L. W. BUGBEE.

DRILL.

APPLICATION FILED JAN. 9, 1915.

1,175,121.

Patented Mar. 14, 1916.

2 SHEETS—SHEET 1.

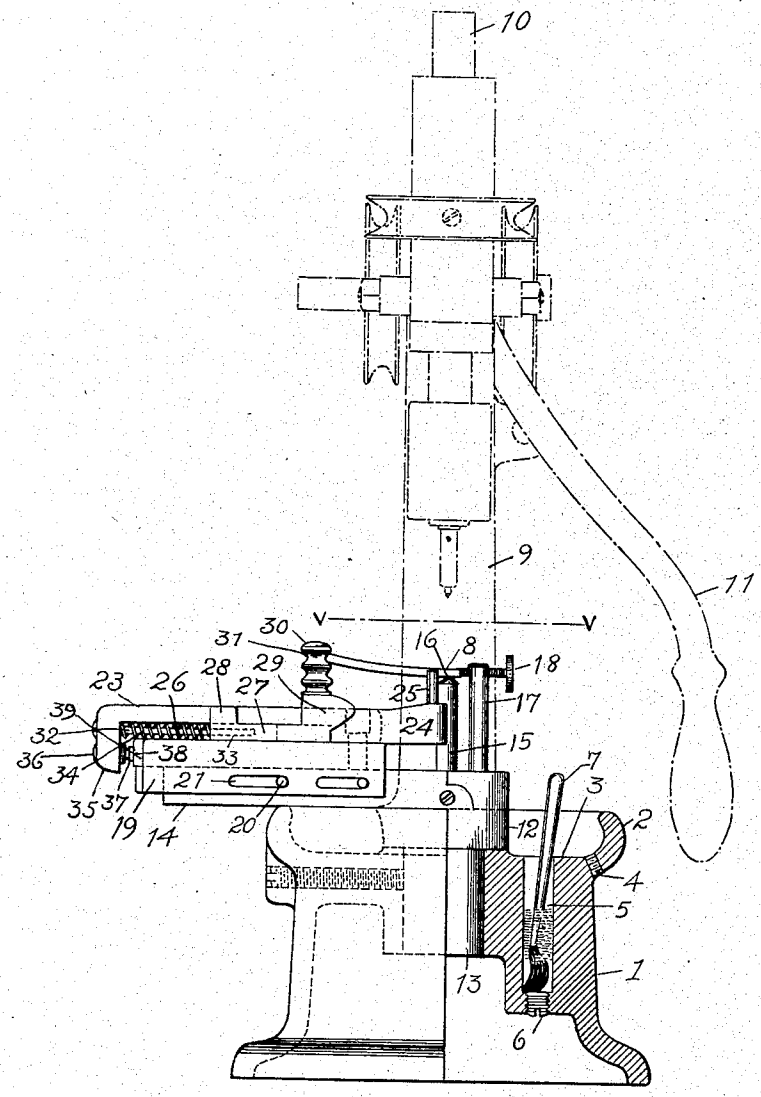


FIG. I

WITNESSES:

Joseph J. Downey

Arthur Jackson

INVENTOR

LUCIAN W. BUGBEE

BY

~~H.H.~~ Stytt & ~~H.K.~~ Parsons

ATTORNEYS

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

L. W. BUGBEE.

DRILL.

APPLICATION FILED JAN. 9, 1915.

1,175,121.

Patented Mar. 14, 1916.

