

May 24, 1966

R. C. MILLER ET AL

3,252,247

PROGRAM CAR

Filed Nov. 9, 1962

4 Sheets-Sheet 1

FIG. 3.

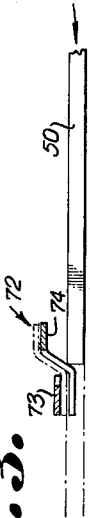


FIG. 1.

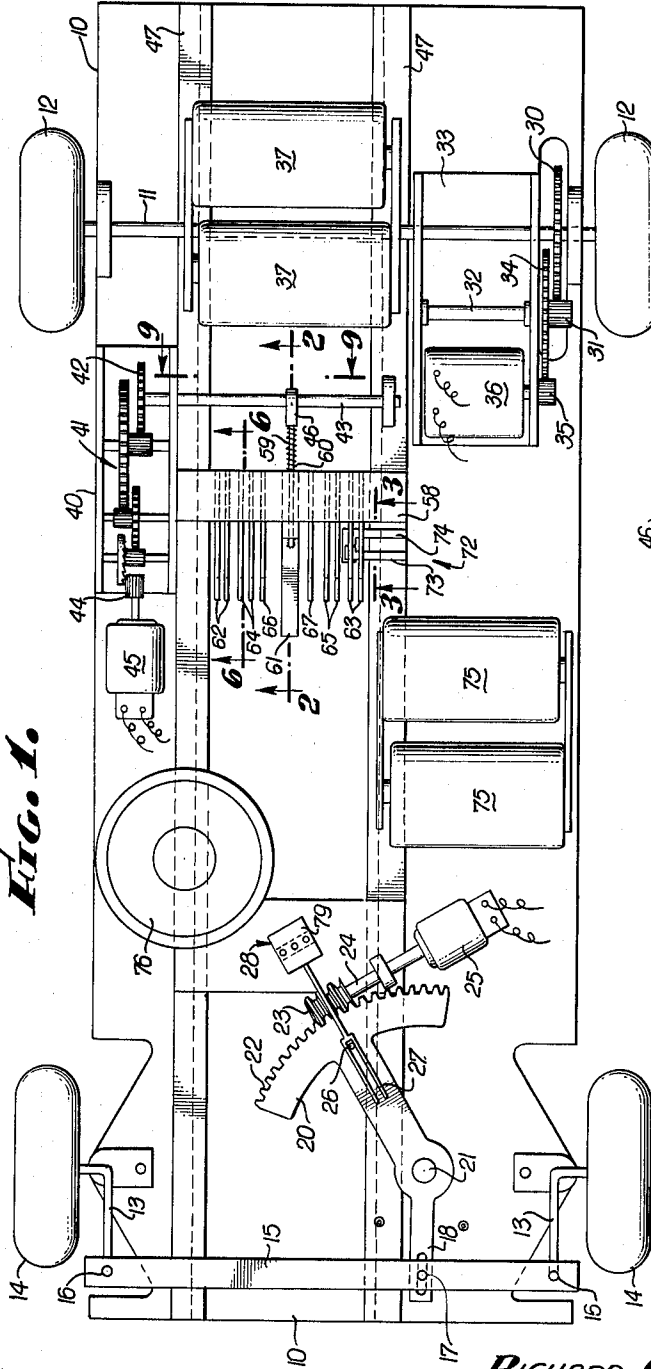
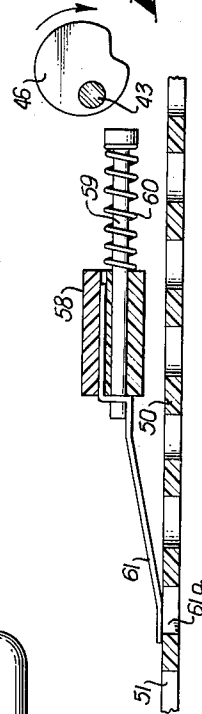


FIG. 2.



INVENTORS.
RICHARD C. MILLER
JAMES ROBBINS
By *Albert M. Mergig*
ATTORNEY.

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FIG. 4.

