

No. 762,424.

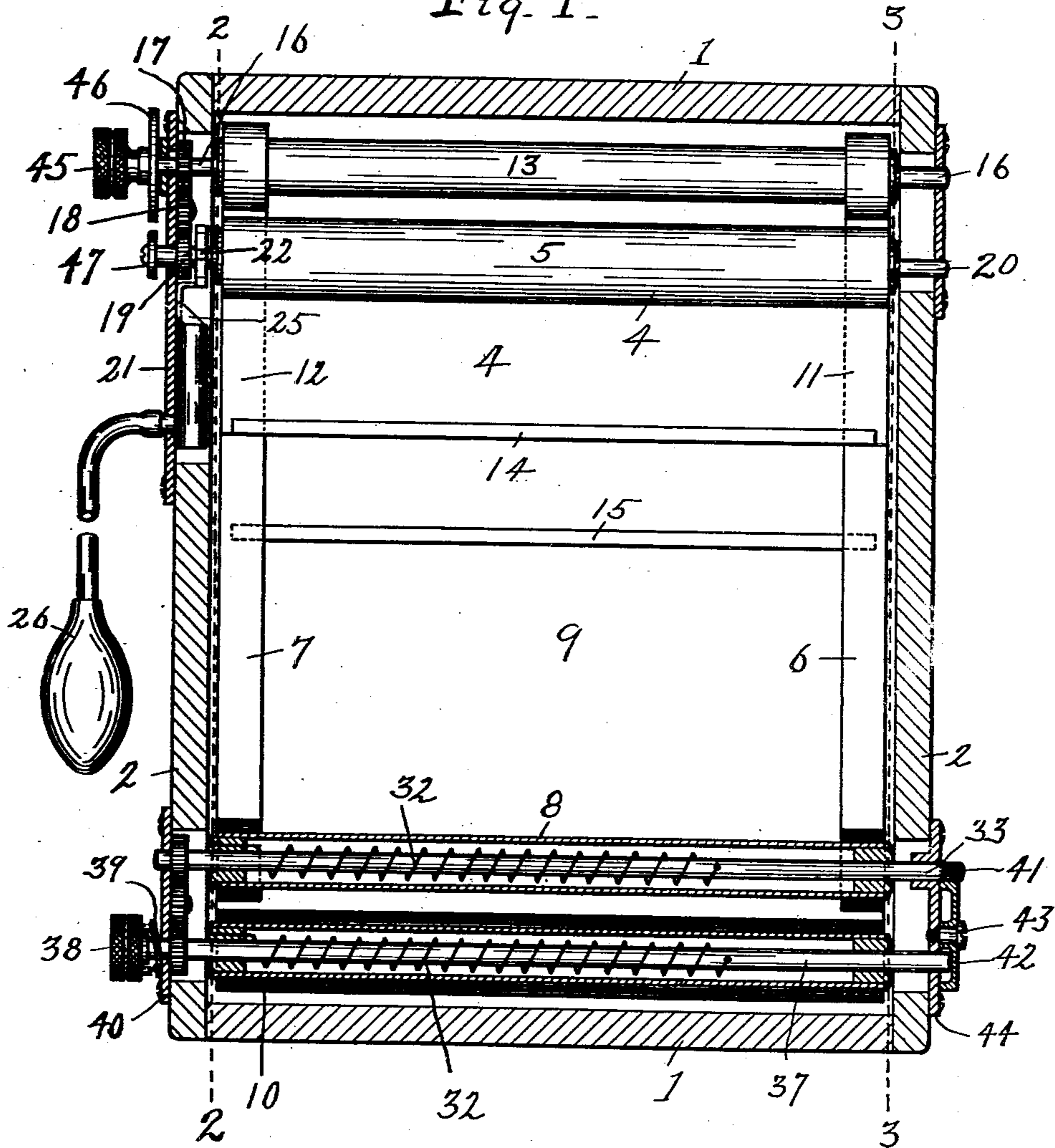
PATENTED JUNE 14, 1904.

