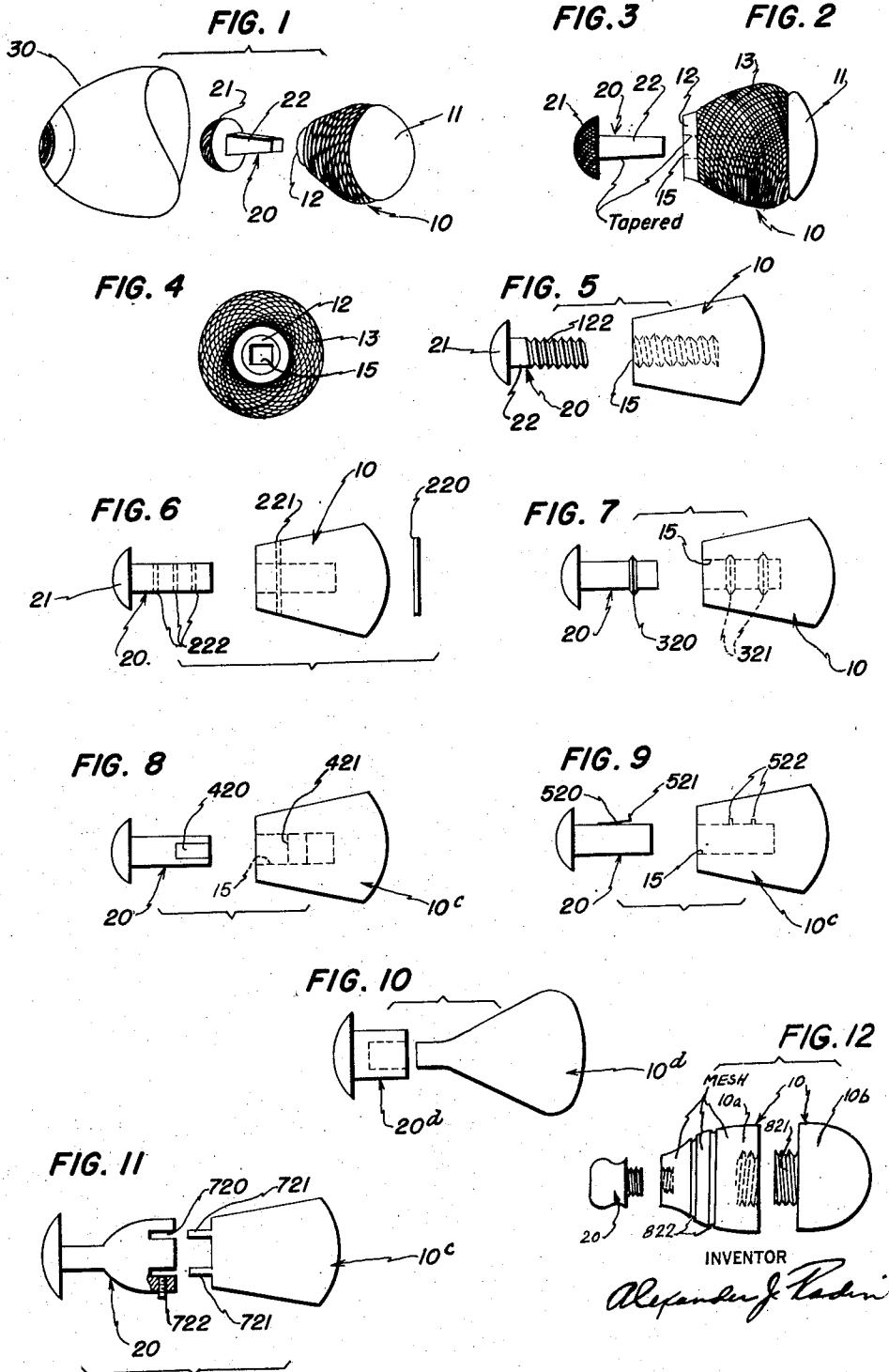


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ARTIFICIAL EYES

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This invention relates to artificial eyes.

The usual practice is to construct each artificial eye to match its eye socket. Not only is this process costly, but it entails serious loss of time before the patient can be measured, fitted, and attended.

