L. J. E. COLARDEAU & J. RICHARD.

PHOTOGRAPHIC SHUTTER.

APPLICATION FILED JUNE 13, 1911.

1,117,637.

Patented Nov. 17, 1914.

4 SHEETS—SHEET 1.

Fig. 1.

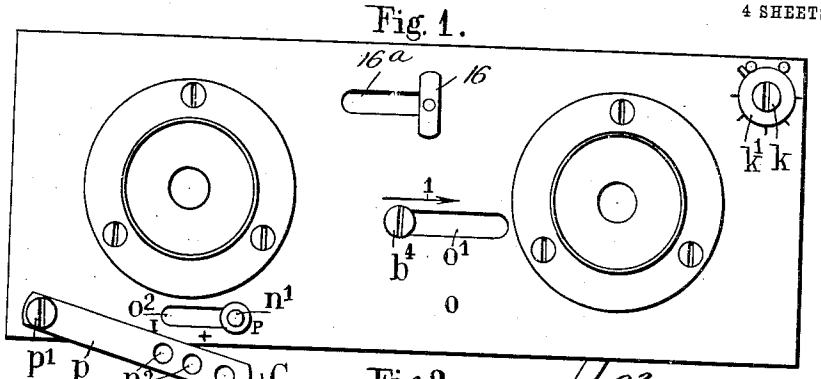


Fig. 2.

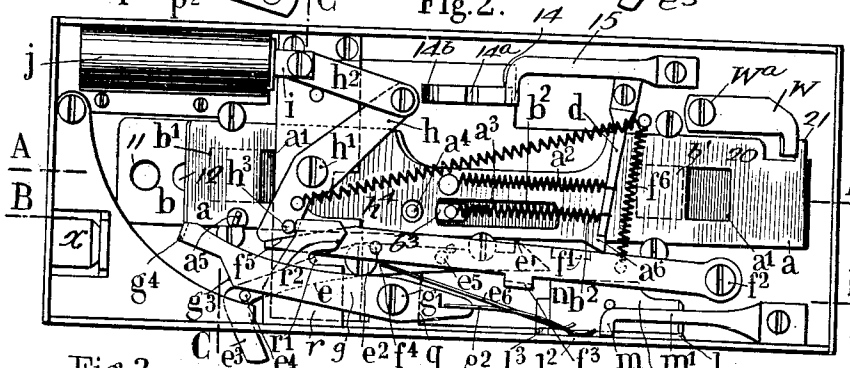


Fig. 5.

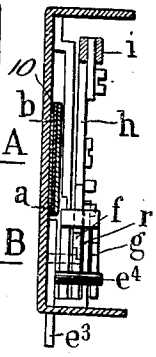


Fig. 3.

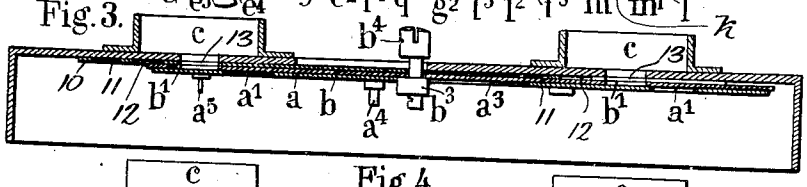


Fig. 4.

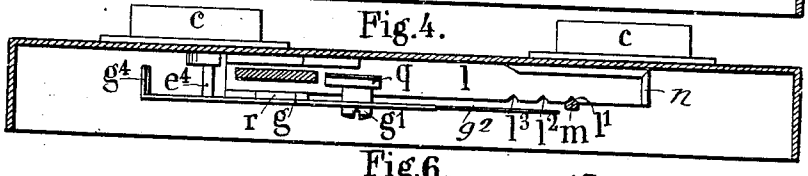
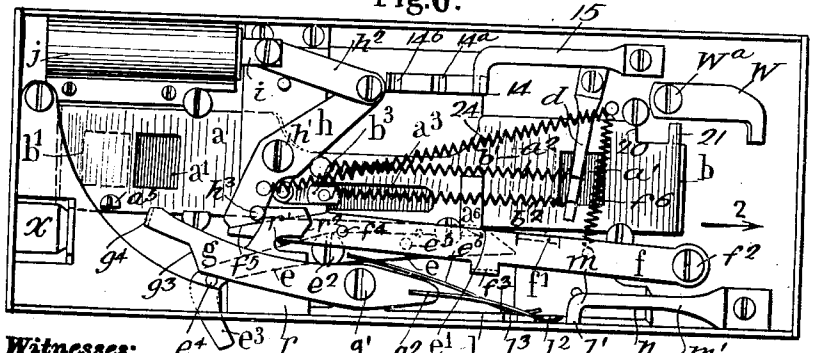


Fig. 6.



