

March 16, 1971

P. M. TOMARO

3,570,177

TOY MONORAIL TRAIN SYSTEM

Filed Jan. 29, 1970

3 Sheets-Sheet 1

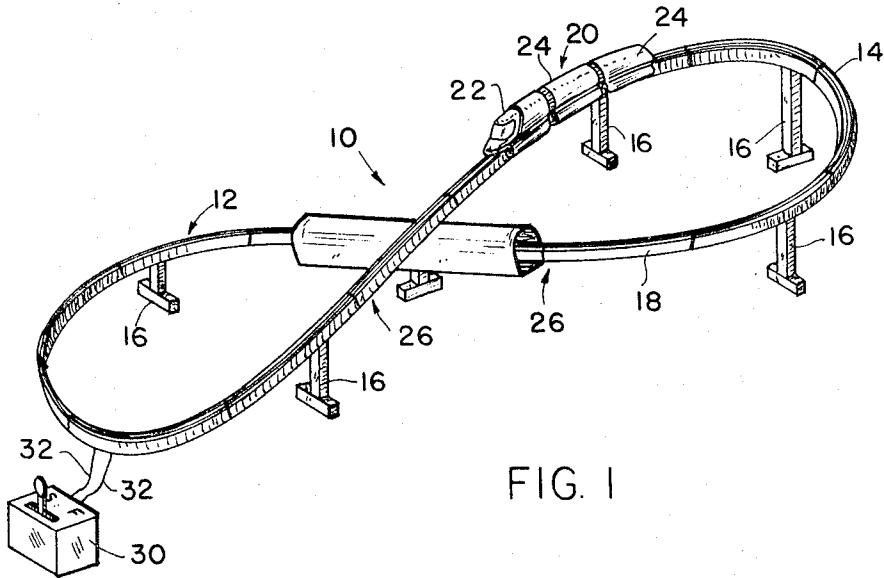


FIG. 1

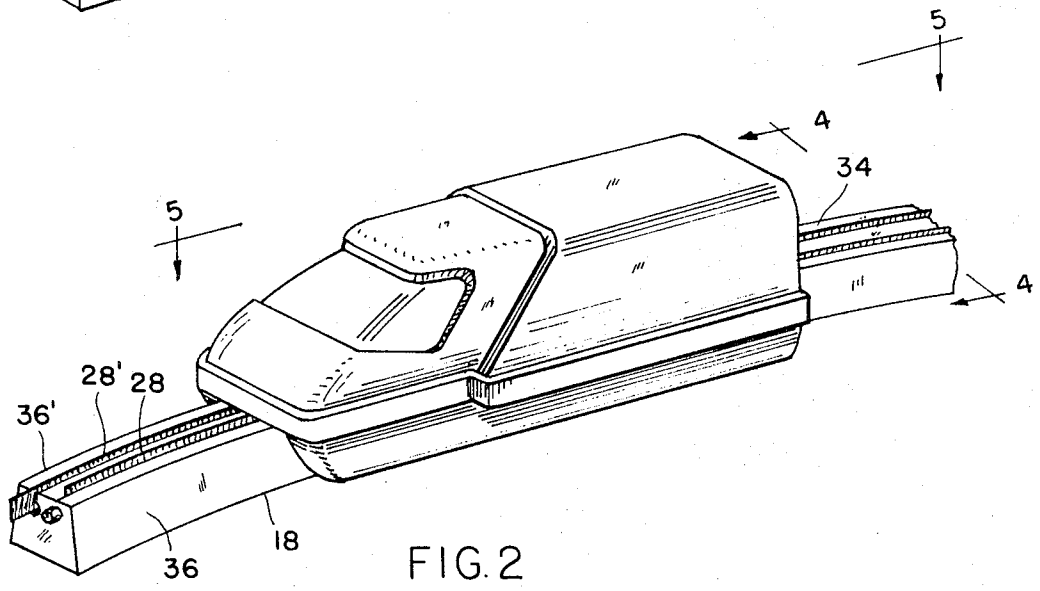


FIG. 2

INVENTOR
