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Porter et al.

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[54] **HELICAL TRACK SYSTEM**

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[21] Appl. No.: **107,377**

[52] **U.S. Cl.** .....**238/10 E,** 46/1 K

[51] **Int. Cl.** **A63h 19/30**

[58] **Field of Search** .....238/10 R, 10 E, 10 F; 46/43, 1, 1 K; 104/60

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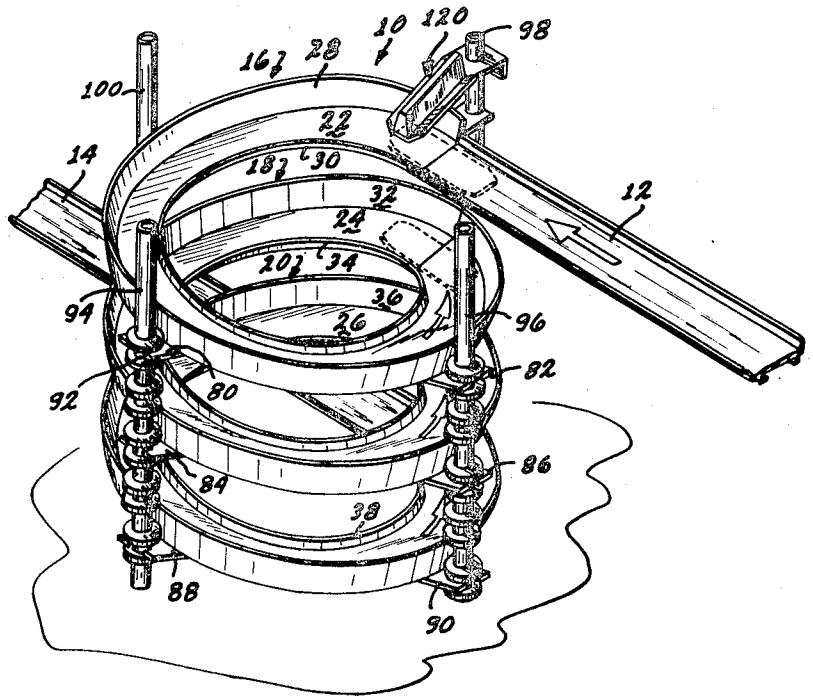
[57] **ABSTRACT**

A helical track accessory for a toy vehicle and track layout system including three easily assembled and disassembled track sections having integral tabs which are attaCheD to alignment and support poles. The poles have spaced pairs of annular flanges for receiving the tabs. A deflector arm positioned at the upper end portion of the helical track provides a bearing force upon moving toy vehicles to insure the vehicle is retained on the helical track. The track and poles are simply constructed and of synthetic resin so as to be inexpensively manufactured.

