



US 20100105280A1

(19) **United States**(12) **Patent Application Publication**
LAI(10) **Pub. No.: US 2010/0105280 A1**(43) **Pub. Date: Apr. 29, 2010**(54) **SIMULATED EYE FOR TOY**(30) **Foreign Application Priority Data**(75) Inventor: **JIN-SHI LAI**, Shenzhen City (CN)

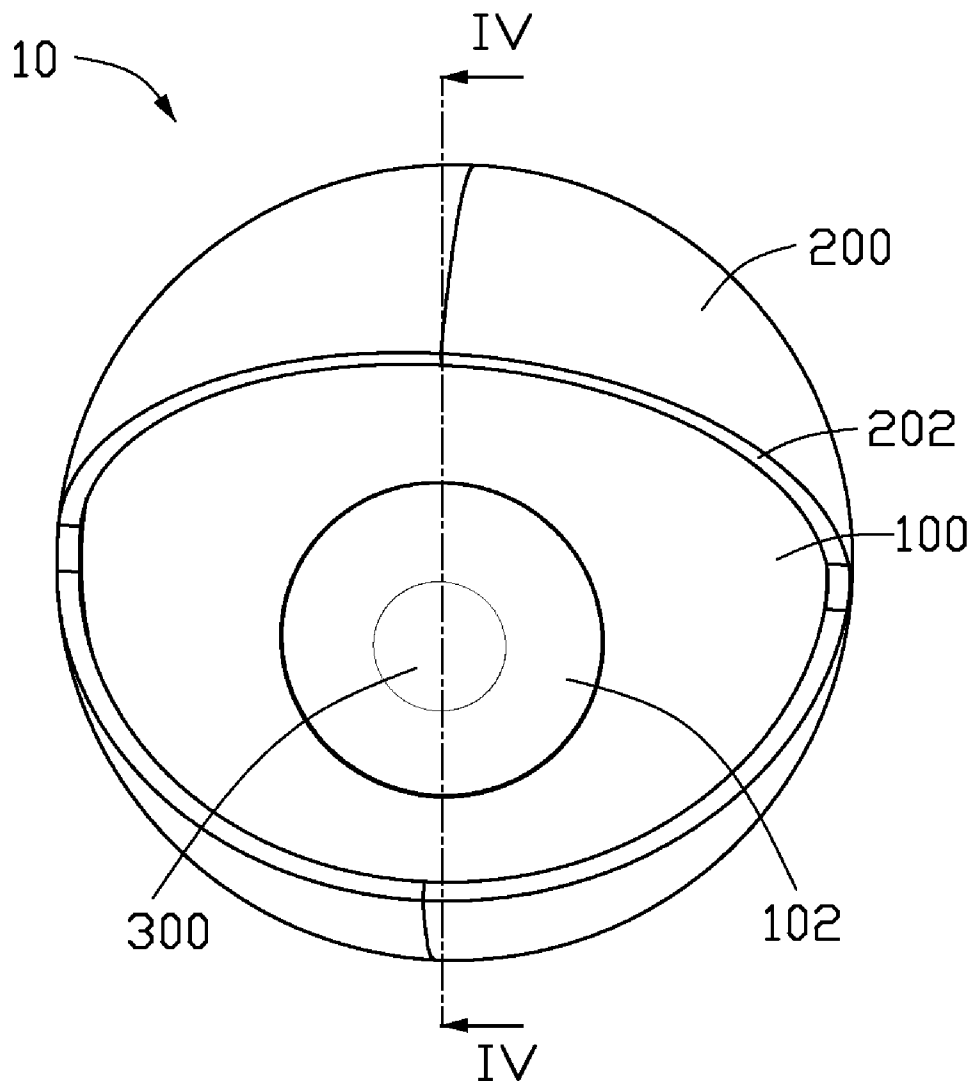
Oct. 28, 2008 (CN) 200810305244.5

Publication Classification

Correspondence Address:

PCE INDUSTRY, INC.**ATT. Steven Reiss****288 SOUTH MAYO AVENUE****CITY OF INDUSTRY, CA 91789 (US)**(51) **Int. Cl.**
A63H 3/40 (2006.01)(52) **U.S. Cl.** **446/343**(57) **ABSTRACT**

A simulated eye is capable of being changed between a contracted state and a dilated state. The simulated eye includes a shell defining an opening, an eyeball, and a driving device. The eyeball is received in the shell and exposed at the opening, the eyeball includes a lens and a pupil, the pupil is visible through the lens, and a virtual image of the pupil formed via the lens. The driving device is configured to drive the pupil to move toward and backward the lens. When the transmission member drives the pupil to move, the virtual image of the pupil is changeable, and the simulated eye changed between a contracted state and a dilated state.

