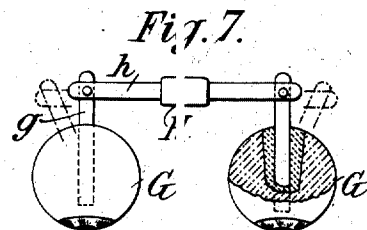
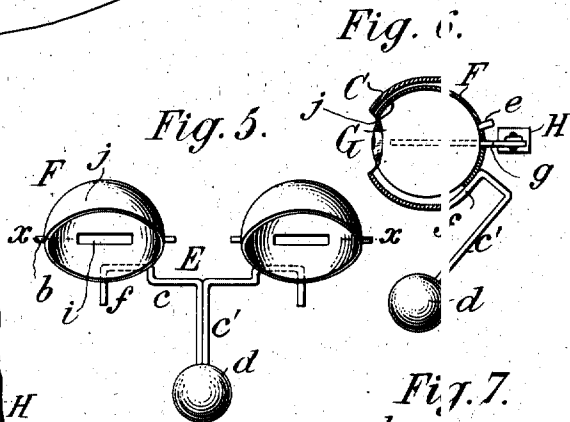
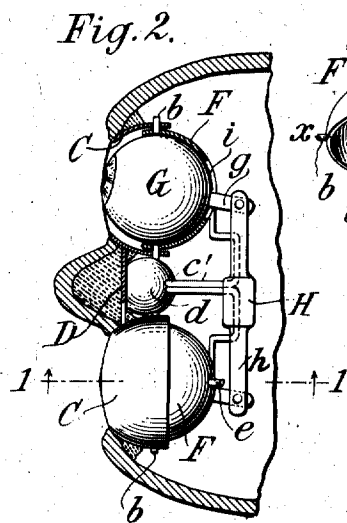
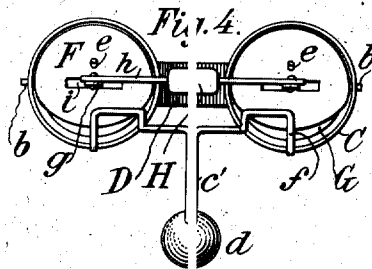
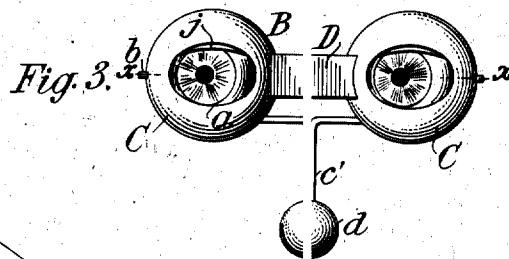
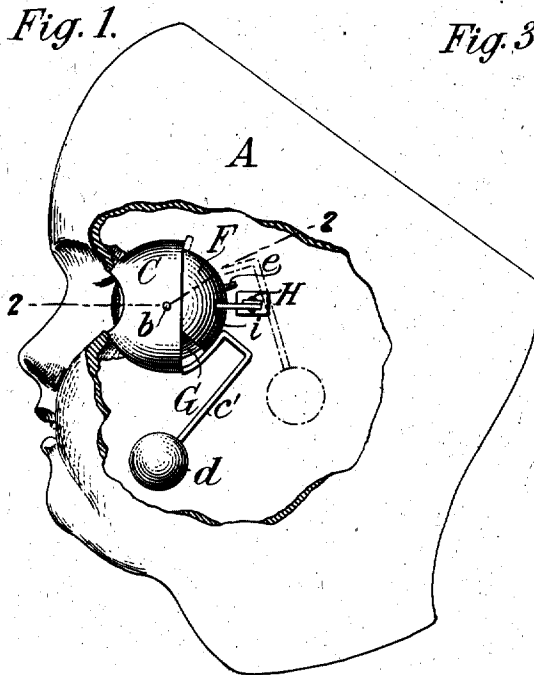


1,008,471.

Patented Nov. 14, 1911.

2 SHEETS—SHEET 1.



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1,008,471.

Patented Nov. 14, 1911.

