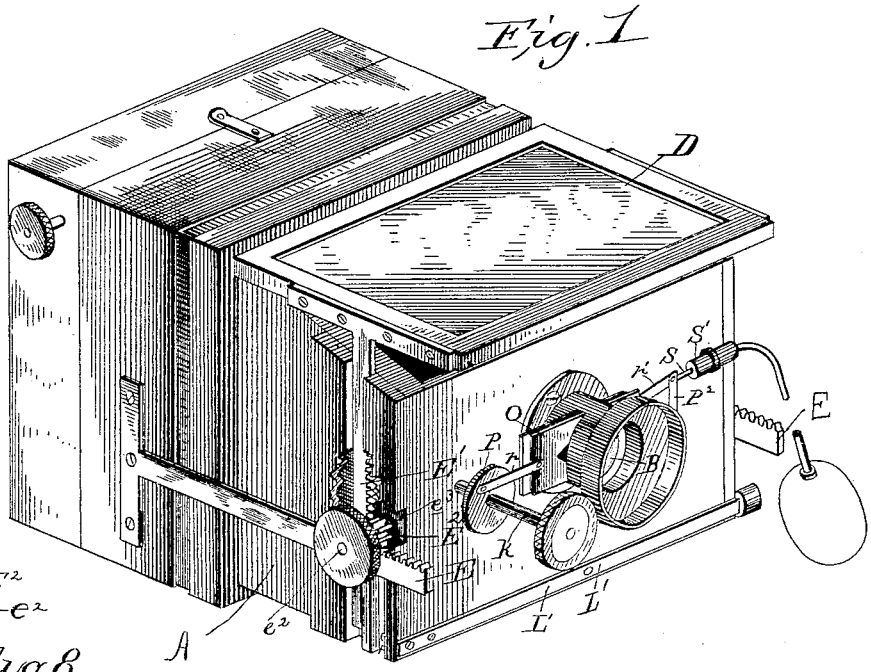
(No Model.) 3 Sheets—Sheet 1.

J. M. TRACY & G. S. HODGES.

PHOTOGRAPHIC CAMERA.

No. 494,354. Patented Mar. 28, 1893.

Fig. 1



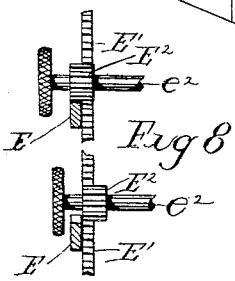


Fig 8

Fig. 3

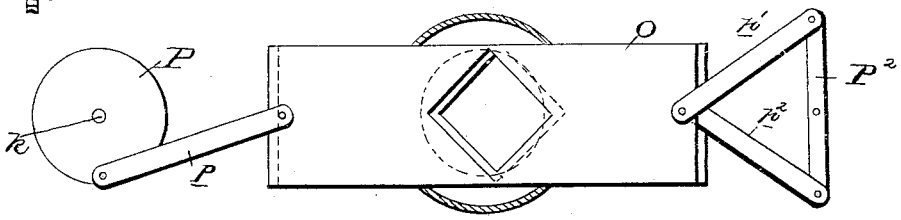
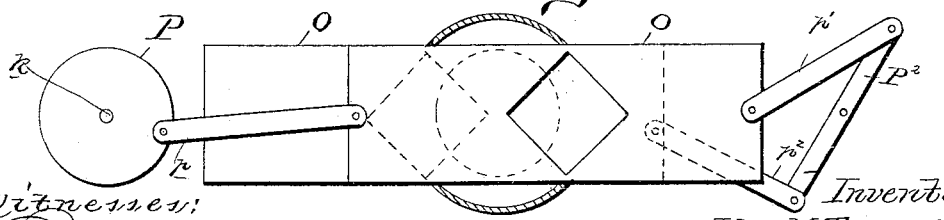


Fig 3ª



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J. M. TRACY & G. S. HODGES.

PHOTOGRAPHIC CAMERA.

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Fig. 2.

