L. W. BUGBEE.

LENS CUTTER.

APPLICATION FILED APR. 10, 1916.

1,201,686.

Patented Oct. 17, 1916.

2 SHEETS—SHEET 1.

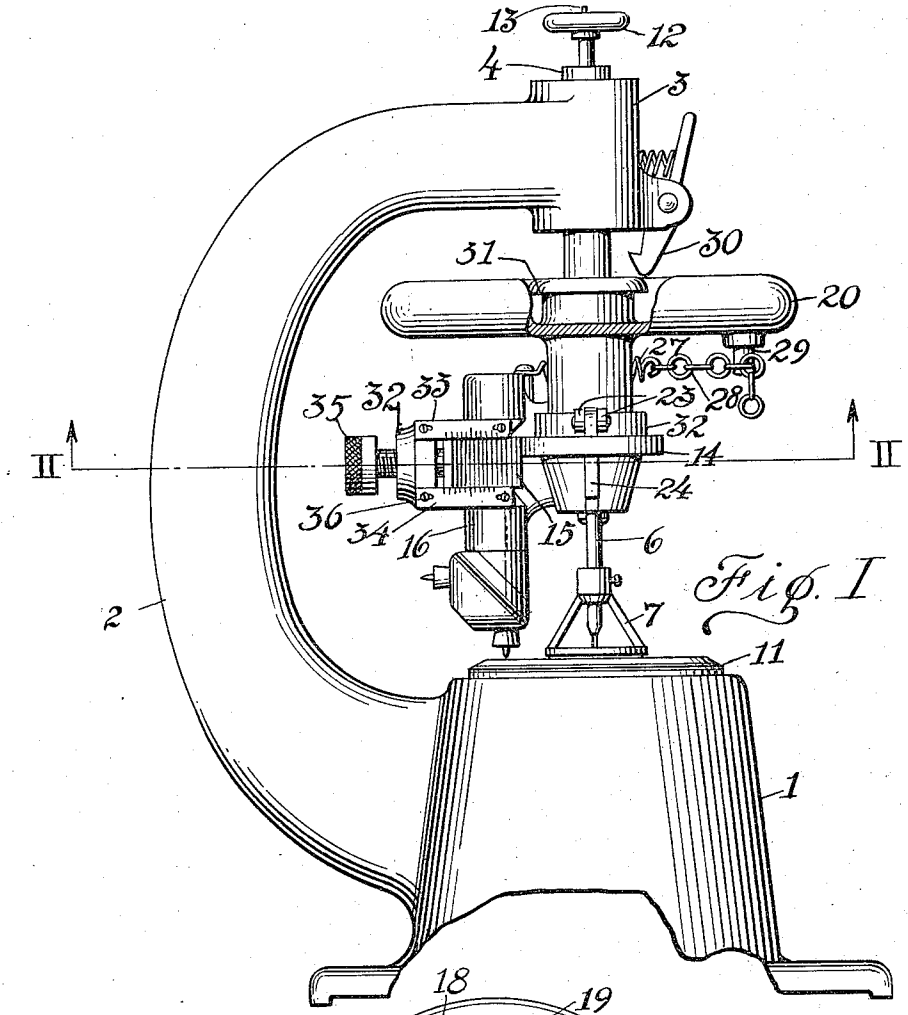


Fig. I

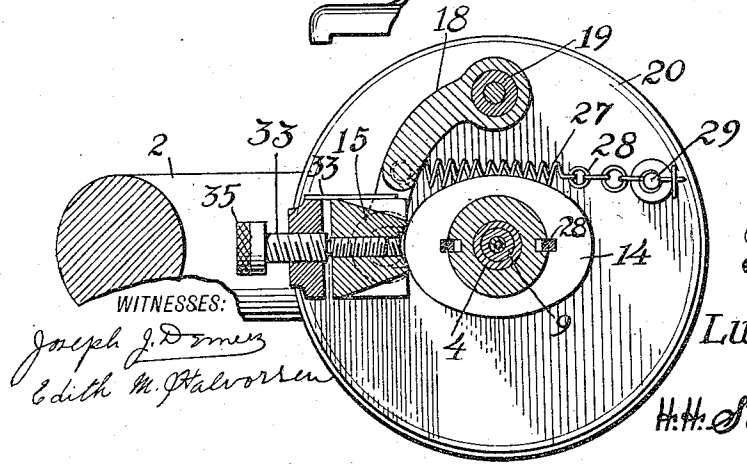


Fig. II

WITNESSES:

