A walking doll of the type in which its legs are operatively connected with its torso and are arranged to step forward alternately as the weight is shifted from one leg to the other by swinging its torso right and left, including a pneumatic system operative for imparting the swinging motion to the torso. The pneumatic system comprises a hollow inflatable body disposed within the torso and a pneumatic remote-control device for supplying and removing air from the inflatable body. Pneumatic accessories such as a balloon, a sounder, or a toy dog may be attached to the doll. The body may be moved and caused to "bark" by pneumatic means.
PNEUMATICALLY OPERATED WALKING DOLL

SUMMARY OF THE INVENTION

This invention relates to a walking doll, and more particularly to a pneumatically operated walking doll which is arranged to be remotely controlled.

It is, therefore, the principal object of the present invention to provide a novel pneumatically operated walking doll which is so constructed as to be remotely controllable by means of a pneumatic remote-control device.

Another object of the present invention is to provide a walking doll of the kind described above which is provided with pneumatically operated accessories that can be selectively inter-changeably used in combination therewith.

A further object of the present invention is to provide a walking doll of the type stated above which is simple in construction and operation and which can be produced and sold at a reasonable cost.

The foregoing and more specific objects, features and advantages of the present invention will become apparent from the following description of the embodiments of a toy according to the invention exemplified by the drawings in which:

FIG. 1 is a perspective view of one embodiment of the present invention, having an accessory;

FIG. 2 is a vertical cross-sectional side view, partly broken away, of the embodiment of FIG. 1, illustrating the internal structure thereof;

FIG. 3 is a vertical cross-sectional front view of a part of the walking doll, showing the internal structure thereof and how the doll is operated;

FIG. 4 is a perspective view of a part of the operating mechanism of the doll;

FIG. 5 is a perspective view of an accessory in the form of a flute combinable with the doll;

FIG. 6 is a perspective view of another embodiment of the present invention, illustrating the state in which an accessory in the form a dog is attached thereto;

FIG. 7 is a vertical cross-sectional view, partly broken away, of the doll shown in FIG. 6, illustrating the internal structure thereof;

FIG. 8 is a partially cross-sectioned side view of the accessory shown in FIG. 6, showing the internal structure thereof; and

FIG. 9 is a bottom plan view of the lastmentioned accessory.

In the drawings like portions or parts are designated with like reference numerals.

Referring to FIGS. 1 to 4, there is shown a pneumatically operated walking doll, indicated as a whole at A, as one embodiment of the present invention. The doll A comprises a torso 1, a pair of arms 2 and a pair of legs 3 which are moulded from plastics material. The hollow torsos 1 are formed with circular openings 4 on both sides of the lower portion thereof. The legs 3 are provided, respectively, with inwardly protruding, cylindrical housings 5 on the upper parts thereof. These housings 5 extend into the hollow torso 1 through the openings 4 and are interconnected to each other by a transversely extending shaft 6.

Within the lower portion of the torso 1 is mounted an operating framework 7 so constructed as to control the correlated motions of the torso 1 and legs 3. The framework 7 comprises a frame 7a which is generally U-shaped, a rear plate 7b which connects the rear ends of the U-shaped frame 7a, and a tongue-like lug 7c depending from the lower edge of the rear wall 7b. The opposing side plates or walls 7a' of the U-shaped frame 7a are formed with vertically elongated slots 8, one each, in portions adjacent to the rear ends thereof, so that the shaft 6 passes transversely through the slots 8 and is allowed to move vertically up and down within the upper and lower limits thereof.

On both end portions of the shaft 6 are pivotally mounted the rear end portions of a pair of operating arms 9 which are respectively secured to the inner faces of the bearings 5 by appropriate means. Each one of arms 9 is provided, at its front end, with an inwardly turned lug 9a, which fits in loose engagement in a recess formed by a cut-out 10 in the front end of each side plate 7a', so that each arm 9 can be rotated on lug 9a as a pivot within a limited angular range.

To the rear plate 7b of the framework 7 is secured a horizontal shaft 11 which extends at right angles to the transversely extending shaft 6. Both ends of the shaft 11 are journalled in the boxes 12a of bearing bosses 12 which project inwardly from the front wall 1a and back wall 1b of the torso 1, respectively.

To a portion of the depending lug 7c of the operating framework 7 is secured one end of a tension spring 17, the other end of which is secured to a pin 18 fixed to the inner wall of the torso 1, so that the torso 1 is normally urged in one sideward direction on the pivot 11 by the action of the spring 17. Also, in order to restrict the pivotal movement of the torso 1 within a given angular range, there is provided an upwardly projecting lug 20 on the bottom of the torso which is engageable in a recess 19 formed in the lower end of the depending lug 7c.

