

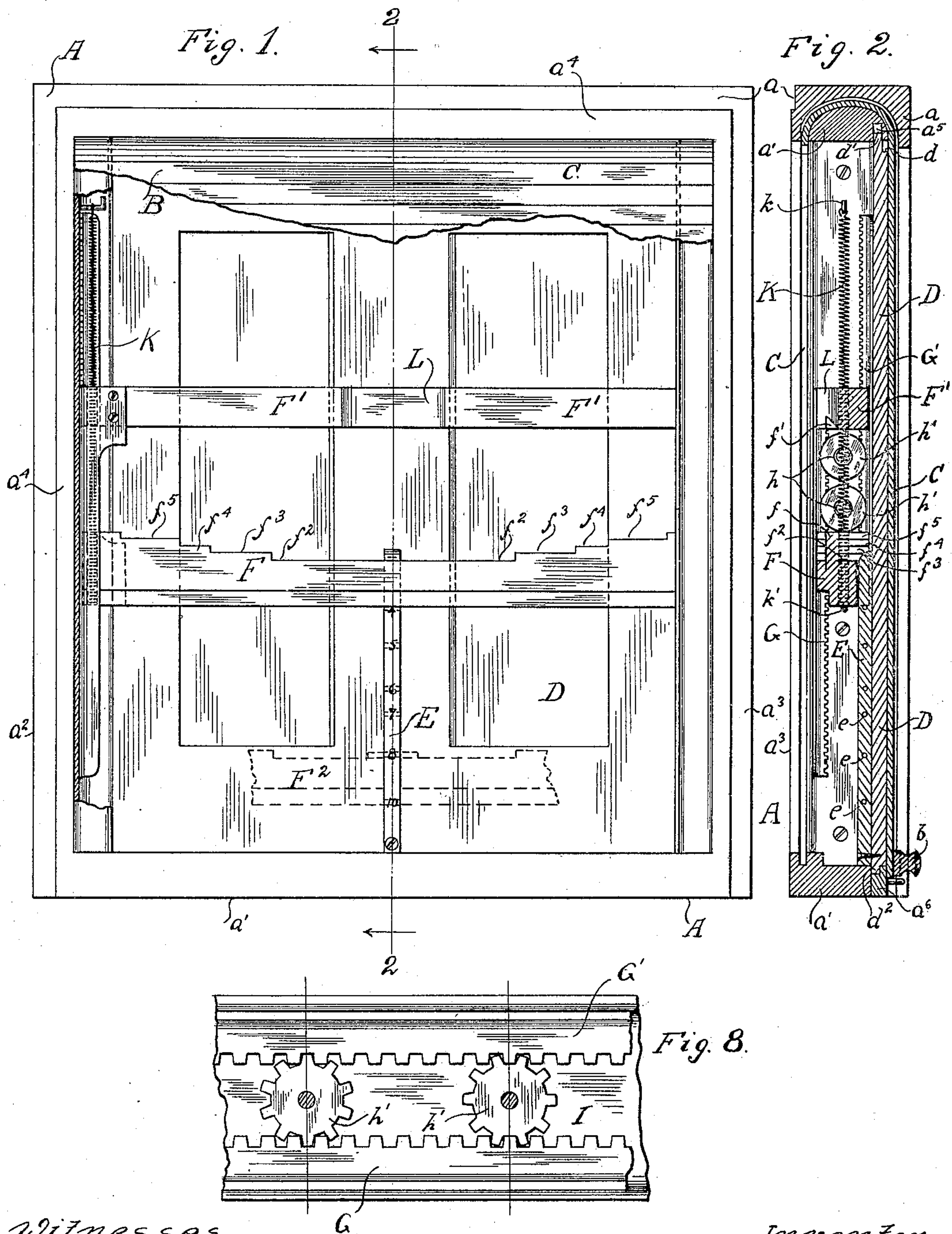
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NEGATIVE PLATE HOLDER FOR CAMERAS.

(Application filed Feb. 8, 1902.)

(No Model.)