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4 SHEETS—SHEET 2.

Fig. 7.

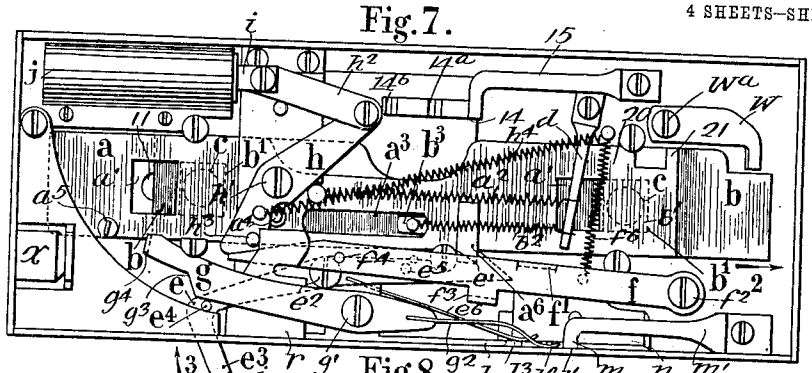


Fig. 8.

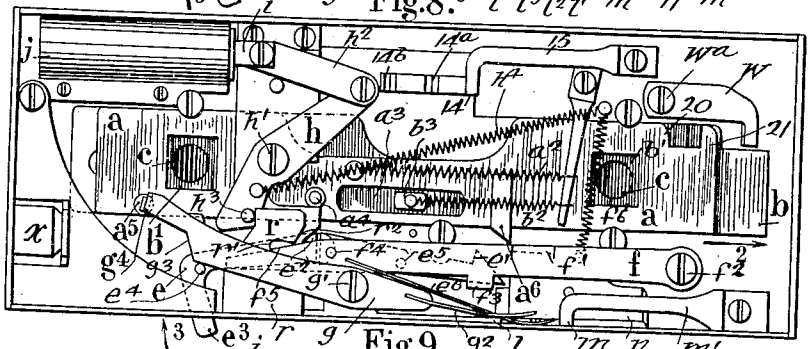


Fig. 9.

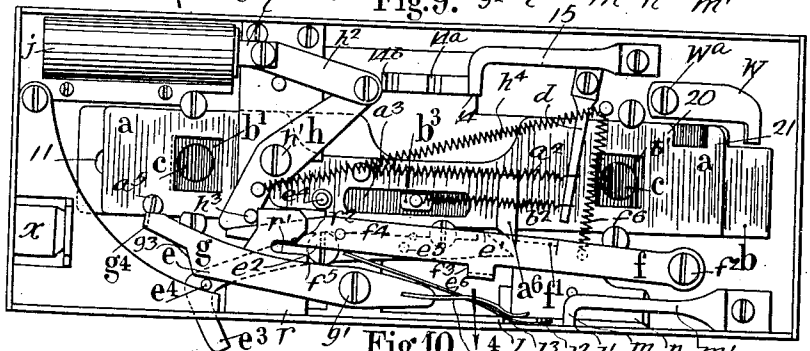
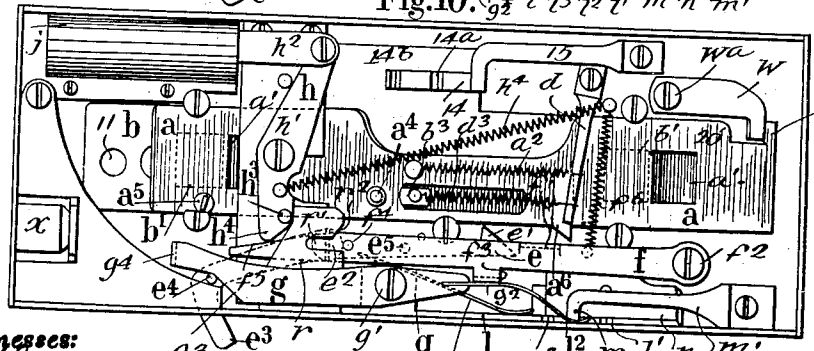


Fig. 10.



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4 SHEETS—SHEET 3.

Fig.11.

