

(No Model.)

2 Sheets—Sheet 1.

J. E. THORNTON.  
PHOTOGRAPHIC SHUTTER.

No. 482,854.

Patented Sept. 20, 1892.

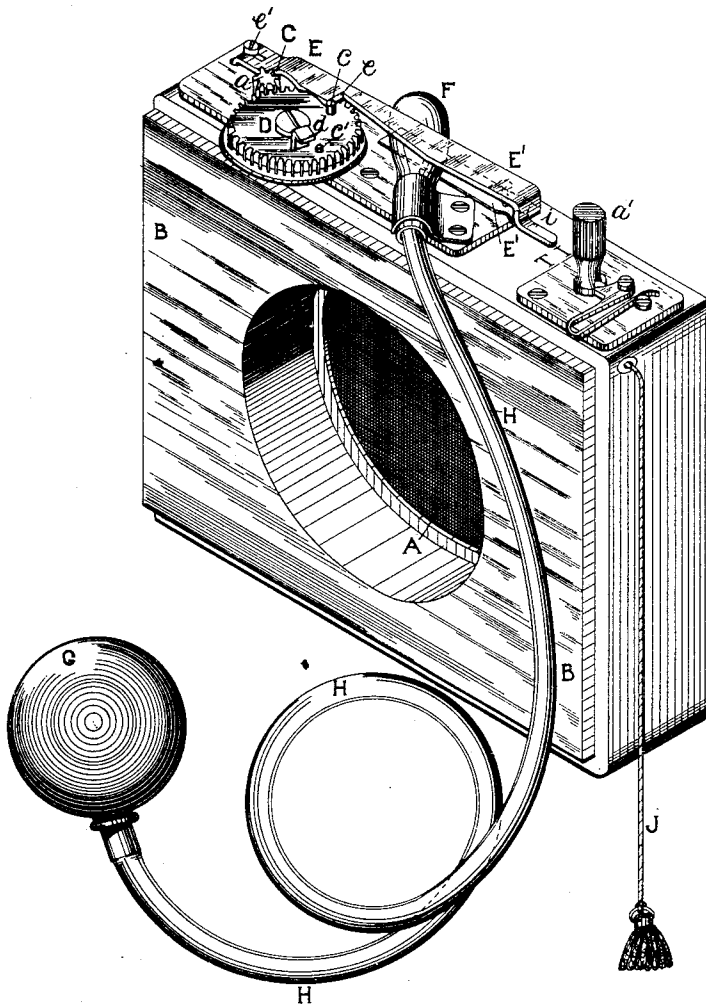


FIG. 1.

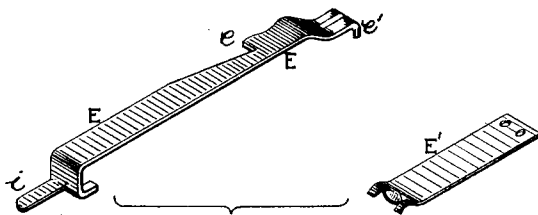


FIG. 4.

WITNESSES

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INVENTOR

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Attys

(No Model.)

2 Sheets—Sheet 2.

J. E. THORNTON.  
PHOTOGRAPHIC SHUTTER.

No. 482,854.

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FIG. 2.

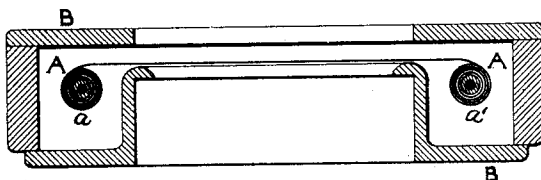
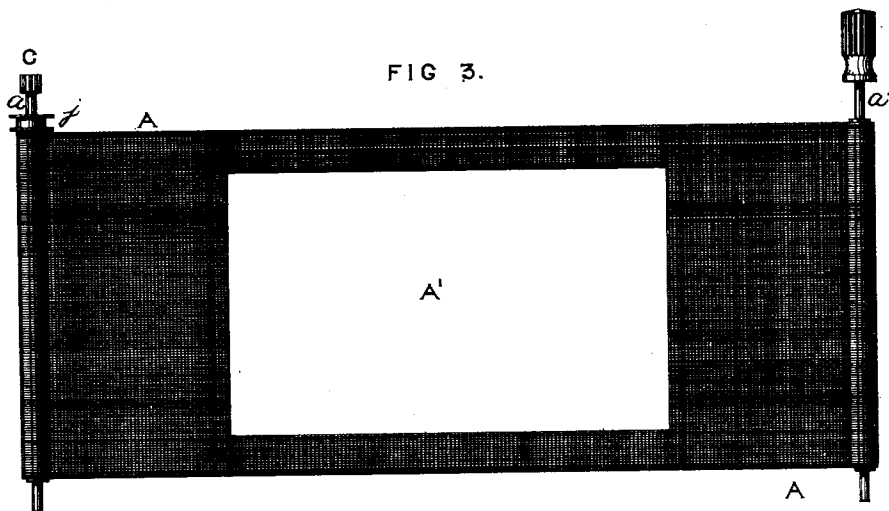


FIG. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN E. THORNTON, OF MANCHESTER, ENGLAND, ASSIGNOR OF ONE-HALF  
TO EDGAR PICKARD, OF SAME PLACE.

