No. 816,555. PATENTED APR. 3, 1906.

J. L. BORSCH, JR.

TOOL FOR GRINDING LENSES

APPLICATION FILED JUNE 20, 1905.

FIG. I.

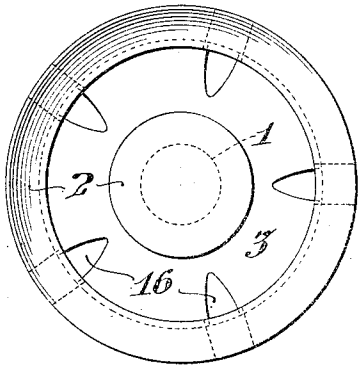


FIG. V.

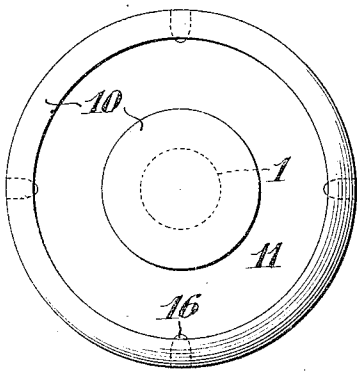


FIG. II.

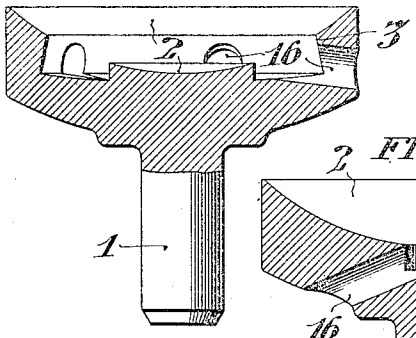


FIG. VI.

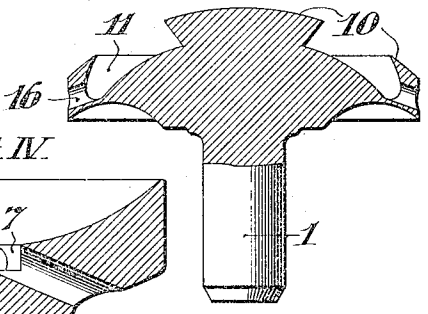
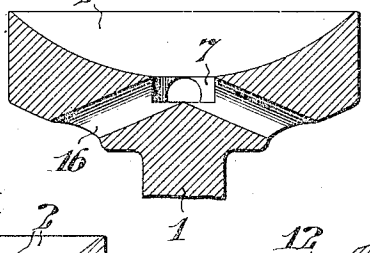


FIG. IV.



6 FIG. III.

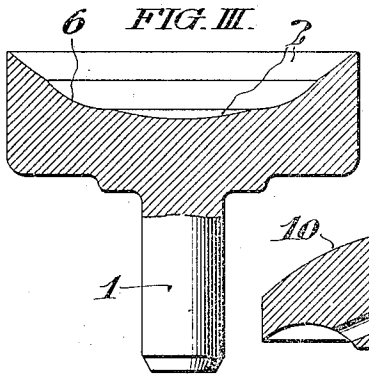


FIG. VII.

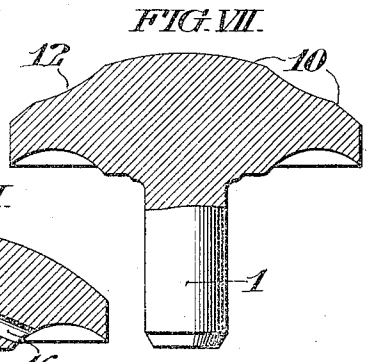


FIG. VIII.

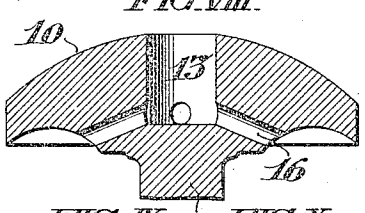
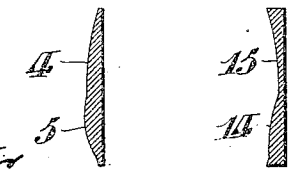


FIG. IX. 1 FIG. X.



