C. C. ALLEN.

LENS GRINDING MACHINE.

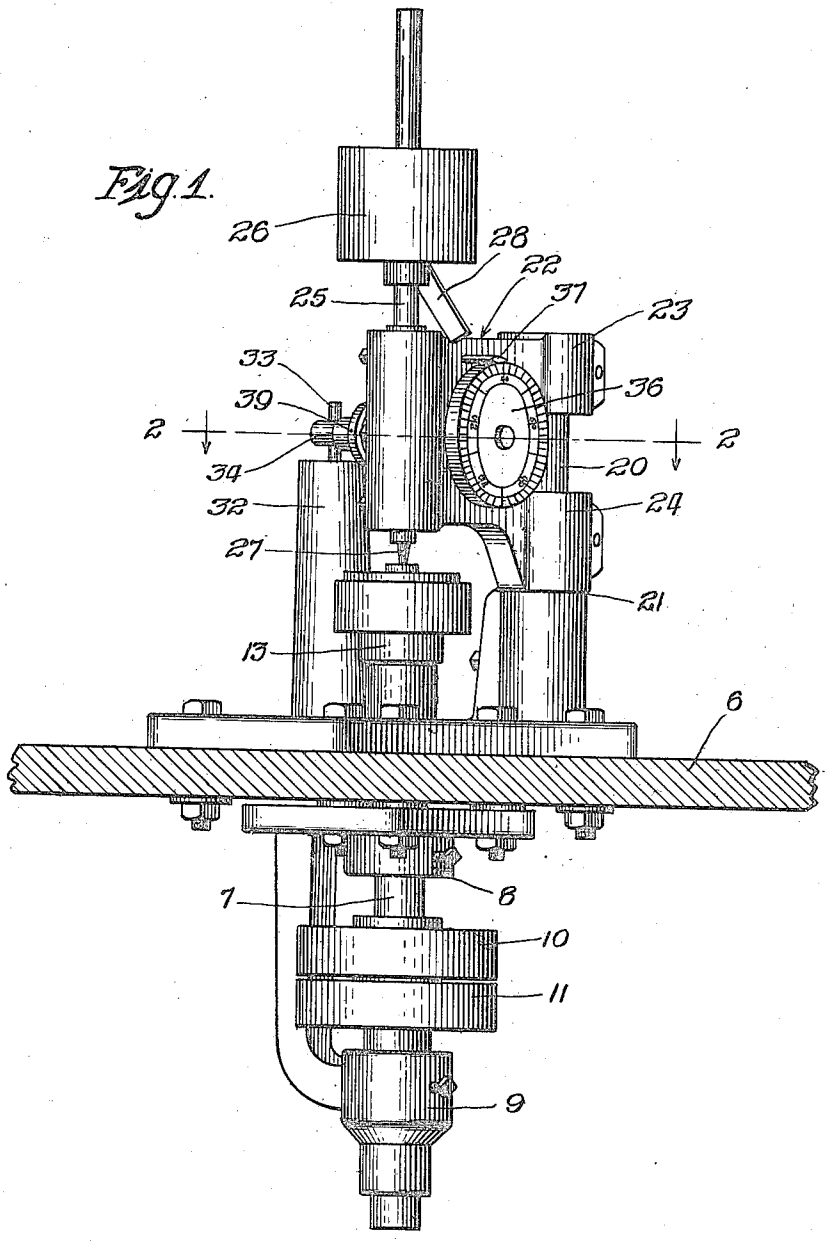
APPLICATION FILED APR. 15, 1916.

1,282,722.

