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H. L. BOSTON.

MULTIPLE EXPOSURE ATTACHMENT FOR CAMERAS.

APPLICATION FILED JUNE 4, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

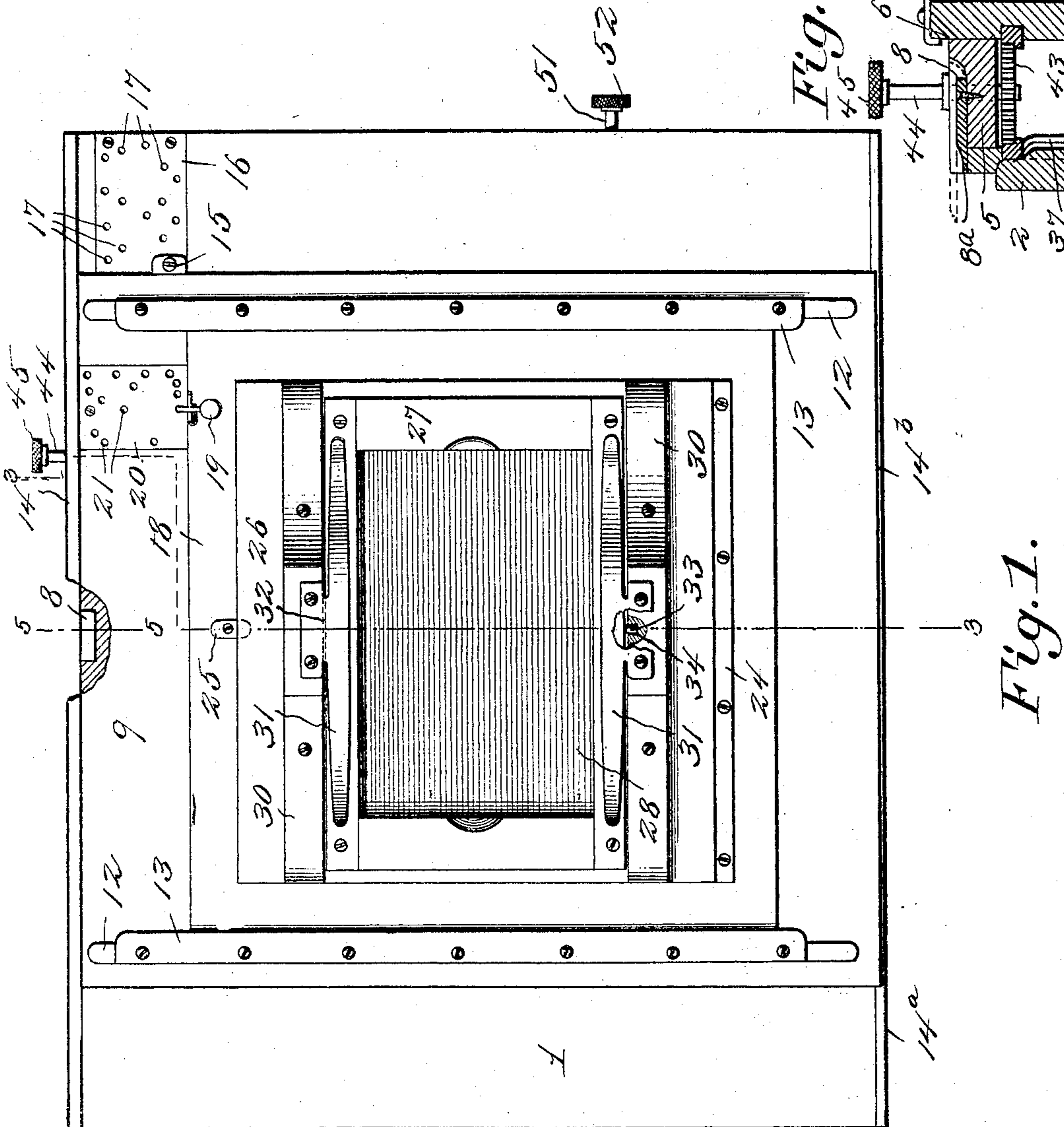


Fig. 5.