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TOOL FOR GRINDING LENSES.

No. 816,555. Specification of Letters Patent. Patented April 3, 1906.

Application filed June 20, 1905. Serial No. 266,103.

To all whom it may concern:

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

My invention relates to an improvement in tools for grinding lenses for eye glasses. Its object is to provide a tool of simple construction, which may be employed to grind a lens having a plurality of portions of different curvatures. Lenses of this character have a plurality of independent focal points and are known as bi-focal lenses. The lens itself is of old or known construction and I do not make any claim to the same.

My invention resides in the novel construction of grinding tool which I have designed for the purpose of grinding a lens of the character to which reference has been made.

In order that my invention may be more readily and clearly understood, reference is to be had to the accompanying drawings, in which,

Figure I is a top plan view of a grinding tool adapted to grind or form the convex surface of a lens;

Figure II is a central section of the same;

Figure III is a central section of a modified construction of grinding tool, which is adapted to grind or form the convex surface of a lens;

Figure IV is a central section of a second modified construction of grinding tool for grinding the convex surface of a lens;

Figure V is a top plan view of a grinding tool which is adapted to grind or form the concave surface of a lens;

Figure VI is a central section of the same;

Figure VII is a central section of a modified construction of tool, which is adapted to grind or form the concave surface of a lens;

Figure VIII is a transverse section of a second modified construction of tool for grinding or forming the concave surface of a lens;

Figure IX is a transverse section of a lens, the convex surface of which has been ground or formed upon one of the grinding tools shown in Figures I, and II or III or IV;

Figure X is a plano-convex lens, the concave surface of which has been ground or formed upon a grinding tool shown in Figures V, and VI or VII or VIII.

In the drawings,—

1 designates a spindle or shank by means of which the grinding tool is secured to a rotatable support, not shown. In Figures I and II a concave surface 2 of the grinding tool is interrupted by a relatively annular or circular channel 3, which is located about half way between the center and the outer circular edge of the concave grinding surface 2.

The channel 3 is made deep enough to prevent contact with its bottom of the lens which is being ground upon a tool provided with such channel. Without the presence of the channel 3, a lens ground upon the surface 2 would present a perfectly smooth and regular surface having a single focal point.

As is well known, it is frequently desirable to employ an eye glass lens having at least two focal points, such lenses, as hereinbefore stated, being known as bi-focal lenses. Such lenses are formed, as will be understood by reference to Figure IX, by grinding one portion 4 thereof with a greater radius of curvature than the portion 5 thereof.

In Figure III, the concave surface 2 is interrupted by an annular depression 6, which, transversely considered, is curvilinear, and which has a less radius of curvature than the concave portion 2 of the grinding tool.

The radius of curvature and the depth of the depression 6 may be varied at will.

In Figure IV, I have shown a construction which is provided with a depression 7 at the center of the grinding surface 2, which construction of tool may be employed, if desired, instead of either of the constructions of tools shown in Figures I, and II or III.

In the grinding of lenses upon tools such as are shown in Figures I, II, III and IV, the radius of curvature of the convex side of the portion 4 thereof will be equal to the radius of curvature of the concave portion 2 of such grinding tools.

The portion 5 of the said lens when ground upon the grinding tool shown in Figure III will have a radius of curvature equal to that of the depression 6 of the said tool, such radius of curvature differing from that of the portion 4 thereof, as previously stated.

In grinding a lens upon a tool, such as is shown either in Figures I and II or IV, a lens is taken having any particular radius of curvature desired but differing from the radius of curvature of the concave portion 2 of the tool and by grinding the same upon either of the tools, the convex portion 4 thereof will be made to assume the same radius of curvature as that of the concave surface 2 of the

tool, while the portion 5 thereof will still have its original curvature. A lens ground on either of these tools is completed by polishing off or smoothing the line which separates the portions 4 and 5 of the lens.

