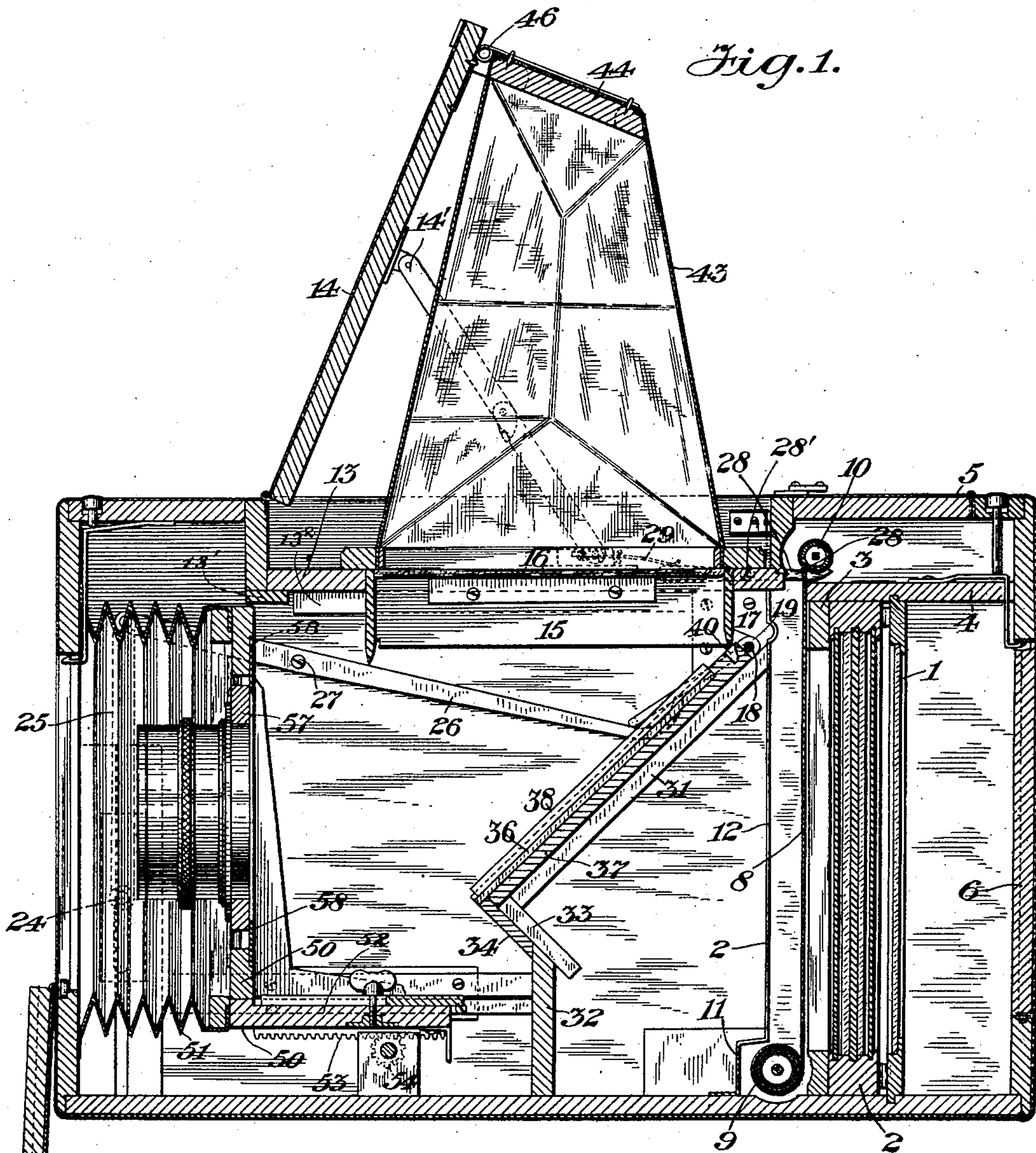


L. J. R. HOLST.
PHOTOGRAPHIC CAMERA.
