United States Patent

Bales et al.

[15] **3,696,555**

[45] **Oct. 10, 1972**

[54] **TOY HILL-CLIMBING SYSTEM**

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[73] Assignee: **Mattel, Inc.,** Hawthorne, Calif.

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[21] Appl. No.: **99,084**

[52] **U.S. Cl.** **46/202**

[51] **Int. Cl.** **A63h 17/16**

[58] **Field of Search** 46/201, 202

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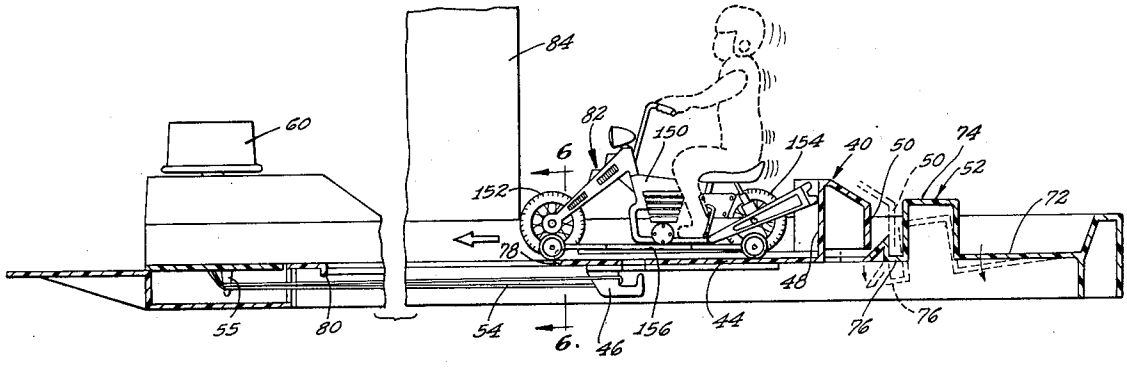
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Primary Examiner—Antonio F. Guida
Assistant Examiner—Robert F. Cutting
Attorney—Seymour A. Scholnick

[57] **ABSTRACT**

A toy hill-climbing system is disclosed including a simulated motorcycle, a motorcycle launcher, a roadway simulating rough terrain and parallel tracks connecting the roadway and the launcher. The roadway is placed at a greater vertical height than the launcher so that the tracks are upwardly sloped to simulate an actual motorcycle hill climb competition.