H. W. LOCKE.
CURTAIN SHUTTER.
APPLICATION FILED DEC. 23, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



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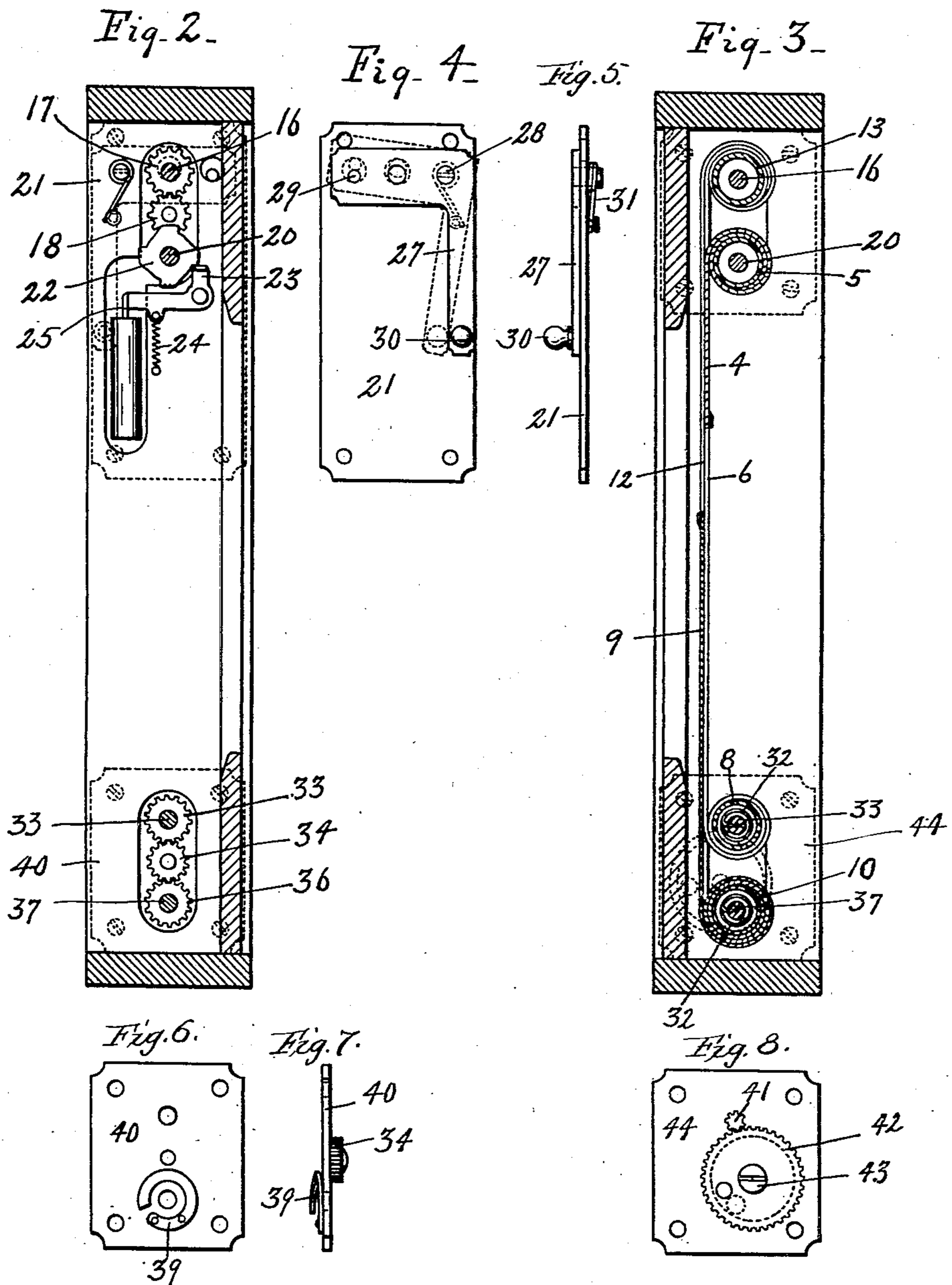
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UNITED STATES PATENT OFFICE.

