United States Patent

[11] 3,587,191

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

[54] **TOY ROBOT**
25 Claims, 13 Drawing Figs.

[52] **U.S. Cl.** **46/247,** 46/119, 46/148, 46/244
[51] **Int. Cl.** **A63h 33/26**
[50] **Field of Search** ..... 46/243-—247, 106—107, 212, 104, 119—120, 148

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Assistant Examiner—J. N. Eskovitz
Attorney—Amster and Rothstein

ABSTRACT: A toy robot having a self-reversing mechanism and a first arm for automatically simulating a karate chop when the second arm is moved slightly. The self-reversing operation is accomplished by the provision of pins depending from the bottom of the robot which reverse the motor circuit when they engage obstructions placed in the path of the robot. The arm operation is accomplished by rotating the right arm, thereby winding up a spring, and cocking it in a raised position. The cocking mechanism is released to allow the spring to force the right arm downward when the left arm is moved slightly.

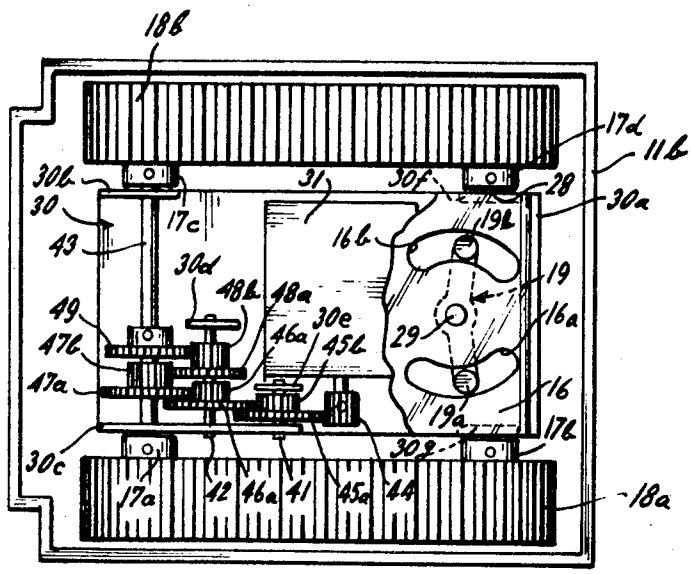
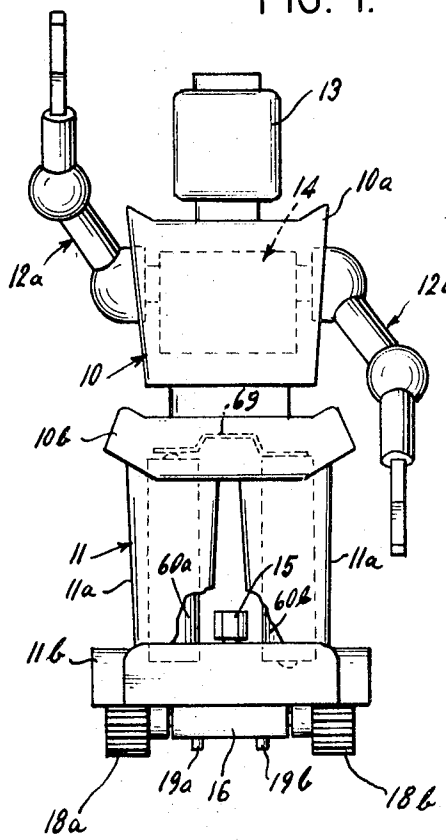


FIG. 1.



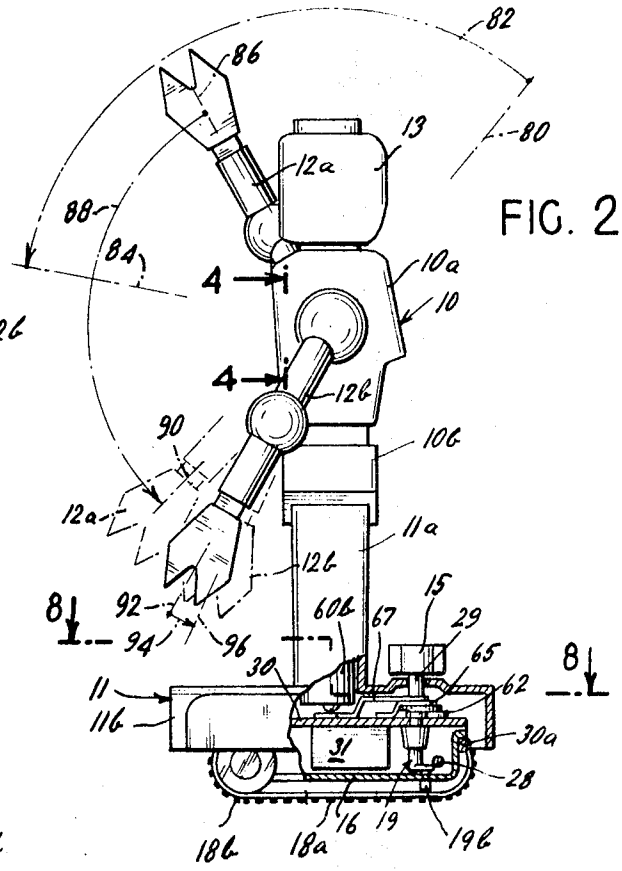


FIG. 2.

FIG. 3.