7 Claims, 6 Drawing Figures



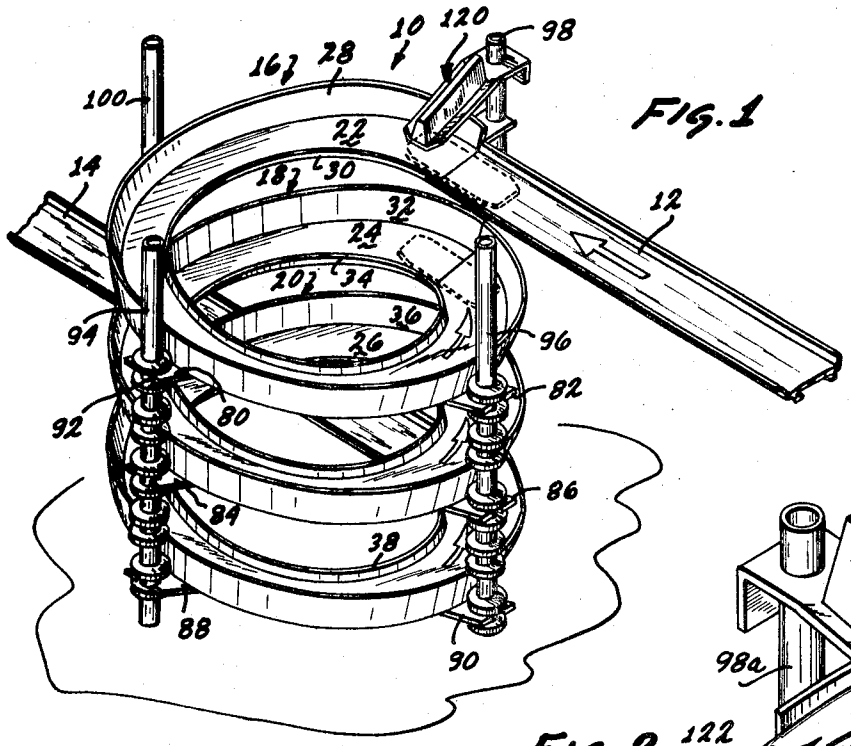


FIG. 1

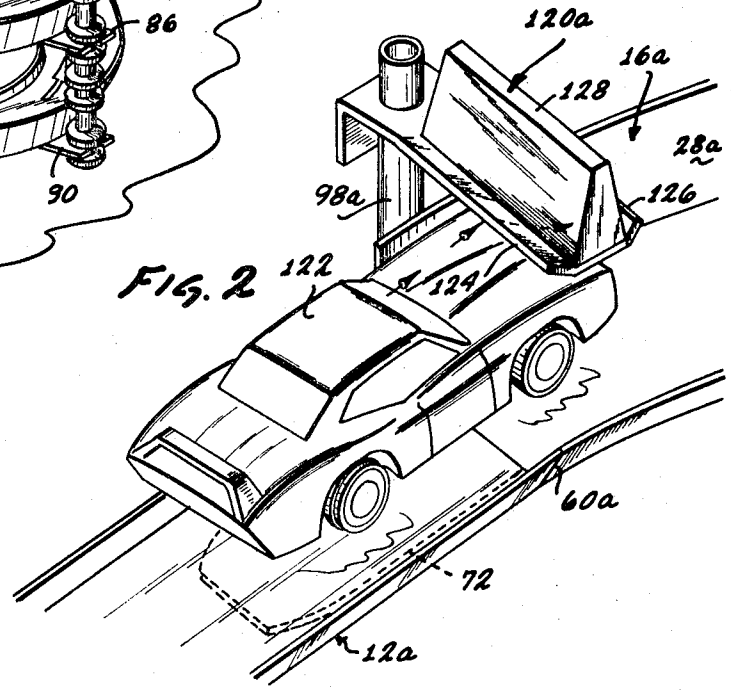


FIG. 2

