

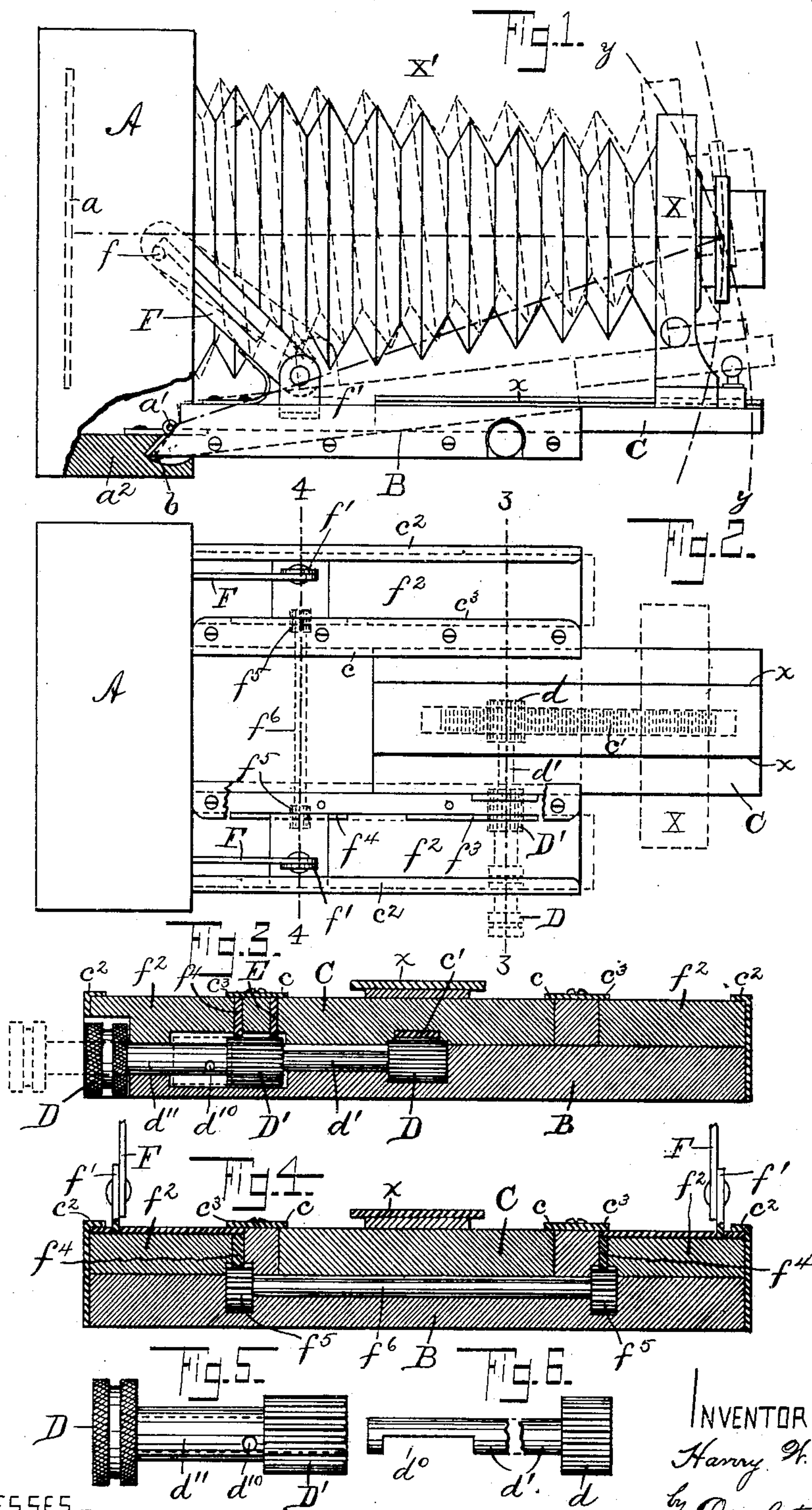
H. W. LOCKE.

CAMERA.

(Application filed Apr. 23, 1902.)

(No Model.)

2 Sheets—Sheet 1.



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No. 708,721.