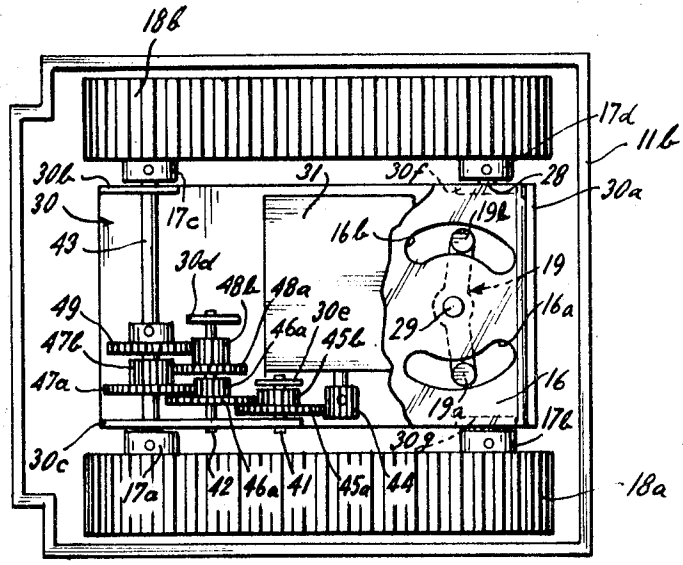


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FIG. 4.

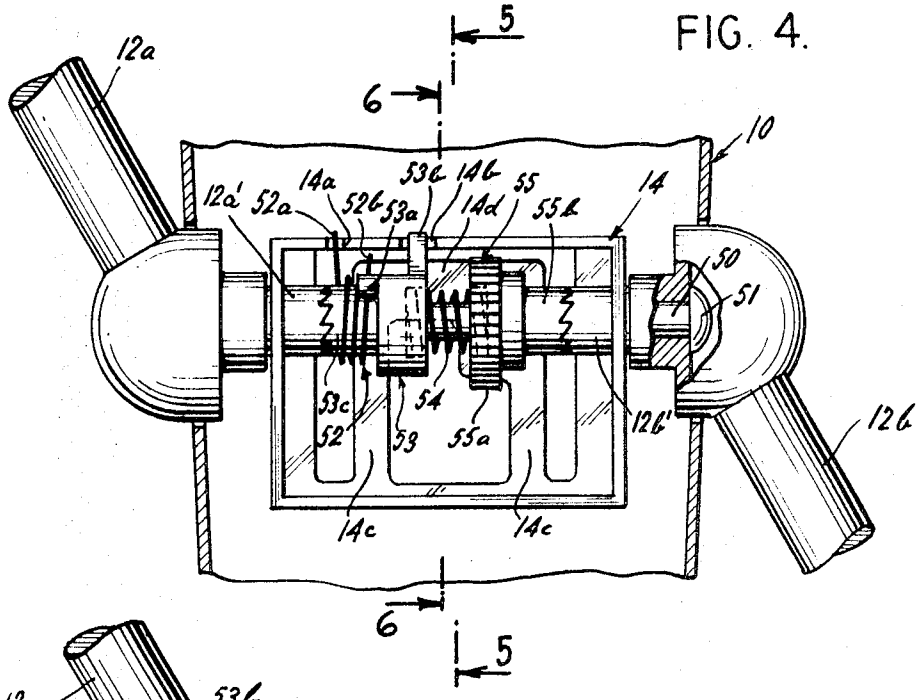

FIG. 5.

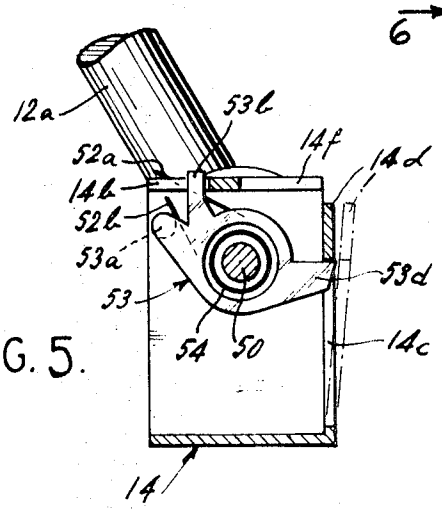

FIG. 6.

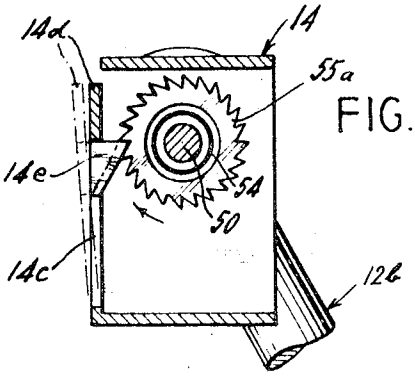

FIG. 7.

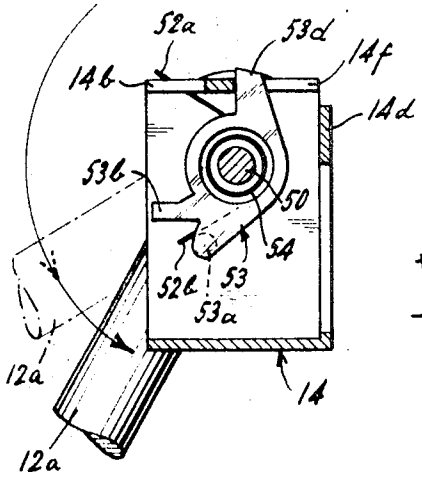

FIG. 10.