10 Claims, 12 Drawing Figures



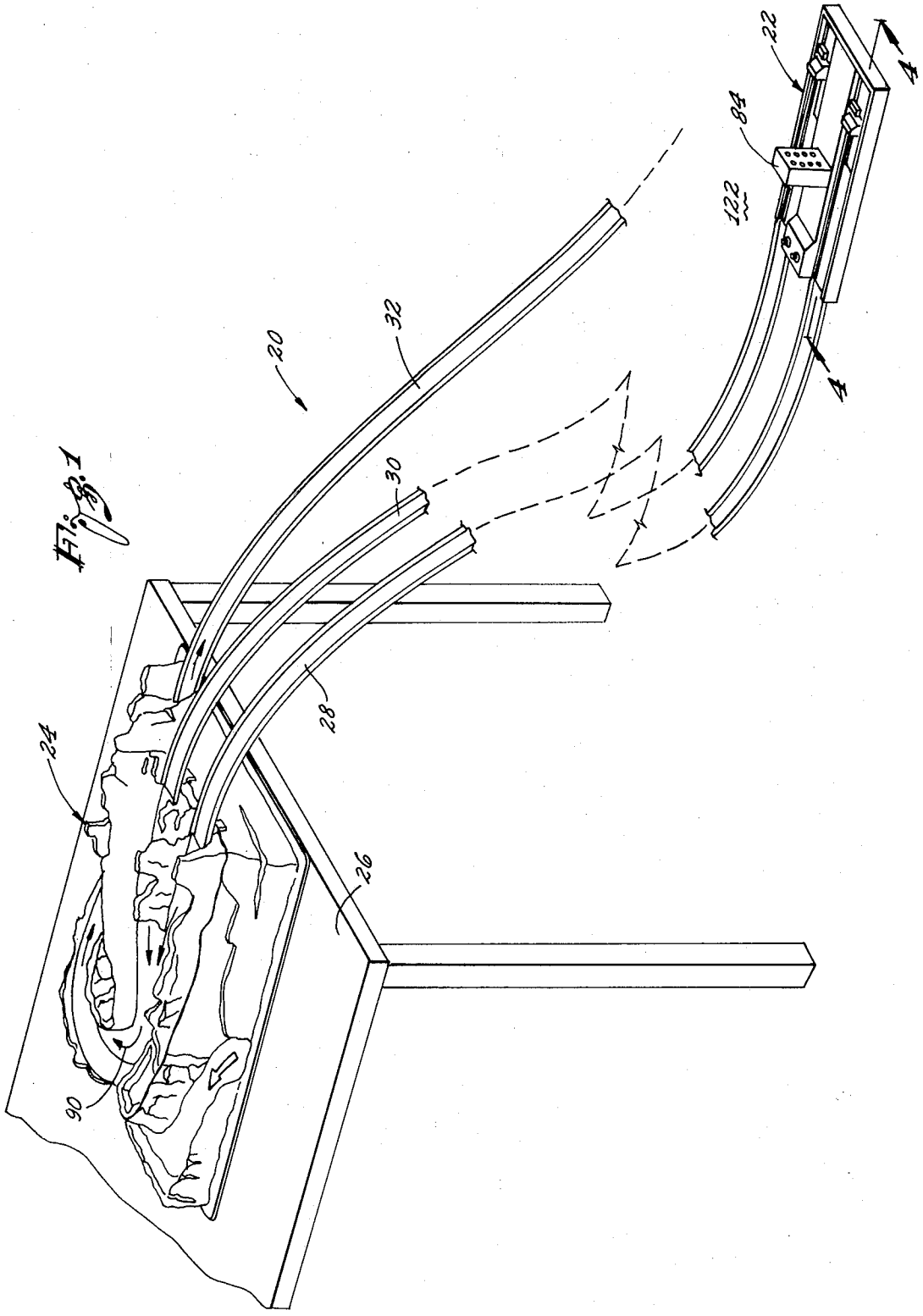


Fig. 1

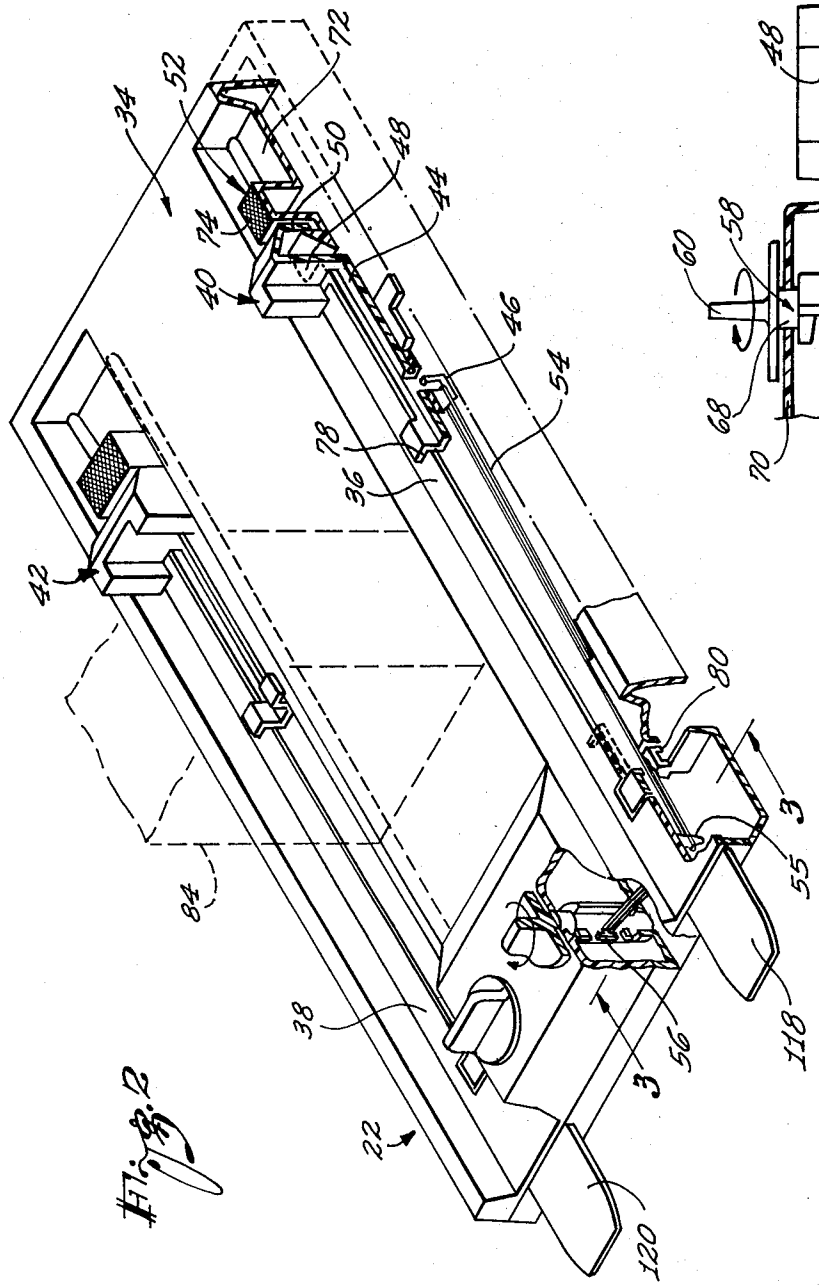

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Fig. 2

