

[54] TOY RACE TRACK

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46/240

[51] Int. Cl. A63f 9/14, A63h 18/16

[58] Field of Search 273/86 B, 86 F, 86 H;
40/106.45; 46/235, 240

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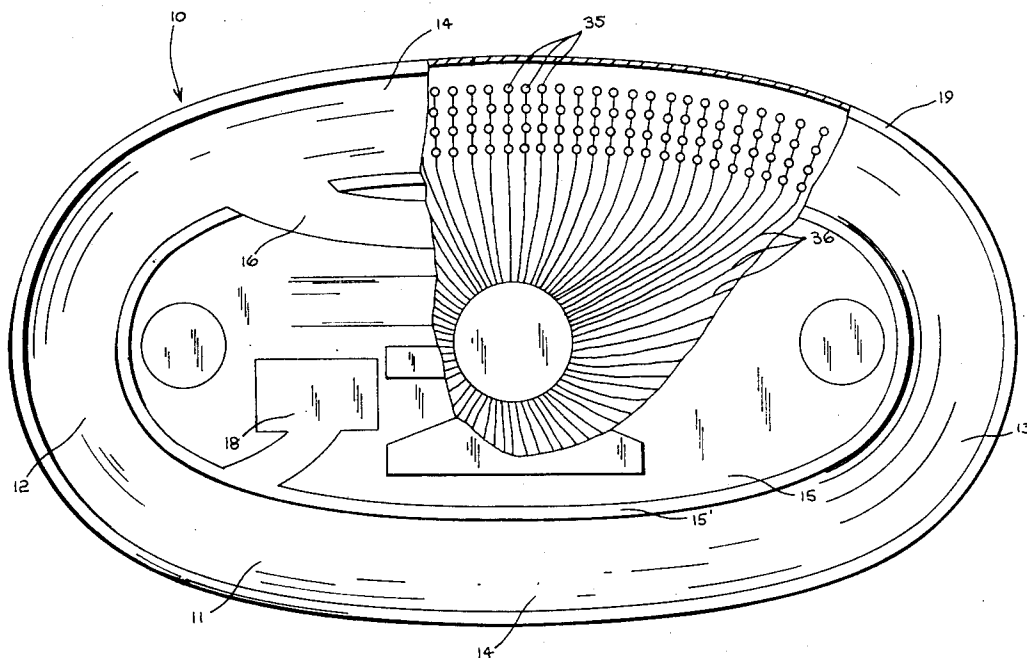
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[57] ABSTRACT

In abstract, a preferred embodiment of this invention is a race track for toy vehicles wherein a plurality of magnets mounted beneath the surface of the race track move rapidly thereunder to pull the racing cars along. Since there is no predetermined track for each vehicle, skids, spin-outs and wrecks can occur as in real auto racing as well as cars passing each other as they race.