(73) Assignees: **HONG FU JIN PRECISION**
INDUSTRY (ShenZhen) CO.,
LTD., Shenzhen City (CN); **HON**
HAI PRECISION INDUSTRY
CO., LTD., Tu-Cheng (TW)(21) Appl. No.: **12/545,090**(22) Filed: **Aug. 21, 2009**

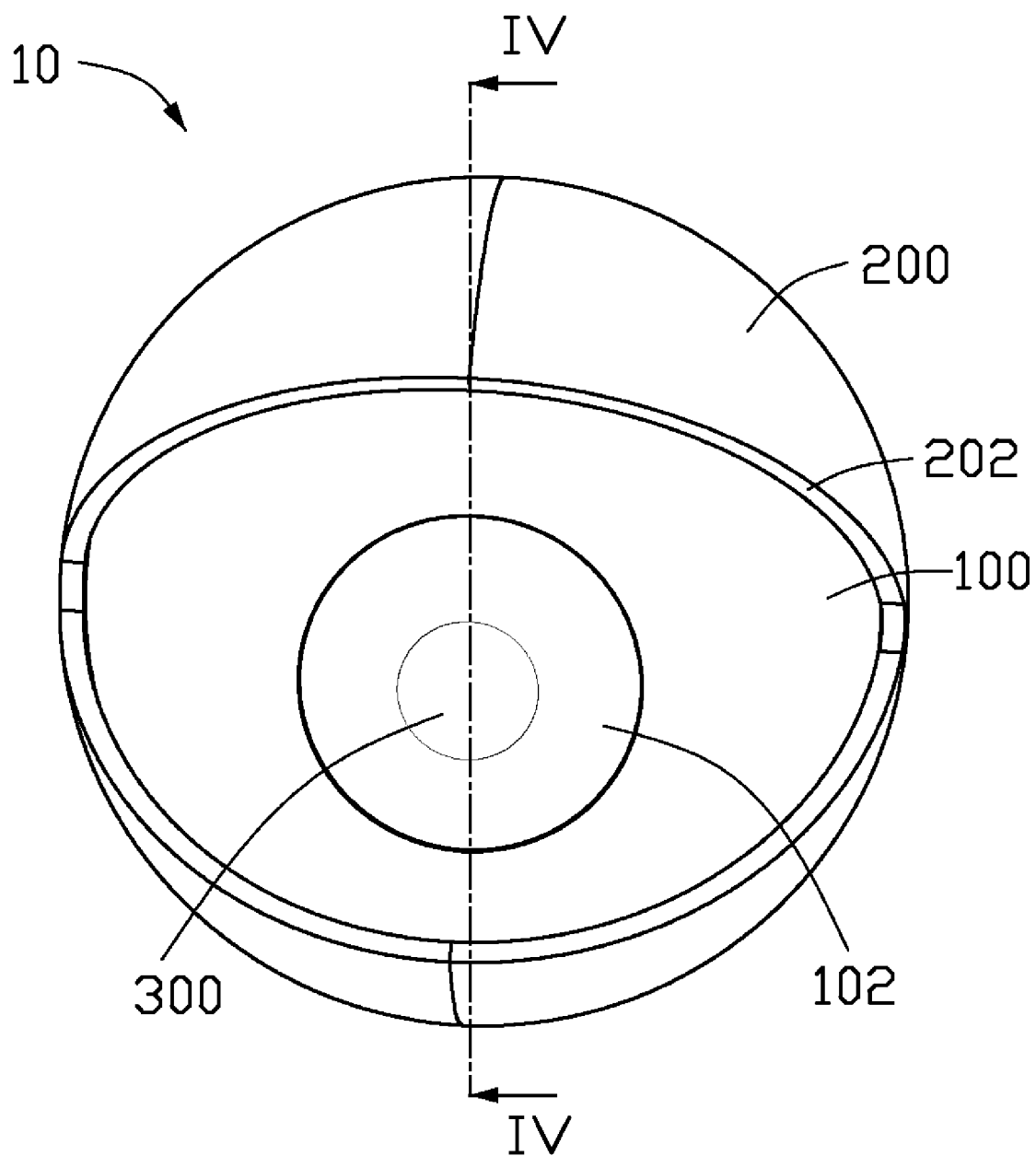


FIG. 1

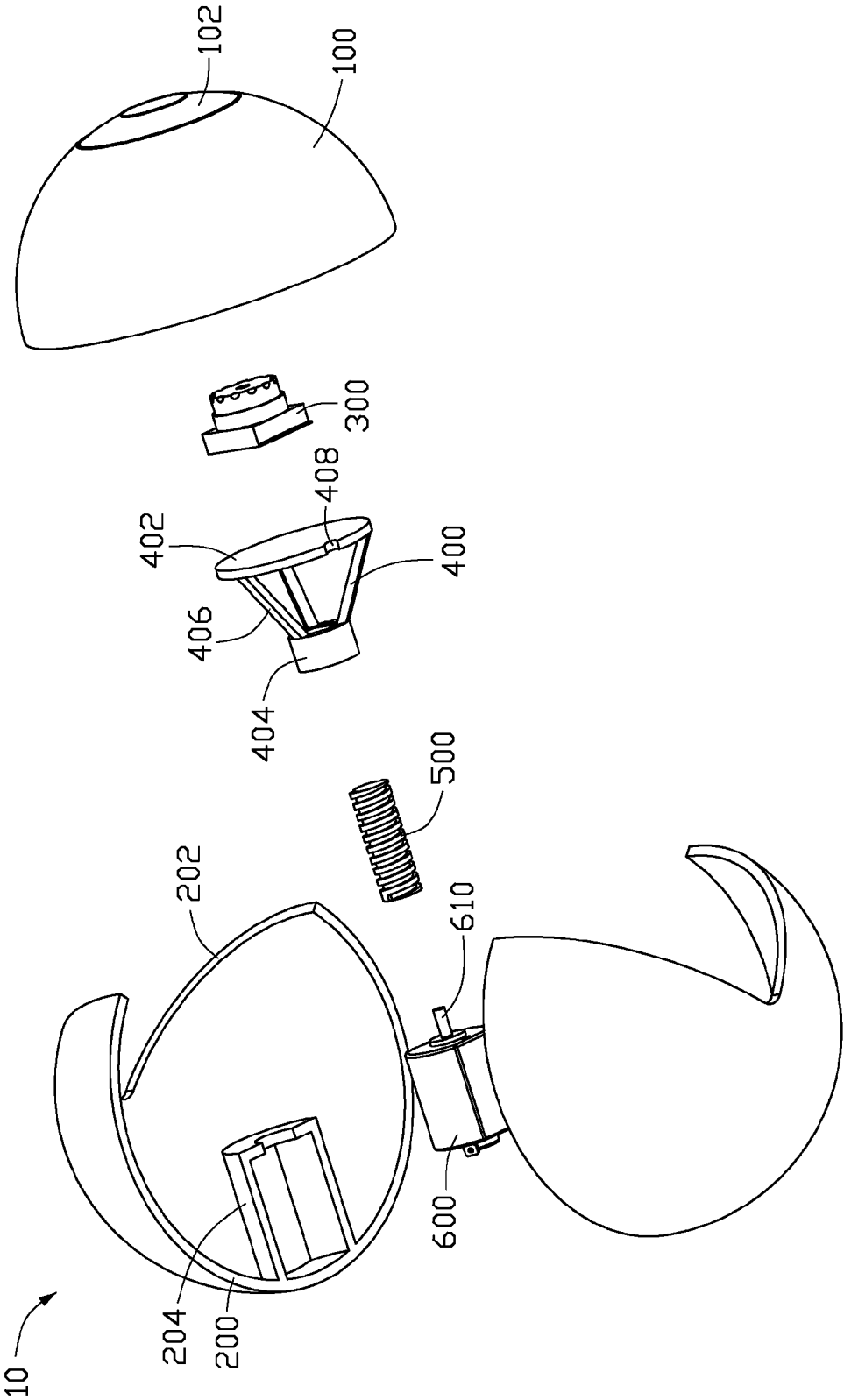


FIG. 2

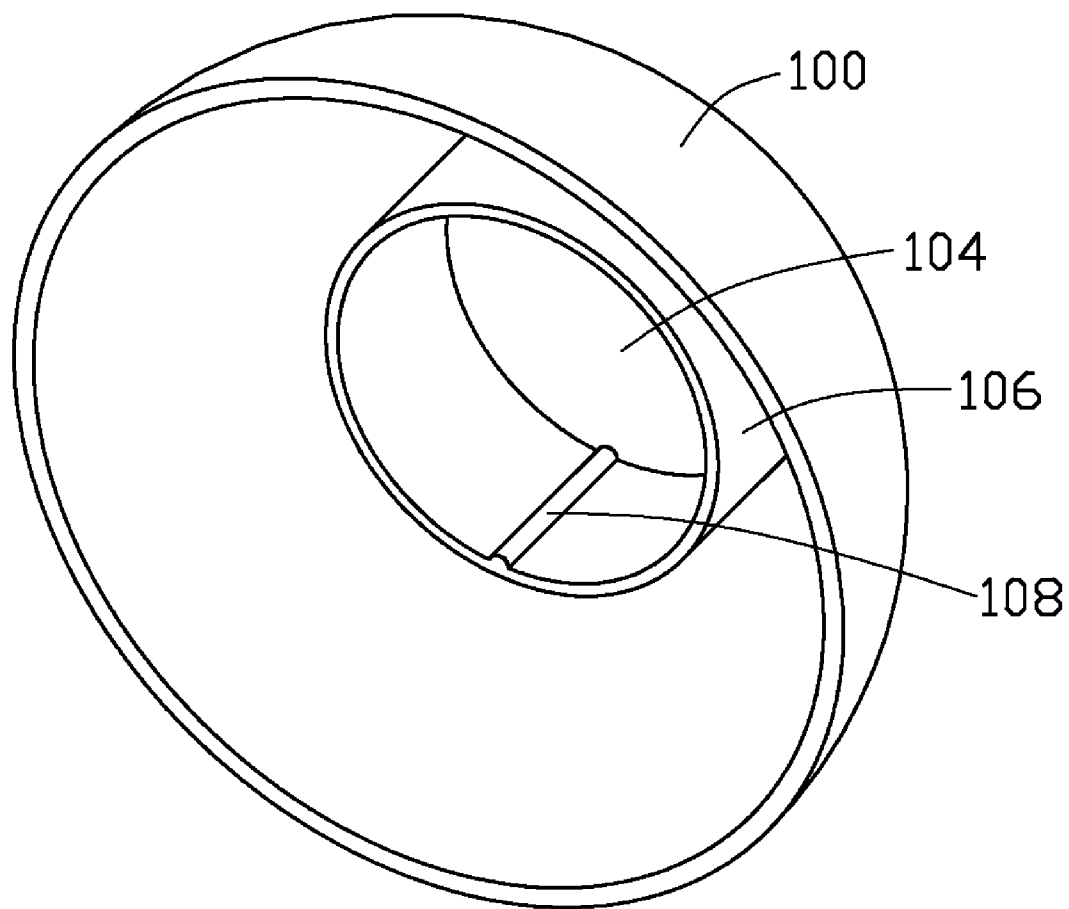


FIG. 3

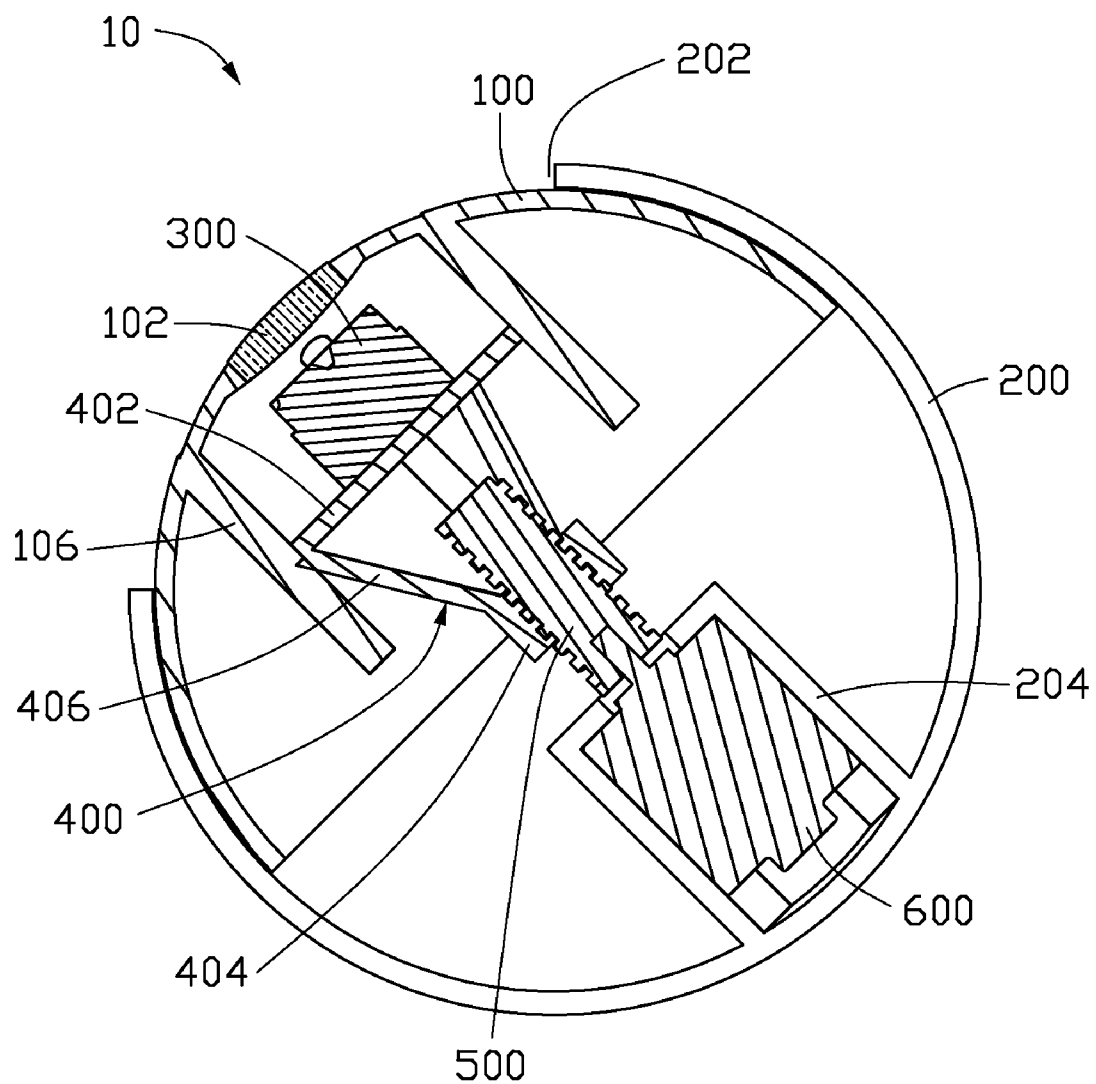


FIG. 4

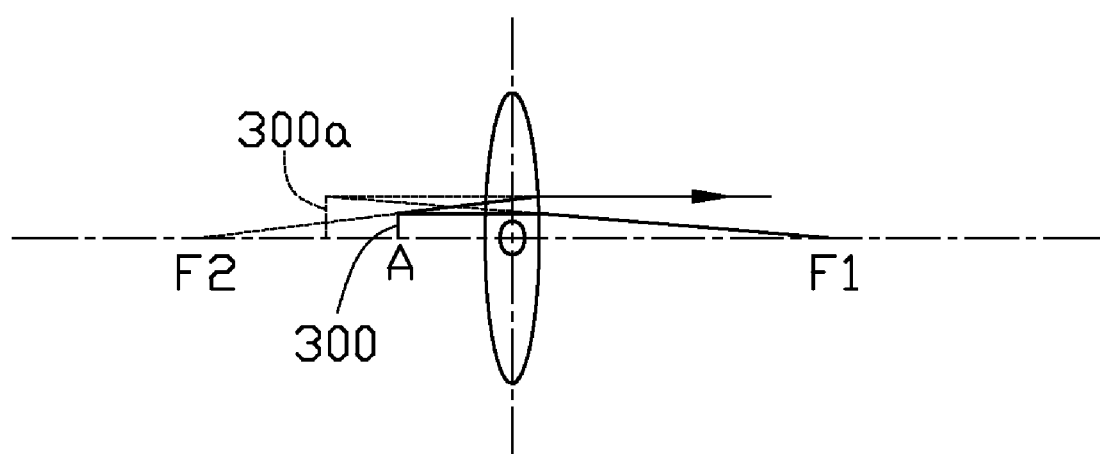


FIG. 5

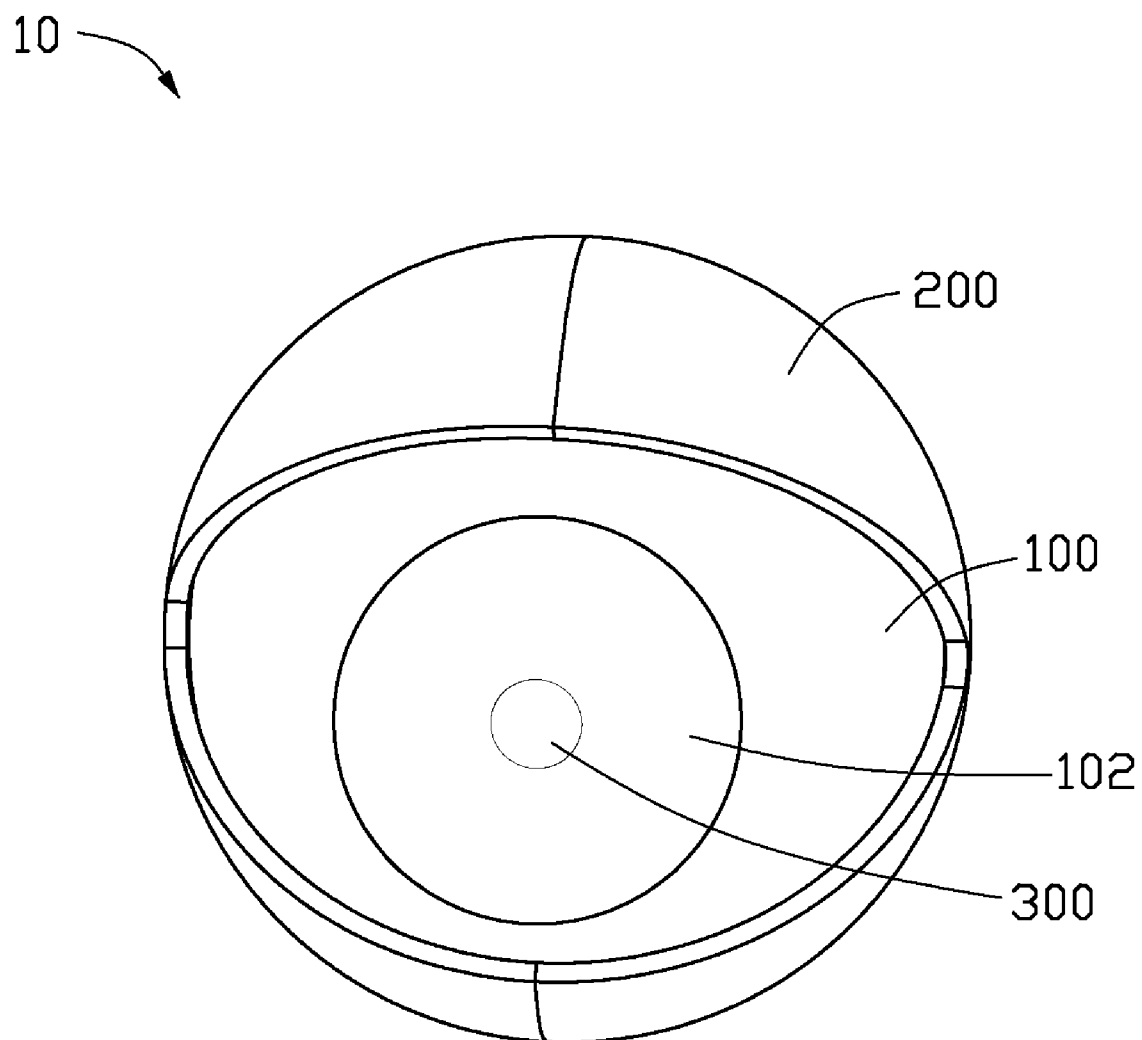


FIG. 6

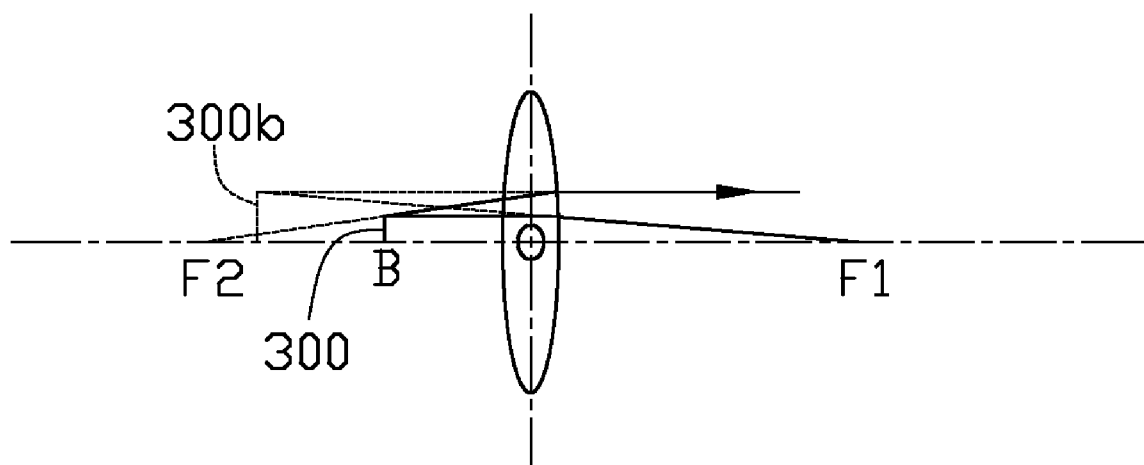


FIG. 7

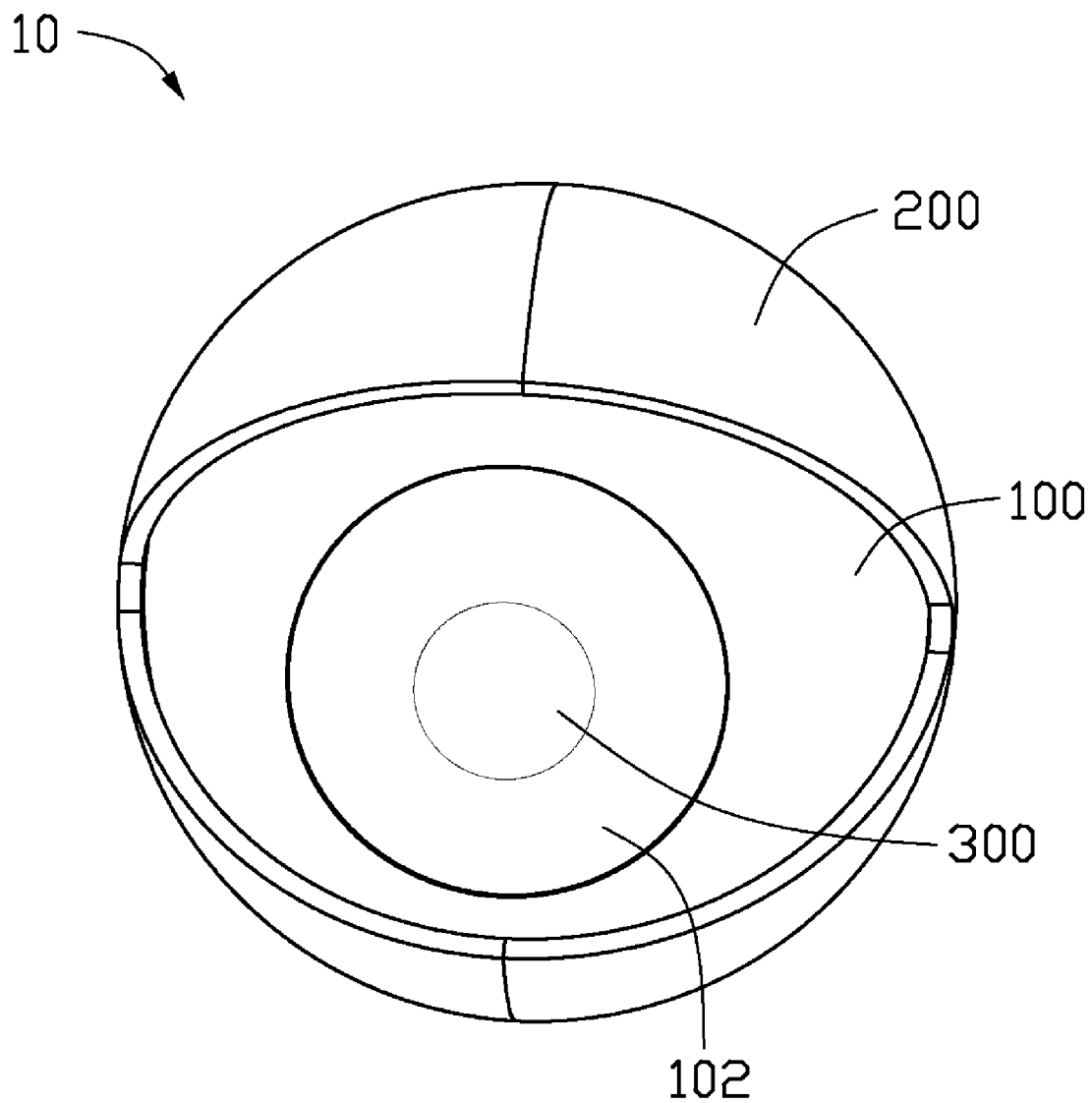


FIG. 8

SIMULATED EYE FOR TOY

BACKGROUND

[0001] 1. Technical Field

[0002] The disclosure relates to toys and, more particularly, to a simulated eye for a toy.

[0003] 2. Description of Related Art

