

(No Model.)

G. W. LOW & W. SHAKESPEARE, Jr.  
PHOTOGRAPHIC SHUTTER.

No. 446,529.

Patented Feb. 17, 1891.

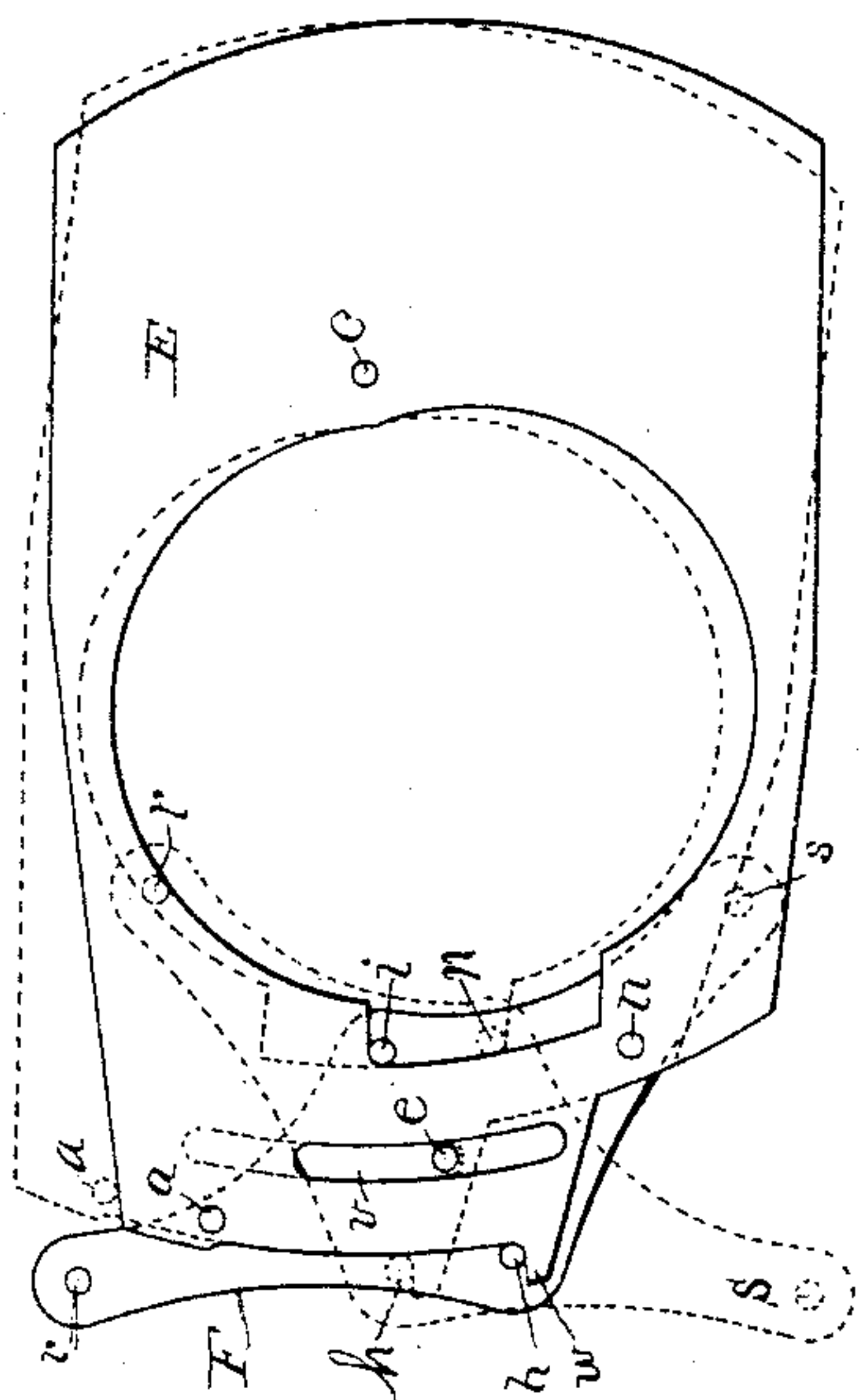


Fig. 3

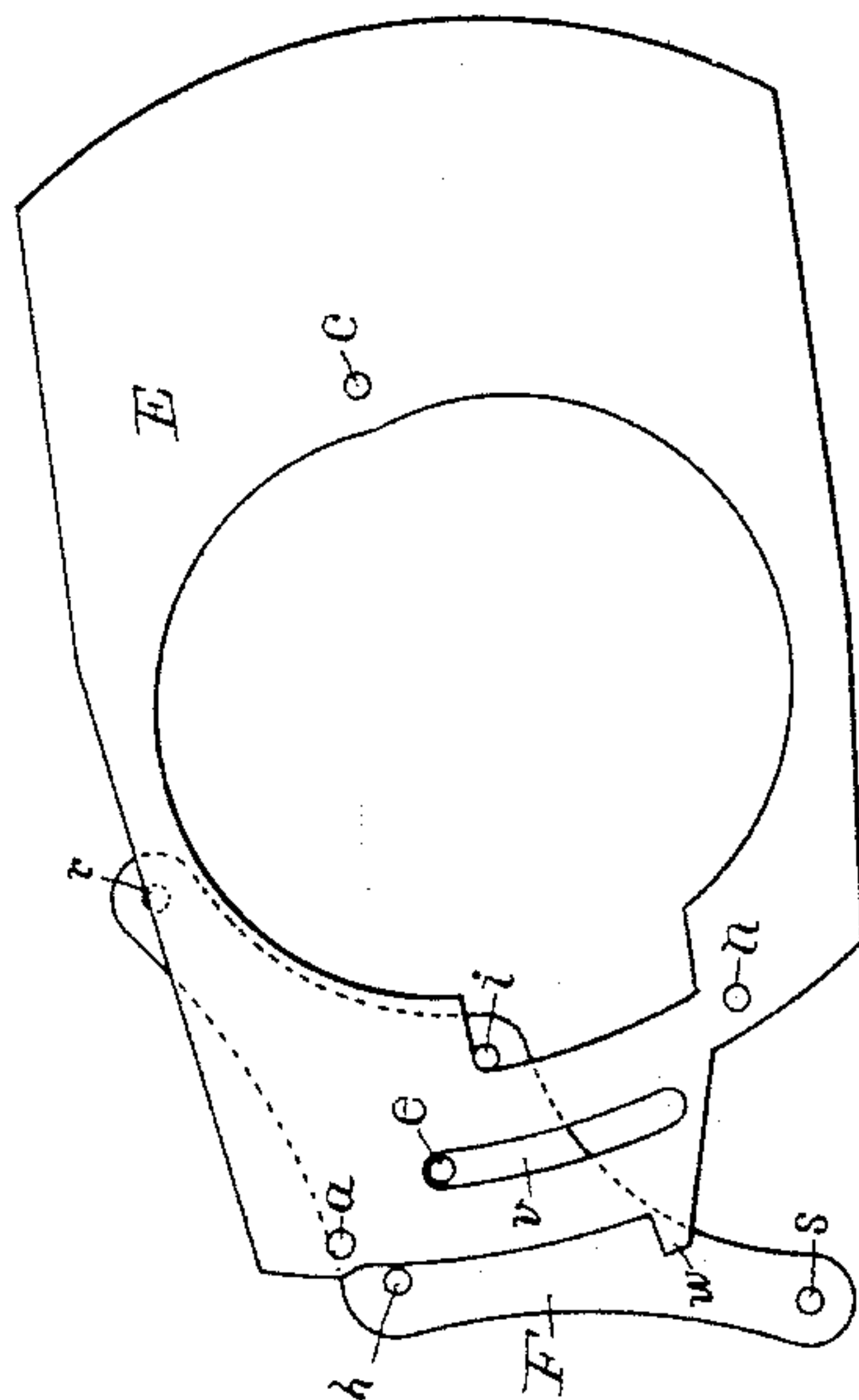


Fig. 4

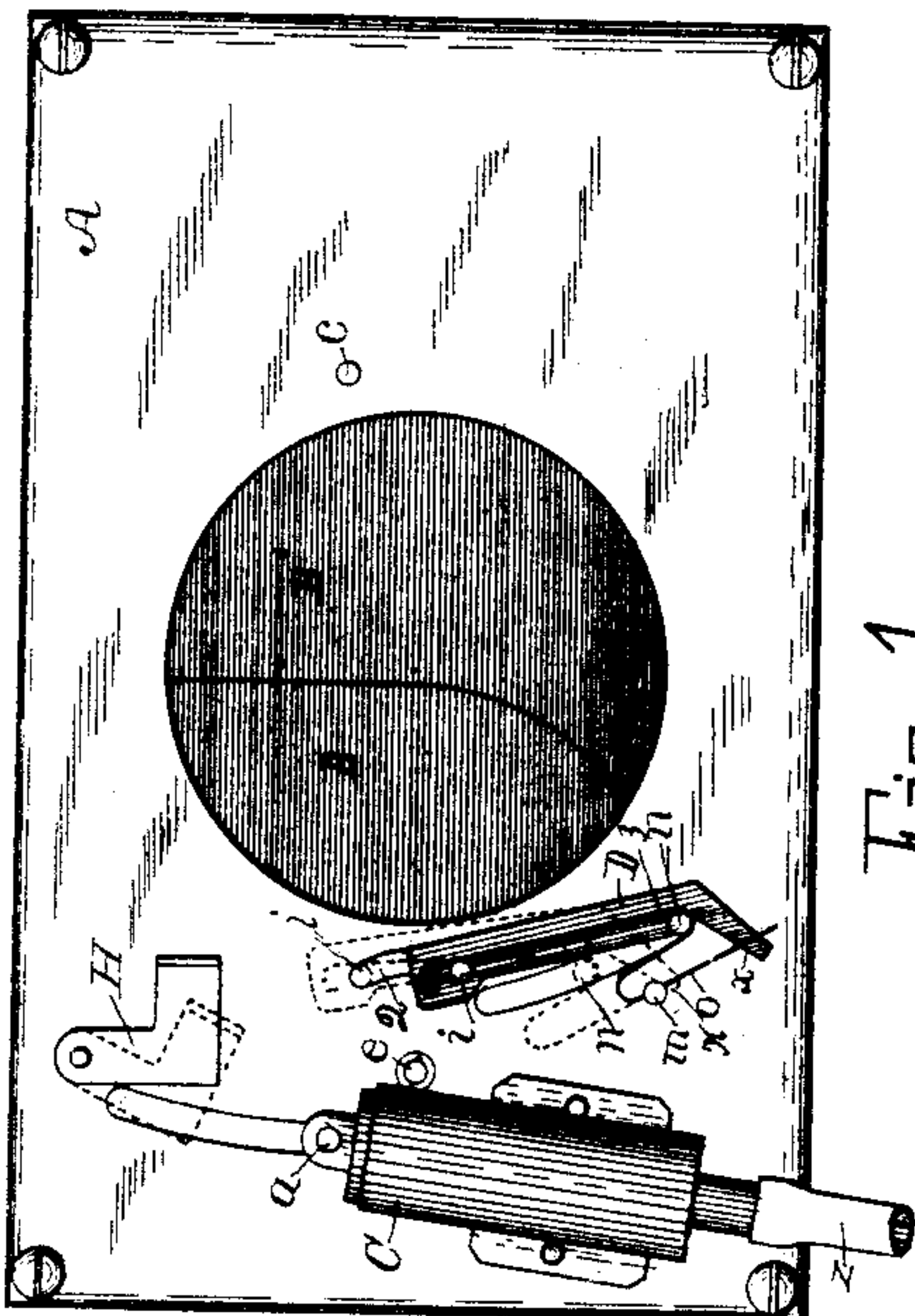


Fig. 1

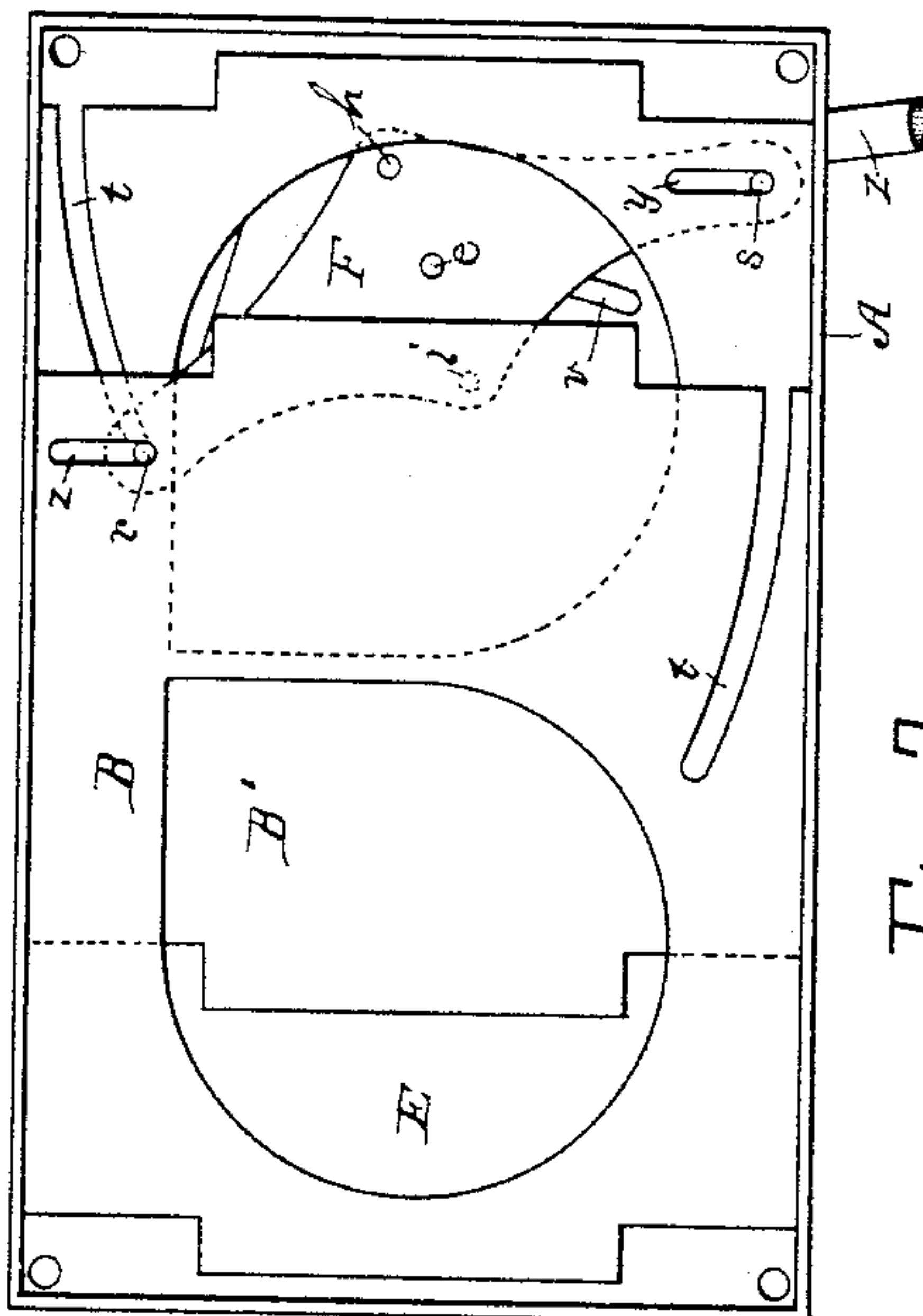


Fig. 2

Witnesses:

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Inventor.

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By *Lucius C. West*  
Att'y.



# UNITED STATES PATENT OFFICE.

GARRETT W. LOW AND WILLIAM SHAKESPEARE, JR., OF KALAMAZOO,  
MICHIGAN.

## PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 446,529, dated February 17, 1891.

Application filed August 16, 1890. Serial No. 362,163. (No model.)

*To all whom it may concern:*

