R. KLEIN & T. BRUECK.

IRIS DIAPHRAGM.

APPLICATION FILED DEC. 11, 1914.

1,153,319. Patented Sept. 14, 1915.

Fig. 1

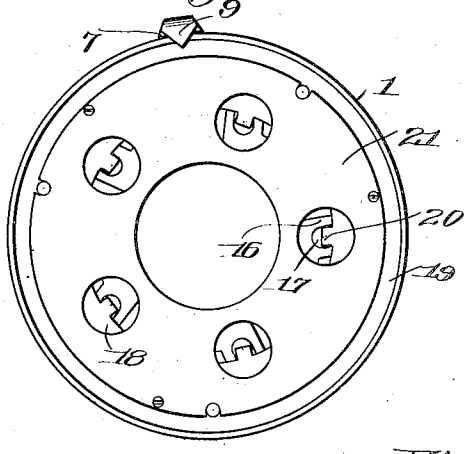


Fig. 2

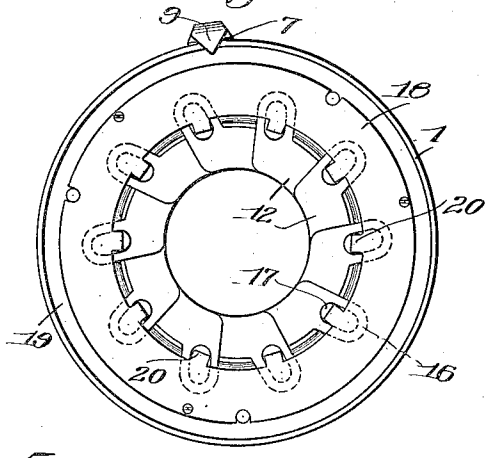


Fig. 5

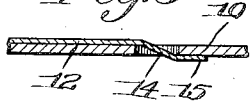


Fig. 3

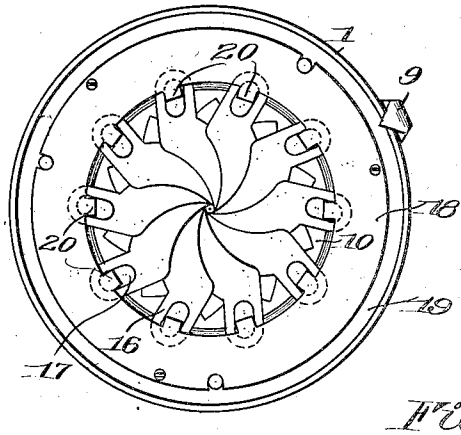


Fig. 4

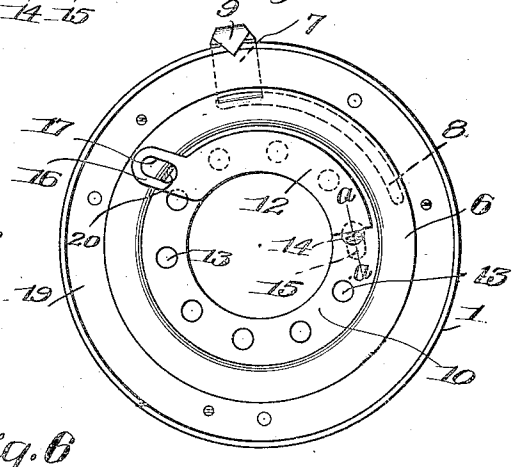
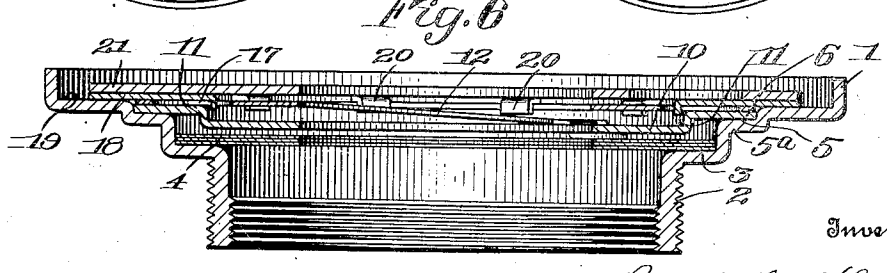


Fig. 6



Witnesses

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IRIS-DIAPHRAGM.

