April 15 , 1924. 1,490,156

L. W. BUGBEE

LENS SURFACE CORRECTING DEVICE

Filed Nov. 5, 1919 2 Sheets-Sheet 1

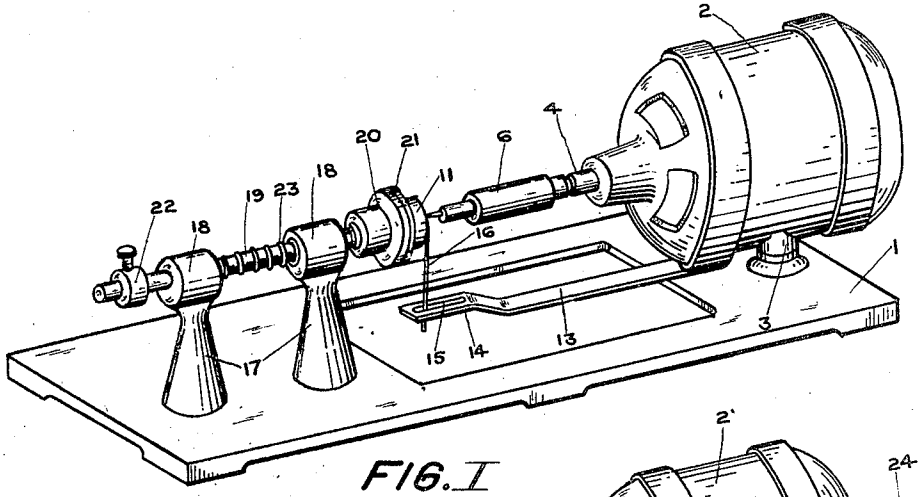


FIG. I

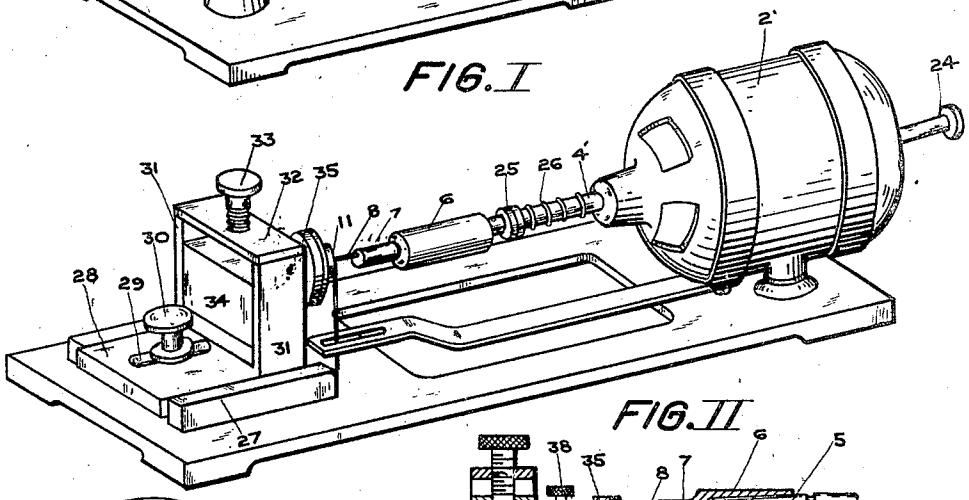


FIG. II

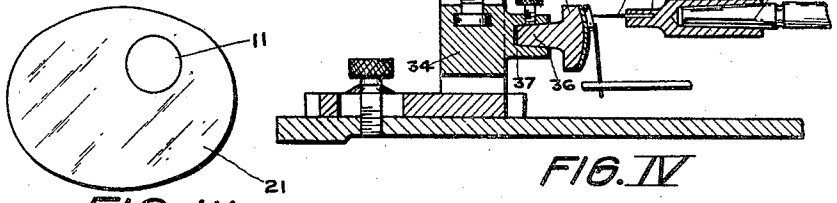


FIG. III

FIG. IV

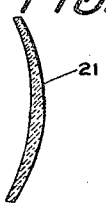


FIG. V

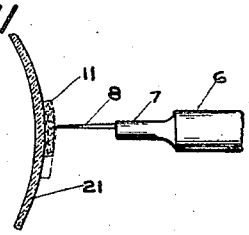


FIG. VI

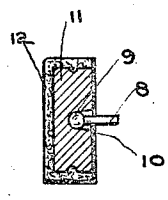


FIG VII

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April 15 , 1924. 1,490,156

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LENS SURFACE CORRECTING DEVICE

