

(No Model)

L. GATHMANN.
LENS.

No. 531,994.

Patented Jan. 1, 1895.

Fig. 1.

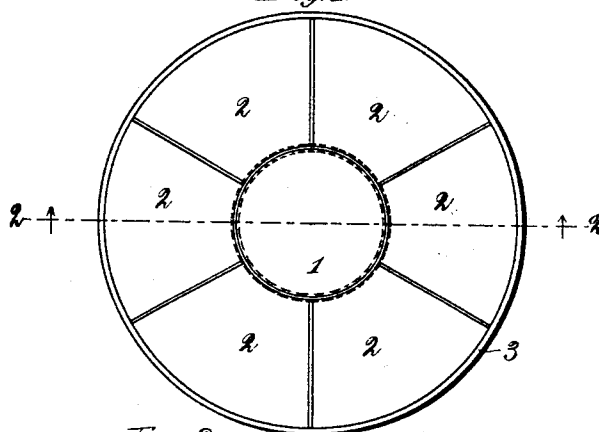
T2264
X2056

Fig. 2.

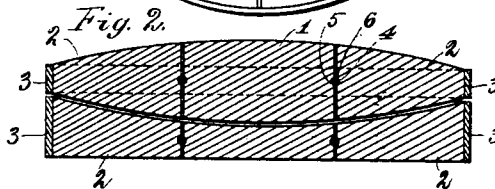


Fig. 3.

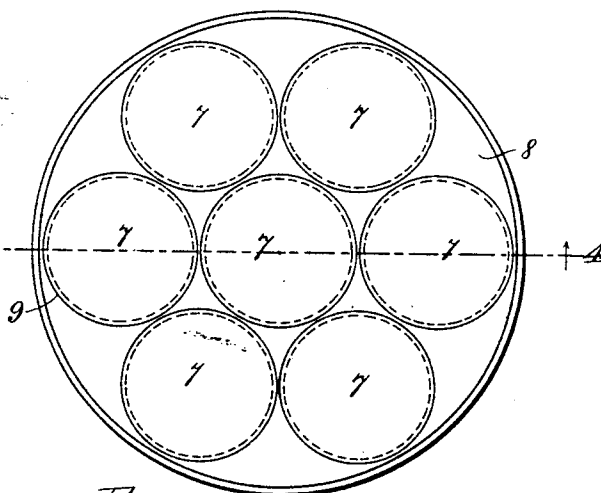


Fig. 5.

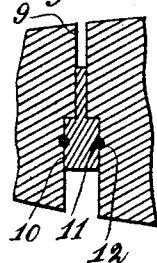
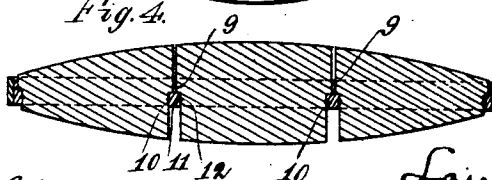


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

LOUIS GATHMANN, OF CHICAGO, ILLINOIS.

LENS.

SPECIFICATION forming part of Letters Patent No. 531,994, dated January 1, 1895.

Application filed January 9, 1893. Serial No. 457,857. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GATHMANN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lenses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in lenses, the object being to provide a novel construction in a lens whereby not only the cost of large lenses is reduced and their manufacture rendered less difficult, but whereby it is possible to make a large lens of glass, all of which is clear and as perfect as a small lens.

The invention consists in the features of construction and combinations of parts herein-after fully described and specifically claimed.

In the accompanying drawings illustrating my invention, Figure 1 is a plan view of a lens constructed in accordance with my invention. Fig. 2 is a sectional view of the same on the line 2—2 of Fig. 1. Fig. 3 is a plan view of a modified form of construction embodying my invention. Fig. 4 is a sectional view of the same taken on the line 4—4 of Fig. 3. Fig. 5 is a detail fragmentary view on an enlarged scale.

Referring now to said drawings (Figs. 1 and 2) A indicates the lens as a whole embracing a plurality of members, namely,—a central member 1 and a plurality of surrounding members 2. In the instance illustrated the central member 1 is circular, while the outer and inner faces of the members 2 are segments of an annulus and are so constructed that they fit the central member and each other, so that when they are placed together, they are in the form of a circle. To hold the members of the lens together a band 3 is employed that surrounds the same as shown and prevents their displacement in an obvious manner. To secure the members against displacement or movement within the ring, I prefer to make grooves 4 in the inner curved faces of the members 2 and a groove 5 in the periphery of the member 1. These grooves are

located opposite each other when the members are secured together and located therein is a key 6, conveniently a piece of wire, that enters each groove and serves to lock the members together. It will be understood, of course, that the meeting faces of the members are made to fit nicely, and in placing them together the meeting faces are made irreflective by placing thereon a paste or cement that will not reflect rays of light, such as, for instance, a dull waterproof cement.

