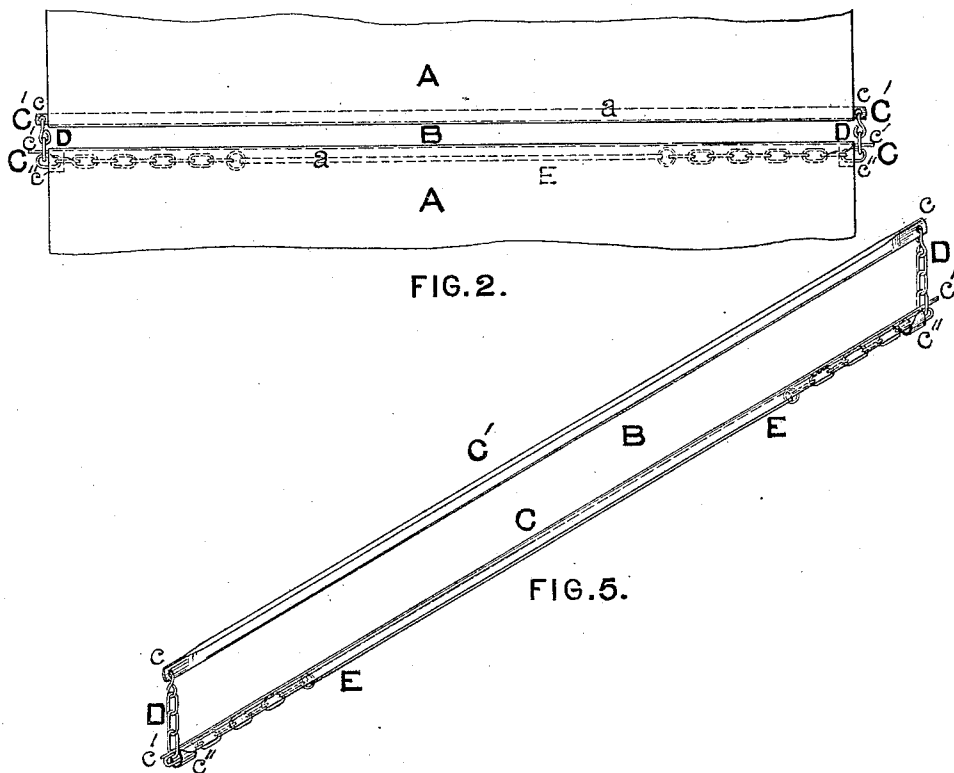
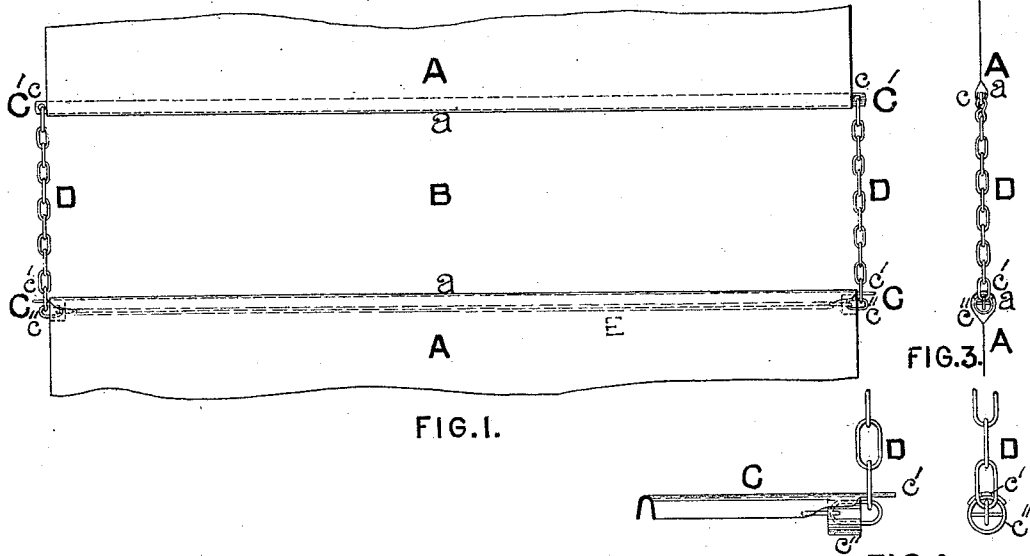


J. E. THORNTON & E. PICKARD.
FOCAL PLANE SHUTTER.

No. 529,820.