2 Sheets—Sheet 1.



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*Inventor*  
**Knud Nelson,**  
*By*  
**Charles Turner Brown,**  
*Attorney.*

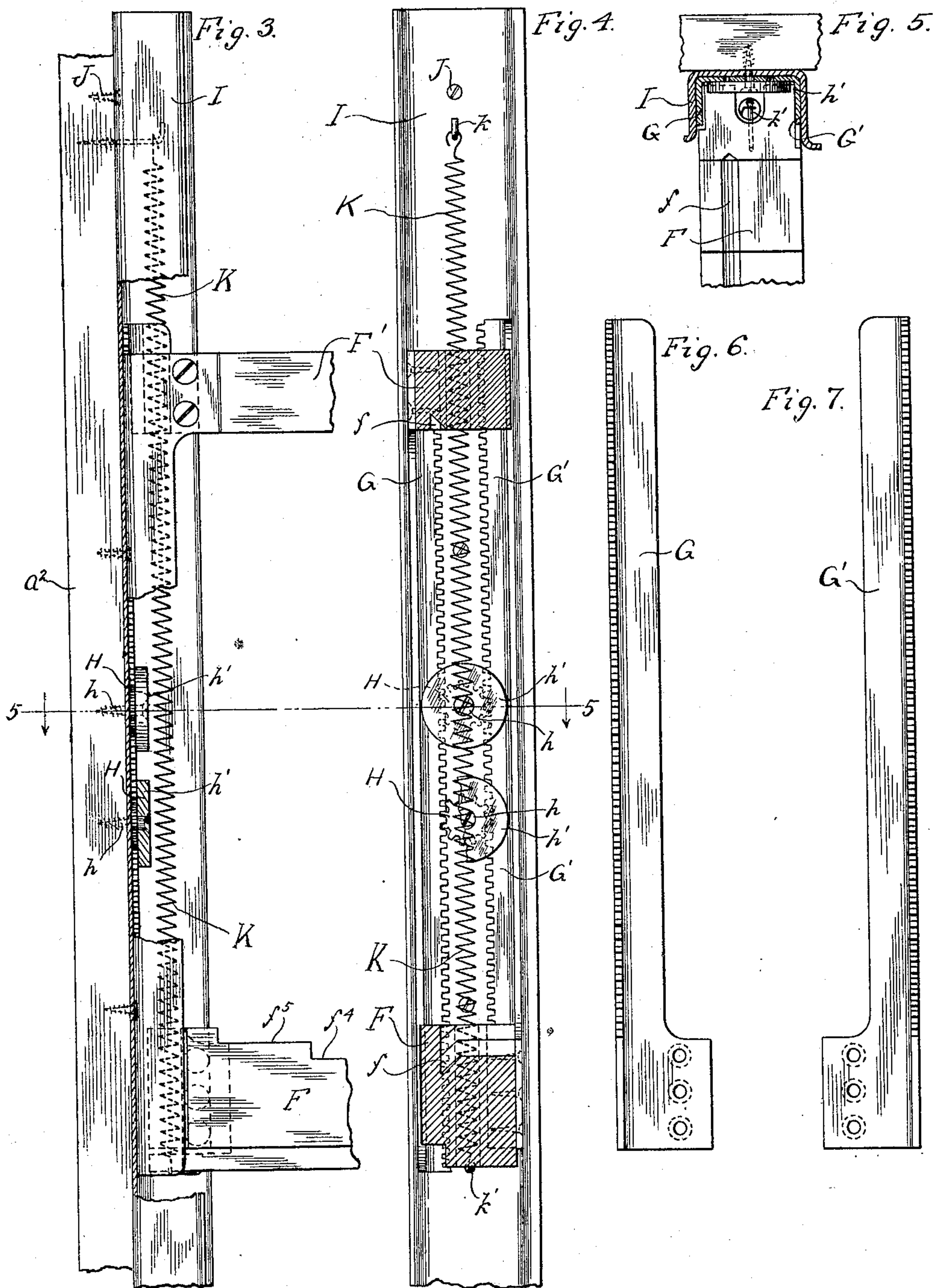
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 Attorney.



# UNITED STATES PATENT OFFICE.

KNUD NELSON, OF CHICAGO, ILLINOIS.

## NEGATIVE-PLATE HOLDER FOR CAMERAS.

SPECIFICATION forming part of Letters Patent No. 698,731, dated April 29, 1902.

Application filed February 8, 1902. Serial No. 93,151. (No model.)

*To all whom it may concern:*

Be it known that I, KNUD NELSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented certain new and useful Improvements in Negative-Plate Holders for Cameras, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete  
10 description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

The invention relates to what are known in the art as "curtain plate-holders" for cameras,  
15 such plate-holders being ordinarily used in large cameras, wherein negative-plates of different sizes are inserted for use.

In practice I have found that where a negative-plate of any considerable size, as, say,  
20 one larger than four by five inches, is used and a spring is pressed against such plate to hold it in a determined plane the face of such negative-plate will not be all in the same plane—that is, the plate will spring;  
25 and the object of this invention is to obtain a plate-holder of the kind named wherein negative-plates of different sizes and constructed of glass, which are placed therein, will be held in a determined plane without the  
30 use of a spring or any other thing pressing upon the face of the plate.

