

No. 689,933.

Patented Dec. 31, 1901.

J. K. UNDERWOOD.

BLOCKING OR MOUNTING LENSES FOR GRINDING.

(Application filed Dec. 22, 1900.)

(No Model.)

3 Sheets—Sheet 1.

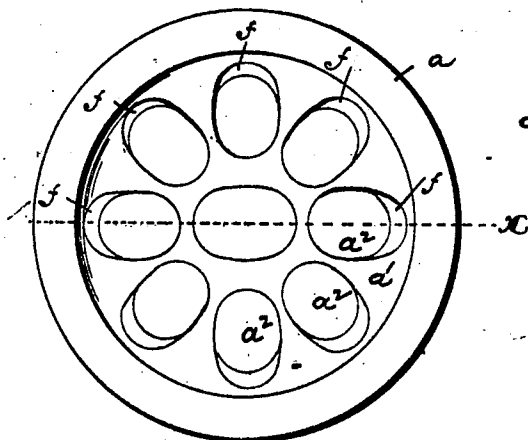


Fig. 1.

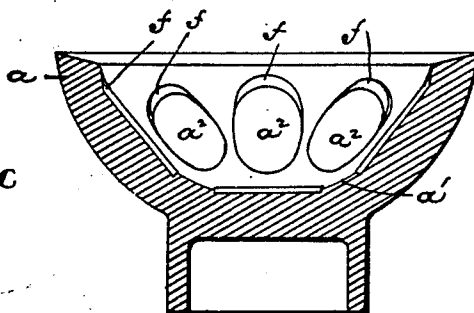


Fig. 2.

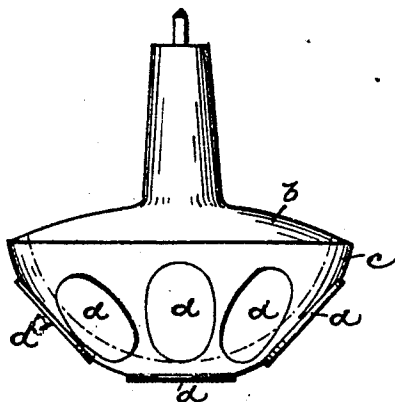
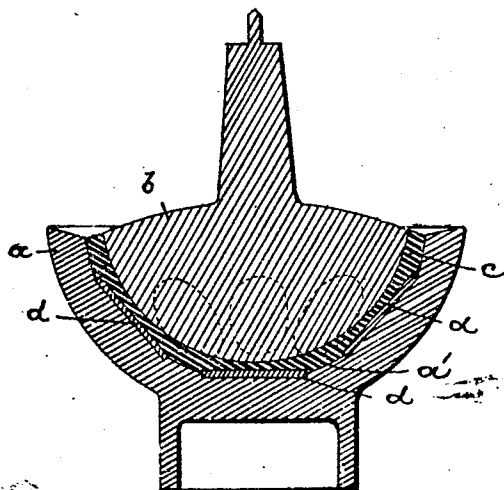


Fig. 3.

Fig. 4.



WITNESSES:

Henry King

Russell M. Everett

INVENTOR:

John K. Underwood,

BY

Drake & Co.

ATTORNEYS.

No. 689,933.

Patented Dec. 31, 1901.

J. K. UNDERWOOD.

BLOCKING OR MOUNTING LENSES FOR GRINDING.

(Application filed Dec. 22, 1900.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 6.

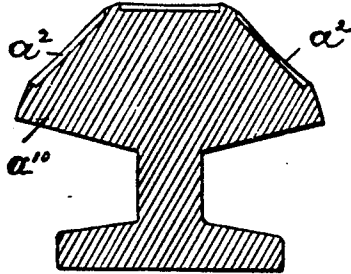


Fig. 6.