Filed Nov. 5, 1919 2 Sheets-Sheet 2

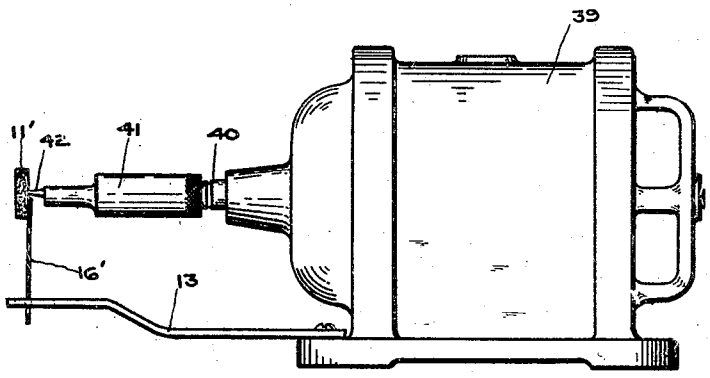


FIG. VIII

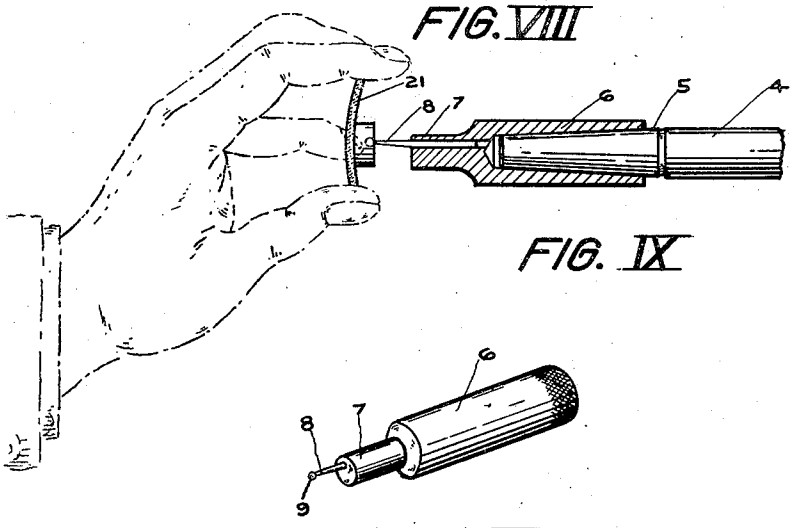


FIG. IX

FIG. X

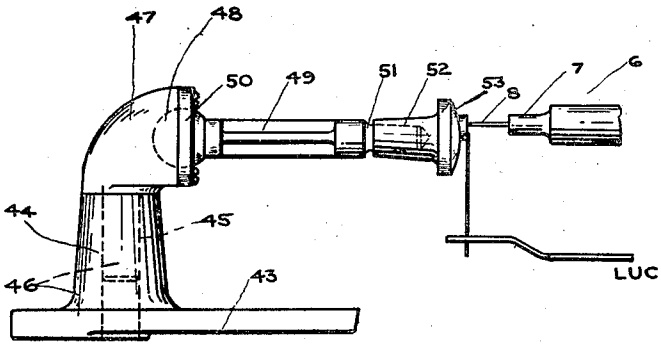


FIG. XI

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Patented Apr. 15, 1924. 1,490,156

UNITED STATES PATENT OFFICE.

LUCIAN W. BUGBEE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS.

LENS-SURFACE-CORRECTING DEVICE.

Application filed November 5, 1919. Serial No. 335,869.

