Aug. 22, 1950 W. HOWARD 2,519,472

REMOTELY CONTROLLED TOY VEHICLE

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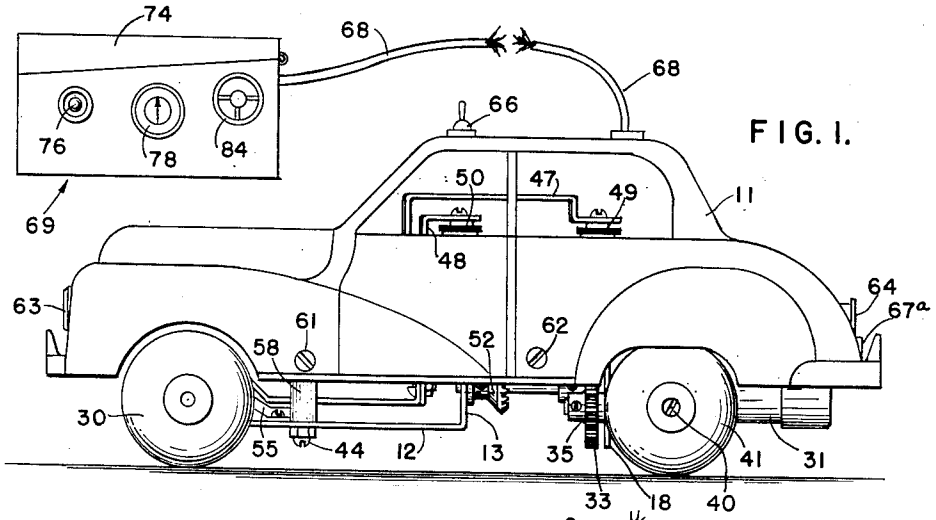


FIG. 1.

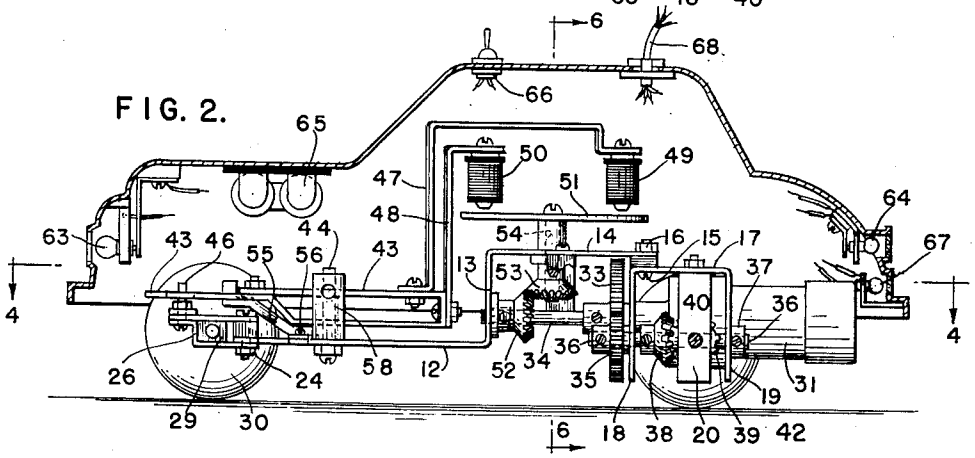


FIG. 2.

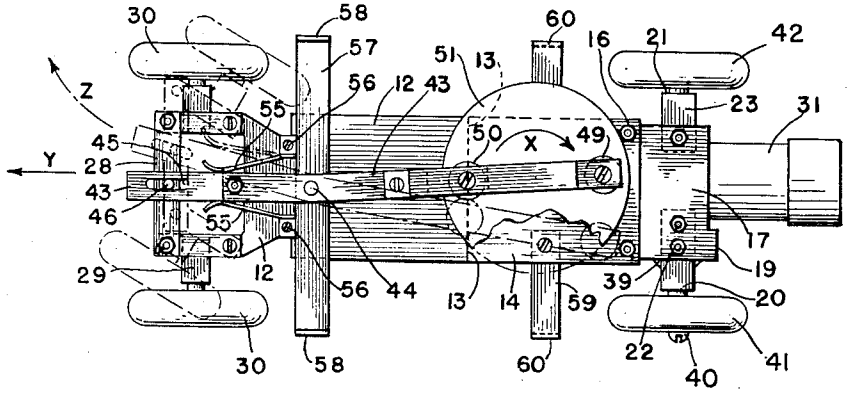


FIG. 3.