[0004] As the development of the electronic technology, more and more robot toys simulate people's actions, such as, walking, jumping, and so on. As known, eyes are one of the most important organs of human body, and people can express various feelings via the action of the eyes. The eyes of some robot toys simulate human eyes by imitating various shapes of the human eyes. However, some of these simulations are limited to the eyelids opening and closing, and accordingly, other simulation effects of the eyes of the robot toys are needed to make the robot looks more lifelike. Therefore, what is needed is a simulated eye capable of simulating more human eyes' actions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The components of the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the embodiments of the simulated eye. Moreover, in the drawings, like reference numerals designate corresponding parts throughout several views.

[0006] FIG. 1 is a perspective view of a simulated eye having an eyeball, a pupil and a convex lens in accordance with one embodiment.

[0007] FIG. 2 is an exploded view of the simulated eye of FIG. 1.

[0008] FIG. 3 is a perspective view of the eyeball of FIG. 2, but viewed from another aspect.

[0009] FIG. 4 is a cross-sectional view taken along line IV-IV of FIG. 1.

[0010] FIG. 5 is a perspective view illustrating a virtual image of the pupil formed via the convex lens while the pupil is at a first position.

[0011] FIG. 6 is a perspective view of the pupil in a contracted state.

[0012] FIG. 7 is a perspective view illustrating a virtual image of the pupil formed via the convex lens while the pupil is at a second position.

[0013] FIG. 8 is a perspective view of the pupil in a dilated state.

DETAILED DESCRIPTION

[0014] Referring to FIG. 1, a simulated eye 10 includes an eyeball 100 and a spherical shell 200 for receiving the eyeball 100. An opening 202 is defined in the shell 200. A convex