

(No Model.)

G. F. GREEN.
PHOTOGRAPHIC SHUTTER.

No. 362,211.

Patented May 3, 1887.

Fig. 1.

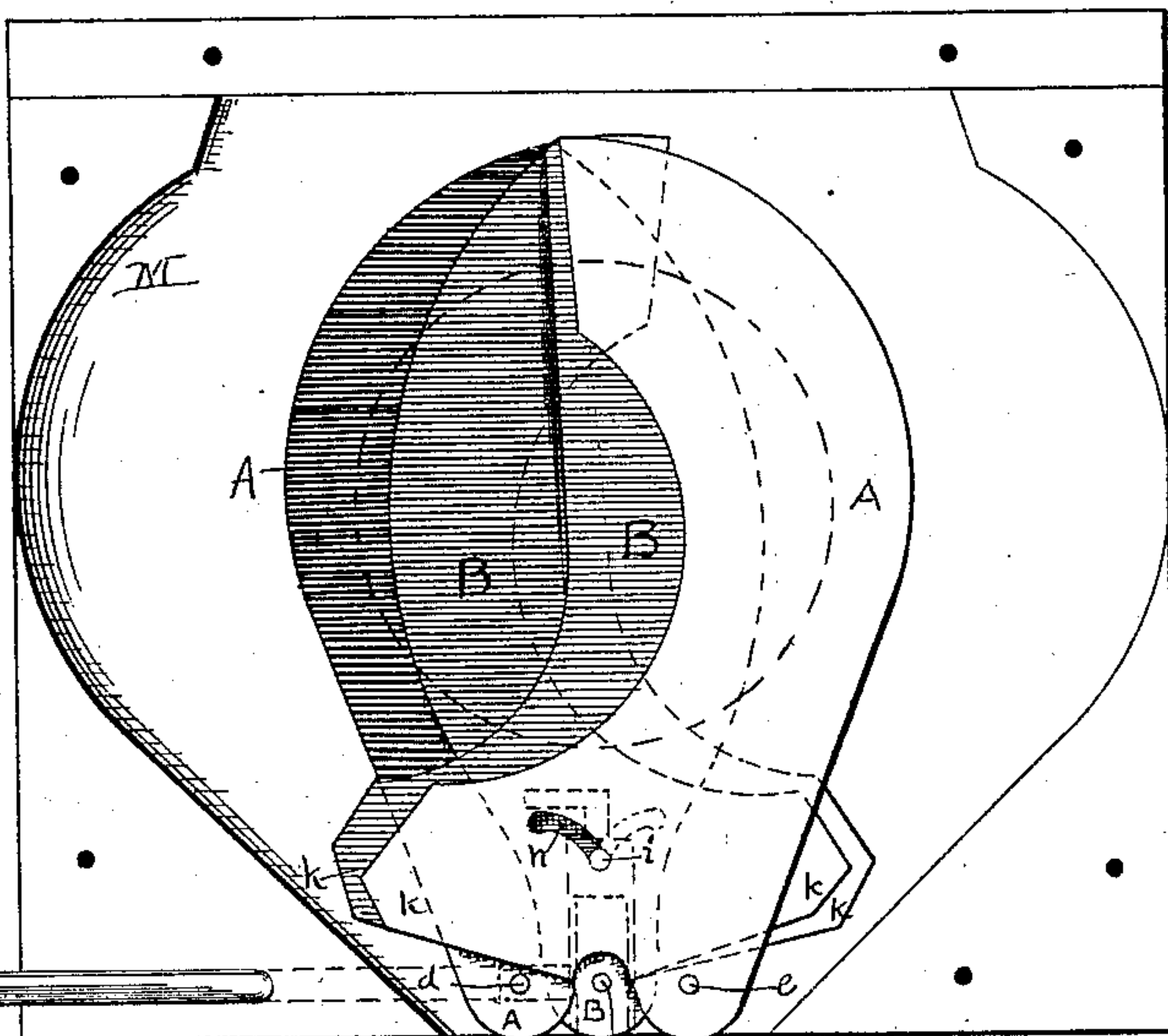


Fig. 2.



Fig. 3.

