

No. 781,156.

PATENTED JAN. 31, 1905.

G. A. PICKARD & F. SLINGER.

PHOTOGRAPHIC SHUTTER.

APPLICATION FILED MAY 25, 1903.

MODEL.

2 SHEETS—SHEET 1.

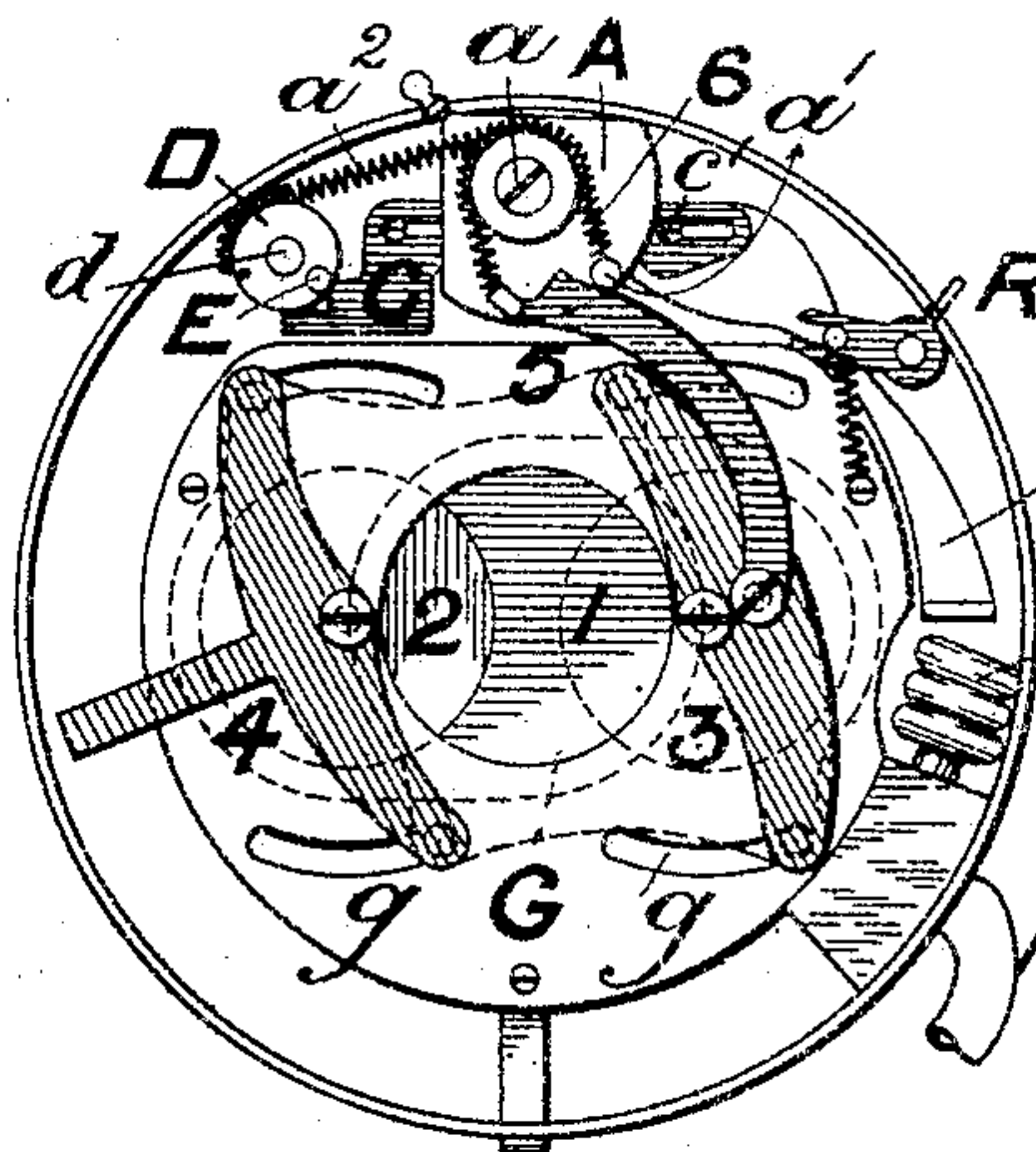


FIG. 1.

