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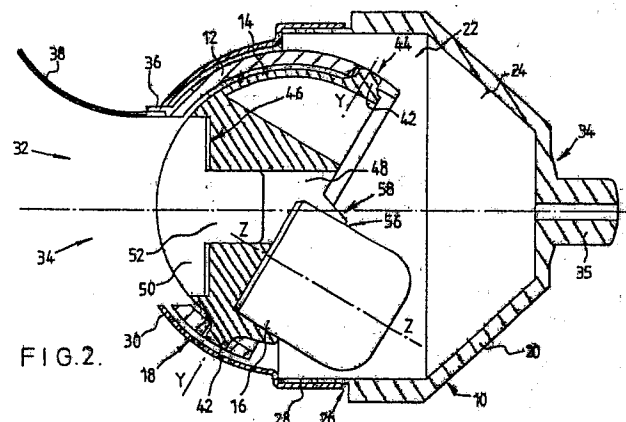
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⑤④ **An artificial eye for toys.**

⑤⑦ The present invention provides an artificial eye for a toy comprising a primary housing (10), a secondary housing (12), an inner body (14), balance means (16) and tear duct means (36). The secondary housing (12) is pivotally retained in the primary housing (10) and the inner body (14) is pivotally retained in the secondary housing (12). The balance means (16) is arranged to result in relative pivotal motion between the primary and secondary housings (10, 12) and relative pivotal motion between the secondary housing (12) and the inner body (14) upon respective movement of the primary housing (10). The tear duct means (36) enables liquid to escape from the eye to simulate tears.



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Description

An Artificial Eye for Toys

The present invention relates to an artificial eye for toys such as dolls.

In order to improve the appeal of the toys such as toy animals and especially dolls, it is well known to provide for movement of the eyes of the toy. In particular the so called "sleeping eye" has become popular. In this arrangement the eye has two alternatively viewable portions, one depicting the pupil etc and the other depicting an eye lid. The pupil or eye lid is viewable in accordance with the vertical or horizontal position of the toy. That is, in the case of a doll, the doll's eyes open and close as the doll is moved between standing and lying positions.

It is also known to provide for "left/right" movement of the eyes of a toy. Obviously it is desirable for the left/right movement to be synchronized between the two eyes of a toy. Initially this was achieved by a physical connection between the eyes. More recently counterweight arrangements have been devised which maintain synchronization between the eyes without the provision of a physical connection therebetween.

Eye movement is one aspect of increased realism in toys. Another such aspect is the provision of a water reservoir within the toy with ducting to enable water to be expelled to simulate tears.

The present invention resides, at least partially, in a combination of these eye movement and simulated tear features.

According to the present invention there is provided an artificial eye for a toy comprising:

- a primary housing,
- a secondary housing pivotally retained in the primary housing,
- an inner body pivotally retained in the secondary housing,
- balance means arranged to result in relative pivotal motion between the primary and secondary housings and relative pivotal motion between the secondary housing and the inner body upon respective movements of the primary housing, and
- tear duct means which enable liquid to escape from the eye to simulate tears.

An embodiment of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a front view of an artificial eye embodying the present invention,

Figure 2 is a vertical section taken along the line A-A of figure 1, and

Figure 3 is a partial horizontal section taken along line B-B of Figure 1.

The drawings illustrate an artificial eye particularly suitable for dolls. Two such eyes are located in respective sockets in a doll's head. The artificial eye has an eye lid which closes so as to cover the iris and pupil. The iris and pupil themselves are capable of left/right movement relative to the eye lid and in addition the eye is provided with a tear duct so that water can be made to escape from the eye to simulate tears. The construction of the eye is such

that movement of the eye lid and left/right movement of the iris and pupil is synchronized between two eyes set in a doll's head, even though the eyes operate separately.

As best shown in figure 2, the eye comprises a two part primary housing 10 a secondary housing 12, an inner body 14 and a counterweight 16.

The primary housing 10 comprises a front casing 18 and a rear casing 20. Rear casing 20 is formed of a moulded plastics material and comprises a hollow cylindrical section 22 closed at one end by a hollow frusto-conical section 24 and circular surface 34. The outer cylindrical surface of portion 22 is recessed from the open end of the rear casing and this recess 26 is engaged by a short cylindrical section 28 of the front casing 18, thus joining the two parts 18 and 20 together. Recess 26 incorporates upper and lower flat platforms 27 (Figure 1) which assist in alignment and mutual retention of the two parts 18 and 20. The remainder of front casing 18 is in the form of a hollow hemisphere 30 which is provided with a central aperture 32. The front casing 18 is formed of metal and this has a number of advantages. In particular, forming the front casing 18 of metal enables the part to have a much thinner cross-section, as contrasted with forming the part of a plastics material. Additionally, the metal casing 18 can exhibit an improved resilience in mating with casing 20, as contrasted with a plastics material.

