United States Patent [19]

Ensmann et al.

[11] **3,728,816**

[45] **Apr. 24, 1973**

[54] CLAMORING DOLL

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[73] Assignee: **Ideal Toy Corporation**, Hollis, N.Y.

[22] Filed: **Apr. 21, 1971**

[21] Appl. No.: **136,018**

[52] **U.S. Cl.** **46/116**

[51] **Int. Cl.** **A63h 13/00**

[58] **Field of Search** 46/116, 119, 120, 46/141, 148, 247

[56] **References Cited**

UNITED STATES PATENTS

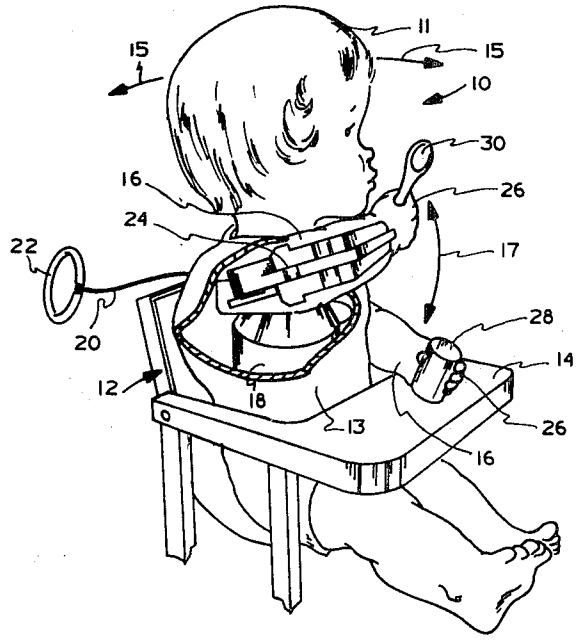
3,604,147	9/1971	Ceccon	46/150
3,419,994	1/1969	Glass et al.	46/119
3,566,537	3/1971	Tepper et al.	46/247
3,571,967	3/1971	Glass et al.	46/116

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[57] **ABSTRACT**

A doll is described which is of the type having a spring motor and a drive train to animate the arms and head. The arms are pivoted for an up and down motion. The drive train includes a spring-loaded yoke connected to drive the arms through the required arcuate displacement, a driven finger on the yoke, and a toothed drive wheel on the output spindle of the motor. The teeth of the wheel gradually displace the finger on the yoke, and afterwards release it abruptly. This abrupt release action, in combination with irregular spacing of the teeth about the spindle, helps to simulate an impatient clamoring activity.

