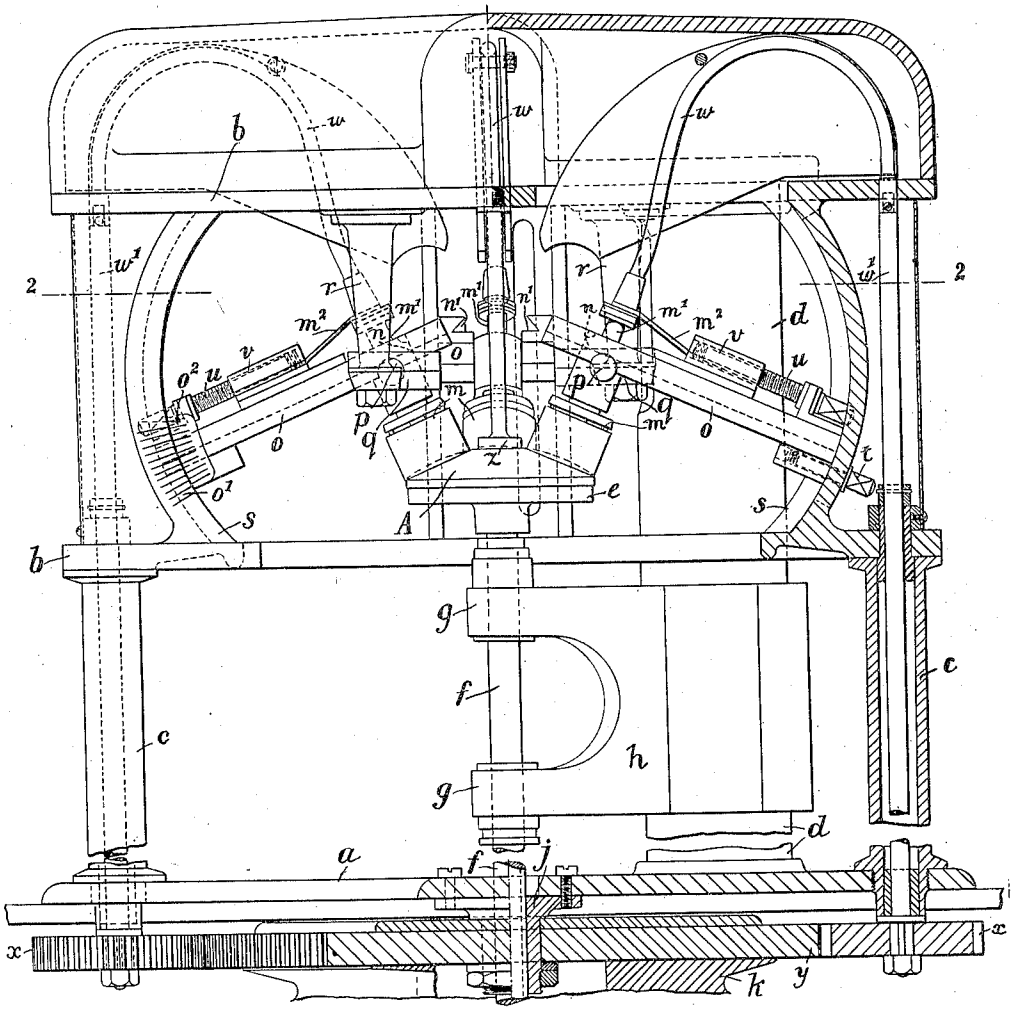
March 2, 1926. 1,575,311

M. BENTZON

MACHINE FOR GRINDING LENSES

Filed July 5, 1921 3 Sheets-Sheet 1

Fig. 1.



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Filed July 5, 1921 3 Sheets-Sheet 2

Fig. 2.

