United States Patent

[11] 3,563,301

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[21] Appl. No. **834,185**
[22] Filed **Mar. 21, 1969**
Division of Ser. No. 635,232, May 1, 1967.
[45] Patented **Feb. 16, 1971**

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[54] **APPARATUS FOR GENERATING A LENS**
8 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **164/332,** 51/277, 249/83
[51] **Int. Cl.** **B22d 17/24**
[50] **Field of Search** 51/277, 284, 124L, 216, 216.2; 164/332; 249/83

[56] **References Cited**

UNITED STATES PATENTS

3,049,766	8/1962	Buckminster	51/277
3,431,688	3/1969	Rudd et al.	164/112
3,448,549	6/1969	McCall	51/284
3,192,676	6/1965	Buckminster	51/216
3,271,912	9/1966	Buckminster	51/216

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ABSTRACT: The apparatus includes a mold having a cavity open at its upper end, and containing two sets of spaced projections defining two reference lines extending diametrically of the cavity. One set comprises a pair of pins mounted on opposite sides of an angularly adjustable ring, which surrounds a piston that is axially reciprocable in the bottom of the mold for ejecting molded blocks therefrom. The second set comprises either two wedge-shaped formations on opposite sides of the cavity wall, or two pins projecting from the face of the piston. The blank, that is to be blocked, is placed sealingly over the upper end of the mold with a layout line thereon registering with the second set of projections. The ring is then adjusted until the line defined by said pins corresponds to the desired cylindrical axis for the blank; and molten blocking material is then fed to the cavity to mold to the blank a block which will contain recesses corresponding to said sets of projections.

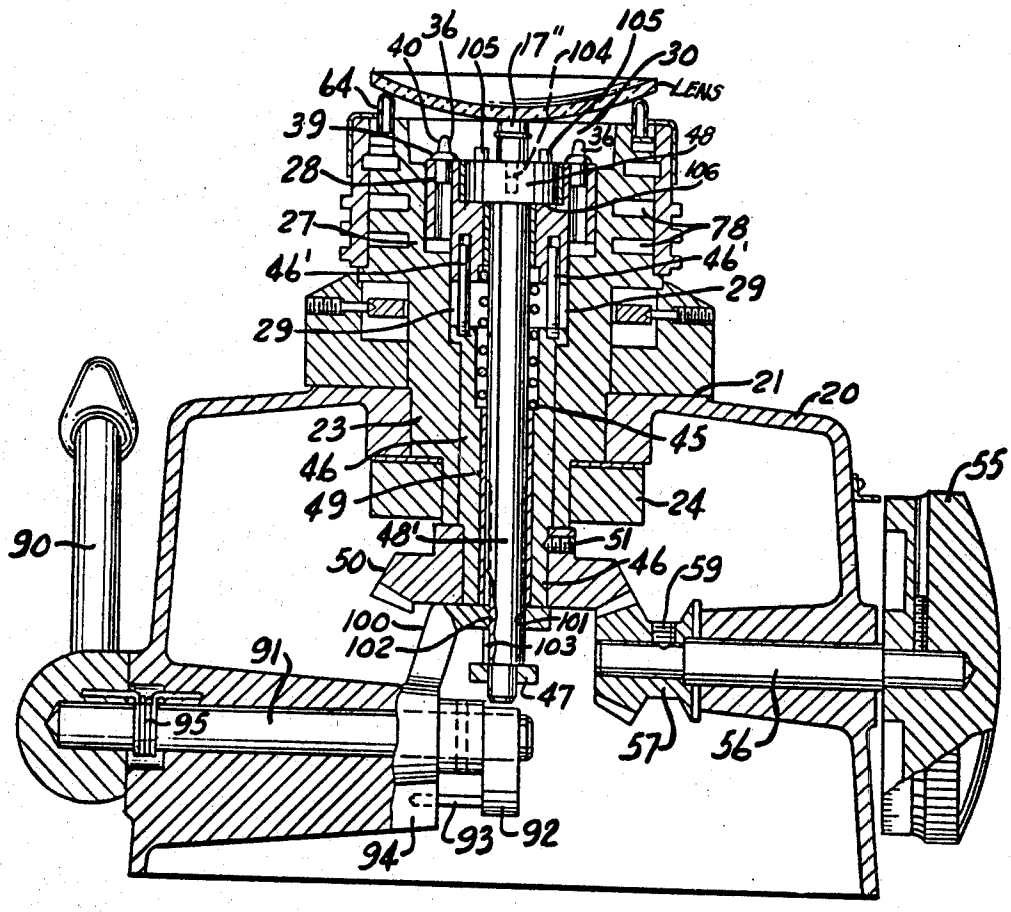
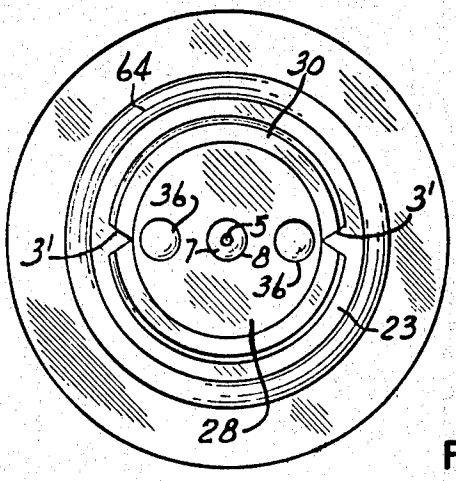


