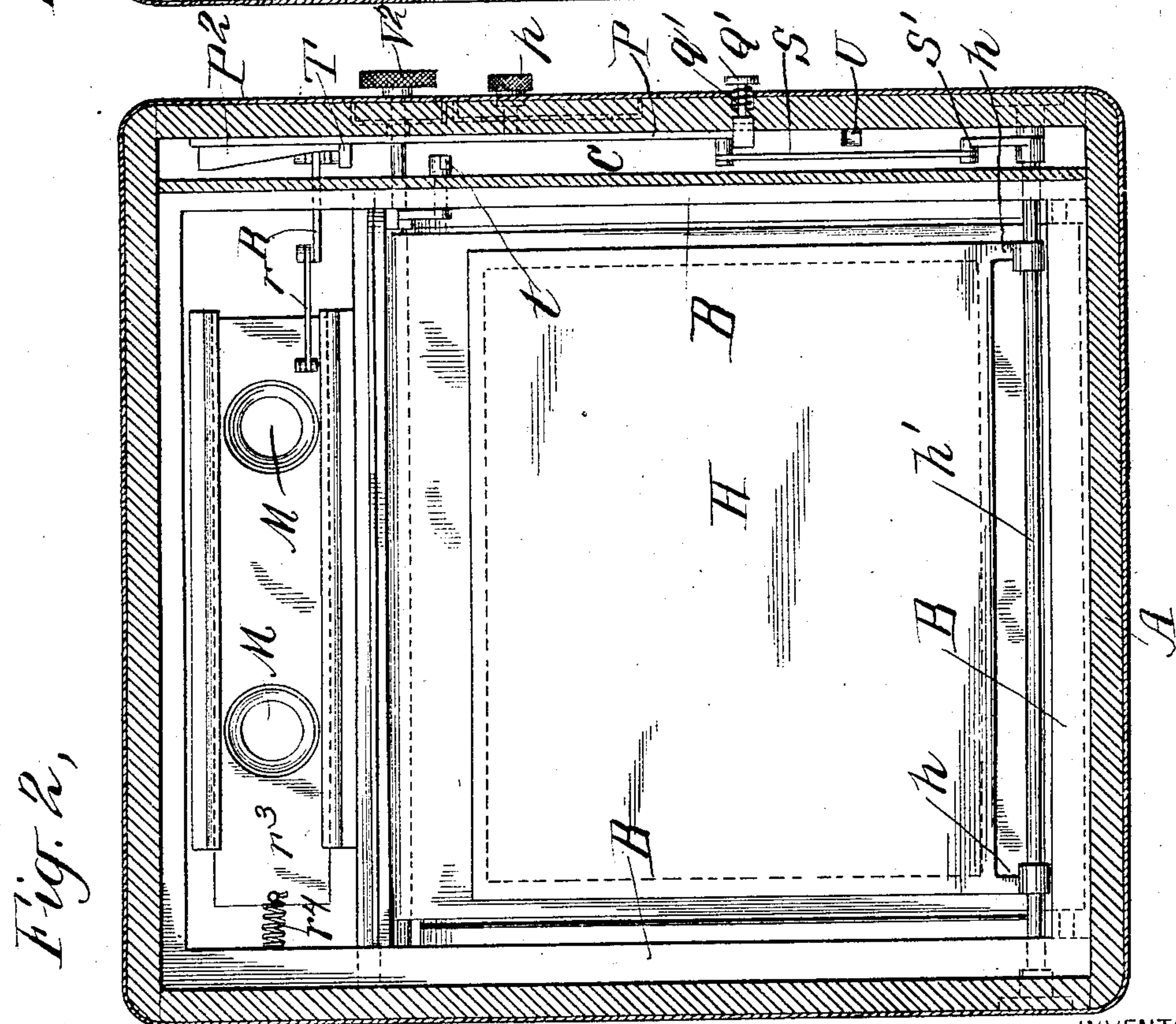
