

No. 609,033.

Patented Aug. 16, 1898.

H. W. LOCKE.
PHOTOGRAPHIC SHUTTER.

(Application filed Nov. 12, 1897.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

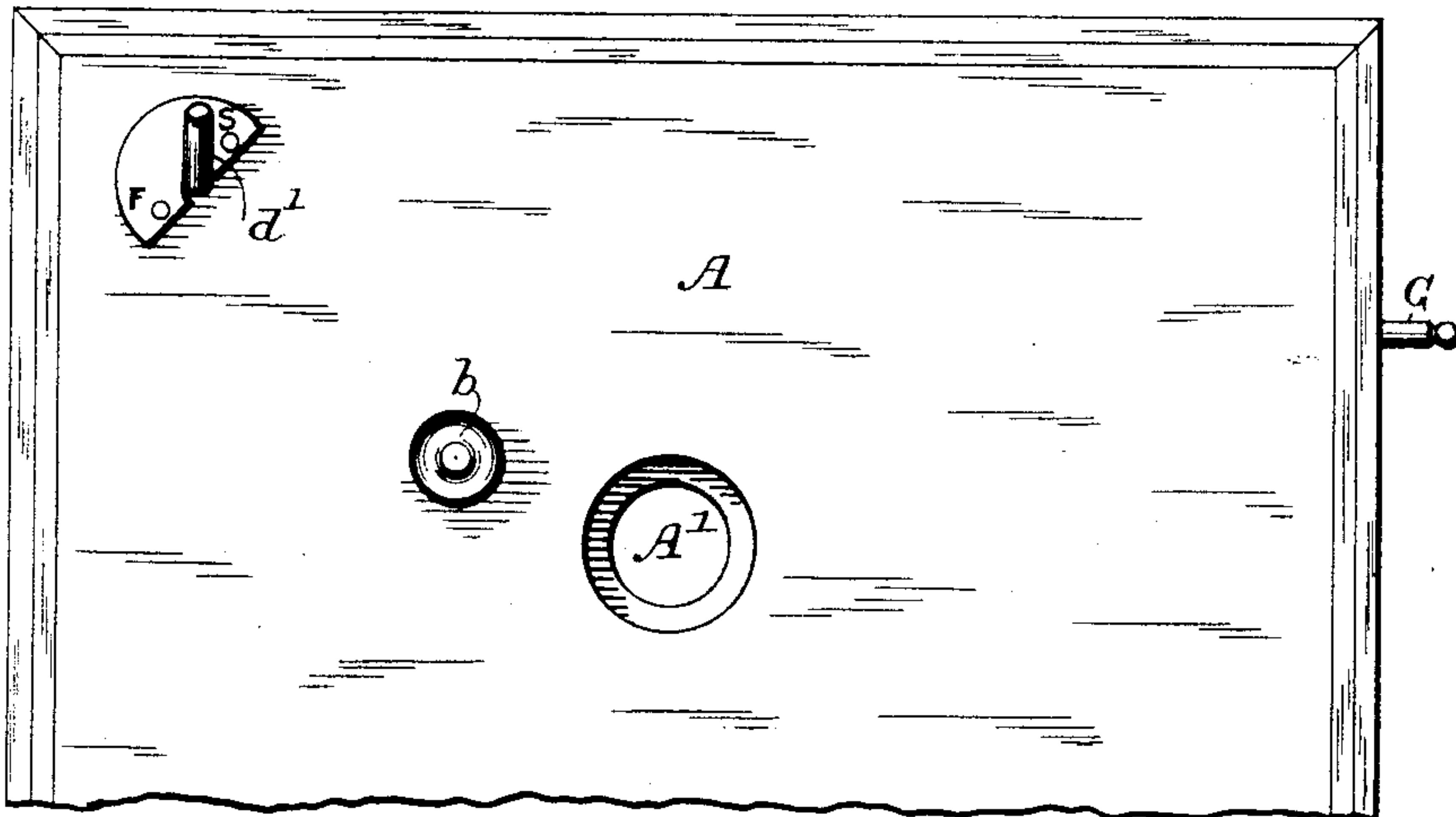


Fig. 2.