To all whom it may concern:

Be it known that I, LUCIAN W. BUGBEE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Lens-Surface-Correcting Devices, of which the following is a specification.

This invention relates to a new and useful lens polishing machine and the leading object of the invention is the provision of a device whereby the roughened surface and all grooves, scratches, and the like caused by grinding or other action on the surface of the lens can be quickly and readily removed therefrom.

Another object of the invention is the provision of a polishing device whereby a lens is securely held in contact with a polishing button so that the roughened surface of the lens can be readily removed therefrom by the movement of the polisher over the surface of the lens, it being understood that rouge or other suitable polishing material can be used in this operation.

As stated above, it is the object of this invention to provide a machine whereby the roughened surface of a lens can be readily removed, and it will be understood that a further object of the invention is to carry out this operation with this improved device without interfering with or changing the foci of the lens as the movement of the polishing button over the surface of the lens will so distribute the polishing that the lens will remain practically the same as before.

A further object of the invention is the provision of means whereby the lens is supported in such a position that the polisher can be readily contacted therewith, and the polisher is so mounted as to provide for an oscillating movement over the surface of the lens thus distributing the polishing operation.

With the above and other objects in view, the invention consists in the novel features of construction and the combination and arrangement of parts hereinafter more fully set forth, described in the claims, and shown in the accompanying drawings, in which—

Figure I is a perspective view of a polishing device constructed in accordance with the invention.

Figure II is a similar view illustrating a modified form of the invention.

Figure III is a front elevation of a lens illustrating one position of the polishing button with respect to the lens.

Figure IV is a detail, transverse sectional view of one end of the device illustrated in Figure II.

Figure V is a transverse sectional view of a lens illustrating the roughened surface thereof which is to be removed by means of the improved polishing machine.

Figure VI is a transverse sectional view of a lens illustrating a position of the polishing button with respect to the lens.

Figure VII is a transverse sectional view of the polishing button.

Figure VIII is a side elevation of another form of polishing machine.

Figure IX is a side elevation of a portion of Figure VIII, parts thereof being broken away and illustrated in section, and also illustrating the position of a lens with respect to the polishing button.

Figure X is a detailed perspective view of the removable member which supports the polishing button, and

Figure XI is a detailed side elevation of still another form of the invention.

In the accompanying drawings, wherein the various numerals indicate several parts of the invention, the numeral 1 designates the base member of the machine, on one end of which is mounted a motor as illustrated at 2, said motor being preferably mounted upon a pivot 3 whereby the same can be rotated or swung to any desired position. The motor 2 is provided with a central shaft 4 which extends outwardly from one end thereof and is provided with a tapered outer end 5, and mounted upon this tapered end is a sleeve 6 provided with an inner tapering bore to correspond with the tapering end of the shaft 4 whereby this sleeve can be quickly and readily placed in position upon the tapered end 5 or removed therefrom.

Eccentrically mounted within the reduced end 7 of the sleeve 6 is a supporting pin 8, the outer end of which is provided with a

ball member 9 adapted to fit within a socket 10 formed in a metallic polishing button 11 whereby the button 11 will be loosely mounted upon the end of the pin 8, and as the pin 8 is eccentrically mounted upon the end of the sleeve 6, it will cause an oscillating movement to be imparted to the button 11 and thus provide means whereby a large grinding range can be obtained. The polishing button 11 is preferably covered with suitable felt or other desirable material as illustrated at 12, and in polishing a lens or the like so as to remove the roughened surface from the lens, any suitable polishing material such as rouge or the like can be employed.

Extending outwardly from one end of the motor 2 and arranged in parallel relation with the shaft 4 is a supporting arm 13 having an offset end 14 provided with a longitudinal slot 15 to receive the lower end of a guide pin 16 which is carried by the polishing button 11 whereby to assist in retaining the button in its proper position with respect to the lens.

