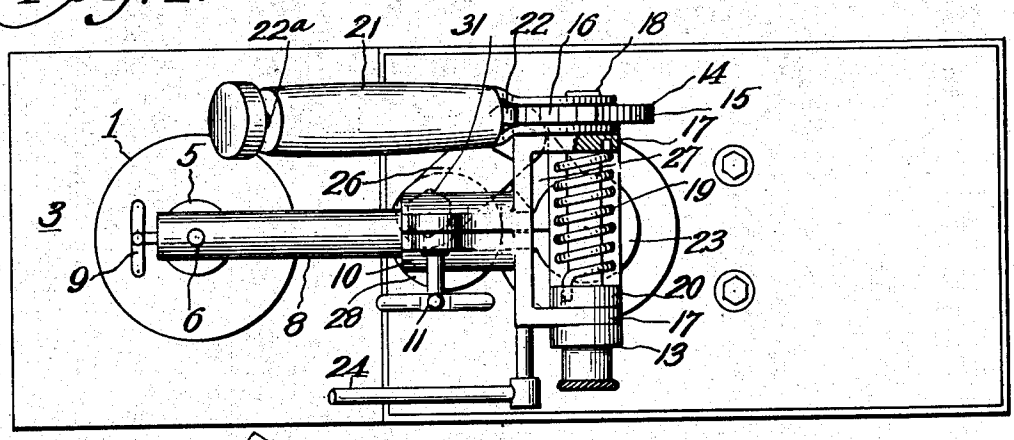
Dec. 24, 1940. R. F. DUFFENS 2,225,826

LENS SURFACING MACHINE

Filed Jan. 29, 1940 2 Sheets-Sheet 1

Fig. 1.