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FIG. 4.

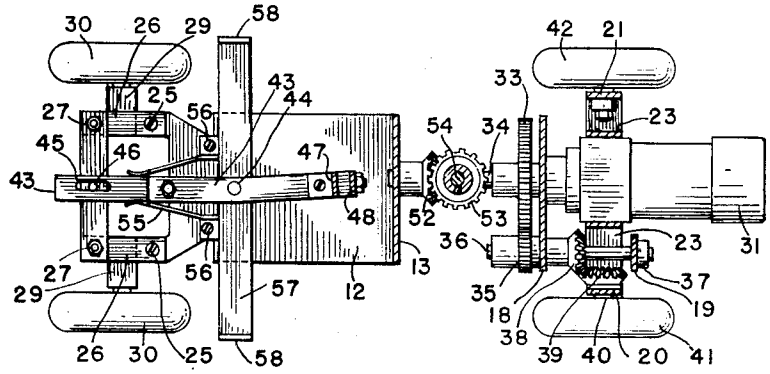
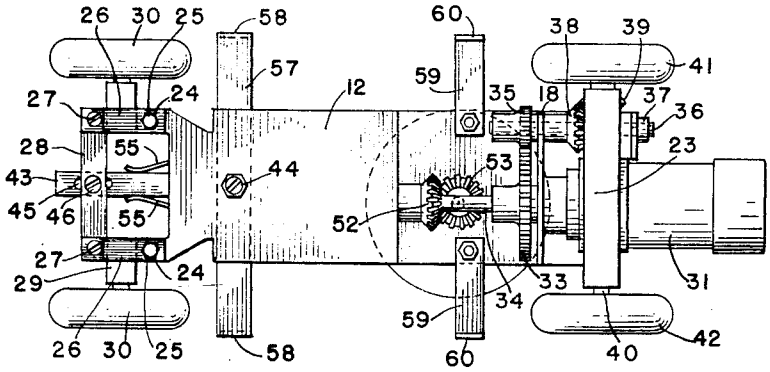


FIG. 5.



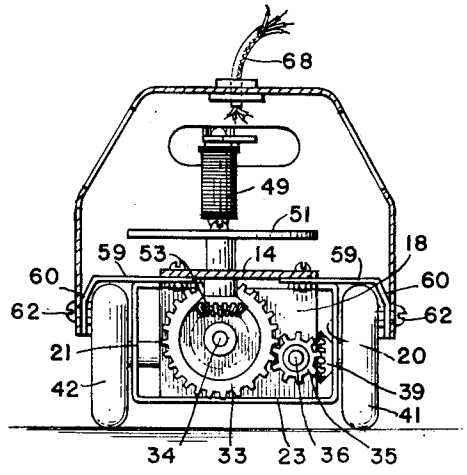


FIG. 6.

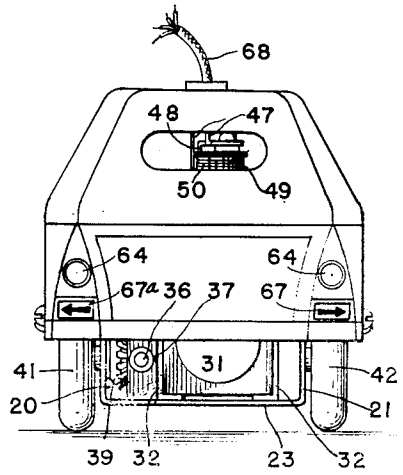


FIG. 7.