2 SHEETS—SHEET 2.

FIG. II

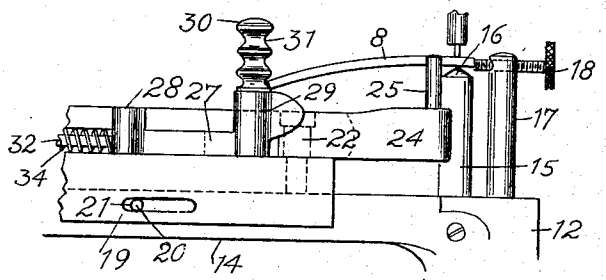


FIG. III

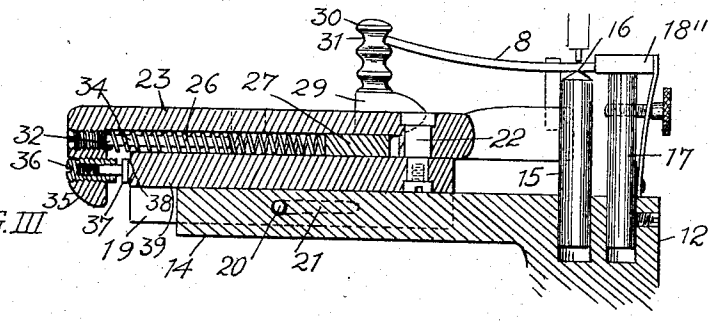


FIG. IV

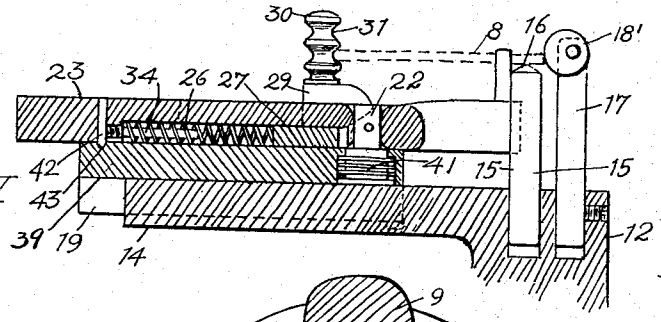


Fig VI

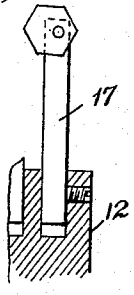
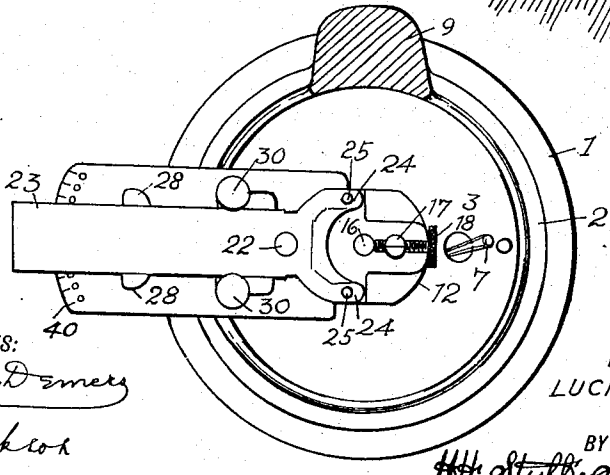


FIG. V



WITNESSES:

Joseph J. Demers

Arthur Jackson

INVENTOR

LUCIAN W. BUGBEE

BY

H. H. Stylle & A. K. Parsons

ATTORNEYS

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LUCIAN W. BUGBEE, OF SOUTHBRIDGE, MASSACHUSETTS, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS.

DRILL.

1,175,121. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed January 9, 1915. Serial No. 1,439.

To all whom it may concern:

Be it known that I, LUCIAN W. BUGBEE, 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 Drills, of which the following is a specification.

This invention relates to improvements in drills, and has particular reference to an improved type of drill especially adapted for use in the drilling of ophthalmic lenses.

One of the objects of this invention is the provision of a simple, inexpensive and durable construction in which the parts are so arranged that either flat, concave or convex surfaces may be satisfactorily drilled substantially normal thereto without the necessity of any adjustment of the parts of the drill.

A further object of the invention is the provision of an improved machine of this character in which the work will at all times be satisfactorily supported immediately beneath the drill irrespective of the curvature of the work.

Other objects of the invention include a simplification of construction, arrangement and operation of parts, substantially as hereinafter described, and it will be understood that any modifications may be made falling within the scope of the appended claims without departing from or exceeding the spirit of this invention.