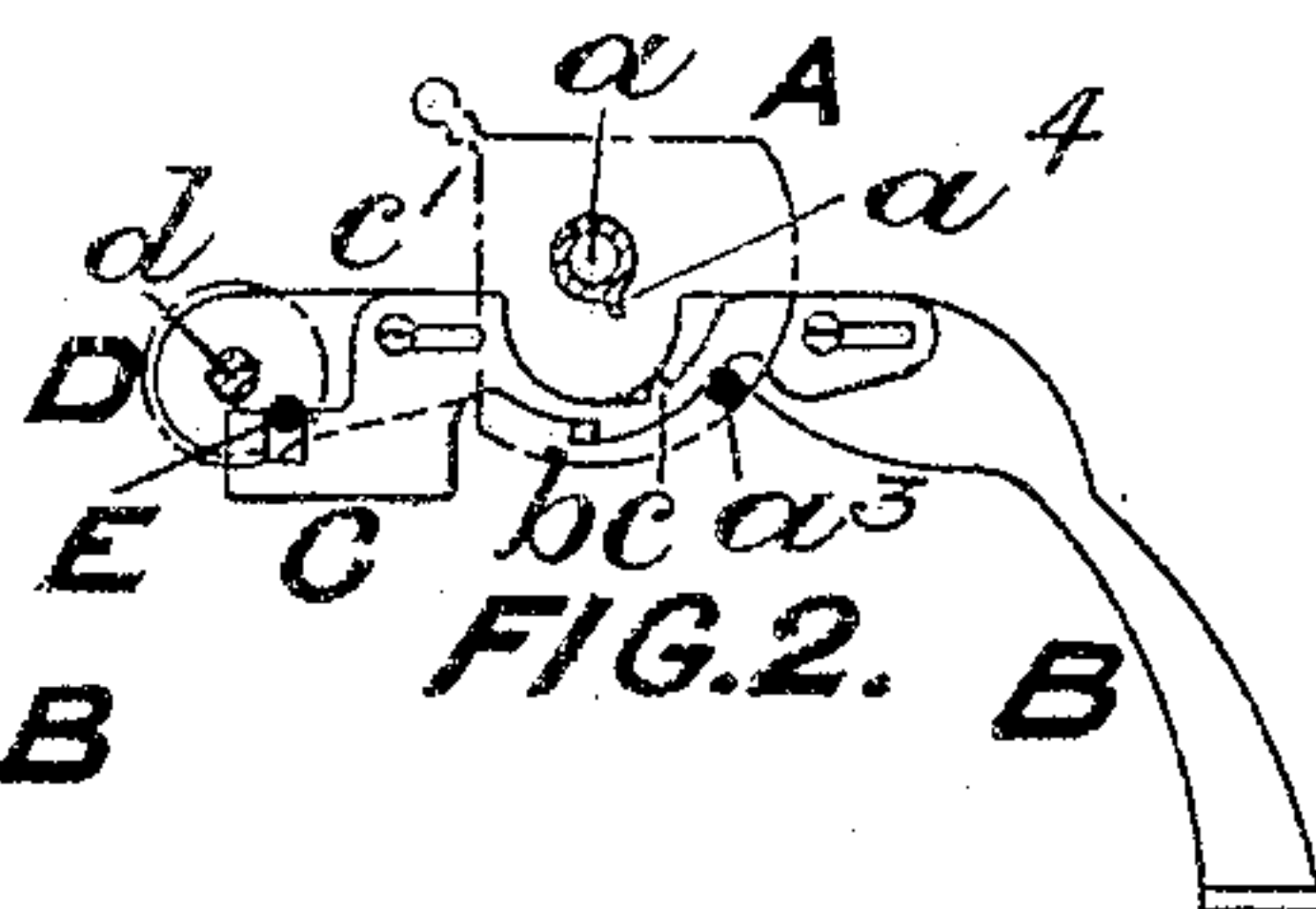


FIG. 2. B

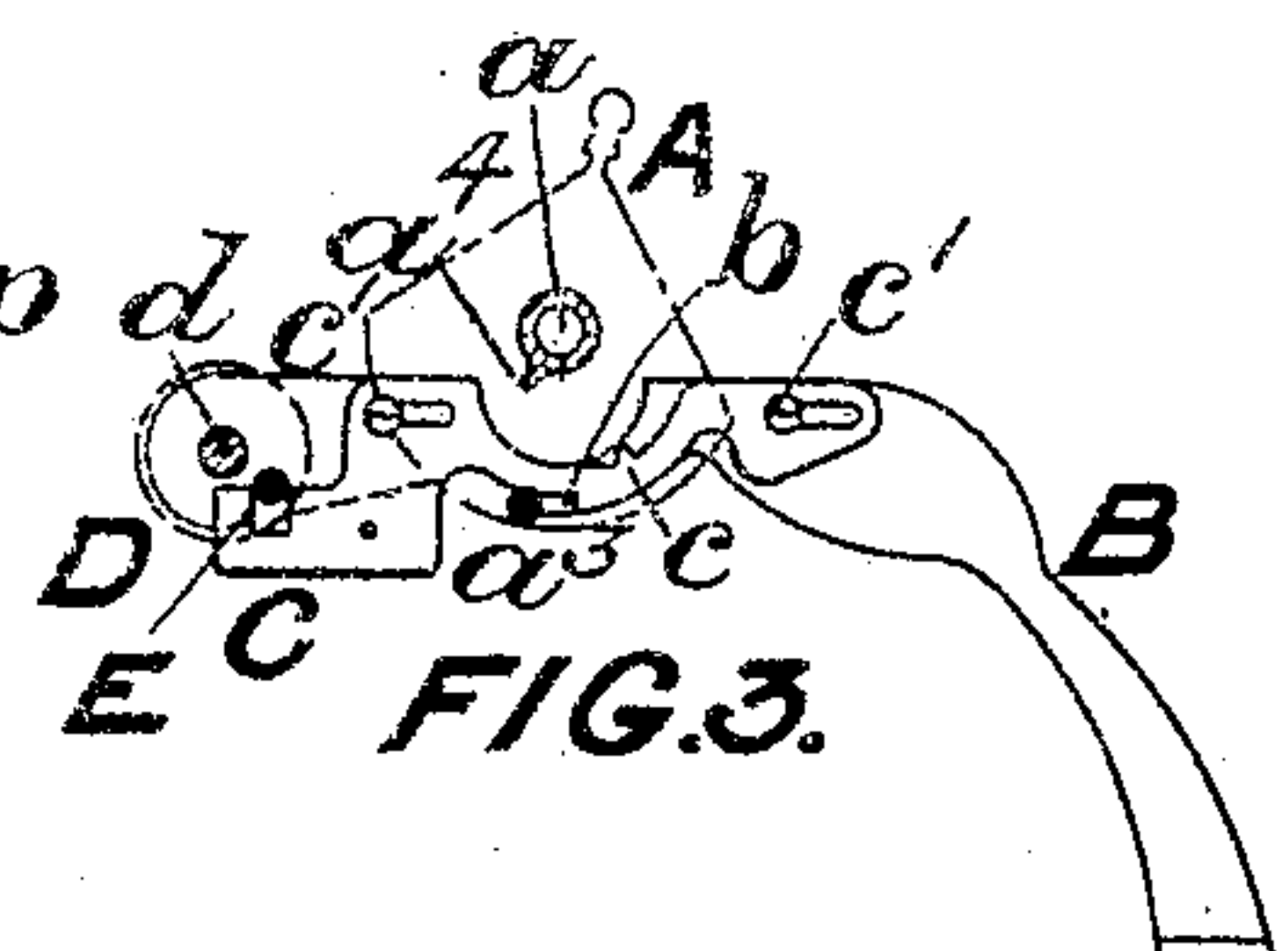


FIG. 3.

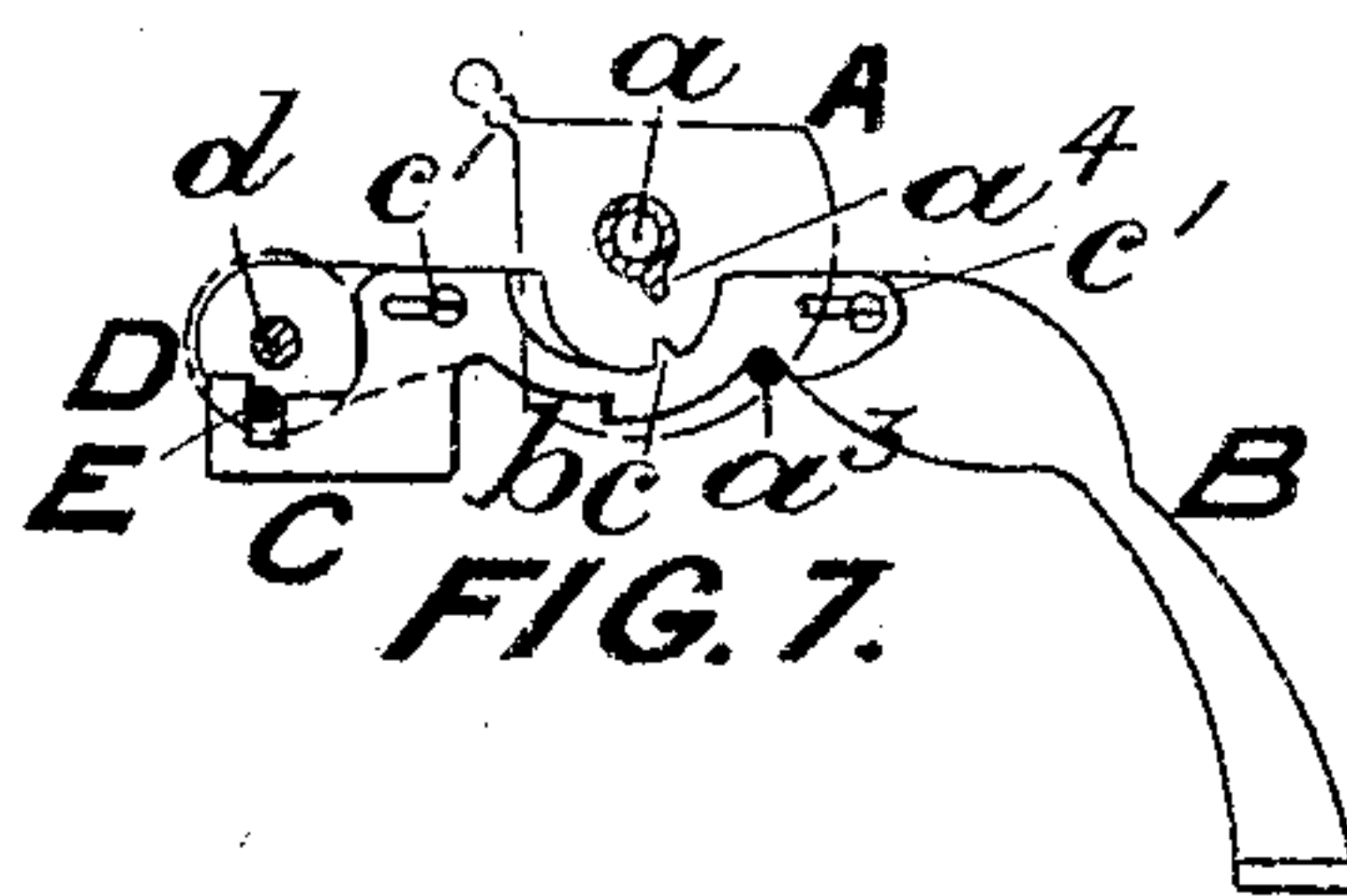


FIG. 4.

