May 28, 1963 J. M. SUDDARTH 3,091,062

LENS DE-BLOCKING DEVICE

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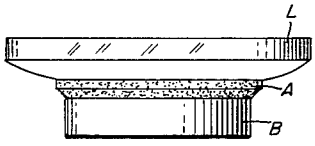


FIG. 1

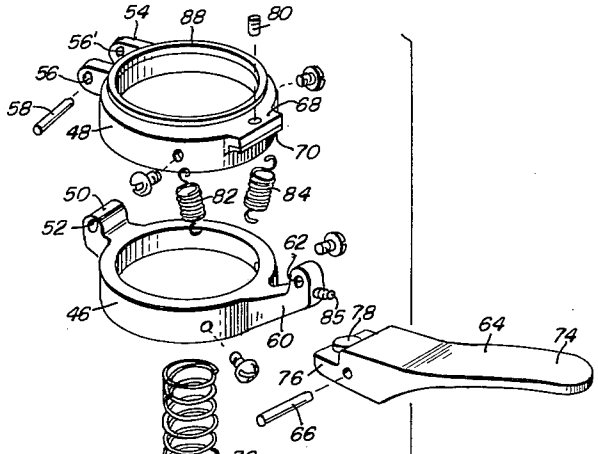


FIG. 2

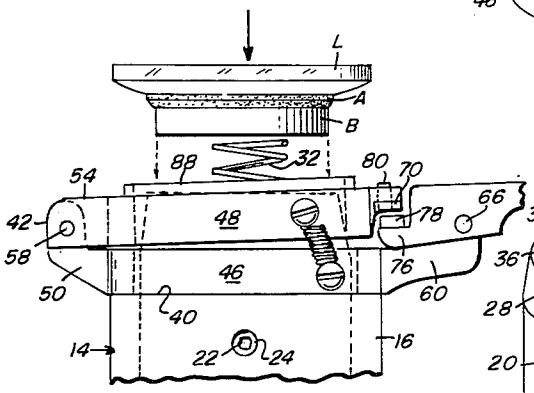
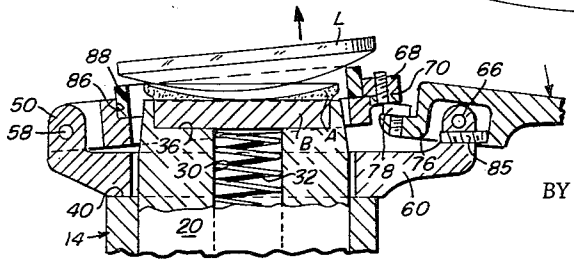


FIG. 3

FIG. 4



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LENS DE-BLOCKING DEVICE

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This invention relates to an apparatus for removing a chucking block from a lens blank after the lens blank has been through an abrading process. More specifically, the invention relates to a hand operated device for efficiently removing a metallic block from the lens surface through the use of very slight pressure and without the use of chemicals.

In the process of generating a lens surface, or in beveling its periphery with conventional grinding and abrading equipment known to the art, it is necessary to attach a chucking block to one surface of the lens blank in order that it may be firmly held and accurately positioned with respect to the cutting tools. The fragile nature of the lens blank makes direct chucking undesirable. There are various methods of attaching the block to the lens and the disclosed embodiment is specifically concerned with removing circular blocks, which are secured to the surface of a lens via a low melting point alloy, from the convex surface of a lens blank.

An objective of this invention is to provide a device which mechanically removes the chucking block from the lens with greatly reduced incidence of lens breakage.

A further objective of the invention is to provide an apparatus for removing a chucking block from a lens and which apparatus is inexpensive in its manufacture and rugged and simple in its operation.

A further objective of this invention is to provide a lens de-blocking device in which the lens surface is engaged by a ring-like member such that an operator may cause a progressive separating force from one side of the lens to the other.

A still further objective of the invention is to provide means whereby the above-mentioned progressive line of force may commence along any selected diameter of the lens.

A further objective of the invention is to provide an apparatus of the character described in which the elements are so constructed that wear plates are conveniently mounted and are readily replaced to increase the life of the device itself.

These and other important objectives and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment of the invention, and wherein:

FIGURE 1 is a side elevation of a lens blank having a chucking block secured thereto;

FIGURE 2 is an exploded perspective of the principal elements of this invention;

FIGURE 3 is a partial side elevation showing the assembled elements just prior to inserting the lens block assembly into the apparatus; and

FIGURE 4 is a cross-sectional view showing the elements in their lens de-blocking position.

Referring now more particularly to the drawings wherein like numerals indicate like parts, the numeral **10** designates the presently preferred embodiment of this invention. The embodiment is provided with a base **12** from which a cylindrical standard **14** upwardly extends.