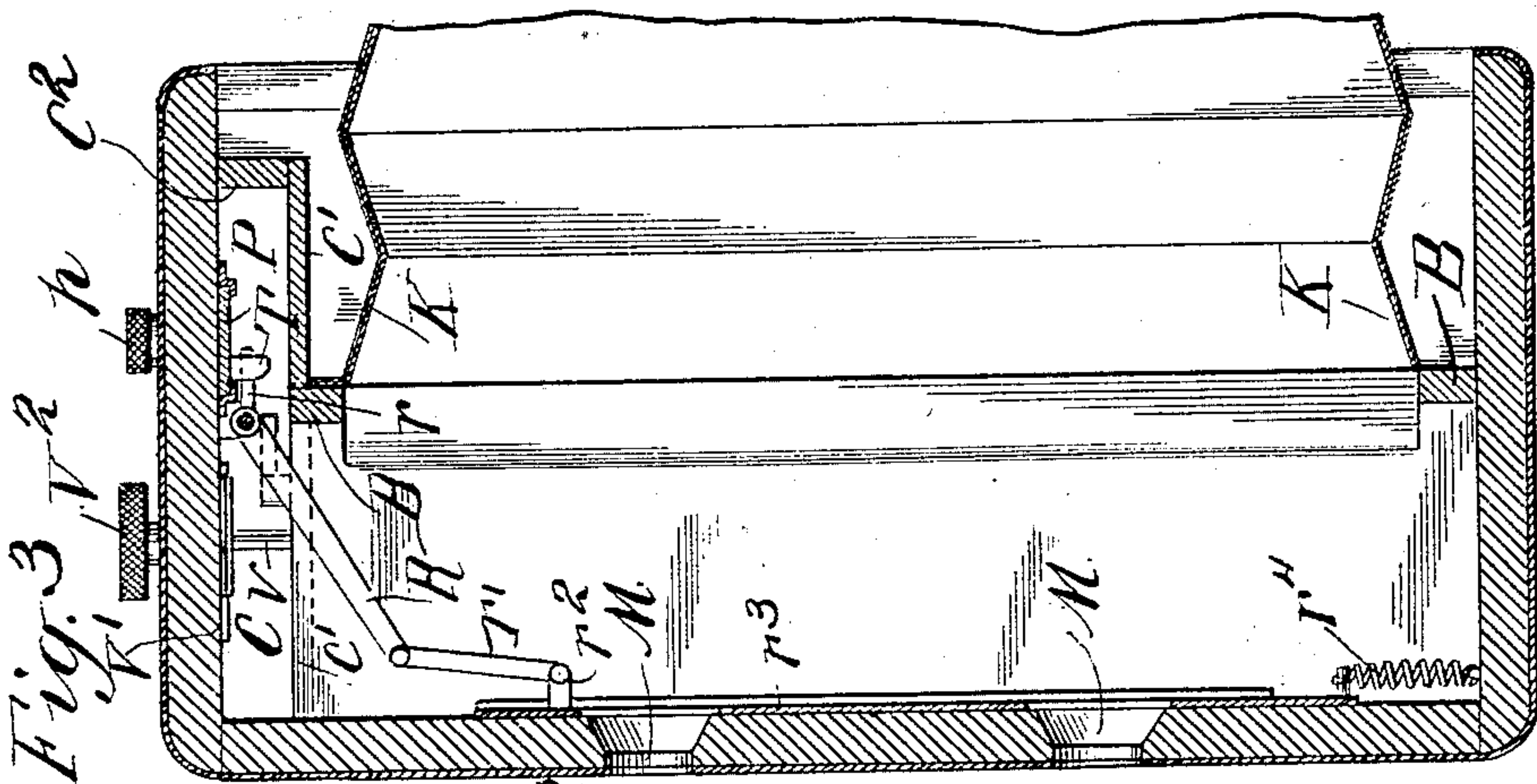