FIG. 3



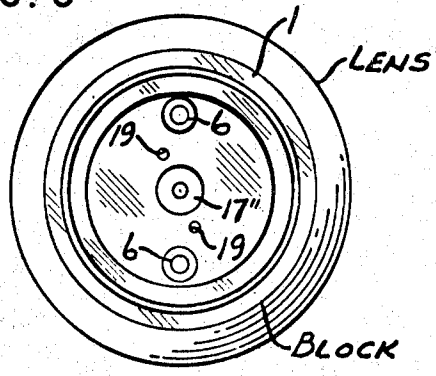


FIG. 2

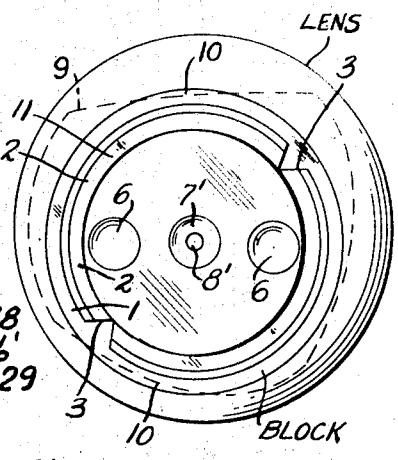


FIG. 1

FIG. 4

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APPARATUS FOR GENERATING A LENS

This is a division of application Ser. No. 635,232, filed May 1, 1967.

CROSS REFERENCES

Copending application Ser. No. 599,591, filed Dec. 6, 1966 now Pat. No. 3,449,253, and copending application for "Lens Blocks and the Method of Blocking a Lens" Ser. No. 628,970, filed Apr. 6, 1967, now U.S. Pat. No. 3,448,549.

Buckminster U.S. Pat. No. 3,049,766 is incorporated herein by reference to complement the disclosure as certain embodiments of the present invention are inventive improvements in the Buckminster lens blocking apparatus as disclosed therein.

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to the manufacture of ophthalmic lenses, and more particularly to the blocking of lenses so that they can be chucked in the machines for generating and polishing their surfaces and for edge grinding them.

2. Description of Prior Art

Buckminster U.S. Pat. No. 3,049,766 should be referred to for an explicitly detailed description of the prior art.

In the conventional processes for manufacturing an ophthalmic lens, a lens blank of molded glass or plastic is ground and polished on each of its two sides successively and then is ground on its perimeter or edge. Usually one side is concave and the other convex; and the two surfaces have different curvatures so that the thickness of the lens varies at different points. The shapes and spacial relation of the two surfaces determine the desired optical refraction.

