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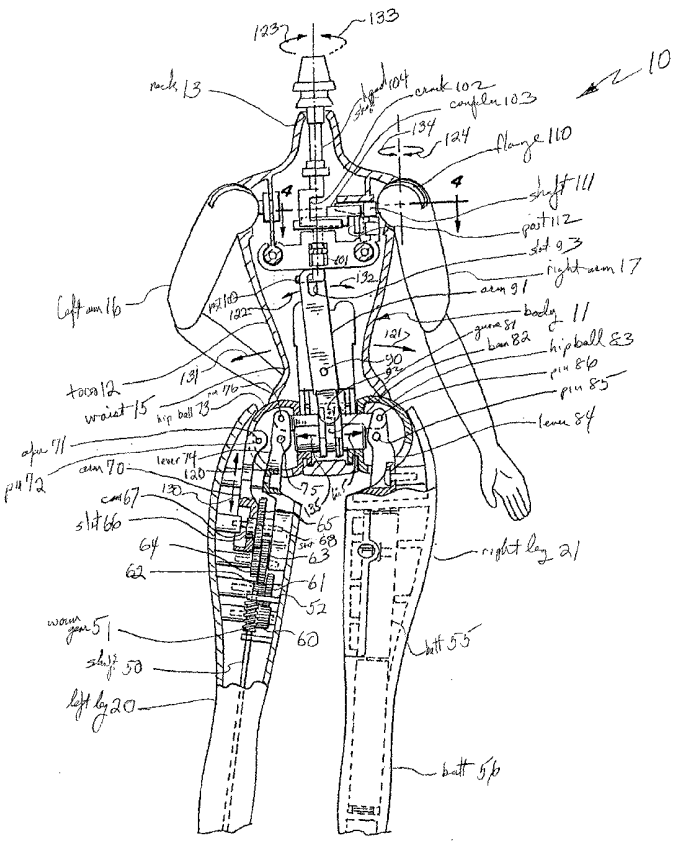
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(54) Title: ROLLER SKATING DOLL



(57) Abstract: A doll (10) includes a body (11) having a torso (12) supporting a neck (13) and head (14) together with a pair of arms (16, 17) and legs. Each of the legs is integrally formed with a skate resembling a conventional in-line skate. The left leg (20) of the doll supports a motor drive mechanism (40) including a gear (43) coupled to one wheel (30) of the left skate (22) to provide forward motion of the doll. The drive motor is further coupled upwardly through the left leg of the doll by a flexible shaft (50) to a gear drive unit. A plurality of batteries (55) are supported on the right leg (21) of the doll and provide operative power for the drive motor. A gear drive mechanism (65) provides speed reduction and produces an oscillatory movement in the hips of the doll. A further coupling mechanism (102) causes the doll head to pivot side-to-side about a vertical axes and causes one of the dolls arms to pivot in an oscillatory fashion at the shoulder joint.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

ROLLER SKATING DOLL

SPECIFICATION

Field of the Invention

This invention relates generally to skating dolls and particularly to those having movement mechanism within the doll body to simulate skating activity.

Background of the Invention

Skating dolls are well known and extremely popular in the art. As a result, many dolls have been provided which utilize some type of skating mechanism. Among modern dolls, the most common type of skating doll utilizes a battery-powered motor drive mechanism supported and concealed within the doll. This mechanism is operatively coupled to one or more of the skate wheels to facilitate movement and skating action. One of the most vexing problems associated with providing dolls which have the ability to skate or simulate skating is found in maintaining the dolls balance. Because skating in its natural form is a relatively complex weight-shifting activity, a true skating doll for the most part, as a practical matter beyond the capability of so-called skating dolls. Nonetheless, the apparatus required to provide some level of skating activity has compelled practitioner's in the toy arts to employ relatively complex and

therefore costly drive mechanisms. The complexity and extent of most skating drive mechanisms have also largely limited practitioners to providing dolls having relatively large bodies. The larger volume of such larger body dolls provides the desired room within the doll torso and legs to provide sufficient drive mechanisms and balance mechanisms.

