, respectively, to the extent of the slots O and Q, respectively, so that the hook-like part N of the lever J, and also so that the pivoted stop S on the lever K may be moved into line with the slot F, through which the wing-actuated pin E moves.

The operation is as follows: Assume that it is desired to make an instantaneous exposure. Of course the shutter is ordinarily closed, all the wings being drawn in, and being super-

posed one upon the other—*i. e.*, their edges overlapping—exclude the light. The lever K is now moved in such direction that the pivoted stop S lies across the slot F. Upon squeezing the bulb or otherwise operating the motor, depending upon what kind of motor it may be, and which is not essential to my invention, the pin E is carried upwardly through the slot, actuating the wings first to open and then instantly to close the same, and also as it rises it forces the pivoted stop S out of its path, compressing the spring U until it reaches the upper part of the slot F, when, having passed the stop S, it, under the action of the spring U, immediately falls again across the slot F in rear of the wing-actuating pin E, thus locking that pin in the upper end of the slot and preventing reopening of the wings of the shutter. Thus an instantaneous exposure is secured.

When it is desired to make a time exposure, the lever K is swung backwardly, so that the stop S is removed from over the slot F. The lever J is then swung into such position as that its hook-like end N will lie over the slot F. The position of the parts at this time are as shown in Fig. 2 of the drawings. Of course the pin E, which actuates the wings, has again returned to the bottom of the slot F, that being the normal and starting-point always for that pin. Now upon squeezing the bulb or otherwise actuating the motor, of whatever form the motor may be, the pin rises through the slot F until the shutter attains its open position—in other words, until the pin has passed through that part of the slot in each wing which affects its opening movement—and when it has so done it comes in contact with the overhanging end of the lever J, which stops its further movement. Thus the wings are prevented from again closing, since the pin cannot proceed farther through the part of the slots which affect the closing of the wings. The position of all the parts at this time—*i. e.*, during a time exposure—is fully illustrated in Fig. 2.

I sometimes put a light spring W on the lever J, which will be deflected during the upward movement of the pin E and immediately close in behind it when it rests against the part N of the lever J, thus holding the pin in its then position. This will obviate the necessity for continuing the compression of the bulb or piston, if that form of motor be employed.

In Fig. 6 I show the preferred form of wings when I employ a four-wing shutter under my invention. a' a^2 are the outside shutters. a^3 a^4 are the inner shutters. They are all pivoted upon pivots through the hole a^5 made in each one, and the actuating-pin E plays through the slots a^6 shown in each. The operation is identical in all respects with that shown in the other figures wherein I employ a two-wing shutter; but the use of four wings has certain advantages which occasionally I prefer to employ. It is not essential that they should all be pivoted, nor that the two wings, when two only are used, should be so pivoted. There may be as many pivots employed as desired.

I do not limit myself to the details of construction shown, because it will be obvious to those familiar with this art that changes may be made therein and still the essentials of my invention be employed. Moreover, it is obvious that the levers J and K may be upon either side of the case of the shutter, and that if upon the exposed side they may be readily seen and their construction and operation more fully understood; also, that my device may be made as an entity already mounted upon a plate or board, metal or otherwise, in which event it may be sold as an article of manufacture ready for application to any form of camera-box.

It will be seen that by my invention I use a single motor only, and that I do not require, as many other shutter mechanisms do, a positively-acting motor and another releasing-motor which enables the first one to act upon the shutter for its movement, and also that, because the slots are in the body of the wings themselves, I very greatly save space in the shutter-case, reducing the size of the device.

I claim—

1. The combination, in a photographic shutter, of a plurality of flat pivoted shutter-wings, each wing having a slot therein constructed and arranged to reciprocate the wing upon movement of the actuating-pin therethrough in one direction, a pin actuated by a motor which plays through the said slots, and locking devices for the pin, whereby the wings are locked after having been opened and closed, substantially as set forth.

2. The combination, in a photographic shutter, of a plurality of flat pivoted wings, each provided with a slot, a motor provided with a pin which projects through the slots in the wings, and a spring-actuated automatic lock which embraces the pin after the motor has effected the opening of the wings, thus preventing their subsequent movement in either direction, whether actuated by the motor or otherwise, substantially as set forth.

3. The combination, in a photographic shutter, of flat pivoted wings actuated by a pin passing through a slot, and two locking-levers for the wings, one of which locks the pin at or near the extreme of its movement, preventing its return, and the other of which incloses the pin when at or about midway of its movement, thus preventing its movement in either direction, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 22d day of October, A. D. 1889.

CULLEN C. PACKARD.

Witnesses:

PHILLIPS ABBOTT,

EDWIN C. DUSENBURY.