APPLICATION FILED MAY 15, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



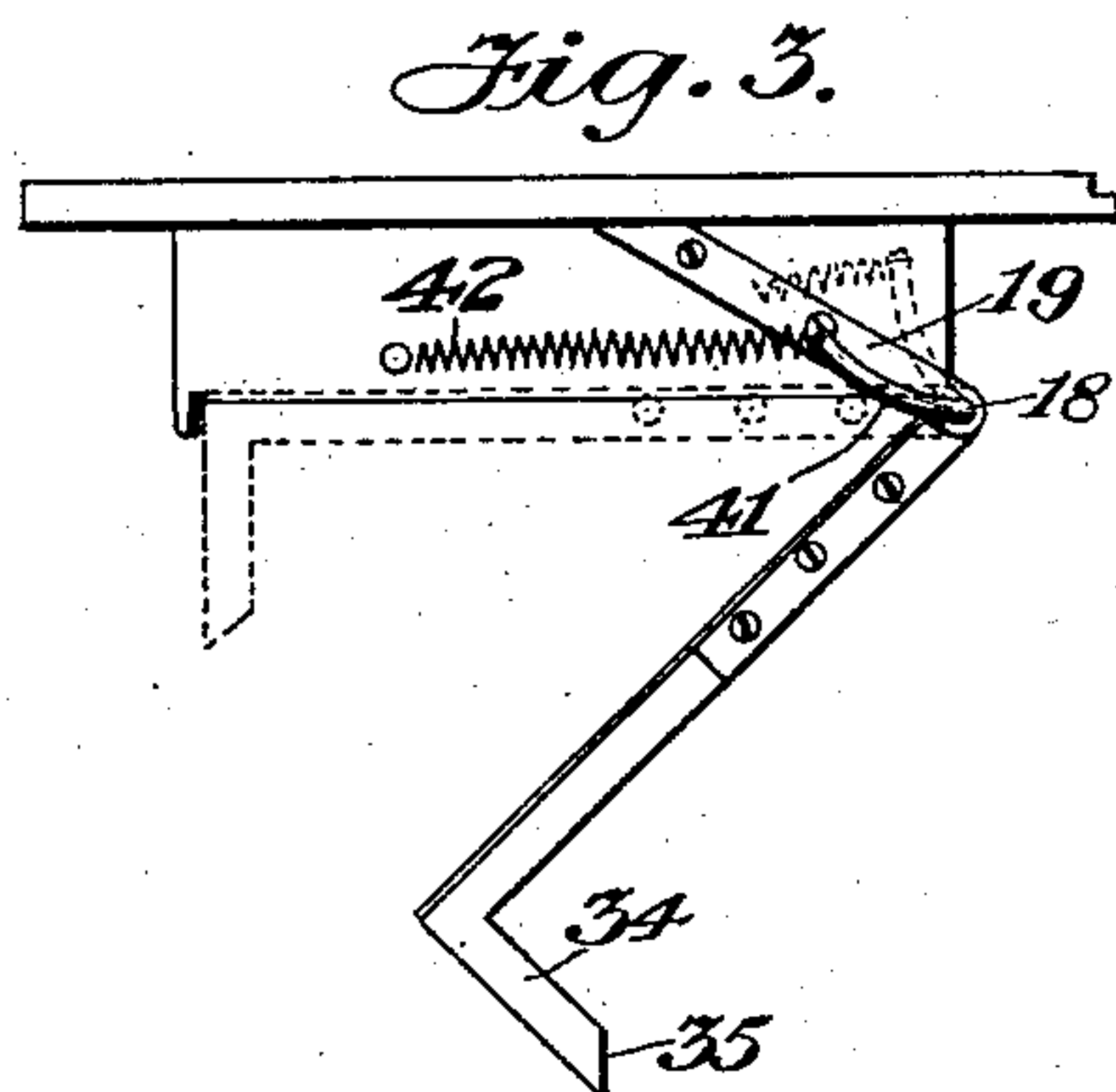
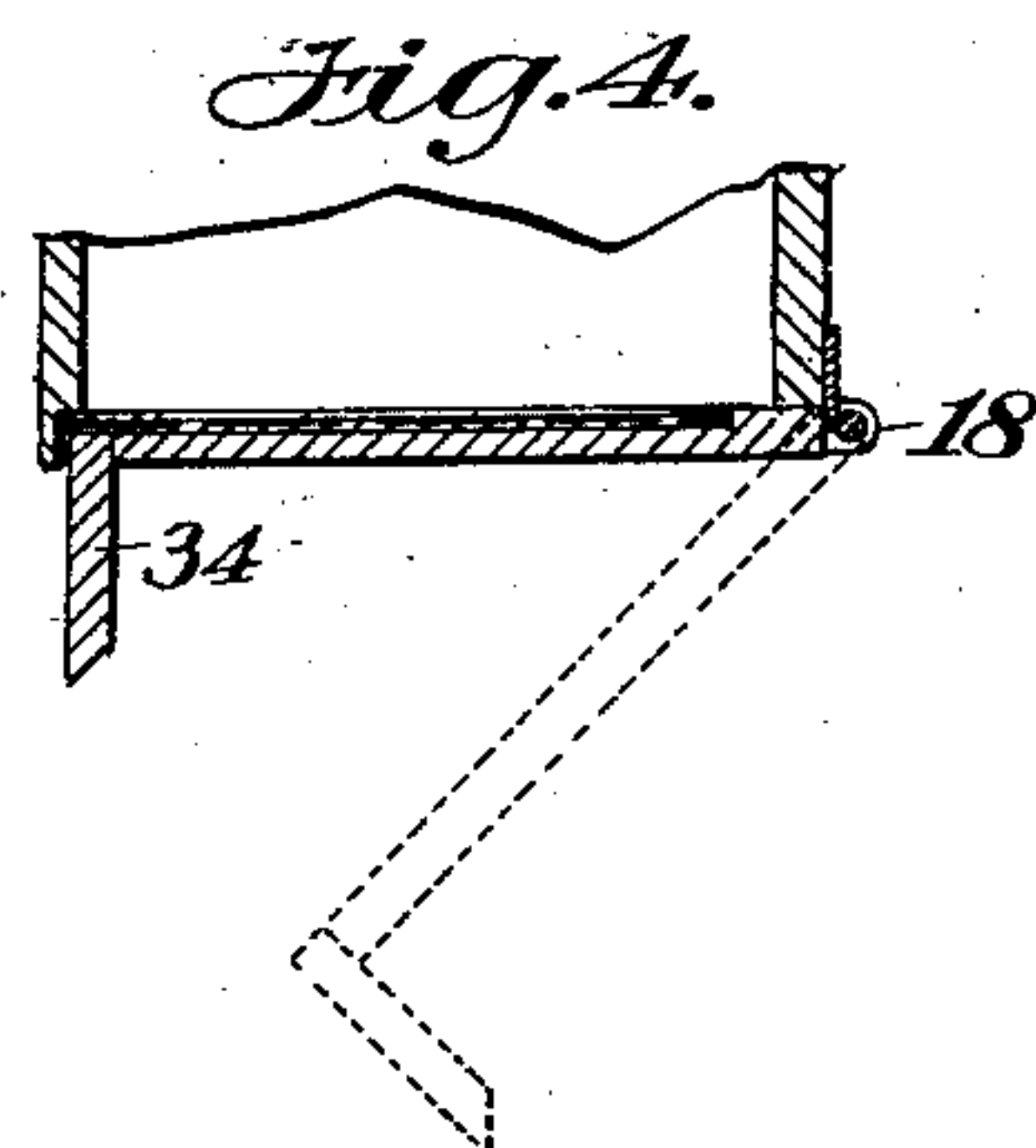
