

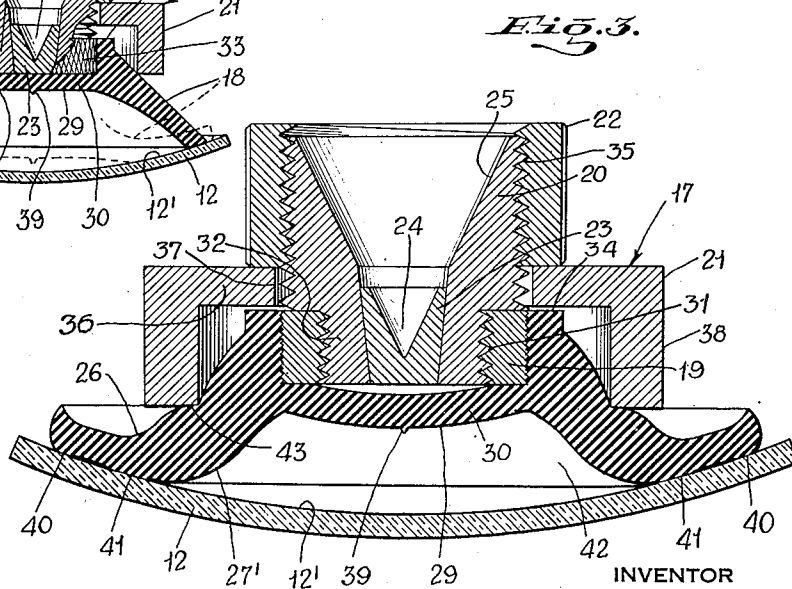
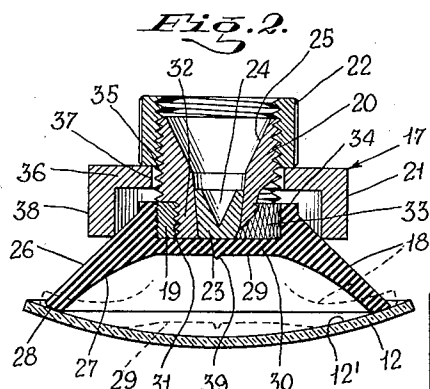
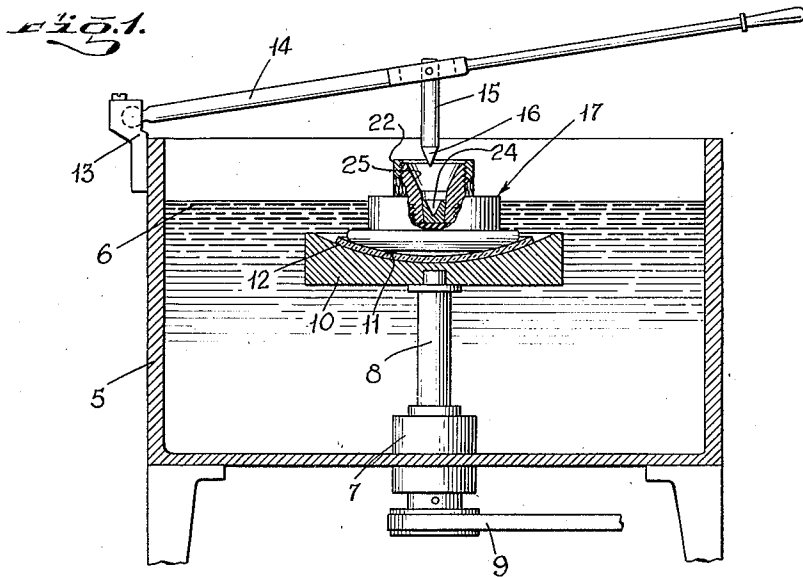
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VACUUM LENS BLOCK

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## VACUUM LENS BLOCK

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6 Claims. (Cl. 51—235)

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This invention relates to what are generally termed blocks for use in supporting lenses during the operation of grinding the same. More particularly, my invention deals with a lens block adapted for mounting primarily upon concaved surfaces of lenses or workpieces in support of the lens or workpiece in the operation of grinding or polishing the opposed or convex surface thereof. Still more particularly, the invention deals with a method of blocking wherein a suction cup and pressure ring are employed in firm support of the cup upon the lens, and further, in providing a block device having a deep seated cone for maintaining the lens guiding or manipulating pin as close to the concaved surface of the lens as possible. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic view illustrating the use of one of my improved blocking devices, parts of the construction being shown in section, and parts in elevation.

Fig. 2 is a sectional view through one of my improved devices, prior to attaching the same to a lens, and indicating in dotted lines the first operation in establishing the attachment; and

Fig. 3 is an enlarged view similar to Fig. 2, showing the device attached to the lens.

The device and method herein disclosed, constitutes a continuation of the structure disclosed in my prior application Serial Number 716,352, filed December 14, 1946.

