(No Model.) 2 Sheets—Sheet 1.

C. P. CALL.

SELF TIMING PHOTOGRAPHIC CAMERA SHUTTER.

No. 368,930. Patented Aug. 30, 1887.

Fig. 1.

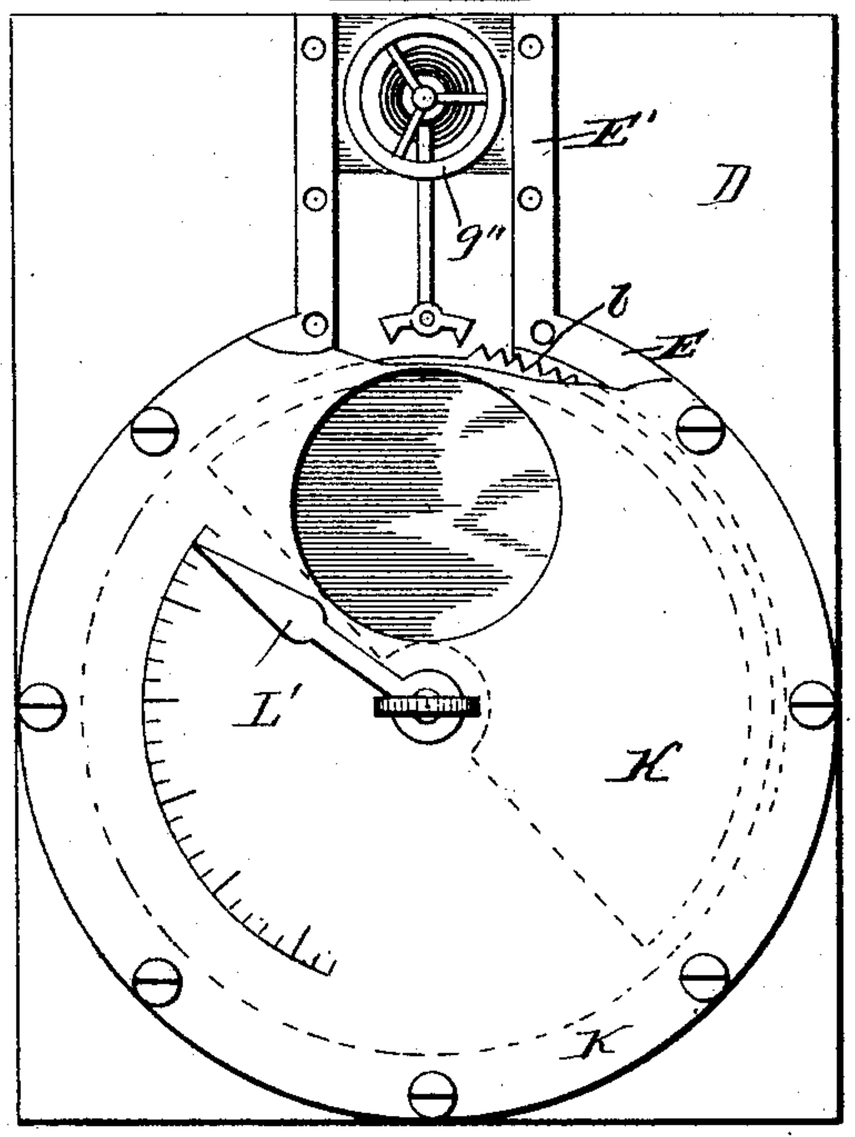


Fig. 2.

