

[54] **DOLL WITH BLINKING EYELIDS
MOVED BY A PENDULUM**

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46/238

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[58] Field of Search 46/165, 166, 167, 168, 169 R,
46/169 A, 169 B; 40/106.32, 51

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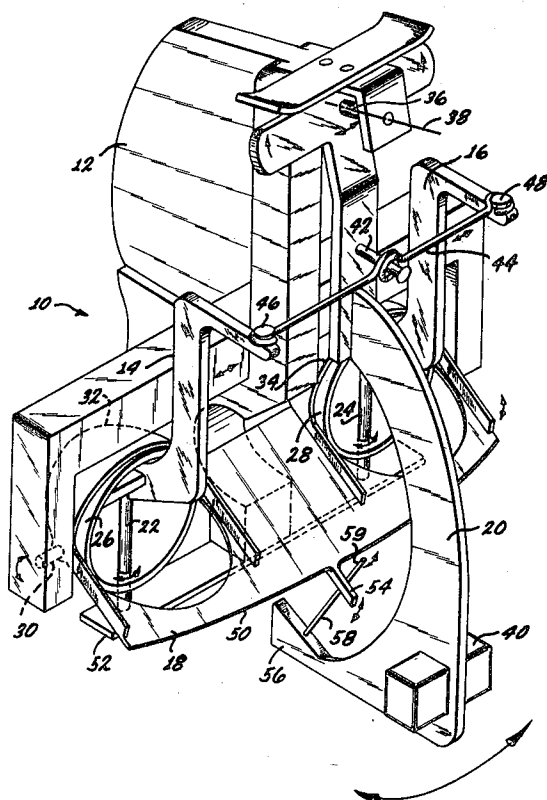
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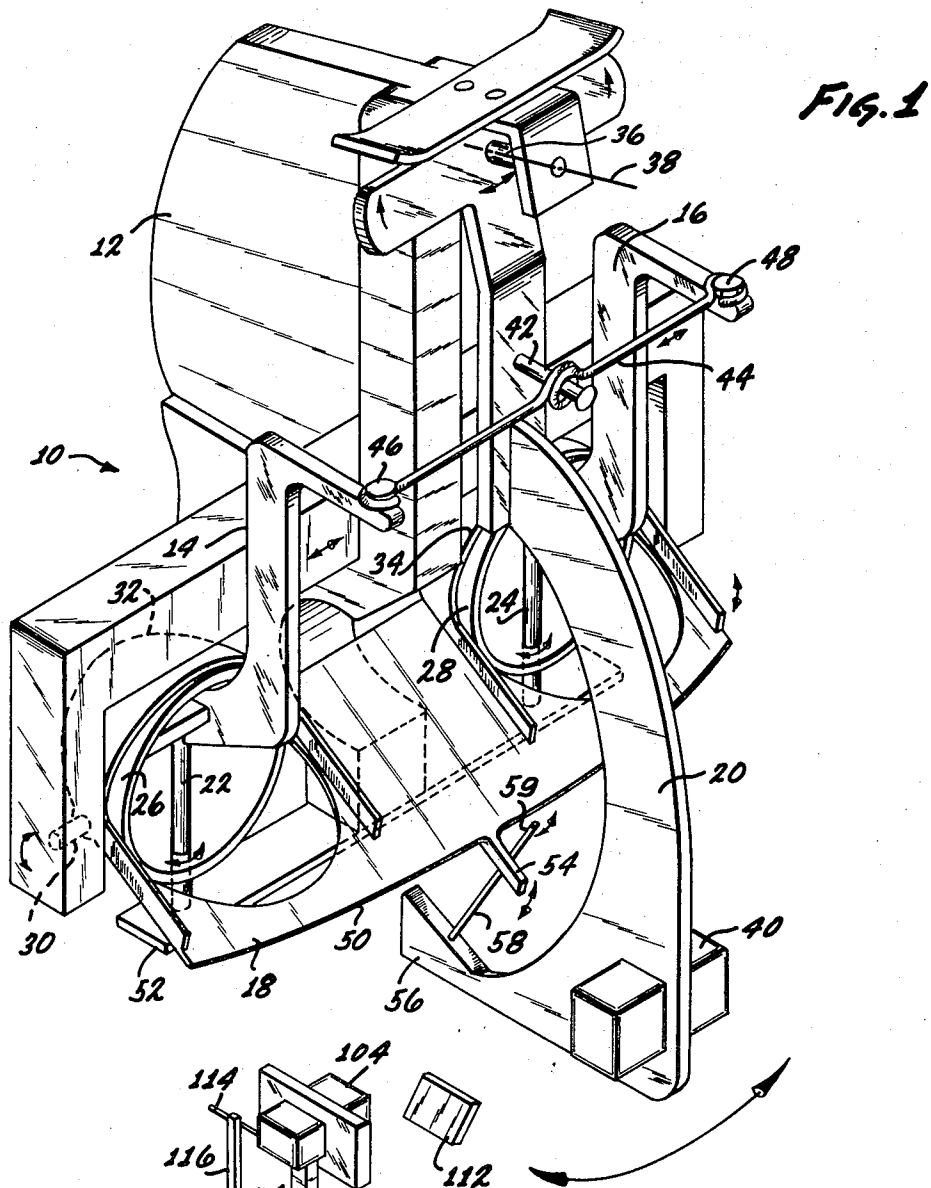
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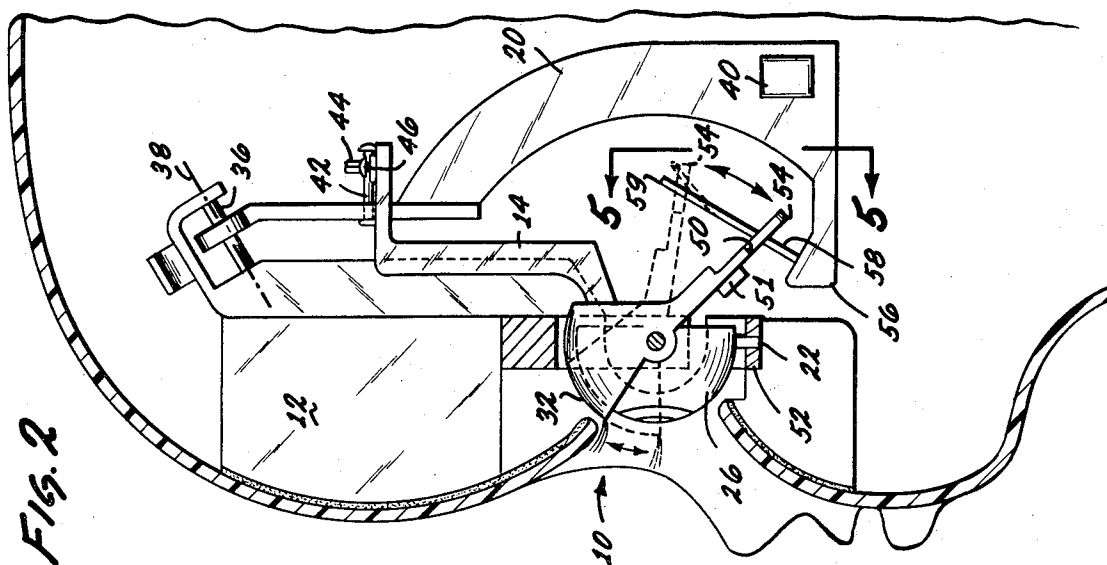
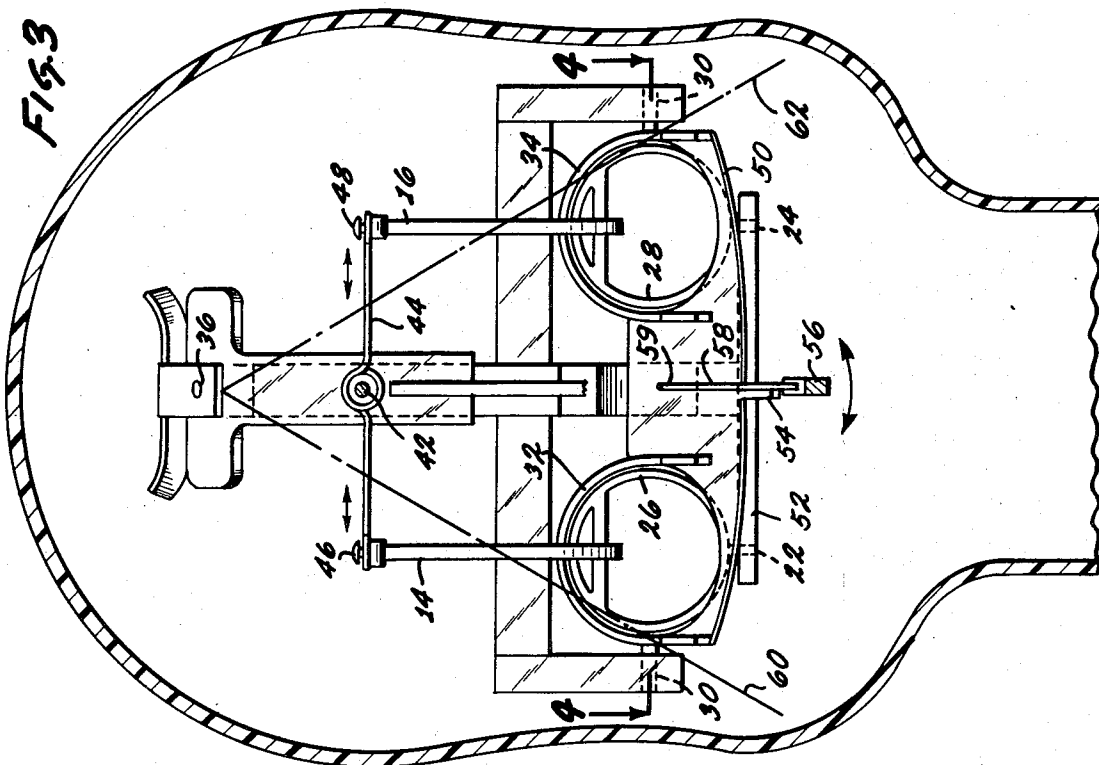
[57] **ABSTRACT**