A further object of the invention is to obtain a plate-holder of the kind described wherein no adjustment is required of the several parts in putting in place therein negative-plates of different sizes.

A further object of the invention is to obtain a plate-holder of the kind named which will be easy to operate, simple in construction, durable, and not liable to get out of  
40 order.

A further object of the invention is to obtain a plate-holder of the kind named which will be sightly, effective in its protection of a  
45 negative-plate from actinic rays, not cumbersome, and easily handled.

In the drawings referred to and forming a part of this specification, Figure 1 is a front elevation of a plate-holder embodying this  
50 invention with the curtain thereof closed on the front of the holder and such curtain broken away to disclose to view the opera-

tive parts of the holder, such operative parts being in the position assumed thereby when no negative-plate is contained in the holder. 55  
Fig. 2 is a vertical sectional view on line 2 2 of Fig. 1 viewed in the direction indicated by the arrows. Fig. 3 is a front elevation, on an enlarged scale, of the operative parts of one end of the plate-holder with a portion 60 of the front of such part broken away to expose to view the movable parts thereunder. Fig. 4 is an elevation, also on an enlarged scale, of the several parts illustrated in Fig. 3 viewed in a position at right angles to the 65 view obtained in such Fig. 3. Fig. 5 is a horizontal sectional view on line 5 5 of Figs. 3 and 4 viewed in the direction indicated by the arrows; and Figs. 6 and 7 are front elevations, respectively, of right and left hand 70 gear-racks, forming elements in the plate-holder embodying this invention. Fig. 8 is an enlarged view of a section of the gear-racks and engaging wheels.

A reference-letter applied to designate a 75 given part is used to indicate such part throughout the several figures of the drawings wherever the same appears.

A is the frame of the plate-holder and comprises the top bar  $a$ , bottom bar  $a'$ , and side 80 bars  $a^2$   $a^3$ .

$a^4$  is the raised portion of the front of the frame A, which is ordinarily made on plate-holders to obtain a light-tight joint between the plate-holder and the camera with which 85 the plate-holder is used.

B is a curtain, constructed substantially in the same way as a roller-top to a desk, but light-proof.

$b$  is the handle of the curtain, by means of 90 which handle the curtain is moved in grooves C C from the front of the frame A (the position of such curtain which is shown in Fig. 1) to the back of such frame, (the position of such curtain which is shown in Fig. 2.) 95

When a negative-plate is to be inserted in the plate-holder embodying this invention or is to be taken therefrom, the curtain B is preferably moved to the back of the frame, as is shown in Fig. 2 of the drawings, the negative-plate being inserted in and taken from such plate-holder from the front thereof. 100

D is a removable back to the plate-holder. When removable back D is taken from the



plate-holder, a negative-plate may be inserted in or taken from such plate-holder from the back thereof upon moving the curtain B to the front of the plate-holder. The back D constitutes the protection to the negative-plate contained in the plate-holder from actinic rays when curtain B is in front of the plate-holder, as in Fig. 1. Back D is not required to be removed in the use of this plate-holder at any time, the negative-plates being removable from the plate-holder through the front thereof, as is hereinafter fully described; but as plate-holders have heretofore been constructed so that the back D is necessarily taken out to remove the negative-plate therein or to put a negative-plate therein I have so constructed the plate-holder embodying this invention as to permit its operation in the same way, although I deem the preferable way of operating the plate-holder to be the insertion of a negative-plate and the removal thereof from such plate-holder through the front, with the curtain C in the position illustrated in Fig. 2 of the drawings. To remove the back D from frame A, such back is slid until shoulder  $d$  is close to contact with the under side of bar  $a$ , and tongue  $d'$  is contained in groove  $a^5$ , at which time the tongue  $d^2$  on the under or bottom edge of the back D is not in engagement with the groove  $a^6$  on the bottom of such back.

E, Figs. 1 and 2, is a rib attached to the forward or inner side of back D. Rib E is provided with pin-holes into which may be inserted a pin  $e$ , as is indicated by broken lines in Fig. 1, such pin being used when a number of negative-plates of a given size are to be inserted and taken from the plate-holder, at which time it is desired that bars F F' shall be held apart from each other, so as not to approach (beyond pin  $e$ ) to their closed position—that is, to the position illustrated in Figs. 1 and 2. The open position of bar F, above referred to, is indicated by the broken lines F<sup>2</sup> in Fig. 1.

