

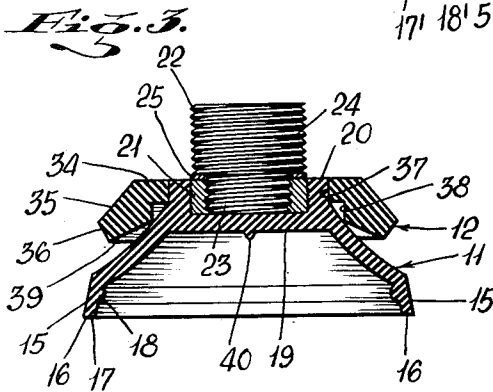
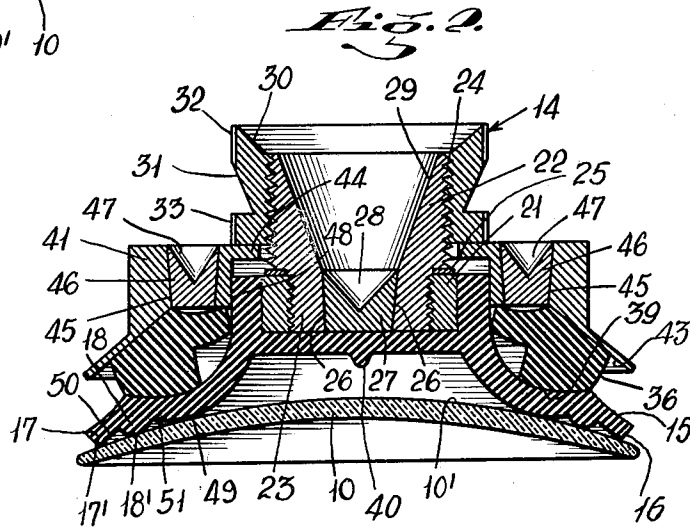
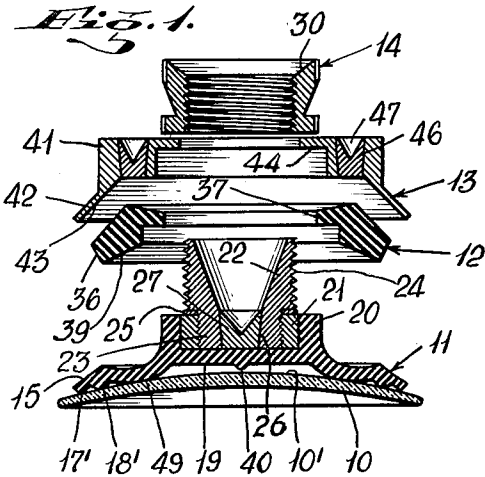
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LENS BLOCK

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LENS BLOCK

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This invention relates to lens blocks for supporting lenses in the operation of grinding and polishing the same. More particularly, the invention deals with a lens block construction wherein means is provided for pressing a suction cup so as to provide three circumferential or annular pressure engaging surfaces of a cup with a lens, while the central portion of the cup is drawn away from the lens. Still more particularly, the invention deals with a lens block of the type under consideration having means for coupling various operating tools therewith and in providing a rigid or substantial pressure cone for supporting the cup on the lens. Further, the invention deals with the construction of a novel suction cup for engagement with the lens or other support.

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 an exploded view of the several primary parts of a lens block, made according to my invention, illustrating one part in its normal attachment with a lens or other support.

Fig. 2 is an enlarged sectional view showing the assemblage of the parts, and attachment of the block to a lens; and

Fig. 3 shows the mounting of the pressure ring on the suction cup, with the suction cup in normal position.

Lens blocks of the type and kind under consideration are adapted for mounting in connection with grinding and polishing machines of various types and kind, and the present invention deals with a block adapted for mounting and operation in machines having different types and kinds of operating tools or members.

