June 10, 1930. S. MARCUS 1,763,312

ARTIFICIAL EYE

Filed Feb. 10, 1928

Fig. 1.

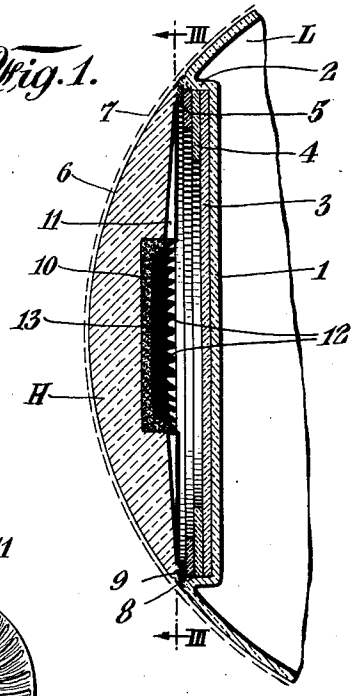
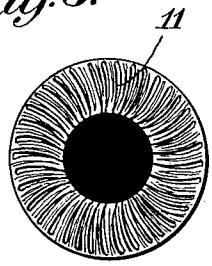


Fig. 3.



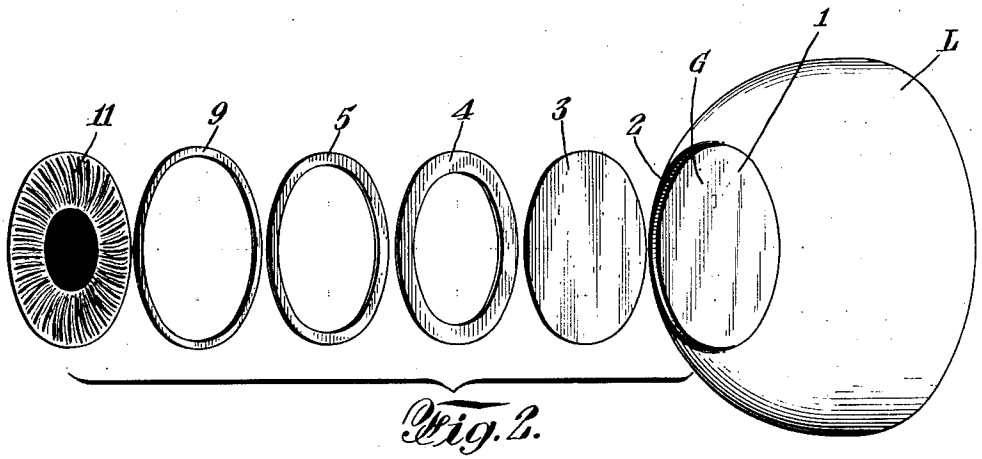


Fig. 2.

INVENTOR.
Samuel Marcus

ATTORNEY

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UNITED STATES PATENT OFFICE

SAMUEL MARCUS, OF RIVERDALE, NEW YORK, ASSIGNOR TO MARKON MANUFACTURING CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

ARTIFICIAL EYE

Application filed February 10, 1928. Serial No. 253,312.

This invention relates to an improvement in artificial eyes, and particularly to that class of artificial eyes which is intended for use in toy figures, such as dolls and the like.

An object of the invention is to provide a simple and practical structure by which a highly natural and human-like appearance is secured and which at the same time is inexpensive to manufacture.

A further object is to construct the eye, and particularly the pupil and iris portions thereof in such manner that the colorings of these features may be readily modified in different eyes, merely by the substitution of different selected parts.

A further object is to so design the parts that the pupil, when viewed from different angles will appear to slightly change its shape and to dilate and contract, thus to give almost a life-like appearance.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:

Fig. 1 is an enlarged fragmentary central sectional view through a portion of an eye constructed in accordance with this invention.

Fig. 2 is a perspective view illustrating in detached relation the several separate elements proposed for use according to this invention, and

Fig. 3 is a rear elevational view of the lens or iris element employed.

Referring to the drawings for describing in detail the structure illustrated therein, the reference character L indicates the main body or shell of the eye. This shell is of a general semispherical form usually, though not necessarily, open at its rear side. At its forward side the material of the shell is inset so as to provide a substantially flat disc like wall 1 having an annular marginal wall 2 projecting forwardly therefrom and merging into the body of the shell, said walls 1 and 2 thus providing a depression or seat as G at the forward side of the shell and said seat being in the desired position and of the approximate size desired for the iris of the eye.

This shell or body may be of any desired material, such as thin sheet metal, sheet celluloid, or the like, and it may be colored on its outer surface to correspond with the desired color for the "white" of the eye. This color may continue over the forwardly facing surface of the wall 1 without change or this surface may be colored otherwise as may be desired.

