

(No Model.)

3 Sheets—Sheet 1.

M. C. G. DE GIRAUDY.
MAGAZINE CAMERA.

No. 536,514.

Patented Mar. 26, 1895.

FIG. 1.

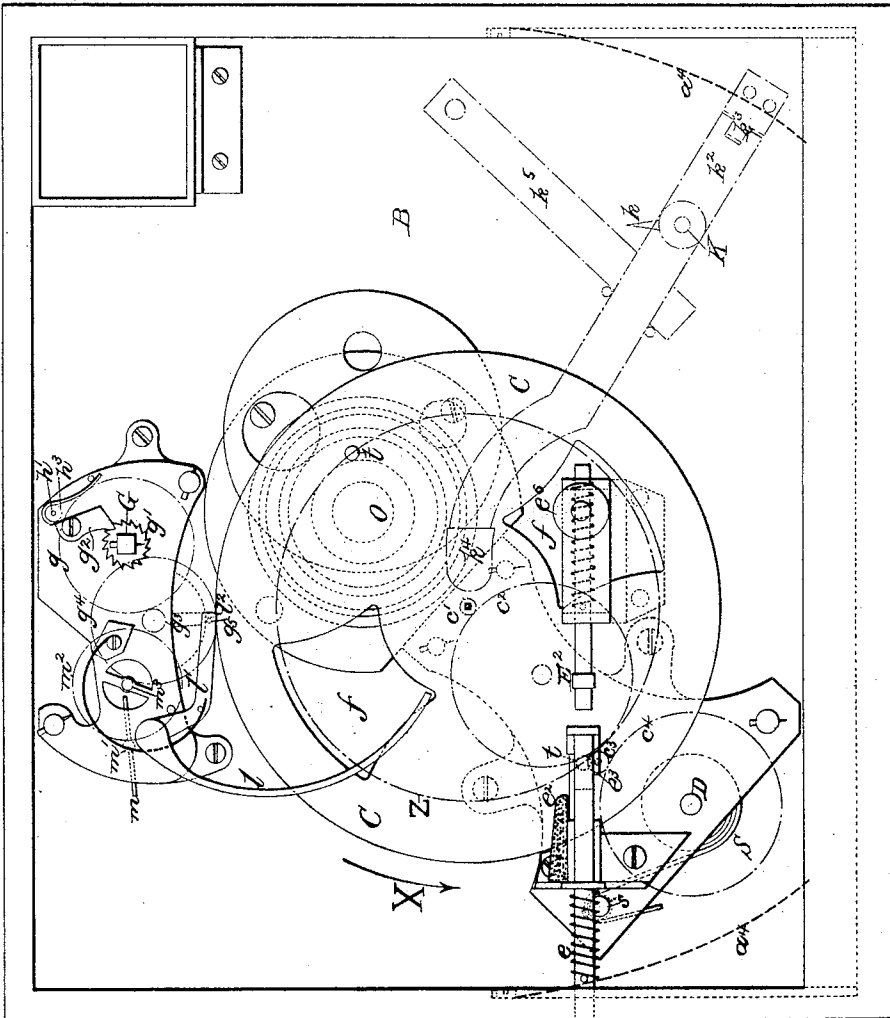
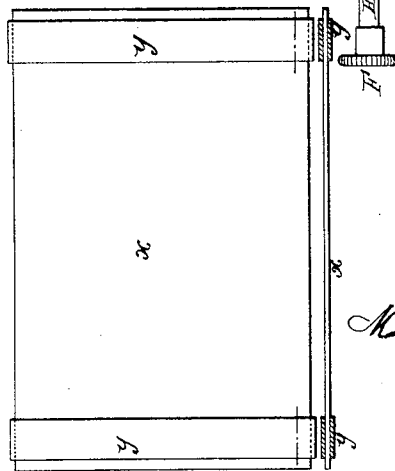


FIG. 7.



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Marcel C. G. de Giraudy

BY

Horton and Horton
ATTORNEYS.