A doll with eyes that not only move from side to side, but which also blink rapidly but occasionally and close when the doll is laid horizontally. The doll includes an eyelid lever which can pivot up and down to cover and uncover the eyes, and a pendulum which swings laterally. The pendulum carries a resilient wire that can brush against a projection on the eyelid lever to quickly pivot it to cover the eyes, and then quickly release from it to allow the eyes to be uncovered. The eyelid lever is weighted so that the eyelids thereon cover the eyes when the doll is laid horizontally and face up.

7 Claims, 7 Drawing Figures







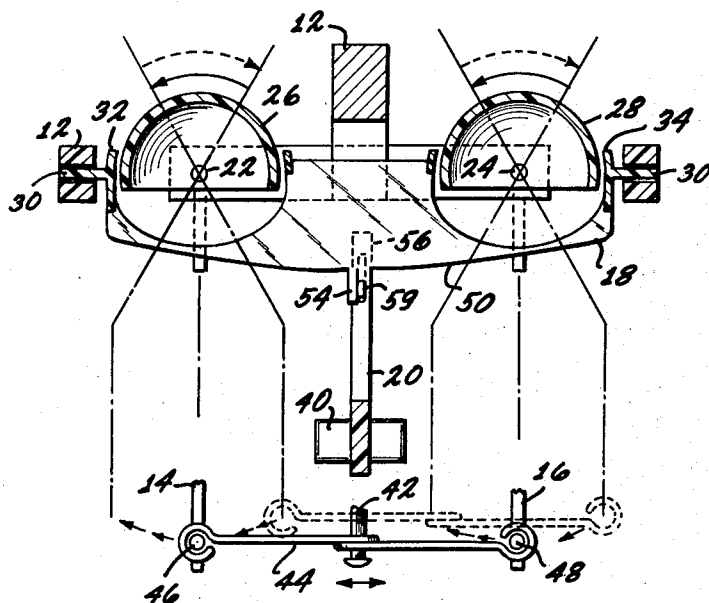


FIG. 4

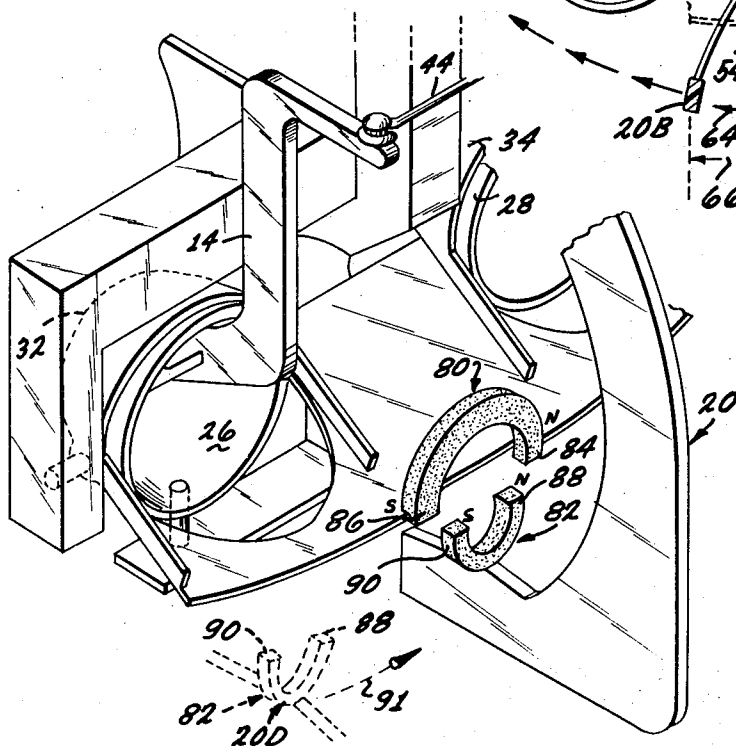
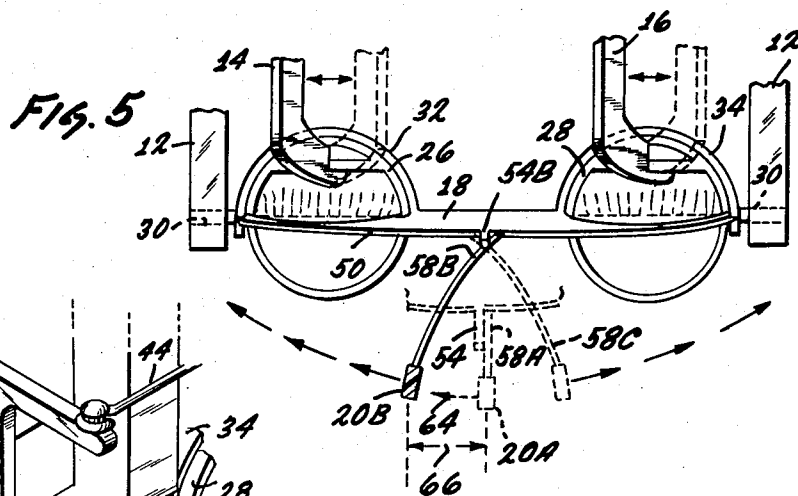


FIG. 6

DOLL WITH BLINKING EYELIDS MOVED BY A PENDULUM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to toy figures and to animating mechanisms therefor.

2. Description of the Prior Art

Properly animated eye movements can greatly enhance the entertainment value of dolls. Thus, dolls have often been constructed with eyelids mounted on a lever that closes them over the eyes when the doll is laid face up, and eyes have been mounted on pendulums so the doll appears to look from side to side when the pendulum swings. One type of movement which could be included to further add to realism would be a rapid blinking movement. However, blinking should occur only occasionally, and should be very rapid to make it realistic. A mechanism which was of simple construction and could perform these various eye movements in a realistic manner would enable highly entertaining dolls to be widely sold.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide animating means for causing occasional rapid blinking movements in a doll.

Another object is to provide a doll of relatively simple construction, whose eyes can slowly look from side to side, automatically close and open when the doll is laid horizontal or moved upright, and perform occasional rapid blinking movements.

In accordance with one embodiment of the present invention, a figure doll is provided with eyes that look from side to side, close or open when the doll is positioned horizontal or vertical, and occasionally perform a rapid blinking movement. The doll includes a pendulum which can slowly swing from side to side in the doll's head, a pair of eyes mounted on levers that can pivot to make the doll look from side to side, and an eyelid lever which can pivot up and down to perform rapid blinking motions or to slowly close and open for simulating sleeping and waking up. The eyelid lever is weighted so that the eyes tend to remain open when the doll is upright. The pendulum carries a spring wire that can brush against a projection on the eyelid lever to move it up and close the eyes to simulate blinking. As the pendulum swings, the spring wire engages the eyelid lever and quickly springs past it so that the eyelids are quickly moved up and then released to move down again in a rapid blinking movement. The engagement of the spring wire with the eyelid lever occurs only during a small portion of the path of the pendulum, so that blinking occurs only occasionally in the case of a pendulum that swings slowly.