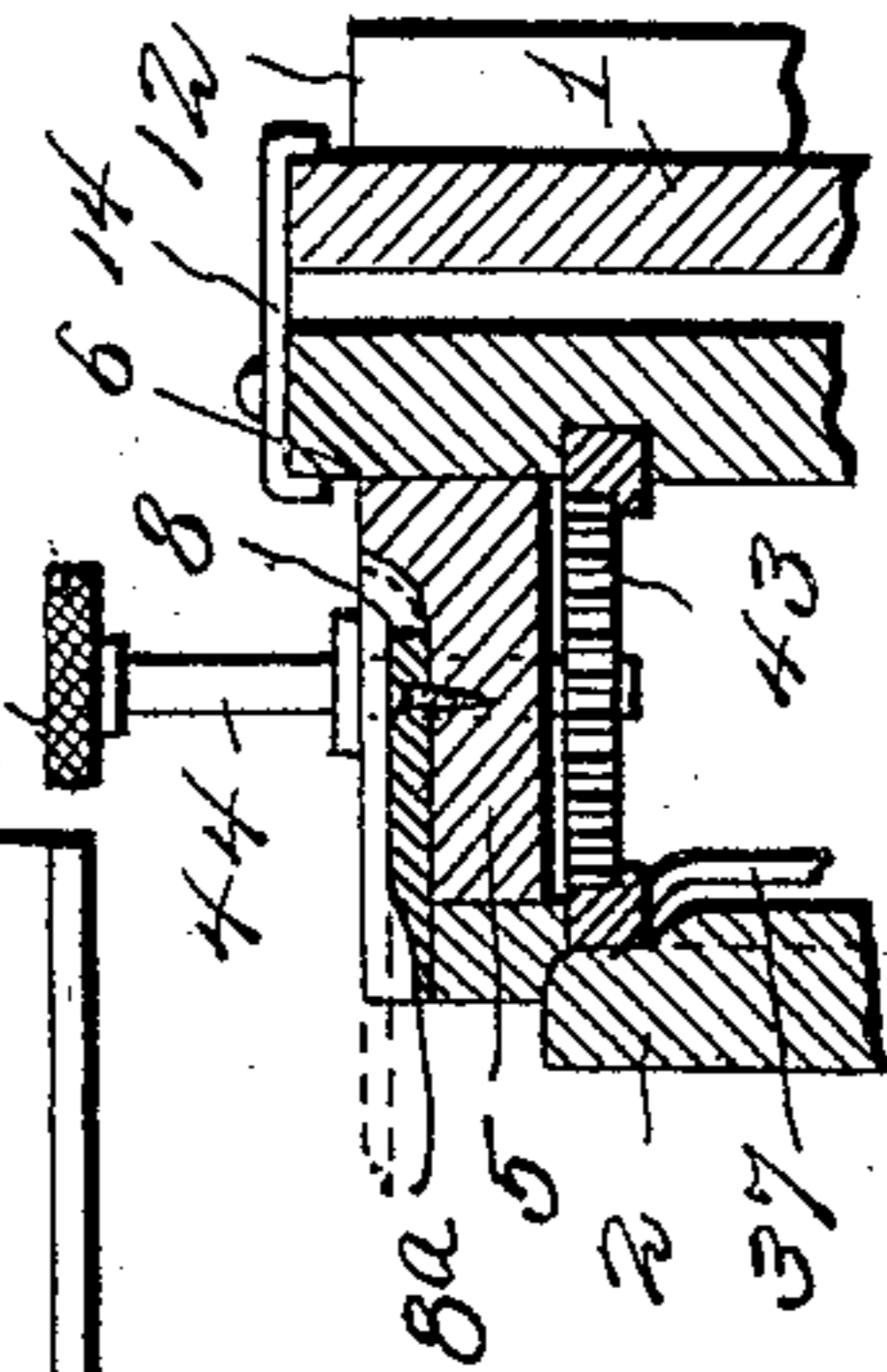
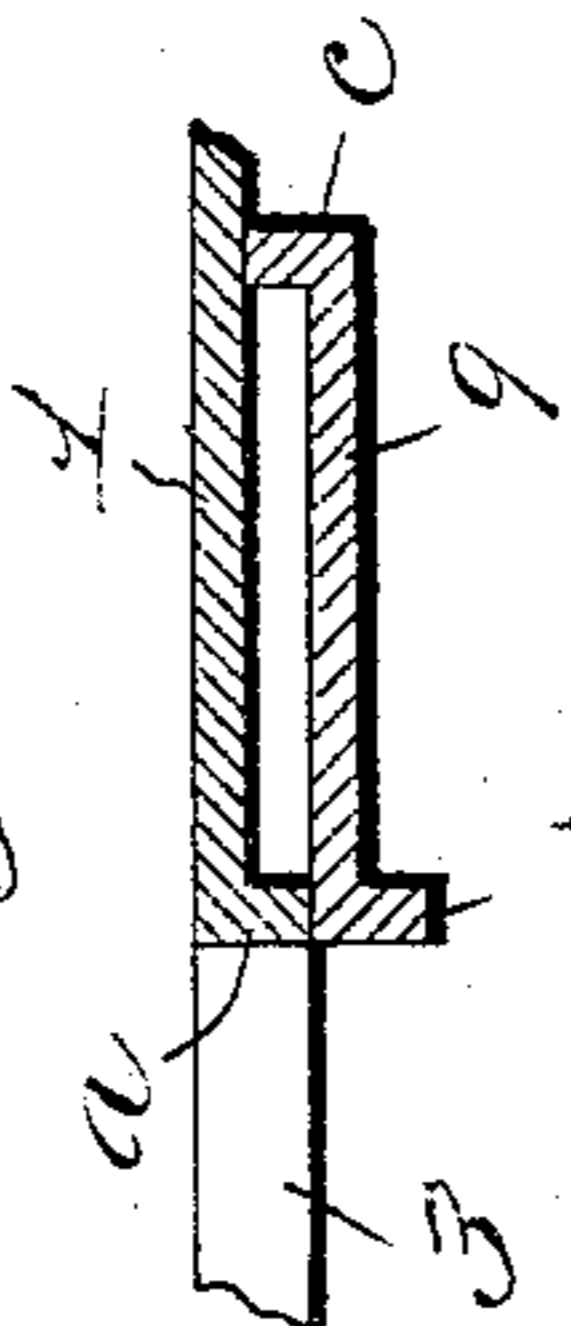