4 Claims, 13 Drawing Figures



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2 Sheets-Sheet 1

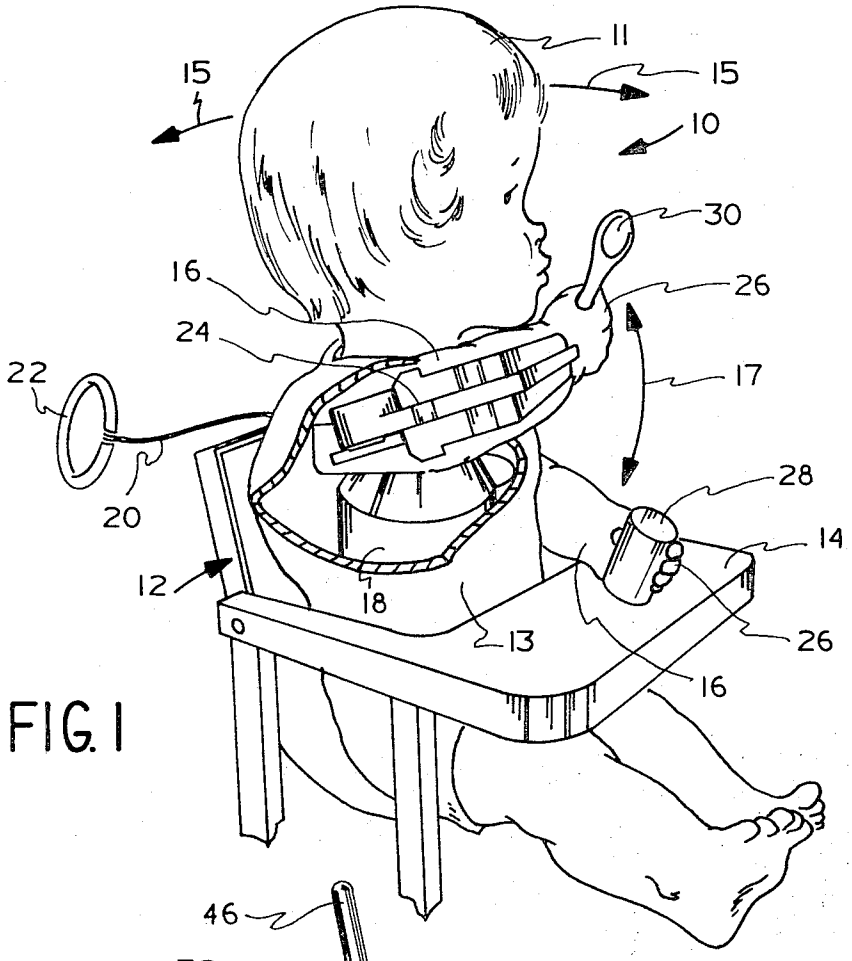


FIG. 1

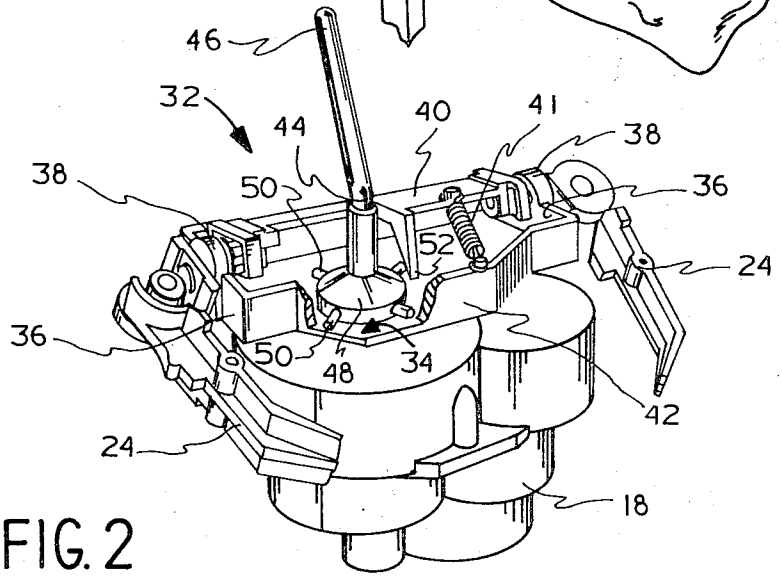


FIG. 2

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FIG. 3

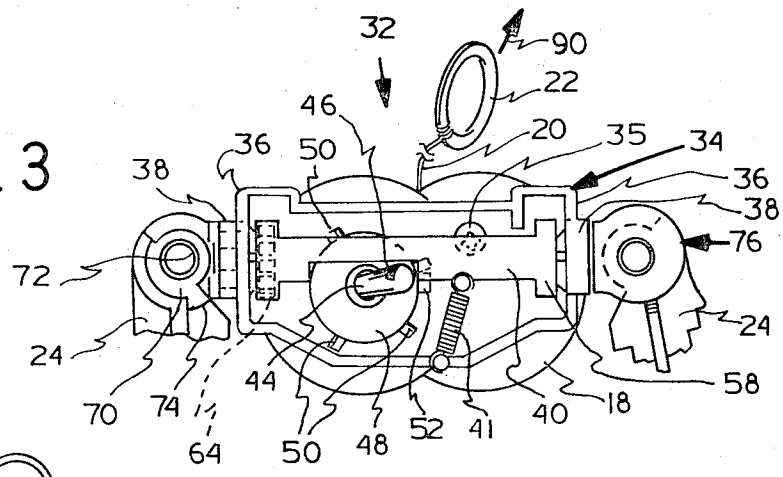


FIG. 6A

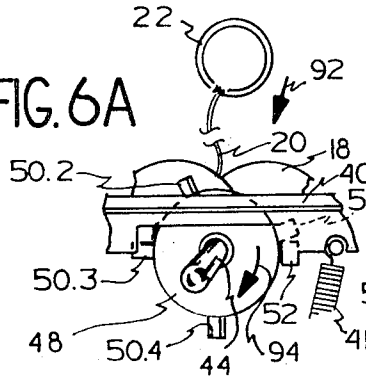


FIG. 6B

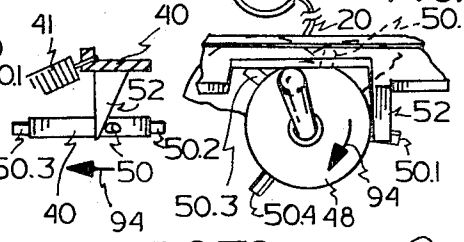


FIG. 7A

FIG. 7B

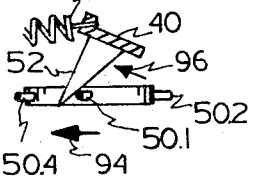


