May 21, 1968 A. E. GOLDFARB 3,384,030

CONTROL MEANS FOR TOY ELECTRIC RACING CARS

Filed Feb. 1, 1965 3 Sheets-Sheet 1

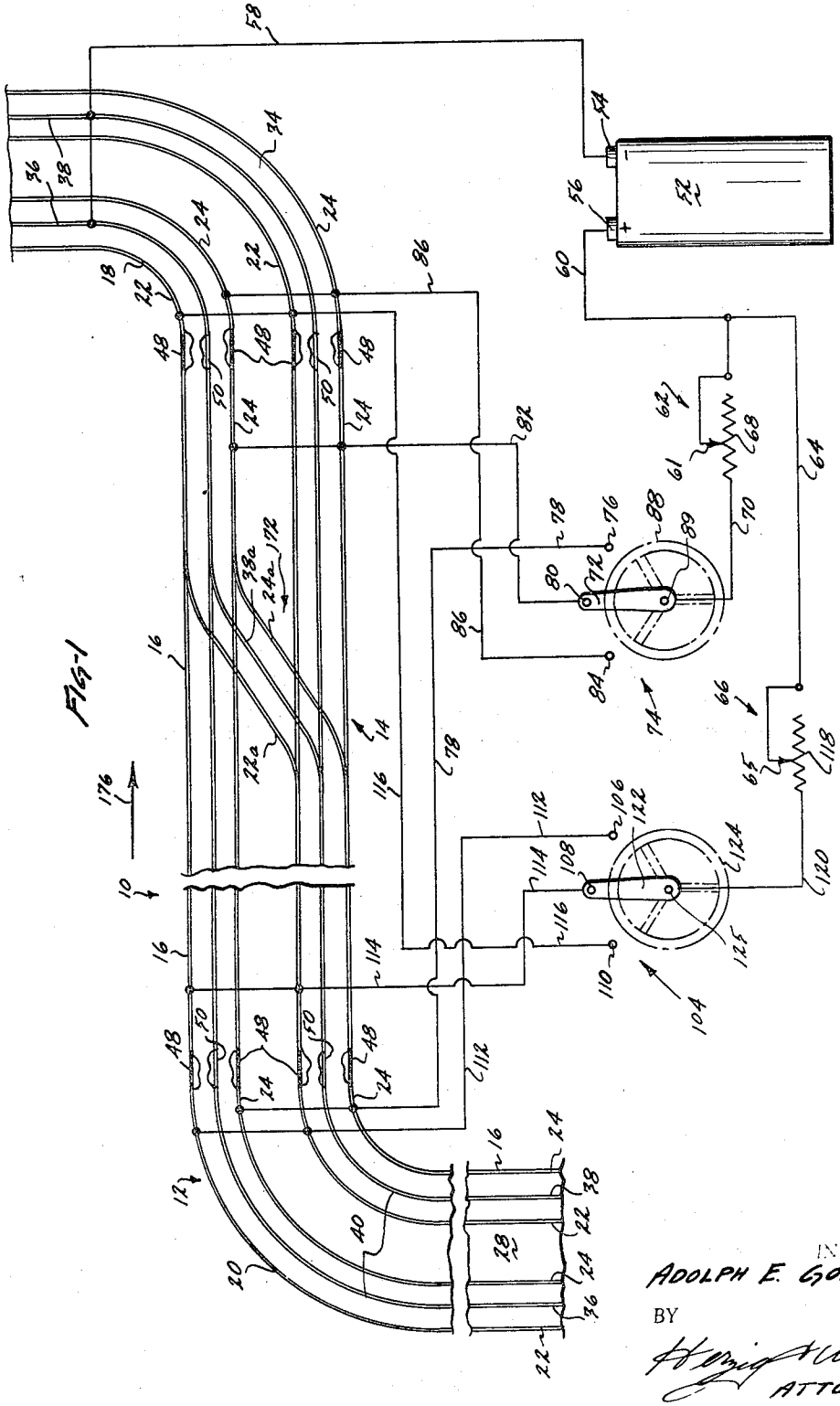


FIG-1

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CONTROL MEANS FOR TOY ELECTRIC RACING CARS

