J. M. DAVIDSON.

EYE OPERATING MECHANISM FOR DOLLS.

APPLICATION FILED OCT. 3, 1917.

1,289,687.

Patented Dec. 31, 1918.

3 SHEETS—SHEET 1.

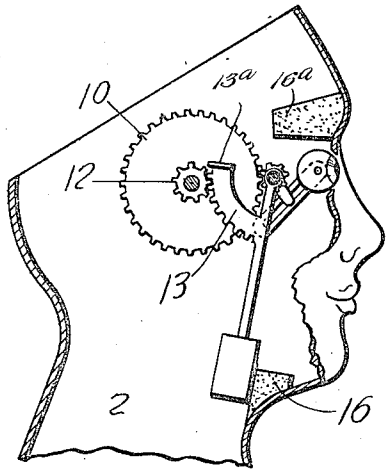


Fig. 1.

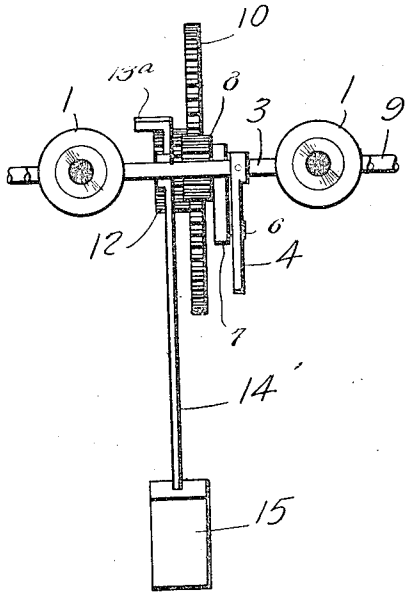


Fig. 2.

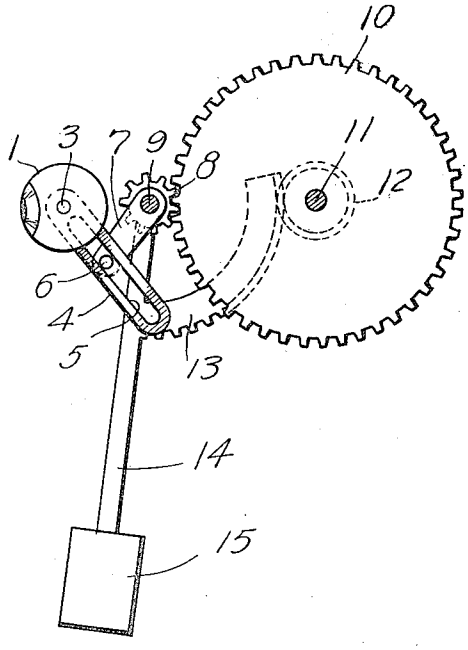


Fig. 3.

Witnesses

J. M. Lyles

Inventor

JOHN M. DAVIDSON,

By Munn Co

Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 4.

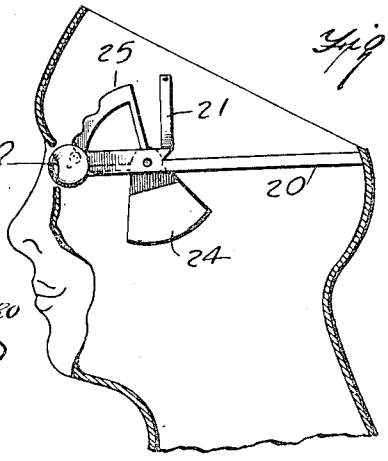


Fig. 8a

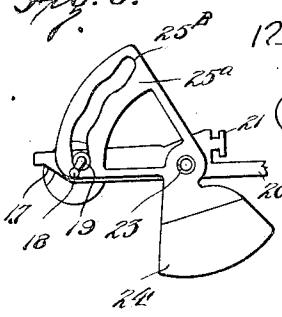


Fig. 5.

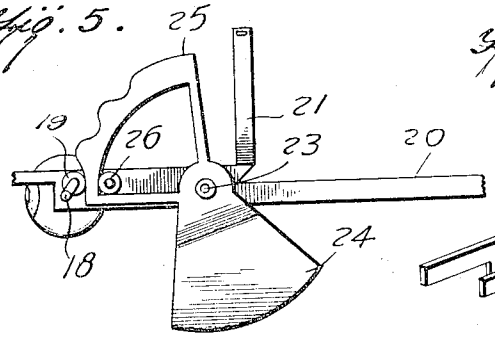


Fig. 6.