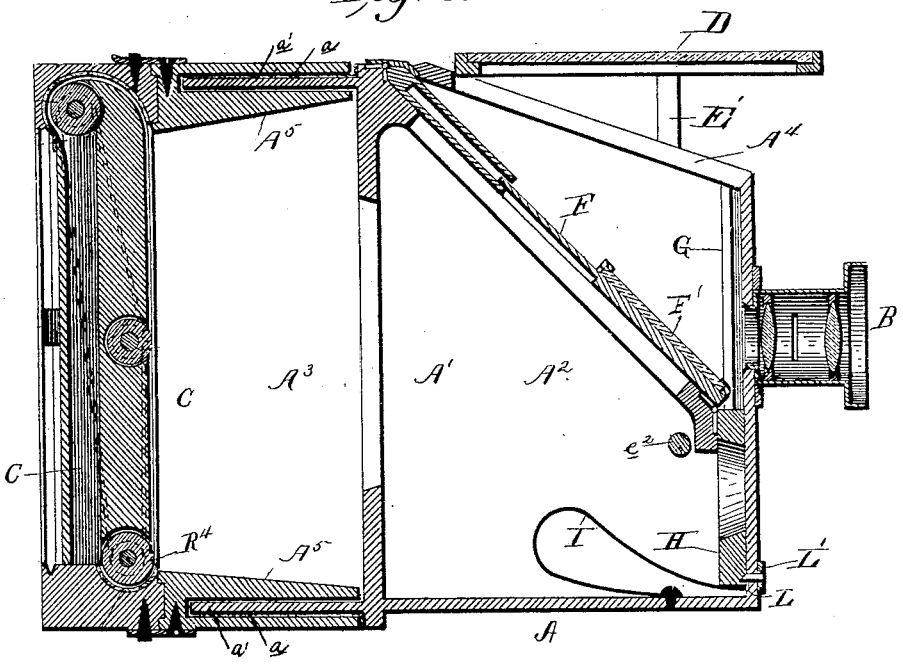
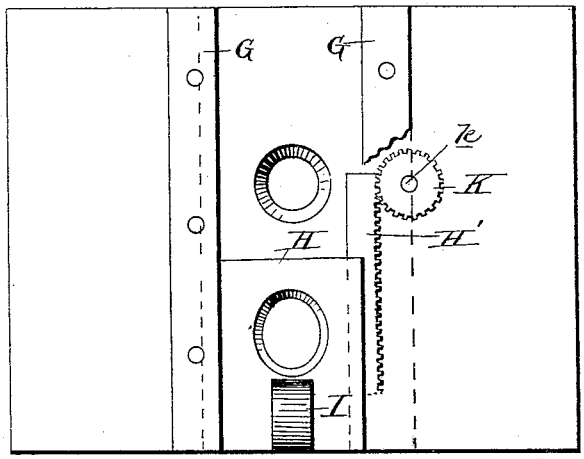


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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PHOTOGRAPHIC CAMERA.

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Fig. 5.

