March 26, 1957 J. K. NORTHROP ET AL 2,786,680

RACING GAMES

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Fig. 1

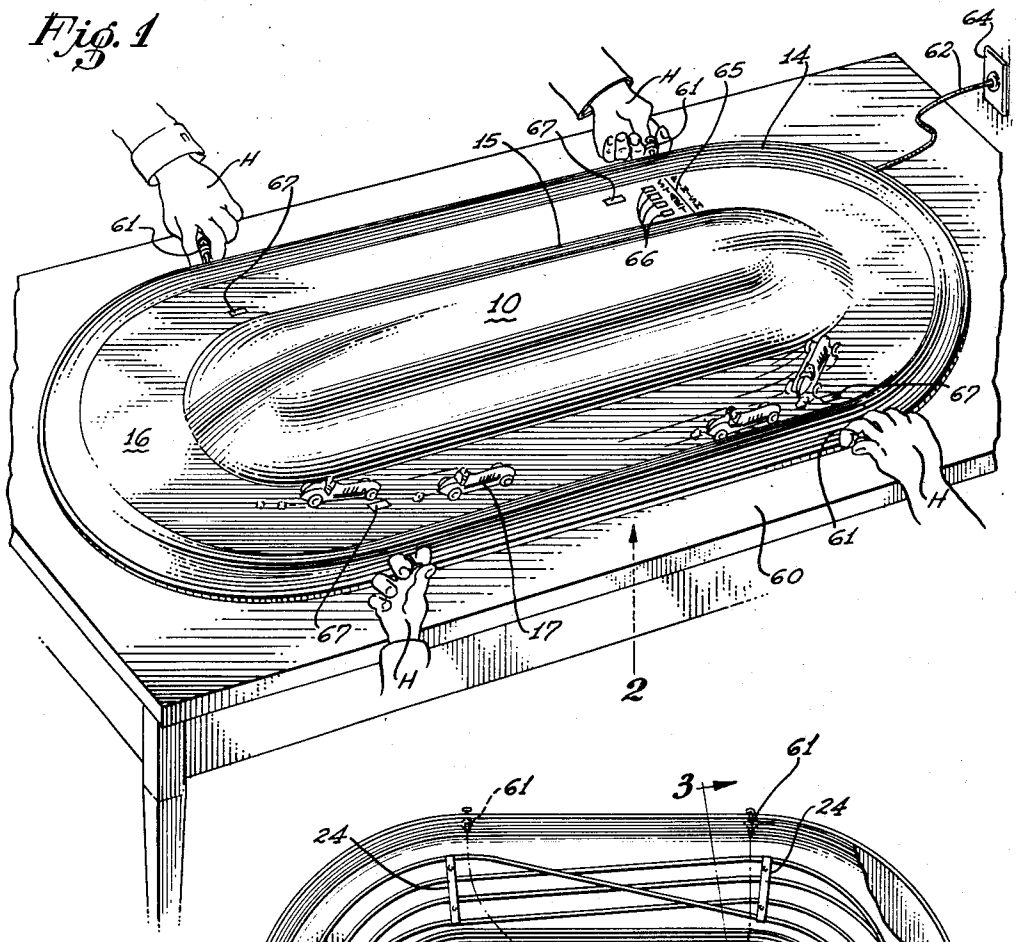
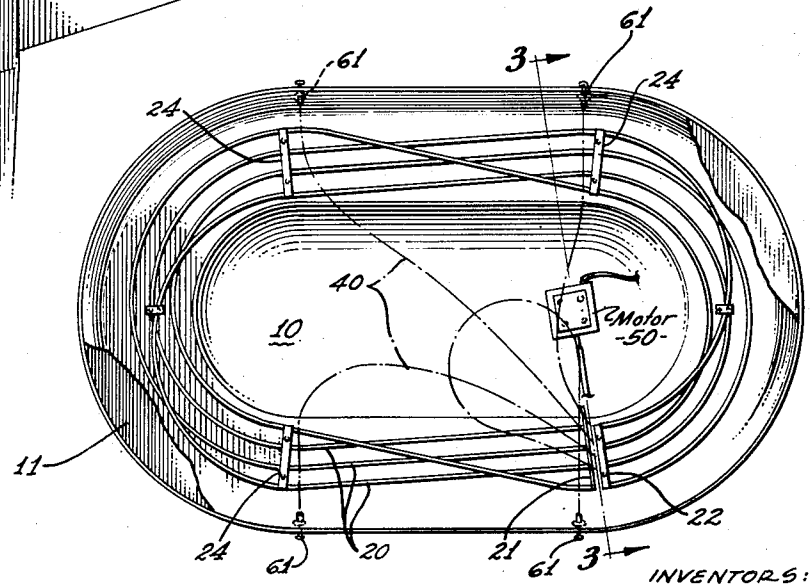