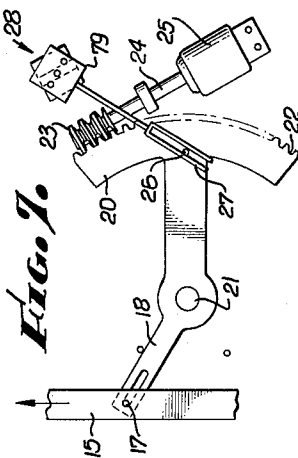
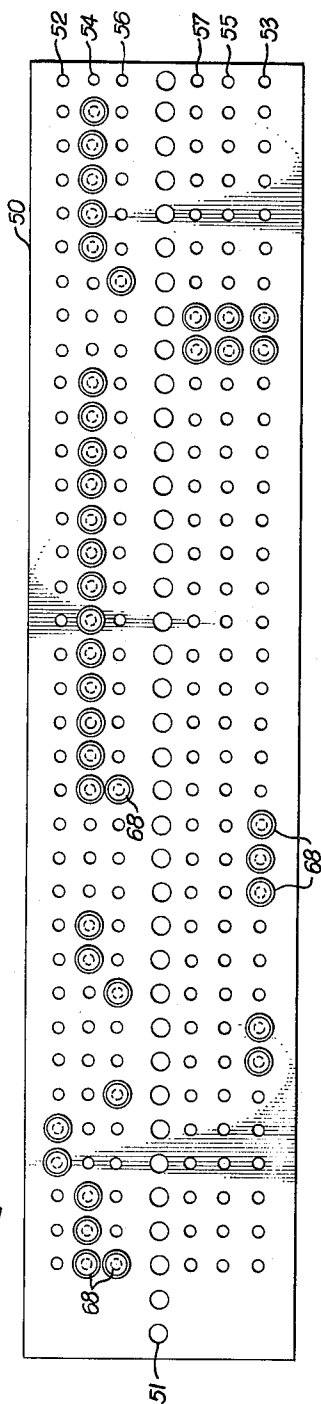


FIG. 8.

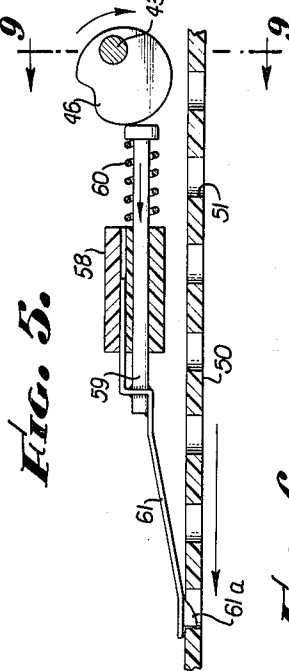
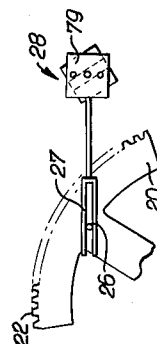
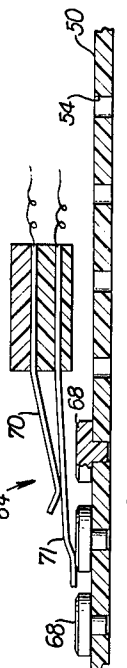


FIG. 6.



INVENTORS.

RICHARD C. MILLER
JAMES ROBBINS

By *Albert Mergig*
ATTORNEY.

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R. C. MILLER ET AL

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FIG. 9.