In the accompanying drawing, in Figs. 1 and 2, I have shown at 10, a lens or other support in connection with which a block device made according to my invention is adapted to be secured in the support of the lens in the operation of grinding and polishing the same. Considering Fig. 1, the block may be said to comprise four primary detachably connected parts, namely the cup part 11, the pressure ring 12 and the pressure cone 13, also the clamping nut 14. These parts are shown in an exploded relationship with respect to each other in Fig. 1. They are shown in assembled operative position in Fig. 2, and in Fig. 3, two of the parts are in

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normal assembled relationship, namely the cup 11 and the ring 12.

The cup 11 comprises a substantially conical cup body having an inwardly bevelled and substantially perpendicular peripheral wall 15. The wall 15 has a slightly bevelled lower surface 16 which forms a ridge or projection 17 at the inner surface of the cup. Inwardly of the ridge 17, the inner surface of the wall 15 has a circumferential rib or enlargement 18, and the ridge 17 and rib or enlargement 18 defines in the operative use of the cup, two annular or circumferential pressure areas of engagement with the lens 10, as at 17' and 18' respectively, note Fig. 2.

The central portion of the upper end of the cup 11 has a transversely straight bottom wall 19 forming an inner closure for an enlarged hub portion 20. Suitably anchored in the hub portion 20 is an internally threaded sleeve 21, any means being provided on the outer surface thereof for anchorage in the hub 20 to prevent rotation and displacement of the sleeve. At 22 is shown a stud having a reduced externally threaded lower end 23 for engagement with the sleeve 21, the larger upper end 24 of the stud being externally threaded and being adapted to seat upon a washer 25. The bore of the stud 22 has at its inner end, a small diameter tapered bore 26, adapted to receive a plug 27, having a conical upper surface as at 28. At the upper portion of the stud is an enlarged tapered bore 29, the inner contracted end of which registers with the conical recess 28 in the plug 27, as clearly seen in Fig. 2 of the drawing. The nut 14 is internally threaded to engage the threaded end 24 of the stud 22 and the outer end of the nut has a conical recess as at 30 to aid in guiding a tool into the conical bore 29. The outer surface of the nut is recessed, as seen at 31, to form two milled or other gripper surfaces 32 and 33 on said nut, facilitating operation thereof in attaching the block to a lens or other support.

The pressure ring 12 is preferably composed of yieldable material, such as rubber, as is also the cone 11, and this ring has a slightly conical upper surface 34 meeting with a downwardly bevelled outer surface 35, which in turn registers with an inwardly bevelled lower periphery 36. The bore 37 of the ring 12 is adapted to fit freely, but snugly, on the hub 20 of the cup, the bore being enlarged, as seen at 38, at the lower portion thereof, and this enlargement joins the bevel 36 in a lower bevelled wall 39, the bevel of which is preferably slightly different from the

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bevel or taper of the conical cup 11, as clearly seen in Fig. 3 of the drawing. The bottom wall 19 of the cup has a center projecting indicator 40 to facilitate centralizing the lens 10 or other support on the cup, particularly when the parts are in the position as seen in Fig. 1 of the drawing.

The pressure member or pressure cone 13, in the construction shown, comprises a comparatively heavy annular ring-like body 41, terminating at its lower end in an outwardly flared conical portion 42, the inner surface 43 of which extends onto the body 41. The upper surface of the body 41 has a relatively narrow inwardly protruding flange portion 44, which is of sufficient diameter to fit freely over the stud 22, but is of less inside diameter than the outside diameter of the hub 20. The body 41 has two or more tapered bores 45 arranged closely adjacent the greatest diameter of the nut 14 and in these tapered bores are fitted plugs 46 having conical upper recesses 47 to receive tools for guiding and supporting the lens block in the operation of moving the lens supported thereon with respect to grinding and polishing tools. In one instance, the guide and supporting tools engage two opposed plugs 46, whereas in other types of machines, a single tool is adapted to be arranged in the recess 28 of the plug 27 in support and guide of the block. It will clearly appear from a consideration of Fig. 2 of the drawing, that the larger diameter bore 48 of the body 41 is adapted to fit freely over and move relatively to the hub portion 20 of the cup 11.