Patented Oct. 29, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

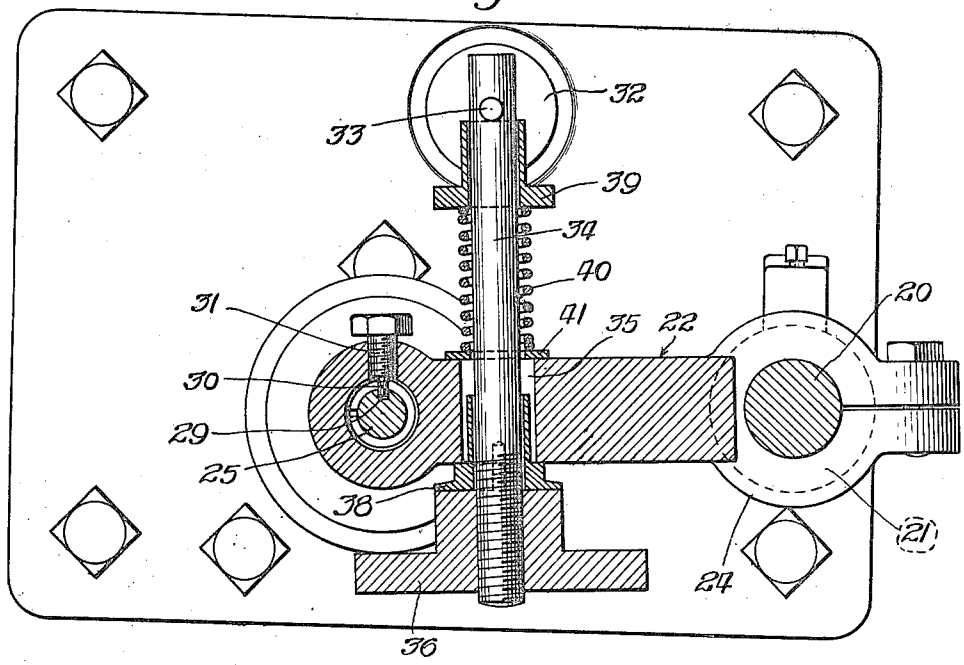


Fig. 3.

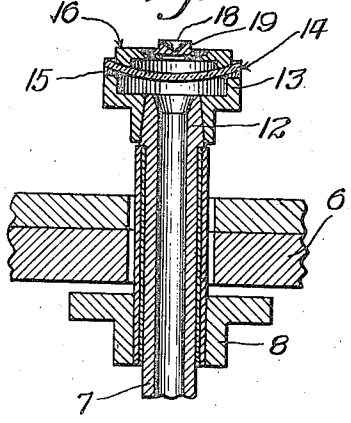


Fig. 4.

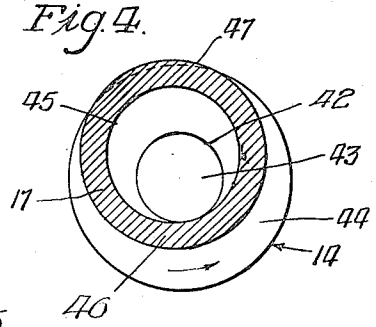
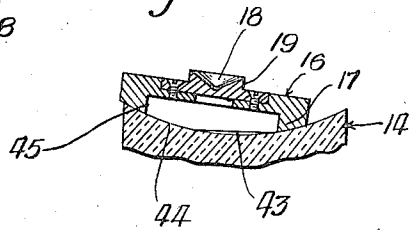


Fig. 5.



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UNITED STATES PATENT OFFICE.

CLILE C. ALLEN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW YORK LENS COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

LENS-GRINDING MACHINE.

1,282,722. Specification of Letters Patent. Patented Oct. 29, 1918.

Application filed April 15, 1916. Serial No. 91,455.

To all whom it may concern:

Be it known that I, CLILE C. ALLEN, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Lens-Grinding Machines, of which the following is a specification.

The present invention has to do with improvements in machines for grinding lenses, and is very well adapted for use in the grinding of lenses of eye-glasses, spectacles, and the like. The machine is also so constructed as to adapt it to the ready grinding of one piece bi-focal lenses, and certain of the features of the invention are particularly intended for use in this class of work. It will presently appear that the machine is not limited to the grinding of this particular class of product.

In grinding lenses, accuracy is a primary consideration, and any machine to be entirely successful for this class of work should be so constructed as to enable the operator to attain a high degree of accuracy in the finished product. One of the objects of the present invention is to so design and construct the machine that this result may be accomplished.

In the grinding of one-piece bi-focal lenses, it is very desirable to be able to so control the grinding of the reading and distance fields as to entirely eliminate the formation of any shoulder or the like at the line of joinder of the two fields. In other words, it is very desirable to be able to so control the grinding operation as to bring the two fields of vision together on a single line of joinder, the surfaces of both fields merging together in said line of joinder. If this result is not accomplished, it will be found that the completed product will present the objectionable or undesirable feature that a spectrum will be formed at the line of joinder, throwing rays of different color onto the eye of the wearer. This will distract the attention of the wearer and throw an unnecessary harmful strain upon the eyes. On the other hand, where the line of joinder between the two fields is perfectly made, no such spectrum will be formed.

Another object of the invention is to construct a machine wherein the grinding operations for the reading and distance fields may be individually effected, as distinguished from a construction in which both of these fields are simultaneously ground. This will make it possible for the operator to still more perfectly control the grinding operation. I will state, however, that certain features of the invention are not necessarily limited to use in a machine in which two grinding operations are separately performed, as distinguished from a machine in which they are carried forward simultaneously.