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FIG-2

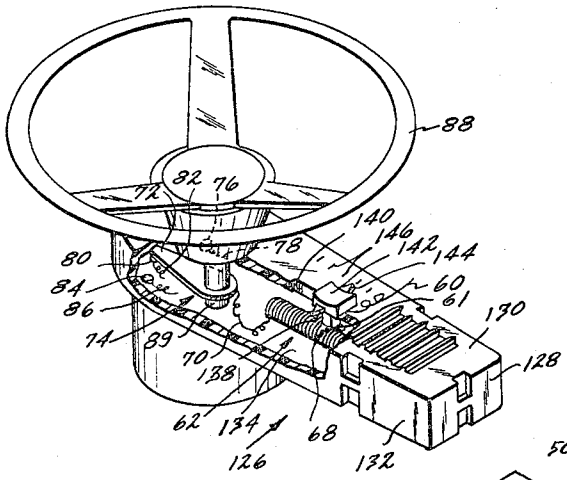
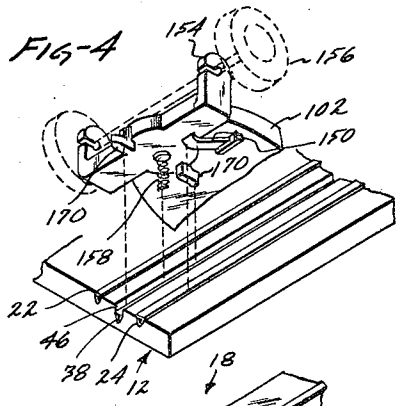
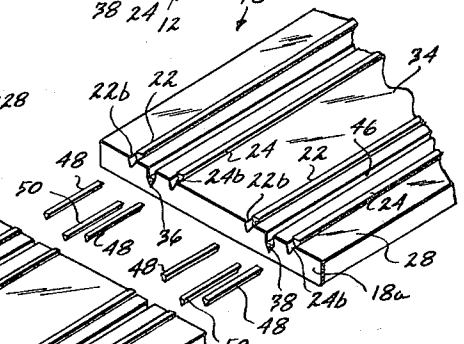


FIG-4





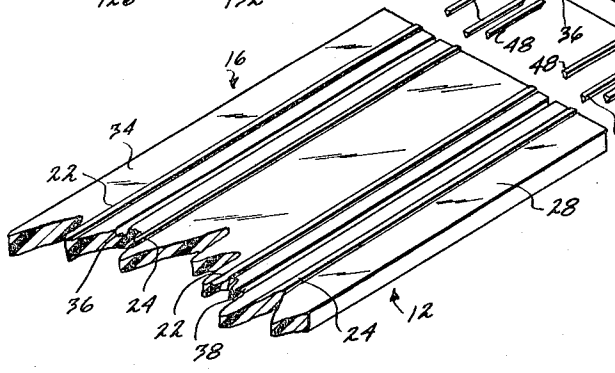
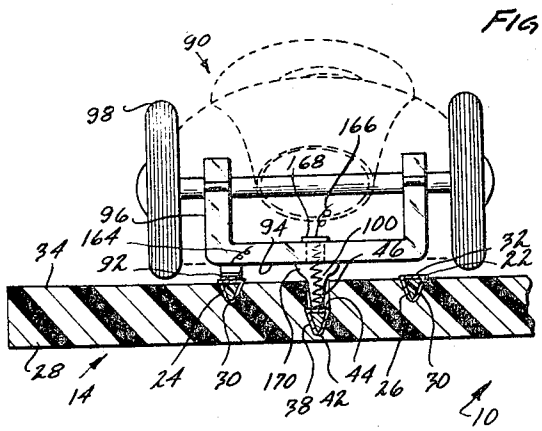
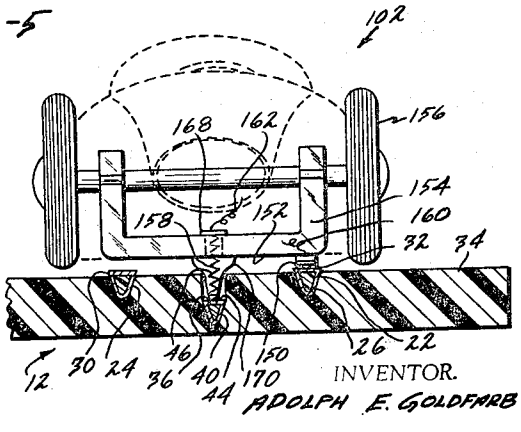


