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CAMERA SHUTTER

Original Filed Oct. 1, 1923

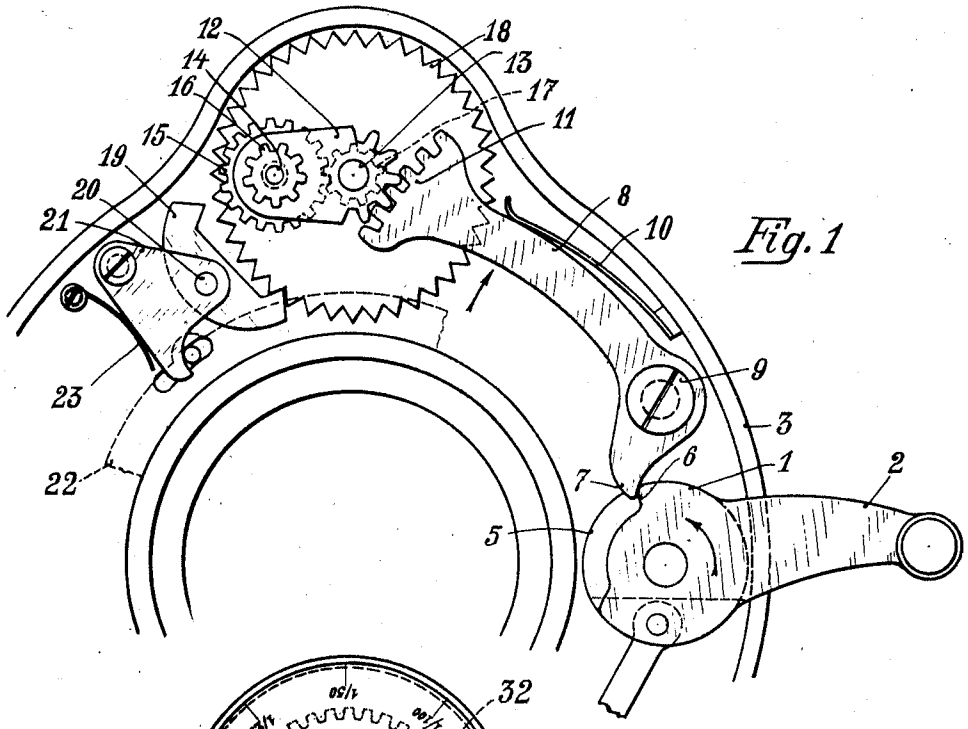


Fig. 1

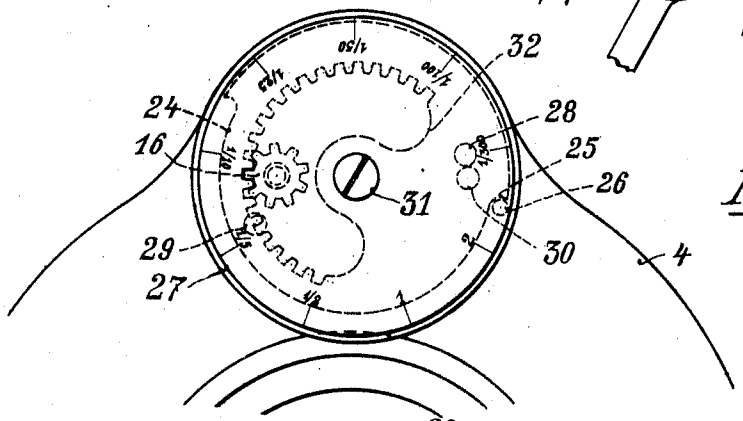


Fig. 2

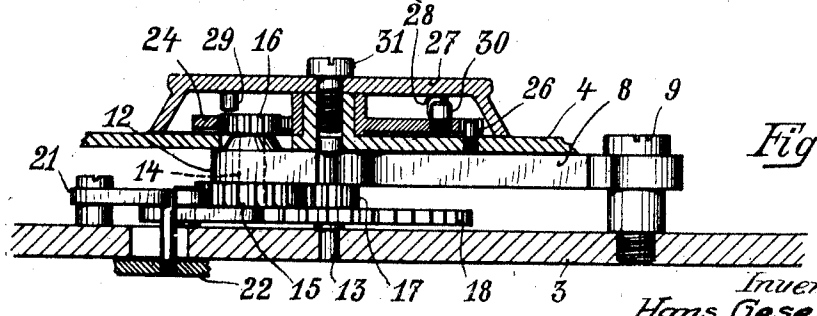


Fig. 3

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CAMERA SHUTTER.

