

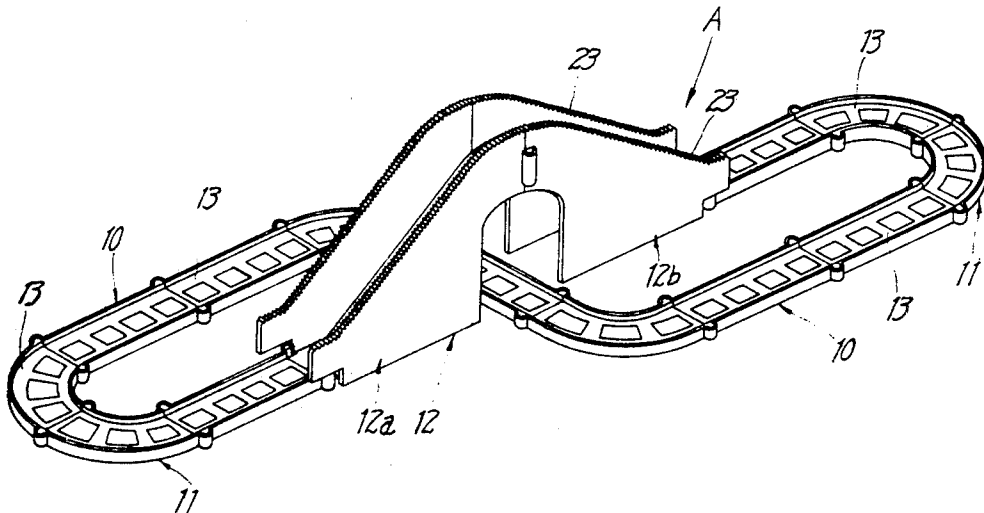
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[33] **Japan**
[31] **43/26,155**

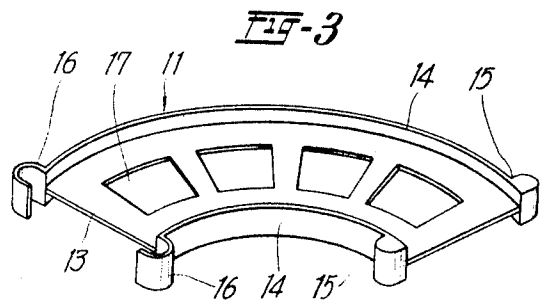
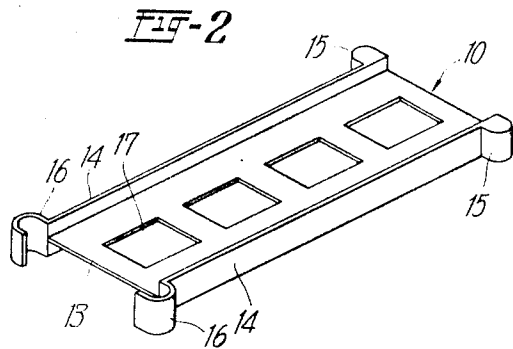
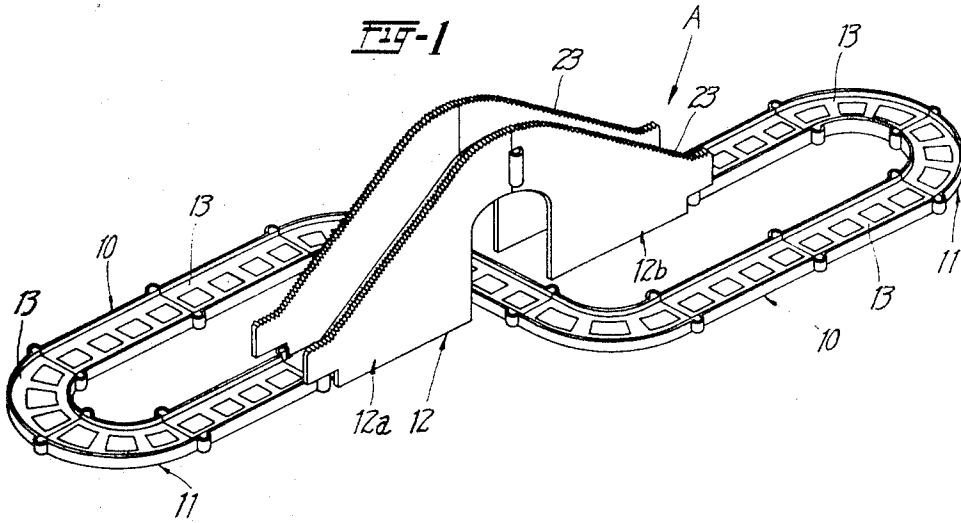
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[54] **TOY TRACK SYSTEM**
8 Claims, 9 Drawing Figs.
[52] U.S. Cl. **46/243,**
46/216
[51] Int. Cl. **A63h 18/04**
[50] Field of Search **46/243,**
216, 217