HARVEY W. LOCKE, OF ROCHESTER, NEW YORK, ASSIGNOR TO CENTURY CAMERA COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

CURTAIN-SHUTTER.

SPECIFICATION forming part of Letters Patent No. 762,424, dated June 14, 1904.

Application filed December 23, 1903. Serial No. 186,365. (No model.)

To all whom it may concern:

Be it known that I, HARVEY W. LOCKE, a citizen of the United States, and a resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Curtain-Shutters, of which the following is a specification.

This invention relates to curtain-shutters adapted, preferably, for use in the focal plane of cameras.

It consists in the mechanism hereinafter described and claimed.

In the drawings, Figure 1 is an elevation, partly in section, of a mechanism embodying the invention. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a section on the line 3 3 of Fig. 1; and Figs. 4, 5, 6, 7, and 8 are views of details.

In the drawings, 1 1 are the top and bottom rails of the rectangular frame for the shutter. 2 and 3 are the vertical side rails thereof. Within this frame are supported four rollers for operating two flexible blinds. One blind, 4, is rolled upon and unrolled from a roller 5 and has narrow bands 6 and 7 attached to its outer corners that are rolled upon an automatic spring-roller 8 in the lower part of the frame. The other blind, 9, is rolled upon and unrolled from an automatic spring-roller 10 in the lower part of the case and has narrow bands 11 and 12 attached to its outer corners that are rolled upon a roller 13 in the upper part of the frame. Mechanism is provided for operating the rollers, and thereby the blinds.

The principle of the mechanism thus far described is as follows: If the blind 4 remains stationary and the roller 13 is turned in one direction or the other, thereby moving the blind 9, the exposure-gap between the edges 14 and 15 of the blinds 4 and 9 can be enlarged or diminished. The spring-rollers 8 and 10 if they have been put under sufficient tension will move the blinds 4 and 9 simultaneously, since they are geared together, whenever they are released from the catch that holds them, from acting, and the exposure-gap will move across from the upper to

the lower portion of the shutter-opening, thereby exposing the plate. If the tension of either or both of the springs in the blinds 4 and 9 is increased or diminished, the speed of movement of the exposure-gap is correspondingly changed. When the rollers 13 and 5 wind, respectively, the bands 11 and 12 of the blind 9 and the blind 4 to the upper part of the casing, the device is ready for use. If, then, the roller 13 is released while the roller 5 is held fixed, the blind 9 will be rolled upon the roller 10, so that the shutter will be opened wide. If next the roller 5 is released, the blind 4 will be pulled toward the roller 8, so that the opening will be closed. The time between the release of the roller 13 and the release of the roller 5 will determine the length of this time exposure.

The operating mechanism of this shutter is as follows: The roller 13 has a shaft 16, carrying a pinion that meshes with a second pinion 18, which latter pinion meshes with a pinion 19, Fig. 1, on the shaft 20 of the roller 5. These shafts and pinions are supported on a plate 21, attached to the shutter-frame. The shaft 20 carries also a ratchet-disk 22 for engagement with a spring-operated dog 23, pivoted on the plate 21 and actuated in one direction by a spring 24 and in the other direction by the plunger 25 of an air-engine that is controlled in the usual way by a bulb 26. The shaft 16 passes through a perforation in the plate 21 of such size that it permits the movement of the shaft far enough to disengage the teeth of the pinion 17 from the teeth of the pinion 18; and the end of the shaft 16 rests in a movable plate 27, pivoted at 28 to the plate 21 and provided with means for limiting its movement, such as the pin 29 movable in a roller or slot in the plate 21. The movable plate 27 may have a handle 30 and is moved in the direction to maintain engagement between the pinions 17 and 18 by means of a spring 31.

