

G. DIETZ.
 PHOTOGRAPHIC SHUTTER.
 APPLICATION FILED APR. 28, 1910.

997,378.

Patented July 11, 1911.

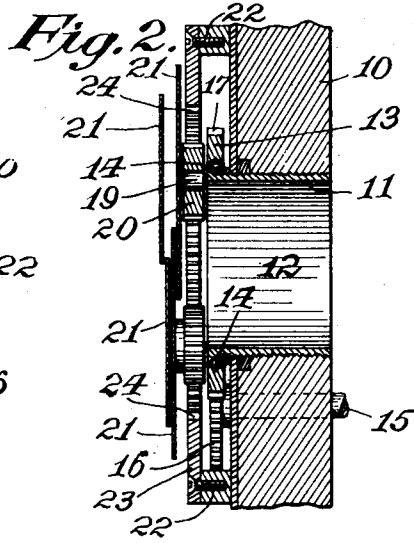
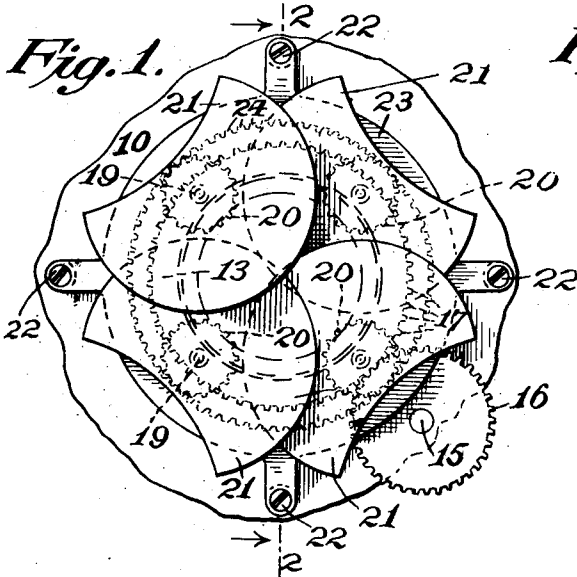


Fig. 3.

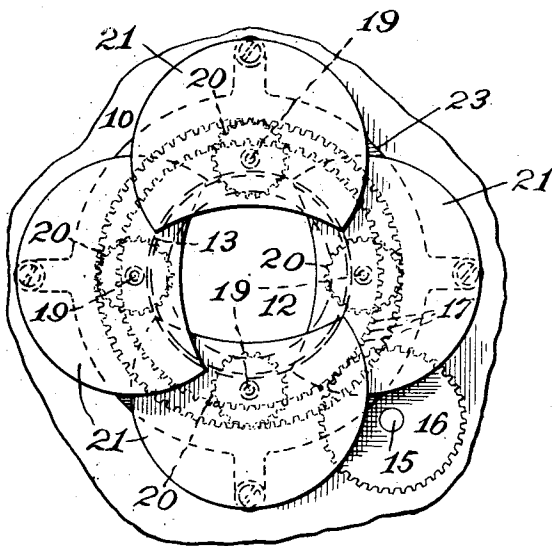


Fig. 4.

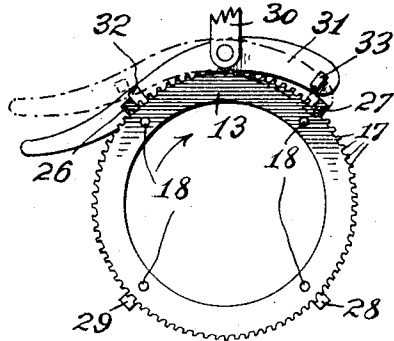
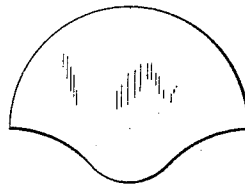


Fig. 5.



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UNITED STATES PATENT OFFICE.

GUSTAV DIETZ, OF YONKERS, NEW YORK, ASSIGNOR TO THE MULTI SPEED SHUTTER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PHOTOGRAPHIC SHUTTER.

997,378.

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To all whom it may concern:

Be it known that I, GUSTAV DIETZ, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Photographic Shutters, of which the following is a specification.

This invention relates to photographic shutters and its novelty consists in the construction and adaptation of the parts as will be more fully hereinafter pointed out.

The object of the invention is to produce a shutter of this class having a plurality of rotatable blades or flies with a high speed movement and high light efficiency.

In the drawings there is illustrated a device embodying the invention.

Figure 1 represents a front elevation of a shutter with the front plate removed, the blades or flies being shown in closed position. Fig. 2 is a central vertical section of the same on the plane of the line 2--2 in Fig. 1, one of the fly pinions being also shown in section. Fig. 3 is a view similar to that shown in Fig. 1, the flies or blades being shown in open position. Fig. 4 is an illustration of the annular carrier and the means for controlling it manually, and Fig. 5 is a plan of a modified form of blade.