In the grinding and polishing operations, the blank is normally secured to a lens block. The lens block may be of the permanent hard metal type or of the low melting point metal-type block which is molded to the lens. The hard metal block is generally secured to the lens blank by means of an adhesive such as molten pitch or by a low melting point alloy. The lens block serves as a means to chuck the lens in the grinding and polishing machines.

Regardless of which block type is used, it must be removed for edge grinding the lens and replaced with another block of smaller diameter for this purpose. The block for holding the lens blank during surfacing has to be large enough to back up the glass or plastic lens to avoid breakage, while the block used for holding the lens blank during edging generally has to be small enough to clear the grinding wheel during the edge grinding operation.

In order for the lens to have the desired ophthalmic properties the unfinished side of the semifinished lens must bear an exact and precise relation to the first finished surface of the blank which is mounted by the lens block. The precise location of the second surface with respect to the first may require either or both of two adjustments or settings, one called "axis" and the other called "prism". Setting for the axis or cylindrical axis involves a rotation of the second surface with respect to the first, and setting for prism involves a tilting of the second surface with respect to the first. Adjustment for prism, as well as for axis, may be achieved in the blocking operation if so desired.

When the permanent or hard metal-type block is employed, the setting for axis is accomplished by orienting or rotating the block about the optical vertex or center of the lens. However the setting for prism is generally incorporated in the grinding machine chuck.

When the soft low melting point lens block is used, both of these settings are generally incorporated in the block mold before the block is molded. Thus the desired prism and axis settings to be imparted to the lens are incorporated in the block itself.

The soft metal block is manufactured by a lens-blocking apparatus which has a mold cavity therein. The lens blank is positioned on top of the mold and a heated low melting point alloy is flowed into the mold on one side of the lens blank, and is then allowed to cool adhering itself to the blank. This type of apparatus employs an annular seal or seat about the mouth of the mold upon which the finished surface of the lens blank is seated. The desired amount of prism is incorporated into the mold cavity by tilting the lens seat. The bottom of the mold cavity is provided with a rotatable piston having diametrically arranged pins projecting into the cavity which form bearing recesses in the molded block for chucking the same in cylindrical and spherical generating machines.

The lens is seated on the annular seat such that its ocular vertex or center, as prescribed, is centered over the central pin in the bottom of the mold cavity. The bearing point formed by the center pin is utilized for the transmission of spherical grinding forces.

Molten metal is supplied from a hopper into the lens block mold to fill the mold cavity. Means is provided for flowing water or other coolants around the mold when the pouring operation is completed to solidify the molten metal. The rotatable piston is then urged upwardly breaking the molded block away from the mold cavity.

Regardless of which lens block type is employed, the lens edge will overhang the perimetral edge of the block. This may be accentuated at some portions of the overhanging edge more so that at others because the lens block by necessity must be centered over the ocular center of the lens rather than the mechanical center of the lens. During surfacing or grinding of the mounted lens the overhanging lens portion is flexed or warped repeatedly due to the fact that no backup surface is provided. This causes the lens to be driven into the perimetral hard edge of the block thereby forming a permanent ring on the finished surface of the lens which renders it useless. This is found to be more common with the plastic lens which has greater flexing qualities than does the glass lens blank.

Flexing of the lens overhang causes the lens to become warped all the way into the center of the lens due to the flexing about the fulcrum point set up by the perimeter of the lens block. As a result the lens is distorted and its molecular structure is broken down rendering it useless.

Others have tried to solve this problem by using a larger lens block which covered practically the entire area of the finished lens surface. The block was secured to the lens with an epoxy which proved to be messy and time consuming and therefore not desirable or practical from a laboratory standpoint.

The problem could also be overcome by edging or grinding off the lens edge before the grinding and polishing operations are initiated. However prior to the present invention this would have to be done in an arbitrary manner while the lens was mounted by its lens block, or an edging block would have to be applied to the lens blank before the lens block for generating and polishing is applied. This, however, would consume valuable time and would require the application of an edging block not only after polishing of the lens but also before.