In the use of my improved device, the suction cup 11 is first pressed by hand onto a lens or other support in the manner illustrated in Fig. 1 of the drawing, the cup being centralized with respect to the lens in this operation by utilizing the indicator 40. In this operation, the cup has been flexed so that the bottom wall 19 is brought into close proximity to the surface 10' of the lens, the pressure areas 17' and 18' have been established to some extent and the wall structure of the cup has been brought into close proximity to the surface 10' to establish a partial inner and primary pressure area 49. The pressure area 49 in the normal position of the cup as seen in Fig. 1 is only slight, and might produce a relatively narrow engagement with respect to radial dimensions.

With the cup attached to the lens, as shown in Fig. 1, the next operation is to place the pressure ring 12 in position, with the bore 37 arranged around the hub 20. Now the cone or pressure member 13 is placed in position on top of the ring 12, after which the nut 14 is coupled with the stud 22, and the nut is now tightened so as to push down on the pressure member or cone 13, including the ring 12, while at the same time, drawing the central portion of the suction cup 11 upwardly or away from the surface 10'. This operation is continued until the cup is firmly secured in position, and in Fig. 2, the parts are shown in their final assembled position.

In firmly securing the block to the lens, the surface 39 of the pressure ring is pressed downwardly upon the wall structure of the cup to securely retain the pressure areas 17' and 18' upon the surface of the lens and to materially increase the pressure area, as at 49, the latter becoming the primary securing and sealing area of the cup on the lens. The area 18' becomes a secondary pressure area, whereas the area 17' becomes a third and sealing pressure area. This

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last pressure area serves primarily to prevent moisture, grinding compounds and the like from entering beneath the surface of the suction cup or to enter the annular chamber as at 50, between the pressure area 17' and the pressure area 18'.

Another annular chamber 51 is provided between the pressure areas 49 and 18'. In the operation of securing the parts together, distortion of the rubber body of the suction cup, as well as that of the pressure ring takes place, and while some of this distortion is diagrammatically illustrated, no attempt is made in the present illustration to accurately show the actual structural changes which take place.

The heavy body of the pressure member or cone, concentrates the pressure to the outer peripheral portion of the ring, or upon the outer conical surface 35 thereof, so that this pressure is transmitted to the body of the cup inwardly of the wall 15, and also through said wall to the enlargement 18 and the ridge 17. It will be understood that a device of the kind under consideration may be utilized for mounting on supports of any type or kind in providing a substantially positive engagement of the device with the support, or positive mounting of the support on the device to prevent relative shifting or displacement of the parts. In the specific uses as herein mentioned, namely the support of lenses for grinding and polishing, it is essential that the lens be firmly supported in position, and in such manner as to withstand the operation of the grinding and polishing tools upon the lens.

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

1. In devices of the character described, a suction cup comprising a closed conical body defined by a bottom wall and an outwardly flared annular wall, said outwardly flared annular wall terminating at its periphery in an annular angularly and downwardly extending flange, an upwardly extending hub portion centrally of the cup, means anchored within said hub portion for detachably coupling a stud member therewith, said stud member having an externally threaded portion, a nut on said threaded portion a compression ring mounted on said cup and adapted to engage the wall portion thereof intermediate the flange and said hub, a conical member mounted on the hub of the cup and moved by said nut to apply pressure to said ring and the cup, the inner surface of the flange of said cup having an annular inwardly projecting rib inwardly of and spaced from the peripheral edge of said flange, and said rib in combination with the edge portion of the flange forming two radially spaced annular pressure engagements of the cup with a supporting surface.