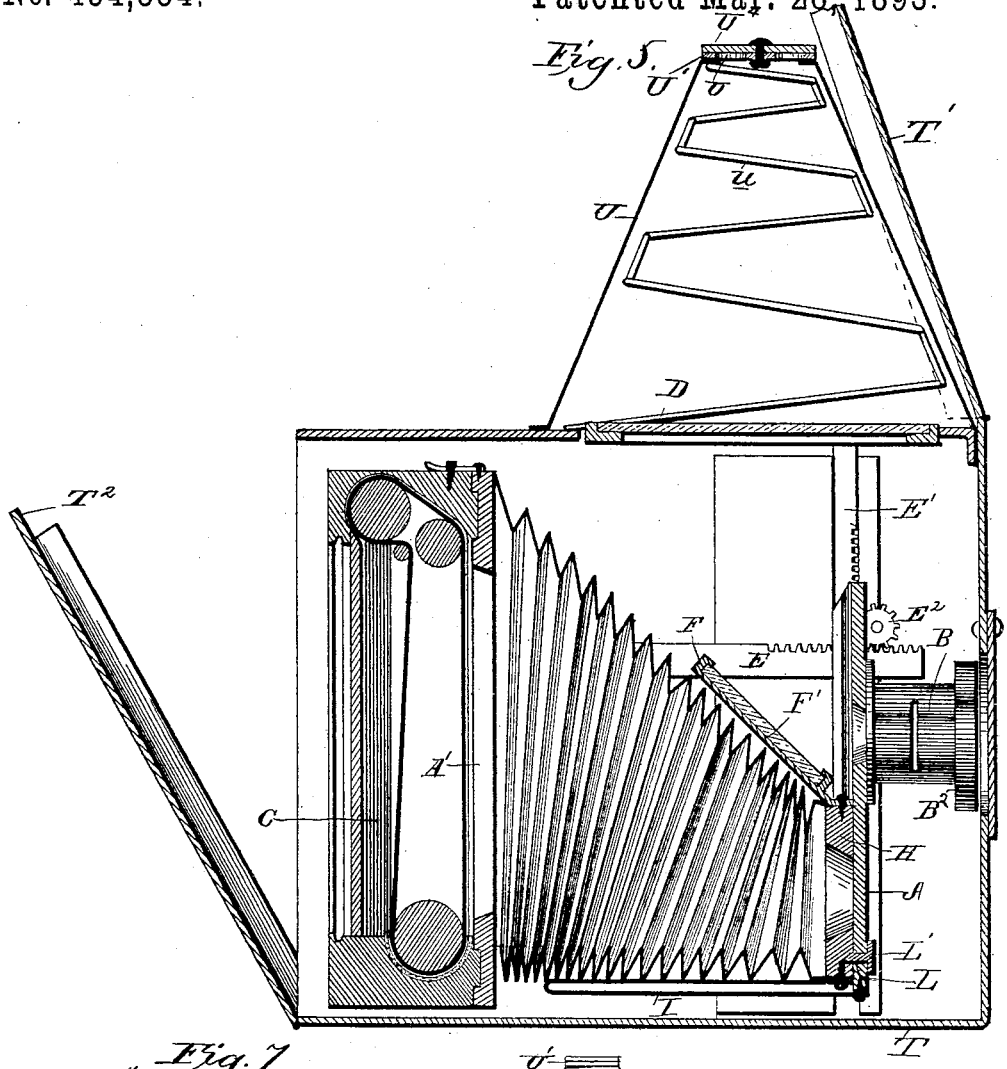


Fig. 7

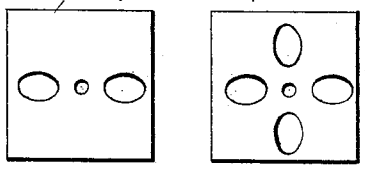
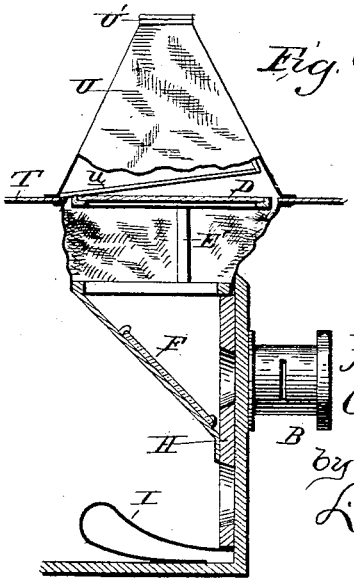


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN M. TRACY, OF NEW YORK, N. Y., AND GEORGE S. HODGES, OF ORCHARD LAKE, MICHIGAN.

PHOTOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 494,354, dated March 28, 1893.

Application filed January 20, 1890. Serial No. 337,462. (No model.)

To all whom it may concern:

Be it known that we, JOHN M. TRACY, of New York, county of New York, and State of New York, and GEORGE S. HODGES, of Orchard Lake, county of Oakland, and State of Michigan, citizens of the United States, have invented certain new and useful Improvements in Cameras; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to an improvement in cameras, and it consists in the construction and arrangement of parts more fully hereinafter described and definitely pointed out in the claims.

The aim and objects of the invention are the production of a simple, accurate and compact camera having its parts so arranged that an easy manipulation thereof can be had with but little trouble. We obtain these objects by the construction illustrated in the accompanying drawings wherein like letters of reference indicate corresponding parts in the several views, and in which.