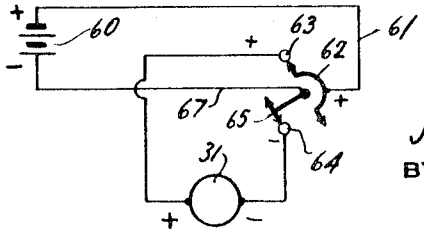

FIG. 9.

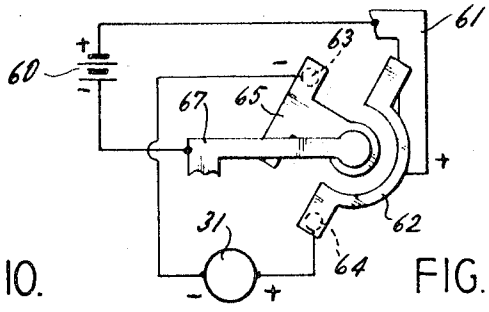

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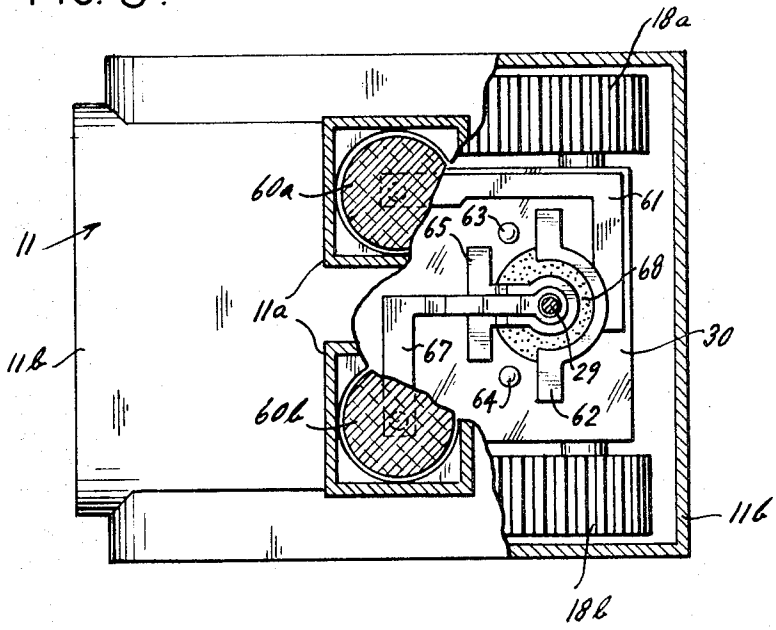
FIG. 8.



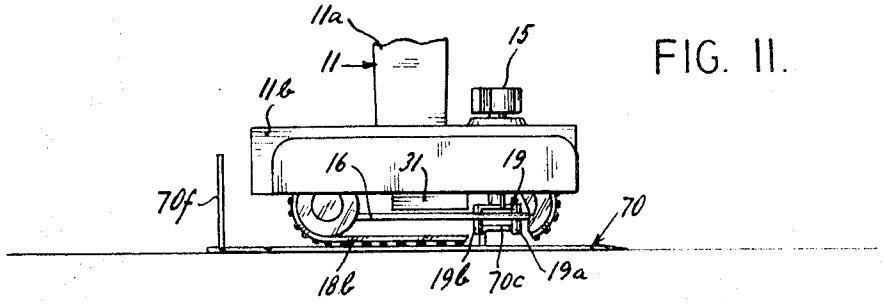


FIG. 11.

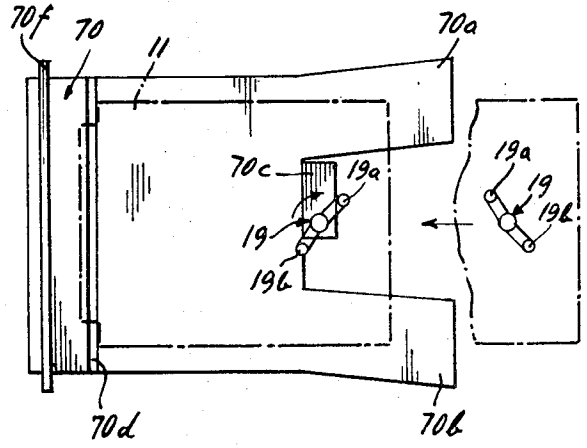


FIG. 12.

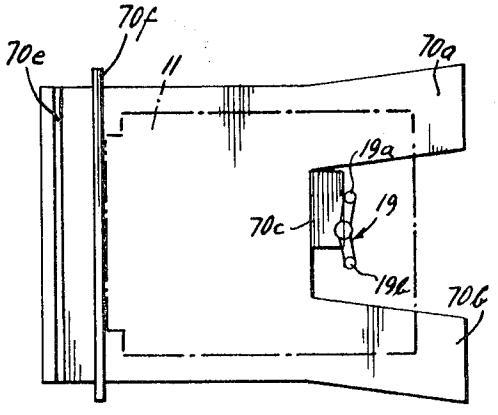


FIG. 13.

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TOY ROBOT

This invention relates to toy robots, and more particularly to a toy robot which is capable of automatically changing its direction of movement and self-triggering arm motions.

There are prior art toy robots which have been provided with caterpillar tracks and battery-operated motors, such a robot moving in either the forward or reverse direction depending on the position of a switch. Generally, in order to control a change in direction it is necessary for the child to manually change the switch position.