lens 102 is disposed in the eyeball 100 and exposed via the opening 202. A pupil 300 is fixed in the eyeball 100 and is visible through the convex lens 102, and an optical axis of the convex lens 102 generally extends through a centre of the pupil 300. A portion of the pupil 300 facing the convex lens 102 is colored.

[0015] Referring to FIGS. 2 and 3, a round through hole 104 is defined in the eyeball 100. The convex lens 102 is mounted into the through hole 104. A hollow cylindrical sleeve 106 protrudes from an inner surface of the eyeball 100 and surrounds the through hole 104. The sleeve 106 is configured for receiving a supporting member 400. A cylindrical protrusion

108 protrudes inwardly from an inner surface of the sleeve 106. The protrusion 108 is parallel to an axis of the sleeve 106.

[0016] The simulated eye 100 further includes the supporting member 400 for supporting the pupil 300, a transmission member 500, and a motor 600 having a motor shaft 610. The supporting member 400 is threadedly engaged with the transmission member 500. The transmission member 500 is fixed on the motor shaft 610 of the motor 600.

[0017] The supporting member 400 includes a round supporting sheet 402, a nut 404, and three supporting rods 406 for connecting the nut 404 to the supporting sheet 402. The pupil 300 is fixed on a side of the supporting sheet 402 opposite to the convex lens 102. A diameter of the supporting sheet 402 is a little less than that of the sleeve 106. A recess 408 is defined in a rim of the supporting sheet 402. The recess 408 engages with the protrusion 108 to restrict the supporting member 400 to rotate relative to the sleeve 106. The supporting member 400 is slidable along the axis of the sleeve 106 when received in the sleeve 106. The supporting member 400 is movably coupled to the transmission member 500 via the nut 404. In particular, the three supporting rods 406 are arranged for converting the rotational force of the transmission member 500 with respect to the nut 404 to a linear force to move the pupil 300 back and forth.

[0018] Therefore, the supporting member 400 is driven by the motor 600 to move back and forth. As a result, the pupil 300 fixed on the supporting member 400 is movable toward and away from the convex lens 102. In the embodiment, the transmission member 500 has a plurality of threads, and the motor 600 is a step-motor, or a servomotor.

[0019] Moreover, A holding member 204 protrudes inwardly from an inner surface of the shell 200, and the holding member 204 defines a cavity (not shown) for holding the motor 600. The convex lens 102 includes two focal points F1 and F2, and a center point O. The pupil 300 can be moved between the center point O and the focal point F2 thereof.

