Feb. 3, 1970 J. S. LEWIS ET AL 3,492,759

APPENDAGE ANIMATING MEANS FOR FIGURE TOYS

Filed Oct. 11, 1967 3 Sheets-Sheet 1

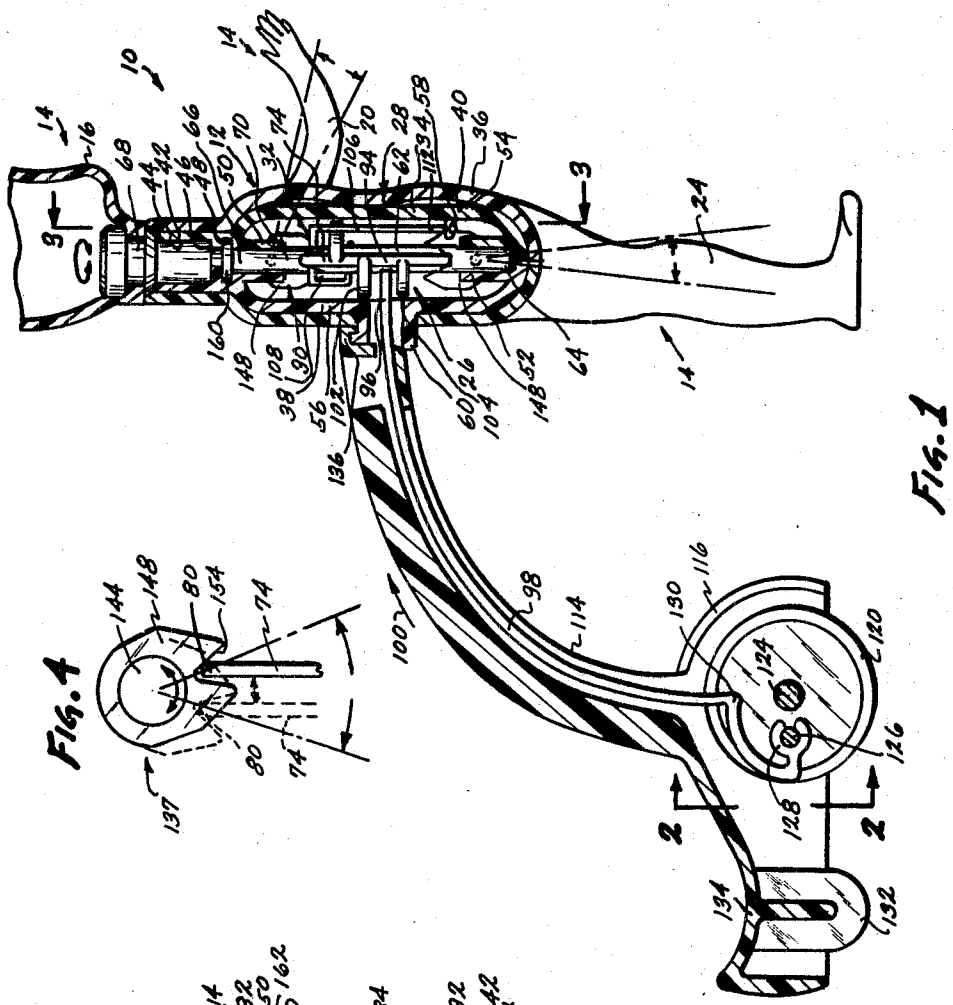


Fig. 1

Fig. 4

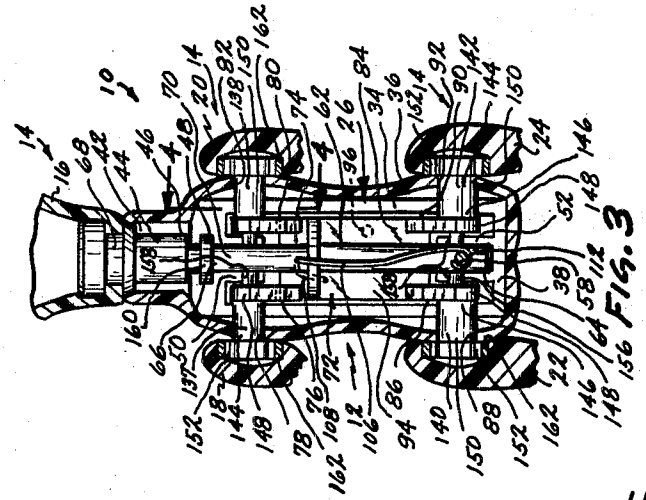


Fig. 3