FIG. 9B

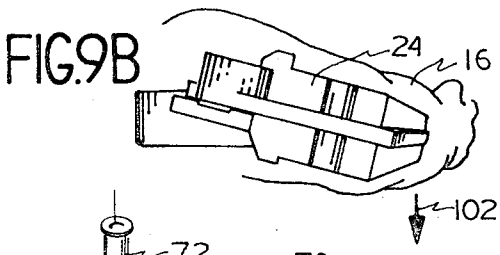


FIG. 7C

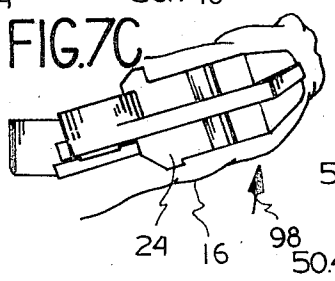


FIG. 8

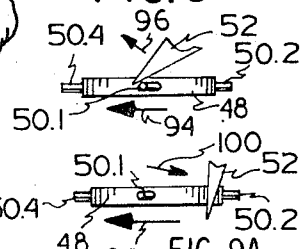


FIG. 9A

FIG. 4

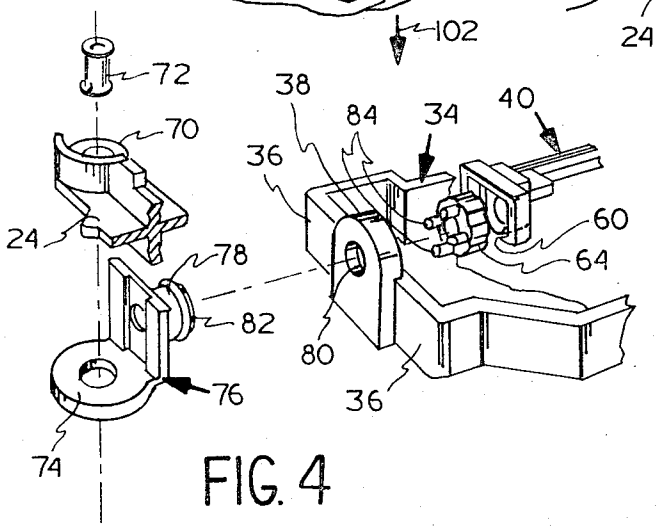
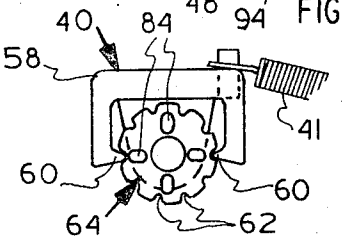


FIG. 5



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CLAMORING DOLL

FIELD OF THE INVENTION

This invention relates generally to toys, and is particularly directed to an animated doll.