FIG-3

FIG-5





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CONTROL MEANS FOR TOY ELECTRIC RACING CARS

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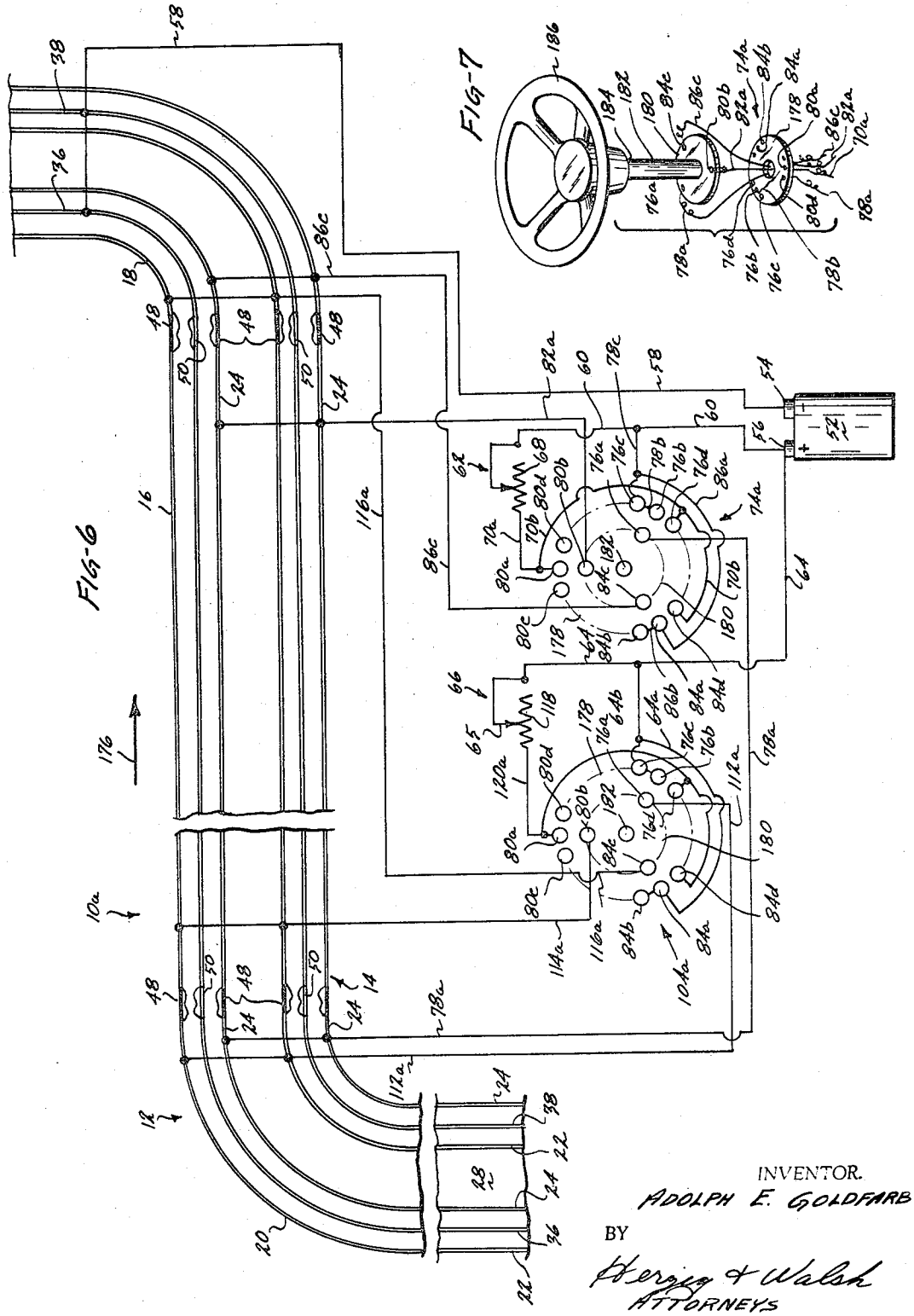


FIG-6

FIG-7

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3,384,030

CONTROL MEANS FOR TOY ELECTRIC RACING CARS

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4 Claims. (Cl. 104—60)

ABSTRACT OF THE DISCLOSURE

The invention is a control system for toy electric cars driven on tracks that are electrified. The tracks have straight sections, left-hand turn sections and right-hand turn sections. The sections are insulated from each other. The cars are controlled by means of a steering wheel and a potentiometer. The steering wheel controls switch contacts arranged so that the steering wheel must be turned from a center position to right-hand or left-hand position for energizing the respective sections of track. Unless the wheel is turned appropriately the sections are not energized to operate the cars. The operation of the wheel simulates actual steering merely by energization of the track sections. In a modified form the circuitry is arranged so that if the wheel is not turned properly additional power is supplied to a right or left-hand track section to cause the car to leave the track.