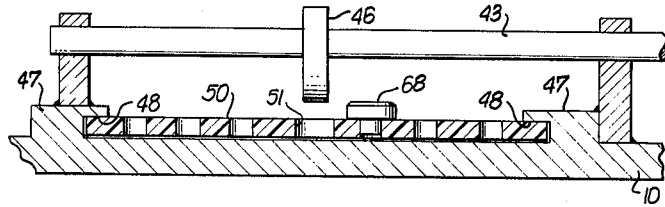
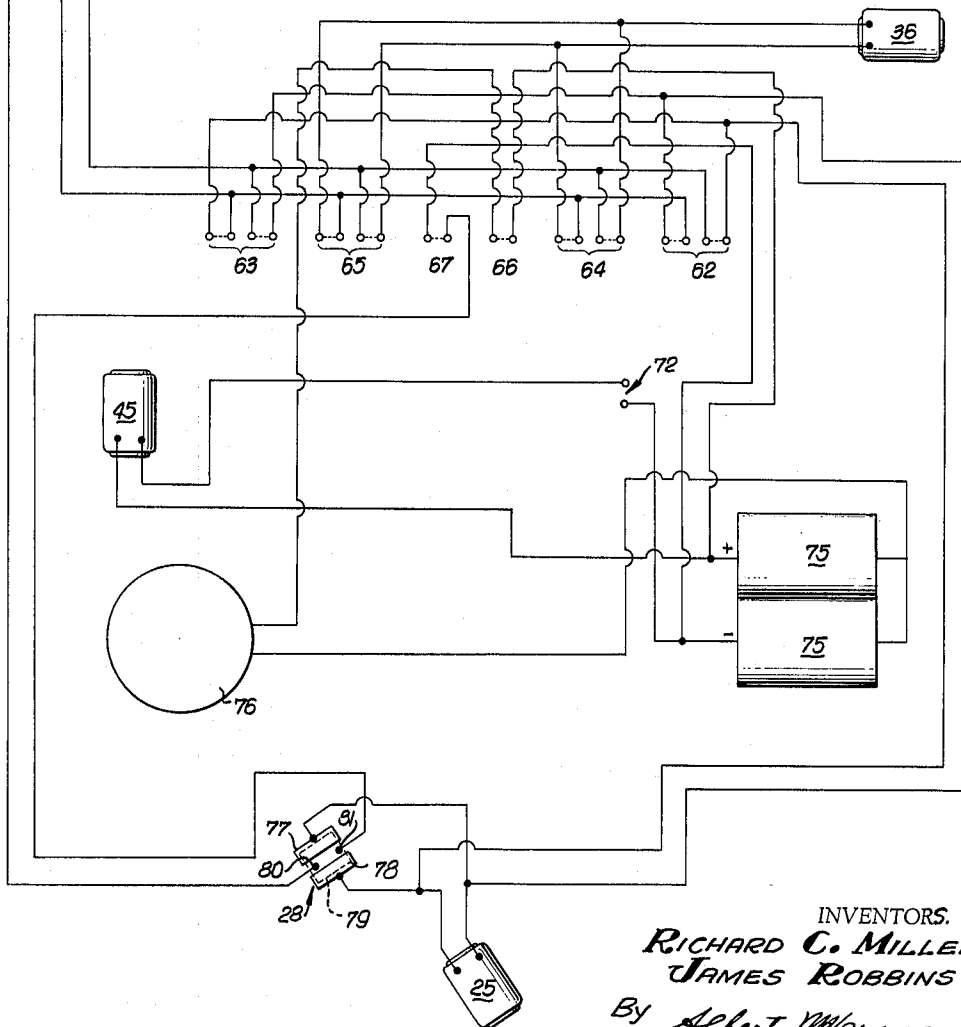


FIG. 10.



INVENTORS.
RICHARD C. MILLER
JAMES ROBBINS
By *Albert M. Mery*
ATTORNEY.

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R. C. MILLER ET AL

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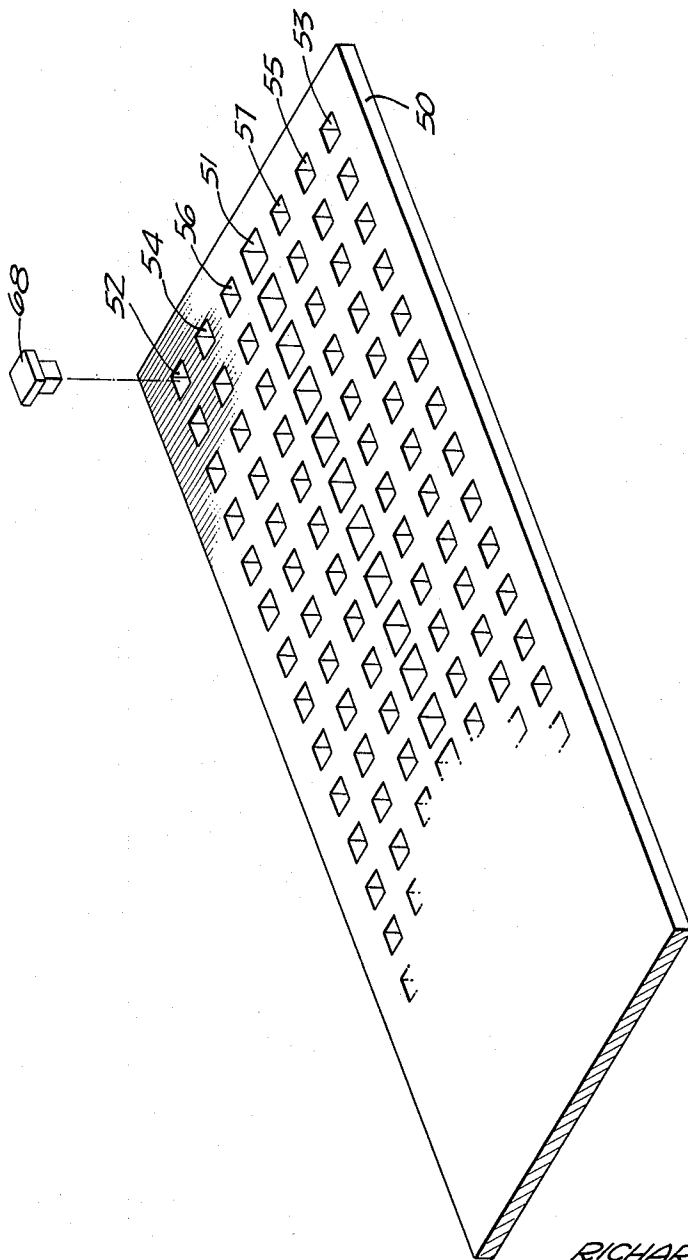