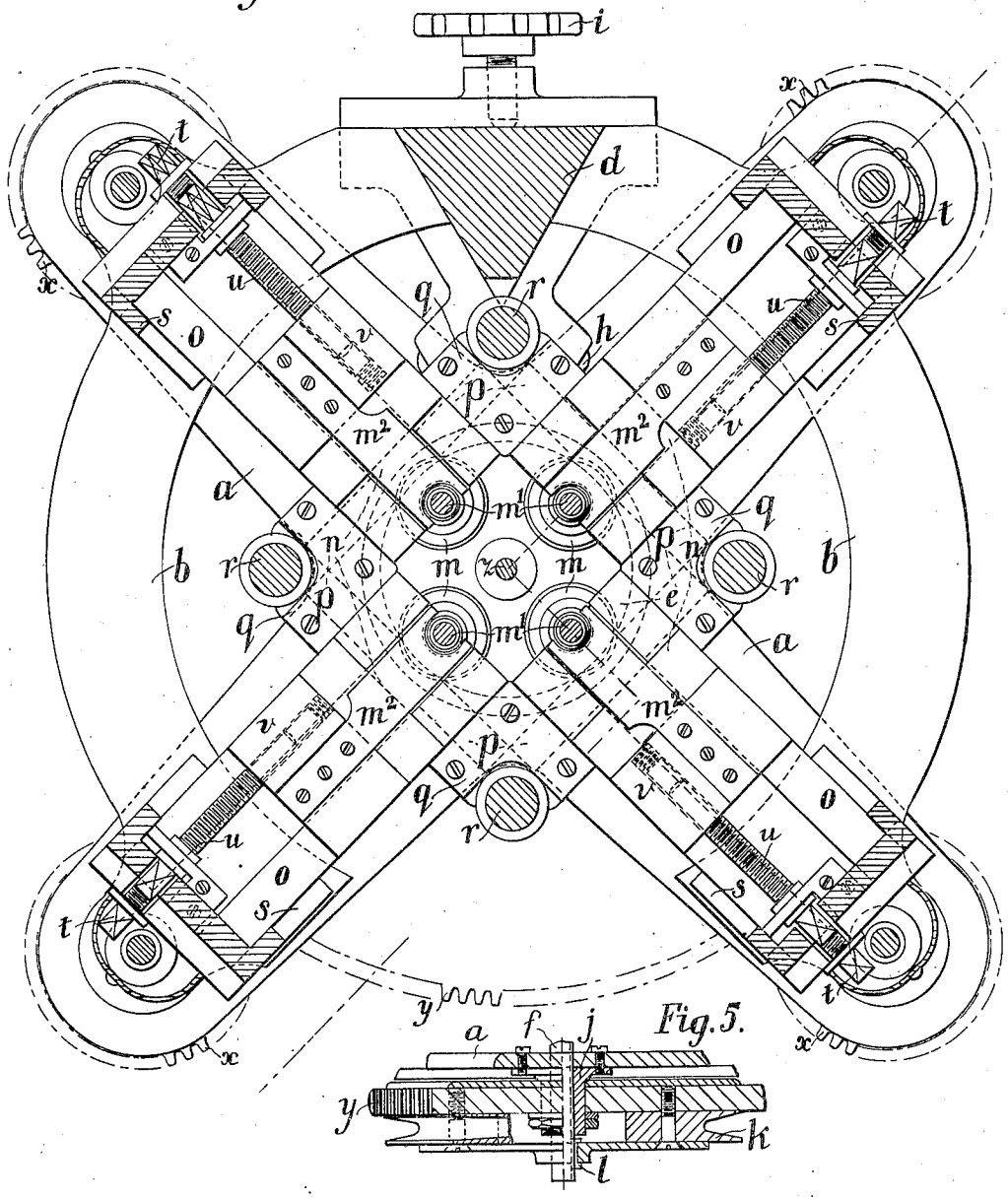


Fig. 5.

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Filed July 5, 1921 3 Sheets-Sheet 3

Fig. 3.