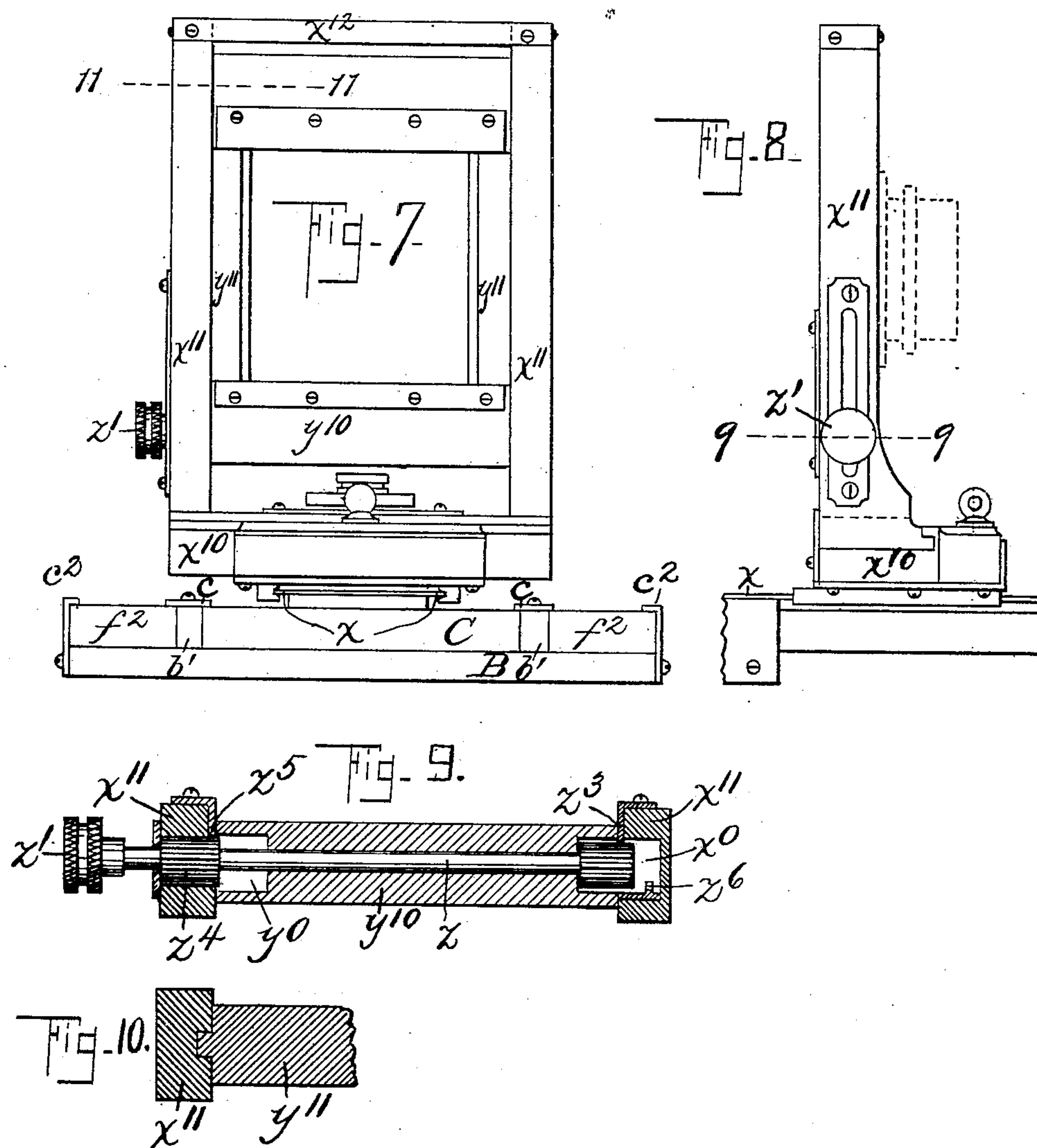
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CAMERA.

SPECIFICATION forming part of Letters Patent No. 708,721, dated September 9, 1902.

Application filed April 23, 1902. Serial No. 104,389. (No model.)