The present invention relates to control means for toy or model electric racing cars and more particularly to steering control means for such cars.

A hobby which has gained popularity in recent years comprises racing model electric cars on a closed track which may be put together in sections in a manner similar to that used in model railroad building. The track may include two or three bus bars or electrical conductors which supply electrical current to the cars. Each car includes protuberance means which engage a slot in the track to maintain the car on its course. The speed of each car is controlled by a rheostat or potentiometer which is held in the hand of the operator of the car. The rheostat or potentiometer is employed primarily to slow the cars down on curves so that they will not jump the track. In a three-bus-bar system, two cars can be separately controlled by supplying current to one through one outside conductor plus a center conductor and to the other through the other outside conductor and the center conductor.

While this method of racing toy cars is generally satisfactory, it does have certain disadvantages.

One disadvantage resides in the fact that the only control the operator has over the car is to either slow it down or speed it up with the rheostat.

Another disadvantage resides in the fact that there is no particular feeling that the operator is operating the car because he does not steer it.

Another disadvantage resides in the fact that the rheostat control means does not adequately control the car on curves.

In view of the foregoing factors and conditions characteristic of toy racing cars and means for controlling same, it is the primary object of the present invention to provide a new and useful control means for toy electric racing cars not subject to the disadvantages enumerated above and which includes a steering means for controlling toy racing cars safely, efficiently and expeditiously.

Another object of the present invention is to employ prior art electric racing cars without modification thereto which can be steered electrically with a new and useful steering means of the present invention.

Yet another object of the present invention is to provide a new and useful control means for toy electric racing cars which employs a steering wheel to position a selector switch in a first position for running the car on a straight-away, in a second position for negotiating a right hand turn with the car and in a third position for negotiating a left-hand turn with the car.

The present invention will be described for purposes of illustration but not of limitation, as being used in conjunction with a 3-conductor track.

According to the present invention, the outside conductors of a 3-conductor track for toy or model racing cars include insulated sections at each curve in the track. Each outside conductor on straight-away sections of the track is connected to a first electrical contact, each outside conductor on left-hand curves is connected to a second electrical contact and each outside conductor on right-hand curves is connected to a third electrical contact. The center conductor is connected to a source of power which, in turn, is connected to each set of outside conductors through a rheostat. A selector switch is provided which has a leaf or knife connected to the rheostat. The leaf is rotatably driven by a steering wheel in such a manner that it is positionable on any one of the three contacts. Current can only be supplied to the straight-away sections of the track by positioning the leaf to contact a center contact. Current can only be supplied to the right-hand curves by positioning the leaf on a right-hand contact and can only be supplied to the left-hand curves by positioning the leaf on a left-hand contact. Thus, the steering wheel must be positioned straight ahead while the car is on the straight-away, must be turned to the right to make the car negotiate a right-hand turn and must be turned to the left to make the car negotiate a left-hand turn.

The steering wheel and the rheostats are mounted on a hand control unit which is held by the operator of each toy racing car. The operator of each car can control the speed of his car by operating the rheostat with one hand while simultaneusly operating the steering wheel with his other hand to assure a flow of current to the outside collectors on all sections of the track.

The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which like reference characters refer to like elements in the several views.

In the drawings:

FIGURE 1 is a schematic view of a race course showing a pair of tracks and the electrical system supplying power thereto which constitutes a first embodiment of the present invention;

FIGURE 2 is a perspective view of a toy, electric-car control means of the first embodiment of the present invention;

FIGURE 3 is a partial, exploded perspective view of a section of the race course shown diagrammatically in FIGURE 1;

FIGURE 4 is an exploded, perspective view showing a portion of a toy electric car in relation to a section of track;

FIGURE 5 is a cross-sectional view showing a pair of racing cars in position on a race course of the present invention;

FIGURE 6 is a schematic view of a race course constituting a second embodiment of the present invention; and

FIGURE 7 is an exploded perspective view of a control means for the race course of FIGURE 6.