Figure I represents a front elevation of the drill. Fig. II represents an enlarged fragmentary elevation with a lens in position. Fig. III represents a sectional view of the parts shown in Fig. II with the lens in reversed position. Fig. IV represent a view similar to Fig. III of a modified form of construction. Fig. V represents a sectional view on the line V—V of Fig. I. Fig. VI represents a detailed view of a modified form of abutment or stop.

In the drawings, in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 1 designates the base of the machine having at the upper portion thereof the flange 2 providing the tank 3 to receive superfluous mélange and products of drilling. If desired, an outlet may be provided for the tank 3 normally closed by a plug 4 which may be removed when desired to drain the tank. In addition the tank is preferably provided with the well or reservoir 5 into which the mélange will drain, said reservoir being closed at the lower end of a plug 6 and being adapted to receive a brush 7, by which a small portion of the mélange may be dipped out of the well 5 and placed on the lens 8 to be drilled.

Rising from the base 1, preferably at the rear thereof, is a standard 9 having suitable bearings for the drill spindle 10 and bearing the handle 11 suitably engaging the drill spindle to reciprocate the same. Rising from the base centrally of the tank 3 is the boss or flange 12 which preferably extends at least as high as the flange 2, while passing downward through the boss is the stud 13 bearing on its upper end the table 14 having a portion 15 interlocking with the boss or flange 12. Rising from the table 14 in axial alinement with the drill spindle 10 is a post 15 having a tapering or pointed upper portion 16 adapted to provide a rest for the lens 8, while adjacent the post 15 is a second post 17 bearing an adjustable screw 18 located just above the point 16, to engage the edge of the lens and limit the inward movement thereof. If preferred, in place of the screw 18 a plain cam 18′ as shown in full lines in Fig. IV may be used for the stop, or an eccentrically mounted star wheel such as is illustrated in Fig. VI, a spring washer, set screw or the like locking the stop against accidental rotation.

Mounted on the table 14 is a slide 19 having its movement limited by the pin 20 secured in the table and projecting through the slot 21 of the slide. This slide has pivoted thereon, as at 22, the lens holding arm 23, having a furcated inner end providing the jaws 24, from which rise the pins 25 for engaging the inner end of the lens.

In the preferred embodiment of this invention, the outer portion of the lens arm 23 is relieved or cut away to provide between said arm and the slide 19, the space 26 in which rides the slide 27, having the lugs 28 and 29 engaging opposite sides of the arm 23 to insure the correct positioning of the slide. The lug 29 has rising therefrom the turret 30, provided with a plurality of annular grooves 31 which are adapted to receive the outer end of a lens. It will thus be seen that the pins 25 in combination with the turrets 30, serve to engage the edge of a lens at four points and thus to in-

sure proper geometrical centering of the same on the lens arm 23. To hold the lens in position on the arm any suitable mechanism may be employed, that here shown consisting of the guide 32 extending into a recess 33 in the clamp slide 27 and having mounted thereon the spring 34, yieldingly forcing the clamp slide inward into position to engage and hold the lens against the pins 25, as is clearly illustrated in Figs. II and III.

The operation of the drill and particularly the ease with which toric lenses or the like may be drilled, will be best understood by reference to Figs. II and III, from which it will be seen that when a strong toric lens for example is to be drilled, the clamp slide 27 is suitably drawn back as by engagement with one of the pairs of lugs thereof a sufficient distance to permit of the insertion of the lens between the pins 25 and the turrets 30. If it is desired to first drill through the convex surface the outer end of the lens is placed in the lowermost groove 31 of the turret while the inner end of the lens is rested on the point 16. The relation of the lowermost groove 31 and the point 16 is such as to bring the lens in exactly correct position for drilling. To drill the other side of the lens to complete the aperture it is then merely necessary to disengage the lens from the centering pins and turrets and turn the same over, in this instance, however, the outer end of the lens being placed in the uppermost groove 31 in place of the lowest, bringing the lens into the position shown in Fig. III.

In those instances where it is desired to drill a plano lens as has been indicated in Fig. IV, the lens is placed for both sides in the middle groove, this groove being disposed substantially on line with or with its center just above the point 25 so that the lens will be held normal to the axis of the drill spindle.