To all whom it may concern:

Be it known that I, HARVEY W. LOCKE, a citizen of the United States, and a resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Cameras, of which the following is a specification.

This invention relates to cameras. Its object is to provide simple and efficient means for operating camera parts; and it consists in the mechanisms and combinations hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of a folding camera provided with the inventions hereinafter set forth, a part being broken away to exhibit construction. Fig. 2 is a top plan view of the same device, the bellows and lens-frame being removed. Fig. 3 is an enlargement of a cross-section on the line 3 3 of Fig. 2. Fig. 4 is an enlargement of a cross-section on the line 4 4 of Fig. 2. Figs. 5 and 6 are enlarged elevations of details. Fig. 7 is a front elevation of the lens-frame and its mechanism. Fig. 8 is a side elevation of the same. Fig. 9 is a horizontal cross-section on the line 9 9 of Fig. 8, and Fig. 10 is a cross-section on the line 11 11 of Fig. 7.

A is the usual camera-box, and *a*, Fig. 1, represents in dotted lines the position of the sensitive plate therein. To the camera-box is hinged a folding front by means of the hinge *a'*. The folding front is the support for the lens-frame, and in the present example of my invention consists of a main section B, on which is a sliding supplementary or extensible section C, to which the usual lens-frame X X is adapted to be attached and is connected by the bellows X' with the camera-box A. Guideways *x* upon the section C support and guide the lens-frame X thereon, which may be locked by suitable means in any position on said guideways and may slide off said guideways into the camera-box A when the camera is to be closed, as usual.

The supplementary or extensible section C slides upon the main section B and is held thereon in any suitable manner, but preferably by plates *c*, fastened upon said main section and extending over the upper side edges of the supplementary or extensible section C, on the under side of which is a rack

c', (see Fig. 2,) which meshes with a pinion *d* on a shaft *d'*, that is operated by a milled head D. The milled head D has a tubular extension *d''*, and the shaft *d'* fits in it and has a long notch *d''* in the side thereof, while a pinion *d'* in the extension *d''* sets in said notch and permits longitudinal movement of the milled head with reference to the shaft *d'*, but prevents relative rotary movement of the two parts. Connected rigidly to the milled head D and preferably upon the end of the tubular extension *d''* is an elongated pinion D', which is adapted in one position to engage a stationary rack E, fastened to the main section B of the folding front. The milled head D is adapted in one position to set in a notch in the edge of the folding front and may be pulled out into the position shown in dotted lines in Figs. 2 and 3 for the purpose of operating the mechanism. If the milled head D is pulled out into the position shown in dotted lines in Fig. 3, the pinion D' disengages from the stationary rack E and the pinion D may now be turned, moving the supplementary or extensible section G by means of the rack *c'*. On pushing in the milled head D the pinion D' reengages the stationary rack E and locks the parts, so that the pinion *d* cannot turn. Thus this invention embodies means (rack-and-pinion devices) for locking a movable part (the extensible section C) by causing a movable portion of the pinion device to mesh with a stationary rack, and thus locking said movable part in any position to which it may be moved. It is immaterial where this stationary rack is situated or whether it engages a supplementary pinion D' or the pinion *d*, provided either pinion is made longitudinally movable, so as to engage with and disengage from the stationary rack, according as the movable rack *c'* is to be extended or locked in place.

The locking mechanism just described comprises a rack-and-pinion device, one element of which is upon a relatively movable part and the other element of which is upon a relatively stationary part, in combination with locking mechanism comprising a second rack immovable by rotation of said pinion and adapted to mesh therewith and to unmesh therefrom, so that the pinion component is locked against rotation by the engagement of

the rack component of the locking mechanism, thereby locking the movable part against change of position. In the present example of this invention the pinion is longitudinally or axially movable and is for convenience always in mesh with the rack of the rack-and-pinion device that is used for actuating the relatively movable part, although it is obvious that the locking by means of the locking-rack can occur without the constant meshing with the actuating-rack just described. So, too, the pinion and the locking-rack need only have relative movement of one with relation to the other in order to produce the locking effect. As shown by the locking mechanism for the lens-frame, hereinafter described, the pinion may travel with a movable part, while the actuating and locking racks, or either of them, may be stationary.

