

No. 731,296.

PATENTED JUNE 16, 1903.

J. C. FYFE & V. ODQUIST.

SHUTTER FOR CAMERAS.

APPLICATION FILED OCT. 10, 1902.

MODEL.

Fig. 1.

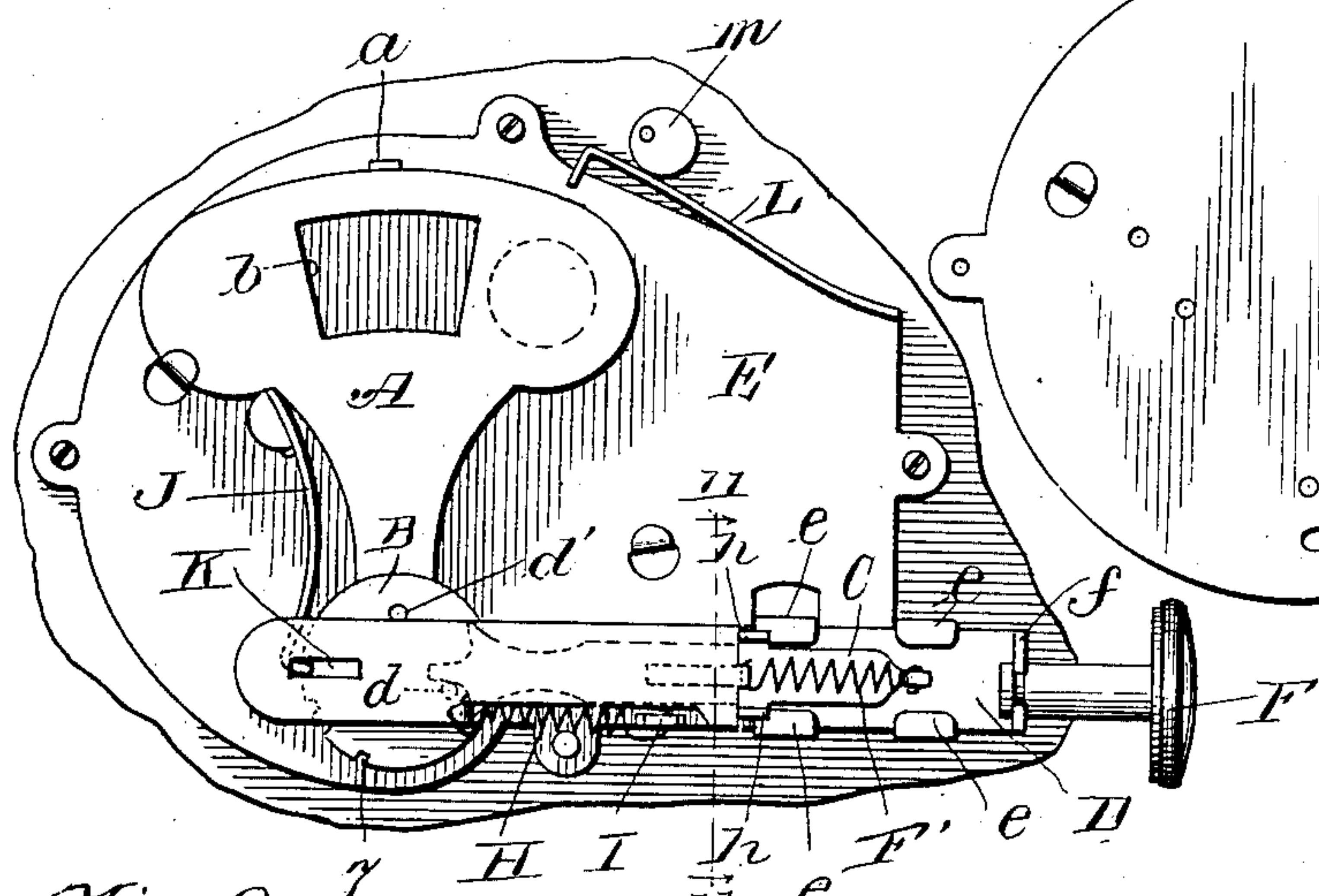


Fig. 4.