6 Claims, 11 Drawing Figures



SHEET 1 OF 4

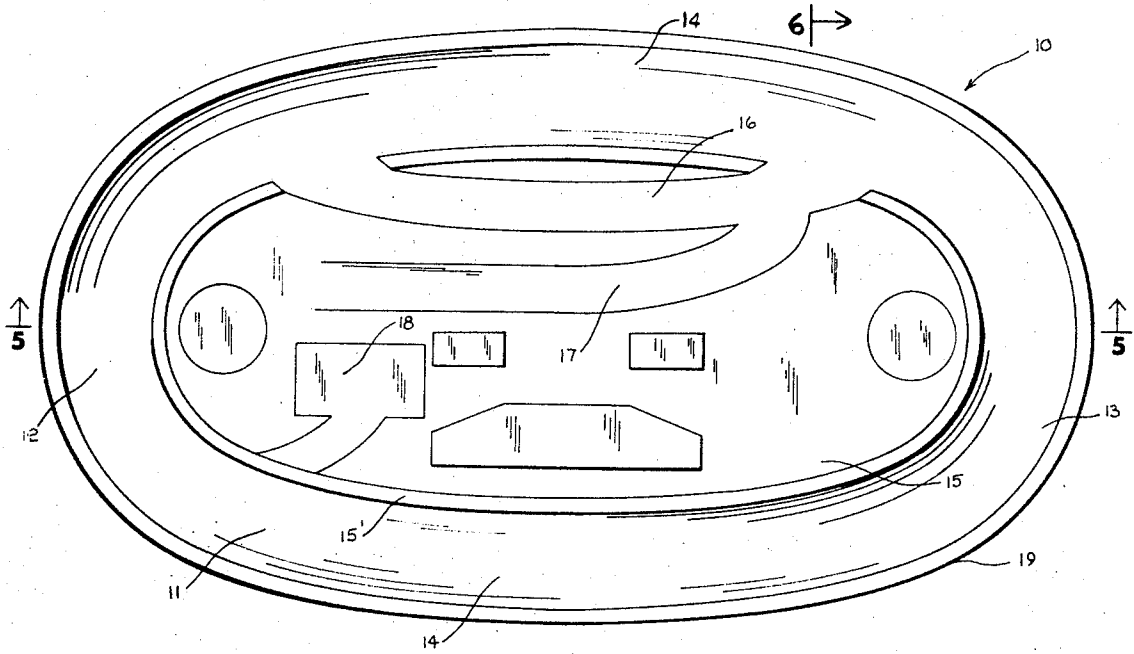


Fig. 1

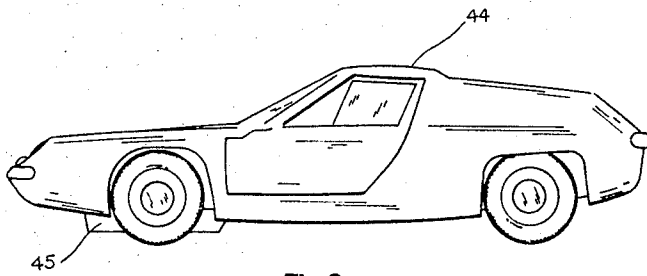


Fig. 2

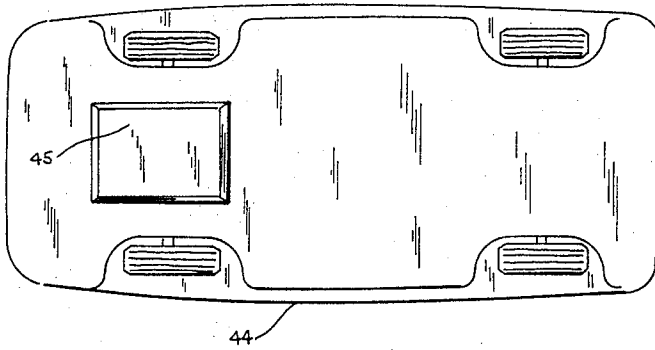


Fig. 3

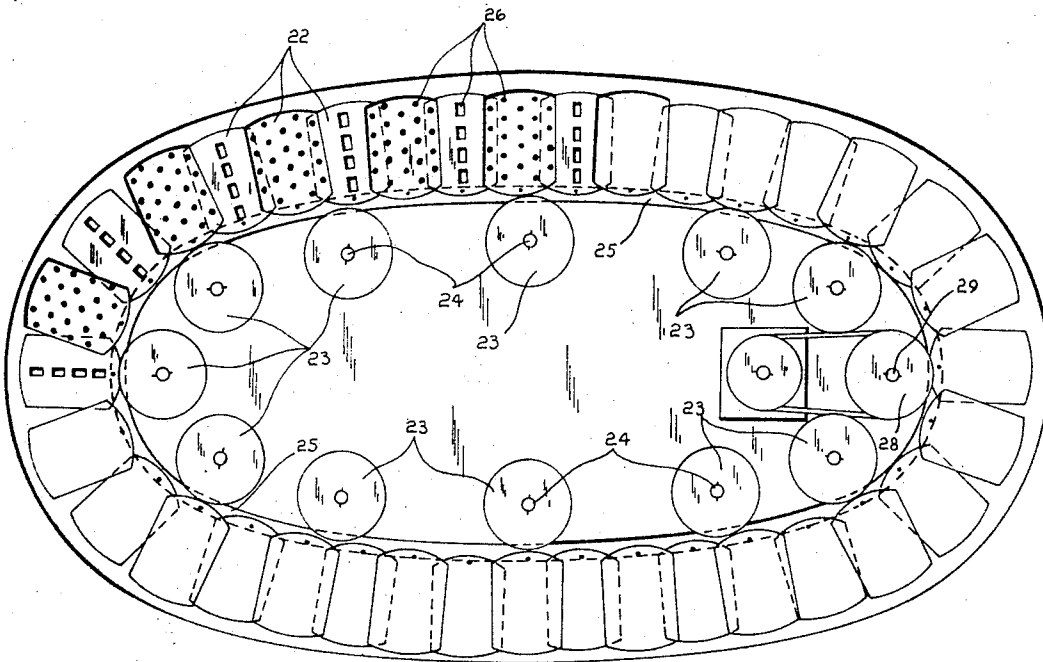


Fig. 4