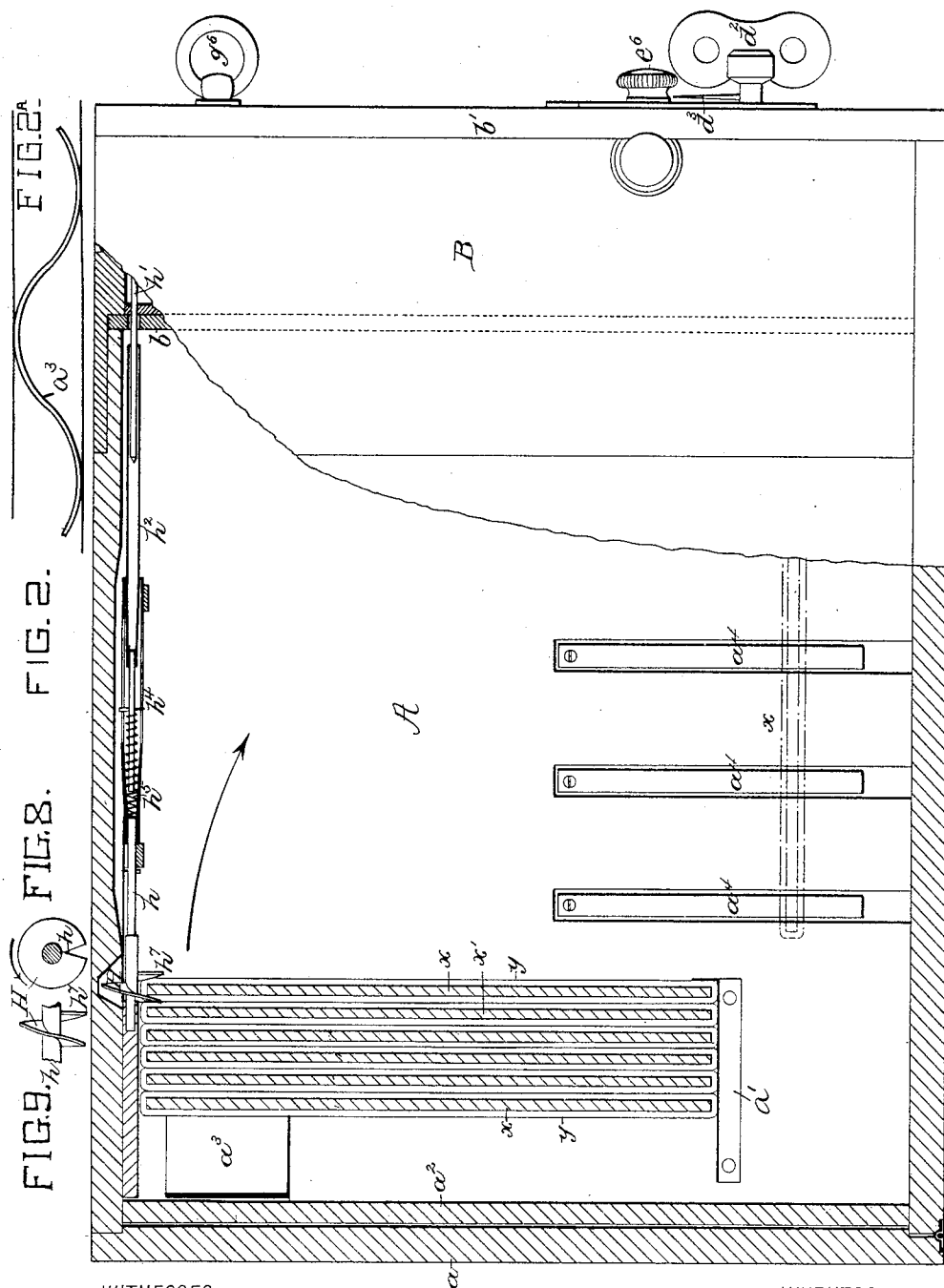
(No Model.)