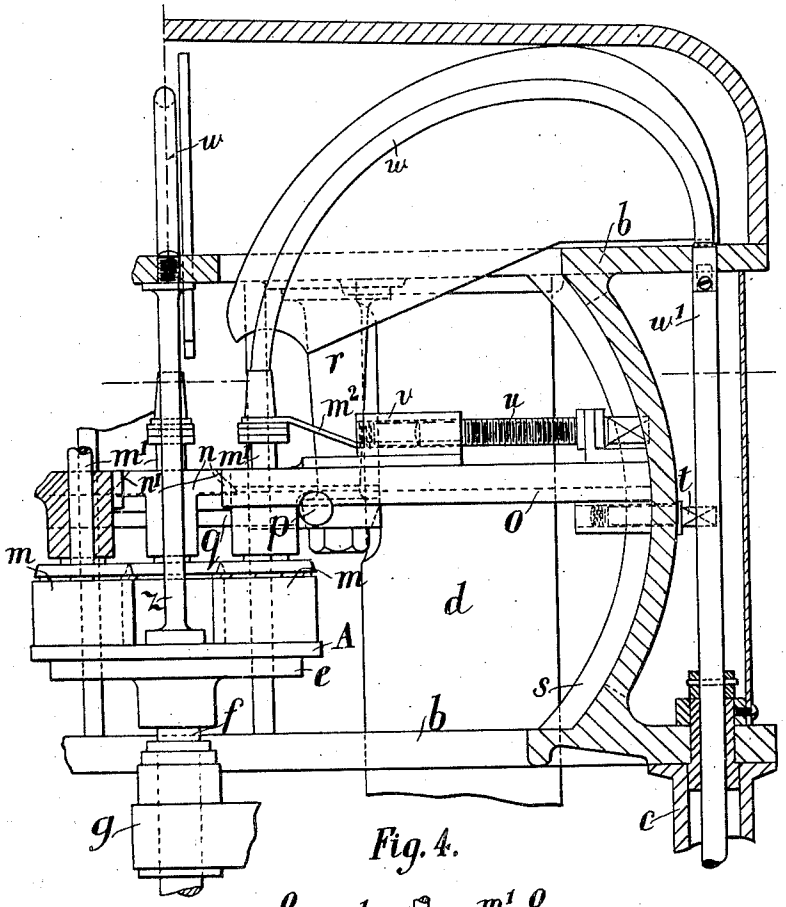
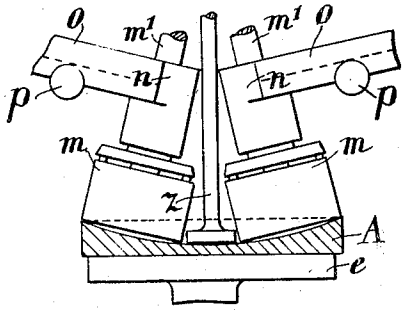


Fig. 4.



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UNITED STATES PATENT OFFICE.

MALCOLM BENTZON, OF NEUILLY-SUR-SEINE, FRANCE.

MACHINE FOR GRINDING LENSES.

Application filed July 5, 1921. Serial No. 482,438.

To all whom it may concern:

Be it known that I, MALCOLM BENTZON, a subject of the King of Denmark, residing at 41 Avenue de Neuilly, Neuilly-sur-Seine, Paris, France, have invented new and useful Improvements in Machines for Grinding Lenses, of which the following is a specification.

My invention relates to machines for grinding bi-focal lenses, and is especially designed for smoothing and polishing, although it can also be used for roughing purposes.

In the specification of my former British Patent No. 18,109, of 1910, there is described a machine for grinding plano bi-focal lenses, such machine consisting of a rotating lens-holder in combination with a series of grinding discs which are carried on spindles mounted in a stationary head and driven by flexible shafts. The main object of the present invention is to adapt a machine of this type to the grinding of convex and concave lens surfaces, for example, for meniscus and cylindrical lenses.

According to the invention each of the grinding discs is carried by a holder mounted on a radially disposed arm, which is pivoted to the stationary head so that its angle can be adjusted in a vertical plane. The adjustment can be controlled in any convenient way, say, by the use of a vernier scale or by the employment of standard templates or gauges. Furthermore, the grinding disc holder can be adjusted longitudinally in the arm which carries it, this being effected, for example, by means of an adjusting screw, for the purpose of enabling the position of the grinding disc to be varied in the radial direction.

As will be understood, the grinding discs are rotated through the medium of flexible shafts, and these flexible shafts are advantageously carried between pairs of guide plates or the like.

