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METHOD OF MOUNTING LENSES

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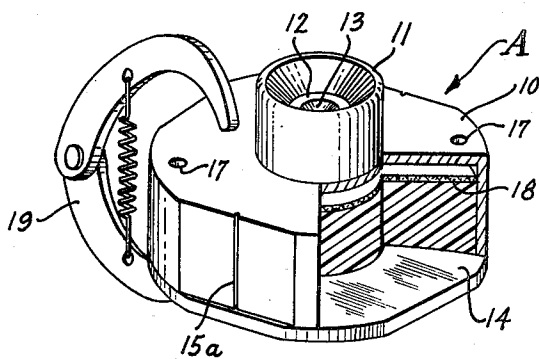


Fig. 1

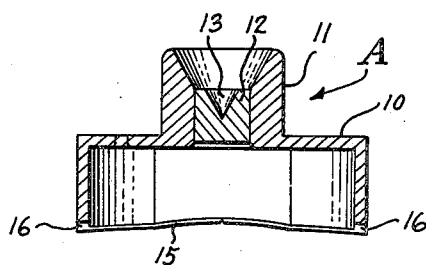


Fig. 2

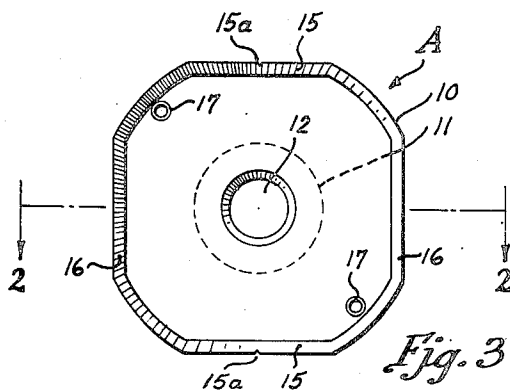


Fig. 3

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METHOD OF MOUNTING LENSES

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This invention relates to a method of mounting and demounting lenses in a lens chuck.

It is customary in the manufacture of ophthalmic lenses to grind and polish one side, mount the lens in some type of holding device to expose the unfinished side, and then to finish the unfinished or second side in the grinding, fining and polishing machines. To my knowledge, a great number of types of chucks or holding devices have been tried for holding lenses in these machines while the second side is being finished but the standard type of lens holder, in which the finished side of the lens is embedded and held in optical pitch or some other adhesive, is still widely used. While the standard type of lens holder has been preferred in the past, it is far from being a perfect means for holding a lens.

The great disadvantage with the standard type of lens holder in which the lens is embedded in optical pitch or the like, is that the lens tends to shift position in the pitch as it is being ground due to the contraction and expansion of the pitch, with the result that the lens is ground thinner at one point on its edge than at a diametrically opposed point on its edge. This defect is known as prism.

The lens chucks of the prior art of which I have knowledge that have departed from the principle of supporting a lens in optical pitch, to overcome this and other defects, have been impractical for a variety of reasons.

I have developed a practical lens chuck for rigidly supporting a lens while its second surface is being precision ground.

It is a further object of this invention to provide a method for quickly and efficiently mounting and demounting lenses on a chuck having a rigid mechanical surface for the purpose of supporting a lens.

With these and other objects in view, a lens chuck according to my invention comprises a cupped body ventilated adjacent its bottom and having its edges machined to abut with the ground surface of a lens applied thereover.

The chuck and its novel method of use will be clearly understood after reference to the following detailed specification read in conjunction with the drawings.

In the drawings—

Figure 1 is a perspective view of a lens chuck

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according to the present invention with a lens mounted thereon partly cut away to show the manner in which the lens is mounted.

Figure 2 is a cross sectional view of the lens chuck taken on line 2—2 of Figure 3.

Figure 3 is a bottom view showing the lens chuck.

Referring to the drawings the letter A generally indicates a lens chuck according to the present invention. It will be seen to comprise a cupped body 10 having a projecting shank 11 centrally located on the bottom outside thereof for the purpose of mounting it in a grinding, fining or polishing machine.

The construction of the shank 11 is illustrated in the cross sectional Figure 2. It has a central bore designed to receive the plug 12, the top of which is formed with a conical depression 13 for coaction with the polishing machine where a floating relation between the lens and the polishing lap is required. The mounting of lens chucks in lens grinding, fining and polishing machines, however, is well known and it is not thought necessary that it should be expanded upon at any greater length in the present application.

The edges of the cupped body 10 are machined to abut with the precision finished surface of a lens 14. The lens 14 shown in the drawings is a cylinder lens and to this end the edges of the cupped body 10 are accordingly ground in one direction with a cylinder curve 15 equal in radius to the radius of the base curve of the finished plus side of the lens 14 and ground in a direction at right angles thereto with a cylinder curve 16 equal in radius to the radius of the cross curve of the finished plus side of the lens 14.

Ventilation holes 17 are formed in the bottom surface of the cupped body 10.

In order to mount a lens in a chuck according to my invention a paper liner 18 is placed over the bottom interior surface of the cupped body 10. A quantity of optical pitch or other suitable adhesive is then placed in the cup and the precision finished plus side of the lens 14 is placed over the ground edge thereof with its base curve aligned with the base curve 15 ground on the edges of the cup 10 and with its cross curve aligned with the cross curve 16 ground in the edges of the cup. In this connection the opposed

sides of the cup are preferably marked as at 15a to indicate the centre of the cylinder base curve 15 formed on the edges of the cup. A corresponding marking is usually found on minus side of the lens for the purpose of demarking the centre of the base curve of the lens. The lens can be quickly aligned on the machined edge of the cupped body of the chuck by aligning the base curve marks on the lens with the base curve marks on the sides of the cup.