3 Sheets—Sheet 2.

M. C. G. DE GIRAUDY.
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(No Model.)

3 Sheets—Sheet 3.

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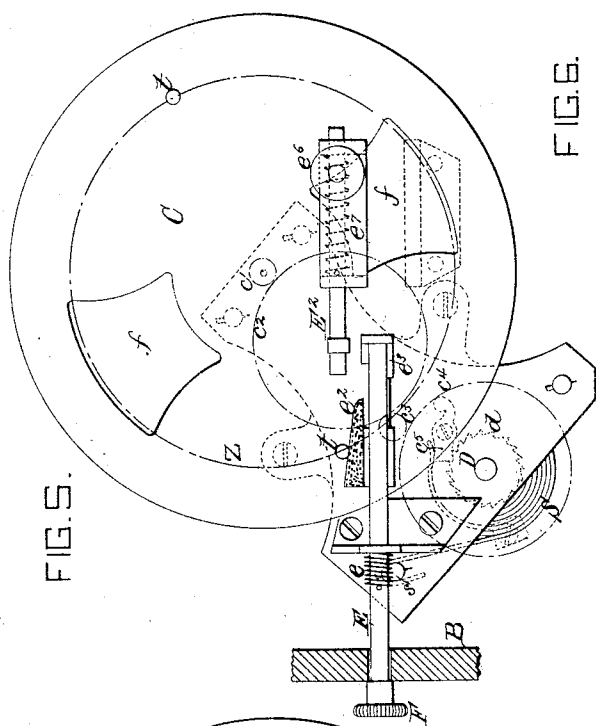


FIG. 3.

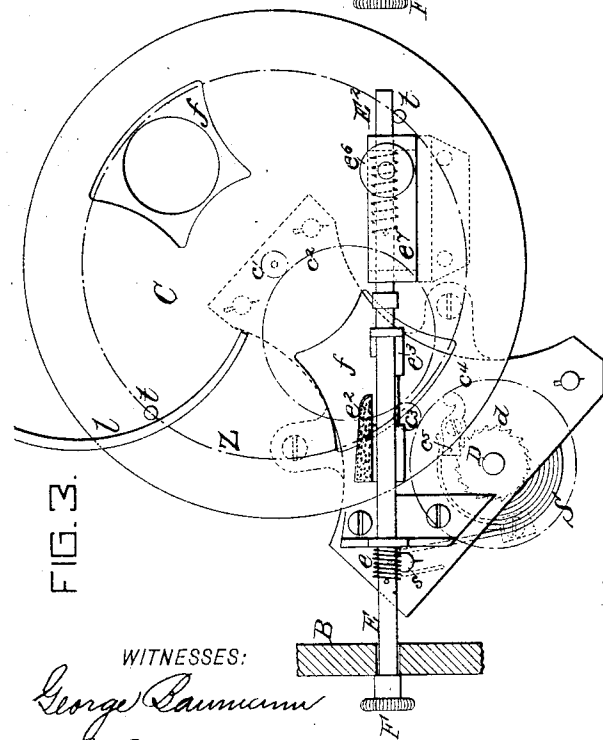


FIG. 4.

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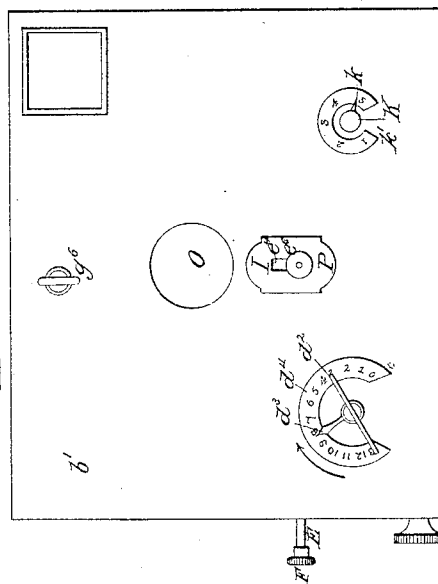


FIG. 5.

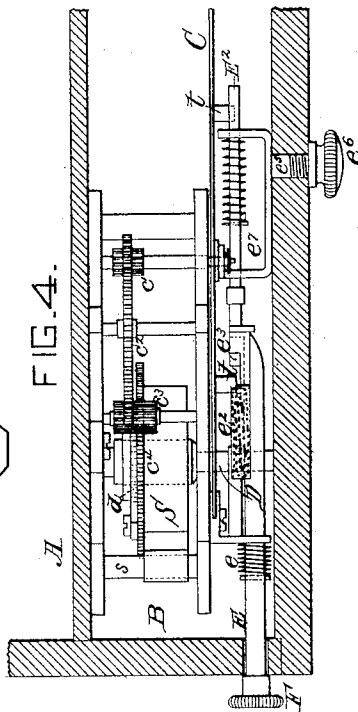


FIG. 6.

