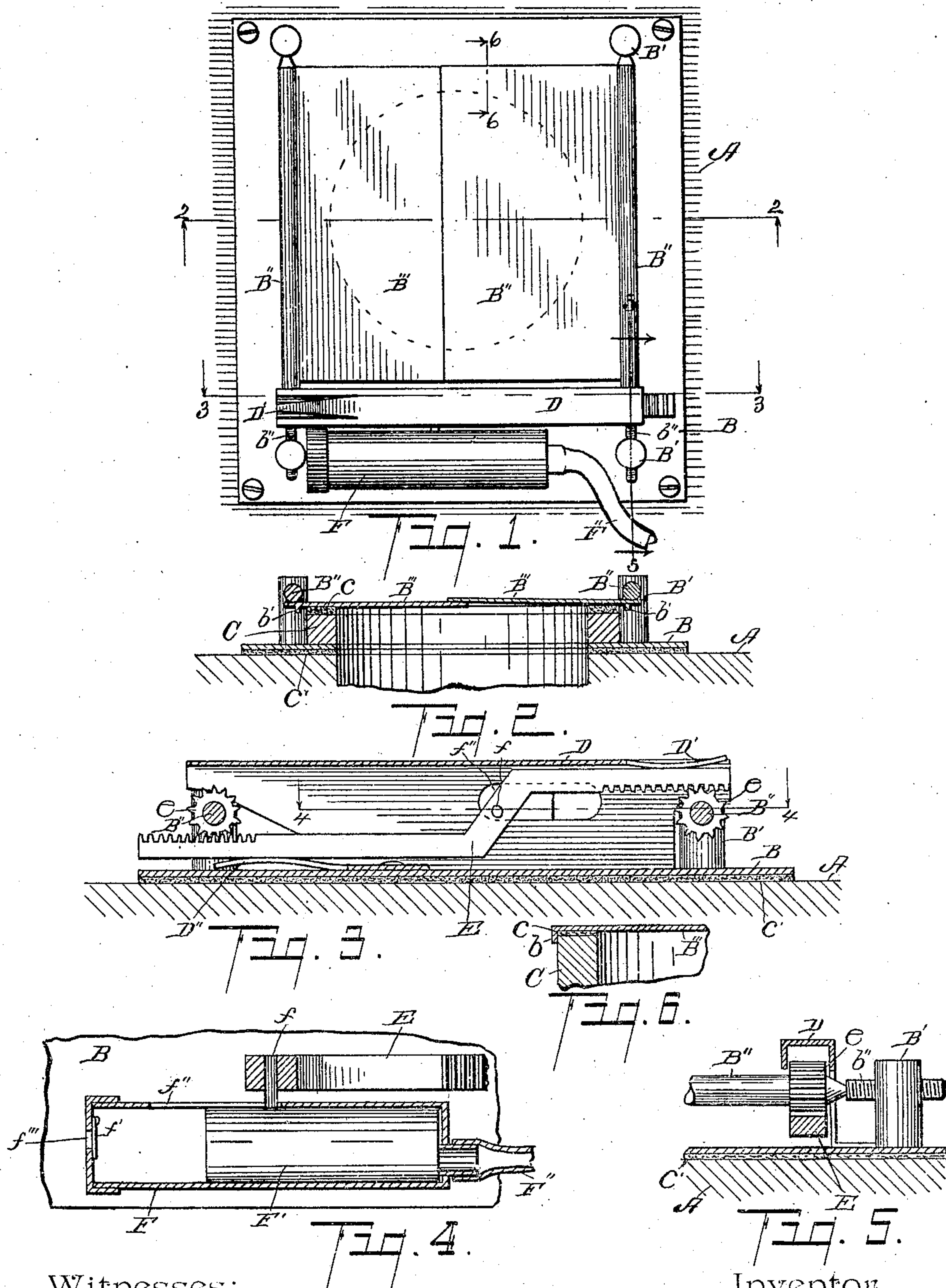


No. 847,373.

PATENTED MAR. 19, 1907.

C. A. ROOT.
PHOTOGRAPHIC SHUTTER.
APPLICATION FILED MAR 1, 1906.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES A. ROOT, OF KALAMAZOO, MICHIGAN.