The present invention envisages a new type of prosthesis that can be made in a stock size or in a small number of sizes, and that is capable of adjustment to fit the individual patient. The adjustment is simple so that a far smaller degree of skill may be availed of for the installation. The fit may be regulated to exactness, since the prosthesis is composed of two parts easily movable relative to each other. Similar means may be used to fit eyes to dolls, toys, mannequins, and similar objects.

The two parts are called, respectively, a ball and a peg, the peg being designed to fit adjustably within a hole in the ball and to be subsequently fixed in position. The ball and peg are then secured to or embedded within the eye socket, with the peg facing anteriorly and the ball posteriorly, so that the peg, or the tissues overlying it, project forwardly. A shell that simulates the natural eye is then inserted in the socket so that it is movable by and with the peg, in the manner described in Letters Patent 2,466,780, issued to me April 12, 1949.

In the accompanying drawings, forming part of this specification;

Fig. 1 represents an exploded perspective view of the three components of the artificial eye: the shell, the peg, and the ball.

Fig. 2 is an elevation of the ball.

Fig. 3 is an elevation of the peg.

Fig. 4 is a side view of the ball.

Fig. 5 is an elevation of a modification using screw threads.

Fig. 6 is an elevation of a modification using a pin.

Fig. 7 is an elevation of a modification using a ridge.

Fig. 8 is an elevation of a modification using a magnet.

Fig. 9 is an elevation of a modification using a spring.

Fig. 10 is an elevation of a modification with slot and shank reversed.

Fig. 11 is another modification using rim projections and recesses.

Fig. 12 is an elevation of still another modification using a three-part prosthesis.

With particular reference to the modification shown in Figs. 1 to 4, there is shown a ball 10, a peg 20, and a shell 30. The ball 10 is semispherical at one end 11, flat at the opposite face 12, and frusto-conical at the intermediate portion 13. The frusto-conical portion 13 is covered with tantalum mesh, for a purpose to be described more fully hereinafter. The ball 10 is apertured axially from its flat face 12 with a tapered hole 15.

The peg 20 comprises head 21 and a shank 22, the shank 22 being formed and tapered to fit slidably in the accommodating hole 15 in the ball 10. The head 21 too may be covered with tantalum mesh.

The shell 30 resembles the shell in the aforesaid Patent 2,466,780.

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The operation of the device is as follows:

After enucleation and healing, the socket is prepared to receive the ball 10. A single stock size of ball, or say three ranges of size and shapes are provided, with a view to embedding the ball 10 in Tenon's capsule, but without at this time fixing it in place. The peg 20 is then slidably fitted in the tapered hole 15, with the object of protruding the head 21 so that it can engage and move the appropriate recess in the back of the shell 30, as described more particularly in Letters Patent 2,466,780. When the distances have been ascertained, by trial and error, or measurement, or both, the shank 22 is fixed within the hole 15, by heat, cement, wedging action, or otherwise, and the combined ball and peg are then sutured to the tissues within the socket, with the head 21 of the peg 20 pointing anteriorly. The tantalum mesh of the conical section 13 of the ball 10 and of the head 21 of the peg 20 provides anchors for the sutures, and in addition prevents slipping of the prosthesis relative to the socket.

The ball 10 and peg 20 may be made of gold, acrylic, stainless steel, tantalum, or any other material that is immune or resistant to bodily secretions, and the entire surface of the ball 10 may be meshed or knurled. The ball 10 may be spherical or otherwise, as described in the prior patent. The ball 10 and peg 20 may be completely embedded, or the head 21 may be exposed, the prime consideration being that the head 21, or the tissue overlying it, form sufficient of a protuberance to engage the shell 30.

It will be seen, therefore, that the provision of adjustability between the ball 10 and peg 20 results in ready servicing of all sizes of eye sockets, so that an ophthalmologist or even general surgeon can completely obtain the exact size of artificial eye required by the patient, without recourse to exceptional skills, tedious measurements, discomfort to the patient, and great economic expediture.

This adjustability may, moreover, be obtained by means other than that shown in Figs. 1 to 4, which show a tapered fit that is secured in position by heat or cement. Thus, in Fig. 5 is shown a modification wherein the adjustability is obtained by means of screw threads 122 on the shank 22 that are adapted to mesh with similar threads in the slot 15 of the ball 10. Or, as shown in Fig. 6, a pin 220 is slidable in a hole 221 in the ball 10 and in any one of a series of holes 222 in the peg 20, in accordance with the desired dimensions.