SUMMARY OF INVENTION

The present invention provides a lens block which may be used not only for generating and polishing the lens, but it also provides a block for edge-grinding the lens before the operations of generating and polishing are initiated, and thereby makes possible a new and novel method of generating a lens whereby the excessive lens edge is removed before generating and polishing the lens by using the same lens block. Removal of the excessive lens edge overhanging the lens block prevents lens warping and flexing thereby saving additional manufacturing time, cost and material.

The lens block normally used for lens grinding and polishing is provided with indexed chucking means or reference surfaces which permit the mounted lens to be chucked relative to the lens horizontal layout line in an edge grinding machine. The reference surfaces may consist of a flat surface, notches or the like, in the perimetral edges of the block or small

recesses or projections located adjacent the axial center of the face of the block. The lens is blocked such that its horizontal layout line is positioned parallel with the reference surfaces or at a known angle therewith.

Instead of chucking the blocked lens directly in the edge grinding machine, an adapter may be mounted on the block in mating engagement with the reference surfaces, and may be provided with a smaller edging block for chucking in conventional edging machines using a small chuck.

A hard metal or permanent lens block may be employed in the method of generating a lens as taught by the present invention, wherein the lens edge is ground before generating and polishing. However the excess lens edge may be ground only to the block perimeter. When the soft, low melting point metal block is used, the overhanging lens edge may be reduced beyond the perimetral edge of the block as the soft metal of the molded block is easily removed by the edge grinding machine along with the excessive glass or plastic. In either instance, the time required to generate and polish the lens is reduced as there is less lens surface area to work with and the lens will not be damaged from repeated flexing.

Since the lens block is centered with respect to the optical center of the lens, the preliminary lens edging is by necessity performed with this center as the reference rather than the mechanical center of the lens as is required for finish edging the lens to fit the lens frame in conformity with the prescription. Thus the lens edge which is preliminarily removed may be taken off in amount and shape close to that of the finished lens for example within 4 mm. of the desired finished edge, but no further. Otherwise, when the polished lens is reblocked for edge grinding in accordance with a template shape generated about a different lens center, it would be discovered that too much lens edge had already been removed along portions of the lens edge and the lens would have to be discarded.

When the soft melting point metal-type block is employed, the lens-blocking apparatus of the present invention provides the indexed chucking means on the block to permit the mounted lens to be chucked relative to its horizontal layout line for edge grinding. The apparatus of the present invention constitutes a new and novel improvement over the apparatus of Buckminster. This improvement is accomplished by either of two structural embodiments. In the first structural embodiment the apparatus of Buckminster is provided with fixed reference surfaces on the sidewalls of the mold cavity. These reference surfaces may be in the form of diametrically opposed wedges or a flat surface forming a cord section of the circular mold cross section to form the desired reference surfaces on the lens block as previously described. The lens blank is seated on the mold and oriented such that its horizontal layout line intersects or is parallel with the line of reference provided by the fixed reference surfaces on the walls of the cavity. The piston is then rotated in the bottom of the mold cavity to provide the proper cylindrical axis setting by rotating the diametrically aligned pins thereon which form the bearing recesses in the molded block.

The second structural variation of the lens blocking apparatus of the present invention provides centrally located pins, or similar means to form indexed chucking surfaces, in the bottom of the mold cavity which remain stationary, while the perimetral portion of the piston retaining the pins to form the outside cylindrical bearing recesses is permitted to rotate thereabout.

Thus a collar is received in the bottom of the mold cavity for axial rotation and a cylinder is received within the collar which is fixed against axial rotation but permits relative axial rotation with the surrounding collar. Means to provide bearing points on the finished lens block for the transmission of cylinder generating forces to the lens is provided on the collar. Thus the collar may be rotated to align this means with the cylindrical axis of the lens. Another molding means is provided on the surface of the inner cylinder, which is exposed by the mouth of the mold cavity along with the collar, to provide a centrally located indexed mount on the finished lens block for mating with a lens edging chuck.

