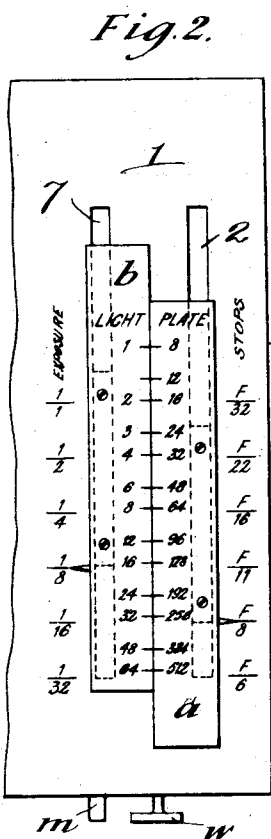
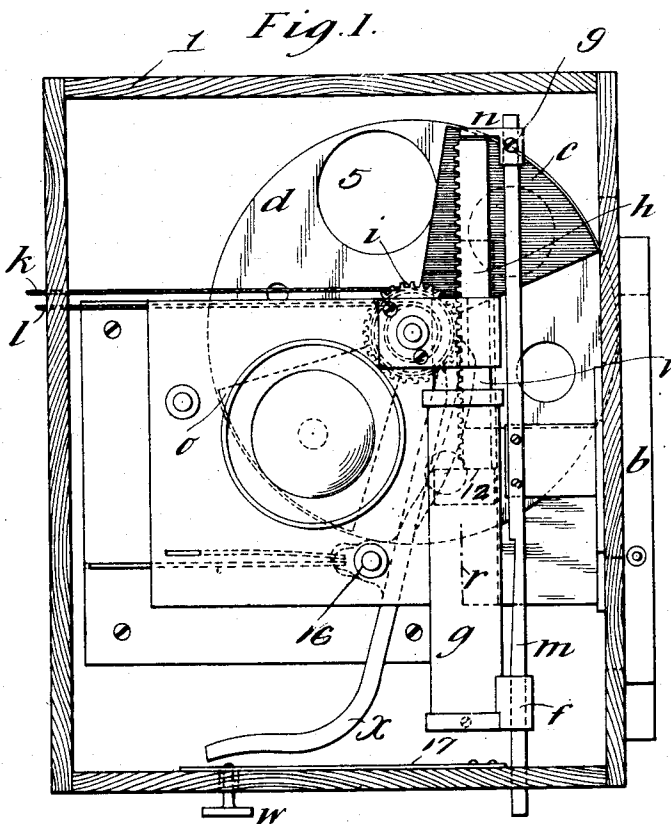
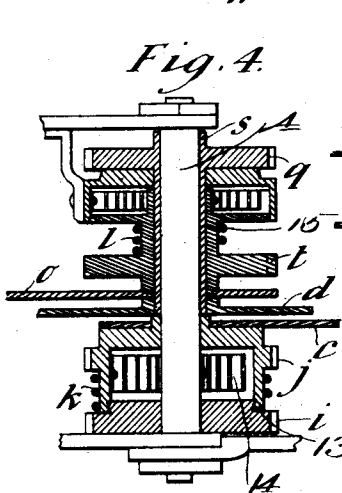
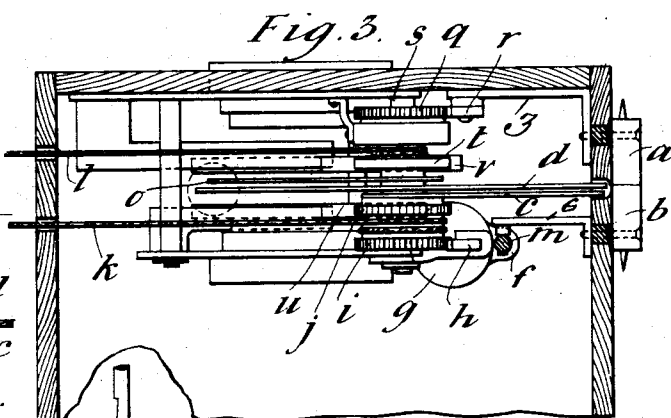
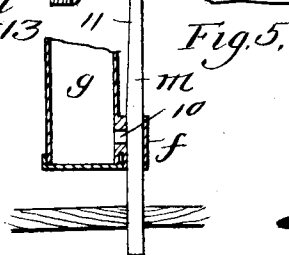


A. WATKINS.

APPLIANCE FOR ADJUSTING AND WORKING SHUTTERS AND DIAPHRAGMS  
OF PHOTOGRAPHIC CAMERAS.