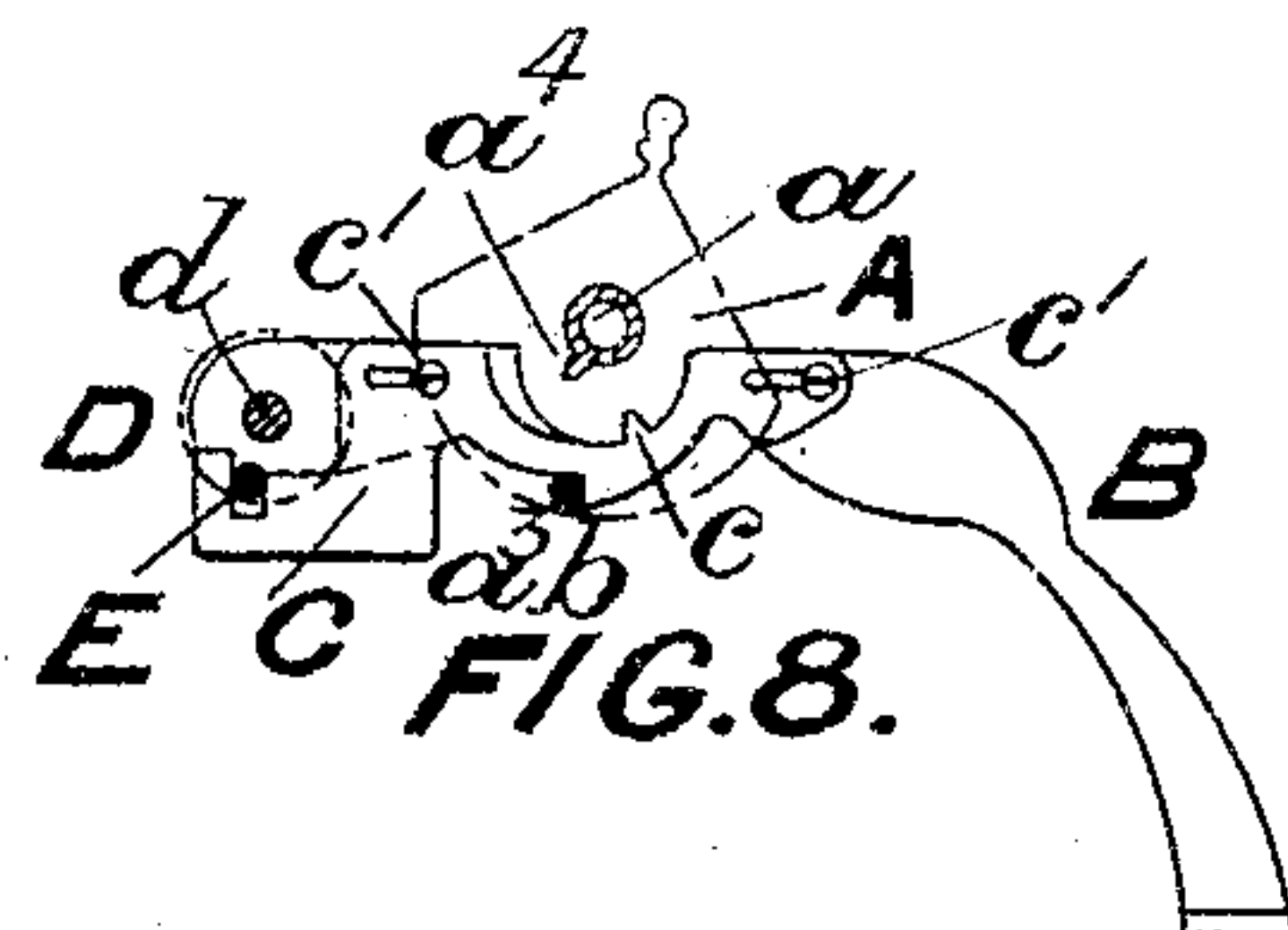


FIG. 5.

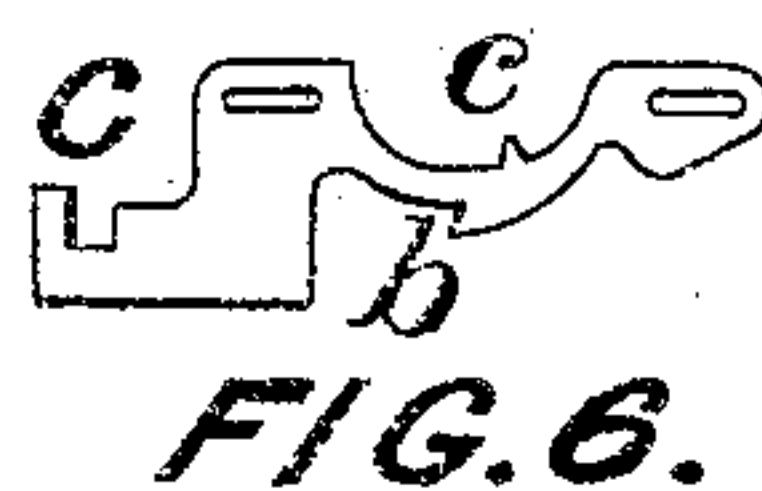


FIG. 6.

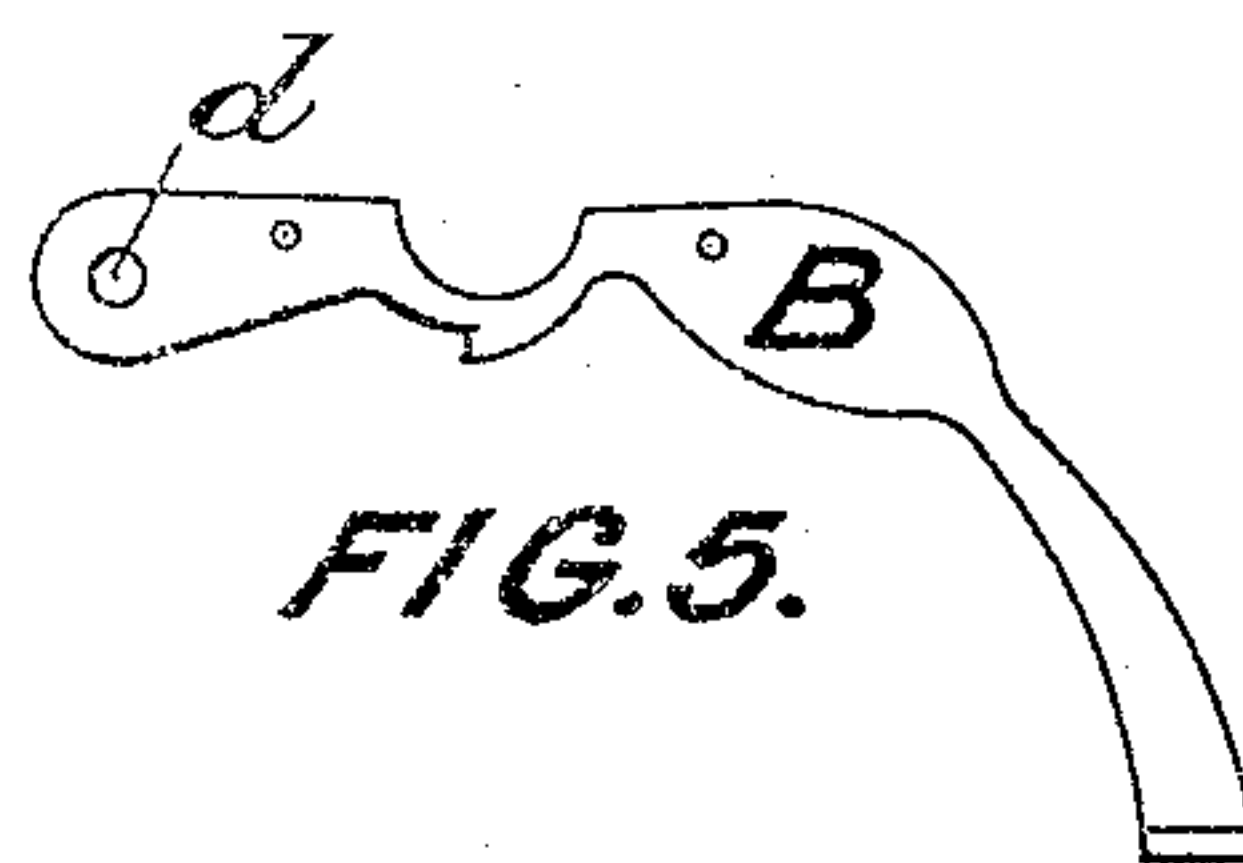


FIG. 7.

