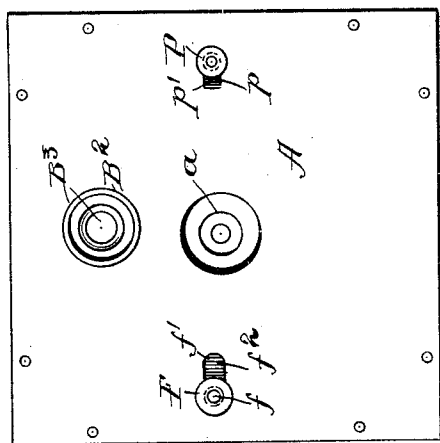
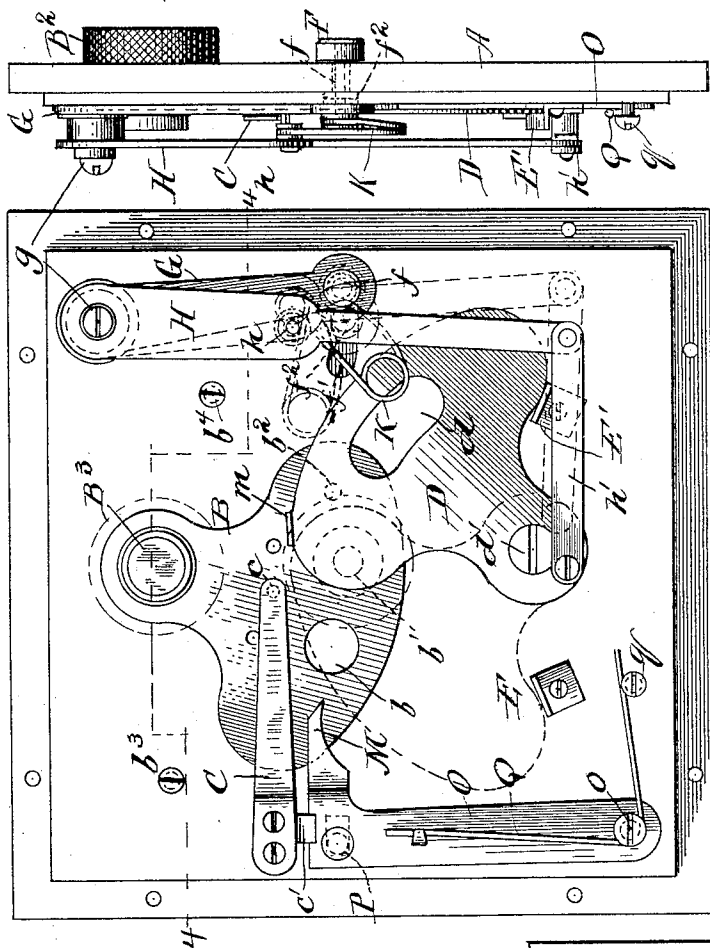


(Model.)

J. A. MOSHER.
PHOTOGRAPHIC SHUTTER.

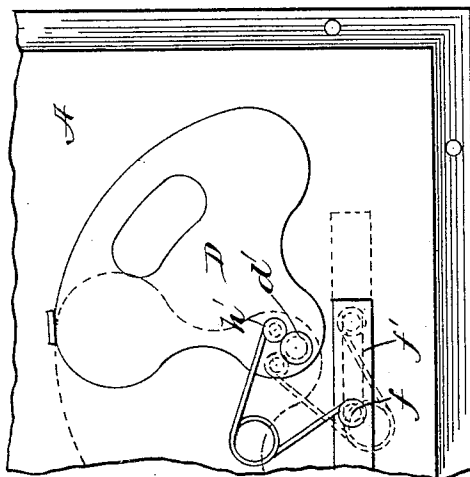
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Patented May 11, 1897.



Witnesses
W. C. Corlies
C. A. Crawford

Fig. 1



Inventor
John A. Mosher
By Louis H. Gleason
Attorney.

UNITED STATES PATENT OFFICE.

JOHN A. MOSHER, OF CHICAGO, ILLINOIS.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 582,219, dated May 11, 1897.

Application filed November 5, 1896. Serial No. 611,190. (Model.)

To all whom it may concern:

Be it known that I, JOHN A. MOSHER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, 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 of reference marked thereon, which form a part of this specification.

The object of the invention is to provide improved means for actuating a shutter without preliminary setting, the shutter being at all times ready for action. This is accomplished by means of a spring, substantially U-shaped, pivotally connected at its ends to reciprocating parts which move in approximately parallel paths, the path of the one to which power is applied being longer than and overlapping at each end the path of the other part, by means of which the movement is transmitted.

The invention consists, further, in various parts and arrangement of parts, as hereinafter set forth.

In the drawings, Figure 1 is a front elevation of a portable or hand camera. Fig. 2 is an inside elevation of the camera-front upon a somewhat larger scale. Fig. 3 is an edge elevation of the same. Fig. 4 is a sectional view on the line 4 4 of Fig. 2, and Fig. 5 is a detail showing a modification.