Joseph J. Domes

Edith M. Halvorsen

INVENTOR

Lucian W. Bugbee

BY

H. H. Stull & K. K. Parsons

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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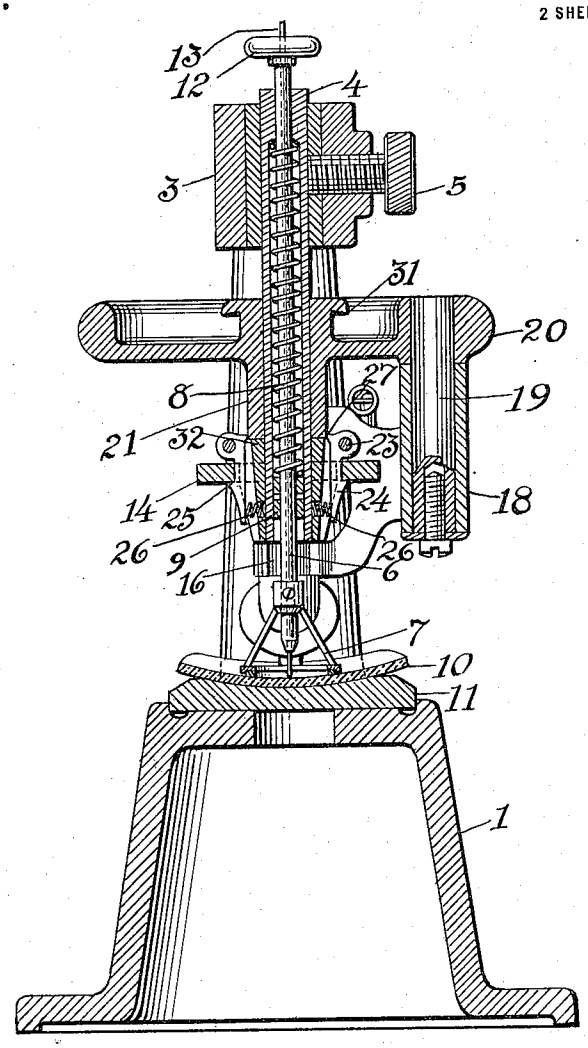


Fig. III

WITNESSES:

Joseph J. Dimeck

Edith M. Halvorsen

INVENTOR

Lucian W. Bugbee

BY

H. H. Stull & H. K. Parsons

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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

LENS-CUTTER.

1,201,686. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed April 10, 1916. Serial No. 90,130.

To all whom it may concern:

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

This invention relates to improvements in cutters, and has particular reference to an improved form of machine adapted for the cutting of ophthalmic lenses.

One of the leading objects of my invention is the provision of an improved type of cutter which shall embody all the advantages of the present known form of automatic cutters and at the same time will in its operation more closely approximate cutting with a hand tool and which will thus particularly commend itself to those desiring to do extremely accurate or delicate work, as in the cutting of expensive bifocal or other lenses.

A further object of the invention is the provision of an improved form of cutter in which normally a constant amount of pressure is applied to the cutting point automatically during the cutting operation as distinguished from the present type of cutters, in which the lens is held against the cutter with a variable or indeterminate pressure.

A further object of the present invention is the provision of an improved cutter in which the former controlling the shape of lens may be readily varied and interchanged as desired.

Another object of the invention is the provision of an improved cutter having means for retaining a lens in fixed position therein, which will permit of exact and accurate positioning of the lens relative to the former and maintenance of the lens in such adjusted position during the cutting operation.

Other objects and advantages of my improved construction should be readily apparent by reference to the following description 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 side elevation of my improved cutter. Fig. II represents a sectional view taken on the line II—II of Fig. I looking in the direction of the arrow. Fig. III represents a vertical sectional view taken through my complete cutter.

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 my cutter which may be of any desired form, and has curving upwardly therefrom the C-shaped bracket arm 2, terminating in the head 3. This head has slidably mounted therein the hollow spindle or sleeve 4 secured in vertically adjusted position in the head by means of the set screw 5, and has extending downwardly therethrough, a second hollow spindle 6 bearing on its lower end a tripod or lens clamping member 7. A spring 8 contained within the sleeve 4 and bearing at one end against the sleeve and at the other against the collar 9 on the spindle 6, serves to press the tripod or lens clamping member 7 downwardly to secure the lens 10 in position on the lens receiving pad 11, as is most clearly illustrated in Fig. III.

A hand piece 12 secured to the upper end of the spindle 6 above the terminus of the sleeve 4 permits of ready raising of the spindle and tripod, while a slender guide rod 13 projecting downwardly through the center of the spindle 6 is adapted to be engaged on the point which it is desired to have for the exact geometrical center of the finished lens to insure the lens being in the exact desired relation to the cutter before the cutting operation is commenced.