The folding front is provided with the usual pair of links F F for supporting the folding front and for permitting the latter to be folded up to close the camera-box, and each link is pivoted at one end to one side of the camera-box and at the other end to a movable part on the folding front. These links engage pins f in the sides of the camera-box and are pivoted to standards f' , attached to the main section B of the folding front. The links may be connected to the main section B in the usual way by immovable pivots or standards f' ; but for the purposes to be described I prefer that the standards f' should be fastened to connected slides or bars f^2 , sliding on the main section B in guides c^2 c^3 , and adapted for movement parallel with the supplementary or extensible section C. One of the slides carries the rack f^3 , adapted to engage with the pinion D' , so that rotation of the milled head D operates the slide f^2 (see Fig. 3) and may move it outward along the main section B, thus tilting said main section B upward in a manner clearly shown by the dotted lines in Fig. 1. In order to provide means for moving or shifting both slides f^2 f^2 simultaneously for tilting the front or lens-frame support, I provide racks f^4 , attached to said slides, a pair of pinions f^5 f^5 , carried in the main section B to engage said racks, and a shaft f^6 , connecting said pinions, so that when the pinion D' is revolved and the rack f^3 is moved the motion of the slide f^2 causes rotation of the pinions f^5 and the movement of both slides f^2 at the same rate. One of the racks f^4 may be continuous with the rack f^3 . Consequently the rotation of the milled head D moves both slides f^2 simultaneously outward or inward upon the main section B at the same time and with equal speed. Consequently the main section B of the folding front and all parts thereon will be tilted, as before suggested, into various angular positions, according as the slides f^2 are moved inward or outward along said main section. The arc of movement is around the pivotal center of the hinge a' , as indicated by the dotted line y of Fig. 1. The same rotation of the milled head D causes an extension

or retraction of the supplementary or extensible section C, and when the main section B is tilted upward by the operating means above described the supplementary section C is simultaneously extended or pushed outward, and vice versa. Hence this invention embodies means (rack-and-pinion devices) for locking a movable part (a slide f^2) by causing a movable portion of the pinion devices to mesh with a stationary rack, and thus locking said movable part in any position to which it may have been moved. Of course the device is operative when only one of the links is used, the other being dispensed with or disconnected. This simultaneous tilting of the main section B and longitudinal movement of the supplementary section C is so adjusted as to maintain the focusing of the image upon the sensitive surface of the plate A substantially unchanged when the tilting occurs. In other words, the lens-frame may be drawn out and the image may be focused upon the ground glass, (which of course has the same position as the sensitive plate.) A plate may then be introduced into the camera and the lens-frame may be tilted, and this may occur without changing the focusing. The operation of the milled head D is the only mechanism for the operator to actuate for these purposes. The milled head D may now be pushed in until it engages the stationary rack E, whereby the parts are locked in the position to which they have been set. This device finds its particular advantage in use with cameras having tripods or other stationary rests.

In order that when the camera is folded and closed the folding front may not show any gap, I provide a particular arrangement of the parts for this purpose. The rear edge of the main section B is made angular, as shown at b , Fig. 1, and the upper side of the lower rail a^2 of the camera-box is recessed near the front edge, and in the lines of movement of the angular lower edge b is cut on the proper curvature from the pivotal center of the hinge a' , which is above the said lower edge b , so that said edge will move along said curved surface and when the folding front B is fully closed will show only closely-matching edges in front.

The lens-frame in the present camera is supplied with a rack-and-pinion locking device of the same character as the one hereinbefore described.