Other objects and uses of the invention will appear from a detailed description of the same which consists in the features of construction and combinations of parts hereinafter described and claimed.

Referring to the several drawings:

Figure 1 shows an elevation of the complete machine looking at the same in a direction substantially 45 degrees between its front and side portions;

Fig. 2 shows a horizontal section taken on the line 2—2 of Fig. 1, Fig. 2 being on considerably enlarged scale;

Fig. 3 shows a vertical section through the chuck head, crystal, and grinding lap, being also on enlarged scale as compared to Fig. 1.

Fig. 4 shows, in plan view, the relationship between the crystal and grinding lap used in the grinding of the distance fields; and

Fig. 5 shows in greatly enlarged vertical section the relationship existing between the crystal and the lap used in the grinding of the distance fields.

Referring to the several figures, the machine is conveniently illustrated as being supported on a table or the like 6. A spindle 7 is conveniently journaled in bearings 8 and 9, said spindle being provided with the fast and loose pulleys 10 and 11 respectively. It may thus be conveniently driven by a belt, or in any other suitable manner.

The upper end 12 of the spindle is tapered to receive a chuck head 13. Said chuck head is provided with a conical recess in its lower portion, adapted to evenly engage the tapered head 12. A crystal 14 is conveniently fastened to the chuck head 13 by means of cement or the like 15, in the usual manner.

Reference particularly to Figs. 4 and 5 shows in detail the construction of the annular grinding lap. This is the lap 16 having the annular depending flange or the like 17. On the upper portion of the lap is pro-

vided a cone-shaped recess 18, and said recess is conveniently illustrated as being formed in a removable block 19 set into the upper face of the lap.

In the grinding operation the annular lap is decentered with respect to the center of rotation of the crystal, so as to perform the grinding operation in the manner to be presently described. As a convenient construction for securing this decentration I have illustrated the following mechanisms: A post 20 is secured to a stationary portion. This post is provided with an upwardly facing shoulder 21, and the decentering block 22 is swingingly mounted on the post. For this purpose the decentering block is provided with the sidewise extending flanges 23 and 24 which may oscillate on the post, the lower flange 24 resting on the upwardly facing shoulder 21. In the front portion of the decentering block is mounted a pin 25 which is vertically slidable with respect to the block. On its upper end said pin carries a weight 26, and its lower end is conveniently pointed, as indicated at 27. This pointed lower end is adapted to seat into the conical recess 18 of the lap, for the purpose of decentering the lap and holding said lap at the desired position with respect to the center of rotation of the crystal. When it is desired to remove or replace the lap, the pin 25 may be raised, and then a stop bar 28 pivoted onto the pin or the weight, will swing down into a vertical position, so that, upon releasing the pin, said block will rest against the upper face of the decentering block and thus retain the pin 25 in raised position. In order to prevent rotation of the pin, the same is conveniently provided with a vertical groove 29 into which seats the end 30 of a screw 31.

To one side of the structure is another stationary post 32, having in its upper end a pin 33. Another pin 34 has its outer end pivoted on the pin 33, and its inner end passes through an opening 35 in the decentering block. A graduated hand wheel 36 is threaded on the outer end of the pin 34, a pointer or the like 37 on the decentering block giving an indication as to the amount of rotation of the graduated wheel. Interposed between the wheel and the decentering block is a flanged sleeve or collar 38, so that upon rotating the wheel the collar 38 will be caused to bear against the decentering block so as to force it backwardly. On the rear end of the pin 34 is a flanged collar 39 bearing against the pin 33. A spring 40 is mounted on the pin 34 between the flanged collar 39 and a washer 41, said spring tending at all times to move the decentering block forwardly so as to retain it firmly against the collar 38 and wheel 36. By means of the foregoing construction, the decentering block may be swung back and forth by the graduated wheel, the graduations on the wheel being a measure of the amount of swing thus occasioned.

When the decentering block stands at the initial position, the pointed lower end 27 of the pin 25 will lie exactly in line with the center of rotation of the crystal, and, consequently, the lap at such time will also be centered with respect to the center of rotation of the crystal. By rotating the graduated wheel, and thus swinging the decentering block, the pin 25 will be carried to one side, thereby decentering the lap by an amount indicated by the graduations. Thus the wheel gives at all times an indication of the amount of decentration.

Referring to Figs. 4 and 5, I will now explain more in detail the grinding operations and process, so that the operation of the apparatus will be more clearly understood. The crystal 14 is ordinarily of circular form, and, as previously stated, is secured to the chuck head 13. The circle 42 on Fig. 4 designates the desired line of joinder between the reading field 43 and the distance field 44. After these fields have been ground, the crystal may be cut into two parts, for the formation of two lenses of equal characteristics, in the manner well understood in the art.