In the drawings 10 represents the annular casing of a photographic shutter. It is provided with a central drum 11 having an aperture 12 through which the light may pass to the lens system (not shown), the imaginary axis of the drum coinciding with the axis of the lens system. Near the outer end of the drum there is formed a race-way around which is mounted an annular carrier 13, anti-friction balls 14 being placed in the race-way to facilitate the ready rotation of the carrier.

At any convenient place in the casing 10, there is provided a shaft 15 carrying on its outer end a driving pinion 16 which is adapted to mesh with the teeth 17 with which the carrier 13 is externally provided. Any approved form of driving mechanism may be employed to actuate the shaft 15 and by means of which it may be given a continuous rotary motion.

The carrier 13 is provided with a number of apertures 18 equally spaced apart, each having a journal surface, or bearing, for

the axle or shaft 19 of a small pinion 20 to the outer surface of which in turn is secured one of the blades or flies 21 of the device.

Rigidly secured to the outer face of the casing 10 by means of screws 22, or in any other usual manner, is a stationary annulus 23 provided on its inner periphery with an internal gear 24, with which the pinions 20 are adapted to mesh. It will be readily seen from the construction described that when the shaft 15 and its pinion 16 are rotated, the carrier 13, the teeth of which mesh with the pinion 16, is also rotated and this moves bodily in a circular path all of the pinions 20 of the different blades or flies which in turn, as they are moved, mesh with the internal teeth on the periphery of the annulus 23, and are themselves thereby rotated, so that each blade while it is bodily moved in a path concentric with the axis of the lens is itself rotated in turn.

The annular carrier 13 is provided with a series of projecting stop lugs 26, 27, 28 and 29 outside of the plane of its teeth and spaced apart at an equal distance, one lug being provided for each blade mounted on the carrier. At any convenient place near the periphery of this ring 13 there is provided a bracket 30 to which is pivoted a lever 31 having two lateral projections 32 and 33.

The distance between the projections 32 and 33 is less than the distance between any pair of the lugs in order, for instance the lugs 26 and 27. Therefore if it is desired to stop the carrier for a single exposure the lever 31 is moved toward the carrier as shown in full line in Fig. 4 and the projection 32 is interposed in the path of the lug 26 and stops it and the carrier. When the lever 31 is tilted in the opposite direction as shown in dotted outline in Fig. 4 the projection 32 being lifted releases the lug 26 and allows the carrier to move until the lug 26 is caught against the projection 33. Then if the lever is depressed, the projection 33 releases 26, but the projection 32 then catches the lug 29 so that every time the lever is lifted a single exposure is made and when the lever is depressed the carrier is set at the proper place for the next exposure.

Each blade 21 is composed of a circular

segment rotating on its center and with a crescent shaped indentation. When the blades are arranged as shown in Fig. 1 the shutter is closed because the segments are positioned to overlap slightly at the line of the lens axis. But when the blades have all been rotated a half turn to the positions shown in Fig. 3, the crescent shaped indentations are in opposing relation and the greatest amount of light is admitted between the opening formed between the blades.

The number of teeth on the carrier 13, and on each pinion 20 and the stationary ring 23 together with the size of these parts are so proportioned in the described form of the apparatus that while any one pinion is moving one quarter way around the circle the blades have opened or closed and returned to their original positions. In other words, as the annular carrier is rotated once, each blade makes as many complete cycles as there are blades. If the pinion 16 is therefore continuously rotated, the shutter blades are so actuated that the light is alternately admitted and excluded at regular intervals from the lens aperture and by means of the described mechanism this is accomplished at a high speed and at the same time the complete light opening is much larger than usual.

In Fig. 5 there is shown a construction of blade in which the segment shaped indentation of the form of blade shown in Figs. 1 and 3 are replaced by an epicyclic curve which gives an exposure of the lens aperture to the light during only one-half of the cycle of movement of the different blades, such exposure being well adapted to the exigencies of operation of a moving picture camera and corresponding with a movement of the film.

The tiltable lever shown in Fig. 4 when used as described allows a continuation of repeated single exposures in one direction.

What I claim as new is:—

1. A photographic shutter comprising a plurality of rotatable blades; and means for continuously moving them as a series in a circular path in one direction for successive exposures.

2. A photographic shutter comprising a plurality of rotatable blades, and means for continuously moving them bodily as a series in a circular path and simultaneously rotating each blade in one direction for successive exposures.

3. A photographic shutter comprising a plurality of rotatable blades, and means for continuously moving them bodily as a series in a circular path for successive exposures, consisting of an annular toothed carrier and a driving pinion adapted to mesh therewith.

4. A photographic shutter comprising a revoluble carrier and means for continuously

revolving it in one direction for successive exposures, and a plurality of rotatable blades loosely pivoted on said carrier.

5. A photographic shutter comprising a revoluble carrier and means for continuously revolving it, a plurality of rotatable blades loosely pivoted on said carrier and means for simultaneously rotating all of the blades as the carrier revolves in either direction for successive exposures.