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APPENDAGE ANIMATING MEANS FOR FIGURE TOYS

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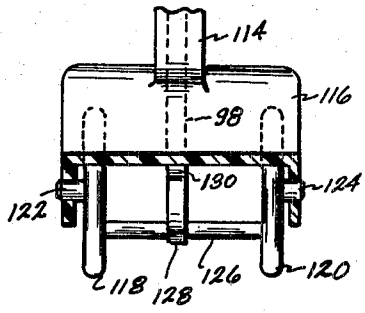


FIG. 2

FIG. 6

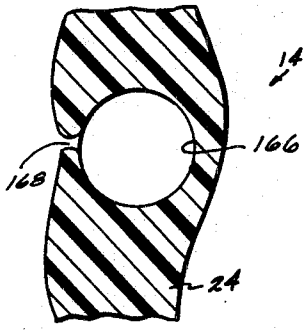
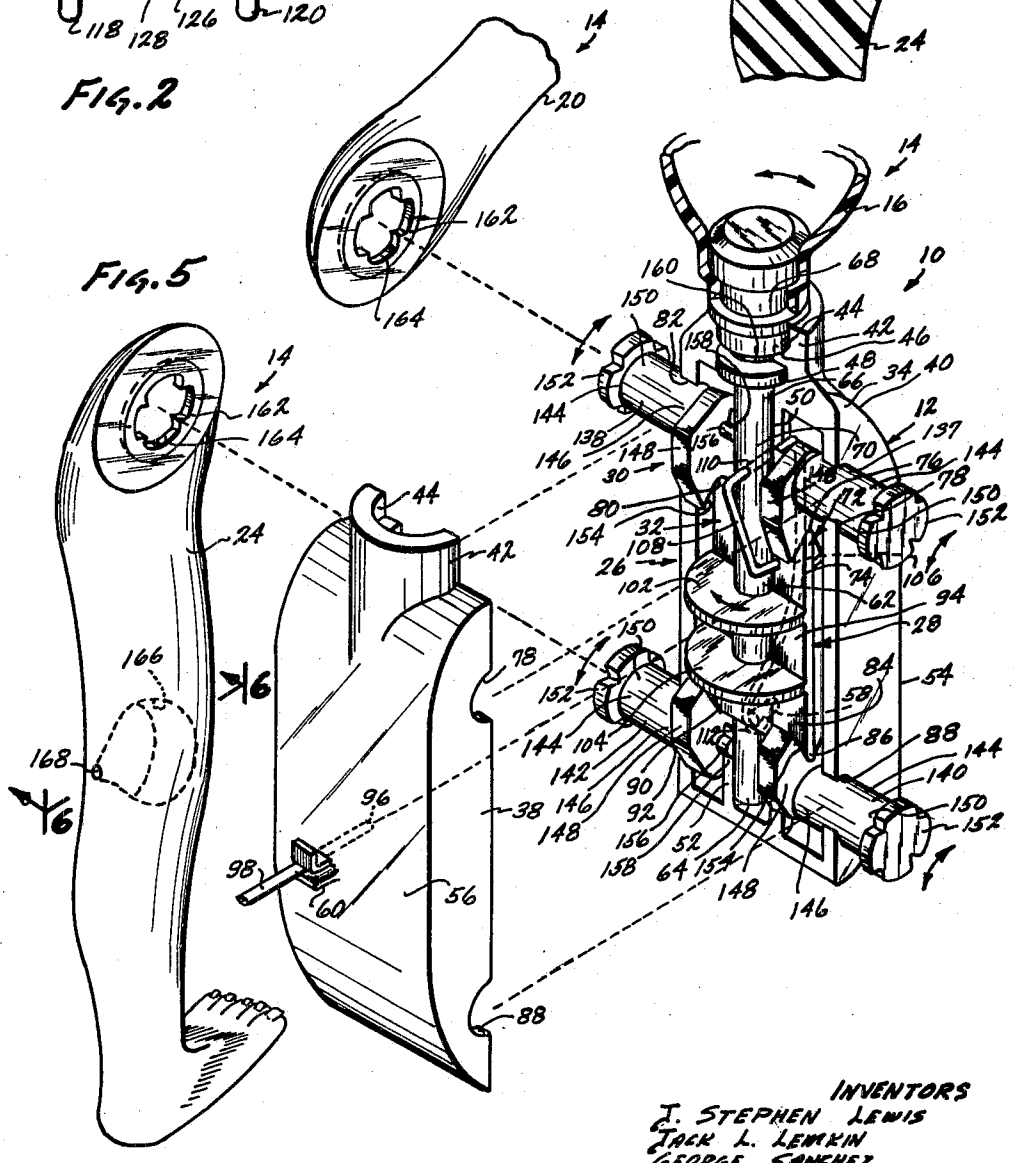