ABSTRACT: A toy track system which comprises a wheeled and powered toy vehicle and a closed track on which the vehicle is adapted to travel. The track has a bridge incorporated therein which includes racks engageable by gears which are provided on a shaft operatively connected to a motor of the vehicle, said shaft being rotatably carried by the vehicle, separately from wheel axles thereof. When the vehicle travels on a level surface, it is driven by its wheels, and, when it crosses the bridge, it runs with the gears engaging said racks. The vehicle runs on the track while moving a funnel up and down.

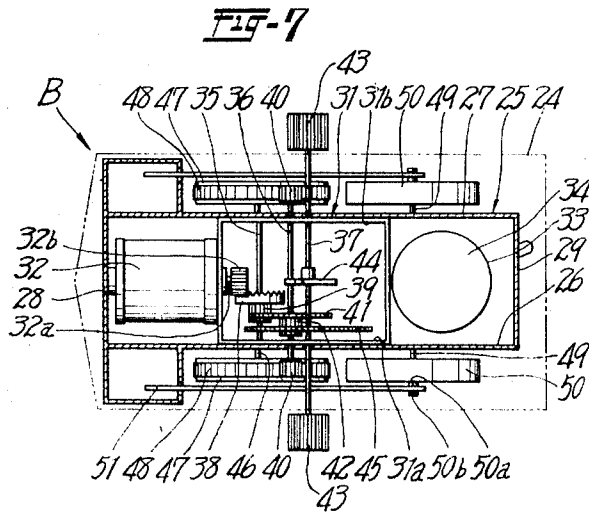
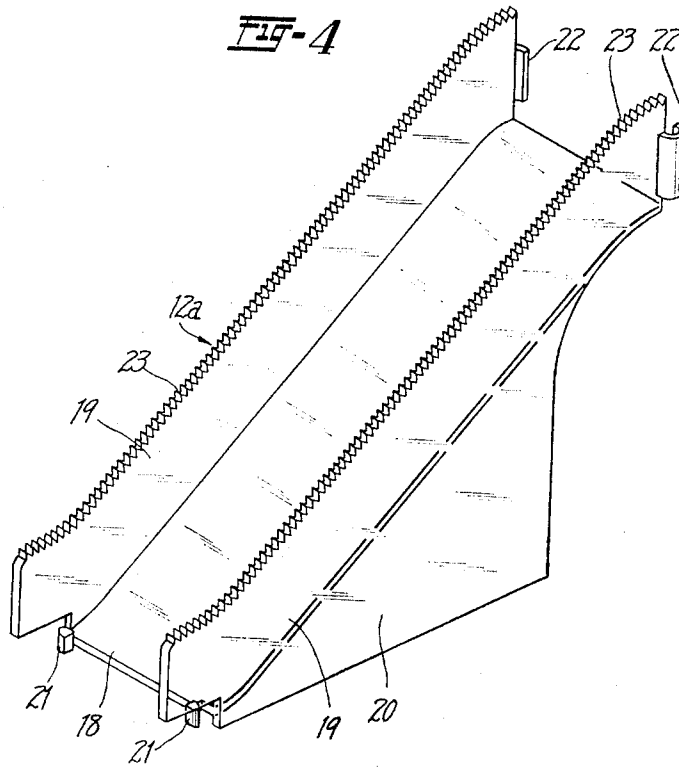