L. BORSUM.
PHOTOGRAPHIC CAMERA.

APPLICATION FILED AUG. 20, 1901. RENEWED JULY 16, 1902.

NO MODEL.

4 SHEETS—SHEET 2.



WITNESSES:

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L. F. Browning

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4 SHEETS—SHEET 3.

Fig. 6,

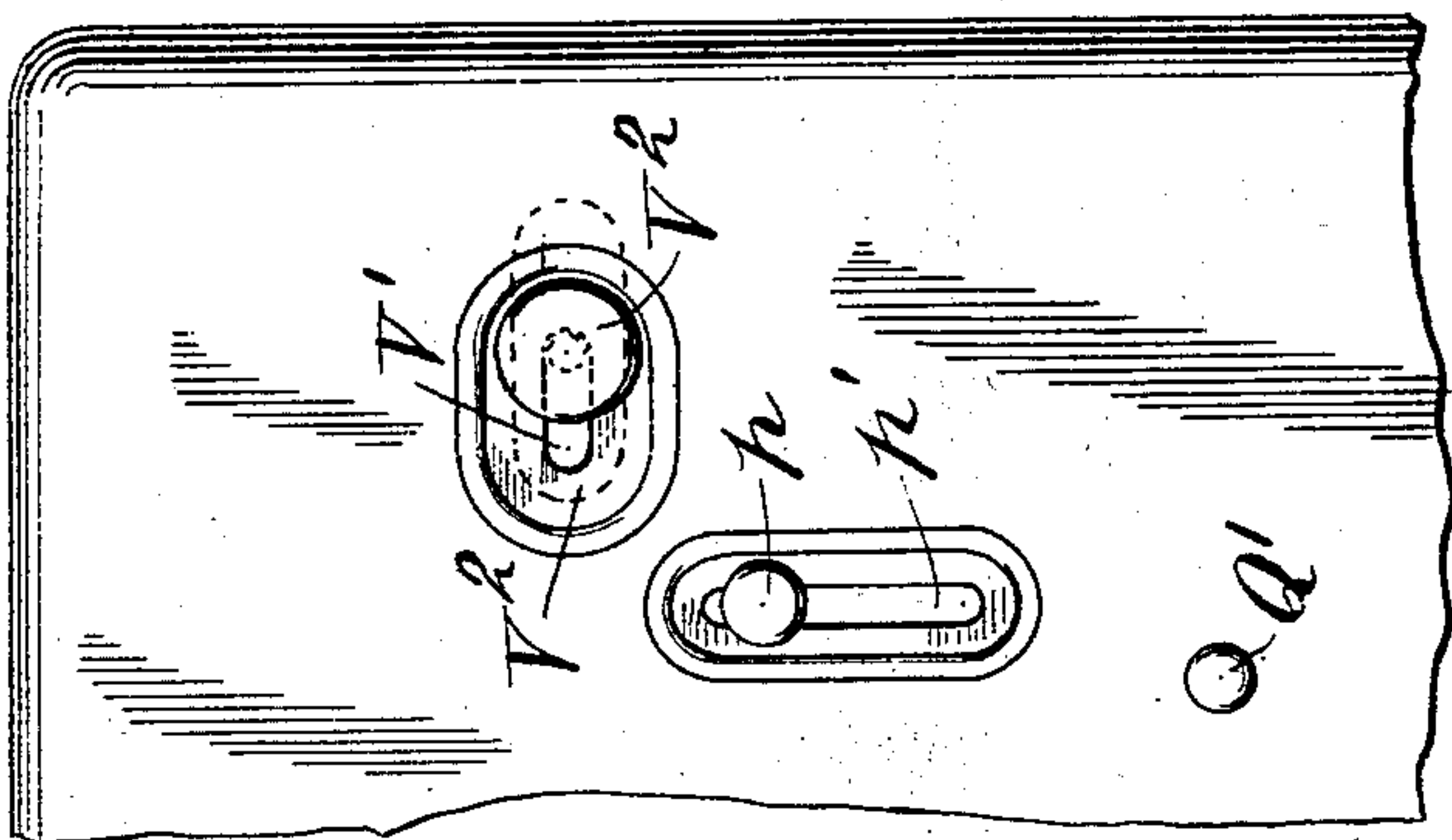


Fig. 7

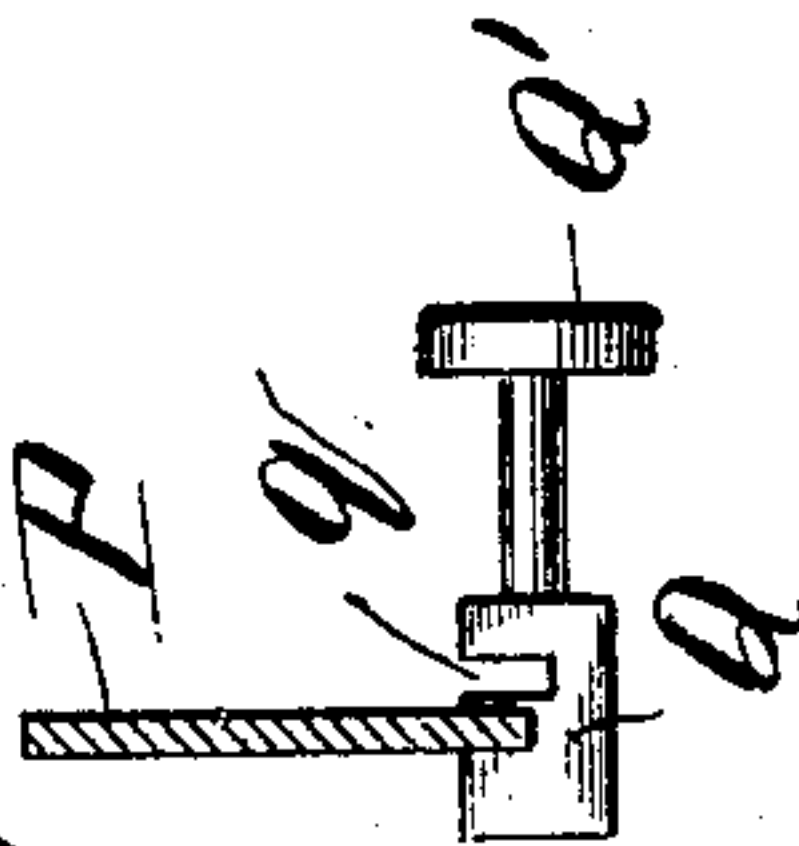


Fig. 4

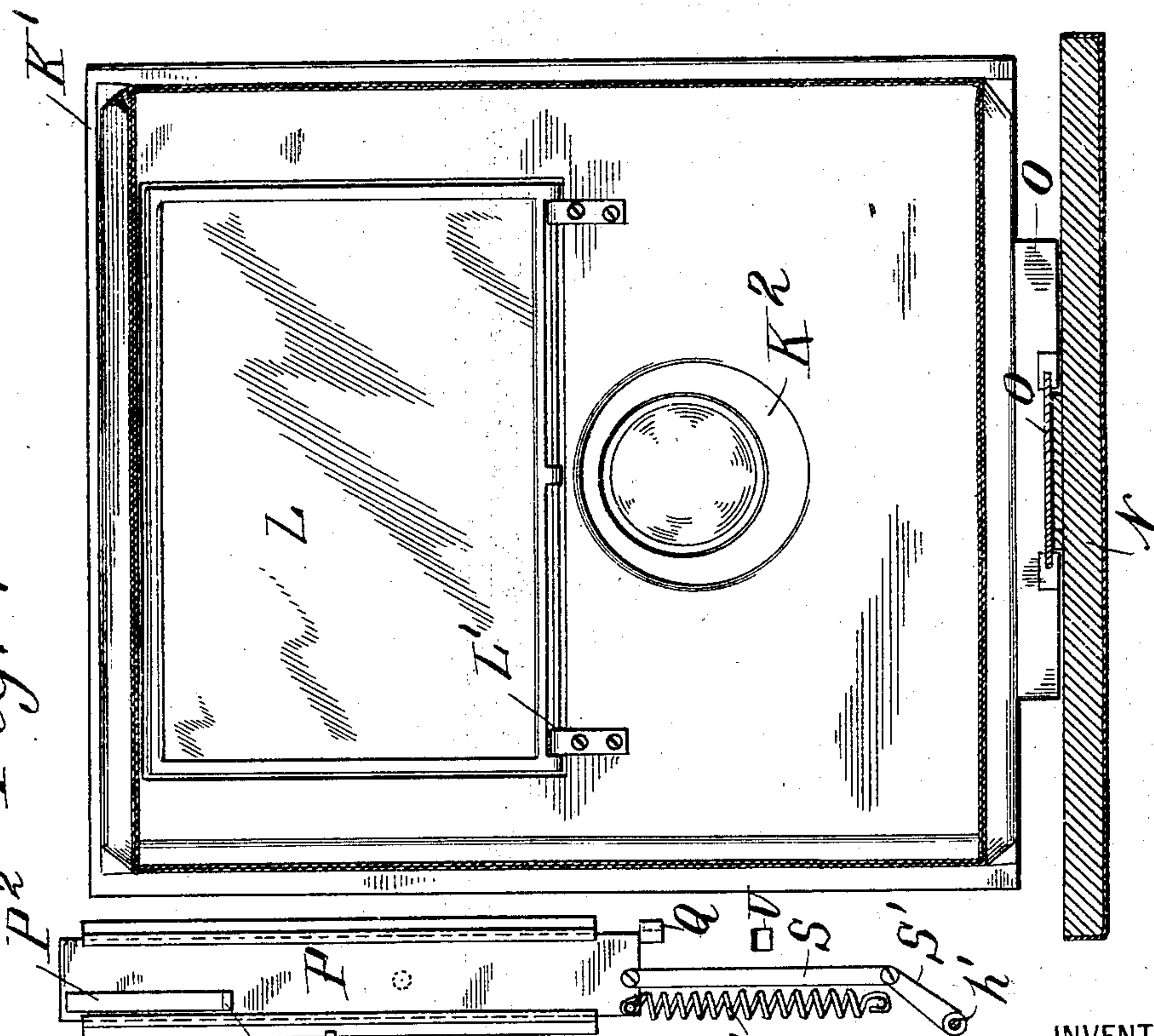
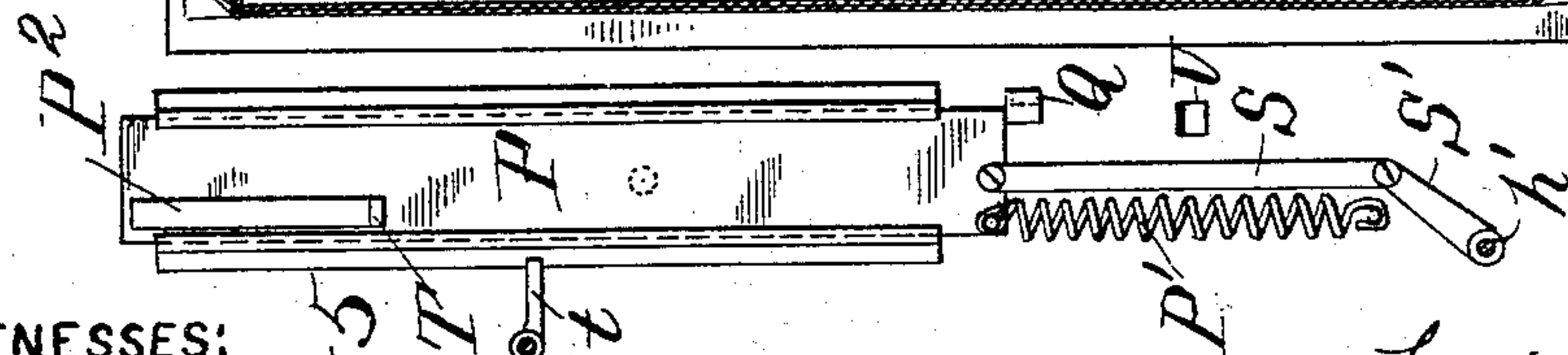