A further modification is shown in Fig. 7, wherein the peg 20 is provided with an annular ridge 320 that may be sprung into any of a series of annular grooves 321 in the slot 15 of the ball 10.

In Fig. 8, the peg 20 is provided with a magnet 420, and a magnet 421 of opposite polarity is positioned within the slot 15 of the ball 10c, so that when once inserted at the right location, the peg will tend to stay.

In Fig. 9 is shown still a further species. The peg 20 is provided with a leaf spring 520 that is tipped with a pin 521. The interior of the slot 15 of the ball 10d has a series of longitudinally spaced apertures 522, into which the pin 521 may engage, thereby to hold the peg 20 in adjusted position in the ball 10.

It is not necessary to this invention that the peg 20 fit within the ball 10. As shown in Fig. 10, the peg 20d may be apertured to receive an end of the ball 10, using any type of means for holding the two parts together in adjusted position.

In Fig. 11 is shown another modification. Here the peg 20 is recessed at 720 to receive one or more projections 721 on the ball 10d, the fit between each recess and projection being snug. The relative interdigitation may be fixed in any one of several different ways, such

as friction, springs, magnets, heat, wedges, pins, grooves, or the like. For example, a set screw 722 held in one of the members is adapted to bear against the other to hold it against movement.

In Fig. 12 is shown another modification wherein the ball 10 comprises two portions 10a and 10b. These two portions are attached to each other in any manner already described for attachment of the ball 10 to the peg 20, a screw thread 821 like that of Fig. 5 being here shown as illustrative. In this form there may be a range of sizes for the peg, the front ball portion 10a, or the rear ball portion 10b, or any two or all three of them, to effect any size or shape of desired prosthesis. The screw threads, or other fastening means, for each pair of parts remains the same, and the contacting faces coincide, to result in smooth contours. The relative position of screw threads, or other fastening means, may of course be reversed, if desired.

The ball 10, or a portion thereof, in any of these modifications, may contain one or more annular grooves 822 to facilitate suturing or other fastening of the ball 10 to the tissues in the socket.

I claim:

1. An artificial eye, comprising a shell simulating the natural eye, and means adapted to be attached to the living tissue in the eye socket and to move the shell in accordance with the movement of the said tissue, said means being slidably expansive anteriorly and posteriorly, whereby said means and said shell may be adjusted to fit sockets of different sizes.

2. The device set forth in claim 1, wherein the said means comprises a ball adapted to be attached to the living tissue in the eye socket, and a peg movable with respect to the ball and adapted to move the shell.

3. A device for moving the shell of an artificial eye, comprising means adapted to be attached to the living tissue of an eye socket, and means carried by said first means and adapted to move the shell in accordance with the movement of the tissue, said second means being slidably expansive with respect to the first means, whereby it may be adjusted to fit sockets of different sizes.

4. The device set forth in claim 3, including means for fixing the second means in adjusted position.

5. The device set forth in claim 3, wherein the second means includes a peg having a posterior portion adapted to be slidably adjusted anteriorly-posteriorly with respect to the first means, and a headed anterior portion adapted to engage the shell.

6. The device set forth in claim 5, including a reduced intermediate portion between the posterior portion and the anterior portion.

7. The device set forth in claim 5, wherein the adjacent portions of the first and second means are interdigitated.

8. The device set forth in claim 7, wherein the device includes means for fixing the interdigitations in adjusted position.

9. The device set forth in claim 5, wherein the adjacent portions of the first and second means comprise interdigitated rim projections and recesses.

10. The device set forth in claim 9, including means for fixing a projection in a recess.

11. The device set forth in claim 9, including a set screw for fixing a projection in a recess.

12. An eye implant, comprising a ball, a peg, means for adjusting the ball and the peg relatively to each other, and means for holding them in adjusted position.

13. An eye implant, comprising a ball, a peg, means for adjusting the ball and the peg anteriorly-posteriorly relatively to each other, and means for holding them in adjusted position.

14. The implant of claim 13, wherein the ball and the peg have a complementary projection and recess.

15. The implant of claim 13, wherein the ball and the peg have interdigitating rim projections and recesses.

16. The implant of claim 14, wherein the holding means comprises a set screw for holding a projection in a recess.

17. An artificial eye, comprising two adjustable members having interdigitating rim portions.

18. An eye implant, comprising two adjustable members having interdigitating portions, and means for holding the members in adjusted position.

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