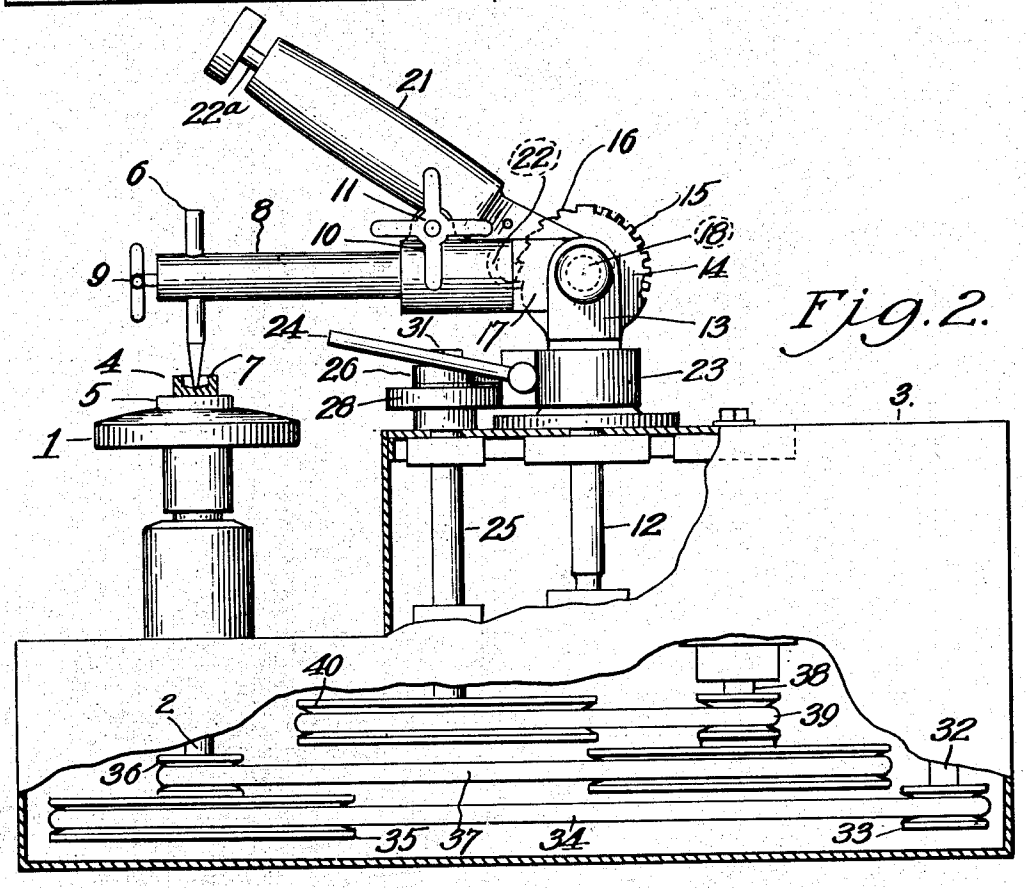


Fig. 2.

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Filed Jan. 29, 1940 2 Sheets-Sheet 2

Fig. 3.

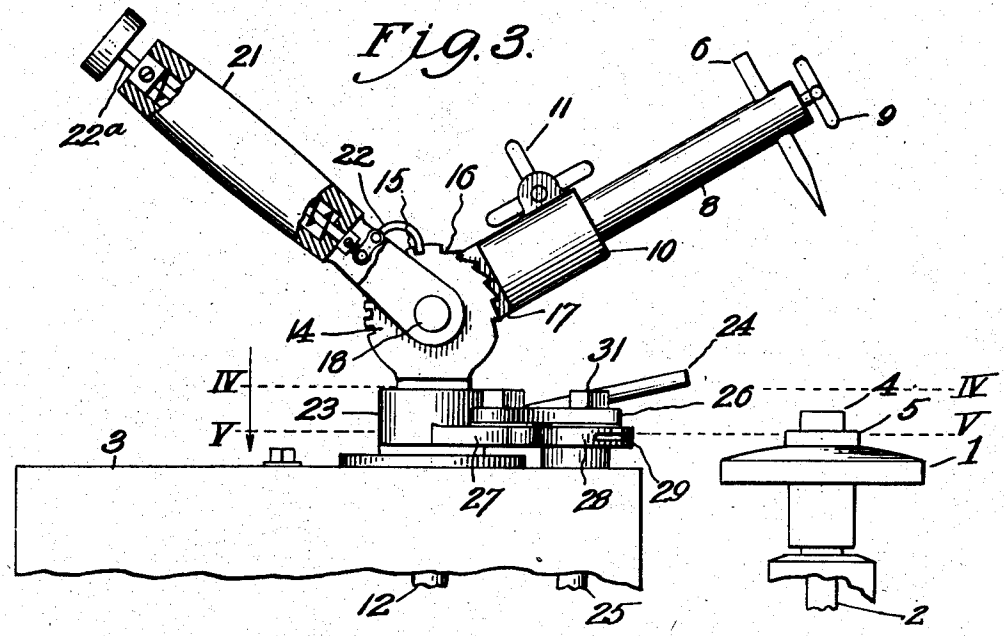


Fig. 4.

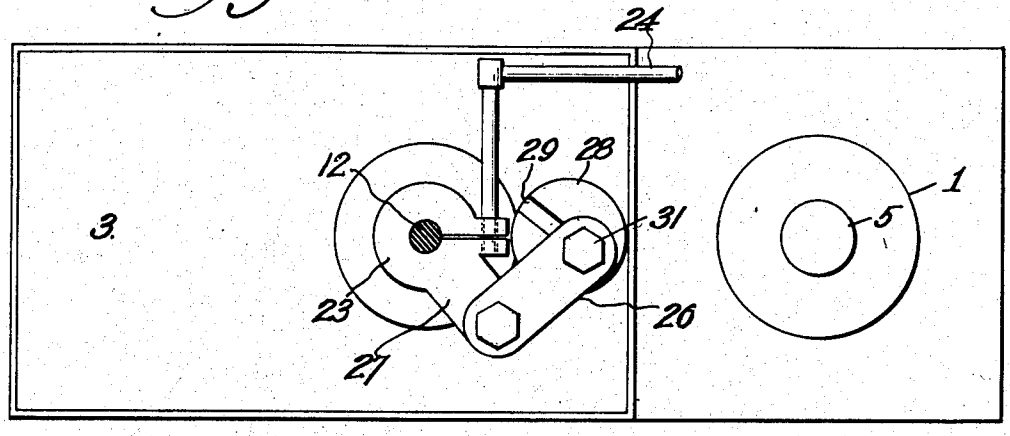


Fig. 5.