The inner cylinder may also be provided with a central pin projecting axially into the mold cavity to provide a central bearing recess in the molded block to receive transmission of spherical generating forces from a generating or polishing machine. Instead of this central pin, the inner cylinder may be provided with a central axially aligned recess to receive the stem of an inverted shield plug of the type disclosed in the aforementioned copending applications.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawings show for the purpose of exemplification, without limiting the invention or claims thereto, certain practicable embodiments illustrating the principles of this invention wherein:

FIG. 1 is a bottom plan view of a lens mounted by a low melting point lens block incorporating the principles of the present invention.

FIG. 2 is a plan view of a mold used with the lens-blocking apparatus of the present invention and illustrating the interior of the mold cavity.

FIG. 3 is a bottom plan view of a lens mounted by a lens block and illustrating another embodiment of the lens block of the present invention.

FIG. 4 is a cross-sectional view in front elevation of lens-blocking apparatus of the present invention for the manufacture of the block shown in FIG. 2.

Referring to FIG. 1 of the drawings, the lens block illustrated is made from soft metal, being molded on the exterior surface of the lens which may be first coated with plastic material or a tape. The lens illustrated may be a glass lens or a lens molded of plastic material.

The lens block is provided with a cylindrical head portion 1 having a frustoconical shank portion 2 projecting therefrom and terminating in a circular flat surface that is normal to the axis of the lens block. Opposed perimetral notches 3 are provided in the frustoconical shank portion 2 in line with the center of the lens block. The notches 3 provide indexed reference surfaces which locate the horizontal layout line of the blocked lens. When the lens block is initially poured with material of a low melting point, the notches 3 are formed by the indexed surfaces 3' on the sidewalls of the mold cavity as illustrated in FIG. 2.

For simplification and comparison, most of the lens blocking apparatus illustrated in FIGS. 2 and 4 is provided with the same reference numerals as found in the Buckminster disclosure U.S. Pat. No. 3,049,766.

To block the lens shown in FIG. 1, the lens is seated on the annular seat or seal 64 (FIG. 4) encompassing the mouth of the mold cavity 30 such that the optical center of the lens is positioned over the center 5 of the mold. The lens horizontal layout line is then aligned with the reference surfaces 3' and the pins 7 and 36 which are secured to the piston 28. At this time the pins 36, which provide the cylindrical axis bearing points on the molded block, are located at an axis setting of 0° from the horizontal. The piston 28 is then rotated to provide the desired axis setting.

After the hot molten metal has been introduced into the mold 30 and has been permitted to solidify the blocked lens is removed by urging the piston 28 upwardly.

The finished lens block is thereby provided with the outside recesses 6 for cylindrical generation of the lens and the center bearing recess 7' for transmission of the spherical generating forces to the lens. The central recess 7' has a small opening 8' in the bottom thereof which exposes a small portion of the lens surface for the insertion of calipers to measure the lens thickness.

The blocked lens of FIG. 1 may then be chucked in an edging machine chuck provided with surfaces for mating engagement of the indexed reference surfaces 3. The lens is thereby chucked relative to its horizontal layout line and its overhanging or overlapping edge may be removed in accordance with the desired lens shape as indicated by the dashed line 9. However, since the lens block is centered over the optical center of the lens rather than its mechanical

center, the edge portion may not be removed to the desired final or finished shape. Otherwise, when the polished lens is reblocked for final edge grinding in accordance with the lens frame opening, it will be discovered that too much of the lens edge has already been removed along portions thereof. Therefore the overhanging portion is generally ground down to within, for example, 4 millimeters of the finished shape.

As indicated at **10** in FIG. **1**, portions of the soft metal block may be removed along with the lens edge to produce the desired shape. However, when a hard metal-type block is employed, the lens edge may not be removed beyond the perimetral edge of the head portion **1**.

The conventional edge grinding machines are provided with a chuck of smaller diameter than the lens block. However, the block of FIG. **1** may be readily adapted to be received in such a chuck. For this purpose an adapter of the type disclosed in our above-noted pending application Ser. No. 635,232 is provided with a pair of reference wedges for mating engagement with the reference surfaces **3** of the lens block of FIG. **1**. Thus when the adapter is mounted on the lens block its reference wedges are properly aligned with the lens layout line.