The standard consists of an annular wall **14**, and is

bottomed at **18** by a portion of base **12**. A spindle **20** is received in the standard **14** and is fixedly secured thereto by an Allen screw or the like **22** through the threaded apertures **24** and **26**, of the standard and spindle respectively. The cylindrical spindle is tapered about its upper end at **28**. The spindle is centrally bored at **30** to receive a coil spring **32**, and about the upper surface thereof, is provided with an upwardly extending annular flange **34** which defines a block receiving pocket or seat **36**. The inner periphery **38** of wall **36** is vertical, and the outer periphery is defined by the previously mentioned taper **28**. The flange **34** is terminated by the annular upper edge **39**.

Between the spindle **20** and the wall **16** a ledge **40** is formed. An expanding ring assembly **42** is adapted to slide over the spindle **20** and be rotatably supported on ledge **40**. The assembly **42** is comprised of a first lower ring **46** and a second upper ring **48** of substantially the same dimensions.

The lower ring is formed with an outwardly and upwardly extending arm **50** which is apertured at **52**. Formed along the periphery of upper ring **48**, adjacent to arm **50**, is a bifurcated arm **54** which is apertured at **56** and **56'**. Arms **50** and **54**, along with pin **58**, form a pivotal connection between the rings.

Diametrically opposed to the arm **50**, the lower ring is provided with an outwardly and upwardly extending arm **60** which is apertured at **62**. Pivotally secured to arm **60** is an operating lever **64** by way of a pin **66**. Immediately above the arm **60**, and spaced therefrom, a bearing lug **68** protrudes from upper ring **48**. A wear plate **70** is secured to the underside of lug **68** via the screw **72**.

The operating lever is comprised of a handle **74**, a fulcrum recess **65** through which pin **66** extends, and a forwardly extending boss **76** which is received in the space between the lug **68** and arm **60**. A screw **78**, having a wear plate head **80**, is secured to the boss in mating relationship with wear plate **70**.

A pair of biasing springs **82** and **84** extend between the upper and lower rings and maintain the wear plates **70** and **78** in engagement with one another. The springs normally bias the rings **46** and **48** toward each other to a substantially edge-to-edge relationship. A screw **85** extends through arm **60** below the pivot point, and will adjustably limit the pivoting movement of the operating lever by engaging a side wall of recess **65**. The upper ring is counterbore at **86** to receive an annular fiber member **88**. As will become more apparent hereinafter, the fiber member provides a relatively non-abrasive contact surface between the apparatus and the lens blank.

In FIG. 1 there is shown a lens blank L secured to a circular block B by the previously mentioned low melting point alloy A. It is common practice to coat the convex side of the lens with a quick dry plastic prior to applying the alloy. This coating protects the lens surface and makes block removal an easier operation.

The assembled elements are shown in cross-sectional elevation in FIG. 3, just prior to the insertion of the workpiece. It should be noted that in the assembled arrangement, the upper edge of fiber ring **88** extends slightly above the upper edge **39** of the seat and the coil spring **32**, in its expanded condition, extends well beyond the confines of seat **36**. The work-piece is lowered by an operator into the seat **36**, against the bias of spring **32** until fiber ring **88** is in annular surface contact with the convex side of the lens L. This may, or may not be, at the point where the bottom of the block engages bottom **18**.

The close tolerance between the inner periphery of the seat and the outer periphery of the block substantially prevents any tilting of the block. Referring to FIG. 4 in particular, it can be seen that as the handle 74 is depressed, that portion of the ring 48 adjacent the lug is tilted upwardly, causing the lens blank to tilt away from the block B. The taper 28 facilitates the tilting of the upper ring. Since the annular upper surface of the fiber ring 38 is spaced from pivot pin 58, the top edge of the fiber ring, which is in annular engagement with the lens, exerts a continuous progressive force from left to right, as viewed in FIG. 4. This progressive force along two semi-circular arcuate lines provides an annular line of force about the lens blank which greatly reduces the amount of breakage encountered in other lens de-blocking devices. In those instances where an operator is confronted with a particularly tight bind between the lens and block, the operator can rotate the ring assembly 42 about the spindle 20, while repeatedly depressing handle 64, until a point about the seal is found that is weak enough to break.

Since the block itself cannot tilt, because of the close tolerances between it and the inner periphery of the seat, no other apparatus is required to vertically secure it with respect to the lens blank. When the upper ring applies the pressure to the lower surface of the lens the lens block, of course, due to a tendency to tilt, will bind itself slightly within the seat. A slight tap on the block will normally break the bind and along with the spring the block is easily removable from the seat, and the device is ready to receive another workpiece.

