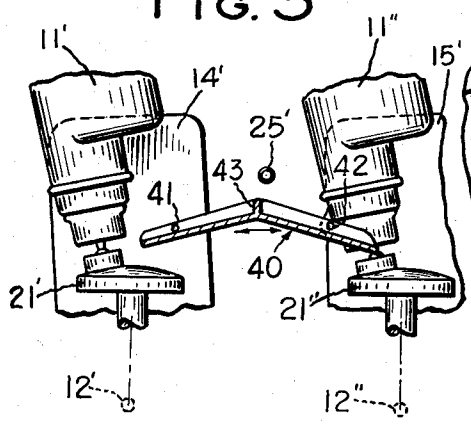
Dec. 22, 1953 J. J. HUNT 2,663,127

ABRADANT SUPPLYING MEANS

Filed Sept. 13, 1952

FIG. 3



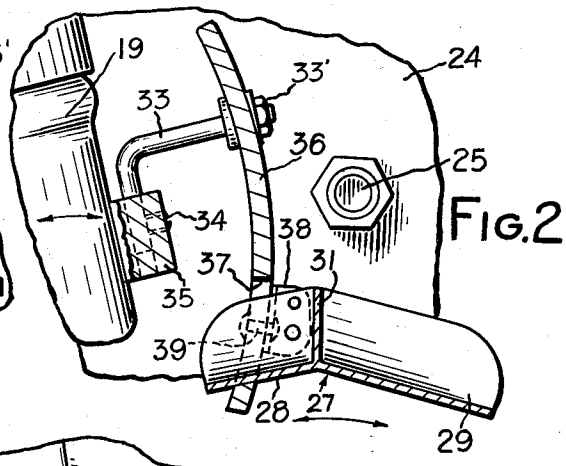


FIG. 2

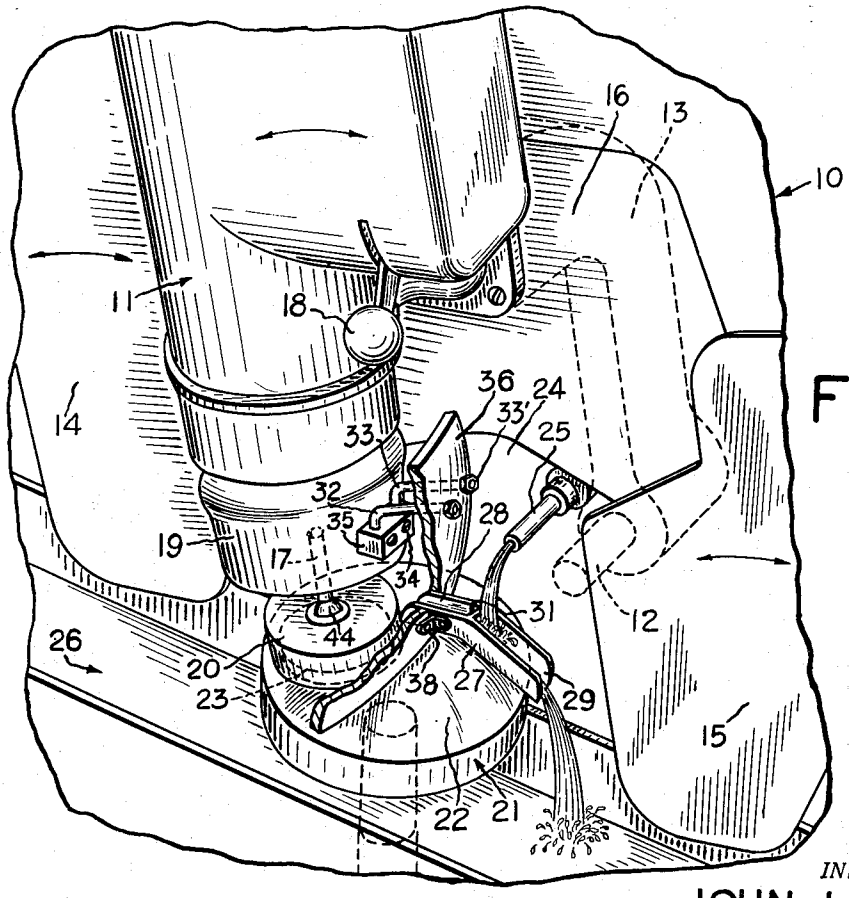


FIG. 1

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ABRADANT SUPPLYING MEANS

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8 Claims. (Cl. 51—263)

1

This invention relates to improvements in lens polishing apparatus and the like and more particularly it relates to means for supplying fluid abradant such as rouge and water to the working surface of a polishing tool.