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

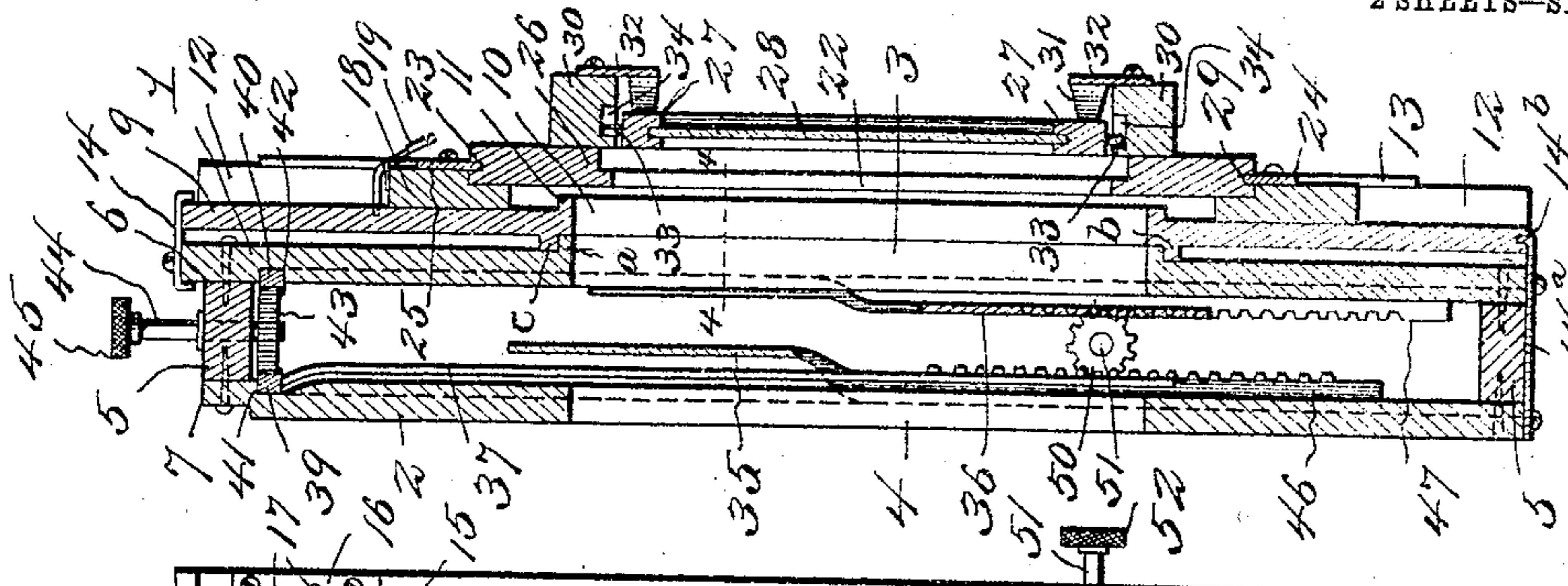