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UNITED STATES PATENT OFFICE.

MARIUS CONSTANTIN GUITTON DE GIRAUDY, OF MARSEILLES, FRANCE,
ASSIGNOR OF ONE-HALF TO ANDRÉ & LIEUTIER, OF SAME PLACE.

MAGAZINE-CAMERA.

SPECIFICATION forming part of Letters Patent No. 536,514, dated March 26, 1895.

Application filed April 25, 1894. Serial No. 508,960. (No model.) Patented in France September 9, 1893, No. 232,724.

To all whom it may concern:

Be it known that I, MARIUS CONSTANTIN GUITTON DE GIRAUDY, a citizen of the Republic of France, residing in Marseilles, France, have invented new and useful Improvements in Magazine Photographic Apparatus, (for which I have obtained a French patent, No. 232,724, dated September 9, 1893,) of which the following is a specification.

The present application for a patent relates to a magazine photographic apparatus in which all the operations, such as changing the plates, working the shutter, numbering or counting the plates, &c., are performed automatically by the operation of clockwork, when a single button has been pressed, so that the manipulation of the apparatus is extremely simple.

In order to clearly explain the nature of my invention I will describe it by way of example, with reference to the accompanying drawings, in which—

Figure 1 is a front elevation of an apparatus made according to my invention, the front board being supposed to be removed so as to permit the mechanism to be seen. Fig. 2 is a side elevation of the apparatus with the rear part in section. Fig. 2^a is a plan view of the spring to press forward the plates. Fig. 3 is a separate front elevation of the shutter mechanism arranged for time exposure the operating button being pressed in. Fig. 4 is a corresponding horizontal section. Fig. 5 is a view similar to Fig. 3, the mechanism being arranged for instantaneous work. Fig. 6 is a front elevation of the apparatus drawn to a smaller scale showing the buttons, keys, pointer and sectors employed in working the apparatus and Fig. 7 represents on a smaller scale in elevation and section a plate provided with rubbers. Fig. 8 is a sectional detail of the endless screw. Fig. 9 is a side view thereof.

The apparatus consists of two chambers A and B, the one A serving as the magazine for the plates, and the other B capable of sliding on the chamber A in any desired manner for focusing and inclosing all the operating mechanism of the apparatus.

The chamber A is closed at its rear part by

a hinged back *a*, which is opened for the insertion of the plates. The latter are arranged vertically on a part *a'*, the upper edge of the front plate abutting against an endless screw H, hereinafter described. Between the back *a*, and the plates *x*, is inserted a board *a''* carrying one or more springs *a'''*, of any desired shape to keep the plates pressed against the endless screw and feed them forward one by one when the endless screw revolves as hereinafter described.

Springs *a''*, fixed on the two side walls of the chamber A, serve to deaden the fall of plates which fall after the operation of the endless screw. These springs are utilized not only for deadening the shock, but also for retaining the plates when the apparatus is tilted. I may add that the plates are surrounded at each end by rubber pieces *y*, for keeping the plates apart and helping to deaden their fall. (I reserve the right of using metallic frames.)

The endless screw H, is mounted on a spindle *h*, which may be connected, by fitting in, or any other suitable means with another rod *h'* operated by clockwork as hereinafter described, so that the endless screw may effect one revolution each time the objective is uncovered. The operation of this arrangement will be hereinafter described. The chamber B of the apparatus contains all the motive mechanism. It is closed in at the back by a partition *b*, through which passes the rod *h'* of the clockwork movement which drives the endless screw, and in front by the board *b'*.

The motive mechanism comprises essentially two clockwork movements, viz.—one clockwork movement for operating the shutter, and the device for registering the number of plates used, and a second movement for operating the endless screw H, the second movement being set in motion by the first.

C is the shutter consisting of a disk perforated with one, two or more apertures *f*, two being shown in the drawings. The disk C, is provided with stops *t t*, corresponding in number to the apertures on the drawings, two being shown.

