

- [54] **VOICE CONTROLLED TOY**
- [75] **Inventor:** Masami Furukawa, Tokyo, Japan
- [73] **Assignee:** Tomy Kogyo Inc., Tokyo, Japan
- [21] **Appl. No.:** 647,144
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- [52] **U.S. Cl.** 446/175; 446/280;
 446/354; 367/198; 74/789; 74/665 GA;
 74/674; 74/353; 381/110
- [58] **Field of Search** 446/175, 454, 456, 443,
 446/436, 279, 354, 289, 290, 352, 353, 280,
 340/825.72; 381/110; 364/513.5, 513; 367/198,
 197; 74/789, 665 GA, 674, 353

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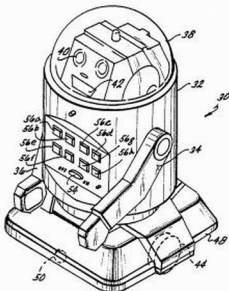
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Primary Examiner—Mickey Yu
Attorney, Agent, or Firm—Herb Boswell

[57] **ABSTRACT**

A voice actuated toy robot receives commands via a radio transmitter and receiver, and in response to receipt of these commands propagates a signal through a CPU. Initially the toy is programmed by storing records of commands in a memory which is associated with the CPU. Upon further receipt of identical commands, the CPU scans the memory and upon finding a match between a record in the memory and a new command, the CPU activates a switch associated with the record in the memory so as to set the switch. A mechanical interrogator is capable of cyclicly interrogating a plurality of switches each of which corresponds to one of the records in the memory. Upon interrogation of the switches, if it is determined a signal is present at one of the switches, the interrogator ceases interrogation and a mechanism is set so as to propagate motion from a motor to an appendage driving wheel or the like of the robot to produce an output in response to the audio command which was received.

18 Claims, 23 Drawing Figures



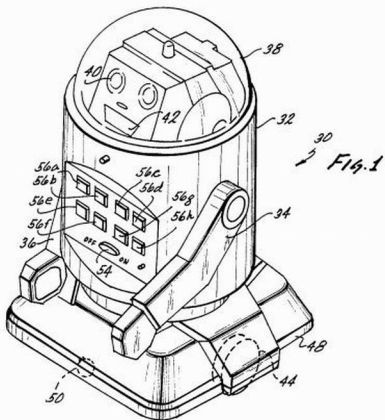


Fig. 7

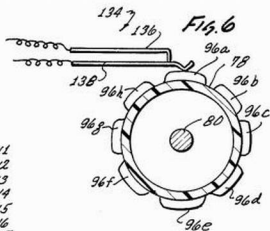
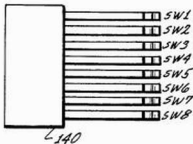
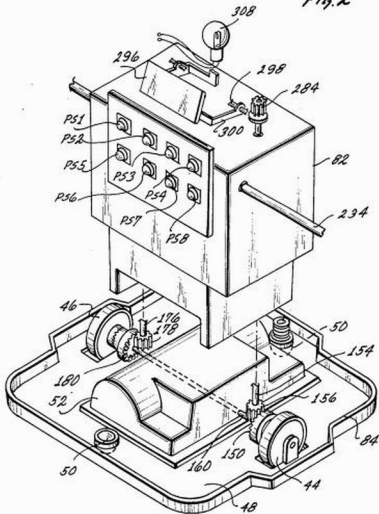