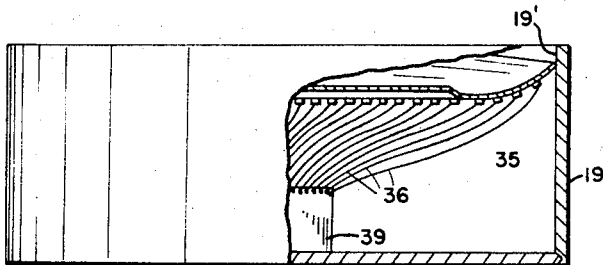


Fig. 11

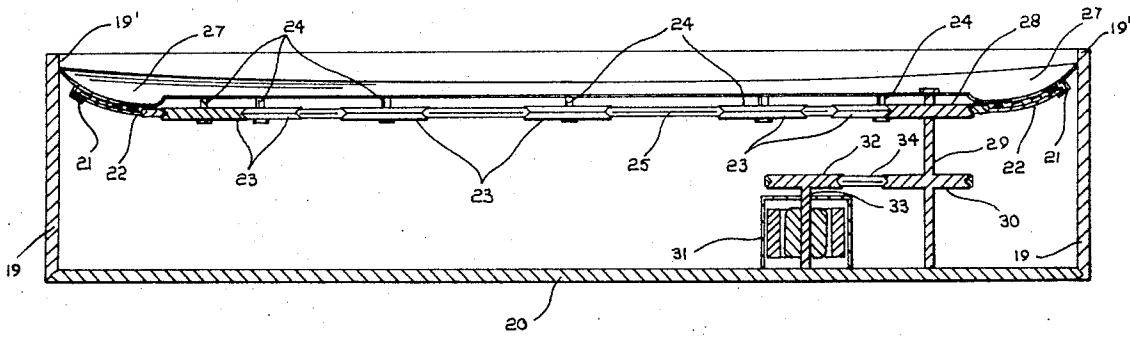


Fig. 5

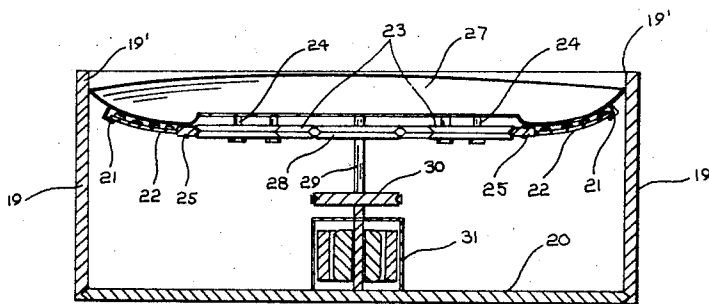


Fig. 6

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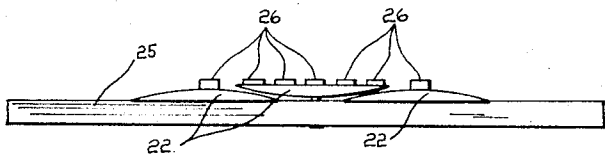