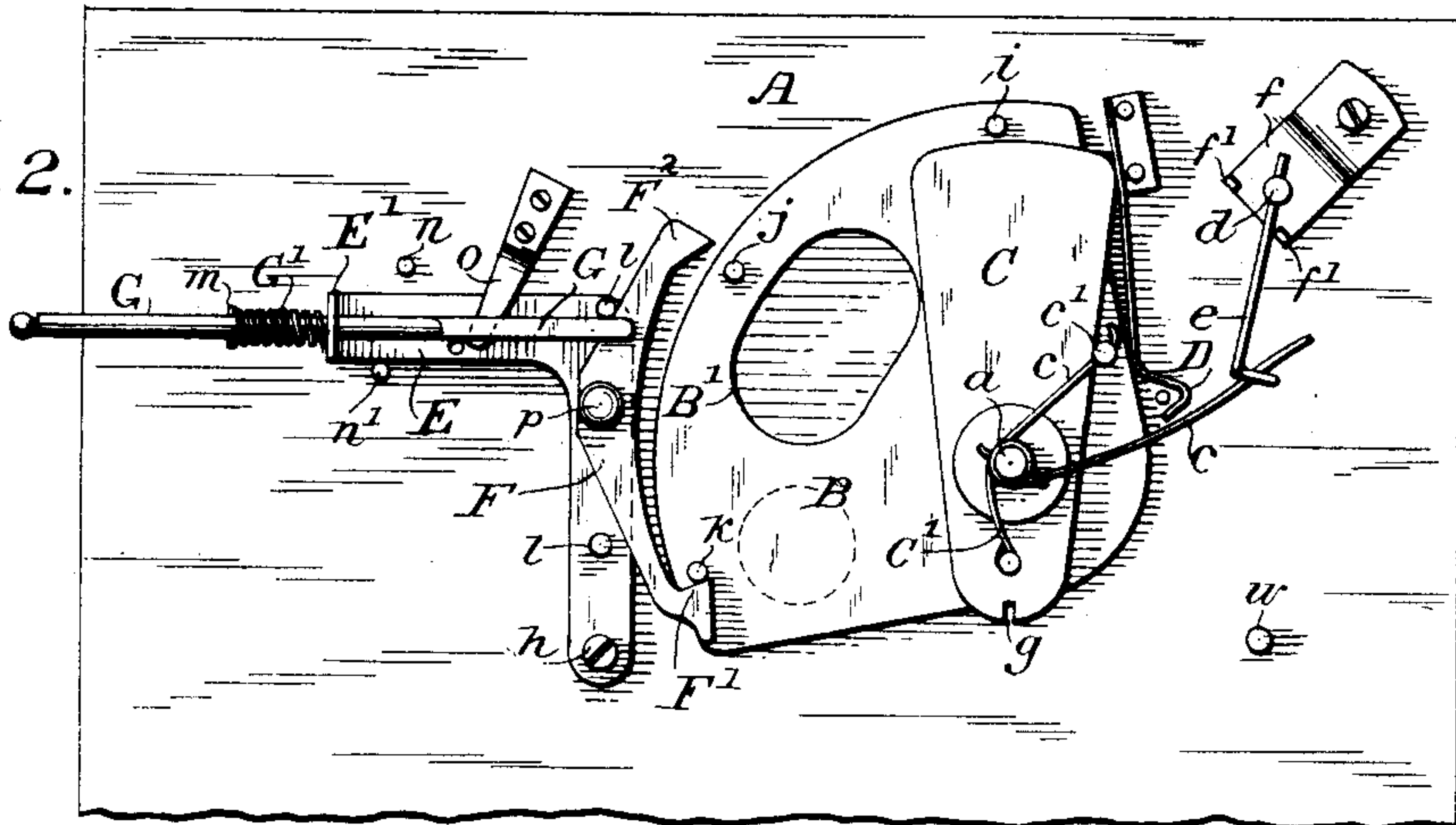
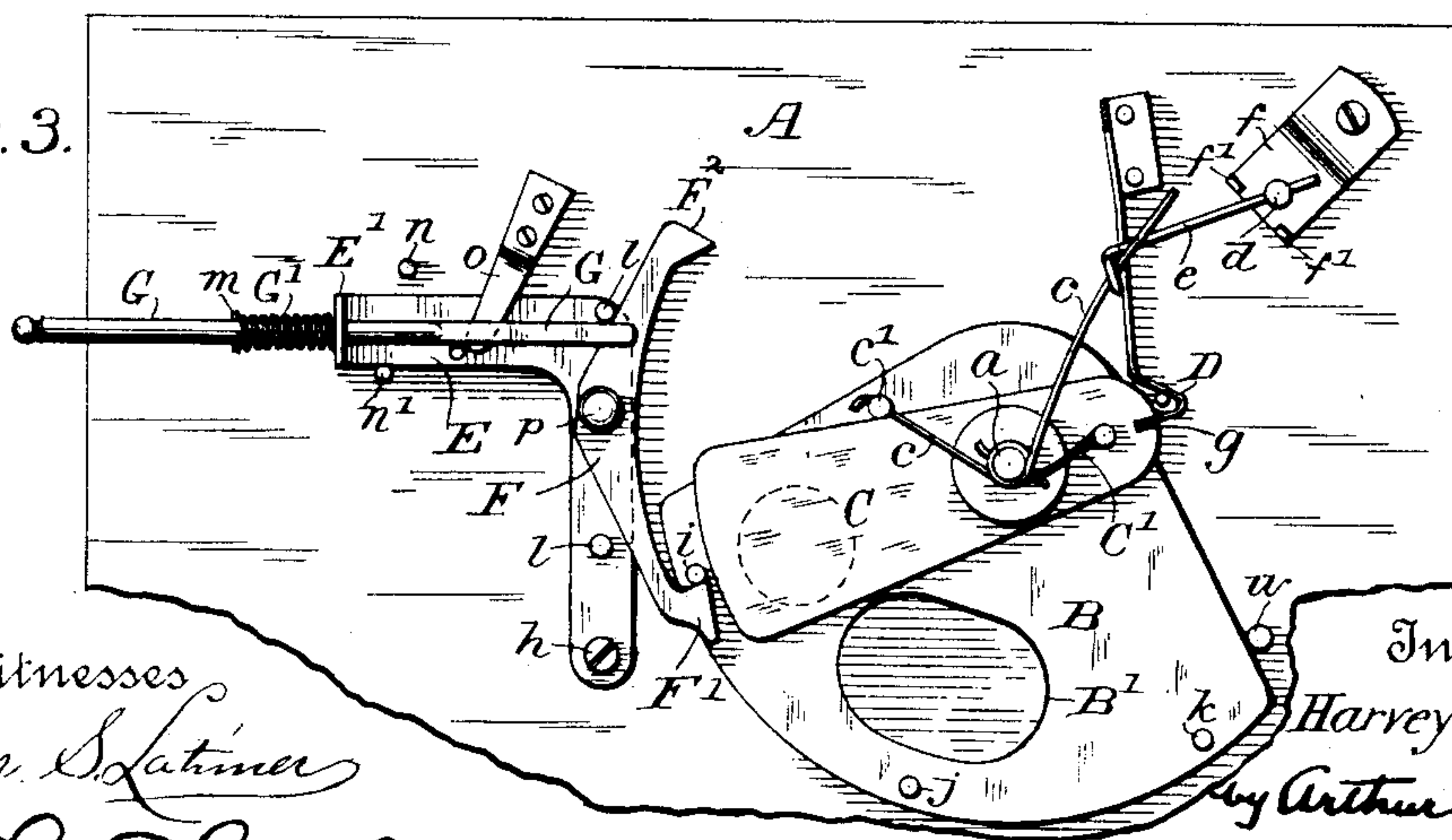


Fig. 3.



Witnesses

Jos. S. Latimer
Theo. T. Snell.