It is an object of this invention to provide a toy robot with a three-position (stop, forward and reverse) switch, the position of which switch is automatically changed when the toy robot engages a switching mechanism placed in its path of movement.

Prior art toy robots, in most cases, have been provided with arms which remain in fixed positions during movement of the robot. It would be highly desirable to provide a toy robot with arms which are capable of executing a specific movement to perform some function at a predetermined point during the robot's travel.

It is another object of this invention to provide a robot with a pair of arms, one of which can be cocked to perform a specific function when the other engages an obstruction (or is moved slightly by a child).

It is still another object of this invention to provide the aforesaid arm action in an infinite number of combinations, that is, where the arm which performs the function can be cocked to move from any initial position, and the other arm which triggers the function does so when it is moved slightly from any preselected initial position.

The first of the aforesaid objects is accomplished in the illustrative embodiment of the invention by the provision of a three-position switch which is mounted for pivotal movement about a vertical axis. At the bottom of the switch, there is provided a horizontal pivotal plate with two vertical depending pins at either end thereof. The two pins are separated by approximately 180° relative to the switch axis. When the switch is first placed in the forward position, one of the two depending pins is forward of the other in the direction of the robot movement. When this pin engages a switching plate placed in the path of the robot it is pushed backward relative to the axis of the switch. This, in turn, causes the switch to rotate about its axis from the forward position toward the reverse position. Depending on the placement of a wall on the switching plate, the robot immediately starts to travel in the reverse direction or it ceases to move altogether.

The second and third objects are achieved by mounting the two arms, at their shoulders, on a common shaft extending through a supporting frame. The right arm is first rotated in the direction of a simulated karate chop until it is in the terminal position of the chop movement. The arm is then rotated approximately 90° in the reverse direction. A clutch mechanism permits free rotation of the arm in the forward direction, but the reverse movement winds up a bias spring and also cocks the arm in an initial chop position. When the cocking mechanism is released, the arm moves from the initial position to the terminal position and simulates a karate chop. The left arm is also moved to an initial desired position, typically extending forward of the robot body and slightly downward. When this arm engages an obstruction and is forced downward slightly, it releases the cocking mechanism and the bias spring forces the right arm through a simulated karate chop.

Because each arm can be set by the child in any initial position, there are an infinite number of combinations possible (the karate chop type of operation being only illustrative). The right arm can also be provided with different attachments for simulating various actions. For example, an object can be placed in the right hand of the robot so that when the cocking mechanism is released and the right arm springs forward the object will be thrown in the process.

It is a feature of my invention to provide a switch for controlling forward and reverse movement of a toy robot whose position can be changed either by hand or by engaging an obstruction placed in the path of movement of the robot to control either a reversal in its direction or its stopping.

It is another feature of my invention to provide the robot with a pair of arms, one of which can be cocked in any position to sweep through an arc when the other is moved slightly from any initial position.

Further objects, features and advantages of the invention will become apparent upon a consideration of the following detailed description in conjunction with the drawing in which:

FIG. **1** is a front view, shown partly broken away, of an illustrative toy robot constructed in accordance with the principles of the invention;

FIG. **2** is a side view, shown partly broken away, of the robot;

FIG. **3** is a bottom view of the robot with cover section **16** of FIGS. **1** and **2** removed;

FIG. **4** is a sectional view taken through body section **10** of the robot showing the mounting of arms **12***a*, **12***b* in supporting frame **14**;

FIGS. **5** and **6** are sectional views taken along respective lines **5–5** and **6–6** of FIG. **4**;

FIG. **7** is a view similar to FIG. **5** but shows the position of arm **12***a* following a movement from the cocked position shown in FIG. **5**;

FIG. **8** is a sectional view taken through line **8–8** of FIG. **2**;

FIG. **9** illustrates the switching elements for controlling movement of the robot in two directions;

FIG. **10** is the equivalent circuit diagram of the switching mechanism of FIG. **9**;

FIGS. **11** and **12** show the cooperation of the robot switching mechanism with a plate **70** for controlling a reversal in the robot movement; and

FIG. **13** illustrates the manner in which the robot can be stopped automatically by plate **70** rather than reversing its direction.

As shown in FIG. **1**, the robot includes an upper body part **10** and a lower body part **11**. The upper part **10** of the robot includes a lower section **10***b* which can be snap-fitted onto part **11** as shown. The upper section **10***a* is connected to a head **13** and two arms **12***a*, **12***b*. The two arms are pivoted at their shoulders to a shaft supported in frame **14**. The frame **14** can be mounted inside section **10***a* of the robot in any conventional manner.

Lower body part **11** is provided with two batteries **60***a*, **60***b* contained in battery compartment **11***a*. The positive terminal of battery **60***a* is connected to the negative terminal of battery **60***b* by a metal bridging element **69** secured inside section **10***b* of the robot in any conventional manner. To change the batteries, the snap-fit of sections **10** and **11** is released, new batteries are put into place, and the two sections are then snap-fitted together once again.

The bottom section includes a three-position knob **15**. Two pins **19***a*, **19***b* extend through respective arcuate slots (see FIG. **3**) in cover plate **16**. The two pins rotate around the axis of knob **15** as the knob is moved by hand. Similarly, if the two pins are rotated relative to each other, the knob turns with them. The switch assembly is mounted in lower section **11***b* of the bottom half of the robot body. This section further includes two caterpillar tracks **18***a*, **18***b*.