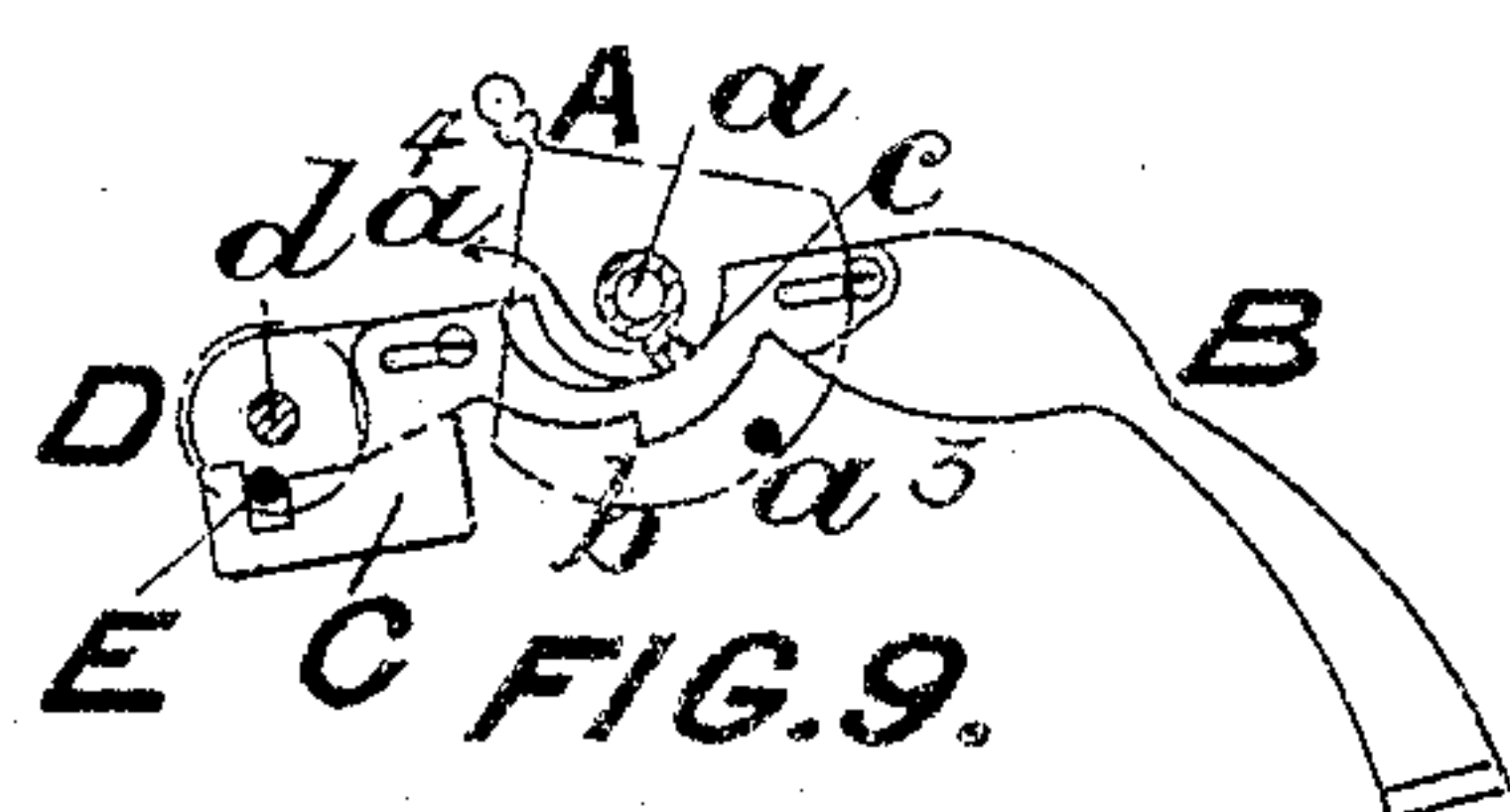


FIG. 8.

WITNESSES.

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PHOTOGRAPHIC SHUTTER.

APPLICATION FILED MAY 25, 1903.

MODEL.

2 SHEETS—SHEET 2.

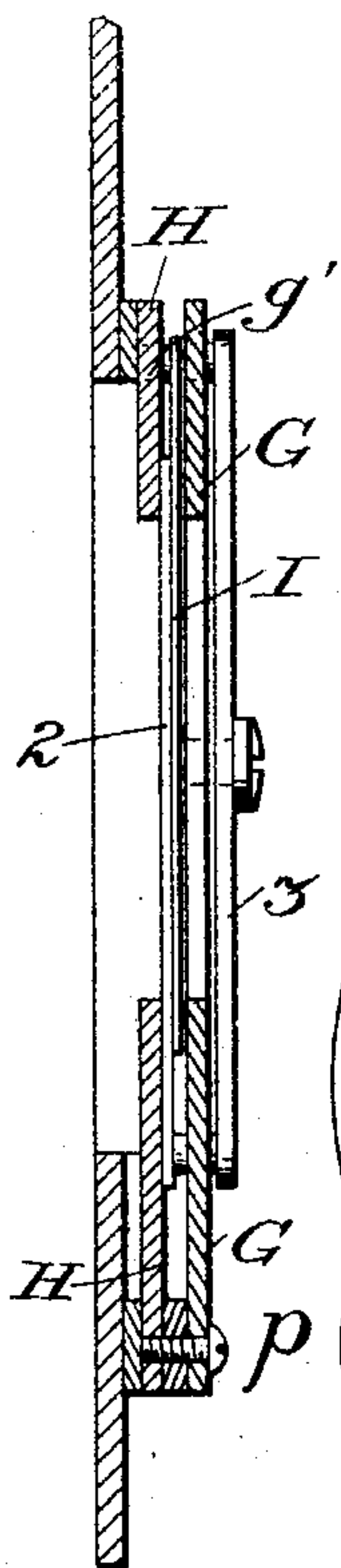


Fig. 17.

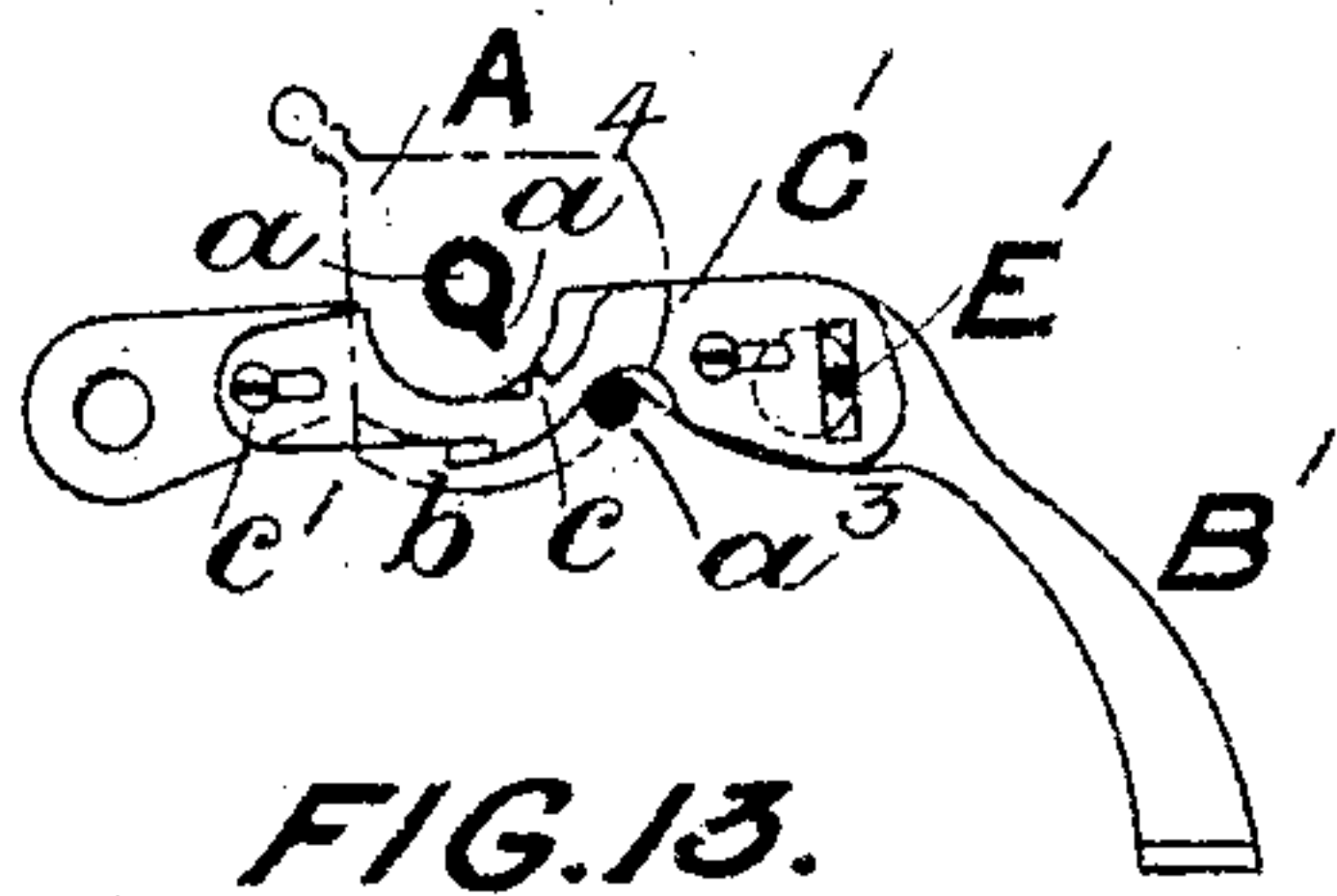


FIG. 13.