FIG. 5



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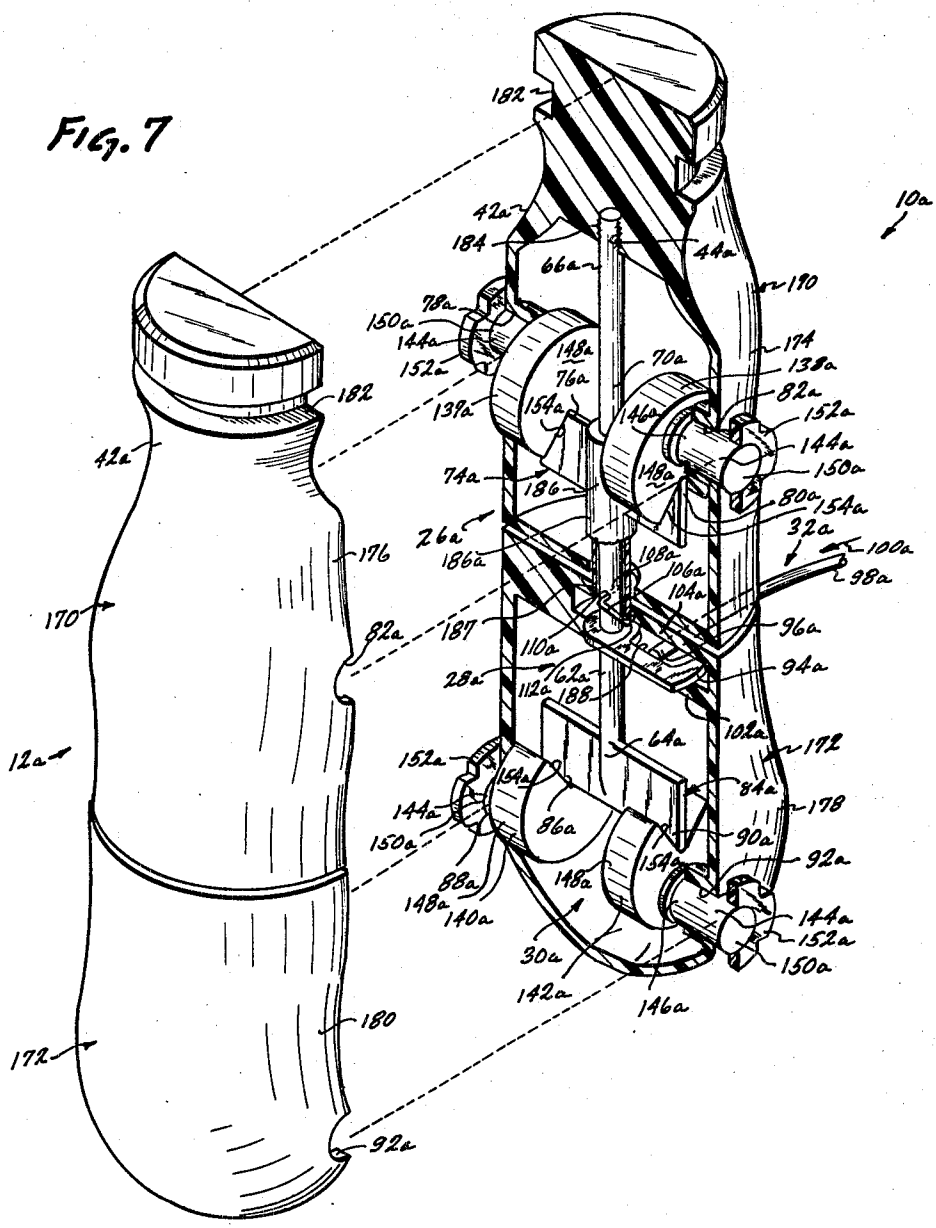
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APPENDAGE ANIMATING MEANS FOR FIGURE TOYS