Fig. 2



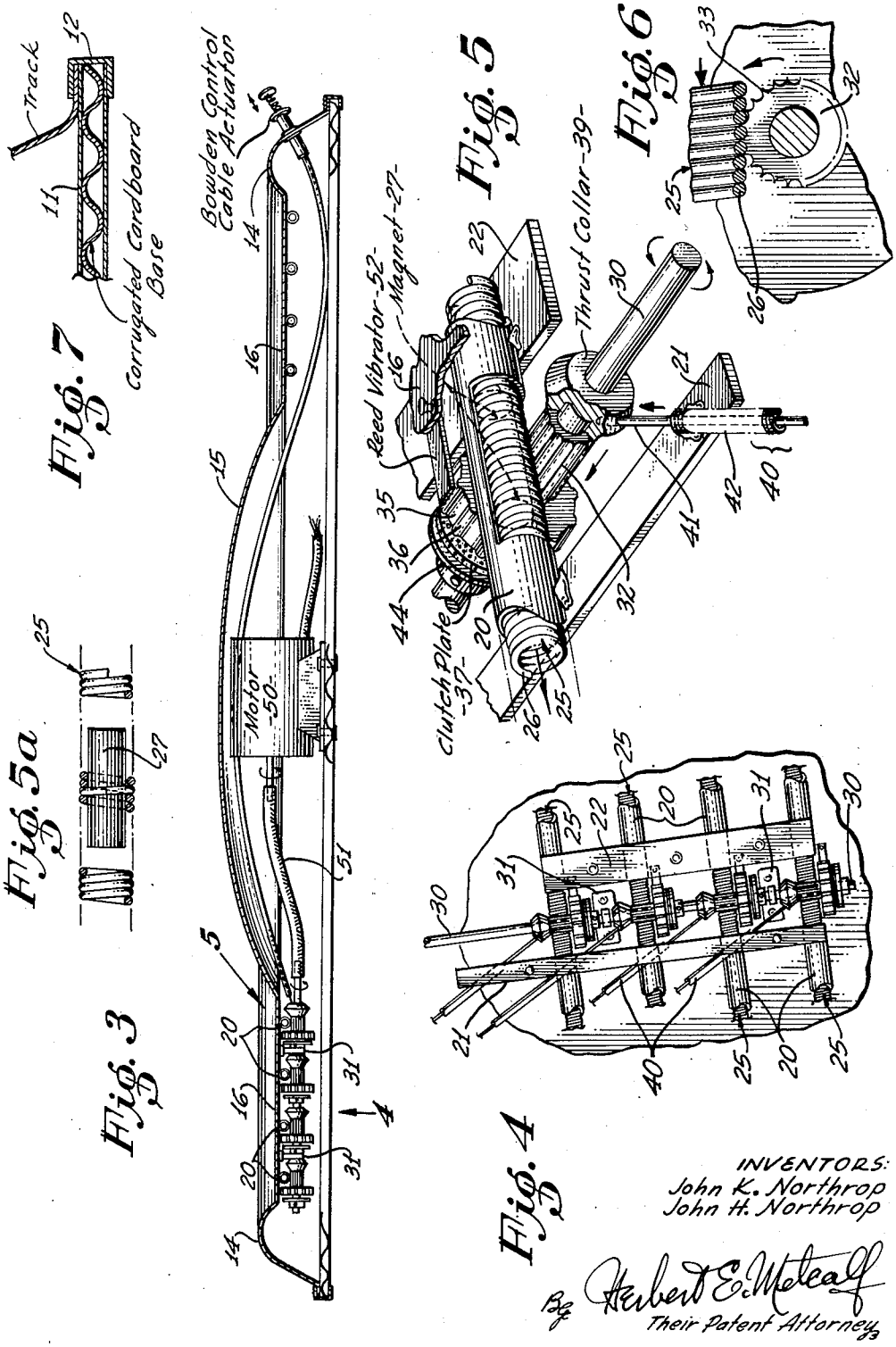
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RACING GAMES

