Jan. 3, 1967 R. GARDEL ETAL 3,295,253

DOLL WITH HEAD AND EYE ANIMATING MECHANISM

Original Filed June 17, 1964 3 Sheets-Sheet 1

Fig. 1

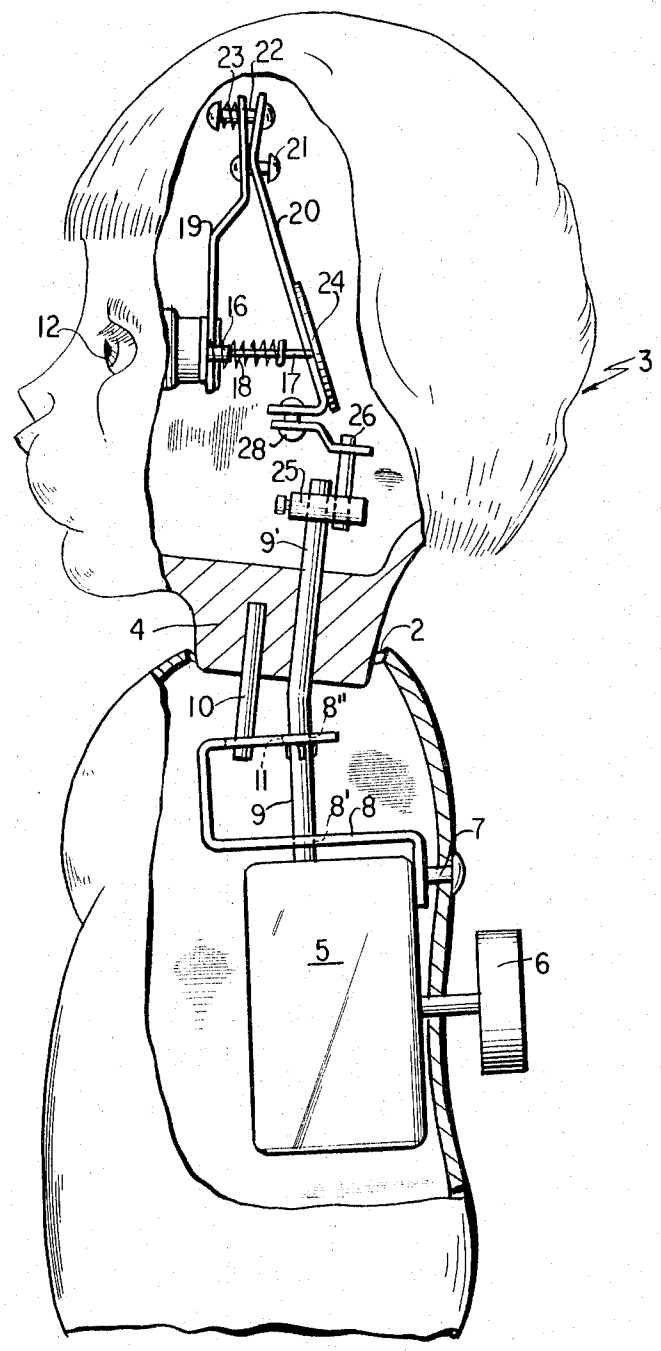