Inventor

Harvey W. Locke

by Arthur S. Browne

his Attorney

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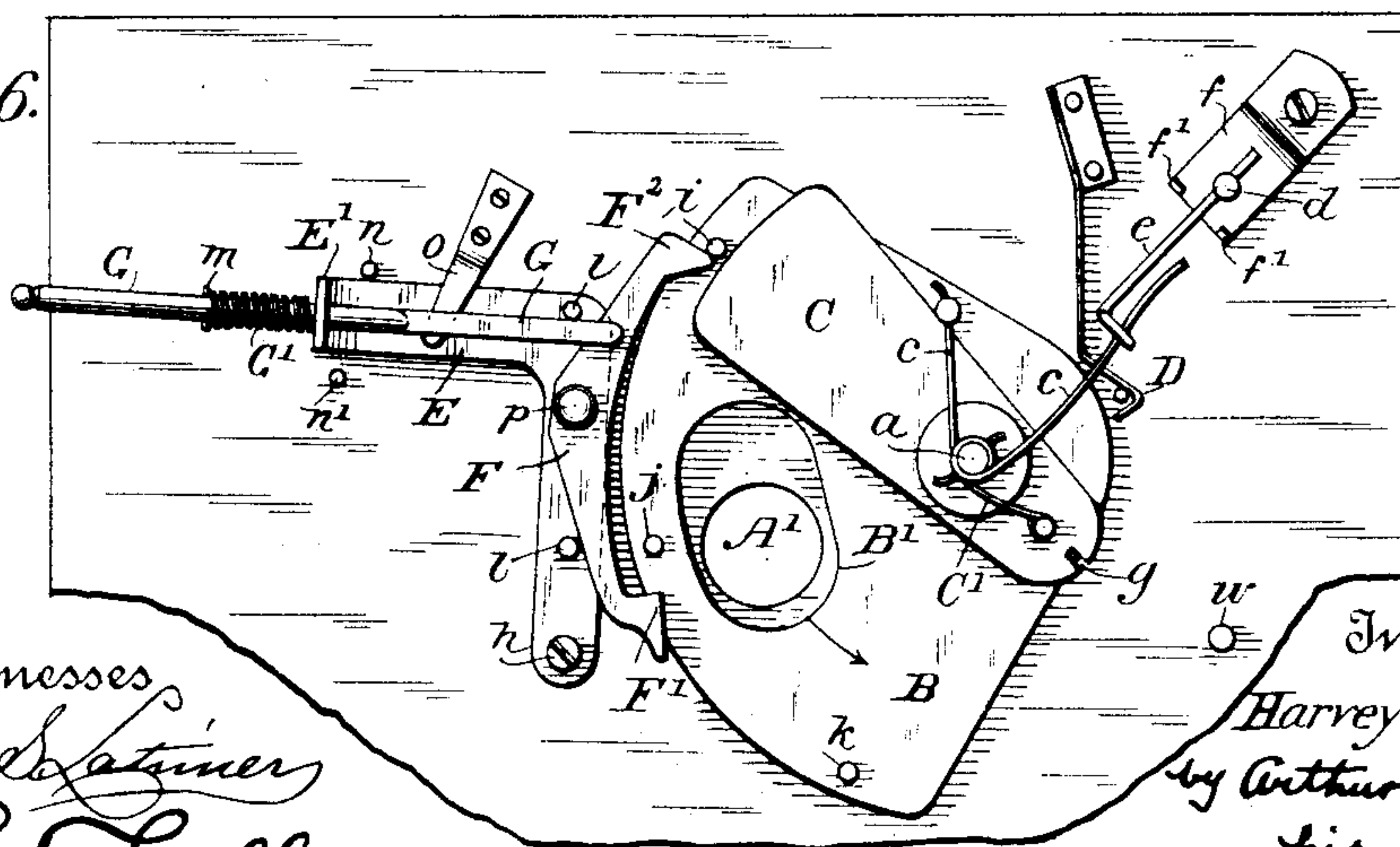
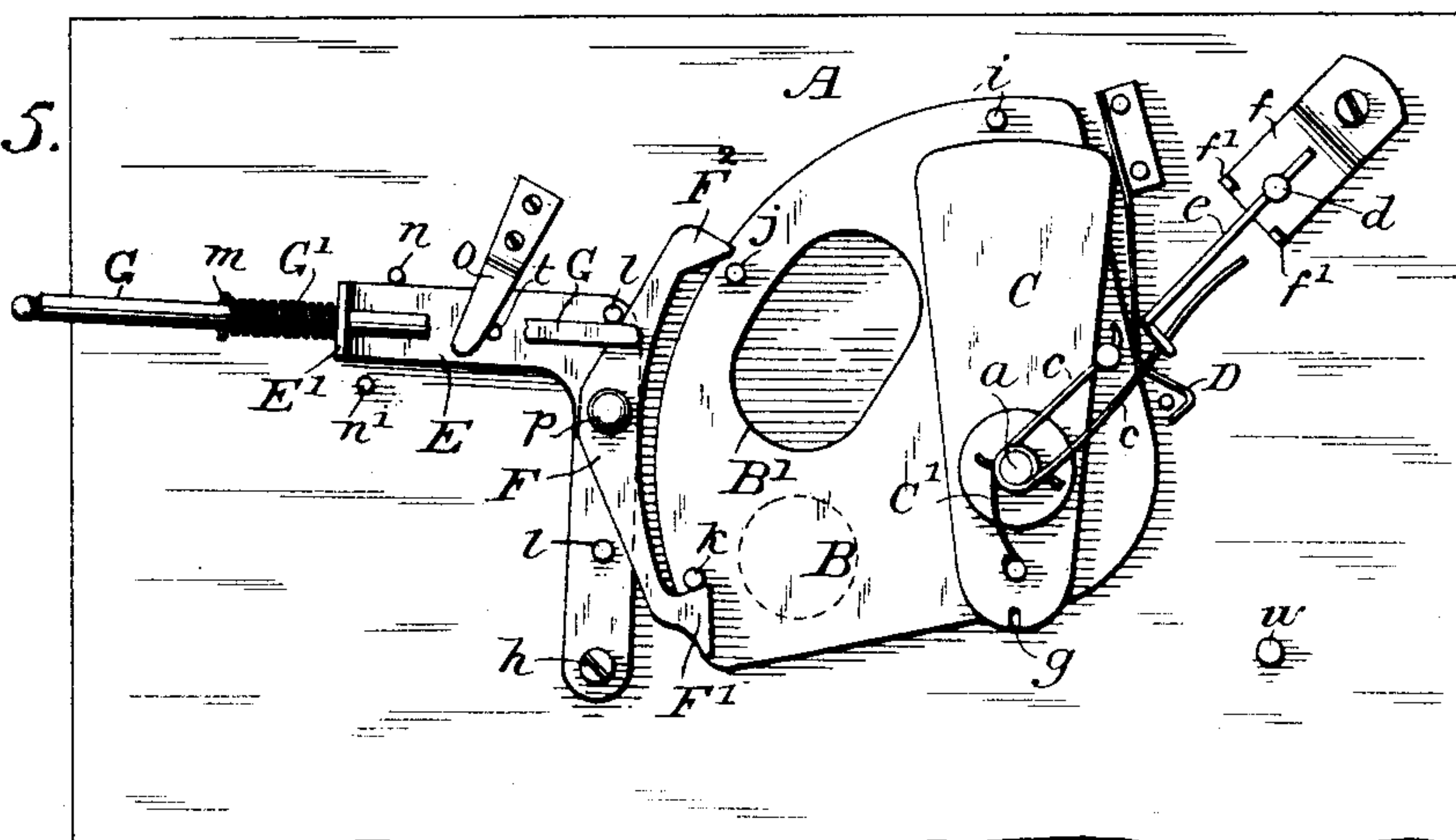
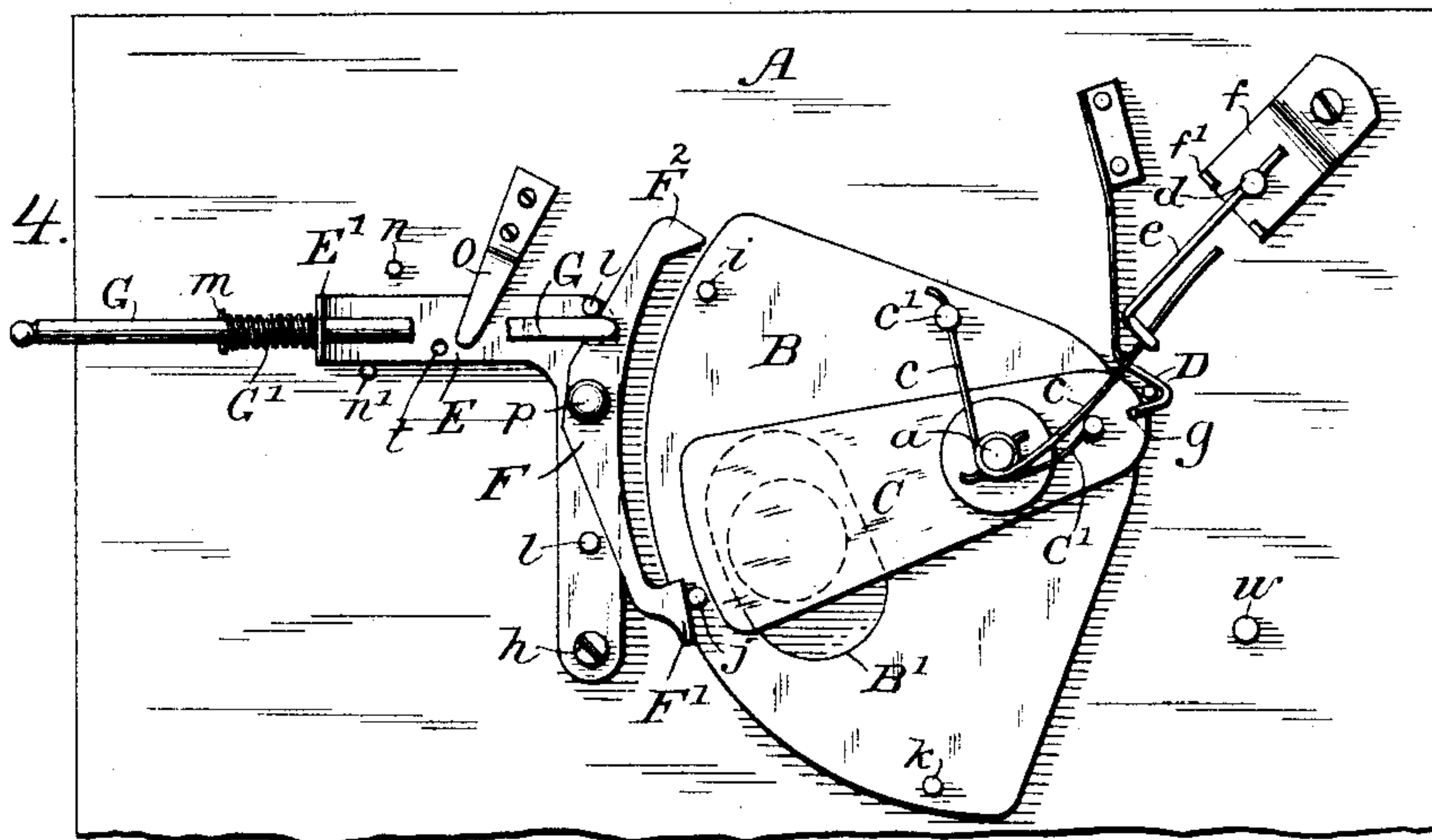
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3 Sheets—Sheet 2.