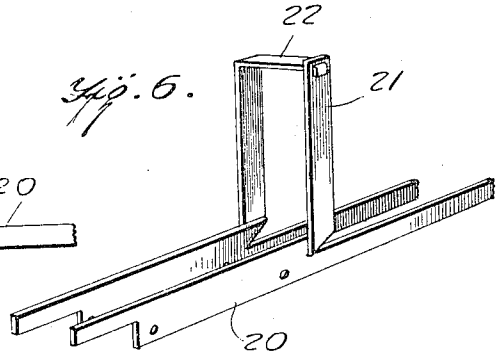


Fig. 7.

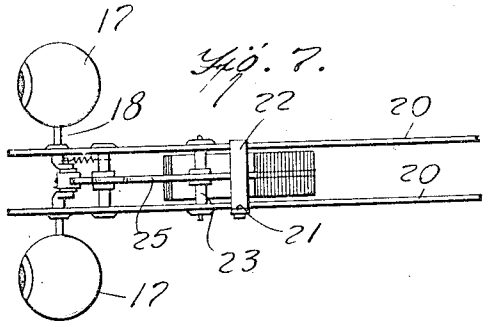
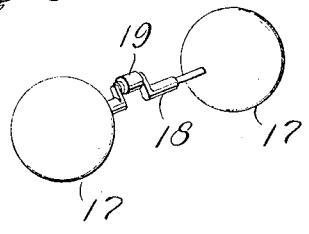


Fig. 8.



WITNESSES

John K. Phillips Jr.

INVENTOR

JOHN M DAVIDSON,

BY Munn & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. M. DAVIDSON.

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3 SHEETS—SHEET 3.

Fig. 9.

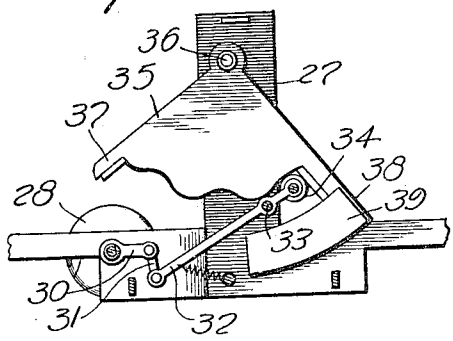


Fig. 10.

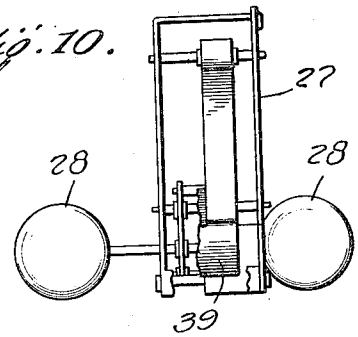


Fig. 11.

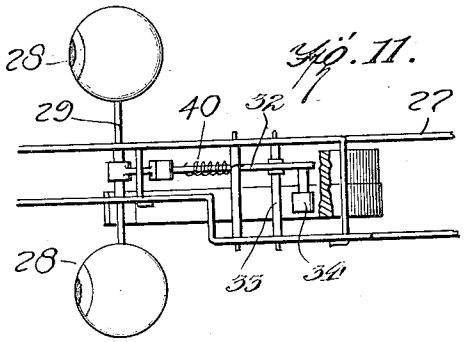


Fig. 12.

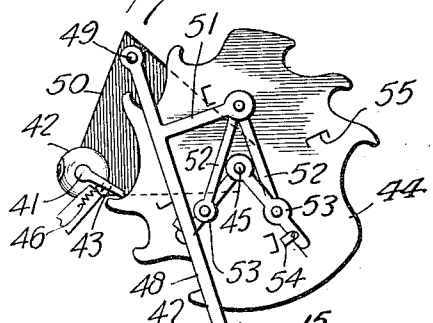


Fig. 13.

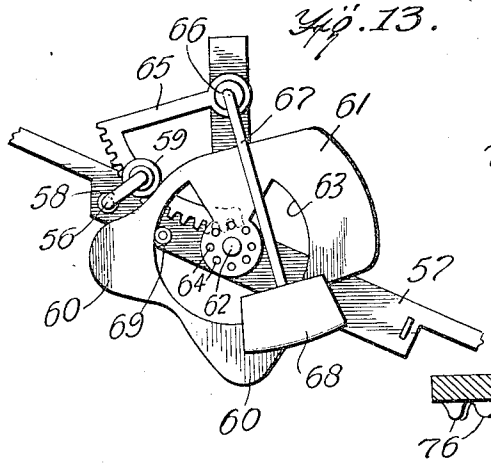


Fig. 14.