The spring-rollers 8 and 10 are of well-known construction, at least in so far as each roller is hollow, and has a spring 32 attached to the roller and to a stationary shaft on

which the roller turns, so that by revolving the roller itself with reference to the shaft the spring 32 is wound up and put under tension for operation. The roller 8 has a shaft 5 33, which at one end carries a pinion 34, that meshes with a pinion 35 and which in turn meshes with a pinion 36 upon the shaft 37 of the roller 10. Either the shaft 33 or the shaft 37 has upon it a milled head 38 for turning it 10 in order to increase the tension of the springs 32 of the two rollers. Said milled head is held by means of a split ring 39, fastened to the plate 40, which is the plate that constitutes the bearing for the shafts 33 and 37 and 15 carries the pinion 35. The split ring 39 has its free end bent out from the plane of the remainder of the ring, so that said end may engage in notches on the milled head 38. As the milled head 38 is turned so that it winds 20 up the spring 32 the free end of the ring 39 engages in the successive notches in the head 38, thereby preventing the unwinding of the spring, and since the shafts 37 and 33 are geared together as just described both springs 25 are wound up in the same direction. When the free end of the ring 39 is pressed in, it is released from the head 38, so that the tension of the spring 32 may be let down. The opposite end of the shaft 33 carries a small pinion 30 41, that engages a disk 42, pivoted to turn an axis 43 on a plate 44 on the outside of the frame. The disk 42 has numerals arranged around its periphery, and the position of said numerals with reference to a fixed point, such 35 as the pinion 41, indicates the tension of the spring 32.

On the end of the shaft 16 is a milled head 45 for operating said shaft and also a disk 46, carrying numerals upon its edge. The end of 40 the shaft 20 carries a disk 47 adjacent to the disk 46 and is provided with a marker or pointer, (not shown,) whereby the relative position of the shaft and roller 13 with reference to the shaft and roller 5 may be determined for the purpose of determining the 45 width of the exposure-opening between the edges 14 and 15 of the respective blinds. This exposure-opening is increased or diminished by swinging the plate 27 by means of the handle 30 and at the same time keeping hold of the 50 milled head 45, so that the latter cannot revolve. Thus the roller 13 is rendered free to revolve with reference to the roller 5. By allowing the blind 9 to be wound to a suitable 55 degree upon the roller 10 by this action of the spring in the roller 10 the exposure-opening between the edges 14 and 15 is increased and by turning the milled head in the opposite direction it is diminished. The marker on the 60 disk 47 should point upward, so that it will indicate the width of the exposure-opening by reference to the proper numeral on the disk 46.

For instantaneous exposures the shutters 65 are operated by merely pressing the bulb,

which causes the plunger 25 of the air-engine to disengage the dog 23 from the ratchet-disk 22 on the shaft 20, thereby releasing the spring-rollers 8 and 10, so that they wind up, respectively, the bands 6 and 7, attached to the blind 70 4 and the blind 9. For time exposures the blinds 4 and 9 are released, so that they are drawn successively across the shutter-opening. To accomplish this, the movable plate 27 is first tilted by its handle 30, thereby releasing the shaft 16, so that the spring-roller 75 10 will pull down the outer blind 9 and expose the plate. Then to close the blind tilt first the lever, as before, thereby disengaging the roller 5 from the roller 13, and then press 80 the bulb, thereby releasing the shaft 20 of the roller 5 from the dog 23, so that the spring-roll 8 is free to pull down the other blind 4, thereby completing the exposure.

What I claim is—

1. The combination of a frame; a pair of 85 adjacent spring-rollers, supported in said frame; means for adjusting the tension of the springs in said spring-rollers; a flexible blind wound on one of said spring-rollers; a pair of 90 flexible bands wound on the other of said spring-rollers; a pair of adjacent rollers at a suitable distance from said spring-rollers, also supported in said frame; a second flexible 95 blind wound on one of said last-mentioned rollers and connected to the bands that are wound on one of said spring-rollers; a second pair of flexible bands wound on the other of the two last-mentioned rollers and connected to the 100 blind that is wound on one of said spring-rollers; a gearing connection between the other two rollers; means for locking one of said last-mentioned rollers against rotation; means for releasing said last-mentioned roller from 105 said locking means for releasing both blinds; and means for disconnecting said gearing connection for releasing one of said blinds for the purpose of adjusting the width of the opening between the edges of said blinds.

