



Jan. 25, 1966

R. BORNN ET AL  
ANIMATED CRYING DOLL

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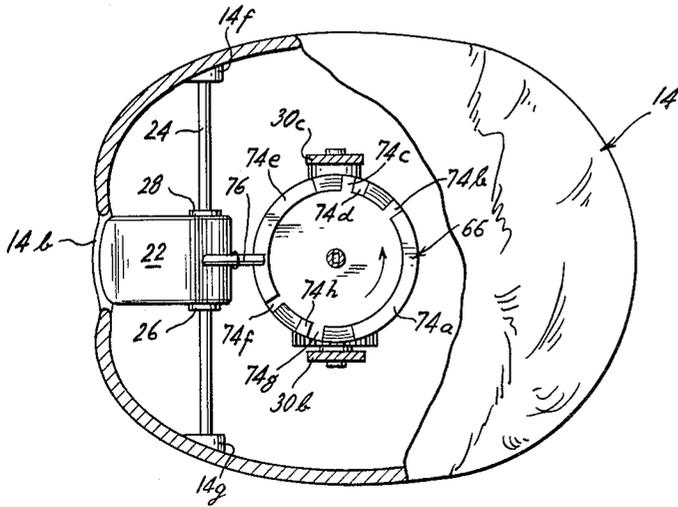


FIG. 4.

FIG. 5.

FIG. 6.

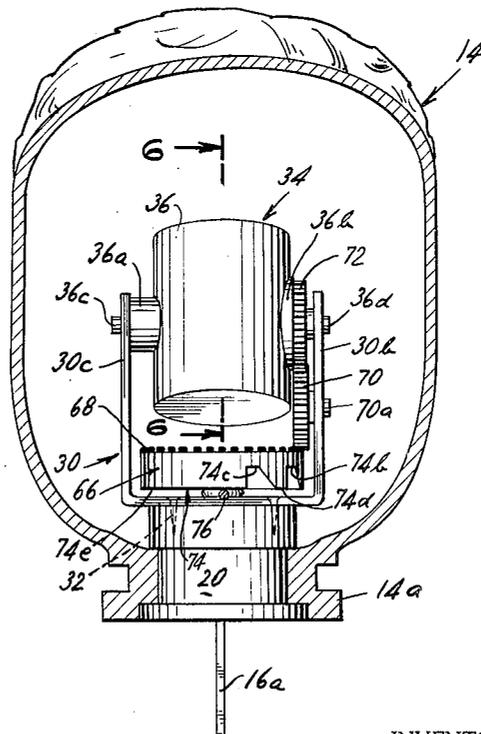
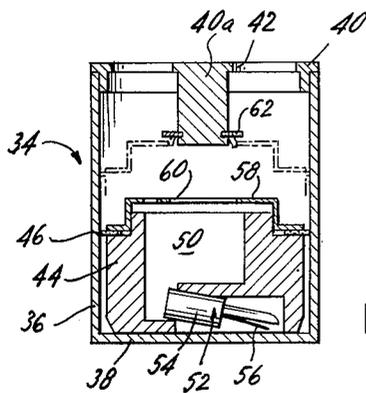
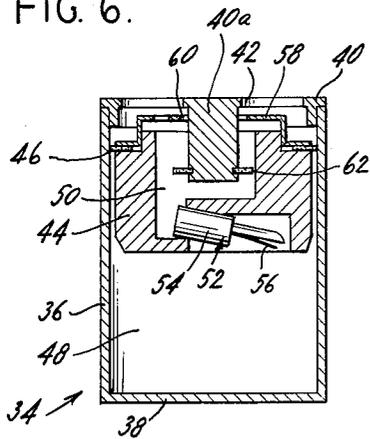


FIG. 7.

INVENTORS  
RALPH BORNN  
JULIUS WEIH  
BY *Amster & Levy*  
ATTORNEYS

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FIG. 8.

FIG. 9.