PATRICK M. TOMARO
BY *Robertson, Bryan
Parmelee & Johnson*
ATTORNEYS

March 16, 1971

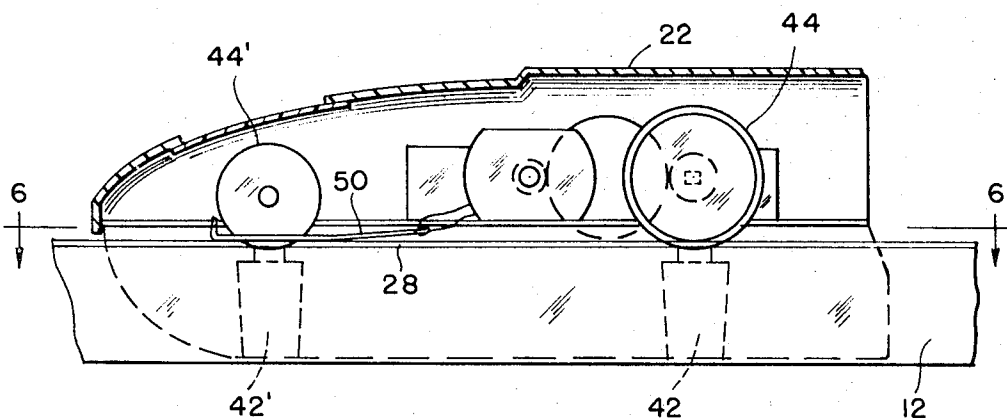
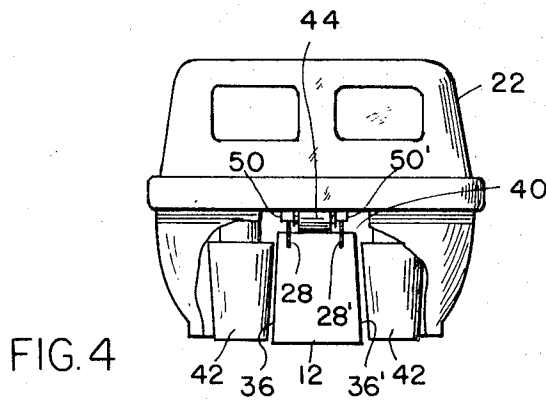
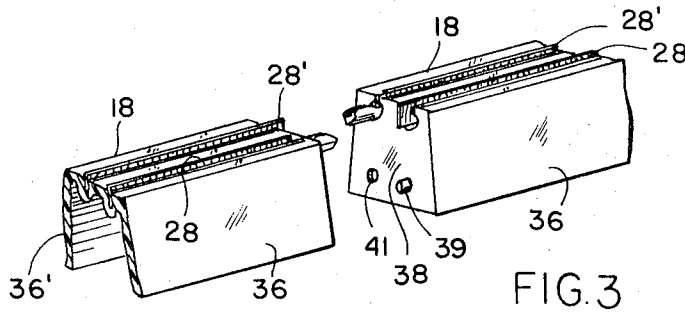
P. M. TOMARO