2 SHEETS-SHEET 2.

Fig. 8.

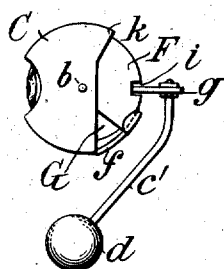


Fig. 9.

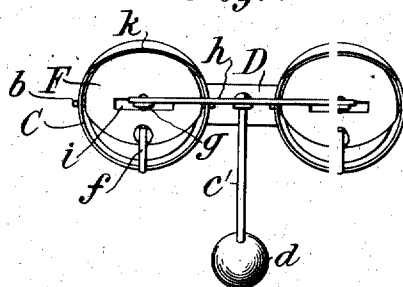


Fig. 10.

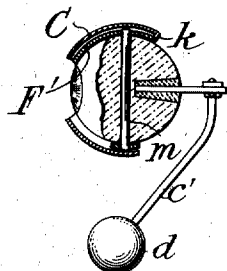


Fig. 11.

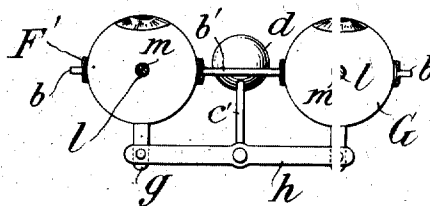


Fig. 14.

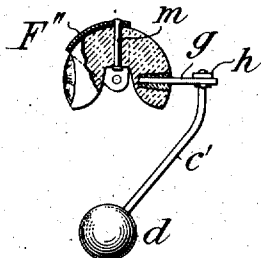


Fig. 15.

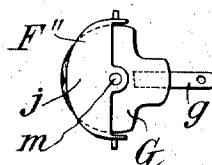


Fig. 12.

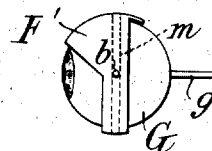
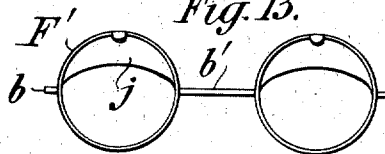


Fig. 13.



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MECHANICAL EYES.

1,008,471.

Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed December 17, 1909. Serial No. 533,670.

To all whom it may concern:

Be it known that I, PAUL CHARLES JACQUEROD, a citizen of the Republic of Switzerland, residing in West New York, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Mechanical Eyes, of which the following is a specification.

This invention relates to mechanical eyes for dolls, lay figures, wax figures, or other use. Its object is to provide a practicable construction whereby the eyes may be capable both of the ordinary opening and closing movement, and of moving laterally.

Figure 1 of the accompanying drawings is a side elevation of the head of a doll with its cheek broken open and in partial section (in the plane of the line 1—1 in Fig. 2) showing the mechanical eyes in side elevation; Fig. 2 is a horizontal section of the head (on the line 2—2 in Fig. 1) showing the mechanical eyes partly in plan and partly in horizontal section; Fig. 3 is a front elevation of the mechanical eyes removed from the head. Fig. 4 is a rear elevation thereof; Fig. 5 is a front elevation of the pivoted shell or pendulous frame which carries the eye-ball; Fig. 6 is a vertical mid-section through one of the eye-balls; Fig. 7 is a plan of the two eye-balls and their connections. Figs. 8 and 9 show another construction in side and rear elevation; Figs. 10 to 13 show another construction; Figs. 14 and 15 show still another construction.

The embodiment of the invention shown in the drawings will be described. The doll's head A is of the well known construction designed for movable eyes. Inside the head and closely fitting the eye openings, is fastened an outer shell B which forms the main support for the mechanical eyes. This shell is constructed preferably of two hemispherical shells C C each formed with an eye opening in front, and the two connected by a cross bar D (see Fig. 3). To the main shell B is pivoted on a horizontal transverse axis $x x$ (Fig. 3) the tilting frame or pendulous support E which is shown detached in Fig. 5. This is preferably constructed with two hollow shells or hoods F F which are best formed as segments of spheres, and which fit respectively within the hemispherical shells C C. For pivoting the frame E, its shells F F are formed with pivot pins

b upon the pivotal axis x (Fig. 5), which pins enter pivot holes in the shells C C. The shells F F are connected by a cross bar c which has portion c' extending downward and carrying a weight c by which the pivoted frame is given a pendulous motion. It is desirable to provide stops e and f upon the shells F in order to limit the swinging movement of the frame E in opposite directions.