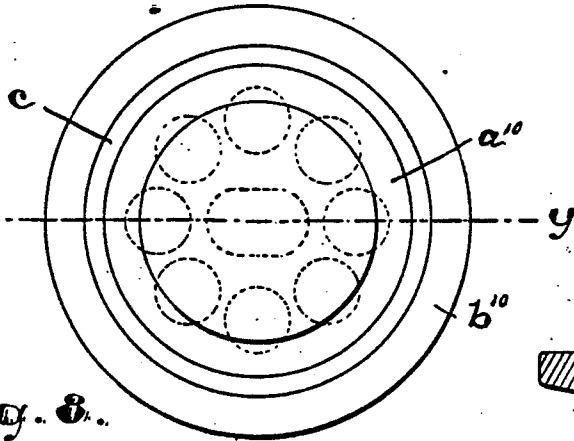
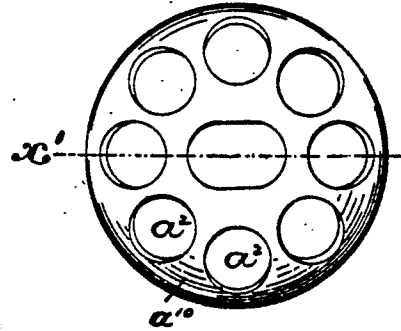


Fig. 8.

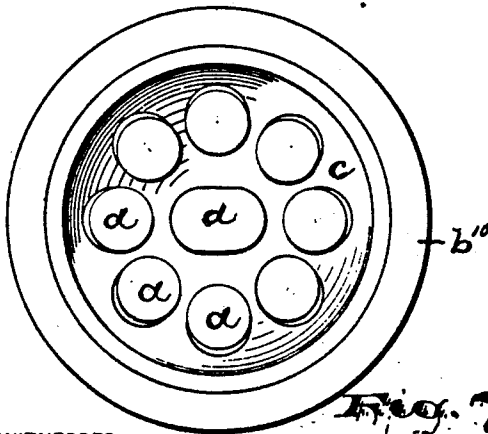


Fig. 7.

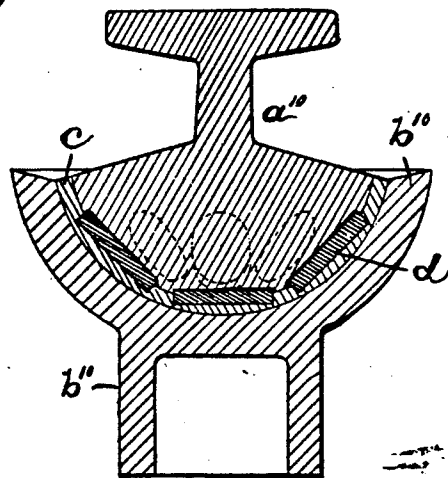


Fig. 9.

WITNESSES:

Henry Shug

Russell M. Everett

INVENTOR

John K. Underwood,

BY

Frank A. [Signature]
ATTORNEYS.

No. 689,933.

Patented Dec. 31, 1901.

J. K. UNDERWOOD.

BLOCKING OR MOUNTING LENSES FOR GRINDING.

(Application filed Dec. 22, 1900.)

(No Model.)

3 Sheets--Sheet 3.

Fig. 11.

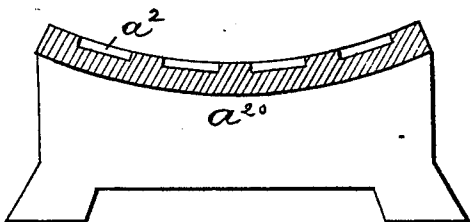


Fig. 12.

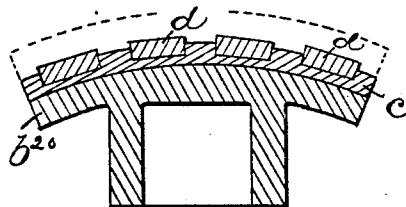


Fig. 10.