Unfortunately, typical type of movement apparatus utilized in providing skating dolls can not, as a practical matter, be miniaturized and used in smaller thinner dolls such as the well known and popular type of dolls known generally as "fashion dolls". Such fashion dolls utilize relatively thin dolls formed of molded plastic body components which lack the volume for prior art skating mechanisms. Prior attempts to provide some skating action in smaller dolls such as fashion dolls have resulted in dolls having limited body activity and a very unrealistic appearance which is substantially different than skating action. Nevertheless, practitioners continue to provide a variety of roller skating dolls of various sizes and shapes having a corresponding variety of drive apparatus. For example, U.S. Patent 4,846,752 issued to Combs sets forth a REMOTE CONTROLLED ROLLER SKATING TOY having a plurality of batteries for supplying power to a remote control signal receiving device for selectively activating a plurality of motors positioned within the torso of the figure. A plurality of driven roller chains are positioned through either leg of the figure cooperating with a plurality of tension rollers to drive each of the roller skates supported upon each foot of the figure.

U.S. Patent 4,305,222 issued to Terzian et al. sets forth a SKATING DOLL having a pair of roller skates and an internal drive mechanism permitting the doll to skate. The skates are removably secured to a pair of legs movably mounted to a torso portion of the body. A pair of arms are operatively associated with the drive mechanism and are movable in a cyclical path. The head is designed to pivot in accordance with the weight distribution of the body to maintain balance.

U.S. Patent 5,326,302 issued to Llorens sets forth a PERFECTED ROLLER SKATING DOLL having a structure which is also set forth in U.S. Patent 5,238,441 also issued to Llorens and entitled ROLLER SKATING DOLL the structure shown in both patents utilizes a large doll having legs supported by a pair of roller skates. A motor driven mechanism within the doll torso is operatively coupled to the legs and is further coupled to a head movement mechanism. The head movement is utilized to shift the dolls weight and provide balance during skating activity.

U.S. Patent 3,038,275 issued to Curci sets forth a SELF WALKING DEVICE which is similar to the above described skating mechanisms and which provides an early example of motor driven walking dolls.

In a further related technology, U.S. Patent 4,836,820 issued to Ebihara et al. and U.S. Patent 4,708,688 issued to Lee set forth examples of skiing dolls which utilize internal drive apparatus to simulate skiing activity.

In a technology generally related to the technologies utilized in providing skating dolls, U.S. Patent 3,199,249 issued to Carver et al.; U.S. Patent 5,823,845 issued to O'Berrigan and U.S. Patent 4,623,320 issued to Kakizaki et al. set forth toy figures supported by bases which in turn utilize a plurality of rolling wheels and at least one driven wheel to provide movement.

U.S. Patent 4,623,317 issued to Nagano and U.S. Patent 4,208,834 issued to Lin set forth examples of rolling toy figures which further add the sophistication of remote control.

While the foregoing described prior art devices have to some extent improved the art and in some instances enjoyed commercial success, there remains nonetheless a continuing need in the art for evermore improved, interesting and amusing roller skating dolls.

Summary of the Invention

Accordingly, it is a general object of the present invention to provide an improved roller skating doll. It is a more particular object of the present invention to provide an improved roller skating doll which utilizes a drive mechanism and movement mechanism suitable for use within fashion dolls.

In accordance with the present invention there is provided a roller skating doll comprising: a doll body

having a torso, a neck, a head supported on the neck, a pair of arms pivotably coupled to the torso and first and second legs pivotably coupled to the torso; a first skate, having a first plurality of freely rotating wheels thereon, joined to the first leg; a second skate, having a second plurality of freely rotating wheels and a drive wheel thereon, joined to the second leg; a motor having a first shaft end and a second shaft end supported within the second skate; first gear means coupling the first shaft end to the drive wheel and a flexible shaft having a first flexible shaft end coupled to the second shaft end and a second flexible shaft end; second gear means coupled to the second flexible shaft end having an oscillating output arm coupled to the pair of legs for moving the torso side-to-side; and a battery power supply supported within the first leg for energizing the motor.

Brief Description of the Drawings

The features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings, in the several figures of which like reference numerals identify like elements and in which:

Figure 1 sets forth a front perspective view of a roller skating fashion doll constructed in accordance with the present invention;

Figure 2 sets forth a partial section side elevation view of the doll of Figure 1 taken along section lines 2-2 therein;

Figure 3 sets forth a partial section rear view of the roller skating fashion doll of Figure 1;

Figure 4 sets forth a partial section view of the roller skating fashion doll of Figure 3 taken along section lines 4-4 therein.

