P. J. MARKS.

IRIS DIAPHRAGM.

APPLICATION FILED MAR. 25, 1920.

1,422,461. Patented July 11, 1922.

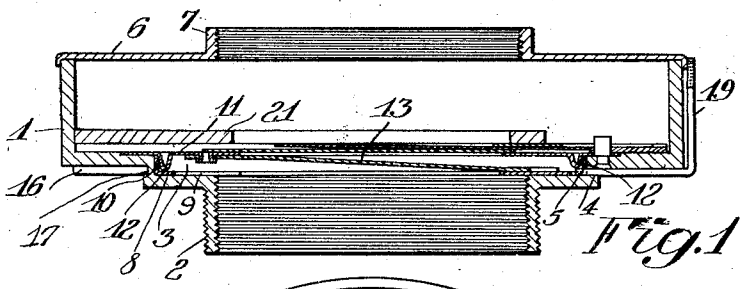


Fig. 1

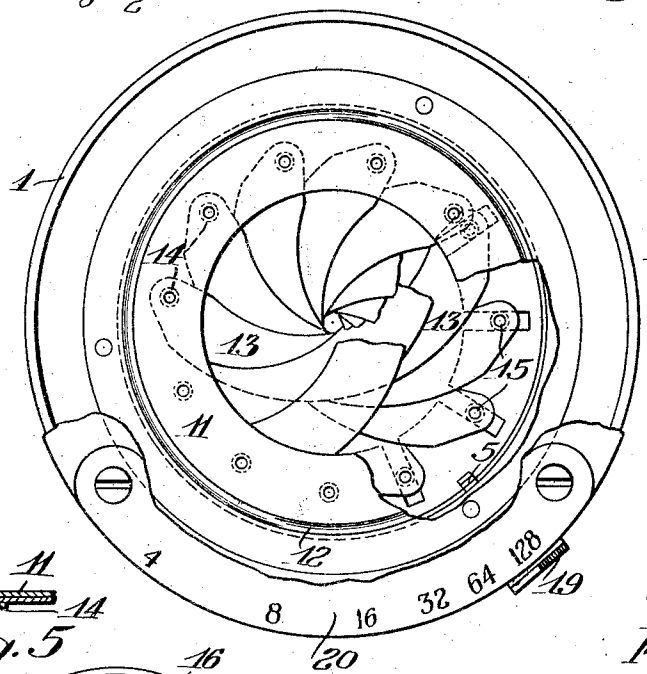


Fig. 2

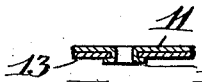


Fig. 5



Fig. 5a

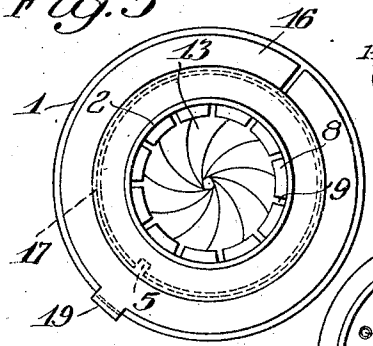


Fig. 3

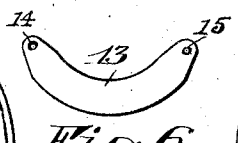


Fig. 6

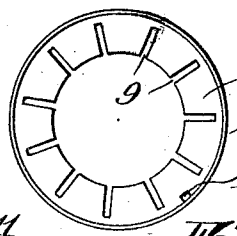


Fig. 4

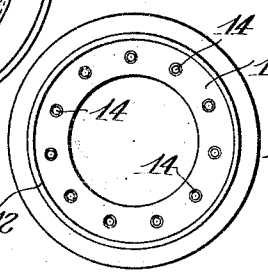


Fig. 7

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IRIS DIAPHRAGM.

1,422,461. Specification of Letters Patent. Patented July 11, 1922.

Original application filed October 27, 1919, Serial No. 333,838. Divided and this application filed March 25, 1920. Serial No. 368,657.

