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2,352,178

SUPPORTS FOR LENS BLANKS AND PROCESSES OF SECURING
LENS BLANKS TO SAID SUPPORTS
Filed Jan. 5, 1943

FIG. 1

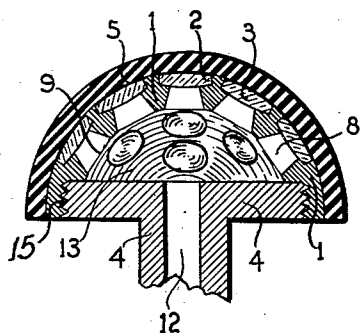


FIG. 2

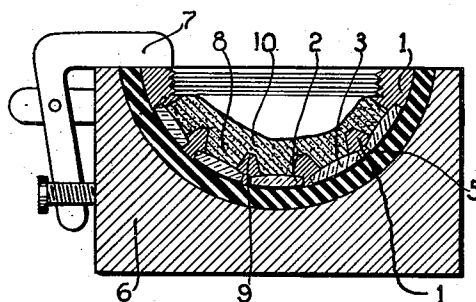


FIG. 3

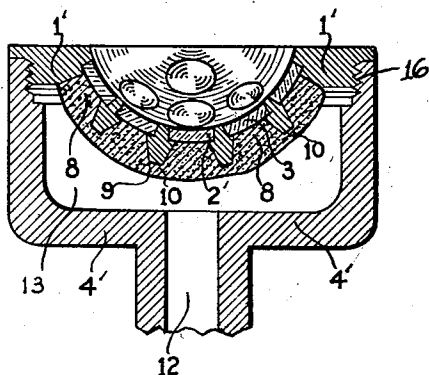


FIG. 4

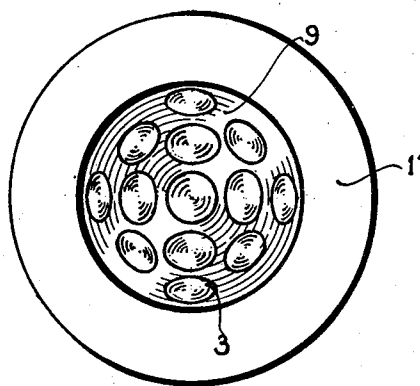
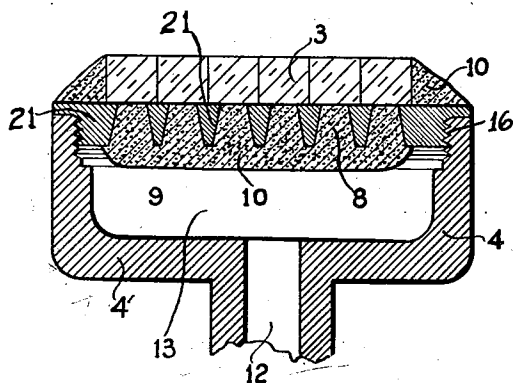


FIG. 5



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SUPPORT FOR LENS BLANKS AND PROCESS
OF SECURING LENS BLANKS TO SAID
SUPPORTS

Jacques Bolsey, New York, N. Y.

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6 Claims. (Cl. 51-216)

My present invention relates to lens blocking means and to processes of securing lens blanks to a lens supporting member, e. g. a tail stock, during grinding and polishing.

It is an object of my present invention to provide supports for lens blanks which enable precise and exact grinding and polishing of the lens while it is secured to these supports.

It is a further object of my invention to provide a tail stock of simple construction.

It is still a further object of my invention to provide a tail stock or similar support adapted to support simultaneously a plurality of lenses secured exactly centered to its lens supporting face.

Another object of my present invention consists in new processes of securing optical elements to be ground and finished, as for instance lens blanks, to supports, e. g. tail stocks, in such a manner that these lens blanks are automatically centered and that there is no need of lengthy measurements during this fastening operation.

With the above objects in view, my present invention mainly consists of a new support for lens blanks which comprises a supporting member having two faces, one of which serves as supporting surface for the lens blanks; this supporting member is provided with a hole connecting this supporting surface with the other face of the supporting member; this hole is shaped in such a manner as to prevent removal of hardened adhesive material filling the hole from the same through that end of the hole which is in that other face of the supporting member without breaking the hardened adhesive.

In this way, it is prevented that the adhesive material securing the lens blank to the supporting surface of the lens supporting member, e. g. tail head, become detached from the hole without being either broken or separated from the lens blank it is holding. This assures proper and secure fastening of the lens blank to the supporting surface of the tail stock. Furthermore, my new method of securing the lens blank to the tail stock avoids the application of any adhesive material between the lens blanks and the lens supporting surface of the same and assures correct position and centering of the lens blank in relation to the tail stock and the grinding and polishing devices.