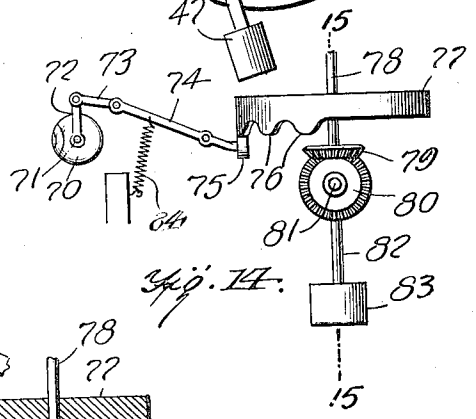
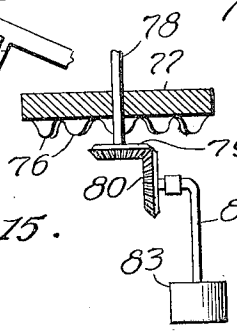


Fig. 15.



WITNESSES

John F. Phillips Jr.

INVENTOR

JOHN M. DAVIDSON,

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN MITCHELL DAVIDSON, OF XENIA, OHIO.

EYE-OPERATING MECHANISM FOR DOLLS.

1,289,687. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed October 3, 1917. Serial No. 194,487.

To all whom it may concern:

Be it known that I, JOHN M. DAVIDSON, a citizen of the United States, and a resident of Xenia, in the county of Greene and State of Ohio, have invented certain new and useful Improvements in Eye-Operating Mechanism for Dolls, of which the following is a specification.

My invention is an improvement in eye operating mechanism for dolls, and has for its object to provide mechanism in connection with the eyes of dolls for causing the said eyes to blink when the doll is moved from an upright to recumbent position, or from recumbent to upright position.

In the drawings:

Figure 1 is a sectional view of the doll provided with my improved eye operating mechanism;

Fig. 2 is a front view of the operating mechanism, with the eyes attached;

Fig. 3 is a side view of the same;

Fig. 4 is a side view of a doll head showing another embodiment of the invention, the head being in section;

Fig. 5 is a similar view of the mechanism removed;

Fig. 6 is a perspective view of the supporting bracket for the mechanism;

Fig. 7 is a top plan view;

Fig. 8 is a perspective view of the eyes and their support;

Fig. 8^{A} is a modification of the mechanism shown in Figs. 4 to 8, whereby the spring which is necessary in the structure illustrated in said figures may be dispensed with;

Fig. 9 is a side view of another embodiment of the invention, with parts in section;

Fig. 10 is a rear view of the same;

Fig. 11 is a bottom plan view;

Figs. 12, 13 and 14 are side views of other embodiments of the invention;

Fig. 15 is a section on the line 15—15 of Fig. 14, looking in the direction of the arrows adjacent to the line.

In the embodiment of the invention shown in Figs. 1 to 3, the eyes 1 of the doll 2 are mounted on a shaft 3 which is journaled in the head, the shaft 3 being at the centers of the spherical eyes. A longitudinally slotted arm 4 is rigid with the shaft between the eyes, and the slot 5 of the arm is engaged by a pin 6 on a crank arm 7 secured to a pinion 8, which is journaled on a shaft 9 arranged in rear of the shaft 3. This pinion meshes with a gear wheel 10 journaled on the shaft 11 in rear of the shaft 8, and a pinion 12 is secured to the gear wheel 10 coaxial therewith. This pinion meshes with the teeth of an arc-shaped rack bar 13 which extends outwardly and upwardly from an arm 14 journaled at its upper end on the shaft 9, and provided at its lower end with a weight 15. The weight 15, when the doll is in upright position, occupies the position of Fig. 1, resting against a buffer stop 16 within the head.