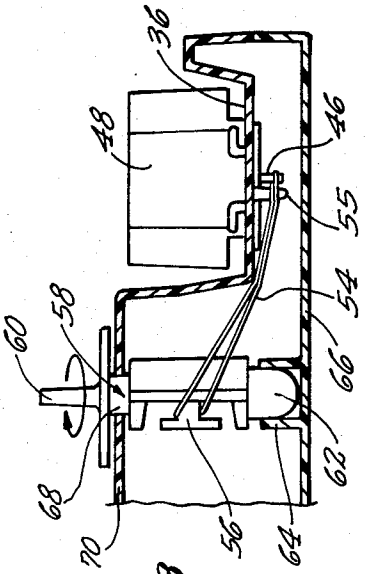

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Fig. 3

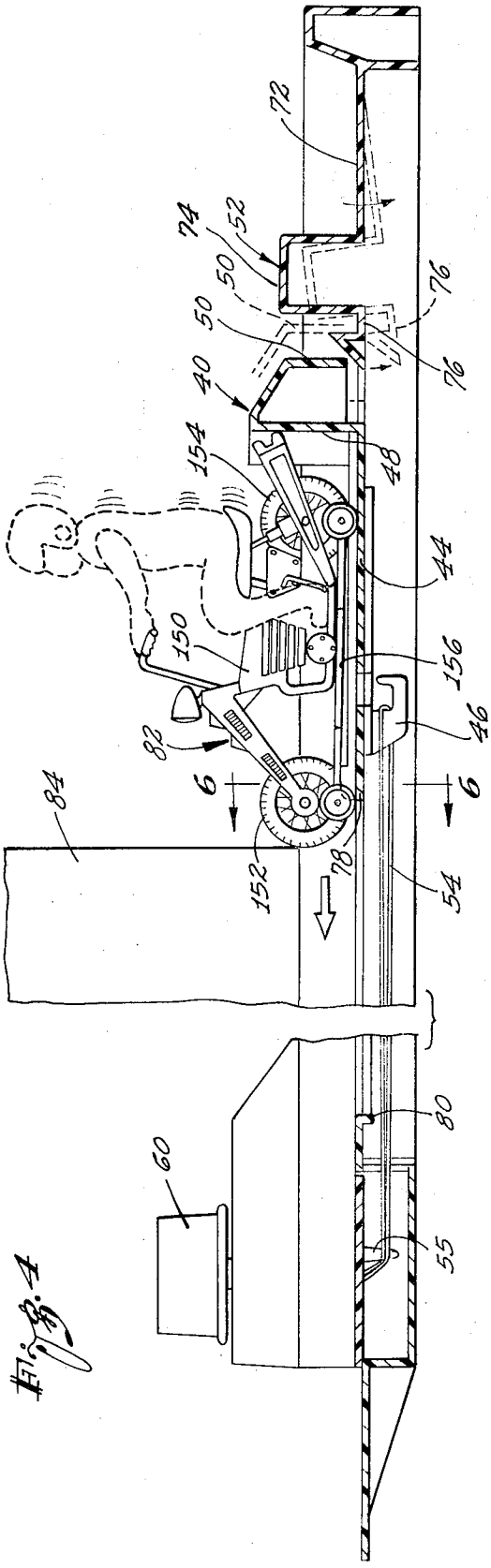


Fig. 4