2. The combination of a frame; a pair of 110 adjacent spring-rollers supported in said frame; means for adjusting the tension of the springs in said rollers; a flexible blind wound on one of said spring-rollers; a pair of flexible 115 bands wound on the other of said spring-rollers; a plate pivotally supported on one side of said frame; a pair of adjacent rollers at a suitable distance from said spring-rollers, one of which is supported at both ends in said 120 frame and the other of which is supported at one end in said frame and at the other end in said plate; a second flexible blind wound on one of said last-mentioned rollers and connected to the bands that are wound on one of 125 said spring-rollers; a second pair of flexible bands wound on the other of the two last-mentioned rollers and connected to the blind that is wound on one of said spring-rollers; a 130 gearing connection between the other two rollers; means for locking against rotation

that one of said last-mentioned rollers that is supported at both ends in said frame; means for releasing said last-mentioned roller from said locking means for releasing both blinds; and means for tilting said pivotally-supported plate whereby the gearing connection between said last-mentioned rollers is disconnected for the purpose of adjusting the width of the opening between the edges of said blinds.

3. The combination of a frame; a pair of adjacent spring-rollers supported in said frame; means for adjusting the tension of the springs in said spring-rollers; a flexible blind wound on one of said spring-rollers; a pair of flexible bands wound on the other of said spring-rollers; a plate pivotally supported on the side of said frame; a pair of adjacent rollers at a suitable distance from said spring-rollers, each carrying a pinion at one end, one of said rollers being supported at both ends in said frame, and the other of said rollers being supported at one end in said frame, and at the other end in said pivotally-supported plate; a pinion supported on said plate, and adapted to mesh with the pinions on said rollers; means for tilting said plate whereby the pinion on the roller supported thereby is disconnected from said intermediate pinion; a second flexible blind wound on one of said last-mentioned rollers, and connected to the bands that are wound on one of said spring-rollers; a second pair of flexible bands wound on the other of the two last-mentioned rollers, and connected to the blind that is wound on one of said spring-rollers; means for locking against rotation that one of said last-described rollers that is supported at both ends in said frame; and means for releasing said last-mentioned spring-roller from said locking means.

4. The combination of a frame; a pair of adjacent spring-rollers supported in said frame; means for adjusting the tension of the springs in said spring-rollers; a flexible blind wound on one of said spring-rollers; a pair of flexible bands wound on the other of said rollers; a pair of adjacent rollers at a suitable distance from said spring-rollers, also supported in said frame, one of said rollers carrying a ratchet-disk; a dog pivoted on said frame; a spring adapted to actuate said dog in one direction to engage said ratchet-disk; an air-engine having a plunger adapted to actuate said dog to release said disk; a second flexible blind wound on one of said last-mentioned rollers, and connected to the bands that are wound on one of said spring-rollers; a second pair of flexible bands wound on the other of the two last-mentioned rollers, and connected to the blind that is wound on one of said spring-rollers; a gearing connection between the last-described rollers; and means for disconnecting said gearing connection between said last-mentioned rollers.

5. The combination of a frame; a pair of

adjacent spring-rollers supported in said frame; means for adjusting the tension of the springs in said spring-rollers; a flexible blind wound on one of said spring-rollers; a pair of flexible bands wound on the other of said spring-rollers; a plate pivotally supported on the side of said frame; a pair of adjacent rollers at a suitable distance from said spring-rollers, each carrying a pinion at one end, one of said rollers being supported at both ends in said frame, and carrying a ratchet-disk, and the other of said rollers being supported at one end in said frame and at the other end in said pivotally-supported plate; a pinion supported on said plate and adapted to mesh with the pinions on said rollers; means for tilting said plate whereby the pinion on the roller supported thereby is disconnected from the pinion on said plate; a dog pivoted on said frame; a spring adapted to actuate said dog in one direction to engage said ratchet-disk; an air-engine having a plunger adapted to actuate said dog to release said disk; a second flexible blind wound on one of said last-mentioned rollers, and connected to the bands that are wound on one of said spring-rollers; and a second pair of flexible bands wound on the other of said last-described rollers, and connected to the blind that is wound on one of said spring-rollers.

