

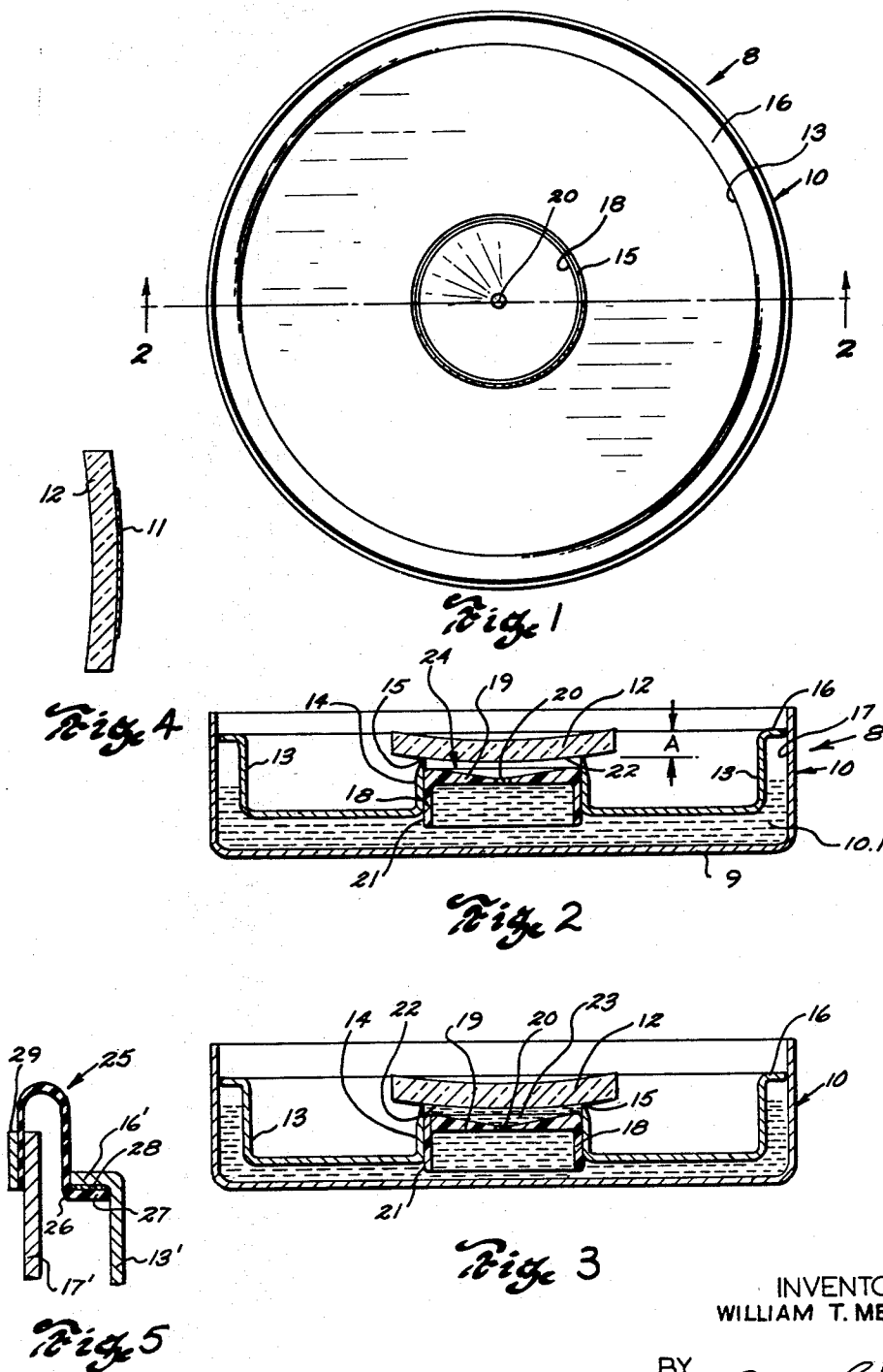
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W. T. MERKER

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DEVICE FOR APPLYING A THIN COATING ON AN ARTICLE

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INVENTOR
WILLIAM T. MERKER

BY *Louis L. Dagnan*
ATTORNEY

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DEVICE FOR APPLYING A THIN COATING ON AN ARTICLE

William T. Merker, Orchard Park, N.Y., assignor to
American Optical Company, Southbridge, Mass., a
voluntary association of Massachusetts

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This invention relates to a novel device for applying and controlling the deposition of a thin coating of transparent material on a side surface of an article such as a lens blank and method of applying and controlling such coating.