Fig. 2



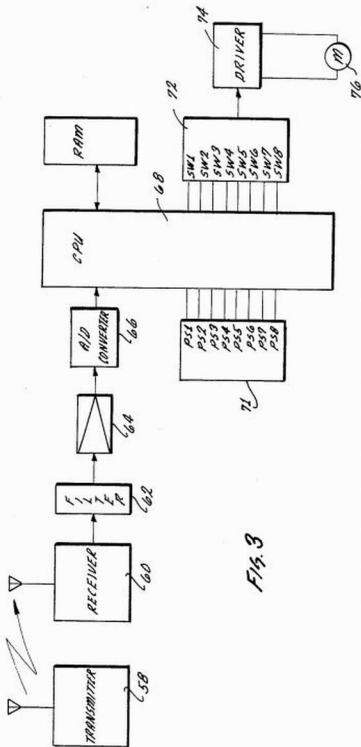


FIG. 3

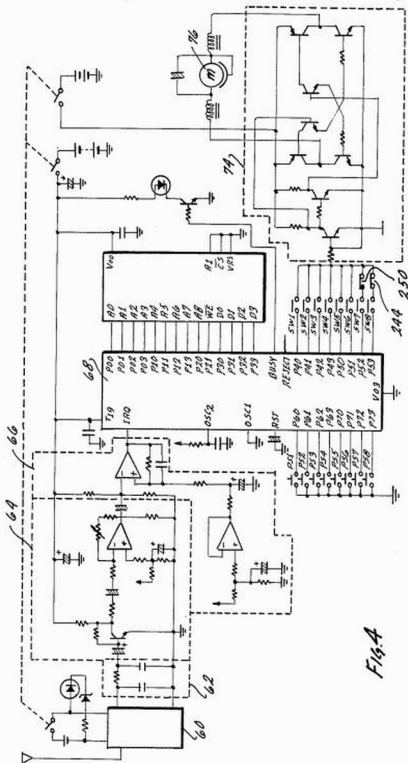
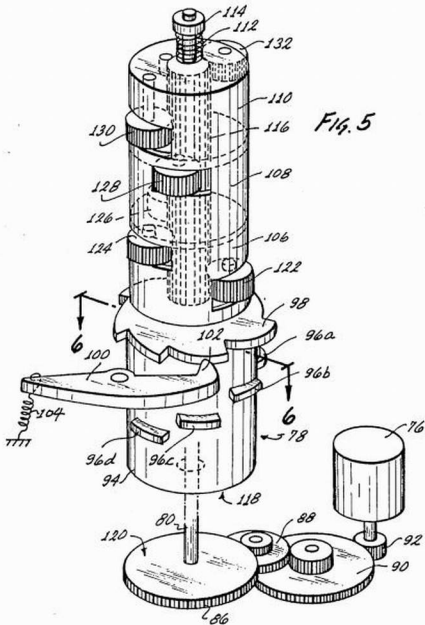
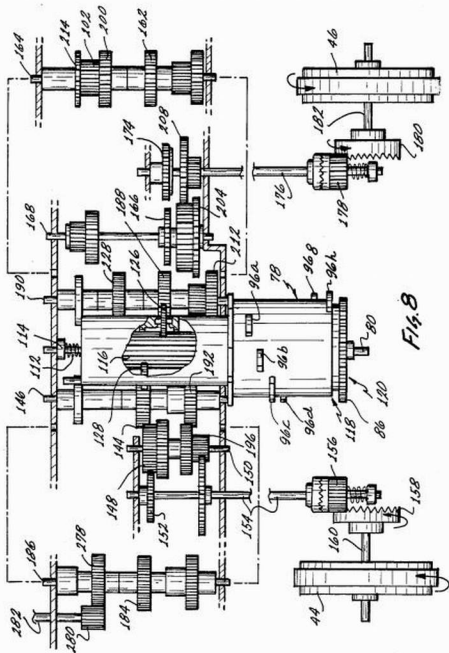
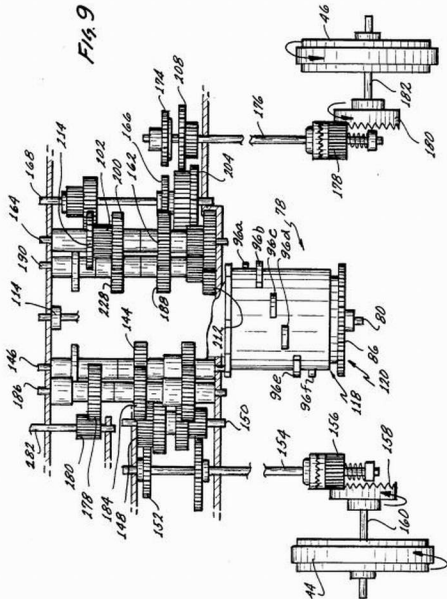
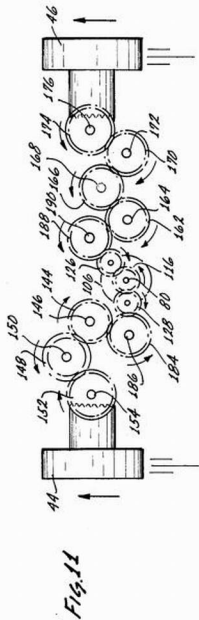
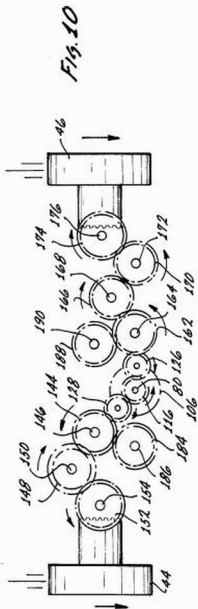