In order to support the lens in contact with the polishing button spaced standards 17 are provided having at their upper ends suitable sleeves 18 in which a shaft 19 is slidably mounted and secured to the inner end of this shaft is a lens block 20 to which a lens 21 can be readily attached in any suitable manner, such as by the application of pitch or any other similar material well known in the optical art. Applied to the outer end of the shaft 19 is an adjustable sleeve 22 to contact with one of the sleeves 18 whereby to limit the sliding movement of the shaft 19 in one direction, it being understood that the movement of the shaft in the other direction will be controlled by the lens block 20. Mounted upon the shaft 19 and disposed between the two sleeves 18 is a coil spring 23 which yieldably retains the shaft 19 in a forward position or in such a position that the lens 21 will be yieldably held in engagement with the polishing button 11 so that the roughened surface of the lens can be quickly and readily removed therefrom.

In Figure II there is illustrated another form of the invention wherein the motor 2′ is provided with a shaft 4′ which extends entirely through the motor and is provided upon its outer end with a handle 24 so that the shaft can be readily reciprocated within the motor. The shaft is further provided with a collar 25 and arranged between the collar and the end of the motor is a coil spring 26, which yieldably retains the shaft in an outward projected position whereby the polishing button 11 will be yieldably retained in contact with the lens.

In this form of the invention the lens support includes a pair of spaced guide members 27, and movably mounted between these guide members is a block 28 having a longitudinal slot 29 in which is mounted an adjusting pin 30 whereby this block may be adjusted toward or away from the motor 2′. Extending upwardly from this block 28 are the spaced standards 31 connected at their upper ends by means of a cross piece 32, and mounted within this cross piece 32 is an adjusting screw 33, the lower end of which is connected to the block 34 slidably mounted between the standards 31 and carrying the lens block or support 35.

From the above description it will be apparent that in that form of the invention illustrated in Figure II the lens can be readily adjusted in various positions such as toward and away from the polishing button 11 or vertically adjusted according to the location of the roughened surface of the lens. In Figure IV there is illustrated a longitudinal sectional view showing the relative positions of the adjustable blocks and the position of the lens with respect to the polishing button 11. It will be noted from Figure IV that the block 35 is provided with a shank 36 preferably tapered as illustrated and is inserted within a socket 37 and carried by the block 34, and securely held therein by means of the set screw 38 so that either convex or concave lenses can be applied to the same adjusting means simply by changing the block 35 which can be readily done by releasing the shank 36 from the socket 37 through the medium of the set screw 38.

In Figure V there is illustrated a transverse sectional view of a lens showing the position of a roughened surface thereon, and in Figure VI there is also illustrated the position of the buffing wheel with respect to this roughened surface, and it will be apparent that by adjustably mounting the lens and providing for an oscillating movement for the button, a large grinding surface can be obtained so that the roughened surface of the lens can be readily removed without interfering with the foci of the same. The dotted line positions illustrated in Figure VI will give an idea as to the range covered by the polishing button in this operation.

In Figure VIII there is illustrated another form of the invention which is preferably used when it is desired to polish the lenses by hand, or in other words hold the lens in the hand while polishing the roughened surface thereon without placing the lens in a machine or on a support as illustrated in previous figures of the invention. This form of the invention includes a motor 39 having a shaft 40 and a removable sleeve 41 upon the outer end of the shaft, and an eccentrically mounted pin 42 within the

outer end of the sleeve 41. Carried by the pin 42 is the polishing button 11′ and depending from the button 11′ is the guide pin 16′ co-acting with the arm 13, the same as in the preferred form of the invention.

It will be apparent from the illustrations in Figures VIII and IX that in order to remove a roughened surface from a lens by this simple form of the invention illustrated in these figures the lens is held in the hand as shown in Figure IX and moved over the outer surface of the polishing button 11′ until the roughened surface is removed therefrom. By operating the lens in this manner, a wider range of polishing surface can be covered and a finer grade of work result therefrom. As stated heretofore, it is the object of the present invention to provide a device for removing, by polishing, the roughened surface caused by grinding or other action or any similar deformities from a lens without interfering with the foci of the same or changing the entire surface, and this result may be accomplished by any one of the forms that have been heretofore illustrated and described. In Figure X there is illustrated a perspective view of the sleeve 6 showing its reduced end 7 and the position of the pin 8 with respect thereto so as to give a clear idea of how the eccentric movement of the polishing button is obtained.