Fitting into the seat G is arranged a thin disc 3. This disc may be opaque and of a color as may be desired for the central portion of the iris surrounding the pupil, or it may be transparent to expose a desired color upon the forward face of the wall 1, or it may be semi-transparent and tinted, say a light blue, to co-act with the underlying color of the forward face of wall 1 to give the correct shade desired for the central portion of the iris surrounding the pupil.

Upon the outer surface of the disc 3 is arranged a ring as 4 and upon the outer surface of this ring is a second ring as 5, both being of the same external diameter and being received in the seat G. These rings are of different circumferential widths, the ring 5 being of less width than the ring 4 so that when viewed from the front of the eye an inner marginal portion of the ring 4 is visible within the ring 5.

These rings 4 and 5 may be made of any appropriate material and of any desired colors according to the artistic dictates of the manufacturer. They may be opaque, transparent, or semi-transparent, but it has been found that an excellent effect may be obtained by making them, as well as the disc 3, of thin sheet celluloid slightly tinted in color, as for instance blue, the ring 4 being of a tint slightly darker than the material of the disc 3, and the ring 5 being still another shade darker, it being here noted that by us-

ing semi-transparent material of this character the portions of the disc and rings which overlie each other will have cumulative color value, that is to say that even if these three elements were of identical shades before assembly the apparent color of the ring 5 when superposed upon the disc and upon the ring 4 would be dark, the apparent color of the exposed portion of the ring 4 would be less dark and the exposed portion of the disc would be lightest. The relative color value of these parts may obviously be altered at will by making the different parts of slightly differently tinted materials.

Arranged over the open side of the seat G, and serving as a closure for said seat is a lens H, said lens being preferably convexed on its outer surface as at 6 to conform substantially to the spherical curvature of the outer surface of the shell, thus completing the spherical contour of said shell.

This lens may be formed of any appropriate material such as glass, celluloid or the like. It is preferably colorless, but may be of a slightly tinted color if preferred. It may be attached in position upon the shell L by any approved means as by a transparent covering of glass, celluloid, varnish, or other material fitted or applied over its outer surface and over the outer surface of the shell L, as suggested by the dotted line 7, or it may be cemented by its peripheral edge to the material of the shell as indicated at 8, the cover 7 being present or not as preferred.

In some instances a third ring as 9 may be employed at the joint between the lens and the shell, this ring being preferably of substantially the same material as the rings 4 and 5 but usually being of a considerably darker color or shade so as to constitute a highly contrasting annular line dividing the iris from the "white" of the eye.

Where the lens is formed of celluloid and the shell L is of celluloid or of celluloid-coated metal, the lens may be very esaily and efficiently attached by applying a suitable dissolvent such as "acitone" to the joint between the lens and the shell thus causing these parts to become in effect fused together. Where the ring 9 is also of celluloid the "acitone" will serve to partly dissolve this ring into integral relation with the lens and shell and make an almost invisible joint in which the strong color of the ring 9 is desirably prominent.

The pupil of the eye may be provided in any appropriate manner but as hereinabove suggested it is a purpose of this invention to cause the pupil to appear to dilate and contract according as it is viewed from different angles and positions. To this end the invention proposes that the lens shall be formed in its inner or rear surface with a central annular depression as 10 of the desired size for the pupil and that the inner surface of the lens surrounding this depression shall be corrugated or irregularly scored with a multitude of radially extending grooves as 11 therein said grooves being deepest and broadest adjacent the depression 10 and being of diminishing dimensions outwardly substantially to the periphery of the lens and being slightly curved radially of their length as clearly seen in Fig. 3. The relatively large inner ends of these grooves or corrugations open into the depression 10, thus causing the rear annular edge or corner of said depression to be provided with serrations as 12—12, as best seen in Fig. 1.

The corrugations or scorings on the rear surface of the lens are purposely made somewhat irregular, there being minor radial lines or corrugations between the main corrugations, and all of the corrugations being more or less prominent according as fancy may suggest.

The depression 10 is filled or coated with a coloring material such as black paint or wax 13 at least some of which extends onto the serrations 12—12, and it will be thus seen that if the pupil be viewed from directly in front its outlines will be relatively sharp and circular while if viewed more or less sidewise the darkly colored serrations 12—12 nearest to the observer will be prominent, the prominence diminishing in oppcsite directions from this nearest point. Because of the irregular character of the serrations and the consequent indefinite line which they define, this will cause the pupil to appear to lose its precise circular contour and slightly dilate or contract according to the changing angle from which the observation is made.