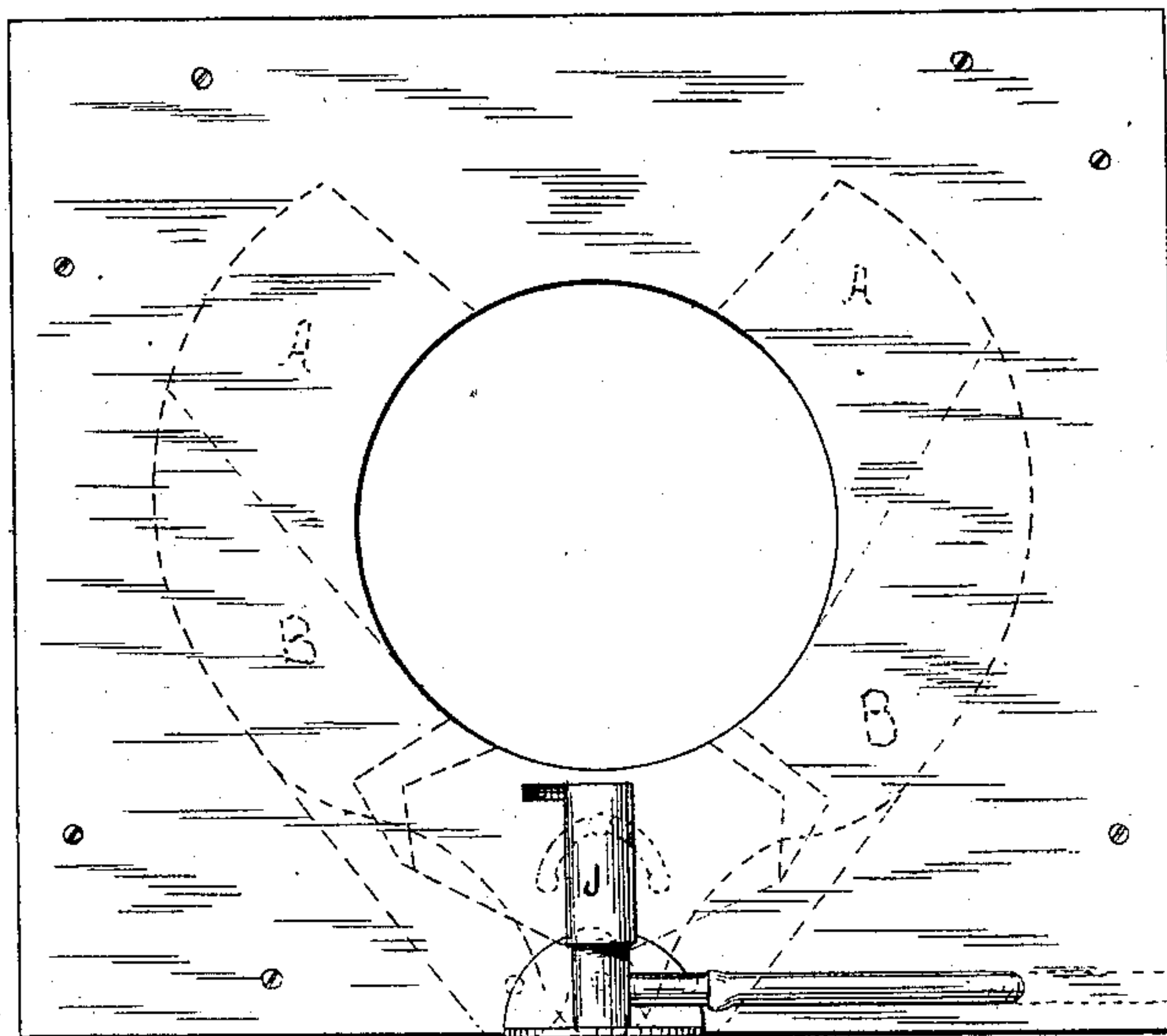
