Dec. 2, 1952 L. H. STRAYER 2,619,773

SLEEPING-DOLL EYE MECHANISM

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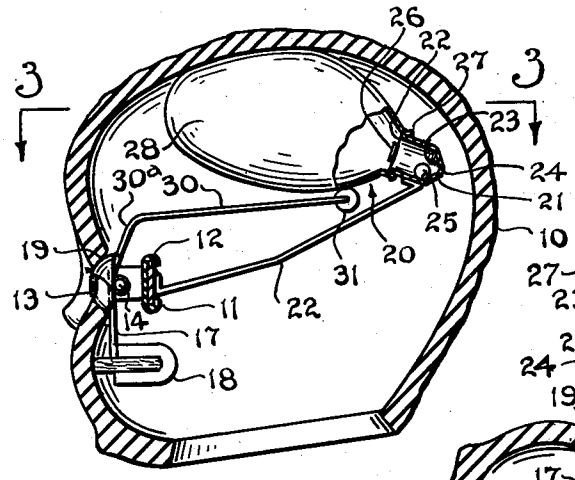


Fig. 1

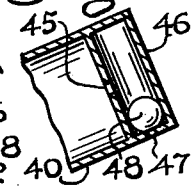


Fig. 5a

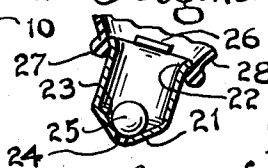


Fig. 2a

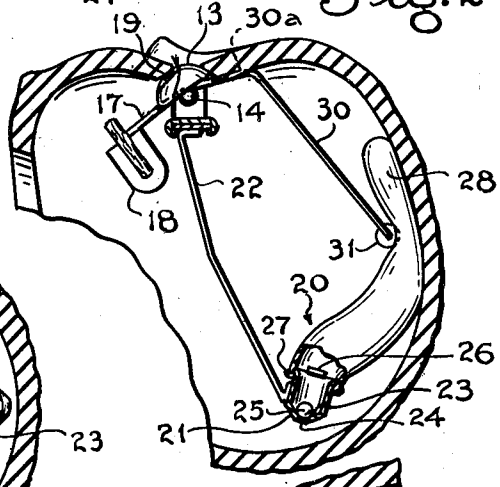


Fig. 2

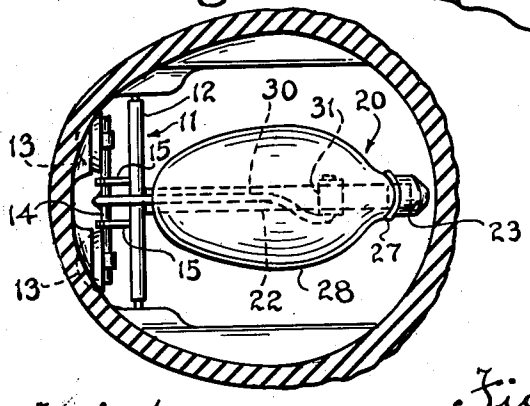


Fig. 3

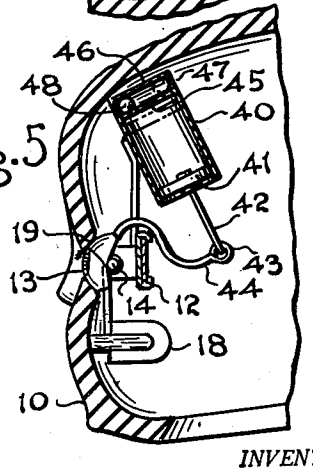


Fig. 5

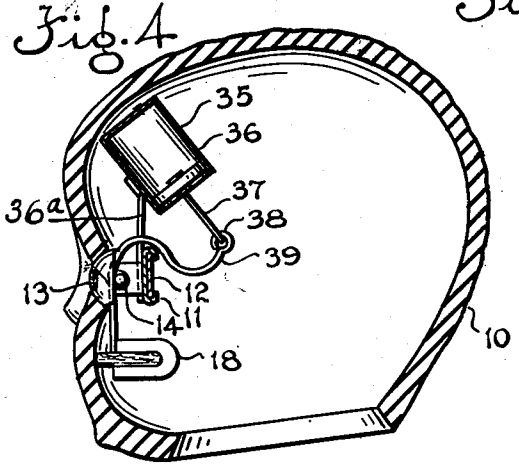


Fig. 4

INVENTOR.
Lawrence H. Strayer
BY
William Cleland
Attorney

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SLEEPING-DOLL EYE MECHANISM

Lawrence H. Strayer, Kent, Ohio

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5 Claims. (Cl. 46—169)