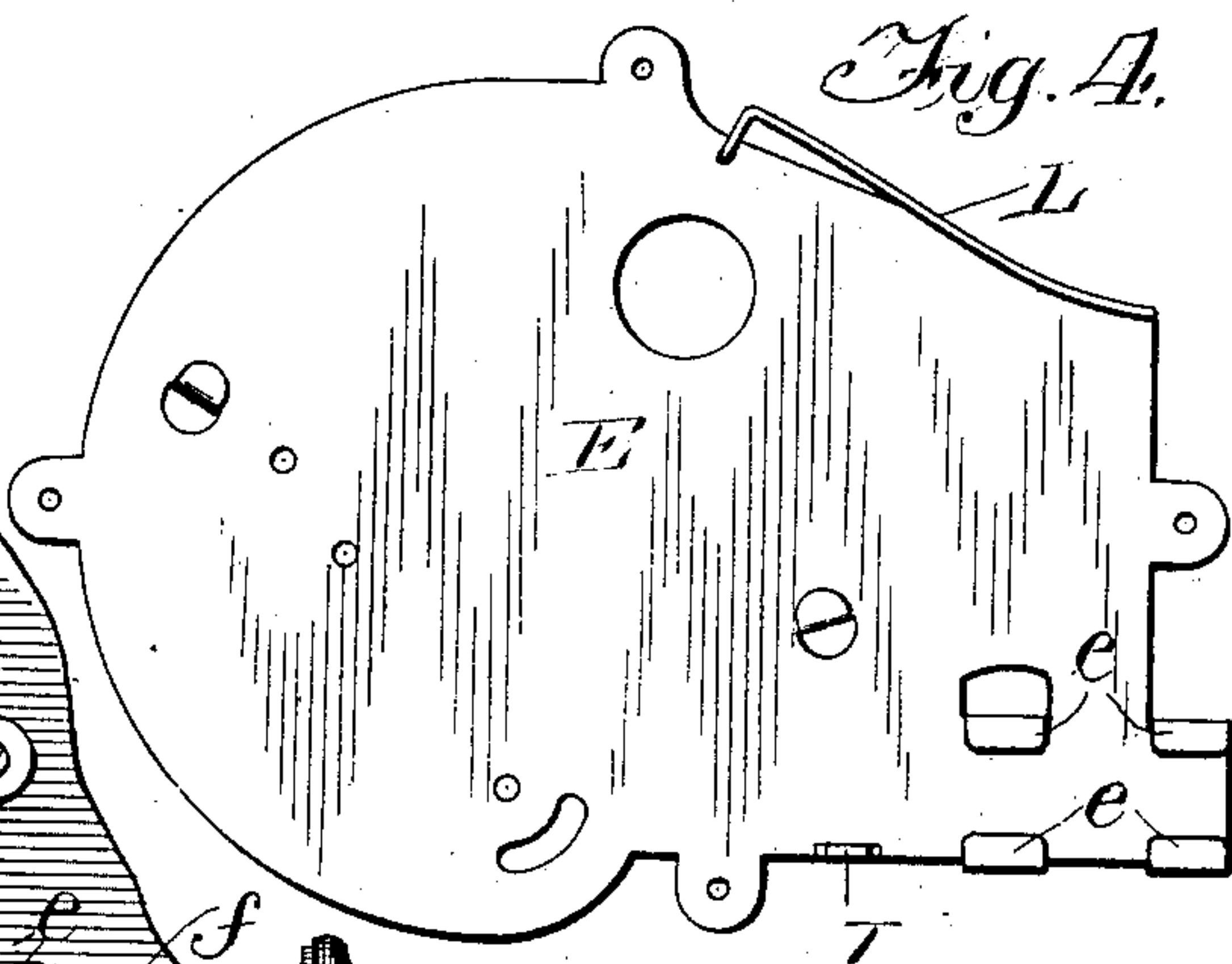


Fig. 5.