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RACING GAMES

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Fig. 8

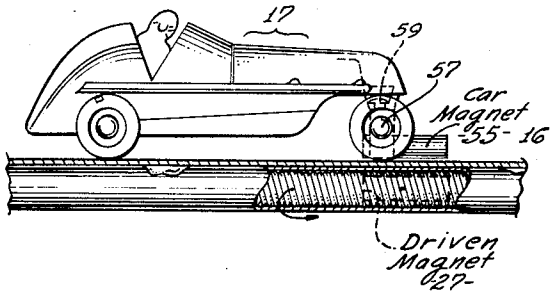


Fig. 9

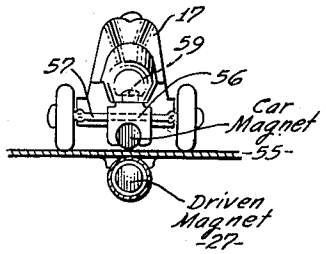


Fig. 10

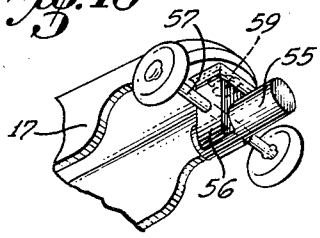


Fig. 11

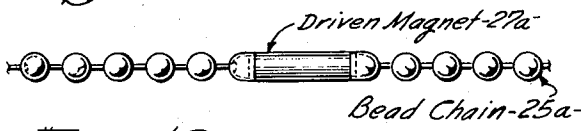


Fig. 12

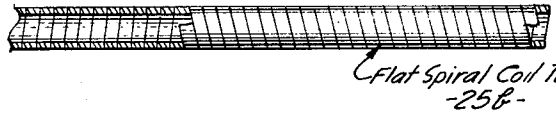


Fig. 13

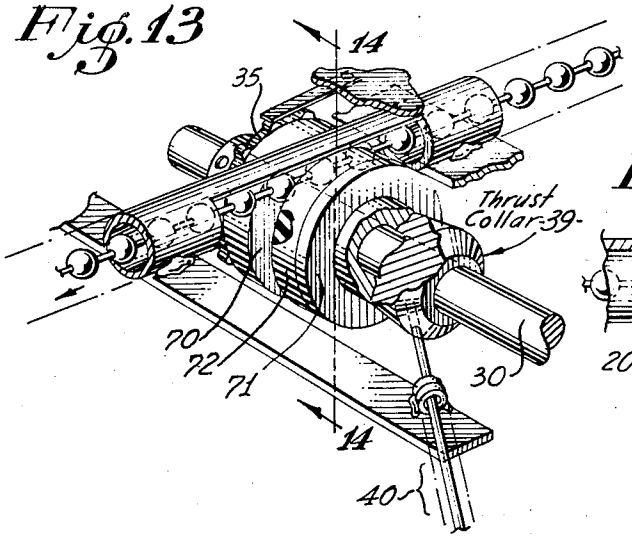
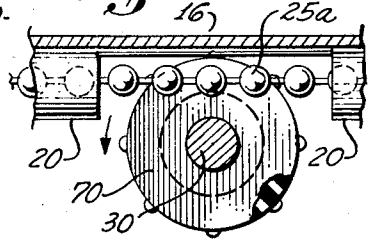