Fig. 7

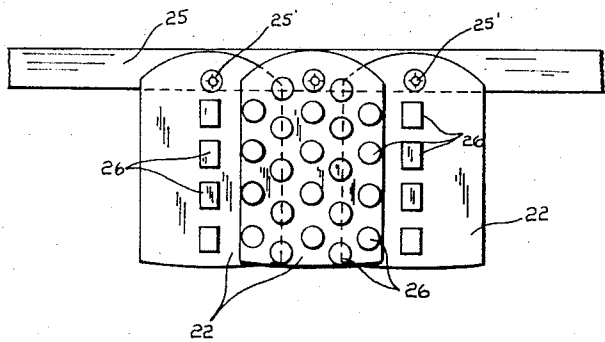


Fig. 8

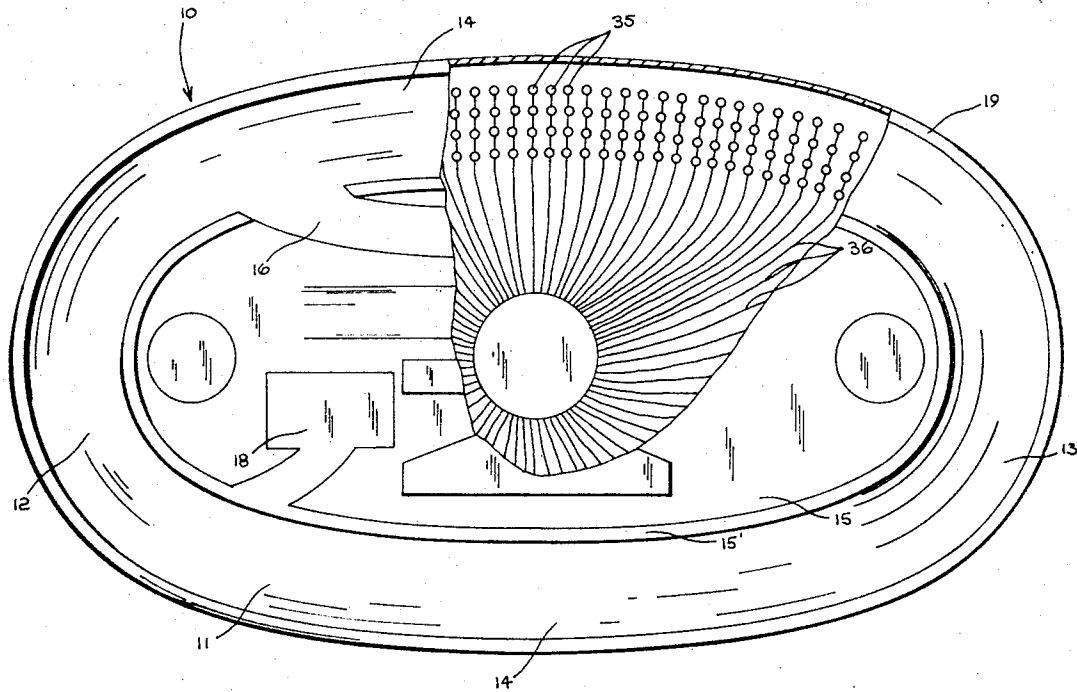


Fig. 9

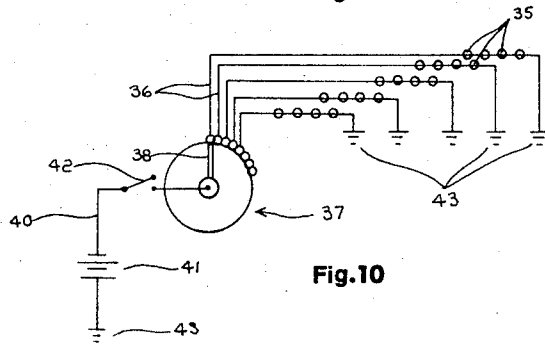


Fig. 10

TOY RACE TRACK

This invention relates to amusement devices and more particularly to toy race tracks and means for propelling vehicles around such track.