Fig. 3.

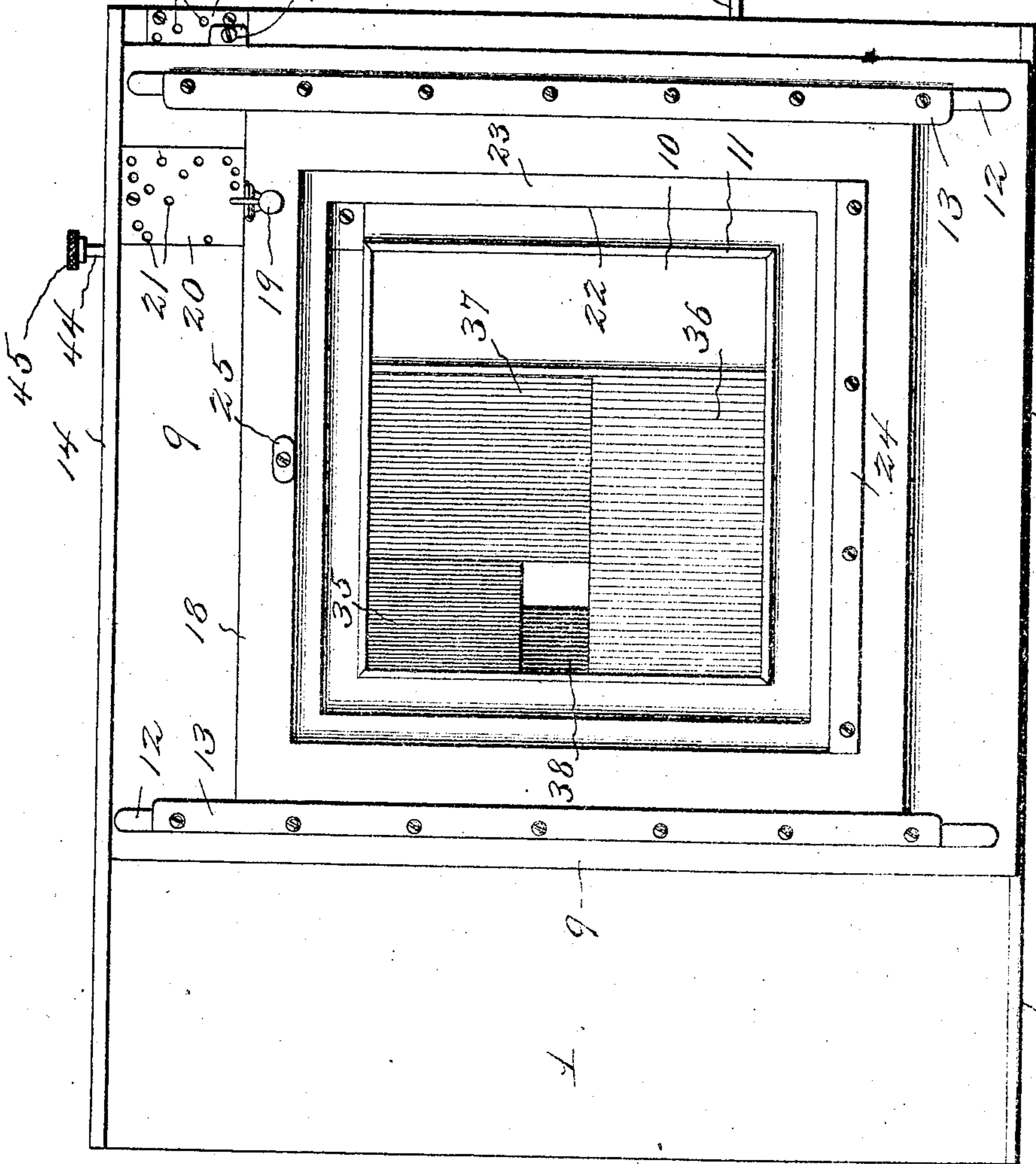


Fig. 2.