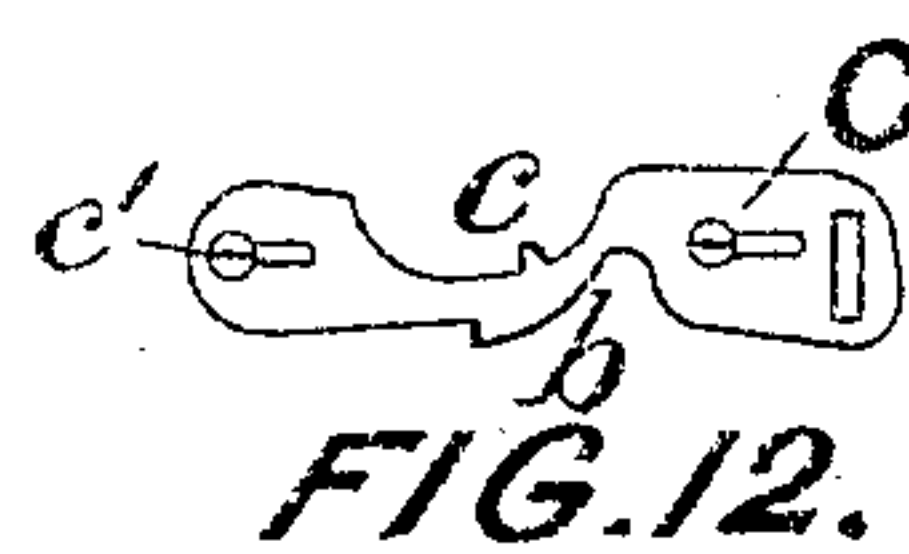


FIG. 12.

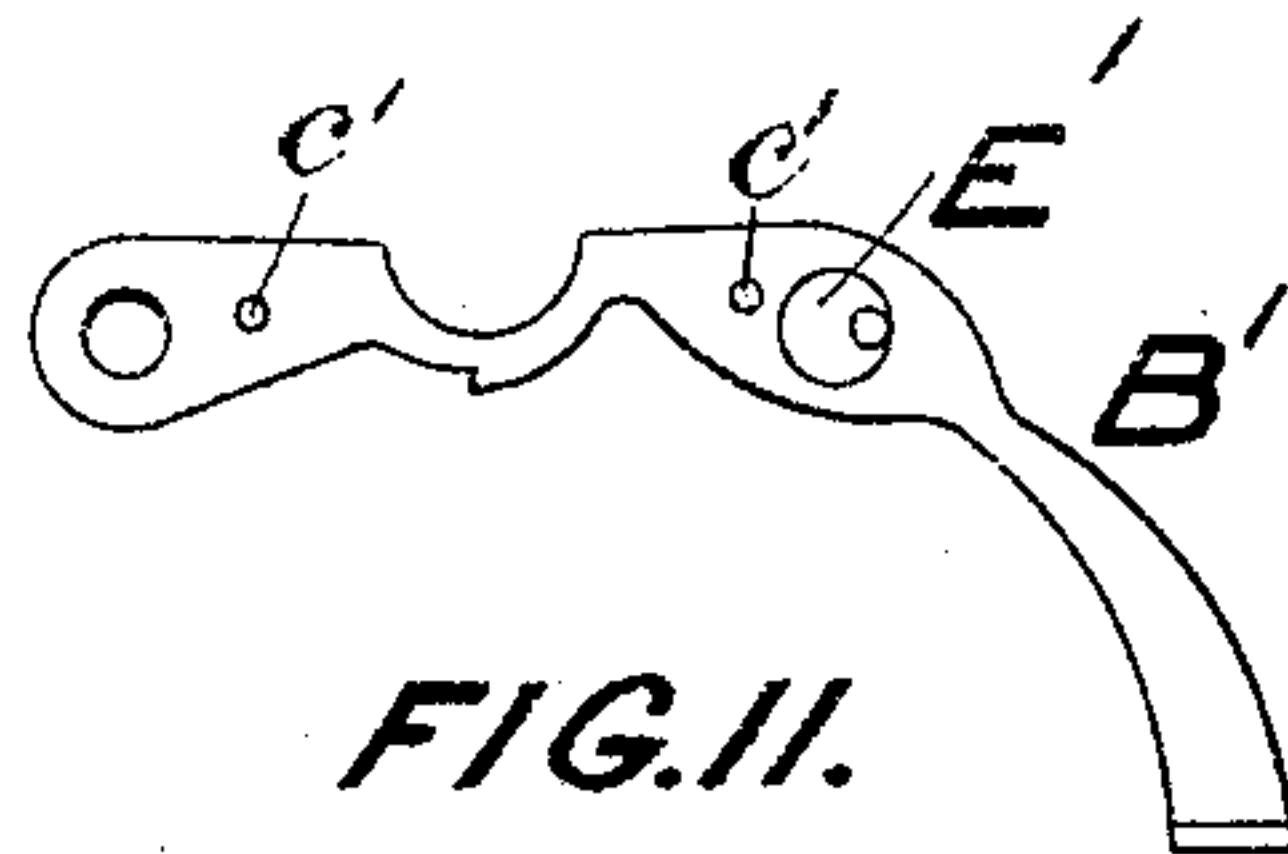


FIG. 11.

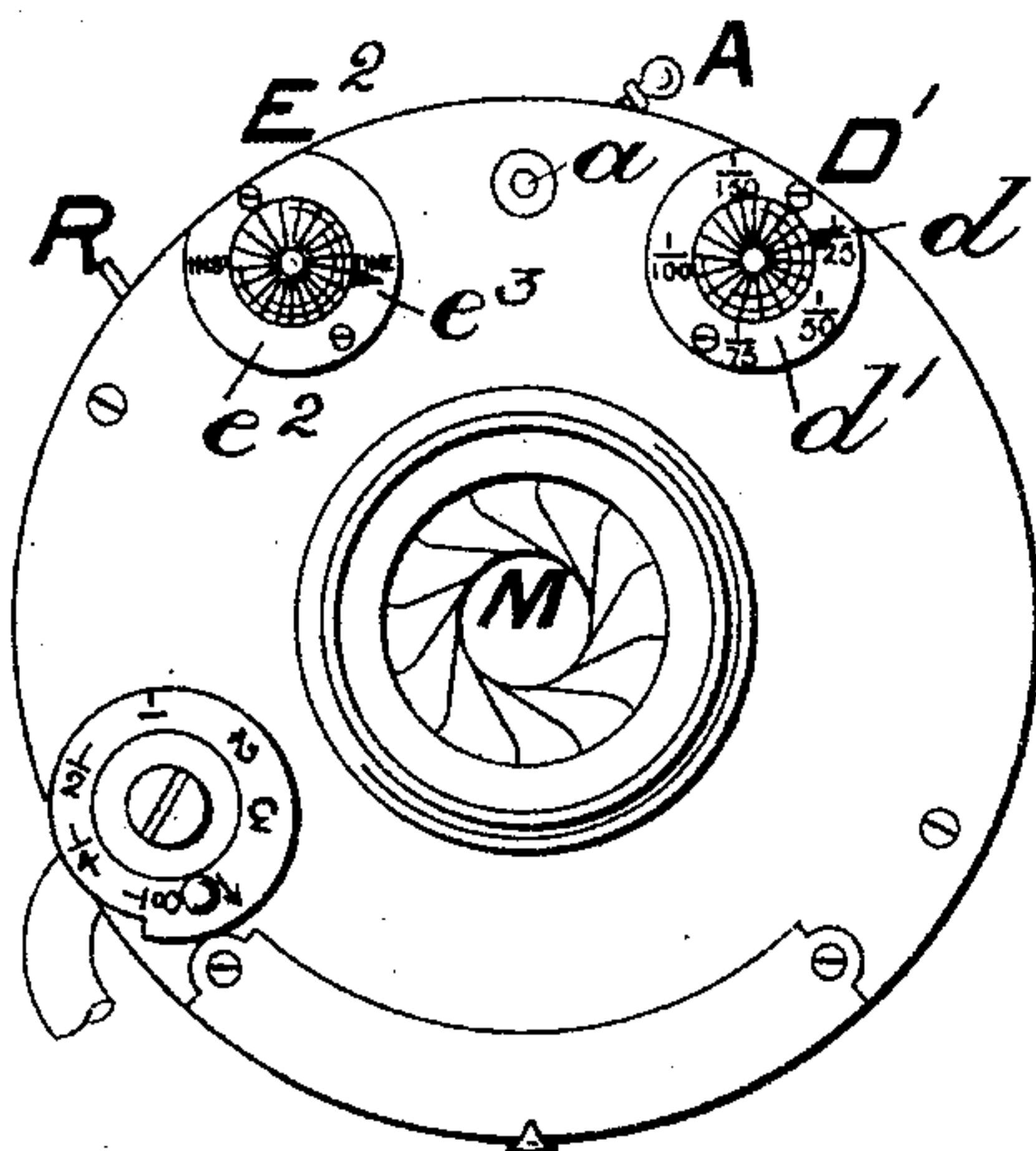


FIG. 14.