The eye-balls G G are best made of glass, being either complete spheres or partial spheres. They fit respectively within the spherical shells F F. Each eye-ball has an arm g projecting rearwardly from it, and these arms are connected together by a cross-bar h as best shown in Fig. 7. The arms $g g$ are best made of metal and cemented into the eye-balls, as shown in Fig. 7. The eye-balls fit closely and yet freely within the shells F F, so that they may readily turn therein, but as their movement therein should be solely a lateral one, or in a horizontal plane, some connection is required to restrain them from other movements. This is simply accomplished by forming the shells F with horizontal slots i through which the arms g pass, so that the sides of these slots prevent movement in a vertical plane, while their ends serve as stops to limit the horizontal movement. For operating the eyes by gravity, the arms g and connecting bar h may be made sufficiently heavy, or a weight H may be applied, preferably to the middle of the bar.

The shells F F serve not only to carry the eye-balls, but also serve as eye-lids; that is to say the portion of these shells which is marked j in Fig. 5, moves down and closes the eye openings a by the gravitating movement of the frame E when the doll is laid down. This portion j requires therefore to be painted or enameled with a flesh color. For a doll having tangible eye-lashes, these are fastened to the edge of the portion j , as shown in Figs. 1 and 3.

In operation, the eye-balls participate in the gravitating movements of the frame E, as the doll is moved from the vertical to the recumbent or horizontal position, and vice versa. In addition, the eye-balls have an independent lateral movement, caused by the gravitation of the weight H as the doll is turned to either side. This movement imparts to the eyes a natural expression, such

that as a partially recumbent doll is turned toward the person holding it, it has the effect of looking up into that person's face.

Figs. 8 to 15 inclusive show other embodiments of this invention wherein the construction is somewhat simplified by utilizing the weight or pendulum bob *d* to perform the functions also of the weight *H*. For this purpose the cross-bar *c* is omitted and the stem *c'* of the weight *d* is connected to the middle of the cross-bar *h*. This construction has an advantage in that the lateral movement of the eyes is less free than in that first described, so that the turning of the head upon its side does not cause so abrupt a movement of the eyes. This result is due to the hanging of the weight beneath the level of the eye-balls so that its action upon the arms *g* is indirect and results in the generating of a certain amount of friction between the eye-balls and their sockets or pivots.

In Figs. 8 and 9 the shells *F* with their guide slots *i* are of the same construction as in the preceding figures, but the stops for limiting the swinging movements of the shells *F* *F* are somewhat modified. The lower stops *f* are pieces soldered to the shells *F*; the upper stops are provided by extending the outer shell *C* rearwardly at *k* to be struck by the arms *g* when the head is tilted fully back.

Figs. 10 to 13 show a construction wherein the eye-balls are formed with vertical holes *l* through which pass pivot pins *m* for pivoting the eye-balls within the shells *F'* *F'*. In this construction these shells *F'* are reduced to mere rings except for the portion *j* constituting the eye-lid. To compel the two shells or rings to turn together they may be connected by a portion *b'* which may constitute an extension of the pivot pins *b*. The arms *g* are connected by a cross-bar *h* as in the previous constructions, and from this bar is hung the arm *c'* carrying the weight *d*. The arms *g* serve as stops to limit the closing movement of the eyes by striking projections *k* on the shell *C* and these projections are turned inwardly so as to be struck by the rear of the upper portion of the shell *F'* to limit the opening movement of the eye.

In Figs. 14 and 15 the eye-ball is partly cut away, leaving however the portion which is visible through the front opening *a* of the fixed shell *C*, and leaving sufficient for the engagement of the pivot pin *m* and arm *g*. The shell *F''* is cut away so as to leave only the portion forming the eye-lid *j* and the pivotal portions.