Referring again to the drawings, a race course for toy electric racing cars, generally designated **10**, includes a pair of tracks **12** and **14**.

The tracks 12 and 14 each include a straight-away section 16, a left-hand turn section 18 and a right-hand turn section 20. The sections 16, 18 and 20 are preferably joined together in a continuous, closed loop.

The tracks 12 and 14 are each provided with first and second, outside electrical conductors or bus bars 22 and 24 which are recessed into grooves 26 provided in a base board 28 which is made of suitable dielectric such as plastic. The conductors 22 and 24 each include an encompassing sidewall 30 which is shaped to fit within the groove 26 and provide a flat upper surface 32 which is approximately flush with the upper surface 34 of the base board 28. The tracks 12 and 14 also include center electrical conductors or bus bars 36 and 38, respectively, which are recessed into grooves 40 and 42, respectively, provided in the base board 28. The conductors 36 and 38 each include an upper flat surface 44 which is recessed below the upper surface 34 of the base board 28 sufficiently to provide a continuous groove 46.

The sections 18 and 20 of the tracks 12 and 14 may be connected to a straight-away section 16 by any suitable means, such as by conventional connecting means, not shown, or by pins 48 and 50 which are shown in FIGURE 3 for connecting a section 18 to a section 16 by engaging pins 48 and 50 in the outer and center conductors, respectively. It is an important feature of the present invention that the pins 48 be made of a suitable dielectric, such as plastic, and that the pins 50 be made of a suitable conductor, such as copper, so that, when the section 16 is joined to the sections 18 and 20, an electrical fault will exist between the portions of the conductors 22 and 24 mounted on the straight-away section 16 and those mounted on the curved sections 18 and 20 while, simultaneously, the center conductors 36 and 38 maintain electrical continuity throughout the sections 16, 18 and 20. The conductors 22 and 24 may be recessed from the connecting edges of one of the sections 16, 18 and 20, as shown at 22*b* and 24*b* in FIGURE 3 for the edge 18*a* of section 18, so that the connecting ends of the conductors 22 and 24 on one section will not contact the associated connecting ends of the conductors of the other section when they are connected together. Of course it is apparent that, when the tracks 16 and 18 are connected together in conventional manner, flat insulating strips may be placed between the male and female prongs of the conductors 22 and 24.

Electrical power may be supplied to the tracks 12 and 14 from a suitable power source, such as a dry-cell battery 52 which has a negative post 54 and a positive post 56. The negative post 54 is connected to the center electric conductors 36 and 38 by a lead 58. The positive post 56 is connected by a lead 60 to the wiper 61 of a first potentiometer or rheostat 62 and by a lead 64 to the wiper 65 of a second potentiometer or rheostat 66. The coil or resistor 68 of rheostat 62 is connected by a lead 70 to the pole or leaf 72 of a three-position switch 74. The switch 74 includes right-hand contact 76 which is connected by a lead 78 to the outside electrical conductors 24 on the right-hand curved portion 20 of the tracks 12 and 14. The switch 74 also includes a middle contact 80 which is connected by a lead 82 to the outside conductors 24 on the straight-away section 16 of the tracks 12 and 14. In addition, the switch 74 includes a left-hand contact 84 which is connected by a lead 86 to the outside collectors 24 on the left-hand curved portion 18 of the tracks 12 and 14. Thus, the switch 74 may be used to complete a circuit to the outside conductors 24 on the straight-away section 16, the left-hand curved section 18 or the right-hand curved section 20 of the tracks 12 and 14, depending on which of the contacts 80, 84 or 76 the leaf 72 engages. The leaf 72 is attached to a steering wheel 88 through a steering shaft 89 which may be rotated to a mid-position so that the leaf 72 engages the contact 80 to complete a circuit to the straight-away sections 16 of the tracks 12 and 14. The steering wheel 88 may be turned to the right,

as viewed in FIGURE 1, until the leaf 72 engages the contact 76 to complete a circuit to the right-hand curve 20 of the tracks 12 and 14. Also, the steering wheel 88 may be turned to the left until the leaf 72 engages the contact 84 whereupon a circuit is completed to the left-hand curve 18 of the tracks 12 and 14.