Referring to the mounted lens of FIG. **3**, the low melting point soft lens block is provided with the recesses **19** molded directly therein and which serve to receive the mating pins of an edge grinding chuck. Referring again to FIG. **3**, the mounted lens is also provided with recesses **6**, and with the shield plug **17''** which is inserted into the mold cavity of the lens blocking apparatus prior to molding the block. The lens block thus illustrated is manufactured by the lens-blocking apparatus shown in FIG. **4**.

The lens-blocking apparatus of FIG. **4** may be readily compared with FIGS. **2** and **3** of the Buckminster patent to determine the specific structural features of the present invention over this prior art. The apparatus of FIG. **4** is in all other respects identical to that shown in FIGS. **1**, **2** and **3** of the Buckminster patent. A portion of the upper surface **21** of the base **20** is inclined to the horizontal. Mounted in the base, and keyed against rotation thereto is a block mold **23**. This mold is held against upward movement by a collar **24** which is fastened to the mold by screws which may be observed in FIG. **2** of the Buckminster patent, and which engages under the inclined top wall of the base. Mounted to reciprocate in a counter bore **27** in the upper end of the mold is a piston or collar **28**. The piston is of reduced diameter at its lower end; and the reduced diameter portion of the piston is adapted to slide in the guide bore **29** of the mold. The counter bore **27** communicates with the guide bore **29** at its lower end; and at its upper end communicates with the mold cavity **30** in the upper end of the mold. Guide bore **29** communicates at its lower end with the reduced diameter coaxial main bore of the mold. Secured in the upper end of the collar **28** are two pins **36**. These pins are arranged diametrically of the collar and each has a pressed fit in the collar. These two end pins **36** are alike. Each has a truncated conical portion **39** seating against the upper face of the collar and projecting thereabove. Each has a dome-shaped portion **40** above its conical portion **39**.

The collar **28** is constantly urged upwardly by coil spring **45**, which seats at its upper end in a recess in the bottom of the collar and which is interposed between the bottom of the collar and the base of a counterbore in the sleeve **46**. Slidably received within the central opening of the collar **28** is a piston **48** having a piston rod **48'** of circular cross section extending through sleeve **46** in slidable engagement therewith. The sleeve **46** has an integral collar formed on it at it upper end which engages in guide bore **29** to prevent the sleeve from dropping out of the main bore of the mold. The sleeve is journaled in the main bore of the mold **23**, and has a bevel gear **50** fastened to it at its lower end by a setscrew **51**.

The collar **28** is rotatable in the mold by means of a knurled knob **55** which is secured by means of a setscrew to a shaft **56** that extends at right angles to the rod or shaft **48'**. Shaft **56** has a bevel pinion **57** secured thereto by a setscrew **59**. The pinion **57** meshes with the bevel gear **50** that is keyed to sleeve **46**. Pins **46'** are threadably secured in the collar of the sleeve **46** and protrude upwardly into guide bore **29** where they are slidably received within mating holes in the bottom of collar **28**. Thus when knob **55** is turned sleeve **46** is rotated along with pins **46'** which cause collar **28** to rotate while permitting the same to slide axially. The piston **48** and rod **48'** are held against axial rotation by means of the boss **100** secured to the base **20** as indicated and by providing in the slide bore **101** a key **102** which projects slidably into the groove **103** extending longitudinally in the rod **48'**. The collar **47** is secured to the lower end of the rod **48'** by means of a setscrew to prevent removal of the piston **48** and to limit its upper movement.

The upper face of the piston **48** exposed to the mold cavity **30**, is provided with a central recess **104** to receive the stem of the inverted shield plug **17''**. Diametrically aligned with the center recess **104** are two pins **105**, which project from piston **48** into the mold cavity **30** to provide the chucking reference surfaces or recesses **19** in the molded block as shown in FIG. **3**.

The restriction provided between the cylinder **48** and the rod **48'** provides an abutment or annular shoulder **106** which mates with a corresponding shoulder in the central opening of the collar **28** thereby preventing the collar from being removed axially from the cavity **30** while collar **47** is secured to the bottom end of rod **48'**.