Fig. 5



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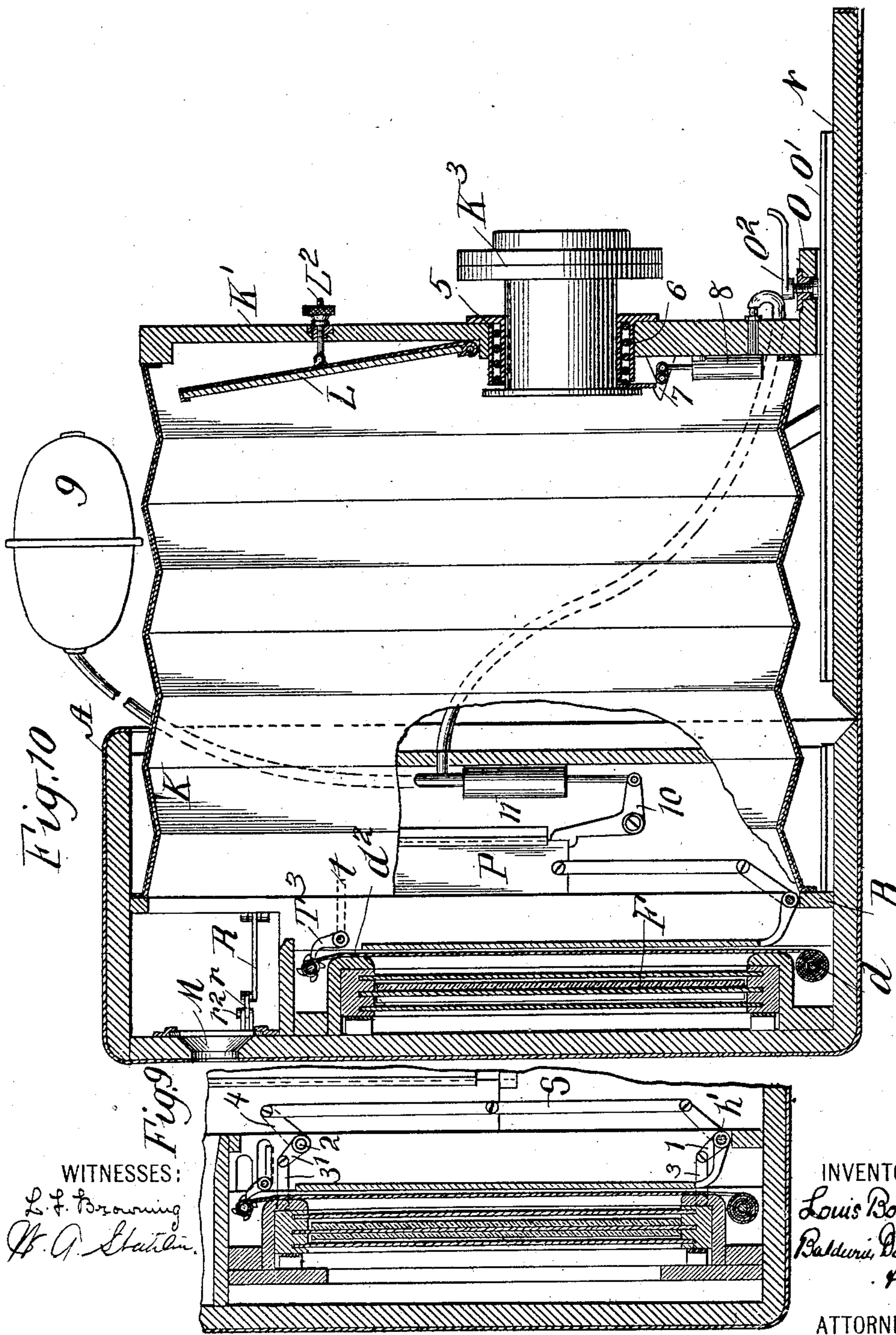
Baldwin, Davidson & Wright
ATTORNEYS

L. BORSUM.
PHOTOGRAPHIC CAMERA.

APPLICATION FILED AUG. 20, 1901. RENEWED JULY 16, 1902.