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UNITED STATES PATENT OFFICE.

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MULTIPLE-EXPOSURE ATTACHMENT FOR CAMERAS.

SPECIFICATION forming part of Letters Patent No. 773,627, dated November 1, 1904.

Application filed June 4, 1904. Serial No. 211,190. (No model.)

To all whom it may concern:

Be it known that I, HARVEY L. BOSTON, a citizen of the United States, residing at David City, in the county of Butler and State of Nebraska, have invented a new and useful Multiple-Exposure Attachment for Cameras, of which the following is a specification.

This invention relates to cameras, and has for its object to provide an improved plate-carrying attachment capable of adjustment across the exposure-opening of the camera, so as to obtain a plurality of exposures upon a single sensitive plate. It is furthermore designed to provide for conveniently adjusting the attachment in directions at right angles to one another at regular intervals to insure an accurate shifting of the device and prevent overlapped exposures, thereby to effectually make use of the entire plate without losing any portion thereof.

Another object of the invention is to provide for adjusting the exposure-opening of the attachment so as to vary the size and shape thereof according to the number and shape of the exposures to be received by the plate.

A further object of the invention is to have all the parts of the attachment arranged for convenient access in adjusting the same and to insure the exclusion of light through the joints of the several parts of the device in a simple and effective manner without interfering with the ready disconnection of any of the parts whenever desired.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is an elevation of a multiple-exposure attachment embodying the features of the present invention.

Fig. 2 is a similar view with the plate-holder support removed. Fig. 3 is a longitudinal sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a detail sectional view taken on the line 4 4 of Fig. 3, showing portions of the back and the main carrier only. Fig. 5 is an enlarged detail sectional view on the line 5 5 of Fig. 1.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

The present attachment includes a body made up of outer and inner members 1 and 2 in the form of rectangular plates, which are provided with centrally-registered rectangular openings 3 and 4, respectively, of a size at least equal to that of the largest sensitive plate which the camera is capable of receiving. These two plates or members are placed face to face and are connected by means of a peripheral flange 5, carried by the inner side of the outer member and fitting within a corresponding groove or seat 6 in the adjacent inner face of the inner member 2, thereby effectually excluding light from entrance between the two members. A peripheral groove or seat 7 extends around the edge of the member 2 upon the outer face thereof, so as to receive a corresponding flange upon the back of the camera-box to insure a snug fit of the attachment and to exclude light from between the latter and the back of the camera-box. Upon the top edge of the peripheral flange 5 is a catch 8, adapted to engage a hook upon the top of the camera-box, so as to connect the attachment to the box against accidental separation therefrom.

Mounted to slide horizontally across the outer or rear face of the plate member 1 is a carrier-plate 9, which is provided at its center with a rectangular opening 10, corresponding in size to the openings in the body members 1 and 2, and extending around the edge of the opening 10 at the outer side thereof is a peripheral flange 11. Near the upright opposite edges of the carrier 9 are parallel upright guideways, each consisting of a strip or rib 12, secured to the outer face

of the carrier with a metallic strip or plate 13, secured to the outer face of the rib and projected at the inner edge thereof, so as to overlap the carrier and form an open-ended groove or way. At their top edges the carrier and the body of the attachment are slidably connected by means of a keeper in the nature of a flanged metal strip 14, secured to the top edge of the plate member 1, with its opposite pendent flanges embracing the carrier and the body so as to permit of the former being slid edgewise in a horizontal direction upon the body. The bottoms of the members 1 and 2 are connected by a plate 14^a to exclude light from the interior of the hollow back formed by said members, the front portion of the plate being projected in advance of the back member 1 and provided with an upstanding flange 14^b, loosely received within the longitudinal groove in the lower edge of the main carrier 9, so as to form a guideway for the lower edge thereof. Carried by one of the upright edges of the carrier, preferably near the upper right-hand corner thereof, is a catch 15 in the nature of a spring-actuated bolt working transversely across the edge of the carrier toward and away from the member 2 of the body, the latter having a keeper-plate 16 upon the outer face thereof and provided with parallel horizontal sets of perforations or sockets 17, into which the spring-bolt is designed to snap, so as to hold the carrier 9 at any adjusted position upon the body. It will be noted that the sockets of one set are disposed at intervals differing from those of the other sets, and the catch is adjustable vertically upon the carrier, so as to cooperate with any of the sets of sockets, whereby the carrier may be locked at a plurality of predetermined positions. It will of course be understood that the relative positions of the sockets 17 have been accurately determined in order that the carrier may be held accurately with respect to the exposure-opening of the camera, as will hereinafter appear.