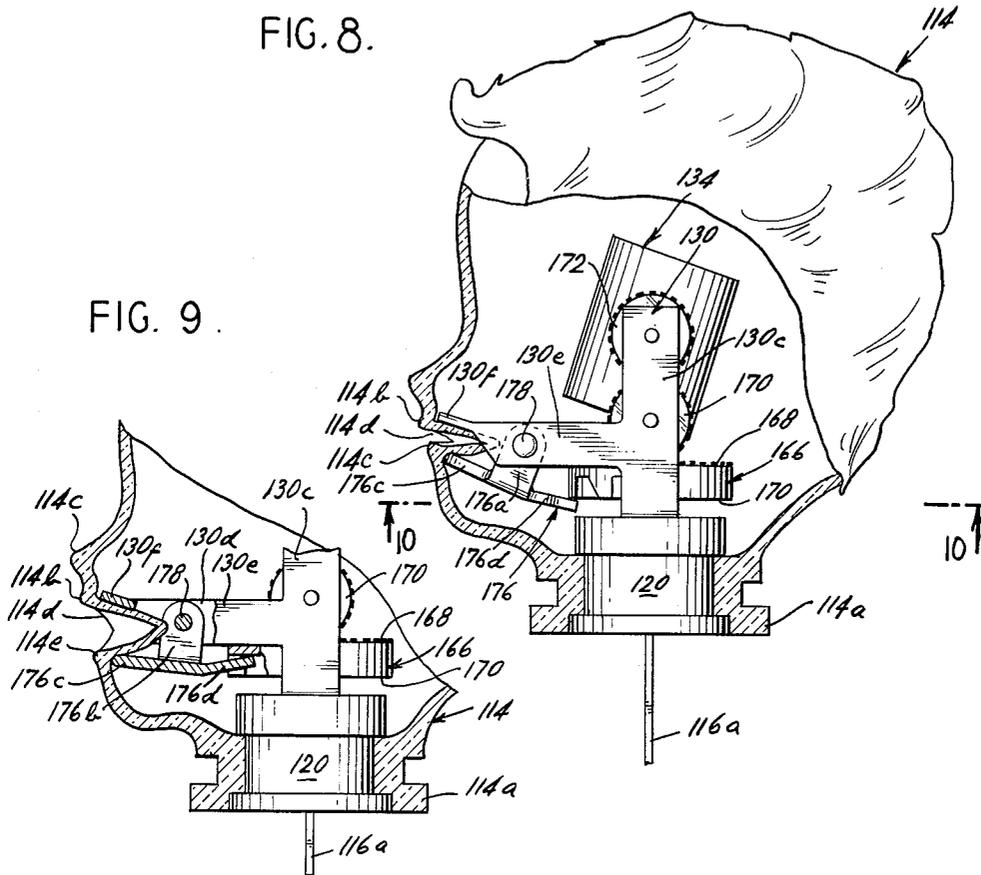
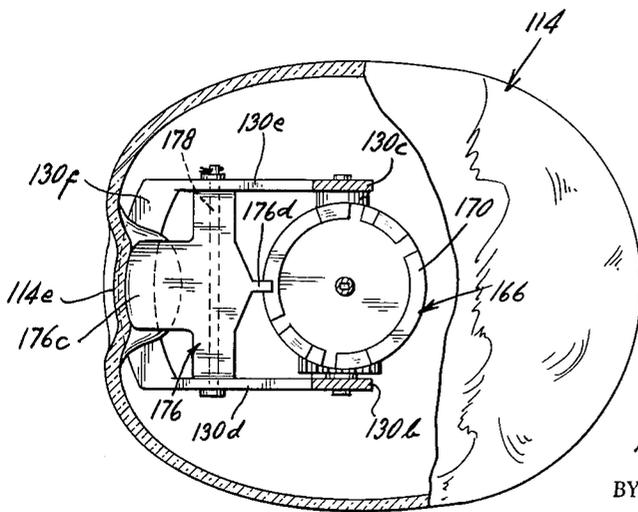


FIG. 10.



INVENTORS  
RALPH BORNN  
JULIUS WEIH

BY *Amster & Levy*  
ATTORNEYS

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3,230,664

**ANIMATED CRYING DOLL**

Ralph Bornn, South Farmingdale, and Julius Weih, Ozone Park, N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.

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11 Claims. (Cl. 46-118)

The present invention relates generally to dolls, and in particular to an animated doll which is adapted to emit a sound and to produce a concurrent lip movement.