Description of the Preferred Embodiment

Figure 1 sets forth a front perspective view of a doll constructed in accordance with the present invention and generally referenced by numeral 10. Doll 10 includes a body 11 fabricated to provide a fashion doll. Body 11 includes a torso 12 supporting a neck 13 which in turn supports a head 14. Torso 12 further supports a left arm 16 and a right arm 17. A waist 15 is formed in torso 12. A left leg 20 and a right leg 21 having respective in-line roller skates 22 and 23 are pivotally supported in the manner set forth below in greater detail. Left skate 22 includes a drive wheel 30 together with a pair of freely rotatable wheels 31 and 32. Right skate 33 includes a plurality of freely rotatable wheels such as wheel 33. The remainder of wheels supported upon right skate 23 are not seen due to the perspective view of Figure 1.

In accordance with the operation set forth below in greater detail, and internal battery-powered motor drive mechanism is operative coupled to drive wheel 30 to rotate drive wheel 30 in the direction indicated by arrow 36. The rotation of drive wheel 30 in turn moves doll 10 forwardly. In addition, a further operative mechanism within doll 10 shown in Figures 2 through 4 cooperates to simultaneously move right arm 17 outwardly and inwardly in the directions indicated by arrows 26 while moving torso 12 from left-to-right in the directions indicated by arrows 25. In addition, the operative mechanism within doll 10 set forth below further moves head 14 in a pivotal fashions in the directions indicated by arrows 27.

The result is a realistic skating movement in which doll 10 moves forwardly while simultaneously while appearing to shift weight between legs 20 and 21 and further appearing to move arm 17 and head 14 in accordance with realistic skating motions.

Figure 2 sets forth a section view of doll 10 taken along section lines 2-2 in Figure 1. As described above, left leg 20 supports a left skate 22 having wheels 31 and 32 freely rotatable upon skate 22 and having a drive wheel 30 also supported on left skate 22. Left leg 20 and left skate 22 are formed as an integral unit and define a common interior cavity 35. A motor 40 is supported within interior cavity 35 and includes a downwardly extending shaft end 42 and an upwardly extending shaft end 41. A worm gear 43 is coupled to shaft end 42 while a flexible drive shaft 50 is coupled to shaft end 41 by a coupler 44. Motor 40 is operatively coupled to a battery power supply (batteries 55 and 56 seen in Figure 3) by connecting wires 47. A bearing 45 rotatably supports worm gear 43. Drive wheel 30 includes a gear 37 which engages worm gear 43 and is thus rotated when motor 40 is energized. In the preferred fabrication of the present invention, the direction of rotation of motor 40 is selected to provide rotation of drive wheel 30 in the direction indicated by arrow 36 thereby propelling doll 10 forwardly in the direction indicated by arrow 38.

Flexible shaft 50 extends upwardly through interior cavity 35 through a bearing 46 to an upper bearing 52. The upper end of flexible shaft 50 supports a worm gear 51. A motor capacitor 48 is

supported within interior cavity 35 and is operatively coupled to batteries 55 and 56 (seen in Figure 3) by wires 49 and is coupled to motor 40 by a wire 39.

Worm gear 51 engages a gear 60 which in turn engages a gear 61 integrally formed with a gear 62. Gear 62 engages a gear 63 integrally formed with a gear 64. Gear 64 engages a gear 65. Gear 65 supports an integrally formed offset cam 67. Both gear 65 and cam 67 are rotatably supported by a shaft 68. An elongated arm 70 includes a slot 66 which receives cam 67 and further defines an aperture 71. A hip ball 73 supports left leg 20 and is pivotally joined to arm 70 by a pin 72 received within aperture 71 of arm 70. Torso 12 of body 11 (seen in Figure 3) defines a waist 15. By means set forth below in Figure 3, torso 12 supports left leg 20 at hip ball 73.

In operation, motor 40 is energized to rotate shaft ends 41 and 42. As mentioned above, the rotation of shaft end 42 produces a rotation of worm gear 43 which in turn drives gear 37 and rotates drive wheel 30 in the directions indicated by arrow 36. The rotation of drive wheel 30 in turn moves doll 10 forwardly in the direction indicated by arrow 38. Simultaneously, the rotation of shaft end 41 rotates flexible shaft 50 which in turn rotates worm gear 51. The combination of gears 60 through 65 provide a plurality of serially coupled speed reduction gears resulting in rotation of gear 65 at a substantially slower speed than worm gear 51. This allows a gain of torque between worm gear 51 and gear 65 facilitating the use of motor 40 having a sufficiently small size to fit within left skate 22.

