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Byron

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[54] **CONTROLLABLE AMUSEMENT DEVICE**

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[52] **U.S. Cl.** ..... **46/244 R,** 46/247

[51] **Int. Cl.** **A63h 11/10**

[58] **Field of Search** ..... 46/244 R, 244 C, 46/243 M, 243 LV, 247; 200/DIG. 1

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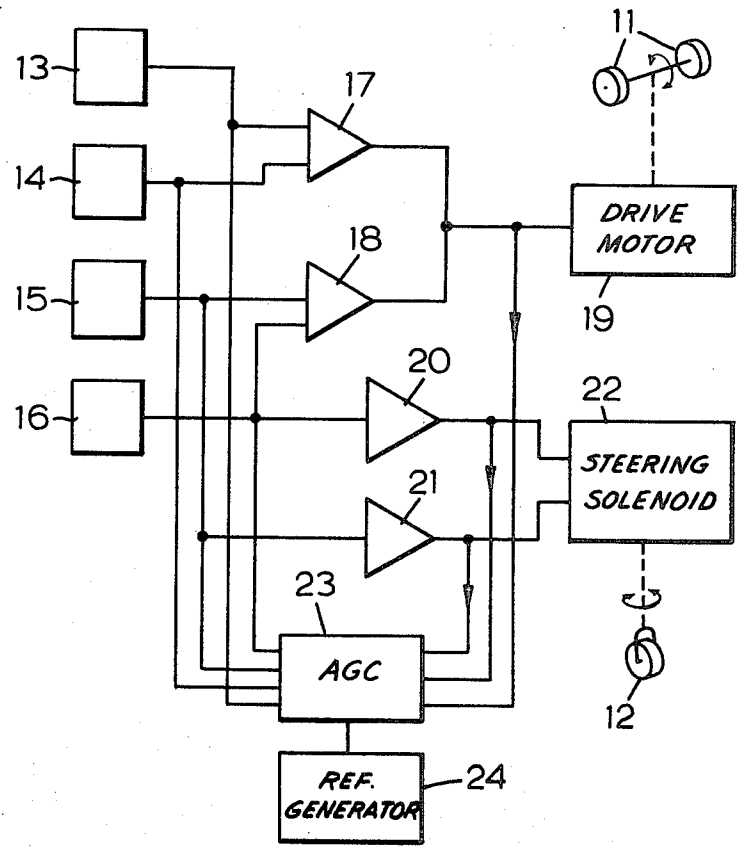
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Primary Examiner—Louis G. Mancene
Assistant Examiner—Robert F. Cutting
Attorney—David M. Rogers et al.

[57] **ABSTRACT**

A self propelled amusement device including a body member shaped in any form which appeals to a child, a pair of drive wheels and at least one steering wheel for supporting the body member. The drive wheels are driven by means of a battery operated motor, and the steering wheel is controlled by a solenoid. Proximity detectors or other sensing devices are placed at both ends of the body member and at both sides. The proximity detectors may be sensitive to changes in capacity in their vicinity, and in such a case the presence of a hand of the child near one of the proximity devices causes a voltage to appear at the output thereof. Appropriate electronic circuitry is provided for controlling the operation of the drive motor and the steering solenoid in response to changes in electrical capacity occurring near any of the proximity detectors, so that the body member can be caused to travel forwards or backwards or to turn any desired direction by merely placing a hand or other body having electrical capacity near selected ones of the proximity detectors.