As set forth in said earlier application, in the grinding and polishing of lenses, it has been customary to employ blocking tools which have been adhered to the lens by the use of a heated pitch or similar agent, which agent has been chilled in establishing secure attachment of the tool to the lens. In this procedure, it has been difficult to center the lens on the blocking tool, and furthermore, the procedure has been expensive from the standpoint of the skill of operators in mounting lens on blocks, and still further, costly in the necessity of having to remove the pitch or other agent from the lens and the necessity of cleaning the blocks in further use thereof. Further, my improved method eliminates all danger of scratching or marring the lenses, which has been experienced by the known processes.

In Fig. 1 of the drawing, I have diagrammati-

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cally illustrated one adaptation and use of my invention, and in this figure, 5 represents a tank in which the grinding or polishing compound is arranged and indicated at 6. Supported in a suitable bearing 7 at the bottom of the tank is a shaft 8 rotated by a suitable driving source through a belt or other drive, as at 9. Supported upon the upper end of the shaft 8 is a grinding tool 10 having a concaved surface 11 for grinding the outer convex surface of a lens or other workpiece 12. Pivoted to one side of the tank 5, as seen at 13, is a lever 14 actuated by hand, in carrying centrally above the tank a freely swinging center pin 15 having a conical lower end 16. This pin is adapted to engage the block generally identified, as 17, in manipulating the block to move the lens over the surface 11 of the grinding or polishing tool 10, as the latter is being rotated at high speed.

The blocking device or tool 17, in the construction shown, comprises six parts, namely a suction cup 18, within which is anchored a sleeve 19, a stud 20, a pressure ring or collar 21, a tightening or pressure nut 22, and a pointer plug 23, the latter being forcefully held in the stud 20 and being preferably formed of hardened material and is provided with a conical seat 24 adapted to receive the conical end 16 of the pin 15. The stud 20 has a conical bore 25 registering with the seat 24, as clearly seen, so that the conical end 16 of the pin 15, is free to pass into and out of the seat 24.

The cup 18 is preferably formed of a rubber of high resilient properties as well as tough characteristics, so as to withstand the stresses and strains to which the cup is subjected. The cup has a substantially straight outer conical surface 26 joining a slightly curved inner surface 27 in a pointed peripheral edge 28. The surfaces 26 and 27 are contracted slightly in the direction of the peripheral edge as clearly seen in Fig. 2 of the drawing, and the rounded concaved inner surface 27 joins a flat center surface 29. The flattening of the surface 29 enables the sleeve 19 to be maintained in close proximity to the surface 29, leaving a relatively thin wall 30. The sleeve 19 is internally threaded, as seen at 31, to receive the reduced externally threaded portion 32 of the stud. The outer or peripheral surface of the sleeve 19 is knurled, as seen at 33, in Fig. 2, to establish firm anchorage of the sleeve in the cup retaining the same against rotary, as well as axial movement. The outer end of the sleeve 19 terminates flush with the upper flat surface 34 of the cup. The stud 20 has a large diameter ex-

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ternal thread 35 adapted to be engaged by the nut 22. The ring or collar comprises a horizontal wall portion 36 with an aperture 37 therein to freely pass over the enlarged threaded end 35 of the stud 20 and a depending annular wall portion adapted to cooperate with the surface 26 of the cup, as later described.

In the use of my improved blocking tool, the cup 18 of the tool is first centered approximately upon the lens 12, using as a guide, the center marking 39, shown in Figs. 2 and 3, with the several parts of the tool partially assembled, as indicated in Fig. 2, whereupon the tool is pressed in the direction of the concaved surface 12' of the lens 12 which brings the cup 18 substantially into the position shown in dotted lines in Fig. 2, with the surface 29 closely adjacent the central portion of the surface 12'. When in this position, the final adjustment and centering of the cup 18 upon the lens is performed, after which the screw 22 is now tightened so as to force the pressure ring or collar 21 or the depending portion 38 thereof downwardly upon the surface 26 of the cup, while at the same time, drawing the center portion of the cup upwardly, the result of which is indicated at least diagrammatically in Fig. 3 of the drawing.

Upon completing this operating, bringing the parts to a position substantially similar to that shown in Fig. 3, the outer portion of the cup 18 will have established at least two annular pressure contacts upon the convex surface 12' of the lens 12, one in a relatively narrow annular band, represented by the light lines, as indicated at 40 in Fig. 3, and the other by a wider annular band, as at 41 in said figure, the latter band establishing the firmest engagement of the cup 18 with the lens. Whereas, the band 40 is sufficiently tight to form a seal preventing fluid or grinding compound or material entering between the cup and the surface of the lens. In this connection, it may be said that the band 41 comprises the primary band and the band 40, the secondary band.

