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M. A. LAABS

PROCESS FOR PRODUCING LENSES AND THE PRODUCT

Filed April 27, 1925

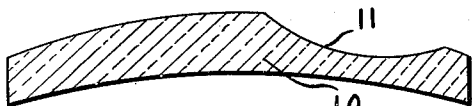


Fig. 1.

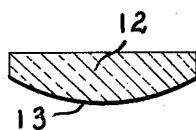


Fig. 2.

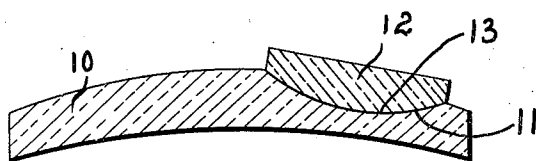


Fig. 3.

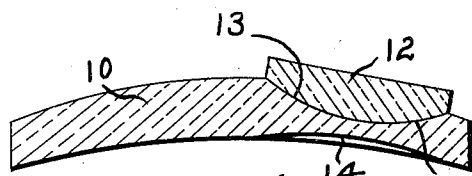


Fig. 4.

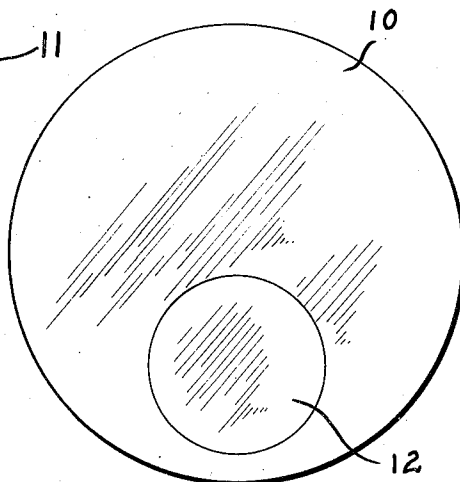


Fig. 7.

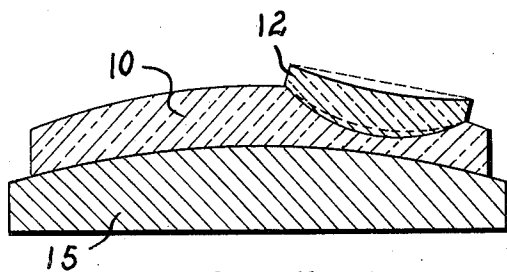


Fig. 5.

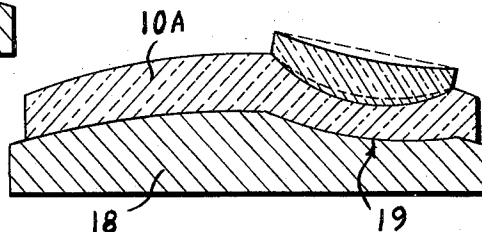


Fig. 8.

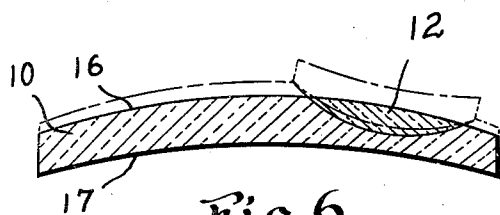


Fig. 6.

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PROCESS FOR PRODUCING LENSES AND THE PRODUCT.

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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 Processes for Producing Lenses and the Products, of which the following is a specification.

This invention relates to improvements in the manufacture of lens blanks and finished lenses, and has particular reference to the provision of an improved process for the production of multifocal ophthalmic lenses.

An important object of this invention is to provide an improved process for the production of multifocal lenses, and more particularly those composed of two different kinds of glass known in the art as Kryptoks.

Another object is to provide such a process whereby standard rough multifocal blanks may be changed to provide any desired optical addition through the reading portion.

Another object is to provide such a process whereby special additions in the reading portion may be readily obtained.

Another object is to provide such a process which will be simple, economical and reliable in application to lens manufacture.

Other objects and advantages will be apparent from the following description taken in connection with the accompanying drawings, wherein is shown by way of illustration certain preferred steps in the process.

In the drawings, wherein similar reference characters designate corresponding parts:

Figure 1 is a transverse sectional view through the major portion of the lens blank;

Figure 2 is a similar view through the minor portion of the blank;

Figure 3 is a sectional view showing the major and minor portions in their assembled relationship;

Figure 4 is a similar view illustrating the preparation of a standard blank for a variation of its reading addition;

Figure 5 is a similar view of a lens blank on its supporting block after the addition has been changed;

Figure 6 is a sectional view through a finished lens made from the blank;

Figure 7 is a front elevation thereof;

Figure 8 is a view similar to Figure 5, showing a modified form of the invention.

In the production of multifocal lenses it has been necessary in order to supply the various demands of the trade, to produce a great many different blanks each having a different optical addition through its reading portion. The production and carrying in stock of so many different styles of blanks has naturally been expensive and has required a great many extra tools to be used in the factory. This is particularly true in the case of lenses and blanks formed from two pieces of different kinds of glass, one of which being set into a recess in the other, since the addition of such cases is dependent upon the curve of the recess and that of the member secured in the recess.

It is an object of the present invention to overcome the necessity for carrying so many blanks and tools in stock, and to thereby simplify the manufacture and reduce the cost of the same.