Referring to FIG. **2**, base section **11***b* includes a mounting plate **30** which can be secured in place in any conventional manner. At the top of the plate are various contact elements, to be described below. Knob **15** is attached to shaft **29**, the shaft extending through base section **11***b* and plate **30** to element **19**. This element bears against the underside of plate **30** to maintain knob **15**, shaft **29** and element **19** in a fixed vertical position. Element **19** includes a pair of horizontal legs (see FIG. **3**), one of pins **19***a*, **19***b* depending from the end of each leg. The two pins extend through arcuate slots **16***a*, **16***b* in cover plate **16**. The cover plate is snap-fitted over sections such as **39***a* in the mounting plate in a conventional manner.

Attached to shaft **29** are two wiper contacts **62, 65**. These contacts rotate in horizontal planes as shaft **29** is turned and, as will be described below, control the direction in which motor **31** operates. The motor is secured to the underside of support plate **30**.

Referring to FIGS. **2** and **3**, axles **28, 43** are mounted in four respective lugs **30***b*, **30***c*, **30***f*, **30***g* extending down from the underside of plate **30**. At the end of each axle there is attached one of elements **17***a*, **17***b*, **17***c*, **17***d*. Each element includes small and large diameter sections, the large diameter sections having the two caterpillar tracks **18***a*, **18***b* placed around them. The drive for the tracks is provided by axle **43**.

Two additional lugs **30***d*, **30***e* depend from the underside of plate **30**. Shafts **41, 42** are each mounted at one end in one of these two lugs, and at the other end in lug **30***c*. The gear train shown in FIG. **3** serves to increase the torque on axle **43** relative to the motor torque and to decrease the speed of the axle relative to the motor speed. Gear **45**, consisting of large diameter section **45***a* and small diameter section **45***b*, is mounted for free rotation on shaft **41** and engages motor gear **44**. Gear **46**, consisting of large diameter section **46***a* and small diameter section **46***b*, is mounted for free rotation on shaft **42**. Similarly, gear **47**, consisting of large diameter section **47***a* and small diameter section **47***b*, is mounted for free rotation on axle **43**. Gear **48**, consisting of large diameter section **48***a* and small diameter section **48***b*, is similarly mounted for free rotation on shaft **42**. Finally, gear **49** is secured to axle **43**. The various gears serve to successively reduce the speed of rotation of gear **49** and axle **43**, as is known in the art.

The electrical switching circuit is shown symbolically in FIG. **10**. Motor **31** is connected to two terminals **63, 64**. The positive terminal of battery **60** is connected to contact element **62** and the negative terminal of the battery is connected to contact element **65**. Both contact elements rotate around a vertical axis coincident with the axis of shaft **29** (see FIGS. **1** and **3**). When the two contact elements are in the position shown in FIG. **10**, contact element **65** engages terminal **64** and contact element **62** engages terminal **63**. The positive potential of battery **60** is thus extended to terminal **63** and the negative potential is extended to terminal **64**, and the motor turns in one direction. If the two contact elements are rotated clockwise in FIG. **10**, such that contact element **62** engages terminal **64** and contact element **65** engages terminal **63** (see FIG. **9**), the positive potential of battery **60** is extended to terminal **64** rather than terminal **63**, and the negative potential of the battery is extended to terminal **63** rather than terminal **64**. In such a case the motor rotates in the opposite direction. If the contact elements are rotated to a position intermediate the extreme positions of FIGS. **9** and **10**, such that neither engages either of terminals **63, 64** as shown in FIG. **8**, the motor circuit is broken and the motor does not operate. The two contact elements are attached to shaft **29** such that they rotate as described with the turning of the shaft.

FIGS. **2, 8** and **9** show the actual contact arrangement whose equivalent circuit is shown in FIG. **10**. On the upper surface of plate **30**, insulating disc **68** is secured to shaft **29**. Attached to the disc are the two contact elements **62, 65**, which elements rotate with the disc. Contact element **67** is fixed to plate **30**. One end of each of contact elements **65** and **67** is provided with a hole through which shaft **29** passes. Contact element **67** is bent so that the end around shaft **29** bears against contact element **65**. The other end of contact element **67** extends into one battery compartment **11***a* of the robot body so that it supports the negative terminal of battery **60***a*. Thus, the negative terminal of the battery source is extended to contact element **65** independent of its orientation as determined by the position of shaft **29**.

Contact element **61** is similarly mounted to plate **30**. One end of the element is extended into the other battery compartment **11***a* and supports the positive terminal of battery **60***b*. The other end of the contact element is bent up toward contact element **62** to extend the positive potential of the battery source to contact element **62** independent of its orientation relative to plate **30**. Terminals **63, 64** are mounted on plate **30** for engagement with contact element **62, 65**, the two terminals being connected by wires on the other side of plate **30** to the two terminals of motor **31** as depicted in FIGS. **9** and **10**.