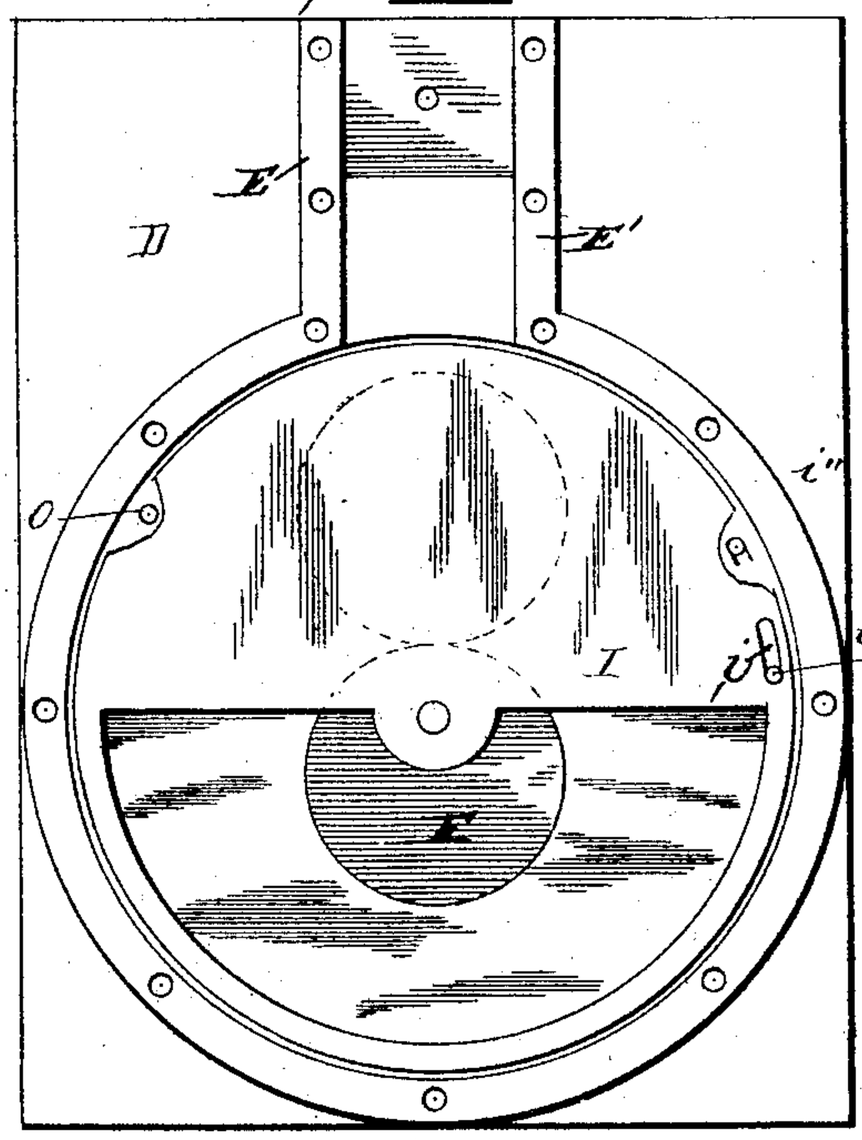


Fig. 3.

