

L. MORETTI.  
FOCAL PLANE SHUTTER.

(Application filed Sept. 12, 1901.)

(No Model.)

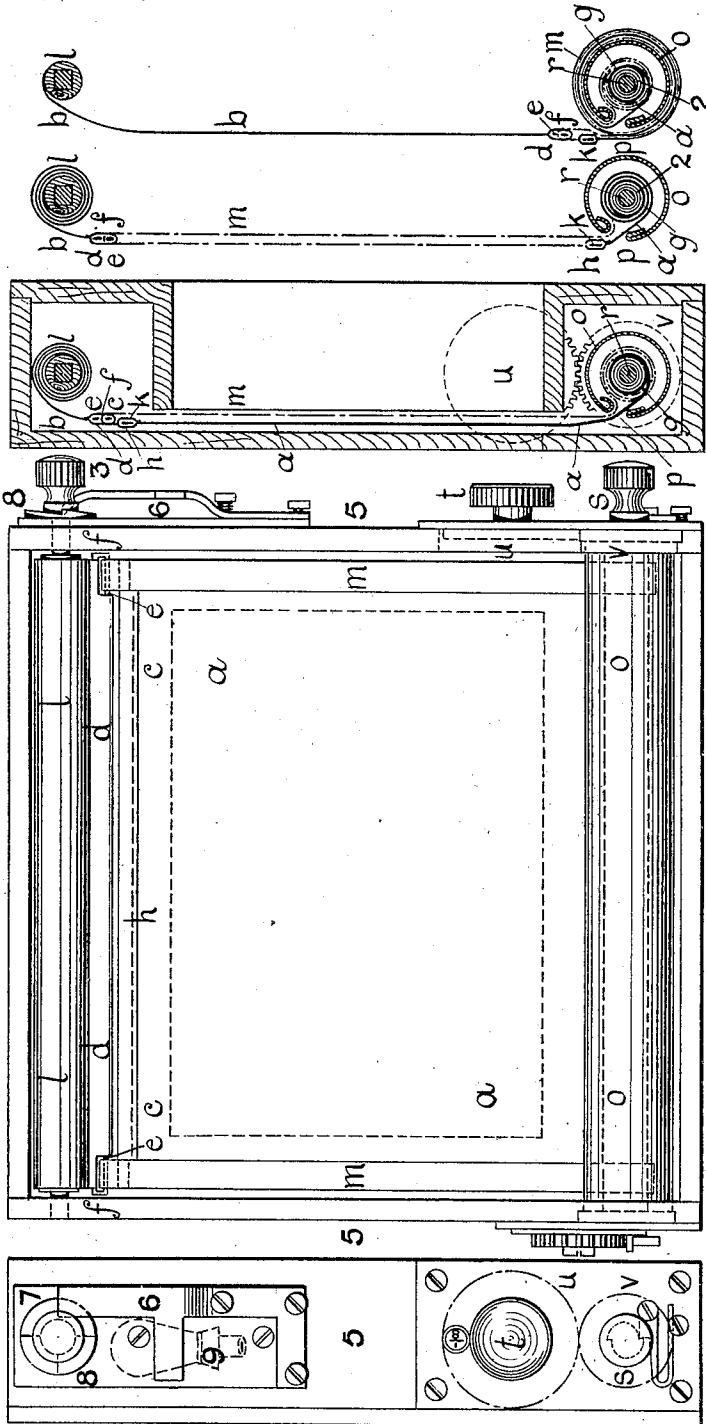


Fig. 2. Fig. 5. Fig. 6.

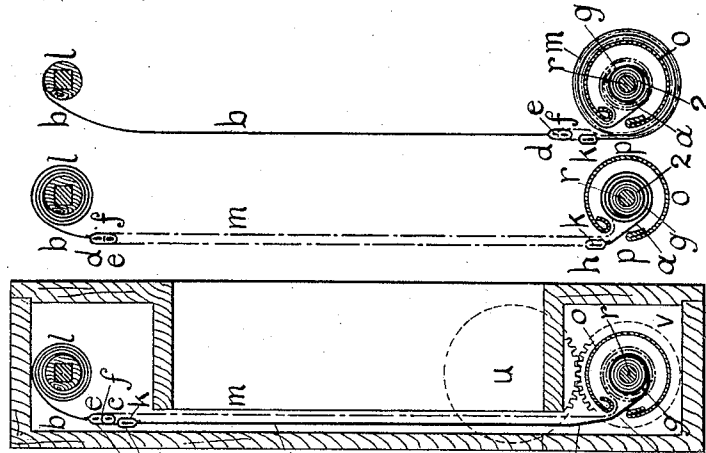


Fig. 1.