FIG. 11.

RICHARD C. MILLER
JAMES ROBBINS
INVENTORS

BY *Herbert M. Hering*

ATTORNEY

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3,252,247

PROGRAM CAR

Richard C. Miller, 3444 Mentone, and James Robbins,
3622 Mentone, both of Los Angeles, Calif.

Filed Nov. 9, 1962, Ser. No. 237,446

1 Claim. (Cl. 46—244)

This invention relates to toys and more especially to toy cars and similar vehicles. This invention is a continuation-in-part of our previous application Serial No. 179,427, filed March 13, 1962, for Program Car, now abandoned.

Heretofore, numerous toy cars or vehicles have been developed which are self-propelled and to some degree dirigible; however, to the knowledge of the present inventors the prior art has not produced a self-propelled dirigible toy car or vehicle having more than a moderate degree of variation in the driving and steering operation capabilities of the vehicle. The present invention has been developed to provide a toy car that is self-operated in both forward and rearward directions and having self-controlled steering means for changing the path or route of travel of the car and wherein both of these actions, as well as starting and stopping, can be predetermined and varied throughout a substantially unlimited number of variations.

These novel and desirable results are obtained by the provision of motor-actuated steering, as well as driving means, and a continuously actuating controlling device actuated by a moving card or tape which operates switch means for controlling the driving and steering motors. This tape can be made changeable by provision of a series of holes in which buttons may be selectively positioned and the pattern or sequence of which may be changed at will. This programming card or tape may also contain provisions for actuating lights, turn signals, horns or other accessories of any desired nature which may be incorporated in the construction of the vehicle.

It is, therefore, the primary purpose and objective of this invention to provide a novel and improved toy car or vehicle that is self-driven and self-controlled according to a prearranged, but changeable sequence or pattern.

Another object of the invention is to provide a program-actuated and controlled toy car that is self actuated, the actuation being controlled by a punch card type of actuating mechanism.

A further object of the invention is to provide a program-actuated car, as in the previous object, wherein the sequence of control actuations may be varied.

An additional object of the invention is to provide a substantially continuous control card for a sequence of operations that may be repeatedly used and the control pattern changed at will.

Another object of the invention is to provide a self-controlled dirigible vehicle wherein novel means are provided for actuation of the steering means to provide a straight forward or reverse direction of movement of the vehicle.

These and other additional objects and advantages of this invention can be best understood in connection with the accompanying drawings wherein:

FIGURE 1 is a top plan view of a toy vehicle or car incorporating the present invention.

FIGURE 2 is a sectional view, enlarged, taken along line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view taken along the line 3—3 of FIGURE 1.

FIGURE 4 is a top or face view of a program card employed in the actuation of the vehicle of FIGURE 1.

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FIGURE 5 is a view similar to FIGURE 2 showing the actuation of the program card shown in FIGURE 4.

FIGURE 6 is a sectional view, enlarged, taken along the line 6—6 of FIGURE 1.

FIGURE 7 is a partial view showing the steering mechanism after actuation to turn the steering wheels in a direction for a right turn.