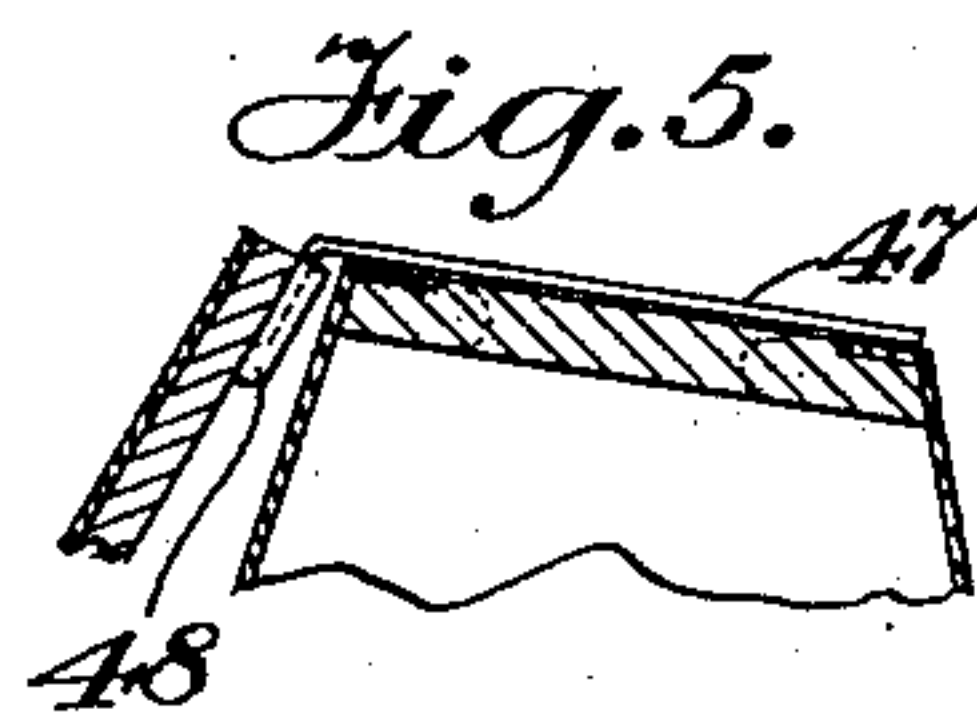
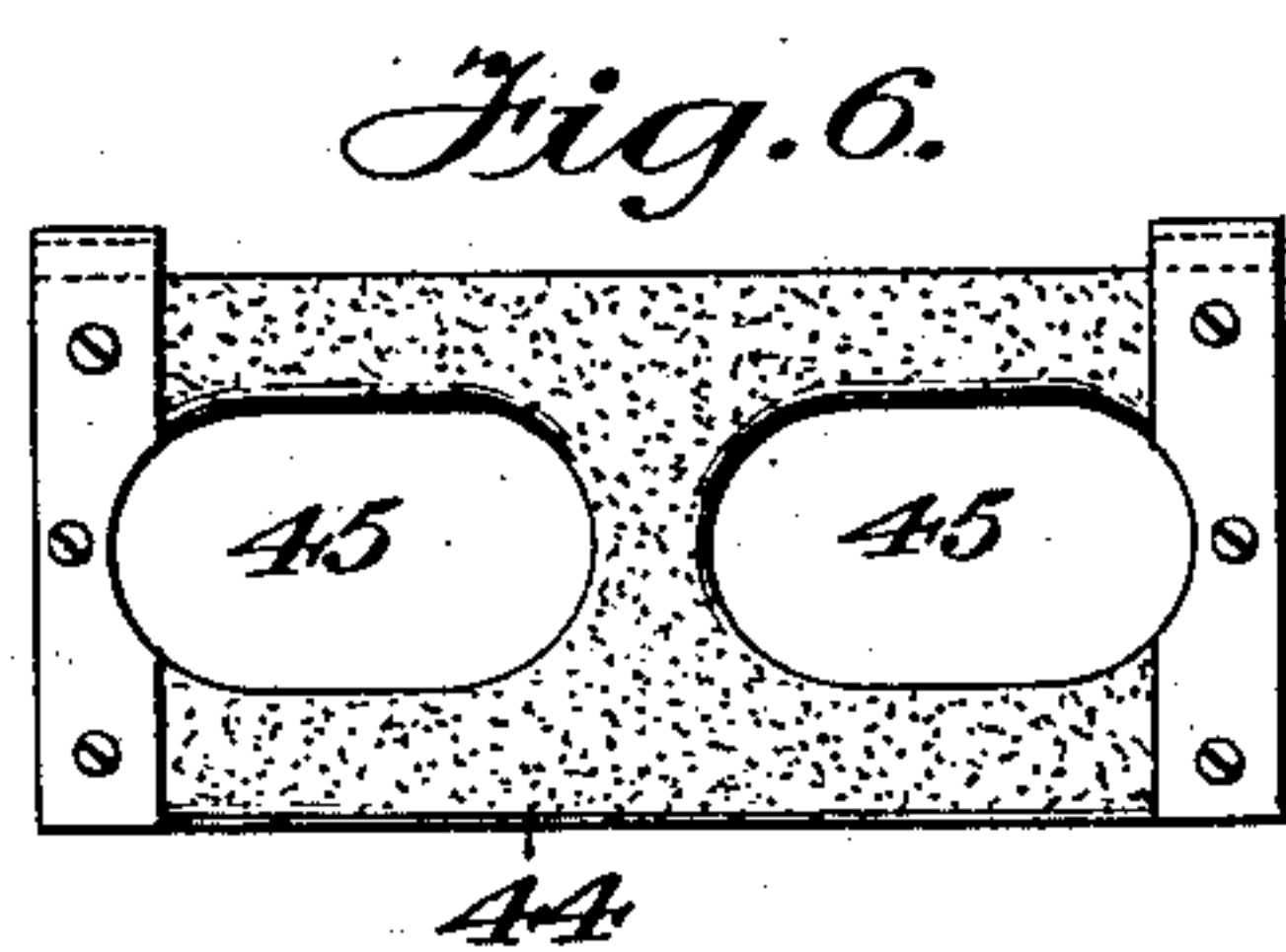