The circular surface 34 which closes the frusto-conical section 24 of casing 20 has an integral hollow pipe 35 projecting outwardly from the centre thereof. Pipe 35 is attached, in a manner to be described, to a water reservoir within the doll thus enabling water to enter the inside of the eye.

As shown in Figure 3, the recessed portion of the cylindrical section 22 of casing 20 is provided with two slots 38 located diametrically opposite each other. The slots 38 extend into the cylindrical portion 22 from the open end thereof. Secondary body 12 is provided with two spigots 40 which extend into respective slots 38 and which are retained therein by the front covering 18. The secondary housing 12 is thus pivotally retained within the primary housing 10. The spigots 40 lie along a common axis X and, with the doll in a standing position, axis X lies in the central horizontal plane of the eye.

Secondary housing 12 has in its vertical cross-section, the form of a partial hollow sphere, as shown in Figure 2. The front part of the housing 12 is provided with an aperture 34 of substantially the same shape and size as aperture 32. The secondary housing 12 is however provided with an outwardly projecting flange 36 which extends through aperture 32. From figure 2, it will be apparent that flange 36 acts as a stop at both extremes of pivotal movement of housing 12 within housing 10. Artificial eye lashes 18 are attached to flange 36. The secondary housing 12 is formed of a moulded plastics material.

Inner body 14 represents the eye ball and comprises a partially spherical body of moulded

plastics material. Inner body 14 is provided with two integral spigots 42 which extend into circular apertures 44 provided in the secondary housing 12. Spigots 42 lie on a common axis Y which is perpendicular to axis X. With the doll in the standing position, axis Y is inclined at an angle of approximately 30° to the vertical. Spigots 42 snap-fit into apertures 44.

Inner body 14 is provided with a shallow cylindrical recess 46 extending inwardly from the front surface thereof. The diameter of recess 46 is almost as large as the height of aperture 34, as can be seen from figure 2. A recess 48 having a diameter of approximately 0.4 of that of recess 46 extends deeper into body 14 and in fact passes therethrough. Apertures 46 and 48 together receive a round headed stud 50 which represents the iris and pupil of the eye. Stud 50 is formed of a translucent material and the depth of the shank 52 forms a dark circular area representing the pupil, when viewed through the head of the stud. The lesser depth of material for the remainder of the head of the stud and the reflective properties of the bottom of recess 46 together produce the appearance of an iris surrounding the pupil. This effect can be significantly enhanced by the provision of radial grooves 5a in the underside of the head of the stud. This is best seen in figure 1. Stud 50 is frictionally engaged in recesses 46 and 48.

Counterweight 16 is received in a recess 56 provided in a boss 58 projecting from the lower portion of the rear of inner body 14. Counterweight 16 is formed of a sufficiently dense material such as lead and may be held in recess 56 by frictional engagement. Alternatively body 14 is moulded onto weight 16. Counterweight 16 is in the form of solid cylinder, its longitudinal axis Z being perpendicular to axis Y.

The whole of the unit shown in the drawings snap-fits into an eye socket provided in the head of the doll. As the doll is moved from a standing to a lying position, counterweight 16 causes the inner body 14 and the secondary housing 12 to rotate as a single unit about axis X. Consequently, flange 36 moves across aperture 32 thus providing the effect of an eye lid closing in front of the eye ball. Counterweight 16 always try to maintain its lowest position. Of course, as the doll is moved from the lying to the standing position, the relative pivotal movement between secondary housing 12 and primary housing 10 is such as to give the effect of the eye opening. Rotational movement of the doll's head will result in an effective left/right movement of primary and secondary housings. Counterweight 16 is, however, sufficiently heavy as to resist movement of the inner body 14 which thus pivots in the secondary housing 12 about axis Y. Since the inner body 14 effectively remains stationary during left/right movement of the doll's head, the apparent motion of the two eyes relative to the doll's head is synchronized. Of course, rotation of the doll's head while moving the doll from a standing to a lying position will result in simultaneous rotation about axes X and Y.

Operation of the tear simulation facility will now be described.