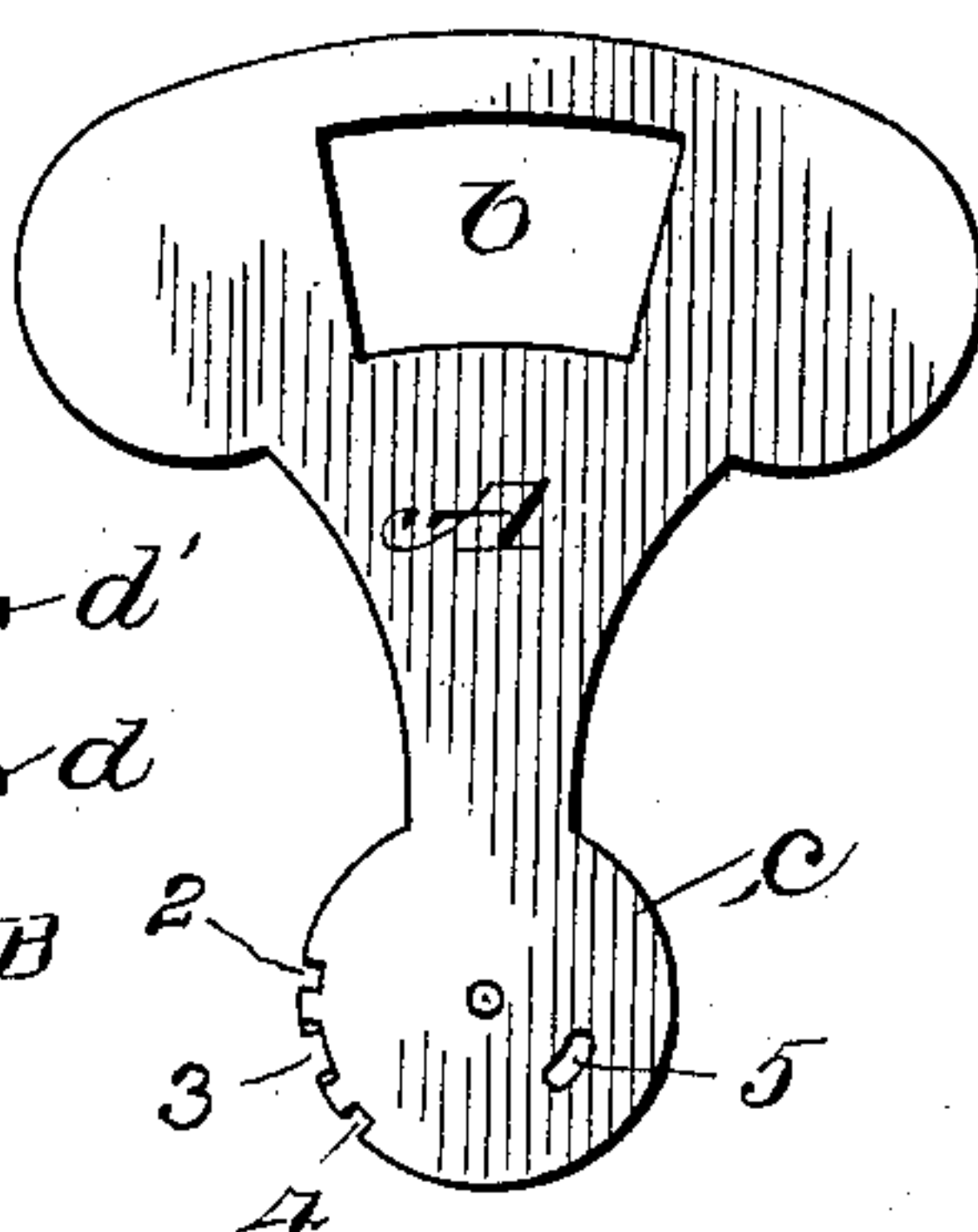


Fig. 6.

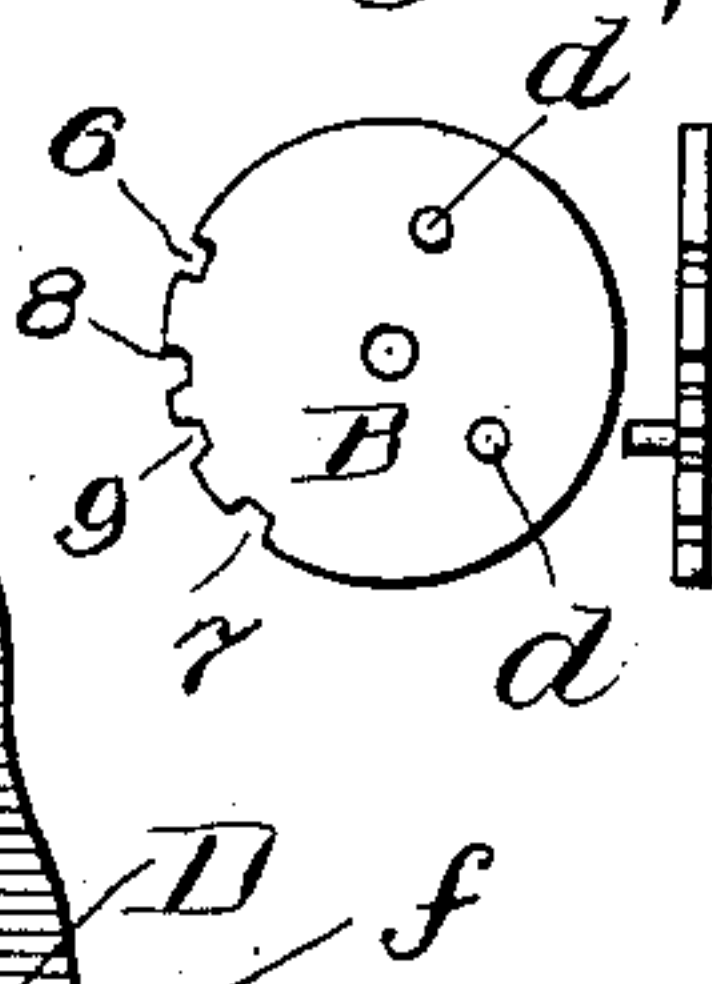


Fig. 7.

