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E. BRAUBURGER.

ROLLER BLIND FOR PHOTOGRAPHIC CAMERAS.

APPLICATION FILED APR. 15, 1905.

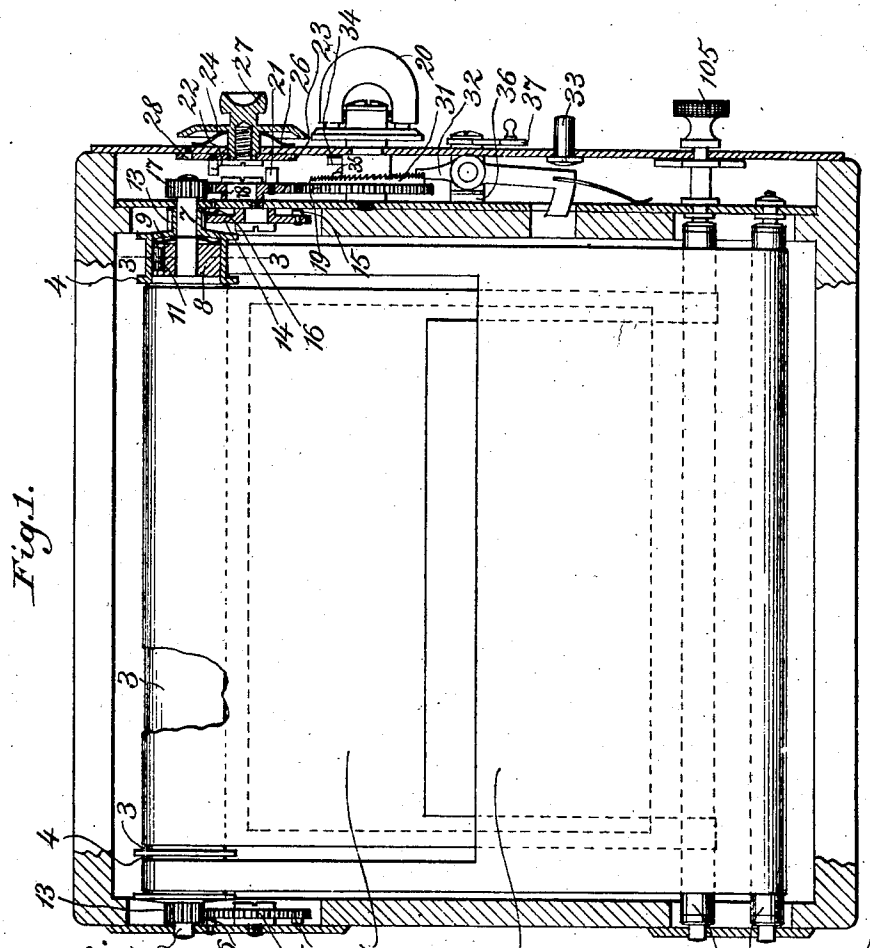

Fig. 1.

Fig. 3.

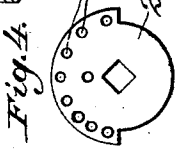

Fig. 4.

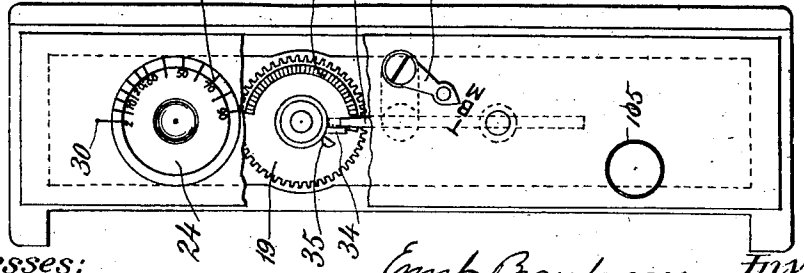

Fig. 2.

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ROLLER-BLIND FOR PHOTOGRAPHIC CAMERAS.

No. 833,916. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed April 15, 1905. Serial No. 255,787.

To all whom it may concern:

Be it known that I, ERNST BRAUBURGER, a subject of the German Emperor, and a resident of Steglitz, near Berlin, Germany, have invented certain new and useful Improvements in Roller-Blinds for Photographic Cameras, of which the following is a specification.

This invention relates to curtain-shutters for photographic cameras in which the size of the slit through which the plate is exposed is regulated by the shifting of two curtains toward or away from each other.