In U.S. Patent No. 3,029,552, of April 17, 1962, which is assigned to the assignee of the instant application, there is disclosed an animated doll which embodies a stuffed body having a relatively simple mechanism for attaining animation. This doll enables the employment of essentially conventional components and/or techniques for the manufacture of the doll. Experience indicates that this type of mechanism is particularly suited to impart varied and interesting movements to the doll which enhances the play value thereof and makes it a more desirable toy. The play value of such a doll, as well as those incorporating a molded body, may be further supplemented by the provision of a combined voice and lip movement mechanism which is adapted to emit a sound from the doll's head and to produce a concurrent movement. Such mechanism should be suitable for mass production manufacture, be exceptionally rugged to withstand anticipated abuse and be functional for its intended purposes.

Broadly, it is an object of the present invention to provide an improved doll exhibiting one or more of the aforesaid advantages. Specifically, it is within the contemplation of the present invention to provide an animated doll in which movement is imparted to the lips thereof to simulate talking and/or crying accompanied by an appropriate sound emanating from the head of the doll.

In accordance with an illustrative embodiment demonstrating objects and features of the present invention, there is provided in combination with a doll including a body and a head mounted on the body for turning movement and having movable lips bounding a mouth, a combined voice and lip movement mechanism adapted to emit a sound from the head and to produce a concurrent lip movement. The mechanism includes a drive within the body having a rotatable actuating shaft extending longitudinally into the head. A housing is mounted in the head for turning movement about a transverse medial axis extending substantially at right angles to the actuating shaft and provision is made for operatively connecting the actuating shaft to the housing for turning the latter in response to rotation of the actuating shaft. A piston is slidably mounted within the housing and movable longitudinally thereof through a sound-emitting stroke in response to the turning movement of the housing and sounding means are operable to emit a sound in response to movement of the piston through the sound-emitting stroke. Lip-moving means are operatively connected to at least one of the lips and are controlled from the actuating shaft for animating the mouth concurrent with the emission of the sound. Preferably, provision is made in the housing engaging the piston for damping the movement thereof during the sound-emitting stroke to thereby establish at least two discrete sounding intervals, with the lip-moving means being arranged to produce at least two discrete lip moving intervals in timed relation to the two sounding intervals.

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 several presently preferred, but nonetheless illustrative embodiments in accordance with the

present invention, when taken in conjunction with the accompanying drawing:

FIG. 1 is a side elevational view, with parts broken away and sectioned, showing a typical doll embodying a combined voice and lip-moving mechanism in accordance with the present invention;

FIG. 2 is an enlarged fragmentary sectional view of a portion of the head of the doll shown in FIG. 1, showing the doll's mouth open;

FIG. 3 is a side elevational view, with parts broken away and sectioned, showing the doll's mouth closed;

FIG. 4 is a sectional view taken substantially along the line 4-4 in FIG. 3 looking in the direction of the arrows;

FIG. 5 is a sectional view taken substantially along the line 5-5 in FIG. 3 and looking in the direction of the arrows;

FIG. 6 is a sectional view taken substantially along the line 6-6 in FIG. 5 looking in the direction of the arrows, and showing the sound-producing mechanism or doll's voice in the position at the start of its sound-emitting stroke;

FIG. 7 is a sectional view similar to FIG. 6, but showing the sound-emitting mechanism or doll's voice at the end of its sound-emitting stroke, the dotted lines illustrating an intermediate position of the piston of the mechanism;

FIG. 8 is a side elevational view, with parts broken away and sectioned of a modified doll's head and combined voice and lip-moving mechanism embodying further features of the present invention, with the mechanism being shown in a position corresponding to the doll's mouth being closed;

FIG. 9 is a fragmentary vertical sectional view similar to FIG. 8, but showing the combined voice and lip-moving mechanism in a position corresponding to the doll's mouth being opened; and,

FIG. 10 is a sectional view taken substantially along the line 10-10 of FIG. 8 looking in the direction of the arrows.

