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APPARATUS FOR GRINDING TORIC LENSES.

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990,524. Patented Apr. 25, 1911.

Fig. 1.

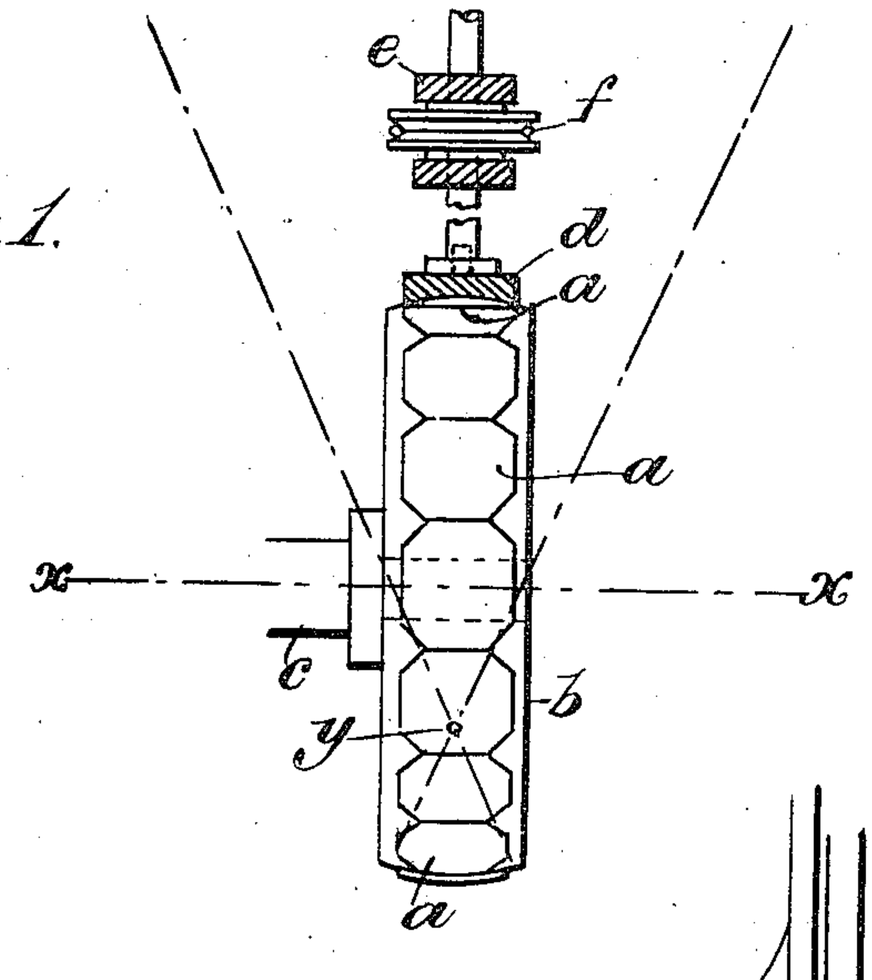
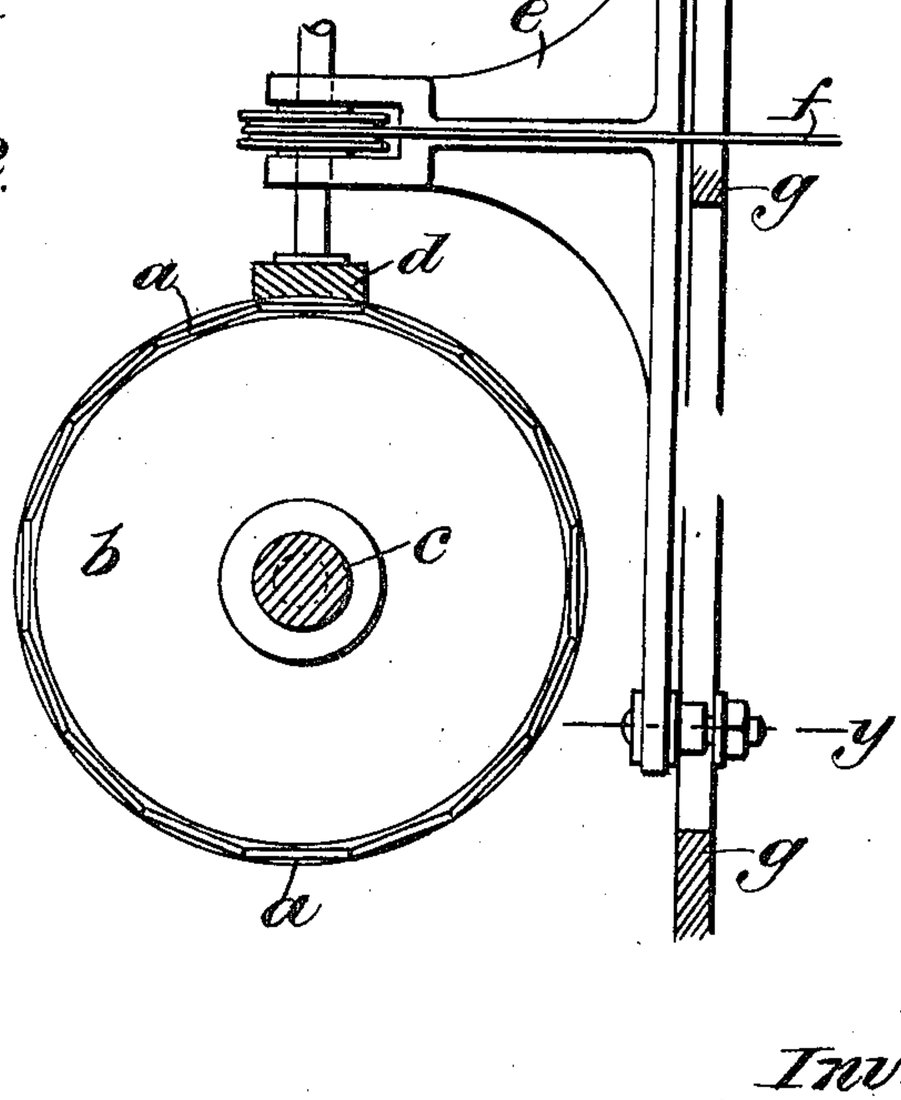