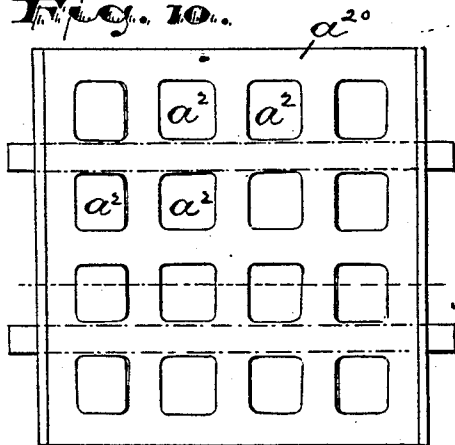


Fig. 13.

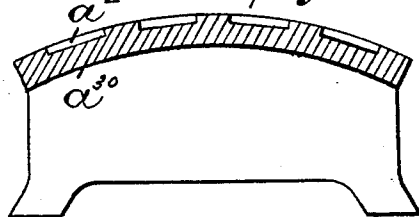


Fig. 14.

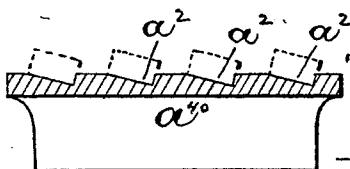
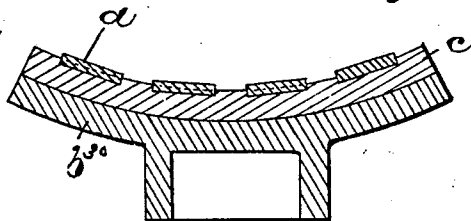


Fig. 16.

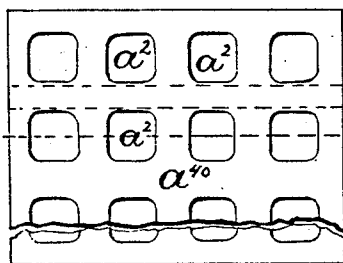
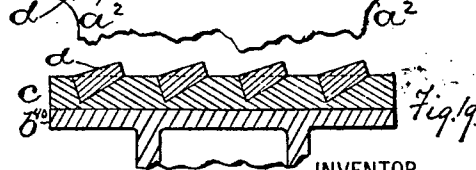
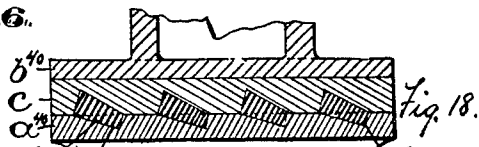
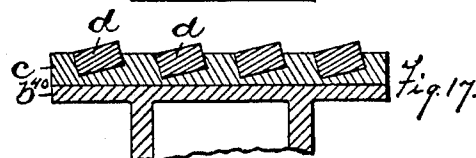


Fig. 15.



WITNESSES:

Henry Long
Russell M. Everett.

John K. Underwood.

BY

Drake & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN K. UNDERWOOD, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE SPENCER OPTICAL MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

BLOCKING OR MOUNTING LENSES FOR GRINDING.

SPECIFICATION forming part of Letters Patent No. 689,933, dated December 31, 1901.

Application filed December 22, 1900. Serial No. 40,734. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. UNDERWOOD, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Blocking or Mounting Lenses for Grinding; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to the art of blocking or mounting lenses preliminary to grinding the surfaces of the said lenses. The method heretofore generally followed in lens-grinding factories has been to cast in a mold a form consisting of a composition of rosin and pitch, the said elements of the composition being proportioned to meet varying conditions and requirements of temperature, &c. In said prior methods the mold is first properly shaped interiorly to such a curved plane or other form as will bring the plastic matter into shape to hold the glasses at positions necessary to secure the desired focus, when the lenses are ground and polished, and the said mold is filled more or less completely with the composition, and an iron block, which has been previously heated so that it will melt the said composition or render the same plastic and effect an adhesion of said composition of said block, is then inserted in the mold. When sufficiently cool, the block is withdrawn, bringing the form of pitchy composition with it. A number of lenses are then heated and placed on the rounded or other shaped surface of the form and pressed against it by the operator or workman by means of what is known as a "blocking-pin." The depth to which each glass or lens is pressed into the pitch depends on the skill of the operator. Even with great skill there has been an irregularity in depth of the sitting of the several lenses or glasses on the form and in the arrangement of the lens with reference to the curved surface, so that the lenses have greatly varied both in thickness