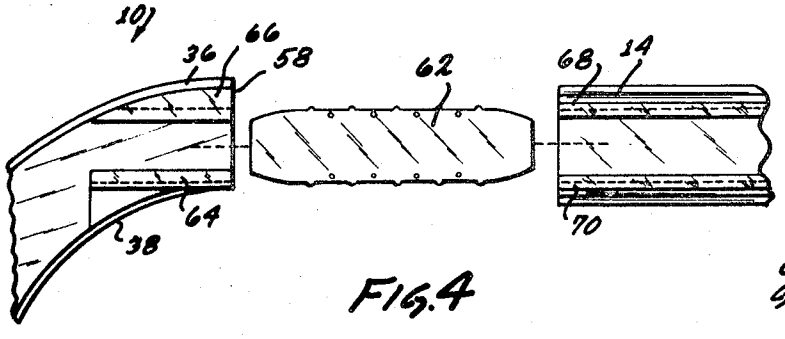


FIG. 4

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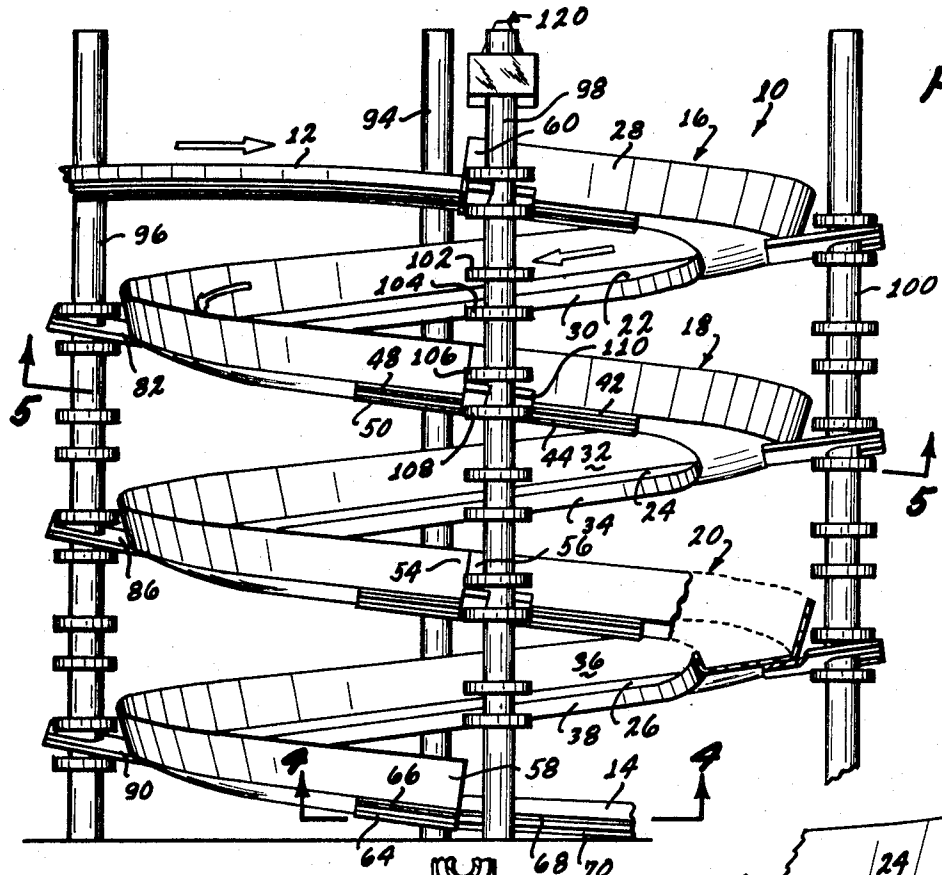