In the art of producing ophthalmic lenses, particularly of the type embodying multifocal fields and/or cylindrical or prismatic corrections, it is the usual practice to provide the trade with a plurality of lens blanks each having a first side surface thereon ground and polished to differently controlled curvatures. It is imperative that the blanks used in producing such lenses be supported in proper aligned and axial relation with means for abrading and finishing the final optical surfaces on the opposite sides of said blanks in accordance with the resultant prescriptive characteristics desired of the finished lenses. It is also imperative, when edging such lenses to the contour shapes desired, that the said lenses be supported in proper aligned and axial relation with the means for performing such an operation so as to retain the desired prescriptive characteristics.

In accordance with more recent developments in the ophthalmic art, a semi-finished lens blank embodying certain markings thereon for determining and controlling the optical characteristics of the final lens is selected and supported in aligned relation with a protractor which may be any one of the known conventional types. Such protractors embody means by which the location of the optical center, segment position relative to said center and the major and minor axes of the cylindrical correction to be embodied in the final lens may be predetermined by sighting through the blank and adjusting the markings thereon with respect to certain indicia on the protractor. The blank is then held in said adjusted position and an adaptor-type lens block, preferably of a low melting metallic alloy, is cast in adhered relation with the first finished side of the blank. During said casting, the resultant block is simultaneously provided with means whereby the blocked blank, when chucked in the devices for surfacing and polishing the second side of the blank or for edging the same, will automatically be located in said predetermined positional relation with respect to said surfacing, polishing or edging means.

Although lens blocks of this nature may be cast in direct adhering relation with the lens blank, it has been found that unless the surface of the blank receiving said lens block has been thoroughly cleansed, proper adhesion not always takes place. To insure proper adhesion and to avoid having to cleanse the surface of the blank, the said blank is initially provided with a relatively thin, quick-drying, transparent coating of adhesive material which can be conventionally peeled from the lens after the removal of the block. Such coating also serves as means for protecting the initially finished surface of the blank on which the lens block is cast. The usual practice in applying such coatings to the surface of the blanks has been to spray, roll or brush the coating material, in liquid form, on the surface and to thereafter allow the coating to dry. It has been found, however, that such methods are not satisfactory as, in most instances,

the coatings are not uniform in thickness, contain brush marks or result in orange-peel type irregularities.

By reason of the fact that the step of aligning the blanks with the protractor requires sighting through the blanks and through the coating, such irregularities have prevented a clear image of the aligning indicia on the protractor and have caused considerable error in the initial locating of the blanks in proper positional relation with said indicia.

The prime object, therefore, of the present invention is to overcome the above by the provision of a simple, efficient and novel device for applying a coating of such liquid transparent adhesive materials to the side surface of lens blanks whereby the resultant coating is thin and smooth, thereby permitting a clear, undistorted image of the protractor indicia to be obtained and a more accurate aligning operation to be performed.

Another object is to provide a device of the above character wherein the evaporation of the liquid coating material contained in said device is greatly retarded and the material is further protected against contaminants.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a top plan view of the device embodying the invention and by means of which the method of the invention is performed;

FIG. 2 is a sectional view taken as on line 2—2 of FIG. 1 looking in the direction indicated by the arrows and illustrating the device in one position of use;

FIG. 3 is a sectional view similar to FIG. 2 illustrating the device in another position of use;

FIG. 4 is a sectional view of a lens blank showing the coating of the invention thereon; and

FIG. 5 is an enlarged fragmentary sectional view of a modified form of the invention.

Referring to the drawings, the device embodying the invention comprises a main container 8 having a flat bottom 9 and a vertically disposed cylindrical side wall 10. The container is adapted to support a transparent quick-drying liquid composition 10.1 therein of a type suitable for forming the desired coating 11 on the side surface of the lens blank 12, as shown in FIG. 4.

The container houses a hollow dish-like float 13 having a flat bottom portion and a vertically disposed cylindrical side wall which is adapted to float on the liquid 10.1 in the container. The dish-like float is provided with a central vertically disposed circular hollow tubular or cylindrical portion 14 having a substantially knife-like upper edge 15 on which the lens blank 12, to be coated, is adapted to be placed. The side wall of the dish-like float, as shown in FIGS. 2 and 3, also has an outwardly disposed flanged upper edge portion 16 which is adapted to have a close sliding fit with the inner surface 17 of the cylindrical side wall 10 of the container. The central vertically disposed circular hollow or cylindrical portion 14 is provided, internally thereof, with a cylindrically-shaped insert 18 preferably press-fitted therein and which, in turn, has an upper transversely extending end wall 19. The end wall 19 is provided with a downwardly and inwardly tapered or concaved upper surface and is provided with a central relatively small perforation 20. The cylindrical insert 18 has an opposite annular open-end portion 21 which protrudes slightly below the plane of the bottom of the hollow dish-like float 13. The protrusion is to space the bottom surface of the dish-like float from the bottom of the container and thereby prevent adhesion therebetween in instances when the liquid in the container is depleted as, for example, by evaporation.