1,153,319. Specification of Letters Patent. Patented Sept. 14, 1915.

Application filed December 11, 1914. Serial No. 876,651.

To all whom it may concern:

Be it known that we, RUDOLPH KLEIN and THEODOR BRUECK, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Iris-Diaphragms, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

The present invention relates to iris diaphragms designed for use on photographic shutters, microscopes, lens barrels and other optical instruments and an object of the invention is to provide a construction which is inexpensive to manufacture both because of the employment of a fewer number of parts and because of the simplicity by which the parts may be assembled.

To this and other ends, the invention consists in certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings: Figure 1 is a view of the iris diaphragm constructed for use with a photographic shutter, the blades being illustrated as open; Fig. 2 is a view similar to Fig. 1 with the covering plate removed; Fig. 3 is a view similar to Fig. 2 showing the blades in closed positions; Fig. 4 is a view with the iris plate and all of the blades except one removed; Fig. 5 is an enlarged sectional view, on the line *a*—*a*, Fig. 4, showing the manner of securing one end of each blade; and Fig. 6 is a central enlarged section through the device.

Referring more particularly to the drawings, 1 indicates the support or casing of the device which is in this instance of annular form having an annular flange 2 projecting from the inner periphery, this flange being both internally and externally threaded, the external threads being for attachment to the camera and the internal threads being for the securing of the lens. This support may be provided with an annular seat 3 about the central opening for the reception of one or more fiber washers 4 which serve as covers for the unsightly parts of the device. The support or casing is also provided with a seat 5^a and an annular bearing 5 to one side of the seat 3 and on this bearing and seat the indicator ring 6 may turn. The indicator ring, in this instance, is provided with an arm 7 working through a curved slot 8 in the support or casing 1 and having a pointer 9 at one end for traveling over a scale as is common in devices of this kind. This ring may have a central offset annular portion 10 pressed laterally to one side of the plane of the outer or bearing portion 6 of said ring, thus forming an annular shoulder 11 between the bearing portion 6 and the central portion 10. The portion 10 serves, in this instance, for pivotally connecting with the blades or leaves 12 which, may be each in the form of a segment of an annulus. At one end, each blade is formed with a pintle and this pintle is of such a construction that it interlocks with one of the bearings 13, the latter being formed by making an annular series of openings in the indicator ring portion 10. In this instance, this pintle comprises a tongue projecting from one end of the blade 12 and bent at an oblique angle at 14 and thence parallel with the blade at 15, the oblique portion being extended through one of the openings 13 so that its side edges form a bearing, and the parallel portion 15 being adapted to coöperate with the face of the indicator ring opposite that on which the blade operates. With this interlocking connection between one end of the blade and the indicator ring, it is possible to readily introduce the pintle into the opening 13 of the indicator ring by a tilting movement of the blade, and, after the blade is moved so as to lie substantially parallel with the indicator ring, there is no tendency for the blade to become detached accidentally from the indicator ring.

The assembling of the blades of an iris diaphragm has been one of the most troublesome operations in the manufacture of these articles as it has been found that where the blade does not interlock with one of the parts of the shutter, it, in a great many cases, becomes detached while other blades are being fitted in place, a slight wind effecting their derangement. This disadvantage is overcome by the present improvement because the blades carry pintles formed with lateral portions which coöperate with that face of the indicator ring opposite that on which the blades operate. It is apparent, however, that the invention is not limited to arranging this pintle on either end of the blade it being merely necessary to provide an interlocking connection which will

hold one end of each blade against accidental displacement during the assembling of the other blades.