6. The combination of a frame, the spring-rollers 8 and 10 supported in said frame; means for adjusting the tension of the springs in said spring-rollers; the flexible blind 9 wound on said spring-rollers 10; the pair of flexible bands 6 and 7 wound on said spring-roller 8; the plate 21 pivotally supported on said frame; the roller 13 on its shaft 16 revolubly supported at one end in said frame, and at the other end in said plate 21, the said shaft 16 carrying the pinion 17; the roller 5 on its shaft 20 revolubly supported at both ends in said frame, and carrying the pinion 19; the pinion 18 supported on said plate 21, and adapted to be interposed between said pinions 17 and 19; a spring adapted to move said plate 21 in the direction to maintain engagement between the pinions 17 and 18; means for tilting the said plate whereby said last-mentioned pinions are disengaged; a flexible blind 4 wound on said roller 5, and connected to the bands 6 and 7; a pair of flexible bands 11 and 12 wound on the roller 13, and connected to the blind 9; means for locking the roller 5 against rotation; and means for releasing said roller 5 from said locking means; substantially as shown and described.

7. The combination of a frame, the spring-rollers 8 and 10 supported in said frame; means for adjusting the tension of the springs in said spring-rollers; the flexible blind 9 wound on said spring-roller 10; the flexible bands 6 and 7 wound on said spring-roller 8; the roller 13 revolubly supported in said frame; the roller 5 revolubly supported in said frame, and car-

rying the ratchet-disk 22; the dog 23 pivoted on said frame; a spring adapted to actuate said dog in one direction to engage said ratchet-disk; the air-engine 25 having a plunger adapted to actuate said dog 23 to release said disk; the flexible blind 4 wound on said roller 5, and connected to said bands 6 and 7; the bands 11 and 12 wound on said roller 13, and connected to said blind 9; a gearing connection between the rollers 5 and 13; and means for disconnecting said gearing connection between said rollers 5 and 13; substantially as shown and described.

8. The combination of a frame; the spring-rollers 8 and 10 revolubly supported in said frame; means for adjusting the tension of the springs in said spring-rollers; the flexible blind 9 wound on said roller 10; the flexible bands 6 and 7 wound on said spring-roller 8; the plate 21 pivotally supported on said frame; the roller 13 revolubly supported at one end of said frame, and at the other end in said plate 21, and carrying the pinion 17; the roller 5 revolubly supported at both ends in said frame, and carrying the pinion 19, and the ratchet-disk 22; the pinion 18 supported on said frame and adapted to mesh with the pinions 17 and 19; a spring adapted to move said plate 21 so as to cause said pinions 17 and 18 to engage; means for tilting the plate 21 whereby the pinion 17 is disconnected from the pinion 18; the dog 23 pivoted on said frame; a spring adapted to actuate said dog in one direction to engage said ratchet-disk 22; the air-

engine 25, having a plunger adapted to actuate said dog to release said disk; the flexible blind 4 wound on said roller 5, and connected to the bands 6 and 7; and the flexible bands 11 and 12 wound on said roller 13 and connected to the blind 9; substantially as shown and described.

9. The combination of a frame, a pair of adjacent shafts revolubly supported therein, each carrying a pinion; rollers revoluble upon said shafts, respectively; springs within said rollers, each spring connected at one end with the roller and at the other end with the shaft; a pinion supported on said frame and interposed between the pinions on said shafts, whereby said shafts are caused to rotate in the same direction; means for rotating one of said shafts; and a lock adapted to hold said shafts against rotation.

10. The combination of a frame; a pair of shafts revolubly supported in said frame, each carrying a pinion; rollers upon said shafts, respectively; springs within said rollers, attached at one end to said rollers and at the other to the shaft; a pinion supported on said frame and interposed between said pinions on said shafts; a head upon one of said shafts having a stop thereon; and a spring-ring attached to said frame and having a free end adapted to engage the stop on said head.

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Witnesses:

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