May 31, 1932. A. BARÉNYI 1,861,257

PHOTOGRAPHIC SHUTTER

Filed Aug. 13, 1930

Fig.1

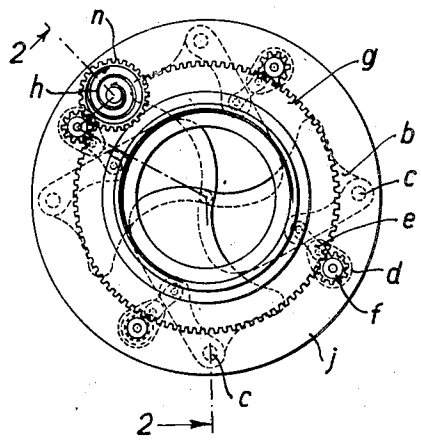


Fig.2

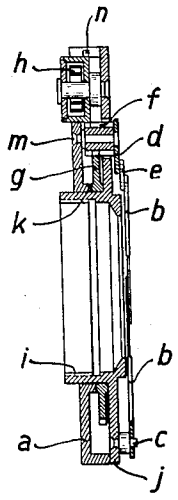


Fig.3

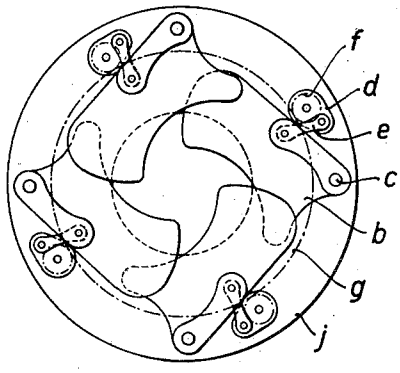
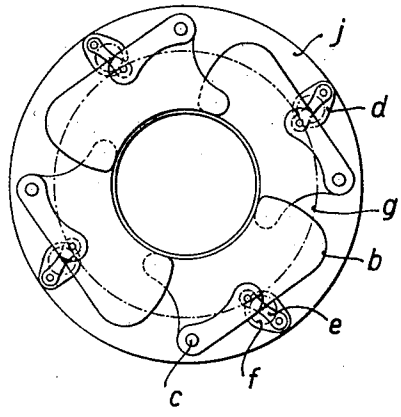


Fig.4



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UNITED STATES PATENT OFFICE

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PHOTOGRAPHIC SHUTTER

Application filed August 13, 1930, Serial No. 474,987, and in Germany October 25, 1929.

My invention relates to improvements in photographic shutters, and more particularly in shutters of the type having a plurality of blades which move outwardly and inwardly for opening and closing the shutter. The object of the improvements is to provide a shutter of this type in which the energy required for operating the blades is reduced, and with this object in view my invention consists in providing pivotally mounted, oscillatory blades, and connecting the blades with an actuating mechanism having a driving member which advances continuously in one direction while imparting to the blades complete oscillation, first in one direction and then in the other. In a preferred embodiment of the invention the actuating mechanism includes cranks connected with the oscillatory blades and adapted to be rotated through a dead center relatively to the blades, so that the movement of the cranks from the initial position to the dead center is transmitted to the blades for imparting opening movement thereto and the further movement of the cranks from the dead center to the end position is used for imparting closing movement to the shutter.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawings, in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawings,

Fig. 1 is a front elevation, the front part of the casing being removed, showing the shutter and the blade-actuating mechanism,

Fig. 2 is a sectional elevation, taken on the line 2—2 of Fig. 1,

Fig. 3 is a rear elevation, showing the blades half open, and

Fig. 4 is a similar rear elevation, showing the blades open.