1

This invention relates to a sleeping-doll eye mechanism.

Heretofore, certain attempts have been made to provide sleeping-doll eye mechanisms wherein the closing movement of the eyes was desired to be gradual, in simulation of drowsing toward sleep. Such attempts have not been satisfactory, however, because the mechanisms thus produced have usually been bulky and complicated and, therefore, too expensive and unreliable for the purposes for which they were designed, or they were unsatisfactory for other reasons too numerous to mention.

One object of the present invention is to provide a simple, compact, unitary structure of the character described, including improved means for causing slow or gradual movement of the doll eyes in simulation of drowsing toward sleeping condition, certain improved portions of the mechanism being easily installed as a single unit with the usual type of movable eye device, or otherwise if desired.

Another object of the invention is to provide eye control means of the character described which is automatic, foolproof, and operable without appreciable noise.

Another object of the invention is to provide control means of the character described, which is adapted either to be supplied as part of a unit also including a movable eye device, or as a separate assembly for mounting in association with a movable eye device of known type.

Other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

Figure 1 is a transverse cross-section through a doll head having incorporated therein an eye mechanism embodying the features of the invention, the doll head being shown in normal erect position.

Figure 2 is a view, similar to Figure 1, but partly broken away, and showing the doll head in a horizontal position in which the eyes are fully closed.

Figure 2a is an enlarged fragmentary detail view of the ball valve in the position thereof shown in Figure 2.

Figure 3 is a horizontal cross-section through the doll head, taken substantially on the line 3—3 of Figure 1.

Figure 4 is a sectional view, similar to Figure 1, but illustrating a modified form of eye mechanism.

Figure 5 is a view similar to Figure 1, partly broken away, and illustrating still another modified form of the invention.

2

Figure 5a is an enlarged fragmentary detail view of the ball valve of Figure 5, but shown in the same relative position of the parts as Figure 2.

Referring particularly to Figures 1 to 3, the numeral 10 designates a hollow doll head of the usual type, generally made of hard rubber, impregnated fibrous material, or the like, the same having incorporated therein a movable eye device 11 which includes a supporting crosspiece 12, which is fixed with respect to the head by having the ends thereof embedded in opposite sides of the doll head, and also including a pair of artificial eyes 13, 13 carried by a spindle 14 rotatably received through apertures in spaced lugs 15 on crosspiece 12. A downwardly extending arm 17, also carried by the spindle, has fixed on the lower end thereof a weight 18 adapted when the head is in the normally erect position of Figure 1, to gravitate to a stop position against the forward wall portion of the head, and thereby in said erect position to maintain the eyes in simulation of an open condition thereof with respect to eye sockets 19 in the head. This arrangement is such that upon inclining a doll head toward a horizontal position, as shown in Figure 2, the weighted arm 17 upon swinging downwardly by gravity will pivot the eyes 13 about the axis of the spindle 14 to a position in simulation of sleeping condition thereof.

The above described eye device 11, in and of itself, is capable of simulating fully awake and fully asleep conditions of the eyes, and unless additional means is provided, the movements of the eyes in either direction will be relatively quick and abrupt upon changing the positions of the head between the limits illustrated in Figures 1 and 2. To obviate this condition, additional control means, indicated generally at 20, is provided particularly for retarding the closing movement of the eyes in simulation of gradual closing thereof or drowsing toward sleep. This control device 20 may include a valve member 21 fixedly supported on a relatively rigid arm or bracket 22 extending rearwardly from the fixed support 12, and a pneumatic container 28 attached thereto. The valve 21 may comprise a cup-shaped receptacle having an open mouth 22 at one end and the other end thereof having an inwardly presented conical seat 23 around a central aperture 24, a ball 25 being retained in the receptacle in all positions of the doll head, by a lug or lugs 26