Fig. 14



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Fig. 15

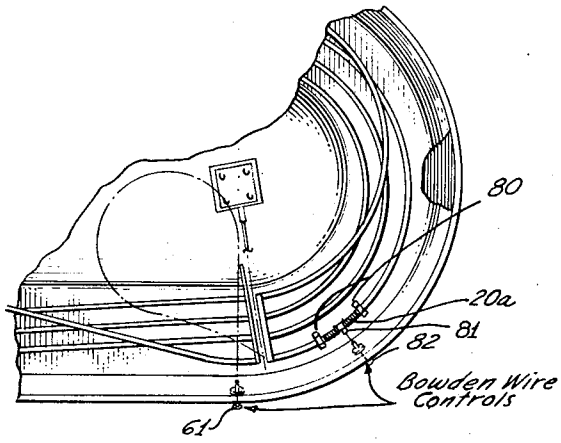
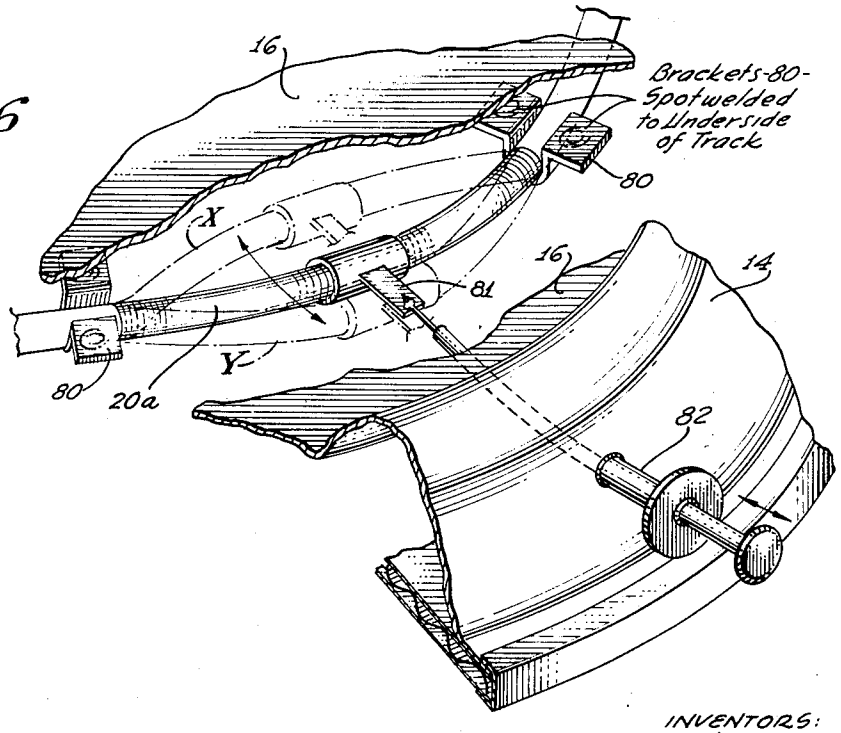


Fig. 16



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RACING GAMES

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Application November 24, 1953, Serial No. 394,042

2 Claims. (Cl. 273—86)

The present invention relates to games, and more particularly to a game wherein toy vehicles are progressed around endless paths under control of individual players.

Among the objects of the invention are:

To provide a means for guiding a toy vehicle around an endless course on a playing surface without the use of tracks or other guidance means on that surface.

To provide a means for guiding a plurality of individually controlled toy vehicles around adjacent endless paths on a playing surface without the use of tracks on that surface.

To provide a means for controlling a toy vehicle movable over a playing surface from beneath said surface.

To provide a simple means and method of controlling the speed and course of a toy vehicle over a generally flat playing surface without direct connection to said surface.

To provide a means and method of individually driving a plurality of toy vehicles over a surface area by means of a single motor only and to provide individual speed controls for each of said vehicles.

To provide a means for progressing a plurality of toy vehicles over a playing surface at controlled speeds without physical contact between a progressing means and the vehicles.

To provide a novel means and method for magnetically controlling the speed and direction of a plurality of toy vehicles on a racing surface.