In grinding a lens upon a tool such as is shown in Figure III, a piece of glass is taken and ground upon said tool until its surface presents a contour corresponding to the concave surface of the said tool.

In the operation of grinding the lenses upon the tools shown in Figures I to III, inclusive, it will be necessary that the lens be made to rotate about a transverse axis independently of the rotation of the tool upon which it is being ground in order that the portion 5 thereof may be substantially circular in outline.

When a lens is being ground upon either of the tools shown in Figures I and II or IV, the portion 5 thereof should be protected in any suitable manner so as not to come into contact with the concave portion 2 of the tool.

In Figures V, VI, VII and VIII, I have shown tools corresponding to those shown in Figures I, II, III and IV, but being adapted to grind the concave surface of lenses, consequently the grinding surfaces 10 of the said tools are convex.

In Figures V and VI, these convex grinding surfaces are interrupted by circular or annular channels 11, deep enough to prevent the lens from coming into contact with its bottom. Such channel corresponds to the channel 3 shown in Figures I and II.

In Figure VII, the grinding surface 10 is interrupted by a concave, relatively shallow depression 12, corresponding to the depression 6 in Figure III. If desired, the depression 12 need not be concave, but may be replaced by a portion or section having a radius of curvature of convexity less than or greater than the portion 10 thereof.

In Figure VIII, I have shown a construction of tool in which a relatively deep depression 13 is provided substantially at the center. In grinding a lens upon this tool, it will be understood, of course, that a portion thereof is made to assume the contour or curvature corresponding to the main portion 10, and that the portion of the lens corresponding to the said depression 13 may be of any particular contour or curvature of radius desired.

In Figure X, I have shown a lens having a portion 14 which is convex, the said portion being located within or upon the concave surface 15 of the said lens. A lens of this character may be ground or formed upon a tool having the construction of any one of the forms of tools shown in Figures V to VIII, inclusive.

It may be found desirable, however, to construct a lens having a section or portion which is concave, the radius of curvature of the concavity of which is different from the radius of curvature of the concave surface 15 of the main portion of the lens instead of convex. This is accomplished by grinding a concavity in a lens at a desired point to any degree of curvature, after which said lens may be ground upon a tool such as is shown in Figures V and VI or VIII, such previously ground concave portion being kept in position opposite the channel 11 or the relatively deep depression 13.

In using the tools illustrated in Figures V, VI, VII and VIII, the operation is identical with that employed in the use of the tools shown in Figures I, II, III and IV. Consequently further description of such operation and use need not be given.

In the operation of grinding a lens upon any one of the tools illustrated, it is necessary to use a suitable powder, which is from time to time placed upon the grinding surface of the said tool, for instance, powdered emery. Water is employed, in consequence of which the powder employed is converted into a paste, which gathers or collects in the annular channels 3 and 11 and also in the depressions 7 and 13.

In order to cleanse the said channels and the said depressions, that is, in order to remove therefrom the collected paste, I have provided ports 16 leading to the outer edge or periphery of the tool. To cleanse the said channels 3 and 11 and the depressions 7 and 13, rotation of the tool is occasioned and at the same time water is poured into the said channels or depressions which escapes through the said ports under the influence of centrifugal force. The water thus escaping completely cleanses the said channels or depressions.

Having thus described my invention, I claim—

1. A tool for grinding bi-focal lenses having a grinding surface, and having also a relatively deep depression formed in the said tool, and interrupting the continuity of the said surface, and the said tool being provided with ports or openings which extend laterally from the said depression.

2. A tool for grinding bi-focal lenses comprising a head portion which is provided with a grinding surface and which is also provided with a circular or annular channel, which interrupts the said grinding surface, the said tool being provided with ports or openings extending from the bottom of the said channel to the outer edge of the said tool.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 16th day of June, A. D. 1905.

JOHN L. BORSCH, JR.

In presence of—
LAURA KLEINFELDER,
THOS. K. LANCASTER.