To all whom it may concern:

Be it known that I, PAUL J. MARKS, a citizen of the United States, residing at Rochester, county of Monroe, State of New York, have invented certain new and useful Improvements in Iris Diaphragms; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to iris diaphragms of the kind used with photographic shutters or cameras or other instruments and is a division of my prior application, Serial No. 333,838, filed Oct. 27, 1919, for photographic shutters. My present invention has for its object to provide a diaphragm which is simple in construction and operation, not liable to get out of order when in use, and more efficient than diaphragms now in use. A further object of my invention is to provide a casing for a diaphragm and shutter mechanism which is light and strong and which is strengthened by the diaphragm operating devices. Another object of my invention is to provide an iris diaphragm in which the wings are constructed of thin material and are provided with hollow bosses struck up from the material and by which they are connected with the operating ring rendering such connection light tight, and providing a thin and durable diaphragm which permits the lens combinations to be placed nearer together than has been possible with iris diaphragms as heretofore constructed.

To these and other ends my invention resides in certain improvements, combinations and arrangement of parts all as hereinafter more fully described and particularly pointed out in the appended claims.

Figure 1 is a section of the shutter casing showing my improved iris diaphragm,

Figure 2 is a view of the shutter casing with parts broken away to show the construction of the iris diaphragm,

Figure 3 is a rear view of the diaphragm slightly reduced,

Figure 4 is a plan view of the diaphragm operating ring,

Figures 5, 5[a] and 6 are detail views showing the construction of the diaphragm wings, and

Figure 7 is a plan view of the fixed diaphragm ring to which the blades are pivoted.

My improved diaphragm comprises a casing 1 of metal or other suitable material from the rear side of which projects the lens barrel 2, having internal screw threads adapted to receive the rear combination of a lens. The barrel 2 is also externally threaded to cooperate with that part of the camera to which it is secured. Adjacent the barrel 2, the casing is provided with a recess 3, best seen in Fig. 1 of the drawings, in which the iris diaphragm and connected parts are housed. At the rear side of the recess 3, the casing is slotted as at 4 and an inwardly and upwardly projecting lug 5 on the diaphragm operating member projects through this slot to cooperate with the diaphragm ring. Forwardly of the recess 3, the casing is enlarged to house the operating mechanism of the shutter. The front of the shutter is closed by means of a cover plate 6 suitably secured in position and provided with an internally threaded lens barrel 7.

Seated in the rear side of the recess 3 and adapted to rotate therein is a ring 8 having a central aperture corresponding with the lens aperture of the shutter and having a plurality of radially extending slots 9 communicating with the central aperture, as clearly shown in Fig. 4. The ring 8 may be made of very thin material and is provided with an upturned flange 10 at its outer circumference to form a bearing surface for the ring in its recess, and also to cooperate with a fixed ring 11 between which and the ring 8 the diaphragm wings are housed when the aperture is fully open. The fixed ring 11 is seated in a recess provided therefor in the back wall of the shutter casing and is secured in position by any suitable or preferred means not shown herein. The ring 11 may be made of very thin material and bent upon itself, adjacent the outer wall of the recess 3, to form a depression or fold 12, to strengthen or reinforce the ring, and over which the flange 10 of the ring 8 is seated to hold the ring 8 in position. The ring 11 is provided with a central aperture corresponding with the lens aperture of the shutter and the diaphragm wings 13 are pivoted adjacent one end to the ring and are provided with projections adjacent the opposite end adapted to cooperate with the slots 9 in the ring 8. I

