G. S. DEY.

LENS GRINDING.

APPLICATION FILED MAR. 8, 1920.

1,438,100. Patented Dec. 5, 1922.

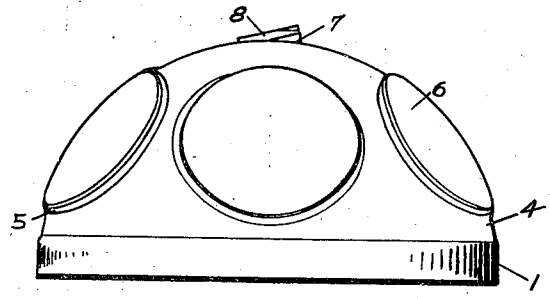


Fig. I

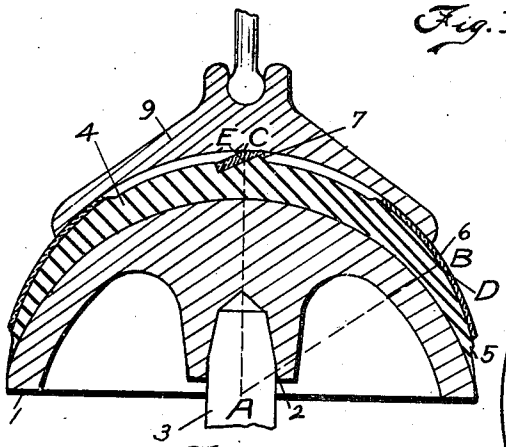


Fig. II

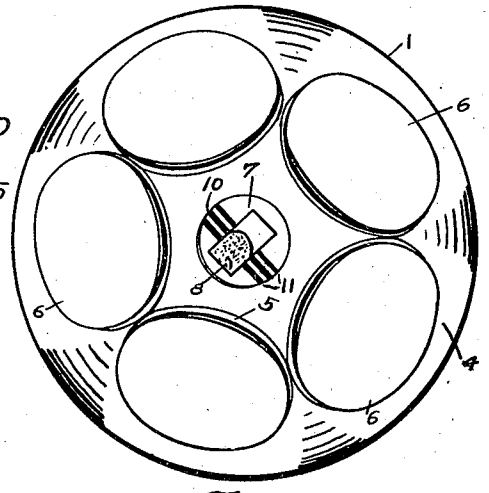


Fig. III

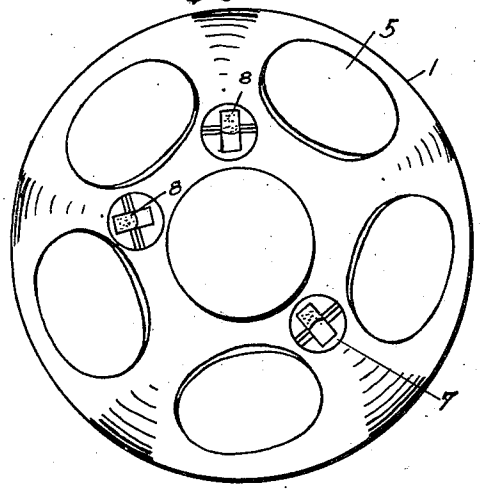


Fig. IV

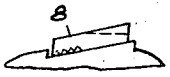


Fig. V

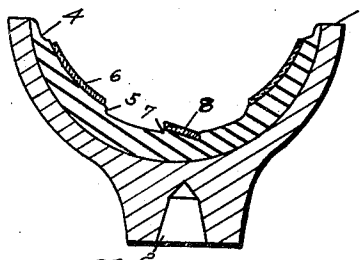


Fig. VI

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UNITED STATES PATENT OFFICE.

GILBERT S. DEY, OF SOUTHBRIDGE, MASSACHUSETTS, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

LENS GRINDING.

Application filed March 8, 1920. Serial No. 363,925.

To all whom it may concern:

Be it known that I, GILBERT S. DEY, 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 Lens Grinding, of which the following is a specification.

This invention relates to improvements in lens grinding and has for its principal object the provision of novel and improved means for accurately determining the thickness of a series of lenses while the same are being ground.