3,570,177

TOY MONORAIL TRAIN SYSTEM

Filed Jan. 29, 1970

3 Sheets-Sheet 2



INVENTOR
PATRICK M. TOMARO
BY *Robertson, Bryan,
Parmelee & Johnson.*
ATTORNEYS

March 16, 1971

P. M. TOMARO

3,570,177

TOY MONORAIL TRAIN SYSTEM

Filed Jan. 29, 1970

3 Sheets-Sheet 3

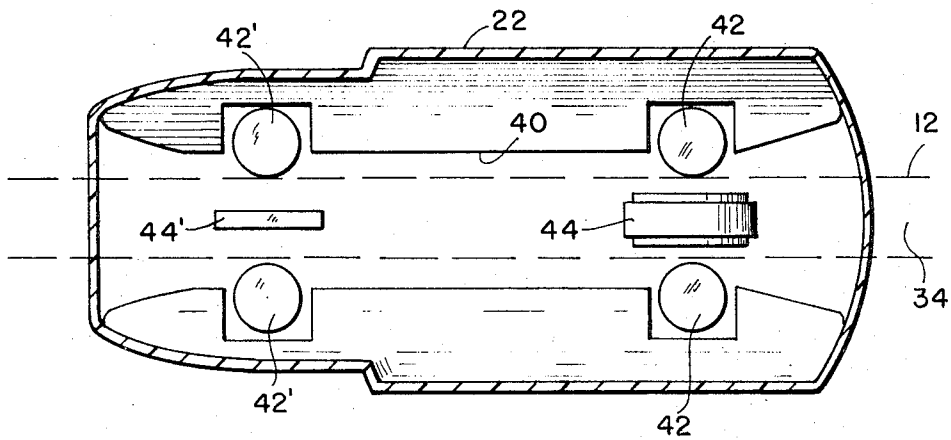


FIG. 6

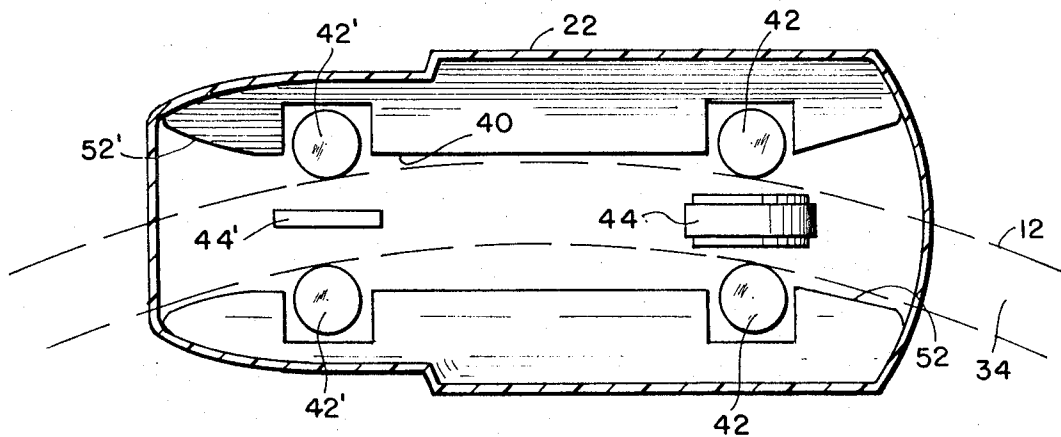


FIG. 7

INVENTOR
PATRICK M. TOMARO
BY Robertson, Bryan,
Parmelee & Johnson.
ATTORNEYS

1

2

3,570,177

TOY MONORAIL TRAIN SYSTEM

Patrick M. Tomaro, Maplewood, N.J., assignor to
Remco Industries, Inc., Harrison, N.J.
Filed Jan. 29, 1970, Ser. No. 6,880
Int. Cl. A63h 18/12

U.S. Cl. 46—243

7 Claims

ABSTRACT OF THE DISCLOSURE

A toy train system is described with a monorail track. A train adapted to move on this track is provided with lateral supporting and vertical supporting wheels which ride respectively on side and upper surfaces of the track. The wheels are mounted in a track receiving channel of the train body and are both longitudinally and laterally spaced to engage the monorail in a track hugging manner. In one embodiment stanchions are attached to the underside of selected portions of the monorail track to obtain track elevations. High train speeds may be sustained along the elevated portions of the track without train derailment.

BRIEF DESCRIPTION OF THE INVENTION

This invention relates to a toy train system. More specifically, this invention relates to a toy train system with a monorail and a train structure shaped to envelop the monorail track for high speed stable movement over the monorail.

In a preferred embodiment in accordance with the invention a high speed toy train system is provided with a track structure generally in the form of a continuous monorail made of nonconductive material with conductive strips imbedded therein for electrical power transmission to the train. A train adapted to move on the monorail has wheels which ride on both upper and side surfaces of the track. The wheels are mounted in a track receiving channel of the train body and are spaced longitudinally along the track as well as laterally on both monorail track sides so that the train may embrace the monorail for stable train motion. Electrical power take off wipers are located in the track receiving channel of the train and contact the conductive strips which are preferably mounted in the top surface of the monorail. Upper track surface contacting vertical support wheels are also located in the channel of the train body with one of the latter wheels being driven by an electric motor whose driving power is obtained from the conductive strips. In a preferred embodiment the vertical support wheels ride between the imbedded conductive strips.