Referring now specifically to the drawings, there is shown in FIGS. 1 through 7 inclusive, a first embodiment of doll 10 in accordance with the present invention which includes a body 12 having a head 14 mounted thereon for rotation about a vertical or longitudinal axis. In this illustrative embodiment, the body 12 of the doll includes a stuffed torso 12a and molded arms 12b and legs 12c hingedly connected thereto. Internally of the doll body 12, there is disposed a constant speed drive 16 of the spring type which is wound by an actuating knob 18 accessible at the rear or back of the doll's torso 12a. The head 14 of the doll includes a depending integral neck 14a in which there is mounted a neck block 20 secured to the head 14 and is rotatable therewith. The drive 16 includes an actuating shaft 16a which extends longitudinally of the doll's body or torso through the neck block 20 and into the head 14. For further details of this type of doll body construction and for typical internal mechanisms within the constant speed spring drive 16, reference may be made to the prior art. Although the invention herein will be described in this typical environment, it should be appreciated that the present combined voice and lip-moving mechanism will find useful application of dolls having molded bodies and in diverse other doll construction.

In this illustrative embodiment, the head 14 includes an upper lip 14h formed integrally of the face portion of the doll below the nose 14c thereof and a cut-out 14b substantially coextensive with the mouth region. The cut-out 14b is bounded at its lower side by the lower edge 14d and by the doll's chin 14e. Internally of the

head 14, there is mounted a jaw insert 22 which projects through the mouth opening 14b and is formed with a lip 22a which is adapted to define the lower side of the doll's mouth. The forward end 22b of the jaw insert 22 is configured beneath the lip 22a to form a substantial continuation of the chin 14e of the doll when the jaw insert 22 is in the closed position illustrated in FIG. 1. The upper side 22c of the jaw insert 22 is configured to define the lower surface of the mouth when the jaw 22 is in the open position, as illustrated in FIG. 2. The jaw insert 22 is mounted for turning movement about an axis extending transverse to the head 14 and at right angles to the actuating or drive shaft 16a on a stationary mounting shaft 24 (see FIGS. 2 and 4) which extends across the width of the head 14 internally thereof and at a location spaced rearwardly of the mouth opening 14b. As seen in FIG. 4, the jaw-mounting shaft or pin 24 is secured internally of the doll's head at this location by the provision of integral mounting lugs 14f, 14g formed internally of the doll's head on the interior of the cheek portions thereof. In that the head is normally fabricated of a rotationally cast and relatively flexible plastic, it will be appreciated that the jaw-mounting shaft 24 may be snap-fitted into the mounting lugs or projections 14f, 14g in a preliminary assembly operation. The jaw insert 22 is journaled on the jaw-mounting shaft 24 for turning movement about the axis of the shaft 24 and is held in an oriented position medially of the doll's head by the provision of stop collars 26, 28 fixed to the shaft 24 and bearing against the opposite sides of the jaw insert 22.

Fixed to the upper end of the neck block 20 is an upstanding U-shaped mounting bracket 30 which includes a bight 30a fixed to the upper surface of the neck block 20, as by the screws 32, and upstanding spaced legs 30b, 30c. The mounting bracket 30 provides a relatively stationary mount for the sounding mechanism or doll's voice 34 which is specifically of the so-called ma-ma type. As best seen in FIGS. 6 and 7, the doll's voice 34 includes a substantially cylindrical housing 36 including a flat base wall 38 at one end thereof and a cover plate 40 at the other end thereof which is provided with a series of air openings 42. The housing 36 provides a piston cylinder inside of which there is positioned a weighted piston 44 which is in sliding but relatively airtight contact with the internal cylindrical wall of the housing 36. The piston 44 is provided with a circular sealing ring 46 which is in sliding contact with the internal wall of the housing 36. It will be appreciated that an air chamber 48 is defined by the cylindrical walls of the housing 36, the base wall 38 and the piston 44. As the piston 44 moves downwardly towards the base wall 38, the volume of the air chamber 48 correspondingly decreases and such decrease in volume is utilized to produce a crying sound or doll's voice. Specifically, an air passage 50 is provided within the piston 44 such that air may pass upwardly there-through as the piston 44 moves downwardly within the housing 36. A reed assembly 52 including a reed body 54 and a sounding reed 56 is positioned at the end of the air passage 50 in communication with the chamber 48 such that the sounding reed 56 is actuated by the stream of air passing from the chamber 48 to the outside of the mechanism through the apertures 42 in the cover plate 40. Two discrete sounding intervals are established due to the interruption of the sound-emitting stroke of the piston 44 as it moves from the upper limit position illustrated in FIG. 6 to the lower limit position illustrated in FIG. 7. This is achieved by mounting an apertured interrupting plate 58 on the piston 44 which interrupting plate includes a central opening 60. Depending from the cover plate 40 is an integral central post 40a which extends through the central opening 60 and carries a damping member 62 in the form of an elastomeric washer or the like. The diameter of the central opening 60 is selected in relation to the diameter of the washer 62