In the above operation of securing the cup to the lens, the inner surface 27 takes a convex curvature, as indicated at 27', Fig. 3, closely adjacent and inwardly of the band 41. On the other hand, the wall 30 including the surface 29 thereof is convexed downwardly, the latter being the result of the vacuum or suction in the chamber 42.

In Fig. 3, the relative positions of the parts are exaggerated from a standpoint of clarity. In some instances, the degree of movement of the parts relative to each other will be materially varied, depending here also upon the curvature of the lens.

Keeping in mind that the wall portion 38 of the ring or collar 21 is engaging the conical surface 26, the pressure engagement with the collar is such as to establish the excessive pressure engagement of the cup with the lens in the band 41, at a position substantially as indicated in Fig. 3, or in other words, at a point inwardly with respect to the engagement of the wall 38 with the cup, as indicated at 43.

The blocking tool assembled with the lens, as indicated above, may now be placed in the apparatus, and upon grinding or polishing, the tool 10 and the pin 15 are moved into engagement with the tool to manipulate the lens in the manner stated above. After the lens or other work-piece 12 has been ground or polished, the blocking tool or device is removed from the lens by simply loosening the nut 22 to relieve the pressure of the collar upon the cone 18, after which the pe-

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riphery of the cone may be flexed away from the lens allowing air to enter the chamber 42, which will quickly free the device from the lens.

My improved device may be used in conjunction with lenses of any type and kind, and regardless of the contour of the surface engaged by the tool. The tool, however, is particularly adaptable for use in mounting upon concaved surfaces, but will establish a firm engagement with flat or other surfaces.

It will be apparent that the plug 23 is tapered, to facilitate removal of the plug for replacement when the same becomes worn. The same can be readily driven from the stud or member 20 when the latter is detached from the cup or the sleeve 19 thereof. It will also be apparent that the conical bore 25 is made with a wide throat to facilitate movement of the pin 15 therein in manipulating the block in the operation of grinding or polishing the lens.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the character described comprising a suction cup, an internally threaded sleeve embedded axially in the cup and exposed through one end thereof, said cup being substantially conical in form, the walls of the cup contracting to the outer peripheral portion thereof, the other surface of the cup within the cone being flat centrally and axially thereof, a member in threaded engagement with the sleeve, a pressure ring mounted on said member, said ring having a horizontal wall and an annular wall depending at right angles to said horizontal wall, said annular wall engaging the walls of the cup in applying pressure thereto, and a nut adjustable on said threaded member in applying pressure to said ring while simultaneously drawing the central portion of the cup in a direction opposite to the applied pressure to said cup by said ring.

2. A suction cup device of the character described comprising a substantially conical cup body of yieldable material, a threaded member anchored to the axial portion of said body, a ring for applying pressure to the outer surface of said body between the axial and peripheral portions thereof, means coupled with the threaded member engaging the ring to move the same into engagement with said body to establish two circumferential pressure area engagements of the inner surface of said body with a supporting surface, one pressure area being adjacent the ring and the other at the periphery of the cup body, said threaded member comprising a part anchored in said body and a stud detachable with respect to said part, and said stud having a conical recess.

3. A suction cup device of the character described comprising a substantially conical cup body of yieldable material, a threaded member anchored to the axial portion of said body, a ring for applying pressure to the outer surface of said body between the axial and peripheral portions thereof, means coupled with the threaded member engaging the ring to move the same into engagement with said body to establish two circumferential pressure area engagements of the inner surface of said body with a supporting surface, one pressure area being adjacent the ring and the other at the periphery of the cup body, said threaded member comprising a part anchored in said body and a stud detachable with respect to said part, and said stud having a conical recess, and a conical tapered plug detachable with respect to said stud.

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4. In suction cup devices of the character described, a conical cup body of yieldable material, a threaded sleeve anchored in said body, a stud detachable with respect to said sleeve, a tapered plug detachable with respect to said stud, said plug and stud having registering conical recesses, and the conical recess of said stud extending, at its outer end, to a point adjacent the outside diameter of the stud to provide a wide entrance throat.

5. In suction cup devices of the character described, a conical cup body of yieldable material, a threaded sleeve anchored in said body, a stud detachable with respect to said sleeve, a tapered plug detachable with respect to said stud, said plug and stud having registering conical recesses, the conical recess of said stud extending, at its outer end, to a point adjacent the outside diameter of the stud to provide a wide entrance throat, inner ends of the stud and plug terminating adjacent the inner central surface of said body, and the conical recess of said plug extending to a point adjacent said inner surface of the body.

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6. In suction cups of the character described, a conical cup body of yieldable material, means centrally of said body and exposed through the outer surface thereof for attaching the body to a supporting surface, said means comprising a device embedded and anchored in the central portion of the cup body, said device having means forming a deep conical recess opening outwardly through said device, a pressure ring for engaging the cup body, and means adjustable on said device for urging said ring in engagement with said cup body.

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