A negative-plate is held in the plate-holder embodying this invention between the bars F F', and such bars are arranged to be movable laterally in frame A to and from each other. To insure the placing of the negative-plate in the plate-holder in the determined plane therefor, I provide the triangular-shaped grooves  $ff'$  in bars F F', respectively, and to maintain the negative-plate in proper position in the plate-holder to the right and left I provide the steps  $f^2 f^3 f^4 f^5$  on the bar F. To maintain such negative-plate in proper position in the plate-holder relative to being above and below a horizontal line through the center of the plate-holder, the bars F F' are respectively attached to the racks G G and G' G'. The racks G G are attached at one end of bars F F', and the racks G' G' are attached to the opposite ends of such bars F F', and also I place the gear-wheels H H to intermesh with the teeth of such racks.

$h h$  are the pivots on which the gears H H are respectively loosely mounted. Such pivots  $h h$  may well consist of ordinary wood-screws.

$h' h'$  are washers, also loosely mounted on pivots  $h h$ . Washers  $h' h'$  are used to hold the racks G G and G' G' in place against the U-shaped bars I I, with the teeth of such racks in engagement with the teeth of the gear-wheels  $h h$ .

The U-shaped bars I I are preferably made of metal and are attached, as by screws J J, rigidly to the side bars  $a^2 a^3$ , respectively, of frame A. The racks G G G' G' and the gear-wheels H H are preferably made of aluminum, as such metal is well adapted to withstand the acid which in use is frequently brought in contact therewith.

To hold the bars F F' against the upper and lower edges of the negative-plate placed in grooves  $ff'$ , I provide springs K K at the ends of one of such bars F F'. I have shown in the drawings such springs K K attached at one end to the bars  $a^2 a^3$ , respectively, as at  $k$ , and at the other end attached to the lower bar F, as at  $k'$ . (See Figs. 1 and 4.)

It will be observed in Fig. 8 that the distance of pivots  $h h$  from each other is such relative to the size of gear-wheels H H and racks G G (or racks G' G') and the size of the teeth on the wheels and racks that when the teeth of one of the gear-wheels H H are well engaged, say, with one of the teeth of such wheel on the horizontal center of the pivot that the teeth of the other one of such gear-wheels H H will be above and below such horizontal center when engaging with the rack and a tooth of the rack will be on such horizontal center.

I find that by using two gear-wheels H H, arranged as described and shown in Fig. 8, a very even action is obtained between the bars F F', so that when one of such bars—as, say, bar F, being the one to which one end of the springs K K are attached—is forced laterally away from the center line of the plate-holder and away from the other one of such bars such lateral movement is transmitted by means of the racks G G and G' G' and gear-wheels H H to the other one of such bars, and such other bar F' is thereby moved laterally an equal distance from such horizontal line passing through the center of the plate-holder.

To enable an operator to readily control a negative-plate when such plate is being placed in or taken from bars F F', I cut the recess L into bar F'. (See Figs. 1 and 2).

The manner of operating the plate-holder embodying this invention is: When a negative-plate is to be inserted in the plate-holder in the preferable way, the curtain B is put into the position illustrated in Fig. 2 of the drawings. The lower edge of the negative-plate is then placed in groove  $f$  of bar F and such negative-plate is pressed downward, thereby forcing the bar F downward and the bar F' upward. This operation is continued until



the bar  $F'$  is raised a sufficient distance to permit the insertion of the upper edge of such negative-plate in groove  $f'$  of bar  $F'$ . The downward pressure on the negative-plate is then released and the bar  $F'$  is raised by the resilience of the springs  $K K$ , thereby drawing-bar  $F'$  downward, thereby holding such negative-plate in place in grooves  $f f'$ . To take the negative-plate out of the plate-holder, such negative-plate may again be forced downward by placing the hand on the upper edge thereof in recess  $L$  until such upper edge is out of the groove  $f'$  and then bringing such upper edge forward out of such groove and raising the plate from bar  $F$ . When the plate is in the holder embodying this invention, the curtain  $B$  is closed thereover in the ordinary manner of closing the curtain of the plate-holder of this kind over the negative-plates when the plate-holder is being placed on or taken from a camera.