to interrupt the drop of the piston 44 under the influence of gravity substantially in the position illustrated by the dot-dash lines in FIG. 7 to thereby establish the two discrete sounding intervals, namely a first one as the piston moves from the position illustrated by the dot-dash lines in FIG. 7 and a second one as the piston 44 moves from the dot-dash line position in FIG. 7 to the full line position illustrated therein. As the housing 36 is turned end for end about the transverse medial axis thereof, it will be appreciated that the piston 44 is returned to the upper limit or starting position illustrated in FIG. 6 from which the piston will fall under the influence of gravity to the lower limit position of its movement shown in FIG. 7. Turning the housing end for end will again restore the piston 44 to the starting position for the next sound-emitting stroke.

The doll's voice is mounted such that the housing 36 will turn about a transverse medial axis extending at right angles to the actuating shaft 16a. To this end, the housing 36 is formed with enlarged projections 36a, 36b at the opposite sides thereof which terminate in stub shafts 36c, 36d which are received within corresponding bearing openings formed in the upstanding legs 30b, 30c of the mounting bracket 30. It will thus be appreciated that the crying device 34, may be turned end for end to actuate the piston 44 thereof, in almost any attitude of the doll except when the doll is lying on its side. When the doll is placed on its side such that the housing 36 effectively turns about a vertical axis only, there is no horizontal component which tends to either move the piston 44 through its sound-emitting stroke or restore the same to its starting position.

Disposed beneath the turnable doll's voice 34 is a combined driving and lip moving cam and gear 66 which is keyed or otherwise secured to the upper end of the actuating shaft 16a. About its upper face, the combined driving and lip-moving cam and gear 66 is provided with gear teeth 68 which mesh with an intermediate gear 70 journaled by a stub shaft 70a on the leg 30c of the mounting bracket 30. The intermediate gear 70 in turn meshes with a driven gear 72 which is secured to the projection 36b of the housing such as to complete a gear train between the actuating shaft 16a and the housing 36. In response to rotation of the actuating shaft 16a, the housing 36 turns about its transverse medial axis defined by the stub shafts 36c, 36d at a rate determined by the drive imparted to the actuating shaft and the gearing ratio.

The undersurface of the member 66 is formed with a cam track or surface 74 which includes (see FIG. 4) a first rise portion 74a of a substantial circumferential extent, a pair of dwell portions 74b, 74c separated by a relatively short rise portion 74d, a further rise portion 74e of substantial circumferential extent, and a further pair of dwell portions 74f, 74g separated by a short rise portion 74h. The configuration of the cam 74 and the spacing of the respective rise and dwell portions is selected and arranged to produce two discrete lip movement intervals in timed relation to the two discrete sound intervals produced by the doll's voice 34 such that there will be simultaneous sound emission and lip movement. A cam follower 76 is fixed to the jaw insert 22 at a point spaced below the jaw mounting shaft 24 and rides along the cam track or surface 74. A coil spring 78 is operatively connected to the cam follower 76 and to the head 14 to urge the cam follower 76 against the cam track 74.

A typical sequence of operations will now be described in order to facilitate a more thorough understanding of the present invention:

The child, upon grasping the knob 18, may wind the spring drive 16 such that the actuating shaft 16a will impart rotation to both the doll's voice 34 and to the combined lip moving cam and gear 66. In response to end for end turning of the housing 36 of the doll's voice

34, there is produced a talking or crying sound which is dependent upon the design of the doll's voice. Concurrently, the jaw insert 22 pivots about its shaft or axis 24 in accordance with the configuration of the cam surface 74a. In this specific embodiment, the sound producing mechanism or doll's voice 44 produces a ma-ma sound, while the cam 74 of the motion-producing mechanism moves the jaw insert 22 in synchronism with the two sounds produced by the doll's voice to obtain simultaneous audible and visible animation of the doll.