FIG. 3

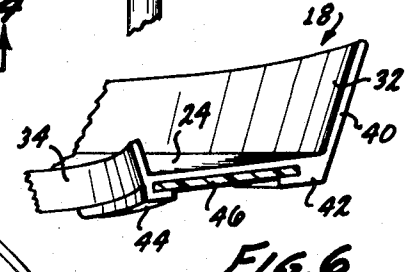
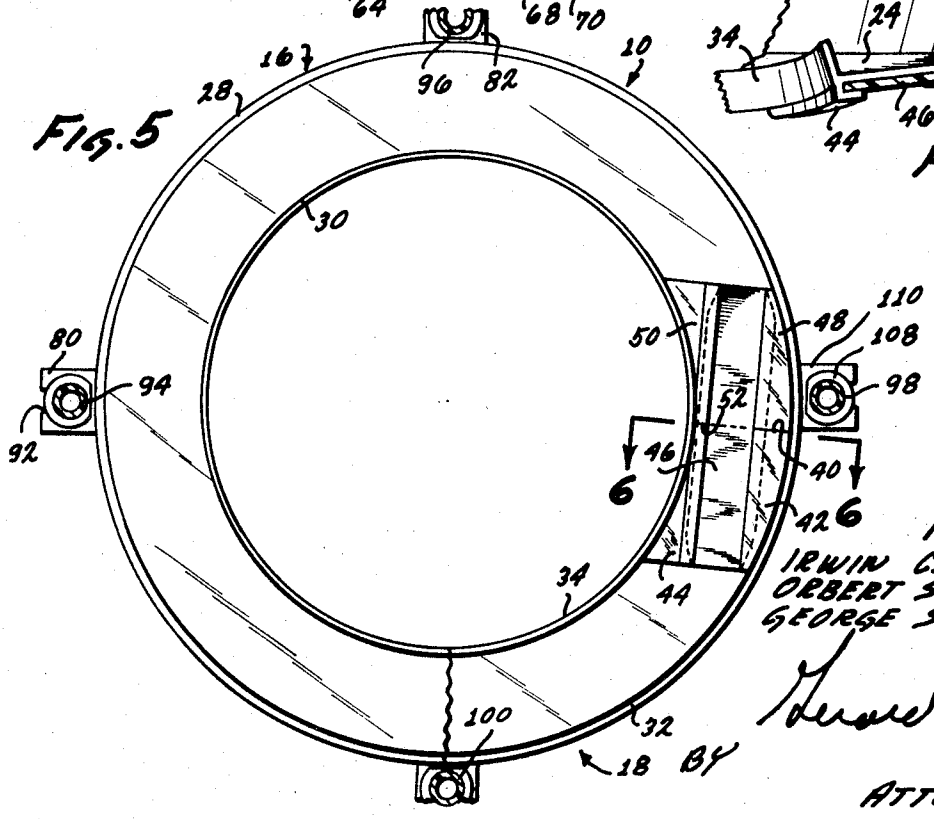


FIG. 6

FIG. 5



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HELICAL TRACK SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a toy vehicle track or roadway system and, more particularly, to a toy vehicle track or roadway system wherein the track sections are helically curved.

2. Description of the Prior Art

Small toy vehicles have become extremely popular among young children. These vehicles are usually sold in sets which include extruded synthetic resin track sections which allow various track layouts to be constructed. A very popular form for toy vehicles are scaled automobiles having metal bodies and riding on freely rotatable wheels, as more clearly described in U.S. Pat. No. 3,510,981 to H. W. La Branche et al. The track sections are of brightly colored material having a running surface and two oppositely disposed guide flanges for guiding the toy vehicle along the running surface. The track sections also include depending flanges which provide a channel-shaped receptacle for receiving track section connectors to allow easy connection of abutting track sections. The track system is exemplified by U.S. Pat. No. 3,487,999 to A. W. B. Nash et al. More recently, a newer self-powered toy automobile of the same scale as the above-mentioned automobile has appeared. By self-powered, it is meant the vehicle has a small motor directly connected to the rear wheels and a small rechargeable battery for energizing the motor.

The combination of small toy vehicles with freely rotatable wheels, and especially self-powered vehicles, and adaptable track sections make for extremely exciting toy vehicle systems. Added to this are various accessories such as curves, loops, starting gates, finishing gates, speed indicators, lap counters, power boosters, etc., which may be added to a track layout. In order to increase the excitement and to offer greater versatility to imaginative children, endeavors have been made to provide additional accessories. To be successful, however, each element of a toy vehicle system must be simply constructed so as to be inexpensively manufactured to allow mass marketing at a reasonable cost.

SUMMARY OF THE INVENTION

The present invention provides another exciting accessory which may be used with the above-mentioned toy vehicles and track sections and which fulfills the requirement of being suitable for mass marketing by providing a track system comprising at least one helically curved track section having a vehicle running surface and two oppositely disposed inner and outer guide flanges projecting from the running surface for guiding a vehicle along the running surface; flange means connected to an outer peripheral portion of the track section for attaching the track section to a support and alignment means; and means connected to the flange means for supporting and aligning the track section.

It is a general aim of the present invention to provide a track system having a helically curved track which is simply constructed and inexpensive to manufacture.

A corollary object of the present invention is to provide a track system having a helically curved track which is easily assembled and disassembled for compact packaging, for facilitating transportation and handling, and for allowing operation by a young child.