By attaching the springs  $K K$  to the lower one of the bars  $F F'$  when a negative-plate is inserted between the bars by placing the lower edge of such negative-plate in the groove in the lower one of such bars  $F F'$  and forcing such negative-plate and lower bar downward a very smooth and even action of bars  $F F'$  is obtained, both because of the fact that two gear-wheels engage with each of the racks  $G G' G'$  and because there is no resistance to the upward movement of the upper one of the bars except the weight thereof, while after the negative-plate is inserted between the bars and the bars released such springs will draw the lower bar upward and by means of the racks and interposed gear-wheels will also draw the upper bar downward to hold the negative-plate firmly in place.

Having thus described my invention and the construction and operation of an apparatus embodying the same, what I claim as new, and desire to secure by Letters Patent, is—

1. In a negative-plate holder the combination of a frame, bars arranged to move laterally in the frame, geared racks secured to the ends of the bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks and springs attached at one of the ends thereof to the ends of one of the bars, with the other of the ends of such springs attached to the frame; substantially as described.

2. In a negative-plate holder the combination of a frame,  $U$ -shaped bars attached to the inner sides of the frame, the bars arranged to move laterally in the frame, geared racks secured to the ends of the bars to move longitudinally in the  $U$ -shaped bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks and washers rotatably mounted on the pivots of the gear-wheels to maintain the geared racks in place; substantially as described.

3. In a negative-plate holder the combination of a frame,  $U$ -shaped bars attached to

the inner sides of the frame, cross-bars arranged to move laterally in the frame, geared racks secured to the ends of the cross-bars such geared racks arranged to slide longitudinally in the  $U$ -shaped bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, washers rotatably mounted on the pivots of the gear-wheels to maintain the geared racks in place, springs attached at one end, respectively, to the ends of one of the bars and an attachment at the other end to the frame, the cross-bars respectively provided with grooves on adjacent sides; substantially as described.

4. In a negative-plate holder the combination of a frame, plate-holding bars arranged to move laterally in the frame, geared racks secured to the ends of the bars and a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, such plate-holding bars respectively provided with grooves on the inner side thereof, such grooves triangular in cross-section with the front face thereof substantially vertical when the plate-holder is in an upright position; substantially as described.

5. In a negative-plate holder the combination of a frame, plate-holding bars arranged to move laterally in the frame, geared racks secured to the ends of the bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, and springs attached at one end respectively to the ends of one of the bars and at the other end to the frame, such plate-holding bars respectively provided with grooves on the inner side thereof, such grooves triangular in cross-section with the front face thereof substantially vertical when the plate-holder is in an upright position; substantially as described.

6. In a negative-plate holder the combination of a frame, plate-holding bars arranged to move laterally in the frame, one of such bars provided with steps arranged in pairs at equal distance from the center of the bar, such steps respectively provided with grooves on the inner sides thereof, such grooves triangular in cross-section with the front face thereof substantially vertical when the plate-holder is in an upright position and the other bar provided with a recess on its front face and with a groove on its inner side, such groove corresponding in cross-section with the first-named groove, geared racks secured to the ends of the bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, and springs attached at one end respectively to the ends of one of the bars and at the other end to the frame, such plate-holding bars movable in opposite directions; substantially as described.

7. In a negative-plate holder the combination of a frame, plate-holding bars arranged to move laterally in the frame, one of such



bars provided with steps arranged in pairs at equal distance from the center of the bar, such steps respectively provided with grooves on the inner sides thereof, such grooves triangular in cross-section with the front face thereof substantially vertical when the plateholder is in an upright position and the other bar provided with a recess on its front face and with a groove on its inner side, such groove corresponding in cross-section with the first-named groove, geared racks secured to the ends of the bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, and springs attached at one end respectively to the ends of one of the bars and at the other end to the frame, a back, a rib in the inner face of the back, such rib provided with holes and a pin removably fitting such holes; substantially as described.

8. In a negative-plate holder the combination of a frame, plate-holding bars arranged to move laterally in the frame, one of such bars provided with steps arranged in pairs at equal distance from the center of the bar,

such steps respectively provided with grooves on the inner sides thereof, such grooves triangular in cross-section with the front face thereof substantially vertical when the plateholder is in an upright position and the other bar provided with a recess on its front face and with a groove on its inner side, such groove corresponding in cross-section with the first-named groove, U-shaped bars attached to the inner face of the sides of the frame, geared racks secured to the ends of the bars to slide longitudinally in the U-shaped bars, a plurality of gear-wheels pivotally mounted between adjacent racks to engage with the teeth of such racks, washers rotatably mounted on the pivots of the gear-wheels to hold the racks in place, and spring attached at one end respectively to the ends of one of the bars and at the other end to the frame; substantially as described.

KNUD NELSON.

In presence of—

ANNA NELSON,

CHARLES TURNER BROWN.