provided at the mouth of the receptacle. The angle of the valve 21 is such that when the doll head approaches the horizontal position of Figure 2, the ball 25 will gravitate to be seated on the conical seat 23 to close the aperture 24. Suitably attached over the open end of the receptacle of the valve is a reduced neck portion 27 of pneumatic container 28, which may be a membranous container in the nature of a ballon-like sac of thin flexible rubber or other elastic material. The above referred to relative angle of valve 21 is also such that when the doll head is in the upright position of Figure 1, the ball 25 will be out of seating engagement with the conical seat 23 to permit the air pressure within the sac to be equalized with the external or atmospheric pressure, in which condition of the sac it will be maintained in distended condition, backed by the top wall portion of the doll head.

The arm 17 of the eye device 11 is extended upwardly and rearwardly, as indicated at 30, to have the free end of the extension closely adjacent the bottom wall portion of the distended sac 28 (see Figure 1). The arrangement is such that when the doll head is inclined from the upright position of Figure 1 toward the horizontal position of Figure 2, the ball 25 will roll into seating engagement with the conical seat 23 to substantially restrict the flow of air through the aperture 24, whereby engagement of the free end of the extension 30 with distended sac 28 will initially tend to prevent the weight 18 from immediately dropping by gravity to close the eyes 13 as previously described. The pressure of the arm 30 against the sac 28, as urged by the weight 18, however, being greater than the internal pressure of the sac, will slowly force the air from the sac, through the ball restricted aperture 24, and the eyes will slowly move from the open position in Figure 1 toward the closed position of Figure 2, in which the sac 28 is substantially fully collapsed. A roller 31 is provided on the free end of the weight-operated extension 30 to facilitate smooth closing engagement of the arm 30 with sac 28. The forward portion 30a of the extension is utilized to provide a positive limit to the closing movement of the eyes, by engagement thereof with the forward wall of the doll head.

In the use or operation of the mechanism described above, a child playing with the doll upon holding same with the head 10 in the horizontal position, will cause the ball 25 to roll toward seating engagement with the conical valve seat 23 to seal the aperture 24 to a limited degree, and thereby to restrict the flow of air from the sac 28 as urged by pressure of the extension element 30 against the membranous wall of the sac as previously described. The closing movement of the eyes may be varied, as for example, by patting the doll while maintained in horizontal position whereby resultant momentary jarring of the ball 25 away from the aperture 24 produces a life-like simulation of a child stubbornly dozing off to sleep. When it is desired to reopen the eyes of the doll, it is necessary only to return the doll to an upright position whereupon the weight will cause unopposed and relatively rapid return to the position of Figure 1. Obviously the device may be designed to control the length of time in which it takes to close the eyes 13, as by varying the thickness or size of the sac 28, the size of the valve aperture 23, or the size or material of the weight 18.

Referring now to Figure 4, there is illustrated a modified form of the invention in which parts thereof corresponding to like parts of Figures 1 to 3 are given like numerals. In place of the control device 20, however, there is provided a cylinder 35 open at one end for the reciprocation therein of a piston or plunger 36, the stem of which extends downwardly and is pivotally or flexibly connected at 38 to the free end of a suitably shaped extension arm 39, fixed to the rotatable spindle 14 which moves the eyes 13 upon movement of the weight 18, as before. The cylinder 35 is mounted in association with the movable eye device as by means of a bracket 36a attached to the crosspiece 12.

This arrangement is such that upon inclination of the head from the vertical toward the horizontal position, in the manner previously described, gravitational movement of the weight 18 for closing the eyes 13 will be retarded by cushioning of the movement of plunger 37 against the internal air pressure of the cylinder. As the pressure of the plunger 36 is continued, however, the cushioning air within the cylinder will be slowly forced past the edges of the plunger until it has reached the upper end of its stroke, at which time the eyes will be fully closed. For the foregoing purposes therefore, the plunger 36 must fit relatively loosely within the cylinder so that the cushioning air will escape therefrom in a predetermined period of time, under the influence of the weight 18.