In carrying out the invention a lens blank 10, preferably formed of crown glass, is provided on one of its surfaces with a ground and polished recess or countersink 11, which may preferably be either spherical or toric in form. A minor lens member 12 having a different refractive index from that of the major portion 10 and preferably formed from flint glass is provided with a convex curved surface 13 ground and polished and substantially contrageneric to the recess 11. These two lens members 10 and 12 are then placed in proper relationship to each other so that the flint button 12 may be secured within the recess 11 such as by fusing. The particular steps of the fusing operation are well known to those skilled in the art and, therefore, it is not thought necessary to go into the details thereof in this case. In this manner a standard Kryptok blank is produced which will have a certain optical addition through the reading portion or button 12, and by combining different curves on the outer surfaces of the blank any one of a number of different finished lenses may be produced.

However, it is necessary to have lenses with different additions through the reading portion, and to accomplish this I provide the blank with a second recess 14 opposed to the recess 11 and substantially in central alignment therewith, as clearly

shown in Figure 4. I then place the blank upon a block 15 of refractory material, such as carborundum, graphite, etc., and soften the blank by the action of heat, whereupon the material above the recess 14 will sag down, as shown in Figure 5. As the material of the blank sags down into the recess 14 the curve 11 which is the surface of joinder between the flint and glass members, will be displaced to a stronger curve than what it was originally. The amount of such displacement can be readily controlled by the radius of curvature of the recess 14 and by its depth.

As one specific example I have taken a standard blank having a minus 6 diopter base curve on the inner side of the blank, and a plus 4.50 diopter curve in the recess 11. By providing such a blank with a recess 14 having a minus 6.87 diopter curve and then allowing it to sag down, as explained, the optical addition through the reading portion will be equal to 87 hundredths of a diopter. In other words, the final optical addition through the reading portion will be plus 5.37 instead of plus 4.50.

The advantages of this will be readily seen from the fact that all of the flint buttons 12 may be produced with the same radius of curvature 13, and any of the standard blanks may be finally rendered to the desired optical addition by the improved process.

After the blank has been thus formed, proper optical surfaces 16 and 17 may be formed upon the opposite sides of the blank to produce a finished lens, as shown in Figures 6 and 7, wherein the crown glass 10 provides a distance vision portion and the flint button 12 provides the reading portion of a bifocal lens.

In Figure 8, I have illustrated a modification of the invention, whereby the surface of joinder of the two glass members may be displaced by dropping a portion of the lens into a recess. For example, the lens blank 10^A, similar to that shown in Figure 3, may be supported upon a refractory block 18 which is provided in its upper surface with a countersink or recess 19 of the desired curvature. Upon heating the blank 10^A while resting on the block 18, a portion of the material will sag into the recess 19 in the block and thus displace the line of joinder between the two glass members.

The process is simple in its application to commercial use and has been proven to be entirely practical. By it the cost of manufacturing lenses of this type can be considerably reduced and the results obtained are equal in quality to those of the prior art processes.

Obviously other modifications may be made in the various details and in the steps of the process, and the right is herein re-

served to make such changes as fall within the scope of the appended claims without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A process for producing multifocal lens blanks consisting in forming a major portion with a recess in one of its surfaces, securing a button of a different refractive index in the recess, countersinking the opposite surface of the major portion behind the button, and bending the major portion and button to change the surfaces of the recess and button.

2. A process for producing multifocal lens blanks consisting in forming a major portion with a recess in one of its surfaces, fusing a button of a different refractive index in the recess, forming a depression in the opposite side of the major portion and behind the button, heating the blank and causing part of the major portion and the button to be bent toward the depression on the opposite side.

3. A process for producing multifocal lens blanks consisting in forming a major portion with a recess in one of its surfaces, securing a button of a different refractive index in the recess, softening the two members by heating, and displacing part of the major portion and button to change the optical addition through that portion of the blank.

4. A process for producing multifocal lens blanks consisting in forming a major portion with a recess in one of its surfaces, securing a button of a different refractive index in the recess, softening the two members by heating, and increasing the amount of optical addition through the button by bending while in softened condition.

5. A process for producing multifocal lens blanks consisting in providing a two part fused bifocal blank with a depression opposed to the optical addition, and bending a portion of the blank into said depression to increase the amount of the optical addition.

6. A process for producing multifocal lens blanks consisting in providing a two part fused bifocal blank with a depression opposed to the optical addition, supporting said blank on a refractory block, heating the blank to soften it, and allowing a portion of the material to sag into the recess to deform the surface of joinder of the two pieces of glass constituting the blank.

7. A process for producing multifocal lens blanks consisting in forming a crown glass major portion with opposed recesses in its surfaces, forming a flint glass button with a curve contrageneric to that of one of the recesses, securing the button in its recess in the major portion, heating the crown and flint members to soften them, and displacing

a portion of the crown glass into the second recess to change the curve of the first recess and button, substantially as set forth.

5 8. A process for producing bifocal lenses consisting in forming a two part fused bifocal blank with a depression opposed to the optical addition, bending a portion of the blank into said depression to increase the amount of the optical addition, and
10 subsequently finishing the surfaces of the blank to continuous curves.

9. A process for producing multifocal lenses consisting in forming a major portion with a recess in one of its surfaces, securing
15 a button of a different refractive index in the recess, softening the two members by heating, displacing part of the major por-

tion and button to produce the desired optical addition through that portion of the lens, and subsequently finishing the surfaces 20 of the blank to continuous optical curves.

10. A blank for a multifocal lens comprising a major portion having a recess on one side finished to an optical surface, and a recess on the opposite side in alignment 25 with the first recess.

11. A blank for a multifocal lens comprising a major portion having a recess finished to an optical surface, a minor portion of different index of refraction secured in one recess, and a recess on the other side of the major blank in alignment with the first recess. 30

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