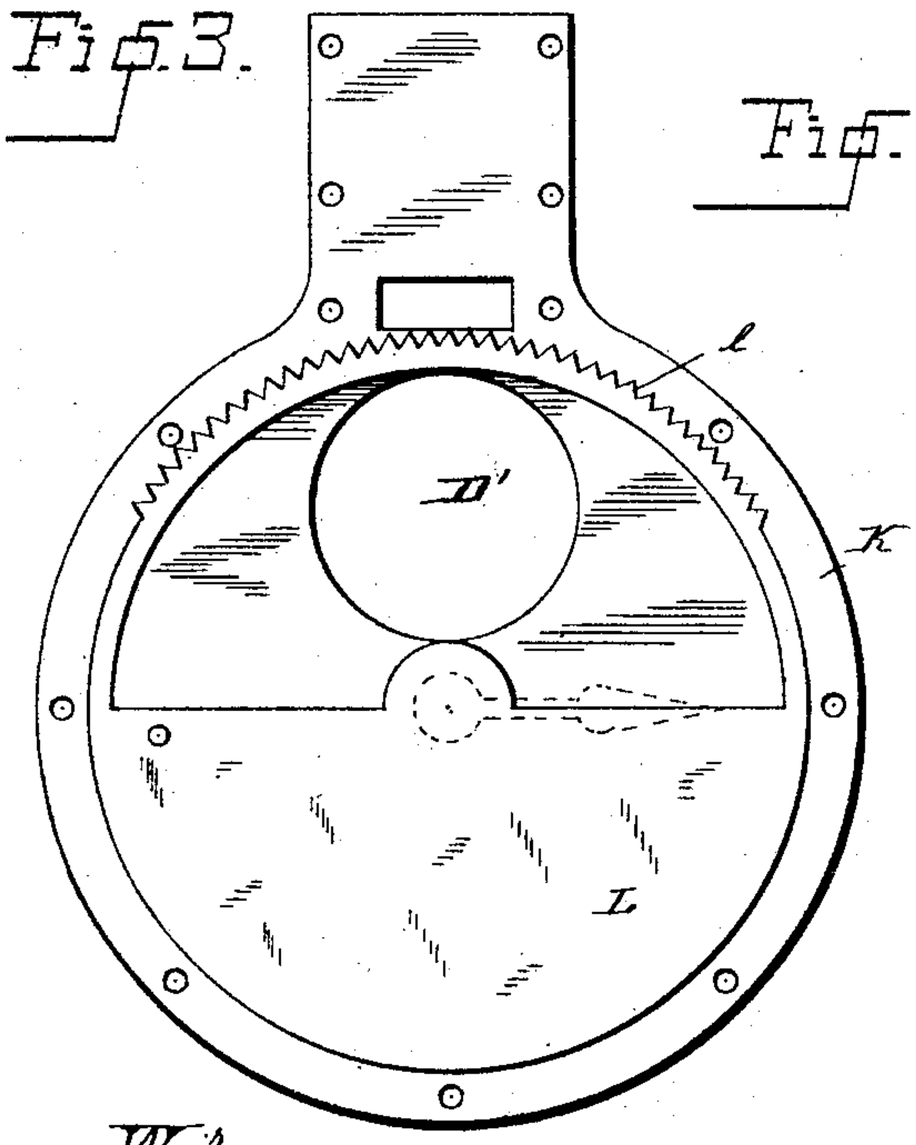
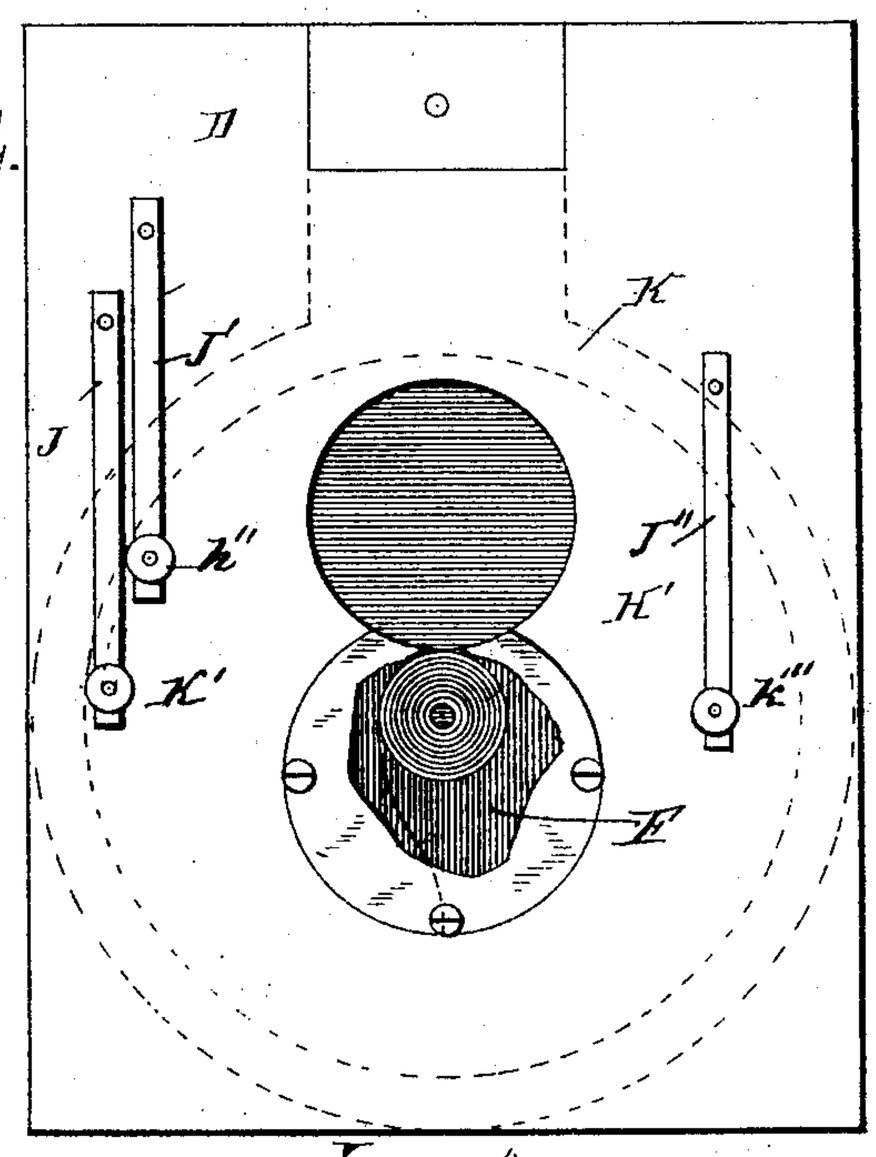