The pins **36** are thus located angularly about the axis of the collar **28** by the turning of knob **55**. This determines the angular position which the molded lens block will occupy in the chuck of a lens manufacturing machine. In other words the angular position of the collar **28** determines the cylindrical axis of the lens being manufactured.

The lens blank to be blocked is seated upon the annular resilient seal or seat **64** encompassing the mouth of the mold cavity **30**. The desired prism setting to be incorporated into the molded block is accomplished by tilting the seat **64**. The means provided for tilting the seat **64** is not herein described but one may refer to the Buckminster U.S. Pat. No. 3,049,766 to determine its structural operation. It need only be said here that the annular ring or seat **64** can be tilted to any angle to adjust the blank for the desired amount of prism and prism axis by means of a cam rotatable about an axis disposed at right angles to the axis of the rod **48'**.

For supplying the molten metal to the mold, a hopper is provided to receive chunks of metal alloy, including previously used lens blocks. The hopper has a heater secured to it for melting down the chunks of metal. The hopper is provided with a passage leading to the mold cavity **30** which may be opened and closed at will to fill the cavity with the molten metal.

Mounted directly on the molding apparatus is a suitable sighting device provided with an eye piece in a retical for aid in aligning the lens blank. This sighting device is aligned directly over the mold cavity **30** and is provided with resilient prongs at its lower end which may be lowered into engagement with the lens blank to maintain the same against the seat **64**. The operation of the sighting device and hopper along with their associated parts are shown and described in detail in FIGS. **1**, **2** and **3** of the Buckminster patent and their accompanying disclosure.

To maintain the mold cool during the casting operation, and to harden the molten metal in the mold cavity **30**, thereby forming the lens block, the mold is provided with peripheral grooves **78** around it at its top portion, and water or other suitable coolant is supplied to these grooves by a conduit which is connected with the collar **24**.

After the molded block has cooled, the block is stripped from the mold cavity by forcing the rod **48'** upwardly, thereby pushing the piston **48** upwardly. The piston **48** is followed by the collar **28** which is urged upwardly by the coil spring **45**. The rod **48** is moved upwardly by manual operation of a lever **90**, which is secured to a shaft **91** that is journaled in the base of the machine. This shaft has a cam **92** pinned to it which is positioned to engage the lower end of the rod **48'**. A coil

spring 95, which surrounds the shaft 91 and which is engaged at one end in the lever arm 90 and at its opposite end in the base 20, serves to urge the shaft constantly to its 0 position where the cam 92 is out of engagement with the rod 48 as indicated in the drawings. A pin 93 is secured to the cam and adapted to engage against the lug 94 in the base to limit the return movement of the shaft 91.

To briefly sum up the operation of the apparatus, the operator seats a shield plug 17'' into the central recess 104 of the piston 48. A lens blank is then seated on the seat or ring 64 and the operator sights through the sighting device to locate the ocular center of the lens over the center of the mold. The lens is also positioned such that its horizontal layout line intersects both of the pins 105. The ocular vertex service area of the lens being in engagement with the plug 17'' forces the cylinder 48 downwardly along with collar 28. Good sealing engagement is provided between the ocular vertex area of the lens and the upturned face of the resilient shield plug 17'' by means of the constant urging imparted by coil spring 45. The operator then adjusts collar 28 rotatably by turning knurled knob 55, pinion 57 and gear 50 while sighting through the eyepiece to position the pins 36 for the desired cylindrical axis. He also adjusts the prism axis by rotating the aforementioned cam (not shown) until the upper surface of the lens blanks has the proper tilt for its desired prism. The sighting device is adjusted downwardly until the resilient prongs clamp the lens blank on the annular seat 64. The molten metal is then permitted to flow into the mold cavity 30. When the mold cavity is filled with the molten metal the flow is stopped and the molten metal is permitted to harden. The sighting device is raised from the lens surface and the lever 90 is moved to cause cam 92 to force cylinder 48 upwardly to strip the molded block secured to the blank from the mold. The blocked lens is then ready to be chucked in an edge grinding machine for removal of the excessive lens edge overhanging the block in accordance with a desired template shape. As heretofore pointed out, portions of the cylindrical head 1 of the block may be removed during this process where dictated by the template.