In the example shown in the figures the shutter comprises an annular casing *a*, in which is mounted a central drum *i*, the drum is formed with a flange *j* and has an aperture 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. On pivot-bolts *c* fixed to the flange *j* shutter blades *b* are mounted, which blades are adapted to be oscillated on said pivot-bolts outwardly and inwardly for opening and closing the shutter. For actuating the blades a toothed ring *g* is rotatably mounted on the drum *i*, between the flange *j* and a rim *k* of the casing *a*. The said ring *g* is in mesh with pinions *f*, rotatably mounted on pivot bolts *m* fixed to the wall of the casing *a*. The said pinions are rigidly connected with crank-arms *d*, and the crank-arms in turn are connected by means of links *e* with the blades *b*. The points at which the links are connected to the blades are, with respect to the direction of blade movement, in substantial alignment with the centers of mass of the blades. Rotary movement is imparted to the ring *g* by means of a spring-driven motor or master member *h* which, as shown in Figs. 1 and 2, is provided with a toothed flange *n* meshing with one of the pinions *f*. Any known or preferred mechanism may be provided for setting and releasing said master member.

For each exposure the master member *h* and the gear wheel *g* are rotated continuously in one direction and through so great a range of turning that the cranks *d* perform a complete rotation. In the course of one rotation the cranks *d* effect first the opening and thereafter the closing of the shutter.

For operating the shutter the gear-wheel *g* is rotated by means of the master member *h* through an angle such that all the shutter blades are oscillated for opening and closing the aperture of the drum *i*, as has been shown in Figs. 1, 3 and 4, the blades being first rocked from the position shown in Fig. 1 outwardly until the cranks come to their outer dead centers, relatively to the blades, as is shown in Fig. 4. In the further turning of the crank-arms the blades are closed again, and when the cranks return to their inner dead centers closure is complete (Fig. 1).

By connecting the links to the blades at points in substantial alignment with the centers of mass thereof, the resistance due to inertia is reduced to a minimum, so that great

acceleration may be imparted to the blades at the beginning of the opening movement.

I claim:

1. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and opening of such orifice, actuating mechanism for said blades including a corresponding plurality of members rotatably mounted on said support and a mechanism intermediate each of said members and one of said blades for transforming unidirectional movement of the member into to-and-fro oscillation of the blade, and means for rotating said members simultaneously.

2. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and opening of such orifice, actuating mechanism for said blades including a corresponding plurality of members rotatably mounted on said support, the said members being provided each with a crank-arm, the said crank-arms being articulated to the said blades, whereby unidirectional rotation of the said members effects to-and-fro oscillation of the said blades, and means for rotating said members simultaneously.

3. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and opening of such orifice, a corresponding plurality of pinions rotatably mounted on said support, each of said pinions being equipped with a crank-arm, a link connecting each of said crank-arms with one of said blades, and means for imparting unidirectional rotary movement to the said pinions, whereby each crank-arm in passing through a dead center relatively to the blade imparts to-and-fro oscillation thereto.

4. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and openings of such orifice, a corresponding plurality of pinions rotatably mounted on said support, each of said pinions being equipped with a crank-arm, a link connecting each of said crank-arms with one of said blades, a single gear-wheel in mesh with all of said pinions, and operating mechanism for said gear-wheel adapted to impart unidirectional rotation thereto, each said crank-arm being so articulated to its blade that when rotated uniformly in one direction in response to the rotation of said gear-wheel it is moved through a dead center relatively to the corresponding blade.

5. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and opening of such orifice, actuating mechanism for said blades including a corresponding plurality of members rotatably mounted on said support, each of the last-named members being provided with a crank-arm and each crank-arm being articulated to one of said blades, the proportions being such that each complete rotation of the said members effects one complete to-and-fro oscillation of the blades.

6. A photographic shutter comprising an annular support having an orifice, a plurality of blades severally pivoted to and oscillatory upon said support and spaced at intervals around such orifice, such blades in their simultaneous oscillation effecting the alternate closing and opening of such orifice, actuating mechanism for said shutter including a corresponding plurality of members rotatably mounted on said support, and mechanism intermediate each of said members and one of said blades for transforming unidirectional rotation of the member into to-and-fro oscillation of the blade, said intermediate mechanism engaging the blade at a point substantially in line with the center of mass thereof, and means for rotating said members simultaneously.

In testimony whereof I hereunto affix my signature.

ÁRPÁD BARÉNYI.