have shown eleven diaphragm wings herein, although a greater or smaller number may be used without departing from the spirit or scope of my invention. The wings 13 may be made of very thin material and are of the usual arcuate form, as clearly shown in the drawings. As clearly shown in Figs. 1 and 5 of the drawings, each of the wings is pivoted to the ring 11 by pressing up the material of the ring to form a projection adapted to extend through an opening in the wing and spinning the material of the projection over the surface of the wing, as at 14, to retain it in position and permit it to turn freely on the ring. I have found this construction, which avoids the use of pins or rivets, to cheapen the construction of the diaphragm, to be efficient in use and that it permits the use of thinner materials in its construction enabling me to construct a much thinner diaphragm than has heretofore been possible and which can be mounted nearer to the shutter blades than diaphragms as heretofore constructed, and thus permitting the lens combinations to be mounted much nearer together. The wings are also connected with the movable ring 8 by means which avoids the use of rivets or screws and which is always light tight. This construction is shown in the sectional view Fig. 5[a] in which the material of the wing is struck up to form a hollow closed projection 15 cooperating with the ring 8 and adapted to slide in the slots 9 when said ring is turned to open or close the diaphragm aperture. Means, outside the casing are provided for rotating the ring 8 to adjust the diaphragm opening. Said means comprises a ring 16 seated in a groove 17 provided therefor in the outer wall of the casing and provided with the projection or lug 5 which extends through a slot in the casing wall normally covered by the ring 16 and engages the ring 8. The ring 8 is provided with an opening 18 into which the lug 5 projects thus operatively connecting the rings 8 and 16. For convenience in assembling the ring 16 may be a split ring as shown, and springs snugly into the groove 17 and serves to reinforce the casing and to overcome the weakness of the casing caused by the groove 17 and the slot for the lug 5. The ring 16 is provided with a pointer 19 which is bent up adjacent the outer periphery of the casing and cooperates with a scale 20 secured to, or formed on, the front wall of the cover, as shown in Fig. 2. The scale is provided with the usual numerals 4, 8, 16, etc., to indicate the usual diaphragm openings.

Suitably secured in the casing, is a plate or partition 21 having an aperture concentric with the diaphragm opening and which serves as a support for the shutter operating devices. The shutter blades, of which there are three in number, are pivoted to the rear casing wall and operate between the ring 11 and the rear face of the partition 21.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In an iris diaphragm, the combination of a casing having an aperture there through, said casing having a slot and provided with a circumferential groove in its outer wall, a diaphragm comprising a plurality of movable wings for controlling the admission of light through said aperture, a movable ring for controlling the position of the wings, a second ring movable in the groove in the external wall of the casing, and a lug on said second ring projecting through the slot in the casing wall and operatively connected with the first mentioned ring.

2. In an iris diaphragm, the combination of a casing having an aperture therethrough and a groove in its outer wall, a diaphragm comprising a plurality of movable wings for controlling the admission of light through said aperture, a ring seated in said groove in the casing and movable thereon, a lug on said ring projecting through a slot in the casing wall and adapted to operate the diaphragm wings; and a pointer on said ring adapted to cooperate with a scale for indicating the diaphragm opening.

3. In an iris diaphragm, the combination of a casing having an aperture there through, a groove in its outer wall and a slot through its wall communicating with the bottom of the groove, a ring seated in said groove to reinforce the casing, and a lug on said ring projecting into the slot and adapted to engage and control adjustable devices within the casing.

4. In an iris diaphragm, the combination of a casing having an aperture there through, a plurality of diaphragm wings for controlling the passage of light through said aperture, a ring fixed in said casing on which said wings are pivotally mounted, a second ring movable in said casing, hollow projections struck up from the material of said wings and operatively engaging said movable ring, and means for moving said ring.

5. In an iris diaphragm, the combination of a casing having an aperture there through, a ring fixed in said casing, a plurality of hollow projections struck up from the material of said ring, diaphragm wings pivotally secured to said projections, a ring having a plurality of radial slots movably mounted in said casing, closed projections struck up from the material of said wings projecting into said slots and operatively connecting said wings with said ring, and means for moving said ring.

6. A wing for a diaphragm constructed

of thin opaque material and having a light proof hollow projection adjacent one end and an opening adjacent its opposite end.

7. In an iris diaphragm, the combination of a casing, a retaining ring of thin material fixed in said casing, a plurality of hollow projections struck up from said material, and a plurality of wings pivotally secured to said projections by spinning the material of the projection over the surface of the the wing.

8. A retaining ring for an iris diaphragm constructed of thin material, embossed to strengthen the ring, and having a plurality of projections struck up therefrom on which the wings are adapted to be pivoted.

9. In a device of the kind described, the combination of a casing having a groove in its outer wall, a reinforcing ring in said groove, a pointer on said ring, a scale with which the pointer cooperates, and means operatively connecting said ring with a movable part within the casing.

PAUL J. MARKS.