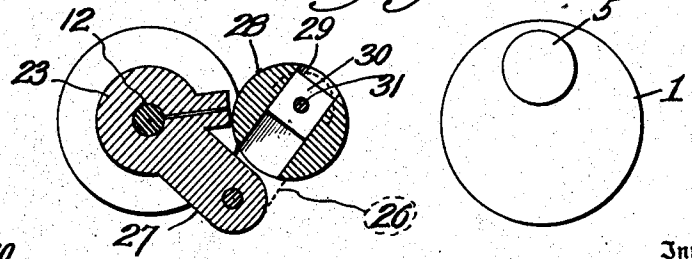
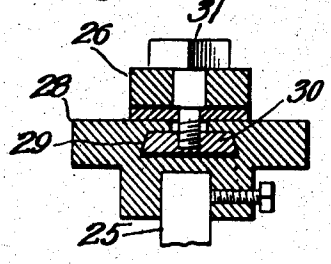


Fig. 6.



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UNITED STATES PATENT OFFICE

2,225,826

LENS SURFACING MACHINE

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Application January 29, 1940, Serial No. 316,159

4 Claims. (Cl. 51—124)

This invention relates to improvements in lens surfacing or polishing machines and particularly to such machines for the working of spherical and cylindrical lens and the like. Although not illustrated herein, it is to be understood that in the surfacing of cylinder lenses any suitable apparatus may be utilized to maintain the lens and the lap against relative independent rotation.

One of the objects of the invention is to provide a machine of this character of strong, durable, efficient and inexpensive construction wherein means is provided for adjusting the pressure of the lens on the lap and for moving the lens block working arm to inoperative position for the changing of a lap or lens.

Another object of the invention is to provide a machine of this character in which the lens block has an arcuate course of travel over the lap, the travel of the lens block in relation to the axis of the lap and the length of stroke being subject to quick and easy adjustment.

A further object of the invention is to produce a construction in which the tension or pressure of the lens block in relation to the lens and lap may be adjusted while the machine is in operation.

With the general objects named in view and others as will hereinafter appear, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which—

Figure 1 is a top plan view of a machine embodying the invention with the parts occupying the positions shown as the lens is travelling laterally back and forth over the axis of the lap.

Figure 2 is a side elevation of the structure as shown in Figure 1, with the housing broken away to disclose one type of driving transmission.

Figure 3 is a view of the opposite side of the machine as shown in Figures 1 and 2, except that the lens block working arm has been raised by operation of the control handle, to its inoperative position.

Figure 4 is a horizontal section on the line IV—IV of Figure 3.

Figure 5 is a horizontal section on the line V—V of Figure 3, but with certain parts disposed as they appear when the lens is at one of its extremes of arcuate movement.

Figure 6 is an enlarged vertical section through the driving head for oscillating the lens block working arm.

In the said drawings, where like reference characters identify corresponding parts in all of the figures, 1, is a lap detachably mounted on the upper end of a driven shaft 2 journaled in a housing 3. The lens block 4 carries a lens 5 and during the constant rotation of the lap 1, said lens 5 is adapted to be rotated by contact with said lap 1 while the lens 5 is moved back and forth or oscillated in an arcuate path across any desired area of the lap 1, in simulation of hand polishing, as will hereinafter appear. The lens 5 and lens block 4 are held down against the lap with any desired pressure, in accordance with the thickness of the lens, through a spindle 6 fitted in a recess 7 in the back of the lens block 4, as common in the art.

The spindle 6 may be vertically positioned in the end of a working arm 8 by means of a clamp screw 9. The end of said working arm 8 fits in a split clamping sleeve 10, so that by manipulation of a clamp screw 11, said arm 8 may be positioned to adjust the longitudinal axis of the spindle 6 to an angle substantially at right angles to the face of the lap 1 as usual with lens surfacing machines of this general character.