A vertically-adjustable substantially rectangular frame 18 is mounted to slide in the guideway formed by the bars 12 and flanges 13 and is capable of being supported at different elevations through the medium of a spring-catch 19, secured to the right-hand corner of the frame and cooperating with a keeper-plate 20, having several vertically-disposed sets of sockets or perforations 21. The catch is of course adjustable horizontally upon the frame, so as to cooperate with any of the sets of sockets, and the members of each set of sockets are disposed at intervals differing from those of each of the other sets, thereby to obtain a plurality of adjustments for the frame. This frame is provided with a central rectangular opening 22 of considerably greater area than the opening 10 of the carrier-plate 9, the edge of said opening

being rabbeted at its outer side, as indicated at 23, with an upstanding rib or flange 24 extending horizontally across the outer side of the bottom of the rabbeted portion, there being a turn-button 25 pivoted to the upper portion of the frame and capable of being turned to overlap the adjacent rabbeted portion thereof.

As shown in Fig. 3 of the drawings, it will be noted that the member 1 of the hollow box is provided upon its outer side with a flange *a*, extending entirely around the exposure-opening 3 therein, and the main carrier 9 is provided upon its inner face with upper and lower flanges *b*, overlapping the flange *a*, so as to form light-tight joints at its points. These overlapped flanges must of course have a slidable fit to permit of the horizontal slidable adjustment of the carrier. Upon reference to Fig. 4 it will be noted that the inner face of the carrier is provided with upstanding flanges *c*, which slidably engage the adjacent face of the back member 1 and are spaced at suitable intervals from the upstanding flange member of said back member, so as to permit of the horizontal slidable movement of the main carrier and at the same to form light-tight joints.

Removably fitted within the rabbeted portion of the vertically-adjustable frame or carrier 18 is a plate-holder support made up of a relatively large front member 26 of a shape and size to fit the rabbeted portion of the carrier and a narrower rear frame member 27, each of which is provided with a central rectangular opening, with the opening of the rear member closed by a ground-glass plate 28. The front member 26 is provided with a peripheral edge groove 29, which extends entirely around the member and is designed to receive the flange 24 of the carrier and the button 25, whereby the plate-holder support is detachably connected to the carrier and is capable of being inverted. Upon the outer side of the front member 26 are cleats or shoulders 30, between which the ground-glass frame member 27 fits. A pair of bowed springs 31 have their terminals frictionally bearing against the ground-glass frame member and are provided at their middles with transverse shanks 32, which are rigidly secured to the outer faces of the respective shoulders, whereby the ground-glass frame member is yieldably held against the front member 26 of the plate-holder support. An outwardly-directed stud or projection 33 is carried by the respective upright edges of the ground-glass frame, and these projections work in seats or grooves 34, formed transversely in the inner faces of the cleats or shoulders 30, thereby permitting of a lateral yielding of the ground-glass frame, but preventing endwise displacement thereof from the frame member 26. By reason of this yieldable mounting of the ground-glass frame any ordinary form of plate-holder may be

readily inserted between the ground-glass frame and the front frame of the plate-holder support.

As thus far described, it will be understood ; that in using the attachment a plate-holder is fitted between the members of the plate-holder support. The latter is then fitted to the vertically-adjustable carrier 18, after which the horizontally-adjustable carrier 9 is set to some
 10 predetermined position, and then the vertically-adjustable carrier 18 is set to a predetermined position, whereby a predetermined portion of the sensitive plate in the plate-holder will be properly alined with the lens or exposure-opening of the camera. By raising
 15 and lowering the carrier 18 and shifting the carrier 9 from right to left, and vice versa, all of the available space on the sensitive plate may be successively alined with the lens of the
 20 camera, thereby to obtain a plurality of exposures upon a single plate.