The rotation of gear 65 produces a corresponding rotation of offset cam 67. The rotation of offset cam 67 within slot 66 oscillates arm 70 upwardly and downwardly in the directions indicated by arrows 74. The pivotal coupling of arm 70 to hip ball 73 converts this oscillation to a side-to-side motion of torso 12 in the manner shown in Figure 3.

Figure 3 sets forth a partially sectioned rear view of doll 10. As described above, doll 10 includes a body 11 having a torso 12 supporting a neck 13, a left arm 16, a right arm 17, a left leg 20 and a right leg 21. Torso 12 also defines a waist 15.

Torso 12 is pivotally coupled to left leg 20 by a hip ball 73 and is pivotally coupled to right leg 21 by a hip ball 83. Hip balls 73 and 83 are coupled to a beam 82 which defines a groove 81 therein.

As described above, left leg 20 supports a flexible shaft 50 having a worm gear 51 at the upper end thereof. As is also described above, worm gear 51 is coupled to gear 65 by a plurality of speed reduction gears 61, 62, 63 and 64. A bearing 52 supports the upper end of flexible shaft 50. As is also described above, gear 65 supports an offset cam 67 while a shaft 68 rotatably supports the combination of gear 65 and cam 67.

An arm 70 defines a slot 66 which receives cam 67. Arm 70 extends upwardly within left leg 20 and is secured to hip ball 73 in an offset attachment by a pin 72 fitted within an aperture 71 formed in the

upper end of arm 70. Left leg 20 is pivotally secured to hip ball 73 by a pin 75 and is further secured by a pin 76 to one end of beam 82.

Right leg 21 supports a pair of batteries 55 and 56 which are operatively coupled to motor 40 by conventional connecting wires (not shown). However, it will be understood that the connecting wires from batteries 55 and 56 are able to pass upwardly through right leg 21 passing laterally through an aperture formed in beam 82 and thereafter descending downwardly through left leg 20 to ultimately couple to motor 40.

Right leg 21 further defines an upwardly extending lever 84 which is secured to hip ball 83 by a pin 85. Lever 84 is further coupled to the remaining end of beam 82 by a pin 86.

An arm 91 is pivotally supported within the interior of torso 12 by a pivot pin 90. The lower end of arm 91 defines a post 92 which is received within groove 81 of beam 82. The remaining end of arm 91 defines a slot 93.

Left arm 16 is pivotally supported upon torso 12 in a conventional fabrication and is preferably "poseable" by manipulation on the part of a child user. Right arm 17 is pivotally supported at the shoulder portion of torso 12 and includes a flange 110. Flange 110 is joined to an inwardly extending shaft 111 which in turn in is joined to a downwardly extending post 112.

A crank member 102 is rotatably supported by a head shaft 104 supported within neck 13 and a downwardly extending shaft 101 supported within torso 12. The lower end of shaft 101 includes a laterally extending post 100 which passes through slot 93 of arm 91. A coupler 103 couples crank 102 to post 112 in the manner better seen in Figure 4.

In operation, the above described energizing of motor 40 (seen in Figure 2) rotates shaft 50 which in turn rotates gears 60 through 65. Gear 65 rotates offset cam 67 within slot 66 of arm 70. As a result, arm 70 moves up and down in the directions indicated by arrows 120 and 130.

Each time arm 70 moves upwardly in the direction indicated by arrow 120, a pivotal movement is imparted to hip ball 73 which in turn moves beam 82 in the direction indicated by arrow 125. The movement of beam 82 in the direction of arrow 125 moves the lower end of arm 91 in a corresponding direction. The upper end of arm 91 is pivoted in the direction indicated by arrow 122. The pivoting movement of the upper end of arm 91 rotates post 100 and shaft 101 in the direction indicated by arrow 123. This in turn pivots head 14 (seen in Figure 1) in the same direction of arrow 123.

The rotational movement of shaft 101 causes crank 102 to be corresponding pivoted providing a movement which is coupled to flange 110 and shaft 111 by post 112. As a result, flange 110 and the remainder of right arm 17 are pivoted in the direction indicated by arrow 124.

Conversely, each time arm 70 moves downwardly in the direction indicated by arrow 130, beam 82 is moved in the direction indicated by arrow 135 causing the upper end of arm 91 to pivot in the direction indicated by arrow 132. The movement of arm 91 is communicated by post 100 and shaft 101 to pivot crank 102 and head shaft 104 in the direction indicated by arrow 133. Correspondingly, head 14 (seen in Figure 1) is pivoted in the direction indicated by arrow 133 also.