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FIG. 7



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APPENDAGE ANIMATING MEANS FOR FIGURE TOYS

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Int. Cl. A63h 11/10, 11/00

U.S. Cl. 46—102 11 Claims

ABSTRACT OF THE DISCLOSURE

An animated doll has a rocker assembly mounted therein. The rocker assembly may be connected to the doll's head, legs and arms for oscillating the head and swinging the arms and legs when the rocker assembly is rocked by a torsion drive including a reciprocating push rod for turning the rocker assembly a partial turn in one direction and a return spring for returning the rocker assembly to its initial position. The push rod may be driven by a ground-engaging wheel associated with the doll. In a modification the rocker assembly may be connected to the legs and upper torso half for swinging the legs and oscillating the upper torso half. The arms may be connected to a member which is fixed to the lower torso half so that oscillation of the upper torso half will cause the arms to swing.

BACKGROUND OF THE INVENTION

The background of the invention will be set forth in two parts:

Field of the invention

The invention pertains generally to the field of mechanical figure toys and more particularly to appendage animating means for figure toys.

Description of the prior art

An example of an appendage animating means for figure toys may be found in U.S. Patent No. 3,147,566 which discloses a mechanical doll having a movable head, movable legs and movable arms connected to an actuator strip rotatably mounted in the doll. The head is connected directly to the strip for rotation therewith and the arms and legs are connected to the strip by a system of bevel gears. A pair of bevel gears are also provided for rotating the strip.

These bevel gears make the first-cost of the doll comparatively high and are subject to becoming worn and, if made from inexpensive materials, damaged in use.

SUMMARY OF THE INVENTION

In view of the foregoing, it is a primary object of the present invention to provide a new and useful appendage animating means for figure toys not subject to these disadvantages and exemplifying an improvement over the prior art.

Another object of the present invention is to provide a new and useful appendage animating means for figure toys which includes a simple, inexpensive rocker assembly and a torsion drive means for rocking the rocker assembly to animate the figure toys' appendages.

A further object of the present invention is to provide appendage animating means of the type described which will oscillate a doll's head and swing its arms and legs when a cart, which forms a part of the present invention and which is connected to the doll, is moved over a suitable surface.

Another object of the present invention is to provide appendage animating means of the type described which will oscillate a doll's upper torso half and swing its legs and which includes means whereby oscillation of the upper torso half swings the doll's arms.

According to the first embodiment of the present invention, a figure toy, which is provided with appendages in the form of a head, arms and legs, is provided with appendage animating means including a rocker assembly mounted in the figure toy.

The rocker assembly includes an upper post which is journalled in the neck opening of the figure toy. The upper post includes an extension which frictionally receives the head of the figure toy so that the head will be oscillated when the rocker assembly is oscillated. The rocker assembly also includes a lower post, which is journalled in the lower portion of the figure toy, and plate means, which may be formed integrally with the upper and lower posts.

The appendage animating means also includes torsion drive means for oscillating the rocker assembly and connecting means for converting oscillation of the rocker assembly to swinging of the arms and legs. The torsion drive means includes a reciprocating push rod of the Bowden-wire type having one end which engages the plate to rock the rocker assembly in a first direction (such as clockwise, for example). The push rod is reciprocated by an off-center axle on a cart which may be attached to the figure toy by a tongue forming the housing for the push rod.

The torsion drive means also includes a return spring for returning the rocker assembly to its initial position after it has been rocked by the push rod.

The arms and legs are connected to the plate means by actuator cams which engage the corners of the plate means in such a manner that the motion thereof will be converted to swinging movements in the arms and legs. Thus, the arms and legs will be swung to-and-fro when the rocker assembly is rocked to oscillate the plate means.