PHOTOGRAPHIC SHUTTER.

No. 847,373.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed March 1, 1906. Serial No. 303,690.

To all whom it may concern:

Be it known that I, CHARLES A. ROOT, a citizen of the United States, residing at Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Photographic Shutters, of which the following is a specification.

This invention relates to improvements in photographic shutters.

The objects of this invention are, first, to provide an improved shutter for cameras having pivoted wings which may be operated very rapidly; second, to provide in a photographic shutter an improved means for operating the shutter-wings; third, to provide an improved photographic shutter which is very simple and economical in structure and at the same time one which is not likely to get out of repair.

Further objects and objects relating to structural details will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which—

Figure 1 is an elevation of my improved shutter. Fig. 2 is a detail cross-section taken on a line corresponding to line 2 2 of Fig. 1. Fig. 3 is an enlarged detail cross-section taken on a line corresponding to line 3 3 of Fig. 1, showing details of the operating means. Fig. 4 is an enlarged longitudinal section taken on a line corresponding to line 4 4 of Fig. 3, showing details of the engine and its connections. Fig. 5 is an enlarged detail section taken on a line corresponding to line 5 5 of Fig. 1. Fig. 6 is an enlarged detail section taken on a line corresponding to line 6 6 of Fig. 1, showing structural details of the wings.

In the drawing similar letters of reference refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines.

Referring to the drawing, A represents a wall of the camera; B, the shutter-plate or plate upon which the shutter is mounted. A suitable gasket *c'* is preferably interposed between the shutter-plate and the wall of the

camera, as is illustrated in the drawing. Projecting from this plate are posts *B'*, upon which the shafts *B''* for the shutter-wings are mounted. These shafts are provided with suitable pivot-bearings at one end and at the other end are provided with bearing-pivots *b''*, which are screw-threaded through the posts, so that they may be adjusted. The wings *B'''* are carried by these shafts.

The ends of the wings are turned down to form flanges *b*, which fit over the end of the lens-tubes C. A gasket or facing *c* is provided for the end of the tube, making a light-excluding joint for the parts. The rear edges of the wings are also flanged at *b'*. (See Fig. 2.)

On each of the shafts is secured a pinion *e*. The rack-bar E is arranged to engage these pinions. This rack-bar is formed of oppositely-facing racks arranged to engage the inside of one pinion and the outside of the other, so that when the rack is reciprocated the pinions are actuated in opposite directions, thereby opening or closing both wings simultaneously. The rack E is arranged within the casing D, which is preferably formed of sheet metal. Springs *D'* and *D''* are arranged to bear on the rack and hold it in engagement with the pinions. These springs are preferably formed by slitting and bending inwardly portions of the casing D.

The pneumatic engine consists of the cylinder F, having a piston *F'* arranged therein. The cylinder F is slotted at one side, as *f''*, through which slot a pin *f*, which connects the piston to the rack, is arranged. The piston is operated by a suitable means, (not shown,) adapted to inject and exhaust the air from the cylinder—that is, by injecting air into the cylinder the piston is actuated to open the shutter, and it is withdrawn to its inward position by exhausting the air. A common rubber bulb, such as is commonly used to operate shutters, may be used for this purpose. In the outer end of the cylinder is a port *f'''*, provided with a check-valve *f'*. This allows air to enter freely, so that the piston readily returns to its normal or initial position and at the same time the piston is provided with an air-cushion at the end of its stroke. This makes the operation of the shutter practically noiseless.

By arranging the parts as I have illustrated and described the wings may be very easily and rapidly operated. The operation is positive and the parts are simple in con-

struction and arrangement, so that they are not liable to become disarranged.

I have illustrated and described my improved photographic shutter in detail in the
5 form preferred by me, although I am aware that it is capable of considerable variation in structural details within the scope of the claims without departing from my invention.

Having thus described my invention, what
10 I claim as new, and desire to secure by Letters Patent, is—

1. In a photographic shutter, the combination of a shutter-plate; posts projecting therefrom; shafts journaled on said posts;
15 wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite
20 sides respectively; a casing for said rack-bar formed of sheet metal; springs formed integral therewith, arranged to engage said rack-bar for holding the same against said pinions;
25 a pneumatic engine consisting of a cylinder having an inlet-port at its outer end and a longitudinal slot in the side thereof; a check-valve for said inlet-port; a piston; and a pin arranged through the said slot in said cylinder
30 for connecting said piston to said rack-bar, for the purpose specified.