## PHOTOGRAPHIC SHUTTER.

**SPECIFICATION** forming part of Letters Patent No. 482,854, dated September 20, 1892.

Application filed November 3, 1890. Serial No. 370,208. (No model.) Patented in England September 27, 1886, No. 12,238.

### *To all whom it may concern:*

Be it known that I, JOHN EDWARD THORNTON, manufacturer of photographic apparatus, a subject of the Queen of England, and a resident of Manchester, in the county of Lancaster, England, have invented a new and useful Photographic Shutter, (for which I have obtained Letters Patent in Great Britain, No. 12,238, bearing date September 27, 1886,) of which the following is a specification.

The object of the invention is to provide a shutter for photographic cameras which, while capable of being used as an instantaneous shutter, can also be set or adjusted as a time-shutter, in which the duration of the exposure may extend to any desired length of time. It refers to that class of shutters in which a spring-blind of Mackintosh cloth or other opaque material is used, the blind being attached at one end to a spring-driven roller and at the other to a winding-roller, and formed with an aperture or opening in the center, through which light enters to the lens as the blind moves across the front of it.

The invention consists, essentially, in applying to or combining with the gear of the winding-roller an adjustable detent or stop capable of being set in two positions, which (in addition to retaining the blind in position when drawn up) will when set in the first position by one movement or stroke of the detent-lever stop or arrest the movement of the blind when full open and shall instantly release it and allow it to close at a second stroke or movement of the lever, thus effecting a time-exposure, and when moved to the second position shall allow of a so-called "instantaneous exposure," not stopping or arresting the movement of the blind at all when full open. It will be fully described with reference to the accompanying drawings.

Figure 1 is a perspective view of a photographic shutter with the invention applied thereto; Fig. 2, a sectional elevation of the shutter, showing the position of the blind; Fig. 3, an extended view of the blind and blind-rollers, and Fig. 4 detail views of the detent-lever E and the spring E'.

The shutter is constructed in the usual way

with a blind A, of the shape shown in Fig. 3, 50 inclosed in a box or case B. The blind is in the form of a spring-blind, mounted upon a winding-roller *a* at one end and upon a spring-driven roller *a'* at the other end, and is provided with an opening or aperture A' in the center for the passage of light to the lens as the blind travels past it. The blind is wound up upon the roller *a* by a cord J, passing over a small pulley *j*, or by a projecting knob or otherwise.

On the end of the winding-roller *a* which projects through the side of the inclosing case B is placed a small wheel or pinion C, preferably gearing into a larger wheel or pinion D. In one of these wheels—preferably in the face of the larger wheel D—are affixed two studs *c d*, by means of which the rotation of the wheel D can be arrested. In close proximity to the wheel D is a movable lever E, carrying a detent or stop *e*, which may be cut into the lever, as shown, or project from the side or top of it and which engages with the studs *c d* on the face of the wheel D. The lever E is arranged to move laterally, being pivoted at *e'*, so as to adjust the position of the detent *e* relatively to the studs *c* and *d*.

The lever E has a movement in two directions—horizontally and vertically. When in the position shown in the drawings, with the finger *i* pointing to the index-letter "I," if raised it is clear of both studs *c d* and the toothed disk D and the winding-roller pinion C have an uninterrupted movement. When, however, the lever E is moved to the left until the finger *i* points to the index-letter "T," the raising of the lever only releases the stud *c* from the detent *e* and the stud *d* as the disk moves comes in contact with the detent *e* and all movement is arrested thereby. The lever E is held in position and drawn back when raised by the spring E'.

The position of the stud *d* relatively to the blind A is such that when in contact with the detent *e* of the detent-lever E the aperture A' of the blind is opposite to the lens or lens-aperture in the shutter-case B. Consequently when the stud *d* is arrested by the detent *e* the blind A is arrested when full open and

remains so for any length of time, according to the will of the operator, and the position of the stud *c* relative to the blind A is such that when the blind is fully wound up upon the winding-roller *a* the stud *c* engages with the detent *e*. The stud *d* is bent or of inverted-L shape to allow of its passing over or clear of the detent *e* and detent-lever E when the lever is at rest.