(Application filed Oct. 2, 1900.)

(Model.)



Witnesses—  
*[Signature]*  
*[Signature]*

Inventor  
*[Signature]*  
James L. Norris  
att'y

# UNITED STATES PATENT OFFICE.

ALFRED WATKINS, OF HEREFORD, ENGLAND.

APPLIANCE FOR ADJUSTING AND WORKING SHUTTERS AND DIAPHRAGMS OF PHOTOGRAPHIC CAMERAS.

SPECIFICATION forming part of Letters Patent No. 681,087, dated August 20, 1901.

Application filed October 2, 1900. Serial No. 31,763. (Model.)

*To all whom it may concern:*

Be it known that I, ALFRED WATKINS, miller, a citizen of England, residing at the Imperial Mills, in the city of Hereford, England, have invented certain new and useful Improvements in Appliances for Adjusting and Working the Shutters and Diaphragms of Photographic Cameras, (for which I have applied for a patent in Great Britain, dated March 27, 1900, No. 5,737,) of which the following is a specification.

My invention relates to means of adjusting and working shutters and diaphragms of photographic cameras, as I shall describe, referring to the accompanying drawings.

Figure 1 is a rear elevation of the diaphragm and shutter mechanism. Fig. 2 is a side view showing the adjusting-scale according to my invention. Fig. 3 is a plan of the diaphragm and shutter mechanism. Fig. 4 is a sectional plan, drawn to an enlarged scale, showing the spindle and parts mounted on it; and Fig. 5 is a detail, partly in section, of the cylinder and rod.

On the side or top of the casing 1 I provide a scale for calculating exposures, which has two slides *a* and *b* side by side, the one, *a*, graduated with divisions for various plate speeds, the other, *b*, graduated for various light values. Each of these slides has an index moving over a scale at the side, the one to which points the index of *b* graduated for various times of exposure, the other to which points the index of *a* for various diaphragm values. I connect the slide *a* through the slot 2 by a bracket 3 and a rack *r* to a pinion *q* on a sleeve *s*, mounted on a shaft 4. On the sleeve *s* is fixed the diaphragm-disk *d*, which has apertures 5 of various sizes through it, so that according as the scale *a* is moved the disk *d* is turned, so as to bring one or other of its apertures into line with the lens-aperture. The other slide, *b*, has attached thereto the bracket 6, which extends through the opening 7 and is connected to the sliding rod *m*, on one end of which is adjustably fixed, by means of the screw 9, a tappet *n*. This rod slides through a guide *f* over a laterally-extending discharge or exhaust opening 10 of the air-brake cylinder *g*, and the side of the rod next the hole is flattened tapering, as at 11, so that as the rod is moved more or less for-

ward it throttles more or less escape by the discharge or exhaust opening from the cylinder. The piston 12, as shown in dotted lines, of the brake-cylinder has a rack-rod *h*, gearing with a pinion *i* on the barrel 13 of a spring 14, mounted on the shaft 4, and on which there is fixed a ratchet-wheel *j* and a shutter *c* in the form of a circular sector. This barrel can be turned in opposition to the spring by pulling a cord *k*. Another cord *l* when pulled turns another spring 15, mounted on the sleeve 2, and on which is fixed a ratchet-wheel *t*, having one tooth and also a shutter *o* in the form of a circular sector. The cords *k* and *l* extend out through the casing, as shown. The two ratchet-wheels *j* and *t* are engaged by two spring-pawls *u* and *v*, mounted upon the pivot 16. The pawls can be simultaneously disengaged from ratchet-wheels *U* and *B* by pushing a button *w*, attached to a blade-spring 16', the latter engaging and moving the lever *X*.