6. A photographic shutter comprising a revoluble carrier and means for rotating it and a plurality of rotatable blades loosely pivoted on it and means for simultaneously rotating all of the blades as the carrier revolves consisting of a plurality of pinions, one pinion secured to each blade and common means for moving all of the pinions simultaneously.

7. A photographic shutter comprising a revoluble carrier and means for moving it and a plurality of rotatable blades pivoted on and moving with it and means for continuously and simultaneously rotating all of the blades for successive exposures at the same rate of speed and in the direction opposite to that of the carrier.

8. A photographic shutter comprising a rotating carrier, a plurality of rotatable blades mounted on and moving with it, and means for simultaneously rotating all of the blades as the carrier revolves consisting of a plurality of pinions, one pinion secured to each blade and a stationary ring having an internal gear adapted to mesh with all of the pinions.

9. A photographic shutter comprising a carrier, a plurality of rotatable blades mounted on and moving with it, a pinion on each blade, and means for simultaneously rotating all of the blades at the same rate of speed and in the opposite direction to that of the carrier as the carrier revolves in either direction consisting of a ring having an internal gear adapted to mesh with all of the pinions.

10. In a photographic shutter, a driving ring and means for moving it continuously in either direction, a series of blades each mounted on and moving with the ring, and means for rotating each of the blades as the driving ring is rotated.

11. In a photographic shutter, a driving ring and means for moving it in either direction, a series of blades each pivoted on the ring and moving with it, and means for rotating each of the blades as the driving ring is rotated, consisting of a pinion on each blade and a toothed ring adapted to engage all of the pinions.

12. In a photographic shutter, a driving ring and means for revolving it continuously in either direction for successive exposures, a series of blades each loosely pivoted on the ring and moving with it in a path

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concentric with its center, and means for rotating all of the blades as the driving ring is rotated.

13. The combination with a shutter case of an internally toothed ring, an annular carrier located outside of the plane of the said ring, means for moving the carrier, a series of blades provided with shafts loosely mounted on the carrier, and a pinion mounted on each blade shaft, all of the pinions being in the plane of the toothed ring and adapted to mesh with it as the carrier is moved.

14. In a photographic shutter, an annular carrier, means for continuously rotating it in either direction for successive exposures, a series of rotatable blades mounted thereon, and means for rotating the blades.

15. In a photographic shutter, an annular carrier, means for continuously rotating it in one direction for successive exposures, a series of rotatable blades mounted on the carrier, and means for rotating the blades derived from the rotation of the carrier.

16. In a photographic shutter, an annular carrier, means for rotating it, a series of rotatable blades mounted thereon, means for rotating the blades continuously in one direction for successive exposures, and means for interrupting the movement of the carrier.

17. In a photographic shutter, an annular carrier, means for rotating it, a series of rotatable blades mounted thereon, means for rotating the blades and means for interrupting the movement of the carrier consisting of a stop lever adapted to be moved into the path of a moving part of the carrier.

18. In a photographic shutter, an annular carrier, means for rotating it, a series of rotatable blades mounted thereon, means for rotating the blades and means for interrupting the movement of the carrier consisting of a stop lever adapted to be moved into the path of a moving part of the carrier and provided with a lug or projection for intercepting its movement.

19. A photographic shutter comprising a stationary internal gear, a series of blades each provided with an actuating pinion adapted to mesh with said internal gear, an

annular carrier on which all of the blades are mounted to revolve and means for continuously moving the carrier, in combination with means for arresting its movement.

20. A photographic shutter comprising a stationary internal gear, a series of blades each provided with an actuating pinion adapted to mesh with said internal gear, an annular carrier on which all of the blades are mounted to revolve and means for continuously moving the carrier in either direction, in combination with means for arresting its movement.

21. A photographic shutter comprising a stationary internal gear, a series of blades each provided with an actuating pinion adapted to mesh with said internal gear, an annular carrier on which all of the blades are mounted to revolve, a series of lugs on the carrier one for each blade, means for continuously moving the carrier and means for arresting its movement including a lever adapted to engage with any one of said lugs.

22. A photographic shutter comprising a revoluble carrier and means for moving it and a plurality of rotatable blades loosely pivoted on it and means for simultaneously rotating all of the blades as the carrier revolves consisting of a pinion secured to each blade and common means for moving all of the pinions simultaneously, consisting of a gear wheel adapted to mesh with all of the pinions.

23. A photographic shutter comprising a revoluble carrier and means for moving it and a plurality of rotatable blades loosely pivoted on it and means for simultaneously rotating each blade as the carrier revolves consisting of a pinion secured to each blade and common means for moving all of the pinions simultaneously, consisting of a gear wheel adapted to mesh with all of the pinions and against which gear wheel they are propelled by the carrier.

In testimony whereof I affix my signature in presence of two witnesses.

GUSTAV DIETZ.

Witnesses:

CHAS. G. KELLER,

E. L. PEBBLES.