FIG. 4









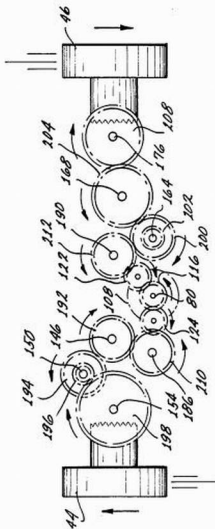
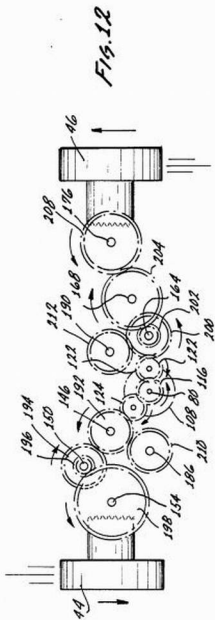


FIG. 13

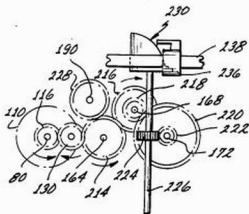


Fig. 14

Fig. 15

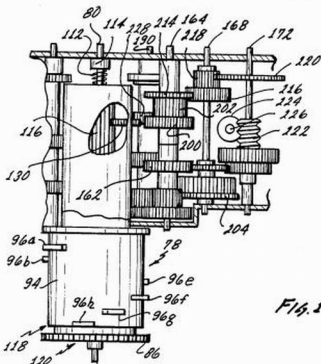
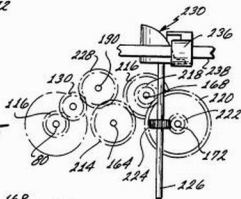
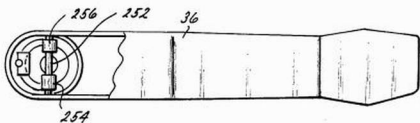
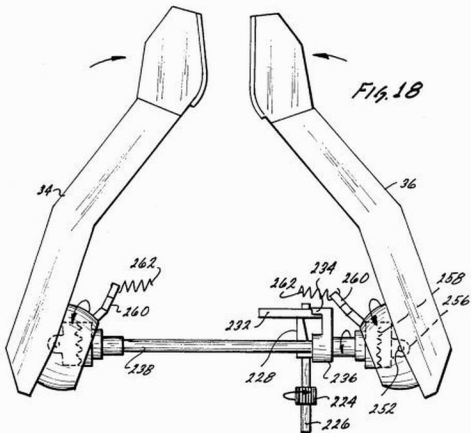


Fig. 16



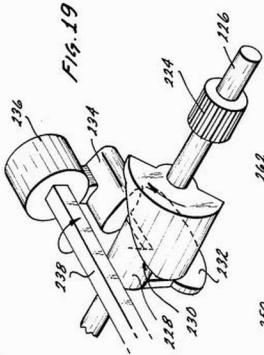


Fig. 19

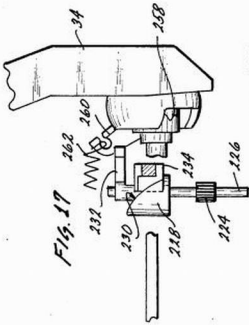


Fig. 17

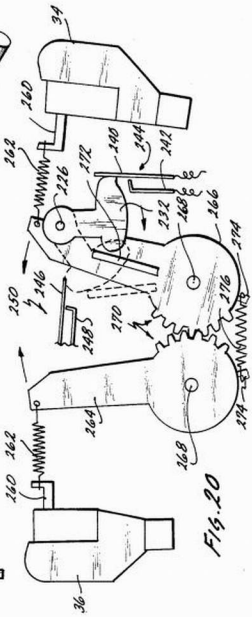


Fig. 20

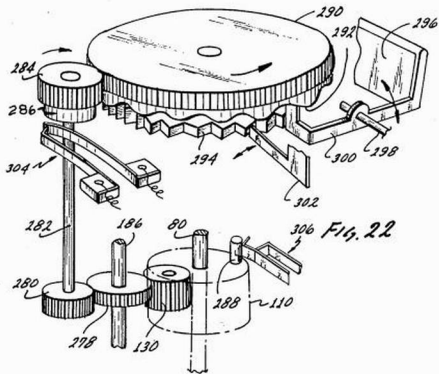
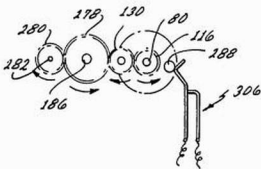


Fig. 23



VOICE CONTROLLED TOY

BACKGROUND OF THE INVENTION

This invention is directed to a voice controlled toy which makes a plurality of movements each of which is governed by an appropriate voice command uttered by the operator of the toy. The invention utilizes a radio transmitter and receiver for transfer of the voice commands from the operation to the toy. The toy further includes a CPU and an associated memory for comparing the voice command with stored records of voice commands. Electrical signals outputted by the CPU are fed to a plurality of switches which are interrogated one at a time by a drive mechanism in the toy. In response to recognition of a particular command, the toy executes a particular motion.