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The present invention relates to camera shutters and has for its object to provide means for regulating the exposure time of such shutters in a very simple yet extremely accurate and sensitive manner without step or break over a very extended range of adjustment. The above and various other improvements will be hereinafter fully described and claimed.

In order that this our invention may be more readily understood reference is made to the accompanying sheet of drawings, which shows how this invention may be carried into practical effect. All parts of the shutter not standing in direct relation to the object of the invention have not been shown but may be of well known construction.

Fig. 1 shows the internal arrangement of the retarding mechanism, the cover plate and the parts above the cover plate being removed.

Fig. 2 shows the parts on top of the cover plate.

Fig. 3 is a sectional view through the mechanism at right angles to Figures 1 and 2.

The spring motor or master member 1 that furnishes the power is wound by a setting lever 2. It is located in the annular recess of the shutter housing 3 which is closed by the cover 4. The arrow on Figure 1 indicates the direction of movement of the master member 1 when tripped. A spring 10 tends to swing a retarding lever 8 on a pivot 9, making a nose 7 of the retarding lever enter into a recess 5 which has been cut into the circumference of the master member 1. The retarding lever 8 is formed on the end 11 with gear teeth. In engagement with this gear sector are teeth cut onto one end of a lever 12 which is turnably mounted on a stud 13. The other end of the lever 12 provides a bearing for a pin 14, to which two gears 15 and 16 are rigidly connected one on each side of the lever 12. A gear 17 in mesh with gear 15 is fastened to an escape 18, both turning freely on the stud 13. Working together with the escape wheel 18 there is located an anchor 19 pivoted on a stud 20, which is carried by a lever 21. Lever 21 is held by a spring 23 up against a pin of the shutter blade actuating ring 22.

The gear 16 meshes with an internal gear 24 which is rotatably mounted coaxially with the lever 12 and the gear 17. The internal gear teeth extend only partways around, the end wall of the recess limiting thus the movement of the gearwheel 16. On the outside of the internal gear 24 a recess has been formed extending approximately half way around the circumference. A shoulder 25 of the internal gear 24 comes into contact with a pin 26, fastened in the cover plate 4. An indicating disc 27, held by a screw 31 coaxially with the internal gear wheel 24, lever 12, gear 17 and escape wheel 18, carries two pins 28 and 29 which are located in the path of a pin 30 fastened in the body of the internal gear wheel 24.

The action of the mechanism is as follows:

After setting the motor spring through pressure on the setting lever 2 the nose 7 of the retarding lever 8 influenced by the spring 10 enters into the recess 5 of the master member 1 a certain distance which may be descreased for part of the regulating range by the setting of the indicating dial 27. The lever 8 swings at first the internal gear 24 through lever 12 because the bodily movement of the whole planetary gear system offers the least resistance. This movement is limited either by the shoulder 25 striking the pin 26 or for the short durations of exposure by the contact of pin 30 with pin 29. Thereafter the gear 16 rolls off on the teeth of the internal gear 24 until it runs up against the end of the slot 32. During this period of setting the anchor 19 is out of engagement with the escape wheel 18 allowing thus a very fast return although only a weak spring 10 is employed.

When releasing the motor member 1 the lever 8 remains stationary until the shoulder 6 of the recess 5 strikes against the nose 7. The moment of contact should be chosen at the time when the blades of the shutter which are actuated by a connecting rod from the motor member 1 in a well known manner have been opened the furthest, in order that the lever 8 together with the system of planetary gearing may interpose at this pe-

riod the retardation of varying magnitude. After the nose 7 of the lever 8 has been pushed out of the recess 5, the motor member 1 is free to move and the closing of the shutter blades is quickly accomplished.

The movement of the lever 8 turns lever 12. Located thereon the gears 15 and 16 swing around and actuate either the internal gear 24, the gear 16 moving it around bodily, or, if this gear is prevented from turning by the stop 28 on the regulating disc 27, the gear 16 rolls off on the internal gear 24 imparting thus through gears 15 and 17 a relatively fast movement to the escape wheel 18, which is retarded by the anchor 19 not held out of engagement during the exposure period by the shutter actuating ring 22. Instead of an escape wheel and anchor any other retarding means may be used.