To provide a magnetic coupling between a toy vehicle and a driven element that permits skidding of the vehicle on turns.

To provide a racing game where toy vehicles are raced over an endless substantially flat race course area under individual control and in predetermined intersecting paths.

To provide a means and method of progressing a plurality of toy vehicles over a substantially flat race course area at variable speeds with the motive power for said vehicles supplied from a single constant speed motor.

To provide a toy vehicle racing game in which a high degree of skill can be utilized by the players thereof.

To provide a toy vehicle racing game having a race course area on which the course to be followed by the vehicles is not visible to the eye.

To provide a toy vehicle racing game simulating in many respects real midget car racing.

And to provide a novel racing game.

In the drawings:

Figure 1 is a top perspective view of a game board with racing courses for four individually controlled toy vehicles.

Figure 2 is a bottom plan view, partly diagrammatic, of the board of Figure 1 taken as indicated by arrow 2 in Figure 1.

Figure 3 is a cross sectional view taken as indicated by the line 3—3 in Figure 2.

Figure 4 is a bottom view in elevation of the coil drive mechanism used in the game board shown in Figure 1.

Figure 5 is an enlarged perspective view of one coil drive and control.

Figure 5a is a diagrammatic side view of a magnet mounting.

Figure 6 is a sectional view showing how a coil is driven.

Figure 7 is a sectional view of the edge construction of the game board shown in Figure 1.

Figure 8 is a side view partly in section and partly in elevation showing one magnetic vehicle drive.

Figure 9 is an end view partly in section and partly in elevation of the vehicle drive shown in Figure 8.

Figure 10 is a perspective view from below showing one manner in which the vehicle magnet can be mounted.

Figure 11 is a side view of a driving chain.

Figure 12 is a side view, partly in section, of a flat spiral coil drive.

Figure 13 is a perspective view showing means for driving the driving chain shown in Figure 11.

Figure 14 is a view partly in section and partly in elevation taken as indicated by the line 14—14 in Figure 13.

Figure 15 is a bottom plan view showing how a flexible tube portion can be used to vary a vehicle path.

Figure 16 is a detailed perspective view of the flexible portion shown in Figure 15.

Referring first to Figures 1, 2, 3 and 7, a game board 10 is provided with a flat base 11 preferably formed from corrugated sandwich type cardboard and is clipped to the board 10 by edge clips 12 as best shown in Figure 7.

The board 10 is preferably formed from light weight aluminum sheet on a rubber bed press by the well known hydroforming process, and has a raised bead 14 all around the board adjacent the edge thereof and with a domed center 15 spaced from bead 14 to provide a generally flat closed race course area 16. A preferred course will be longer than wide with semi-circular ends, with an overall size adapted to rest on a table top as best shown in Figure 1, with the players standing or sitting around this table.

The upper surface of the race course area 16 is not provided with any tracks or other vehicle guiding means whatever, although this is the area on which a plurality of toy vehicles 17 travel under the control of the individual operators as represented by hands H in Figure 1.

All vehicles are controlled as to their paths around course area 16 through mechanism beneath the game board as best shown in Figures 2, 3, 4, 5 and 6.

The path each vehicle is to follow is determined by the position beneath the board 10 of a tube 20, one end of which is attached to a first cross bar 21 and then extends around and beneath the race course area 16 to position the other end opposite to but spaced away from the first end, this other end being attached to second cross bar 22 as best shown in Figure 4.

In the example illustrated and described, four tubes 20 are used, each tube passing beneath the other three tubes once as it extends around and beneath course area 16, as best shown in Figure 2. In this manner each tube 20 can be made of the same length, thereby describing paths of the same length. Tubes 20 are of non-magnetic material such as aluminum or plastic, and are held in generally parallel and spaced position by tube clips 24 positioned at intervals around the extents of the tubes, again best shown in Figure 2.