A variety of remote control toys are known. Earlier remote toys were in fact not true remote control in that they utilized a tether, coaxial cable or the like, to connect the operator of the toy with the toy. With refinement and miniaturization of radio transmitters and receivers, true remote control toys were developed. These toys, however, were very limited in their action and for the most part executed only a single action or movement in response to receipt of radio signals.

Further sophistication of remote control toys utilized broadcasting at two different band frequencies such that two motions or movements could be executed. A variety of these so called "dual channel" toys are known. As for instance radio controlled race cars and the like are known which utilize a first channel to control a steering motion and a second channel to control an acceleration motion. Normally the operator inputs a signal to the transmitter by operation of a joystick or the like.

More recently remote control toys have been developed which respond to audio commands. These, however, are quite limited. They essentially respond to the presence of or the absence of any audio command, i.e. on and off. The source, content, or other individual characteristics of the audio command are completely ignored in these toys. It matters not what the audio command is except whether it is present or it is absent.

With the widespread proliferation of micro computers, CPUs (i.e. central processing units) have been developed which utilize either external or internal memory to store the pattern of a particular audio signal. U.S. Pat. Nos. 4,181,821 and 4,348,550 give brief histories of developments in this area.

For the most part the research directed to voice recognition devices is associated with highly sophisticated and expensive systems. It goes without saying that in order for a toy to incorporate and utilize any type of technology, the use of this technology in the toy must be extremely simple and economical. Because of the practicalities of the marketplace it is extremely difficult to incorporate new technologies into toys because of the complexities and the cost associated with those technologies. In order for the toy to become an economical reality, its mechanism must be simple, inexpensive, and capable of mass production. Further, the ultimate toy must not be "fragile" because the users of the toy, children subject their toys to rigorous use and abuse.

Because of the above considerations, it is simply economically unpractical to burden a toy with multiple motors each which only drives a single function. Fur-

ther, it is impractical, because of the user of the toy, to burden the toy with extremely complicated controls beyond the intellectual development of the young user of the toy. Additionally, any technology incorporated into the toy must be entertaining in order to maintain the interest of the child yet it also can not be unduly complicated which would inhibit enjoyment of the toy by the child.

BRIEF DESCRIPTION OF THE INVENTION

In view of the above, it is a broad object of this invention to provide a toy which utilizes an extremely simple switching means to provide a plurality of outputs in response to inputted control signals. It is a further object of this invention to provide a toy which utilizes a voice recognition system for these inputted signals. Additionally, it is the object of this invention to provide a toy which because of its engineering principles, is capable of exhibiting multiple outputs utilizing a minimum of control units to control these multiple outputs. Also, it is the object of this invention to provide a toy which is entertaining and enjoyable to a child yet is educational in nature.

These and other objects as become evident in the remainder of this specification are achieved in a voice actuated toy which comprises in an electronic means for receiving audio signals and storing records of said audio signals, said electronic means further capable of comparing an inputted audio signal with each of its previously stored audio signals, said electronic means outputting a particular output signal in response to receipt of an input audio signal which matches one of said stored records of audio signals; a plurality of switches connected to said electronic means, the number of said switches equal to the number of said stored records of said audio signals, each of said switches including an output terminal; a drive means operatively associated with said switches, said drive means having a plurality of output members each of which is capable of executing a predetermined movement, said drive means output members executing said movements in response to said output signals of said electronic means; said drive means further including switch interaction means for interacting with said plurality of switches one at a time, each of said respective output signals from said electronic means propagated to said drive means only when the respective switch associated with said respective signal is activated by said switch interaction means.

Further, these objects are achieved in a robot which comprises a housing, a plurality of movable means movable mounted on said housing for movement relative to said housing; a motor means mounted on said housing, said motor producing a first output and a second output, one of said first and second outputs comprising a clockwise output and the other of said first and second outputs comprising a counterclockwise output; connector means located on said housing, said connector means operatively associated with said motor so as to receive both of said first and second outputs, said connector means further operatively associated with each of said plurality of movable means, said connector means for transmitting said first output of said motor independently to each of said movable means so as to move said movable means relative to said housing; said connector means including selector means, said selector means rotatably mounted on said housing, said selector means rotating in response to said second output and said se-