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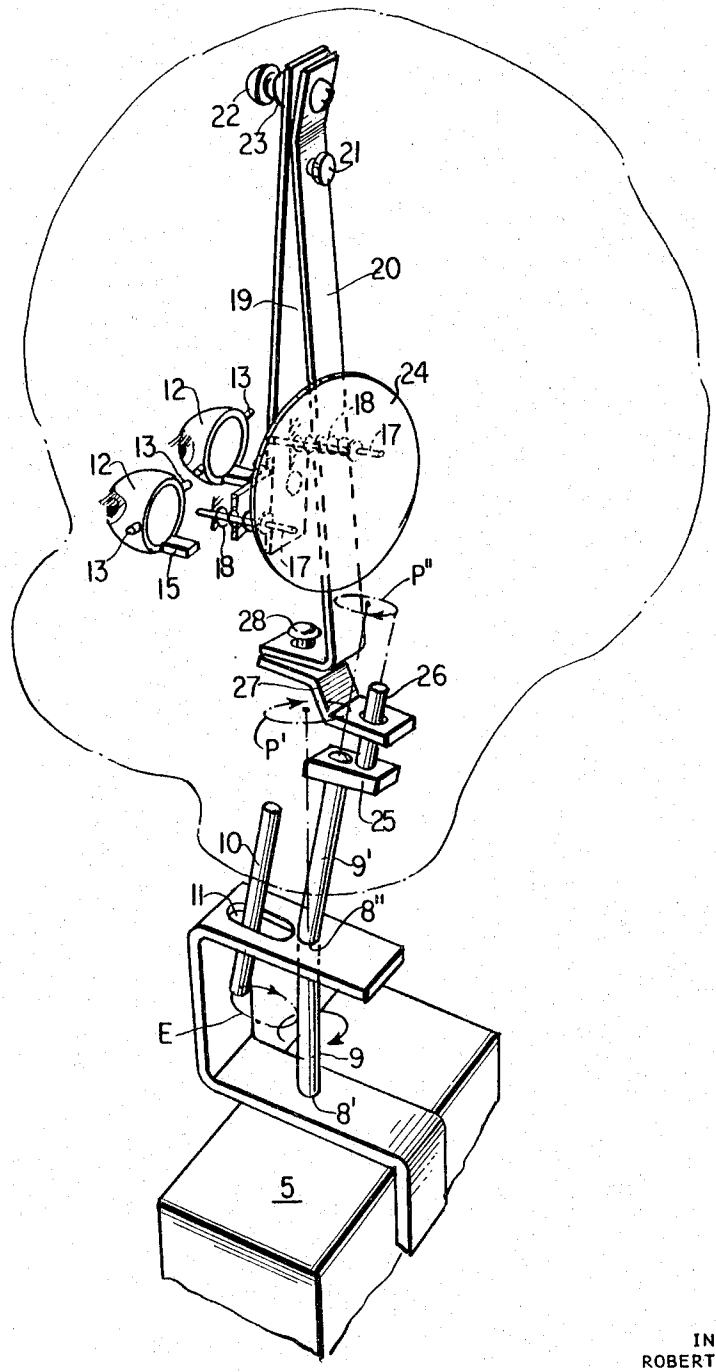
Fig. 2



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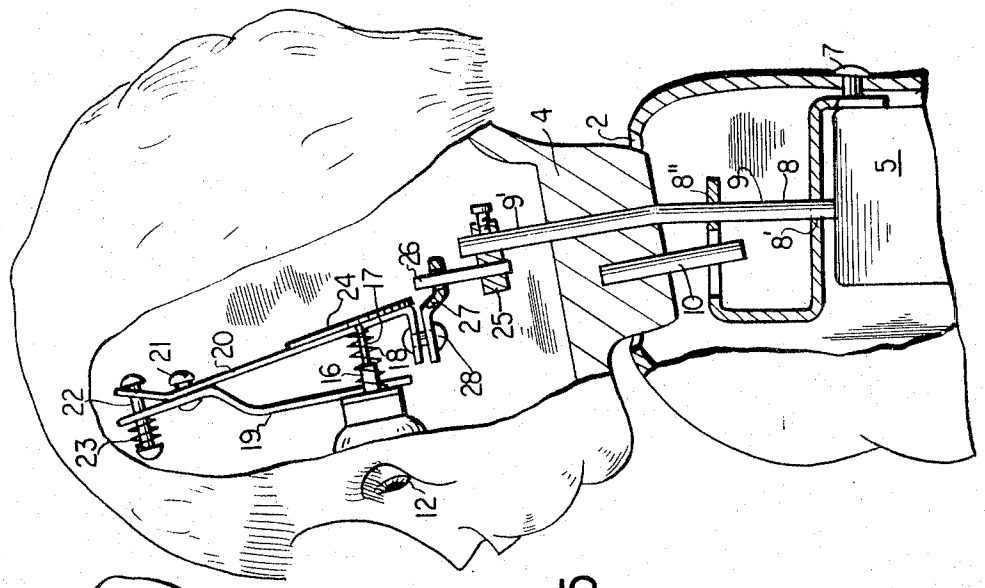