When the doll is moved from upright to recumbent position, the weight 15 will swing the arm 14 and the rack bar 13 will rotate the pinion 12 and the gear wheel 10. The gear wheel, because of its engagement with the pinion 8, will rotate the said pinion, causing also the arm 7 to move the slotted arm 4. The pin 6 moves in the slot, and as the arm 7 is rotated about the shaft 9 the eyes 1 will swing with the shaft 3 to simulate blinking of the eyes. It is to be understood that the shaft 9 is suitably journaled and that it terminates at the arm 7, so as to allow the arm 4 to oscillate without interference. Because of the larger size of the gear wheel, the pinion 8 will move much faster and the shaft 3 may be completely rotated as many times for each complete rotation of the shaft 11 as may be desired, the ratio depending upon the relative proportion of the gear wheel and pinion. In the present construction, the parts are arranged to cause the doll to blink twice during the movement from upright to recumbent position, or from recumbent to upright position. The buffer stop 16 is so placed that the motion of the eyes will be stopped with the pupils in proper position with respect to the face. The end of the rack 13 is provided with a flattened portion 13^{a} adapted to engage a cushioned stop 16^{a} and arrest the parts with the pupils of the eyes out of sight when the doll is in a recumbent position.

In the embodiment of the invention shown in Figs. 4 to 8 the eyes 17 are secured to the ends of a crank shaft 18, and a roller 19 is journaled on the shaft. This shaft is journaled between two parallel bars 20, with

the eyes outside of the bars, and each bar at its rear end is slit longitudinally, and a portion 21 thereof is bent up perpendicularly to the bar. One of these portions has an extension 22 which is connected with the other portion, as shown, extending across the space between the portions.

A counter-weight supporting shaft 23 is journaled between the bars in rear of the crank shaft, and upon this shaft 23 is mounted a counter-weight 24 and a species of segmental rack bar 25. It will be noticed that the teeth of the rack bar are rounded, and these teeth engage the roller 19, the roller being pressed toward the rack by a spring 19^a seen in Fig. 7. It will be obvious that when the doll is moved from upright to reclining position, or the reverse, the crank shaft will be oscillated to give the blinking effect of the eyes.

A stop 26 is arranged between the bars, the said stop engaging within the segment to limit the swinging movement of the counter-weight and segment.

In the modification shown in Fig. 8^A the serrated rack 25 is displaced by the segment 25^A, which has an undulating slot 25^B. The undulating margins of the slot form in fact a pair of racks having opposing complementary serrations. As the roller 19 is moved in both directions by the undulations of this slot no spring is necessary. This insures a very easy and smooth movement of the eyes, particularly if they are well balanced. The stop 26 is also unnecessary as the movement of the eyes is limited by the roller 19, the ends of the slot acting as stops. It will be noted that the ends of the slot 25^B carry the roller farther than do the intermediate undulations. This is so that the eyes will be entirely open or entirely closed at the end, while in their intermediate movements they only partially open and close. The blinking of the eyes is thus made to appear more natural. It is evident that this effect may be obtained in the structure shown in Figs. 4 and 5. In fact, it may be obtained in other of the structures shown in this application.

In the embodiment of the invention shown in Figs. 9, 10 and 11, a suitable supporting frame 27 is provided, the said frame consisting of a horizontal and a vertical portion. The eyes 28 are secured to a shaft 29 journaled in the frame, and the shaft has a crank arm 30 extending rearwardly and connected by a link 31 with a lever 32 which is pivoted at 33 to the frame. The rear end of the lever has a laterally extending roller 34, and this roller is adapted to engage the rounded teeth of a quadrantal plate 35 which is pivoted to the frame at 36. At each end of the teeth the plate has an extension 37 and 38, which, at their tops, limit the swinging movement of the segment under the influence of the counter-weight 39 which is secured to the extension 38.

A coil spring 40 acts normally to draw and hold the lever in the normal position of Fig. 9. When the doll is moved from erect to reclining position or from reclining to erect position the segmental plate 35 will be swung and the teeth will vibrate the lever which, in turn, will oscillate the shaft to give a blinking effect.

In the embodiment of the invention shown in Fig. 12, the shaft 41 upon which the eyes 42 are mounted has a radial arm 43, and this arm is adapted to be engaged by the teeth of a disk-like plate 44 mounted to rotate on a shaft 45. A coil spring 46 holds the arm in engagement with the teeth, and the controlling counter-weight 47 is secured to the free end of the lever 48 having its other end pivoted at 49 to the frame 50. This lever has a lateral arm 51, and the arm is connected by links 52 with pawl carriers 53 which are pivoted on the shaft 45 before mentioned. The pawls 54 of the pawl carriers are adapted to engage teeth 55 on the face of the plate. When the lever swings in one direction under the influence of the counter-weight the pawl carriers will be moved in opposite directions one advancing the plate while the other is retracted to obtain a new hold.