In Figure XI there is illustrated another form of the invention which includes the base member 43, extending upwardly therefrom is a standard 44 provided with a pocket 45 in which an arm 46 is mounted for rotation, said arm depending from a standard 47 having formed in one face thereof a concave opening 48. This opening 48 within the standard 47 receives the ball end of a supporting arm 49 whereby when the plate 50 is secured in position to the outer surface of the standard 47 it will provide a ball and socket joint whereby the arm 49 may be moved to any desired position. The arm 49 is provided with an outer reduced end 51, on which is carried a sleeve 52 which is provided with a lens block 53 whereby a lens may be readily applied thereto to be placed in position for polishing. In this form of the invention it will be noted that by grasping the arm 49 with the hand, the lens which is applied to the block 53 can be moved about with respect to the polishing button 11 so that the polishing surface of the button will be equally distributed over the surface of the lens.

From the above description taken in connection with the accompanying drawings it is thought that the object and use of the invention will be readily understood and that the construction of the various modifications can be readily interpreted from the accompanying drawings. As stated, the invention is not to be limited to the specific manner in which the lens is to be held against the polishing button during the operation of removing the roughened surface or other deformities from the lens, but is, in practice, subject to such changes, as may fall within the scope of the claims.

What is claimed is:

1. A lens surface correcting device including an electric motor, having a projecting shaft, an eccentric drive pin on said shaft, an arm secured to the motor housing extending substantially parallel to the shaft, said arm terminating in a slotted portion, and a lens polishing member having a socket to receive the eccentric on the shaft and having a laterally extending arm riding in the slot.

2. A lens surface correcting device including an electric motor, having a projecting shaft, an eccentric drive pin on said shaft, an arm secured to the motor housing extending substantially parallel to the shaft, said arm terminating in a slotted portion, a lens polishing member having a socket to receive the eccentric on the shaft and having a laterally extending arm riding in the slot, and resilient means carried by the shaft and intermediate the motor and eccentric for outwardly urging the latter.

3. A lens surface correcting device including an electric motor having a projecting shaft, an eccentric drive pin on said shaft, an arm secured to the motor housing extending substantially parallel to the shaft, said arm terminating in a slotted portion, a lens polishing member having a socket to receive the eccentric on the shaft and having a laterally extending arm riding in the slot, a base for the motor, and a lens support adjustably mounted upon the base and extending into alinement with the motor shaft.

4. A device of the character described, including a horizontal base, a lens support and a motor support on the base, said lens support being adjustable longitudinally of the base and vertically with respect to the base, a motor carried by the motor support and in opposition to the lens holder, said motor support also having a slotted guide arm secured thereto and extending in the direction of the lens support, and a dry polishing device operatively associated with the lens and motor shaft and having a projection engaged in the slot to prevent rotation thereof.

5. In a lens surface correcting machine, including a frame, the combination with a driven shaft having an eccentric drive pin, including a surface correcting tool, of a support for holding a lens in operative contact with said correcting tool, a guide on said frame, an element carried by the correcting tool and reciprocating through the

guide as a grinding movement is imparted to the tool by the drive pin, and means for holding the support in different adjusted positions to regulate the lens toward and from the tool.

6. In a lens surface correcting machine, including a frame, the combination with a driven shaft having an eccentric drive pin, including a surface correcting tool, of a support for holding a lens in operative contact with said correcting tool, a guide on said frame, an element carried by the correcting tool and reciprocating through the guide as a grinding movement is imparted to the tool by the drive pin, means for holding the support in different adjusted positions to regulate the lens toward and from the tool, and means for adjusting the support for governing the lens surface to be corrected relatively at right angles to the correcting tool.

In testimony whereof I have affixed my signature, in presence of this witness.

LUCIAN W. BUGBEE.

Witness:

JULIA H. WELLS.