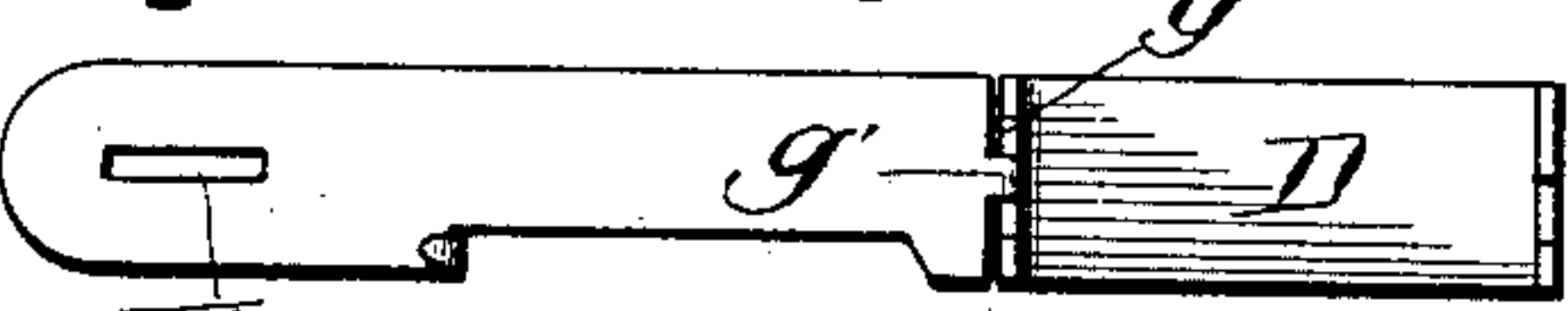


Fig. 3.

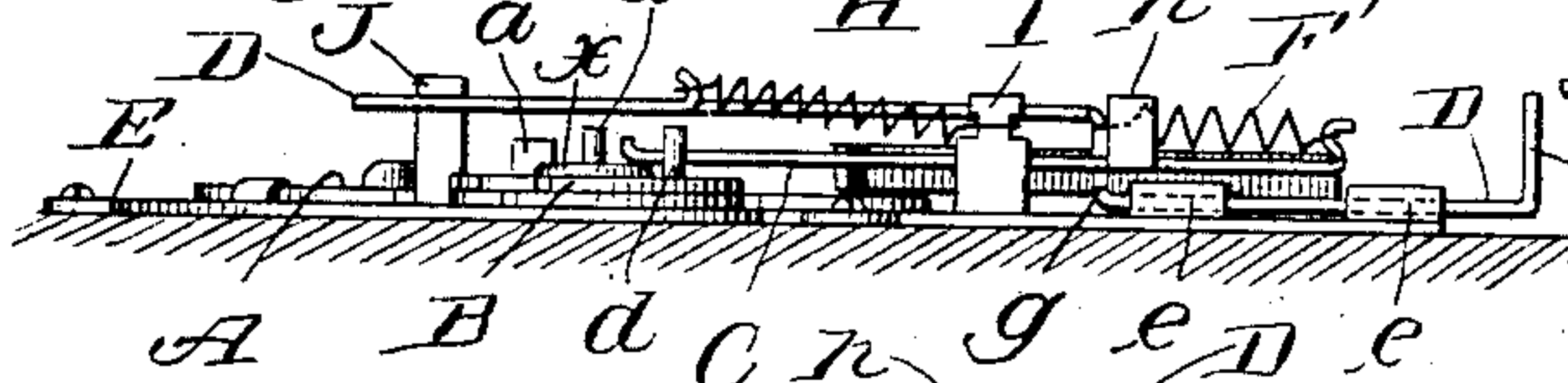


Fig. 8.



Fig. 9.



Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN C. FYFE AND VICTOR ODQUIST, OF CHICAGO, ILLINOIS.

SHUTTER FOR CAMERAS.

SPECIFICATION forming part of Letters Patent No. 731,296, dated June 16, 1903.

Application filed October 10, 1902. Serial No. 126,644. (Model.)

To all whom it may concern.

Be it known that we, JOHN C. FYFE and VICTOR ODQUIST, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Shutters for Cameras, of which the following is a full, clear, and exact specification.