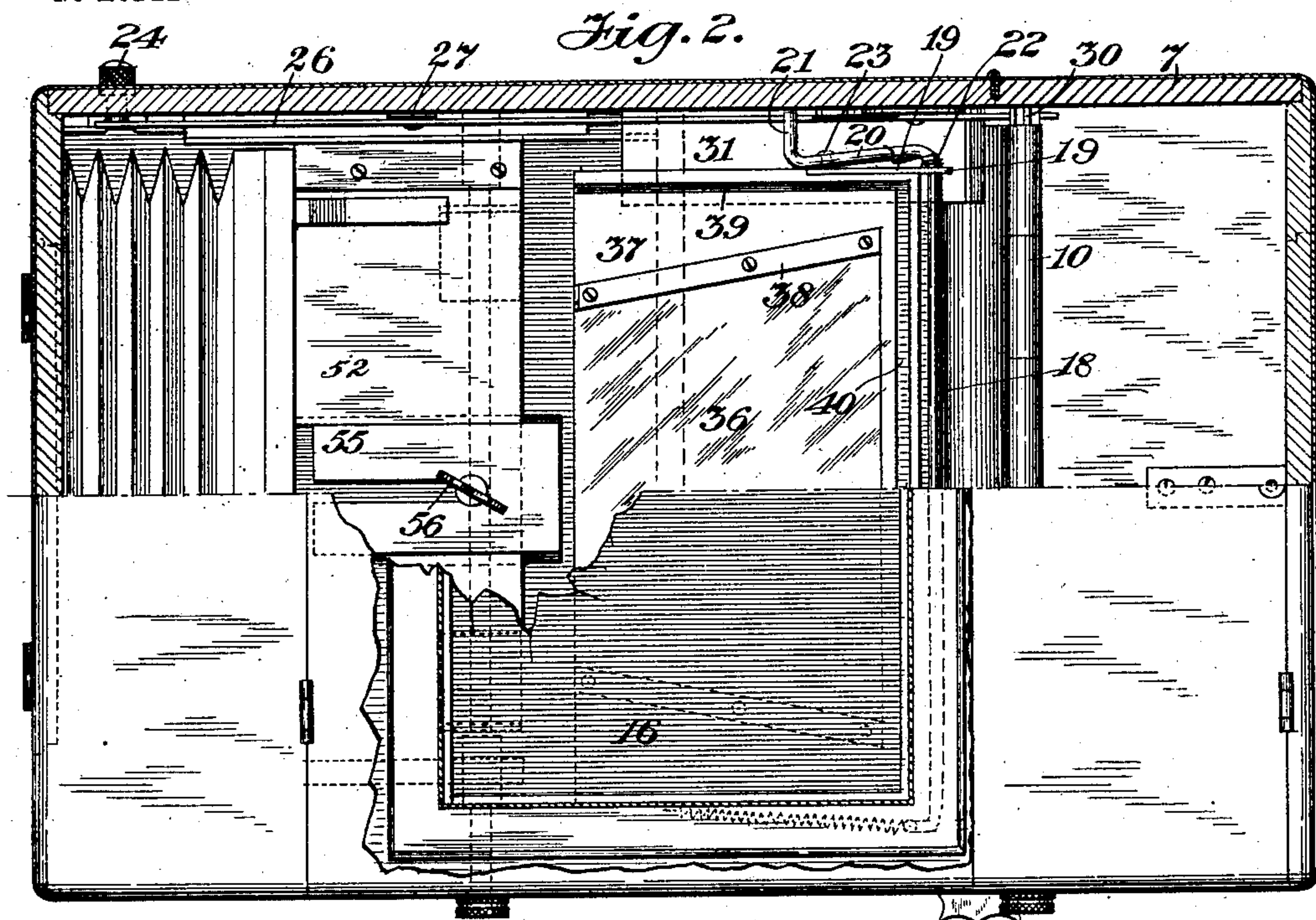
Witnesses
W. A. Stahl
L. L. Browning