The conductors 36 and 24 of the track 12 and the conductors 38 and 24 of the track 14, when energized, supply electrical power to a first electric racing car 90 through a first electrical conductor 92 affixed to the underside 94 of the car's front axle-carrying yoke 96 adjacent its right front wheel 98 and through a second electrical conductor 100 which is affixed at the approximate center of the yoke 96. The conductor 100 may depend into the groove 46 into engagement with the surface 44 of the conductor 38, as shown in FIGURE 5, or it may depend into the groove 44 into engagement with the conductor 36 when car 90 is to be run on track 12. Thus, the car 90 can be run on the track 12 or the track 14 at the will of the operator who controls the operation of the car with the switch 74 and the rheostat 62. Of course, it is apparent that the car 90 will run in a clockwise direction when tracks 12 and 14 are arranged in a closed loop.

A second car 102 can also be run on the tracks 12 or 14 without interference by the operator of car 90. This is accomplished by running the car 102 with power supplied through the conductors 22 and 36 on track 12 and the conductors 22 and 38 on track 14. Although the conductors 36 and 38 are common to both cars 90 and 102, the conductors 22 are controlled independently of the conductors 24 through the rheostat 66 and a second three-position switch 104 having contacts 106, 108 and 110. These contacts are connected through electrical leads 112, 114 and 116 to the conductors 22 on the right-hand curve section 20, the straight-away section 16 and the left-hand curve section 18, respectively. The coil or resistor 118 of the rheostat or potentiometer 66 is connected by a lead 120 to a leaf spring 122 which may be rotated into engagement with the contacts 106, 108 and 110 by a second steering wheel 124, through a second steering shaft 125.

The rheostats 62 and 66 and the steering wheels 88 and 124 together with the switches 74 and 104 may be mounted in a suitable device, such as the control unit 126 shown in FIGURE 2 for the rheostat 62 and switch 74.

The control unit 126 includes a housing 128 having a top wall 130, a side wall 132 and a bottom wall 134. The steering shaft 89 is rotatably mounted in the bottom wall 134. The leaf spring 72 is affixed to the shaft 89 and extends over the contacts 76, 80 and 84 which are affixed to the bottom wall 134. The coil 68 of the potentiometer 62 is mounted in the housing 128 and is connected to the leaf 72 by the lead 70 as shown. The wiper 61 of potentiometer 62 is affixed to a post 138 which extends upwardly in the housing 128 through an elongated slot 140 provided in the top wall 130. A finger engaging saddle 142 is affixed to the upper end of the post 138 and carries a suitable pointer 144 which may be aligned with indicia 146 provided on the top wall 130 to indicate to the operator of the control device 126 the relative position of the wiper 61 on the coil 68 and thereby give an indication of the speed of the car 90. The operator of the car 102 will also be provided with a control unit not shown identical to the control unit 126 which has the steering wheel 124, the switch 104 and the potentiometer 66 mounted therein.

Power is supplied to the car 102 by a first wiper 150 which is mounted on the underside 152 of its front axle-carrying yoke 154 adjacent its left front wheel 156, and by a second wiper 158 which is connected to the approximate center of the yoke 154 and extends into the groove 46 into engagement with the surface 44 of the conductor 36. The wipers 150 and 158 supply power to an electric motor, not shown, in the car 102 through suitable leads 160 and 162, respectively. Also, the wipers 92 and 100 of the car 90 supply power to an electric motor, not shown,

through leads 164 and 166, respectively. The yokes 96 and 154 are pivotally connected to their associated cars 90 and 102 by suitable pivot pins, such as the one shown at 168.

The cars 90 and 102 are each guided and retained in position on the base board 28 by a pair of depending lugs 170 which are affixed to the yokes 96 and 154 and which are engageable with the grooves 40 and 42 in the tracks 12 and 14.

If desired, a switch 172 may connect the track 14 to the track 12 along the straight-away portion 16 by connecting the conductors 22, 38, and 24 of track 14 to the conductors 22, 36 and 24 of track 12 together by transition conductors 22*a*, 38*a*, and 24*a*, respectively. The switch 172 makes it possible to race both the cars 90 and 102 on the track 14 and permit one car to pass the other by switching it over onto track 12 at the switch 172.

