Nov. 10, 1925. 1,561,107

H. K. PARSONS

LENS GRINDING MACHINE

Filed July 1, 1921 2 Sheets-Sheet 1

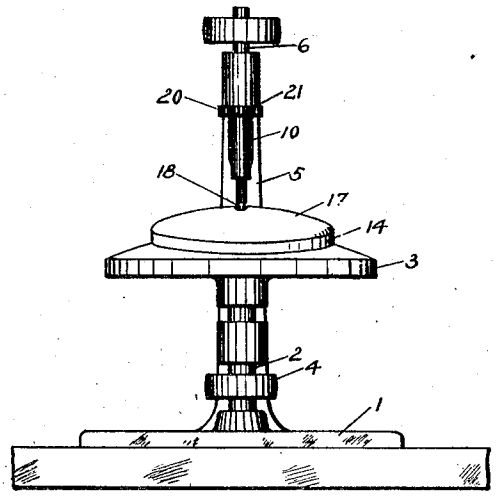


FIG. I

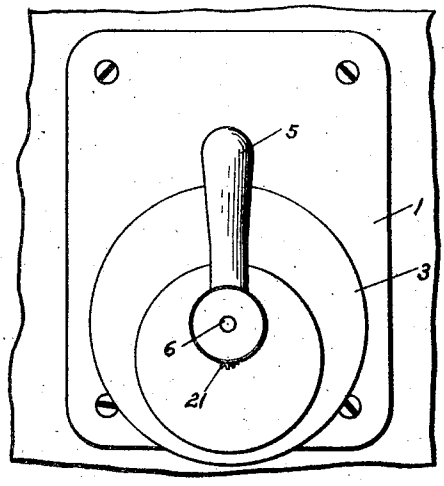


FIG II

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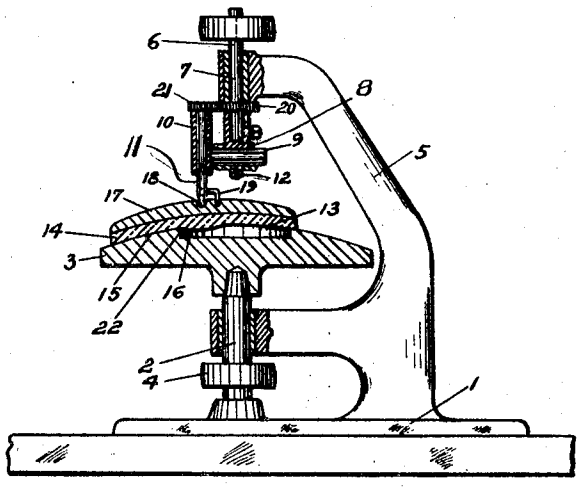


FIG. III

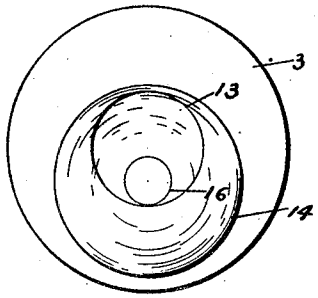


FIG. IV

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Patented Nov. 10, 1925. 1,561,107

UNITED STATES PATENT OFFICE.

HAROLD K. PARSONS, OF SOUTHBRIDGE, MASSACHUSETTS, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

LENS-GRINDING MACHINE.

Application filed July 1, 1921. Serial No. 481,812.

To all whom it may concern:

Be it known that I, HAROLD K. PARSONS, 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 Machines, of which the following is a specification.

This invention relates to improvements in lens-grinding machinery and has particular reference to a novel and improved construction of machinery especially adapted for use in the formation of multifocal lenses.

One of the principal objects of the present invention is the provision of a machine which will satisfactorily produce the distance portion of a multifocal lens of the target blank type and will ensure true curves on said distance portion and eliminate the liability of formation of distorted curves thereon.

A further object of the present invention is a machine which shall obtain the most satisfactory cross grinding or break up motion in the production of a surface of this character and at the same time will very accurately work up to the exact edge or line of division between the several focal surfaces of the lens.

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 front elevation of my improved machine.

Figure II represents a plan view thereof.

Figure III represents a vertical sectional view, and

Figure IV represents a diagrammatic view illustrating the relationship of the lens and tool during the grinding operation.

In the drawings, the numeral 1 designates the main base or frame of my machine having mounted thereon the spindle 2 carrying the lens-grinding tool 3. This spindle 2 may be either stationary or rotated as desired. If rotated, power is applied to the pulley 4 for driving the spindle in the usual manner.