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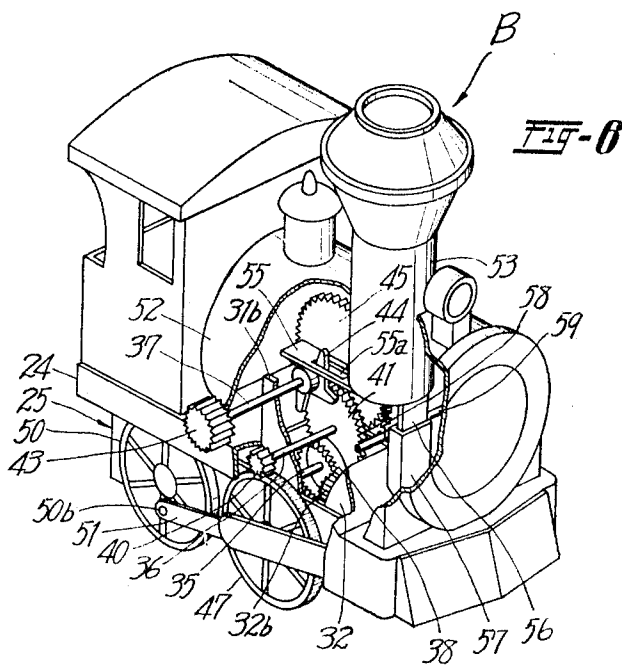
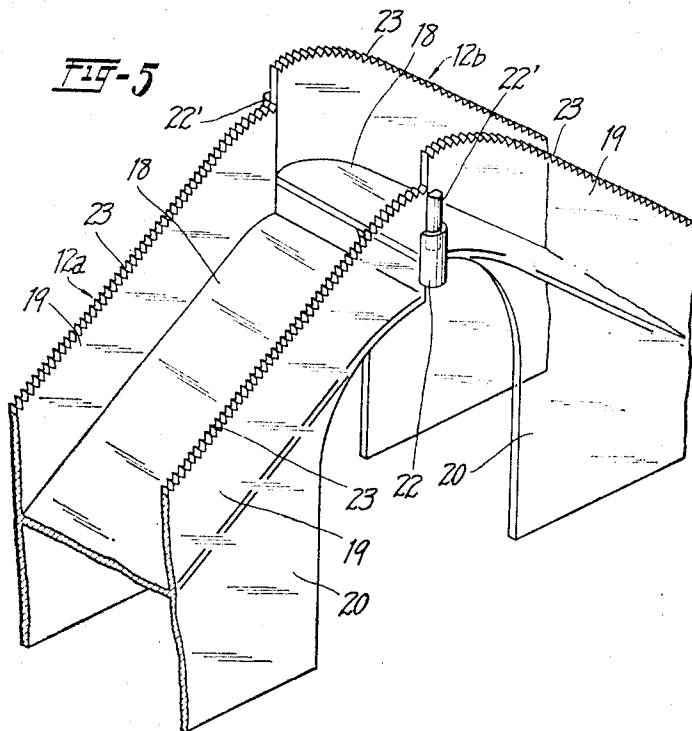
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FIG-8

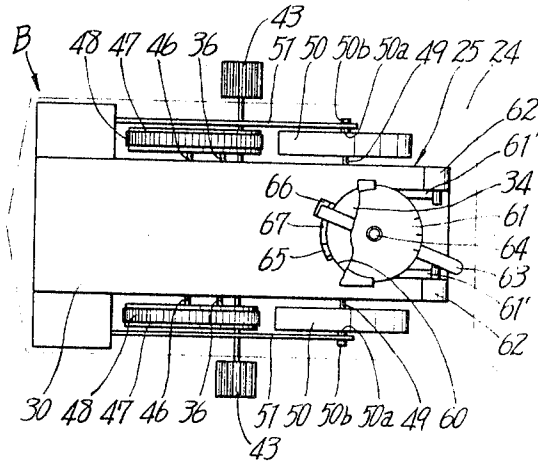
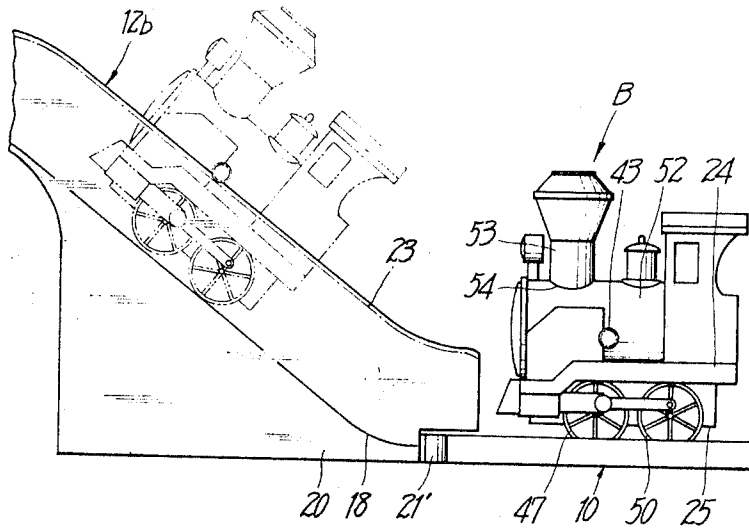


FIG-9



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TOY TRACK SYSTEM

SUMMARY OF THE INVENTION

This invention relates to a toy, and more particularly to a novel toy track system comprising in combination a wheeled and powered toy vehicle, and an endless track therefor made up of a plurality of track sections including a bridge member.