The novel features of the invention are set forth with particularity in the appended claims. The invention will be best understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an eye operating mechanism which can be mounted in the head of a doll to perform eye movements;

FIG. 2 is a sectional side view of a doll's head, showing the mechanism of FIG. 1 therein;

FIG. 3 is a sectional rear view of the doll head of FIG. 2;

FIG. 4 is a view taken on the line 4—4 of FIG. 3;

FIG. 5 is a view taken on the line 5—5 of FIG. 2;

FIG. 6 is a partial perspective view of an eye operating mechanism constructed in accordance with another embodiment of the invention; and

FIG. 7 is a partial perspective view of an eye operating mechanism constructed in accordance with still another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates an eye operating mechanism 10 which can be mounted in the head of a doll to perform realistic eye movements. The mechanism includes a frame 12 that is fixed to the inside of the doll's head, a pair of eye levers 14, 16 pivotally mounted on the frame, and eyelid lever 18 that is pivotally mounted on the frame, and a pendulum 20 that is pivotally mounted on the frame. The eye levers 14, 16 which are pivotally mounted by shafts 22, 24 on the frame, carry eyes 26, 28 that appear at the eye regions of the doll's head. As the eye levers 14, 16 pivot, the doll's eyes appear to look from side to side. The eyelid lever 18, which is pivotally mounted by trunions 30 on the frame, carries a pair of eyelids 32, 34. The eyelids 32, 34 can close over the eyes 26, 28, to simulate sleeping and awakening as the doll is moved between a horizontal and vertical position or to perform rapid blinking movements. The eyelid lever 18 is weighted to automatically close and open the eyes when the doll is moved between the vertical and horizontal positions. The pendulum 20 operates the eyelid lever 18 to make it perform blinking movements, the pendulum also operating the eye levers 14, 16 to make the doll look from side to side as the pendulum swings.

The pendulum 20 carries a shaft 36 at its upper end which is pivotally mounted on the frame 12, so that the pendulum can pivot about an axis 38 that extends primarily in forward and rearward directions. A weight 40 at the lower end of the pendulum increases the pendulum mass, to facilitate its driving of the eye and eyelid levers and also to increase the period of oscillation of the pendulum. A long period of pendulum oscillation is desirable to promote slow eye movements and reduce the frequency of occurrence of blinking. The pendulum carries a post 42 which pivotally supports a connecting rod 44 for coupling the pendulum to the eye levers 14, 16. The connecting rod 44 has opposite ends pivotally engaged with posts 46, 48 on the eye levers. As the pendulum swings from side to side, the connecting rod urges both eye levers to pivot simultaneously to make both eyes of the doll look from side to side. It may be noted that the center portion of the connecting rod 44 not only pivots on the post 42, but moves axially along it as the eye levers pivot. This manner of coupling the pendulum to the eye levers is simple and produces a minimum of friction.

The trunions 30 of the eyelid lever 18 are located so that most of the weight of the eyelid lever is at the rearward end 50 of the lever which is opposite the eyelids 32, 34. A weight 51 (shown in FIG. 2) is employed to

assure movement of the lever. Accordingly, when the doll is in an upright position, the rearward end 50 of the eyelid lever falls down until it hits a stop 52 on the frame, to maintain the eyelids in their extremest upward position wherein they substantially completely uncover the eyes and the doll appears awake. When the doll is laid horizontally, the rearward end 50 of the lever hangs straight down and maintains the eyelids in a closed position with respect to the eyes 26, 28. Thus, when the doll is moved between a vertical position and a horizontal face-up position, the eyelids automatically close and open. The eyelid lever is constructed so that it does not begin to disengage the stop 52, and therefore does not begin to close the eyes, until after the doll is turned more than about 45° from a true vertical position, so the eyes do not flutter in response to slight changes in the doll's orientation when it is almost upright.

In accordance with the invention, the blinking of the doll's eyes is made to occur rapidly but only occasionally. The eyelid lever 18 is provided with a narrow projecting part 54 at its rearward end. The pendulum 20 has a portion 56 which carries a resilient projection 58 in the form of a length of spring wire, the wire having an inner end 57 mounted on the pendulum and an outer end 59 extending from the pendulum. As the pendulum swings, the resilient projection 58 brushes past the eyelid projecting part 54 to urge it to move upwardly and pivot the eyelid lever so that the eyelids close over the eyes. As the rearward portion 50 of the eyelid lever pivots up and the pendulum 20 continues to swing in an arc, the resilient projection 58 disengages from the projecting part 54 of the eyelid lever to release the lever so it can pivot back to its original position. This movement produces a single blinking movement.