In Figs. 7, 8, and 9 the mechanism for raising and lowering the lens-frame for a well-known purpose and for locking it in place is shown. The lens-frame X is of any suitable form, but is herein shown as having a base x^{10} , two vertical standards x^{11} , and a top bar x^{12} . The standards x^{11} may have guideways x^{13} in them, in which slide the side rails y^{11} of the lens-holder. (See Fig. 11.) The base y^{10} of the lens-holder carries a pinion-shaft z , (see Fig. 9,) having a milled head z' extending through a slot x^{14} in one of

the side rails x^{11} . A pinion z^2 on the pinion-shaft meshes with a rack z^3 , attached to one of the side rails x^{11} , whereby on rotating the milled head z' the pinion travels along the rack z^3 and carries with it the lens-holder. If desired, a second pinion z^4 on the pinion-shaft may mesh with a second rack z^5 on the other side rail x^{11} , so as to give perfectly equal motion to both sides of the lens-holder and to avoid any possible binding. On one of the rails x^{11} —as, for instance, the one on the right of Figs. 7 and 9—a second rack z^6 is provided, and a space y^0 is provided in the parts adjacent to the pinion z^2 , so that the pinion-shaft and pinion may move axially or longitudinally, so that the pinion z^2 may engage with and disengage from the rack z^6 . It will be noticed that the rack z^6 is set on the diametrically opposite side of the pinion z^2 from the rack z^3 , so that when the pinion is in mesh with both racks z^3 and z^6 it cannot be rotated, and the lens-holder is therefore held and locked in a stationary position. When a second rack and pinion z^2 z^5 are used, a space x^0 is provided for the movement of the pinion.

In general the following claims are not intended to be limited to the specific devices herein shown and described except where the state of the prior art requires such limitation.

What I claim is—

1. In a camera, a camera-box, a support for the lens-frame hinged thereto, link mechanism hinged to the box and to a movable part on the support, and means for moving said movable part relatively to said support for tilting the latter, substantially as described.

2. In a camera, a camera-box, a support for the lens-frame hinged thereto, link mechanism hinged to the box and to a movable part on the support, means for moving said movable part relatively to said support for tilting the latter, and means for fastening said movable part in the various positions relatively to said support to which it may be moved, substantially as described.

3. In a camera, a camera-box, a support for the lens-frame hinged thereto, an extensible section on said support to which the lens-frame is adapted to be attached, link mechanism pivoted to the camera-box and to a movable part on said support, and means for moving said link mechanism and extensible section simultaneously, substantially as described.

4. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising a slide on said support, a link pivoted at one end to the camera-box and at the other end to the slide, and rack-and-pinion devices for shifting said slide for tilting said support, substantially as described.

5. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising a slide on said support, a link pivoted at one

end to the camera-box and at the other end to the slide, rack-and-pinion devices for shifting said slide for tilting said support, and a rack on said support adapted to engage said pinion for locking the same in any position to which said parts may be moved, substantially as described.

6. In a camera, a camera-box, a support for the lens-frame hinged thereto, a pair of links each hinged to one side of the box and to a movable part on said support, and means for moving said movable part with reference to said support for tilting the latter, substantially as described.

7. In a camera, a camera-box, a support for the lens-frame hinged thereto, a pair of links each hinged to one side of the box and to a movable part on said support, means for moving said movable part with reference to said support for tilting the latter, and means for fastening said movable parts in the various positions to which they may be moved, substantially as described.

8. In a camera, a camera-box, a support for the lens-frame hinged thereto, comprising an extensible section on said support to which the lens-frame is adapted to be attached, a pair of links each pivoted to one side of the camera-box and to a movable part on said support, and means for moving the ends of said links and said extensible section simultaneously, substantially as described.

9. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising an extensible section on said support to which the lens-frame is adapted to be attached, a pair of links each pivoted to one side of the camera-box and to a movable part on said support, means for moving the ends of said links and said extensible section simultaneously, and means for fastening said movable parts in any position to which they may be moved, substantially as described.

10. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising a pair of slides on said support, a pair of links each pivoted at one end to the camera-box and at the other end to one of the slides, and rack-and-pinion devices for shifting said slides simultaneously for tilting said support, substantially as described.

11. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising a pair of slides on said support, a pair of links each pivoted at one end to the side of the camera-box and at the other end to one of the slides, and rack-and-pinion devices for shifting said slides simultaneously for tilting said support comprising means for fastening said slides in the different positions to which they may be moved, substantially as described.

12. In a camera, a camera-box, a support for the lens-frame hinged thereto, a pair of links each pivoted at one end to one side of the camera-box and at the other end to a movable part on said support, rack-and-pinion devices for operating said movable parts simul-

taneously for tilting said support, and a stationary rack upon said support adapted to engage said pinion for locking the same in any position to which the parts may be moved, substantially as described.