The object of our invention is to provide an oscillating shutter which is shot and set by the same reciprocal movement of a push-bar, is locked in its set position whether said shutter is moved to make a time or an instantaneous exposure, and is so constructed in an economical manner, mostly by machine-work, that the operation of the actuating mechanism in releasing the locked shutter and moving the same is positive and certain. This we accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a rear elevation of our improved shutter mechanism, showing the push-bar in its normal position. Fig. 2 is a similar view showing said push-bar at the limit of its inner position and the shutter in a position antipodal to that shown in Fig. 1. Fig. 3 is a lower edge view of said mechanism, showing the front board to which it is secured in section. Fig. 4 is a detail view showing a plan of the supporting-plate of our invention. Fig. 5 is a detail view showing a plan of the shutter. Fig. 6 is a detail view showing a plan and edge view, respectively, of the tumbling-disk. Fig. 7 is a detail view showing a plan of the reciprocal push-bar. Fig. 8 is a side edge view thereof. Fig. 9 is a detail view showing a plan of the oscillatory pawl carried by said push-bar. Fig. 10 is a side edge view thereof. Fig. 11 is a transverse vertical section taken on dotted line 11 11, Fig. 1, looking in the direction indicated by the arrow.

In the drawings, A represents a suitable fan-shaped shutter made of thin sheet metal and having a rearwardly-turned stop-lug *a* projecting from the center of length of its peripheral edge, an exposure-opening *b* of suitable proportions made therein and intersected centrally by the radial plane striking through the pivotal center of the shutter and said

stop-lug *a* and having concentric to its pivotal center a circular disk-shaped boss *c*. This boss *c* is provided with a suitable central pivotal opening and has three notches 2, 3, and 4 made in a segment of its edge on one side of the radial plane striking through said stop-lug and pivotal opening thereof and has an opening 5 made therethrough on the side of said radial plane opposite said notches, which is elongated slightly in a plane concentric to the pivotal opening of the shutter.

B represents a tumbling-disk, the diameter of which corresponds to that of the diameter of the boss *c* of the shutter. This disk B is placed flatwise against and concentric to the boss *c* and is secured in such position by a pivotal screw *x*, which passes through its central opening and also that of boss *c* and is tapped into the supporting-plate, to which more extended reference will hereinafter be had. In the circumferential edge of this disk, on the same side of the pivotal center of the shutter as notches 2, 3, and 4, it is provided with a series of four notches 6, 7, 8, and 9, and it also has projecting rearwardly at points an equal distance from the center thereof and about one hundred and twenty (120°) degrees apart two studs *d d'*, which are located on the side of the disk opposite said notches 6, 7, 8, and 9. Stud *d* extends through the disk, and the portion thereof projecting from the meeting surface of the same extends into the elongated opening 5, which latter thus limits the extent of the initial movement possessed by the disk independently of the boss *c*.

The position of the shutter is either that shown in Fig. 1 or in Fig. 2 or a position intermediate these two points, as will hereinafter more fully appear. In any of these positions the studs *d* and *d'* will be at points one above a horizontal plane striking through the pivotal center of the shutter and the other below said horizontal plane. When it is desired to move said shutter in either direction, an oscillating pawl C, which is carried by a horizontal reciprocal push-bar D, is made to engage first one of said studs and then the other, according as the one or the other of the same may come in the path of said pawl as the latter is carried in its normal horizon-

tal position by the bar D toward the center of movement of the shutter. The outer portion of this push-bar is confined by and slides longitudinally in guide-lugs *e*, that are made by suitably bending tongues of metal projecting rearwardly from the supporting-plate E. The outer end or extremity of said push-bar may extend through the side of the camera-box to within convenient reach of the finger of the operator. We prefer, however, to bend its extremity *f* to the rear and provide the end edge thereof with a recess *f'* and to actuate said push-bar by means of a push-button F, the shank of which extends inward in alignment with and just past the end *f* of the push-bar, at which latter point it is provided with a circumferential groove, so as to enable it to pass through the recess *f'*. This construction permits the front board of the camera, to which the shutter mechanism is attached, to be removed without the necessity of the push-bar being first detached from the shutter mechanism.

The longitudinal movement of the push-bar D is limited when making its inward throw by its outer end coming in contact with guide-lugs *e* and is limited when making its outward throw by pawl J. About two-fifths of its length distant from end *f* it is provided with a rearward bend which extends at right angles to the remainder of the length of the bar a sufficient distance so that the inner and longer part of its length may pass to the rear of and clear disk B and the studs thereof and afford the necessary free opportunity for the play of the engaging end of the pawl C. The width of this bend is such that the lower portion is less than that of the part movable in the guide-lugs *e*, and the upper part thereof is made still narrower, so as to provide a neck *g'*, which extends through the longitudinally-elongated slot C' of the pawl C.