In polishing lenses, an abrasive, such as rouge, is usually mixed with water and applied to the work at proper intervals by the operator. The application of this mixture of rouge and water has a lubricating effect and, of course, tends to reduce the friction between the polishing tool and the work. As the movement of the polishing tool continues, the friction between it and the work gradually increases as the abrasive mixture evaporates and becomes exhausted. It is important that a fresh application of the abrasive mixture be made at the proper time so as to avoid excessive friction and resulting high temperatures and other conditions which would be detrimental to the lenses or objects which are being polished. On the other hand, it is also important that a certain amount of friction should exist between the polishing tool and the work in order that the polishing operation will be efficiently accomplished. In polishing lenses, for example, on a large scale, it is customary for one operator to attend to a large number of polishing units and make periodical applications of rouge and water. Such a procedure makes it impossible, from a practical standpoint, to supply each polishing unit with an application of rouge and water at the proper time in order to insure the most efficient operation.

Likewise, in the grinding of lenses, an abrasive such as emery and water is applied periodically to the work and it is also important that the abrasive be applied at the proper time in order to insure the desired results and efficiency in operation. Under the prevailing practice the grinding abrasive, such as emery and water, is also applied to the abrading tool by the operator who must attend to a large number of grinding units, thereby making it practically impossible to apply the abrasive so as to insure the greatest grinding efficiency for each individual unit.

By means of my invention, however, I am able to overcome the difficulties due to improper applications of abrasive and provide means for controlling and applying the abrasive so as to insure the greatest efficiency of operation, as will hereinafter be more fully described.

In operating lens polishing machines, for example, the maximum efficiency is obtained when the fluid abradant is applied periodically to the work. Devices for making such periodic applications of abradant automatically have been proposed. In such devices the automatic application of abradant is accomplished by placing valves in the abradant system which are actuated periodically to cut off the flow of abradant. Heat, friction and various other phenomenon of the grinding surface of the tool have been employed to actuate the valves. But generally when the flow had been shut off, the rouge in the abradant mixture settled out rapidly and clogged the circulating system. The settled rouge became so hard that it was often necessary to drill the pipes out to clear the system. Still, a continuous flow of abradant onto the work surface was not advisable, as little or no abrading action could take place when the work surfaces were continually lubricated.

2

Therefore, it is an object of this invention to provide an automatic means for supplying an intermittent flow of abradant to a work surface from a continuously flowing stream of fluid abradant. More specifically, it is an object of this invention to provide an abradant supply mechanism that is fully automatic in operation. Another object of this invention is to provide a mechanism that maintains a continuous stream of abradant in the system. A further object of this invention is to provide a mechanism that has a means for supplying an intermittent stream of abradant to a work surface.

Further objects and advantages of the present invention will appear from the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a general perspective view of a preferred form of my invention incorporated in a polishing machine, some parts being broken away and shown in section,

Fig. 2 is an enlarged side elevation of certain parts of the structure shown in Fig. 1 with some parts broken away and shown in section, and

Fig. 3 is a diagrammatic side view of a modification of my invention with some parts shown in section.

In one form of my invention, such as shown in Figs. 1 and 2, a grinding or polishing apparatus 10 is principally composed of an oscillating head 11, a rotatable lower member 21, an abradant nozzle 25, and an abradant directing trough 27.

The head 11 is mounted to oscillate about pivot 12 through link 13. The splash shields 14 and 16 are fastened to oscillate with link 13 and head 11. Overlapping the shield 16 is a shield 15 which is mounted to oscillate with an adjoining head,

not shown. Extending downwardly from the head 11 is the spindle holder 19 which removably retains the retractable power operated spindle 17. The lever 18 on the head 11 controls the mechanism for raising or lowering said spindle 17. Said spindle 17 acts through a universal coupling 44 to control a lens holding block 20. Element 20 is sometimes referred to as an upper member, it should be understood that this upper member could be a grinding tool without departing from the spirit of this invention. The lens holding block 20 has a lens 23 secured therein with one face exposed for grinding. Disposed below the block 20 is a tool 21 having an abrading surface 22 in contact with lens 23. Element 21 is sometimes referred to as a lower member, it should be understood that a lens block could be substituted for the tool without departing from the scope of this invention.