Fig.5

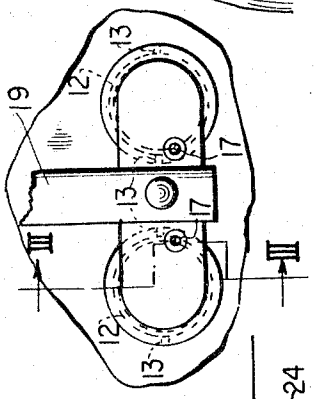

Fig.4

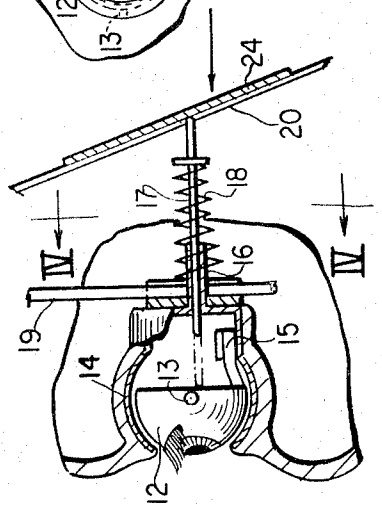

Fig.3

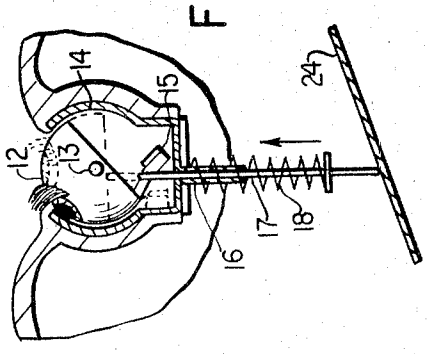

Fig.6

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3,295,253

DOLL WITH HEAD AND EYE ANIMATING MECHANISM

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Original application June 17, 1964, Ser. No. 375,803, now Patent No. 3,230,666, dated Jan. 25, 1966. Divided and this application Oct. 20, 1965, Ser. No. 508,887
3 Claims. (Cl. 46—135)

This application is a division of our co-pending application Ser. No. 375,803, filed June 17, 1964, entitled "Doll Animating Mechanism," now Patent No. 3,230,666.

This invention relates to a doll animating mechanism and particularly to a mechanism for imparting motion to the head and eyes of a doll.

An object of the invention is to provide an adaptation of the mechanism shown in Katz Patent No. 3,029,552, April 17, 1962, to a doll having a molded plastic body and a molded plastic head associated therewith.

A further object is to provide means whereby the eyes of the doll, which close in a normal manner when the doll is in a reclining position, can be opened intermittently as the mechanism moves the head to different positions.

Another object is to provide certain improvements in the form, construction, arrangement and material of the several elements whereby the above named and other objects may effectively be attained.

In Patent No. 3,029,552, cited above, the head moving mechanism is shown as being installed in a doll body which is soft and filled with stuffing, the head being securely tied in the neck opening of the body so that it can be given a rotary rocking motion without being free to rotate with respect to the body. When the body and head are both of relatively stiff molded plastic it is necessary to provide different means for restricting the rotation of the head, and the means shown herein operates very satisfactorily.

A practical embodiment of the invention is shown in the accompanying drawings, wherein:

FIG. 1 represents a left side elevation of the mechanism installed in a doll, parts of which are cut away to show the mechanism and parts being shown in section;

FIG. 2 represents a detail perspective view of the mechanism, including indications of the paths followed by certain moving parts;

FIG. 3 represents a detail vertical section through one of the eyes, with the doll in erect position and the eye open, the section being taken on the line III—III of FIG. 4;

FIG. 4 represents a deail vertical section taken on the line IV—IV of FIG. 3;

FIG. 5 represents a left side elevation similar to FIG. 1 but with the drive shaft turned 180°, to its forward position, and

FIG. 6 represents a detail vertical section through an eye with the doll in reclining position, the eye being normally closed and means for opening it being shown.

Referring to the drawings, the doll is shown as having a molded plastic body 1 provided with a neck opening 2. The head 3 is also molded plastic, being hollow and provided with a neck portion 4 which fits in the opening 2 with sufficient clearance to permit movement as described below. A spring motor 5, designed to be wound up by means of the knob 6 projecting from the back of the body, is fixed to the body, as by means of a rivet 7 or the like which may also hold in place an angular bracket 8. A drive shaft 9 projects upwardly

from the motor 5 and passes through openings in the lower horizontal part of the bracket 8 and in the upper horizontal part of said bracket, as indicated at 8′ and 8″.

A short distance above the upper horizontal part of the bracket, the drive shaft 9 is bent slightly so that its upper portion 9′ constitutes an angularly offset shaft extension on which the neck portion 4 of the head is rotatably mounted. Rotation of the head with respect to the body is restricted by the provision of a pin 10 fixed in the neck portion 4 a short distance in front of the drive shaft 9 and projecting downwardly into a slot 11 in the upper horizontal part of the bracket. The parts just described make possible the rotary rocking motion of the head according to the principle illustrated in the above cited Patent No. 3,029,552, the axis of the extension 9′ following a path indicated by the dotted circle P′ in FIG. 2 and the bottom of the pin 10 following a substantially elliptical path between the upper and lower horizontal parts of the bracket 9 indicated by the line E in FIG. 2, while the head as a whole is restrained from rotation with respect to the body by the engagement of the pin 10 in the slot 11.

In the conventional eye mechanism shown in FIGS. 3, 4 and 6, hemispherical eye element 12 is supported at opposite points 13, 13 for rotation in the partially spherical socket 14 around a horizontal axis. A weight 15 is connected to the lower rear part of the eye element so that the eye is normally held in the open position shown in FIG. 3 when the doll is more or less erect. When the doll is moved to a reclining position the weight 15 normally causes the eye to close, as shown in FIG. 6. The mechanism shown herein includes means for causing the normally closed eyes to open and close again, intermittently, as the doll's head is slowly moved in its rotary rocking course.