Patented Nov. 27, 1894.



WITNESSES
Chas Wendale.
Joseph Bates.

INVENTORS
J. E. Thornton
E. Edgar Pickard
by Wm. Thompson
att'y

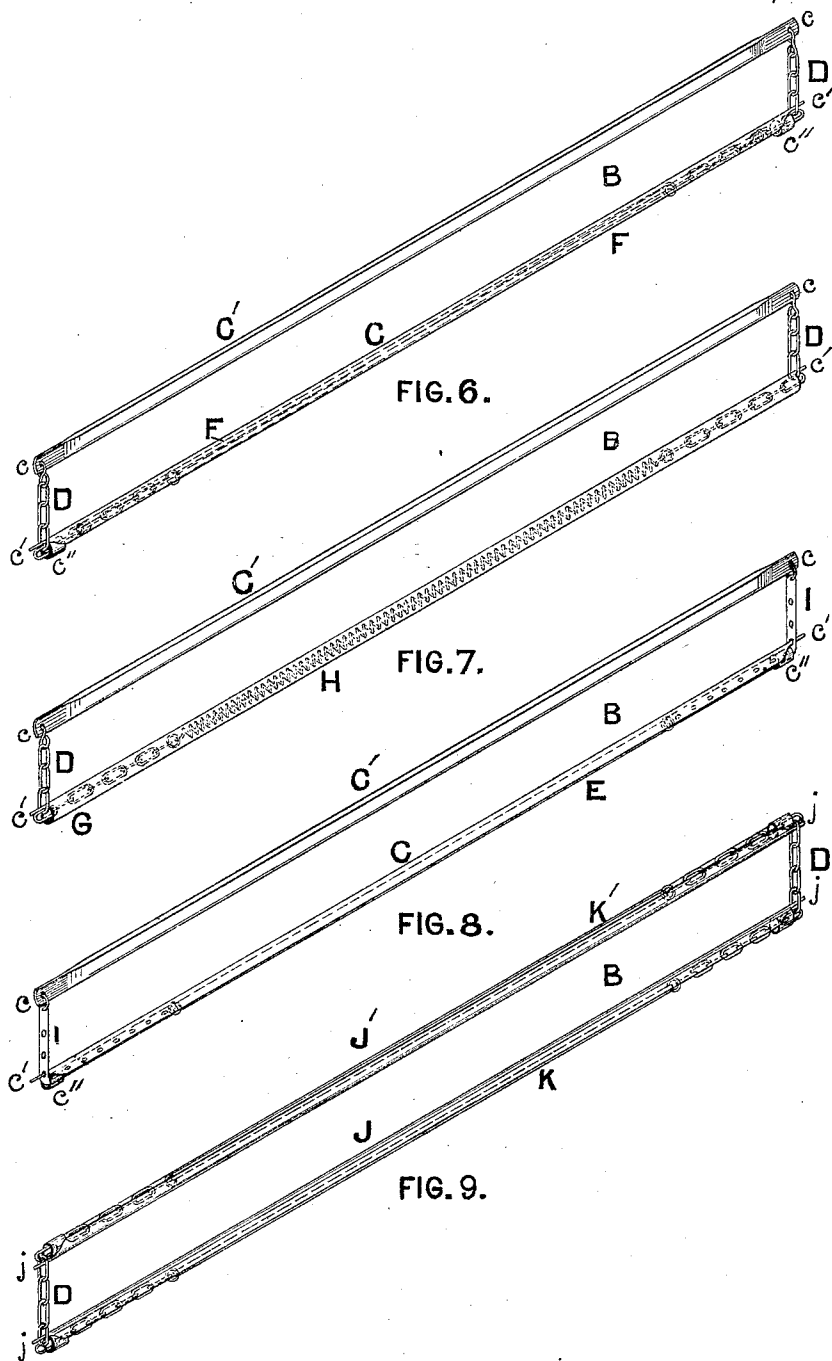
(No Model.)

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UNITED STATES PATENT OFFICE.

JOHN E. THORNTON AND EDGAR PICKARD, OF ALTRINCHAM, ENGLAND.

FOCAL-PLANE SHUTTER.

SPECIFICATION forming part of Letters Patent No. 529,820, dated November 27, 1894.

Application filed January 18, 1894. Serial No. 497,326. (No model.) Patented in England February 24, 1893, No. 4,081.