To cut a lens mounted on the pad 11 to desired shape, I mount upon the lower end of the spindle 4 a suitable shape or former 14 which coöperates with the shoe 15 of the cutter spindle 16 to control the in and out movement of the carrier arm 18 rotatably mounted on the pin 19 depending from the hand wheel 20. This hand wheel 20 is clearly shown in Fig. III of the drawings as rotatably and slidably mounted on the spindle or sleeve 4 just beneath the head 3 and has the depending hub 21 adapted to rest against the collar 32 on the lower end of the spindle which limits the downward movement of the hub and wheel and thus retains the hand wheel in position. In addition this collar is provided with the ears 23 to which are pivoted the latch members or former securing devices 24, having the beveled lower

ends terminating in the locking recesses having the shoulders or keepers 25 to engage beneath the former 14 and retain the same in position, springs 26 swinging the latch members or keepers outward into operative position. To remove a former it is merely necessary to press together the inclined or beleved lower portions of the keepers to disengage the locking shoulders 25 from the former 14, when the former may be readily slipped down and off over the tripod 7, the engagement of the lugs 27 with the collar 32 on the keepers or latch members serving to limit their outward movement so that a new former when slipped over the tripod and pressed upward will engage the lower portions of the keepers within its sockets or recesses 28, when the former may simply be snapped upward, sliding over the locking shoulders 25 when the springs 26 automatically press the members 24 into locking position, securely and quickly retaining the former in place.

Particular attention is invited to the fact that as brought out especially in Fig. II, the keepers serve not only as means for locking the former in raised position but also as keys or means for insuring correct positioning of the former on the spindle 4 so that its major and minor axes will always lie in predetermined relation to the table and pad 11, and thus to the lens which is to be cut.

As has been previously mentioned, the carrier arm 18 for the tool or cutter 17 is pivotally secured to the hand wheel 20 and rotatable therewith, while to retain the contact shoe 15 in engagement with the former 14, I preferably employ means such as the spring 27, having one end secured to the carrier arm and the other end secured to the chain 28, one of the links of the chain being engaged over the pin 29 on the hand wheel, the links being selectively engaged with the pin according to the tension of spring desired.

When it is desired to place a lens within the cutter the wheel, and thus the cutting tool or diamond 17, is held in raised position by means of the latch member 30 which engages the flange 31 at the upper end of the hub of the hand wheel. These parts being thus held in raised position, the chain 28 may be disengaged from the pin and the carrier arm swung outwardly out of engagement with the former to permit of changing of the former, after which the arm is swung inwardly and the chain and pin engaged to hold the contact shoe 15 in engagement with the desired former at correct tension. Grasping and upward movement of the handle 12 then raises the tripod so that the lens 10 may be positioned exactly as desired upon the pad 11, the pad preferably bearing suitable designations to indicate axis, etc., as regards the form 14 located thereabove. The lens having been placed in the exact desired position, the latch 30 is then released and the hand wheel allowed to move downward its hub sliding on the spindle 4 until the cutter 17 comes into engagement with the lens. The lens is preferably grasped and securely held against any possible movement with one hand, while the hand wheel is grasped and turned as desired by the other hand, rotation of the hand wheel carrying around with it the arm 18 and cutter 17 to suitably cut the lens. It will thus be seen that while the former 14 guides the cutter as to shape, that the operator has practically direct hold of the cutter and is thus able to feel out the action of the cutter on a lens, to stop the cut at any desired point, and in every way to be in the closest possible touch with the cutting operation, thus making the matter an individual one under the control of the individual to a much greater degree than has been possible in the past with the automatic type of cutter in which the cutting movement is so transferred through gearing arrangements and the like that feeling of the action of the cutter is almost impossible.

In order that various sizes of lenses of the same shape may be formed with my cutter I preferably slidably mount the shoe in a suitable bracket 32 on the spindle 16, a right and left threaded adjusting screw 33 being engaged in the bracket and in the shoe to insure rapid relative adjustment of the parts, while scale plates 33 and 34 are secured to the face of the bracket and have designations adapted to coincide with the outer edge of the shoe to indicate adjustment thereof, adjustment in even number of millimeters being indicated along the scale 33, and in odd number of millimeters or other designations on the scale 34 so that a very fine adjustment of the shoe can be accomplished. A knurled thumb piece or head 35 on the screw facilitates the rotation thereof, while the scale members may if desired have short slots formed in them for the securing screws 36 to permit of adjustment of the scales to correct position when initially assembling the machine, or additional adjustment to compensate for wear of the parts if needed.

From the foregoing description taken in connection with the accompanying drawings the construction and operation of my improved cutter should be readily apparent, and it will be seen that I have provided an extremely simple and efficient machine in which the lens is rigidly held, both by the tripod and also by the hand if desired, in which the cutter is pressed downward into operative position by the weight of the hand wheel 20 carrying the same, thus insuring constant and uniform pressure of the cutter against the lens if desired, and in which the

cutter is carried around by manual grasping and turning of the hand wheel so that the operator is able to stop the cut at any desired point and has practically all the advantages as to feeling of the cutting action, etc., which are inherent in the old form of cutting around a former with the hand tool. It will also be noted that the former itself may be readily and quickly interchanged and the cutter withdrawn into raised inoperative position, or by disengagement of the chain swung outward entirely away from the lens and lens table, as desired.