The object of the invention is to attain a sure action of the closing device, combined with a simple construction. To this end means are provided for effecting the shifting of the curtains easily and precisely and other means for regulating the width of the slit, as desired, and, finally, means to make the closing device when it is released work accurately.

In order that the invention may be understood by those skilled in this special branch of technics, I have illustrated it on the accompanying drawings.

On the drawings, Figure 1 shows a front view of the shutter and parts of the same in longitudinal section through a roller of the curtain. Fig. 2 is a side view of the casing of the shutter with the wall of the casing partly broken off. Figs. 3 and 4 show details of the device, Fig. 3 being a section on line 3 3 of Fig. 1.

Similar numerals refer to similar parts throughout the several views.

The two curtains are marked with 1 and 2. The roller on which the curtain 1 is wound is marked with 3, while the rollers of the curtain 2 are marked with 4. The spring stretching-roller for the curtain 1 is marked 5; the one for the curtain 2, 6. The axle of the roller 5 is provided at one end with a knob 105, allowing the tension of the spring of the roller to be regulated at will by rotating the knob 105. The rollers 4 are located coaxially with the roller 3 and mounted loosely on the end parts 7 of its axle. The end pieces 7 of the axle of the roller 3 carry also friction-bodies 8, which are adapted to be pressed with their inner lateral surfaces by springs 9 against the roller 3. The periphery of the disk-like bodies 8 is such that there remains a space 10 between the bodies 8 and the inner surface of the rollers 4. In this space are arranged coupling-bodies 11, which in the embodiment represented in the drawings have the form of rollers, the freedom of movement of such coupling-bodies being kept within certain limits by a weak spring 12. The rollers 4 are provided at their ends with teeth 13, which engage with toothed wheels 14. Each toothed wheel 14 is provided with a pin 15, which can be made to engage with a projection 16 on the casing. 17 is a toothed wheel rigidly arranged on the end 7 of the axle of the roller 3. This wheel engages with a toothed wheel 18, which in its turn engages with a toothed wheel 19, connected with the winding-up handle 20. The toothed wheel 18 is provided with a pin 21, which can be made to engage with a pin 22 on a disk 23. Disk 23 is connected with a disk 24, provided with divisions 25 and pressed by a spring 26 toward the outside. By a pressure on the button 27 the disk 24, and simultaneously with it the disk 23, connected with it, can be pressed inward, when a pin 28 will step out of one of the openings 29 of the disk 23, so that the disk 24 can be turned. The position of the disk 24 can at any time be read on the scale 25 of the same by means of the mark 30.

On the toothed wheel 19 is arranged a toothed wheel-segment 31, with which the disengaging-lever 32, with the disengaging knob or button 33, can engage. The teeth of the segment 31 lie on an inclined surface, so that at one end of the segment they are at a greater distance from the face of the toothed wheel 19 than at the other.

34 is a projection provided on the shaft of the toothed wheel 19, while 35 is a projection protruding from the surface of the toothed wheel 19. The disengaging-lever 32 pivots on a shiftable part 36, which by turning an adjusting-hand 37 can be pushed more or less toward the center of the toothed wheel 19, so that the lever 32 in one of its positions can only engage with the teeth of the segment 31 without being in the path of the projections 34 and 35. In another position of the hand 37 the lever 32 projects not only into the path of the teeth of the segment 31, but also into the path of the projection 34, and in a third position, moreover, into the path of the projection 35.

The working of the shutter is as follows: When the device is to be wound up and an exposure to take place, the handle 20 is turned and the winding-up rollers 3 4 rotated thereby, so that the curtains 1 2 are wound upon these rollers. During this movement the roller 3 moves the friction-bodies 8, which in their turn transmit their movement, through the rollers 11, to the winding-up rollers 4. The friction-bodies 8 therefore form a kind of bridge between the rollers 3 and 4, the bridge 8 being coupled as well with the roller 3 as with the roller 4 by suitable coupling devices. The rotation of the winding-up rollers of both curtains continues until the pin 15 of the wheel 14 strikes against the projection 16. This stops the further rotation of the rollers 4. If now the handle 20 is turned farther, the curtain 1 is moved farther and displaced with relation to curtain 2 until the projection 21 strikes against the projection 22. According to the adjustment of the disk 24 the slit between the two blinds 1 2 will be more or less broad. If now the disengaging-lever 32 by a pressure on the button 33 is moved out of the teeth of the segment 31, the curtains are moved under the action of the spring stretching-rollers 5 6. Both curtains are moved simultaneously until the pin 15 of the wheel 14 strikes from the other side against the pin 16, the same as during the winding up. As soon as this takes place the rollers 4 can no longer rotate; but the roller 5 can wind up the blind 1 still farther, as the coupling-rollers 11 when the friction-disks 8 are turned in this direction enter into a widened part of the spaces 10 within the rollers 4, and thus uncouple the rollers 3 4. During this movement of the curtain 1 independent of the curtain 2 the slit is closed, so that when the shutter is wound up again no light falls upon the plate.