After the lens has been caused to abut the machined edge of the cup 10 with the cylinder curves of the plus side of the lens aligned with the cylinder curves formed on the edges of the cup, it is clamped into position by means of a suitable clamp 19 and the entire assembly is placed into an oven with the chuck overlying the lens. The oven is heated to a temperature of about 200° F. for the purpose of melting the optical pitch and causing it to flow over the top of the lens 14 and the interior sides of the cupped body 10. When the pitch has been melted the assembly is withdrawn from the oven and allowed to cool to room temperature with the chuck still overlying the lens. As the pitch hardens it will adhere to the sides of the cupped body 10 and to the plus surface of the lens 14 to firmly retain the lens against the machined edges of the cupped body 10. The chuck carrying the lens is then mounted in the various machines used for finishing the minus side of the lens 14.

In order to remove the lens 14 from the chuck according to my invention I place the lens carrying chuck in a cold box and cool it to a temperature of about 0° F. to cause the pitch within the chuck to contract and to release the lens which was formerly held against the cylinder machined edges 15 and 16. Just as soon as the lens 14 has been released due to the contraction of the pitch I remove the separated lens and the chuck from the cold box. The procedure can then be repeated by clamping a second lens to the chuck and placing it in the oven again as before to mount another lens in the chuck.

The purpose of the paper liner 18 on the bottom interior of the cupped body 10 is to absorb the strains and stresses caused by expansion and contraction of the pitch. It is well known that when pitch is cooled it contracts considerably, and if no paper liner were provided and the pitch 18 were permitted to come in contact with the bottom interior of the cupped body 10 the pitch would probably adhere to the bottom of the cupped body 10 and pull away from the lens surface 14 to release the lens.

The holes 17 formed in the top of the cupped body 10 are for the purpose of providing ventilation within the cup as the pitch contracts and expands.

I have described the chuck according to my invention the edges of which are machined to accommodate a specific cylinder lens. It will be apparent that a different chuck will be required for the various size cylinder lenses. It will also be apparent that the edges of the chuck could be machined to accommodate a cylindrical lens surface.

What I claim as my invention is:

1. A method for mounting and demounting lenses on a lens chuck, the said lens chuck having a cupped body with machined edges to abut with the surfaces of lenses applied thereto, the said chuck further having a quantity of pitch that is solid at room temperature within its cupped body, comprising the steps of placing a lens

over the machined edges of the said cupped body, clamping said lens over the machined edges of the said cupped body, heating said chuck and lens with said chuck overlying said lens to melt said pitch, cooling said lens chuck and pitch to room temperature while maintaining said chuck above said lens whereby to cause said pitch to solidify against said lens and retain said lens against the edges of said cupped body, said lens at this stage of the process being mounted on said lens holder, cooling said lens and said chuck below room temperature to cause said pitch to contract and release said lens from said chuck, said lens at this stage of the process being demounted from said lens chuck, the foregoing steps being repeated with different lenses on the same chuck and without removing the pitch therefrom.

2. A method for mounting and demounting lenses on a lens chuck, the said lens chuck having a cupped body with machined edges to abut with the surfaces to the lenses applied thereto and a vented bottom, the said chuck further having a quantity of pitch that is solid at room temperature within its cupped body, comprising the steps of placing a lens over the machined edges of the said cupped body, clamping said lens over the machined edges of the said cupped body, heating said chuck and lens with said chuck overlying said lens to melt said pitch, said pitch being in a quantity whereby communication between the atmosphere and the bottom interior of said cupped body is achieved through said vented bottom at this stage of the process, cooling said lens chuck and pitch to room temperature while maintaining said chuck above said lens whereby to cause said pitch to solidify against said lens and retain said lens against the edges of said cupped body, said lens at this stage of the process being mounted on said lens holder, cooling said lens and said chuck below room temperature to cause said chuck, said lens at this stage of the process being demounted from said lens chuck, the foregoing steps being repeated with different lenses on the same chuck and without removing the pitch therefrom.

3. A method for mounting and demounting lenses on a lens chuck, said lens chuck having a cupped body with machined edges to abut with the surfaces of lenses applied thereto and a vented bottom, the said chuck having a paper liner for its bottom interior, the said chuck still further having a quantity of pitch that is solid at room temperature within its cupped body, comprising the steps of placing a lens over the machined edges of the said cupped body, clamping said lens over the machined edges of the said cupped body, heating said chuck and lens with said chuck overlying said lens to melt said pitch, said pitch being in a quantity whereby communication between the atmosphere and the bottom interior of said cupped body is achieved through said vented bottom at this stage of the process, cooling said lens chuck and pitch to room temperature while maintaining said chuck above said lens whereby to cause said pitch to solidify against said lens and retain said lens at this stage of the process being mounted on said lens holder, cooling said lens and said chuck below room temperature to cause said pitch to contract and release said lens from said chuck, said lens at this stage of the process being demounted from said lens chuck, the foregoing steps being repeated with different lenses on the

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same chuck and without removing the pitch therefrom.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,168,710	Coleman	Jan. 18, 1916
1,332,778	Taylor et al.	Mar. 2, 1920
1,456,673	Dey	May 29, 1923
1,574,816	Hill	Mar. 2, 1926

6

Number	Name	Date
1,952,373	Hill	Mar. 27, 1934
2,264,392	McClernon	Dec. 2, 1941
2,352,178	Bolsey	June 27, 1944
2,465,153	Fritzsche	Mar. 22, 1949

FOREIGN PATENTS

Number	Country	Date
372,171	Germany	Mar. 20, 1923
450,965	Germany	Oct. 13, 1927

OTHER REFERENCES

"Prism and Lens Making," by F. Twyman, published by Adam Hilger Ltd., London, England, 1942. pp. 64 and 65.