To all whom it may concern:

Be it known that we, JOHN EDWARD THORNTON and EDGAR PICKARD, both of Altrincham, in the county of Chester, England, have invented certain new and useful Improvements in Focal-Plane Shutters, (for which we have obtained Letters Patent in Great Britain, No. 4,081, dated February 24, 1893,) of which the following is a specification.

This invention relates to photographic shutters of the roller blind type that work close in front of the sensitive plate or film and are well known as "focal plane shutters." Shutters of this type have hitherto been constructed with a narrow transverse slit in the spring blind through which the light is admitted to the sensitive plate during the passage of the blind from the winding roller on to the spring roller the width of the slit being in most instances constant and unalterable.

This invention is designed to construct or form the blind so that the width of the slit can be adjusted when required either by increasing or reducing it.

It consists essentially in applying a flexible chain or other looped band to each of the longitudinal edges of the blind between the two transverse edges which form the slit the chains being lengthened or shortened by passing the links over a projecting point or pin at each end of the slit carried on a strut or stay placed along one side of it. It will be fully described with reference to the accompanying drawings which show sufficient of a blind of this type to illustrate our invention.

Figure 1 is a front view with slit open to full extent; Fig. 2, a front view with slit closed to the narrowest width; Fig. 3, a side elevation; Fig. 4, enlarged views showing position of chain on the projecting point or pin with which the links engage; Fig. 5, a perspective view in detail of parts removed from the blind; Figs. 6, 7, 8, and 9, perspective views of modified forms of the invention described in the specification.

The blind A is formed and attached to the rollers in the usual manner. The two edges of the blind which form the slit B we form with a loop or slot *a* by turning over the edges and stitching or otherwise fastening them down. Through the slot *a* in each side of the blind is passed a strut or stay C C' of thin

channeled steel like a half tube. One of the struts C' terminate at the ends in an eye *c* and the other in a projection or point *c'*. A ring or short piece of tube *c''* is fitted over the ends of the strut which carries the points *c'*. The two struts C C' are connected together at their ends by light chains D one at each edge of the blind. The chains are attached to the eyes *c* of one strut C' and pass down through the rings or tubes *c''* on the other strut C the links engaging with the points or projections *c'*. The chains D thus placed form the ends of the transverse slit B. The two ends of the chains D which pass over the points *c'* and through the rings or tubes *c''* lie inside or along the groove in the strut C and are connected together by an elastic band or spring E. The tendency of the spring E is to draw the loose ends of the chains D together so that when released from the points *c'* they are drawn down the strut C and the slit closed to the desired degree.

Referring to Fig. 6, instead of the two ends of the chains D being attached to one spring they may each be attached to a separate elastic band or spring F the other end of which is attached to the strut C.

Referring to Fig. 7, the strut may be formed of a light tube G instead of a grooved strip with tubes on the end and a spiral wire spring H may be used inside instead of the elastic band.

Referring to Fig. 8, instead of chains a strip of leather or a woven or textile band I may be employed provided with holes, loops, eyelets or the like to engage with the projections *c'* in the ends of the strut C.

Referring to Fig. 9 instead of attaching the chains D to one strut and providing a spring at the other ends of the chains the two struts J J' may be made alike with projections *j* similar to the strut C and projection *c'* and both ends of the chains may be provided with springs K K'.

To decrease the width of the slit B it is only necessary to shorten the chains D at each side by hooking the points *c'* of the strut C into other links, the spring E inside the strut C taking up and drawing the loose ends of the chains D into the loop or slot *a*.

To increase the width of the slit B the chains D are each lengthened by pulling out more

links through the ring or tube c'' and hooking them on to the points c' . In doing so the spring E is stretched.

What we desire to protect by Letters Patent is—

1. In a focal plane shutter for photographic cameras the combination with the blind of struts placed in slots therein which form the edges of the slit, the bands which connect the two parts together, the projections at the sides of the blind with which the bands engage to adjust the width of the slit and the spring which draws the ends of the bands into the slot substantially as described and shown.

2. In a focal plane shutter for photographic cameras the combination of the blind A provided with slots a in the edges, the struts C C'

placed therein which form the edges of the slit B, the chains D which connect the two parts of the blind together, the projections c' on the strut C at the sides of the blind with which the links of the chains D engage to adjust the width of the slit F and the spring E which draws the slack ends of the chains D into the slot a substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

J. E. THORNTON.
EDGAR PICKARD.

Witnesses:

J. OWDEN O'BRIEN,
CHAS. OVENDALE.