The magnifying effect of the lens upon these serrations, the refraction of light rays from the encircling angularly disposed surfaces of the corrugations 11, and the defusion of said rays due to the multitude of radial lines produced by the corrugations, all combine to give an appearance of great depth and to at the same time at least partially obliterate any definite outlines of either the corrugations 11 or the serrations 12. As the point of observation is moved from one position to another the refraction and defusion of light causes a very marked apparent difference in the size and contour of the pupil so that an almost life-like appearance is secured.

It is to be noted that the magnifying effect of the lens and the defusing effect of the corrugations 11 will not only at least partially obliterate the actual sharp lines existing defining the inner annular edges of the rings 4, 5 and 9 but will so soften these lines to the eye of the observer that they will entirely disappear, the effect being merely a gradual shading of color from a light field immediately surrounding the pupil to a dark ring on the edge of the iris. Moreover the distortion of lines of vision through the lens and

through the corrugations will cause the relatively dark parts of this field to appear to approach nearer to the pupil in some places than in others surrounding the pupil, this also in accordance with changing points from which observations are made. The appearance of depth and life-likeness of the entire pupil is thus greatly enhanced, it having been found in actual practice that an observer not familiar with the structure described herein finds it difficult to believe that there is no actual movement of parts within the eye structure.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An artificial eye comprising a body member, a lens member, means providing a pupil visible at the centre of said lens, a plurality of separately formed circular members arranged concentrically with respect to the pupil behind said lens and each presenting a ring of different color also visible through the lens, the lines of demarkation between said rings of different colors being visible through the lens and being undesirably sharply defined, and means comprised in the lens of a character to at least partially obliterate said lines of demarkation as viewed through said lens.

2. An artificial eye comprising a body member, a lens member, means providing a pupil visible at the centre of said lens, means providing color visible through the lens surrounding the pupil to thereby constitute an iris, said means consisting of a plurality of separately formed and concentrically arranged rings of coloring material, the lens having an annular edge part, the body having a corresponding annular edge part, said annular edge parts being both of celluloid, one of said mentioned concentric rings being of a dark colored celluloid and being disposed at the juncture between said mentioned annular edge parts, and said last mentioned ring and said annular edge parts all having a solvent applied thereto to hold said parts assembled and provide a sharp line of color between the lens and the body.

3. An artificial eye comprising a spherically shaped body member having an annular seat provided in its outer surface, a lens overlying said seat and attached to said body so as to complete the spherical contour of the outer surface of the body, a plurality of separately formed rings of transparent coloring material arranged concentrically within said seat, said rings being of different radial widths and being visible through said lens to constitute the iris, and pupil forming means visible through the central portion of the lens.

4. An artificial eye comprising a spherically shaped body member having an annular seat provided in its outer surface, a lens overlying said seat and attached to said body so as to complete the spherical contour of the outer surface of the body, a plurality of separately formed rings of transparent coloring material arranged concentrically within said seat, said rings being of different radial widths and being visible through said lens to constitute the iris, means comprised in the lens of a character to at least partially obliterate the marginal edges of said rings, and pupil forming means visible through the central portion of the lens.

5. An artificial eye comprising a spherically shaped body member having an annular seat provided in its outer surface, a lens overlying said seat and attached to said body so as to complete the spherical contour of the outer surface of the body, a plurality of separately formed rings of transparent coloring material arranged concentrically within said seat, said rings being of different radial widths and being visible through said lens to constitute the iris, means comprised in the lens of a character to at least partially obliterate the marginal edges of said rings, pupil forming means visible through the central portion of the lens, and means comprised in the lens of a character to render indefinite the marginal edges of said pupil forming means as viewed through said lens.

6. An artificial eye comprising a body member, a lens member, means providing a pupil visible at the centre of said lens member, and a plurality of separately formed rings of differently colored material, said rings being arranged concentrically with respect to each other and to the pupil and being behind the lens and visible therethrough to thereby assist the lens as iris forming means, said rings being of different proportions so that inner annular parts of some thereof are exposed within the inner margins of others as viewed through the lens.

7. An artificial eye comprising a body member, a lens member, means providing a pupil visible at the centre of said lens member, and a plurality of separately formed rings of differently colored material, said rings being arranged concentrically with respect to each other and to the pupil and being behind the lens and visible therethrough to thereby assist the lens as iris forming means, said rings being at least partially transparent and said rings being superposed so as to provide a cumulative coloring effect visible through said lens.

8. In an artificial eye comprising a body

member, a lens member, means providing a pupil visible at the centre of the lens member, and the rear surface of the lens member surrounding the pupil being radially corrugated, the combination therewith of a plurality of separately formed rings of differently colored material said rings being arranged concentrically with respect to each other and to the pupil and being arranged behind the lens and visible through the corrugated portion of the lens so that the colors of the different rings are made to blend into each other as viewed through the lens.

In testimony whereof I affix my signature.

SAMUEL MARCUS.