No. 714,106. Patented Nov. 18, 1902.

J. D. GARFIELD.

FOCAL PLANE SHUTTER.

(Application filed Mar. 17, 1902.)

(No Model.)

Fig. 1.

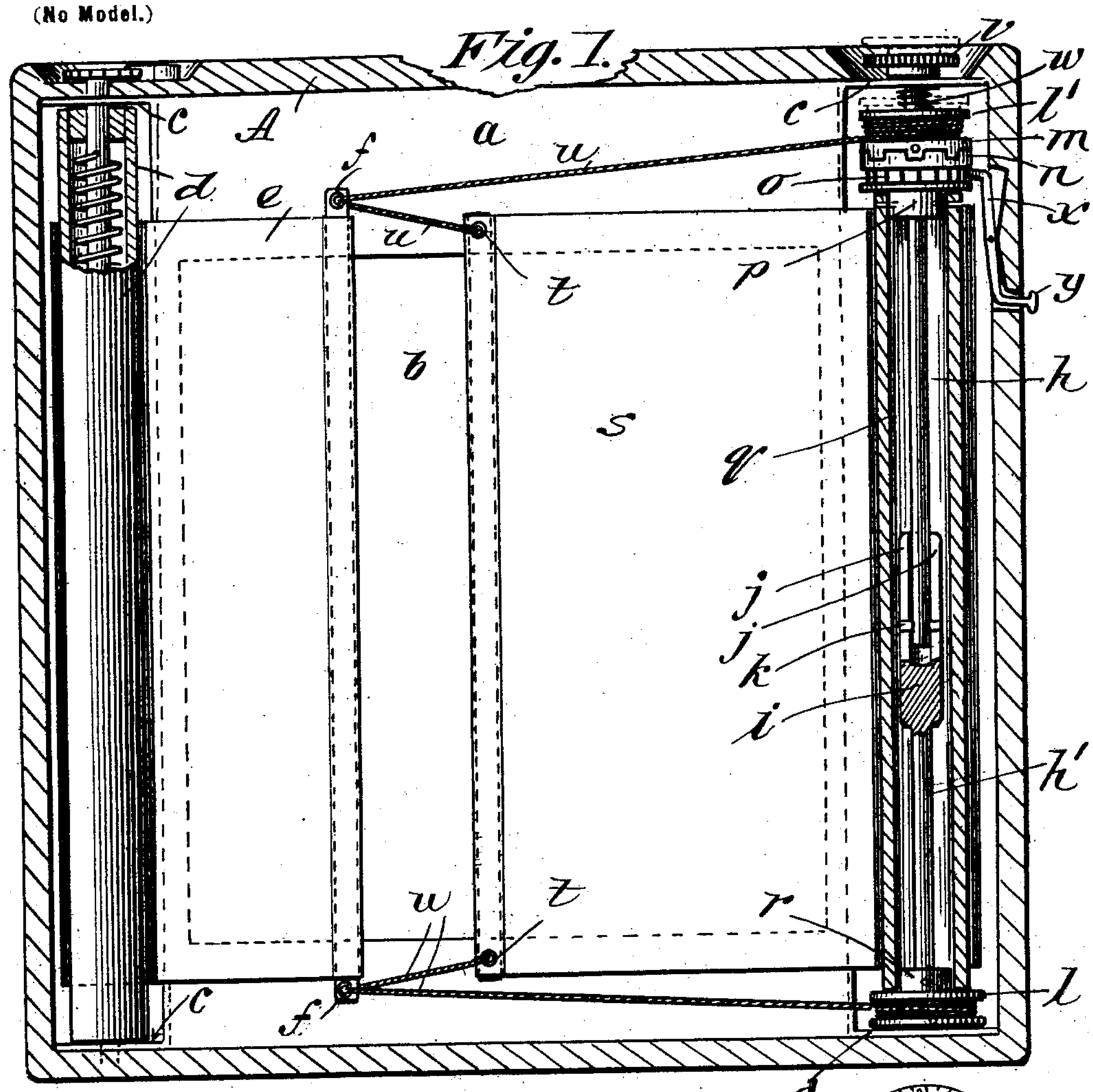
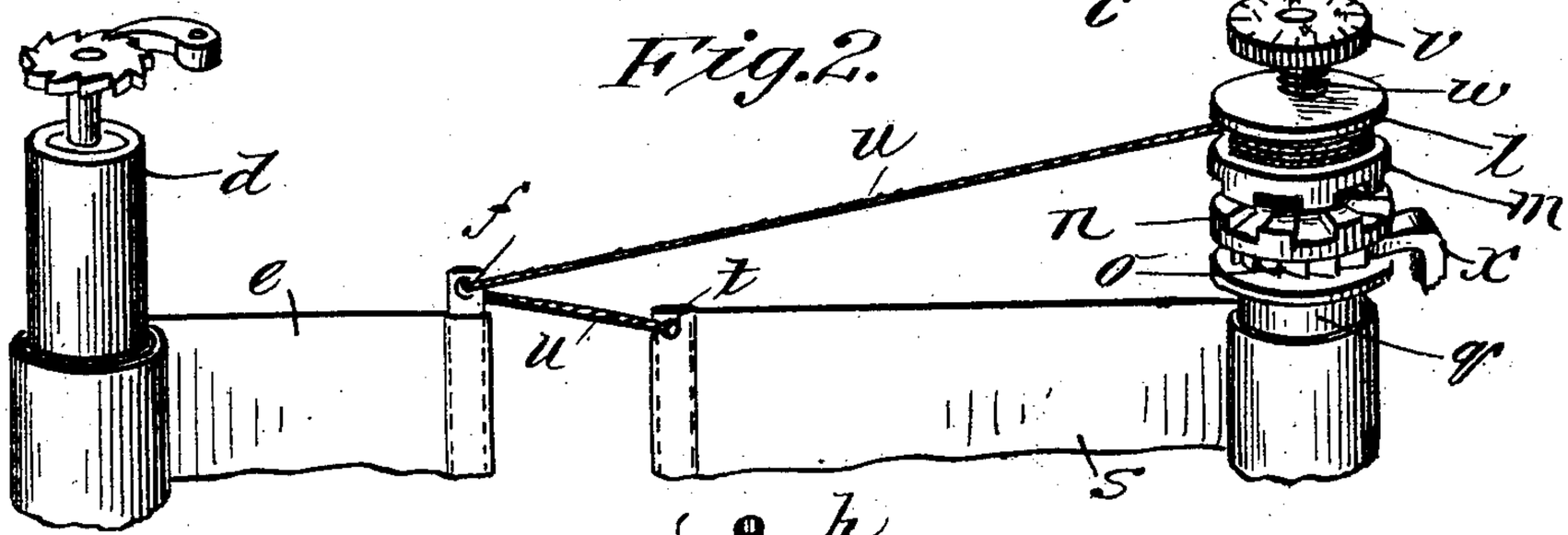
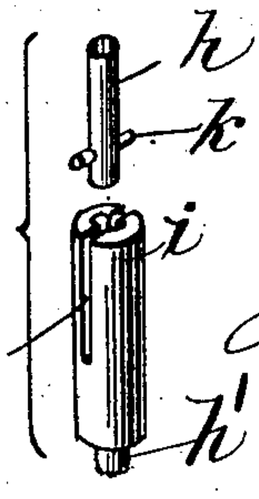