Inside of each tube 20 is a flexible driven member 25, in this case a closely coiled wire 26, of aluminum, for example. The joint between the open ends of driven member 25 is made, in this case, by forcing these ends over a cylindrical "Alnico" magnet 27, for example, slightly larger than the interior of coil 26 so that the magnet 27 is tightly gripped, with plastic cement between the coil and the magnet for extra security, as best shown in Figure 5a. The coil 26 thus becomes an endless mem-

ber **25**, and as the coil is made to fit loosely within tube **20** it can be progressed inside said tube **20** to cause the magnet **27** to traverse a path directly beneath course area **16**.

Progression of each driven member **25** is accomplished in this case, as best shown in Figures 4, 5 and 6.

A shaft **30** is positioned beneath coils **26** and between cross bars **21** and **22** and is supported by bracket bearings **31** from game board **10**. Just below each coil **25** is positioned an elongated pinion **32** having teeth **33** sized and positioned to mesh with the turns of coil **25** as best shown in Figure 6. Next to each pinion **32** on shaft **30** is a small flywheel **35** having peripheral serrations **36**. Next to flywheel **35** is also positioned a clutch plate **37**.

Pinion **32**, flywheel **35** and clutch plate **37** are all connected together and are free to rotate on shaft **30**. At the other end of pinion **32** from flywheel **35** is positioned, on shaft **30**, a thrust collar **39** also free to rotate on shaft **30**, this thrust collar being slidable on shaft **30** under control of a Bowden cable **40** of the slide wire type, the control wire **41** of which is connected to thrust collar **39**, the outer sheath **42** being connected to cross bar **21**.

Operation of Bowden cable **40** causes the thrust collar **39**, pinion **32**, flywheel **35** and clutch plate **37** to move longitudinally on shaft **30** until the clutch plate **37** is forced against a driven plate **44** pinned to shaft **30**.

Shaft **30** is rotated by a constant speed motor **50** mounted beneath game board **10** in the domed center **15** thereof, through a flexible shaft **51**, as shown in Figures 2 and 3.

The drives for all four driven members are the same except for the noise producing means operated by serrations **36**. These serrations are for the purpose of actuating reed vibrators **52** extending over flywheels **35** and terminating in contact with these flywheels so that when the flywheels are rotated, a noise resembling engine exhaust is produced. By varying the reed shape and thickness a distinctive sound can be provided for each vehicle.

The four toy vehicles **17**, such as miniature racing cars, preferably formed of molded plastic, as best shown in Figures 8, 9 and 10, are progressed around the course area **16** by being magnetically coupled to driven magnet **27**. To provide this coupling, a car magnet **55** is provided for each vehicle, this magnet being held in clips **56** dropped down from the front axle **57** of the car **17**, this axle being rotatable on vertical axle pivot **59**. Magnet **55** extends well forward of axle **57** and is positioned close to the top surface of area **16**. The poles of the driven magnet **27** and the car magnet **55** are reversed to provide coupling when the cars **17** are facing in the direction the driven magnet **27** is being progressed, so that as the driven members **25** are progressed through tubes **20** by clutching into rotative shaft **30** the cars will be progressed over race course area **16** following paths as prescribed by the paths of the driven magnets to which the car magnets are coupled.

An important feature of the magnetic coupling between the car magnets and the driven magnets is to be noted. Modern "Alnico" magnets, for example, are sufficiently strong so that even when the driven and car magnets are separated somewhat during the passage of the driven magnet in one tube below the other tubes, sufficient coupling will still exist to progress the vehicle across the tube cross-over so that that particular vehicle will cross from one side of the race course area to the other.

As shown in Figure 1, the game is preferably placed on a table **60** with four Bowden cable actuators **61** spaced along the outside of bead **14** of the game board. These actuators are in positions where two players can control the Bowden cables on one side of the game from one side of table **60** with the other two players on the other side of the table as indicated by hands H in Figure 1. Motor **50** is provided with the usual cord and plug **62** for insertion into a convenient electrical outlet **64**.