Journaled within the housing 3 is a post or shaft 12, the upper end of said post 12 being provided with a fixed bracket having a pair of spaced ears 13 and 14, one of said ears, 14, being in the form of a quadrant with straight-walled notches 15 rearwardly of its vertical center line, and with ratchet teeth 16 forwardly of its center line. The split clamping sleeve 10 is formed with a pair of spaced ears 17 received between the ears 13 and 14 carried by the post 12. Journaled in alined openings in said ears 13—14 and 17, is a shaft 18, which is encircled by a spring 19, one end of said spring being secured to an abutment collar 20 keyed or otherwise secured to the shaft 18, and the other end of the spring 19 is secured to one of the ears 17 of the split sleeve 10.

In order to tension the spring 19 to force the split sleeve 10 to rock in a vertical plane on the shaft 18 and cause the arm 8 carrying the spindle 6 to press the lens 5 against the lap 1, one end of said shaft 18 is secured to an operating handle 21 having a spring-advanced dog 22 for cooperative engagement with the notches 15 or with the ratchet teeth 16. The operation of the dog 22 is controlled by a push-rod 22a carried by the handle 21. When the operating handle 21 is thrown forwardly to the position shown in Figures 1 and 2, the shaft 18 has been rotated to tension the spring 19 to yieldingly press the lens 5 against the lap 1. When the tension or pres-

sure applied by the arm 8 is to be relaxed or released, the dog 22 is withdrawn from a tooth 16, which permits reaction of the spring 19 to swing the handle 21 rearwardly. By preference the parts are so proportioned that when the handle 21 reaches a median point in its total arc of possible travel, all of the tension on the spring 19 will have been released. Further rearward manual swinging movement of the handle 21 will, through the connection of the spring 19 and the shaft 18 with the arm 8, effect upward swinging movement of said arm to withdraw the spindle 6 from the lens block 4 (see Figure 3). The arm 8 may be locked at any desired point of inoperative position by permitting the dog 22 to engage one of the notches 15.

In order to oscillate the post 12 to impart corresponding arcuate travel to the lens 5 in relation to the lap 1, the post 12 is encircled by a split collar 23, said collar 23 being adapted to be clamped by means of a hand operated clamp 24, in other words, when the collar 23 is clamped to the post 12, movement of the former is transmitted to the latter. To impart movement to the collar 23, a constantly driven shaft 25 is journaled in the housing 3, said shaft 25 being connected by any suitable linkage, as by link 26, to an arm 27 on the collar 23. The connection between the shaft 25 and the link 26, is preferably of the crank type. In its preferred form, there is a disk 28 on shaft 25, provided with a diametric slot 29 containing an adjustable slide block 30. A bolt 31 forms the pivot for the adjacent end of the link 26, and said bolt 31 is tapped into the slide block 30 and is adapted to clamp said block 30 at any desired point in the length of the slot 29, as clearly shown by Figures 4 and 6. This adjustment provides for varying the length of the stroke or travel imparted to the link 26, it being apparent that when the vertical axis of the slide block 30 coincides with the longitudinal axis of the shaft 25, no travel will be imparted to the link.

It will be apparent that the operator, knowing the direction of rotation of the shaft 25, by inspection of the position of the slide-block can determine the position of the post 12 in relation to the oscillation of the collar 23, and that by loosening the clamp 24, the post 12 and consequently the working arm 8 and its associated parts, may be positioned as desired, and the clamp 24 reapplied to have any determined point in the oscillation of the lens 5, commence at any determined point in relation to the operating face of the lap 1. With this arrangement, and by shortening or lengthening the stroke through adjustment of the cross-head or slide-block 30, the operator can have the lens 5 travel back and forth on either side of the vertical axis of the lap 1, or he can arrange for the lens 5 to travel over the center axis of the lap 1, or in front of or in the rear of such axis (depending upon the length of the arm 8). It will also be evident that the further forward, that is toward the horizontal in a forward direction, the handle 21 is manipulated, the greater the spring 19 is tensioned resulting in an increase of pressure between the lens 5 and the lap 1.