Rising from the frame 1 is the standard or bracket portion 5 carrying the upper lens-driving spindle 6 journaled in the portion 7 of the bracket. This spindle depends through the portion 7 and has secured on its lower end the section 8 of a telescoping bracket arm. This arm has a second portion 9 provided with a sleeve 10 in which is journaled the drive spindle 11. A set screw or suitable locking device 12 serves to secure the two bracket arm sections in desired relatively adjusted position. It is to be noted that the spindles 6 and 2 are axially aligned one with the other so that the general grinding action is the same whether the spindle 2 be rotated or stationary, the only difference being that there is a speedier relative movement of the parts when both spindles are rotated in opposite directions.

In the operation of my improved machine the lens grinding tool is formed with the central recess or cut away portion 13 which is in the form of a pronounced recess entirely out of engagement with the overlying portion of the lens blank 14. The lens blank 14 is in the form of a disc intended to be ground as a target to produce a multifocal lens having one curve at the point 15 and a second different curve or curves as at the point 16. This blank is carried by a holder 17 having a recess 18 to receive the lower end of the spindle 11, and in addition having a suitable interlocking connection 19 with the spindle so that it is rotated thereby in addition to being carried around in a circular path about the spindle as a center by the action of the bracket arm. This rotation of the spindle 11 is accomplished by planetary gearing comprising the central gear 20 removably secured on the lower end of the sleeve 7 and the pinion gear 21 in mesh with the gear 20 and on the upper end of the spindle 11. The meshing of the teeth of these two gears is such as to allow a certain latitude of in and out movement of the sleeve 10 and associated parts with respect to the spindle 6 and still maintain the gears in operative position. If it is desired to increase this adjustment, it is merely necessary to remove the gear 20 and substitute a gear of slightly larger diameter.

The purpose of the adjustment of the bracket arm is to allow the lens blank 14 to be laterally shifted in and out as desired with respect to the edge 22 of the recess in the grinding tool, this shifting in and out varying the diameter of the portion 16 of the lens blank which fits within the recess and is not operated upon by the tool 3. In other words, this varies the diameter of the reading portion of the target.

In operation a tool with suitable curve having been mounted on a spindle 2, the lens blank is placed over the tool and adjusted to desired relation as will be best understood by reference to diagrammatic view of Figure IV bringing out the relationship of the lens and tool. Power is then applied to the machine, and rotation of the member 6 will through the bracket arm carry the lens holder and lens around in a circle while at the same time the pinion 21 rotating on the gear 20 will cause the lens to spin about the spindle 11 as a center. This point will, therefore, be the center of the circumscribing circle of the reading portion, and the pin-driving action thus accomplished will continuously present a new point on this surface against the line or edge 22 of the tool so that this surface will be properly positively abraded equally at all points and a finely finished surface directly up to the edge will be secured. At the same time the relative size of the parts is preferably such that the lens blank overlaps the recess and extends partially over the opposite side of the tool so that the lens is perfectly balanced on the tool 3 and the proper spherical curve is reproduced on the distance portion, while a continuous relative edging movement of the portions of the lens and tool coming into contact is obtained breaking up any possible scratching effects or the like which might occur were the lens only drifting in place of being positively driven. Also by the lens being rotated and largely in engagement with one side of the tool and the tool rotated in the opposite direction, the positive drive counteracts the tendency of the lens to go with the tool and opposes the movement of the parts, ensuring much more rapid abrading action.

I claim:

1. A machine for grinding multifocal lenses comprising a tool provided with a central recess on its surfacing face, a spindle concentrically mounted for rotation above the tool, a sun gear secured adjacent the lower end of the spindle, an adjustable bracket arm secured to the lower end of the spindle, the length of said bracket arm being less than the radius of the recess in the tool, a work holder mounted for rotation in the bracket arm, and a pinion secured to the work holder shaft and meshing with the sun gear.

2. A lens-grinding machine, including a bracket, a spindle carried by the bracket having a bracket arm, a sub spindle rotatably mounted in the bracket arm and provided at its lower end with a lens-holder-engaging member, a sun gear carried by the bracket and a pinion on the lens-holder-engaging spindle in mesh with the sun gear for spinning the spindle as the main spindle and bracket arm are rotated, said bracket arm having an adjustable telescoping portion for varying the lateral position of the lens-holder-engaging spindle.

In testimony whereof I have affixed my signature.

HAROLD K. PARSONS.