In a general manner, while there has been disclosed in the above description, what is deemed to be the most practical and efficient embodiment of the invention, it should be well understood that the invention is not limited to such an embodiment as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

I claim:

1. A device for removing a block from the surface of a lens blank comprising a base, a standard of lesser cross-section than said base extending upwardly therefrom and defining a step with said base, an upwardly extending flange about the top of said standard defining a seat having an inner wall configuration closely approximating the outer periphery of said block, a base ring rotatably received about said standard and support by said ledge, an upper ring about said standard pivotally secured to said base ring, said upper ring having a first position wherein its upper edge is parallel to and slightly above the upper edge of said flange and is in engagement with the surface of said lens when said block is inserted in said seat, and means to tilt said upper ring from said base ring whereby said lens is tilted away from said block.

2. A device for removing a block from the surface of a lens blank comprising a base, a standard of lesser cross-section than said base extending upwardly therefrom and defining a step with said base, an upwardly extending flange about the top of said standard defining a seat having an inner wall configuration closely approximating the outer periphery of said block, a first ring rotatably received about said standard and support by said ledge, and a second ring about said standard pivotally secured to said base ring, said second ring having a first position wherein its upper edge is parallel to and extends slightly above the upper edge of said flange and in engagement with the surface of said lens when said block is inserted in said seat, and means to tilt said first ring upwardly from said base ring such that said lens is tilted away from said block by a pressure exerted by said second edge.

3. A device for removing a block from the surface of a lens blank comprising, a base, a standard of lesser cross-section than said base extending upwardly therefrom and defining a step with said base, an upwardly extending flange about the top of said standard defining a seat having a vertical inner wall configuration closely approximating the outer periphery of said block and an inwardly directed taper along the outer wall thereof, a lower ring rotatably received about said standard and supported by said ledge, an upper ring about said taper and pivotally secured to said base ring, said upper ring having a first position wherein its upper edge is parallel to and extends slightly above the upper edge of said flange and is in engagement with the surface of said lens when said block is inserted in said seat, and means to tilt said upper ring from said base ring whereby said lens is tilted away from said block.

4. A device for removing a block from the surface of a lens blank comprising a base, a standard of lesser cross-section than said base extending upwardly therefrom and defining a step with said base, an upwardly extending flange about the top of said standard defining a seat having a vertical inner wall configuration closely approximating the outer periphery of said block and an inwardly directed taper along the outer wall thereof, a lower ring rotatably received about said standard and supported by said ledge, an upper ring about said taper and pivotally secured to said base ring, a coil spring in said seat, said upper ring having a first position wherein its upper edge is parallel to and extends slightly above the upper edge of said flange and is in engagement with the surface of said lens when said block is inserted in said pocket, and means to tilt said upper ring from said base ring to a second position whereby said block is unable to tilt in said seat, said lens is tiltable away from said block by said lever, and said coil spring aids in removing said block from said seat after the lens is separated from said block.

5. A device for removing a block from the surface of a lens blank comprising a base, a standard of lesser cross-section than said base extending upwardly therefrom and defining a step with said base, an upwardly extending flange about the top of said standard defining a seat having an inner wall configuration closely approximating the outer periphery of said block, a lower ring rotatably received about said standard and supported by said ledge, an upper ring about said standard, means pivotally securing said lower ring to said ring at a first point along their peripheries, said upper ring having a first position wherein its upper edge is parallel to and extends slightly above the upper edge of said flange and is in engagement with the surface of said lens when said block is inserted in said seat, an operating lever pivotally attached to said lower ring at a second point diametrically opposed to said first point, one end of said lever in contact with the lower edge of said upper ring whereby when the other end of said lever is depressed, said upper ring and said lens are tilted away from said block.

6. A device for removing a block from the surface of a lens blank comprising a base, a standard extending outwardly from said base and defining a step therewith, a flange about the outer end of said standard defining a seat having an inner wall configuration closely approximating the outer periphery of said block, a first ring rotatably received about said standard and supported by said ledge, a second ring about said standard pivotally secured to said first ring, said second ring having a first position wherein a first edge is prarallel to and slightly above the edge of said flange and is in engagement with the surface of said lens when said block is inserted in said seat, and means to tilt said first ring from said second ring whereby said lens is tilted away from said block.

7. An apparatus for removing a sealed chucking block from the convex surface of a lens blank comprising upper and lower coaxial annular rings circumscribing said block,

said upper ring in annular engagement with said convex surface of said blank, means rotatably mounting rings with respect to said block, a hinge pivotally connecting said upper ring to said lower ring, a seat rigidly securing said block against a tilting movement, and second means to pivot said upper ring with respect to said block about said hinge and against said lens.

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