and in the location of their focuses, as will be apparent. In my improved method or process of blocking the lenses I avoid these variations and secure a more uniform product and reduce the cost of manufacture.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a plan of a concave mold for blocking lenses to be ground convexly; and Fig. 2 is a section of the same, taken on line *x*, Fig. 1. Fig. 3 is a side elevation of the block having lenses applied thereto ready for grinding; and Fig. 4 shows in section the mold, block, lenses and adhesive matter in position preliminary to withdrawing the block, &c., from the mold. Fig. 5 is a plan showing a convex mold having recesses for the lenses or lens-glasses and adapted to force said lens-glasses into the pitch of the block in the operation of making concave lenses. Fig. 6 is a section on line *x'*, Fig. 5. Fig. 7 is a plan of the concave block adapted to be used with said convex mold. Fig. 8 is a plan showing said block arranged in connection with a mold; and Fig. 9 is a section on line *y*, Fig. 8. Fig. 10 is a plan, and Fig. 11 is a section on line *z*, Fig. 10, of a recessed mold for use in seating glasses for convex cylindrical grinding. Fig. 12 is a section of a block to cooperate with the last said mold. Figs. 13 and 14 are respectively the mold and block for concave cylindrical grinding. Fig. 15 is a plan, and Fig. 16 is a section, as on line *z'*, Fig. 15, of a flat mold recessed to receive glasses in the manufacture of prismatic lenses. Fig. 17 is a block to receive the seated glasses from said flat mold preliminary to grinding. Fig. 18 shows the relation of said mold, block, pitch, and lenses in the second blocking operation after the lenses have been ground on one side, and Fig. 19 shows the lenses seated on the block ready to be ground on the second side to complete the form of a prism.

In said drawings, *a* indicates the mold; *b*, the block; *c*, the waxen or pitchy composition, and *d* the lenses applied to the block by means of the said composition.

In my improved system or process of block-

ing or mounting the lenses for grinding the mold a^1 is made of iron or other suitable metal, as heretofore, and for convex lenses is interiorly concavely curved, as at a' , Fig. 2, to secure the desired proper curvature of the composition necessary for holding the lenses in the proper relative position for grinding to a desired focus or thickness. For grinding to other than convex surfaces the mold is made of other suitable shapes, as will be hereinafter more fully described. The said concave or other shaped surface is provided with a collection of shallow lens-recesses a^2 , of a depth and outline adapted to receive the lenses and hold the same exactly in such proper relative positions that when withdrawn from the mold with the block said lenses will be in true and exact position for grinding to a uniform focus. The glass pieces or lenses after being heated are quickly placed in the recesses or receptacles a^2 therefor and automatically assume their exact relative positions without any skill or care on the part of the operator. A heated composition of pitch and wax or other suitable adhesive matter is then poured into the mold, the heated block b is inserted into the mass, as indicated in Fig. 4, and the whole is allowed to cool, the plastic or adhesive matter becoming hard and serving as a firm backing for the glasses. The block b is then withdrawn, carrying the pitchy composition c on its outside and the lenses or glasses embedded therein, said glasses being disposed exactly in their proper relative positions and at uniform depths in the pitchy mass ready for grinding in the ordinary grinding-shell.

By my improved method and means thus described of mounting the glasses or lenses I avoid the loss of time required for carefully pressing down the individual lenses.

To enable the lenses to be withdrawn from the concave mold with the plastic composition upon the block, I bevel the upper walls of the recesses, as indicated at f in Figs. 1 and 2.

