G. E. PRYOR.

LENS GRINDING MACHINE.

APPLICATION FILED MAR. 6, 1917.

1,256,256. Patented Feb. 12, 1918.

Fig. 1.

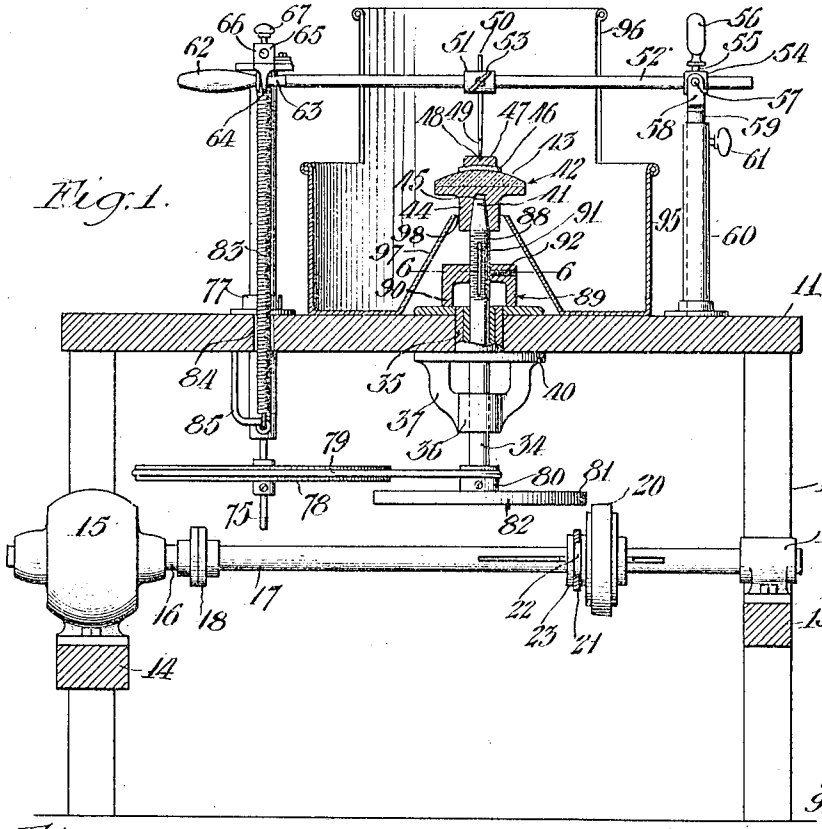


Fig. 6.

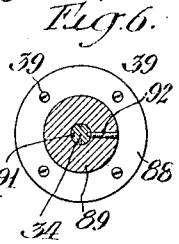


Fig. 2.

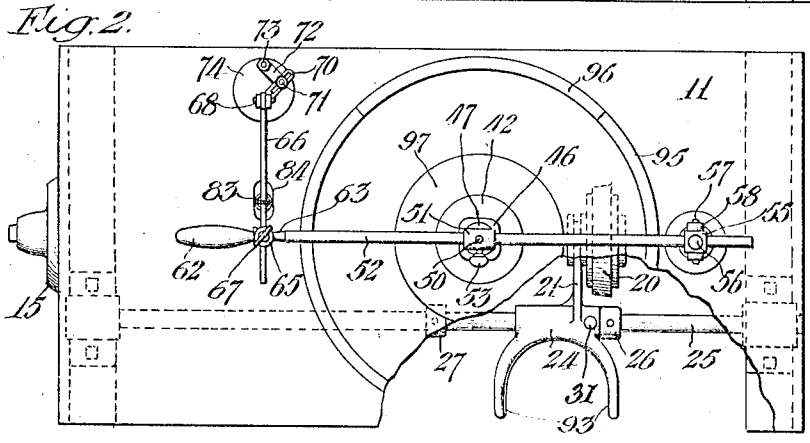


Fig. 4.

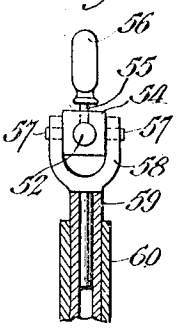


Fig. 5.

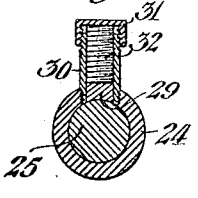
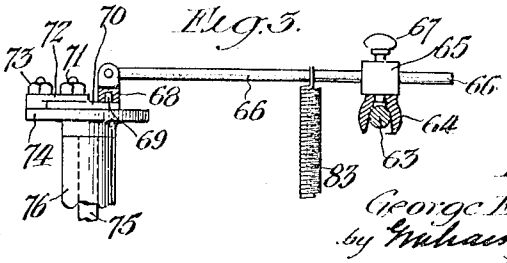


Fig. 3.



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UNITED STATES PATENT OFFICE.

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LENS-GRINDING MACHINE.

1,256,256. Specification of Letters Patent. Patented Feb. 12, 1918.

Application filed March 6, 1917. Serial No. 152,884.

To all whom it may concern:

Be it known that I, GEORGE E. PRYOR, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Lens-Grinding Machine, of which the following is a specification.