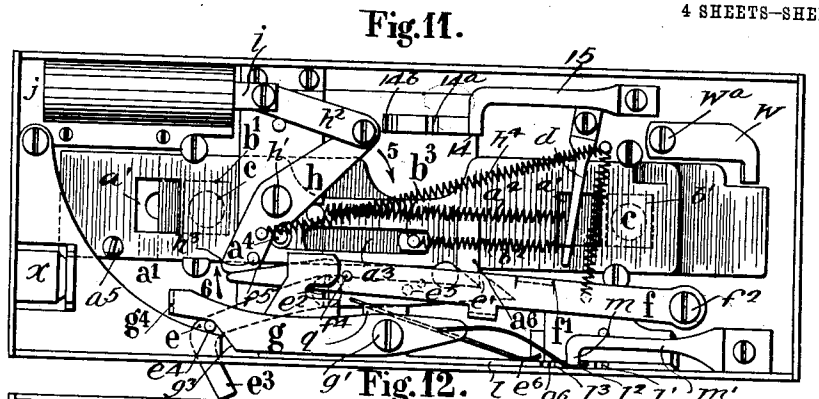


Fig.12.

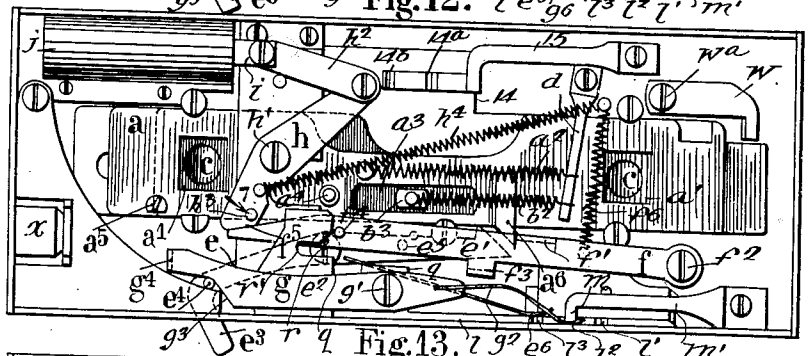


Fig.13.

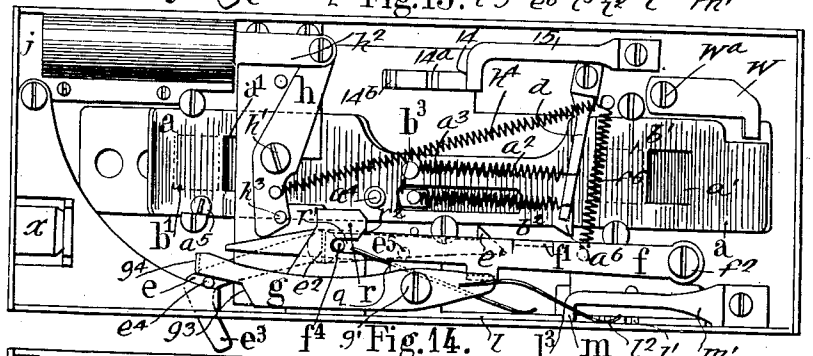
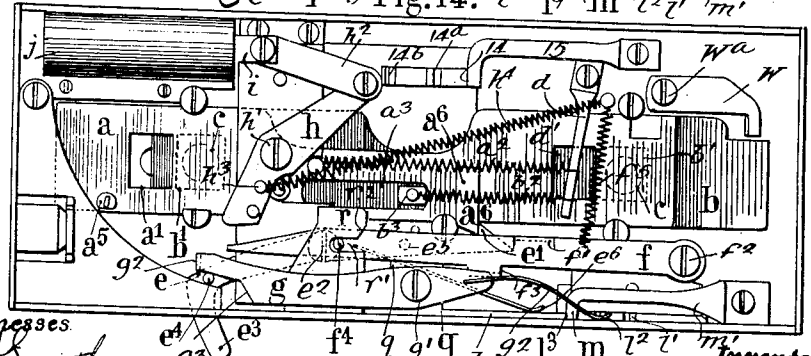


Fig.14.



Witnesses.
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4 SHEETS—SHEET 4.

Fig.15.

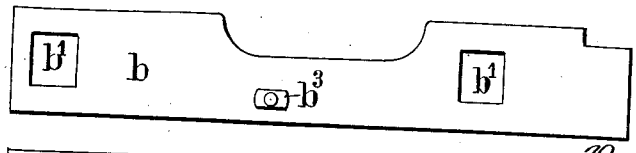


Fig.15a.

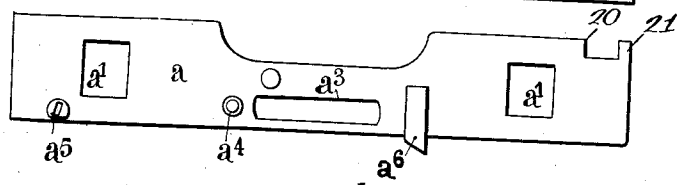


Fig.16.

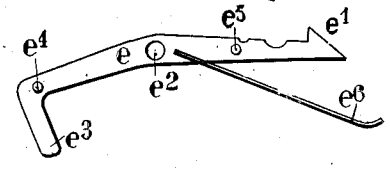


Fig.16a.

