June 19, 1923. 1,459,373

M. A. LAABS

LENS

Filed Jan. 12, 1921

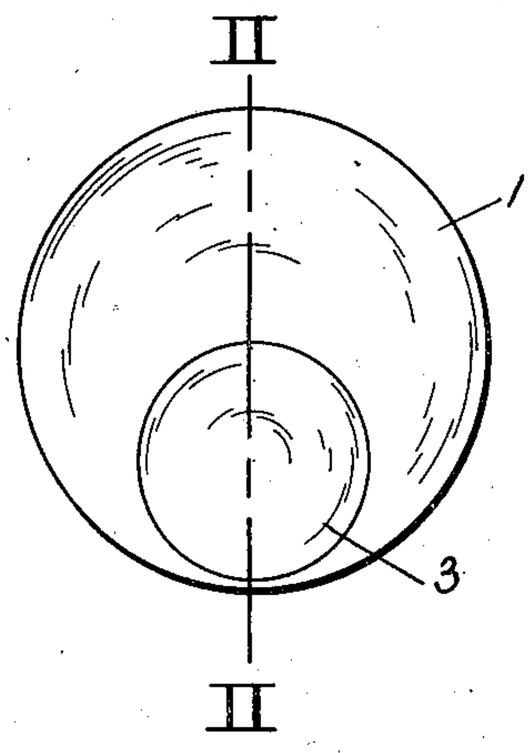

FIG. I

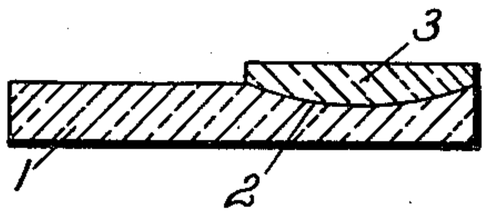

FIG. II

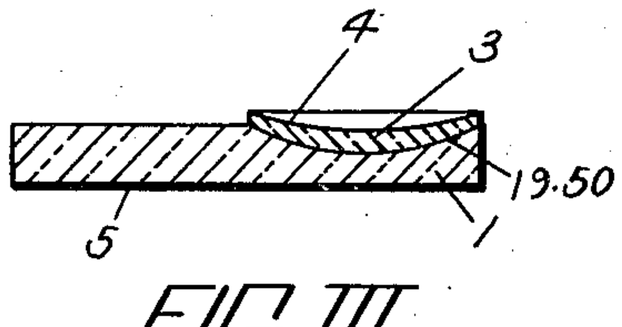

FIG. III

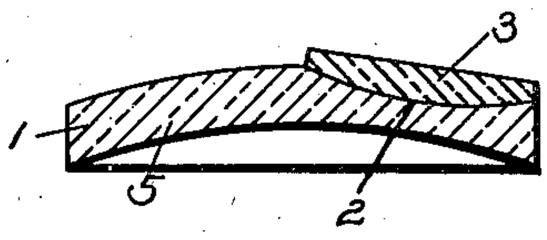

FIG. IV

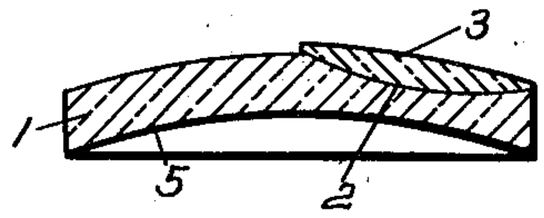

FIG. V

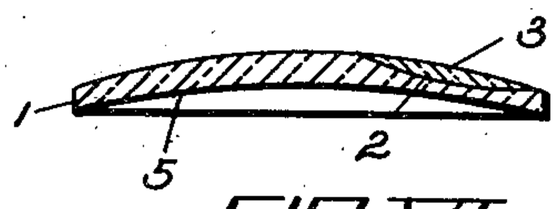

FIG. VI

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UNITED STATES PATENT OFFICE.

MAX ALFRED LAABS, OF SOUTHBRIDGE, MASSACHUSETTS, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

LENS.

Application filed January 12, 1921. Serial No. 436,669.

To all whom it may concern:

Be it known that I, MAX A. LAABS, a citizen of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Lenses, of which the following is a specification.

This invention relates to improvements in lenses and has particular reference to an improved form of blank for a multifocal lens.

One of the leading objects of the present invention is the provision of a commercial blank or article of manufacture to be subsequently transformed into a multifocal lens formed from two or more portions of glass which shall be so constructed that the combined focal values of the two portions of glass may be readily determined before the lens has been surfaced.

A further object of the present invention is the provision of a novel and improved blank for a multifocal lens which shall be so constructed that the portion of the lens of greater power may be readily examined prior to the surfacing operation, thus eliminating the grinding up of defective blanks, and in which in addition the power of said portion may be measured upon the surface in place of through neutralization as has hitherto been necessary.

A further object of the invention is the provision as an improved commercial article of a lens blank which shall be composed of a major portion having a countersink and a segment disposed within the countersink so constructed that there will be an absence of power in the blank through the segment and countersink, enabling the effective additive value produced through the countersink and segment construction to be measured upon the exterior surface of the lens.

Other objects and advantages of my improved construction should be readily apparent by reference to the following specification taken in connection with the accompanying drawings, and it will be understood that I may make any modifications in the specific details of construction shown and described within the scope of the appended claims without departing from or exceeding the spirit of my invention.

Figure I represents a plan view of a blank embodying my improvements.