The axle of the shutter carries a toothed pinion *c'*, gearing through the toothed wheels *c'' c''' c''''* with the shaft D, of the first clock-

work movement. The spiral spring S of this movement, is fixed at one end to any fixed point *s*, and at the other end to the shaft D. The gear wheel *c*⁴ is loose on the shaft D, and carries a spring pawl *c*⁵ (Fig. 3) engaging with a ratchet wheel *d* (Fig. 3) rigidly fixed on the shaft D. The shaft D carries a key *d*² (Fig. 6) for winding, and a pointer *d*³ which moves over a graduated arc *d*⁴. When the spring S is wound up by turning the key *d*² in the direction of the arrow in Fig. 6, the ratchet wheel *d* fixed on the shaft D turns without operating the pawl *c*⁵ or the toothed wheels *c*⁴ *c*³ *c*² *c*¹. When on the other hand the spring S, is left free to unwind by means of a releasing arrangement hereinafter described it imparts a movement of rotation to the shaft D, and a ratchet wheel *d*, which engages the pawl *c*⁵ and all the toothed wheels *c*⁴ *c*³ *c*² *c*¹ as well as the shutter. The releasing arrangement which is employed for controlling the movement of the shutter consists of a rod E, provided with a button F passing through one of the lateral walls of the chamber B, and which is constantly forced outwardly by a spring *e*. This rod carries at its other extremity two abutments *e*² *e*³ arranged baffle-wise, relatively to the circular path taken by the stops *t*, *t*¹, of the shutter.

The mechanism can be adjusted at will either for instantaneous or time exposures by means of the following arrangement: The front board *b*¹ of the apparatus is perforated by a slot *e*⁴ Fig. 6 in which a screw threaded rod *e*⁵ can rise and fall and to which is secured a U-shaped carriage *e*⁷ (Fig. 4). The arms of this U-shaped carriage serve as a guide to a rod E² which a spring tends constantly to return toward the stop rod E of the releasing device herein above described. A milled screw nut *e*⁶, carried outside by the rod *e*⁵ is employed for fixing the carriage and the rod E² either in its upper position I, corresponding to the position for instantaneous working (Fig. 5) or in its lower position P corresponding to time exposure. In this last position the rod E² is in a line with the rod E (Figs. 1 and 3). It is evident that the rod E can be operated from outside by an air ball or any other mechanism in place of the direct driving by the button F.

A brake may be arranged as usually to retard in a greater or less degree the speed of the shutter for instantaneous work. By way of example I show in the drawings an arrangement which I may adopt by preference. Through the front board *b*¹ passes a screw K, carrying a pointer *k*, moving on a graduated arc *k*¹ of velocities. The end of this screw bears on a thin bar *k*² (Fig. 1) which can turn on a hinge *k*³ and carries at its other extremity a cushion *k*⁴ which bears more or less on the shutter C, according as the screw K is screwed up, more or less. A spring *k*⁵ tends to keep the cushion *k*⁴ free from the shutter. I have thus described the mechanism for the shutter, the device for registering the number of

plates used and the mechanism for operating the same.

I will now describe the clockwork movement for operating the endless screw H. Differing from the clockwork movement previously described this one comprises an ordinary barrel spring, fixed at one of its ends to the toothed barrel *g*, and at its other end to the shaft G of the winder on which is fixed the ratchet wheel *g*¹ engaging with the pawl *g*². The toothed wheel *g*, gears with two like toothed pinions *h*³ *g*³, of which the one *h*³ is keyed on the spindle of the endless screw, and the other *g*³ is fixed on a shaft, which also carries a toothed wheel *g*⁴ on which is a stop *g*⁵.

The mechanism for releasing the clockwork movement above described consists of a two armed lever *l*, *l*¹, the extremity of the arm *l* being situated in the path Z, described by the stops *t* of the shutter and the arm *l*¹ of which is bent at *l*² at right angles to itself, so as to present its end in the path taken by the stop *g*⁵ at the time of the rotation of the toothed wheel *g*⁴. To retard the speed of the clockwork motion and consequently that of the endless screw H, I have arranged a fly *m*, which is connected with the wheel *g*⁴ by means of the toothed wheels *m*¹ *m*² *m*³ arranged so as to considerably increase the speed of the "fan" *n*, in proportion to that of the wheel *g*⁴. The vanes *m*, beat the air which retards their speed and that of the whole mechanism. A key *g*⁶ is employed for winding up the above described movement.