BACKGROUND OF THE INVENTION

Animated toys are well represented in the prior art. In particular, there are animated dolls which rotate their arms about an axis of rotation passing generally through the doll's shoulders. An example is seen in Dekan U.S. Pat. No. 3,436,859, in which a doll moves both arms up and down arcuately to perform a motion which imitates the splashing of water. This arm motion is accompanied by a nodding of the head. Both the head and arm movements are smoothly driven by crank mechanisms responsive to an electric motor.

The Dekan mechanism, and others known to the prior art, are too smooth and regular to be suitable for simulating this same type of arm motion as it would be performed in a completely different psychological context, specifically the arm motions of an impatient infant banging repeatedly upon a table. This is a gesture which suffering mothers recognize as a demand for immediate feeding. Such a petulant activity is best simulated by arm movements which are neither smooth nor regularly spaced. On the contrary, the actions should be sudden blows, irregularly spaced in time.

SUMMARY OF THE INVENTION

In carrying out the present invention, a doll animation mechanism is provided in which the rotary output spindle of the animating motor has a plurality of radial teeth. The arms are rotatably mounted and connected to be driven by an angularly reciprocable yoke. A finger on the yoke is repeatedly engaged and displaced by consecutive teeth of the rotating spindle, and then abruptly released. At each release, the drive yoke and the arms are spring-returned. The spindle teeth are preferably irregularly spaced about the circumference of the spindle, so as to emphasize the frenetic nature of the activity by its irregularity in time.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view, with parts broken away for clarity of illustration, of an animated doll in accordance with this invention.

FIG. 2 is a perspective view of the drive motor and animation mechanism of the foregoing doll.

FIG. 3 is a top plan view of the motor and mechanism of FIG. 2.

FIGS. 4 and 5 are exploded perspective view of a portion of the same mechanism.

FIGS. 6A through 9B are a series of action views illustrating an operating sequence of the same mechanism. The figures are labeled in such a way that drawings having the same numerical designation correspond in time.

Specifically, FIGS. 6A and 6B are fragmentary top plan and side elevational views respectively, correlated in time, and showing an initial phase in the operation of the mechanism, just prior to engagement of a driving tooth and driven tooth.

FIGS. 7A and 7B are correlated with each other in time, and are similar to FIGS. 6A and 6B respectively, but show the position of the mechanism as tooth engagement occurs.

FIGS. 7C corresponds in time to FIGS. 7A and 7B, and is a side elevational view of one of the doll arms, illustrating how the arms rise arcuately during tooth engagement.

FIGS. 8 and 9A are similar to FIGS. 6B and 7B, but illustrate respectively the final phase of tooth engagement, and abrupt release after tooth engagement terminates.

FIG. 9B corresponds in time to FIG. 9A. It is similar to FIG. 7C, but shows the abrupt downward arcuate movement of the doll arm which occurs upon tooth release.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows the animated doll **10** of this invention sitting in a toy feeding table **12** which is equipped with a food tray **14**. The doll is molded of a rubber-like material, and includes a hollow torso **13**, and a hollow head **11** and hollow arms **16** both of which are flexibly connected to the torso. The flexible connections permit a nodding motion of the head (arrows **15**), and enables the arms **16** to be moveable arcuately up and down, as indicated by double-headed arrow **17**, about an axis passing generally through the shoulders of the doll. A conventional spring motor **18** mounted within the torso **13** of the doll is wound by a pull-string **20** and ring **22**. During the spring run-out cycle thereof, the motor **18** drives a suitable animation mechanism **32** (see FIG. 2), causing molded plastic arm actuator members **24** to move through the desired vertical arcuate motions. The actuators **24** are within the interiors of their respective arms **16**, and thus cause the arms to move with the actuators.