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Jos. S. Latimer
Theo. T. Snell.

Inventor
Harvey W. Locke
by Arthur S. Browne
his Attorney

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3 Sheets—Sheet 3.

Fig. 7.

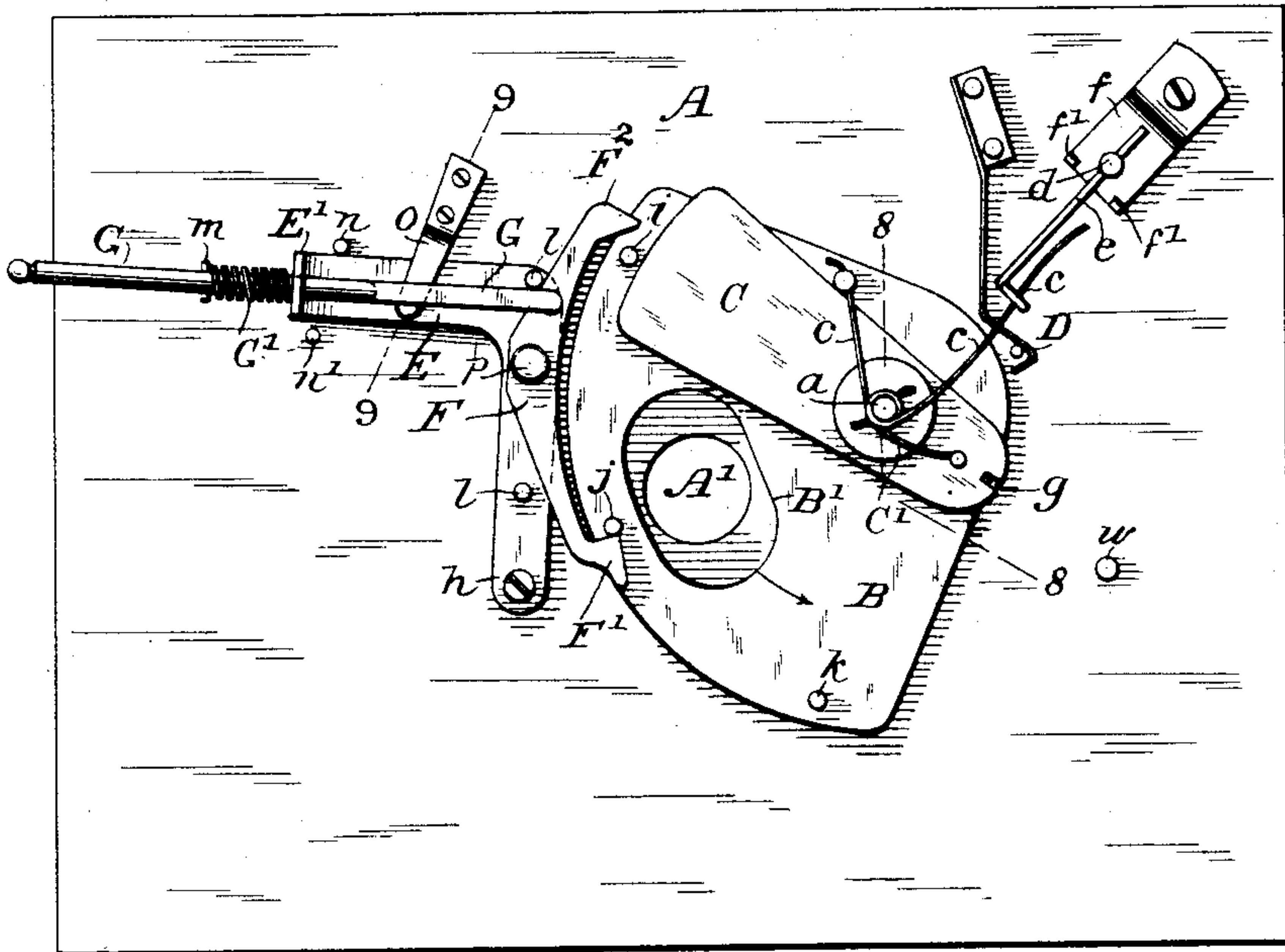


Fig. 8.

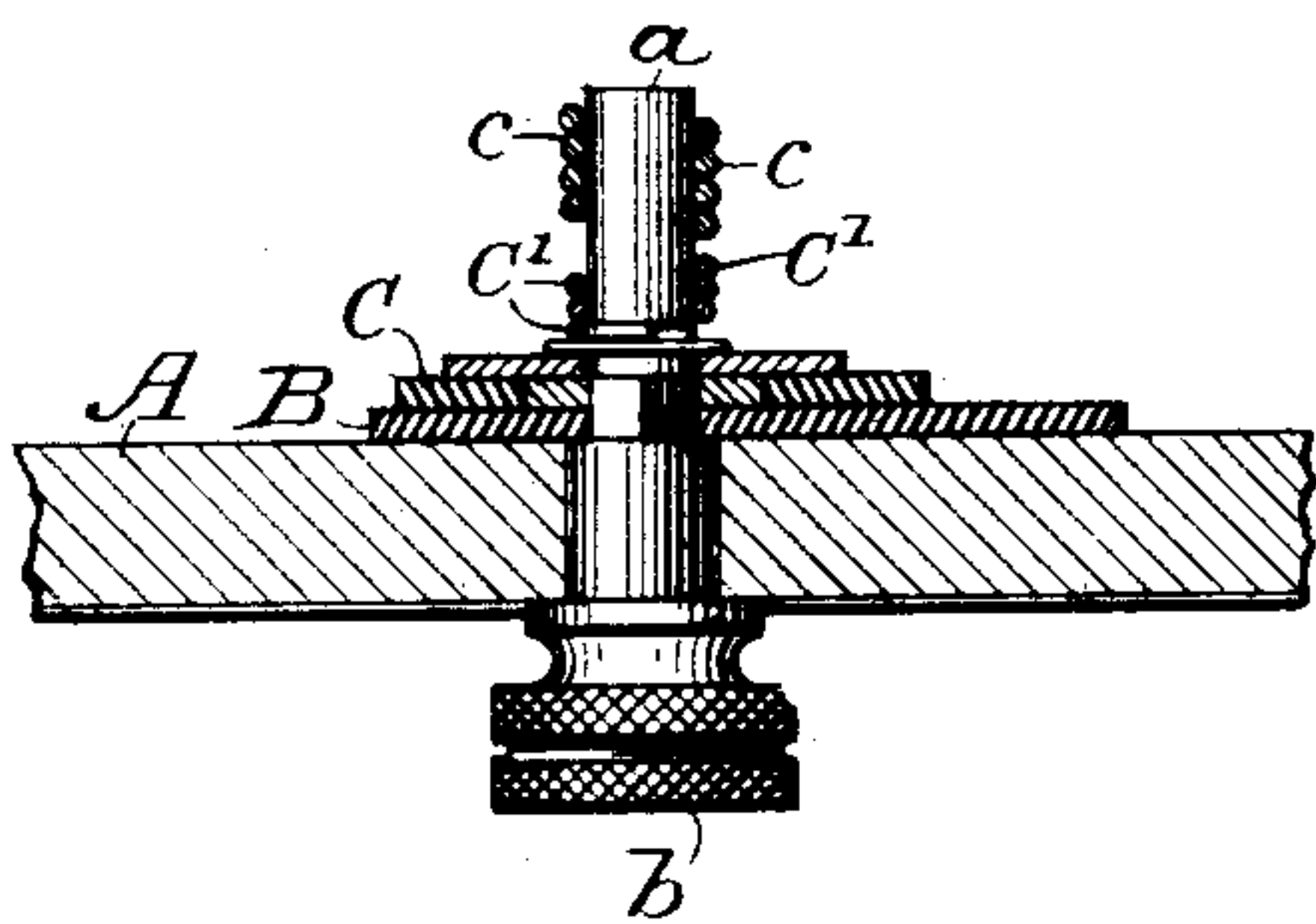


Fig. 9.