NO MODEL.

4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

LOUIS BORSUM, OF PLAINFIELD, NEW JERSEY.

PHOTOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 720,217, dated February 10, 1903.

Application filed August 20, 1901. Renewed July 16, 1902. Serial No. 115,789. (No model.)

To all whom it may concern:

Be it known that I, LOUIS BORSUM, a citizen of the United States, residing in Plainfield, county of Union, State of New Jersey, have invented certain new and useful Improvements in Photographic Cameras, of which the following is a specification.

This invention relates to a style of camera in which the image formed by the lens is focused upon a surface or plate parallel with and immediately in front of the plate-holding chamber and is observed by the operator through a suitably-located aperture or apertures in the camera-box. Observation of the image is best afforded by apertures in the rear wall or part of the camera-box opposite a mirror located in front of the image-receiving surface.

The invention comprises certain improved organizations wherein the image-receiving surface is moved out of the path of the cone of light and the distance between the lens and the sensitive plate or film adjusted so that it shall be equal to that previously existing between the lens and the image-receiving surface, these operations being automatically effected in timely sequence by the lever or other device employed for tripping the shutter.

The invention also comprises other general features, as well as special details of construction hereinafter set forth in detail and claimed.

The accompanying drawings show an organization embodying the invention in a practical form, which is the best construction now known to me; but obviously variations of structure may be made without departing from the principles of the invention.

Figure 1 is a vertical longitudinal section; Fig. 2, a transverse section on the line 2 2 of Fig. 1; Fig. 3, a horizontal section on the line 3 3 of Fig. 1; Fig. 4, a transverse section on the line 4 4 of Fig. 1; Fig. 5, a detached elevation of the slide that moves the image-receiving surface out of the path of light, effects a closure of the observation-aperture, and trips the shutter; Fig. 6, a side elevation of a part of the camera-box, showing the sliding button for shifting the slide illustrated in Fig. 5 and a rotating button for setting the shutter; Fig. 7, a detail view of the latch for

holding the slide in its elevated position. Fig. 8 is a detached end elevation of the movable frame containing the plate-holding chamber and having mounted in it the upper and lower shutter-rolls; Fig. 9, a detail vertical section showing a modification in the way of moving the plate-holding frame, and Fig. 10 a vertical longitudinal section showing a stationary plate-holding frame and an axially-movable lens.

The box A is divided into front and rear chambers A' A² by partition-strips B, inclosing an opening of suitable dimensions. At the left-hand side, as shown in the drawings, a narrow vertical chamber C is formed by partition-walls C' C' C². In the rear chamber formed by the partition-strips B is located, Fig. 1, a movable frame D, containing a chamber to receive the plate-holder F and having chambers or recesses D' D' at the top and bottom to receive the lower roller or spring-drum *d* and the upper roller or winding-drum *d'* of the curtain or focal-plane shutter *d*², the rollers and curtain being of any usual or appropriate construction. Springs G, interposed between the front wall of the box and the frame, tend to urge the latter forward against the partition-strips B. Normally the frame is forced back by a plate H, on whose front face is formed the image while focusing and which is attached, by means of small curved arms or brackets *h*, to a rock-shaft *h'*, operated, as hereinafter described, to hold the plate in either the vertical position (indicated in full lines) or the horizontal position. (Shown in dotted lines.)

To the partition-strips B is attached the rear edge of a collapsible bellows K, secured at the front to a board K', in which is mounted the usual vertically-adjustable lens-board K², carrying the lens K³. Above the lens (in the special form of the invention here illustrated) is a mirror L of suitable size, preferably hinged at its lower edge at L'. To the back of the mirror is hinged a screw-bolt L², passing through a bushing in the board K' and having a thumb-nut applied to its outer end. Between the inner face of the board and the hinge connection with the back of the mirror L a coil-spring L³ is placed around the bolt to steady the mirror and prevent its vibration. The angle of the mirror may be adjusted by

manipulation of the thumb-nut L^2 . Such adjustment is unnecessary, although desirable, perhaps, in some cases. Above the plate-holding chamber and in the rear wall of the box are formed two observation-apertures M. The broken lines in Fig. 1 indicate the axis of the lens, the reflection by the mirror L of the image formed on H, and the line of observation through the apertures M. The operator may hold the camera in front of his face and view the reflected image conveniently by directing his gaze horizontally, or substantially so. With the ordinary reflex camera the point of view of the operator is above the camera-box—an arrangement that limits the manipulation of the camera to some extent and is more or less inconvenient. When an exposure is to be made, the plate or surface H is moved out of the path of the light-cone, the observation-apertures closed, and the shutter tripped, all as presently described. Before the shutter is tripped the lens and photographic plate are adjusted as to relative position so that the face of the film or sensitive plate will be the same distance from the lens as was the face of the image-receiving surface.