FIGURE 8 is a view similar to FIGURE 7 showing the steering mechanism in a left turn position.

FIGURE 9 is a sectional view, enlarged, taken along line 9—9 of FIGURE 1.

FIGURE 10 is a wiring diagram of the electrical circuit of the invention.

FIGURE 11 is a perspective view of an alternate form of program card and buttons.

Referring in more detail to the drawing, and especially to FIGURE 1, the present invention is shown incorporated in a toy car or vehicle having a generally flat frame or body 10 providing suitable bearing formations for a rear axle 11 having wheels 12 thereon and a pair of axle bearing and pivot members 13 which mount front wheels 14. A drag link 15 has its ends pivotally connected at 16 to steering axle members 13 and has a pivot connection 17 to a forwardly extending arm 18 of a steering wheel 20 pivoted at 21 to body or frame 10. Steering wheel 20 is sector shaped having gear teeth 22 formed on its outer edge which teeth mesh with a worm gear 23 on a shaft 24 of a steering motor 25. A pin 26 extends upwardly from the face of gear 20 and extends between the fork legs 27 of a "straight-forward" steering control device 28 to be more fully described hereinafter.

A gear 30 is secured on rear axle 11 and is driven by a pinion gear 31 on shaft 32 carried by a bracket 33 suitably secured on frame 10. Shaft 32 mounts a gear 34 driven by a pinion gear 35 secured on the shaft of a motor 36 suitably mounted on bracket 33. Motor 36 is of a type adapted to be reversible and it should be clear that driving wheels 12 will be driven by motor 36, power for which is derived from one or more batteries 37, suitably mounted on frame 10.

A sub-frame 40 is secured on frame 10 and is in the form of a channel providing bearings for a reduction gear train 41 which has a last driven gear 42 mounted on a shaft 43 suitably bearing mounted on frame 10 or bracket 40. The driving gear 44 of the gear train 41 is mounted on the shaft of a program control motor 45 secured on frame 10.

Shaft 43 mounts a cam disc 46 centrally of the frame. Frame plate 10 is formed with or secures a pair of longitudinally extending rails 47 having inwardly directed guide channels 48 (see FIG. 9) for supporting and guiding a program card 50 which is shown separately in FIGURE 4. Card 50 has a longitudinally extending row of apertures 51 disposed centrally of the card and on each side of this central row of apertures there are three rows of apertures designated 52, 53, 54, 55, 56 and 57 respectively. Preferably as shown in FIGURE 11 buttons 68 have a square shape and the apertures 51 are square-shaped to promote smooth uniform contact of the switches therewith. However, if desired the buttons 68 may have a circular top with a square shaft fitting into a square-shaped aperture 51 or the button and aperture may both be completely circular or any other convenient shape. A non-metallic switch mounting bar 58 extends across rails 47 and provides mounting for a plunger 59 having a head engageable with cam 46, the plunger mounting a spring 60 seated against the head of the plunger and plate 58 to urge the plunger to retracted position as shown in FIGURE 2. A flexible rod 61 extends forwardly from plunger 59 and is formed with a dog 61a which drops into apertures 51, and by which the card 50 is advanced each time

shaft 43 is turned to complete a revolution of cam 46 thereon and push the plunger forwardly. Mounting plate 58 also provides mounting for a plurality of switches 62, 63, 64, 65, 66 and 67 and disposed to overlie program card 50 and the corresponding apertures rows 52 to 57 respectively.

These card apertures 52 to 57 respectively are adapted to receive a plurality of buttons formed with stems to fit into apertures 52 to 57. Each switch 62 to 67 respectively is formed with a relatively fixed contact member 70 (FIGURE 6) and a movable contact arm 71 which is raised into engagement with arm 70 thereof as each button 68 successively moves and passes under this contact arm. One of the rails 47 a switch 72 (FIGURE 3) having a fixed contact 73 and a movable contact 74 which is moved into engagement with contact 73 when the leading edge of the card 50 is initially positioned in the channels 48 and moved forwardly. Switch 72 upon being closed completes a circuit through motor 45 and rotates shaft 43 and thus causes the step-by-step movement of the card 50 and the programming provided by the arrangement of the buttons 68 along the several aperture channels.