As shown in FIG. 3, the eyelid projecting part 54 is located at the middle of the arc of swinging of the pendulum, as indicated by the lines 60, 62. The resilient projection 58 on the pendulum is located to engage the eyelid projection 54 when the pendulum is at the center of its path of swinging. As best shown in FIG. 5, when the pendulum is in a center position as indicated at 20A, a lower portion of the resilient projection at 58A contacts the part 54 of the eyelid lever. As the pendulum swings in the direction of arrow 64, the resilient projection 58A bends and urges the eyelid lever part 54 to rapidly move upwardly until it reaches its highest position and the doll's eyes are closed. When the pendulum has reached the position 20B, the tip of the resilient projection at 58B has almost passed the eyelid part at 54B, and further swinging of the pendulum causes disengagement of the resilient projection. Once such disengagement occurs, the eyelid lever is free to be pivoted by gravity forces back to its original position to open the eyes. The rapid closing and opening occurs while the pendulum has moved through the limited arc distance 66, which is only about one-eighth the total arc of the pendulum. As the pendulum swings back in the opposite direction, a second blinking movement will occur as the resilient projection 58 moves between the position at 58A and 58C.

The fact that the blinking movement occurs rapidly makes it realistic in appearance. The fact that the blinking movement occurs only during a small portion

of the pendulum swing means that blinking does not occur often. Of course, the longer the period of pendulum swing, the less often does blinking occur. The pendulum does not tend to constantly swing, but swings only when the doll is moved laterally during play. Thus, the blinking movement generally occurs only occasionally during play with the doll, and appears to occur in a random manner which is somewhat similar to the manner in which persons generally blink. It may be noted that the rapid blinking movement can be made to occur with the resilient projection mounted on the eyelid lever 18 instead of the pendulum.

FIG. 6 illustrates another embodiment of the invention wherein a pair of magnets 80, 82 is utilized instead of the resilient wire. The first magnet 80 is mounted on the eyelid member 18, with the North pole 84 of the magnet and the South pole 86 thereof located adjacent to the path of the other magnet 82. The second magnet 82, which is mounted on the pendulum 20, has a North pole 88 and South pole 90 which are located for passing adjacent to the poles of the first magnet 80 as the pendulum swings. Inasmuch as unlike poles attract while like poles repel, the magnets alternately attract and repel each other as the pendulum swings and the second magnet 82 passes across the location of the magnet 80.

If the pendulum 20 begins swinging from a position at 20D towards its central position, the North pole 88 of the pendulum magnet will first reach the South pole 86 of the eyelid magnet. The magnets will strongly attract one another and the eyelid lever will remain in its downward position. Soon after that, the pendulum will reach its center position, as shown in FIG. 6, wherein like poles will be adjacent. The magnets will then strongly repel one another and the eyelid lever 18 will be forced to pivot and close the eyes. A further swinging of the pendulum in the direction of arrow 91 will cause the South pole 90 of the pendulum magnet to move under the North Pole 84 of the eyelid magnet, causing the magnets to strongly attract one another and forcing the eyelid lever to pivot back to its original position wherein the eyes are open. Thus, as the pendulum swings past a central position, the eyelids quickly close and then open again. The magnets tend to retain the pendulum in a position wherein one of the poles of the pendulum magnet is under the opposite pole of the eyelid magnet, and the eyelids are then maintained open. However, any appreciable lateral forces of the doll will cause the pendulum to swing and result in blinking action. The fact that the magnets tend to maintain the pendulum away from a position wherein the eyelids would be closed, helps to prevent a closed condition of the eyes when the doll is upright and held in a position wherein the pendulum is at the center of its arc, as can occasionally occur with the mechanism of FIG. 1.