A further aspect of the present invention is to provide a track system having a helically curved track which may be used in conjunction with other track system accessories to provide an exciting addition to a toy vehicle system.

Other objects and advantages of the invention will appear from the following description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the present invention illustrated as part of a track system.

FIG. **2** is an enlarged perspective view of a modified portion of the embodiment illustrated in FIG. **1**.

FIG. **3** is an enlarged elevational view partially sectioned of the embodiment shown in FIG. **1**.

FIG. **4** is an enlarged plan view of a portion of the embodiment shown in FIG. **3** taken along line **4—4** of FIG. **3**.

FIG. **5** is a plan view taken along line **5—5** of FIG. **3**.

FIG. **6** is an elevational sectional view taken along line **6—6** of FIG. **5**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention is susceptible of various modifications and alternative constructions, illustrative embodiments are shown in the drawings and will herein be described in detail. It should be understood, however, that it is not the intention to limit the invention to the particular forms disclosed; but, on the contrary, the invention is to cover all modifications, equivalents and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring now to FIG. **1**, there is illustrated a helical track system **10** connected to a track section **12** at one end and a track section **14** at its other end. It is to be understood that the track sections **12** and **14** connect the helical track system **10** to a track layout (not shown) which may include other accessory pieces in any of a great variety of layout formations. If non-motorized toy vehicles are used, they will be introduced to the helical track system from the track section **12** and move in a downward spiral fashion to the track section **14** by the force of gravity. If, however, a self-powered toy vehicle is used, it may be moved either upwardly or downwardly along the helical track section. Thus, the depiction of the arrows in FIGS. **1** and **3** to indicate the direction of travel of a vehicle is to indicate the usual direction taken by a vehicle but is not to be considered limiting since a self-powered vehicle can move in either direction.

In accordance with one of the important aspects of the present invention, provision is made for a helically curved track which is simply constructed and capable of inexpensive manufacture. In addition, the helically curved track is very easy to assemble and disassemble to enable compact packaging and to facilitate transportation and handling. The ease of assembly and disassembly allows even a small child to operate the track system. Referring now to FIGS. **1**, **3**, **5** and **6**, there is illustrated in more detail the track system comprising a

plurality of helically curved track sections **16**, **18** and **20**. Each track section includes a vehicle running surface such as the running surface **22** of the track section **16**, the running surface **24** of the track section **18** and the running surface **26** of the track section **20**. In addition, each track section is bounded by two oppositely disposed guide flanges extending in an oblique fashion upwardly from the running surface to provide retaining walls for guiding the toy vehicle moving over the running surface. More particularly, the track section **16** has an outer guide flange **28** and an inner guide flange **30**, the track section **18** has an outer guide flange **32** and an inner guide flange **34**, while the track section **20** has an outer guide flange **36** and an inner guide flange **38**; it is to be noted that the outer guide flanges **28**, **32** and **36** form the outer peripheral portion of the helically curved track sections. As more clearly shown in FIG. **6**, the outer guide flange **28** is substantially longer than the inner guide flange **30** due to the centrifugal forces on the vehicle attempting to move the vehicle tangential to the running surface. This tends to bring the vehicle into repeated contact with the outer guide flange which must prevent the vehicle from leaving the track system.

At each end of track section, two depending connector arms are provided forming a channel-shaped receptacle with a bottom surface to receive a track section connector to securely connect two adjoining helical track sections. For example, an end portion **40**, FIGS. **5** and **6**, of the track section **18** has two depending connector arms **42** and **44** to receive about one-half of a track section connector **46**. The other half of a track section connector is received by two connecting arms **48** and **50**, FIG. **5**, of the track section **16** having an end portion **52** which abuts the end portion **40**. The track section connector **46** may be identical to that disclosed in the Nash et al. patent mentioned hereinabove. In a similar fashion, the other end portion **54**, FIG. **3**, of the track section **18** abuts and is connected to an end portion **56** of the track section **20**. The second end portion **58** of the track section **20** is connected to the track section **14**, while the other end portion **60** of the track section **16** is connected to the track section **12**.