Arm motions of this general type are not new in the animated doll art. What distinguishes the present doll animation, however, is their timing. Specifically, the arm motions of this doll include a relatively gradual rising arc followed by a relatively abrupt falling arc, causing one or both of the doll's hands **26** to strike a sharp blow against the food tray **14**, in imitation of the petulant, clamoring activity of a child who is impatient to be fed. The audible effect is enhanced if various metallic, and therefore noisy, objects such as a cup **28** or spoon **30** are held in the doll's hands **26** and are used in pounding upon the feeding tray **14**.

FIGS. 2 and 3 show the animation mechanism **32** mounted atop the motor **18**. To begin by describing it in general terms, this mechanism comprises a molded plastic frame **34** secured to motor **18** by a fastener **35** and having upstanding side walls **36** formed with bosses **38** upon which the arm actuators **24** are journaled to permit the reciprocal arcuate motion indicated by arrow **17** of FIG. **1**. A molded plastic drive yoke **40** extends transversely across the platform **34**, and is secured to and drivingly engaged with a drive train for the arm actuators **24** to impart the desired arcuate motion thereto. A return spring **41** is tensed between posts on the drive yoke **40** and a front wall **42** of the platform **34**, in order to bias the yoke **40** in the direction which moves the arm actuators **24** arcuately downwardly.

The motor **18** drives a rotary output shaft **44** which extends upwardly from the motor through the floor of

the platform 34, and terminates at its upper end in an eccentric headoanimating extension 46. A substantially circular spindle 48 is pressed upon the concentric lower portion of the output shaft 44, and rotates therewith. This spindle 48 is provided with radially extending driving teeth 50 (four of them in the illustrated example), which rotate with the spindle and repeatedly engage an integrally molded driven tooth 52 extending downwardly from yoke 40, to drive the yoke through an arcuate motion which results in upward travel of the arm actuators 24.

FIGS. 4 and 5 show details of the connection between the yoke 40 and the arm actuators 24. Specifically, at both ends of the yoke 40 there are integrally molded claws 58 (see also FIG. 3) each comprising two opposed pawls 60 which engage two of several peripheral detents 62 formed in a gear-like molded plastic wheel 64 (see also FIG. 3). The engagement between the pawls 60 and the detents 62 serves to mount the yoke 40 in place, and also causes the yoke to rotate the gear wheels 64 about their axes.

Each arm actuator 24 terminates in an integrally molded disc 70 which is fastened by means of a rivet 72 to another disc 74 which is an integrally molded part of a carrier member 76 (see also FIG. 3). The carrier 76 is formed with an integrally molded stub shaft 78 that fits rotatably within a journal opening 80 formed in its cooperating boss 38 on the adjacent side wall 36 of platform 34.

An enlarged head 82 formed on the stub shaft 78 snaps through the journal opening 80 to retain the shaft in place therein, and is formed with recesses designed to make driving engagement with pins 84 molded integrally on, and projecting axially from, the gear wheel 64. The rotatability of stub shaft 78 relative to journal boss 38 permits the desired vertical arcuate motion of the arm actuators 24 to occur about the axis of shafts 78, and also permits an adjustment of the initial position of the doll arms by changing the angular position of the gear wheel 64 relative to its associated claw 58. During such adjustment, the toothed pawls 60 yield resiliently, and ride about the periphery of the gear wheel 64 to seat in different recesses 62. Thus, as desired, the doll's right arm can be set at a higher initial position than the left arm, as seen in FIG. 1, or both arms can be set at approximately the same height as shown by the positions of the actuators 24 in FIG. 2. This determines whether the doll 10 will bang upon the food tray 14 with one or both hands 26, or the objects 28 and 30 contained therein.

In order to wind the spring motor 18, the pull-ring 22 is drawn outwardly from the body of the doll as indicated by arrow 90 in FIG. 3. When this happens, the motor output shaft 44 does not perform any reverse rotation, owing to the inherent declutching characteristics of the spring motor 18 during rewind. After the motor is wound and the ring 22 released, the string 20 is pulled back into the motor 18 during the run-out cycle, as indicated by arrows 92 in FIGS. 6A and 7A. During this run-out cycle the direction of rotation of the output shaft 44 and spindle 48 is shown by arrows 94 in FIGS. 6A through 9A.