3 Claims, 2 Drawing Figures



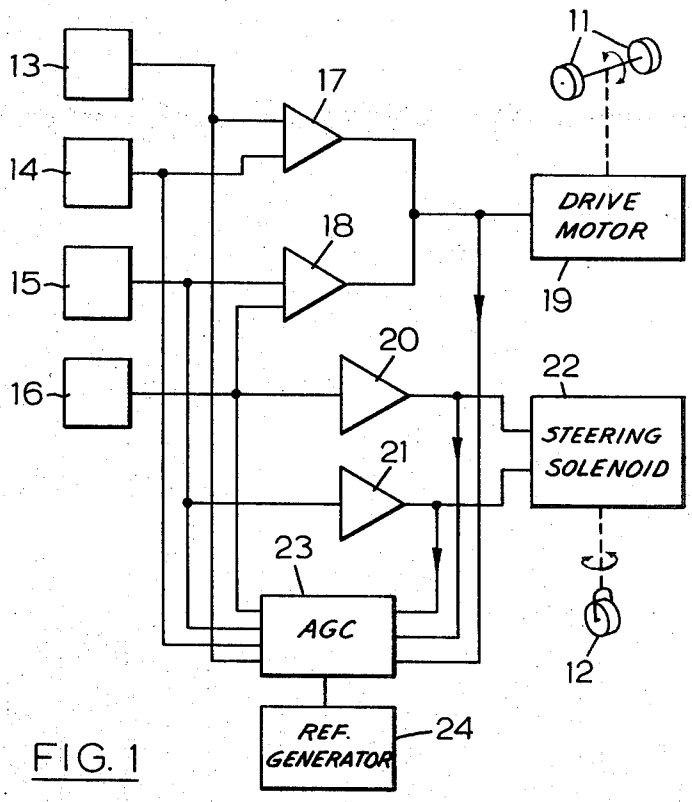

11
13
17
14
DRIVE MOTOR
18
19
15
20
22
16
STEERING SOLENOID
21
23
AGC
12
REF. GENERATOR
24

FIG. 1

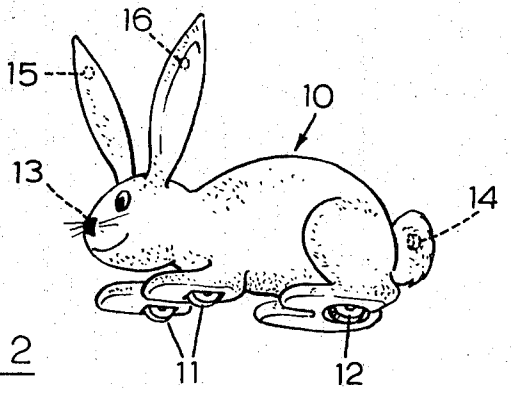

16
15
10
13
14
11
12

FIG. 2

CONTROLLABLE AMUSEMENT DEVICE

This invention relates to an amusement device, particularly to a self-propelled toy which a child may cause to move in any desired direction without any physical contact with the toy.

A preferred embodiment of the invention includes a body member which may be shaped in any desired form, such as the shape of a rabbit or other animal, automobile, etc. The body member is propelled along a surface such as a floor by means of a pair of wheels which are driven by a battery operated motor. Another wheel or wheels is used for steering. Detectors such as proximity devices are placed at each end of the body member (front and rear) and at both sides, and the output of the proximity detectors, which may consist of an electrical signal, is fed to an electronic circuit which produces an output signal which is proportional in amplitude to the degree of unbalance between two opposed proximity detectors. The output signal is of sufficient voltage and current to drive the motor. The proximity detectors positioned at the sides of the body member are also fed to amplifiers which are designed to drive a solenoid which is coupled by appropriate linkages to the steering wheel or wheels. By placing his hand in the proximity of one or more of the proximity detectors, the child can cause the device to move in any desired direction along the floor. For example, by placing his hand immediately in front of the body member, the toy will travel directly towards the hand, and similarly by placing the hand near one of the proximity detectors at the side of the body member, the body member will turn towards the hand. In this manner the toy can be made to follow the child about a room. A preferred embodiment of the invention is illustrated in the accompanying drawing in which:

FIG. 1 is a block diagram of an electrical circuit employed in the invention, and

FIG. 2 is a diagrammatic view showing a typical toy. Referring to the drawings, a body member generally indicated by reference numeral **10** may be shaped in any form which appeals to a child, such as the shape of a rabbit, etc., and the body member **10** is supported by a pair of front wheels **11** and a rear wheel **12.** The body member **10** is propelled over a floor or other flat surface by means of a motor coupled to the wheels **11** which are mounted on a fixed axle (not shown). The wheel **12** is rotatable about a vertical axis so that the body member **10** may be steered by adjusting the position of the wheel **12.** It will be understood, of course, that the wheel **12** could be positioned at the front of the body member **10** and the wheels **11** at the rear thereof, and that a pair of wheels **12** could be used when it is necessary to employ four wheels for supporting the body member **10,** as for example in the case of a toy automobile. Four proximity detectors **13, 14, 15** and **16** are respectively secured to the body member **10** at the front, rear and both sides of the body member **10.** In the case of the rabbit shown in FIG. **2,** the proximity detector **13** may be positioned at the nose of the rabbit, the proximity detector **14** positioned in the tail, and the proximity detectors **16** and **17** may respectively be positioned in both ears of the rabbit. The proximity detectors **13, 14, 15** and **16** are conventional devices which produce an electrical signal when a body such as a hand is placed in proximity to the device. The sensitivity of such devices can be adjusted so that signals of reasonable amplitude are obtained when a hand is within a few inches of the device.

