

Jan. 17, 1967

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3,298,129

ANIMATED CRYING DOLL

Filed Feb. 26, 1962

2 Sheets-Sheet 1

FIG. 1.

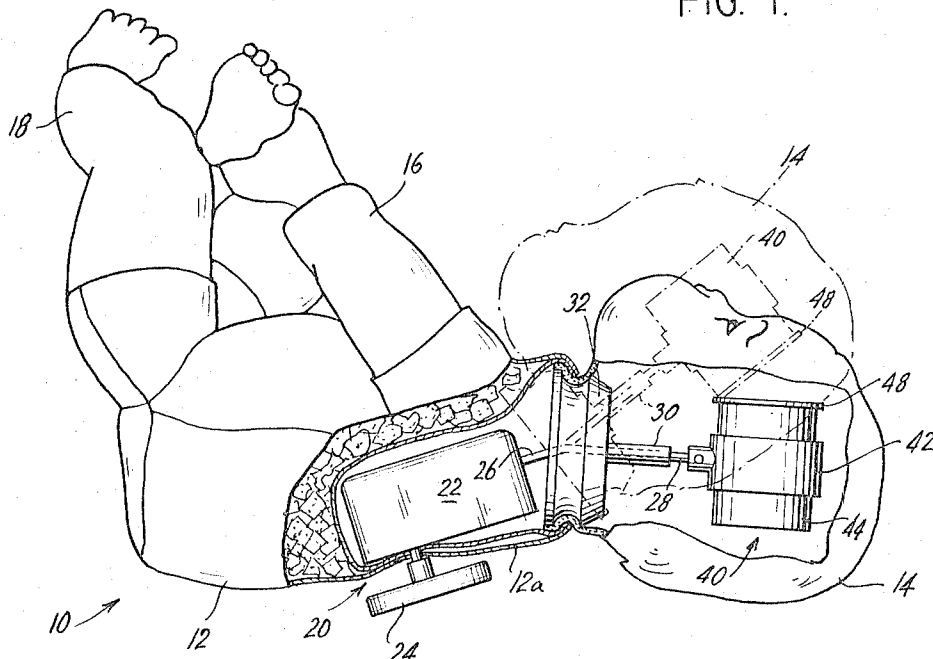
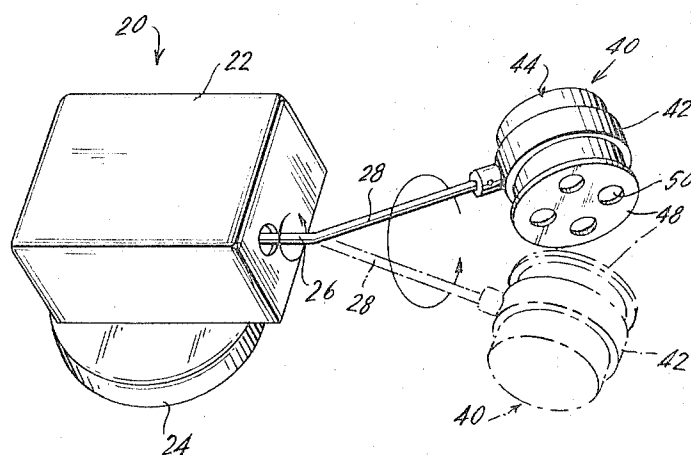


FIG. 2.



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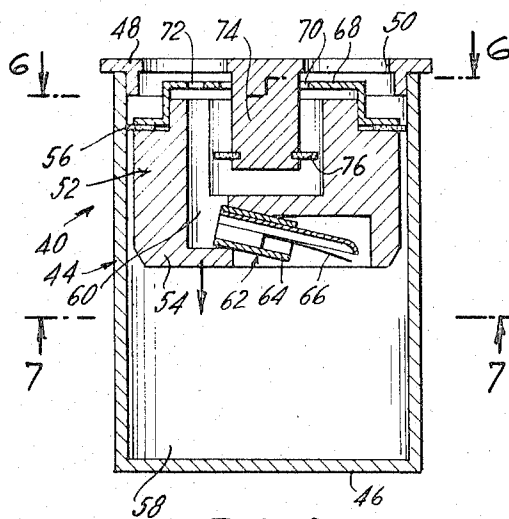


FIG. 3.