2. In a photographic shutter, the combination of a shutter-plate; posts projecting therefrom; shafts journaled on said posts;
35 wings carried by said shafts; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a casing for said rack-bar formed of sheet metal;
40 springs formed integral therewith, arranged to engage said rack-bar for holding the same against said pinions; a pneumatic engine consisting of a cylinder having an inlet-port at its outer end and a longitudinal slot in the
45 side thereof; a check-valve for said inlet-port; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

3. In a photographic shutter, the combination of a shutter-plate; posts projecting therefrom; shafts journaled on said posts;
50 wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite
55 sides respectively; a casing for said rack-bar formed of sheet metal; springs formed integral therewith, arranged to engage said rack-bar for holding the same against said pinions; a pneumatic engine consisting of a cylinder having a longitudinal slot in the side
60 thereof; a piston; and a pin arranged

through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

4. In a photographic shutter, the combination of a shutter-plate; posts projecting
70 therefrom; shafts journaled on said posts; wings carried by said shafts; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a casing
75 for said rack-bar formed of sheet metal; springs formed integral therewith, arranged to engage said rack-bar for holding the same against said pinions; a pneumatic engine consisting of a cylinder having a longitudinal
80 slot in the side thereof; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

5. In a photographic shutter, the combination of a shutter-plate; posts projecting
85 therefrom; shafts journaled on said posts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to
90 close; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a pneumatic engine consisting of a cylinder having an inlet-port at its outer
95 end and a longitudinal slot in the side thereof; a check-valve for said inlet-port; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified. 100

6. In a photographic shutter, the combination of a shutter-plate; posts projecting
therefrom; shafts journaled on said posts; wings carried by said shafts; pinions on said
105 shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a pneumatic engine consisting of a cylinder having an inlet-port at its outer end and a longitudinal
110 slot in the side thereof; a check-valve for said inlet-port; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

7. In a photographic shutter, the combination of a shutter-plate; posts projecting
115 therefrom; shafts journaled on said posts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to
120 close; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a pneumatic engine consisting of a cylinder having a longitudinal slot in the
125 side thereof; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

8. In a photographic shutter, the combination of a shutter-plate; posts projecting
130 therefrom; shafts journaled on said posts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a pneumatic engine consisting of a cylinder having a longitudinal slot in the side thereof; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

nation of a shutter-plate; posts projecting therefrom; shafts journaled on said posts; wings carried by said shafts; pinions on said shafts; a rack-bar having oppositely-facing racks thereon, arranged to engage said pinions on opposite sides respectively; a pneumatic engine consisting of a cylinder having a longitudinal slot in the side thereof; a piston; and a pin arranged through the said slot in said cylinder for connecting said piston to said rack-bar, for the purpose specified.

9. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; a casing for said rack, formed of sheet metal; springs formed integral therewith, arranged to engage said rack for holding the same against said pinions; and means for shifting said rack, for the purpose specified.

10. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; a casing for said rack, formed of sheet metal; springs formed integral therewith, arranged to engage said rack for holding the same against said pinions; and means for shifting said rack, for the purpose specified.

11. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; springs arranged to engage said rack for hold-

ing the same against said pinions; and means for shifting said rack, for the purpose specified.

12. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; springs arranged to engage said rack for holding the same against said pinions; and means for shifting said rack, for the purpose specified.

13. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts, having inturned flanges at their ends and rear edges; a lens-tube over which said wings are adapted to close; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; and means for shifting said rack, for the purpose specified.

14. In a photographic shutter, the combination of a pair of shafts; wings carried by said shafts; pinions on said shafts; a rack arranged to engage said pinions on opposite sides respectively; and means for shifting said rack, for the purpose specified.

15. In a photographic shutter, the combination of the shutter-wings; a pneumatic engine, consisting of a cylinder having an inlet-port at its outer end; a check-valve for said inlet-port; a piston; and connections between said piston and wings, for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

CHARLES A. ROOT. [L. s.]

Witnesses:

OTIS A. EARL,
AMELIA J. ALBER.