

No. 625,535.

Patented May 23, 1899.

J. L. BORSCH.
BIFOCAL LENS.

(Application filed Feb. 25, 1899.)

(No Model.)

FIG. 1.

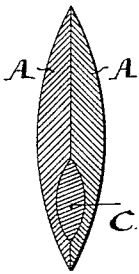


FIG. 2.

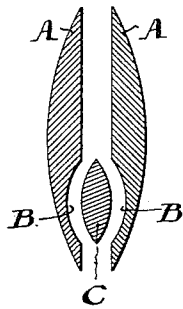


FIG. 3.

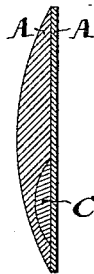


FIG. 4.

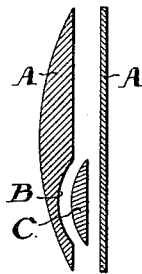
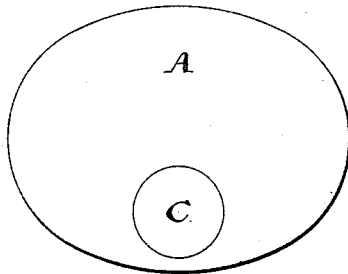


FIG. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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BIFOCAL LENS.

SPECIFICATION forming part of Letters Patent No. 625,535, dated May 23, 1899.

Application filed February 25, 1899. Serial No. 706,799. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. BORSCH, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Bifocal Lenses, of which the following is a specification.

My invention relates to lenses, employed in spectacles and eye glasses, of the special character known as bifocal, that is to say, having two independent focal points located in the vicinity of each other, each occurring in one of the two regions into which the lens is divided, which respective regions are formed of such material and ground to such configuration that their respective coefficients of refraction are of dissimilar power.

In practice bifocal lenses are employed by persons whose vision is of such a character that a lens which enables them to see distant objects does not enable them to see objects or print at close range, such persons being under the necessity either of employing two pairs of glasses, one for distant and one for near vision, or of employing lenses of the character above set forth having distinct regions of dissimilar powers of refraction.

Heretofore bifocal lenses have been frequently formed by matching and uniting edge to edge two pieces of lens glass, each constituting but part of a complete lens, and respectively suitably ground, the one for distant and the other for near vision,—and various forms have by different constructors been given to the respective elements or sections of the lens, the only fixed requirement as to such sections being that they should when united present as to their combined outer edges the usual oval outline of a lens.

In whatever forms the respective independent sections or elements of a bifocal lens of the foregoing character have been made, however, they have been united by bringing the respective edges of said sections or elements into contact and cementing the abutting edges by any suitable balsam or uniting medium, or maintaining them in their assembled position by an inclosing lens frame.

This construction has been objectionable, however, by reason of the fact that however carefully the sections are assembled and cemented, a minute cement-filled space exists

between the abutting edges, and the cement which is present of course on both surfaces of the lens, in time becomes slightly worn away under the action of heat and the attrition to which it is subjected in the cleaning of the lens, with the result that the permanence of the union between the elements or sections is impaired; furthermore, the line of connection between the two sections of a bifocal lens as heretofore constructed as described is always visible, and not only detracts from the appearance of the lens but is an annoyance to the wearer; furthermore, no matter how carefully the sections or elements are united it is practically impossible to prevent one of the meeting edges of the sections from projecting slightly above the opposing edge of the other section, with the result that in the cleaning of the lens the projecting edge is very liable to be chipped.

When, instead of uniting edge to edge two pieces of lens glass to form a bifocal lens, such lenses have been constructed by placing one piece of lens glass upon the face of the other, the objections referred to are the more pronounced.

Broadly stated, it is the object of my invention to produce a bifocal lens of an attractive, efficient, and durable character, in which the objections hereinbefore stated to the existing forms of such lenses shall be entirely obviated.

Generally expressed, my invention comprehends the provision of a lens of usual outline, the body of which is composed of ordinary lens material, such as crown glass, and the faces of which are of any usual curvature or form to produce any selected magnifying power or corrective effect to suit the eyes of the wearer,—and herein termed the major lens,—within a suitable recess in the interior of which lens is located a smaller lens,—herein termed the minor lens,—and which is preferably formed of flint glass to constitute an element of index different from that of the major lens, and the refractive power of which minor lens combined with the refractive power of that portion of the major lens which overlies it, produces a net coefficient of refraction distinct from that of the remaining portion or field of the major lens, and, of any desired strength.