Operation of the cars 90 and 102 will be readily understood. With the car 90 on the track 14 and the car 102 on the track 12, as shown in FIGURE 5, the operator of the car 90 will be provided with the control unit 126 which is electrically connected to the tracks 12 and 14, as previously described. The operator of the car 102 will also be provided with a control unit identical to the control unit 126 which is connected to the tracks 12 and 14 by the electrical leads 112, 114 and 116, as previously described. Assuming that the cars 90 and 102 are placed in position on a straight-away portion 16 of their associated tracks, the operator of the car 90 can place his car in motion by energizing the conductor 24 of the straight-away section 16 by turning the steering wheel 88 until the leaf spring 72 engages the contact 80. This will energize the car causing it to travel at a speed determined by the position of the wiper 61 on the coil 68. As will be apparent to those skilled in the art, maximum speed can be attained by sliding the wiper 61 to a position where a minimum amount of resistance is included in the circuit from the battery 52 to the conductor 24. As the car 90 approaches the left-hand turn 18, assuming that the cars are travelling in the direction of arrow 176 shown in FIGURE 1, the operator of the car 90 must turn the steering wheel 88 to the left causing the leaf 72 to engage the contact 84 to complete a circuit to the left-hand curve 18 in order to energize the conductor 24 on the down-stream side of the fault produced by pin 48. The operator of the car 90 can simultaneously control its speed by manipulating the slider 61 on the control unit 126 so that the car 90 will take the curve 18 at an optimum speed.

In like manner, the operator of car 102 controls his car on the straight-away 16 with the switch 104 and the rheostat 66 by manipulating his steering wheel 124 and the slider 65. Alternatively, both cars can be raced on the same track by starting one ahead of the other. The rear car can then pass the forward car at the switch 172.

Referring now to FIGURES 6 and 7, a race course constituting a second embodiment of the present invention, generally designated as 10*a* includes tracks 12 and 14 which may be mounted on a suitable base board 28, all of which may be identical to the like elements described in connection with the first embodiment of the present invention. In addition, the conductors 22, 24, 36 and 38 are employed in conjunction with the insulated pins 48 and the metal pins 50, as in the previous embodiment. Also, an identical battery 52 may be employed which has posts 54 and 56 connected by a conductor 58 to the center conductors 36 and 38, as previously described in connection with the first embodiment. In addition as in the previous embodiment, the positive post 56 is connected by a lead 60 to a potentiometer 62 and by a lead 64 to a potentiometer 68.

The embodiment 10*a* of the present invention differs from the first embodiment in the steering control. In the first embodiment of the invention if the steering control was not correctly manipulated when the racing cars pass from a straight section to curved sections of track, power was completely interrupted and the car went dead. With the present embodiment, on the other hand, power is supplied from the post 56 of the battery 52 to the tracks 12 and 14 in such a manner that, should the operator of a car fail to steer on a turn, the car will be supplied with full voltage and speed up instead of going dead. Thus, if the operator does not correctly steer his car, it will shoot off the track on a curve. The steering control of the second embodiment 10*a* of the present invention may be used in conjunction with the cars 90 and 102 shown in the FIGURE 5. The car 90 may be controlled by means of a multi-position switch 74*a* and the car 102 may be controlled with a multi-position switch 104*a*.

The switch 74*a* includes a fixed base plate 178 having a first middle contact 80*a* which is connected by a lead 70*a* to the resistor 68 in the potentiometer 62. The switch 74*a* also includes a rotatable disc 180 having a middle contact 80*b* which is engageable with the contact 80*a* and which is connected to a lead 82*a* to the conductors 24 on the straight section 16 of tracks 12 and 14. A right-hand contact 76*a* is also provided on the disc 180 and is connected by a lead 78*a* to the conductors 24 on the curved section 20 of tracks 12 and 14. The contact 76*a* is engageable with a first right-hand contact 76*b* which is provided on the plate 178 and which is connected by a lead 78*b* to a second right-hand contact 76*c* provided thereon. The contacts 76*b* and 76*c* are supplied with full voltage from the battery 52 through the lead 60 and a lead 78*c* which also supplies full line voltage through a lead 86*a* to a first left-hand contact 84*a* from which power is supplied through a lead 86*b* to a second left-hand contact 84*b*, all of which are provided on the plate 178. A left-hand contact 84*c* is also provided on the disc 180 and is connected by a lead 86*c* to the conductors 24 provided on the left-hand turn section 18 of the tracks 12 and 14. A third left-hand contact 84*d* and a third right-hand contact 76*d* are also provided on the plate 178 and are connected by a lead 70*b* to the resistor 68 through the lead 70*a*. The plate 178 also includes second and third middle contacts 80*c* and 80*d*, which are not connected in any electrical circuit and which are engageable by the contact 80*b* when disc 180 is rotated.