In the past, various systems have been developed to simulate races between toy vehicles. These various systems have included either guides for each individual vehicle so that it is forced to follow a predetermined course using its own propelling means or mechanical means mounted within the track. Other systems have included magnets traveling below the surface of the track with the vehicle accurately following such magnet immediately thereabove. Again the track that the magnet follows controls the course of the vehicle.

In none of the prior known systems has the vehicle been propelled around the track within predetermined limits and yet been free to shift positions within these limits to more accurately simulate actual race conditions.

After much research and study into the above mentioned problems, the present invention has been developed to provide a means for propelling toy vehicles around an endless track, said means controlling the vehicles within certain predetermined limits of lateral movement but not predetermining the track of travel within such limits. This is accomplished through the use of a plurality of magnetic means which move at a speed substantially faster than the speed at which the vehicles are moving thus when the effect of one magnet passes in front and beyond the vehicle, it will come within the magnetic influence of the next following magnet. Through this system, no single magnet controls the direction and movement of the vehicle but only influences the same to cause it to move in the same general direction as the magnets. The desired results are accomplished either through the use of mechanical driving means for a plurality of magnets or the use of electromagnets embedded in the race track surface with a distributor means for alternately energizing and deenergizing such magnets.

It is an object, therefore, of the present invention to provide an automatically controlled, spectator type, toy race track.

Another object of the present invention is to provide an automatically controlled endless track type race system.

Another object of the present invention is to provide a vehicular race track wherein all of the racing vehicles can move to any point within predefined limits generally outlined by the edges of the race track.

Another object of the present invention is to provide a plurality of magnets as a drive means for a race track wherein the vehicles used are not limited to a specific predetermined course.

Another object of the present invention is to provide a race track using a plurality of magnets wherein either attraction or repulsion forces are used as the vehicle drive means.

Another object of the present invention is to provide, in a magnetically driven race track, mechanical means for moving the said magnets.

Another object of the present invention is to provide, in a race track utilizing magnetic driving forces, electrically controlled, in sequence electromagnets.

Another object of the present invention is to provide, in a magnet propelling system for toy race tracks,

means for moving the magnets at a speed substantially greater than that at which the vehicles move.

An additional object of the present invention is to provide, in a toy race track, means for automatically forcing vehicles to recover from spins and skids and again move in straight, forward direction.

A further object of the present invention is to provide high velocity track magnets and fixed front end vehicle magnets in a toy race track system thereby allowing automatic spin and skid recovery.

Another object of the present invention is to provide a toy race track relying on magnet power, velocity, centrifugal force and gravity for operation and control vehicular movement.

Another object of the present invention is to provide a toy race track system which simulates real vehicular races with the cars accelerating on the straightway, riding up banked turns and slowing down, drifting out of the turn onto another straightway, and again accelerating to approach the next turn.

Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings which are merely illustrative of such invention.

IN THE DRAWINGS:

FIG. 1 is a top plan view of one type of race track with which the system of the present invention can be used;

FIG. 2 is a side elevational view of the type of vehicle used in conjunction with the race track shown in FIG. 1;

FIG. 3 is a bottom plan view of a typical vehicle of the type disclosed in FIG. 2;

FIG. 4 is a top plan view of the race track of the present invention with the race track surface removed for illustrative purposes;

FIG. 5 is a section taken through lines 5—5 of FIG. 1;

FIG. 6 is a section taken through lines 6—6 of FIG. 1;

FIG. 7 is an enlarged side elevational view of the portion of the magnet carrying means;

FIG. 8 is an enlarged top plan view of such magnet carrying means;

FIG. 9 is a cutaway top plan view of the electromagnetic version of the race track of the present invention;

FIG. 10 is a schematic view of the electromagnetic control mechanism of the present invention, only a representation portion of the complete system being shown for clarity; and

FIG. 11 is a cutaway end elevational view of the electromagnetic version of the present invention.

With further reference to the drawings, a race course indicated generally at 10 includes a race track 11 which is banked to varying degrees around its enclosed path. The steeper banked, more sharply curved portions 12 and 13 are considered the ends of the track and the more or less straight run portions 14 are considered the straightways.