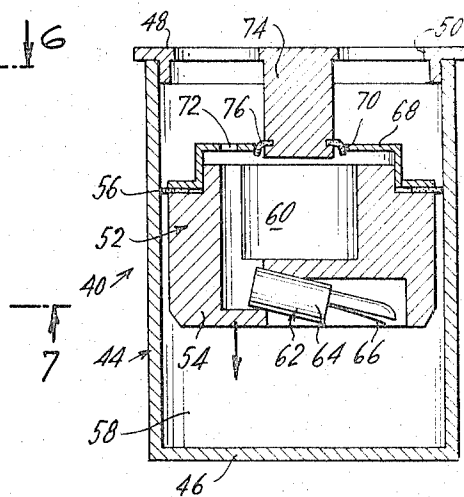


FIG. 4.

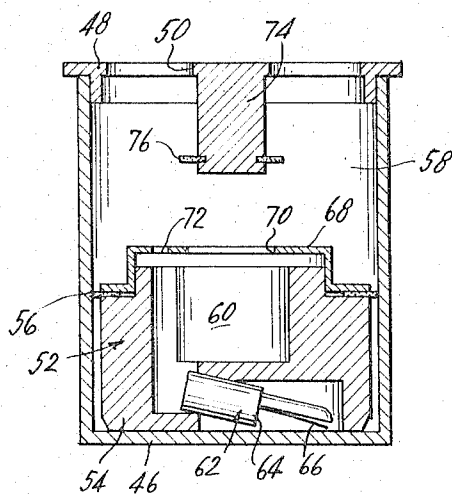


FIG. 5.

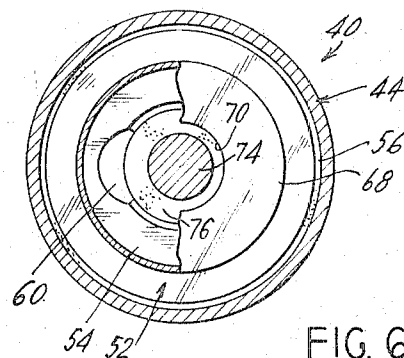


FIG. 6.

FIG. 7.

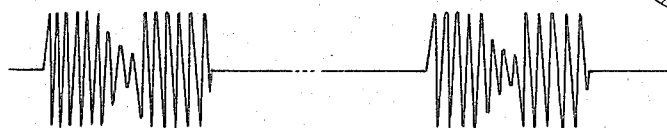
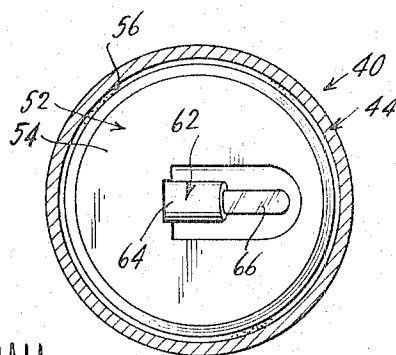


FIG. 8.

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ANIMATED CRYING DOLL

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5 Claims. (Cl. 46-118)

This application is a continuation-in-part of application Serial No. 120,144 filed on June 23, 1961, and entitled "Animated Doll," now U.S. Patent No. 3,029,552 of April 17, 1962.

The present invention relates generally to dolls and in particular to an animated crying doll which is adapted to simulate a relatively young infant.

A wide variety of mechanisms have been employed and/or suggested for imparting animation to the head, body and limbs of a doll. Such mechanisms are usually relatively complicated, require the provision of specially constructed components for the doll, and produce a periodically repetitive sequence of movements which after a short period of use become relatively well known to the child, thereby detracting from the play value of the doll. There exists the need for a doll which simulates the movement of an infant or newborn baby, embodies relatively simple mechanisms for attaining animation, enables the employment of essentially conventional components and/or techniques for the manufacture of the doll, and produces a random motion which is virtually non-repetitive and thereby has the capacity for maintaining the interest of the child over prolonged periods of play. This need has substantially been met by the invention described and claimed in the aforementioned patent. Further, there exists a need for such a doll simulating the movement of an infant or newborn baby which doll incorporates the crying sound normally associated with such an infant. It is known in the doll industry to provide a crying mechanism to produce a "ma-ma" sound in response to tilting movement of the doll. It is within the contemplation of the present invention to provide a doll incorporating the advantageous features of animation and further including the provision of means to provide crying sounds as the doll performs its animated function. Specifically, it is within the contemplation of the present invention to provide an animated doll having a non-repetitive movement, including relative motion of the head, torso and limbs thereby imparting life-like characteristics to the doll and further including sound producing means to simulate the sounds of an infant in response to the non-repetitive movement of the doll.