In conjunction with the grinding discs, I may also employ a central stop which is fixed in the stationary head, and against which the centre of the lens surface to be ground is caused to contact, when the machine is set for grinding.

To enable the invention to be fully understood, I will describe it by reference to the accompanying drawings, in which:—

Figure 1 is a sectional elevation of a machine for grinding bi-focal lenses, constructed in accordance with the invention.

Figure 2 is a horizontal section on the line 2—2, Figure 1, but showing the parts in a different position.

Figure 3 is a sectional view similar to the right hand portion of Figure 1 but showing the parts in the same position as in Figure 2.

Figure 4 is a view showing another position of some of the parts.

Figure 5 is a view of a detail drawn to a smaller scale than the rest of the figures.

The frame of the machine advantageously comprises a base *a* and a head *b*, the latter being supported on the said base by four pillars *c* and a pillar *d*, the pillars *c* being equi-distant from the vertical centre of the machine and from one another, whilst the pillar *d* is arranged intermediate of two of the pillars *c*. *e* is the holder mounted on the spindle *f* for supporting the lens A being treated, the axis of which holder is coincident with the vertical centre of the machine. This spindle is carried in bearings *g* on the bracket *h* which latter is adjustable vertically on the pillar *d* to which it can be clamped by a set-screw *i*. The spindle *f* also passes through a bearing *j* on the base *a*, which bearing also serves as a pivot or bearing for a pulley *k* designed to rotate the said spindle through the medium of the key *l* (see Figure 5) which engages an extended keyway in the spindle *f* to allow of the vertical movement of the latter when the bracket *h* is adjusted on the pillar *d*.

m indicates the grinding discs and *n* the holders carrying each of the said discs through the medium of the shafts m^1 which are pressed upon by springs m^2 to impart pressure to the said discs in the usual way. *o* indicates the arms carrying the holders *n* which arms are arranged radially with respect to the axis of rotation of the lens-holder *e*, and *p* are the pivots on the said arms whereby the latter are pivoted to the head *b* so that their angle in the vertical plane can be adjusted, the said pivots being

in the form of trunnion pins engaging bearings q supported by pillars r depending from the head b. The outer ends of the arms o work in conjunction with graduated scales o^1 on curved portions s of the head b and to which portions they can be clamped by screws t passing through slots in the said curved parts s. The said arms may be provided with vernier scales o^2 at their ends, as shown in Figure 1, to enable very fine angular adjustments of the arms o to be made. Instead of the scales o^1 on the portions s of the head b, standard templates or gauges may be provided for determining the angular positions of the arms o.

The holders n carrying the guiding discs m are arranged to slide in the arms o to allow of their longitudinal adjustment relatively thereto, the said arms being provided with V-grooves n^1 with which the correspondingly shaped sides of the holders engage. This adjustment is conveniently effected by screws u carried in bearings on the arms and engaging fixed nuts v on the holders.

w indicates the flexible shafts for driving the shafts m^1 of the grinding discs m, the said shafts w being connected to vertical shafts w^1 located in bearings in the pillars c and carrying at their lower ends spur pinions x gearing with a common spur-wheel y integral with, or secured to, the pulley k. It will thus be seen that the pulley serves for rotating both the lens-holder e and the grinding discs m.

z is the central stop which is fixed to the head b and against which the center of the surface of the lens A is caused to contact when the machine is set for grinding, as indicated in Figures 1 and 3.

In Figure 1 it will be seen that the arms o are inclined so that they can grind or polish the convex surface of a lens A whilst in Figure 4 they are inclined so that they can grind or polish a lens having a concave surface. Figure 3 shows the arms o in position for grinding or polishing a flat surface.

Claim:

A lens grinding machine of the kind hereinbefore referred to, comprising a lens holder, a plurality of grinding discs designed to act upon one only of the two lens surfaces, means whereby each grinding disc can be presented to the lens at the angle required to grind or polish convex or concave surfaces thereon and a stop to contact with the centre of the lens to determine the grinding position therefor.

MALCOLM BENTZON.