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR GRINDING TORIC LENSES.

990,524. Specification of Letters Patent. Patented Apr. 25, 1911.

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To all whom it may concern:

Be it known that we, STEPHEN DRUMMOND CHALMERS and HERBERT SIDNEY RYLAND, both subjects of the King of Great Britain, residing at Northampton Institute, Clerkenwell, London, England, have invented certain new and useful Apparatus for Grinding Toric Lenses, of which the following is a specification.

Our invention relates to a new or improved apparatus for manufacturing lenses which have a surface of double curvature and are known as toric lenses.

According to our invention, the lenses to be ground and polished, having been prepared, are cemented symmetrically about the axis of revolution or oscillation of a suitable bed, table, or other support in such a manner that one of the desired curves is produced by such rotation or oscillation. The other curve is produced by the motion of a radius arm or bracket which is centered on the desired axis and is held in the plane through the axis of revolution of the shaft. The actual polishing tool is carried by said radius arm or bracket so as to rotate.

In the accompanying drawings, one form of the apparatus is shown, it being understood that any suitable frame-work and gearing (whether manual or power) may be employed and the construction varied to suit circumstances.

Figure 1 is a front view and Fig. 2 is an end view partly in section.

As before stated, the lenses *a* are cemented symmetrically about the axis *x* of revolution or oscillation of a bed or table which in the example given comprises a disk *b* detachably fixed upon a suitable mandrel or shaft *c*. It will thus be seen that one of the desired curves will be that which is described from the axis *x*, so that the diameter of the disk *b* chosen should be that which would best suit the desired curve of the lenses. For producing the other curve, a rotary grinding and (or) polishing tool *d* is oscillating more or less in the direction of the axis *x*, the center *y* of oscillation being adjusted to give the desired curve. As shown, the tool *d* is mounted in bearings upon a bracket or radius arm *e* which may be reciprocated to a limited extent about the axis *y*, so that the speed of the tool is slightly greater or less than the peripheral speed of the work; for this purpose the arm *e* may conveniently derive its motion from some moving part of the mechanism. The means for rotating the tool *d*, such as the endless cord or band *f*, must allow of the oscillating motion of the arm *e*. Any suitable means may be employed for feeding the tool to and from its work.

The periphery of the disk *b* (or other bed or support for the lenses) is preferably formed approximately to the curves which will be produced by the combined motions of the disk shaft *c* and the arm or bracket *e*, the lenses being cemented to said curved surface. The working face of the grinding or polishing tool *d* is preferably spherical, of radius equal to the longer radius of the surface to be formed, the abrasive or polishing materials being supplied in the usual manner.

In the case where one or both of the curvatures is concave, the working face of the grinding or polishing tool is turned to the desired curve or the steeper of the two concave curves. Necessarily for concave work the lenses would be mounted upon the internal periphery of the drum, ring, or cup bed, while the axis *y* of the oscillating arm *e* would be located nearer to the work than the axis *x*.

Prior to cementing the lenses to the bed, they may be shanked to shape and roughed in cylindrical tools of approximately the required curvatures.

By adjusting the axis *y* of the arm *e* horizontally (such as by sliding the support *g* in a horizontal direction more or less as required) lenses may be produced in which one of the curvatures continually increases from end to end.

We claim:—

1. An apparatus for manufacturing toric lenses comprising a rotatable support adapted to carry a single row of lenses upon its periphery, a rotatable tool arranged in operative relation to said support and having its axis disposed at right angles to that of the latter, and an oscillatory support for said tool arranged for movement at right angles to the direction of motion of the rotatable support.

2. An apparatus for manufacturing toric lenses comprising a rotatable support adapted to carry a single row of symmetrically-arranged lenses upon its periphery, a rotatable grinding tool arranged in operative

relation to said support and having its axis disposed at right angles to that of the latter, said tool having a curved grinding face, the radius of which is different from that of said support, and an oscillatory support for said tool arranged for movement at right angles to the direction of motion of the rotatable support.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

STEPHEN DRUMMOND CHALMERS.
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Witnesses:
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