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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SELF TIMING PHOTOGRAPHIC CAMERA SHUTTER.

No. 368,930. Patented Aug. 30, 1887.

Fig. 5.

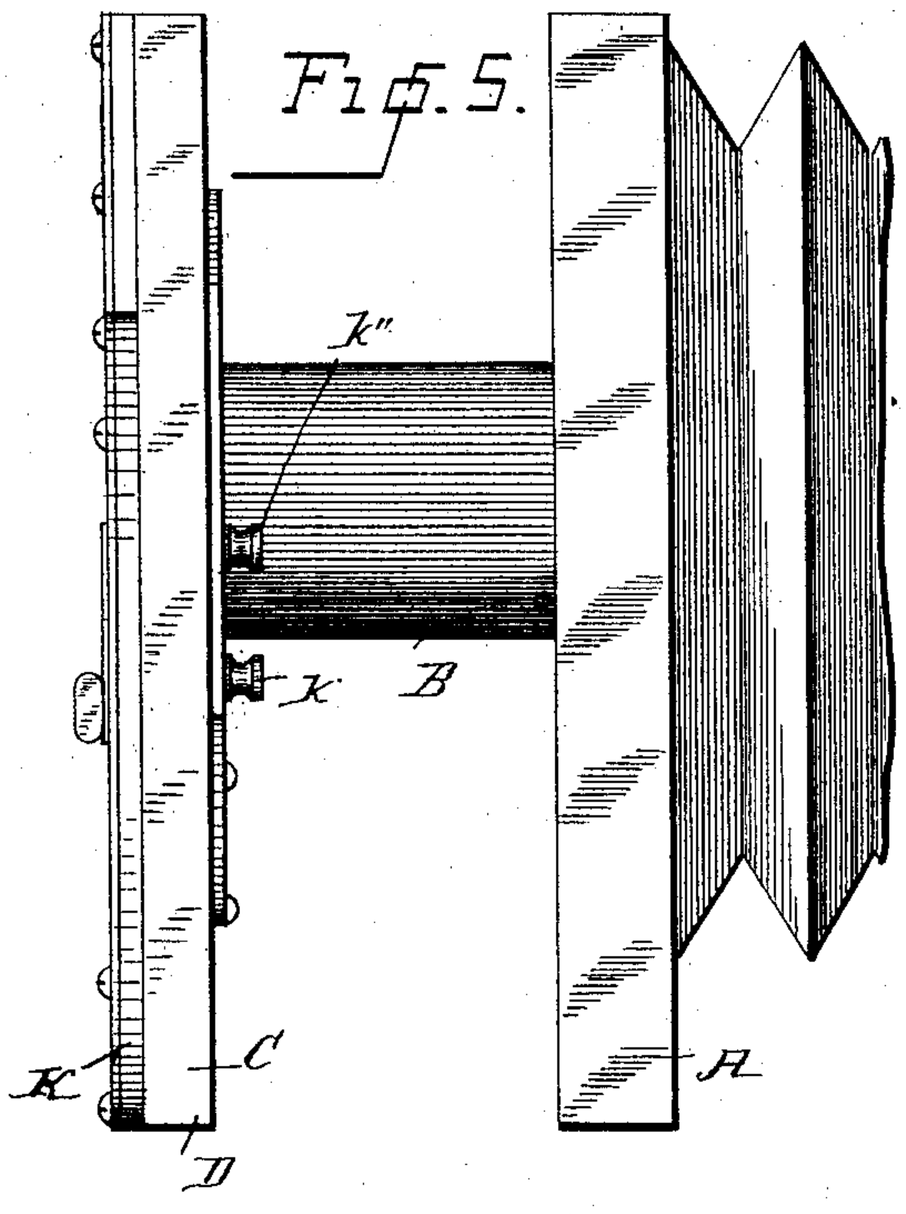

Fig. 6.

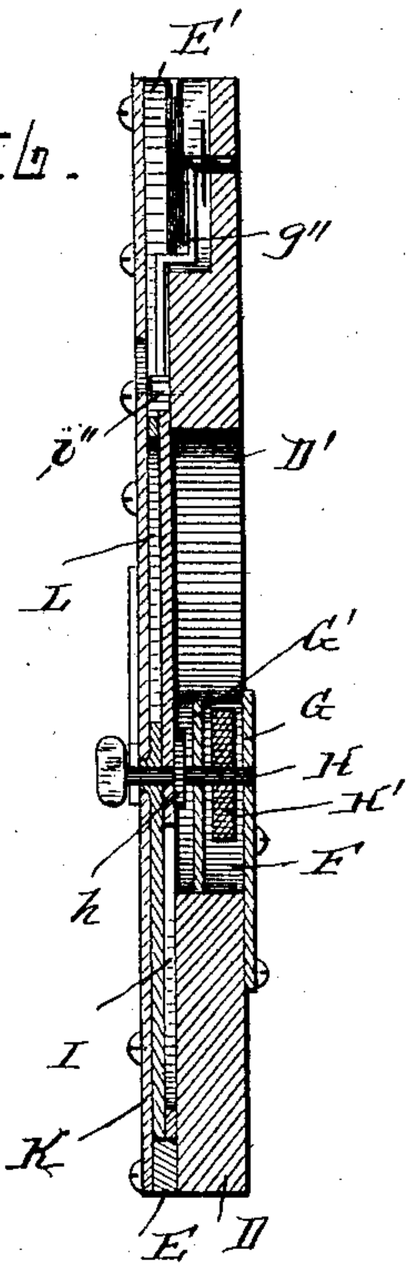

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES P. CALL, OF BOYNE, MICHIGAN.

SELF-TIMING PHOTOGRAPHIC-CAMERA SHUTTER.

SPECIFICATION forming part of Letters Patent No. 368,930, dated August 30, 1887.

Application filed February 24, 1887. Serial No. 228,717. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. CALL, of Boyne, in the county of Charlevoix and State of Michigan, have invented certain new and useful Improvements in Self-Timing Photographic-Camera Shutters; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 part of this specification.

My invention relates to improvements in that class of devices known as "instantaneous or timing shutters for photographic cameras;" and it consists in the improved construction and combination of parts of a shutter, which may be operated by means of clock mechanism, thereby rendering the action more or less quick, as desired, or it may be operated by means of air compressed in an elastic bulb; and it also consists in a back or rear plate having an aperture, and which is adapted to be attached or secured to a tube connected to a camera; and it further consists in a series of circular or partly-circular plates forming a shutter, which is centrally pivoted to a winding post or stem and adapted to be instantaneously closed or opened by springs suitably secured to the back or rear frame. I also employ a front plate or dial, upon which are printed or stamped seconds, minutes, or a fraction thereof, and an indicating-hand secured to a time-plate provided with ratchet-teeth and adapted to be controlled by an escapement and spring secured to the rear plate.