To successfully obtain a plurality of exposures upon a single plate, it is of course necessary to restrict the field of action of the rays
 25 of light passing through the lens of the camera and acting upon the plate, and to accomplish this result I provide for varying the size of the exposure-opening of the attachment in the following manner: The maximum exposure-
 30 opening is defined by the registered openings 3 and 4 in the members 1 and 2 of the body of the attachment, and in order that this opening may be restricted in size I employ within the slight space between the members 1 and
 35 2 a pair of upper and lower vertically-adjustable slides 35 and 36 and a pair of vertically-disposed and horizontally-adjustable slides 37 and 38, of which the opposite slides are simultaneously adjustable in opposite directions,
 40 whereby the size of the exposure-opening may be readily adjusted. Moreover, by moving one pair only of the slides the opening may be changed from a square to an oblong, and it may also be changed from a horizontally-
 45 disposed oblong to a vertically-disposed oblong, and vice versa. The two upright slides 37 and 38 are connected at their upper ends with individual rack-bars 39 and 40, working endwise in registered grooves or guideways
 50 41 and 42 in the inner faces of the members of the body of the attachment, there being a pinion 43 disposed between and in mesh with both racks and having a stem 44 projected upwardly through the adjacent frame-bar 5
 55 and having a finger-piece or head 45 upon its upper end, whereby the pinion may be rotated so as to simultaneously work the racks back and forth in opposite directions, and thereby cause the upright slides 37 and 38 to
 60 simultaneously approach and recede, so as to vary the width of the opening. The upper and lower slides 35 and 36 have a similar controlling means including rack-bars 46 and 47, working in guideways, a pinion 50, in mesh

with both racks and having a stem 51, provided 65 with a head or finger-piece 52.

The catch 8 (shown in Figs. 1 and 5 of the drawings) is in the nature of a plate let into the top of the flange 5 and provided with a beveled front 8^a, with its inner edge terminated short of the back of the recess in which
 70 the catch is fitted, so as to present a shoulder for engagement by any suitable form of hook carried by the top of the camera-box—such, for instance, as indicated by dotted lines in
 75 Fig. 5—whereby the apparatus may be detachably connected to the camera.

Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, 80 is—

1. A multiple-exposure attachment comprising a back having an exposure-opening, a main carrier having an exposure-opening and mounted upon the back to slide across the exposure-opening thereof, a supplemental carrier having an exposure-opening alined with the opening of the main carrier and mounted upon the main carrier to slide across the same at right angles to the direction of movement
 85 of the main carrier, and a plate-holder support detachably carried by the supplemental carrier in alinement with its exposure-opening.

2. A multiple-exposure attachment comprising a back having an exposure-opening 95 and provided with upper and lower horizontal guideways, a main carrier having an exposure-opening and slidably mounted in the guideways of the back, and also provided with upright guideways at opposite sides of its exposure-opening and upon the outer side of the carrier, means to adjustably interlock the main carrier with the back, a supplemental carrier slidable in the ways of the main carrier and provided with an exposure-opening, alined with the opening of the main carrier, means to adjustably interlock the two carriers, and a plate-holder support detachably carried by the supplemental carrier in alinement with its exposure-opening. 100

3. A multiple-exposure attachment comprising a back having an exposure-opening and provided with a series of sockets, a main carrier having an exposure-opening and mounted to slide across the exposure-opening of the back, a catch carried by the carrier for coöperation with the series of sockets to adjustably interlock the carrier with the back, a supplemental carrier having an exposure-opening alined with the opening of the main carrier and mounted to slide across the main carrier at right angles to the direction of the movement of said main carrier, a series of sockets upon the main carrier disposed at right angles to the series of sockets upon the back, a catch upon the supplemental carrier for coöperation with the sockets of the main carrier, and a plate-holder support detach- 105 110 115 120 125

ably carried by the supplemental carrier in alinement with its exposure-opening.