The disc 180 may be rotated by a steering shaft 182 having an end 184 to which a steering wheel 186 is attached. When the disc 180 is rotated by the steering wheel 186 in such a manner that the contact 80*b* engages the contact 80*a*, a circuit is completed to the conductors 24 on the section 16 of tracks 12 and 14 from the battery 52 through the lead 60, the rheostat 62, the lead 70*a*, the contact 80*a*, the contact 80*b*, and the lead 82*a*. Thus, the rheostat 62 is in an electrical circuit with the battery 52 and may be used to control the speed of a car on the track 16. A car traveling on the track 16 in the direction of arrow 176 passes from the section 16 into the left hand curve 18. At this time, if the operator of the car does not turn the steering wheel 186 to the left thereby placing the contact 84*c* of disc 180 in contact with the contact 84*d* of plate 178 to thereby place the rheostat 62 in the circuit, the contact 84*c* will complete a circuit from conductors 24 on section 18 and lead 86*c* directly to the battery 52 through contact 84*a*, lead 86*a*, lead 78*c* and lead 60. This circuit will supply full voltage to a car being controlled by switch 74*a* so that the car will speed up and jump the track.

Similarly, when a car is approaching a right-hand turn, full voltage will also be supplied to the car causing it to jump the track 20 if the steering wheel 186 is not first turned to the right place to contact 76*a* in engagement with the contact 76*d* so that a circuit is completed through the leads 70*b* and 70*a* to the rheostat 62.

The electrical switch 104*a* is identical in structure to the switch 74*a* and may be used to control the flow of current to the outside conductors 22 on the tracks 12 and 14. The switch 104*a* is connected to the rheostat 68 by a lead 120*a*, directly to the battery 52 through leads 64*a*, 64*b* and 64 and to the conductors 22 on the section 16 of the

tracks 12 and 14 through a lead 114*a*. The switch 104*a* is connected to the conductors 22 on the section 18 of tracks 12 and 14 through a lead 116*a* and to the conductors 22 on the section 20 of tracks 12 and 14 through a lead 112*a*.

While the particular control means for electric racing cars herein shown and described in detail are fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that they are merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended calims.

What is claimed is:

1. Steering control means for controlling the operation of a toy electric racing car on a track supplied with electrical power through first and second electrical conductors mounted on said track, said track having a straight section, a left-hand curved section, and a right-hand curved section, said control means comprising:

a source of electrical power having a negative post and a positive post;

a first electrical lead connecting one of said posts to said first conductor;

a second electrical lead connecting the other of said posts to potentiometer means for controlling the speed of said car;

a third electrical lead connecting said potentiometer means to a multi-position electrical switch, said switch including a stationary base plate having a first plurality of electrical contacts and a rotatable disc having a second plurality of electrical contacts selectively engageable with said first plurality of contacts, said third lead being connected to said first plurality of contacts;

a fourth electrical lead connecting one of said second plurality of contacts to said second electrical conductor on said straight section of track;

a fifth electrical lead connecting a second of said second plurality of contacts to said second conductor on said left-hand section of track;

a sixth electrical lead connecting a third of said second plurality of contacts to said second conductor on said right-hand curved section of tracks; and

insulator means provided in said second conductor on said track to create a fault between each of said sections.

2. A steering control means as defined in claim 1 wherein said disc is connected to a steering wheel to be manipulated by an operator of said control means to selectively engage said contacts.

3. A steering control means as defined in claim 2 wherein said steering wheel and said potentiometer means are mounted in a control unit to be held in the hand of an operator of said control means.

4. A steering control means as defined in claim 3 including shunt means connecting a predetermined group of said first plurality of contacts directly to said other post for supplying full voltage to said car when it passes from one of said sections of track to another section when said operator fails to correctly manipulate said steering wheel.

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