My invention relates to grinding machines used for grinding and polishing the surfaces of lenses, such as are used for spectacles, and the like.

The principal object of my invention is to produce a machine of the class described of simple form and construction in which the application of power may be controlled by the leg or knee of the operator, the lens moved on the face of the grinder during the grinding operation, and the machine automatically braked upon the release of the driving mechanism.

Other objects and advantages will appear hereinafter from the following description.

Referring to the drawings, which are for illustrative purposes only:

Figure 1 is a vertical, sectional view of a machine embodying my invention.

Fig. 2 is a plan view, partly broken away, of the machine shown in Fig. 1.

Fig. 3 is an end view, partly in section, of a portion of the machine.

Fig. 4 is an end view of the pressure rod support.

Fig. 5 is a vertical, sectional view of a friction device.

Fig. 6 is a section on line 6—6, Fig. 1.

11 designates a table supported on legs 12 having cross bars 13 and 14. Supported on the bar 14 is an electric motor 15, the shaft 16 of which is secured to a drive shaft 17 by means of a coupling 18, the free end of the shaft 17 being journaled in a bearing 19 mounted in the bar 13. Slidably keyed on the shaft 17 is a conical faced, friction clutch member 20, the position of the clutch member being controlled by means of a fork 21 which engages a circular groove 22 formed on the hub 23 of the member 20. The fork 21 is formed as a part of, or may be secured to, a sleeve 24 slidably mounted on a rod 25, the movement of the sleeve 24 on the rod being limited by collars 26 and 27 fixed to the shaft at determined points by means of set screws 28. The sleeve 24 is frictionally held against movement on the rod 25 by means of a shoe 29 mounted in a cup 30 threaded into an opening in the sleeve 24. The cup is provided with a cap 31 and contains a coiled spring 32 which presses against the shoe 29 to elastically hold the shoe against the rod 25.

34 designates a vertically arranged stub shaft which slidably extends through the table 11, being mounted therein by means of upper and lower bearings 35 and 36, respectively, formed on a bracket 37. The upper bearing 35 extends through the table 11 into the center of a circular plate 38 which rests upon the face of the table 11 and is secured thereto by means of bolts 39 which extend through the table and plate 40 of the bracket 37. The upper end of the shaft 34 is tapered, as indicated at 41, to receive and support the grinding disk or head 42. The upper face of the grinding disk 42 is convex, as indicated at 43, and the lower end of the grinding disk terminates in a boss 44 having a tapered opening 45 adapted to receive the tapered upper end of the shaft 34. 46 designates the lens blank which is cemented in the usual manner to the under face of a block or holder 47. The upper face of the block 47 is provided with a recess 48 adapted to receive the point 49 of a pin 50 supported in a collar 51 fixed to a controlling bar 52, the pin being adjustably fixed in the collar 51 by means of a set screw 53.

54 designates a block slidably mounted on the bar 52 and adjustably fixed thereon by means of a set screw 55 formed with a handle 56. The block 54 is provided with pins 57 which are pivotally mounted in a yoke 58 rotatably mounted on the upper end of a tube 59 vertically slidable in a hollow post 60 mounted on the table 11, a set screw 61 being provided on the post 60 by means of which the position of the rod 59 may be regulated in the post 60. 62 designates a handle formed on one end of the bar 52, and 63 designates a reduced portion of the bar 52 adapted to be engaged by a fork 64 rotatably mounted on a block 65 slidably mounted on a crank arm 66, the block being adjustably fixed on the arm 66 by means of a set screw 67. One end of the crank arm is pivotally mounted in a standard 68 rotatably supported on a pin 69 formed on a slotted link 70 which link 70 is secured by means of a bolt 71 to an arm 72 secured by means of a bolt 73 to a crank disk 74. The crank disk 74 is secured to the upper end of a crank shaft 75, and is supported in a post 76 secured to the table by means of a flanged

collar 77. Fixed to the lower end of the shaft 75 is a grooved pulley 78 driven by means of a belt 79 from the grooved hub 80 of a friction disk 81 secured to the shaft 34 and having a flat under face 82.

83 designates a coiled spring, the upper end of which is secured to the crank arm 66. A spring 83 extends through an opening 84 in the table 11 and has its lower end secured to a bent rod 85 secured to the under part of the table 11.

A portion of the upper end of the shaft 34 is threaded, as indicated at 88, upon which portion is threaded a brake collar 89 terminating in a downwardly extending circular flange 90, which, when the machine is not in motion, rests upon the plate 38, thereby supporting the shaft 34 and parts thereon when the machine is not in operation. The threaded portion 88 of the shaft 34 is provided with four vertical slots 91 adapted to receive the inner end of a set screw 92 carried on the collar 89. By this construction the position of the friction disk 81 may be adjusted with relation to the face of the clutch member 20, which, under common practice, would be covered with leather, or similar material, subject to wear. Means are provided whereby the clutch member 20 may be engaged and disengaged with the disk 81 by the leg or knee of the operator, thereby leaving both hands free for operating the parts of the machine above the table, and consists of a fork 93 formed on the sleeve 24, whereby the sleeve may be moved on the rod 25 to slide the clutch member 20 on the shaft 17.