An upright ear 13 is fixed to the upper end of the rear plate 7b of the framework 7, and through a hole 13' formed in the ear 13 is inserted a tubular member 15a which is provided on one side of a pneumatically inflatable body 15, such as bellows. The other side of the inflatable body 15 is engaged with an inwardly protruding supporting plate 16 which is fixed to the rear wall 1b of the torso 1. The tubular member 15a of the inflatable body 15 is connected to one end of a flexible air duct 14 the other end of which is airtightly attached to a coupling tube 21 which protrudes inwardly from the rear wall 1b of the torso 1.

In the inlet 21a of the coupling tube 21 is detachably fitted one end of a flexible air pipe 23, the other end of which is connected to an air pump 22. Accordingly, when the air pump 22 is compressed, the compressed air flows into the inflatable body 15 to inflate the same pneumatically through an air passage formed by the air pipe 23, coupling tube 21, duct 14, etc... Since the supporting plate 16 engaged with one end of the inflatable body 15 is fixedly attached to the inner wall of the torso 1, the inflation of the body 15 urges the torso 1 to swing about the pivot 11 against the action of the tension spring 17.

Next, manner of operation of the walking doll A will be explained in detail.

First, when the walking doll A is not in use, that is, when the air pump 22 is left unsqueezed, a valve, such as a globe valve (not shown) mounted in the pump is open and the air chamber of the pump 22 is in communication with the atmosphere. Accordingly, the inside of the inflatable body 15 is also in communication with
the atmosphere through the air passage composed of the duct 14, air pipe 23, etc.,

As previously described, the torso 1 of the walking doll A is normally tilted, by the action of the spring 17, in one lateral direction on the horizontal shaft 11 which is fixed to the frame 7 at right angles to the shaft 6. Accordingly, when the inflatable body 15 is in communication with the atmosphere, the torso 1 acts to compress the inflatable body 15 through the medium of the supporting plate 16, and the projection 20 provided on the bottom of the torso 1 is engaged with one inner side edge the cut-out 19 of the depending lug 7c of the framework 7 thereby to maintain the torso 1 in a certain tilted position. At this time, the weight of the torso 1 and head 24 are borne by the framework 7 and, accordingly, the transverse shaft 6 that connects the legs 3 is in contact with the upper edges of the slots 8 of side plates 7a of the framework 7.

When the air pump 22 is compressed, the aforementioned valve is actuated and the air compressed by compression of the air pump 22 is supplied to the inflatable body 15 through the aforementioned air passage whereby the inflatable body 15 is inflated and the pressure due to the inflation of the inflatable body 15 acts upon the support member 16 to tilt the torso 1 about the pivot 11 in the direction indicated by an arrow P in FIG. 3 against the action of the tension spring 17. In the following the reference to left and right is intended as the viewer's left and right in considering FIG. 3.

If the torso 1 tilts rightward, its weight is almost totally borne by the right leg, and the load upon the left leg is reduced to almost zero. In this case, the abutment of the projection 20 against the left side edge of the cut-out 19 causes the framework 7 to be rightwardly inclined. As a consequence, the left side of the framework 7 is slightly raised and the right leg is also slightly tilted rightward. When the left side of the framework 7 is moved up, the arm 9 which is secured to the left leg through the medium of the cylindrical bearing 5 is turned slightly upwardly with the leg about the horizontal shaft 6 as the pivot. Accordingly, the foot 3' of the left leg is swung forward while being raised to some height above the floor level, thus completing the preparation for making a step forward.

Next, as the air pump 22 is released out of compression, the inside of the air pump 22 is brought into communication with the atmosphere and the air supplied to the inflatable body 15 is released. The torso 1 is then tilted back leftward by the action of the spring 17, and the left foot 3' touches the floor and moves a step forward. This time, in the same manner as above described, the right leg and hence the right foot are turned forward to thereby complete the preparation for making a further step forward.

As the air pump 22 is repeatedly squeezed and released in the manner described, the walking doll A moves its left and right legs 3 alternately forward, thus advancing forward.

In the illustrated embodiment A, an air duct 29 is connected at one end to a coupling tube 28 which projects inwardly from the back wall 1b of the torso 1, the other end of duct 29 extending into the mouth 25 of the head 24, in order that a balloon 26, flute 27 or the like, selectively detachably fitted in the mouth 25 of the head 24, can be inflated or played. In this case, the tube 28 may be interconnected with another air pump, not shown, via an air pipe, not shown. The balloon 26 is provided, as illustrated, with a kind of check valve 30 to avoid any reverse flow of the air blown therein.

Referring now to FIG. 6, there is shown another embodiment of the present invention, denoted as a whole by B. As shown in FIG. 7, the doll is provided with an air duct 29' one end of which is connected to a coupling tube 28' and the other end of which is extended into one of the arms 2 and connected to a coupling tube 29' secured to the hand 2'. To the coupling tube 28' is connected a pneumatically operated accessory 31 of the form of a dog by means of a flexible air tube 32.