In accordance with an illustrative embodiment demonstrating objects and features of the present invention, there is provided an animated doll which comprises a doll's body having limbs hingedly connected thereto, a head movably mounted on the doll body for complex motion, and actuating means within the doll body for imparting this complex motion to the head to animate the doll body and hingedly connected limbs. In combination with the foregoing, there is provided a crying mechanism which is operatively connected to the actuating means such that the crying mechanism is stimulated in response to relative motion between the doll body and the doll head.

In accordance with the present illustrative embodiment, the actuating means include a motor having a drive shaft which terminates at an angularly offset shaft extension projecting into the head of the doll from the doll body. The shaft extension serves as the generatrix of a conical surface about which a central axis of the head moves in response to rotation of the drive shaft. Provision is made within the doll head for coupling the shaft extension to the head along the central axis of the head such that the

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motion of the doll head in rotation and flexion will cause movement of the doll body and of the hingedly connected limbs both in relation to each other and to a supporting surface thereby imparting a continually varying animation to the doll.

The crying mechanism, according to the presently preferred embodiment, includes a housing which is mounted on the shaft extension, a piston slidably mounted within the housing and cooperating therewith in a starting position to define an air chamber, and sounding means for emitting a crying sound in response to the movement of the piston, under the influence of gravity, through an actuating stroke which is effective to decrease the volume of said air chamber.

As a feature of the invention, the animation of the doll may be enhanced by the provision of a further shaft which extends substantially at right angles to the drive shaft and projects from the back of the doll body. A disc-like member, which may serve for winding if a spring-type drive is employed, is operatively connected to the further shaft and at least partially serves as a rotatable pedestal support for the doll body when the doll is placed on its back. The rotation of the pedestal support coacts with the complex motion of the head to contribute to the animation of the doll.

Advantageously, the doll body may be fabricated from a body-forming skin having a yieldable stuffing at least partially filling the same such that the body will have a soft and cuddly feeling to the child. Further, the limbs preferably include molded semi-rigid extremities which are connected to the doll body proper by stuffed extensions of the body such that the limbs are loosely and hingedly jointed and readily respond to the complex motion of the head which may be enhanced by the rotation of the pedestal support in contact with the supporting surfaces underlying the doll.

The above brief description, as well as further objects, features, and advantages of the present invention will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment in accordance with the present invention, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an elevational view, with parts broken away and in section, of an animated doll embodying features of the present invention;

FIG. 2 is a perspective view of the actuating mechanism incorporated in the doll according to the present invention illustrating in full line the position of the shaft extension and crying mechanism in a starting position before a sound is emitted and, in dotted line configuration, the position of the shaft extension and crying mechanism after the emission of a sound;

FIGS. 3, 4 and 5 are axial sectional views of the crying mechanism showing the various components thereof in FIG. 3 in a starting position, in FIG. 4 in an intermediate position wherein the sound produced by the mechanism is interrupted to produce the "ma-ma" effect and, in FIG. 5 in the final position after a sound has been emitted;

FIG. 6 is a sectional view taken along the line 6-6 of FIG. 3 looking in the direction of the arrows;

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 3 looking in the direction of the arrows; and,

FIG. 8 is a diagrammatical illustration of the variations in the amplitude of sound produced by the crying mechanism which variations serve to simulate the "ma-ma" cry of a baby.

Referring now specifically to the drawings, there is shown in FIG. 1 a doll, generally designated by the numeral 10 which includes a body 12 having attached thereto a head 14 mounted on the body for relatively complex

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motion including components of rotation and flexion. A pair of arms 16 are hingedly connected to the body 12 as are a pair of legs 18. The general constructions of the head, body and limbs of the doll 10 are more fully described in the aforementioned patent. It is sufficient for the purposes of the present description simply to note that the limbs 16, 18 are connected to the body 12 by appropriate hinge means, preferably including the fabric construction of the body 12 and limbs 16, 18 themselves, and that a flexible joining is made between the head 14 and the body 12 such that the head may be rotated and flexed with respect to the body 12 by the actuation means described below.

The actuation mechanism 20 is contained within a housing 22 which is mounted within the body 12 of the doll 10 as shown in FIG. 1. Motor means, comprising a spring motor or other drive means, is provided within the housing. Extending outwardly from the housing 22, and through the back skin 12a of the doll 10, is a disc-like member 24 which is secured to the internal workings of the actuating mechanism 20. In the normal situation where the actuation mechanism 20 is powered by a spring motor, the disc 24 is utilized through its connecting shaft to wind the spring motor. Extending outwardly from the housing 22, at right angles to the axis of the disc 24, is a drive shaft 26 which is oriented at an angle to the longitudinal axis of body 12 and which is rotated by the motor-means provided within the actuation mechanism 20. Extending at an angle to the drive shaft 26 is a shaft extension 28 which, in response to rotation of the drive shaft as indicated by the arrow in FIG. 2, describes a conical surface as illustrated by the larger circular arrow in FIG. 2.