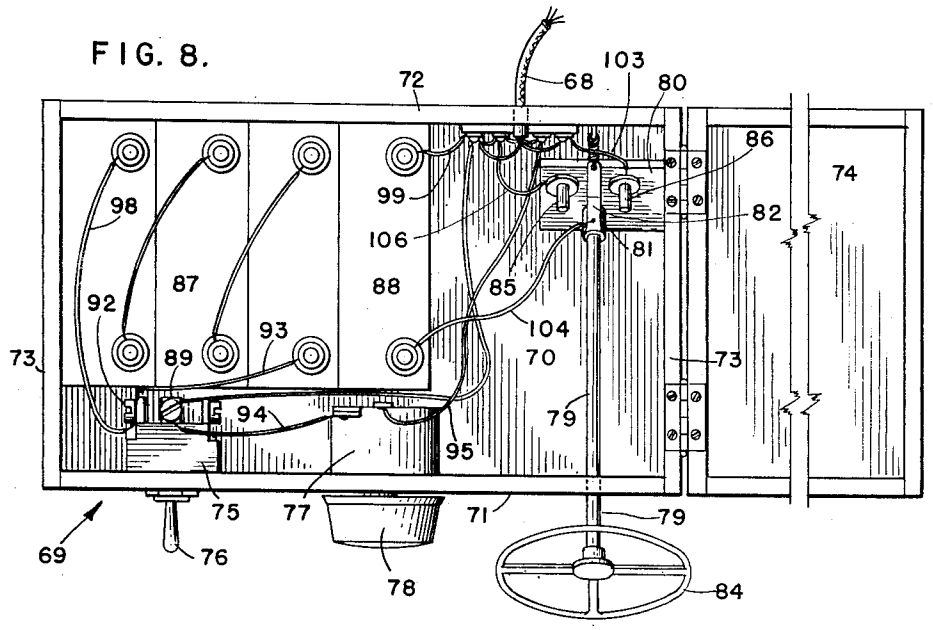
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FIG. 8.



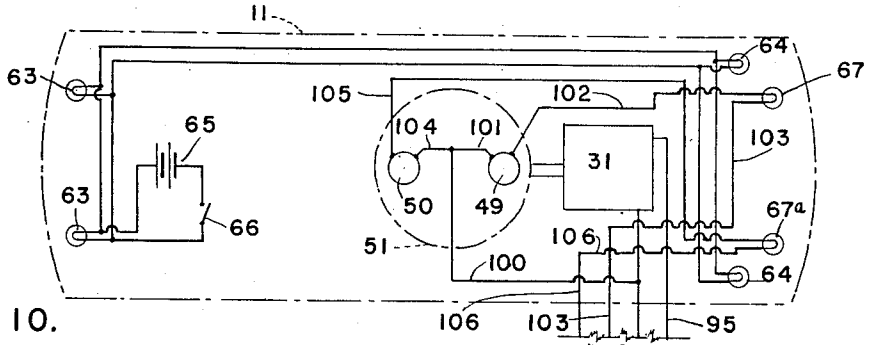


FIG. 10.

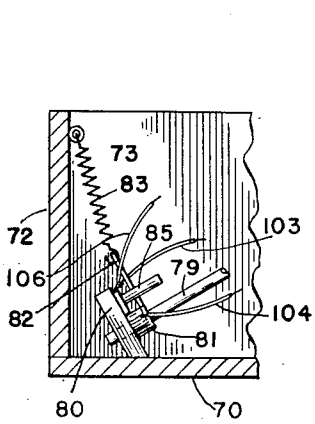
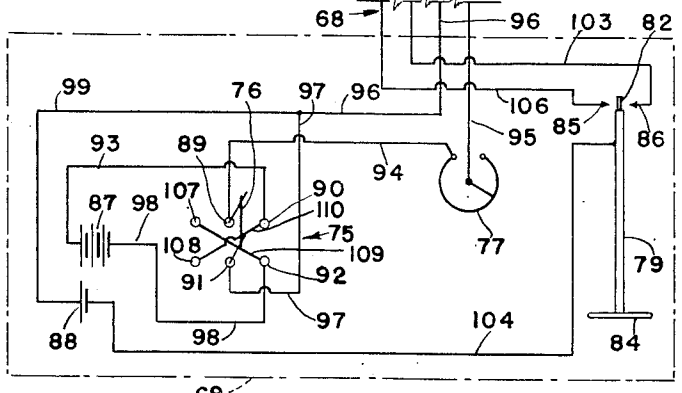


FIG. 9.