In operation, motor **50** is started, thereby rotating shaft **30** and all four driven plates **44** at a constant speed. Preferably, the toy racing cars **17** are formed of different colored plastic, and are initially placed side-by-side over tubes **20** on the racing area **16** at a start-finish line **65** preferably directly over shaft **30**. The proper position is preferably shown to the players by the use of colored marks **66** on the upper surface of the racing area at the start line, the colors of these marks corresponding to the colors of the cars. Similarly, color marks **67** are positioned in front of each player on the playing area **15** so that each player knows where to replace his car on the racing area to be over the proper tube, in case the car leaves the racing area or is stalled.

Each player can progress the driven magnet **27** corresponding to his car, by manipulation of his Bowden cable actuator **61**, which, when operated, causes the corresponding flywheel **35** and pinion **32** to rotate, thereby progressing driven member **25** in tube **20** to carry the driven magnet **27** around the endless path. When the proper car **17** is coupled to the driven magnet **27**, this car will be progressed around the prescribed path on the racing area **16**. When all four cars are coupled, they can be raced, taking into account of the fact that the car paths intersect at every cross-over. Thus the players must carefully control their individual cars to avoid collisions. Cross-over positions are preferably not marked.

It is also to be noted that by mounting the car magnet **55** on the front axle, steering is facilitated, and that the vehicles, if propelled around the curves too fast can skid, possibly into the path of another car, thereby providing a course hazard. However, skidding does not necessarily cause de-coupling of the magnets **27** and **55**, but excessive speed on turns will.

Although the motor **50** is a constant speed motor, the speed of the cars can be controlled by the players from zero to maximum by careful clutch control through the Bowden cables **40**. The flywheels **35** contribute some momentum to the system, preventing instant stops, etc., to make the action of the cars more realistic. Realism is further simulated by the use of the reeds **52** which provide distinctive sounds for each vehicle, the frequency however varying as the speed of the cars is changed.

In Figures 11 to 14, two alternate driven members **25** are shown.

In Figure 11 the driven member is a bead chain **25*a***, the two ends thereof being joined by a driven magnet **27*a***.

In Figure 12, the driven member is a flat spiral coil **25*b***, the coiling being such that no space ordinarily appears between convolutions.

Both the bead chain **25*a*** and the flat coil **25*b*** can be driven as shown for the bead chain **25*a*** in Figure 13.

In this case shaft **30** supports the flywheel **35** which in this case has a facing **70** of rubber or the like, chain **25*a*** passing across this face as shown in Figure 14. An idler plate **71** having a similar facing **72** thereon is positioned on shaft **30** so that when facings **71** and **72** are forced toward each other by movement of thrust collar **39** under Bowden cable control, the chain will be gripped and progressed in its tube **20**.

In Figures 15 and 16 an additional hazard is shown. Here, a section **20*a*** is made of flexible material and anchored at each end by section brackets **80**. At the center of section **20*a*** a connector **81** is attached and this connector is made movable as shown by broken lines *x* and *y* by the use of an auxiliary Bowden control **82**. When one such flexible section **20*a*** is positioned adjacent each player, this player at will can change the course of his own particular car to interfere, if desired, with other cars being progressed.

It will thus be seen that we have provided a racing game in which a plurality of players can participate and in which a high degree of skill can be utilized by each player, and is in fact required, in order to win.

While in order to comply with the statute, the invention has been described in language more or less specific

as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprises a preferred form of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed is:

1. Apparatus of the class described comprising a relatively thin sheet of non-magnetic material having a substantially flat horizontal upper surface thereon, a plurality of tubes positioned immediately beneath said sheet and said area, each tube having the opposite ends thereof opposed and spaced apart a distance short with respect to the length of the tube, said tube and the space between said ends describing an endless course beneath said area, a portion of each of said tubes being flexible, means for moving said flexible portions of said tubes to change the course thereof, an endless flexible element inside of each tube and extending across the space between the ends thereof, a magnet attached to and progressible within

said tube by said element over said course, a plurality of toy vehicles moveable over said area, means for magnetically coupling a vehicle to a magnet, and means for progressing said flexible element through said tubes to move said magnet over said courses.

2. Apparatus in accordance with claim 1 wherein said means for moving said flexible portions of said tubes to change the course thereof is adapted for manual movement.

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