The track enveloping construction of the train body imparts to the toy train system excellent stability with little likelihood of toppling at high operating speeds. Portions of the monorail may be elevated with stanchions mounted to the underside of the track. When a track is elevated, upwardly and downwardly slanted ramps are formed; yet, train stability is maintained despite the high speed of a train as it travels along a downwardly slanted ramp.

DESCRIPTION OF THE DRAWINGS

These advantages of the invention and others may be understood from the following description of a preferred embodiment in conjunction with the drawings wherein:

FIG. 1 is a perspective view of a continuous monorail track system in accordance with the invention;

FIG. 2 is an enlarged perspective view of a train locomotive while operatively mounted on a monorail track in accordance with the invention;

FIG. 3 is a perspective partially broken view of ends

of monorail track segments utilized with the toy train system in accordance with the invention;

FIG. 4 is a broken rear end view of a locomotive of a toy train and monorail track taken along the line 4—4 in FIG. 2;

FIG. 5 is a sectional view parallel along the monorail track with a train locomotive thereon taken along the line 5—5 in FIG. 2;

FIGS. 6 and 7 are horizontal sectional views of a train locomotive such as taken along a line 6—6 in FIG. 5 illustrating the position of the train wheels while on a straight and curved track segment respectively.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIG. 1 a toy train system 10 is shown formed of a continuous monorail track 12. Monorail track 12 is formed of nonconductive material and is arranged in a figure 8 pattern with a portion 14 thereof elevated with stanchions 16. Track 12 is formed of a plurality of mating and interlocking monorail segments such as 18 some of which are curved. A train 20 is mounted on track 12. Train 20 is formed of a locomotive 22 which pulls cars 24. The track system depicted in FIG. 1 is arranged in a figure 8 pattern though it may be appreciated that other configurations may be used as desired.

Stanchions 16 are differently sized so as to provide gradually inclined track portions 26. Track 12 is further provided with electrically conductive strips 28—28' (See FIG. 2) embedded in the top nonconducting surface of the track to supply electrical power to a driving motor located within train 22. Electrical power for this purpose is fed to conductive strips 28—28' from a conventional transformer and rheostat control 30 with electrical leads 32.

The construction of a track segment 18 may be more clearly appreciated from the views in FIGS. 2 and 3. Therein, track segments 18 are shown with conductive strips vertically embedded in the track upper surface 34 and producing thereabove sufficiently to enable electrical power pick-off wipers located in the locomotive 22 to make electrical contact therewith. As can be seen in FIG. 2 conductive strips 28—28' terminate in male and female ends whereby mating engagement may be made with other track segments 18 to form a continuous electrified track 12.

Track segments such as 18 have channel shaped bodies with smooth outwardly facing side surfaces 36—36'. Preferably these side surfaces extend in a downwardly and outwardly lateral direction so as to form a trapezoidal crosssection with the bottom of surfaces 36—36' wider spaced from one another than their tops. The ends, 38 of track segments 18 are closed to form a rigid track segment whose side surfaces 36—36' are free from undulations and present a smooth high speed riding platform for train wheels. When in use, track segments 18 are placed with their open channels facing downwardly. The vertical track elevating supports 16 may then be placed in the track channels without interference with a train moving along the track. The top portions of vertical track supports 16 are, therefore, preferably so shaped as to wedge between the sides of track segments 18. A protrusion 39 and a recess 41 are each located in end surfaces 38 of a track segment 18 and mate in complementary fashion with like protrusions and recesses of other track segments 18. The protrusion 39 and recess 41 are so spaced from the male and female ends of conductive strips 28—28' that a tight frictional lock between adjacent track segments is obtained when male and female ends of conductive strips 28—28' are connected to one another.

Train 20 is so shaped that each of its components such as locomotive 22 and cars 24 envelop track 12. This construction is made possible by providing each train component with a track receiving channel 40. (See FIG. 4.)