The camera-front plate A is provided with the usual central exposing-aperture *a* and finding-lens B³. The push-button F for actuating the shutter is located near one side edge and about midway between the top and bottom, its stem or pin *f* reciprocating in a slot *f'*, and the push-button P for controlling time exposures is similarly located at the opposite side of the front, its stem or pin reciprocating in a slot *p*. This arrangement brings the two buttons into convenient position for manipulation by the first or second fingers of the hand of the operator when the camera is held in the usual manner by placing the thumbs upon the top of the box and the third and fourth fingers below it, the first and second fingers of each hand naturally falling

upon the front face. I show these push-buttons also as having sliding movements within slots, in preference to using turn-buttons, which require the use of both thumb and finger and prevent the firm grasping of the box essential to steadiness.

The shutter mechanism is attached to the inner face of the camera-front. A diaphragm-plate B is mounted upon a spindle B', projecting through the plate A, and swings over the aperture *a*. This plate has a plurality of apertures, as *b b' b²*, of varying sizes, so disposed as to be brought into registry with the aperture *a*, and a pair of stop-pins *b³ b⁴* are so set as to prevent the plate B from being moved in either direction to wholly uncover the exposing-aperture. A turn-button B² is fixed upon the outer end of the spindle B', and for convenience and compactness, as well as for the purpose of reducing the number of openings in the camera-front, I make the spindle B' tubular in form and utilize it as the aperture for the finder, (not shown,) mounting within it the lens B³.

The plate B is frictionally held in any desired position by means of a spring-arm C. This arm is secured to the camera-front and bears upon the surface of the plate and is provided with a point *c*, which coöperates with a series of indentations in the plate corresponding in number with the apertures *b b' b²* and so disposed that the point is brought into engagement with one of them when any one of these apertures registers with the exposing-aperture *a*.

The shutter D is fan-shaped and is pivoted at *d'*, below the aperture *a*, which it covers. The shutter is adapted to have a reciprocal or oscillatory movement between the stop-lugs E E', secured to the camera-front and limiting the movements of the shutter, so that it cannot uncover the exposing-aperture except as its aperture *d*, which is preferably oblong, registers with it.

The essential element for transmitting motion from the stem of the push-button F to the shutter is an expanding spring K, preferably U-shaped, mounted in substantially the manner hereinafter described. The pin *f*, carrying the push-button F, is fixed in a swinging arm G, pivoted upon the pin *g*, fixed in the camera-front near its upper corner.

A swinging lever II is also pivoted upon the pin *g*, its lower or swinging end reaching to the level of the lower end of the shutter D and being connected therewith by means of a rigid link-bar *h'*. The arm G and lever II are spaced apart upon the pin *g*, so as to provide space between them for the spring K, one end of which is pivotally secured to the inwardly-projecting end of the pin *f*, and the other end of which is similarly attached to a pin *h*, set in the lever II. The pins *f* *h* are at different distances from the pin *g*—that is to say, their paths do not coincide. Preferably the pin *h* is the nearer to the pin *g* for the reason that its path is necessarily shorter than that of the pin *f*, and by locating it nearer the center of movement this difference of travel is secured with a shorter movement of the pin *f* than would be the case were the relative position of the two pins reversed.

When the two pins *f* *h* are at opposite limits of their movements, the body of the spring K is oblique to their paths and its expansive action resists the approach of the pins. As the pin *f* is moved along its path the spring is compressed and its body is swung into line with the path of the moving pin, crossing this path and becoming oblique to it as the pin passes the pin *h*. As the spring tends at all times to separate the pins to which it is attached, it follows that when the pin *f* has passed to the opposite side of the pin *h* the pressure upon the latter will be reversed in direction and it will be thrown to the opposite end of its path, thereby correspondingly moving the shutter D. By this means a very quick and free action of the shutter is secured, so that no preliminary setting of the shutter is necessary, but the exposure is accomplished by the simple movement of the button F, first in one direction, then in the other.

The use of a swinging arm, lever, and a connecting-link is not essential to the action of the shutter mechanism forming the subject of this application, though they give smoothness of action, reduce friction, multiply movement, and provide for a more convenient location of the push-button. They may be greatly varied in form and arrangement from the construction described, the only essential feature being that the expansion-spring shall have its ends pivotally connected to two reciprocating parts which move in approximately parallel but not in coincident paths, the path of the one also being longer than that of the other and overlapping it at both ends. These essentials are operatively present in the construction shown in Fig. 5, in which the slot *f'* is located below the shutter D and in close proximity to the pivot-pin. The pin *f* slides to and fro in this slot and the pin *h* is fixed directly in the shutter D and above its pivot-pin, the spring K forming the sole connection between the stem of the push-button and the shutter.