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REMOTELY CONTROLLED TOY VEHICLE

William Howard, Mineola, N. Y.

Application July 17, 1948, Serial No. 39,289

1 Claim. (Cl. 46—210)

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This invention relates to a propelling mechanism for rolling toys and has particular reference to a mechanism of the character described wherein a remote controlling unit is included to direct the operation of the said mechanism.

An object of this invention is the provision therein for remotely controlling the forward or rearward motion of the toy and actuating a steering mechanism therein to change the direction of the moving toy.

Another object of this invention is the provision therein for locating a control unit at a distance from the rolling toy and connecting the toy to the remote control unit by a flexible electrical conductor cable.

Another object of this invention is the inclusion therein of rear signal lights to indicate the direction of the turning movement of the rolling toy.

Another object of this invention is the means provided therein for normally keeping the front wheels of the toy in alignment with the rear wheels so that the toy, as it rolls, will travel in a straight line, either forwardly or rearwardly.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description and in the claim wherein parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit. In the accompanying drawings there has been illustrated the best embodiment of the invention known to me, but such embodiment is to be regarded as typical only of many possible embodiments, and the invention is not to be limited thereto.

The novel features considered characteristic of my invention are set forth with particularity in the appended claim. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view of a rolling toy which embraces the driving mechanism and control unit of this invention and which, in the embodiment herein described, shows a miniature simulation of an automobile body, enclosing the said driving mechanism.

Figure 2 is a side elevational view of the driving mechanism and shows the encasing body in section.

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Figure 3 is a plan view of the driving mechanism having the enclosing body removed.

Figure 4 is a partial plan and sectional view of the driving mechanism taken approximately along line 4—4 of Figure 2.

Figure 5 is a bottom view of the driving mechanism removed from the enclosing body.

Figure 6 is a transverse sectional view taken along line 6—6 of Figure 2.

Figure 7 is a rear end elevational view of a toy automobile including the driving mechanism.

Figure 8 is a top view of the box containing the remote control elements and shows the cover thereof raised and swung to the side to bring to view the said elements therein.

Figure 9 is a fragmentary sectional elevation of the control box and shows the lower end of a steering shaft and coacting switches to control the lateral movement of the front wheels of the toy.

Figure 10 is a diagram showing the electric circuits connecting the control units in the remote control box with the various elements in the driving mechanism.

Referring in detail to the parts, 11 designates an enclosing body which in the drawings (Figures 1, 2, 6 and 7) show a miniature automobile body, but which may be a representation of any similar body, or animal. Numeral 12 indicates a chassis or lower plate carrying the various elements of the toy propelling mechanism, and is formed with an upright wall 13 and an extension 14 to which there is secured, by screw bolts 15 and nuts 16, a further extension 17 having downwardly extending portion 18 and a downwardly extending leg 19. Laterally and downwardly extending wheel supporting members 20 and 21 are secured to the extension 17 by means of bolts 22. The said legs 20 and 21 are integrally connected by a band 23 (Figures 4 to 7).

The forward end of the chassis 12 is formed with forwardly extending arms 24 to which there are pivotally attached, by screw bolts 25, arms 26 to the outer ends of which there is pivotally attached, by means of screw bolts 27, a cross bar 28, the said forward end of the chassis, together with the pivotally attached arms 26 and cross bar 28 forming a parallelogrammatic construction for the purpose hereinafter to be described. To the arms 26 there are secured blocks 29 which carry wheels 30 pivotally attached thereto.

An electric motor 31 is secured to and held in place upon the frame by the said band 23 and

side strips 32, (Figure 7) and is adapted to rotate a gear 33 mounted upon the motor shaft 34 which has a bearing in portion 18 of the chassis. The said gear engages and is adapted to rotate a meshing gear 35 which is secured upon a shaft 36 extending through and having bearings in the portion 18 and leg 19. A collar 37 may be secured upon said shaft 36 to hold same in place. Upon the said shaft 36 there is secured a bevelled gear 38 which, coacting with its complementary bevel gear 39 mounted upon a shaft 40, is adapted, by its rotation, to rotate a drive wheel 41 secured upon the said shaft 40. The said shaft 40 passes through and has bearing in said supporting member 20. A wheel 42 is pivotally mounted upon the said supporting member 21 upon said chassis in axial alignment with the said drive wheel 41.