Ordinarily the reading field 43 will first be ground, and then the distance field will be ground, by the use of the annular lap herein illustrated. For this purpose it is desired to so decenter said lap that its inner periphery 45 will be brought into exact registry with the line of joinder 42, or in some cases to slightly overlap said line of joinder. From a knowledge of the diameter of the reading field 43, and a knowledge of the diameter of the inner periphery 45, the amount of decentration necessary to bring about the desired registry can immediately be ascertained by the use of a table or by calculation. The graduated wheel may then be turned the desired amount and the grinding operation may be proceeded with.

As previously explained, the pin 25 may be retained against rotation by the screw 31, but the annular lap is permitted to rotate in its decentered position. When the crystal is driven or rotated the lap will follow at a different speed. If, for example, the crystal be driven in the direction of the arrow, in Fig. 4, the portion 46 of the lap lying most nearly adjacent to the line of joinder 42 will be in contact with a portion of the crystal of less radius than the portion 47 of the lap, which lies in contact with a portion of the crystal having a much greater radius. Inasmuch as the speed of the crystal on the short radius is proportionately less than its speed on the greater radius, it follows that the lap will rotate at an intermediate speed. Con-

sequently, the crystal will be rotating at a higher rate than the lap. Furthermore, it will be observed that, as the lap rotates, each portion of its grinding surface travels from a position near the line of joinder 42 out to a position adjacent to the edge of the crystal, and afterward returns to its initial position. Consequently, during each rotation of the lap, each portion of its grinding surface travels across all or a portion of the width of the distance field 44, and then returns to its starting point. In the meantime the crystal itself has rotated at a different speed from that of the lap, so that each portion of the grinding surface of the lap, after an infinite number of rotations of the crystal, will theoretically have come into contact with all portions of the distance field. It will be observed, however, that those portions of the grinding surface of the lap lying adjacent to the inner periphery 45 of said lap never reach as great a distance from the line of joinder 42 as do those portions of said grinding surface lying adjacent to the outer periphery 47, of the lap. It is, therefore, desirable to use a lap having a comparatively narrow annular grinding surface, and to allow said lap to slightly overlap the outer periphery of the crystal during the grinding operation.

In the operation of grinding the reading field 43, the same mechanism may be used as is used to support and decenter the lap used in grinding the distance field, but another lap of suitable shape, size and curvature will be used. Frequently, the lap used in grinding the reading field will be annular in shape, but of smaller size and different curvature than that used in the grinding of the distance field.

While I have herein shown and described only a single embodiment of my invention, I do not limit myself to the same, except as I may do so in the claims.

I claim:

1. In a lens grinding machine, the combination with a chuck head for the support of a crystal and means for rotating the same on a fixed center, of a stationary post having an upwardly facing shoulder, a decentering block swingingly mounted on said post, and resting against the shoulder and swinging on an axis parallel to the axis of rotation of the chuck head, a pin vertically slidable in the outer end of said block, said pin lying in axial alinement with the axis of rotation of the chuck head when the decentering block stands in a given position, a lap centered with respect to the lower end of said pin, another pin lying substantially at right angles to the decentering block, a fixed support for one end of said pin, a graduated wheel threaded on the other end of said pin and adapted to engage the decentering block, and a spring on said pin between said fixed support and the decentering block, for the purpose specified.

2. In a lens grinding machine, the combination with a chuck head and means for rotating the same, of a stationary post having an upwardly facing shoulder, a decentering block swingingly mounted on said post, and swinging on an axis parallel to the axis of rotation of the chuck head, a pin vertically slidable in the end portion of the decentering block, the lower end of said pin lying in the axis of rotation of the chuck head when the decentering block stands in a given position, a lap centered with respect to the lower end of said pin, a fixed support, an operative connection between said fixed support and the decentering block for swinging the decentering block on the stationary post, and means for indicating the instantaneous position of the decentering block, for the purpose specified.

3. In a lens grinding machine, the combination with a chuck head and means for rotating the same, of a decentering block, a pivotal mounting for the same permitting said block to swing on an axis parallel to the axis of rotation of the chuck head, a pin vertically slidable in the end portion of the decentering block, the lower end of said pin lying in the axis of rotation of the chuck head when the decentering block stands in a given position, a lap centered with respect to the lower end of said pin, means for swinging the decentering block under the control of the operator, and means for at all times indicating the instantaneous position of said block, for the purpose specified.

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Witnesses:
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