In the above description of the working of the shutter it has been presumed that the disengaging-lever 32 is in the position shown in Fig. 1. If, however, the lever 32 is in the position shown in Fig. 2 in full lines, the curtains cannot, after being wound up, when the button 33 is pressed roll off at once entirely, as in this case the projection 34 on the shaft of the toothed wheel 19 comes into engagement with the disconnecting-lever 32, (position shown in full lines in Fig. 2 of the drawings,) whereby the movement of the curtains is interrupted. The projection 34 is so arranged that the interruption in the movement of the blind occurs at such a place that the shutter is just opened. It remains open as long as the button 33 is pressed down. When the button 33 is released, the curtain is wound off entirely, as described above. If the hand 37 is so adjusted that the lever 32 is in the position indicated by dotted lines in Fig. 2, the curtain will when the button 33 is pressed down roll off again until the projection 34 strikes against the lever 32—that is to say, until the shutter is opened. If now button 33 is released, lever 32 on its return into the position of rest engages the projection 35 of the toothed wheel 19, so that the shutter remains open until the button 33 is pressed upon again. According to the adjustment of the lever 32 the exposure will either be instantaneous, (the corresponding position of the hand 37 being indicated in Fig. 2 by the letter M,) a so-called "ball-exposure," (indicated by letter B,) or a prolonged exposure, (indicated by letter T.) In order that if the lever 32 is adjusted in a certain position the corresponding exposure will really follow, it is necessary that each time when the lever is put on ball or prolonged exposure the projection 34 is engaged by the lever. This is attained by the arrangement that the segment 31 is of the shape of an inclined surface with indentations and so arranged on the face of the toothed wheel 19 that with its upper end it engages with the detent-lever 32, when the shutter is entirely wound up. Only a very slight lifting of the lever 32 is required in this case in order to bring it into the path of the projection 34. The projection 34 can nevertheless freely pass over the lever 32 as soon as the latter is released, as in the meantime the toothed wheel 19, with the segment 31, has turned so far that the lower part of the range of teeth is underneath the lever 32.

What I claim as my invention, and desire to secure by United States Letters Patent, is—

1. In a shutter the combination of two curtains adapted to be moved as well independently of each other as jointly, and adapted to form a slit, means adapted to successively interrupt the movement of the two curtains at the end of the winding-off movement, means for limiting at the end of the winding-up movement at first the movement of one curtain and other adjustable means adapted to limit thereafter the movement of the second curtain at the moment when a slit of desired width has been formed.

2. In a shutter the combination of two curtains adapted to form a slit between their edges, rollers allowing of moving the curtains to and fro, either independently of each other or jointly, a bridge-piece adapted to communicate the movement of one roller of one curtain to one roller of the other curtain, coupling devices between said bridge-piece and said two curtain-rollers, one of said coupling devices being a friction-coupling and the other being a coupling which locks on rotation in one direction and means for interrupting the movement of one curtain at the end of the winding-up and winding-off movement, substantially as set forth.

3. In a shutter the combination of two curtains adapted to form a slit between their

edges, rollers adapted to move the curtains to and fro, either independently of each other or jointly, a bridge-piece adapted to communicate the movement of one roller of one curtain to one roller of the other curtain, coupling devices between said bridge-piece and said two curtain-rollers, one of said coupling devices being a friction-coupling securing frictional contact between said bridge-piece and one of said two curtain-rollers and the other, interposed between the bridge-piece and the second curtain-roller, a coupling which locks on rotation in one direction and means for interrupting the movement of that curtain-roller which is actuated during the winding-up movement by means of said bridge-piece and coupling devices, at the end of the winding-up and winding-off movement, substantially as set forth.

4. In a shutter the combination of two curtains, adapted to form a slit between their edges, rollers adapted to move the curtains to and fro, either independently of each other or jointly, a bridge-piece adapted to communicate the movement of one roller of one curtain to one roller of the other curtain, coupling devices between said bridge-piece and said two curtain-rollers, one of said coupling devices being a friction-coupling and one a coupling which locks on rotation in one direction and means for interrupting the movement of the one curtain at the end of the winding-up and winding-off movement, and adjustable means for interrupting the winding-up movement of the second curtain after the interruption of the movement of the said first curtain, substantially as set forth.