Shifting fulcrums are provided for the other ends of the blades on the iris ring or plate 18 which is supported on a seat 19 in spaced relation to the bearing portion 6 of the indicator ring. Within this space lie the laterally extending lips 16 of the blades, said lips being slotted at 17 to receive pintles 20 on the iris ring or plate 18. The manner of forming these pintles and also the location of the same is novel. These pintles are formed by providing radial projections preferably on the inner periphery of the annular blank from which the iris plate or ring 18 is made. These projections are bent laterally with reference to the iris ring 18 to provide the pintles 20. The pintles lie within the annular shoulder 11 in close proximity to the latter and in this way retain the slotted ends of the blades within the space between the indicator ring and the iris ring 18. As the pintles 20 are near the inner periphery of the iris ring it is possible for the assembler, when putting the iris ring in place, to properly and easily position the slotted ends of the blades so that the pintles may be easily passed into the slots. If desired, a covering plate 21 may be fitted over the iris plate, and the casing or support for the iris diaphragm may serve as a cover or cap for a photographic shutter.

According to this invention, the blades are assembled in the device by interlocking one end of each to the ring which, according to the construction is most advantageously situated for this purpose. In this instance, this ring is the indicator ring. After all the blades have been interlocked with the indicator ring, the iris ring is placed over them, the position of the pintles at the inner periphery of the iris ring making it possible to see clearly whether the pintles are entering the slots in the blades, and also to see the blades to manipulate them.

What we claim as our invention and desire to secure by Letters Patent is:

1. An iris diaphragm comprising an iris ring, a rotary indicator ring, and blades, one end of each blade having a shifting fulcrum on one of said parts, and the other end of the blade having a pivotal interlocking connection with the other of said parts to prevent accidental displacement of the blade during assembling.

2. An iris diaphragm comprising an iris ring, a rotary indicator ring, blades, a shiftable fulcrum connecting each blade with one of the first two named parts, and a pivotal connection between each blade and the other of the first two named parts, the pivotal connection embodying a pivot projecting laterally from one of the parts which it connects, extending through the other of said connected parts and having a portion cooperating with the opposite face of the part through which it extends.

3. An iris diaphragm comprising an iris ring, a rotary indicator ring, blades, a shiftable fulcrum between one end of each blade and one of the first two-named parts, and a pintle projecting laterally from each blade and extending through the other of the first two-named parts, said pintle having a lateral extension to coöperate with the opposite face of the part through which the pintle extends.

4. An iris diaphragm comprising an iris ring, a rotary indicator ring provided with an annular series of openings, blades, a shiftable fulcrum between each blade and the iris ring, and a pintle extending from each blade through one of the openings of the indicator ring and having a lateral extension at one end adapted to coöperate with the opposite face of the ring.

5. An iris diaphragm comprising a support, an indicator ring mounted to rotate on the support and having an annular series of circular openings, a plurality of blades each having a pintle at one end extending obliquely to the plane of the blade through one of the openings of the indicator ring, said pintle having an extension parallel with the blade to engage the opposite face of the indicator ring, an iris ring, and a shiftable fulcrum connecting each blade with the iris ring.

6. An iris diaphragm comprising blades each having a slotted portion, an indicator ring to which said blades are pivoted, said indicator ring having a bearing portion and a central annular portion offset from the bearing portion to provide an annular shoulder, the blades being pivoted to the central annular portion, an iris ring spaced from the bearing portion of the indicator ring and having the slotted portions of the blades lying in said space, and pintles projecting from the iris ring through the slotted portions of the blades and within the annular shoulder of the indicator ring to overhang such shoulder and thus retain the blades in the space between the indicator ring and the iris ring.

7. An iris diaphragm comprising blades each having a slotted portion, an indicator ring to which said blades are pivoted, and an iris ring having laterally extending pintles arranged at the inner periphery of the ring and projecting through the slots of the blades.

8. An iris diaphragm comprising blades each having a slotted portion, an indicator ring to which said blades are pivoted, and an iris ring formed from an annular blank having radially extending tongues at one edge thereof bent laterally and extending through the slot of the blades.

9. An iris diaphragm comprising an iris ring and an indicator ring, one of which is formed from an annular blank having radially extending tongues at one edge, said tongues being bent laterally with reference to the ring, and blades having slotted portions fulcrumed on the tongues, said blades being also pivotally connected to the other ring.

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