When knob **15** is rotated to the off position, the two pins **19***a*, **19***b*, extending through slots **16***a*, **16***b* in cover plate **16**, are in the relative positions shown in FIG. **13** and neither of terminals **63, 64** is energized. If the child moves knob **15** to a position such that pins **19***a*, **19***b* are in the orientation shown on the right side of FIG. **12**, the robot moves in the forward direction. In the path of the robot there can be placed a switching plate **70** which includes two legs **70***a*, **70***b* for supporting the caterpillar tracks (see FIG. **12**). At the center of plate **70** there is an inverted L-shaped lug **70***c*, seen most clearly in FIGS. **11** and **12**. As the robot moves to the left in FIG. **12** from an initial position shown on the right side of the drawing, pin **19***a* strikes the front edge of lug **70***c*. As the robot continues to move, the two pins rotate relative to each other inasmuch as pin **19***a* is prevented from further movement while switching element **19** as a whole continues to move with the robot. As the robot (shown by base section **11**) moves to the left in FIG. **12** and assumes its leftmost position, switching element **19** rotates from its initial position to the position shown on the left side of the drawing. This reverses the relative potentials applied to terminal **63, 64** and the robot immediately starts to move in the reverse direction. FIG. **11** is a side view showing switching element **19** in its position just prior to the reverse movement.

In the course of switching from the forward to the reverse direction, the motor turns off. However, after the motor turns off, the momentum of the robot is sufficient to move it forward slightly. This slight forward movement causes switching element **19** to rotate sufficiently to move the contact elements from the off position to the reverse position.

Plate **70** includes two grooves **70***d*, **70***e* (see FIGS. **12** and **13**) and a front wall **70***f* which can be snap-fitted into either groove. When the wall is in groove **70***e*, as shown in FIG. **12**, the operation is as just described; the robot changes direction. But when the wall is in groove **70***d*, as shown in FIG. **13**, the robot comes to a stop. The front of the robot strikes the wall just when pins **19***a*, **19***b* are rotated to the off position. The momentum of the robot cannot carry it forward relative to the plate because of the position of wall **70***f*. Switching element **19** does not continue to rotate to the reverse position and the robot comes to a halt.

The plate or other obstruction can be used in a similar manner to change the robot direction from reverse to forward.

The arm operation sequence is shown symbolically in FIG. **2**. Right arm **12***a* can be moved freely in the counterclockwise direction. The child moves it to some arbitrary position as shown by the numeral **90**. He then rotates the arm in the clockwise direction to the position shown by the numeral **86**. In so moving the arm in the reverse direction, a spring is wound and the arm is cocked in the upper position. When the cocking mechanism is released, the arm springs forward from position **86** to position **90**. As shown in FIG. **2**, the robot arm simulates a karate chop along arc **88**. However, any other terminal position such as **84** can be selected and when the cocking mechanism is released robot arm **12***a* will spring forward from position **80** along an arc **82** as shown in FIG. **2**.

Left arm **12***b* is mounted for movement in either direction. However, clockwise rotation of the arm in FIG. **2** has no effect on the operation. A small counterclockwise rotation, on the other hand, serves to release the cocking mechanism so that arm **12***a* can spring forward. In operation, after arm **12***a* is positioned as desired by the child, arm **12***b* is rotated in the clockwise direction to a desired position such as that shown by the numeral **92**. Thereafter, if the arm is rotated only slightly in the counterclockwise direction along arc **94** to position **96**, the cocking mechanism is released and arm **12***a* springs forward. Any initial position for arm **12***b* can be selected. However, a position such as that shown by the numeral **92** is preferred because an obstruction can be placed in the path of

the robot to automatically cause the arm to rotate slightly in the counterclockwise direction as the arm hits the obstruction during forward movement of the robot.

The arm structure is shown most clearly in FIGS. 4—7. Referring to FIG. 4, the two shoulder portions of the arms are mounted for pivotal movement within body part 10 of the robot, the two arms being secured to shaft 50 as shown at 51. Arm 12*b* is an integral element which includes clutch member 12*b'* extending through a hole in frame 14. Similarly, arm 12*a* includes a clutch member 12*a'* extending through a hole in the other side of frame 14. Also mounted on shaft 50 are two additional elements 53 and 55. Element 53 includes a clutch member 53*c* for engaging clutch element 12*a'*. It also includes two lugs 53*b*, 53*d*, as shown most clearly in FIGS. 5 and 7. Also attached to element 53 is a pin 53*a* for engaging end 52*b* of spring 52. The spring is mounted on element 53 and its other end 52*a* is held in slot 14*a* of frame 14. The spring serves to bias element 53 for rotation in the counterclockwise direction in FIGS. 5 and 7.

Element 55 includes both a clutch section 55*b* for engaging clutch member 12*b'* and a toothed section 55*a*. Spring 54, mounted on shaft 50 between elements 53 and 55, serves to bias each of elements 53, 55 toward its respective mating clutch member 12*a'*, 12*b'*.

The rear section of frame 14 includes two cutouts which form an inverted U-shaped element consisting of two vertical sections 14*c* and a bridging leg 14*d*. A lug 14*e* is mounted on the rightmost section 14*c* in FIG. 4, as shown in FIG. 6, for engaging toothed section 55*a* of element 55. It is apparent that element 55 cannot be rotated in the counterclockwise direction of FIG. 6 because such movement is obstructed by lug 14*e*. However, element 55 can move in the clockwise direction, as shown, with the inverted U-shaped element of frame 14 being bent outward slightly as shown by the dotted lines in FIG. 6.

The frame also includes two additional cutouts 14*b*, 14*f* along its upper surface as shown in FIGS. 4, 5 and 7. These cutouts permit movement of lugs 53*b*, 53*d* to the extreme positions shown in FIGS. 5 and 7. Lug 53*d* also moves within the central cutout defined by sections 14*c* for engagement with section 14*d* of the frame as shown in FIG. 5.