Fig. 4.

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WITNESSES.

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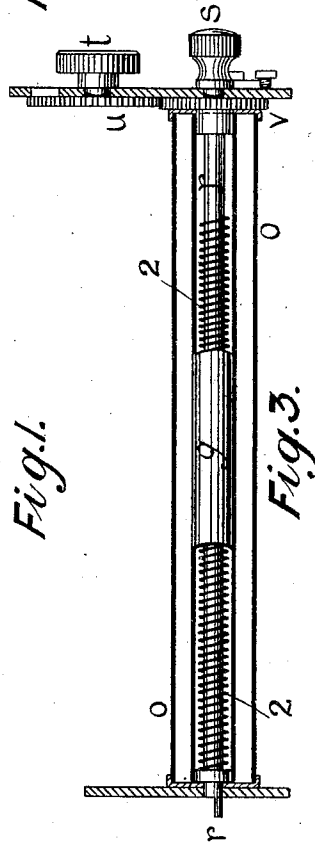


Fig. 3.

# UNITED STATES PATENT OFFICE.

LORENZO MORETTI, OF TURIN, ITALY, ASSIGNOR TO THE THORNTON PICKARD MANUFACTURING COMPANY, LIMITED, OF ALTRINGHAM, ENGLAND.

## FOCAL-PLANE SHUTTER.

SPECIFICATION forming part of Letters Patent No. 697,350, dated April 8, 1902.

Application filed September 12, 1901. Serial No. 75,214. (No model.)

To all whom it may concern:

Be it known that I, LORENZO MORETTI, engineer, of Turin, in the Kingdom of Italy, have invented certain new and useful Improvements in Focal-Plane Shutters, of which the following is a specification.

This invention relates to photographic shutters that are known under the term of "focal-plane" shutters; and it is designed to provide special facilities for adjusting or varying, the size or width of the slit in the blind.

It is well known that mechanism for adjusting the slit of a focal-plane shutter has already been proposed; but in every instance the slit has to be adjusted before the shutter is set for photographing.

This invention consists, essentially, in so arranging or constructing the blinds, that the slit can be enlarged or reduced after the shutter is set to expose the plate, by attaching the adjustable blind and its tapes to the spring driving-roller, and inclosing such in an external roller, upon which they are wound when the blind is released.

The invention will be fully described with reference to the accompanying drawings.

Figure 1 is a front elevation of focal-plane shutter with front of case removed to show the rollers; Fig. 2, transverse sectional elevation of same with the blind "set" or ready to be released for exposing the plate; Fig. 3, part elevation in section through the spring driving-roller; Fig. 4, end elevation of shutter; Fig. 5, sectional elevation of blind, showing the aperture full open for focusing and the blind wound upon the inner roller; Fig. 6, sectional elevation of blind in position after "exposure" of the plate, one-half of the blind being wound upon the outer roller.

The blind is constructed in two parts *a* and *b*, the part *a* being the part which protects the plate before exposure, and the part *b* the part which covers and protects the plate after exposure, by the passage of the slit *c* across it.

The part *b* of the blind, which covers the plate after exposure, is attached to the ordinary driven and setting roller *l*, upon which it is wound up against the pull of the spring 2 by turning the knob 3. The free edge *d*, of this part *b* of the blind, is made stiff by the inser-

tion of a rod or wire *e*, and at each side it is provided with eyes or loops *f* for a band or cord to pass through. The roller *l* is mounted in bearings in the case 5, and when the blind *b* is wound upon it the roller is held at rest against the pull of the spring 2 by the spring-catch 6, engaging in the notch 7, in the face of the disk 8. The roller *l* and blind *b* are released by raising the catch 6, by a pneumatic bulb 9 or otherwise. The other part *a* of the blind, which covers the plate before exposure, is attached to the roller *g*, upon which it can be wound up. The free edge *h* of this part of the blind is also made stiff by a rod or wire *k*, and to each side is attached a band or cord *m*, the other end of which is affixed to the roller *g*, to wind thereon in the opposite direction to that in which the blind winds, so that by turning the roller *g* in one direction the blind *a* is wound up thereon and the bands or cords *m* unwound, whereas by turning the roller in the reverse direction the blind *a* is unwound and the bands or cords *m* wound up. The bands or cords *m* are passed through the eyes or loops *f* in the edge of the other part of the blind *b*.