In more detail, the end section **58** is shown in an exploded view, FIG. **4**, connected to the track section **14** by a track section connector **62**. The helically curved track section **20** includes two depending connector arms **64** and **66** forming a channel-shaped receptacle to receive about half of the track section connector **62** while the other half of the track section connector is received by two depending arms **68** and **70** of the track section **14** which also forms a channel-shaped receptacle.

As an alternative to the use of a separate track section connector, such as the track section connector **62**, FIG. **4**, an integral track section connector may be formed at one of the end portions of each of the helically curved track sections, while the other end portion continues to have two depending connector arms. For example, referring to FIG. **2**, an end portion **60*a*** of a helically curved track section **16*a*** includes an integral track section connector **72** which is received by a straight track section **12*a***. Thus, it is quite clear that either of the two alternatives shown can be used to provide the necessary connection between two adjoining track sections.

It is to be understood that while the preferred embodiment illustrates three helically curved track sections connected end to end, more track sections may be added to increase the vertical height and the number of spiral rotations traveled by a moving vehicle. It is also to be understood that the entire helically curved track portion may be constructed of one track section having a multiple number of spiral revolutions if desired. Thus, if the helically curved track sections are made of a substantially rigid material, then it would be preferable to provide several sections so as to allow disassembly for compact packaging. However, if the helically curved track section is made of a material sufficiently resilient, the track section may be made in one piece and then compressed to provide a compact packaging arrangement.

Referring now to FIGS. **1**, **3** and **5**, the helical track system includes a number of tabs about the outer periphery of the track sections. For example, tabs **80** and **82** are integral with the outer guide flange **28** of the track section **16** and extend generally perpendicular from the outer guide flange. In a similar fashion, tabs **84** and **86** are visible in FIG. **1** integral with the outer guide flange **32** of the track section **18**; tabs **88** and **90** are integral with the outer guide flange **36** of the track section **20**. It is noted that each of the helically curved track sections include four integral tabs spaced at 90° intervals about the track system.

Each of the tabs has a recess for attaching to a pole which in turn acts to support and align the helically curved track sections. For example, referring to FIG. **5**, the tab **80** has a recess **92** to receive a pole **94** in snug engagement. In a like manner, the four aligned tabs of the three helically curved track sections receive three other poles **96**, **98** and **100**. If the helically curved track sections **16**, **18** and **20** are of a sufficiently ridged material to support themselves, then the poles act to align and support the track sections so as to prevent them from toppling. However, if the material of the helically curved track sections is not sufficient to support themselves, or if the track sections are flexible enough to be compressed even if to a small degree, then it is desirable for the poles to have flanges to engage the tabs and support the track section vertically as well as horizontally.

As shown, each of the poles has a series of spaced flanges such as the pole **98** having flanges **102**, **104**, **106** and **108**. It is noted that the flanges are spaced in a periodic manner along the length of the elongated pole and are positioned in pairs so that each pair may cooperate with a tab. The pole **98** has six pairs of flanges of which only the alternate pairs make contact with the track sections. For example, the pair of flanges **106** and **108** receive a tab **110** of the track section **18**. The tab **110** is slanted so that a good friction fit is achieved between the flanges of the pole and the tab. Not only is a strong connection made so that better support is achieved, but when flexible enough material is used for the helically curved track sections, the placement of a tab between a pair of flanges aligns the vertical height of the track sections. For example, if the tab **110** was placed between the flanges **102** and **104**, the vertical height of the track section **18** between its end portions **40** and **54** would be increased by the distance between the pair of flanges **102**, **104** and the pair of flanges **106**, **108**.

It is now readily apparent the helically curved track sections with the integral tabs and the poles with the integral flanges may be constructed of any suitable material such as a synthetic resin which may be inexpensively molded into the structure illustrated. The track system also offers versatility in that an imaginative child can add or substract track sections easily and quickly to achieve whatever track layout is desired.