Referring now specifically to FIGS. 8 to 10 inclusive, there is shown a modified voice and lip-moving mechanism which is adapted to be used on a doll's head 114 of the type which includes upper and lower lips 114b, 114c which are formed integrally thereof and bound the upper and lower sides of the mouth opening or cut-out 114d. The head 114 is fabricated of a flexible elastomer and is designed, particularly with respect to wall thicknesses, to facilitate movement of the lip 114c toward and away from the lip 114b to simulate a child talking. Although this embodiment will be described in terms of the movement of one lip relative to the other, it will be appreciated that either or both lips 114b, 114c may be moved relative to each other to simulate talking or crying. Since many of the component parts in this illustrative embodiment are the same as those previously described in conjunction with FIGS. 1 through 7 inclusive, corresponding reference numerals have been employed in FIGS. 8 to 10 inclusive, but as part of a "100" series. Mounted within the neck 114a of the head 114 is the neck block 120 through which the actuating shaft 116a extends. At its upper end the actuating shaft 116a is connected to the combined lip-moving cam and gear 166 which is supported on the mounting bracket 130 which is fixed to the neck block 120. The doll's voice 144 is connected to the gearing 168 on the combined lip-moving cam and gear 166 through gears 170, 172.

In this embodiment, the upstanding legs 130b, 130c of the mounting bracket 130 are respectively provided with forwardly projecting arms 130d, 130e which are connected at their forward ends by a transversely extending cross piece 130f which overlies the upper wall of the mouth 114d contiguous to the upper lip 114b (see FIG. 8). Pivotaly mounted on the forwardly projecting arms 130d, 130e is a combined cam follower and lip actuating member 176 which includes spaced upstanding ears 176a, 176b which receive a pivot pin 178 which extends through the arms 130d, 130e. Additionally, the combined cam and lip actuating member 176 includes a forwardly projecting actuator 176c which underlies the lower portion of the mouth 114d contiguous to the lower lip 114e. Still further, the member 176 includes a rearwardly projecting cam follower 176d which engages the cam track 170. The parts are arranged relative to each other such that there is a slight compression of the mouth 114d of the doll which tends to bias the cam follower 176d onto the cam track 170. Such biasing force may be supplemented or replaced by a spring. It will be appreciated that the cross bar 130f which bears against the upper wall portion of the mouth opening 114b opposite the actuator 176c provides a reaction force to achieve movement of the lower lip and mouth portion under control of the actuating and cam member 176.

From the foregoing it will be appreciated that the combined voice and lip-moving mechanism of the present invention finds application in a doll's head wherein one or both of the lips is provided by an insert which is movably mounted within the head, or wherein one or both of the lips are provided by integral, yet flexible portions of the doll's head proper. Although the illustrative embodiments have shown movement of only one lip portion framing the doll's mouth, it will be appreciated that, with minor modification, both lip portions may be moved relative to each other. The instant mechanism is readily installed in the doll and may be driven from the available drive which is

used to animate the doll's body. The entire sound-producing and lip moving device may be mounted on the neck block and may be rotated with the head proper such that it does not interfere with turning of the doll's head relative to the body or torso.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What we claim is:

1. The combination with a doll including a body, a head mounted on said body for turning movement and having movable lips bounding a mouth, of a combined voice and lip-moving mechanism adapted to emit a sound from said head and to produce a concurrent lip movement, said mechanism including a drive within said body having a rotatable actuating shaft extending longitudinally into said head, a housing mounted in said head for turning movement about a transverse medial axis extending at right angles to said actuating shaft, means operatively connecting said actuating shaft to said housing for turning said housing in response to rotation of said actuating shaft, a piston slidably mounted within said housing and movable longitudinally thereof through a sound-emitting stroke in response to said turning movement, sounding means operable to emit a sound in response to movement of said piston through said sound-emitting stroke, and lip-moving means connected to at least one of said lips and under control of said actuating shaft for animating said mouth concurrent with the emission of said sound.

2. The combination with a doll including a body, a head mounted on said body for turning movement and having movable lips bounding a mouth, of a combined voice and lip-moving mechanism adapted to emit a sound from said head and to produce a concurrent lip movement, said mechanism including a drive, a housing mounted on said head for turning movement about a transverse medial axis thereof, means operatively connecting said drive to said housing for turning said housing about said medial axis, a piston slidably mounted within said housing and movable longitudinally thereof through a sound-emitting stroke in response to said turning movement, sounding means operable to emit a sound in response to movement of said piston through said sound-emitting stroke, means on said housing and engaging said piston for damping the movement thereof during said sound-emitting stroke to thereby establish at least two discrete sounding intervals, and lip-moving means connected to at least one of said lips and under control of said drive for animating said mouth concurrent with the emission of said sound, said lip-moving means being arranged to produce at least two discrete lip-moving intervals in timed relation to said two discrete sounding intervals.