My present invention is particularly adapted to facilitate simultaneous fastening of a plurality of lens blanks to a lens blocking device. In this case, all lens blanks are correctly positioned and centered without the necessity of measuring and

adjusting the position of each lens blank separately as had to be done up to now.

The novel features which I consider characteristic for my invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments, when read in connection with the accompanying drawing, in which:

Figure 1 is a cross section of a lens blocking device having an outer semi-spherical lens supporting surface;

Figure 2 shows a device for pitching lens blanks to the lens blocking device shown in Figure 1;

Figure 3 is a cross section of a modified lens blocking device having an inner lens supporting surface with lens blanks secured to this surface;

Figure 4 is a top view of the device shown in Figure 3; and

Figure 5 is a cross section of another modified lens blocking device having a flat lens supporting surface.

The lens blocking device shown in Figure 1 consists of a lens supporting member 1 preferably provided with depressions 2 into which fit the lens blanks 3 to be ground and polished. Each of these depressions 2 is connected by a hole 8 with the inner face 9 of the lens supporting member 1.

This member 1 is supported by the body member 4 screwed to it. A channel 12 is arranged inside body member 4 and serves for circulating a cooling medium, e. g. cold water, through the hollow space 13 formed by the inner face 9 of the lens supporting member 1 and body member 4.

After the lens blanks 3 have been inserted into the depressions 2 provided in the outer lens supporting surface of the lens supporting member 1, a cover 5 of rubber or like resilient material is placed over the lens supporting member 1 in order to retain the lens blanks 3 in their places during the following operation of applying the adhesive. It should be noted that the inner surface of the rubber cover 5 has to have a shape which is equal to the shape of the outer surface of the lens supporting member 1.

Thereafter, the unit formed by lens supporting member 1, the lens blanks 3, and cover 5 placed thereon, is unscrewed from the body member 4 and placed upside down into the hollow member 6. The inner surface of this member 6 corresponds to the outer surface of rubber cover 5, as shown in Figure 2. Fastening devices 7

are provided in order to hold, during application of an adhesive, the lens supporting member 1 together with the lens blanks 3 and cover 5 in the hollow member 6. These fastening devices 7 serve the further purpose of pressing the lens blanks 3 against the lens supporting member 1, thereby preventing penetration of any adhesive material between these lens blanks 3 and the outer surface of the lens supporting member 1.

Thereafter, heated molten pitch 10 or similar thermoplastic adhesive material is poured into the lens supporting member 1, as shown in Figure 2. It is advantageous if this pitch forms a continuous coherent coating over the inner surface of the supporting member 1.

After the pitch coating 10 has penetrated into and filled all holes 8 and after this pitch coating has hardened, the fastening devices 7 are loosened and the lens supporting member 1 is removed from the hollow member 6. Then, this member 1 together with lens blanks 3 secured to it by the pitch coating 10 is screwed back onto the body member 4. The lens blanks 3 are then ready for further treatment, i. e. grinding and polishing.

It should be mentioned that each of the holes 8 is shaped in such a manner that detachment of the hardened pitch 10 from the same is impossible without either breaking this hardened pitch or separating the pitch from the lens blank 3 to which it firmly adheres. For this purpose, it is preferable to make the diameter of each of these holes adjacent to lens blank 3 smaller than its diameter at the inner surface 9 of the lens supporting member 1. If, as shown in the drawing, the holes 8 are of conical shape, they have to be wider at their inner ends, i. e. near the inner face 9 of the supporting member 1.

Figures 3, 4, and 5 show two modified embodiments of the present invention. While with the lens supporting member shown in Figure 1 it is possible to grind and polish convex lens surfaces, the lens supporting member shown in Figures 3 and 4 serves for treatment of concave lens blanks and the one shown in Figure 5 for treatment of flat lens surfaces. These modified devices are so similar to the one shown in Figure 1 that their detailed description seems unnecessary. They will be easily understood by anybody skilled in this art from Figures 3, 4, and 5, respectively.

It should, however, be mentioned that there are nevertheless some constructive differences between the various embodiments shown in the drawing: thus, the embodiment shown in Fig. 1 has a plate-shaped body member 4 provided with an external thread 15 and a hemi-spherical lens supporting member 1 provided with lens supporting depressions 2 on its outer surface while the embodiment shown in Figs. 3 and 4 comprises a cup-shaped body member 4' provided with an internal thread 16 and a hemi-spherical lens supporting member 1' provided with depressions 2' on its inner surface. The embodiments shown in Fig. 5 comprises also a cup-shaped body member 4' provided with internal threads 16 while the lens supporting member 21 of this embodiment is flat and plate-shaped and has an outer plane surface without any depressions. Of course, the threads on the lens supporting members have to correspond to the threads on the body members: thus, the lens supporting member 1 of the embodiment shown in Fig. 1 is provided with an internal thread while the lens supporting members 1' and 21 of the embodi-

ments shown in Figs. 3 and 5 respectively are provided with outer threads.