While for dolls it is ordinarily preferable to utilize gravity to give the respective movements to the eyes, yet these movements may be otherwise imparted, and especially for other figures than dolls it may be pref-

erable to impart these movements by other operative means. The frame carrying the eye-balls may or may not be formed with or carry the portions *j j* constituting the eye-lids. For some purposes it may be preferable to have the eye-lids independently mounted and moved.

The invention is applicable to the eyes of stuffed animals, and to various automatons or movable figures.

In this specification words indicating direction are used with reference to the upright or vertical position of the doll, unless the context indicates otherwise.

Attempts have heretofore been made to construct mechanical eyes for dolls so as to give them a lateral movement, but without practical success. Eyes have been made with the eye-balls mounted upon fixed vertical axes, and with separately movable eye-lids, two pendulums being provided, the one for operating the eye-lids to close the eyes, and the other for imparting the lateral movements to the eye-balls. In such construction the eye-balls remain immovable during the closing movement of the eyes. By the present invention the eye-balls participate in this closing movement.

What I claim is:—

1. In mechanical eyes, a supporting frame comprising spherical shells having eye openings, a frame pivoted thereto comprising spherical shells turning within the shells of said supporting frame, and a pair of laterally movable connected eye-balls carried within the spherical shells of said pivoted frame.

2. In mechanical eyes, a pivoted frame comprising spherical shells having horizontal slots, and eye-balls carried within said shells and having arms projecting out through said slots, and a connection between said arms.

3. In mechanical eyes, a pair of vertically and laterally movable eyeballs, a pivoted frame having shells partially inclosing said eyeballs, a bar connecting the eyeballs and capable of lateral movement, and a weight attached solely to and hung rigidly below said connecting bar, adapted to impart both vertical and lateral movements to the eye-balls.

4. In mechanical eyes, a pivoted frame, a pair of eyeballs carried by said frame, a bar pivotally connected to the eyeballs and capable of lateral movement, and a weight attached solely to and hung rigidly below said bar, adapted to impart vertical movement to the pivoted frame and lateral movement to the eyeballs.

5. In mechanical eyes, a pivoted frame, a pair of laterally movable eyeballs pivoted in said frame, rearwardly extending arms rigidly attached to the eyeballs, a transverse bar pivotally connecting the said arms, in

mbination with a weight attached directly to the bar, and adapted to rotate vertically on a pivoted frame and impart lateral movement to the bar.

6. In mechanical eyes, a supporting frame comprising spherical shells having eye openings and a cross-bar connecting said shells, frame pivoted thereto comprising spherical shells turning within the shells of said supporting frame, and a pair of connected laterally-movable eyeballs carried within the spherical shells of said pivoted frame.

7. In mechanical eyes, a pair of laterally movable eyeballs, a transverse bar pivotally connecting the rear of the eyeballs, and a pivoted frame comprising spherical shells receiving said eyeballs.

8. In mechanical eyes, a pair of laterally movable connected eyeballs, a pivoted frame carrying them and formed with eyelids, the eyeballs having rearwardly extending arms and a bar pivotally connecting the said arms.

9. In mechanical eyes, a pair of laterally movable eyeballs, a bar pivotally connecting the rear of the eyeballs, and spherical shells

receiving said eyeballs in which the eyeballs may freely turn.

10. In mechanical eyes, a pair of laterally movable eyeballs, rearwardly projecting arms attached to the eyeballs, spherical shells in which the eyeballs may freely turn, and slots in said shells in which the rearwardly projecting arms move.

11. In mechanical eyes for life-imitating heads, a supporting frame fixed in the side of the head and comprising a pair of hemispherical shells having eye openings, a cross-bar connecting said shells, a frame pivoted thereto and comprising a pair of spherical shells adapted to serve as eyelids, and a pair of laterally-connected eyeballs movable in said latter shells.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

PAUL CHARLES JACQUEROD.

Witnesses:

ARTHUR C. FRASER,
FRED WHITE.