Figure 1 is a perspective view of a camera showing parts broken away. Fig. 2 is a vertical longitudinal section of the same. Figs. 3 and 3^a are detail views of the shutter showing the same in both a closed and open position. Fig. 4 is a detail view of the inner face of the front board with the exposing slide and its operating mechanism. Fig. 5 is a vertical longitudinal section of a modified form of an exposing and focusing chamber. Fig. 6 is a sectional view of the mirror compartment and support in a modified form. Fig. 7 is a detail view of the upper and lower eye pieces, and Fig. 8 is a detail view of a pinion and rack bars showing the different positions of the pinion.

In the drawings, A represents the casing and B the double lens located at the front of the casing. The casing is divided by a partition A′ into two compartments, constituting respectively a dark chamber A^2 and a focusing chamber A^3, the partition being formed with a large central opening sufficient in extent to permit all of the rays of light entering through the lens, to pass through and be centered on the sensitive film C, located at the rear of the focusing chamber. The top of the front portion of the casing is formed with an opening A^4 over which the ground glass D is placed. The walls A^5 of the focusing chamber are formed with two thicknesses of material with an intervening space *a*, preferably lined with plush or other suitable material, and into which the rear walls *a″* of the casing are extended, thus permitting a telescopic movement of the parts for focusing purposes, the plush preventing rays of light from entering. By this construction, the use of a bellows is dispensed with for focusing purposes.

To secure a uniform movement of the ground glass and focusing portion of the camera, so that the images portrayed on the ground glass will be in accord with the representation produced on the sensitive plate, a horizontal rack bar E, is rigidly secured to the movable part and extends to the front of the casing, its upper face being formed with suitable teeth. At right angles to the horizontal bars E are placed vertically movable supporting rack bars E′ having suitable T shaped arms on their upper ends to which the ground glass frame is rigidly secured. These bars E′ work in guide ways in the side of the casing and have teeth on their front edges, their lower ends passing between the casing and bar E on one side, and vice-versa on the opposite.

To simultaneously operate the bars E E′, we place in the angles formed by the bars, pinions E^2 which are of sufficient width to engage and mesh with the teeth on both bars and are supported by a shaft e^2 extending laterally across the casing. These pinions are placed in recesses e^3 in the casing which have a depth sufficient to permit of their longitudinal movement to engage or disengage with the teeth of the bars E as shown in Figs. 8 and 9 so that the position of the ground glass can be regulated to coincide with the sensitive plate. On the outer end of the shaft e^2 is placed a milled thumb-screw or disk for turning the shaft to regulate the forms.

To secure a positive and instantaneous exposure and enable us to use the lens as a finder, thereby securing an exact counterpart on the ground glass of the desired reproduc-

tion on the sensitive plate, we hinge to the upper portion of the casing within the dark chamber a vertically movable partition constituting a reflector or mirror support F, the upper end of which is telescopic to permit a vertical movement of the mirror. The reflector or mirror F′ is placed on the lower upper face of the sliding portion of the partition and when lowered, is held at an angle of forty five degrees and directly in front of the lens opening, to reflect the image on to the ground glass.

In the inner face of the front portion of the sides of the casing adjacent to the front are formed vertical ways G in which an exposing slide H works. This slide has an opening therein corresponding to the lens opening and registering therewith when in its elevated position. To the top of this slide is hinged the lower edge of the partition F so that as the slide is thrown up by a suitable spring I located at the bottom of the casing, it carries the mirror with it beyond the lens opening thereby exposing the plate and preventing any rays of light from entering the dark chamber from the ground glass opening.

In Fig. 4 is shown the means by which the slide H and mirror are forced down; it consists of a pinion K journaled on a shaft k extending through the front of the casing. On the edge of the slide is secured a rack H′ with which the pinion K meshes. By turning the pinion the slide is forced down until it engages with the beveled catch L, actuated by a spring L′ which enters an opening or socket in the lower part of the slide. The upper movement of the slide is produced by pressing the end of the spring L′ out, releasing the catch and permitting the spring I to exert its force on the slide thereby forcing it up in the ways.

In addition to the slide which operates as a shutter, we employ and arrange a shutter between the two lenses. It is constructed of two oppositely movable slides O, having registering diamond shaped openings therein. This shutter operates in openings in the lens tube; to move the shutter, a disk P is secured or formed on the end of the shaft k to which a link p is eccentrically secured having its other end secured to outer side of the shutter. On the opposite end of the shutter is pivoted the respective slide links p' and p^2 having their outer ends pivoted to a rocking lever p^2, fulcrumed on a pin on the casing so that the rotation of pinion K reciprocates the slide in opposite direction.