Any arrangement desired may be employed to connect the spindle *h*, of the endless screw H to the spindle *h*¹, that transmits to it the motion of the barrel *g*, so long as the said arrangement will permit of the movement of the chamber B for focusing purposes. The drawings show an arrangement of this kind by way of example. The spindle *h*¹ terminates in a part square in cross section, which fits in a recess of the same section in the rod *h*². This rod *h*² carries a cross pin *h*⁴ which slides in longitudinal slots formed in the tube *h*⁵ which tube is soldered to the rod *h*.

A spring bearing at one end against *h* and at the other on the pin *h*² tends to force *h*² against *h*¹ whatever the relative positions of the chambers B and A have to each other.

I remark that it is evident that the apparatus may be arranged so that the first clockwork movement could be wound in the same direction as the second. To effect this it would be sufficient to add a toothed wheel to gear wheels *c*² *c*³ *c*⁴ which connect the first movement to the shaft of the shutter C.

The operation of the device is as follows:—We will suppose the apparatus charged with a series of plates *x* and that the two clockwork movements are wound up. The first plate *x* is situated between threads of the endless screw H Fig. 2 and one of the stops *t* of the shutter C bears against the abutment *e*³ of the releasing rod E.

To be more clear a distinction must be made between the case for instantaneous exposures, and that when an exposure more or less prolonged is desired.

Instantaneous Exposure.

The rod E^2 is raised to its highest position (Fig. 5) by making the rod e^5 slide to the upper part I of the slot e^4 and the screw nut e^6 is tightened in this position.

With the apparatus so arranged it is sufficient for making instantaneous exposures to press the button F of the rod E and then to allow the said rod to return to its normal position under the influence of the spring e . This simple operation may be repeated as many times as it is desired to obtain exposures without doing anything else, except to refill the magazine with plates as often as it becomes empty. The operations take place as follows: When the rod E is made to slide from left to right the stop t at one period of time escapes from the edge of the abutment e^3 and then the shutter being released obeys the impulse of the spring S acting through the intervention of the shaft D of the ratchet wheels d of the pawl c^5 and of the toothed wheels c^4 c^3 c^2 c^1 . The shutter then commences to turn in the direction of the arrow X Fig. 1 at a speed which can be regulated and varied by means of the button K controlling the brake k^4 ; but the shutter is necessarily arrested as soon as it has effected a half revolution because at the moment in which the rear edge of the abutment e^3 has released the stop t , the abutment e^2 is already intersected by the imaginary circle Z which represents the path traversed by the stop. The stop t opposite that which has just been freed is retained without fail by the abutment e^2 and the shutter can only make a half revolution. When the button F is released the stop at a certain period of time which is stopped by the abutment e^2 releases the latter but is immediately held by the abutment e^3 because the imaginary circle Z always intersects one or other of the abutments e^3 and there is no space between them permitting of the direct passage of the stops. This refers to the statement already made when I said that the abutments are arranged baffewise with reference to the stops.

As the apertures f are arranged on a diameter at right angles to that which passes through the stops t the result is that midway of each movement of the shutter an aperture f passes before the objective o which is instantly uncovered. At this moment one of the stops t moves against the arm l of the starting lever of the endless screw motion so that it is sharply pushed back and the arm l' is depressed. The end l^2 of the said arm l' leaves the stop g^5 so that the wheel g^4 and all the mechanism are free to turn. In any case the wheel g^4 can only make one revolution since the lever l' having resumed its posi-

tion, the stop g^5 is held by the end of the arm l^2 when the wheel has made one revolution. Consequently the shaft of the endless screw H can only make one turn at each time of releasing because the pinions g^3 and h^3 have an equal number of teeth.

As the endless screw turns in the direction of the arrow, its end h^7 rises above the edge of the plate x and at this moment the spring acting on the row of plates pushes the front one, which is no longer held, forward in such a manner as to cause it to fall between the springs a^4 which deaden its fall. Meanwhile the plate x' has been pushed against the rear of the endless screw, and when the screw has finished its revolution it occupies exactly the same position which the plate x occupied before the operation. It is only necessary to press again on the button F in order to obtain the same working.

It should be noted that the stop t acts on the lever l to start the movement of the endless screw only when the shutter has already uncovered the objective (Fig. 3). As in the other case the speed of movement of the endless screw is retarded by the vanes m and the plate receives the impression before its fall which is effected by the action of the endless screw as hereinbefore described.