A further object of the present invention is the provision of a novel and improved form of variable gauge for grinding blocks which will automatically indicate the progress of the grinding and amount of glass which has been removed.

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 side elevation of a block embodying my improvements.

Figure II represents a vertical sectional view of the parts during the grinding operation.

Figure III represents a plan view of one form of my invention.

Figure IV represents a similar view of a modified form thereof.

Figure V represents a detail view of the gauge mechanism.

Figure VI represents a sectional view of a concave block embodying my improvements.

In the drawings, in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 1 designates the metal base or core portion of a lens block having the socket 2 for the actuating member 3, and having applied thereto the heavy pitch or similar material coat 4 in the usual manner. This coat 4 is preferably molded to provide the upstanding portions or spots 5 of proper height and configuration to satisfactorily receive the lenses 6 to be ground. It is to be understood that these lenses may be secured on the spots by slightly heating the lenses and pressing them against the material 4. It will be noted that in addition to the lens receiving spots 5 there is provided on the material 4 the additional spot portion 7 which is adapted to receive the gauge glass 8. This may be a single central spot, as illustrated in Figure III for example, or there may be a plurality of these spots 7, as is illustrated in Figure IV. In any event it is to be noted that the portion 7 is tilted at an angle with in place of conforming to or being a tangent of the curve of the lap. It is further to be noted that the gauge piece 8 is preferably formed of plano stock and, therefore, corresponds in angle to the angle of the upper face of the portion 7.

I would call particular attention for an understanding of the underlying principles of my invention, to Figure II, in which I have shown the line A—B as extending from the center of curvature of the grinding lap 9 at the position then occupied by said lap, which is at the supposed completion of the grinding operation, to the surface of the lens which has been ground, and that I have also shown the line A—C extending from the same center to the point of intersection of the center of the upper face of the gauge piece 8 and the grinding surface of the lap 9, and by comparison it will be found that the lines A—B and A—C are of equal length. It will also be found that the length of the line A—D or from the center A to the center of the outer surface of the lens receiving spot 5 and the length of the line A—E or distance from the center A to the surface of the gauge receiving spot 7 are also equal, while the thickness of the gauge piece 8 is the same thickness as that of the lenses 6 at the completion of the grinding operation.

I will now explain briefly the use of my gauge member and the manner in which the several points above enumerated cooperate to make its use possible. In the grinding of lenses the block 1 having been prepared as shown in Figure I with the series of lenses 6 to be ground in position and the gauge

member 8 also in its position, the grinding tool or lap 9 is placed in operative relation to the block and the parts suitably shifted to produce the grinding effect. As the grinding starts on the several lenses 6 it will also start on the upper or right hand corner of the gauge member 8 as located in Figure I and will start grinding down this gauge member, which on account of its flat upper face formation will be ground away faster at the sides than at the center leaving on the upper face of the gauge a half moon cleared effect with an adjacent ground glass portion, as should be readily understood by reference to Figures III and IV, this half moon gradually creeping across the face of the gauge member 8 as the lap moves downward through grinding away of the material of the gauge member and the several lenses. In view of the fact that the height of the spot 7 at the center line or graduation thereon is the same as the height or distance from center of the several lens receiving spots, it will at once be seen that a spherical grinding tool grinding away equally the several lenses and the material of the gauge member 8 on the spot 7 will approach equally the center points of the several lens and gauge receiving spots and that, therefore, the center thickness of each of the lenses will be the same as the center point thickness of the gauge piece. On account of the fact that the gauge piece is in the form of a narrow flat member resting on a flat surface it is possible for the eye to readily recognize or measure the center thickness of the gauge piece and thus for the grinder to determine the center thickness to which each lens has been ground, and thus to gauge just how far the grinding or roughing process should continue and how long the fine grinding, in order to produce lenses to an accurate center thickness standard. An aditional advantage is gained, however, when the thickness of the gauge piece employed is the same as the center thickness which it is desired to have on the finished lens. This is due to the fact that if the finished center thickness is the same as the thickness of the gauge piece then at the commencement of the operation the combined height of the spot and glass will be just the proper height so that the upper corner of the gauge member and the lenses will be ground away simultaneously bringing the higher side of the gauge piece down to the prescribed height, while when the grinding of the lenses has reached the point at which it has been determined the grinding should be stopped, in place of the operator having to gauge by eye the thickness he need merely glance at the top of the gauge piece, when if the back of the half moon arc of grinding is found to be on line with the center line designation 10 indicating the point E which has preferably been molded on the spot 7, he will know that the grinding operation should cease. If, however, it is desired to produce extra thin lenses suitable aditional designations 11 may be provided on the face of the spot and the grinding continued until the half moon reaches any one of these, it being understood that the grinding on the surface of the gauge member will progress much more rapidly laterally than in vertical depth due to the slight relative angle at which the same is supported, with the result that the designations 11 may for example under some conditions be a millimeter apart but will indicate but one-tenth of a millimeter thickness variation on the lenses.