L. J. R. Holst Inventor
By his Attorneys
Riddell, Davidson & White

L. J. R. HOLST.
PHOTOGRAPHIC CAMERA.
APPLICATION FILED MAY 15, 1901.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses
W. A. Stahl
L. F. Browning

L. J. R. Holst, Inventor
By his Attorneys
Baldwin, Davidson & Wright

UNITED STATES PATENT OFFICE.

LODEWYK J. R. HOLST, OF BROOKLYN, NEW YORK, ASSIGNOR OF TWO-THIRDS TO LOUIS BORSUM, OF PLAINFIELD, NEW JERSEY.

PHOTOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 720,693, dated February 17, 1903.

Application filed May 15, 1901. Serial No. 60,319. (No model.)

To all whom it may concern:

Be it known that I, LODEWYK JAN RUTGER HOLST, a subject of the Queen of the Netherlands, (but having declared my intention to become a citizen of the United States and having taken out my first naturalization-papers,) residing in the borough of Brooklyn, city of New York, State of New York, have invented certain new and useful Improvements in Photographic Cameras, of which the following is a specification.

This invention relates to cameras of the class in which pivoted swinging-mirror finders are mounted in front of a focal-plane shutter, and comprises certain improved features of construction hereinafter set forth in detail and claimed.

Letters Patent of the United States No. 589,349, granted to me August 31, 1897, disclose a camera of the general class to which this invention particularly appertains.

In the accompanying drawings, Figure 1 is a vertical longitudinal section; Fig. 2, a plan view, partly broken away and partly in section; Fig. 3, a detail view showing the mirror-finder and associated light-well; Fig. 4, a detailed sectional view of the same parts, showing a modification of the construction to prevent penetration of light from the light-well to the shutter; Fig. 5, a detail sectional view showing a modified arrangement for holding up the knockdown or collapsible hood of the finder; Fig. 6, a detail view showing the top or end plate of the hood with the double sight or peep apertures therein.

The rear chamber, containing the ordinary ground-glass slide 1 and removable plate-holder 2, is formed by the vertical partition 3, having therein the exposure-opening of suitable area, the horizontal partition 4, and the walls of the camera-box. Suitable doors 5 6 7 are provided.

Important objects of this invention are economy of space in order that dimensions of the camera-box may be reduced to their lowest terms and protection of the plate from vagrant or extraneous rays of light. These objects are in part fulfilled by the arrangement and disposition of the focal-plane or curtain shutter 8, of which 9 is the bottom roll or spring-drum, and 10 the top roll. As

seen from the drawings, the curtain is wound around the upper and lower rolls in the same direction. The lower roll is placed as close as possible to the partition 3, while the top roll is placed above the horizontal partition 4 and in line with the vertical partition 3. The curtain passes from the rear periphery of the lower roll to the front periphery of the upper roll and is therefore disposed close to the opening in the partition 3 and is at all times substantially parallel with the vertical face of that partition. This disposition of one of the rolls, and preferably the upper one, in rear of the other and the resultant juxtaposition of the curtain to the partition and its uniform parallelism therewith are important features constituting a material improvement in focal-plane-shutter cameras. Immediately in front of the lower roll and extending partly over it is a transverse light-guard 11, from opposite ends of which rise vertical side light-guards 12, the edges of which are attached to the side walls of the box and the upper ends of which may abut against the bottom board 13 of a cavity or chamber formed in the top of the camera-box and normally closed by a door or cover 14. Within an opening in this bottom board is secured the light-well 15, which is composed of four downwardly-extending side plates of suitable width to form a light-well of sufficient and appropriate depth and at or near the top of which is the ground-glass plate 16.

The finder-mirror frame is pivoted on straps or brackets 17 at the rear corners of the light-well by means of a rod 18, passing there-through and through straps 19, applied to the edges of the mirror-frame. At one end the rod 18 is bent, as at 20, substantially parallel with the edge of the mirror-frame, and its extreme end 21 is turned out at right angles. A coiled spring 22, surrounding the rod adjacent the strap 19, has one end attached to the rod, and the other end bears against a projecting stop or button 23 in the edge of the mirror-frame. At the side of the camera, near the front, is a button 24, sliding in a vertical slot in the wall of the box and connected by a link 25 (shown in dotted lines in Fig. 1) with one end of a lever 26, pivoted at 27 on the side of the box and having its rear

end curved upwardly, as shown in dotted lines in Fig. 1. The rear end of this lever underlies the projecting end 21 of the rod 18, and the reaction and tension of the spring 22 are such that when the button is pressed down the rear end of the lever coming against the part 21 of the rod will lift the mirror-frame from its operative position (shown in Fig. 1) until it is properly seated against the lower edges of the light-well. The spring 22 will then yield and permit the end of the lever 26 to strike a latch 28, pivoted at 28' on the side of the camera-box and normally pressed by a spring 29 into engagement with the toothed ring 30 on the end of the roller 10. When the end of the lever strikes this latch, the roll 10 is released and the shutter actuated.