In operation, arm 12*a* is first moved in the counterclockwise direction of FIG. 2 to a desired terminal position 90. Referring to FIG. 4, it is seen that such a movement permits clutch members 12*a'*, 53*c* to move relative to each other. As arm 12*a* is rotated, element 53 is forced to the right in FIG. 4 against the restraining force of spring 54. After the arm is rotated to the desired terminal position, spring 54 forces element 53 to move to the left to the position shown in FIG. 4 where the two clutch elements are engaged. Thereafter, arm 12*a* is rotated in the clockwise direction of FIG. 2. Because the two clutch elements are engaged, element 53 rotates on shaft 50 together with arm 12*a*. Initially, lug 53*d* is in the position shown in FIG. 7. As element 53 is rotated in the clockwise direction, the lug bears against frame section 14*d* and forces it outward as shown by the dotted lines in FIG. 5. After the lug has cleared section 14*d* of the frame, this section of the frame springs back into place as shown in FIG. 5. As element 53 is moved in the clockwise direction from the position shown in FIG. 7 to the position shown in FIG. 5, the two ends of spring 52 are forced toward each other. The spring is thus wound and is cocked to move arm 12*a* from the position shown in FIG. 5 to that shown in FIG. 7. However, such a movement is prevented as long as section 14*d* of the frame prevents rotation of element 53. Lug 53*b* is provided in order to prevent excessive movement of arm 12*a* in the clockwise direction during the cocking operation. After the arm has been rotated clockwise to an extent shown by arc 88 in FIG. 2, lug 53*b* bears against the upper part of the frame to prevent further rotation.

Arm 12*b* is then moved in the clockwise direction of FIG. 2. The same motion is in the counterclockwise direction in FIG. 6 since the view is taken from the right side of the robot. When arm 12*b* is rotated in this direction, clutch elements 55*b*, 12*b'* slip relative to each other. As the rotation of the arm continues element 55 is forced to the left in FIG. 4 against the bias force of spring 54. When the child stops moving arm 12*b*, the spring forces element 55 to the right so that the clutch is engaged once again. During this clockwise movement (FIG. 2), it should be noted that element 55 does not rotate about shaft 50. Teeth 55*a* and lug 14*e* serve as a one-way clutch which permits rotation of element 55 only in the clockwise direction of FIG. 6.

After arm 12*b* is positioned, such as shown by the numeral 92 in FIG. 2, the robot is set into motion. As the robot continues to move in the forward direction, if arm 12*b* is forced downward slightly, for example, by engagement with an obstruction placed in the path of movement of the robot, element 55 rotates slightly with the arm due to the fact that with a counterclockwise rotation of arm 12*b* in FIG. 2, the clutch comprising elements 55*b* and 12*b'* is engaged. The same movement is in the clockwise direction of FIG. 6, and inasmuch as element 55 moves with arm 12*b* it is apparent that teeth 55*a* force lug 14*e* and section 14*d* of the frame outward. This, in turn, allows lug 53*d* in FIG. 5 to clear section 14*d* and spring 52 forces arm 12*a* to rotate in the counterclockwise direction of FIGS. 2, 5 and 7. The rotation is limited by the engagement of lug 53*d* with the top part of the frame as shown in FIG. 7. During the movement, right arm 12*a* simulates a karate chop or can perform some other function, e.g., the throwing of an object originally placed in the arm.

Although the invention has been described with reference to a particular embodiment, it is to be understood that this embodiment is merely illustrative of the application of the principles of the invention. Numerous modifications may be made therein and other arrangements may be devised without departing from the spirit and scope of the invention.

I claim:

1. A toy robot comprising a body, means mounted at the bottom of said body for moving the toy robot, a battery-operated motor for operating said moving means in either direction, and a switching circuit for energizing said motor to rotate in either direction, said switching circuit including contact support means mounted in said body for pivotal movement about a central axis, contact means attached to said support means and operative to energize said motor in either direction in accordance with the rotational position of said support means about said central axis, and depending means attached to said support means at the bottom thereof along at least one axis other than said central axis and responsive to engagement with an obstruction while the toy robot moves for rotating said support means about said central axis to change the movement of the toy robot.

2. A toy robot in accordance with claim 1 wherein said support and contact means have three operative positions, the first for energizing said motor in a first direction to move the toy robot in a forward direction, the second to deenergize the motor, and the third for energizing said motor in the second direction to move the robot in the reverse direction.

3. A toy robot in accordance with claim 2 further including means for limiting the pivotal movement of said support means about said central axis to a predetermined arc, and wherein said second operative position of said support and contact means is intermediate said first and third positions along said arc.

4. A toy robot in accordance with claim 2 further including a knob attached to said support means along said central axis for enabling a child to rotate manually said support means for changing the movement of the toy robot.

5. A toy robot in accordance with claim 4 wherein said depending means includes first and second pins mounted to the underside of said support means on opposite sides of said central axis.

6. A toy robot in accordance with claim 5 wherein said contact means are arranged such that when said first pin is forward of said second pin in the direction of forward movement the obstruction of the movement of said first pin is operative

to cause said second pin to move forward of said first pin and said support means to rotate about said central axis in the direction for reversing the robot movement.

7. A toy robot in accordance with claim 1 wherein said depending means includes two pins mounted to the underside of said support means on opposite sides of said central axis.