In Fig. 2 I have shown a double convex and a plano-concave lens made after my invention. In constructing a lens of this kind the members are bound together as described with their faces approximating their finished condition, and after being securely bound together are brought to their finished condition in the ordinary manner.

As above stated, one of the objects of this invention is to reduce the cost of large lenses. The great difficulties experienced in making large lenses, say thirty-six inches in diameter, have made their manufacture arduous and costly, owing to the trouble in cooling off the glass after casting, in which operation the glass by reason of the unequal contraction of its different parts often cracks or breaks, so that it has been a difficult matter to produce a large-sized glass of this kind. The amount of trouble increases manifestly with the size of the glass, and to obviate this objection I make the lens as above stated, in a plurality of members, so that in making a thirty-six inch lens, for instance, the members would be about twelve inches in width. In this way it will be seen, that a lens of any size can be made, as the number of members is unlimited and enough can be employed to make the lens of desired size. The lens constructed in this manner can of course be made thinner than a lens of the same diameter in one piece, and this of course will allow more light to pass. Furthermore, in making a lens in this manner, I am enabled to obtain a clearer and more perfect glass, for it is obvious that in a lens of thirty-six inches diameter numerous defects are present, owing to the cooling of such a large piece of glass, whereas, these defects are reduced to a minimum in a piece of glass

of eight or twelve inches diameter, which will be about the size of the sections forming my object lens. Thus the lens is made of clearer and more perfect glass than if made in one 5 piece. The lines made by the meeting of faces of the members will of course prevent so much light from passing therethrough, but such loss of light is made up for by the ability to make the lens thinner and of glass containing fewer 10 defects.

The curvatures of the sections or members of the lens, form in conjunction with each other a complete lens, that is to say, the foci of the sections or members are the same.

15 In Figs. 3 and 4 is shown a modified form of construction embodying my invention in which all the lens sections or members are circular. In this construction I have a circular frame 8 provided with a plurality of open- 20 ings 9, preferably one central opening and a plurality of openings surrounding the same. This frame 8 is conveniently made of glass or metal and its plan contour will be readily seen in Fig. 3. The lens sections or members 7 are 25 secured within the openings 9 as shown, and have irreflective sides to prevent the reflection of light as pointed out above. As a convenient way of securing the said lens sections or members 7 within the openings 9, I prefer to 30 make one end of said openings 9 larger than the others, said enlarged end being indicated by 9 and the reduced end by 10. The two ends of the lens sections differ in size, one end fitting the enlarged end 9 of the openings, while the 35 other end is a little smaller than the reduced end 10 of the opening 9, so that said lens section 7 can be placed within the openings 9. To hold said lens section in place within the opening 9, I make a groove 11 in the wall of 40 the reduced end of the opening 9 and a registering groove 12 in the side of the reduced end of the lens section, as clearly shown in Fig. 5. When the lens section is in place and these grooves 11 and 12 stand opposite each 45 other, a cement or paste is poured in between the reduced ends of lens section 7 and opening 9 and runs into the groove and thus serves

to hold the parts together. This cement is irreflective to avoid reflection.

I claim as my invention—

1. A lens consisting of a plurality of mem- 50 bers or sections forming in conjunction with each other a complete lens and secured together side by side in the same plane, each of said members or sections having irreflective 55 sides, substantially as described.

2. A lens consisting of three or more mem- 60 bers or sections forming in conjunction with each other a complete lens and secured together side by side in the same plane, each of said members or sections having irreflective 65 sides, substantially as described.

3. A lens consisting of a central member or section and a plurality of surrounding mem- 70 bers or sections, all secured together side by side in the same plane and forming in conjunction with each other a complete lens, and each of said members or sections having irreflective sides, substantially as described.

4. A lens consisting of three or more mem- 75 bers or sections forming in conjunction with each other a complete lens and secured together side by side in the same plane with a layer of irreflective material between the meeting faces of said members or sections, 80 substantially as described.

5. A lens consisting of a central member or section having a peripheral groove, a plural- 85 ity of members or sections located and secured around said central member or section in the same plane, the adjacent faces of said central and surrounding members or sections being of the same contour, grooves in the faces of said surrounding members or sections adjacent to said central section or mem- 85 ber, aligned with the groove of said central member or section, and a key in said grooves, substantially as described.

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

LOUIS GATHMANN.

Witnesses:

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