The parallelogrammatic structure at the forward end of the chassis which carries the wheels 30 may be oscillated to move the said wheels 30 out of alignment with the rear wheels 41 and 42 to turn the toy, while in motion, to the right or left. To accomplish this result there is provided an oscillating arm 43 pivoted to the chassis at 44 and formed at its forward end with a slot 45 which engages a pin 46 secured to the cross bar 28. The inner end of the said oscillating arm 43 has attached thereto L-shaped bracket arms 47 and 48 which carry upon their respective ends electro-magnets 49 and 50. The free ends of the said magnets 49 and 50 are positioned directly above a rotatable disk 51 magnetically attractable to the said magnets when same are electrically energized. The said disk 51 is positioned above the said extension 14 of the chassis or frame and is given rotation by the motor 31 co-ordinating with the bevel gear 52 upon the said motor shaft 34 and its complementary gear 53 fixed upon a shaft 54 to which the disk 51 is secured. The said brackets 47 and 48 are sufficiently flexible to allow either magnet, 47 or 48, when electrically energized, to be drawn to the said disk 51.

When the motor is rotating and driving the toy in a forward direction the disk 51, through its connection with the motor, is spinning in the direction indicated by the arrow X (Figure 3), and the toy is moving in the direction indicated by the arrow Y (same figure). Upon directing an electric current to the magnet 49, as will be hereinafter described, the magnetic attraction produced thereby will draw the said magnet 49 downwardly to contact the spinning disk 51. The frictional contact thus established will draw the bracket 47 and its connected oscillating arm 43 approximately to the position shown by dot-dash lines in Figure 3 thereby moving the cross bar 28 and the wheels 30 connected to the parallelogrammatic structure to the position shown by the broken lines. This position will give the moving toy a movement in the direction indicated by the arrow Z. If, however, the magnet 50 is electrically energized instead, the said magnet would make frictional contact with the disk 51 whereupon the movement of the oscillating arm 43 would be in the opposite direction, as is obvious, and the wheels 30 would move to turn the moving toy in an opposite direction. Flat spring elements 55 are attached to the said lower plate 12 of the chassis at 56 and engage, at their free ends, upon either side of the oscillating arm 43 to hold same in its normal position.

A cross bar 57, having upwardly turned ends 58 and bracket members 59 having downwardly extending ends 60 are secured to the chassis and afford a means for attaching the enclosing body 11 to the chassis. Screws 61 and 62 engaging in threaded orifices in said ends 58 and 60 respectively are provided for this purpose.

Headlights 63 and tail lights 64 are provided and are conventionally connected to the battery 65 and switch 66. Direction lights 67 and 67*a* are also provided and with the motor 31 and magnets 49 and 50 are hooked up, by means of a flexible four conductor cable 68 with a control box 69 which will now be described. The various electrical connections are omitted from the drawings but are clearly shown in the diagram of Figure 10.

The control elements are contained within a box having a bottom 70, front wall 71, rear wall 72, side walls 73 and hinged cover 74. Attached to the inside of the front wall 71 is a cut-off and pole changing toggle switch 75 having an operating handle 76 extending through the front wall and operable from the outside. A rheostat 77 is also attached to the inside wall 71 and has its shaft extending therethrough. An operating knob 78 is attached to the outer end of the said rheostat. A shaft 79 is mounted in the said control box and has its upper bearing through the front wall 71 and its lower bearing in a block 80 (Figures 8 and 9). An annular shoulder 81 is formed upon the said shaft and has an arm 82 extending therefrom while directly above said arm 82 and shaft 79 is a tension spring 83 engaging the end of said arm 82 and attached to the upper part of the rear wall 72. To the outer end of the said shaft 79 there is attached a wheel 84, simulating a miniature auto steering wheel, and operable by a finger hold. Upon the said block 80, in close juxtaposition to the said shaft and in contact alignment with the said arm 82 are contact terminal pins 85 and 86 each of which has electrical connection with a conductor in the flexible cable 68.

A group of dry batteries 87 is suitably connected to the toggle switch 75 and through the said switch to the said rheostat 77, thence to one of the four conductors in the cable 68.