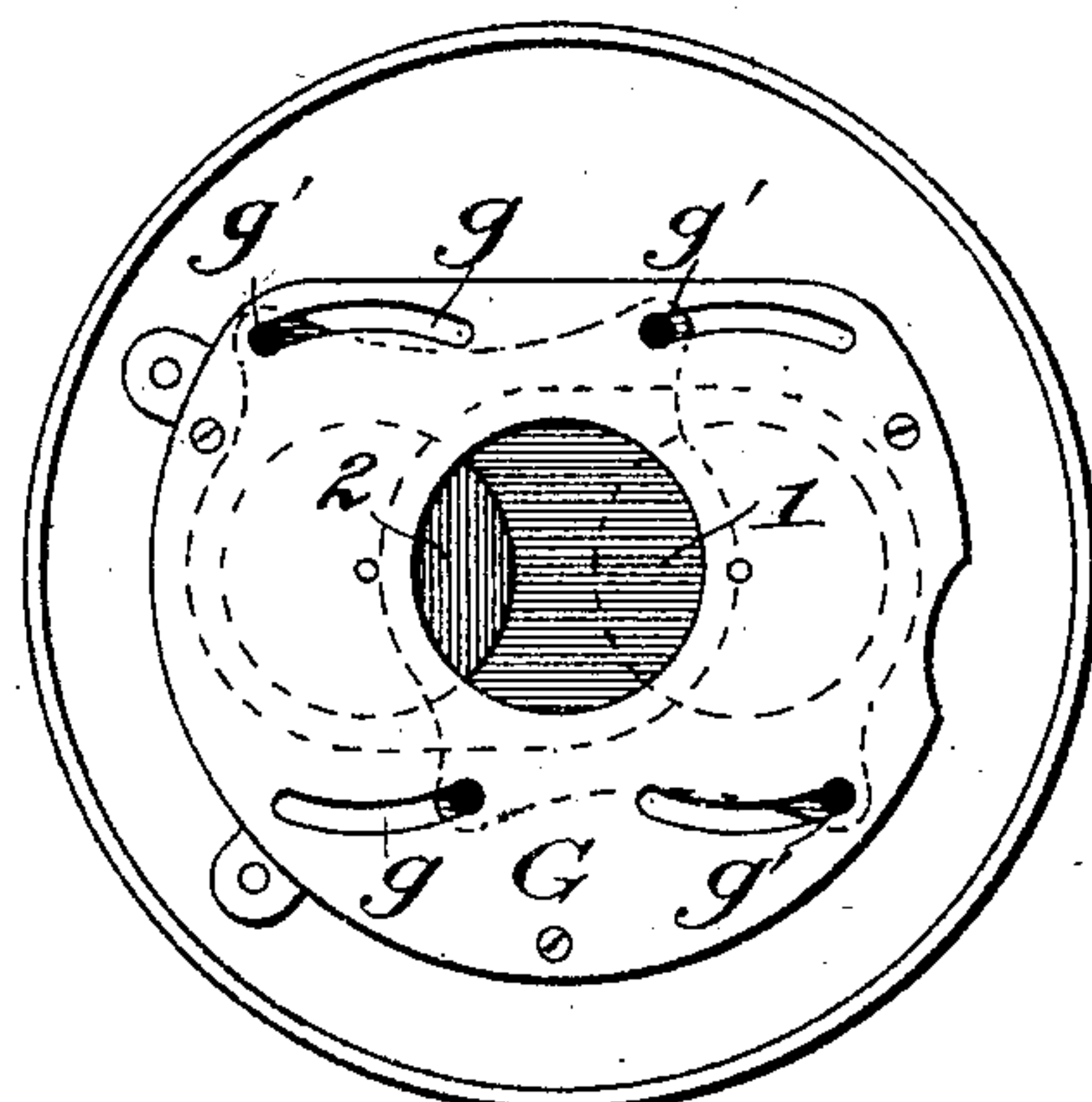


Fig. 15.

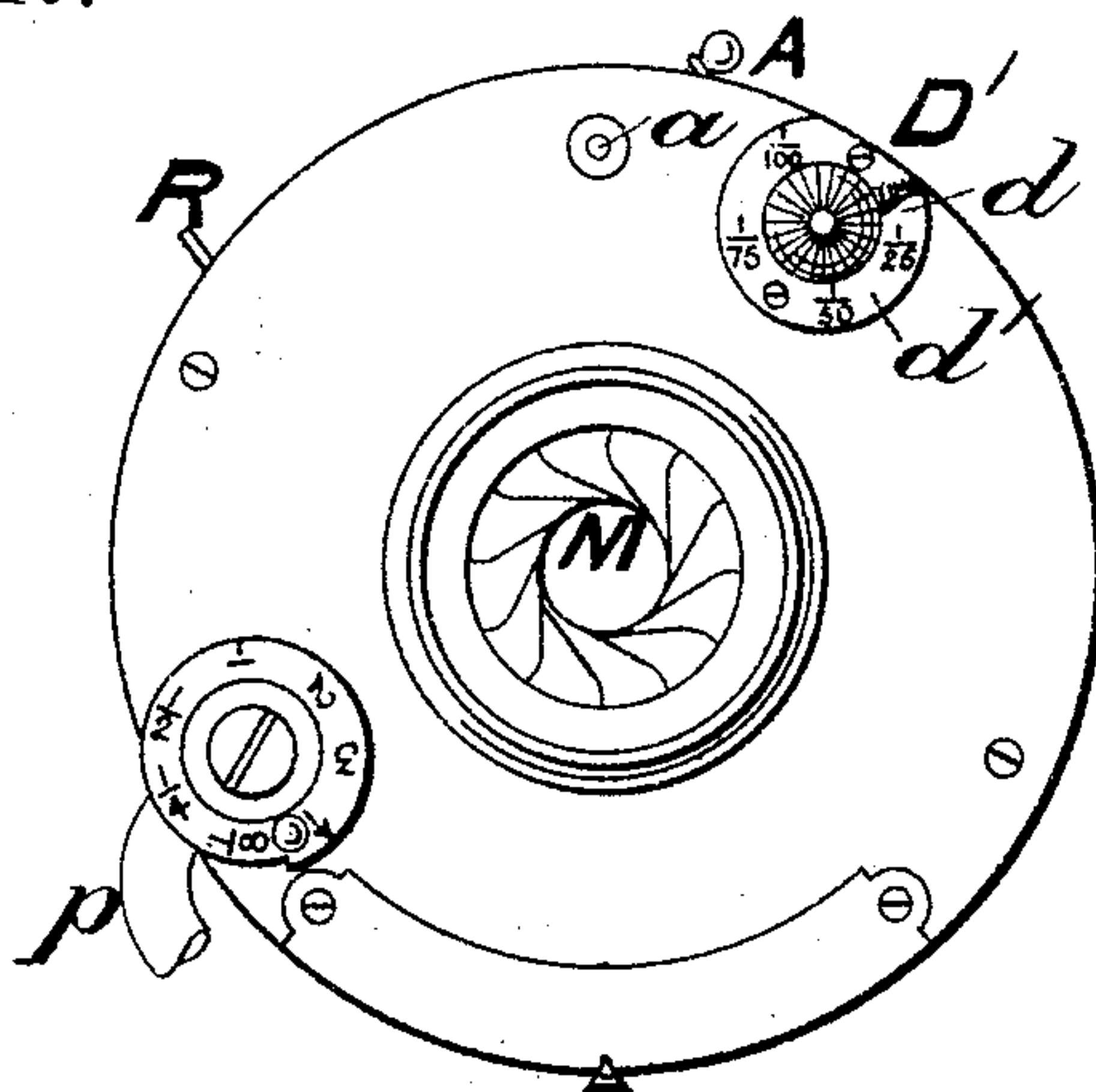


FIG. 10.