In a second embodiment of the present invention, an upper torso portion is free to rotate with respect to a lower torso portion. A post extends from the plate means for the actuator cams on the legs to the upper torso portion and is affixed thereto for oscillating the upper torso portion. Actuator cams and plate means connect the arms to the lower torso portion so as to cause the arms to swing due to oscillation of the upper torso portion.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which like reference characters refer to like elements in the several views.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a vertical cross-sectional view of a figure toy constituting a first embodiment of the present invention;

FIGURE 2 is a partial cross-sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a partial cross-sectional view taken along line 3—3 of FIGURE 1;

FIGURE 4 is an enlarged, partial cross-sectional view taken along line 4—4 of FIGURE 3;

FIGURE 5 is an enlarged, exploded, partial perspective view of the figure toy of FIGURE 1;

FIGURE 6 is an enlarged, partial cross-sectional view taken along line 6—6 of FIGURE 5; and

FIGURE 7 is an exploded perspective view of a figure toy constituting a second embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring again to the drawings, and more particularly to FIGURE 1–6, a figure toy constituting a first embodiment of the present invention, generally designated **10**, includes a torso **12** and appendage means **14**. The appendage means **14** may take the form of a plurality of appendages such as arms, legs, a head or a tail and the like and is shown herein for purposes of illustration, but not of limitation, as including a head **16**, a pair of arms **18, 20** and a pair of legs **22, 24**.

The appendage means **14** may be animated by appendage animating means of the present invention, generally designated **26**, which includes a rocker assembly **28** connected to the appendage means **14** by suitable connecting means **30** and which is adapted to be rocked by a torsion drive means **32**.

The torso **12** serves as a housing for the animating means **26** and is shown herein for purposes of illustration, but not of limitation, as including an inner, rigid housing member **34** and an outer, soft pliable housing member **36**. The outer housing member **36** may be used when it is desired to give the figure toy **10** a soft, life-like feel. It will, of course, be apparent to those skilled in the art that the outer housing member **36** may be dispensed with if this feature is not desired. In such case, the inner housing member **34** would be molded to conform to the shape of the torso of a real-life figure which the figure toy **10** simulates. The inner housing member **34** may be made from suitable plastic materials which cure to a somewhat rigid, shape-retaining structure and may be conveniently made by employing injection molding techniques to form a rear housing half **38** and a front housing half **40**. These housing halves may be joined together to form the inner housing **34** which includes an upper cylindrical neck **42** having a counterbore **44** provided therein. The counterbore **44** forms an annular shelf **46** below which an annular groove **48** is provided. The housing member **34** is also provided with an upper cylindrical sleeve **50**, a lower cylindrical sleeve **52**, a front wall **54** and a rear wall **56**. A pin **58** extends inwardly from front wall **54** and a hollow boss **60** extends rearwardly from the rear wall **56**.

The rocker assembly **28** includes a post **62** having a lower end **64** journalled in sleeve **52**, an upper portion **66** journalled in the upper sleeve **50**, a neck post **68** frictionally receiving head **16** and an intermediate portion **70**. The rocker assembly **28** also includes a plate means **72** which is affixed to post **62** and extends laterally outwardly on each side thereof. Plate means **72** includes an upper portion **74** having a first corner **76** positioned adjacent a first arm opening **78** and a second corner **80** positioned adjacent a second arm opening **82**. The plate means **72** also includes a lower plate portion **84** having a first corner **86** positioned adjacent a first leg aperture **88**, which is provided in housing member **34**, and a second corner **90** positioned adjacent a second leg aperture **92**. The plate means **72** also includes an intermediate portion **94** which is engaged by an end **96** of a push rod **98** forming part of the torsion drive means **32** for pivoting rocker assembly **28** slightly in a counterclockwise direction, as viewed in FIGURE 5 when push rod **98** is moved in the direction of arrow **100** (FIGURE 1). The end **96** of push rod **98** may be caged between a pair of semi-circular wafers **102, 104** which are affixed to the intermediate portion **94** of plate means **72** for stiffening plate means **72**. The rocker assembly **28** is returned to the position shown in FIGURE 1, after being pushed by push rod **98**, by a return spring **106** having a crook **108** passing through an aperture **110**, provided in post **62** and an end **112** affixed to pin **58**. Thus, the return spring **106** also forms part of the trosion drive means **32**. The push rod **98** is reciprocally mounted in a housing **114** forming the tongue on a cart **116** which is supported by a pair of wheels **118, 120** by their associated axle pins **122, 124**, respectively. The wheels **118, 120** are connected together by an offset shaft **126** forming an eccentric drive for push rod **98** which is connected to shaft **126** by a C-shaped connector **128** carried by end **130** of push rod **98**. The cart **116** is adapted to be pushed along on a suitable surface and is prevented from tipping over backwards by a strut **132** depending from a rear housing portion **134** thereof. The tongue **114** is provided with a connector **136** adapted to engage boss **60** for connecting cart **116** to figure toy **10**. The cart **116** may be pushed along a suitable surface with the figure toy **10** slightly elevated. Rotation of wheels **118, 120** reciprocates push rod **98** which co-acts with spring **106** to rock rocker assembly **28** oscillating plate means **72**. This oscillation is translated into fore-and-aft swinging movements of arms **18, 20** and legs **22, 24** by associated arm and leg actuators **137, 138** and **140, 142**, respectively, which, together with the neck post **68**, constitute the connecting means **30**. The actuators **137, 138, 140** and **142** each includes a shaft **144** rotatably mounted in arm openings **78, 80** and leg openings **88, 92**, respectively. Each shaft **144** includes an inner end **146** which carries a cam **148** and an outer end **150** which carries a non-circular connector **152**. Each cam **148** is provided with a substantially V-shaped pocket **154** in which an associated plate corner **76, 80, 86** and **90** is seated, whereby swinging of plate means **72** will rotate the shafts **144** through their associated cams **148**. The cams **148** are retained in position within housing member **34** by an associated pin **156** engaged in an associated aperture **158** provided in the sleeves **50** and **52**. Dislodgment of the plate corners **76, 80, 86** and **90** from their associated pockets **154** is prevented by a thrust washer **160** formed integrally with post **62** and seated in annular groove **48**.