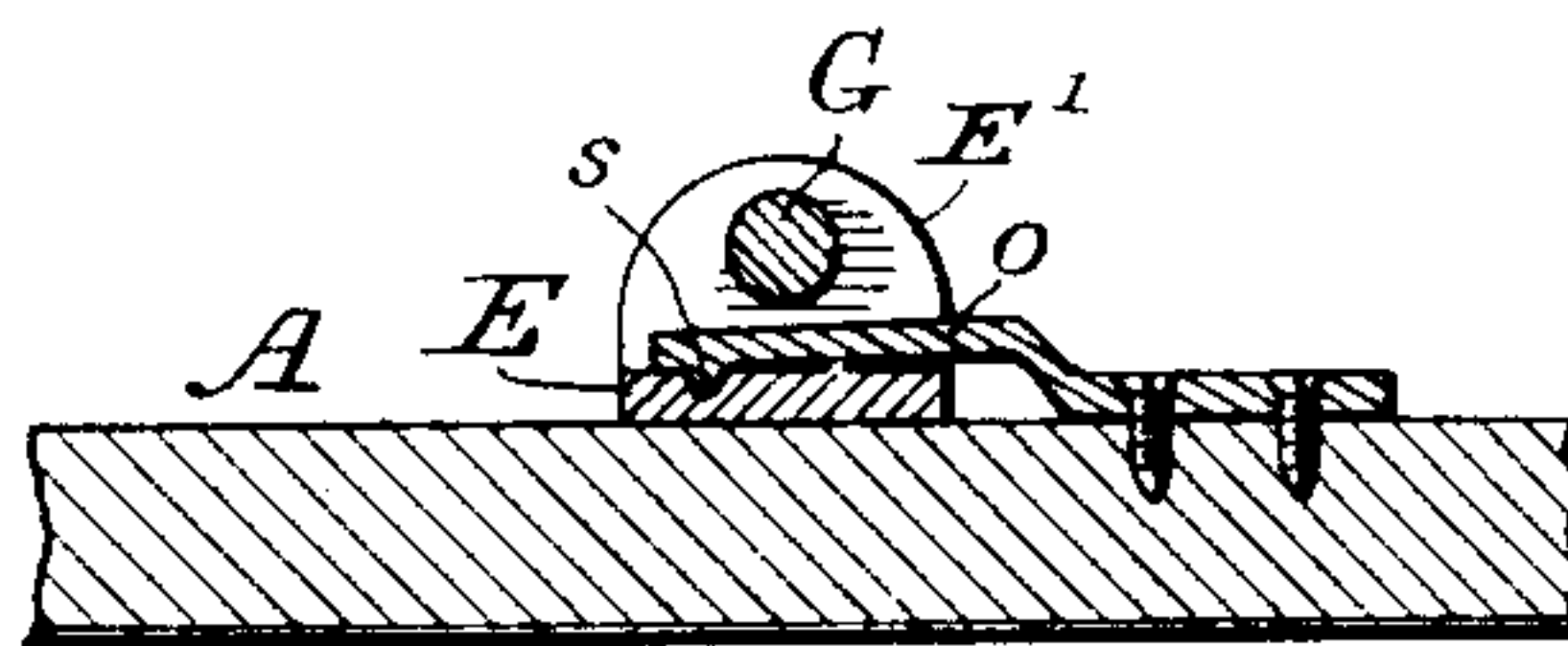


Fig. 11.

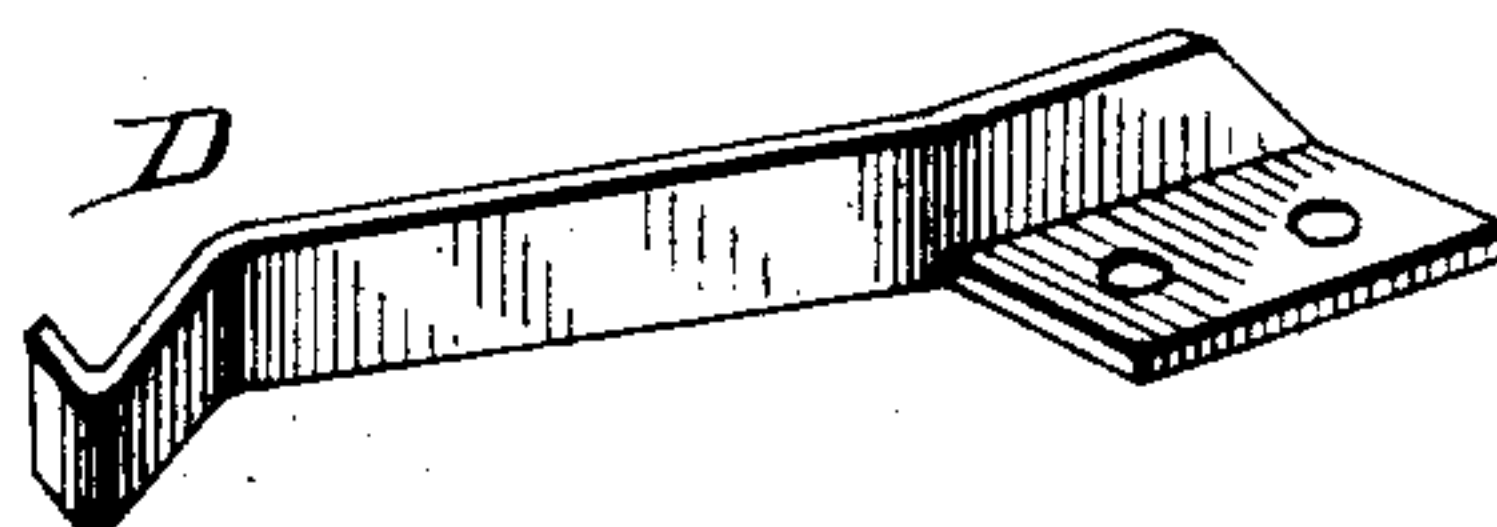
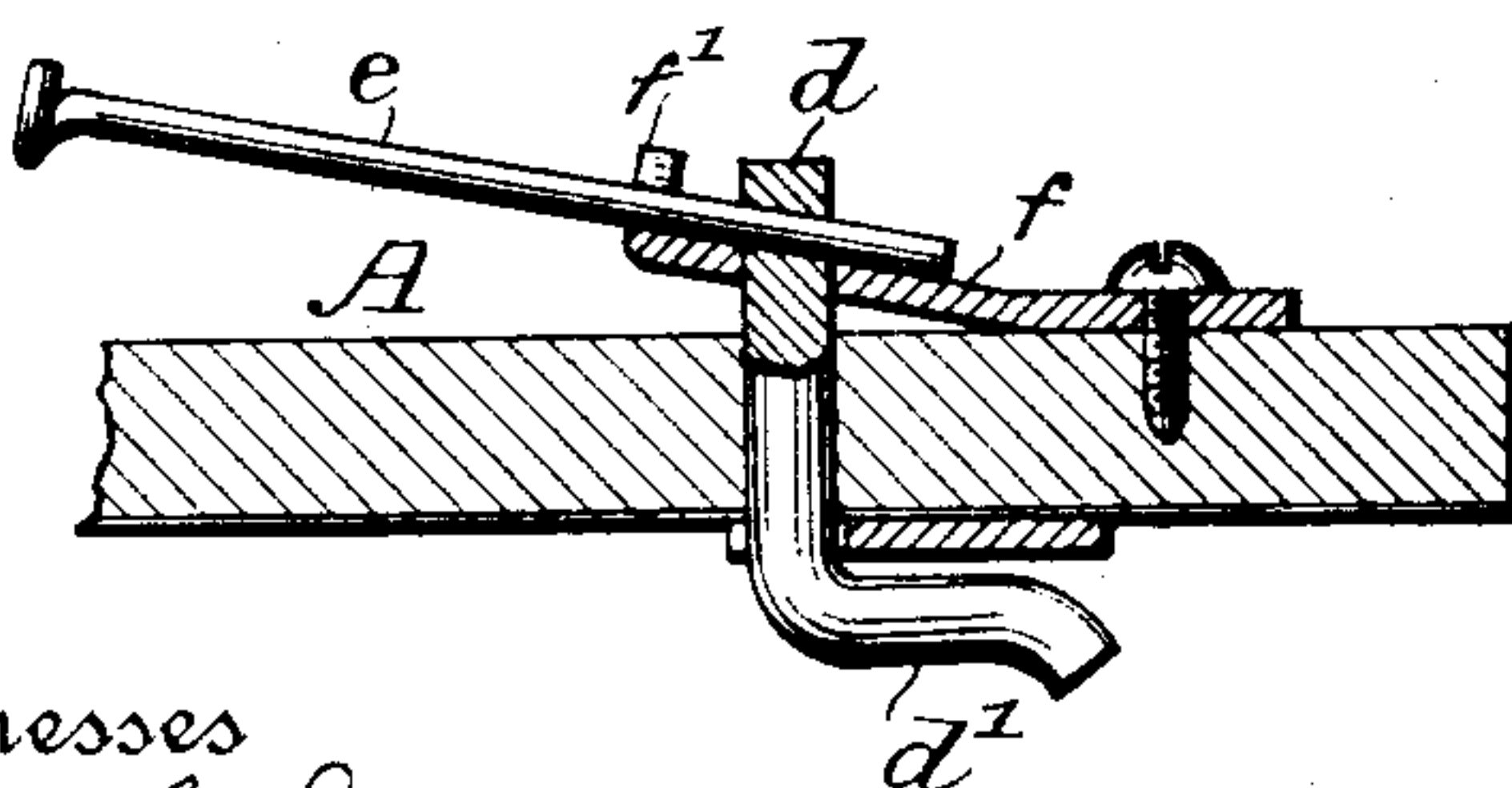