5. In a shutter the combination of two curtains adapted to form a slit between them, rollers adapted to move the curtains to and fro, one roller of one curtain carrying loosely at both ends of its shaft, rollers for the second curtain, friction-bodies on the ends of said shaft in friction contact with the first-named roller for one of the curtains, coupling devices between each of the said friction-bodies and the roller on the same end of the shaft, adapted to couple automatically the two said parts, when moving in one direction, and to automatically uncouple the same, when they move in the other direction, and means for stopping the two rollers on the ends of the shaft, at the termination of the winding-up or winding-off movement of the curtains.

6. In a shutter the combination of two curtains adapted to form a slit between them, rollers adapted to move the curtains to and fro, one roller of one curtain carrying loosely at both ends of its shaft, rollers for the second curtain, each of the two last-named rollers containing a cavity, friction-bodies within such cavities loosely mounted on the ends of the shaft and in friction contact with the first-named middle roller the friction-bodies and the bodies of the curtain-rollers inclosing same leaving hollow spaces between them, coupling-bodies in these hollow spaces, adapted to couple the friction-bodies and the rollers automatically, on moving in one direction and to uncouple them, on moving in the opposite direction, means adapted to stop the said two hollow rollers at the termination of the winding-up and winding-off movement of the curtains, and adjustable means for interrupting the winding-up movement of the roller between the said two rollers, after the stopping of the latter.

7. In a shutter the combination of two curtains adapted to be moved independently of each other as well as jointly, and forming a slit between them, means adapted to interrupt the movement of one curtain at the termination of the winding-up and winding-off movement, a rotatable member carrying a stop-pin said rotatable member being in operative connection with the second curtain and an adjustable member carrying also a stop-pin, the last-named stop-pin crossing the path of the stop-pin of said rotatable member.

8. In a shutter the combination of two curtains adapted to be moved independently of each other as well as jointly and forming a slit between them, means adapted to bring the curtains into operative position by winding up for making exposures and to secure them in this position, other means for releasing the curtains the means for bringing the curtains into operative position and for securing them when wound up, comprising a rotating handle, a toothed wheel rigidly connected with said handle and in operative connection with the curtain, a toothed segment on the front side of the said toothed wheel and a detent-lever adapted to engage with the teeth of the said segment.

9. In a shutter the combination of two curtains adapted to be moved independently of each other as well as jointly and to form a slit between them, means adapted to bring the curtains into operative position by winding up for making exposures and to secure them in this position, other means for releasing the curtains, the means for bringing the curtains into operative position and for securing them when wound up, comprising a rotating handle, a toothed wheel rigidly connected therewith and in operative connection with the curtains, a toothed segment on the front side of said toothed wheel, the teeth of said segment increasing in length from one end toward the other, two projections in fixed positions with relation to the toothed segment, both at a smaller distance from the axis of rotation of the toothed segment than the latter and one of the two projections nearer to this axis than the other, and an adjustable detent-lever adapted to be approached more or less to the axis of rotation

of the toothed segment, and to project, according to its adjustment, into the path of the toothed segment only or, at the same time, into the path of one of the projections or of both, substantially for the purpose set forth.

10. In a shutter the combination of two curtains, spring stretching mechanism for said curtains, winding-up mechanism for said curtains, means for operating the winding-up mechanism of the two curtains together, and automatic means for stopping the operation of the winding-up mechanism of one curtain while permitting further operation of the winding-up mechanism of the other curtain.

11. In a shutter the combination of two curtains, spring stretching-rollers for moving said curtains in one direction, winding-up rollers for moving said curtains in the opposite direction, clutch mechanism for causing the simultaneous movement of the winding-up rollers of the two curtains, means for stopping the movement of one curtain before the other, and adjustable means for regulating the extent of movement of one curtain after the other has stopped, whereby to control the size of the opening formed between the two curtains.

12. In a shutter the combination of two curtains, spring-stretching rollers for moving said curtains in one direction, winding-up rollers for moving said curtains in the opposite direction, winding means acting upon the roller of one curtain, friction clutch means for transmitting the motion of the roller of the first curtain to the rollers of the second curtain, means for stopping the movement of the second curtain at a predetermined point in either direction, adjustable mechanism acting on said winding means for regulating the extent of movement of the first curtain after the second curtain has stopped, and an adjustable releasing member for securing different exposures in the camera.

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

ERNST BRAUBURGER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.