Referring now more in particular to FIGURE 5, each arm **18, 20** may be made from a soft pliable plastic material and, as shown for the arm **20**, is provided with an insert **162** which may be made from a comparatively rigid plastic material and which is provided with a non-circular inner periphery **164** adapted to be keyed to the non-circular connectors **152** on the arm actuators **137, 138**. Each leg **22, 24** may also be made from a soft, pliable plastic material and is provided with an insert identical to the insert **162** for connecting the legs to their associated leg actuators **140, 142**. Each leg **22, 24** is provided with a hollow cavity **166** for forming a knee joint in an associated leg. The cavities **166** may be formed by supporting a spherical member on a suitable stem in the mold in which the legs are formed. This stem (not shown) will form an aperture **168** in the back of each leg **22, 24** for both permitting the removal of the spherical member and for weakening the material at the back of the knee to complete the knee joint.

In use, a child-user of toy **10** may tip cart **116** rearwardly until strut **132** engages the playing surface on which toy **10** is used. This will elevate legs **22, 24** slightly above the surface. The child-user may then push cart **116** along the surface causing wheels **118, 120** to rotate, thereby reciprocating push rod **98**. Movement of push rod **98** in the direction of arrow **100** moves plate **72** causing post **62** to pivot slightly in a clockwise direction, as viewed in FIGURE 5, against the bias of spring **106**. Since head **16** is frictionally engaged on neck post **68**, head **16** will also pivot slightly in a clockwise direction. This movement of plate means **72** causes upper plate **74** to swing arm **20** forwardly and upwardly and to swing arm **18** downwardly and rearwardly through plate corners **80** and **76**, respectively, and their associated actuators **138, 137**. Movement of plate means **72** by push rod **98** also causes lower plate **84** to swing leg **24** rearwardly and to swing leg **22** forwardly through plate corners **90**

and **86**, respectively, and their associated actuators **142**, **140**.

Movement of push rod **98** is in a direction opposite to that indicated by arrow **100** permits spring **106** to turn post **62** in a counterclockwise direction (back to its FIGURE 1 position). This movement causes plate means **72** to swing arms **18**, **20** and legs **22**, **24** in a direction opposite to that heretofore described in connection with the moving of plate means **72** by movement of push rod **98** in the direction of arrow **100**. Head **16** will also rotate in a counterclockwise direction back to its FIGURE 1 position.

Referring now to FIGURE 7, a figure toy constituting a second embodiment of the present invention, generally designated **10***a*, includes a torso **12***a* having an upper torso portion **170** and a lower torso portion **172**. The toy **10***a* may also include the previously described in connection with FIGURES 1–6 as including the head **16**, arms **18**, **20** and legs **22**, **24** previously shown and described, but not shown in FIGURE 7.

The toy **10***a* also includes an appendage animating means, generally designated **26***a*, which includes a rocker assembly **28***a* which may be connected to the appendage means **14** previously described by suitable connecting means **30***a* and which is adapted to be rocked by a torsion drive means **32***a*.