I claim:

1. A lens cutting machine, including a stationary base, means for clamping a lens in fixed position upon the base, a former, a cutter, and means for moving the cutter over the lens in a path guided by the former.

2. In a cutter for ophthalmic lenses, the combination with a base and means for clamping a lens against rotation thereon, of a former supported above the lens, a cutter, and a rotatable carrier for the cutter adapted to move the cutter over the lens to inscribe on the lens the shape of the former.

3. In a machine of the character described, the combination with a base and a support rising therefrom, of a non-rotatable spindle carried by the support, a cutter, and means rotatably mounted on the spindle and engaging the cutter for shifting the cutter circumferentially of the spindle.

4. In a machine of the character described, the combination with a base and a standard rising therefrom, of a spindle carried by the standard, lens clamping means extending axially of the spindle, tool guiding means carried by the spindle, and a rotatable carrier mounted on the spindle and bearing a cutting member, said cutting member having a portion engaging the guide member on the spindle, whereby rotation of the carrier causes the cutter to move over the lens in a path controlled by the shape of the guide member, substantially as described.

5. In a device of the character described, the combination with a base, of means for securing a lens in fixed position thereon, a former, means for supporting the former in predetermined relation to the lens, a cutter, a carrier engaging the cutter for moving the same over the lens, and means for yieldingly holding the cutter against the former as it is moved over the lens to cause the cutter to inscribe the shape of the former on the lens.

6. In a machine of the character described, the combination with a frame including a base and a supporting bracket, of a spindle depending from the bracket, a hand wheel having a hub rotatably mounted on the spindle and a cutter bearing arm depending from one side thereof, a cutter carried by the arm, means on the spindle below the hub for detachably securing a former thereon in fixed position relative to the frame, a former supported by said means, and supplemental connections between the cutter bearing arm and the hand wheel for yieldingly retaining a portion of the arm in engagement with the former to guide the movement of the cutter.

7. An ophthalmic lens cutter comprising a support, a former, means for non-rotatably supporting the former above the lens, a cutter, an adjustable guide shoe connected to the cutter and adapted to engage the former, and means for bodily shifting the cutter around the former with the shoe in contact with the former to cut the lens in the simulation of the former.

8. In a cutter for ophthalmic lenses, the combination with a base and a bracket arm rising therefrom, of a hollow spindle carried by the arm, a sleeve inclosed by the spindle, means within the spindle for pressing the sleeve downwardly, a lens clamping member carried by the sleeve, and a lens centering device projecting through the sleeve and interiorly of the clamping means for engaging a lens, substantially as and for the purpose described.

9. In a machine of the character described, the combination with a frame, of a spindle carried thereby, a hand wheel having a hub encircling and rotatably mounted on the spindle, a pin carried by the hand wheel, a cutter arm pivotally mounted on the pin and bearing a cutter, a collar secured on the spindle below the hub of the hand wheel and serving as a limit for the downward movement of the hand wheel, resilient latch members carried by and projecting laterally from the collar, and a cutter guide mounted on the collar, said guide having recesses adapted to partially receive the latch members, said members having portions interlocking with the guide to securely retain the same in position on the collar.

10. In a machine of the character described, the combination with a lens supporting table and a spindle thereabove, of a hand wheel having a hub slidably and rotatably mounted on the spindle, a carrier arm bearing a cutter and a tension device for the arm carried by the hand wheel, and a latch member mounted adjacent the spindle for engaging the hand wheel to retain the wheel and cutter in raised position.

11. In a device of the character described, the combination with a frame and a spindle carried by the frame, of a disk mounted on the spindle for rotative and sliding movement, a pair of eccentrically located pins carried by the disk, an arm pivoted on one of the pins, a cutter carried by the arm,

a tension device carried by the arm and having engagement with the other of said pins, and means detachably associated with the spindle adjacent the disk for limiting the movement of the arm under actuation of the tension device, substantially as and for the purpose described.

12. In a device of the character described, the combination with a lens supporting table and a standard rising therefrom, of a spindle carried by the standard, said spindle being provided with lens clamping means and cutter controlling means, a weighted hand wheel mounted on the spindle, a cutter arm and cutter carried by the hand wheel and movable about a pivot on the wheel eccentric to the axis thereof, means for yieldingly holding the cutter arm in engagement with the cutter controlling means, and means for holding the wheel in raised position, whereby when said means are released the weight of the wheel will force the cutter downward and retain the same in operative engagement with the surface of the lens to be cut, substantially as described.

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

LUCIAN W. BUGBEE.

Witnesses:
EDITH M. HALVORSEN,
ESTHER M. SHERIDAN.

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