3

This channel extends from the front towards the rear and is provided with side surface riding wheels 42 and vertical support wheels such as 44.

Side riding or lateral support wheels 42 are arranged in front and rear located pairs (See FIG. 5.) and the wheels in each pair are so laterally spaced to receive a track segment 18 between them and provide side rolling contact between locomotive 22 and track 12. As illustrated in FIGS. 4 and 5 lateral support wheels 42 rotate about vertical axes and are preferably in the form of conical roller elements whose conical shape is selected to provide a line contact with side surfaces 36-36' of track 12.

As may be observed in FIG. 5 vertical support of locomotive 22 and other train components is provided with wheels 44 rotating about horizontal axes. A front located vertical support wheel 44 contacts upper surface 34 of track 12 at a location generally between the pair of front located lateral support wheels 42. The other vertical support wheel contacts upper surface 34 of track 12 generally between the rear located lateral support wheels 42. Rear located vertical support wheel 44 is driven by an electric motor 46 through suitable gears 48 to rapidly advance locomotive 22 along continuous track 12. As may be observed in FIG. 4 both the driving vertical support wheel 44 and the front located vertical support wheel 44 contact upper surface 34 of track 12 between the parallel spaced conductor strips 28-28' Sliding contacts such as 50-50' are mounted in track receiving channel 40 to contact conductive strips 28-28' at upper portions thereof for locomotive power.

The location of vertical support wheels 44 is so selected as to reduce their lateral motion to a minimum when the train engages curved track segments. Thus, as clearly illustrated in the view of FIG. 5, each of the vertical support wheels 44 is located so as to contact upper track surface 34 in an area which falls generally midway of a line drawn between the contacts of lateral support wheels 42 with side surfaces 36-36'. In this manner, lateral excursions of vertical support wheels 44-44' are reduced so that these vertical support wheels may ride between conductive strips 28-28' without interference therewith.

FIG. 7 illustrates the lateral displacement of portions of locomotive 22 as it engages a curved track segment 18. As may be observed, portions 52-52' of the longitudinal slot protruding in front of front located lateral support wheels 42' and behind the rear located lateral support wheels 42 tend to approach the curved track. However, portions 52-52' of the locomotive body are laterally recessed so as to accommodate the curved track segments without interference. Portions 54 of channel 40 between lateral support wheels 42-42' are so sized as to accommodate track curvatures.

On a curved track, vertical support wheels 44 operate in tangential direction relative to the track. The lateral support wheels 42, however, maintain locomotive 22 on the track regardless of this tangential effect and the speed of travel.

Having thus described the elements employed in the high speed stable train system in accordance with the invention its advantages may be especially appreciated when high speed operating conditions are encountered. When the high speed train has rounded the curve 14 as indicated in FIG. 1 and commences to move along a downwardly inclined ramp 26 the construction employed with the train system of this invention maintains the train on the track. As the train quickly rounds the bottom located curve it ramps upwardly without toppling over.

What is claimed is:

1. A toy train system capable of operating at high speed over elevated track without unbalance comprising a continuous track having smooth lateral support surfaces and carrying a pair of parallel spaced longitudinally aligned conductors for transmitting electric

4

cal power to a train located on the track, said track being provided with open channel segments, with the track operatively mounted with the open ends of the channel segments facing downwardly;

track supporting stanchions selectively sized and located to engage the track and elevate selected track portions to form a continuous track with vertically slanted ramps, said stanchions being provided with upwardly extending track channel engaging members which supportively engage the open track channels to elevate the track,

a train having a body selectively shaped to embrace the track to enable the train to travel at high speed along the downwardly slanted track ramp without toppling off, said train body being provided with a bottom located track receiving open ended channel commencing at the front of the train and running longitudinally of the train towards the rear of the train, said train body channel being provided with laterally opposing front and rear locations for low friction lateral track contact by the train, said train body channel further being provided with vertical support wheels mounted for rolling over the upper surface of the track and respectively operatively located generally between opposing lateral support wheels for reduced lateral movements thereof as the train engages curved portions of the continuous track, and means electrically coupled to the conductors for driving a vertical support wheel into rotation to advance the train rapidly along the continuous track.