The torso **12***a* serves as a housing for the animating means **26***a* and is shown herein for purposes of illustration, but not of limitation, comprising a rigid housing member preferably molded to conform to the shape of the torso of a real-life figure which the figure toy **10** simulates. The torso **12***a* may be made from suitable plastic materials which cure to a somewhat rigid, shape-retaining structure and may be conveniently made by employing injection molding techniques to form a rear, upper torso half **174**, a front, upper torso half **176**, a rear, lower torso half **178** and a front, lower torso half **180**. The torso halves **174**, **176** may be joined together to form the upper torso portion **170** and the torso halves **178**, **180** may be joined together to form the lower torso portion **172**. The upper torso portion **170** includes an upper cylindrical neck **42***a* having a counterbore **44***a* provided therein. Neck **42***a* is also provided with an annular groove **182** adapted to receive a head, like the one shown at **16** in FIGURE 1.

The rocker assembly **28***a* includes a post **62***a* having a lower end **64***a* affixed to a lower plate means **84***a*, an upper portion **66***a* secured in counterbore **44***a* by weldment means **184** and an intermediate portion **70***a*. The rocker assembly **28***a* also includes an upper plate means **74***a* which is affixed to a sleeve **186** encompassing the intermediate portion **70***a* of post **62***a* and having an end **186***a* secured to lower torso portion **172** by a weldment **187**. The upper plate means **74***a* has a first corner **76***a* positioned adjacent a first arm opening **78***a* and a second corner **80***a* positioned adjacent a second arm opening **82***a*. The lower plate means **84***a* has a first corner **86***a* positioned adjacent a first leg aperture **88***a* and a second corner **90***a* positioned adjacent a second leg aperture **92***a*. The rocker assembly **28***a* also includes a lever **94***a* which is affixed to intermediate portion **70***a* of post **62***a* below sleeve **186** and which is provided with a recessed portion **188** engaged by an end **96***a* of a push rod **98***a* forming part of the torsion drive means **32***a* for pivoting rocker assembly **28***a* slightly in a clockwise direction, as viewed in FIGURE 7, when push rod **98***a* is moved in the direction of arrow **100***a*. The end **96***a* of push rod **98***a* may be caged between a pair of semi-circular shelves **102***a*, **104***a* which are provided in lower torso portion **172**. The rocker assembly **28***a* is returned to the position shown in FIGURE 7, after being pushed by push rod **98***a*, by a return spring **106***a* having a crook **108***a* passing through an aperture **110***a*, provided in post **62***a* and an end **112***a* affixed to shelf **104***a*. Thus, the return spring **106***a* also forms part of the torsion drive means **32***a*.

The push rod **98***a* may be reciprocally mounted in the housing **114** forming the tongue of the cart **116** described in connection with FIGURE 1. Push rod **98***a* co-acts with spring **106***a* to rock rocker assembly **28***a* oscillating upper torso portion **170** and lower plate means **84***a* through post **62***a*. This oscillation is translated into oscillation of arm and leg actuators **137***a*, **138***a* and **140***a*, **142***a*, respectively, which, together with sleeve **186** and upper plate means **74***a* constitute the connecting means **30***a*. The actuators **137***a*, **138***a*, **140***a* and **142***a* each includes a shaft **144***a* rotatably mounted in arm openings **78***a*, **80***a* and leg openings **88***a*, **92***a*, respectively. Each shaft **144***a* includes an inner end **146***a* which carries a cam **148***a* and an outer end **150***a* which carries a non-circular connector **152***a*. Each cam **148***a* is provided with a substantially V-shaped pocket **154***a* in which an associated plate corner **76***a*, **80***a*, **86***a* and **90***a* is seated, whereby swinging of lower plate means **84***a* will rotate the shafts **144***a* in leg openings **88***a* and **92***a* through their associated cams **148***a*. Oscillation of upper torso portion **170** while sleeve **186** and upper plate means **74***a* remain stationary, by virtue of the securement of sleeve **186** to lower torso portion **172**, results in oscillation of arm connectors **152***a* through their associated cams **148***a* and shafts **144***a*. The arms and legs of the first embodiment of the present invention may be connected to their associated actuators **137***a*, **138***a*, **140***a* and **142***a* by engaging the inserts **162** shown in FIGURE 5 with the appropriate connectors **152***a* so that oscillation of connectors **152***a* results in the swinging of the toy's arms and legs while its upper torso portion **170** oscillates in simulation of a walking action.

