

A. WOLLENSAK.
IRIS DIAPHRAGM.
APPLICATION FILED MAR. 2, 1911.

993,431.

Patented May 30, 1911.

Fig. 1.

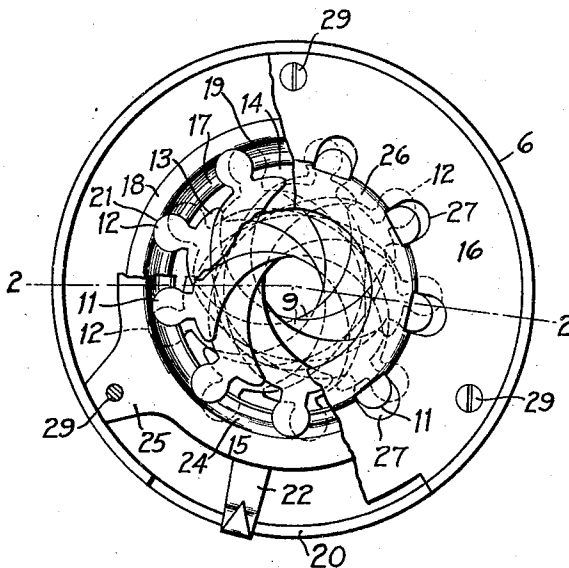


Fig. 3.

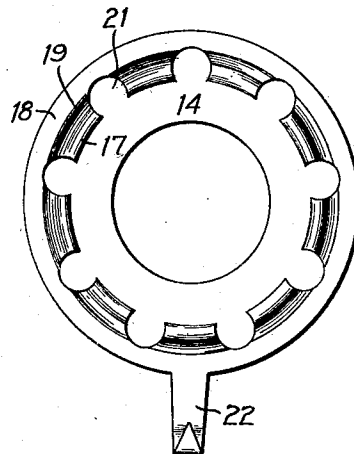


Fig. 2.

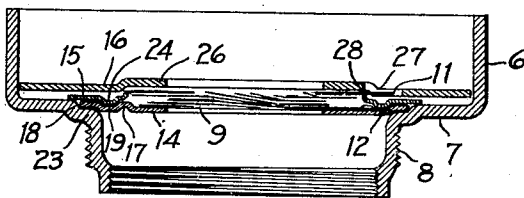


Fig. 4.

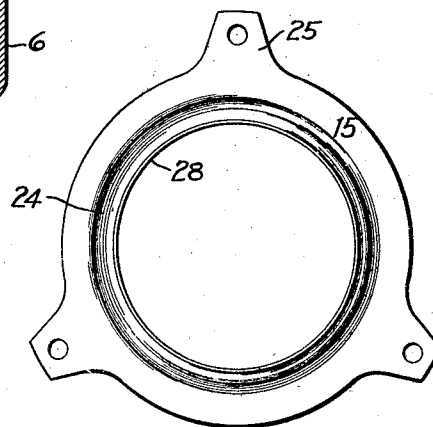
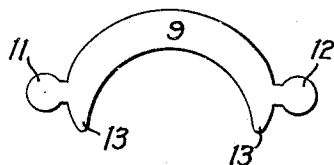


Fig. 5.



Witnesses:

L. Thon
C. W. Carroll

Inventor:

Andrew Wollensak
by his attorneys
Osgood, Davis & Dorsey

UNITED STATES PATENT OFFICE.

ANDREW WOLLENSAK, OF ROCHESTER, NEW YORK, ASSIGNOR TO WOLLENSAK OPTICAL COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

IRIS-DIAPHRAGM.

993,431.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed March 2, 1911. Serial No. 611,950.

To all whom it may concern:

Be it known that I, ANDREW WOLLENSAK, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Iris-Diaphragms, of which the following is a specification.

This application relates to improvements in iris-diaphragms such as are used in connection with cameras and other optical instruments. A diaphragm of this type comprises a series of overlapping thin blades of sheet-material, each blade being pivotally mounted at its ends in two annular relatively-rotary members by which all of the blades are swung simultaneously toward or from the center of the aperture.