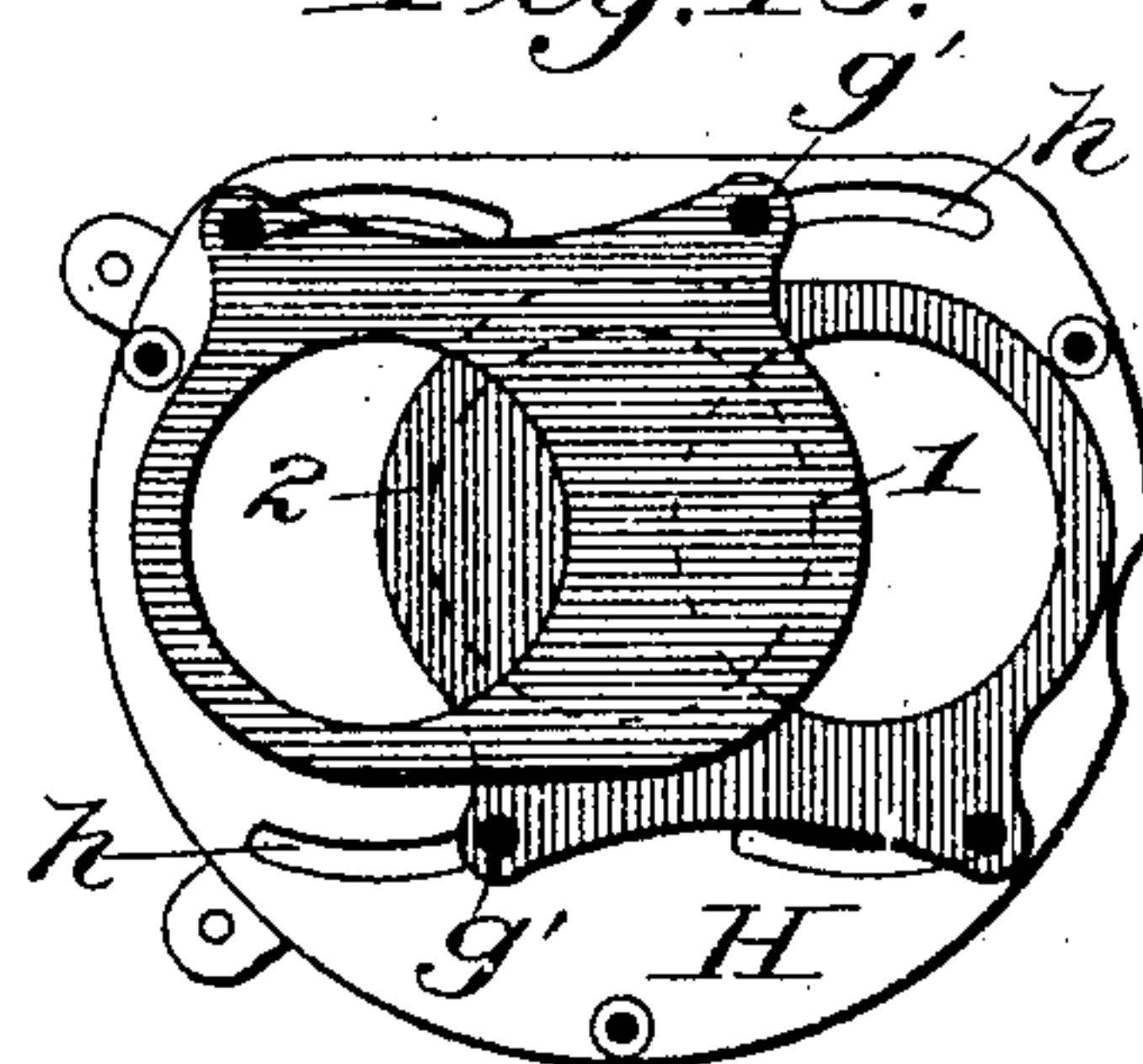


Fig. 16.

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UNITED STATES PATENT OFFICE.

GEORGE A. PICKARD AND FRANK SLINGER, OF ALTRINCHAM, ENGLAND,
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LIMITED, OF ALTRINCHAM, ENGLAND.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 781,156, dated January 31, 1905.

Application filed May 25, 1903. Serial No. 158,659. (Model.)

To all whom it may concern:

Be it known that we, GEORGE ARTHUR PICKARD and FRANK SLINGER, British subjects, and residents of Altrincham, in the county of Chester, England, have invented certain new and useful Improvements in Photographic Shutters, of which the following is a specification.

This invention relates to improvements in shutters of the type in which two perforated pivoted leaves move backward and forward across one another to open and close the shutter, such as described in the specification of the prior English patent, No. 24,319 of 1899, and United States Patent No. 683,166. It has been found in working the shutters hitherto constructed of this type that it has not been possible to obtain by pneumatic cylinders and pistons or other devices which have been adopted an accurate or positive timing of the movement of the shutter-leaves across the aperture of the shutter.

This invention is designed to provide means for more accurately adjusting the speed of travel of the shutter-leaves to the precise predetermined speed required; also, to provide better means for holding open the shutter any desired length of time for what is known as or termed a "time" exposure and to construct a compact and easily-worked shutter with fewer parts.

It consists, essentially, in constructing the shutter with an additional or auxiliary spring to actuate the operating-disk which moves the shutter-leaves, capable of being tightened up to the requisite degree to give the precise speed of travel desired to the shutter-leaves, and with an auxiliary adjustable sliding lever fitted to the releasing-lever provided with a projecting catch to engage a detent upon the operating-disk when it is desired to stop the travel of the shutter for a time exposure, and also in placing the shutter-leaves between two fixed or stationary plates with slots therein, through which guide-pins from the leaves project, and in slotting the lower plate to receive the pivots upon which the leaves of the iris-diaphragm rotate.

The invention will be fully described with reference to the accompanying drawings. 50

Figure 1 is an elevation of the shutter from the back with the case or cover removed and the parts in position preparatory to being set for an "instantaneous" exposure of the camera-lens; Fig. 2, a detached elevation of operating-disk A, the releasing-lever B, and adjustable auxiliary lever C in position at rest preparatory to being set for instantaneous exposure of the lens; Fig. 3, a detached elevation of the operating-disk A and levers B and C, showing position when set for instantaneous exposure before being released; Fig. 4, a detached elevation of the operating-disk A and levers B and C, showing position they assume to release the shutters for instantaneous exposure, but before the shutters have begun to move; Fig. 5, a detached elevation of the releasing-lever B; Fig. 6, a detached elevation of the auxiliary lever C; Fig. 7, a detached elevation of the operating-disk A, the releasing-lever B, and the adjustable auxiliary lever C, showing the position at rest of the auxiliary lever C when adjusted preparatory to being set for a time exposure; Fig. 8, a detached elevation of the operating-disk A and levers B and C, showing their position when set for a time exposure; Fig. 9, a detached elevation of the operating-disk A and levers B and C, showing their position after release of the shutter and during the period of time exposure; Fig. 10, a front elevation of the shutter-case; Fig. 11, a detached elevation of modified form of releasing-lever B'; Fig. 12, a detached elevation of modified form of adjustable auxiliary lever C'; Fig. 13, a detached elevation similar to Fig. 2, showing the modified forms of levers B' and C'; Fig. 14, a front elevation of shutter-case adapted for the modifications shown in Figs. 11, 12, and 13; Fig. 15, an elevation from back, showing the slotted plate G with the levers 3 and 4 removed; Fig. 16, an elevation from back, showing the shutter-leaves 1 and 2 and the plate H with the plate G removed; Fig. 17, a sectional elevation, enlarged, through the leaves 1 and 2 and plates G and H. 95

The two shutter-leaves 1 and 2 are construct-

ed of the usual form, mounted upon or pivoted to two links 3 and 4 and operated by a transmitting-lever 5, connected by a spring 6 with the operating-disk A. The operating-disk A is pivoted to rotate upon a stud a and has a pin a' upon its face, to which are attached the spring 6 and the auxiliary spring a'' . The spring 6 is at its other end attached to the transmitting-lever 5 of the shutter-leaves 1 and 2 and the second or auxiliary spring a'' to a drum D, upon which it is capable of being wound up. By rotating the drum D the auxiliary spring is wound around its periphery and stretched, thereby increasing the tension of the spring, and by rotating it back in the reverse direction the spring is released and the tension decreased. By tightening the auxiliary spring a'' the movement of the operating-disk A can be accelerated to any degree, the extent of the rotation of the drum D determining the amount. When the shutter-leaves 1 and 2 are desired to travel at a slow speed—say one twenty-fifth of a second—the auxiliary spring is practically inoperative; but when desired to travel at a higher speed than, say, one twenty-fifth—say from one-thirtieth to one one-hundred-and-fiftieth of a second—the auxiliary spring is wound less or more upon the drum D and stretched accordingly. The drum D is rotated by a knob D' on the outside of the casing and is provided with a pointer d , traveling over an index or indicator plate d' . The pin a' of the operating-disk A, to which the springs 6 and a'' are attached, also serves to engage the transmitting-lever 5 and operates it in the direction to expose or uncover the lens, the spring 6 drawing it back again. From the other side or face of the disk A a pin a^3 projects, which engages with a shoulder or projection b on the releasing-lever B, by which the disk and operative parts are held stationary after being set until the releasing-lever B is moved and the shoulder b raised out of the path of the pin a^3 . On the same face of the disk A is a second detent or pin a^4 , by which the disk is stopped in its travel and held during a time exposure.