It further consists in the employment of stop-springs, forming projection for more perfectly controlling the closing and opening of the shutters; and it further consists in a means whereby the closing of the shutter will be regulated by setting a hand adapted to be revolved partly over the front plate; and, further, it consists in certain details of construction and combination of parts, as will hereinafter be more fully described, and specifically pointed out in the claims.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a front or plan view of my invention, showing the indicator and part of the front plate cut away to show the ratchet-teeth, escapement, and operating-spring. Fig. 2 is a similar view with the top plate removed, showing an inner shutter, slots, and catches. Fig. 3 is a rear view showing one of the pivoted shutters and ratchet-teeth. Fig. 4 is a similar view, portion being cut away to show the shutter-operating spring and the catch-springs. Fig. 5 is a side elevation showing part of a camera and my device attached thereto. Fig. 6 is a similar view of my device in cross-section; and Fig. 7 is a rear view with the back plate, D, removed.

Similar letters refer to similar parts throughout the several views.

In the accompanying drawings, A represents a portion of a camera, and B its connecting-tube, to which my device is attached. I however do not wish to confine myself to the precise means of attaching the plate D, as I may secure the said plate immediately behind the tube and within the camera.

D is the rear plate, to which all the other plates are secured or connected, and is provided with an aperture, D′, near its upper portion, whereby the same may be secured upon, slipped over, or telescoped within the tube B.

To the plate D is suitably secured a circular frame or projection, E, which terminates at its upper portion in the two vertical pieces E′ E′, and to said frame is adapted to be secured a front plate, K, made to correspond in contour to said frame. Below the aperture D′, I also form a circular aperture, F, having a segment of its circle passing over the center of the rear or back plate. To the rear, and nearly in front of said aperture F, I secure the plates G and G′, and between which is pivoted a winding-post, H, having its bearings on the plates G and G′, and in the space formed by said plate is secured to the winding-post an ordinary clock-spring, H′, as clearly shown in Figs. 4 and 6.

To the upper portion of the plate D, and between strips E′ E′, I secure in a cut-away portion an escapement and operating-spring, *g″*, adapted to engage with ratchet-teeth formed on the periphery of the time-plate, to be hereinafter described.

Above the plate G′, and secured to the winding-post H, is a ratchet-wheel, *h*, in which the ratchet engages with a spring and pawl, *h′*, pivoted to the shutter I, made circular in form, and having a segment of its circle cut away, as clearly shown in Figs. 2, 6, and 7, the said shutter being provided with a slot, *i′*, adapted to engage with the spring-projecting lugs *i″ i″*, in the rear plate, D. To the front plate, K, and underneath the same, I loosely pivot a revolving time-plate, L, to which is also secured a hand or indicator, L′, which is so pivoted that the indicator will revolve with said time-plate and in front and upon the surface of the plate K.

The time-plate L is made similar to the shutter I, with the exception that I form upon its periphery for a portion of its circumference ratchet-teeth *l*, adapted to engage with the escapement *g″*. To the under side of the time-plate L, and near its edge, is a lug or projection, O, which is adapted when the shutter is being revolved to engage with the shutter I.

Between the shutters I and time-plate L, I place washers for the purpose of lessening the friction, and thereby allowing the shutter to revolve more smoothly. On the front plate or dial I form or place thereon figures, whereby the time in seconds, minutes, or a fraction thereof can be computed, and which also regulates the time for keeping the shutters opened or closed, which will be clearly described hereinafter in explaining the operation of my device.

To the back of the rear supporting-plate I secure springs J J′ J″, provided with knobs *k′ k″ k‴*, and having projecting lugs passing through holes in the rear plate and adapted to engage with the slot on the shutter I. The said shutters are adapted to revolve around the winding-post H, which is provided with a stationary or removable key.

Opposite to the spring J′ is a similar spring, J″, described, but which differs from the springs J and J′, as it will have a tendency of keeping its lugs out of engagement without first being pressed down, and is for the purpose of holding the shutter open while posing the subject.