Be it known that we, GARRETT W. LOW and WILLIAM SHAKESPEARE, Jr., citizens of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Photographic Shutter, of which the following is a specification.

This invention relates to that class of photographic shutters in which the opening to the camera is closed by sliding wings or doors which open and close in directions opposite to each other and are usually operated by a pneumatic engine.

The main object of the invention consists in a construction whereby the shutters are opened and closed by the outward stroke or movement only of the piston-rod of the engine, or whatever the operating means is, and remain in said position, while the operating mechanism assumes its normal position, ready for another operation.

Other objects will appear in the following description and claims.

In the drawings forming a part of this specification, Figure 1 is an elevation as when viewed from a point in front of the camera. Fig. 2 is an inverted view of Fig. 1. Figs. 3 and 4 show lettered and figured details below described.

Referring to the lettered and figured parts of the drawings, A is the case which contains and to which are attached the shutters B and B' and the mechanism for operating the same. Within the case A is a lever E—that is, it is a lever in its function, but in its construction it represents a plate having a central opening, and is pivoted to the case A at *c*, as shown in Figs. 1, 3, and 4. At F is a double lever centrally pivoted to the case A at *e*, Figs. 2, 3, and 4. This double lever F is back of the lever-plate E. The lever-plate E is provided with a curved slot *v*, through which the pivot *e* passes, and by means of this slot said pivot *e* does not interfere with the lateral movement or oscillation of the lever-plate E. Of course the lever-plate E could be made in skeleton form in such a manner that there would not be any clearly-defined slot *v*; but we prefer to make said lever-plate as here shown, since it is necessary to have other parts attached thereto and will give it a better bearing in the case.

The extreme ends of the double lever F are provided with projections *r s*, and the wings or slides B and B' are provided with slots *y z*, which have a cam engagement with said projections *r s*. Thus when the double lever F oscillates upon its pivoted end in one direction the slides are thrown in opposite directions and the camera is opened, and when said double lever F oscillates in the opposite direction the slides B and B' are thrown toward each other and the camera is closed.