One or more batteries 75 provide power for the card advancing drive motor 45 and a horn 76 or other accessory which it may be desired to operate on the vehicle. The "straight forward" steering control device 28 comprises a pair of fixed spaced contact plates 77 and 78 (FIG. 10) and a pivoted block 79 from one side of which fork 27 extends. Block 79 mounts a pair of contacts 80 and 81, respectively, to which circuit conductors are connected as shown in FIGURE 10. Conductor wires from motor 25 are connected to contact plates 77 and 78 as shown. Switches 62, 63, 64 and 65 each having two sets of contacts 70 and 71 while switches 66 and 67 each have one pair of contacts 70 and 71, as shown in FIGURE 6. Both pairs of contacts of each of the double contact switches, such as switch 62, are closed when a button 68 passes under these contacts in the associated row of apertures 52. In a similar manner the several buttons positioned in apertures in row 54 will actuate both sets of contacts of switch 64. Similar action occurs with the single pair of contacts of switches 66 and 67.

As should be clear from the wiring diagram of FIGURE 10, upon the closing of switch 62 by a button 68 in one of the apertures of row 52, motor 25 will be operated to turn steering wheel 20 for a "left" turn of the steering wheels 14. During this operation of the motor 25, fork 27 will turn contact block 79 clockwise, as shown in FIGURE 8, which will cause contacts 80 and 81 to engage plates 77 and 78, respectively. After button 68 has moved beyond switch 62, the contacts 70 and 71 thereof will be separated and motor 25 will stop. A similar, but reverse action will occur if a button 68 passes under the contacts of switch 63 for effecting a "right" turn of the wheels. If then a button 68 follows in time sequence in an aperture in row 57, switch 67 will be closed and a circuit will be completed to motor 25 through contacts 80 and 81 and plates 77 and 78 to reverse the direction of drive of motor 25 until the steering wheel 20 is brought back to the normal or "straight forward" position shown in FIGURE 1, and upon reaching this position, contacts 80 and 81 will be between contact plates 77 and 78 thereby stopping the motor until a later actuation by switch 62 or 63 for a "left" or a "right" turn.

Switches 65 and 64, when closed by buttons in the corresponding rows of apertures 55 and 54 respectively, control the actuation of drive motor 36 in forward and reverse directions as determined by the arrangement of the buttons in these rows of apertures. Correspondingly a

button or buttons in aperture rows 56 will close switch 66 to sound the horn signal 76. As mentioned hereinabove, the actuation of the control mechanism will occur upon the insertion of card 50 into the track guide channels 48 and when the leading edge of the card moves past switch 72 the circuit will be completed to start the motor 45 causing a continuous drive of shaft 43 and cam 46 as long as the card is in the trackway and after the card moves past switch 72 it will be opened and motor 45 will stop. During the operation of motor 45, cam 46 will, upon each rotation thereof, cause plunger 59 to be reciprocated whereby dog 61a thereon will successively drop in apertures 51 and advance the card by one aperture spacing.

The actuation of switches 62 to 67 inclusive, is shown as being effected by the buttons 68 in the apertures in the card 50. However, this is one illustrative method only of actuating these switches and other types of actuators may be employed. For example, instead of the apertures and buttons the card may be formed with a series of bosses or tongues which may be pressed upwardly from the surface of the card.

Another variation of switch actuation may be that of having a plurality of cards each formed with recesses or apertures according to a complete and predetermined program and the switches designed to provide spring fingers to drop into these apertures or recesses to close the switch contacts. A further variation would be an electrical contact feeler which would move into and out of such apertures and makes contact with a contact plate below the card.

Other variations in the switching and programming features of the toy car are contemplated and it will be understood that the invention is illustrative rather than restrictive of the invention, and that other changes and modifications may be made without departing from the spirit and scope of the subjoined claim.

What is claimed is:

A self-driven and self-controlled vehicle comprising: a frame having rear drive wheel and separate steerable front wheels thereon; first reversible drive means for driving said rear wheels; second reversible drive means for effecting steering movement of said front wheels; separate control means for said first and second drive means, respectively; programming means on said vehicle for separately actuating said control means according to a preselected program, said control means for said second drive means including means responsive to operation of the means to effect steering movement of said front wheels in at least one direction from a straight-ahead position for conditioning said control means whereby a subsequent actuation thereof by said programming means causes said front wheels to turn in the other direction.

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DELBERT B. LOWE, *Primary Examiner*.

RICHARD C. PINKHAM, *Examiner*.

R. F. CUTTING, *Assistant Examiner*.