Fig. 10.



Witnesses
Jos. S. Lathrop
Thos. T. Snell.

Inventor
Harvey W. Locke
by Arthur S. Browne,
his Attorney

UNITED STATES PATENT OFFICE.

HARVEY W. LOCKE, OF ROCHESTER, NEW YORK, ASSIGNOR TO WILLIAM F. CARLTON, OF SAME PLACE.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 609,033, dated August 16, 1898.

Application filed November 12, 1897. Serial No. 658,287. (No model.)

To all whom it may concern:

Be it known that I, HARVEY W. LOCKE, of Rochester, in the county of Monroe and State of New York, have invented certain new and
5 useful Improvements in Shutter Mechanism for Photographic Cameras, of which the following is a specification.

My invention relates to improved devices for actuating and controlling the movements
10 of the shutter and screen which are employed to close and open the lens-orifice in a photographic-camera case, whereby an instantaneous or time exposure may be made at the will of the operator; and its object is to provide simple and efficient means for accomplishing the said results.

One embodiment of the present improvements is illustrated in the accompanying drawings, wherein—

20 Figure 1 is an outside view of the shutter-support. Fig. 2 is an inside view of the shutter-support, showing the parts set in proper position ready for making an instantaneous exposure. Fig. 3 is a similar view showing
25 the parts in position after an instantaneous exposure has been made. Fig. 4 is a similar view showing the parts in the act of being restored to their set position. Fig. 5 is a similar view showing the parts in proper position ready for making a time exposure.
30 Fig. 6 is a similar view showing the parts in the act of making a time exposure. Fig. 7 is a similar view showing the parts set during the act of making a time exposure. Fig. 8
35 is an enlarged section in the plane indicated by the line 8 8 in Fig. 7. Fig. 9 is an enlarged section in the plane indicated by the line 9 9 in Fig. 7. Fig. 10 is an enlarged section illustrating the tension-adjuster. Fig.
40 11 is a detail perspective of the spring-latch for the lens-screen.

A is a suitable shutter-support, being in the instance shown the front wall of a camera-case, which supports the shutter B, the
45 auxiliary shutter or screen C, and their actuating and controlling mechanism. The support A is provided with lens-opening A' and the shutter B with an elongated exposing-opening B', adapted to register with the lens-opening. The shutter B is in the form of an
50 oscillating opaque segment rigidly secured

to a rocking arbor *a*, Fig. 8, which is journaled in the shutter-support, extends there-through, and is provided with a milled knob
55 *b* outside the support, by which the shutter may be reset after each exposure. The shutter B when set and in its normal position is in the illustrated construction in its uppermost and backward position on the inner
60 face of the shutter-support, as shown in Figs. 2 and 5, its exposing-opening B' being above and out of register with the lens-opening A'. It is locked in this position by means hereinafter described against the action of a forwardly-acting motor consisting of a spring *c*,
65 coiled around the arbor *a*, the ends of said spring being secured, respectively, to a stud *c'* on the shutter and to a tension adjusting or regulating device on the inner face of the shutter-support. The downward and forward
70 movement of the shutter is limited by a stud *w*, against which its forward edge seats after each exposure.

The tension device serves to strengthen or weaken the motor-spring *c*, which actuates
75 the shutter, and thereby increases or reduces the velocity of the shutter in its downward movement when an instantaneous exposure is being made. Extending through the shutter-support is a rock-shaft *d*, having an external crank-handle *d'*, by which it is manipulated,
80 Fig. 10. This external crank *d'* oscillates between letters or marks, Fig. 1, which indicate in which direction the same is to be moved to strengthen or weaken the motor-spring *c*. To the inner end of shaft *d* is secured an arm *e*, projecting toward the arbor
85 *a* and provided with a loop at its outer end, through which the free end of the motor-spring *c* extends. Beneath the arm *e*, near the pin *d*,
90 is a clamping-plate *f*, pressing against said arm and preventing its accidental displacement, while permitting its adjustment. As shown in Fig. 2, the arm *e* is moved to one
95 extreme to weaken the motor-spring and in Fig. 3 to the other extreme to strengthen the same, while in Figs. 4, 5, 6, and 7 it is shown in an intermediate position. The movement of arm *e* in either direction is limited by stops
100 *f'* on the clamping-plate *f*.