To prevent the impact of the exposing slide from jarring the apparatus and also to govern the movement of the shutters, for long or short exposures, we attach to one end of the lever P^2 a link which has connections with a piston rod S working in a cylinder S′. To this cylinder is connected by suitable tubing, a bulb, the compression of which prevents the piston on rod S from moving in the cylinder; the air acting as a cushion and the gradual release of the bulb permiting the shutter to operate.

On the end of the shaft k is placed a milled hand disk whereby the pinion may be turned to draw the mirror and exposing slide down.

On the rear of the casing is secured the plate holder which is adapted more especially for use with flexible negative films.

The camera is placed in a suitable outer casing T as shown in Fig. 5, having a hinged top T′ and a hinged back T^2. Below the top is an opening in which the ground glass moves; this opening is surrounded by a conical hood U made collapsible by being attached to and supported by a rectangular spiral spring u on the top of which is an eye piece U′ composed of two parts U^4 and U^5 one above the other and pivoted together at their centers. In the upper part is formed two eye holes while in the lower part are four at right angles, so that if it should be desired to turn the camera on its side to take a panel or upright picture the operator need only to adjust the upper part of the eye piece to fit the other set of openings in the under part.

In Fig. 5 we have shown a modified form of dark chambered and focusing compartment, it being in this case formed of a tapering bellows its outer end being secured to the slide H and the mirror being located above its upper fold. In this form of camera we secure simplicity of structure, the applicability of the small end of the bellows permitting the slide to move freely in its way. In this figure we have also shown a modified form of plate holder, in which we employ an endless rubber band or belt, which by frictional contact carries the plate from the front of the storage compartment to the exposing face and from thence back to the compartment to the rear of the unexposed plates.

In Fig. 6 we have shown a modified form of mirror compartment. It consists in the mirror rigidly secured in the support F fastened to the top of the slide H and having flexible walls attached to the edge of the ground glass opening, the light is thus prevented from gaining access to the dark chamber.

Having thus described the detail construction and arrangement of the several parts of our improvement, the operation of the same is as follows;—by turning the shafts e^2 the pinions E^2 are rotated, forcing the bars E E′ either up or down, or in or out, as the case may be, to draw in or extend the ground glass and plate holder to secure the desired focus; when the proper focus is obtained the spring L is pushed out by the operator carrying the catch and releasing the slide H which is immediately forced up by the spring I carrying with it the mirror and exposing the sensitive plate, through the opening in the slides; as the slide raises, the pinion K is rotated and the shutter is moved to open the lens, and immediately close the same by the further movement of the slide, which action is instantaneously. When the slide H is to be low-

ered the pinion K is turned by hand, forcing the same down into its former position. To prevent the light from again entering the camera while the plate is descending, a cap B may be placed over the lens as shown in Fig. 5.

Having thus described the invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a camera, the combination with a casing having a movable focusing chamber thereon, rack bars on the chamber extending forward, a vertically movable ground glass having rack bars thereon extending across the said other rack bars, and pinions engaging the rack bars for moving the same simultaneously, substantially as described.

2. In a camera, the combination with an extensible focusing chamber, and a ground glass, of racks on the chamber and racks connected with the glass, and sliding pinions, engaging the respective racks for moving the same, substantially as described.

3. In a camera, the combination with a casing and lens, of an exposing slide within the casing, a spring for actuating the slide, reciprocating shutters for the lens, a shaft having a disk thereon, a link connection between the disk and shutters, and means on the shaft engaging the slide for actuating the shutters upon the movement of the slide, substantially as described.

4. In a camera, the combination with a casing, and lens, of a contractible partition in the casing having its forward edges normally below the lens, an inclined movable reflector above the partition and a spring for moving the reflector and forward edge of the partition above the lens, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN M. TRACY.
GEO. S. HODGES.

Witnesses as to John M. Tracy:
J. SCOTT HARTLEY,
ELLIOTT DAINGERFIELD.
Witnesses as to George L. Hodges:
L. S. BACON,
F. R. CORNWALL.