On the side wall of the box, within the narrow side chamber C, is located a vertically-movable slide P, capable of manipulation by means of the button p on a stud passing through a vertical slot p' in the side wall of the box, as shown in Fig. 6. A spring P' applied to the lower end of this slide and to the side wall of the camera-box tends normally to draw it downward. It is, however, held in an elevated position by a latch Q, mounted in the side wall of the box and having in it a slot q to receive the slide, but which is normally thrown outwardly by a spring q' , Fig. 2, applied around it, so that the bottom edge of the slide rests upon the solid part of the latch. When the button Q' of the latch is pressed inwardly and the slot q is brought under the edge of the slide, it is drawn downwardly by the spring P' . This downward movement effects the following operations: A cam-face P^2 on the slide acts upon the short arm r of an angular pivoted lever to force the short arm away from the wall. The other or longer arm R of this lever is pivoted to one end of a link r' , the opposite end of which is pivoted to a post r^2 , projecting from the face of an apertured plate r^3 , running in ways on the inner face of the back wall of the box and normally held by a spring r^4 in such position that the apertures therein coincide with the observation-apertures in the wall. As the slide descends and the lever R is actuated as described the plate r^3 is drawn endwise against the tension of its spring, so as to close the apertures M. At the same time the surface or plate H is moved away from the shutter and down into the horizontal position (indicated by the dotted lines, Fig. 1) by a link S, pivoted to the lower end of the slide and to a crank-arm S' on the rock-shaft h' . As

the plate H recedes or descends the frame D is advanced by its springs G until it abuts against the partition-strip B, when the face of the front film or sensitive plate in the holder will be in the vertical plane in which the face of the plate H formerly stood, or substantially so. When these operations have been effected, a projection T at the lower edge of the cam-face P^2 strikes the projecting end t of the detent-pawl T^3 of the upper shutter-roll and releases the shutter. The projecting end of this pawl passes through a slot t' in the partition C, as appears in Fig. 1. The stem V of the shutter-winding roll d' passes through slots in the partition C and in the side wall of the box, a plate V' being applied to the stem on the inside of the wall to exclude light.

V^2 is the ordinary thumb-wheel for rotating the stem.

It is obvious that when the surface or plate H is standing in front of the shutter the bellows K may be collapsed, the board K' moved into the open face of the box, and the door N closed. The base-board O of the front board K' may embrace a track formed by a plate O' on the inner face of the door N and also on the bottom of the front chamber of the box. A screw-clamp or friction device O^2 , applied to the base-board O, serves, as is well understood, to clamp the board in any desired position on the track.

The possibility of collapsing a camera of the special construction shown wherein a mirror L is employed is due to the separation of the two members H L, one being associated with the plate-holder and shutter and the other with the board K' or movable section (whatever may be its form) of the camera.

Fig. 9 illustrates a modification of the mode in which the plate-holder frame D is moved forward as the plate H is moved away. In the construction here shown radial arms 1, projecting from the rock-shaft h' and also from the rock-shaft 2, arranged in front of the upper part of the frame D, are connected by links 3 with the frame, so that it is drawn forward positively as the plate H recedes or is moved out of the path of the light-cone. The rock-shaft 2 is connected by a crank-arm 4 with the upper end of the link or part S, which is prolonged upwardly for that purpose.

In Fig. 10 I have shown an arrangement in which the frame D is stationary and the lens K^3 movable. The lens-tube is mounted in a sleeve 5 and surrounded by a coil-spring 6, which tends to urge it rearwardly. It is, however, held in normal position by a latch 7, which in the construction shown is operated by a pneumatic cylinder S, suitably connected, as shown, to the bulb 9. In this construction in lieu of the latch Q Q' for sustaining the slide P, I may employ a bell-crank-lever latch 10, operated by a pneumatic cylinder 11, appropriately connected with the bulb 9. When the bulb is compressed, the lens-tube is released and under the stress of

the spring moves rearwardly until its flange abuts against the front board K'. At the same time the slide P is released and starts upon its downward excursion to perform the operation already described. In this construction, as illustrated, it will be necessary for the operator to reset the lens-tube. The organization, however, illustrates a practical and efficient construction, and the invention is not limited to the special details of construction shown.

I claim as my invention—

1. In a photographic camera, the combination of a sensitive plate or film holding chamber, a focal-plane shutter mounted in front thereof, a movable image-receiving surface mounted immediately in front of the shutter, an inclosing box or casing having an aperture therein for observing the image formed on said surface by the lens, and actuating devices on the initial movement of which the image-receiving surface is moved out of the path of the cone of light and the shutter then tripped.