Water is usually applied to the grinding head 42 during the grinding operation, and for the purpose of catching such material thereon from the head, a pan 95 is provided having upwardly extending aprons 96, at the back thereof, and an upwardly projecting central portion 97 formed on the bottom of the pan, such portion 97 having a central opening 98 through which the shaft 34 and head 43 freely extend.

The machine is operated in the following manner:

A lens blank, indicated at 46, is cemented in the usual manner to the under face of a block 47, the lens being placed upon the face of the grinding disk, and the pin 50 being placed in the recess in the block 47. During this adjustment it is understood that the controlling bar may be swung vertically as well as laterally, due to the connection between the same and the post 60 heretofore described, the opposite end of the controlling bar being placed out of engagement with the fork on the end of the crank arm 66, if necessary. When the lens is placed in position upon the grinding disk, the same is frictionally held against the grinding disk by means of the spring 83 which is exerting a pull downwardly on the crank arm 66, the crank arm being in engagement with the bar 52, as heretofore described. The bar 52 is likewise pulled downwardly by the elastic tension of the spring. The clutch member 20 is then thrown into engagement with the under face of the friction disk 81 by the operator who places his knee in the fork 93 on the sleeve 24, and by moving the same laterally on the rod 45 the clutch member 20 is moved under the friction disk 81. The face of the clutch member 20 being conical, as the clutch member 20 moves under the friction disk and engages therewith, the friction disk 81 is raised and the shaft 34 to which the disk 81 is connected is consequently also raised. The raising of the shaft 34 lifts the brake collar 89 from the plate 38 on the table, thereby freeing the shaft which is driven through the medium of the frictional engagement heretofore referred to. During the grinding operation, it is desirable that the lens be moved on the face of the grinding disk, so that the lens does not always come in contact with the same portion of the grinding disk. This is accomplished by a swinging movement imparted to the controlling bar 52 through the medium of the crank arm 66 which is connected, as heretofore described, with the crank disk 74, the crank disk 74 being driven by the shaft 75 which has thereon the pulley 78 driven by means of the belt 79 from the friction disk 81, as heretofore described. The rotation of the crank disk 74, through the medium of the crank arm 66, moves the controlling arm with a swinging movement, the center of which is the post 60. During this movement, the crank arm 66 is elastically held downward by means of the spring 83. It is understood that the swinging movement of the controlling bar 52 may be varied by an adjustment of the link 70 and arm 72 on the crank disk 74 heretofore referred to.

When it is desired to inspect the lens, or when the operation is completed, the clutch member 20 is moved out of engagement with the friction disk through the medium of the fork 93 operated by the knee of the operator, which disengagement permits the shaft 34 to move downwardly until the circular flange 90 of the brake collar 89 comes into contact with the plate 38, and acting as a brake thereon quickly stops the rotation of the shaft, and at the same time affords a support for the shaft 34 and parts carried thereby on the table. This operation of the brake collar 89 saves considerable time, as in many instances the lens is inspected frequently during the operation of grinding. A fine adjustment of the position of the brake collar upon the shaft may be made by loosening the set screw in the collar and moving the collar on the threaded portion

of the shaft to the desired adjustment. This adjustment may be particularly due to the fact that the face of the clutch member 20 is usually made of leather, as heretofore described.

While I have described the swinging movement of the controlling bar 52, during the grinding operation, as deriving its motion from the crank arm 66, it is understood that the crank arm 66 may be disengaged from the controlling bar 52, and that during the grinding operation a swinging movement may be imparted to the controlling bar 52 by the hand of the operator.

I claim as my invention:—

1. A lens grinding machine comprising a table, a shaft slidably and rotatably mounted in said table, a grinding member on said shaft, a collar on said shaft adapted to support said shaft on the table, means on said table adapted to elastically hold a lens against the grinding member, a friction disk on said shaft, a driving shaft, and a clutch member on said driving shaft adapted to engage said friction disk to drive said first named shaft and lift the collar thereon above the table.

2. A lens grinding machine comprising a table, a shaft vertically slidable and rotatably mounted in said table, a grinding disk on the upper end of said shaft, a collar on said shaft adapted to engage said table and limit the downward movement of said shaft, means on said table adapted to elastically hold a lens against the face of said grinding disk, a friction disk on the lower end of said shaft, a driving shaft, a conical clutch member on said driving shaft, means for moving said clutch member into engagement with the under face of said friction disk to raise said first named shaft and drive the same, and means for changing the position of said lens on the grinding member during the grinding operation.

3. A lens grinding machine comprising a table, a shaft vertically slidable and rotatably mounted in said table, a grinding disk on the upper end of said shaft, means on said table for elastically holding a lens against the grinding face of said grinding disk, a friction disk on the lower end of said shaft, a driving shaft, a clutch member on said driving shaft adapted to engage the under face of said friction disk to raise said first named shaft and drive the same, and means adjustably secured to said first named shaft adapted to engage a stationary member and support said first named shaft when said clutch member is disengaged with said friction disk.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 23d day of February, 1917.

GEORGE E. PRYOR.

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