As shown in FIG. 8, the dog-simulating accessory 31 comprises a hollow body 33, a pair of upstanding brackets 34 disposed within the hollow body 33, a frame 35 pivotally attached to the brackets 34 by means of a horizontal pivot pin 36, a sound-producing device 37 composed of a bellows 37' and a flute 37'' or pipe and being disposed between the rotatable frame 35 and the bottom wall 33' of the body 33, a tension spring 38 for constantly urging the rotatable frame 35 in the clockwise direction, a pair of legs 39 secured to and rotatable with the rotatable frame 35, and an inflatable body 40, such as a bellows, disposed between the rotatable frame 35 and an upper portion of the hollow body 33. The legs 39 are normally retracted within the body 33 by the action of the spring 38 and arranged to be pushed out of the body 33 through longitudinally elongated apertures 4 formed in the bottom wall 33' thereof at a portion adjacent to the front end of the bottom wall when the inflatable body 40 is pneumatically inflated.

In the second embodiment, there is provided an air pump device 42 which is composed of a base 43 and two air pumps 44 and 45 of a squeeze type mounted thereon, respectively. To the first air pump 44 is connected one end of a flexible air tube 23' the other end of which is connected to a coupling tube 21', and to the second air pump 45 is connected one end of a flexible air tube 23'' the other end of which is connected to the coupling tube 28'.

When it is desired to operate the dog-simulating accessory 33, it is only necessary to squeeze the second air pump 45. When this pump 45 is squeezed, the compressed air is supplied to the inflatable body 40 through the air passage formed of a series of the tube elements 23'', 28', 29' and 32 whereby the inflatable body 40 is pneumatically inflated. The inflation or expansion of the inflatable body 40 causes the rotatable frame 35 and legs 39 to pivot about the pivot pin 36 in the clockwise direction to thereby push the legs 39 out of the body 33 through the apertures 41.

As the legs 39 are thus pushed out and brought into contact, at their foot portions 39', with a supporting surface such as a floor surface, the mounting frame 34 is caused to pivot about the pivot pin 36 in the clockwise direction relative to the rotatable frame 35 whereby the accessory body 33 is raised on the support 46 attached to the rear end of the bottom wall 33' of body 33 and at the same time the bellows 37' is squeezed to operate the pipe 37'', thus emitting a sound taking after a lovely bark of dog.

Then, when the compressed air is released from the inflated body 40 by manipulation of the pump 45, the inflated body 40 is caused to shrink by the action of the tension spring 38, while the compressed bellows 37' is inflated, and at the same time the legs 39 are retracted into the hollow body 33, thus returning the dog to its
normal position. When the pump 45 is repeatedly manipulated, the dog repeats the just-mentioned action and steps gradually while barking.

It is to be noted that the accessory 31 may take other forms than that illustrated in FIG. 8. For example, it may shaped into birds or other animals.

The manner of operation of the doll of the second embodiment B is exactly same as that of the first-mentioned doll and, to avoid repetition description relating thereto is omitted.

What is claimed is:

1. A pneumatically operable walking doll comprising a hollow torso having a front side, a rear side, a right side and a left side, a head mounted on said torso, and a pair of legs one attached on the right side and the other attached on the left side of said torso, an operating framework located within said hollow torso, means pivotally mounting said framework within said torso for pivotal movement in a plane extending through the right and left sides of said torso, means for connecting said legs to said framework for effecting movement of said legs in the direction of the front side of said torso relative to the pivotal movement of said framework, a pneumatic system including an inflatable hollow body positioned within said torso and secured at one end to said framework and at its other end to said torso and a manually operable air pump means located exteriorly of said torso and connected to said hollow body, said hollow body, when it is inflated, increasing its dimension between its attachment to said framework and said torso for pivoted said framework toward one of the right and left sides thereof, a tension spring connected at one end to the interior of said torso and at its other end to said framework and biasing said framework in the direction opposite to which it is pivoted when said hollow body is inflated.

2. A pneumatically operable walking doll, as set forth in claim 1, wherein said inflatable hollow body is a bellows and expands in the direction extending between the right and left sides of said torso, a supporting plate connected to one of the rear and front sides of said torso within its interior and extending inwardly from the side to which it is attached, and said bellows connected at one end to said supporting plate and at its other end to said framework.

3. A pneumatically operable walking doll, as set forth in claim 1, wherein means are arranged for limiting pivotal movement of said framework relative to said torso, said means for limiting pivotal movement of said framework including an upwardly extending first lug forming a part of said framework, said lug having a cut-out in its lower end, a second lug secured to the interior of the lower end of said torso and extending upwardly into the cut-out in said first lug, said tension spring secured to said first lug so that said second lug is normally kept in abutting engagement with one side edge of the cut-out in said first lug by the action of said tension spring.

* * * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION


Inventor(s) Yoshie Shinoda

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading of the patent, insert

--[30] Foreign Application Priority Data

March 30, 1970 Japan.................45-26700--

Signed and sealed this 6th day of August 1974.

(SEAL)

Attest:

McCoy M. Gibson, Jr. C. Marshall Dann
Attesting Officer Commissioner of Patents