The pawl C is of a length corresponding to about three-fifths of the length of the bar D, and the portion thereof on the side of the slot C' nearest the end *f* of the bar overlaps the confined portion of said bar movable in the guide-lugs *e* and constitutes about two-fifths of the length of the same. At its extreme outer end pawl C is provided with a suitable hook, to which the contiguous end of a coil contraction-spring is secured that has its opposite end secured to the neck *g'* of the bend of the push-bar, thus keeping the pawl normally at the limit of its inner movement. In order to keep the pawl normally in a horizontal position, it is provided at about the transverse plane of the end of its slot C' nearest end *f* of the push-bar with rearwardly-projecting corresponding lugs *h*, that project from its side edges. When the pawl is at the limit of its movement toward the pivotal center of the shutter, these lugs bear against the shoulders of the rearwardmost longer portion of the push-bar D on each side of the upper end of the neck *g'* thereof and cause the

said pawl to return to the position shown in Fig. 1, in which, as shown, the central longitudinal plane striking therethrough will intersect the pivotal center of the shutter.

The end of the pawl C nearest the pivotal center of the shutter is provided with a centrally-extending finger *i*, the extremity of which is preferably bent rearwardly and is provided with two corresponding spurs *k* *k'*, projecting laterally from the base or root of said finger, substantially as shown in the drawings. Now when the push-bar D is moved inward toward the pivotal center of the shutter the studs *d* and *d'* of the disk B will be in the position shown in Figs. 1 and 2 or in a position in which the plane intersecting the same will be about midway between the planes intersecting the positions shown in said figures. In either of these positions the finger *i* of the pawl C will as it advances clear the stud nearest the horizontal plane intersecting the pivotal center of the shutter; but the spur of said pawl on the same side as said stud will catch the same and as said push-bar continues to advance will push against said stud and cause the shutter to move correspondingly. The movement of the shutter in one direction brings the stud which was disengaged while said shutter was last in motion into the path of the opposite spur of the pawl, when the next engagement of said push-bar takes place. This push-bar is preferably made spring-returnable by means of a coil contraction-spring H, one end of which is secured to a hook-shaped tongue projecting from the lower edge of said bar in the vicinity of the disk B and the other end secured to a lug *i*, projecting to the rear from the lower edge of the supporting-plate E. When making its return movement, the pawl which when engaging either stud of the disk B had been oscillated out of its normal position will brush past the last disengaged stud and automatically resume its normal position. In order to impart such an impulse to the shutter when moving in either direction that an instantaneous exposure occupying but a fraction of a second may be made, it is desirable that the initial effect of the actuating-pawl be resisted, so that the spring F may be thereby extended and its contractility utilized for this purpose. This is accomplished by means of a leaf-spring locking-pawl J, one end of which is secured to a suitable lug projecting from the supporting-plate and the remainder of which extends in a tangential direction to and under the adjacent inner end of the push-bar, as shown in the drawings. The engaging end of pawl J is bent toward the pivotal center of the shutter and is able to simultaneously engage some one of the notches 2, 3, and 4 of the boss of the shutter and some one of the notches 6, 7, 8, and 9 of the disk B and is made considerably wider, so as to pass laterally through a longitudinally-elongated slot

E in the contiguous end of the push-bar. The central notch 3 of the boss *c* of the shutter is wider than the notches 2 and 4. This is necessary in order to compensate for the slight difference in position which the shutter will occupy when stopped at the center of its movement—as, for instance, when it is desired to make a time exposure—when traveling in one direction and when traveling in the other direction. This difference equals the width of the stop-lug *a* plus the thickness of the spring-pawl *L*, which engages said shutter at the center of its flight when its cooperating cam *m* is moved so as to press said pawl downward.

The distance between the two central notches 8 and 9 is less than that between 8 and 6 and 9 and 7 of the disk *B*. This is rendered necessary by reason of the fact that said disk, as hereinbefore explained, has a slight movement independent of the boss *c* of the shutter *A*, which is necessary in order to throw the studs *d d'* in proper position to be engaged by pawl *C*. When the shutter is moved in either direction one-half the length of its entire movement to make a time exposure, the engaging end of pawl *J* will either enter notch 3 of boss *c* and 8 or 9 of disk *B*, according to which direction the shutter is moved. When the engaging end of the pawl *J* enters these notches or the end notches of said disk and boss, it locks the shutter in its terminal position, and in order to release the shutter the push-bar, after it has advanced a distance corresponding to the length of slot *E*, engages the end of said pawl *J* and pushes it out of the notches and permits the accumulated force of the pressure of spring *F* to exert itself upon and move said shutter swiftly to the opposite limit of its movement.