The downwardly and inwardly tapered or concaved

upper surface is so shaped and located at a distance below the knife-like edge 15 as to enable a lens blank 12, whose surface 22 is of the steepest radius of curvature encountered in the art, to be placed on said knife-like edge, as shown in FIGS. 2 and 3.

It is pointed out that the outwardly extending flange 16 of the dish-like float 13 is located in a plane at a controlled distance A above the upper knife-like edge 15, so as to permit the fluid composition 10.1 in the container, whose level is illustrated by the dash lines 23, to rise to a level above said knife-like edge 15 prior to reaching the level of the flange 16 which, as shown in FIG. 2, is normally located in a plane below the upper edge of the side wall of the container.

The fluid composition 10.1 initially is at a level slightly below the lower surface of the upper wall 19 of the insert 18.

To form the coating 11 on the lens blank 12, it is positioned with its surface to be coated in engagement with the knife-like edge 15. Pressure is then applied to the blank to cause the dish-like float 13 to be compressed and thereby cause the liquid composition 10.1, as shown in FIG. 3, to be forced upwardly through the aperture 20 into the chamber 24 formed between said upper wall 19 and the lower surface 22 of the lens blank 12. Compression of the blank is continued until the liquid composition is seen to completely cover or engage the surface 22 within the confines of the knife-like edge 15.

As soon as the entire surface 22 is wetted by the fluid composition, pressure on the lens blank 12 is released whereupon the dish-like float 13, in response to the tendency of the fluid composition to seek its initial level in the container will rise and allow only the fluid coating 11 to remain on the blank. The coated blank is then removed from the knife-like edge 15 and, because of the quick-drying nature of the fluid composition, the coated blank is substantially immediately ready for further processing.

The liquid coating composition may comprise any composition which is of a transparent quick-drying nature. One of the suitable coating solutions comprises about 2 parts of a clear transparent liquid resin combined with about 14 parts of a suitable solvent such as methanol which, when applied as described above, results in a very thin, quick-drying, smooth, transparent coating. The coating not only functions as an adhesive for more positively insuring the adhering of the cast metallic adaptor-type lens block which is subsequently formed thereon, but also functions as a protective coating for the initially finished optical surface 22 which is first formed on such blanks and which is the side on which the metallic blocks are formed.

As stated above, the resultant coating 11 is smooth, clear and transparent and enables a clear image of the protractor indicia therethrough and with which certain markings on the blank may be initially aligned and positioned. This enables the adaptor-type block to then be cast in conventional manner on the blank and will subsequently automatically position the blank in proper relation with the means for performing subsequent operations thereon as previously defined and will incorporate the desired prescriptive characteristics in the finished lens formed by said blank.

In FIG. 5 there is shown a slight modification wherein, instead of forming the peripheral flange 16 in close-fitting and sliding relation with the inner surface 17 of the side wall of the container, the flange 16' is slightly spaced from the side wall. The dish-like float 13', in this instance, is provided with an annular sealing ring 25 formed of resilient material such as rubber or the like which has an inverted U-shaped cross section. The edge 26 of one branch of the U is provided with an inwardly disposed flange 27 preferably secured to the underside surface of the flange 16' by a suitable layer of adhesive or the like 28. The other branch of the U overlaps the upper outer

surface of the wall 17' of the container and is preferably secured in sealed relation therewith by a removable clamp ring or the like 29. The sealing ring 25, by reason of its resiliency, will permit the dish-like float to be compressed into the liquid composition during the forming of the coating 11, as previously described, without danger of having the liquid composition oozing out from between the edges of the flange 16' and the inner side wall 17' of the container and further provides a more positive seal against evaporation. The device otherwise functions in a manner similar to the device described in connection with FIGS. 1 through 3.

When the device is not in use, any suitable cover plate or lens blank 12 may be positioned in overlying relation with the knife-like edge 15 to further prevent evaporation of the liquid composition.

The protruding lower edge 21 of the insert 18 is solely for the purpose of preventing the lower surface of the dish-like float from engaging the bottom surface of the main container 10 in case that the liquid composition should become completely evaporated and will thereby permit the dish-like float to be easily removed from the container for the replacement of the liquid composition.

