

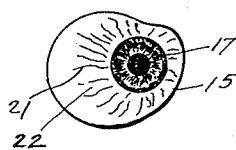
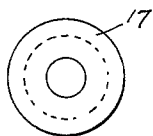
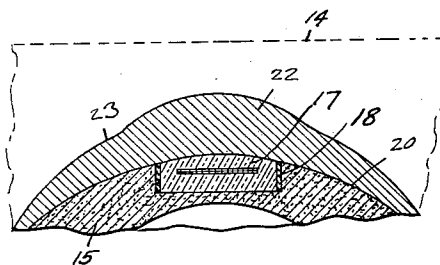
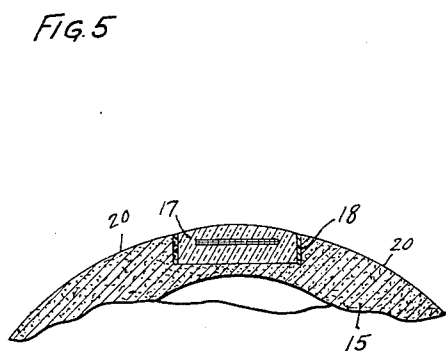
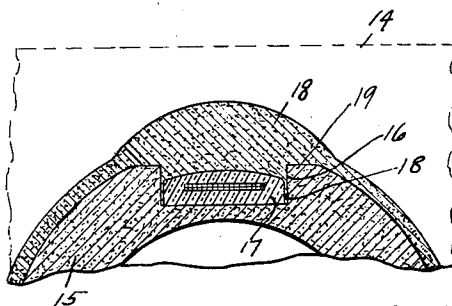
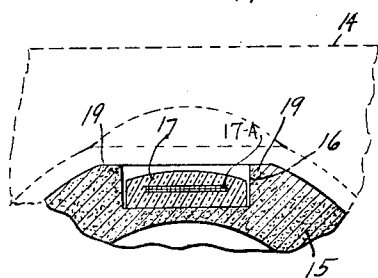
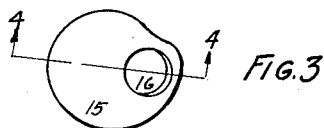
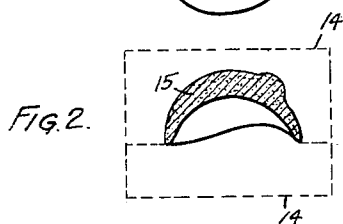
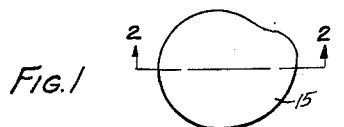
Feb. 5, 1946.

S. O. NOLES

2,394,400

METHOD OF MAKING ARTIFICIAL EYES

Filed Nov. 9, 1942



INVENTOR
SIDNEY O. NOLES.
BY *E. J. Binkert*
ATTORNEY

UNITED STATES PATENT OFFICE

2,394,400

METHOD OF MAKING ARTIFICIAL EYES

Sidney O. Noles, Portland, Oreg.

Application November 9, 1942, Serial No. 465,022

2 Claims. (Cl. 3—13)

This invention relates generally to plastics, and particularly to artificial eyes and the method of making same.

The main object of this invention is to make a non-fragile artificial eye.

The second object is to make an artificial eye which can more comfortably remain in contact with the socket walls for longer periods of time than can the ordinary glass eye.

The third object is to produce an artificial eye which will feel lighter and more natural within the socket than is the case with existing artificial eyes.

The fourth object is to produce an artificial eye which will not break due to rapid temperature changes or under sudden shock, or under ordinary pressure, thereby eliminating a chance for injury to the person of the wearer and also avoiding the loss of time usually occasioned by such replacement.

The fifth object is to prevent the checking of the eye surface and the consequent discoloration due to the action of the fluids in the socket area.

I accomplish these and other objects in the manner set forth in the following specification as illustrated in the accompanying drawing, in which:

Fig. 1 is a plan of a white plastic blank.

Fig. 2 is a section taken along the line 2—2 in Fig. 1.

Fig. 3 is a plan of a blank after being recessed.

Fig. 4 is a section taken along the line 4—4 in Fig. 3.

Fig. 5 is an enlarged fragmentary section taken along the line 5—5 in Fig. 4, showing the wafer in position in the recess.

Fig. 6 is a view similar to Fig. 5 but showing the wafer covered with white plastic and remolded to the original form shown in Fig. 2.

Fig. 7 is a view similar to Fig. 6 but showing the excess plastic removed exposing the wafer with the voids around same filled with white plastic.

Fig. 8 is a view similar to Fig. 7 but showing the clear plastic cornea in place and remolded to the shape shown in Fig. 2.

Fig. 9 is a plan of a wafer containing the colored area.

Fig. 10 is a side elevation of Fig. 9.

Fig. 11 is a front elevation of the completed eye.

Similar numerals refer to the same or similar parts throughout the several views.

Referring in detail to my invention, there is first formed by means of a suitable mold 14,

shown in dotted lines, a blank 15 approximating closely the frontal shape and size of the natural eye. The blank 15 is formed of a plastic material such as one of the phenol resins which is non-porous and preferably free from toxic properties, and practically non-fragile under shock or rapid changes in temperature, and closely resembling the "white" or sclera of the natural eye. The blank 15 is then counterbored substantially parallel to the visual axis to form a circular recess 16 adapted to receive the wafer 17 which contains the colored matter 17-a of the eye commonly referred to as the iris and indicated by dotted lines in Figs. 9 and 10. Owing to the fact that glass lends itself to this portion of the work it is used for this purpose, although any other suitable material may be used. At the same time the surface 20 of the blank 15 is ground back from the dotted mold line as shown in Fig. 5 to provide clearance space.