As shown in the drawing, the upper part of the body members 4 and 4' is shaped in each case in such a manner as to form a hollow space 13 between this body and the face 9 of the lens supporting member 1. The reason for this is that it is advantageous to provide a circulation of cooling liquid along the inner surface of the adhesive coating 10 to prevent the same from becoming softened. This circulating cooling liquid, not shown in the drawing, circulates through channel 12 in well-known way.

It should be mentioned that the depressions 2 in the outer surface of the lens supporting member 1 are preferably shaped in such a manner that the lens blanks inserted into them project over the outer surface of this member so that during treatment of the lens blanks the supporting member itself does not come into contact with the grinding or polishing tools.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other devices for supporting work pieces differing from the lens blocking devices described above.

While I have illustrated and described the invention is embodied in lens blocking devices, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What I claim as new and desired to secure by Letters Patent is:

1. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process comprising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a covering member having an inner resilient covering surface corresponding in shape to the lens supporting surface of said lens supporting member with said covering surface upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon, turning thereafter said lens supporting member with said lens blanks and said covering member placed upon the same upside down, placing it with said covering member on a supporting surface corresponding in shape to the outer non-covering surface of said covering member without removing said lens blanks from the corresponding holes in said lens supporting member, and finally filling said holes in said lens supporting member with a heated thermoplastic adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing after cooling said lens blanks to said lens supporting member without

provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks.

2. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process comprising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a covering member having an inner resilient covering surface corresponding in shape to the lens supporting surface of said lens supporting member with said covering surface upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon, turning thereafter said lens supporting member with said lens blanks and said covering member placed upon the same upside down, placing it with said covering member on a support having a supporting surface corresponding in shape to the outer non-covering surface of said covering member without removing said lens blanks from the corresponding holes in said lens supporting member, securing said lens supporting member and said covering member with said lens blanks between them to said support, preventing thereby unwanted relative movement between said lens supporting member and said lens blanks, and finally filling said holes in said lens supporting member with a heated thermoplastic adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing after cooling said lens blanks to said lens supporting member without provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks.

3. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process comprising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a covering member having an inner resilient covering surface corresponding in shape to the lens supporting surface of said lens supporting member with said covering surface upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon, turning thereafter said lens supporting member with said lens blanks and said covering member placed upon the same upside down, placing it with said covering member on a supporting surface corresponding in shape to the outer non-covering surface of said covering member without removing said lens blanks from the corresponding holes in said lens supporting member, filling said holes in said lens supporting member with a heated thermoplastic adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing after cooling said lens blanks to said lens supporting member without provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks, and finally removing said lens supporting member with said lens blanks secured

to them from said covering member and treating the lens blanks as desired.

4. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process comprising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a covering member having an inner resilient covering surface corresponding in shape to the lens supporting surface of said lens supporting member with said covering surface upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon, turning thereafter said lens supporting member with said lens blanks and said covering member placed upon the same upside down, placing it with said covering member on a support having a supporting surface corresponding in shape to the outer non-covering surface of said covering member without removing said lens blanks from the corresponding holes in said lens supporting member, securing said lens supporting member and said covering member with said lens blanks between them to said support, preventing thereby unwanted relative movement between said lens supporting member and said lens blanks, filling said holes in said lens supporting member with a heated thermoplastic adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing after cooling said lens blanks to said lens supporting member without provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks, and finally removing said lens supporting member with said lens blanks secured to them from said covering member and treating the lens blanks as desired.

5. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process comprising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a holding member upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon holding the latter in their proper places, turning said lens supporting member with said lens blanks and said holding member placed upon the same upside down, and filling said holes in said lens supporting member with an adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing said lens blanks to said lens supporting member without provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks.

6. Process of simultaneously securing a plurality of lens blanks to a lens supporting member provided with a plurality of holes spaced apart from each other and connecting the lens supporting surface of said lens supporting member with another face thereof, said process com-

prising the steps of positioning said lens supporting member with its lens supporting surface facing upward, placing the lens blanks on said surface so that one lens blank is coming to lie on each of said holes, placing a covering member having an inner covering surface corresponding in shape at least substantially to the lens supporting surface of said lens supporting member with said covering surface upon said lens supporting surface of said lens supporting member and the lens blanks placed thereon, turning said lens supporting member with said lens blanks and said covering member placed upon the same upside

5 down, and filling said holes in said lens supporting member with an adhesive material sticking to the walls of said holes and to those faces of the lens blanks which are lying under them, thus securing said lens blanks to said lens supporting member without provision of adhesive material between the supporting surface of said lens supporting member and the supported faces of the lens blanks, and finally removing said lens supporting member with said lens blanks secured to them from said covering member and treating the lens blanks as desired.

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