Relative motion between the doll head 14 and the body 12 is produced by the interaction of the shaft extension 28 with a coupling sleeve 30 which is intimately engaged about the shaft 28 and is rigidly connected to a neck insert 32. The neck insert 32 is in turn connected to the neck of the doll head 14 such that motion of the neck insert 32 is effective to move the head 14. It will be appreciated that the coupling sleeve 30, engaged about the shaft extension 28, will follow the conical path described by the shaft extension as the shaft extension rotates within the sleeve. Therefore, the neck insert 32 will be moved through a relatively complex motion and, therefore, the doll head 14 will be similarly moved with respect to the actuating mechanism 20 and the doll body 12.

The crying mechanism, generally designated by the numeral 40 is operatively connected to the actuation mechanism 20 such that a crying sound is emitted from the doll head in response to the animated motions of the doll. In the present illustrative embodiment of the invention, the crying mechanism 40 is positioned at the outward end of the shaft extension 28 by means of a mounting collar 42 secured to the shaft extension 28 and embraced about the body of the crying mechanism 40. As described below, the crying mechanism employed in the doll 10 is a gravity operated device wherein a falling piston within a cylinder is effective to force a supply of air past a sounding reed to produce a noise. The flow of air is interrupted in order to form a beat sounding substantially like the cry of an infant. The gravity operated piston is effective when utilized according to the presently described construction such that a crying sound is emitted from the crying mechanism 40 on each rotation of the drive shaft 26.

Referring now to FIGS. 3 through 8, description will be made of a crying mechanism advantageously employed in the doll construction according to the present invention. The crying mechanism 40 includes a substantially cylindrical housing 44 including a flat end wall 46 at one end and a cover plate 48 at the other end, which plate is provided with a series of air openings 50. The housing 44 constitutes a cylinder assembly inside of which is posi-

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tioned a weighted piston 52 in substantially air tight contact with the internal cylindrical walls of the housing 44. The piston 52 comprises a solid piston member 54 which is provided with a circular sealing ring 56 which is in sliding contact with the walls of the housing 44. It will be appreciated that an air chamber 58 is defined by the cylindrical walls of the housing 44, the flat base wall 46 and the piston 52. As the piston 52 moves downwardly toward the base wall 46, the volume of the air chamber 58 is decreased. This decrease in volume is utilized to produce the crying sound as follows: an air passage 60 is provided within the piston member 54 such that air may pass upwardly therethrough as the piston 54 moves downwardly within the housing 44 thus decreasing the space within the air chamber 58. A reed assembly 62, including a reed body 64 and a sounding reed 66 is positioned at the beginning of the air passage 60 such that the sounding reed 66 is actuated by an air stream passing from the air chamber 58 to the outside of the mechanism through the cover plate 48.

The constructions as described above will produce a single uninterrupted vibrating sound. In order to produce the interrupted sound, shown schematically in FIG. 8, to simulate the "ma-ma" cry of a baby, means are provided to interrupt the flow of air outwardly from the air chamber 58 and to decrease the velocity of movement of the weighted piston 52 momentarily during the sound-producing period of the crying mechanism 20. These constructions include an interrupting plate 68 secured to and positioned on the top of the piston 52 which plate is provided with a central annular opening 70 and a smaller aperture 72 offset of the central opening 70. The interrupting means further includes a downwardly extending central post 74 which is integrally formed with the end cap 48. The diameter of the post 74 is less than the diameter of the central opening 70 of the interrupting plate 68 such that an air passage is normally provided between the post 74 and the walls of the aperture 72. During the first portion of the movement of the piston 52 from the starting position at FIG. 3 to the intermediate position illustrated in FIG. 4, air passes through the sounding reed assembly 62, through the openings 70, 72 and outwardly into the atmosphere. When the intermediate position illustrated in FIG. 4 is reached, the interrupting plate 68 engages an elastomeric washer-like element 76 which is positioned at the lower end of the post 74 thus blocking the passage through the central opening 70. At this point only the relatively small opening remains through the aperture 72. The air cushion thus produced is effective to decrease the velocity of the falling piston 52 thus decreasing the amplitude of the sound produced by the reed 66 in the manner as shown graphically in FIG. 8. After the washer-like element 76 has been deformed and the gravity influenced piston 52 passes by that element, the piston continues to fall at its relatively high rate thus producing a fast flow of air through the sounding reed assembly 62 to produce a full volume crying sound until the piston 52 has come to rest against the bottom wall 46 of the housing 44.