The pivotal movement of crank 102 in the direction indicated by arrow 133 causes flange 110 to be pivoted in the direction indicated by arrow 134. This in turn pivots right arm 17 in a corresponding movement.

The resulting movement of doll 10 in accordance with the above described operative mechanism provides a general appearance to doll 10 in which the upper torso of doll 10 appears to shift side-to-side in the directions indicated by arrows 121 and 131 each time arm 70 moves upwardly in the direction of arrow 120 and downwardly in the direction indicated by arrow 130 respectively. This apparent side-to-side shifting motion of torso 12 together with the shoulder pivoting movement of right arm 17 and the pivotal movement of head 14 (seen in Figure 1) upon the upper end of head shaft 104 combines to provide a realistic skating action which is not heretofore obtainable within the limited volume of a fashion doll.

Figure 4 sets forth a partial section top view of doll 10 taken along section lines 4-4 in Figure 3. As

described above, doll 10 includes a torso 12 supporting a right arm 17. Right arm 17 is coupled to a flange 110 which in turn in joined to an inwardly extending shaft 111 and a downwardly extending post 112.

As is also described above, doll 10 includes an upwardly extending arm 91 having a slot 93 formed therein. A shaft 101 supports a crank 102 and a laterally extending post 100. Post 100 extends through slot 93 of arm 91. Crank 102 is joined to a coupler 103 which engages downwardly extending post 112.

Thus, as post 100 is moved by arm 91 in the direction indicated by arrow 140, crank 102 is pivoted in the direction indicated by arrow 141 which in turn moves coupler 103 in the direction indicated by arrow 142. The movement of coupler 103 pivots shaft 111 in the direction indicated by arrow 143 producing a corresponding pivotal movement of flange 110 and right arm 17.

Conversely, the movement of the upper end of arm 91 in the direction indicated by arrow 145 pivots crank 102 in the direction indicated by arrow 106 which in turn pivots coupler 103 in the direction indicated by arrow 147. Coupler 103 in the moving in the direction of arrow 107 pivots post 112 and shaft 111 in the direction indicated by arrow 148 producing a corresponding pivotal movement of flange 110 and right arm 17.

Thus, as the above described motor drive gear coupling responds to the rotation of flexible shaft 50 (seen in Figure 3), arm 17 is pivoted about the shoulder thereof in a motion strongly resembling the arm balancing action of a skater.

While particular embodiments of the invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects. Therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention.

THAT WHICH IS CLAIMED IS:

1. A roller skating doll comprising:

a doll body having a torso, a neck, a head supported on said neck, a pair of arms pivotably coupled to said torso and first and second legs pivotably coupled to said torso;

a first skate, having a first plurality of freely rotating wheels thereon, joined to said first leg;

a second skate, having a second plurality of freely rotating wheels and a drive wheel thereon, joined to said second leg;

a motor having a first shaft end and a second shaft end supported within said second skate;

first gear means coupling said first shaft end to said drive wheel and a flexible shaft having a first flexible shaft end coupled to said second shaft end and a second flexible shaft end;