The releasing-lever B is placed behind the operating-disk A and is pivoted to the casing, preferably upon the same stud d as the spring-tightening drum D, and is placed to lie between the releasing-pin a^3 on the under side of the operating-disk A and the pin or center a , upon which the disk A rotates, so that as it is moved to release the disk it is moved toward the center thereof.

To the releasing-lever B is fitted an adjustable sliding auxiliary lever C, the position of which relatively to the releasing-lever B is capable of alteration and adjustment by an eccentric or eccentric-pin E or other device. The auxiliary time-lever C is provided with a catch or projection c (projecting in an opposite direction to that on the releasing-lever)

to engage with the second detent or pin a^4 on the operating-disk. The traversing or sliding of the auxiliary time-lever C over the releasing-lever B puts the projection c into or out of the path of the second pin or detent a^4 on the releasing-disk. Consequently when set for a time or prolonged exposure the raising or movement of the releasing-lever B to disengage it from the releasing-pin a^3 on the disk A at the same time raises the catch or projection c of the auxiliary lever C into the direct path of the second pin or detent a^4 on the disk A and stops the rotation of the disk A at the point when the shutter is open, holding the shutter open until the releasing-lever B is dropped or moved back again. (See Fig. 9.) When the auxiliary lever C is moved by the eccentric E into the reverse position, Figs. 3 and 4, the catch or projection c thereon is moved to one side and out of the path of the second detent or pin a^4 upon the releasing-disk, thus allowing of a rapid or instantaneous exposure. The eccentric E for actuating the auxiliary lever is preferably upon the same spindle d and operated by the same knob D' as the drum D for tightening the auxiliary spring a'' , the eccentric-pin E being so placed that it moves the auxiliary lever C into position for a time or prolonged exposure after the auxiliary spring has contracted and all tension thereof is relieved. By this arrangement when a time or prolonged exposure is being effected the parts are traveling at a comparatively slow speed, because the second or auxiliary spring is slack and non-effective. (See Figs. 2 to 10.) In an alternative arrangement an eccentric E' may be placed at the other end of the auxiliary lever C' and be operated by a separate or independent knob E'. (See Figs. 11 to 14.) The levers are adjustably held together by pins c' , projecting from one entering slots in the other.

On the face of the case a dial-plate d' is fitted, inscribed with fractional parts of a second to indicate the rate of travel of the disk A, and shutter-leaves 1 and 2 at the different degrees of tension of the auxiliary spring a'' , and an index-pointer d'' is affixed to the knob D' or spindle d of the drum D to show the amount of the spring a'' wrapped upon the drum and the consequent speed at which the apparatus is set to travel. On Fig. 14 a second knob E'', with index-plates e'' and pointer e''' , indicates, whether the apparatus is set for time or instantaneous exposure.

The shutter-leaves 1 and 2 are placed between two fixed or stationary plates G and H, between which they move to and fro. The plate G is provided with curved slots g , and the plate H is provided with curved slots h . From the leaves 1 and 2 guide-pins g' project to either side and enter the curved slots g and h , which guide the leaves in their travel across the aperture and cause them to move perfectly evenly and freely backward and forward.

ward. The links or levers 3 and 4, which connect the leaves 1 and 2, are pivoted to the plate G, thereby insuring a steady and even action. The plate H is also slotted with a number of radial slots h' to receive the pins or pivots m of the leaves M of the iris-diaphragm.

An air-bulb P is placed below the end of the releasing-lever B to raise or move it and is connected to an air-tube p . R is a hand-lever, also for operating the releasing-lever B.

What we claim as our invention, and desire to protect by Letters Patent, is—

1. In a photographic shutter, the combination with the shutter-leaves 1 and 2, the links 3 and 4 to which they are pivoted, the transmitting-lever 5, spring 6 connected thereto, and an operating-disk A, of an auxiliary driving-spring a^2 connected by one end to the operating-disk, a drum D to which the other end of the spring is attached and upon which it may be wound, a knob D' to rotate the drum to increase or decrease the tension on the spring, and a releasing-lever B which engages a projection on the disk A, substantially as described.

2. In a photographic shutter, the combination with the shutter-leaves 1 and 2, the links 3 and 4, to which they are pivoted, the transmitting-lever 5, spring 6 connected thereto, and an operating-disk A, of an auxiliary driving-spring a^2 connected by one end to the operating-disk, a drum D to which the other end of the spring is attached and upon which it may be wound, a knob D' to rotate the drum to increase or decrease the tension on the spring, projection a^3 and detent a^4 on the operating-disk, a releasing-lever B provided with a catch b to engage the projection a^3 on the disk, an auxiliary adjustable lever C mounted upon the releasing-lever B and provided with a catch c to engage the detent a^4 on the disk A, and means for moving and adjusting the position of the auxiliary lever C, substantially as described.

3. In a photographic shutter, the combination with the shutter-leaves 1 and 2, the links 3 and 4 to which they are pivoted, the transmitting-lever 5, spring 6 connected thereto, and an operating-disk A, of an auxiliary driving-spring a^2 connected by one end to the operating-disk, a drum D to which the other end of the spring is attached and upon which it may be wound, a knob D' to rotate the drum to increase or decrease the tension on the spring, projection a^3 and detent a^4 on the operating-disk, a releasing-lever B provided with a catch b to engage the projection a^3 on the disk, an auxiliary adjustable lever C mounted upon the releasing-lever B and provided with

a catch c to engage the detent a^4 on the disk A, and an eccentric-pin E affixed to the drum D to adjust the position of the auxiliary lever C to bring it into position either for "time" or instantaneous exposure as desired, substantially as described.

4. In a photographic shutter the combination with the shutter-leaves 1 and 2, the links 3 and 4 to which they are pivoted, the transmitting-lever 5, spring 6 connected thereto and an operating-disk A, of an auxiliary driving-spring a^2 , connected by one end to the operating-disk, a drum D to which the other end of the spring is attached and upon which it may be wound, a knob D' to rotate the drum to increase or decrease the tension on the spring projections a^3 and detent a^4 on the operating-disk, a releasing-lever B provided with a catch b to engage the projection a^3 on the disk, an auxiliary adjustable lever C mounted upon the releasing-lever B and provided with a catch c to engage the detent a^4 on the disk A and means for moving and adjusting the position of the auxiliary lever C, and the two plates G and H between which the leaves 1 and 2 of the shutter move to and fro provided with curved slots g and h to guide the leaves 1 and 2 and with radial slots h' to guide the leaves of an iris-diaphragm substantially as described.

5. In a photographic shutter, the combination with the shutter-leaves 1 and 2, the links 3 and 4, to which they are pivoted, the transmitting-lever 5, spring 6 connected thereto, and an operating-disk A, of an auxiliary driving-spring a^2 connected by one end to the operating-disk, a drum D to which the other end of the spring is attached and upon which it may be wound, a knob D' to rotate the drum to increase or decrease the tension on the spring projection a^3 and detent a^4 on the operating-disk, a releasing-lever B provided with a catch b to engage the projection a^3 on the disk, and auxiliary adjustable lever C mounted upon the releasing-lever B and provided with a catch c to engage the detent a^4 on the disk A and means for moving and adjusting the position of the auxiliary lever C, and a pointer and index-plate on the outside of the case to indicate the position of the drum D and eccentric E and the speed at which the shutter is set to travel substantially as described.

In witness whereof we have hereunto signed our names, in the presence of two subscribing witnesses, this 12th day of May, 1903.

G. A. PICKARD.
FRANK SLINGER.

Witnesses:

J. OWDEN O'BRIEN,
B. LATHAM WOODHEAD.