The mold and block shown in Figs. 1 to 4 are for use in grinding convex lens-surfaces. When I apply my invention to the production or manufacture of concave lens-surfaces, I employ such forms of the parts as are shown in Figs. 5, 6, 7, 8, and 9, in which case the concave block b^{10} serves as a receptacle for the pitch, while the convex mold a^{10} has the recessed surface, by means of which the lens-glasses are properly located preliminary to grinding. Said mold a^{10} has the glasses temporarily fastened into the said recesses by shellac or other adhesive material to hold the said glasses in place when the mold is inverted to be forced into the block b^{10} , and after fastening the glasses in said recesses the mold is forced into the warm adhesive matter within the block, as shown in Fig. 9. After the convex mold a^{10} , with its applied glasses, has been inserted into the block b^{10} , having the semifluid pitch, and has been pressed into proper relative position and after the said pitch has been cooled

and hardened the mold is withdrawn, the shellac by which the glasses are fastened to said mold being insufficient in strength to overcome the adhesive character of the pitch. The glasses are now found projecting a little from the concave bed of pitch and are thus adapted to receive a convex grinding member, which is inserted and operated in any suitable manner to effect the desired concave grinding.

Where the invention is employed for grinding cylindrical lenses, I use the construction shown in Figs. 10, 11, 12, 13, and 14, the construction shown in Figs. 10, 11, and 12 being employed in blocking for grinding the convex side of cylindrical lenses and that shown in Figs. 13 and 14 illustrating the mold and block employed in blocking for the concave side. In these drawings the mold a^{20} is a segment of a cylinder, as indicated in Fig. 11, and is provided with recesses to receive the glasses and hold them in proper relative position while the pitch is being applied and the block b^{20} brought to bear upon the pitch preliminary to stripping the glasses from the said mold. In Fig. 13 the reverse is shown, and the glasses are applied within the recesses of the convex mold a^{30} and held by means of shellac or the like while the mold is inverted for insertion into the concave block b^{30} , containing the pitch, as has been before described in substance. In this case the glasses are disposed in a cylindrical relation and the grinding parts operate substantially as described in a copending application.

When I desire to employ my invention in grinding prisms, I employ a construction shown in Figs. 15, 16, 17, 18, and 19, where the recesses d , adapted to receive the glasses, are formed in a flat mold a^{40} , the bottoms of the recesses being inclined, so that the glasses will be somewhat set up at an incline, as shown in Fig. 16. In this case the viscous pitch is poured upon the center of the mold and a flat block b^{40} is applied to the top thereof, and under pressure the pitch flattens out and overflows the sides to some extent. Upon cooling the block is removed, as usual, and the glasses are drawn away from the mold therewith and project from the surface of the pitch, as shown in Fig. 17. The projecting portions of the glasses are then ground by any grinding process, preferably by the process described in my copending application above referred to, and after the grinding is completed the glasses are removed and again inserted in the recesses of the same mold a^{40} first used, the unground sides being inserted in the recesses of the mold and the smaller edge of each partially-formed prism being placed in the deeper part of a recess. The pitch is then again applied and the block b^{40} pressed upon the same, so that again the pitch and the glasses adhere to said block and are withdrawn from the mold together, and the second side is then ground, so that a complete prism is formed, as indicated in Fig. 19.

Having thus described the invention, what I claim as new is—

1. The process herein described of blocking lenses for grinding, consisting essentially in
5 arranging the lenses within recesses formed at predetermined positions with respect to the axis of the mold, the said lenses projecting out from said recesses a limited distance, applying plastic matter to said lenses, the
10 plastic matter extending across the broad exposed surfaces of the lenses and at the edges thereof, inserting a block in said plastic matter, and causing the said lenses to adhere to said block and withdrawing the block from
15 the mold together with the said plastic matter and lenses, the latter being embedded within said plastic matter and only partially projecting out therefrom, the said lenses thus being exactly seated upon said block at prede-
20 termined positions about the axial center of

said block, so that in rotating said block on its axis, the said lenses will be given exactly the desired curvatures, substantially as set forth.

2. The process herein described of blocking 25 lenses which consists in arranging the lenses in predetermined positions within a mold, applying the plastic matter to the said lenses and inserting a block in said plastic matter, and thereby simultaneously attaching the 30 lenses and plastic matter to said block, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of October, 1900.

JOHN K. UNDERWOOD.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.