In Figure IV, I have shown a slightly different form of my invention in which in place of employing a single central gauge member the central space is occupied by a lens to be ground, and I have shown three small gauge and lens receiving spots disposed at intermediate positions on the block, this having the additional advantage that it enables the grinder to check the gauge pieces one against the other and determine whether there is undue or excessive grinding at one side of the block as respects the other.

Figure VI illustrates the same principles but embodied in a concave in place of a convex block, the general operation, however, being the same.

From the foregoing description taken in connection with the accompanying drawings it is believed the generic principles of my invention and one method of carrying the same into effect will be readily understood, although it will be appreciated that various arrangements of the gauge member other than those shown in the drawings may be employed, and that while for convenience I have made use of the half moon line of demarcation between ground and unground surfaces for determining when the grinding operation has been completed, that the same result could be secured by the eye of a trained operator laterally considering the gauge glass by applying a suitable gauge to the spot and glass, or numerous other ways, all of which I consider within the purview of my invention so far as may be covered by the appended claims.

I claim:

1. In lens grinding, a lens receiving block having a plurality of lens seats formed thereon and a thickness gauge on the block adjacent the seats for the lenses to be ground.

2. In lens grinding, a block formed to receive a series of lenses for simultaneous grinding, a thickness gauge member mounted on the block for grinding with the lenses and means cooperating with the gauge member for indicating the proper point at which to stop the grinding operation.

3. A lens block having lens receiving

seats, a gauge member arranged adjacent said seats and tilted with respect to the block.

4. A lens block comprising a base portion and a moldable covering therefor having portions molded into lens receiving spots and an integrally molded gauge receiving spot.

5. A lens block comprising a base portion and a moldable covering therefor having portions molded into lens receiving spots and an integrally molded gauge receiving spot, a gauge on said spot, said gauge receiving spot having designations formed thereon cooperating with the gauge to indicate the progress of the grinding operation.

6. A lens block including lens receiving portions and a tilted gauge seat, said gauge seat having a flat upper surface, and a gauge in the form of a flat glass plate secured on said surface and projecting into the path of operation of the grinding lap.

7. A lens block including lens receiving portions and a tilted gauge seat, said gauge seat having a flat upper surface, a gauge in the form of a flat glass plate secured on said surface and projecting into the path of operation of the grinding lap whereby the gauge member will be ground away with the lenses, and means for measuring the transverse grinding of the surface of the gauge.

8. The combination with a lens block having lens receiving portions of a tilted seat formed on the block having portions of greater and portions of less height than the height of the centers of the lens receiving portions of the block and a gauge on the tilted seat to indicate the progress of the grinding operation.

9. The combination with a lens block having lens receiving portions and a tilted seat formed on the block having portions of greater and portions of less height than the height of the centers of the lens receiving portions of the block, a gauge glass mounted on the seat and having a portion projecting onto the path of the grinding tool, and means on the seat indicating the limit to which the surface of the gauge should be ground.

10 A curved lens block having a plurality of lens receiving spots whose centers are the same predetermined distance from the center of curvature of the block and having a gauge receiving spot and a gauge on the gauge receiving spot indicating the point on that spot corresponding in center distance with the centers of the lens receiving spots.

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

GILBERT S. DEY.

Witnesses:
ESTHER M. LAFLER,
ALICE G. HASKELL.