The first illustrated phase of the run-out cycle is represented by FIGS. 6A and 6B, which show one driving tooth 50.1 of the spindle 48 approaching the driven tooth 52 of yoke 40, but not yet engaged therewith. Thus, the driven tooth 52, yoke 40 and arms 16 are not yet displaced. The next phase of operation is illustrated by FIGS. 7A, 7B and 7C, wherein the closest driving tooth 50.1 has now engaged and partially displaced the driven tooth 52 as illustrated by arrow 96 of FIG. 7B. This results in an arcuate displacement of the yoke 40 about the axis of stub shafts 78, tensioning the return spring 41 and causing the claws 58 to rotate the gear wheels 64 and thus impart an upward arcuate displacement to both arm actuators 24 and arms 16. The arm displacement, which also occurs about the axis of shafts 78, is illustrated in FIGS. 7C and indicated there by arrow 98.

At a still further phase of the operation, illustrated by FIG. 8, the rotation of spindle 48 (arrow 94) has proceeded further, and the nearest driving tooth 50.1 has raised the driven tooth 52 still higher as indicated by arrow 96. The length of the driven tooth 52 depending from the yoke 40 is such, however, that once the mechanism passes the position of FIG. 8, the nearest driving tooth 50.1 must slip past the driven tooth 52, and thereby release it. The released condition is illustrated in FIG. 9A. There it is seen that although the spindle 48 continues to rotate in the direction indicated by arrow 94, the driven tooth 52 has now escaped from the driving tooth 50.1 which had previously engaged it, and the spring 41 has caused the yoke 40 and driven tooth 52 to return arcuately to their original positions, as indicated by arrow 100. This is accompanied by a downward movement of the arm actuators 24 and arms 16, as indicated by arrow 102 in FIG. 9B.

The characteristic of the arcuate reciprocating motion of the arms 24 which lends itself to an interpretation as impatient clamoring arises from the fact that the rise of the arms 16 (arrow 98, FIG. 7C) is relatively prolonged and gradual, while the subsequent fall of the arms (arrow 102, FIG. 9B) is quite rapid and abrupt by contrast. This alternately gradual and abrupt motion is achieved in the mechanism of the present invention by selecting the length of the driven tooth 52 so that each of the driving teeth 50 initially strikes the driven tooth somewhat above the lower end of the latter. Consequently, the driving tooth 50 must take a certain finite length of time to travel from the point of initial contact to the tip of the driven tooth 52, i.e., the maximum displacement illustrated in FIG. 8. During that finite span of time, the yoke 40 and arms 16 are displaced relatively gradually through their rising arcuate motions, against the bias of spring 41. But once the lower tip of the driven tooth 52 clears the driving tooth 50, the arms 16 are snapped downwardly rather rapidly and abruptly by sudden contraction of the spring 41. As a result, the downward motion of the arms is in the nature of a sudden blow. As such, it is particularly well adapted for simulating an impatient gesture, and for making a clamorous noise upon striking the food tray 14 in FIG. 1.

With reference once again to FIG. 9A, it is seen that after driving tooth 50.1 releases the driven tooth 52, as the rotation of spindle 48 (arrow 94) continues, the next consecutive driving tooth 50.2 moves into position to engage the driven tooth 52. It follows that there will be one complete cycle of upward and downward arcuate motion of the doll arms 16 each time one of the

driving teeth **50** passes the driven tooth **52**. Since there are, in this illustrative example, four driving teeth **50** spaced circumferentially about the spindle **48**, there will be four cycles of up and down operation of the arms **16** for each full rotation of the spindle **48**. Thus, even a single rotation of the spindle is sufficient to produce a multiple series of up and down clamoring arm gestures such as would effectively simulate repetitive, impatient banging of the doll's hands upon the food tray **14**. Moreover, the run-out cycle of the spring motor **18** is such that, when fully wound, it is capable of producing several complete rotations of the spindle **48** during runout.