3. The combination with a doll including a body, a head mounted on said body for turning movement and having movable lips bounding a mouth and a depending neck, and a neck block mounted within said neck and turnable with said head, of a combined voice and lip-moving mechanism adapted to emit a sound from said head and to produce a concurrent lip movement, said mechanism including a drive within said body having a rotatable actuating shaft extending longitudinally into said head through said neck block, a housing mounted on said neck block for turning movement about a transverse medial axis extending at right angles to said actuating shaft, means operatively connecting said actuating shaft to said housing for turning said housing in response to rotation of said actuating shaft, a piston slidably mounted within said housing and movable longitudinally thereof through a sound-emitting stroke in response to said turning movement, sounding means operable to emit

a sound in response to movement of said piston through said sound-emitting stroke, and lip-moving means connected to at least one of said lips and under control of said actuating shaft for animating said mouth concurrent with the emission of said sound.

4. The combination according to claim 3 wherein one of said lips is integral with said head and including a jaw pivoted on said head and providing the other of said lips.

5. The combination according to claim 3 wherein said head is fabricated of a flexible and yieldable elastomer including integral mouth-adjacent portions providing said lips.

6. The combination with a doll including a body, a head mounted on said body for turning movement and having movable lips bounding a mouth and a depending neck, and a neck block mounted with said neck and turnable with said head, of a combined voice and lip-moving mechanism adapted to emit a sound from said head and to produce a concurrent lip movement, said mechanism including a drive within said body having a rotatable actuating shaft extending longitudinally into said head through said neck block, a housing mounted on said neck block for turning movement about a transverse medial axis extending at right angles to said actuating shaft, means operatively connecting said actuating shaft to said housing for turning said housing in response to rotation of said actuating shaft, a piston slidably mounted within said housing and movable longitudinally thereof through a sound-emitting stroke in response to said turning movement, sounding means operable to emit a sound in response to movement of said piston through said sound-emitting stroke, means on said housing and engaging said piston for damping the movement thereof during said sound-emitting stroke to thereby establish at least two discrete sounding intervals, a lip-moving cam within said head on said actuating shaft and rotatable therewith, and lip-moving means connected to at least one of said lip portions and under control of said lip-moving cam for animating said mouth concurrent with the emission of said sound, said lip-moving cam being configured to produce at least two discrete lip-moving intervals in timed relation to said two discrete sounding intervals.

7. The combination according to claim 6 wherein one of said lips is integral with said head and including a jaw pivoted on said head and providing the other of said lips.

8. The combination according to claim 6 wherein said head is fabricated of a flexible and yieldable elastomer including integral mouth-adjacent portions providing said lips.

9. The combination with a doll including a body and a head mounted on said body for turning movement and having movable lips bounding a mouth, of voice-producing and lip-moving mechanisms adapted to emit a sound from said head and to concurrently produce a movement of said lips, said voice-producing mechanisms being disposed in said head and including sounding means, means in said head mounting said voice-producing mechanisms for turning movement with said sounding means being operable to emit a sound in response to said turning movement, said lip-moving mechanisms including lip-moving means movably mounted in said head and operatively connected to at least one of said lips for animating said mouth with lip movements, actuating means mounted in said body and extending into said head, means coupling said actuating means to said voice-producing mechanism for turning the latter to emit said sound, and means coupling said actuating means to said lip-moving mechanism for moving the latter for animating said mouth, the actuating and coupling means being arranged to produce said sound and move said lips in timed relation to each other for imparting a realistic audible and visible animation to said doll.

10. The combination according to claim 9 wherein said voice-producing means includes a cylinder, a piston slidable therein, and means engaging said piston during movement thereof within said cylinder to disrupt said movement to establish at least two discrete sounding intervals.

11. The combination according to claim 10 wherein said lip-moving means is constructed and arranged to produce at least two discrete lip movements in synchronous relation to said sounding intervals.

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45 RICHARD C. PINKHAM, *Primary Examiner.*