It is one object of the present invention to provide entertainment and amusement for children by providing a toy of the type stated above which is simple in assembly and operation, and attractive in appearance.

Another object of the present invention is to provide a wheeled and powered toy vehicle, and track sections and bridge means, thereby enabling children to assemble and operate a track system stated above.

A further object of the invention is to provide such vehicle and track sections which can be mass produced at relatively small expense.

These and other objects and advantages of the invention will become apparent upon reading the following detailed description of the invention in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a fabricated endless track, on which a toy vehicle is adapted to travel, according to the present invention;

FIG. 2 is an enlarged perspective view of a straight track section shown in FIG. 1;

FIG. 3 is an enlarged perspective view of a curved track section shown in FIG. 1;

FIG. 4 is an enlarged perspective view of a bridge section to form the bridge shown in FIG. 1;

FIG. 5 is an enlarged perspective view of a partly broken away bridge shown in FIG. 1, illustrating how to assemble two bridge sections into a bridge;

FIG. 6 is a perspective view of a partly broken away toy vehicle according to the present invention;

FIG. 7 is a partly cross sectioned plan view of the vehicle shown in FIG. 6, from which its body has been removed;

FIG. 8 is a bottom view of FIG. 7; and

FIG. 9 is a fragmental view of a toy according to the present invention, illustrating the state in which the vehicle is travelling on the track.

In FIGS. 1 to 9, like portions or parts are designated with like numerals.

Referring to the drawing in FIG. 1, there is shown a preferred form of a fabricated endless track A, on which a toy vehicle B, for example a locomotive, is adapted to travel, according to the present invention. The endless track A is made up of a plurality of straight and curved track sections 10, 11 and at least a bridge 12 which is composed of two bridge sections 12a, 12b.

Each of the track sections 10, 11 has a level portion 13 and a vertical sidewall portions 14 which define said level portion. Each of the sidewall portions is provided at its ends with a male joint 15 and a female joint 16, respectively so that these sections can be interchangeably joined to each other by inserting said male joint into said female joint. The level portion 13 is provided with a plurality of apertures 17 for decorative purposes. Also, the level portion 13 has upper and lower surfaces defined by said vertical walls so that the both surfaces may be utilized as paths for the vehicle B.

As shown in FIGS. 4 and 5, the bridge 12 is composed of two symmetrical bridge sections 12a and 12b each including a bottom portion 18, parallel spaced-apart sidewalls 19, 19 affixed to said bottom portion and support portions 20, 20 extending downwardly from said sidewalls, respectively. The bottom portion 18 and the side rails 19, 19 form an inclined track section having a substantially U-shape in cross section. One 12a of the bridge sections is provided, at the lower end of its bottom portion 18, with a pair of male joints 21, 21 and on the outer faces of the upper ends of said sidewalls 19, 19 with a pair of female joints 22, 22. While, the other bridge section

12b is provided at the lower end of its bottom portion 18, with a pair of female joints 21', 21' and on the outer faces of the upper ends of said sidewalls 19, 19 with a pair of male joints 22', 22'. Each of the bridge sections 12a, 12b is provided with racks 23, 23 which provided on the sidewalls 19, 19 of each bridge section. The two bridge sections 12a, 12b are coupled to each other by inserting the male joints 22', 22' in the female joints 22, 22, respectively.

In order to fabricate an endless track A as shown in FIG. 1, one has only to connect the fabricated bridge 12 to a track formed by connecting the straight and curved track sections 10, 11 together in the manner depicted and previously described. To connect the bridge 12 to the track thus formed, the male joints 21, 21 of one bridge section 12a are inserted in the female joints 16, 16 of one terminal straight track section 10, while the male joints 15, 15 of the other terminal straight track section 10 are inserted in the female joints 21', 21' of the other bridge section 12b. It is needless to say, however, that the manner of assembling these sections into an endless track A is not limited to such order.