The center or infield 15 of the track includes normal race areas such as pit areas 16, a staging area 17 and a winner's circle 18.

The entire race course surface including the track 11 and infield 15 is preferably constructed of a molded, high impact type plastic. An enclosing skirt type support or housing 19 is provided about the outer periphery of the race course and also is preferably formed

from molded, high impact type plastic. Likewise, the removable bottom portion 20 encloses the operating portions of the present invention and yet gives access thereto for maintenance and repair as may be needed. It is, of course, understood that columns or other types of supports can be provided intermittently beneath the race course surface to give added central support thereto.

Either integrally or attachedly formed about the area adjacent the periphery of the underside of the race course 10 is a slot or groove member 21. This member is adapted to slidably receive magnetized propelling leaves 22 as will hereinafter be described in more detail.

A plurality of pulley type wheels 23 are disposed below the outer extremity of the infield 15. These wheels are mounted for free rotation on shafts 24 which are secured to and depend from the lower portion of the course 10.

A V-belt 25 is adapted to be movingly carried by the plurality of pulley wheels 23. Fixedly secured at spaced intervals along this belt are the magnetized propelling leaves 22. These leaves are alternately concaved and convexed in cross section as seen clearly in FIG. 7. This alternate spacing allows the leaves to overlap along their path of travel and yet at all times have at least a portion of their upper surface lying in a common plane with adjacent leaves. Thus it can be seen that magnets 26 present an almost continuous attraction to the surface of the track with very little gap therebetween even as the leaves fan as they pass around the area below the curved ends 12 and 13 of the track 11 particularly as seen in FIG. 4.

Screws, rivets or other suitable means 25' are used to attach the propelling leaves 22 to belt 25. Relative to the leaves themselves, these are preferably formed of a relatively resilient material so that as the bank of the track increases, they can readily conform to the underside thereof. Also since the track is preferably formed from a plastic material, even if the magnets come into actual contact with the lower surface of the track, they will slide therealong with very little resistance.

As is obvious from FIGS. 5 and 6, pulleys 23 support feed belt 25 which mounts the magnetized propelling leaves 22. The outer ends of these leaves are adapted to engage and ride in groove as such leaves move around the track. This groove not only supports the outer portion of the leaves, but also assures that such leaves closely follow the contour configuration of the bottom of the track.

The bank of the various areas of the track 11 is clearly seen in FIGS. 5 and 6. This bank portion, indicated generally at 27, increases to a high point at the curved ends 12 and 13 and reaches a low point along the straightways 14. The upper portion 19' of the skirt housing 19 acts as a barrier wall to contain the cars 44 which accelerate to an excessive speed while traveling around the track. Also it should be noted that the propelling leaves do not extend to the outer most part of the track 11 thus allowing cars which move to the outside because of centrifugal force created by excessive speed to lose their propelling force and thus slow down. Once the excessive energy is spent, the bank causes the cars to move back into the area of magnetic influence as hereinafter explained in more detail.

To drive feed belt 25 and its attached propelling means, a drive pulley 28 is provided which has fixedly

secured thereto the shaft 29. Also fixedly mounted on shaft 29 is a second pulley 30. Shaft 29 is, of course, rotatively mounted as can be seen in FIG. 5.

A standard electrical type drive motor 31 has a pulley 32 mounted on its rotatable shaft 33. Motor pulley 32 lies in the same plane as shaft pulley 30 so that V-belt 34 can be used to transmit rotative power from the motor to drive pulley 28.

It is noted from the drawings that both drive motor 31 and one end of shaft 29 are mounted on bottom member 20. It is understood, of course, that other mounting configurations can be used to accomplish the desired result. One of these alternatives is to mount the motor 31 to the bottom portion of the race course 10. It is also obvious that the principle would be the same regardless of where the motor is actually mounted.