A second dry battery 88 is contained in the control box 69, one terminal of which connects with a conductor in the cable 68 while the other terminal is electrically connected with the said shaft 79.

Referring now to the diagram in Figure 10 it will be noted that by throwing the toggle switch handle circuits are closed between the contact points 89 and 90 and 91 and 92 in the toggle switch 75. A current flow is thus established which directs a current from the batteries 87 through line 93, to point 90, across switch arm to point 89, along line 94 to rheostat 77, along line 95 (one conductor in cable 68), to motor 31, back along line 96 (a second conductor in cable 68), along branch line 97, to point 91 in toggle switch, through switch arm to point 92, then along line 98 to battery 87, thereby electrically energizing the motor 31 and starting the toy in its forward movement. As hereinbefore stated the rotation of the motor spins the disk 51. As the toy moves forward and the wheel 84 is turned to the right or clockwise and held, the shaft 79 is turned bringing the arm 82 into contact with the pin 86 whereupon an additional current flow is then established which, starting at the battery 88 is directed along branch line 99, line 96, to branch line 100, branch 101, through magnet 49, line

102, through direction light 67, line 103 (third conductor in cable 68), to contact pin 86, shaft 79 and through line 104 back to battery 88 thus setting the front wheels for a right turn and indicating such turn by the direction light 67. Upon releasing the wheel 84 the circuit energizing the direction light and the magnet 49 is broken between the arm 82 and the pin 86 whereupon the front wheels are urged to their normal position and the toy proceeds in a straight line.

By turning the wheel 84 in a counter clockwise movement and holding same the arm 82 contacts the point 85 and a circuit is closed at that point causing an electrical flow as follows: Starting at the battery 88 the current flows along branch line 99 to line 96, branch 100, branch 104, magnet 50, line 105 to direction light 67*a*, line 106 to pin 85, arm 82, shaft 79 and line 104 back to battery 88. With the circuit just described the magnet 50 makes frictional contact with the disk 51 and moves the front wheels in a direction opposite to that previously described for a right turn and directs the toy to the left indicating by the direction light that the toy is making a left turn. Upon releasing wheel 84 the turning circuit is broken at 82—85 and the front wheels will again assume their normal position.

By moving the handle 76 of the toggle switch out to neutral position the motor circuit is broken and the toy will come to a stop. Throwing the handle of the toggle switch in the opposite direction the circuit is closed between the points 89 and 107 and 91 and 108. This act changes the polarity of the circuit flow to and from the motor and reverses the actions above described. The cross lines 109 and 110 switch the polarity and current flow when the arms contact the points 107 and 108 as set forth.

While the embodiment shown and described includes portable dry batteries a transformer may be substituted therefor to reduce a house current to the required low voltage with minor changes to the hook up.

The movement of the toy about the floor is limited, in distance, by the length of cable connecting same to the control unit and to facilitate the movement of the toy about the floor, the said cable may be loosely held aloft by sliding attachment through a ring held upon the end of a string suspended from a chandelier or other means such as a string or wire stretched between the opposite walls of a room along which a ring carrying the cable may slide.

I claim:

In a propelling mechanism for rolling toys comprising a chassis carrying an enclosing body, front and rear wheels upon the said chassis, an electrically driven motor upon the chassis geared to turn one of the rear wheels to impart motion to said rolling toy, the said front wheels being adapted to swing to the right or left to turn the said rolling toy to the right or left while in rolling motion, an arm pivotally connected for limited movement to either side of a central position upon the said chassis and adapted to engage at one end with the said front wheels to swing same to the right or left, electro-magnets secured to longitudinally spaced portions of the opposite end of said arm, a magnetic disk mounted to rotate beneath the said electro-magnets with its face adjacent to the poles thereof and its axis of rotation longitudinally between the magnets, gears connecting the said disk with the said motor, to spin said disk when said motor is in action, each of the said magnets, when electrically energized, making sufficient frictional contact with the said spinning disk to move the magnet end of said arm to its limit to the right or left respectively, thereby swinging the said front wheels in the respective direction, and thereafter so retain the arm by sliding frictional contact between the spinning disk and the magnet while the magnet is energized.

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