The operation of my device is as follows: Immediately before a picture is to be taken the shutter I is closed—*i. e.*, covering the aperture in the rear plate—and the slot is in engagement with the lugs connected to the spring J or J′, and the spring H′ is wound up, the time-plate L being closed, and its ratchet-teeth are in position to engage with the escapement immediately upon the shutter being released. Just before exposure I place the indicating-hand on one of the figures on the front plate, so as to regulate and indicate the time of exposure. I then lift up the spring J, (which may be operated by compressed air in a bulb or otherwise,) which releases the lug and allows the shutter to revolve until it engages with the lug connected to the spring J′. The purpose of employing two lugs is that when the first lug is disengaged it would not have time to spring back and catch in the lug, as the shutter is revolved instantaneously. As soon as the lug J′ is released the projection *o* on the time-plate L engages with the shutter I, when both are revolved, the teeth being immediately in engagement with the escapement, which regulates the rapidity of revolution. It will be understood that just before the shutters are to be revolved the teeth on the time-plate L are about to engage with the escapement; but should an instantaneous action be desired the teeth or hand will be so placed that they will not engage with the escapement. To illustrate:

On the left-hand upper portion of the dial-plate are placed figures indicating one-fourth, one-eighth, or one-sixteenth of a second, commencing at the lower portion of the dial, and the ratchet-teeth on the revolving plate correspond therewith—*i. e.*, the tooth at the upper left-hand corner will either represent one-fourth, one-eighth, or one-sixteenth of a second, so that when the indicating-hand is placed at the second mark on the lower portion of the dial it will be seen that the last tooth will only engage with the escapement, which will pass it in just one-fourth, one-eighth, &c., of a second, thereby closing the shutter in that time. Should it, however, be desired to have a longer exposure, the hand will be placed at the third, fourth, or any mark which will increase the time so many fractions of a second; or, if it is desired that an instantaneous exposure be given, the indicating-hand will be placed so that none of the teeth will come in engagement.

It will be seen that by the above arrangement of the several parts an instantaneous action may be had; or when it is desired to have a more gradual or longer time for exposure, the hand passing over the dial can be so placed as to regulate the revolution of the shutter.

The means herein described are simple and effective in their operation, can be easily made and put together, and when any of the parts are worn can be easily replaced by new ones.

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

1. In a photographic camera, the combination, with a plate, D, a frame and front plate forming a dial, an interior shutter, and operating clock mechanism, of a time-plate provided with a ratchet adapted to engage with an escapement, spring, and balance-wheel, and catches J J′, substantially as shown and described.

2. In a photographic camera, a front and rear plate and intermediate shutter, and time-plate having teeth upon its periphery adapted to engage with an escapement and adapted to open the shutter instantaneously, in combination with a spring and winding-posts, and means for regulating the revolution of the

time-plate and shutter, substantially as described.

3. In a photographic camera, the combination of the rear and front plate, the front plate having figures placed thereon, and a hand secured to a winding-post, the intermediate plates partly cut away, and ratchet-teeth adapted to engage with an escapement, substantially as shown and described.

4. In a photographic camera, the combination of a rear plate and a front dial-plate and intermediate shutter, and time-plate provided with a ratchet, said plates being operated by clock mechanism and regulated so as to be instantaneously or otherwise opened or closed, substantially as set forth.

5. In a photographic camera, the combination of an inner plate and an outer indicating-plate, the intermediate time-plate and shutter, slot *i*, lugs *i'*, adapted to engage with said slot and secured to a spring, winding-post H', and escapement-spring, and balance-wheel actuated to engage with teeth on the time-plate, whereby a shutter may be closed instantaneously or slowly, and apertures formed in said plate adapted to register with the tube, substantially as shown and described.

6. In a photographic camera, the combination of a front and rear plate, and intermediate revolving plates, one of said plates being provided with ratchet-teeth adapted to engage with an escapement, and indicating hand and dial, whereby the opening of the shutter can be turned for an instantaneous or slow movement, substantially as described.

7. The combination, in a shutter for photographic cameras, of a front plate and connecting under plate having ratchet-teeth, shutters to be automatically and instantaneously opened or closed, and a dial representing fractions of a second corresponding with the number of teeth on the revolving plate, and by setting the indicator a shutter may be instantaneously opened or closed, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES P. CALL.

Witnesses:
JULIUS SOLGER,
O. E. DUFFY.