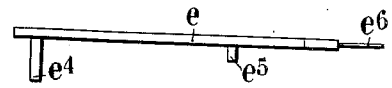


Fig.17.

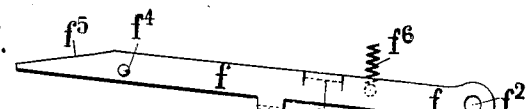


Fig.17a.

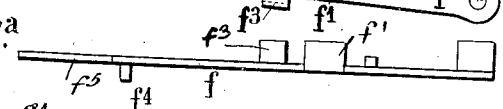


Fig.18.

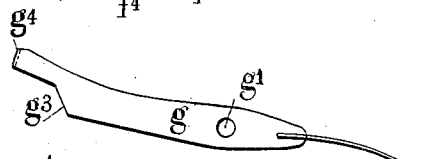


Fig.18a.

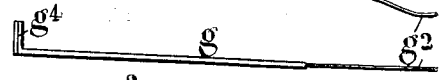


Fig.19.

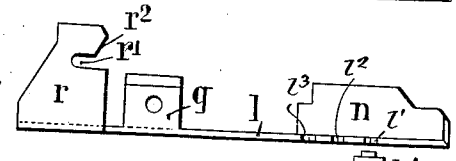


Fig.19a.

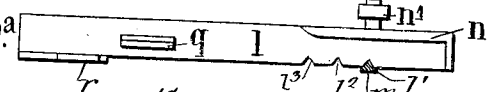


Fig.20

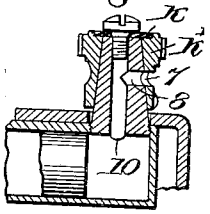


Fig.21



Fig.22.

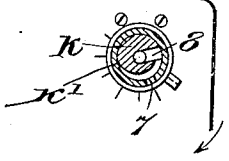


Fig.23.

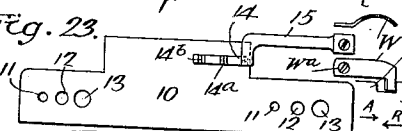
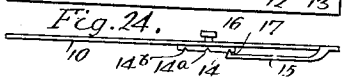


Fig.24.



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UNITED STATES PATENT OFFICE.

LOUIS JOSEPH EMMANUEL COLARDEAU AND JULES RICHARD, OF PARIS, FRANCE.

PHOTOGRAPHIC SHUTTER.

1,117,637. Specification of Letters Patent. Patented Nov. 17, 1914.

Application filed June 13, 1911. Serial No. 632,898.

To all whom it may concern:

Be it known that we, LOUIS JOSEPH EMMANUEL COLARDEAU, of 13 Rue de Navarin, professor at the College Rollin, and JULES RICHARD, of 25 Rue Melingue, instrument maker, both in the city of Paris, Republic of France, have invented an Improved Photographic Shutter, of which the following is a full, clear, and exact description.

The present invention has for its object a shutter for photographic apparatus, permitting one to obtain at will, either the ordinary or "time" exposure, of which the operator regulates the duration according to his judgment, or an exposure, the duration of which is regulated automatically in advance or finally an instantaneous or very rapid exposure. This shutter is characterized principally by a carriage capable of occupying three positions which correspond respectively to the three cases above mentioned, that is to say, ordinary or "time" exposure, exposure for a time regulated in advance, and an instantaneous exposure. In the first position of this carriage, corresponding to the ordinary or "time" exposure, in exposure-lever, which is mounted on the carriage, can be pushed by means of an actuating lever provided with an externally projecting presser-member or handle to momentarily engage the obturating plate or shutter when the latter, in its movement, brings its apertures in front of the objectives, this shutter being then stopped for the whole duration of the exposure by a detent or releasing lever. In the same position, a piece mounted on the carriage, puts out of action an automatic actuating or controlling lever, itself controlled by a spring and provided with a dash-pot, the piston of which can move at a variable speed, which permits the speed of this lever to be regulated at will. In the second position, on the one hand, an abutment or stop mounted on the carriage limits the amplitude of the movement which can be imparted to the actuating lever, in such a manner that the exposure lever can no longer be driven by the actuating lever and becomes inactive, at the same time as the detent or releasing lever becomes independent of this actuating lever; on the other hand, the automatic actuating lever is released and can actuate the detent or releasing lever when a certain time has elapsed after the instant that pressure has been applied to the presser-member or handle of the actuating lever, which time depends on the adjustment which has been given to the dash-pot. In the third position, which corresponds to the case of an "instantaneous" exposure, the exposure lever remains inactive as before and, moreover, the detent or releasing lever is locked, in such a manner that, when the presser-member or handle is pressed, the shutter passes from the "set" position to the position of rest, without stopping and at a high speed.