In order to secure time exposures I employ a movable detent M, capable of being thrown across the path of a laterally-projecting lug *m*, formed on the shutter D. This detent is shown as being rigidly connected with a swinging arm O, pivoted in the lower corner of the camera-front, as at *o*, and controlled by the push-button P, the stem of which is fixed within it and passes through the slot *p*. The detent M is normally held out of the path of the lug *m* by means of a spring Q, reacting against a pin *q*, set in the camera-front. The parts being conveniently disposed, I form a guide-flange *c'* upon the arm C to overhang the arm O and keep it in its proper plane.

When the detent M is advanced, it stops the shutter, when moving in either direction, with its aperture registering with the aperture *a*, and the exposure may be prolonged at pleasure. The release of the detent permits the shutter to continue its movement at once.

Shields in the form of sliding plates *f'*² and *p'* cover the slots *f'* and *p*, respectively, to exclude the light, being attached to the pins *f* and P, so as to move with them. Ways for these plates may be formed in any suitable manner. As shown, they are formed within the plate A.

I claim as my invention—

1. The combination with a reciprocating shutter, and with a reciprocating actuating part, of an expanding spring forming a connection between the actuating part and the shutter, the point of attachment of the spring to the shutter mechanism having a reciprocating movement between positive stops in a path shorter than and non-coincident with the path of the point of attachment of the spring to the actuating part.

2. The combination with a reciprocating shutter, and a reciprocating actuating part, of an expanding spring forming a connection between the shutter mechanism and the operating part, the ends of the spring being capable of reciprocatory movements but in non-coincident paths, the path of the end connected with the actuating part being longer than and at each end overlapping the path of the other end of the spring.

3. The combination with a reciprocating shutter, and a reciprocating actuating part, of a looped or substantially U-shaped spring forming a connection between the shutter mechanism and the operating part, the ends of the spring being capable of reciprocatory movements but in non-coincident paths, the path of the end connected with the actuating part being longer than and at each end overlapping the path of the other end of the spring.

4. The combination with a reciprocating shutter, of a swinging arm, connection between the arm and the shutter whereby the shutter may be actuated by the arm, a laterally-reciprocating push-button, an expanding spring having its ends attached respec-

tively to the arm and to the button but at differing distances from the pivot-point of the arm, the point of attachment of the spring to the arm being limited to a shorter movement than the button.

5 5. The combination with a reciprocating shutter, of a swinging arm, connection between the arm and the shutter whereby the shutter may be actuated by the arm, a later-
10 ally-reciprocating push-button, a U-shaped spring having its ends attached respectively to the arm and to the button but at differing distances from the pivot-point of the arm, the point of attachment of the spring to the arm
15 being limited to a shorter movement than the button.

6. In a camera the combination with a reciprocating shutter, of a swinging arm, a reciprocating plate, an expanding spring having its ends attached respectively to the arm
20 and to the plate, the points of its attachment moving in approximately parallel but in non-coincident paths, the path of the point of attachment to the arm being shorter than that
25 of the plate, and means for actuating the plate from without the camera.

7. In a camera the combination with a reciprocating shutter, of a swinging lever H having a limited movement, a link connecting
30 this lever to the shutter, an arm G swinging between positive stops from the same center as the lever H and being controllable from without the camera, and an expanding spring having its ends attached respectively to the
35 lever and to the arm, the point of attachment of the spring to the lever being nearer to the center of movement than its point of attachment to the arm and having a shorter range of movement.

40 8. In a camera the combination with a reciprocating shutter, of a swinging lever H having a limited movement, a link connecting this lever to the shutter, an arm G swinging between positive stops from the same center

as the lever H and being controllable from 45 without the camera, and an expanding spring having its ends attached respectively to the lever and to the arm, the path of the point of attachment of the spring to the lever being shorter than that of its point of attachment 50 to the arm.

9. In a camera the combination with a reciprocating shutter, an actuating part controllable from without the camera, and an expanding spring forming a connection between 55 the shutter and the actuating part, the two ends of the spring having reciprocating movements in approximately parallel but in non-coincident paths, the path of the end attached to the shutter mechanism being shorter than 60 that attached to the actuating part, of a detent adapted to be interposed in the path of the shutter, and means for controlling the detent from without the camera.

10. In a camera the combination with a 65 front having an exposing-aperture, of a diaphragm-plate pivoted to the camera-front and covering the exposing-aperture, such plate having a plurality of apertures of varying sizes arranged to register with the exposing-
70 aperture, the pivot-pin of the reducing-plate projecting through the camera-front and being rotatable therein but in fixed relation with the plate, and being tubular in form, and a finding-lens mounted within such tubular pin. 75

11. The combination with a reciprocating shutter, of a spring for throwing the shutter, means for connecting the spring with the shutter, means for bringing the spring to a tension and reversing the direction of its pres- 80 sure after it is brought to tension.

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

JOHN A. MOSHER.

Witnesses:

LOUIS K. GILLSON,
RICHARD H. WAYMAN.