Around the roller *g*, to which the blind *a* and bands *m* are attached, is fitted an outer roller *o* with a long slit *p*, through which the blind *a* and the bands *m* pass.

The outer roller *o* is attached to and driven by the spring 2 on the spindle *r*, which spring can be set to any degree of tension by the knob *s*. The inner roller *g* is free to be rotated around the spindle *r* and spring 2 by the knob *t* and the pinions *u* and *v*.

By reason of the slit *p* in the outer roller *o*, through which the blind *a* and bands *m* pass, the rotation of the roller *o* by the spring 2 causes both the blind *a* and the bands *m* to be wound upon its periphery in the same direction, to draw the other part of the blind *b* off the roller *l* and the slit *c* across the plate for the purpose of exposing it for photographing.

When the blind *a* is drawn off the outer or spring driving roller *o*, into the position shown in Figs. 1 and 2, by winding the other part *b* of the blind onto the roller *l* it is set for exposure or, in other words, is in the position to be re-

leased for the purpose of photographing. When in this position, the inner roller can be rotated in either direction by the knob *t* and pinions *u* and *v*, and the slit *c* of the shutter can  
 5 be enlarged or reduced by winding the part *a* of the blind on or off, still leaving the blind set so that an exposure can be at once effected by the release of the roller *l* and of the other  
 10 part *b* of the blind. The slit *c* may also be expanded to any size for focusing or other purpose, as shown in Fig. 5, and again contracted, still leaving the shutter in readiness for photographing without resetting. By this  
 15 arrangement of roller a constant distance is maintained between the edge *d* of the part *b* of the blind and the outer roller *o*, and also the inner roller *g*, and a variable distance between the edge *h* of the part *a* of the blind and the releasing-roller *l*. Thus it is the edge  
 20 *h* that is moved to and from the edge *d* to vary the width of the slit *c* to adjust the slit *c* to the desired size.

What I claim as my invention, and desire to protect by Letters Patent, is—

25 1. In a focal-plane shutter for photographic purposes, the combination with the roller *l* a blind in two parts with a slit between and bands *m* attached to one part of the blind, and passing through eyes in the other part to  
 30 connect the two, of an inner roller to which the part *a* of the blind and the bands *m* are attached and wound thereon in opposite directions, mechanism for rotating the inner roller, and an outer roller with a slit through  
 35 which the blind and bands pass to the inner one, and upon the periphery of which the blind and bands are wound in the same direction substantially as described.

40 2. A focal-plane shutter for photographic purposes comprising in its construction a blind in two parts *a* and *b*, and bands *m* attached to the part *a* passing through eyes *f* in the part *b*, a roller *l* to which the part *b* of the blind is attached, an inner roller *g* to

45 which the part *a* of the blind and the bands *m* are attached and wound in opposite directions, mechanism to rotate the roller *g*, an outer driving-roller *o* upon the periphery of which the blind and bands are wound, and a driving-spring 2 to actuate the roller *o* in one  
 50 direction when released, all arranged substantially as described.

3. A focal-plane shutter for photographic purposes comprising in its construction a blind in two parts *a* and *b*, bands *m* attached  
 55 to the part *a* passing through eyes *f* in the part *b*, a roller *l* to which the part *b* of the blind is attached, an inner roller *g* to which the part *a* of the blind and the bands *m* are attached and wound in opposite directions, a  
 60 knob *t* and pinions *u v* to rotate the roller *g*, an outer driving-roller *o* upon the periphery of which the blind and bands are wound and a driving-spring 2 to actuate the roller *o* in one direction when released arranged sub-  
 65 stantially as described.

4. In a focal-plane shutter for photographic purposes the combination with the roller *l*, means to hold and release the roller, the blind  
 70 in two parts *a* and *b* and bands *m* to connect the two parts of the blind and provided with a slit *c* between them, of the inner roller *g* to which the part *a* of the blind and the bands *m* are both attached but wound in opposite  
 75 directions, the knob *t* and wheels *u v* to rotate the roller *g*, the outer roller *o* with slit *g* around which the blind and bands are wound in the same direction, and the driving-spring *s* attached to the outer roller *o* to operate it  
 80 substantially as described.

In witness whereof I have hereunto signed my name, in the presence of two subscribing witnesses, this 26th day of August, 1901.

LORENZO MORETTI.

Witnesses:

MAURITZ CROUE,  
 CLEMENTE ZINCTJETTI.