Fig. 2.



Witnesses:
M. S. Lemoicr.
W. F. Williams

Fig. 3.



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UNITED STATES PATENT OFFICE.

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FOCAL-PLANE SHUTTER.

SPECIFICATION forming part of Letters Patent No. 714,106, dated November 18, 1902.

Application filed March 17, 1902. Serial No. 98,488. (No model.)

To all whom it may concern:

Be it known that I, JULIUS D. GARFIELD, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Focal-Plane Shutters, of which the following is a full, clear, and exact description.

This invention relates to focal-plane curtain-shutters for cameras, the object being to provide a shutter of this class in which is comprised a simplified means for varying the width of the slit in the curtain, which means may be conveniently operated from the exterior of the camera and which is inexpensive and easily constructed and assembled and which, moreover, because of the substantial nature of its various component parts renders it durable and not easily deranged or broken.

The improvement consists in the constructions and relative arrangements of parts, which are hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a transverse section of a camera-box with my improved shutter, but shown partly in full-line elevation and partly broken out in section. Fig. 2 is a perspective of one edge of the curtain and various parts to be hereinafter described. Fig. 3 is a view of a detail of the winding-shaft construction.

In the drawings, A is a camera-body, and *a* is the rear partition, having the exposure-opening *b* formed therein. This partition *a* may be formed with bearing-pieces *c c c c*, in which are mounted for rotation the rolls forming a part of this shutter.

d is the spring-roll and is provided with the ordinary pawl-and-ratchet device *x* and has secured to it in any suitable manner one portion *e* of a curtain of a suitable light-excluding fabric. The free end of this curtain *e* is provided with a wire or flat strap of metal, which is inserted in a hem in the usual way and has provided at either end the eyes *f f*.