A suitable source of power (not shown) for motor 31 is provided as is a control means (not shown) such as a simple off-on switch or a multiple position switch for variable motor speeds. Since all of these embodiments are considered well known in the art, the details thereof are not disclosed in detail. An additional control means could, of course, be a belt tension control for engaging and disengaging belt 34 thus allowing stop and start motion of the propelling leaves even though drive motor 31 is running continuously. Similarly shiftable, varying sized pulleys (not shown) can be used in the drive section between motor 31 and drive section between motor 31 and drive pulley 28 to vary the speed of the propelling leaves 22 as they move beneath track 11. Again, the variable speed feature is not considered necessary for proper operation of the device of the present invention but these possibilities are mentioned should speed variations be deemed desirable.

An alternate embodiment of the present invention is shown in FIGS. 9 through 11 where the mechanical drive means as well as the moveable propelling leaves are eliminated and replaced by a plurality of fixed electromagnets 35 which are either attached to or embedded in the underside of track 11. Conductive means such as wires 36 connect the electromagnets to distributor 37. This distributor includes a rotor 38 which is driven by drive means 39. Rotor 38 is electrically connected to one side of battery 41 by line 40. Interposed in line 40 is a switch 42 for controlling the current to the distributor. Each of the electromagnets 35 is grounded, as seen at 43 in the schematic of FIG. 10, as is one side of battery 41.

The rotor drive 39 can be any desired source of rotative power but preferably is an electric type motor which can be either fixed speed or can be of the controllable speed type. In either case, the rotor drive controls the energization and deenergization of the electromagnets in a predetermined pattern to give a moving magnetic pulse to the surface of the race track 11.

In the interest of clarity and simplification, only representative contacts are shown in the schematic of FIG. 10. It is to be understood, of course, that contacts are provided all around the path of travel of rotor 38 and electromagnets are provided beneath track 11 along its entire circuit.

The vehicle 44 used with both the mechanical and electromagnetic versions of the present invention is the same. Such vehicle preferably includes a relatively large metallic plate 45 mounted beneath the forward portion thereof, preferably between the front wheels. This metallic plate or member can be either magne-

tized or unmagnetized as desired. In either case, such member would be of a size and configuration that is attracted by the magnetic forces being operated beneath the track portion 11 of the race course 10.

Although obviously the shape and configuration of the vehicle 44 itself can be of any design, the wheels are preferably free rolling and undriven. Spring mounting of the axles can be accomplished to give a smoother ride and more realistic vehicle action. Also some free turning play can be provided in the front wheels to allow tracking without skidding. It is, of course, understood that vehicles other than wheeled vehicles can be satisfactorily used on the track of the present invention.

When the race course of the present invention is used, the plurality of vehicles of the type shown at 44 are placed on the track portion 11 of the race course 10. These vehicles can be placed in several rows with the vehicles in each row being abreast to simulate the start of real automobile races. In the mechanical embodiment of the present invention, the drive motor 31 is energized thus through pulley 32, belt 34, pulley 30, shaft 29 and drive pulley 28, belt 25 is driven. As this belt moves, the magnetized propelling leaves 22, which extend from such belt into groove 21, will also move. As the propelling leaves begin to move around the track, the magnetic force thereof will draw the vehicles 45 along over the upper surface. As the speed of the feed belt 25 increases, it will begin to move faster than the vehicles are moving. At this point, the magnetic force moving in a forwardly direction will be acting on the vehicles thus pulling them forwardly but no single magnetic or set of magnets controlling any given vehicle. Thus the forward moving magnetic forces will cause the vehicles to increase speed until they reach a point where centrifugal force causes them to climb the bank 27 of track 11 into the area adjacent the wall 19'. As a vehicle enters this area, it is beyond the magnetic forces of the moving magnets beneath the track 11 and thus the vehicle, because of the shape of the bank (and also possibly rubbing against the track wall) will slow down to where its position on the bank cannot be maintained. This point the vehicle will move down off the bank of the track and again come within the forwardly moving magnetic field of the propelling leaves. This it can be seen that the reentering vehicle will again pick up speed until its centrifugal force again causes it to climb the bank of the track to a point outside of the magnetic field of the propelling means.