2. In a photographic camera, the combination of the sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a plate having an image-receiving surface hinged at one edge and normally standing immediately in front of the focal-plane shutter, an inclosing box or casing having an aperture therein for observation of the image formed on said surface by the lens and actuating devices on the initial movement of which the plate is swung out of the path of the cone of light and the shutter then tripped.

3. In a photographic camera, the combination of the sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a plate mounted immediately in front of the focal-plane shutter and upon the surface of which the image is formed by the lens, an inclosing box or casing having an aperture therein for observation of the image so formed, a device for closing said aperture and actuating devices on the initial movement of which said aperture is closed, the image-receiving plate moved out of the path of the cone of light and the shutter then tripped.

4. In a photographic camera, the combination of a sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a lens suitably mounted in front of the focal-plane shutter, a movable plate normally standing immediately in front of the shutter and upon the surface of which the image is formed by the lens, an inclosing box or casing having an observation-aperture therein through which the operator may view the image formed on such surface, means by which the distance between the lens and sensitive plate or film may be reduced to the focal distance between the lens and said image-receiving surface, and actuating devices on the initial movement of which the image-receiving plate is moved out

of the path of the cone of light and the distance between the lens and film reduced and the shutter then tripped.

5. In a photographic camera, the combination of a sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a lens suitably mounted in front of the focal-plane shutter, a movable plate normally standing immediately in front of the shutter and upon the surface of which the image is formed by the lens, an inclosing box or casing having an observation-aperture therein through which the operator may view the image formed on such surface, a device for closing said aperture, means by which the distance between the lens and sensitive plate or film may be reduced to the focal distance between the lens and said image-receiving surface, and actuating devices on the initial movement of which the image-receiving plate is moved out of the path of the cone of light, the distance between the lens and sensitive film or plate reduced, the observation-aperture closed and the shutter tripped.

6. In a photographic camera, the combination of a sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a movable plate mounted immediately in front of the shutter and on whose surface the image is formed by the lens, a mirror for reflecting said image mounted in front of the plate, an inclosing box or casing having an observation-aperture in the rear wall thereof and actuating devices on the initial movement of which the image-receiving plate is moved out of the path of the cone of light and the shutter then tripped.

7. In a photographic camera, the combination of a sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a movable plate mounted immediately in front of the shutter and on whose surface the image is formed by the lens, a mirror for reflecting said image mounted in front of the plate, an inclosing box or casing having an observation-aperture in the rear wall thereof, a device for closing said aperture and actuating devices on the initial movement of which the image-receiving plate is moved out of the path of the cone of light and the observation-aperture closed and the shutter then tripped.

8. In a photographic camera, the combination of the rear box having an observation-aperture in its rear wall and containing the sensitive film or plate holding chamber, a focal-plane shutter, mounted immediately in front thereof, a movable plate mounted immediately in front of the shutter and upon the surface of which the image is formed by the lens, the front board or member of the casing having a lens mounted therein, the interposed bellows, a mirror carried by the front board or member and suitably arranged with reference to the observation-aperture and actuat-

ing devices upon the initial movement of which the image-receiving plate is moved out of the path of the cone of light and the shutter then tripped.

5 9. In a photographic camera, the combination of the rear box having an observation-aperture in its rear wall and containing the sensitive film or plate holding chamber, a device for closing said aperture, a focal-plane
10 shutter mounted immediately in front thereof, a movable plate mounted immediately in front of the shutter and upon the surface of which the image is formed by the lens, the
15 front board or member of the casing having a lens mounted therein, the interposed bellows, a mirror carried by the front board or member and suitably arranged with reference to the observation-aperture and actuating devices upon the initial movement of which the
20 image-receiving plate is moved out of the path of the cone of light, the observation-aperture closed and the shutter then tripped.

10. In a photographic camera, the combination of a sensitive film or plate holding chamber, a focal-plane shutter mounted immediately in front thereof, a movable plate mounted immediately in front of the shutter and

upon whose surface the image is formed by the lens, a box or casing having an aperture therein for the observation of the image, the lens mounted in its board or support so as to be moved rearwardly and actuating devices on the initial movement of which the image-receiving plate is moved out of the path of the cone of light, the lens moved rearwardly for the purpose set forth, and the shutter then tripped.

11. In a focal-plane-shutter photographic camera, a movable part having a surface upon which the image is formed by the lens in focusing, an inclosing box or casing having an aperture through which the image so formed may be viewed by the operator combined with a device for closing the aperture and actuating devices on the actuation of which the aperture is closed and the sensitive film or plate exposed.

In testimony whereof I have hereunto subscribed my name.

LOUIS BORSUM.

Witnesses:

GEO. H. RUDOLPH,
W. A. STAHLIN.