As previously explained, the whole of the unit shown in the drawings snap-fits into an eye socket provided in the doll's head. The eye socket is provided with an aperture to receive pipe 35 which projects from the back of primary housing 10. A plastic tube is located inside the doll's head and is retained over pipe 35. It may be necessary to use a tool such as a pair of long-nosed pliers in order to achieve this operation. The plastic tube connects pipe 35 to a water reservoir which is housed, preferably, within the doll's head. The reservoir is filled via a feed tube which is connected to an orifice representing the doll's mouth.

The feed tube may be provided with a valve such that water in the reservoir does not flow back out of the doll's mouth. Alternatively, a bung, perhaps representing a teething ring, is inserted into the doll's mouth after the reservoir has been filled. An air bellows is located in the doll's body and is connected to the reservoir in a known manner. The result is that squeezing the doll's body applies air pressure to the water reservoir which results in water travelling via the plastic tube and pipe 35 into the primary housing 10. The water collects inside primary housing 10 and as the water level there increases, or as the doll's head is tilted forwards, the water passes between the secondary housing 12 and the front casing 18 to escape from the front of the eye, simulating tears. It is to be noted that the components of the eye are preferably formed of water resistant materials or are provided with a water resistant coating. Stud 52 is, in this respect, particularly beneficial as contrasted with the conventional cardboard or paper insert carrying a painted iris and pupil.

While one embodiment of the invention has been described in detail with reference to the accompanying drawings, various modifications will be readily apparent to those skilled in the art.

Claims

1. An artificial eye for a toy characterised by:
 - a primary housing (10), a secondary housing (12) pivotally retained in the primary housing (10), an inner body (14) pivotally retained in the secondary housing (12), balance means (16) arranged to result in relative pivotal motion between the primary and secondary housings (10, 12) and relative pivotal motion between the secondary housing (12) and the inner body (14) upon respective movements of the primary housing (10), and tear duct means (35) which enable liquid to escape from the eye to simulate tears.
2. An artificial eye as claimed in claim 1, characterised in that the secondary housing (12) is pivotally retained about a first axis (X) and the inner body (14) is pivotally retained about a second axis (Y), the second axis (Y) being perpendicular to the first axis (X).
3. An artificial eye as claimed in claim 1 or 2, characterised in that the inner body (14) has a

portion thereof representing an eye ball with an insert (50) therein representing an iris.

4. An artificial eye as claimed in claim 3, characterised in that said insert (50) is a unitary body representing both an iris and a pupil.

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5. An artificial eye as claimed in claim 4, characterised in that said insert (50) is a stud formed of translucent material with the shank of the stud representing the pupil when viewed through the head of the stud, the head of the stud being provided with radial grooves.

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6. An artificial eye as claimed in any preceding claim, characterised in that the primary housing (10) is formed of two parts (18, 20), one part (18) having an aperture (32) through which the secondary housing (14) and inner body (16) may be viewed and the other part including a pipe (35) forming part of said tear duct means.

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7. An artificial eye as claimed in claim 6, characterised in that said one part (18) is formed of metal and the secondary housing (12) and inner body (14) are respective integral structures formed of plastics material.

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8. An artificial eye as claimed in claim 6 or claim 7, characterised in that said secondary housing (12) comprises a flange (36) which projects through said aperture (32) and thereby limits pivotal movement of the secondary housing (12) relative to the primary housing (10).

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9. A doll having an artificial eye as claimed in any preceding claim and a liquid reservoir located within the doll's head and connected to said tear duct means (35).

10. A doll as claimed in claim 9, characterised by an air bellows connected to said reservoir and operable to cause liquid to be expelled from said eye via said tear duct means (35).