Back of each eye element there is provided a tubular bearing 16, the bore of which is aligned with a part of the eye element slightly below the axis thereof. A small rod 17 is slidably carried in each bearing 16 and is designed to be urged away from the eye element, as by a spring 18. A mounting strip 19 is fixed to the head, conveniently at a point between the eye sockets, and extends upward in the head, while a second strip 20 is loosely connected to the strip 19 as by a loose river 21 at a point below the tops of said strips. A short double headed shaft 22 passes loosely through the spaced upper ends of the strips 19 and 20, one end of said shaft being provided with a spring 23 so located as to pull the upper ends of the strips toward each other, thus tending to urge the lower part of the strip 20 in a direction away from the front of the head. The strip 20 is provided with a flat plate 24 which is wide enough and so located as to bear against the rear ends of the rods 17 when it is moved forward.

A driving connection between the drive shaft 9 and the eye opening mechanism just described includes a small block 25 fixed to the upper end of the shaft extension 9′, an eccentrically projecting stub shaft 26 fixed in the block 25, link 27 loosely engaging the shaft 26, and a loose rivet 28 connecting the link 27 to the lower end of the strip 20.

In the operation of this mechanism, caused by the rotation of shaft 9, the stub shaft 26 follows a circular path indicated by the line P″. This motion of the shaft 26 is communicated through the link 27 to the strip 20 which is thus moved toward and away from the front of the doll head. When the strip 20 is moved toward the front, the plate 24 pushes the small rods 17 forward, compressing the springs 18 and bringing the front ends of the rods 17 into a position such that the eyes, if closed, will be caused to open. If the eyes are already open, as shown in FIG. 3, the rods 17 have no effect.

If the doll is reclining so that the eyes are closed, as shown in FIG. 6, the forward motion of the rods **17** causes the eye elements to rotate to the open position, as indicated by the dotted lines in FIG. 6.

Since the head and eye motions described above are naturally associated with the acts of a sleepy baby, it is appropriate to include in the motor unit a music box which may play an appropriate tune such as a lullaby. The total effect of pleasant music, rotary rocking motion of the head and opening and closing of eyes (when the doll is reclining) is unusual and very appealing.

It will be apparent that variations in the mechanical parts can readily be made, as by substituting levers of one class for those of another class, pulling the eyes open instead of pushing them open, varying the positions of the pin **10** and slot **11**, etc., while still obtaining the same desired result in a similar manner. By locating the rods **17** slightly higher—above the axes of the eyes—the eyes can be caused to close intermittently from their normally open position, as when the doll is sitting up or standing. It may also be noted that the eye operating mechanism can be installed in the soft bodied doll of the cited Katz patent, where the parts **8**, **10** and **11** are not needed, while the head moving mechanism (including said parts) can be used advantageously in a molded plastic doll even without providing for the opening of the eyes. It is most desirable, however, to provide both the rotary rocking motion of the head and the slow intermittent opening and closing of the eyes.

It will be understood that various changes may be made in the form, construction and arrangement of the several parts without departing from the spirit and scope of the invention, and hence we do not intend to be limited to the details shown or described herein except as the same are included in the claims or may be required by disclosures of the prior art.

What we claim is:

1. In combination with a doll having a body and a head which is movable with respect to said body and is provided with gravity-closable eyes, a motor fixed within said body, a drive shaft extending vertically from the motor into the head and adapted to be driven by the motor, part of said drive shaft being angularly offset from the axis of rotation of the shaft and said offset part of the shaft being journaled in a part of the head, means for limiting the rotation of the head with respect to the body, means operatively connected to the offset part of the shaft for intermittently causing the eyes to open from a normally closed position, said eye-

opening means including a part which is movable into contact with a gravity-closed eye element with force sufficient to overcome the effect of gravity on said element, a plate mounted in the head for movement toward and away from the eyes, and a crank connection between the offset part of the drive shaft and said plate for causing said movement, the plate being arranged to actuate the movable eye-contacting part.

2. In combination with a doll having a body and a head which is movable with respect to said body and is provided with a gravity actuated eye element, a motor fixed within said body, a drive shaft extending from the motor into the head and adapted to be driven by the motor, part of said drive shaft being angularly offset from the axis of rotation of the shaft and said offset part of the shaft being journaled in a part of the head thereby to effect relative movement between the head and body upon rotation of the shaft, means operatively connected to the offset part of the shaft for intermittently causing movement of the eye element, said means comprising a reciprocable part which is operable to actuate said eye element, a member mounted in the head for movement toward and away from the eye element and arranged to effect actuation of the reciprocable part, and driving connection means between the offset shaft and said member for causing the aforesaid movement of said member thereby to move said eye element with a force sufficient to overcome the effect of gravity on said eye element.

3. The combination according to claim **2** further comprising means pivotally mounting said member within the head of the doll, said driving connection means pivoting said member about said mounting means.

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