13. In a camera, a rack-and-pinion device, a relatively movable part carrying one element of said rack-and-pinion device, a relatively stationary support carrying said movable part and bearing the other element of said rack-and-pinion device, in combination with locking mechanism consisting of said pinion as one component and a second rack immovable by rotation of the pinion as the other component, one of said components being movable into and out of mesh with the other for locking said first-mentioned rack-and-pinion device, substantially as described.

14. In a camera, a rack-and-pinion device always in mesh, a relatively movable part carrying one element of said rack-and-pinion device, a relatively stationary support carrying said movable part and bearing the other element of said rack-and-pinion device, in combination with locking mechanism consisting of said pinion as one component and a second rack immovable by rotation of the pinion as the other component, one of said components being movable into and out of mesh with the other for locking said first-mentioned rack-and-pinion device, substantially as described.

15. In a camera, a rack-and-pinion device having an axially-movable pinion, a relatively movable part carrying one element of said rack-and-pinion device, a relatively stationary support carrying said movable part and bearing the other element of said rack-and-pinion device, in combination with locking mechanism consisting of said pinion as one component and a second rack immovable by rotation of the pinion as the other component, the pinion component being movable axially into mesh with the rack component for locking said first-mentioned rack-and-pinion device, substantially as described.

16. In a camera, a rack-and-pinion device having an axially-movable pinion which is always in mesh with said rack, a relatively movable part carrying one element of said rack-and-pinion device, a relatively stationary support carrying said movable part and bearing the other element of said rack-and-pinion device, in combination with locking mechanism consisting of said pinion as one component and a second rack immovable by rotation of the pinion as the other component, the pinion component being movable into mesh with the rack component for locking said first-mentioned rack-and-pinion device, substantially as described.

17. In a camera, a camera-box, a support for the lens-frame hinged thereto, a rack thereon, a part movable on said support, a rack thereon, and an axially-movable pinion device meshing with the rack on said movable part and adapted to be moved into mesh also

with said rack on said support for locking said movable part with reference to the support, in any position to which it may be moved, substantially as described.

18. In a camera, a camera-box, a support for the lens-frame hinged thereto comprising a main section and an extensible section to which said lens-frame is attached, a pair of slides on said main section, a pair of links each hinged at one end to the side of the camera-box and to one of the slides, a rack on each slide, a stationary rack on said main section, a rack on said extensible section, a pinion mechanism connecting the racks on the slides, and an axially-movable pinion mechanism on said main section meshing with the rack on the extensible section and adapted to be moved into and out of mesh with the stationary rack and with the rack on one of the slides, whereby on operating said pinion mechanism the extensible section may be extended or retracted and simultaneously said support may be raised or lowered, and the parts may be locked in any position to which they may be moved, substantially as described.

19. In a camera, a camera-box, a folding front consisting of a main section hinged to said camera-box, and an extensible section sliding on the main section and to which the lens-frame is attached, a pair of slides on said main section, a pair of links each hinged at its ends to a side of the camera-box and to one of said slides, a rack on each slide, a stationary rack on said main section, a rack on said extensible section, a pinion mechanism connecting the racks on the slides, a pinion carried on the main section in mesh with the rack on the extensible section, and an axially-movable sleeve for operating said pinion and having a pinion thereon adapted to be moved into and out of mesh with the rack on one of said slides and with said stationary rack, substantially as described.

20. In a camera, a folding front having an angular lower edge, a camera-box hinged to said front above the lower edge of the latter and having a recess in the lower rail of the camera-box cut out on the curve of movement of said angular lower edge, substantially as described.

21. In a camera, a rack-and-pinion device, a relatively movable part carrying one element of said rack-and-pinion device, a relatively stationary support carrying said movable part and bearing the other element of said rack-and-pinion device, in combination with locking mechanism consisting of said pinion as one component and a second component immovable by rotation of the pinion, one of said components being movable into and out of engagement with the other for locking said first-mentioned rack-and-pinion device, substantially as described.

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