Referring now to FIGS. 1 and 2, the track system includes a deflector arm **120**, FIG. 1, **120***a*, FIG. 2, mounted to the pole **98**, FIG. 1, **98***a*, FIg 2, and disposed across the upper end portion of the track section **16**, **16***a*. The deflector arm is spaced from the running surface of the track section by a distance approximately the height of a toy vehicle such as the toy vehicle **122**. The deflector arm includes two oblique flanges **124** and **126** and a display surface **128**. It is found that unless the track section **12** is firmly supported, there is a tendency for the center of the track section to be somewhat lower than the end portion **60***a* of the helically curved track section **16***a*.

Thus, a vehicle moving along the track section **12***a* will be moving along in an upward incline prior to entering the track section. In the case of a toy vehicle moving at a high rate of speed, especially for those that are self-powered, there is a tendency of the vehicle to leave the track section in a jumping fashion when the track on which it is moving changes from an upward incline to a horizontal or downwardly incline direction. If the vehicle is moving fast enough, there will be a tendency for it to jump over the outer guide flange **28***a*, FIG. **2**; the slanted flange **124** of the deflector arm prevents this by contacting the upper portion of the vehicle **122** forcing it downward toward the running surface of the track section. The slanted flange **126** performs the same function when the vehicle is moving in an opposite direction; that is, upwardly along the helical track section before moving downwardly along the track section **12**, **12***a*.

In operation, the helically curved track sections are easily assembled end to end with the track section connectors. The support and alignment poles are then attached to the tabs of the track sections to achieve the desired height characteristic. The deflector arm is placed upon the pole adjacent the highest end portion of the helical track system. The system is then in a condition to be attached to a track layout if desired, or could function by itself allowing a toy vehicle to move upwardly or downwardly along the running surfaces.

We claim:

1. A track system for toy vehicles comprising:

at least one helically curved track section having a vehicle running surface and at least one guide flange projecting generally upwardly from substantially one edge of said running surface for guiding a vehicle along said running surface;

flange means connected to an outer peripheral portion of said track section for attaching said track section to a support and alignment means; and

means connected to said flange means for supporting and aligning said track section, said means comprises an elongated pole having spaced pairs of flanges adapted to engage said flange means connected to said track section.

2. A track system as claimed in claim **1**, wherein:

said spaced pairs of flanges are integral with said elongated pole; and

said flange means comprises a tab integral with the guide flange, said tab extending generally perpendicular from said guide flange and having an opening for receiving said pole so that said tab is disposed between a pair of said flanges.

3. A track system as claimed in claim **2**, including a deflector arm connected to said pole and disposed across an upper end portion of said track section spaced from said running surface for biasing a moving vehicle toward said running surface.

4. A track system as claimed in claim **1**, including a deflector arm connected to and disposed across an upper end portion of said track section spaced from said running surface.

5. A track system for toy vehicles comprising:

a plurality of helically curved track sections, each track section having a vehicle running surface and two oppositely disposed inner and outer guide flanges projecting from said running surface for guiding a vehicle along said running surface;

means for connecting said track sections one to another to form an extended helically curved track;

means connected to an outer peripheral portion of said track sections for attaching said track sections to a support and alignment means; and

means connected to said attaching means for supporting and aligning said track sections, said means comprises a plurality of elongated poles, each of said poles including spaced flanges for cooperating with said attaching means to support and align said track sections.

6. A track system as claimed in claim **5**, wherein:

said attaching means comprises a plurality of tabs integral with the outer guide flange, said tabs extending generally perpendicular from said outer guide flange and each having a recess; and

said poles being received within the recesses of said tabs and said tabs being received between pairs of said pole flanges.

7. A track system as claimed in claim **5**, including a deflector arm connected to a pole and spaced from said running surface for biasing vehicles toward said running surface.

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