The regulating disc 27 with corresponding graduations on top is set to the time of exposure wanted. In the accompanying drawings the mechanism is shown set for the longest possible time of exposure, partly run off. In this case the shoulder 25 of the outer recess on the internal gear 24 rests against pin 26 and the pin 28 of the regulating disc 27, which latter is held against movement by a friction spring, arrests pin 30 and makes any movement of the internal gear 24 impossible. Therefore gear 16 has to roll off on the internal gear until nose 7 has been forced out of the way.

In order to shorten the time of exposure the regulating disc 27 has to be turned so that pin 28 moves away from pin 30, allowing thus at first a part movement of the internal gear 24, which is succeeded after the contact of the pin 28 with the pin 30 by the regular rolling off of the gear 16. When the regulating disc 27 has been turned so far that pin 30 does not reach pin 28 any more, the second pin 29 lays up against the opposite side of the pin 30. When turning disc 27 further, the shoulder 25 of the internal gear is removed from the pin 26 and the nose 7 of the lever 8 does not enter to the full extent into the recess 5. In these positions no rolling off of gear 16 takes place. Consequently the amount of movement of the escape wheel 18 grows very slight. When turning the regulating disc 27 still further, the internal gear 24 and the lever 8 move through an increasingly smaller angle decreasing thus gradually the time of exposure. Finally the regulating disc 27 may be turned so far that the nose 7 of the lever 8 does not enter into the recess 5 of the motor member 1, eliminating in this way the influence of the retarding device completely and causing the shortest time of exposure.

Having now fully explained our invention we do not wish to be understood as limiting ourselves to the exact details of construction as obviously many modifications will occur to a person skilled in the art.

What we claim is:—

1. In a camera shutter the combination with a shutter mechanism and a motor member for operating said shutter mechanism of a retarding device geared to one of said elements and embodying a system of planetary gearing.

2. In a camera shutter the combination with a shutter mechanism and operating mechanism therefor embodying a master member of a controllable stop for the master member and planetary gearing and a retarding device for the latter member in connection and moving with said controllable stop.

3. In a camera shutter the combination with a shutter mechanism and operating mechanism therefor of retarding means consisting of planetary gearing geared to one of said elements and means for controlling the movement of said gearing.

4. In a photographic shutter, the combination with blade mechanism including a blade actuating ring, a master member for operating said ring and a retarding device operated by the master member and embodying an escapement wheel and an anchor cooperating therewith, of means on the blade ring adapted to control the relation between the anchor and the escapement wheel.

5. In a photographic shutter, the combination with blade mechanism including a blade actuating ring, a master member for operating said ring and a retarding device operated by the master member and embodying an escapement wheel and an anchor cooperating therewith, of means on the blade ring adapted to throw out the anchor while the blades are being opened by the master member and to restore its cooperation with the escapement wheel while the blades are being closed.

6. In a photographic shutter, the combination with blade mechanism including a blade actuating ring, a master member for operating said ring and a retarding device operated by the master member and embodying an escapement wheel and an anchor cooperating therewith, of a swinging member adapted to carry the anchor into and out of cooperation with the escapement wheel, a spring for moving the same into cooperation and means on the blade actuating ring adapted to engage the swinging member when the blades are opened to throw it out of cooperation with the escapement wheel momentarily and to then release it.

7. In a photographic shutter, the combination with blade mechanism, a master member for operating the same and a retarding device for the master member em-

bodying an escapement wheel and an anchor cooperating therewith, of a segment lever actuated by the master member, planetary gearing actuated by the segment lever to drive the escapement wheel and a regulating device adapted to establish different points at which the planetary gearing is picked up by the segment lever.

8. In a photographic shutter, the combination with blade mechanism, a master member for operating the same and a retarding device for the master member embodying an escapement wheel and an anchor cooperating therewith, of a segment lever actuated by the master member, a toothed swinging member actuated by the segment lever, a gear on the escapement wheel, a planetary gear on the swinging member for driving said last mentioned gear, a second planetary gear on a swinging member, an internal gear cooperating with the latter and having a limited movement with the planetary system and a regulating device for limiting the movement of the internal gear.

In testimony whereof we hereunto affix our signatures.

HANS GESELL.
HEINRICH BRUNS.