2. In devices of the character described, a suction cup comprising a closed conical body defined by a bottom wall and an outwardly flared annular wall, said outwardly flared annular wall terminating at its periphery in an annular angularly and downwardly extending flange, an upwardly extending hub portion centrally of the cup, means anchored within said hub portion for detachably coupling a stud member therewith, said stud member having an externally threaded portion, a nut on said threaded portion a compression ring mounted on said cup and adapted to engage the wall portion thereof intermediate the flange and said hub, a conical member mounted on the hub of the cup and

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moved by said nut to apply pressure to said ring and the cup, the inner surface of the flange of said cup having an annular inwardly projecting rib inwardly of and spaced from the peripheral edge of said flange, said rib in combination with the edge portion of the flange forming two radially spaced annular pressure engagements of the cup with a supporting surface, and the wall portion of the cup inwardly of said rib forming, when pressure of the ring is applied thereto, another and primary annular pressure surface engagement with the support.

3. A device of the character described comprising a closed suction cup, a ring of yieldable material encircling the cup, a member for applying pressure to the ring, means centrally of the cup and adjustable longitudinally of the axis thereof for moving said member to apply pressure to the ring while drawing upwardly on the central portion of the cup, the cup having means forming two radially spaced circumferential pressure bands of engagement of the cup with a supporting surface, one of said bands being formed by an inwardly projecting annular rib on the inner surface of the cup inwardly of and adjacent the peripheral edge thereof, and a third primary circumferential band formed by pressure engagement of said ring with the wall of the cup.

4. A device of the character described comprising a closed suction cup, a ring of yieldable material encircling the cup, a member for applying pressure to the ring, means centrally of the cup and adjustable longitudinally of the axis thereof for moving said member to apply pressure to the ring while drawing upwardly on the central portion of the cup, the cup having means forming two radially spaced circumferential pressure bands of engagement of the cup with a supporting surface, one of said bands being formed by an inwardly projecting annular rib on the inner surface of the cup inwardly of and adjacent the peripheral edge thereof, that part of the cup having the annular rib thereon comprising a flange extending angularly and downwardly to the adjacent body portion of the cup, and a third primary circumferential band formed by pressure engagement of said ring with the wall of the cup.

5. A device of the character described comprising a closed suction cup, a ring of yieldable material encircling the cup, a member for applying pressure to the ring, means centrally of the cup and adjustable longitudinally of the axis thereof for moving said member to apply pressure to the ring while drawing upwardly on the central portion of the cup, the cup having means forming two radially spaced circumferential pressure bands of engagement of the cup with a supporting surface, one of said bands being formed by an inwardly projecting annular rib on the inner surface of the cup inwardly of and adjacent the peripheral edge thereof, that part of

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the cup having the annular rib thereon comprising a flange extending angularly and downwardly to the adjacent body portion of the cup, a third primary circumferential band formed by pressure engagement of said ring with the wall of the cup, said member comprising a thick wall ring-like body, said body having spaced tapered apertures, and conical plugs seated in said apertures.

6. A device of the class described comprising a closed conical suction cup of yieldable material, the cup having a central hub portion, means embedded in the hub portion for mounting and actuating said cup, the peripheral portion of the cup having an angularly and downwardly extending flange, the inner surface of said flange having an inwardly extending circumferential rib inwardly of and spaced from the peripheral edge of said flange, and means adjustable with respect to said first named means for applying downward pressure on the peripheral portion of the cup while drawing upwardly on the central portion of the cup in providing three distinct annular pressure area engagements of the cup with a supporting surface, namely said rib, the body of the cup inwardly of the rib and the peripheral edge of said cup.

7. A device of the class described comprising a closed conical suction cup of yieldable material, the cup having a central hub portion, means embedded in the hub portion for mounting and actuating said cup, the peripheral portion of the cup having an angularly and downwardly extending flange, the inner surface of said flange having an inwardly extending circumferential rib inwardly of and spaced from the peripheral edge of said flange, means adjustable with respect to said first named means for applying downward pressure on the peripheral portion of the cup while drawing upwardly on the central portion of the cup in providing three distinct annular pressure area engagements of the cup with a supporting surface, namely said rib, the body of the cup inwardly of the rib and the peripheral edge of said cup, said second named means comprising an annular member having a conical surface, and means at circumferentially spaced intervals of said member adjacent the hub of the cup for receiving a tool in predetermined support of the cup.

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