For accentuating the frenetic nature of the up and down arm motions, and thus emphasizing the impression of impatience, the animation mechanism **32** is designed to produce irregular time spacing between the successive blows delivered by the doll to the food tray **14**. In order to accomplish this, the driving teeth **50** are irregularly spaced circumferentially about the spindle **48**, as is clearly seen in FIGS. **3**, **6**A, and **7**A. Thus, even for a substantially constant angular velocity of the spindle **48** during spring motor run-out, there is nevertheless a varying amount of time between consecutive engagements of the driving teeth **50.1** through **50.4** with the driven tooth **52**. As a result, the doll **10** appears to pound upon the food tray **14** with a somewhat irregular rhythm, which heightens the impression of impatience.

During the entire time that the spring motor **18** is running out and the arms **16** are pounding upon the food tray **14**, the eccentric extension **46** of motor output shaft **44**, which is long enough to extend into the interior of the doll's head **11** (see FIG. **1**), executes a circular motion and thus causes the head to simulate a nodding motion (arrows **51**). Head-nodding animation by means of a flexible head-body connection and an eccentrically bent motor output shaft is not new in itself. See, for example, the U.S. patent application of Amici and Bornn, Ser. No. 842,156, filed July 16, 1969, and assigned to the same assignee as this application. In the specific context of a doll which also has a mechanism for simulating the impatient table-pounding motion described above, however, the head motions of the doll contribute to the overall frenetic body activity syndrome, which suggests a demand for immediate feeding.

Thus it will now be appreciated that the animated doll of this invention performs arm motions which, by their abrupt and preferably arhythmic nature, and especially when combined with simultaneous head nodding, give an effective imitation of a child pounding upon a food tray to demand immediate feeding.

Since the foregoing description and drawings are merely illustrative, the scope of protection of the invention has been more broadly stated in the following claims; and these should be liberally interpreted so as to obtain the benefit of all equivalents to which the invention is fairly entitled.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An animated doll comprising, a doll body having a torso and an arm mounted to the doll body for pivotal movement along side the torso for up and down clamoring motion, said doll body housing a frame,

a motor mounted within the doll body on the frame and an output shaft driven into continuous rotation about an axis by the motor, said output shaft being provided with a plurality of circumferentially spaced driving teeth for continuous rotation with the output shaft,

spring means coupled to the arm for biasing the arm towards a downwardly pivoted position along side the torso,

a driven tooth being coupled to the arm for pivotal motion therewith, said driven tooth being selectively spaced from the shaft rotational axis and in the path of rotation of one of the driving teeth for pivotal movement thereby against the spring means bias to raise the arm towards an elevated position along side the torso, said driven tooth being gradually pivoted out of the path of the driving tooth and upon completion of contact therewith being abruptly pivoted by the spring means to rapidly pivot the arm downwardly in a clamoring movement a number of times during each rotation of said output shaft by successive engagements of said driven tooth by one of the driving teeth, and

manually adjustable overriding means operatively interposed between the driven tooth and the arm for pivotal movement of said arm relative to the driven tooth.

2. A doll as in claim 1 wherein said plurality of driving teeth are irregularly spaced in said circumferential direction about said motor output shaft whereby the repetitions of said tooth engagements occur at irregularly timed intervals.

3. A doll as in claim 2 wherein said doll body is further provided with a movable head, and wherein said rotating output shaft is provided with a spindle affixed to said shaft for rotation therewith, said driving teeth projecting radially from said spindle, and said shaft having eccentric means thereon coupled to move said head relative to said body during shaft rotation.

4. A doll as in claim 1 wherein said manually adjustable overriding means includes

a wheel positively engaged to said arm for pivotal movement therewith and having peripherally located and circumferentially distributed detent recesses, and a pair of appositely spaced interconnected pawls coupled to the driven tooth, said pawls being spaced and located to engage the detent recesses.

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