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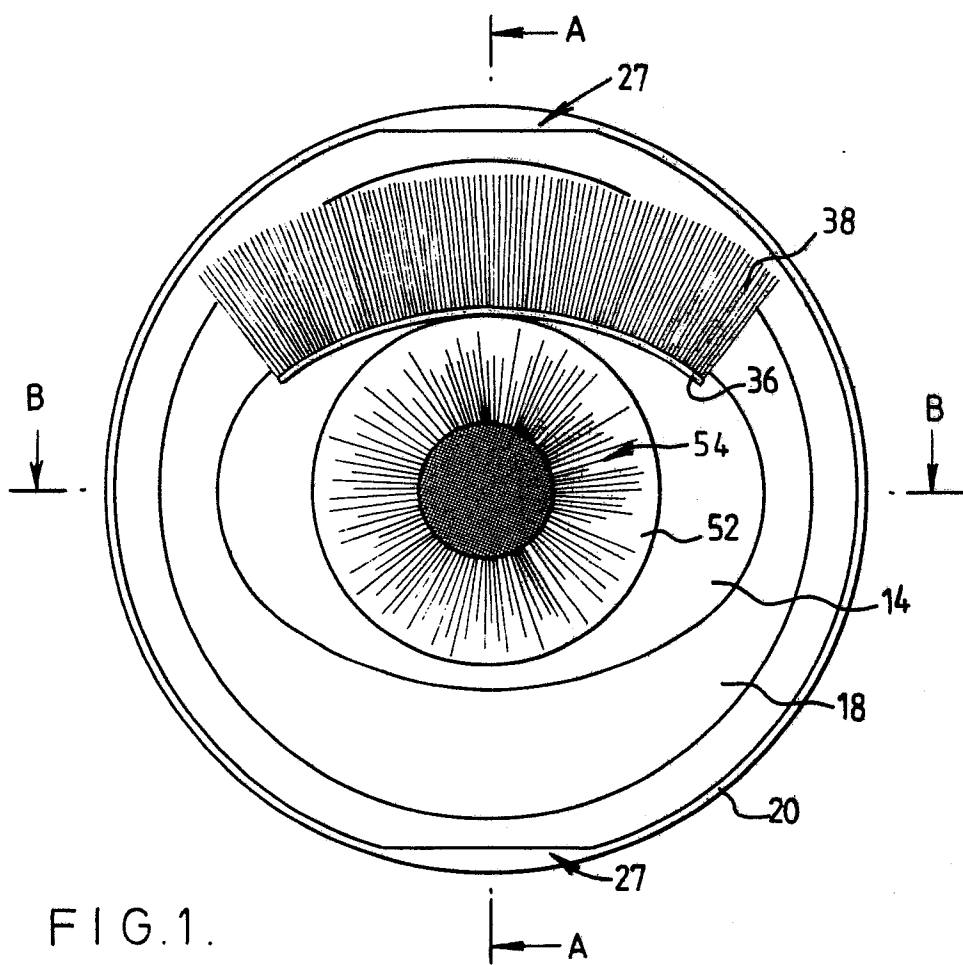
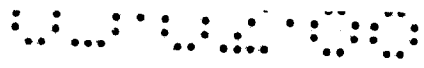


FIG.1.



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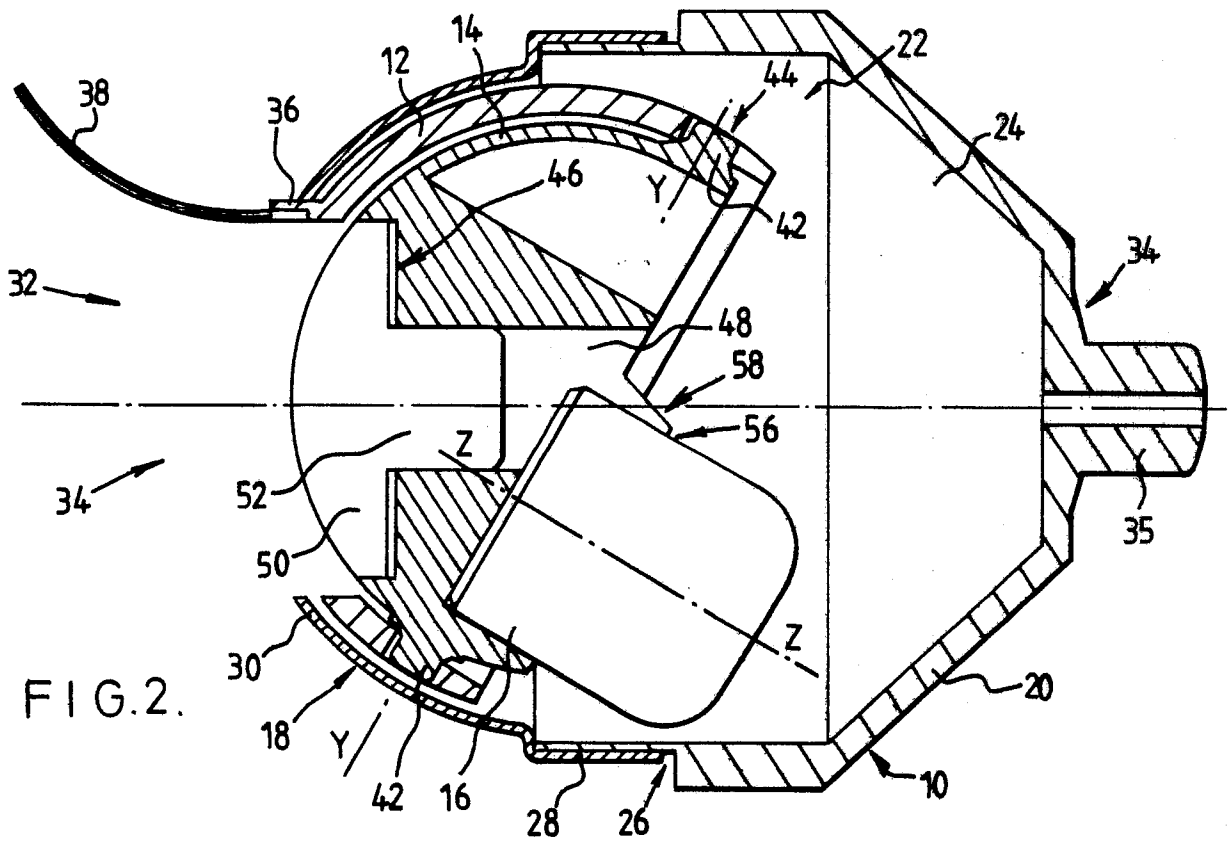