8. A toy robot in accordance with claim 7 wherein said contact means are arranged such that when first pin is forward of said second pin in the direction of forward movement the obstruction of the movement of said first pin is operative to cause said second pin to move forward of said first pin and said support means to rotate about said central axis in the direction for reversing the robot movement.

9. A toy robot in accordance with claim 2 wherein the momentum of the toy robot during movement is sufficient when said support and contact means are moved from one of said first and third positions to said second position upon engagement of said depending means with an obstruction to allow the toy robot to continue to move sufficiently such that said support and contact means continue to move from said second position to the other of said first and third positions.

10. A toy robot in accordance with claim 9 further including a plate for placement in the path of movement of the toy robot, said plate having an obstruction thereon and a wall for preventing movement of the toy robot relative to the plate as a result of the momentum of the toy robot when said support and contact means are moved to said second position upon engagement of said depending means with said obstruction.

11. A toy robot in accordance with claim 10 wherein said wall is removable from said plate for allowing the momentum of the toy robot to cause the robot to continue to move even when said support and contact means are moved to said second position to effect movement of said support and contact means to said other of said first and second positions.

12. A toy robot in accordance with claim 2 wherein said contact means includes first and second motor terminals, a first contact element mounted on said support means, a second contact element mounted on said support means, each of said first and second contact elements being arranged for engagement with either of said first and second motor terminals depending on the rotational position of said support means. A first fixed contact mounted in said body having a first end for connection to a positive source of potential and a second end for slideable engagement with said first contact element, and a second fixed contact mounted in said body having a first end for engagement with a negative source of potential and a second end for slideable engagement with said second contact element.

13. A toy robot in accordance with claim 12 wherein said body includes upper and lower parts, said lower part including a battery compartment and said upper part including a contact for bridging a pair of batteries inserted in said battery compartment when said upper part is attached to said lower part.

14. A toy robot in accordance with claim 12 wherein the momentum of the toy robot during movement is sufficient when said support and contact means are moved from one of said first and third positions to said second position upon engagement of said depending means with an obstruction to allow the toy robot to continue to move sufficiently such that said support and contact means move from said second position to the other of said first and third positions.

15. A toy robot in accordance with claim 1 wherein said contact means includes first and second motor terminals, a first contact element mounted on said support means and connectable to a positive source of potential, and a second contact element mounted on said support means and connectable to a negative source of potential, each of said first and second contact elements being selectively engageable with either of said first and second motor terminals depending on the rotational position of said support means about said central axis.

16. A toy robot comprising a body, means mounted at the bottom of said body for moving the toy robot, a battery-operated motor for operating said moving means in either direction, and a switching circuit for energizing said motor to rotate in either direction, said switching circuit including contact means mounted in said body for rotational movement and operative to energize said motor in either direction in accordance with its rotational position, and means depending from the bottom of said body and responsive to engagement with an obstruction while the toy robot moves for rotating said contact means to change the movement of the toy robot.

17. A toy robot in accordance with claim 16 wherein said contact means has three operative positions, the first for energizing said motor in a first direction to move the toy robot in a forward direction, the second to deenergize the motor, and the third for energizing said motor in the second direction to move the robot in the reverse direction.

18. A toy robot in accordance with claim 16 further including a knob attached to said contact means enabling a child to rotate manually said contact means for changing the movement of the toy robot.

19. A toy robot in accordance with claim 17 wherein said depending means includes first and second pins arranged such that when said first pin is forward of said second pin in the direction of forward movement the obstruction of the movement of said first pin is operative to cause said second pin to move forward of said first pin and said contact means to rotate in the direction for reversing the robot movement.

20. A toy robot in accordance with claim 16 wherein said depending means includes first and second pins arranged such that when said first pin is forward of said second pin in the direction of forward movement the obstruction of the movement of said first pin is operative to cause said second pin to move forward of said first pin and said contact means to rotate in the direction for reversing the robot movement.

21. A toy robot in accordance with claim 17 wherein the momentum of the toy robot during movement is sufficient when said contact means are moved from one of said first and third positions to said second position upon engagement of said depending means with an obstruction to allow the toy robot to continue to move sufficiently such that said contact means continues to move from said second position to the other of said first and third positions.

22. A toy robot in accordance with claim 21 further including a plate for placement in the path of movement of the toy robot, said plate having an obstruction thereon and a wall for preventing movement of the toy robot relative to the plate as a result of the momentum of the toy robot when said contact means is moved to said second position upon engagement of said depending means with said obstruction.

23. A toy robot in accordance with claim 22 wherein said wall is removable from said plate for allowing the momentum of the toy robot to cause the robot to continue to move even when said contact means is moved to said second position to effect movement of said contact means to said other of said first and second positions.

24. A toy robot in accordance with claim 16 wherein said contact means includes first and second motor terminals, support means, a first contact element mounted on said support means, a second contact element mounted on said support means, each of said first and second contact elements being arranged for engagement with either of said first and second motor terminals depending on the rotational position of said support means, a first fixed contact mounted in said body having a first end for connection to a positive source of potential and a second end for slideable engagement with said first contact element, and a second fixed contact mounted in said body having a first end for engagement with a negative source of potential and a second end for slideable engagement with said second contact element.

25. A toy robot in accordance with claim 24 wherein said body includes upper and lower parts, said lower part including a battery compartment and said upper part including a contact for bridging a pair of batteries inserted in said battery compartment when said upper part is attached to said lower part.