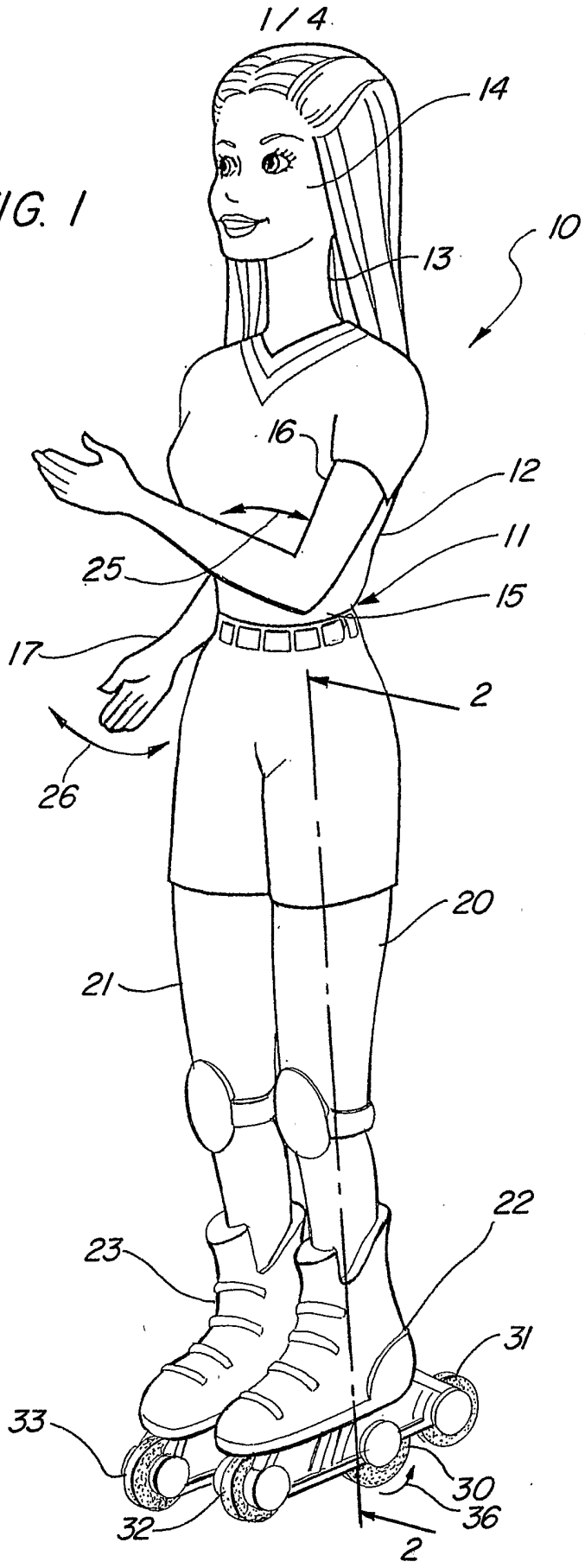
second gear means coupled to said second flexible shaft end having an oscillating output arm coupled to said pair of legs for moving said torso side-to-side; and

a battery power supply supported within said first leg for energizing said motor.

2. The roller skating doll set forth in claim 1 further including arm movement means, coupled to said first and second legs and to one of said arms. For moving said arm as doll skates.

3. The roller skating doll set forth in claim 2 further including head support means for pivotably supporting said head upon said neck and wherein said arm movement means includes means for moving head.