Referring now to the modified form of the invention shown in Figure 5, there is illustrated an eye control mechanism which is in some respects similar to that illustrated in Figure 4, like parts again being given like numerals. A cup-shaped cylinder 40 is supported on the relatively fixed crosspiece 12 to have the open end thereof faced downwardly, there being a plunger or piston 41 reciprocable therein, by means of a stem 42 thereon being pivotally connected at 43 to the free end of an arm 44, carried by spindle 14 to rotate therewith about an axis, as urged by gravitational movement of weight 18. The upper or closed end of the cylinder is provided with a relatively small central aperture 45 which communicates the interior of the cylinder with the atmosphere, through a valve 46 including a cylindrical receptacle fully closed at one end and also closed at the other end except for a relatively small outlet aperture 47. Received within the valve container 46 is a ball or closure member 48, of slightly smaller diameter than the internal diameter of the container. The ball, in conjunction with the angular relation of the cylinder with respect to the doll head 10, is adapted to roll toward one end of the cylinder in the upright position of the doll head and thereby to permit equalization of the internal pressure of cylinder 40 with the external atmospheric pressure. Conversely, when the doll head is inclined toward horizontal position corresponding to Figure 2, the ball will roll toward the other end of the container 46 to close or restrict aperture 47, thereby to provide cushioning air within the cylinder which will retard upward movement of the plunger 41 as urged by gravitational movement of the weight 18, and whereby the desired retarded closing movement of the eyes 13 is accomplished. In this form of the invention, provision of the valve on the cylinder 40 makes possible a relatively leak-proof fit of the plunger 41 within the cylinder 40.

In all forms of the invention described above, it will be seen that the devices herein described for controlling the closing movements of the eyes

are extremely simple and compact, and readily lend themselves to easy installation of the complete eye mechanism, including the movable eye device and control means therefor, as a single unit, which is very important from a manufacturing standpoint. The control mechanisms, of course, may be mounted in association with the usual movable eye device in other ways than as shown and described, and yet embody the same general principle of operation described above.

Other modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. A sleeping-doll eye mechanism comprising an eye device including a fixed part for attachment in a doll head in association with eye sockets thereof and an eye member pivoted on said fixed part to be movable between opened and closed positions, weight means for causing said openings and closing movements of said eye member upon changing the angular position of the doll head and said fixed part with respect to vertical, a ball valve member, means for fixedly mounting said valve member on said fixed part, a sac of thin flexible elastic material attached to and supported by said valve member, said valve member having an aperture therein for communicating the interior of said sac with the exterior, said sac thereby normally being held in distended condition by equalizing atmospheric pressure interiorly and exteriorly thereof, said valve member having guide means for retaining its ball away from said aperture in eye opening positions of the valve and fixed part and for guiding the ball to seating position over said valve aperture when said valve and fixed part are inclined toward eye-closing positions, an extension from said eye member arranged to be swingable therewith by said weight during eye-closing movement thereof to engage said distended sac and apply pressure thereto, said seated ball in said eye-closing position restricting outward flow of air forced from the sac as a result of pressure thereon by said extension but permitting relatively slow collapsing of the sac until said eye member is in closed position.

2. A sleeping-doll eye mechanism comprising an eye device including a relatively fixed part and weighted eye member gravitationally movable relatively thereof by moving the relatively fixed part from a normal relatively upright position toward a given vertically angular position of the same, an extension from said eye member arranged to be movable therewith, a pneumatic cushioning unit mounted in relatively fixed relation to said fixed part, said cushioning unit including a container having a part yieldingly movable against a cushion of air therein and valve means permitting gradual release of air from the container upon application of yielding pressure of said container part against the air cushion, said extension upon movement of said fixed part from said normal position toward said given angular position thereof being movable with resultant gravitational movement of said eye member to apply pressure to said container part and thereby to force the air outwardly through said valve means, said valve means including a receptacle provided with an aperture communicating the interior of the container with the exterior thereof, and a closure member gravitationally movable in the receptacle, said receptacle having guide portions for guiding said closure member to seating position over said aperture when said extension is moved with said eye member toward said given position thereof and thereby to restrict said outward flow of air to accomplish retarded movement of the eye member, said closure member being unseated from said aperture when said fixed part is returned to said upright position thereof, unseating of said ball permitting return of air to said container through said aperture.