The wafer 17 is placed within the recess 16 and covered with a quantity of uncured white plastic 18 which is then pressed in the mold 14 and reformed as shown in Fig. 6 to the original form of the blank 15 also shown in Fig. 2.

The surplus material 18 is then removed by grinding and the projecting portions 19 of the plastic blank 15 around the sides of the recess 16 are ground back to form a somewhat rounded surface 20 as shown in Fig. 7. Vein lines 21 are formed on the surface 20 around the iris or insert 17. The vein lines are usually added by painting them in place with a special, quick drying paint which will not be affected later by curing temperatures.

The cornea is formed of a thick layer of clear plastic 22 which is placed over the wafer 17 and vein lines 21, then remolded and cured, after which the surface 23 of the plastic 22 and all the remaining surface of the blank 15 are highly polished.

In order that the steps in the method may be more conveniently followed, the various additions of plastic are separately numbered.

The advantages of the process involved are based on the fact that the correct eye shape is used as a basis of all of the operations and this shape, having been ascertained by making an impression of the eye socket and corresponding outer curvatures, is transferred to a mold 14 which becomes the governing gauge in the succeeding steps which not only make the applicant's product the perfect article that it is, but do so on a commercial basis.

The steps in the process involve first the for-

mation of a model, then the formation of a mold 14 of the desired eye shape as indicated by the model, including the "projection of the visual axis," then the making of a white plastic blank 15 which corresponds exactly with the mold 14, then recessing the blank 15 along the visual axis of the eye, then mounting a colored insert in the recess, then sealing the insert in the recess and covering the insert with white plastic up to the original mold lines, then cutting away the excess materials outside of the insert as well as cutting away a portion of the exterior of the face 20 to provide clearance between the face 20 and the corresponding side of the mold 14 when the eye is returned to the mold, then filling the clearance space between the partially formed eye and the mold with clear plastic, then polishing the exterior of the clear plastic.

It will be understood that in the various applications of the plastic, each application is cured as applied. This curing is done under pressure and the pressure is obtained by investing it in the mold 14 during the curing process. The earlier process steps can, of course be of shorter duration than the latter steps as the total curing time of the earlier steps increases with each subsequent curing operation.

It must be understood that the size and shape of the parts herein illustrated have no actual bearing on the invention, but are merely illustrative.

It must also be understood that while the term "plastic" is used somewhat loosely, it is imperative that whatever type of plastic is used should be free from toxic properties. Most plastics of the acrylic type are satisfactory for this purpose.

It can be seen from the foregoing that by my invention it is easily possible to retain all of the advantages of glass coloring without keeping the disadvantages which arise from bringing glass into direct contact with the body.

It is a well known fact that most wearers of glass eyes remove them before retiring in order to rest the muscles of the eye socket. This need not be done with plastic eyes. This is due to the fact that glass when wet is naturally slippery, causing the muscles to hold much tighter than is needed with the plastic eye and thereby causing more fatigue. Also the slippage of the glass eye causes friction and often abrasion of the socket lining. With a plastic eye, the socket has a better grip on the eye and less effort is expended, all of which contributes to the feeling of ease experienced by the users thereof.

Again, by the use of plastic, the wearer is robbed of his fear of breakage which adds greatly to his peace of mind.

The plastic eye is not affected by the fluids of the eye socket and there are no discolorations, dimming, cracks or checks which would detract from the beauty of the artificial member. Nor is there any danger of accidentally breaking the eye by dropping it, or by sudden changes in temperature such as are often experienced by farm-

ers and others who move between wide ranges of temperatures.

Since glass eyes are commonly made of imported glass which is becoming less available, it follows that the substitution of plastic for glass meets an acute industrial need, but the real value of the invention resides in the properties possessed by plastic and not possessed by glass.

In addition to the unbreakable feature and the improved gripping and contacting action, the plastic eye possesses the outstanding advantage in naturalness of appearance. Given the same polish, the plastic eye has fewer of the extreme highlights which are so common with the glass eyes. This is especially noticeable when plastic and glass eyes are compared with human eyes.

I have therefore made possible the production of a beautiful reproduction of the appearance of the human eye and this appearance is permanent, the eye non-fragile, and the wearing thereof extremely comfortable.

I am aware that there are several ways in which this result can be accomplished, and it is therefore not my intention to limit myself to the precise form or method described herein, but I do intend to cover all of such forms and variations thereof as fall fairly within the following claims.

I claim:

1. A method of making artificial eyes consisting of forming a blank of white plastic having a convex front side, then partially curing said blank, then forming a cylindrical recess in said front side having its axis substantially parallel to the visual axis, then inserting a colored wafer in said recess, then covering said wafer with white uncured plastic and remolding it to its original size, then further curing the blank and partially curing the added plastic, then making the contour of the convex face of the blank and the outer side of the wafer continuous, then forming a concavo convex covering of transparent plastic over said wafer and blank and curing the transparent plastic in a manner to cause same to bond with the plastic in the blank.

2. A method of making artificial eyes consisting of forming a wafer colored to simulate the iris of a human eye, then forming a white plastic blank conforming to the frontal shape of the human eye, then partially curing said blank, then forming a cylindrical recess in said blank along the visual axis, then placing the wafer within the recess then covering the wafer with plastic and remolding the blank to its original size and form and forcing plastic around said wafer, then further curing said blank, then forming the front of said blank to a rounded contour adjoining said wafer, then forming representations of veins on the plastic portions around said wafer, then covering the front of the blank with clear plastic, then remolding the blank a second time to its original size, then finally curing the piece, and then polishing the entire exterior thereof.

SIDNEY O. NOLES.