- 10 On the toothed disk D is placed a third stud *c'*. This stud is shorter than either of the other two and serves to engage with detent *e* and hold the blind with the aperture opposite to the lens for focusing or similar purposes.
- 15 In the position shown in the drawings—in advance of the stud *d*—this third stud *c'* does not interfere with the movement of the disk D when released, as it passes under the edge of the detent-lever before that lever can fall again. It might, however, be placed at the
- 20 other side of the stud *d*, with the stud *d* slightly in advance of it, in which case the detent *e* would engage with it after the movement of the disk D had been arrested by the stud *d* coming in contact therewith. The lever E
- 25 would then have to be raised a second time before the blind A would continue its travel.

- Instead of applying the stud *c*, engaging with the detent *e*, to retain the blind A in position when fully wound up, a separate pawl or catch engaging with the teeth may be employed, which will be withdrawn by the movement of the detent-lever E. It will be evident, also, that the interposition of the wheels
- 30 C and D are not essential to the working of the invention, as the toothed disk D might be replaced by a straight toothed rack, or both might be dispensed with and a pin or stud be inserted into the projecting end of the winding-roller *a* to engage direct with the
- 35 detent *e*, and the detent-lever E may be arranged to move either horizontally or vertically to release the blind A.

- The detent-lever E is moved to actuate the blind by means of a pneumatic bulb F, which is expanded on pressure being applied to a ball or bulb G at the other end of the tube H, or it may be raised by a small piston actuated by a pneumatic ball or by a cord attached to
- 40 one end of the lever.

- In operation the blind is wound up upon the roller *a* off the spring-driven roller *a'* by the cord J on the pulley *j* until the stud *c* engages with the detent *e*. To effect a "time exposure" or control the duration of the exposure, the lever E is moved to the left until the pointer *i* stands opposite to the index-letter "T." The ball G is compressed by the hand of the operator, expanding the bulb F
- 45 and lifting the lever E, until the detent *e* is clear of the stud *c*. The blind is thus released, and the spring in the roller *a'*, which is tightened by the winding up of the blind on the other roller *a*, draws it back again.
- 50 Its progress is arrested by the cranked or

bent part of the stud *d* coming in contact with the detent *e* when the aperture A' is opposite to the lens. As soon as the pressure on the ball G is released the lever E falls again and the blind is allowed to resume its travel. Thus the duration of exposure is subject to the length of time the ball G is held compressed. By altering the position of the third stud *c'*, as hereinbefore described, the lever E after the detent *e* had arrested the stud *c* would on the release of pressure fall and engage with the stud *c'*, and a second compression of the ball G would be necessary before the blind would be released to resume its travel, and in this case the duration of the exposure would depend upon the length of time allowed to elapse between the first and second compression of the ball G.

To effect an instantaneous exposure, the lever E is moved to the right until the pointer *i* stands opposite the index-letter "I," which draws the detent *e* clear of the stud *d*. The ball G is compressed, as before, the bulb F expanded, the lever E raised, and the blind, being released, is rapidly drawn from the winding-roller *a* to the spring-roller *a'* without stopping.

Having now described the invention, what I claim is—

1. In a photographic shutter constructed with a spring-driven blind mounted upon a roller *a*, the combination, with a rotating disk D, geared to a pinion C and provided with a projecting stud *d*, of the movable adjustable stop-lever E, provided with the detent or stop *e* to engage with the said stud, substantially as and for the purposes described.

2. In a photographic shutter having a spring-driven blind, the combination, with the rotating disk D, carrying projecting pins or studs *c*, *c'*, and *d*, of the detent-lever E, provided with the detent *e*, which engages with the said studs, substantially as described.

3. In a photographic shutter, the combination, with the spring-driven blind A, winding-roller *a*, and pinion C, of the toothed disk having the projecting pin or stud *d*, the detent-lever E, having the detent or stop *e*, which engages with the projecting pin, and the pneumatic bulb F and ball G, by which the detent-lever is moved, substantially as described.

4. In a photographic shutter, the combination, with the spring-driven blind A, winding-roller *a*, carrier-pinion C, and toothed disk D, having studs *c*, *d*, *c'* upon its face, of the adjustable detent-lever E, with detent *e*, which engages with the said studs and the pneumatic bulb F and ball G, substantially as described.

5. The combination of the spring-driven blind A, having aperture A', mounted in the case B on a spring-roller *a'* and winding-roller *a*, the pinion C, affixed to the end of the winding-roller, the toothed disk D, carrying studs *c*, *d*, *c'*, the adjustable lever E, carrying detent

e, which engages with the studs on the disk D and arrests the progress of the blind, and the pneumatic bulb F, operated by the ball G, which moves the detent-lever E to release the  
5 studs on the disk D, substantially as and for the purposes described.

In testimony whereof I have signed my

name to this specification, in the presence of two subscribing witnesses, this 22d day of October, 1890.

J. E. THORNTON.

Witnesses:

J. OWDEN O'BRIEN,  
CHARLES OVENDALE.