The invention is represented, but by way of example only, in the accompanying drawings wherein:—

Figure 1 is an elevation of the new shutter seen from the exterior. Fig. 2 is an elevation looking from the interior. Figs. 3, 4 and 5 are sections on the lines A—A, B—B and C—C respectively of Fig. 2. Figs. 6 to 14 are analogous views to Fig. 2, the parts occupying the different positions which they occupy during the several phases of the operation. Figs. 2, 6, 7, 8 and 9 relates to the ordinary or "time" exposure. Figs. 10, 11 and 12 relate to exposures, the duration of which is regulated in advance. Figs. 13 and 14 relate to instantaneous exposures. Figs. 15, 15^a, 16, 16^a, 17, 17^a 18, 18^a, 19 and 19^a are detail views. Fig. 20–22 are details of the retarding mechanism. Figs. 23 and 24 represent further detail views.

As shown in these drawings, the new shutter comprises superposed obturating plates or shutters a and b (Figs. 2, 3 and 5) shown separately in Figs. 15 and 15^a. These shutters respectively have windows a' and b' arranged at the same distance apart as the objectives c (Fig. 4); they are acted upon by springs a^2, b^2 (Fig. 2) secured at one end to a fixed piece d and at the other end to the shutters; the spring b^2 is attached to a bracket or pin b^3 fixed to the shutter b and extending through a slot a^3 in the shutter a (Figs. 2 and 15). This shutter b bears, on the opposite side, a button b^4 (Fig. 1) which serves to set the shutter-mechanism. This button b^4 can be moved in a window o' in the casing o of the shutter.

On the shutter a are fixed two pins a^4 and a^5 and a finger a^6. This finger can engage with the nose e' of an actuating lever e and with a projection f' on a releasing lever f. The actuating lever e is pivoted at e^2 (Figs. 2 and 16); its end e^3 projects at the exterior and forms a presser-member or handle; it

bears two pins e^4 and e^5 and is provided with a spring e^6. The releasing lever f is pivoted at f^2 (Figs. 2 and 17); it bears, in addition to the projection f', another projection f^3, on which the lever e is to act, and it has a pin f^4; its left-hand end forms an incline f^5; finally, it is subjected to the action of a spring f^6 attached to a fixed point. The pin e^4 of the actuating lever e can act on an exposure lever g (Figs. 2 and 18) pivoted at g' on a projection g on the carriage l, and provided with a spring g^2 and having an incline g^3 and a projection g^4. The incline f^5 on the lever f is in contact with the end of an automatic controlling lever h, subjected to the action of a spring h^4 turning about h' and coupled by a connecting rod h^2 to the rod i of a damping piston inclosed in a cylinder j forming a dash-pot. The cross-sectional area of the air-escape passage is regulated by the aid of a button k (Fig. 1). This is effected by the following mechanism (see Figs. 20, 21 and 22). The part k' is milled and turns about a fixed shell k. The part k' is provided with an orifice 7: the shell presents an opening 8 prolonged by a notch 9 of decreasing cross-section. The opening is in communication with the interior 10 of the dash pot. In the position illustrated in Fig. 21, the two openings 7 and 8 register one with the other; the air-outlet passage has its maximum cross section. If k' be rotated in the direction indicated by the arrow, the cross section of the passage progressively decreases.

The carriage which serves to regulate the operation of the shutter for the "time" exposure, the exposure for a period regulated in advance, and the instantaneous exposure, comprises a plate l (Figs. 2, 4 and 19) provided with three notches l', l^2, l^3 in which a detent-finger m can engage, this finger being carried by the end of a spring m'. A projection n is fixed to the plate l; it bears a button n' which can be moved in a window o^2 in the casing o (Fig. 1). This button n' can be brought opposite any one of three signs P, +, I, which correspond respectively to the "time" exposure, to the exposure for a period regulated in advance, and to an instantaneous exposure. The button n' may be rendered immovable at one of these three positions by a flat spring p capable of turning about p' and having apertures p^2 which can engage over the head of the button n' and lock it in the position which is given to it. The plate l bears another projecting piece g (Figs. 2 and 19), which serves as an abutment for the pin e^5 on the actuating lever e. The plate l bears a piece r; this is capable of locking the lever h by acting on a pin h^3, or of locking the detent or releasing lever f by means of its pin f^4. For this purpose, the piece r has a slot r' which registers with an incline r^2.