From the above, it can be seen that as a plurality of cars move down the track, some will move more quickly into the driven area on the bank and thus be bypassed by other cars which themselves will then move out of the attractive force and be passed by other cars. As the race continues with cars thus passing other cars, a very realistically simulated race is created. As the cars move in and out of the banks and turns, contact between vehicles is bound to occur which, on occasion, will cause spinning and skidding. The infield bank or curb 15' will prevent such skidding or spinning vehicles from inadvertently entering the infield area. The continuous forwardly biasing caused by the moving magnets under the track will act upon plate 45 of the vehicle and will, because of the location of such plate in the forward portion of the vehicle, cause the same to be pulled around and again move in a forwardly direction. Thus it can be seen that realistic looking wrecks, crashes and skids can occur and will auto-

matically be corrected so that the vehicle will again move into racing configuration.

From the above, it can be seen that so long as the magnetized propelling leaves move at a speed greater than the maximum speed at which the vehicles can travel without climbing the bank 27, proper race conditions will be maintained without positive or magnet to metal fixed tracking occurring.

When using the race track 10 of FIGS. 9 through 11, the same principles of operation apply as hereinabove described for the mechanically driven version; namely, the speed of the energizing rotor 38 will move at a speed greater than the maximum bank climbing speed of the vehicles so that the same will accelerate to such climb-out speed, move into the area of non-attraction, slow down, and then move back into such field of attraction.

More specifically, the electromagnetic version of the present invention operates with the rotor 38 rotating to energize and deenergize, in sequence, the various electromagnets 35. This alternate energization and deenergization causes a forwardly moving magnetic field to be created on the upper surface of the race track 11 very similar to that created by the moving magnetized propelling leaves 22.

To stop the race when using the electromagnetic version of the present invention, either the current to the rotor for energizing the magnets can be cut off by opening switch 42, or the power source (not shown) to the rotor drive mechanism 39 can be interrupted. Relative to this latter cut off means, either a simple off-on switch for single speed movement can be used, or a multiple position switch can be used should it be deemed desirable to have variable motor speed and thus variable speed in the moving magnetic field.

Since in the preferred embodiment of the present invention a constant speed, forwardly moving, magnetically propelled means is used, no human participation in the race is needed. For this reason a spectator sport is provided that will prove extremely enjoyable and exciting as is the case with real racing.

From the foregoing, it can be seen that the present invention has the advantage of providing a relatively simple, yet infinitely variable and unanticipatable race that can be completely run without human participation or control. Another advantage of the present invention is to provide an exciting race which automatically slows excessively speeding vehicles to the point where they can again be entered the sphere of accelerating influence. An even further advantage of the present invention is to provide a vehicle race course including means to straighten out and again cause forward motion in vehicles that collide, skid, or otherwise are forced from their usual forward path of travel.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. A spectator sport means comprising: at least one moveable unit; a defined track area having an upper surface and a lower surface; a source of magnetic influence disposed adjacent a portion of said lower surface

and so constructed as to be a motivating force for said moveable units placed on said upper surface, the apparent speed of travel of said force being greater than the maximum speed at which said moveable units can travel without being affected by centrifugal force; and at least one banked area formed in the upper surface of said track, said area sloping downwardly from a portion of said upper surface not affected by said motivating force to a portion of said upper surface affected by said motivating force whereby such force will accelerate said units until centrifugal force moves the same to that portion of the banked area not affected by said motivating force, thereby allowing the units to lose speed and thus move down the bank and back into the area of influence of the motivating force.

2. The means of claim 1 wherein the moveable units

are vehicles.

3. The means of claim 1 wherein the motivating force is a multiplicity of magnets mechanically mounted for longitudinal travel beneath a portion of said track.

4. The means of claim 3 wherein said magnetic means includes a motor means for propelling said magnets.

5. The means of claim 1 wherein the motivating force is a multiplicity of electromagnets mounted beneath the upper surface of said track and being energized and deenergized, alternately, by a distributor means.

6. The means of claim 1 wherein a magnetically influenceable member is mounted in the front portion of each of said moveable units whereby relatively straight tracking movement is assured.

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