In the usual form in which my lens will be constructed, as I contemplate, the major lens will be a lens for distant vision and the minor lens will constitute a correction of said lens (of an area equal to its own diameter) for near vision.

The major and minor lenses may, of course, be of such form and relative proportions as the constructor or user may prefer, and each may, as heretofore, be of any desired coefficient of refraction, their respective powers of refraction being entirely independent of each other and capable of being made to conform to the requirements of any usual formula.

In following a prescribed formula to produce a given strength of refraction in the field of the minor lens, and which is composed as will be understood, of said minor lens and the overlying portions of the major lens bounded by the outline of said minor lens, a compound calculation, so to speak, will be required on the part of the lens grinder, and it will be necessary for him to calculate the refractive power to be possessed by that portion of the major lens which overlies or is opposite to the minor lens, and to then conform or grind the inset minor lens to such shape that its refractive power plus the refractive power of the ground glass in the overlying regions, will produce the aggregate refractive power prescribed.

The calculation referred to is one which any optician can readily make in accordance with known rules.

In the preferred construction of my improved bifocal lens I form the major lens, whether it be the near lens or the distance lens, as two halves, each preferably of approximately half the thickness of an ordinary lens, and carefully grind or conform the opposing faces of the respective halves so that when brought into contact with each other they shall accurately fit, and I also produce in one or both of said opposing inner faces, according to the character of the lens employed, a recess of such form as to be adapted to receive the smaller or minor lens which is to be inclosed between the two halves of the major lens.

When, then, the two halves of the major lens are, with the minor lens within the recess as stated, brought together and secured by balsam or otherwise, the result will be a compound lens of such conformation as to possess as to a selected portion of its area, a given coefficient of refraction, and the remaining portion of the area of which is, by the presence in the interior of the structure of a distinct lenticular body of different index, of a distinct and different coefficient of refraction.

As will be understood, the respective halves of the lens may be of any preferred shape as to their faces.

In the accompanying drawings,

Figure 1 is a vertical, transverse, sectional

elevation of a bifocal lens embodying my invention.

Figure 2 is a view similar to Figure 1, the parts being slightly separated to more plainly exhibit their construction.

Figure 3 is a view similar to Figure 1, illustrating, however, a lens ground to a different form.

Figure 4 is a view similar to Figure 3, the parts being slightly separated to more plainly exhibit their construction.

Figure 5 is a view in front elevation of a bifocal lens embodying my invention.

Similar letters of reference indicate corresponding parts.

In the drawings,

A A indicate the respective halves or portions of the major lenses, and B the recess formed in the inner faces of the same, said recess is in Figures 1 and 2 shown as produced in the inner faces of both halves of the major lens, and in Figures 3 and 4 as produced altogether in one of said halves. C is the minor lens.

As will be understood, a lens embodying my invention is uniform in curvature and integral in structure throughout all portions of each face, so that not only is the presence of the inclosed minor lens not visible except on very close inspection, but the presence of a joint or union between the edges of the respective elements on the surface of the lens is entirely avoided, with the result that the stated disadvantages incident to the use of the well-known forms of bifocal lenses are completely avoided.

I claim and desire to secure by Letters Patent—

1. A bifocal lens consisting of a major lens having faces which are each of selected curvature or form and of exteriorly uninterrupted structure and a relatively smaller minor lens contained within its interior, substantially as set forth.

2. A bifocal lens, consisting of a major lens having faces which are each of selected curvature and of exteriorly uninterrupted structure, and a relatively smaller minor lens contained within the interior of said major lens, and the refractive power of which is combined with the refractive power of the overlying portions of the major lens to produce in the region which it occupies a correction of the refractive power of the said major lens, substantially as set forth.

3. A bifocal lens consisting of a major lens composed of two plates adapted to be placed face to face and secured together, each ground as to its outer face to any selected curvature, a recess between said plates, and a minor lens disposed within said recess, substantially as set forth.

4. A bifocal lens consisting of a lens having faces which are each of selected curvature or form and of exteriorly uninterrupted structure, and having within its interior a rela-

tively smaller lens, the glass of the smaller lens being of index different from that of the larger, substantially as set forth.

5 A bifocal lens consisting of a major lens composed of two plates adapted to be placed face to face and secured together, each ground as to its outer face to any selected curvature, a recess between said plates, and a minor lens disposed within said recess, said major lens

and minor lens being formed of glass of different index, substantially as set forth. 10

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 21st day of February, A. D. 1899.

JOHN L. BORSCH.

In presence of--

WM. M. CROWTHER,
HAROLD G. KNIGHT.