FIG. 1



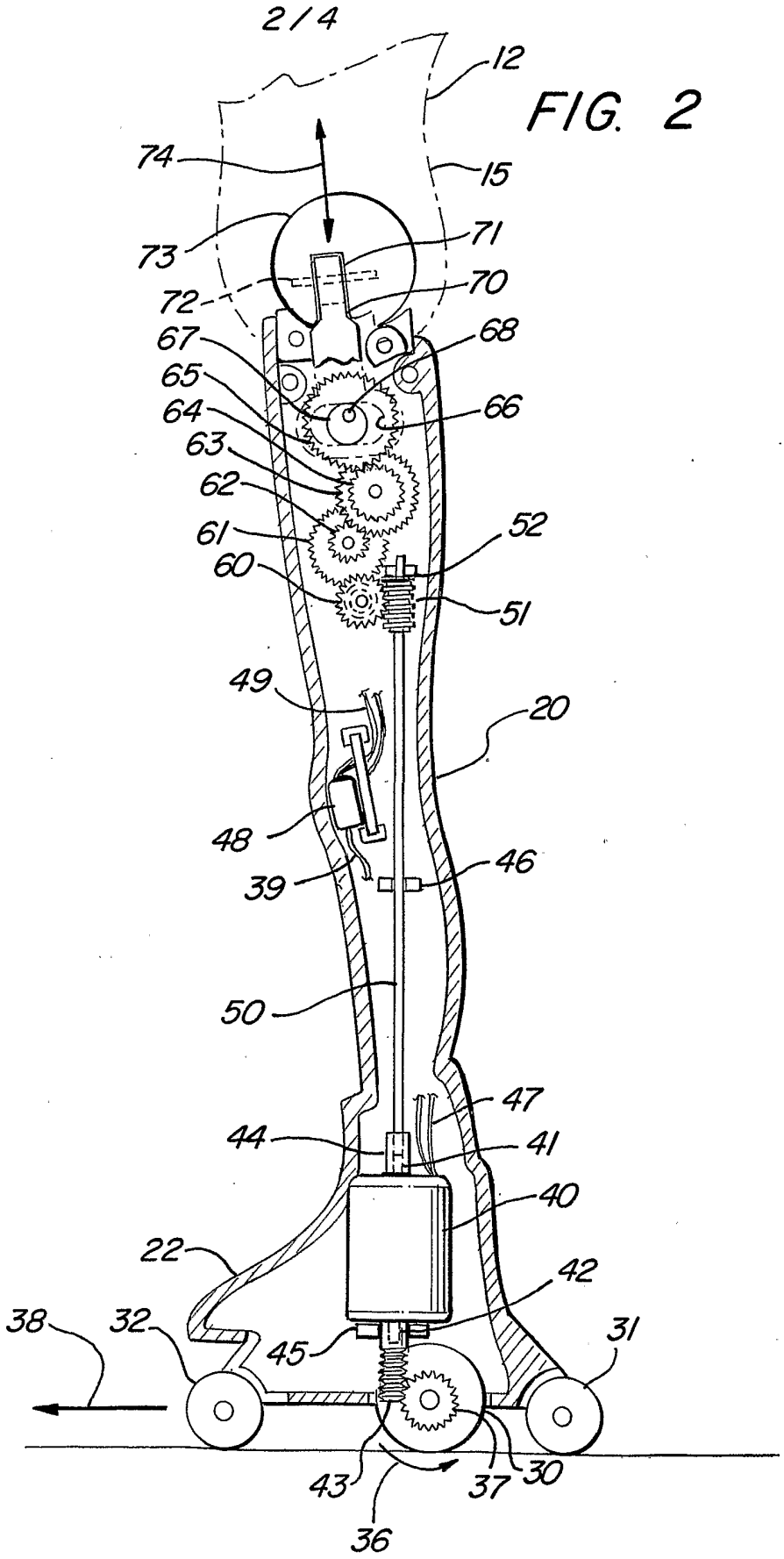
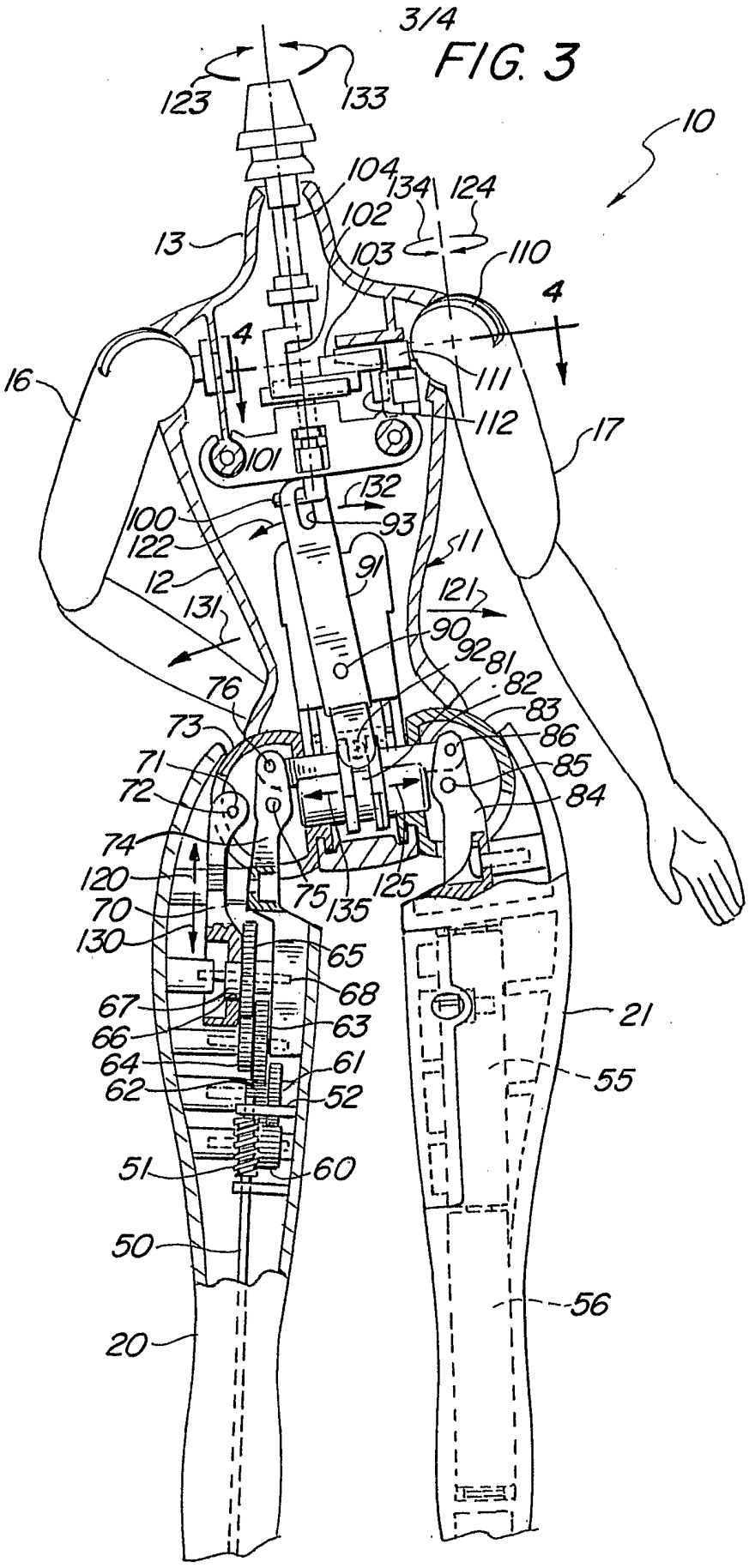