Although any suitable mechanism may be employed to rotate shafts 2 and 25, the preferred form is shown, in which: 32 is a shaft constantly driven by any suitable source of power (not shown). The shaft 32 carries a pulley 33 which is connected by a belt 34 to a pulley 35 on the shaft 2. The shaft 2 carries a second pulley 36 which is connected by a belt 37 to drive a counter-shaft 38, from which power is transmitted by a belt 39 to a pulley 40 keyed on the shaft 25. With this arrangement, it will be evident that the shaft 25 rotates at a slower speed than the lap-carrying shaft 2.

From the above description, it will be apparent that I have produced a machine embodying all of the features set forth as desirable; and while I have described and illustrated the preferred embodiment, it is to be understood that I reserve the right to all changes within the spirit of the invention and without the ambit of the prior art.

I claim:

1. In a lens working machine, a housing, a lap rotatably suported in said housing, a post journaled in the housing eccentrically of the lap, a yoke carried by the upper end of the post, a shaft journaled in the yoke, a second yoke journaled on the shaft between the arms of the first-named yoke, a spring coiled on said shaft between the arms of the second yoke and having its ends fixed in relation to said second yoke and shaft respectively, a split sleeve carried by said second yoke, a lens working arm rotatably mounted in said split sleeve, clamping means to fix the position of said arm in the sleeve, one end of said arm being adapted to press a lens block against the lap, and a lever non-rotatably mounted on the shaft to rotate said shaft and consequently move the spring to impart movement to the second yoke, sleeve and arm, movement of the lever in one direction tensioning the spring when the arm contacts a lens block resting on said lap, and movement of the lever in the opposite direction releasing tension on the spring and oscillating the second yoke, sleeve and arm away from the lens block and lap.

2. In a lens working machine, a housing, a lap rotatably mounted in said housing, a post journaled in the housing eccentrically of the lap, a yoke carried by the upper end of the post, a shaft journaled in the yoke, a second yoke journaled on said shaft between the arms of the first-named yoke, a spring coiled on said shaft between the arms of the second yoke and having its ends fixed in relation to the second yoke and the shaft respectively, a lens working arm carried by said second yoke and adapted to press a lens block against said lap, a lever non-rotatably mounted on the shaft to rotate said shaft and consequently move the spring to impart movement to the second yoke and arm, movement of the lever in one direction tensioning the spring when the arm contacts a lens block on said lap, and movement of the lever in the opposite direction releasing tension on the spring and oscillating the second yoke and arm away from the lens block and lap.

3. In a lens working machine, a housing, a lap rotatably mounted in said housing, a post journaled in the housing eccentrically of the lap, a yoke carried by the upper end of the post, a shaft journaled in said yoke, an arm journaled on the shaft at one end and having its other end adapted to press a lens block against the lap, a spring coiled on the shaft and having its opposite ends respectively secured to the shaft and to said arm, and a lever non-rotatably mounted on the shaft to rotate the shaft and consequently move the spring to impart movement to the arm, movement of the lever in one direction tensioning the spring when the arm contacts a lens block on the lap, and movement of the lever in the opposite direction releasing tension on the spring and

oscillating the arm away from the lens block and lap.

4. In a lens working machine, a housing, a lap rotatably mounted in the housing, a post journaled in the housing eccentrically of the lap, a yoke carried by the upper end of the post and having one of its ends forming a toothed quadrant, a shaft journaled in said yoke, an arm journaled on the shaft at one end and having its other end adapted to press a lens block against the lap, a spring coiled on the shaft and having its opposite ends respectively secured to the shaft and to said arm, a lever non-rotatably mounted on the shaft to rotate said shaft and consequently move the spring to impart movement to the arm, movement of the lever in one direction tensioning the spring when the arm contacts a lens block resting on the lap, and movement of the lever in the opposite direction releasing tension on the spring and oscillating the arm away from the lens block and lap, and a dog pivotally connected to the lever to selectively engage the teeth of the quadrant to hold a desired spring tension or to retain the arm in desired position of adjustment away from the lens block and lap.

ROBERT F. DUFFENS.