3. A sleeping-doll eye mechanism comprising an eye device including a relatively fixed part and an eye member movable relatively thereof by moving the eye device toward a given vertically angular position, a weighted extension from said eye member arranged to be swingable therewith, a pneumatic cushioning unit mounted in association with said eye device, said cushioning unit including a container having a part yieldingly movable against a cushion of air therein and means permitting gradual release of air from the container upon application of yielding pressure of said container part against the air cushion, said cushioning means comprising a container having a membranous wall adapted to be held expanded by equalized interior and exterior air pressures, said container having inlet and outlet valve means, the operative relation of said extension with said container being pressure contact with said membranous wall upon vertical tilting of said eye device to force the air outwardly through said valve means, said valve means including a receptacle provided with an aperture communicating the interior of the container with the exterior thereof, and a ball in the receptacle adapted to gravitationally seat over said aperture when said eye device is tilted to cause said pressure of the extension to be applied to the membranous wall and thereby to restrict said outward flow of air to accomplish said retarded movement of the eyes, said ball being away from said aperture when said eye device is in normal upright position to release said extension from said membranous wall and thereby permit return of air to said container through said aperture.

4. A sleeping-doll eye mechanism comprising an eye device including a relatively fixed part and an eye member movable relatively thereof by moving the eye device toward a given vertically angular position, a weighted extension from said eye member arranged to be swingable therewith, a pneumatic cushioning unit mounted in association with said eye device, said cushioning unit including a container having a part yieldingly movable against a cushion of air therein and means permitting gradual release of air from the container upon application of yielding pressure of said container part against the air cushion, said cushioning means comprising a container having a membranous wall adapted to be held expanded by equalized interior and exterior air pressures, said container having an air inlet and outlet valve means, mounting means on said valve means for fixing said container on said relatively fixed part, the operative relation of said extension with said container being pressure contact with said membranous wall upon vertical tilting of said eye device to force air outwardly through said valve means, said valve means including a receptacle provided with an aperture communicating the interior of the container with the exterior thereof, and a ball in the receptacle adapted to gravitationally seat over said aperture when said eye device is tilted to cause said pressure of

the extension to be applied to the membranous wall and thereby to restrict said outward flow of air to accomplish said retarded movement of the eyes, said ball being away from said aperture when said eye device is in normal upright position to release said extension from said membranous wall and thereby permit return of air to said container through said aperture, said mounting means including a member on said fixed part and to which said receptacle is attached.

5. A sleeping-doll eye mechanism comprising an eye device including a relatively fixed part and a weighted eye member gravitationally movable relatively thereof by moving the relatively fixed part from a normal relatively upright position of the fixed part toward a given vertically angular position of the same, an extension from said eye member arranged to be movable therewith, a pneumatic cushioning unit mounted in association with said eye device, said cushioning unit including an inflatable elastic container having a part yieldingly movable against a cushion of air therein and valve means permitting gradual release of air from the container upon application of yielding pressure of said container part against the air cushion, the operative relation of said extension being engagement thereof with said container part upon vertical tilting of said eye device to apply pressure to the container and thereby to force the air outwardly thereof through said valve means, said valve means including a receptacle provided with an aperture communicating the interior of the container with the exterior thereof, and a ball in the receptacle adapted to gravitationally seat over said aperture when said eye device is tilted to cause said pressure of said extension to be applied to the container part and thereby to restrict said outward flow of air to accomplish retarded movement of the eye member, said ball being unseated from said aperture when said fixed part is returned to said normal upright position to release said extension from said pressure engagement with the container part, unseating of said ball thereby permitting return of air to said container through said aperture.

LAWRENCE H. STRAYER.

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