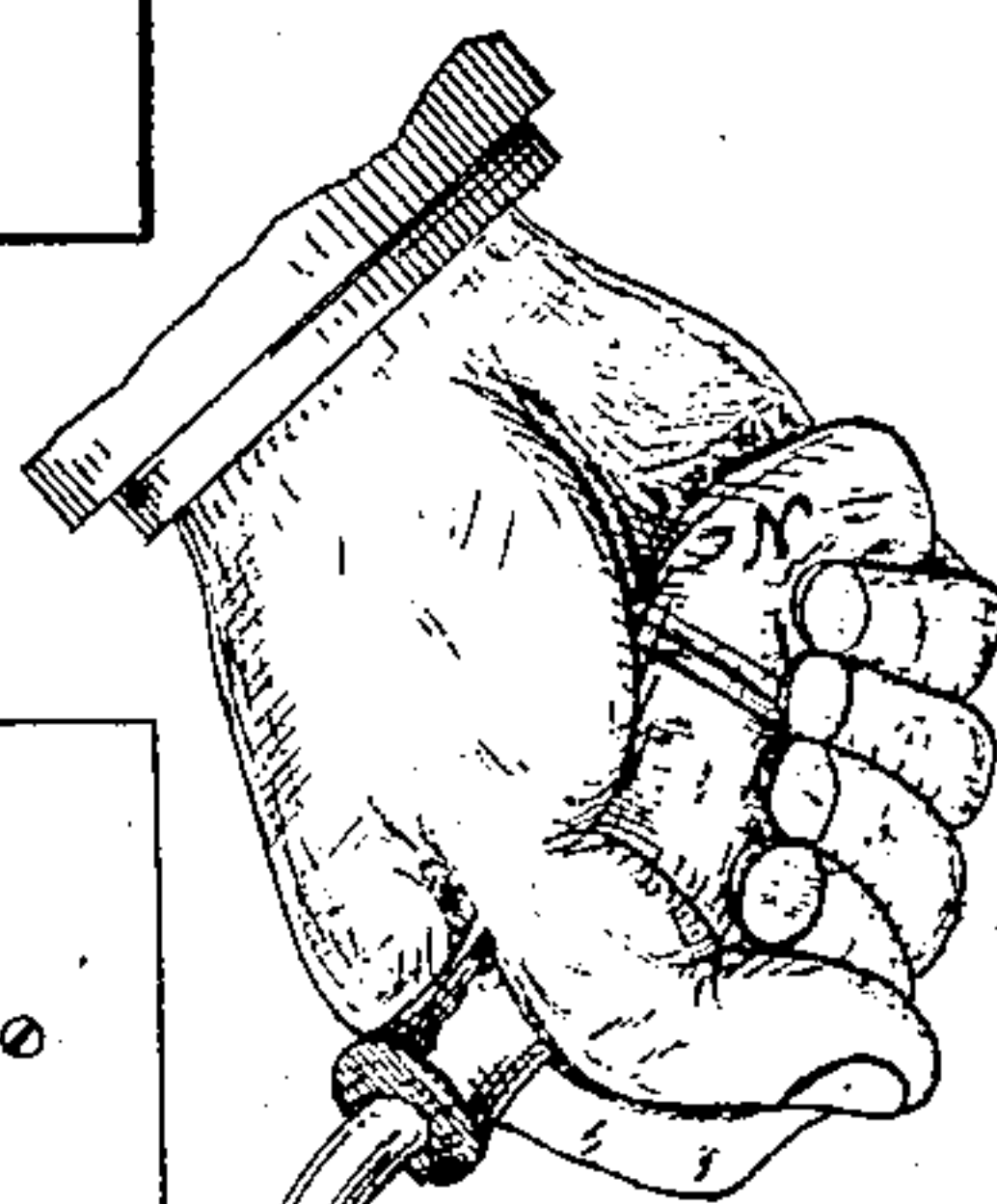