The screen C, already referred to, is an opaque segment fulcrumed loosely on the

rocking arbor *a* and is immediately adjacent to the outer face of the shutter. The purpose of the screen or "auxiliary shutter," as sometimes called, is to close the lens-opening during the restoration of the shutter to its normal or "set" position. When the shutter is in its normal position, the screen is in a substantially vertical position, Figs. 2 and 5, and registers with the upper imperforate portion of the shutter above its exposing-opening *B'*, in which position it is normally held by a backwardly-acting motor consisting of a spring *C'*, coiled around the arbor *a*, one end of said spring being secured to said arbor and the other to the rear end or heel of the screen, said motor being at all times considerably weaker than the shutter-actuating motor. When the screen *C* is in this position, its back edge is in contact with the stud *c'* on the shutter, which acts as a stop to maintain the screen in place overlying on opaque portion of the shutter back of and out of line with the exposing-opening *B'*. Now when the shutter is released and swings forward to make an exposure the screen *C* is moved therewith by the said stud *c'*, and when the shutter reaches its limit of forward movement, Fig. 3, the opaque portion of the same covered by the screen directly registers with the lens-opening *A'*. As the screen is moving into this position a spring-latch *D*, Fig. 11, secured to the shutter-support and independent of the means for retaining the shutter in its set position, rides upon the curved rear end or heel of said screen and seats into a notch *g* in the same, constituting a catch when the position shown in Fig. 3 is reached, thus locking the screen in this position. When the shutter *B* is moved backwardly and is being restored to its initial position by the manipulation of the milled knob *b* of the shutter-arbor, the said screen is held over and in line with the lens-opening by the said latch, and hence prevents any light from passing therethrough when the exposing-opening in the shutter passes thereover. Fig. 4 shows the position occupied by the screen during the backward or restoring movement of the shutter. After the exposing-opening in the shutter has passed beyond the lens-opening in the backward or resetting movement the back edge of the shutter contacts with the body of the screen-latch *D* and pushes it free from the catch *g* of the screen, and thereupon the screen is automatically moved backward and restored to its normal position by its motor *C'* just as the shutter is approaching its backward limit of movement. The portion of spring-latch *D* secured to the shutter-support furnishes an adequate stop to limit the backward movement of said shutter, and this arrangement is that shown in the drawings.

It will be noted that the two motors *c* and *C'* act in different directions. The shutter-motor acts, as shown in Figs. 2 to 7, to move the shutter forward, (considering the picture-taking movement the "forward" one,) while

the screen-motor acts to move the screen backward. Power is stored in the two motors during the backward movement of the shutter by the manipulation of the knob *b*.

Referring now to the means for releasing and controlling the shutter *B*, whereby an instantaneous or time exposure of the lens may be made, *E* is a carrier, preferably composed of an elbow-lever fulcrumed at *h* to the shutter-support in front of the shutter. To the carrier is centrally pivoted at *p* a lever *F*, provided with two detents *F'* and *F''*, projecting toward the shutter and adapted to engage a series of stops *i j k* thereon, said stops consisting in the illustrated construction of projecting studs. The forward detent *F'* acts to lock the shutter in its set position whether time or instantaneous exposures are to be made, and is hence appropriately termed the "locking-detent," while since the rear detent *F''* is only brought into action when a time exposure is to be made it is appropriately termed the "time-detent." The rocking movement of the detent-lever *F* is limited by studs *l l*, projecting from the carrier *E*. The shutter-actuator *G* is supported by the carrier *E*, extending through an aperture in a flange *E'* thereof, and is pivotally connected at its inner end to the detent-lever *F*. The outer end of the actuator extends out within reach of the user of the camera. Between the outer face of flange *E'* and a pin *m*, carried by the actuator *G*, said actuator is provided with a spring *G'*, coiled around its stem, which holds said actuator *G* normally in its outermost position, thus keeping the time-detent *F''* of the lever *F* out of and the locking-detent *F'* in the several paths of the stops *i j k* on the shutter. When the shutter *B* is in its normal or set position, its forward or retaining stop *k* seats directly upon the locking-detent *F'* of lever *F*, Figs. 2 and 5, thus effectually locking the shutter in this position against the action of its motor until the actuator is pressed inwardly, thereby rocking the lever *F* and moving the detent *F'* out of the path of the retaining-stop *k*, thus releasing the shutter and leaving it free to be moved forwardly by the shutter-motor.

The carrier *E* is rendered movable for the purpose of enabling the same actuator to be used in making both instantaneous and time exposures, the extent of its movement being determined by any suitable means, such as by stops *n n'* on the shutter-support. When the carrier is moved into either of its two operative positions between said stops, it is held against accidental displacement by a spring-catch *o* on the shutter-support, having a detent *s*, Fig. 9, which seats into one of two retaining-recesses *t t*, Figs. 4 and 5, in the carrier. The carrier *E* is moved between the stops by means of the shutter-actuator *G*, which on being moved to and fro moves the carrier.

When the carrier is in the position shown in Figs. 2, 3, and 4 against the stop *n'*, it is

in its "instantaneous" position, and during its occupancy of this position the locking-detent F' and retaining-stop k are operative, the time-detent F^2 and the stops i and j being then wholly idle. When then the actuator is pushed inward, the detent-lever will be so moved as to carry its locking-detent F' out of engagement with stop k to release the shutter; but its time-detent F^2 will not thereby be moved sufficiently to be brought into the path of the rear stud or time-stop i on the shutter; and hence the shutter will be thrown instantaneously by its motor c to its extreme limit of forward movement and until stopped by the fixed stop w , as shown in Fig. 3, thus accomplishing an instantaneous exposure of the camera-lens to the light during the registration of the exposing and lens openings.

When it is desired to make a time exposure, the carrier is moved by the lateral movement of the actuator against the stud n into its "time" position, as shown in Figs. 5, 6, and 7. When the actuator is then pushed inwardly, the lever F not only releases the locking-detent F' from the retaining-stop k , but at the same time the time-detent F^2 is moved into the path of the time-stop i on the shutter, thus checking the advance of the shutter, as shown in Fig. 6, with its exposing-opening B' in register with the lens-opening A' . Now when the pressure is removed from the actuator its spring G' pushes it out, thus moving said lever into the position shown in Fig. 7, the time-detent F^2 being thus moved out of the path of the time-stop i and the locking-detent F' being moved into the path of the intermediate or exposing stop j on the shutter. In this position the exposing and lens openings are maintained in registration as long as desired for the time exposure. After a sufficient duration of time the actuator is again pushed in, thereby releasing the locking-detent F' from the exposing-stop j , whereupon the shutter swings down to its forward position against the stop w , thus closing the lens-opening. When the shutter is moved backwardly to restore it to its set position, the exposing-stop j and the retaining-stop k encounter in succession the adjacent beveled face of the locking-detent F' , (see Fig. 4,) thus swinging the lever F on its pivot against the force of spring G' , whereby the said stops are enabled to pass the said detent and the shutter is enabled to be restored.

It will be seen that the adjustment of the parts to determine the nature of the exposure to be made is accomplished simply by shifting the carrier between the studs n n' , said shifting being effected by lateral movement of the exposed end of the actuator. When the carrier is set in either of its positions, as desired, the shutter is operated to make an exposure by longitudinal movement of the same actuator. If a number of exposures of the same kind are to be made successively,

no lateral movement of the actuator is necessary, the only operation between each being the resetting of the shutter by means of the knob b , which turns the shutter-arbor.

When the carrier is in its time position the detent-lever F acts as an escapement-lever, one detent being carried into action as the other is moved out of action. The time-stop i coöperates only with the time-detent F^2 and the exposing-stop j , and retaining-stop k coöperates only with the locking-detent F' . It will be noted that the exposing-stop j rides between the two detents, never moving back as far as the time-detent. While so shown, it is not necessary that the time-stop i should be located in the same arc as the stops j k , since it is only necessary that said time-stop i and the time-detent F^2 should have the proper location relatively to each other. The time-detent F^2 is by the movement of the carrier E moved into and out of coöperative relation with the time-stop i , and a small movement of the carrier suffices, since the detent F^2 is remote from the pivot h , on which the carrier turns. At the same time the locking-detent F' is located so close to the pivot h that its position relatively to the path of the stops j and k is not materially affected by the movement of the carrier.