From the foregoing description, it will be seen that simple, efficient and economical means and method have been provided for accomplishing all of the objects and advantages of the invention and while certain details of construction and steps of the method have been shown and described, it is to be understood that many changes may be made therein without departing from the spirit of the invention as expressed in the accompanying claims. The invention, therefore, is not to be limited to the exact matters shown and described as only the preferred matters have been given by way of illustration.

Having described my invention, I claim:

1. In a device of the character described comprising a combination of a container having vertically disposed side walls adapted to receive a liquid composition therein and a dish-like float adapted to be positioned on said liquid composition within said container, said dish-like float being so dimensioned vertically and the amount of liquid composition, when placed in said container, being so controlled as to locate the upper edge of said float a given distance below the upper edge of the side walls of the container, said dish-like float having a vertically disposed hollow central portion formed with a circular upper edge lying in a plane at a given distance below the upper edge of said float, said hollow central portion having a wall portion extending transversely thereof at a location below the upper circular edge of said hollow portion and said wall portion having a restricted perforation therein normally at a location above the level of the liquid composition and through which said liquid composition may be forced to flow when the dish-like float is moved in a downward direction within said container.

2. In a device of the character described comprising the combination of a container having a vertically disposed cylindrically-shaped side wall adapted to receive a liquid composition therein and a cylindrically-shaped dish-like float adapted to be positioned on said liquid composition within said container, said dish-like float being so dimensioned vertically and the amount of liquid composition when placed in said container, being so controlled as to locate the upper edge of said float a given distance below the upper edge of the cylindrically-shaped side wall of the container, said dish-like float having a vertically disposed hollow central portion formed with a circular upper edge lying in a plane at a given distance below the upper edge of said float, said hollow central portion having a wall portion extending transversely thereof at a location below the upper circular edge of said hollow portion and said wall portion having a restricted perforation therein normally at a location above the level of the liquid composition and through which the liquid composition may

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be forced to flow when the dish-like float is moved in a downward direction within said container.

3. In a device of the character described comprising the combination of a container having vertically disposed side walls adapted to receive a liquid composition therein and a dish-like float adapted to be positioned on said liquid composition within said container, said dish-like float having an upper outwardly extending flange whose edge is in close sliding fit with the inner surfaces of the side walls of the container, said dish-like float being so dimensioned vertically and the amount of liquid composition, when placed in said container, being so controlled as to locate the flange a given distance below the upper edge of the side walls of the container, said dish-like float further having a vertically disposed hollow central portion formed with a circular upper edge lying in a plane at a given distance below the upper edge of said float, said hollow central portion having a wall portion extending transversely thereof at a given distance below the upper circular edge of said hollow portion and said wall portion having a restricted perforation therein normally at a location above the level of the liquid composition and through which said liquid composition may be forced to flow when the dish-like float is moved in a downward direction within said container.

4. In a device of the character described comprising the combination of a container having a flat bottom and vertically disposed side walls adapted to receive a liquid composition therein and a dish-like float adapted to be positioned on said liquid composition within said container, said dish-like float having a flat bottom portion and side wall portions so dimensioned vertically and the amount of liquid composition, when placed in said container, being so controlled as to locate the upper edge of said float a given distance below the upper edge of the side walls of the container, said dish-like float having a vertically disposed hollow central portion formed with a circular knife-like upper edge lying in a plane at a given distance below the upper edge of the side walls of said float, said hollow central portion having a wall portion with a concaved surface extending transversely thereof and at a given distance below the upper circular knife-like edge of said hollow portion and said wall portion having a restricted perforation therein normally at a location above the level

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of the liquid composition and through which the liquid composition may be forced to flow when the vertical dish-like float is moved in a downward direction within said container.

5. In a device of the character described comprising the combination of a container having vertically disposed side walls adapted to receive a liquid composition therein, a dish-like float adapted to be positioned on said liquid composition within said container, said dish-like float being so dimensioned vertically and the amount of liquid composition in said container being so controlled as to locate the upper edge of said float a given distance below the upper edge of the side walls of the container, said dish-like float having a vertically disposed hollow central portion formed with a circular upper edge lying in a plane at a given distance below the upper edge of said float, said hollow central portion having a wall portion extending transversely thereof at a location below the upper circular edge of said hollow portion, said wall portion having a restricted perforation therein normally at a location above the level of the liquid composition and through which said liquid composition may be forced to flow when the vertical dish-like float is moved in a downward direction within said container and an annular sealing ring of resilient flexible material having one of its edges secured in sealed relation with the upper portion of the float and its other edge secured in sealed relation with the upper portion of the side walls of the container and being such as to permit said downward movement of the dish-like float in said container.

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RICHARD D. NEVIUS, *Primary Examiner.*

JOSEPH B. SPENCER, *Examiner.*