Referring now to FIGS. 6 to 8, there is shown a preferred embodiment of a toy vehicle B in the form of a locomotive according to the present invention. The vehicle B is provided with a chassis 24 which has substantially rectangular frame 25 comprising parallel sidewalls 26, 27 end walls 28, 29, and a bottom wall 30. The frame 25 is provided with a gear casing 31 which is situated at the middle portion thereof. Within the frame 25 are also mounted an electric motor 32 having an output shaft 32a on which a pinion 32b is mounted, and a battery casing 33 for receiving a dry cell 34 which is in circuit with said motor.

The gear casing 31 supports a first shaft 35, a second shaft 36 and a third shaft 37 for rotation, respectively. The first shaft 35 has a crown gear 38 and a pinion 39 which are fixedly mounted thereon. The second shaft 36 extends laterally outwardly through apertures formed in parallel sidewall 31a, 31b of the gear casing 31 and through apertures, formed in the sidewalls 26, 27 and has, on its ends, fixedly mounted pinions 40, 40. The second shaft also has, on an intermediate portion thereof, a toothed wheel 41 and a pinion 42 which are fixedly mounted. Similarly, the third shaft 37 extends laterally outwardly through apertures formed in the parallel sidewalls 31a, 31b and in the body 52 of vehicle and has, on its ends, fixedly mounted pinions 43, 43 which are larger in diameter than the pinions 40, 40 of said second shaft. The third shaft 37 also has, on its middle portion, a cam member 44 and, on its intermediate portion, a toothed wheel 45.

The pinion 32b mounted on the output shaft 32a of the motor 32 is in mesh with the crown gear 38 of said first shaft, the pinion 39 of the first shaft 35 is in mesh with the toothed wheel 41 of the second shaft 36 and then the pinion 42 of the second shaft 36 is in engagement with the toothed wheel 45, whereby the first, second and third shafts 35, 36, 37 are rotated simultaneously as the motor 32 is actuated.

The sidewalls 26, 27 of the frame 25 are provided, in their front portions, with elongated vertically extending slots, not shown. A front axle 46 is rotatably and reciprocally mounted in said elongated slots for the purpose of minimizing the drag which is imparted to the motor 32 on curved track portions and for the purpose which will be described latter. The front axle 46 carries a fixedly mounted front wheel 47 on each end thereof. The front wheel 47 is provided, on its outer periphery, teeth 48, which are adapted to engage the pinion 40 of said second shaft, which is situated immediately above the front wheel 47, so that the front wheels 47, 47 can be supplied power for driving the vehicle B by the motor 32 through the gear train comprising pinion 32b, crown gear 38, pinion 39 and toothed wheel 41. A rear axle 49 is secured to the rear portions of the sidewalls 26, 27 of frame 25 and a rear wheel 50 is rotatably mounted on each end of the rear axle 49. Each rear wheel 50 has on its outer face, an eccentric projection 50a to which one end of a reciprocating arm 51, is rotatably fixed by means of a pin 50b so as to reciprocate the arm 51 when the wheel 50 is rotated.

In the illustrated embodiment, the locomotive B is provided with a body 52 having a funnel simulating member 53. This funnel 53 is vertically reciprocally mounted through a circular aperture 54 formed in a top wall portion adjacent to the front end of the body 52. The funnel 53 is of a hollow structure and has at its lower end a horizontally extending rectangular lug 55 and a vertically extending rectangular plate 56. The rectangular lug 55 has an elongated horizontally extending aperture 55a in which a portion of the cam member 44 of the third shaft 37 is adapted to be received as shown in FIG. 6. The vertical rectangular plate 56 is slidably mounted in a rectangular guide socket 57 projecting upwardly from a front portion of the chassis 24 so that the plate 56 can be vertically guided by the socket 57. The funnel 53 is normally biased downwardly by the action of a coil spring 58 one end of which is secured to the lug, not shown, provided on a lower portion of the inner face of the funnel 53 and the other end of which to a rod 59 transversely mounted in the front portion of the body 52.