It will be noted that the intermediate or exposing stop j might be omitted and an operative structure still be left. If omitted, however, it would in the illustrated construction be necessary for the user to hold the actuator pushed in during the time required for the time exposure. Hence to avoid so doing the intermediate exposing-stop is employed.

This improved shutter mechanism is simple in construction and mode of operation, is easily manipulated, and effectively accomplishes the intended and desired results. I do not, however, limit myself to the exact construction shown and described, as it is manifest that the same may be modified without departing from the spirit and substance of my invention.

I claim as my invention—

1. A photographic shutter having a time-stop, a retaining-stop, and an exposing-stop intermediate between said time-stop and retaining-stop; a motor for operating said shutter; and a pivoted swinging carrier having two operative positions in which the shutter is adapted to make time and instantaneous exposures respectively, in combination with an escapement-lever centrally pivoted to said carrier and having at one end a locking-detent near the carrier-pivot, and at its other end a time-detent remote from said carrier-pivot; said locking-detent coöperating only with said retaining and exposing stops, being operative when the carrier occupies both its instantaneous and time positions, being normally in the path of said retaining and exposing stops, and being movable out of said path; and said time-detent coöperating only

with said time-stop, being operative only when the carrier occupies its time position, being normally out of the path of said time-stop, and being movable into the path of said time-stop when said locking-detent is moved out of the path of said locking and exposing stops; a single actuator mounted on said carrier and connected with said lever, said actuator when moved laterally swinging said carrier on its pivot, and when moved longitudinally inwardly swinging said lever to move the locking-detent out of the path of said retaining and exposing stops, and to move the time-detent into the path of said time-stop; and a spring for moving said actuator outwardly, substantially as set forth.

2. A photographic shutter having a time-stop, a retaining-stop, and an exposing-stop; a motor for operating said shutter; and a movable carrier having two operative positions in which the shutter is adapted to make time and instantaneous exposures respectively, in combination with a lever pivoted to said carrier and having a locking-detent and a time-detent; said locking-detent cooperating only with said retaining and exposing stops, being operative when the carrier occupies both its instantaneous and time positions, being normally in the path of said retaining and exposing stops, and being movable out of said path; and said time-detent cooperating only with said time-stop, being operative only when the carrier occupies its time position, being normally out of the path of said time-stop, and being movable into the path of said time-stop when said locking-detent is moved out of the path of said locking and exposing teeth; and a single actuator mounted on said carrier and connected with said lever, said actuator when moved laterally moving said carrier, and when moved longitudinally moving said lever, substantially as set forth.

3. A photographic shutter having a time-stop and a retaining-stop, and a swinging carrier having two operative positions in which the shutter is adapted to make time and instantaneous exposures respectively, in combination with an escapement-lever centrally pivoted to said carrier and having time and locking detents adapted to engage said time-stop and retaining-stop respectively, said locking-detent being operative when the carrier occupies both its instantaneous and time positions and being movable into and out of the path of said retaining-stop, and said time-detent being operative only when the carrier occupies its time position, and being then movable into and out of the path of said time-stop, and a single actuator mounted on said carrier and connected with said lever, said actuator when moved laterally moving said carrier and when moved longitudinally moving said escapement-lever, substantially as set forth.

4. A photographic shutter having a time-stop and a retaining-stop, and a movable car-

rier having two operative positions in which the shutter is adapted to make time and instantaneous exposures respectively, in combination with time and locking detents adapted to engage said time-stop and retaining-stop respectively, said detents being carried by and movable on said carrier, said locking-detent being alone operative when the carrier occupies its instantaneous position, and both of which are alternately operative when the carrier occupies its time position, and a single actuator for moving both said carrier and said detents on said carrier, substantially as set forth.

5. A photographic shutter having a time-stop and a retaining-stop, and a movable carrier having two operative positions in which the shutter is adapted to make time and instantaneous exposures respectively, in combination with time and locking detents adapted to engage said time-stop and retaining-stop respectively, said detents being carried by and movable on said carrier, said locking-detent being alone operative when the carrier occupies its instantaneous position, and both of which are alternately operative when the carrier occupies its time position, substantially as set forth.

6. A photographic shutter adapted for use in making both time and instantaneous exposures, having a retaining-stop, a time-stop, and an exposing-stop, said stops consisting of studs projecting from the face of said shutter, said exposing-stop being intermediate between the other two, in combination with an escapement-lever having a time-detent and a locking-detent at its opposite ends, which are alternately brought into and out of the paths of said stops, the time-detent cooperating solely with said time-stop, and the locking-detents cooperating with the retaining-stop and with the exposing-stop in alternation, and means for moving said lever, substantially as set forth.

7. A photographic shutter adapted for use in making both time and instantaneous exposures, having a retaining-stop, a time-stop, and an exposing-stop intermediate between the other two stops, in combination with an escapement-lever having a time-detent and a locking-detent at its opposite ends, which are alternately brought into and out of the paths of said stops, the time-detent cooperating solely with said time-stop, and the locking-detent cooperating with the retaining-stop and with the exposing-stop in alternation, and means for moving said lever, substantially as set forth.

8. A photographic shutter, and a movable carrier having two operative positions in which the shutter is adapted to make instantaneous and time exposures respectively, in combination with two detents adapted to engage said shutter, said detents being carried by and movable with and on said carrier, one of said detents being alone operative when the carrier occupies its instantaneous posi-

tion, and both of which are alternately operative when the carrier occupies its time position, and a single actuator for moving both said carrier and said detents on said carrier, substantially as set forth.

9. A photographic shutter, and a carrier having two operative positions in which the shutter is adapted to make instantaneous and time exposures respectively, in combination with two detents adapted to engage said shutter, said detents being carried by and movable with and on said carrier, one of said detents being alone operative when the carrier occupies its instantaneous position, and both of which are alternately operative when the carrier occupies its time position, substantially as set forth.

10. A photographic shutter, in combination with a movable carrier having two operative positions, one an instantaneous position and the other a time position, a lever pivoted to said carrier and having two detents adapted to engage said shutter depending upon the position of the carrier and of the lever upon the carrier, and an actuator for moving said carrier from one position to the other and for moving said lever on said carrier, substantially as set forth.

11. A photographic shutter, an arbor to which said shutter is rigidly attached, a locking-detent for holding said shutter in its set position, a motor-spring for moving said shutter in its forward direction, and means for manipulating said arbor to restore said shutter, in combination with a screen loosely turning on said arbor and having a catch on its rear end, means on said shutter whereby said screen is movable with said shutter in its forward direction, a spring-latch independent of said shutter-locking detent for engaging said catch and locking said screen in its forward position, said latch being automatically

released upon the contact therewith of said shutter on its backward movement, and a motor-spring for automatically moving said screen backwardly and restoring it to its normal position, substantially as set forth.

12. A photographic shutter, an arbor to which said shutter is rigidly attached, a locking-detent for holding said shutter in its set position, a motor-spring for moving said shutter in its forward direction, and means for manipulating said arbor to restore said shutter, in combination with a screen loosely turning on said arbor, means on said shutter whereby said screen is movable with said shutter in its forward direction, a spring-latch independent of said shutter-holding detent for engaging and locking said screen in its forward position, said latch being automatically released upon the contact therewith of said shutter on its backward movement, and a motor-spring for automatically moving said screen backwardly and restoring it to its normal position, substantially as set forth.

13. A photographic shutter, and a motor-spring therefor operatively connected at one end to the shutter, in combination with a tension-regulator comprising a rock-shaft having a crank-arm with a loop through which the other end of said spring extends, and a friction-plate bearing against said arm to maintain the same in its adjusted position and having stops to limit the movement of said arm in both directions, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HARVEY W. LOCKE.

Witnesses:

GEO. J. MACLAUGHLIN,
FRED K. TOWNSEND.