I claim:

1. Lens-blocking apparatus comprising:
a mold having a mouth exposing a cavity therein;
an annular seat around said mouth for supporting a lens blank over said cavity;
a collar mounted in the bottom of said mold cavity for movement axially and rotatably about an axis disposed centrally in said cavity normal to the plane of said mouth;
spring means urging said collar axially toward said mouth;
a piston mounted in said collar for limited axial movement therewith and fixed against axial rotation;
abutment means between said collar and said piston to prevent relative axial movement therebetween at least while said spring means is biased;
bearing means on said collar and exposed by said mouth to provide bearing points on the finished lens block for the transmission of generating forces to the lens;
means on said piston and exposed by said mouth to provide an indexed mount on the finished lens block for mating with a chuck; and
said cavity being adapted to have molten metal supplied thereto for molding the lens block therein and adhering it to the lens blank to be blocked.

2. The lens-blocking apparatus of claim 1 wherein said piston has an axial recess in it, and a shield plug is inserted in said axial recess in said piston.

3. Apparatus for molding a lens block to a lens blank of the type having thereon a horizontal layout line, comprising:
a mold having a cavity open at its upper end and adapted to receive a supply of molten blocking material;
first reference means in said cavity defining a first pair of spaced points that lie in a diametral line through the axis of said cavity;
second reference means in said cavity defining a second pair of spaced points that also lie in a diametral line through said axis;
means for supporting a lens blank sealingly over the upper end of the mold with its horizontal layout line registering with one of said pairs of points; and
means for angularly adjusting one of said reference means relative to the other about the axis of said cavity, thereby to effect a corresponding angular adjustment between the diametral lines represented by said first and second pairs of points, respectively, before molding a block to said blank.

4. Apparatus as defined in claim 3 wherein:
said first reference means comprises a first pair of spaced projections in said cavity operative, when a block is molded to said blank, to form in said block a corresponding first pair of recesses for use in cylindrical generation of the blank secured to said block;
said second reference means comprises a second pair of spaced projections in said cavity operative to form in said block a second pair of corresponding recesses the centers of which register with the horizontal layout line of said blank; and
said adjusting means is operable to rotate said first pair of projections into an angular position, relative to said second pair of projections, corresponding to the desired cylindrical axis of said blank.

5. Apparatus for molding a lens block to a lens blank, comprising:
a mold having a cavity open at its upper end and adapted to receive a supply of molten blocking material;
means for supporting a lens blank sealingly over the upper end of the mold in spaced relation to the bottom of the mold, and in position to have said molten material adhere thereto as a block upon cooling;
a pair of spaced, parallel pins projecting from the bottom of said mold into said cavity;
a first member mounted in the bottom of said mold for axial reciprocation into and out of said cavity to eject a molded block therefrom;
means in said cavity defining a reference surface disposed parallel to a plane containing the axis of said cavity, and operative to form a corresponding reference surface on the block molded in said cavity; and
a second member rotatably mounted in the bottom of said mold to adjust, respectively, the angular positions of said pins, and the means defining said reference surface relative to one another about said axis of said cavity.

6. Apparatus as defined in claim 5, wherein:
said pins are mounted on one of said members for movement therewith; and
said means defining said reference surface comprises two, identical, wedge-shaped projections integral with said mold and extending into said cavity from diametrally opposite sides thereof, respectively.

7. Apparatus as defined in claim 5, wherein:
said means defining said reference surface comprises a second pair of pins projecting from the bottom of said mold parallel to the first-named pins; and
one of said pairs of pins is mounted on one of said members, and the other pair of pins is mounted on the other of said members.

8. Apparatus as defined in claim 5, wherein:
said first member is a disc;
said second member is a rotatable ring surrounding said disc; and
a resilient plug is removably secured to said disc and projects upwardly therefrom into said cavity coaxially thereof to form a central recess in the block molded in said cavity.