As shown in FIG. 8, an opening 60 of the battery casing 33 is provided, for replacement of a dry cell 34, in a portion adjacent the rear end of the bottom 30 of said frame 25. The opening 60 is opened and closed by a cover member 61 which is pivotally mounted, at the ends of its arm 61', in notch bearings 62, 62 provided on the rear end of the bottom 30. The cover member 61 is provided with a conductive switch lever 63 which is rotatably fixed to the reverse side thereof by a pivot 64. The switch lever 63 has a spring-loaded contact, not shown, which is adapted to contact the terminal of the dry cell 34, and is adapted to come into contact, at one end thereof, with a contact 65, which is in circuit with the motor 32, by turning the lever 63. In other words, when the lever 63 is in "ON" position, the motor circuit is closed, and when it is in "OFF" position the circuit is open. The switch lever 63 serves also as a locking means for the cover member 61 in such a way that when the inner end of the lever 63 is rotated anticlockwise after it has been retracted into a recess 66 which is radially formed in a circumferential portion of the opening 60 of the bottom wall 30, it is brought into engagement with an upper edge portion of the bottom wall 30, by which a semicircular recess 67 is defined, to hold the cover member 61 in closed position, and that when the lever 63 is turned clockwise until the inner end thereof comes in the square-shaped recess 66, it is disengaged from said engaging portion, thereby enabling the cover member 61 to be opened.

It is to be noted that, according to the present invention, almost all of the track sections 10, 11, bridge sections 12a, 12b and vehicle B can be made of suitable plastics materials, except electrical switch members and a few other parts in the vehicle which are essentially required to be of metal.

In operation, the vehicle B put on the endless track A is made to run along it. As long as the vehicle B travels on the level track portion composed of the straight and curved track sections 10, 11, it runs with the front and rear wheels 47 and 50 the outer peripheries of which are in contact with the level surface 13 of the track. When the vehicle B crosses the bridge 12, it runs with the pinions 43, 43 of the third shaft 37 which engage the racks 23, 23 of the bridge 12. More specifically, when the vehicle B runs on the level track portion, it is driven by the front wheel 47 rotated by the pinions 40, 40 of the second shaft 36, which are brought into mesh with the teeth 48 of the front wheels and to which the motor power is supplied through the gear train aforementioned. When the vehicle B climb and leaves the bridge 12, it is driven by the pinions 43, 43 to which the motor power is transmitted through the reduction gear train previously explained, without the aid of the drive wheels 47, 47.

While the motor 32 is kept rotating, the cam member 44 is kept rotating with the third shaft 40 and causes the funnel 53 to make up-and-down movement by mechanically raising and lowering the horizontally extending rectangular lug 55 of the funnel 53. That is, as the cam 44 is rotated clockwise, each of the camming surfaces thereof engages the lower surface of the lug 55, adjacent the free end thereof, to raise the lug 55 with

the funnel 53 against the action of the spring 58, and then disengages from said lower surface by escaping into the elongated aperture 55a of the lug 55 to permit the funnel 53 to be pulled downwardly by the action of the spring 58. In these cases, the vertically extending rectangular plate 56 of the funnel 53 slides vertically in the guide socket 57 by being guided by the latter, thus enabling the funnel 53 to be vertically reciprocated during travel of the vehicle B. Further, the cam member 44 coacts with the lug 55 and the spring 58 to emit a pleasant sound every time when the funnel 53 comes down, since the lower surface of the lug 55 is forced to strike against the cam 44 by the action of the spring 58 at that time.

As may be seen from the foregoing description when the vehicle B crosses the bridge 12, it is driven by the gears 43 engaging the racks 23 under considerably reduced speed and it can not only surely cross the bridge, but also considerably decrease consumption of the dry cell 34 due to decrease of resistance through the motor 32, since the driving wheels 47 arc, at this time, lowered with the axles 46 thereof by weight and disengaged from the pinions 40 of the second shaft 36 and, as a result, the load imposed upon the motor 32 is considerably decreased. Further, as the vehicle B runs on the track A while imparting to the funnel 53 vertical reciprocation, children can play enjoyably with it.

Thus, the toy as described, according to the present invention, not only is very simple to assembly and operation, and attractive in appearance, but also has such various advantages, affording the so-called high play value.