FIG. 7 illustrates another blinking mechanism wherein a pendulum 100 is provided which is pivotally mounted about an axis 102 near the bottom of the doll's head, and which carries a weight 104 that is above the axis 102 when the doll is upright. A spring 106 which is trapped between a pair of ears 108 on the pendulum, urges the pendulum to remain in a vertical position, and returns the pendulum to a central or vertical position when it pivots away from that position. A

pair of stops 110, 112 mounted on the doll limit the pendulum swinging so that it never swings so far that the spring 104 cannot return it to its central position. The pendulum carries a resilient projection 114 which engages an eyelid lever 116 to blink the eyes in a manner similar to that of the mechanism illustrated in FIG. 1. The lever can carry apparatus of the type illustrated in FIG. 1, for moving eye levers that make the eyes look from side to side. The use of an inverted pendulum with the majority of its weight above its pivot point, allows a long period of pendulum swinging to be achieved with a pendulum of limited length. Because of the limited height available in the head of a typical doll, it is difficult to achieve long periods of swinging, such as several seconds. A long period, such as can be achieved with an inverted pendulum, results in slower eye movements and less frequent blinking, to provide a more natural animation. Even with a very slow pendulum movement, rapid blinking movement can be obtained by the use of the resilient projection 114.

Thus, the invention provides a mechanism for animating the eyes of a doll, which provides for rapid blinking action at a relatively low rate of occurrence. This is accomplished by the use of means on the pendulum for urging the eyelids to close during only a limited portion of the arc of pendulum swinging, such as less than one-fifth of the arc. The pendulum can employ a resilient projection which engages a projecting part of an eyelid-holding lever, to brush against the projecting part so as to quickly pivot the lever and then quickly release it. Instead of utilizing a projecting part for contacting the eyelid lever, magnets can be employed with pairs of poles that move across one another to cause rapid eyelid movement. The pendulum can be of the usual type with a weight hanging below the axis of pivoting when the doll is upright. However, an inverted pendulum arrangement can be utilized, with the weight of the pendulum above the pivotal axis of the pendulum, to achieve a longer oscillation period in a limited space.

Although particular embodiments of the invention have been described and illustrated herein, it is recognized that modifications and variations may readily occur to those skilled in the art and, consequently, it is intended that the claims to interpreted to cover such modifications and equivalents.

What is claimed is:

1. In combination with a figure doll which has eyes, a blinking mechanism comprising:
 - a pendulum pivotally mounted on said doll;
 - means mounted on said doll including eyelids mounted for up and down movement about a horizontal axis for covering and uncovering said eyes; and
 - means for coupling said pendulum to said mounted means to move said eyelids down far enough to cover most of said eyes and then releasing them to move up and uncover said eyes, during movement of said pendulum past a limited portion of its path of swinging, said eyelids being normally biased to move up on said release whereby to obtain rapid

blinking movements at a low repetition rate.

2. The combination described in claim 1 wherein:
 - said mounted means comprises a lever, said eyelids being mounted on said lever, and said lever being pivotally mounted on said doll and urged toward a position wherein said eyelids are in an open position when said doll is in a predetermined upright orientation; and
 - said means for coupling said pendulum to said mounted means includes a member having an inner end fixed to said pendulum and an outer end extending from said pendulum for brushing past said lever to briefly urge it to pivot in a direction to close said eyelids as said pendulum swings.
3. The combination described in claim 2 wherein:
 - said member is constructed of resilient material, to deflect against said lever, and suddenly release from it as said pendulum swings.
4. The combination described in claim 1 wherein:
 - said means for coupling said pendulum to said mounted means includes a first magnet mounted on said mounted means and a second magnet mounted on said pendulum, said first magnet having north and south poles adjacent to the path of said second magnet and said second magnet having north and south poles positioned to pass successively by said poles of said first magnet as said pendulum swings, whereby to attract and then immediately repel said mounted means for a rapid blinking movement of said eyelids.
5. The combination described in claim 1 wherein:
 - said pendulum is pivotally mounted on said doll with a majority of the pendulum weight above the axis of pivoting when the doll is upright, whereby to obtain a long oscillation period in a small doll.
6. In combination with a figure toy which has eyes, animating means for said eyes, comprising:
 - a lever member pivotally mounted in said toy;
 - eyelids coupled to and pivotable with said lever member, said eyelids being in position to cover and uncover said eyes when said lever pivots; a pendulum member pivotally mounted in said toy; and
 - means including a resilient projection for coupling said lever and pendulum members, said projection mounted on a first of said members and having an end portion for contacting the second of said members during a portion of the movement of said members relative to each other to urge said lever member to pivot, said resilient projection positioned to deflect to an extent that it suddenly disengages said second member when moved past a position of initial contact with it, said lever member being biased to automatically return to its prior position upon said disengagement.
7. The combination described in claim 6 wherein:
 - said lever member has a projecting portion; and
 - said resilient projection includes a wire of spring material mounted on said pendulum member to pass the location of said projecting portion of said lever member.

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