A supporting shield 36 disposed above the tool is fastened by nuts 33' to bracket arms 32 and 33 which in turn are fastened by set screws 34 to anchor block 35. The anchor block 35 is fastened to the spindle holder 19 by any suitable means. Therefore, when the spindle holder 19 is oscillated about pivot 12, the shield 36 and trough 27 are also oscillated. Likewise, when spindle holder 19 is raised by lever 18, the shield 36 and trough 27 are also raised. The trough 27 can be of any desired shape or construction, such as the inverted V-shaped member shown, having an upstanding wall 31 at the apex dividing the trough into two downwardly directed segments 28 and 29. The one segment 28 of the trough projects through the aperture 37 in the shield 36 and is fastened therein by brackets 38 and screws 39. The trough 27 is disposed in a plane above the contact plane of the tool 21 and lens 23. A stream of abradant flows from a nozzle 25 into the trough. The segment 28 directs the abradant that flows to the left of wall 31 onto the tool, while segment 29 directs the abradant that flows to the right of wall 31 into the overflow channel 26.

A wall 24 of the machine has nozzle 25 lying in a plane above the plane of the trough to eject a continuous stream of abradant material toward the trough. An overflow channel 26 is located below the tool 21 and lens 23 to catch the surplus abradant that flows from the tool or from the trough. The nozzle 25 is part of a circulating system, not fully shown, that supplies a continuous stream of abradant to the abrading apparatus.

Another embodiment of the invention is shown in Fig. 3 wherein a splash shield 14' is mounted to pivot with head 11' about pivot 12' and splash shield 15' is mounted to pivot with head 11'' about pivot 12''. An inverted V-shaped trough 40 is divided into two segments by an upstanding wall 43. One segment of the trough projects over tool 21' and the other segment projects over tool 21''. The trough 40 is supported by pivot 41 on splash shield 14' and by pivot 42 on splash shield 15' so as to oscillate back and forth with the oscillating heads 11' and 11''. Abradant flow nozzle 25' is fixed to a support and projects over the trough 40. When the machine is in operation, a continuous stream of abradant flows from nozzle 25' toward the trough 40 and it is directed intermittently and successively onto the tools 21' and 21'' by the movement of the wall from one side of the stream of abrasive to the other.

In the operation of the embodiment shown in Figs. 1 and 2, the lens 23 and tool 21 are oscillated and rotated relative to each other. As the trough 27 is moved back and forth laterally by head 11 relative to the nozzle 25, the wall 31 is moved through the stream of abradant whereby abradant flows alternately on opposite sides of the wall. In this manner, the tool receives abradant intermittently from that portion of the trough nearest the tool. During the interval when no abradant flows onto the tool, the friction between the tool and the lens will increase and an effective abrading of the lens will result. In this form of the invention, the amount of abradant directed to the tool for each reciprocation of the trough may be changed by adjusting the trough closer to or farther from the spindle holder 19. In this way, the wall 31 stays longer on one side of the stream than on the other, to thereby increase or decrease the amount of abradant flowing to the tool.

In the modification shown in Fig. 3, an equal amount of abrasive compound will be supplied to each tool 21', 21'' by adjusting wall 43 to oscillate equally on opposite sides of continuous flow nozzle 25'. As the trough 40 oscillates, the flow will first be conducted by one part of the trough to the one tool and then by the other part of the trough to the other tool. In this manner, equal amounts of abradant are fed to each set of tools and lens blanks to permit equal abrading of each lens blank.

It has been shown that a continuous stream of abradant material can be maintained without a continuous lubrication of the lens surface. By maintaining a continuous stream of abradant mixture, the rouge or solid material in the mixture does not settle out and clog the circulating system, thus overcoming one of the chief disadvantages of the prior devices. The intermittent flow of compound to the tool permits more rapid abrading of the lenses.