[0020] Referring to FIG. 4, in assembly, the pupil 300 is fixed on the supporting sheet 402, and the supporting member 400 is received in the sleeve 106. The motor 600 is held in the holding member 204, and the supporting member 400 fixing the pupil 300 is coupled to the motor 600 via the nut 404 engaged with the transmission member 500. After assembly, the center of the convex lens 102, the pupil 300, and the supporting sheet 402 are aligned in a straight line extending along an axis of the motor shaft 610.

[0021] Referring to FIGS. 5 and 6, in a first state, the pupil 300 is located at a first position A adjacent to the convex lens 102. The first position A is on the axis of the convex lens 102 between the focal point F2 and the center point O. In the first state, a first virtual image 300a of the pupil 300 is formed, and a size of the first virtual image 300a is a little larger than that of the actual pupil 300 when observing the pupil 300 through the convex lens 102.

[0022] Referring to FIGS. 7 and 8, in a second state, the pupil 300 is moved further away from the convex lens 102 and is located at a second position B still between the focal point F2 and the center point O. In the second state, a second virtual image 300b of the pupil 300 is formed, and a size of the second virtual image 300b is larger than that of the first virtual image 300a. Therefore, while the pupil 300 is moved from the first position A to the second position B, the pupil 300 looks dilated.

[0023] When the pupil 300 is driven to move toward the convex lens 102 gradually by the motor 600, the pupil 300

changes gradually from a dilated state to a contracted state. When the pupil 300 is driven to move away from the convex lens 102, the pupil 300 changes gradually from a contracted state to a dilated state. Thus, by driving the pupil 300 toward and away from the convex lens 300, the pupil 102 appears to be dilating and contracting respectively.

[0024] Furthermore, the pupil 300 can function as a camera, in the embodiment, the pupil 300 is a micro-camera almost similar to a human pupil. When the pupil 300 is used to capture images, optical parameters for capturing images can be adjusted via the motor 600 driving the pupil 300 in frontward and backward direction, so as to capture images with a better effect.

[0025] Although the present disclosure has been specifically described on the basis of the embodiments thereof, the disclosure is not to be construed as being limited thereto. Various changes or modifications may be made to the embodiments without departing from the scope and spirit of the disclosure.

What is claimed is:

1. A simulated eye, comprising:
 - an eyeball comprising a lens and a pupil, wherein the pupil is visible through the lens; and
 - a driving device operatively coupled to the eyeball for driving the pupil to move toward and away from the lens.
2. The simulated eye in claim 1, further comprising a shell for receiving the eyeball, an opening is defined in the shell, and the pupil being exposed via the opening through the lens.
3. The simulated eye in claim 1, wherein the pupil is colored.
4. The simulated eye as described in claim 1, wherein a hole is defined in the eyeball, the lens is fixed in the hole.
5. The simulated eye as described in claim 1, wherein the lens is a convex lens having a center point and a focal point.
6. The simulated eye as described in claim 5, wherein the pupil is disposed between the center point and the focal point.
7. The simulated eye in claim 1, wherein a hollow cylindrical sleeve protrudes inwardly from an inner surface of the eyeball and surrounds the lens.
8. The simulated eye in claim 7, wherein the driving device is slidable relative to the sleeve, and the driving device comprises a supporting member, a transmission member, and a motor, the supporting member is configured to fix the pupil and is movably coupled to the motor via the transmission member.

9. The simulated eye as described in claim 8, wherein the supporting member comprises a round supporting sheet, the pupil is fixed on the supporting sheet, and the diameter of the supporting sheet is less than that of the sleeve.

10. The simulated eye as described in claim 8, wherein the motor is a step-motor or a servomotor.

11. The simulated eye as described in claim 8, wherein the transmission member comprises a plurality of threads, the supporting member further comprises a nut, and the supporting member is couple to the motor via the nut engaging with the transmission member.

12. A simulated eye capable of being operated between a contracted state and a dilated state, the simulated eye comprising:

a shell defining an opening;

an eyeball received in the shell and exposed via the opening, the eyeball comprising a lens and a pupil, the pupil being visible through the lens, and a virtual image of the pupil formed via the lens; and

a driving device for driving the pupil move toward and away from the lens;

wherein when the transmission member drives the pupil move, a size of a virtual image of the pupil formed by the lens is changeable, whereby the simulated eye is changed between the contracted state and the dilated state.

13. The simulated eye in claim 12, wherein the lens is a convex lens having a center point, and a focal point, the pupil is disposed between the center point and the focal point.

14. A simulated eye capable of capturing images, the simulated eye comprising:

a shell defining an opening;

an eyeball received in the shell and exposed via the opening, the eyeball comprising a lens and a pupil structure comprising a camera, and the pupil structure being visible through the lens; and

a driving device for driving the camera move toward and away from the lens;

wherein when the camera is operated to capture images, the driving device adjusts optical parameters of the camera in association with the lens for capturing images by adjusting positions of the camera.

* * * * *