Normally the finder-mirror frame occupies a position in a plane at an angle of forty-five degrees to the axis of the lens, in which it is supported by inclined strips 31, attached to opposite sides of the camera-box, and by a transverse vertical strip 32, mounted on the bottom of the box and having a beveled edge to which the side strips 31 are connected by pieces 33, extending rearwardly from the side strips at right angles thereto. At the front the mirror-frame has a downwardly-extending flange 34, arranged at right angles to the plane of the mirror and the lower edge 35 of which is beveled at an angle of forty-five degrees, so that in the normal lower position of the mirror-frame it seats closely against the vertical front face of the transverse strip or partition 32. As seen in Fig. 2, the mirror 36 may be formed with inclined sides, being of greater width at the top, and is seated in a correspondingly-shaped depression in the board or mirror-frame 37, in which it is retained by side strips 38. The mirror-board is formed with grooves 39 in its face adjacent to and parallel with its side edges and connected by a groove 40, adjacent to and parallel with the rear edge. The lower edges of the side and rear walls of the light-well are seated in these grooves when the mirror-frame is raised at the time of taking a picture. The front wall of the light-well extends somewhat farther down than do the other walls and fits closely against the front edge or face of the mirror-frame. In this way I provide for exclusion of vagrant rays of light entering by way of the light-well. The end of the hinge-rod 18 opposite that to which specific reference has already been made is formed with a right-angular extension 41, extending upwardly toward the board 13 and connected by a spiral spring 42 with the exterior wall of the light-well toward the front thereof. The reaction of this spring is such as to tend to hold the mirror-frame down upon its supports 31 32 and prevent its vibration or chattering thereon during transportation or handling of the camera. The tension, however, of the spring 22, applied at the other end of the hinge-rod, is

such as to overcome the tension of the spring 42 when the mirror-frame is lifted into contact with the lower edges of the light-well. When the finder-mirror frame is in its lower or operative position, passage of light at its bottom and side edges is prevented by the overlapping joints formed with the side strips 31 and transverse strip 32, while at its top or rear edge the wall of the light-well overlaps the rear wall of the slot 40 and forms a light-excluding joint. The parts are so related and adjusted that when the mirror-finder frame is raised its front flange 34 is above the cone of light emanating from the lens. In a camera of this construction the area of the finder-mirror may not be sufficient to reflect the full picture, but it will be quite large enough to determine the proper focus.

The board 13, carrying the light-well and hinged mirror-frame and constituting the bottom of the depression or chamber in the top of the camera-box, is removably seated at the front on a flange 13' and at the sides on strips 13² on the sides of the camera.

The knockdown or collapsible hood 43 of the finder is attached at its lower edges around the edges of the ground glass 16 by clamping-strips, as indicated, or otherwise. It is formed of opaque flexible material and is contracted at its upper or free end and there furnished with an end board 44, preferably having double peep holes or apertures 45. The end board 44 may, as shown in Fig. 1, have springs 46 applied at its edges and to the under face of the door 14, which is provided with a folding strut or brace, secured at its lower end to the board 13. When the cover 14 is raised, as in Fig. 1, it carries with it the hood 43, and the reaction of the springs 46 holds the end board 44 in the operative position shown in the drawings. To close the cover, it is only necessary to fold the board down against the tension of the springs 46, and the collapsing of the hood on its folding-lines permits the closure of the cover. In lieu of this construction I may employ that shown in Fig. 5, where strips 47 are applied to the edges of the peep-board 44 and their hooked or projecting ends removably seated in sockets 48 on the under face of the cover after the cover and hood have been raised into operative position.

Instead of the construction shown in Fig. 1 for excluding light at the rear or hinge edge of the mirror-frame I may employ that shown in Fig. 4, where the rear edge of the mirror-frame is beveled upwardly at an angle of about forty-five degrees and brought close to the hinge-rod 18. The lower edge of the rear wall of the light-well is correspondingly beveled on one side toward the front and is beveled or cut away on a curve at the rear edge to permit of the hinge-rod being brought forward close to it. When the mirror-frame is dropped into the normal position, (shown in Fig. 1,) the relation of the parts is such as to prevent light-rays passing rearwardly toward

the shutter, and when the mirror-frame is raised, as shown in Fig. 4, the passage of light-rays is also prevented.

A further feature of my invention particularly applicable to cameras of this class is the provision of a universal-focus stop. The lens-partition 50 is connected to the bellows 51 and is carried by a horizontal board 52, extending between the side walls of the camera and movable back and forth for focusing by means of a rack 53 and pinion 54, as is well understood. In the upper face of the sliding board 52 is formed a dovetail groove or way in which is seated a correspondingly-shaped slotted stop-plate 55, which may be adjusted endwise and clamped in position by a set-screw 56. The transverse strip or partition 32 forms the back-stop or abutment for the adjustable stop 55. The universal focus having been determined, the stop-plate 55 is correspondingly set, and the camera is normally focused for distant objects when the lens is in the position determined by this universal stop.