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FIG. 2

3/4

FIG. 3


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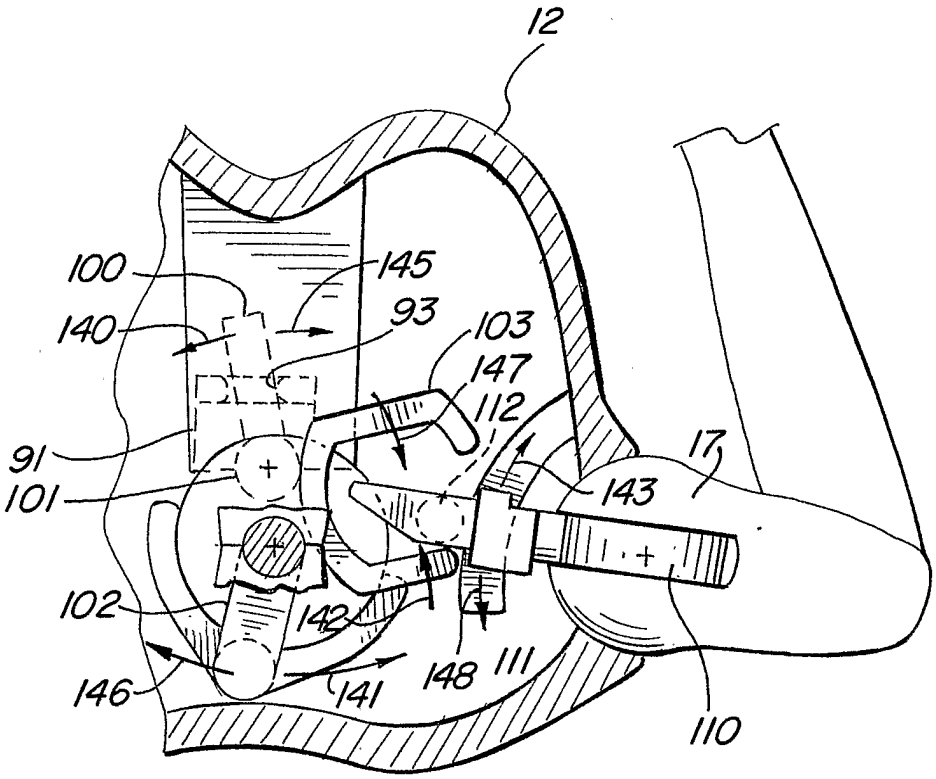

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111
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FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/21965

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A63H 3/00, 3/20, 11/00, 33/40

US CL : 446/268, 269, 279, 330, 353, 456

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 446/226, 272, 278, 280, 285, 288, 352, 354

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,038,275 A (CURCI) 12 June 1962 (12.06.1962), column 2, lines 59-73; column 3, lines 1-42; and column 4, lines 1-14	1
Y	US 4,708,668 A (LEE) 24 November 1987 (24. 11.1987), column 4, lines 23-34 and column 4, lines 54-66	2-3
Y	US 4,305,222 A (TERZIAN et al) 15 December 1981 (15.12.1981), column 4, lines 53-59 and column 5, lines 37-56	2-3

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

08 August 2001 (08.08.2001)

Date of mailing of the international search report

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