2. A toy train system capable of operating at high speed over elevated track without unbalance comprising,

a continuous track having smooth lateral support surfaces and carrying a pair of parallel spaced longitudinally aligned conductors for transmitting electrical power to a train located on the track, said track being provided with open channel segments, with the track surface mounted with the open ends of the channel segments facing downwardly, track supporting stanchions selectively sized and located to engage the track and elevate selected track portions to form a continuous track with vertically slanted ramps, said stanchions being provided with upwardly extending track channel engaging members sized to frictionally grip the open track channels for elevation of the track,

a train having a body selectively shaped to embrace the track to enable the train to travel at high speed along the downwardly slanted track ramp without toppling off, said train body being provided with a bottom located track receiving open ended channel commencing at the front of the train and running longitudinally of the train towards the rear of the train, said train body channel being provided with laterally opposing front and rear locations for low friction lateral track contact by the train, said train body channel further being provided with vertical support wheels mounted for rolling over the upper surface of the track and respectively operatively located generally between opposing lateral support wheels for reduced lateral movements thereof as the train engages curved portions of the continuous track, and means electrically coupled to the conductors for driving a vertical support wheel into rotation to advance the train rapidly along the continuous track.

3. The stable high speed elevated toy train system as claimed in claim 2 wherein said conductors are located on an upper surface of the track and with the vertical support wheels located to contact the track upper surface generally between the parallel longitudinal conductors.

4. The stable high speed elevated toy train system as claimed in claim 3 wherein the side track surfaces are inclined in lateral outwardly directions and wherein said lateral support wheels are in the form of conical elements

5

having a rolling surface forming a vertical contact line with the track lateral surfaces.

5. The stable high speed elevated toy train system as claimed in claim 4 wherein the train body channel is selectively sized with portions thereof between front and rear lateral support wheels being laterally spaced to accommodate track lateral displacements at curved segments thereof, and with train body portions protruding forwardly and rearwardly of the front and rear lateral support wheels being laterally recessed to freely receive without contact laterally extending portions of curved track segments.

6. A toy train system comprising

a high speed monorail track composed of interlocking track sections arrangeable in a closed loop, said interlocking track sections being formed of longitudinal generally U-shaped substantially rigid nonconductive channels having an upper surface for supporting longitudinally extending conductive parallel laterally spaced strips of tracks partially embedded in the upper surface of the channel and terminating at longitudinal ends of channels for matingly receiving other conducting track strips of other channels to form said closed loop with electrically interconnected track strips, said channels being oriented with the open end of the U facing downwardly and the sides of the U channels extending downwardly to provide rigid lateral support for a high speed train moving along the track and a train for moving along the track, said train having a body provided with a bottom located channel shaped to envelop the track, said body channel being provided with lateral train retaining wheels mounted for rolling over the track sides, with said lateral train retaining wheels being arranged in front and rear located pairs of wheels, with wheels in each pair

6

straddling the track to provide rolling contact therewith on opposite lateral track sides, said train body further being provided with a driving wheel operatively engaging the upper surface of the track, said driving wheel being located in the train body channel to provide contact with the upper track surface in an area which is generally in alignment with a contact line defined between one pair of opposing lateral train retaining wheels, a second vertical train supporting wheel mounted to the train body to contact the track upper surface at an area generally in alignment with a contact line defined between the other pair of opposing lateral train retaining wheels, and means electrically contacting said conductive track strips for actuating said driving wheel to propel the train along the monorail track at high speeds.

7. The toy train system as defined in claim 6 and further including, track elevating stanchions sized to engage the open U-shaped downwardly facing channels to selectively elevate the track.

References Cited

UNITED STATES PATENTS

2,788,749 4/1957 Hinsken et al. ----- 104—118

FOREIGN PATENTS

1,224,280 2/1960 France ----- 46—243
 1,058,415 5/1959 Germany ----- 46—243

LOUIS G. MANCENE, Primary Examiner

R. F. CUTTING, Assistant Examiner

U.S. Cl. X.R.

46—216; 104—118