Although only certain forms of my invention have been shown and described in detail, it will be understood that numerous modifications, changes, substitutions and rearrangement of parts may be made without departing from the spirit of the invention as claimed in the appended claims.

I claim:

1. In a lens grinding apparatus including a relatively movable grinding tool and lens holder, a nozzle lying in a plane above the tool for ejecting a continuous stream of abradant material, the combination of means for intermittently directing the stream of abradant material from said nozzle onto said tool, said means comprising a movable trough lying in a plane located between the nozzle and tool, and means for moving the trough to cause a portion thereof to pass through the stream whereby the abradant material is intermittently directed onto said tool.

2. In a lens grinding apparatus having a continuous stream of abradant fed toward the contacting surface of the lens and tool elements that are being rotated and oscillated relative to each other, the combination of means for providing intermittent flow of said abradant to said tool, said means including a movable trough positioned partially over said tool and in the path of the abradant stream, a wall across said trough, means for imparting oscillating motion to said trough to alternately move the wall to opposite sides of the stream whereby the abradant will be intermittently fed onto said tool.

3. A lens polishing apparatus using a solid suspended in liquid as an abradant comprising a

lower rotatable member, an oscillatively mounted upper member contacting said lower member, a nozzle lying in a plane above the lower member for ejecting a continuous stream of abradant material, means for intermittently directing the stream of abradant material from said nozzle onto said lower member, said means comprising a movable trough lying in a plane located between the nozzle and the lower member, and means for moving the trough to cause a portion thereof to pass through the stream whereby the abradant material is intermittently directed onto said tool.

4. A lens polishing apparatus comprising a lower rotatable member, an oscillatively mounted upper member contacting said lower member, a nozzle lying in a plane above the lower member for ejecting a continuous stream of abradant material, a trough mounted to oscillate with the upper member and lying in a plane located between the nozzle and the lower member, a segment of said trough intercepting the stream during a part of each oscillation of said upper member and said trough, said segment directing said intercepted stream onto the lower member, and means for oscillating the upper member and the through whereby the abradant material is directed intermittently onto the lower member.

5. A lens polishing machine having a relatively movable polishing tool and lens holding element comprising a nozzle lying in a plane above the tool for supplying a continuous stream of abradant, means for intermittently directing said abradant to said tool, said means comprising an inverted V-shaped trough for receiving said abradant from said nozzle, an upstanding wall at the apex of and integral with said trough for dividing said trough into two downwardly directed segments, one segment directing abradant onto said tool, and means for producing relative motion between said trough and said nozzle whereby abradant is alternately directed on opposite sides of the wall to provide intermittent flow onto the tool.

6. A lens polishing apparatus using a solid suspended in liquid as an abradant comprising a lower rotatable member, an oscillatively mounted upper member contacting said lower member, a supporting shield secured to said upper member, a trough secured to said shield, a wall dividing said trough into two segments, one segment extending through said shield and lying in a plane above the lower member, a nozzle directing a continuous stream of abradant into said trough and means for simultaneously oscillating the upper member and the trough to alternately move the wall to opposite sides of the stream whereby abradant is directed intermittently into said segment of the trough and onto the lower member.

7. A lens grinding apparatus of the character described comprising two spaced rotatable grinding tools, two spaced oscillatively mounted work holding members in operative relation with said grinding tools, an inverted V-shaped trough having an upstanding wall at an apex for dividing said trough into two downwardly directed segments, each segment terminating in a plane above said tools, a nozzle in a plane above the trough directing a continuous stream of abradant into said trough, said trough being mounted to oscillate with said work holding members to move said wall from one side of the stream of abradant to the other whereby the continuous stream of abradant is directed intermittently onto the respective grinding tools.

8. A lens grinding apparatus of the character described comprising a rotatable tool, an oscillatively mounted head holding a lens in grinding contact with said tool, a nozzle disposed in a plane above the tool for supplying a continuous stream of abradant, a trough divided into two segments by an upstanding wall, said trough being disposed in the stream of abradant and having one segment directing abradant onto said tool, a splash shield carried by the head, said trough being mounted on the shield and having a portion projecting through an opening in the shield, said trough being oscillated with said head to alternately move the wall to opposite sides of the stream whereby an intermittent stream of abradant will be directed onto the tool.

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