The lens-board 57 is mounted entirely within an opening of greater vertical dimensions in the lens-partition and may therefore be adjusted vertically. It may be held in position by retaining friction-plates applied on the front face of the partition to the side edges of the board, and light-guards 58, covering the openings, which may exist at the top and bottom of the lens-board, are let into the rear face of the partition, as shown. This construction is claimed by me in another pending application.

I have now described in detail the various features of construction by which I economize space and reduce to a minimum the dimensions of the apparatus for any given-size plate, protect the plate from light during the focusing of the lens and from extraneous rays at the moment of exposure, and provide a universal-focus stop.

I claim as my invention—

1. In a photographic camera, the combination of a mirror-finder hinged in front of the plate-holding chamber and comprising the grooved mirror-board with a downwardly-projecting flange at its front edge, the lateral inclined and transverse vertical light-excluding supports therefor, the light-well having a front wall overlapping the front of the mirror-frame when raised, and other walls whose edges then enter the grooves in the mirror-board, and means for raising the finder.

2. In a photographic camera, the combination, of a mirror-finder hinged in front of the plate-holding chamber, its lateral and transverse light-excluding supports, a spring whose reaction normally tends to seat the finder thereon, and a lever for lifting the finder from the path of the light-cone.

3. In a photographic camera, the combination, of a mirror-finder hinged in front of the plate-holding chamber, its lateral and transverse light-excluding supports, a spring whose

reaction normally tends to seat the finder thereon, a lever for lifting the finder from the path of the light-cone and then tripping the shutter, and operative connections between said lever and finder including a spring requiring greater energy for its compression than is required to overcome the reaction of the first-named spring, for the purposes set forth.

4. In a photographic camera, the combination, of a mirror-finder hinged in front of the plate-holding chamber, its inclined lateral light-excluding supports, its transverse vertical light-excluding support located below the line of the light-cone, a loose light-excluding joint at the hinged rear edge of the finder acting to prevent passage of light-rays to the rear in all positions of the finder and overlapping joints at the sides and front edge of the finder when in its elevated position to prevent entrance of light-rays from above.

5. In a photographic camera, the combination, of a mirror-finder hinged in front of the plate-holding chamber, its inclined lateral light-excluding supports, its transverse vertical light-excluding support located below the line of the light-cone, a loose light-excluding joint at the hinged rear edge of the finder acting to prevent passage of light-rays to the rear in all positions of the finder, overlapping joints at the sides and front edge of the finder when in its elevated position to prevent entrance of light-rays from above, a spring normally tending by its reaction to seat the finder upon said supports, a shutter, a lever and means for operating it, and operative connections between the lever and finder whereby the finder may be raised and the shutter then tripped.

6. In a photographic camera, the combination, of a mirror-finder hinged in front of the plate-holding chamber, its inclined lateral light-excluding supports, its transverse vertical light-excluding support located below the line of the light-cone, a loose light-excluding joint at the hinged rear edge of the finder acting to prevent passage of light-rays to the rear in all positions of the finder, overlapping joints at the sides and front edge of the finder when in its elevated position to prevent entrance of light-rays from above, a spring normally tending by its reaction to seat the finder upon said supports, a shutter, a lever and means for operating it, and operative connections including a spring of greater strength than the first-named spring between the lever and finder whereby the finder may be raised and the shutter then tripped.

7. In a photographic camera, the camera-box having the depression in its upper side and containing a mirror-finder hinged in front of the plate-holding chamber, combined with the collapsible folding hood attached at its lower edges to the bottom of said depression around the ground glass therein and reduced in cross-sectional area at its upper end, the apertured end board secured in its upper end,

the cover of said depression which when closed is flush with the side of the box, and connections between the cover and apertured end board by which the hood is supported in

5 operative position when the cover is raised.

8. In a photographic camera, the camera-box having the depression in its upper side and containing a mirror-finder hinged in front of the plate-holding chamber, combined with

10 the collapsible folding hood attached at its lower edges to the bottom of said chamber around the ground glass therein and reduced in cross-sectional area at its upper end, the

apertured end board secured in its upper end,

15 the cover of said depression which when closed is flush with the side of the box, permanently-attached spring-supporting connections between said end board and the cover whose spring reaction operates to hold the

end board in operative position when the cover is raised, but permits the folding of the end board when the hood is to be collapsed and the cover closed.

9. In a photographic camera, the combination with the box containing a hinged mirror-finder having its transverse light-guard applied on the bottom of the box, of the lens-partition having an adjustable base-board and an adjustable universal stop applied to the base-board and abutting against the transverse light-guard.

In testimony whereof I have hereunto subscribed my name.

L. J. R. HOLST.

Witnesses:

KATHARINE MACMAHON,
EDWARD C. DAVIDSON.