Time Exposure.

The rod E^2 is depressed into the position shown by Fig. 3 so that it is in a line with the rod E. To effect this it is simply necessary to tighten the screw e^6 at the base of the slot e^4 at P. By pressing on the button on the rod E the latter effects the starting of the working of the shutter by releasing one of the stops t , as previously described, but a further effect is actually produced.

In sliding from left to right the rod E has drawn with it the rod E^2 which is in line therewith so as to cause it to pass from the position shown in Fig. 1 to that shown in Fig. 3. In this last position the rod E^2 intersects the circular path Z of the stops. The result is that the stop t which has just been released is stopped by the rod E^2 , when the shutter has only made a quarter of a revolution, *i.e.*, when one of the apertures f is exactly in front of the objective O and when the other stop t is on the point of touching the lever l . The shutter will remain in this position (Fig. 3) as long as pressure is applied to the button F and the length of exposure can be made as desired. On releasing the button E the stop t will at a certain period of time escape from the extremity of the rod E^2 . The shutter will then complete its half revolution, and the upper stop will strike against the abutments e^2 and then against e^3 , as has been described above. In its movement this stop t will operate the lever l for starting the motion of the endless screw and the exposed plate will fall and will be replaced by the next following.

The abutment e^2 may be covered with

leather or other elastic material to deaden the shock of the stops *t*.

Counting the Plates.

5 Any shaft for transmitting the movement of the spring *S* to the shutter *C* may be employed for fixing thereon a pointer showing every half revolution of the shutter on a graduated dial. For example the shaft *D* which
10 turns through a certain angle at every half revolution of the shutter there may be fixed an indicating pointer *d*³ which thus moves through one division of the dial at every movement of the shutter or what comes to the
15 same thing for every fall of a plate. The number of plates that have not yet been used can be thus readily read off and without opening the apparatus.

I may remark in conclusion that I do not
20 limit myself to the precise details of construction hereinbefore described and moreover I reserve the right of adapting my improvements to all known photographic apparatus. Thus my invention is applicable to apparatus
25 with two objectives as well as those with only one and moreover I may adopt any suitable construction or arrangement for shifting the chamber *B* and focusing, for the brake device for instantaneous working, and for operating
30 the diaphragms.

I claim—

1. In a magazine camera, the combination of an endless screw adapted to release one plate at each revolution of the screw and a
35 clock-movement to actuate the endless screw, with a shutter provided with one or more apertures and a corresponding number of stops, the said stop or stops being adapted to release the clock-movement of the endless screw, a
40 second clock-movement to operate the shutter and means for releasing the said second clock-movement from outside the camera, substantially as set forth.

2. In a camera, the combination of a rotating shutter provided with one or more apertures and a corresponding number of stops, and a clock-movement to actuate the shutter,

with an operating device to release the clock-movement, said operating device having means for arresting the shutter and clock-movement each time one of the stops reaches
50 a certain point, all substantially as and for the purposes set forth.

3. In a magazine camera, the combination of a series of plates, an endless screw adapted
55 to permit the plates to fall one by one, and a clock-movement to operate the screw, with a shutter provided with means for automatically releasing the said clock-movement when the shutter is moved, all substantially as and
60 for the purpose set forth.

4. In a camera, the combination of a spring-actuated shutter provided with one or more apertures and a corresponding number of stops, and a push-rod provided with two baffle
65 abutments one or the other of which is always in the path of said stop or stops, with a spring rod *E*² capable of adjustment in or out of the path of the push-rod, the said spring rod
70 adapted to be pushed by the push-rod into the path of the stop or stops, substantially as and for the purposes set forth.

5. In a magazine camera, the combination of a shutter provided with one or more apertures, means for releasing the shutter to bring
75 one aperture at a time before the lens, means for dropping one plate after each movement of the shutter, with a spiral spring, a shaft to which one end of the spring is secured, gearing, pawl and ratchet mechanism between the
80 spring and the shutter, the said shaft passing through to the outside of the camera and indicating means connected therewith to indicate on the outside the number of times the shutter has been released and consequently
85 the number of plates exposed, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARIUS CONSTANTIN GUITTON DE GIRAUDY.

Witnesses:

AUGUSTE JABOT,
JEAN BARNÉOUD.