I claim:

1. A toy track system comprising, in combination, an endless track composed of a plurality of straight and curved track sections and a bridge, and a toy locomotive arranged to travel on said endless track, said straight and curved track sections being interchangeably connectable to form a substantially level course portion of said endless track, said bridge being connectable to said track sections to form an elevated course portion joining spaced parts of said level course portion, said bridge including a pair of parallel spaced-apart sidewalls each having a similar predetermined inclined surface and a rack being formed in said inclined surface of said sidewalls, said toy locomotive including an electric motor, a pair of driving wheels mounted in said toy locomotive for travelling on said track sections, gear means being arranged for operatively connecting said driving wheels to said motor for driving said locomotive on the level course portion of said endless track, a pair of driving gears each supported on and extending laterally from an opposite side of said locomotive and rotatable on an axis spaced from the axis of said driving wheels, said gear means operatively connecting said motor to said driving gears and said driving gears arranged to engage said tracks on said sidewalls of said bridge for driving said locomotive across said bridge, a vertically reciprocal funnel being mounted in said locomotive and extending upwardly above said locomotive through an opening in the top thereof, spring means normally biasing said funnel in the downward direction, and said gear means comprising a cam being disposed in operating engagement with the lower end of said funnel for raising said funnel as said gear means are driven by said motor so that the combined effect of said cam and spring means affords vertical reciprocation of said funnel.

2. A toy track section, as set forth in claim 1, wherein the axis of said driving gears is located vertically above the axis of said driving wheels.

3. A toy track system, as set forth in claim 1, wherein said straight and curved track sections each having a horizontally arranged level portion for supporting said driving wheels, and said bridge having a bottom portion forming a continuation of said level portion of said track sections and said sidewalls extending upwardly from the opposite sides of said bottom portion, said racks being located along the upper edges of said sidewalls and the height of said racks above said bottom portion being arranged to support that locomotive on said racks so that on said bridge the driving action is developed between said locomotive and said racks.

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4. A toy track system, as set forth in claim 1, wherein said funnel being formed as a hollow structure, an upright member secured to the lower end of said funnel, a guide socket secured to said locomotive and arranged to receive and guide said upright member in the vertical direction as said funnel reciprocates.

5. A toy track system, as set forth in claim 1, wherein a horizontally arranged lug is secured to the lower end of said funnel and an elongated aperture is provided in said lug, said cam of said gear means being disposed opposite said lug for contact therewith during a portion of its rotational movement and for passage through the aperture in said lug during another portion of said rotational movement so that said funnel is displaced upwardly when said cam contacts said lug and is pulled downwardly by said spring means when said cam passes through the aperture in said lug.

6. A toy truck system, as set forth in claim 1, wherein said driving wheels form the front wheels of said toy locomotive, and a pair of rear wheels are provided rearwardly of said driving wheels, said driving wheels being arranged for rotation at reduced speed by said gear means operatively engaged with said motor, said gear means comprising a first shaft, a second shaft, a third shaft, a crown gear and a pinion being fixedly mounted on said first shaft, a pinion being disposed on the output shaft of said motor, said crown gear being disposed in meshed engagement with said pinion on said motor, a toothed wheel fixedly mounted on said second shaft and disposed in meshed engagement with said pinion on said first shaft, a pair of spaced pinion mounted on the opposite ends of said second shaft and being arranged to drive said driving wheels by engaging the outer periphery thereof, said locomotive comprising a frame, a gear casing supported on said frame, said first and

second shafts being rotatably supported by said gear casing, another pinion mounted on said second shaft, between said pinions for driving said driving wheels, a toothed wheel mounted on said third shaft and being disposed in meshed engagement with said another pinion on said second shaft, and said driving gears being mounted on the opposite ends of said third shaft whereby said driving gears are rotated by said motor through said gear means.

7. A toy track system, as set forth in claim 1, wherein a battery casing positioned within said locomotive and arranged for replaceably housing a dry cell, said battery casing having an opening formed in its lower end which is accessible through the bottom of said locomotive, a pivotally mounted closure member being arranged to close the opening in said battery casing, and switch means for closing and opening the motor circuit being arranged as a locking member for said closure member for holding said closure member in the closed position.

8. A toy track system, as set forth in claim 1, wherein each of said straight and curved track sections having a level portion arranged to be disposed in a horizontal position and side portions extending vertically from the edges of said level portion and serving as guide walls for said locomotive travelling on said level portion, said sidewalls extending vertically from both sides of said level portion so that both surfaces of said level portion can be utilized as paths of travel for said locomotive, each of said sidewall portions having a male joint at one end and a female joint at the opposite end thereof, whereby said straight and curved track sections can be joined to one another by fitting the male joints of one track section into the female joints of another track section.

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