In using this instrument I set the graduation of the light value on the slide *b* in line with that of plate speed on the slide *a* and move both slides together till I bring the index of *a* to one of the diaphragm-divisions *F*, such as I may select. The index of *b* then points to the suitable time of exposure. Having thus set the slides, I pull both cords *k* and *l*, thus turning the shutter *o*, so as to cover the lens-aperture and the shutter *c*, which is moved along with the piston of the brake-cylinder until the rack of the piston meets the tappet *n*. For taking an exposure I press the button *w*, thus releasing both springs. By the one the shutter *o* is rapidly moved away from the lens-aperture, and the other shutter *c* is moved around until it closes that aperture, the time occupied by its movement being determined in the first place by the distance which the rack *h* has to travel back from the tappet *n* and in the second place by the more or less throttling of escape-hole at *f* by the tapered flattened part of the rod *m*.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—  
1. The combination with a diaphragm and shutter mechanism of a photographic camera, of an adjustable slide provided with graduations for various plate speeds, connected to

the diaphragm mechanism and mounted in suitable relation to a scale for indicating the diaphragm values, and an adjustable slide provided with graduations for light values, 5 connected to the shutter mechanism and mounted in suitable relation to a scale for indicating various times of exposure.

2. In an apparatus for adjusting and working the shutters and diaphragms of photographic cameras, an adjustable slide provided with graduations for various plate speeds and mounted in suitable relation to a scale for indicating the diaphragm values, an adjustable slide provided with graduations for light values mounted in suitable relation to a scale for indicating various times of exposure, a diaphragm connected to the first-named slide, shutters connected to the last-mentioned slide, and a spring-actuated means 20 for operating the said shutters.

3. In an apparatus for adjusting and working the shutters and diaphragms of photographic cameras, an adjusting-slide provided with graduations and mounted in suitable relation to a scale for indicating the diaphragm values, an adjustable slide provided with graduations mounted in suitable relation to a scale for indicating various times of exposure, a diaphragm connected to the first-named slide, shutters connected to the last-mentioned slide, and means for operating the said shutters. 25

4. The combination with the diaphragm and shutters of a photographic camera, of means for setting and indicating the position of the diaphragm over the lens-opening, means for indicating the light values, means for setting the shutters, and means for operating the shutters thereby opening and closing the lens-openings. 40

5. The combination with the diaphragm and shutters of a photographic camera, of means for setting and indicating the position of the diaphragm over the lens-opening, means for indicating the light values, means for setting the shutters, and a spring-actuated means for operating the shutters thereby opening and closing the lens-openings. 45

6. The combination with the diaphragm and shutters of a photographic camera, of means for setting and indicating the position 50

of the diaphragm over the lens-opening, means for setting the shutters, means for locking the shutters in their set position, and means for releasing said shutters, causing their operation thereby opening and closing the lens-opening. 55

7. The combination of a diaphragm and shutters of a photographic camera, of means for setting and indicating the position of the diaphragm over the lens-opening, means for indicating the light views, means for setting the shutters, means for locking the shutters in their set position, and means to permit of the operation of said shutters when released according to the light values. 60 65

8. In an apparatus for operating the diaphragm and shutters of a photographic camera, a pair of spring-actuated shutters for closing and opening the lens-opening according to the light values, means for locking the said shutters in the desired position, and means for operating said shutters according to the light values when the said shutters are released. 70 75

9. The combination with the diaphragm and shutters of a photographic camera, of means for setting the diaphragm in the desired position, means for setting the shutters in the desired position, a spring-actuated means for operating the said shutters, and a means for operating the shutters according to the light values. 80

10. The combination with the diaphragm and shutters of a photographic camera, of means for simultaneously setting and indicating the position of the diaphragm over the lens-opening of the camera, means for indicating the light values, means for setting the shutters according to the light values, a spring-actuated means for operating said shutters thereby opening and closing the lens-opening, and means for causing the operation of the said shutters according to the light values. 90 95

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALFRED WATKINS.

Witnesses:

JAMES DYER,  
W. COWPER.