While the particular figure toys herein shown and described in detail are fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that they are merely illustrative of the presently preferred embodiments of the invention.

What is claimed is:

1. In combination with a figure toy having a torso and appendage means, animating means for moving said appendage means, comprising:

a rocker assembly mounted in said figure toy;

means connecting said rocker assembly to said appendage means for oscillating said appendage means when said rocker assembly is rocked;

torsion drive means operatively associated with said rocker assembly for imparting rocking action thereto, whereby said rocker assembly oscillates said appendage means;

said rocker assembly including a post rotatably mounted in said torso and plate means carried by said post and wherein said drive means includes push-rod means reciprocally mounted in said figure toy in operative association with said plate means.

2. A combination as stated in claim **1** wherein said appendage means comprises a head and wherein said connecting means comprises an extension of said post.

3. A combination as stated in claim **1** wherein said appendage means comprises limbs and wherein said connecting means comprises limb-actuator means connected to each limb, each limb-actuator means including cam means engaging said plate means for rotation thereby when said rocker assembly is rocked.

4. A combination as stated in claim **3** wherein said figure toy is a doll, wherein said limbs comprise a pair of arms and a pair of legs on said doll and wherein said appendage means includes a doll's head affixed to said post for rotation thereby.

5. A combination as stated in claim **3** wherein said torso includes a pair of arm openings and a pair of leg openings and wherein said limb-actuator means each also includes a shaft rotatably mounted in an associated one of said arm and leg openings, said shaft having an inner end to which said cam means is affixed and an outer end to which an associated one of said arms and legs is non-rotatably connected, said cam means including a V-shaped pocket receiving a corner of said plate means.

6. A combination as stated in claim 3 wherein said drive means includes spring means having one end connected to said post and another end connected to said torso for biasing said post to a predetermined angular position, said push rod means pivoting said post in one direction and said spring means pivoting said post in a reverse direction to return said post to said predetermined angular position.

7. A combination as stated in claim 6 wherein said drive means includes cart means having rotatable wheel means, a tongue and means connecting said tongue to said figure toy, said push rod means also being reciprocally mounted in said tongue, said drive means also including eccentric connecting means connecting said push rod means to said wheel means in such a manner that rotary motion thereof is converted to linear motion of said push rod means.

8. A combination as stated in claim 7 wherein said wheel means comprises a pair of wheels, wherein said eccentric connecting means includes an off-centre shaft connecting said wheels together and wherein said cart includes a strut engageable with a playing surface when said cart is tipped to elevate said figure toy.

9. In combination with a figure toy having a torso and appendage means, animating means for moving said appendage means, comprising:

a rocker assembly mounted in said figure toy;

means connecting said rocker assembly to said appendage means for oscillating said appendage means when said rocker assembly is rocked; and

torsion drive means operatively associated with said rocker assembly for imparting rocking action thereto, whereby said rocker assembly oscillates said appendage means,

said torso including an upper torso portion and a lower torso portion, said rocker assembly including a post having an end connected to said upper torso portion for oscillating said upper torso portion when said rocker assembly is rocked, said combination including a sleeve affixed to said lower torso portion, said post being rotatably mounted in said sleeve and having another end disposed in said lower torso portion below said sleeve, said rocker assembly also including lower plate means affixed to said other end of said post, said appendage means comprising legs connected to said lower plate means in such a manner that rocking of said lower plate means swings said legs.

10. A combination as stated in claim 9 including upper plate means affixed to said sleeve, a pair of arms carried by said upper torso portion and means connecting said arms to said upper plate means so that oscillation of said torso causes swinging of said arms.

11. In a figure toy having a torso and plural appendage means pivotally mounted thereon;

said appendage means being nonrotatably carried by rotatable shaft means extending into said torso and having peripherally notched cam means at their inner ends;

a rocker assembly including a post rotatably mounted in said torso on an axis generally perpendicular to the axes of said shaft means, laterally directed generally vertical and substantially coplanar plate means secured to said post on opposite sides thereof with their lower edge portions extending into cam notches of said cam means, said lower edge portions engaging both sides of said notches whereby pivotal motion of said plural appendages, in both directions, is coordinated by said rocker assembly with substantially no lost motion upon change of direction.

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F. BARRY SHAY, Primary Examiner

U.S. Cl. X.R.

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