It will be appreciated that the cycle of noise production accomplished by the crying mechanism 44 may be actuated by alternatively turning the housing 44 through 180 degrees, end to end, thus moving the weighted piston 52 from one end of the housing toward the other. This is accomplished in the doll 10 by mounting the crying mechanism 40 in the manner illustrated in FIG. 2. It will be seen that the position of the crying mechanism 40 illustrated in FIG. 2 mounted upon the shaft extension 28 is such that the weighted piston 52 will be against the top wall 48 thus assuming the defined starting position for the sound producing cycle. As the shaft extension 28 is moved through its conical path by the rotation of the drive shaft 26 and if the doll 10 is in a horizontal position, the orientation of the crying mechanism will assume a position wherein the base wall 46 is facing

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downwardly such that the piston 52 will begin its downward sliding motion along the length of the cylindrical walls of the housing 44. This action will decrease the volume of the air chamber 58 in the manner described above thus passing a stream of air through the sounding reed assembly 62 and outwardly to the atmosphere. The momentary interruption of this operation, by the inter-engagement of the interrupting plate 68 with the elastomeric washer-like member 76, is effective to momentarily decrease the amplitude of the sound produced thus providing a crying noise which substantially imitates that of a young infant.

It is an additional feature of the constructions here illustrated that the doll 10 will cry only when in a horizontal position. Since the crying mechanism is mounted within the doll such that its axis is generally transverse to that of the doll, and since the gravity operated mechanism will work only when its axis is generally vertical, the axis of the doll must be horizontal for the crying mechanism to function. Thus, when a child playing with the animated doll 10 picks it up, it will automatically stop crying.

The invention embodied in the animated crying doll described above may be employed in a number of differing embodiments wherein one or more of the above described features may be incorporated. Therefore, the following claims should be broadly interpreted in accordance with the spirit and scope of the present invention.

What I claim is:

1. The combination of a crying mechanism with an animated doll including an elongated hollow body having a longitudinal axis and a neck opening at the upper end of said body, a head having a neck insert and a prescribed central axis therethrough and movably mounted on said body within said neck opening for movement in a complex motion including a starting position wherein the central axis of said head is generally in longitudinal alignment with the longitudinal axis of said body, and actuating means within said body for imparting said complex motion to said head, said actuating means including a drive shaft oriented at an angle to said longitudinal axis of said body and having an extension thereon offset at a predetermined angular relation to said drive shaft and projecting into said head and coupled thereto, said predetermined angular relation between said drive shaft and said extension being such as to orient said extension substantially parallel to the longitudinal axis of said body and to the central axis of said head in said starting position of the head, said crying mechanism being disposed within said head and operatively connected to said shaft extension for selectively emitting a crying sound in response to rotation of said drive shaft, said crying mechanism including a cylindrical housing and means for mounting

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said cylindrical housing on said shaft extension with its longitudinal axis normal thereto, a sounding means entirely enclosed within said cylindrical housing, and a freely slidable piston slidably mounted within said cylindrical housing and effective to selectively operate said sounding means to emit a sound in response to movement of said piston through an actuating stroke within said cylindrical housing, said actuating stroke occurring only when the doll is in a horizontal position enabling movement of said piston under the influence of gravity during rotation of said drive shaft.

2. The combination of a crying mechanism with an animated doll as defined in claim 1 including means engaging said piston for temporarily interrupting the movement thereof during said actuating stroke such that two discrete crying sounds are emitted in rapid succession as said piston moves through said actuating stroke.

3. The combination of a crying mechanism with an animated doll as defined in claim 2 wherein said cylindrical housing defines an interior air chamber and said freely slidable piston operating within said air chamber is effective to selectively operate said sounding means to emit a sound during said actuating stroke thereof by decreasing the volume of said air chamber.

4. The combination of a crying mechanism with an animated doll as defined in claim 3 wherein said piston is formed with an air passageway in communication with said air chamber and the atmosphere and said sounding means includes a vibrating reed mounted on said piston within said air passageway and actuated into vibrating movement by air movement through said passageway during said decrease in volume of said air chamber.

5. The combination of a crying mechanism with an animated doll as defined in claim 4 wherein said piston is weighted and free of any connection to structure within said cylindrical housing to facilitate sliding movement therein under the influence of gravity.

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