On the opposite side of the camera from the roll *d* is the winding-roll *q*. This roll as a whole consists in a two-part shaft *h* and *h'*, the end portion of the one being of sleeve form, as indicated at *i*, and to prevent the rotation of the part *h* sleeve portion *i* is provided with slits *j j*, and the shaft-section *h* near the end that enters such sleeve-like portion is provided with a pin *k*, which is adapted to slide endwise in the slits *j j*. Near the opposite ends of these shaft-sections *h* and *h'* are secured by pins or otherwise the sheaves *l* and *l'*. Sheave *l'* has formed on one side thereof a clutch member *m*, which is adapted to engage a clutch member *n* on the ratchet-wheel *o*. This ratchet-wheel *o* is constructed to rotate freely on shaft-section *h* and has a hub *p*, to which is pinned one end portion of the tubular roller *q*, the other end of which roller is adapted to rotate freely on the hub *r* of sheave *l*. Secured to this roller *q* is a curtain *s*, similar to curtain *e*, before described, and the stiffening wire or band in this curtain is also provided with eyes *t t*, and the two curtains are united by cords *u*, which are secured to curtain *s* at *t t* and pass with running engagements through the opposite eyes *f f* at the end of the curtain *e*, thence to and around the winding-sheaves *l* and *l'*.

The operation of setting this curtain-shutter is as follows: By means of the milled knob *v*, which may be pulled out, as shown in dotted lines, the clutch members *m* and *n* are separated, and while these parts are in this condition a rotation of this knob does not wind up the roller *q* and its attached curtain; but by means of the single purchase of the cords running through the eyes *f f* the curtain *e* is made to approach or retire from the curtain *s*, thus forming a certain way of adjusting the opening or slit. On releasing knob *v* the spring *w* replaces the clutch members, and the knob *v* then may serve to wind up the curtain against the spring-roller, and in its wound position, as well as during the operation of setting the pawl *x'*, retains the roller *q* against unwinding until released by the knob *y* of the pawl *x'*. The knob *v* is provided with graduations or numbers, which serve as an index on the exterior of the camera to indicate the width of the slit.

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

1. In a focal-plane shutter for cameras, in

combination, a spring-roller, and a winding-roller, each having a curtain wound thereon, the end portions of both curtains being approached, a two-part shaft in said winding-roll, one shaft part being endwise movable but non-rotatable relatively to the other, sheaves fast on the end portions of said shaft parts, cords in winding engagement with said sheaves, and having running engagement with the end portion of one curtain, and attachments to the end portion of the other curtain, a clutch member secured to the winding-roll, and a fellow clutch member carried on one of said shaft parts and adapted on the endwise movement of such part to disengage the shaft and the sheaves thereon from connection with the winding-roll, for permitting the independent rotational movement of the sheaves for winding or unwinding the cords to widen or narrow the slit.

2. In a focal-plane shutter for cameras, in combination, a spring-roller, and a winding-roller, each having a curtain wound thereon, the end portions of both curtains being approached, a two-part shaft extended centrally through said winding-roll, the inner end of one shaft part being formed sleeve-like and longitudinally slotted, and the inner end of the other shaft part telescoping within the sleeve and having a pin engaging in the slot thereof, sheaves fast on the end portions of said shaft parts, cords in winding engagement with said sheaves, and having running engagements with the end portion of one curtain and attachments to the end portion of the other curtain, a combined clutch member and ratchet-wheel secured to the winding-roll, and a fellow clutch member carried on one of said shaft parts and adapted on the endwise movement of such part to disengage the shaft and the sheaves thereon from connection with the winding-roll, and a pawl in normal engagement with the ratchet-wheel and adapted to disengage the same, for the purposes set forth.

3. In a focal-plane shutter for cameras, in combination, a spring-roller, and a winding-roller, each having a curtain wound thereon, the end portions of both curtains being approached, and said winding-roll having affixed thereto a combined ratchet-wheel *o* and clutch member *n*, a two-part shaft in said winding-roll, the one part being endwise movable, but non-rotatable, relatively to the other, sheaves fast on the end portion of each said shaft parts, cords in winding engagement with said sheaves and having running engagements with the end portion of one curtain and attachments to the end portion of the other curtain, a clutch member secured on one of said shaft parts and movable endwise therewith to engage and disengage the winding-roll clutch member, the knob *v* on the end of one of the shaft parts, a spring for normally maintaining said shaft parts in their contracted relations and a pawl normally in engagement with the winding-roll ratchet-wheel and adapted to be temporarily disengaged therefrom, for the purpose set forth.

Signed by me at Springfield, Massachusetts, in the presence of two subscribing witnesses.

JULIUS D. GARFIELD.

Witnesses:
WM. S. BELLOWS,
M. A. CAMPBELL.