4. A multiple-exposure attachment comprising a back having an exposure-opening, a main carrier having an exposure-opening and mounted to slide across the back, a supplemental carrier having an exposure-opening and mounted upon the main carrier to slide at right angles to the movement of the main carrier, a plate-holder support detachably carried by the supplemental carrier in alinement with its exposure-opening, a projection and socket detachable connection between one end of the plate-holder support and the supplemental carrier, and a turn-button connection between the other ends of said members.

5. A multiple-exposure attachment comprising a back having an exposure-opening, a carrier having an exposure-opening and mounted to slide across the exposure-opening of the back, and a plate-holder support mounted upon the carrier in alinement with its exposure-opening and including movably-connected frame members having a seat therebetween for the reception of a plate-holder.

6. A multiple-exposure attachment comprising a back having an exposure-opening, a carrier having an exposure-opening mounted to slide across the exposure-opening of the back, and a plate-holder support comprising a front frame member mounted upon the carrier and a rear frame member movably connected to the front frame member and carrying a ground glass, said frame members having a seat therebetween for the reception of a plate-holder.

7. A multiple-exposure attachment comprising a back having an exposure-opening, a carrier having an exposure-opening and mounted to slide upon the back, and a plate-holder support made up of a front frame member mounted upon the carrier and provided with opposite cleats, a rear frame member movably seated between the cleats, and springs carried by the cleats and bearing against the rear frame to yieldably hold the latter against the front frame.

8. In a multiple-exposure attachment, the combination of a back having an exposure-opening, a carrier having an exposure-opening mounted to slide upon the back, and a plate-holder support comprising a front frame mounted upon the carrier and provided with spaced cleats having transverse grooves in their inner faces, a rear frame seated between the cleats and provided with projections working in the grooves of the cleats, and springs carried by the cleats and bearing against the rear frame to yieldably hold the same against the front frame.

9. In a multiple-exposure attachment, the combination of a back having an exposure-opening, a carrier having a rabbeted exposure-opening mounted to slide upon the back, a

front plate-holder supporting-frame removably fitted in the rabbeted edge of the exposure-opening of the carrier and provided with an edge recess, a catch carried by the carrier and detachably engaging the recess of the frame, spaced cleats carried by the front frame and provided with transverse grooves in their inner faces, a rear frame seated between the cleats and provided with opposite projections working in the grooves, and springs carried by the cleats and engaging the rear frame to yieldably hold it against the front frame.

10. A multiple-exposure attachment comprising a back having an exposure-opening, slides carried by the back at opposite sides of the opening, and means to simultaneously adjust the slides in opposite directions to vary the size of the opening.

11. A multiple-exposure attachment comprising a back having an exposure-opening, pairs of overlapped slides carried by the back and working across the opening therein, and means to adjust the members of each pair of slides simultaneously in opposite directions.

12. A multiple-exposure attachment comprising a back having an exposure-opening, a slide carried by the back and movable across the opening, an endwise-movable rack carried by the back and connected to the slide, a pinion journaled upon the back and meshing with the rack, and means for rotating the pinion to adjust the slide.

13. A multiple-exposure attachment comprising a back having an exposure-opening, slides carried by the back at opposite sides of the opening therein, endwise-movable racks connected to the slides, a pinion journaled upon the back between the racks and in mesh therewith, and means for rotating the pinion.

14. A multiple-exposure attachment comprising a hollow back having front and rear exposure-openings, upstanding horizontally-movable slides mounted within the back at opposite sides of its exposure-opening, vertically-movable slides working within the back at the upper and lower sides of the exposure-opening, a pair of horizontally-movable racks mounted within the back and carrying the horizontally-movable slides, a pair of vertically-movable racks mounted within the back and connected to the vertically-movable slides, pinions journaled within the back between and in mesh with the members of the respective pairs of racks, and finger-pieces accessible externally of the back and connected to the respective pinions.

15. In a multiple-exposure attachment, the combination of a back having an exposure-opening, slides adjustable across the opening to vary the same, a main carrier having an exposure-opening mounted to slide across the exposure-opening of the back, means to adjustably interlock the carrier with the back, a supplemental carrier having an exposure-

opening and mounted to slide upon the main carrier at right angles to the direction of movement of said carrier, means to adjustably interlock the two carriers, and a plate-holder
5 support mounted upon the supplemental carrier.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in the presence of two witnesses.

HARVEY L. BOSTON.

Witnesses:

L. B. FULLER,
LOTTIE OTON PALIK.