Referring to FIG. **1,** the output of the proximity detectors **14** are respectively fed to the input of a differential amplifier **17,** and the outputs of the proximity detectors **15** and **16** are respectively fed to the inputs of a differential amplifier **18.** The outputs of the differential amplifiers **17** and **18** are connected together and are fed to a battery operated drive motor **19.** The differential amplifiers **17** and **18** may include conventional current amplifier circuits to provide the required current and voltage for driving the motor **19.** The motor **19** is coupled by conventional means to the wheels **11.**

In addition to being connected to the differential amplifier **18,** the proximity detectors **15** and **16** are also respectively connected to amplifiers **20** and **21** which are designed to energize a steering solenoid **22.** The solenoid **22** is conventional, and it is designed to have a central neutral position. The solenoid **22** is coupled by any conventional steering linkage to the steerable wheel **12.** As an added refinement, an automatic gain control circuit **23** may be connected to the circuit of FIG. **1.** As shown diagrammatically in FIG. **1,** the outputs of the amplifiers **17, 18, 20** and **21** are fed to the automatic gain control circuit **23,** and the circuit **23** in turn feeds back an AGC voltage to any appropriate point in the input stages of the amplifiers **17, 18, 20** and **21.** The automatic gain control circuit **23** may be referenced by any conventional stores of a fixed reference voltage, indicated diagramatically as reference generator **24** in FIG. **1.**

In operation, assuming the child places a hand near the proximity detector **13** at the nose of the body member **10,** a voltage will appear across the inputs of the differential amplifier **17,** resulting in an output voltage that is fed to the drive motor **19** which causes the wheels **11** to rotate. The proximity detectors **15** and **16** will not respond to the presence of the hand if it is immediately in front of the proximity detector **13,** and consequently the wheel **12** will be maintained in its neutral position, i.e. with its axis at right angles to the longitudinal axis of the body member **10.** As a result, the body member **10** will be caused to travel forwards in a straight line. Conversely, if the hand is placed immediately in front of the proximity detector **14** at the tail of the body member **10,** a voltage of opposite polarity will appear at the output of the differential amplifier **17** and cause the drive motor **19** to operate in the opposite direction to the previously described direction, so that the body member **10** will be caused to travel backwards in a straight line.

If it is desired to cause the body member **10** to change its direction while moving either forwards or backwards, the hand is placed near either of the proximity detectors **15** and **16.** For example, when the hand is placed near the proximity detector **15,** a voltage of predetermined polarity appears at the output of the differential amplifier **18,** is fed to the drive motor **19** and the wheels **11** are caused to rotate in a predetermined direction, for example counter-clockwise. In addition, the output of the proximity detector **15** is fed to the amplifier **21,** which causes the steering solenoid **22** to move from its neutral position to a position such that the wheel **12** is caused to pivot through a predetermined angle with respect to the vertical. Consequently, the body member **10** will be caused to move in a for-

ward direction in a curved path, for example towards the hand that is placed near the proximity detector **15.** Similarly, if the hand is placed near the proximity detector **16,** the body member **10** will be caused to travel forwards in a curved path towards the hand that is placed near it.

It will be understood that conventional electrical circuitry can be employed between a battery (not shown) and the drive motor **19** and steering solenoid **22** to provide an "on-off" function and also to permit the polarity of the voltage fed to the motor **19** to be reversed so that placing the hand near the proximity detector **13,** for example, can be made to cause the body member **10** either to travel forwards or backwards depending upon the polarity of the voltage fed to the drive motor **19.** Similarly, if desired the polarity of the voltage fed to the solenoid **22** can be reversed so that the body member **10** will be caused to either travel towards the hand or away from it.

The automatic gain control **23,** which is a conventional circuit, is designed to automatically increase the gain of the amplifier controlled by it so that the output of the amplifier is reasonably uniform despite variations in the level of the voltages produced by the proximity detectors **13, 14, 15** and **16.** If desired, the automatic gain control **23** may be designed so that the output voltage of the amplifier controlled by it is higher than normal when the signal produced by the proximity detector is relatively weak. If the signal produced by the proximity detector drops a predetermined level, the automatic gain control **23** will cease to function and the voltage appearing at the output of the relevant amplifier will be zero.

What I claim is:

1. An amusement device comprising a body member, controllable drive means, a pair of rotatable wheels operatively connected to said drive means, said rotatable wheels being attached to said body member and being positioned for moving said body member along a surface in a horizontal direction and in a generally linear path, controllable steering means including a wheel that is pivotable about a vertical axis attached to said body member and positioned for varying the direction of said body member as it moves along said surface, first means responsive to a change in a condition proximate to and spaced from said body member for producing electrical signals fed to said drive means to cause said drive means to operate selectively so as to cause said body member to move forwards and back, and second means responsive to a change in a condition proximate to and spaced from said body member for producing electrical signals fed to said steering means to vary the direction of said body member, said first and second means comprising proximity detectors respectively positioned at the front, rear and both sides of said body member.

2. An amusement device as claimed in claim **1** wherein said first and second means further include first and second differential amplifiers which are respectively connected to said front and rear proximity detectors and to said side proximity detectors.

3. An amusement device as claimed in claim **2** wherein an automatic gain control is connected to said differential amplifiers to maintain the gain thereof at a substantially uniform level over a predetermined change in said proximate condition.

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