FIG. 2.

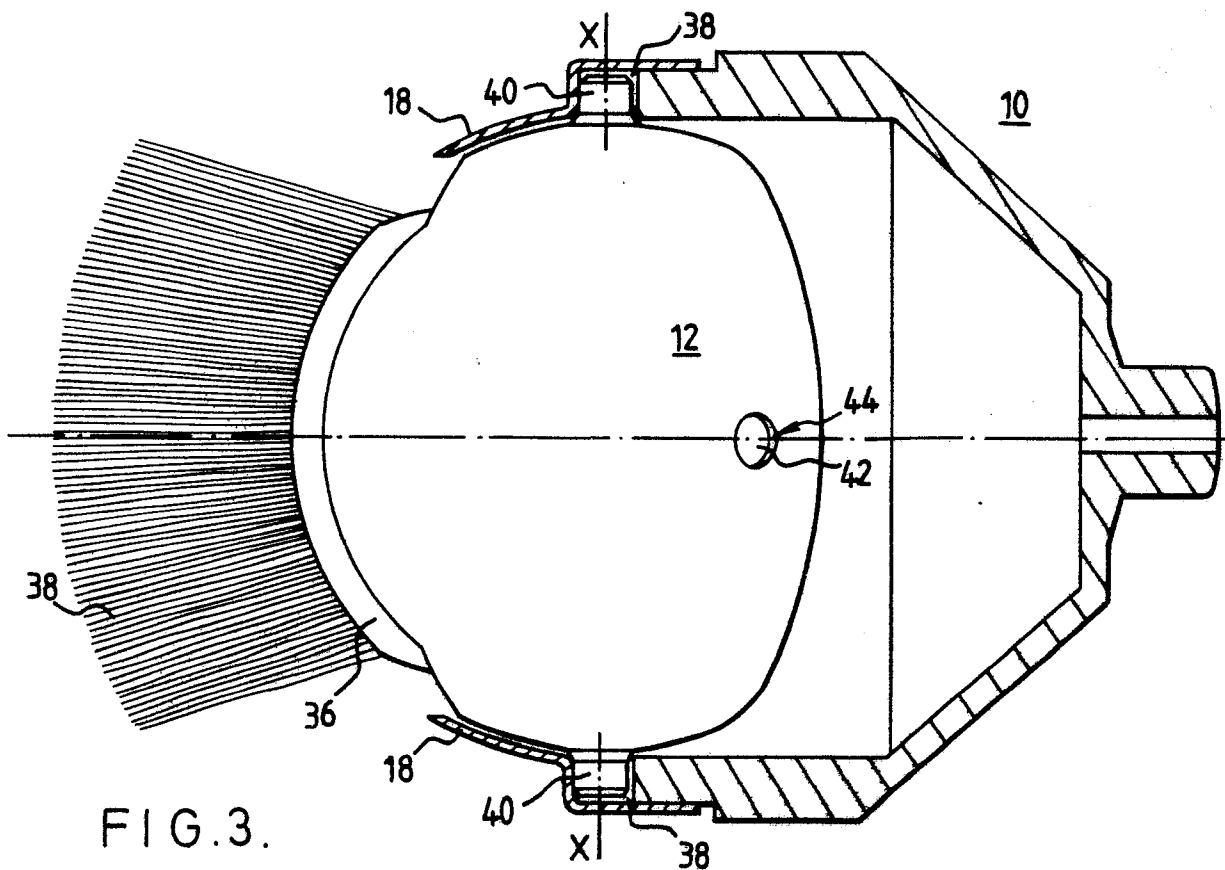


FIG. 3.