The operation is as follows: As shown more particularly in Figs. 23 and 24, a plate 10 is provided with two sets of apertures 11, 12, 13, the three apertures of each set being of different dimensions. According as the light is more or less intense, one or other of these apertures is brought opposite the objectives in known manner. The plate 10 is actuated by means of a handle or knob 16 moving in a slot 16^a (Fig. 1) and can be locked in three positions by means of a tooth 17 which enters one or other of three notches 14, 14^a, 14^b, formed in the rear of the plate. This tooth is carried by a spring member 15. A member w (see Fig. 23) pivoted at wa is provided for acting in known manner on the plate a to retard its movement and prevent rebounding. The part 20 of the plate a passes under the member w when the plate moves in the direction of the arrow A (Fig. 23) while the portion 21 passes under the member w when movement takes place in the opposite direction R. The member x is adapted to receive and be actuated in well known manner by means of a flexible Bowden transmission.

Let us suppose that it is desired to make an ordinary or "time" exposure. The button n' is placed opposite the sign P, this brings the carriage l to its extreme position toward the left (Fig. 2), the notch l' coming beneath the finger m. The piece r can push against the pin h^3 and lock the automatic controlling lever; on the other hand, the incline g^3 on the lever g mounts the pin e^4 in such a manner that the lever g turns and the projection g^4 as its end advances toward the shutters or obturating plates. The shutters now are in the position shown in Fig. 2.

To set the shutter-mechanism, the button b^4 is moved in the direction of the arrow 1 (Fig. 1); the shuter b accompanies the button b^4 to which it is fixed; the pin or projection b^3 abutting against the end of the window a^3, also carries along the plate a; the finger a^6 of the shutter a clears the projection f' of the lever f and the projection e' of the lever e, by slightly rocking these two levers; the different parts are then in the position shown in Fig. 6, in which it is assumed that the button b^4 has been moved as far as possible and then held by the operator.

If the operator then lets go of the button b^4, the shutter a is retained by the finger a^6 which remains in engagement with the nose e' of the lever e; but the shutter b, drawn back by its spring, moves toward the right (arrow 2) Fig. 6, the pin b^3 then moving in the slot a^3 until it brings windows b' opposite the objectives c; the latter are covered

at this moment by the shutter or plate *a*. The shutter is then set; this position is shown in Fig. 7. In order to effect the releasing of this shutter, pressure is applied to the presser-member e^3 (arrow 3) Figs. 7 and 8. This action oscillates the lever *e*, of which the projection *e'* releases the finger a^6; the shutter *a*, drawn by its spring a^2, is returned rapidly toward the right (arrow 2) Figs. 6–8 and its windows *a'* come opposite the objectives *c*, which are then uncovered. The shutter *a* is stopped at this position by the projection g^4 of the lever *g* which has come into the path of the pin a^5 and stops it. This position is shown in Fig. 8, which shows the parts at the instant when the presser-member e^3 is pushed in.

If the presser-member is released, the exposure lever *g* returns to the position in Figs. 2 and 7, and the projection g^4 leaves the pin a^5; the shutter *a* moves slightly, but is immediately stopped by the finger a^6 meeting the abutment *f'* of the lever *f*, this position being shown in Fig. 9. The objectives *c* are then open and remain so during the whole time it is desired that the exposure shall last.

When the operator wishes to close the objectives, he again presses the presser-member e^3, which motion oscillates the lever *e*; the right-hand end of the lever *e* presses against the abutment f^3 of the lever *f*, see the arrow 4 (Fig. 9), and the said lever turns downward about its pivot, the abutment *f'* leaves the finger a^6 and the plate *a* returns to its position of rest closing the objectives; the parts then again take up the position shown in Fig. 2. When the presser-member e^3 is thus pressed for the second time, the exposure lever *g*, pressed by the pin e^4 oscillates and the projection g^4 advances toward the pin a^5; but it then comes behind this pin, by reason of the slight movement toward the right which the shutter *a* has made in passing from the position where it was retained by the pin a^5 (Fig. 8) to that where it is retained by the abutment *f'* (Fig. 9). Nothing then prevents the plate *a* from moving back the whole distance toward the right.

As will be seen from what precedes, the operator can cause the exposure to last for the time which he considers suitable, as in the greater number of shutters. In pressing a first time on the presser-member e^3, he opens the objectives; by pressing a second time, he closes them, the time of exposure is equal to the interval between these two actuations of the presser-member.