In diaphragms of the type in question it is necessary to make the blades of very thin, flexible, sheet-material, owing to their overlapping arrangement, in order that they may lie as nearly as possible in one plane, and for this reason the blades are very easily distorted or twisted at their ends by the means by which their movements are produced. Furthermore, it has been found that the edges of the blades, where they cross each other, tend to catch against each other and resist movement of the blades, and this resistance has a further tendency to cause the blades to be twisted or broken through the operation of the adjusting members.

The object of the present invention is to produce an iris-diaphragm in which the harmful twisting effect upon the blades is substantially eliminated, and the action of the blades rendered smooth and easy. To this end I employ a construction in which the ends of each blade are closely embraced between two surfaces upon the annular supporting and controlling members of the diaphragm, so that the ends of the blades are effectually prevented from twisting under the strains incurred in the movement of the blades. As a further precaution against twisting, and to produce an easy sliding movement of the blades over each other, I modify the usual crescent form of the blades by providing each blade with bifurcated ends, one extremity of each end constituting a bearing-lug cooperating with one of the annular members, while the other extremity extends beyond the bearing-lug and engages the surface of the adjacent blade,

and in this manner the blade, at each end, has a bearing upon the adjacent blade on each side of its pivotal connection with the annular member. This bearing not only tends to prevent twisting action on the blade, but it also facilitates the movement of the edges of the blades across each other.

In the accompanying drawings:—Figure 1 is a front-elevation of an iris-diaphragm embodying the present invention, mounted in a shutter-casing, and with parts broken away to illustrate the construction more fully; Fig. 2 is a section on the line 2—2 in Fig. 1, looking from beneath; Fig. 3 is a front-elevation of the rotary controlling-member; Fig. 4 is a front-elevation of the middle ring; and Fig. 5 is a front-elevation of one of the blades.

The invention is applicable to iris-diaphragms of various forms, but in the accompanying drawings it is illustrated as embodied in a diaphragm constructed in accordance with United States Letters Patent issued to Wollensak Optical Company, February 28, 1911, No. 985,311. In the diaphragm of said patent the usual pivots projecting laterally from the blades are eliminated, and the blades are moved and supported by means engaging them directly and in the planes of the blades.

The diaphragm is illustrated as inclosed within a shutter-casing having the usual cylindrical body-portion 6, flat back 7, and threaded nipple 8.

Each blade of the diaphragm comprises a body-portion 9 of the usual crescent shape. Each end of this blade is bifurcated, as shown in Fig. 5, so as to produce, at the respective ends, two pivot-lugs 11 and 12 and two tapering bearing-extremities 13. The pivot-lugs, in accordance with said patent, are not provided with the usual metal pivots, but are made in the form of flat circular heads connected with the body of the blade by comparatively narrow necks.

The annular supporting and operating members comprise three rings 14, 15 and 16, which are stamped from sheet-metal, and are hereinafter designated, respectively, as the back-ring, the middle-ring, and the front-ring. The back-ring 14 is provided with a discontinuous, annular bead 17 producing a corresponding ridge on the front of the ring, and its outer margin 18 is also offset in the same direction, thus producing

an annular groove 19 between the bead 17 and the margin 18. At equal intervals the back-ring is also provided with depressed portions or sockets 21, which interrupt the bead 17 and are of substantially the same diameter as the pivot-lugs 12 on the blades. The back-ring constitutes the rotatable member of the diaphragm, and it is provided with the usual arm 22 which projects outwardly through an aperture 20 in the casing and is manually operable to adjust the aperture of the diaphragm. The margin 18 of the back-ring is seated in an annular recess 23 in the back 7 of the casing, as shown in Fig. 2. The middle-ring 15 is provided with an annular bead 24, constituting a ridge on the rear surface of the ring, and the inner margin of the ring is bent in the opposite direction to produce an annular ridge 28 on the front surface of the ring. This ring is fixed in the shutter-casing, being provided with three lugs 25 adapted to receive screws for this purpose. The front-ring, at its inner margin 26, is forwardly offset, as shown in Fig. 2, and is provided with a series of apertures or sockets 27 extending outwardly from the portion 26 and of a diameter slightly greater than the diameter of the pivot-lugs 11 on the blades. The front-ring is fixed in the casing by means of screws 29 which also pass through the lugs 25 on the middle-ring, and are threaded into the back 7 of the casing.