Figure II represents a sectional view as on the line II—II illustrating one step in the formation of the same.

Figure III represents a similar view illustrating a further step.

Figure IV represents a view similar to Figure II of a meniscus form of lens.

Figure V is a view corresponding to Figure III of the same form of lens, and

Figure VI illustrates a finished lens manufactured from such blanks.

Prior to my invention it has been customary to manufacture what is known as two-part bifocals, multifocals, or the like through the use of a major disc or slab 1 having a recess or countersink 2 formed therein to receive the segment portion 3 formed of a glass of a different index of refraction. This segment portion may be secured in position in the countersink either through fusion or through the use of a suitable cement or uniting medium. In either event the result is the same; that is, a lens having a plurality of different foci is provided when the blank is surfaced on the two sides, one focus being the result of the exterior curves on the two faces of the glass and the other focus being the result of the four curves; that is to say, of the two surface curves and the two united inner curves combined with the differences in index of refraction of the two glasses. This difference it has always been impossible to measure in the lens through the process of neutralizing. This on the other hand is required that the last surfaces be rendered clear or transparent either through grinding and polishing or through the use of cover glasses, enclosed films and the like. In any event, however, the determination of the power of this portion of the lens has been dependent entirely on proper neutralization before grinding while inspection of the surface has also been rather difficult

with the result that in many instances work has been wasted in grinding up a lens which was afterwards found to be defective in the countersink portion or one in which the countersink did not give the desired additive result in the finished lens.

These lenses it is to be understood are ordinarily sold in what is termed blanks; that is to say, in a flat or curved slab having the segment secured in position thereon so that the bifocal part or addition is completed but requiring grinding on one or both sides, Figures II and IV, therefore, illustrating the commonly known form of commercial blank as generally produced by the manufacturer and sold to the trade. It is to this that my improvement relates. My improvement consists in a new process of producing these blanks and a new structure as a result of this process.

After the segment has been secured within the countersink and the blank is in the condition shown in Figures II and IV, I proceed to grind on the surface of the segment only a finished curve of such power as to counteract the additive value of the lens caused by the difference in refraction of the two portions of glass, taking as a concrete example the structure shown in Figure III. I have there illustrated the crown major partion 1 as having formed therein the countersink having a power as respects the crown of about 19.50 dioptres, while secured within the countersink is the flint button or segment 3 having its lower face fitting and secured in position within the countersink. Ordinarily, this button would have a substantially flat upper face producing an additive value due to the difference in refraction of about 3.50 dioptres, or in other words, the lens illustrated, being a flat or plano blank, would have a zero power in the distance portion and a +3.50 power in the reading portion. In my process I then form on the upper face 4 of the segment a curve of such power as to counteract or neutralize the power produced by the countersink so that the lens will have no power through the countersink, this curve being formed, however, on the countersink only and not affecting the major portion of the blank in the slightest, nor deep enough to interfere with whatever curve, either concave or convex, it may be desired subsequently to form on the bifocal face of the blank. In the example just quoted I would form on the segment 3 a curve 4 which as respects the crown glass of the major portion would produce a power of approximately 3 dioptres but which on the higher index flint will produce a power of about —3.50 dioptres, thus counteracting the +3.50 dioptre power produced through the countersink value of 19.50 dioptres.

The advantages gained by this should be at once apparent, and it will be seen that with my improved blank having a ground and polished surface on the countersink or segment or button, and preferably having a cleared or transparent back surface as at 5, it will be possible to look directly through the countersink and determine whether there is any appreciable amount of residual power left after the application of the neutralizing curve thereto. In addition there will be no power in the countersink, and it will be possible to examine it as a plain piece of glass and to locate any defects due to pebbles, poor fusion, color or the like. It will also be possible through measuring the curve 4 and determining the ratio power of flint lens produced by that curve, algebraically adding the curve on the face 5 and crown power produced by that curve, to determine by surface measurement of the blank just what the additive value is through the countersink or segment portion of the lens. This is the first time in the manufacture of lenses of this character that it has been possible to measure mechanically and determine the countersink power in the blank, an operation which can be performed by relatively unskilled persons as distinguishing them from persons of a high degree of skill required for proper measurement of powers or the like through the neutralization process.

I claim:

1. A multifocal lens including a major blank and a separate segment secured to the major blank, one of the parts having a concave curve and the other part having a portion fitting said curve, the segment and major portion being of glasses of different index of refraction, and the segment having a curve on its exposed face neutralizing the addition produced in the lens due to difference in index of refraction of the parts.

2. A blank for a multifocal lens comprising a major portion having a countersink formed from glass of one index of refraction and a segment in the countersink formed from glass with a different index of refraction, said segment having on its exposed face a curve neutralizing the additive value present due to difference in index of refraction of the two glasses.

3. A lens formed from a plurality of portions of glass having different indexes of refraction, having curved joining faces producing an additive value through portions of the blank, and having related curved exterior faces counteracting said additive effect.

4. A lens comprising a major portion having one focal value and a minor portion having a different focal value, and a segment secured to and overlying the minor portion,

the faces of the segment being related to produce power sufficient to neutralize the focal value of the minor portion.

5. A multifocal lens including a major portion having a countersink formed therein and a segment of different index of refraction from the major portion overlying the countersink and having its faces related to produce a power which will neutralize the power of the lens through the countersink.

In testimony whereof I have affixed my signature, in presence of two witnesses.

MAX ALFRED LAABS.

Witnesses:

ALICE G. HASKELL,
ESTHER M. LAFLER.