Fig. 4.



Witnesses:
J. H. Stuart.
R. W. Smith.

Inventor.
Geo. F. Green
By his Attorney
R. W. Smith.

UNITED STATES PATENT OFFICE.

GEORGE F. GREEN, OF KALAMAZOO, MICHIGAN.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 362,211, dated May 3, 1887.

Application filed December 29, 1886. Serial No. 222,962. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. GREEN, of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented new and
5 useful Improvements in Photographic Shutters; and I do hereby declare that the same is accurately described and shown in the following specification and the drawings attached.

10 This invention relates to that class of shutters which are operated by a pneumatic engine, and particularly to the shutter for which Letters Patent No. 342,693 were granted to me on the 25th of May, 1886.

15 The object of this improvement is to adapt my shutter to cameras which have small-sized front boards, and which therefore cannot apply a shutter which requires so much lateral space as those heretofore in use. It is also
20 adapted for use on the front of the tube, and will not then be so large as to be objectionable.

In the accompanying drawings, Figure 1 is a front elevation with front board removed and wings closed. Fig. 2 is a rear elevation
25 with wings open. Figs. 3 and 4 are plans of the wings detached.

In my said patent of May 25, 1886, there were two wings pivoted to the frame. Necessarily said wings were each more than half
30 the diameter of the lens, and the whole width required for the shutter was more than twice the diameter of the lens-opening. By dividing each wing—that is to say, by making four wings instead of two—I am enabled to reduce
35 the whole width required to considerably less than double the diameter of said opening.

A A are the outer or short-stroke wings, and B B are the inner or long-stroke wings.

The wings A A are pivoted on the pin *d e*,
40 one on each side of the median line, through the aperture of the shutter, and said pins may set in the front board of the camera or in a board, M, separate from the camera. This latter is the usual way. The outer or back
45 edge of the said wing is curved, but with a larger radius than the aperture, so that when closed said wing will lap over and past the edge of the aperture. The inner edge of said
50 wing is also curved with a radius the same as the radius of the aperture, so that when open the inner edge will coincide with the edge of said aperture. By this means the outer wings,

A, only a little more than half close the aperture, and therefore do not require a movement much in excess of one-fourth the aperture. 55

The inner wings, B B, are pivoted on pin *g* on the median line of the aperture and midway between pins *d e*. They overlap the wings A A at their back edges and overlap each other at the middle or inner edges. When
60 the shutter opens, the wings B B close back in the same space occupied by the wings A A.

The wings A A B B may be simultaneously actuated by any of the common devices for opening and closing pivoted shutter-wings; 65 but I prefer to operate them by the direct-acting pneumatic engine shown and described in my patent above referred to. I therefore provide each wing with a curved slot, *h*, to receive the operative pin *i*, carried by the engine-piston J. The slot *h* in the wings B is
70 longer than in the wings A, because the wings B have a longer stroke than the wings A.

Each wing at its foot may have a lateral prolongation, *k*, which reaches over and strikes on
75 the pivot pin of the opposite wing as a stop when the wings close together over the aperture. When they open to uncover the aperture, they all strike on their backs against the frame; but this prolongation is not essential, 80 because a stop may be made against the engine-stud or otherwise, as preferred.

The center of motion for the larger or outer wing, A, is placed at one side, because said wing has a less distance to move than wing B, 85 and I can thereby impart a shorter stroke with the same movement of the pin *i*, which moves the wing B through its longer stroke.

If the four wings were all centered on the same pin it would be necessary to operate them 90 by independent connection with the piston, which would be less convenient.

The engine J is operated by compressed air, consequent upon squeezing the hand-bulb N, as is usual. The shutter may be placed inside the camera or on the front of the tube, as
95 preferred.

Having described my invention, I claim—

1. A photographic shutter provided with four wings, A A B B, overlapping each other 100 and having different ranges of movement, whereby they are enabled to fold back into the case side by side, substantially as set forth.

2. A photographic shutter provided with

wings A A and B B, the former pivoted on pins *d e*, respectively, and the latter pivoted on the center pin, *g*, said wings being provided with foot-extensions *k*, whereby, in closing over the
5 aperture, each wing reaches over and is arrested by the pivot-pin of the opposite shutter, substantially as set forth.

3. A photographic shutter provided with wings A A, centered on the pins *d e*, respectively,
10 ively, and each having a slot, *h*, and wings B

B, pivoted on the pin *g*, and each provided with a slot, *h*, and a moving piston, J, provided with a pin, *i*, which passes through and engages all of said wings in the several slots *h*, and thereby coincidently actuates all of said
15 wings.

GEORGE F. GREEN.

Witnesses:

WM. McDONALD,
JOSEPH TALLMAN.