The slides B and B', Fig. 2, are for convenience provided with slots *tt* to permit the play of the projections *r s* without interfering with said slides during the oscillation of the double lever F. The lever-plate E, as here shown, is attached to the end of the piston-rod at *a* of the pneumatic engine C. The rubber tube, which in said engine extends to the air-bulb, is here shown broken at *z*, and is oscillated laterally upon its pivot *c* by the reciprocating movements of said piston-rod. The lever-plate E is provided with a pin or projection *n*, which comes out through a slot through the outer plate of the case A, as shown in Fig. 1. The double lever F has a projection *i*, which extends out through slot 2 of the piston-plate of the case, and which plays back and forth in said slot during the oscillation of said double lever F.

Referring to Fig. 1, D is a dog pivoted to the projection *i*, and is also provided with an inclined end *x* and a shoulder 3, against which shoulder the projection *n* comes in contact when the lever-plate E oscillates to the left. At *m* is a projection on the case A in Fig. 1, against which the incline *x* of the dog comes in contact, which action throws the dog upward and frees the projection *n* from the shoulder 3 of said dog. When this action takes place, the double lever F is in the position shown in Fig. 3 and the shutters are open. The lever-plate E also has an extension *w*, which at this time comes in contact with a projection *h* on the double lever F, (which projection *h* and the one we before described are at opposite sides of the pivot *e* of said double lever, as in Figs. 3 and 4,) as in Fig. 3, and since the dog now trips and frees the projection *n* the extension *w* of the lever-plate E (since said lever-plate continues to



move in the same direction) will oscillate the double lever F in the opposite direction, and thus close the shutters. By this means during one lateral movement of the lever-plate E, as indicated by dotted lines in Fig. 3, the double lever F has been oscillated in both directions, and the shutters or slides open and close during said single movement of the lever-plate E, and they will remain in their closed position, while the piston-rod of the engine returns to its normal position, as in Fig. 1, as soon as the air-pressure is released, bringing the lever-plate E back to the proper position for a new operation. By means of a pivoted stop H the movement of the lever-plate E is arrested at the time the shutters are thrown open, and in this case of course the shutters are closed by the return-stroke of the engine. From this it will also be seen that the lever-plate E may be dispensed with, provided the operative power is applied to the oscillating double lever F to merely open and close the shutters or slides.

Returning to Fig. 1, while it is designed that the dog D (after being tripped by the engagement of its inclined end  $x$  with the projection  $n$ ) shall fall by its own weight to a proper position to again form an engagement of its shoulder 3 with the projection  $n$  of the lever-plate E, ready for the next operation, if desirable, a spring  $o$  may be employed to bring said dog back to place after being tripped, as shown in Fig. 1, or otherwise; but said spring is not deemed necessary by us.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a photographic shutter, the combination of the two slides, a centrally-pivoted double lever attached to and adapted to open the slides during its oscillation in one direction and to close them during its oscillation in the opposite direction, a pivoted lever-plate connected with and adapted during its movement in one direction to impart both of the oscillating movements to the double lever,

and means for operating the lever-plate, substantially as set forth.

2. In a photographic shutter, the combination of the centrally-pivoted double lever having the end projections and the projections each side of its pivot, the pivoted lever-plate, the pivoted dog connecting with a projection of said lever-plate and with the projection which is on the double lever, said lever-plate being also provided with an extension adapted to engage one of the side projections of said double lever during the lateral swing of the lever-plate, and the slides or shutters forming a cam engagement with the end projections of the double lever, substantially as set forth.

3. In a photographic shutter, the combination of the slides, the double lever for operating them, the pivoted lever-plate, the pivoted dog joined to the double lever and having a shoulder in position to be engaged by a projection of the lever-plate, and a projection on the case adapted to trip the dog and disengage said projection, substantially as set forth.

4. In a photographic shutter, the combination of the slides, the lever-plate having the pin to engage the dog, the pivoted double lever having the pin for engaging with the lever-plate, said lever-plate provided with the extension for engaging the pin of said double lever, and the pivoted dog forming a connecting-link between the double lever and lever-plate and adapted to trip, as stated, substantially as set forth.

In testimony of the foregoing we have hereunto subscribed our names in presence of witnesses.

GARRETT W. LOW.

WILLIAM SHAKESPEARE, JR.

Witnesses as to first name:

JOHN GALLIGAN,

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Witnesses as to second name:

WM. E. EARLE, Jr.,

F. S. DOYLE.