In view of the fact that it is believed the mechanical principle involved in the actuating mechanism in our invention is entirely new and original we do not desire to be confined to the exact construction hereinbefore described and shown, because it is believed other slight modifications may be resorted to which would be equally effective without involving a departure from the scope of the principle of our invention. All such changes we desire to be considered as contemplated within the scope of our invention.

What we claim as new is—

1. In a camera the combination with an oscillatory shutter, of a longitudinally-reciprocal push-bar, and pawl carried thereby having a limited longitudinal movement independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

2. In a camera the combination with an oscillatory shutter, of a longitudinally-reciprocal push-bar, and an oscillatory pawl carried thereby and having a limited longitudinal play independent thereof for moving said shutter, when carried toward the same, first in one direction and then the other.

3. In a camera the combination with an oscillatory shutter, of a longitudinally-reciprocal push-bar, and a pawl carried by said bar having a spring-returnable longitudinal play independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

4. In a camera the combination with an oscillatory shutter, of a longitudinally-reciprocal push-bar, and an oscillatory pawl carried by said bar and having a spring-returnable longitudinal play independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

5. In a camera the combination with an oscillatory shutter, of a spring-returnable longitudinally-reciprocal push-bar, and an oscillatory pawl carried thereby for moving said shutter, when carried toward the same, first in one direction and then the other.

6. In a camera the combination with an oscillatory shutter, of a spring-returnable longitudinally-reciprocal push-bar, and pawl carried thereby having a limited longitudinal movement independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

7. In a camera the combination with an oscillatory shutter, of an automatically-returnable longitudinally-reciprocal push-bar, and an oscillatory pawl carried thereby and having a limited longitudinal play independent thereof for moving said shutter, when carried toward the same, first in one direction and then the other.

8. In a camera the combination with an oscillatory shutter, of an automatically-returnable longitudinally-reciprocal push-bar, and a pawl carried by said bar having a spring-returnable longitudinal play independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

9. In a camera the combination with an oscillatory shutter, of an automatically-returnable longitudinally-reciprocal push-bar, and an oscillatory pawl carried by said bar and having a spring-returnable longitudinal play independent of the same for moving said shutter, when carried toward the same, first in one direction and then the other.

10. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of a longitudinal reciprocal push-bar, and a pawl carried thereby which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

11. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of an automatically-returnable

longitudinal reciprocal push-bar, and a pawl carried thereby which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

12. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of a longitudinal reciprocal push-bar, and an oscillatory pawl carried thereby which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

13. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of a longitudinal reciprocal push-bar, and an oscillatory pawl carried by said bar and having a limited longitudinal play independent of the same which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

14. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of a longitudinal reciprocal push-bar, and a pawl carried by said bar and having a limited longitudinal play independent of the same, which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

15. In a camera the combination with an oscillatory shutter, and studs connected thereto which are arranged in different radial planes striking through the center of movement of said shutter, of a longitudinal reciprocal push-bar, and a pawl carried by said bar and having an automatically-returnable limited longitudinal play independent of the same, which alternately engages first one of said studs and then the other, when carried toward said shutter, and moves the same first in one direction and then the other.

16. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter, movable therewith but having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and a pawl carried thereby for alternately engaging the studs of said disk, when carried toward said shutter, to move the same first in one direction and then the other.

17. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric

with the boss of said shutter, movable therewith but having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and an oscillatory pawl carried thereby for alternately engaging the studs of said disk when carried toward said shutter to move the same first in one direction and then the other.

18. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter, movable therewith and having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and a pawl carried by said bar and having a limited longitudinal play independent of the same.

19. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter, movable therewith and having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and a pawl carried by said bar and having a limited automatically-returnable longitudinal play independent of the same for alternately engaging the studs of said disk when carried toward said shutter to move the same first in one direction and then the other.

20. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter, movable therewith and having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and an oscillatory pawl carried by said bar and having a limited longitudinal play independent of the same for alternately engaging the studs of said disk when carried toward said shutter to move the same first in one direction and then the other.

21. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter, movable therewith and having a slight initial movement independent thereof, and having two studs projecting therefrom which are intersected by different radial planes, and means applied thereto for resisting the initial action of the means actuating said shutter, of a longitudinal reciprocal push-bar, and an oscillatory pawl carried by said bar and having a limited

ited automatically - returnable longitudinal play independent of the same, for alternately engaging the studs of said disk when carried toward said shutter to move the same first in one direction and then the other.

22. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric with the boss of said shutter which is movable therewith and has a slight initial movement independent thereof, and studs projecting from the same intersected by different radial planes, and means for resisting the initial action of the actuating devices of said shutter, of said actuating devices.

23. In a camera the combination with an oscillatory shutter having a central boss which is provided in a segment of its edge with a series of three notches the central one of which is wider than the others, a tumbling-disk concentric with said boss and moving therewith but having a slight initial movement independent thereof and having a series of four notches in a segment of its edge of the same radius as the edge of the boss in which the notches therein are made, the two central notches of which are nearer together than the end notches are to the same, studs projecting from said disk in different radial planes, and a pawl simultaneously engaging said notches of said boss and disk, of actuating devices alternately engaging said studs and thereby moving said shutter first in one direction and then the other.

24. In a camera the combination with an oscillatory shutter, having a central boss with notches in a segment of its edge, a tumbling-disk having a series of notches in its edge coming in the same peripheral plane as the notched edge of the boss with which it moves but has a slight initial movement independent of the same, studs projecting from said disk in different radial planes and a pawl engaging said notches, of actuating devices alternately engaging said studs and thereby moving said shutter first in one direction and then the other.

25. In a camera the combination with an oscillatory shutter, a tumbling-disk concentric to the boss of said shutter and movable therewith but having a slight initial movement independent of the same, studs projecting from said disk in different radial planes, and means for resisting the initial action of the actuating devices, of said actuating devices alternately engaging said studs and simultaneously disengaging the means for resisting the initial action of the same whereby said shutter is caused to move first in one direction and then the other.

26. In a camera the combination with an oscillatory shutter, of a longitudinal reciprocal push-bar D having a bend g made by deflecting the same rearward, of a longitudinally-disposed pawl having a longitudinal slot therein through which said bend extends which is adapted to engage and impart to said

shutter a movement first in one direction and then the other.

27. In a camera the combination with an oscillatory shutter, of a longitudinal reciprocal push-bar having the bend made by deflecting the same rearward, a longitudinally-disposed pawl having a longitudinal slot therein through which said bend extends, and a spring for normally keeping said pawl at the limit of its independent movement toward said shutter, which latter it engages to move the same first in one direction and then the other.

28. In a camera the combination with an oscillatory shutter, of a push-bar having a bend made by deflecting the same to the rear the width of which is less than the remainder of said bar, and a pawl normally at the limit of its movement toward said shutter having a longitudinal slot therein through which said bend extends and having lugs projecting from the side edges thereof contiguous to the transverse plane of the end of the slot farthest from said shutter which are adapted to engage the contiguous end edges of the rearwardmost portion of said push-bar, as and for the purpose set forth.

29. In a camera the combination with an oscillatory shutter of a longitudinal reciprocal push-bar, a push-button to the alining shank of which the outer end of said bar is detachably connected, and means carried by said push-bar for engaging said shutter.

30. In a camera the combination with an oscillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a longitudinal reciprocal pawl having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

31. In a camera the combination with an oscillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a longitudinal reciprocal oscillatory pawl having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

32. In a camera the combination with an oscillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a yielding longitudinal reciprocal pawl having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

33. In a camera the combination with an os-

cillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a yielding longitudinal reciprocal oscillatory pawl, having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

34. In a camera the combination with an oscillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a yielding longitudinal reciprocal pawl automatically restorable to a longitudinal plane intersecting the pivotal center of said shutter, having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

35. In a camera the combination with an oscillatory shutter, and a disk concentric with the boss thereof which is movable with but having a slight initial movement independent of the same, and studs projecting from said disk in different radial planes, of a longitu-

dinal reciprocal pawl automatically restorable to a longitudinal plane intersecting the pivotal center of said shutter, having a central finger projecting from its engaging end and lateral spurs projecting at the root of the same adapted to alternately engage said studs as and for the purpose set forth.

36. In a camera the combination with an oscillatory shutter, and a locking-pawl engaging the boss of the same the engaging end of which is made wider and projects rearward, of a longitudinal reciprocal bar having a slot therein out through which the widened engaging end of said pawl extends, and means carried by said bar for actuating said shutter.

37. In a camera the combination with an oscillatory shutter, and locking devices engaging the boss of the same, means for actuating said shutter and a longitudinal reciprocal push-bar by which the same is carried and which during its engaging movement released said locking device.

In testimony whereof we have hereunto set our hands this 6th day of October, 1902.

JOHN C. FYFE.
VICTOR ODQUIST.

Witnesses:

E. K. LUNDY,
FRANK D. THOMASON.