In Fig. 13 the eyes are secured to a shaft 56 which is journaled in the frame 57. This shaft has a crank 58 carrying a roller 59 and the roller is adapted to be engaged by teeth 60 of a wheel or plate 61 mounted to rotate on the shaft 62 also journaled in the frame. The roller is kept in engagement with the wheel 61 by a spring (not shown) wrapped around the shaft 56, one end of the spring being anchored to the frame 57 and the other to the wheel. About the center the plate 61 is cut away for approximately two hundred eighty degrees, as indicated at 63, and that portion left at the center has an annular series of laterally extending teeth 64. These teeth are adapted to be engaged by the teeth of a segment 65, which is journaled at 66 on the frame. A lever 67 is rigid with the segment, and the lever carries a counter-weight 68 at its free end. A stop roller 69 is mounted on the frame within the opening 63, and by its engagement with the ends of the opening limits the swinging movement of the plate 61. With this construction, when the weight swings, the plate 61 will be oscillated and the eyes will be moved to simulate blinking.

In the embodiment of the invention shown in Figs. 14 and 15, the eyes 70 are secured to a shaft 71 having a radial arm 72. This arm is connected by a link 73 with one end of a lever 74 pivoted to the frame (not shown) intermediate its ends, and having

at the other end a roller 75 which engages depending teeth 76 on a disk 77 secured to a shaft 78. This shaft has a toothed gear 79 at its lower end, which is engaged by a toothed gear 80, and a shaft 81 having a radial arm 82 to which the counterweight 83 is secured. A coil spring 84 acts normally to hold the lever in normal position.

In the operation of the above described construction, the swinging of the weight will oscillate the shaft and the swinging of the lever 74 by the teeth will rapidly oscillate the shaft 71.

I claim:

1. In a doll, eye operating mechanism, comprising a shaft journaled in the head and secured to the eyes at the axes thereof, and means for oscillating the shaft to cause the eyes to simulate blinking when the doll is moved from recumbent to upright or from upright to recumbent position.

2. In a doll, eye operating mechanism comprising a shaft to which the eyes are secured, and means for oscillating the shaft to cause the eyes to simulate blinking when the doll is moved from upright to recumbent position or from recumbent to upright position, said means comprising a toothed segment pivoted in rear of the shaft and carrying a counter-weight, the shaft having a crank intermediate its ends engaging the teeth, said crank carrying a roller for engaging the teeth, and a stop for limiting the movement of the segment.

3. In a doll, eye operating mechanism comprising a shaft to which the eyes are secured, and means for oscillating the shaft to cause the eyes to simulate blinking when the doll is moved from upright to recumbent position or from recumbent to upright position, said means comprising a toothed segment pivoted in rear of the shaft and carrying a counter-weight, the shaft having a crank intermediate its ends engaging the teeth.

4. In a doll, eye operating mechanism, comprising a movable member and means for imparting a plurality of reciprocal movements thereto while the doll is moved from an erect to a recumbent position, or vice versa.

5. In a doll, eye operating mechanism, comprising a movable member, means for imparting a plurality of reciprocal movements thereto while the doll is moved from an erect to a recumbent position, or vice versa, and means for terminating said movement when the member has last moved in a given direction and the doll is in a recumbent position, and for terminating it when the member has last moved in the opposite direction and the doll is in an erect position.

6. In a doll, eye operating mechanism, comprising a movable member, means for imparting a plurality of reciprocal movements thereto while the doll is moved from an erect to a recumbent position, or vice versa, means for terminating said movement when the member has last moved in a given direction and the doll is in a recumbent position, and for terminating it when the member has last moved in the opposite direction and the doll is in an erect position, and means for amplifying said terminal movements.

7. In a doll, eye operating mechanism, comprising a movable member, an operating element having a to and fro movement, and means for imparting a plurality of reciprocal movements to said member by a movement of said element either to or fro.

8. In a doll, eye operating mechanism comprising a shaft to which the eyes are secured, a crank on said shaft, a toothed segment pivotally mounted so that as the segment rocks to and fro the teeth thereon reciprocate the crank and oscillate the shaft; means for limiting the movement of the segment so that at one extremity thereof the crank will be in engagement with a tooth and at the other extremity of said movement the crank will lie in a depression, said tooth being more prominent and said depression more pronounced than the intermediate teeth and depressions.

JOHN MITCHELL DAVIDSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."