It has been previously mentioned that the lens arm 23 is pivotally mounted upon the main slide 19. The purpose of this is to allow of rotative adjustment in those instances where it is desired to drill the lens either above or below the longest geometrical axis thereof. In this event it is desirable that the lens arm and parts carried thereby be locked in their adjusted position. One means of attaining this adjustment is illustrated in Fig. III and a second means in Fig. IV. In Fig. III the arm 23 is shown as provided with a depending portion 35 having fitted thereinto the plug 36 bearing the yielding latch 37 adapted to be engaged in one of the plurality of serrations or notches 38 in the block 39 which is set into the rear of the main slide 19. These notches or the like 38 are preferably so arranged that each gives a definite amount of decentration of the lens at the point to be drilled, the degree of movement off center being preferably indicated by suitable graduations 40 on the upper face of the slide.

In that form illustrated in Fig. IV in place of the resilient latch member the pivot 22 may have a loose or rocking fit in either the arm or the slide, as indicated in Fig. IV, and may be engaged by a spring 41 tending to yieldingly hold the lens arm and the slide in tight engagement. When desired to vary the relative adjustment of the parts the outer end of the arm 23 may be raised against the pressure of the spring 41 sufficiently to draw the locking pin 42 out of engagement with the notch 43 in the slide, when the arm may be rotated about the post 22 to desired adjusted position and there released when the spring 41 will draw the same downward to securely retain the pin 42 within the proper notch and thus lock the arm against accidental rotative movement.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of this improved drill should be readily apparent, and it will be seen that there has been provided a simple and efficient mechanism in which the various annular grooves in the turret or their equivalent will serve to take care of various configurations of lenses without the necessity of special adjustment of the contacting members or of the complete lens holder as has hitherto been deemed necessary, while at the same time the complete device may be readily rotarily adjusted to cause the drilling to take place in desired position relative to the geometrical axis of the lens.

I claim:

1. In a lens drill, the combination with a table, of a work engaging post rising therefrom, a lens holder mounted on the table adjacent the post and including a pair of fixed and a pair of movable lens engaging members, the said movable members being provided with a plurality of lens retaining points for engaging the outer end of the lens, whereby when the lens is in engagement with the post the angle thereof with the post may be readily varied, substantially as and for the purpose described.

2. A lens holding device for a drill, comprising a lens arm having a pair of plain spaced abutments, and a gripping slide resiliently carried by the arm, said gripping slide having a pair of lens engaging members provided with a plurality of spaced lens engaging portions for holding the lens in different angular positions, substantially as described.

3. In a lens drill, the combination with a work table, having a post rising therefrom, of a lens carrying arm mounted on the table

adjacent the post and provided with a pair of lens positioning members, a lens clamping slide movable relative to the arm, said slide having turrets rising therefrom each provided with a plurality of annular grooves arranged at different heights, the relative position of the work engaging post and the grooves being such that engagement of the outer end of the work in various grooves will vary the angular relation of the work to the line of operation of the drill, substantially as described.

4. A lens drill, including a reciprocable drill and a lens supporting post disposed therebeneath, a lens clamping member for coöperation with the post to support the outer end of the lens when the inner end is on the post, said lens clamping member having a plurality of abutments for holding the outer end of the lens at different heights relative to the inner end which is in engagement with the post, whereby the surface of the lens to be drilled may be brought substantially normal to the line of movement of the drill, substantially as described.

5. In a lens drill, the combination with a work table, of a slide mounted thereon, a lens carrying arm rotatably mounted on the slide, there being a recess between the slide and arm, a clamping slide mounted in the recess, means for resiliently forcing the clamping slide into operative position, and means for locking the carrier arm and clamping slide in rotatively adjusted position relative to the main slide.

In testimony whereof I affix my signature in presence of two witnesses.

LUCIAN W. BUGBEE.

Witnesses:
H. K. PARSONS,
JOSEPH J. DEMERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."