The blades are arranged in the usual overlapping position, as shown in Fig. 1, each blade having its pivot-lug 11 located in one of the apertures 27 in the front-ring, and its pivot-lug 12 seated in one of the sockets 21 in the back-ring. The middle-ring 15 co-operates with the back-ring and the front-ring to embrace the ends of the blades closely. The ridge 24, being seated in the groove 19, confines the lugs 12 in their sockets in a space of a depth equal only to the thickness of the blades, and the form of the pivot-lugs and of the sockets is such that the blades have a swinging or pivotal movement in these sockets. In a similar manner the pivot-lugs 11 are closely confined between the ridge 28 and the rear surface of the front-ring 16, in a space equal in depth only to the thickness of the blade. The form of the sockets thus produced is such as to permit the lugs 11 to have a longitudinal as well as a pivotal movement, as is necessary for the free movement of the blades. By tightening the screws 29 more or less, the parts may be drawn together with more or less pressure, and thus an adjustable friction is secured by which the parts are maintained in adjusted position, against accidental movement.

As shown in Fig. 1, each extremity 13 of each blade rests against the flat surface of the adjacent blade, so as to provide a bear-

ing extending in advance of the pivot-lug, and the blades are thus effectually protected against twisting action or against binding between the edges of the blades.

My invention is not limited to the embodiment thereof hereinbefore described and illustrated in the accompanying drawings, but may be embodied in various other forms within the nature of the invention, as it is defined in the following claims.

I claim:—

1. An iris-diaphragm having, in combination, two relatively-rotary annular members, and a series of overlapping blades pivotally connected with, and actuated by, said members, each blade being a flat piece of thin sheet-material with a body-portion in the general form of a crescent and with a pivot-lug extending from its outer edge at each end, the extremities of the body-portion extending beyond the pivot-lugs so as to provide a bearing between each blade and the contiguous blade on both sides of each pivot-lug.

2. An iris-diaphragm having, in combination, a series of overlapping blades of thin, flexible sheet-material, and annular means for adjusting and supporting the blades, said means being provided with a series of sockets in each of which an extremity of one of the blades is seated and each socket being of a depth substantially equal to the thickness of the blade, so that the blade is closely confined by the socket against twisting.

3. An iris-diaphragm having, in combination, a series of overlapping blades of thin, flexible sheet-material, and three superposed, annular, relatively-rotary adjusting and supporting members, each of the two outer annular members embracing, between itself and the adjacent surface of the middle annular member, the respective extremities of the blades, whereby the blades are supported against twisting at both ends.

4. An iris-diaphragm having, in combination, a series of overlapping blades of thin, flexible sheet-material, and three superposed, annular, relatively-rotary adjusting and supporting members, the two outer annular members having each, at the surface adjacent the middle annular member, a series of sockets to receive the respective extremities of the blades, and the middle annular member engaging the lateral surfaces of said extremities opposite said sockets so as to confine the blades closely in the sockets.

5. An iris-diaphragm having, in combination, a series of overlapping blades of thin, flexible sheet-material, an annular adjusting member having a series of sockets to receive, respectively, an extremity of each blade, and a second annular member having an annular ridge engaging said extremities opposite said sockets and confining them closely therein.

6. An iris-diaphragm having, in combina-

tion, a series of overlapping blades of thin, flexible sheet-material, an annular adjusting member having a series of sockets to receive, respectively, an extremity of each blade, and
5 an annular groove connecting the sockets, and a second annular member having an annular ridge seated in the groove and engag- ing and closely confining said extremities in the sockets.

ANDREW WOLLENSAK.

Witnesses:

D. GURNEE,
L. THON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