In order to obtain exposure of a duration regulated in advance, the operator brings the button *n'* opposite the sign + (Fig. 1). In moving this button from P toward +, it carries the carriage with it toward the right, in such a manner that the finger *m* falls into the notch l^2 (Fig. 10). This movement of the carriage produces several results. In the first place, the incline g^3 of the exposure lever descends on the pin e^4; this lever then assumes the position shown in Fig. 10 at the same time, the piece *q* on the carriage *l* comes opposite the pin e^5 of the actuating lever *e*, in such a manner that the angle through which the actuating lever can be turned and consequently the turning of the exposure lever *g* is limited by the abutment of this pin against the piece *q*. Under these conditions, the projection g^4 of the exposure lever cannot come into the path of the pin a^5. On the other hand, the actuating lever *e* cannot act on the abutment f^3 of the releasing lever; this latter lever thus becomes independent of the actuating lever. In the second place, the piece *r*, moving toward the right, ceases to press the pin h^2 of the controlling lever *h* toward the left; this lever is released and takes up the position shown in Fig. 10, in which its end h^4 resting on the incline f^5 turns aside the detent or releasing lever *f* from the shutters and from the path of the finger a^6. The shutter-mechanism is then prepared for making exposures automatically regulated in advance; the parts of the shutter occupying the position shown in Fig. 10.

The duration of the exposure is regulated by turning the button *k* (Fig. 1), which controls an escape cock partially closing the air-exit of the dash-pot cylinder; in turning this button, the cock is opened or closed, and thus the speed with which the piston of the dash-pot can be moved is regulated. On this speed depends the duration of the exposure for a time regulated in advance, as will be seen hereinafter. In order to set the shutter, the button b^4 is moved in the direction 1 Fig. 1 as before; by the aid of this button, the shutters *a* and *b* are moved toward the left (Fig. 10); and the pin b^3 drives the shutter *a* with the shutter *b*, as has already been explained.

When the pin a^4 meets the lever *h*, it effects the oscillation of this lever in the direction indicated by the arrow 5 (Fig. 11); in this motion, the dash-pot does not offer resistance to the movement of the lever *h*; the turning of this lever *h* permits the releasing lever *f* also to rock while approaching the shutters or obturating plates, see the arrow 6. When the button b^4 is released, the shutter *b'* moves to the right and brings its windows *b* in front of the objectives. The shutter *a* is retained by the finger a^6, which has come into engagement with the projection *e'* of the actuating lever, and the pin a^4 holds the lever *h*. The shutter is then set; its parts occupy the position shown in Fig. 11.

In order to release, pressure is applied to the presser-member e^3; the projection e^1

leaves the finger a^6. The shutter a, drawn by its spring, moves toward the right, until its finger a^6 is stopped by the abutment f^1 of the releasing lever which comes into the path of this finger a^6. In this moment, the windows a' come in front of the objectives which are uncovered. The parts of the shutter at this instance occupy the position shown in Fig. 12. The lever h acted upon by its spring x, oscillates in the direction of the arrow 7. This movement is retarded by the dash-pot. As the lever h turns, its end h rests on the incline f^5 and causes the releasing lever to oscillate. A moment arrives at which this lever allows the finger a^6 to escape; the shutter a returns immediately to the position of rest closing the objectives. The exposure thus lasts, in this case, from the instant when pressure is applied to the presser-member until the moment when the lever f leaves the finger a^6; this time depends on the speed with which the releasing lever is moved aside, that is to say, the speed with which the lever h turns. This last speed can be regulated at will by the aid of the button k as above mentioned, which permits the duration of the exposure to be regulated in advance. A graduation k' (Fig. 1) moreover indicates this time.

In order to obtain instantaneous exposure, the button n' is brought opposite the sign I (Fig. 1). Consequently, the carriage is moved toward the right (Fig. 13) until the finger m is brought into the notch l^3. This movement of the carriage has for its result to lock the releasing lever in a position wherein the abutment f' is moved out of the path of the finger a^6. In fact, the incline r^2 moves the pin f^4 until it comes opposite the slot r^1, and this slot fits on to the pin f^4. The piece q' again comes opposite the pin e^5 of the actuating lever and limits its travel as in the previous case. The position of the parts of the shutter is shown in Fig. 13. The setting of the shutter takes place as already described; the finger a^6 hooks on the projection e' of the lever e. The set position is shown in Fig. 14. As the presser-member e^3 is pressed in, the projection e' leaves the finger a^6. The shutter a is drawn back passes from the set position to the position of rest in a single motion. In this movement, the windows a' pass in front of the objectives, which are uncovered for a very short period of time.

It should be remarked that the movement of the obturating plate or shutter is not retarded by any accessory part carried along with it, since at this moment, it is entirely free and, in particular, it is independent of the piston of the dash-pot.

It will thus be seen that, with the new shutter, it is possible to obtain either an exposure of a duration variable at the will of the operator, or an exposure of a duration which can be regulated in advance, or an instantaneous or very rapid exposure.

The above arrangements are only given by way of example; the form, dimensions, and detailed arrangements can be varied in all cases without modifying the principle of the invention.

Claims:

1. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, means for actuating said shutter plate according to the position of the carriage, and controlling means adapted to allow of the movement of the shutter at a predetermined speed when the carriage is in the second mentioned position.

2. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter, actuating means for releasing the shutter, releasing means acted upon by the carriage, and means for modifying the exposure according to the position of the carriage.

3. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, means for actuating said shutter plate according to the position in which said carriage is set, and means for locking the carriage in any one of its three positions.

4. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with an objective, a shutter plate, means for setting the shutter plate, means for releasing the shutter plate, and means for returning the shutter plate with its window opposite the objective to its normal position, when the first mentioned exposure is being effected.

5. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, and

means for actuating said shutter plate according to the position in which said carriage is set.

6. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with an objective, a shutter plate, an actuating lever, a releasing lever adapted to engage with said shutter plate when said actuating plate is operated, and retarding means adapted to disengage the releasing lever from the shutter plate and to allow the movement of said plate past the objective at a predetermined speed.

7. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, an actuating lever, a projection on said lever, and an exposure lever for determining according to whether it is active or inactive the duration of exposure and formed with an inclined surface adapted to coöperate with said projection.

8. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, actuating means for said plate, a pin on said lever, and a projection on the carriage adapted to engage with said pin.

9. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, means for actuating the shutter plate, a releasing lever formed with an inclined surface, and a controlling lever adapted to engage said inclined surface and disengage said releasing lever from said shutter plate to allow the second mentioned movement of the shutter plate after a regulable period of time.

10. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with a shutter plate, a releasing lever, and a pin on said lever adapted to coöperate with the projection formed on said carriage.

11. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with an objective, a shutter plate, locking means for said carriage, an exposure lever shifted by and in the movement of said carriage, a releasing lever, an actuating lever adapted to operate primarily the shutter mechanism, and an automatically acting controlling lever adapted to act on said releasing lever and to allow the movement of said shutter plate past the objective at a predetermined speed.

12. In shutter mechanism for photographic apparatus, an objective, and a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with mechanism for effecting the first mentioned exposure, said mechanism comprising means to shift the carriage into its corresponding position, means to lock the carriage in such position, a shutter plate, an actuating lever adapted to retain said shutter plate after being set and to be operated to release said plate to allow same to move toward the objective, an exposure lever adapted to retain said shutter plate in its movement, a releasing lever adapted to retain said plate opposite the objective after said plate is disengaged from said exposure lever when the operation of the actuating lever is discontinued, said shutter plate returning to its normal position when said actuating lever is again operated.

13. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with mechanism for effecting the second-mentioned exposure, said mechanism comprising a shutter plate, an actuating lever adapted when operated to disengage itself from said shutter plate to allow said plate to move, a releasing lever adapted to engage said shutter plate to interrupt its movement, and retarding means adapted to disengage said releasing lever from said shutter plate to allow the plate to return to its original position.

14. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with mechanism for effecting the second-mentioned exposure, said mechanism comprising means to move said carriage into its corresponding posi-

tion, and means to lock the carriage in such position, a shutter plate, an actuating lever adapted when operated to disengage itself from said shutter plate to allow said plate to move, a releasing lever adapted to engage said shutter plate to interrupt its movement, and retarding means adapted to disengage said releasing lever from said shutter plate to allow the plate to return to its original position.

15. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with mechanism for effecting the last-mentioned exposure, said mechanism comprising a shutter plate, a releasing lever, means acting during the movement of said carriage to shift said releasing lever out of the path of the shutter plate but engaging said releasing lever with said carriage, and an actuating lever adapted when operated to disengage itself from the shutter plate and allow said plate to pass to the objective rapidly and to return to its normal position.

16. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and to an instantaneous exposure, in combination with mechanism for effecting the last-mentioned exposure, said mechanism comprising means for moving the carriage into a position corresponding thereto, locking means for said carriage, a shutter plate, a releasing lever, means acting during the movement of said carriage to shift said releasing lever out of the path of the shutter plate but engaging said releasing lever with said carriage, and an actuating lever adapted when operated to disengage itself from the shutter plate and allow said plate to pass to the objective rapidly and to return to its normal position.

17. In shutter mechanism for photographic apparatus, a carriage adapted to occupy any one of three positions corresponding to an ordinary exposure, to an exposure for a period of time regulated automatically in advance, and an instantaneous exposure, in combination with mechanism for effecting the last-mentioned exposure, said mechanism comprising a shutter plate, an objective, a releasing lever, means to lock said lever out of the path of the shutter plate, and an actuating lever adapted to said plate in rapid motion past the objective.

The foregoing specification of our improved photographic shutter signed by us this 20th day of May, 1911.

LOUIS JOSEPH EMMANUEL COLARDEAU.
JULES RICHARD.

Witnesses:
DEAN B. MASON,
GEORGE CHARLES COQUET.