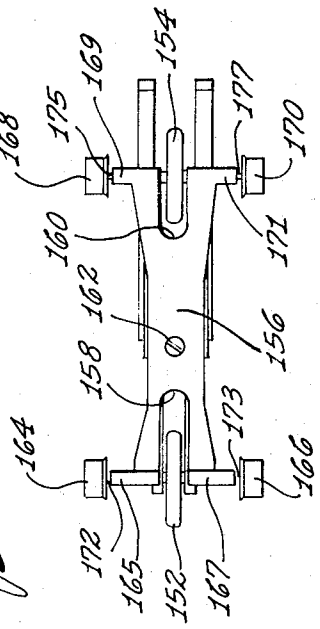


Fig. 5

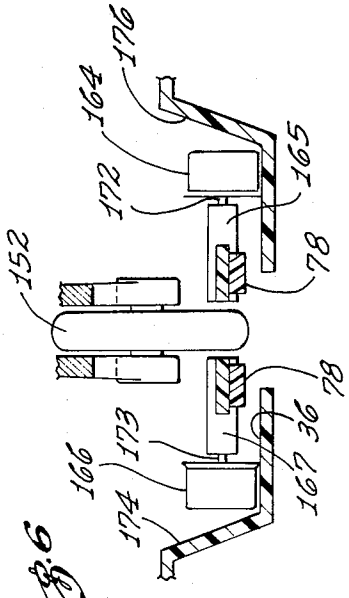


Fig. 6

Fig. 7

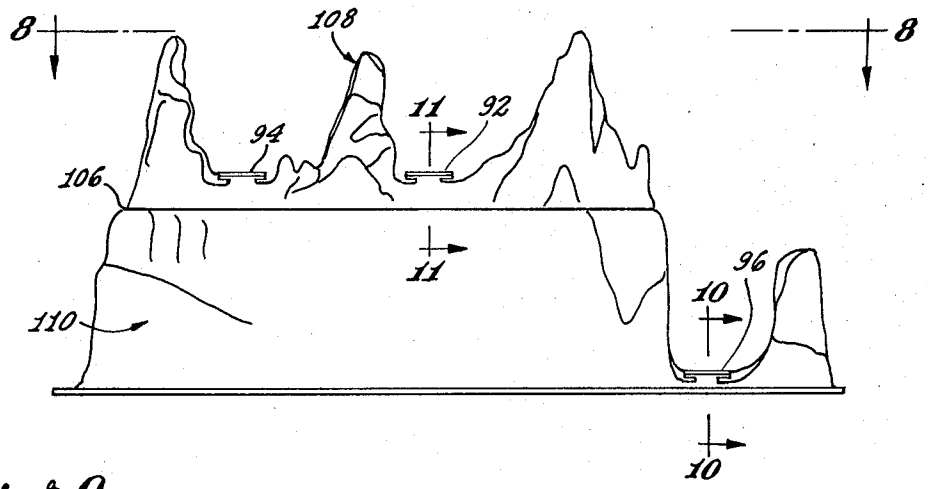


Fig. 9

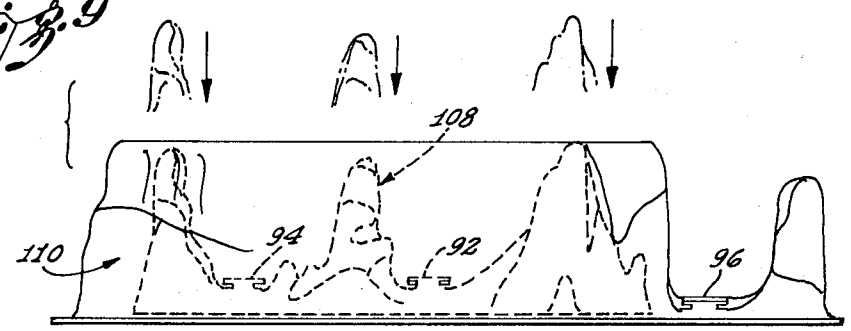
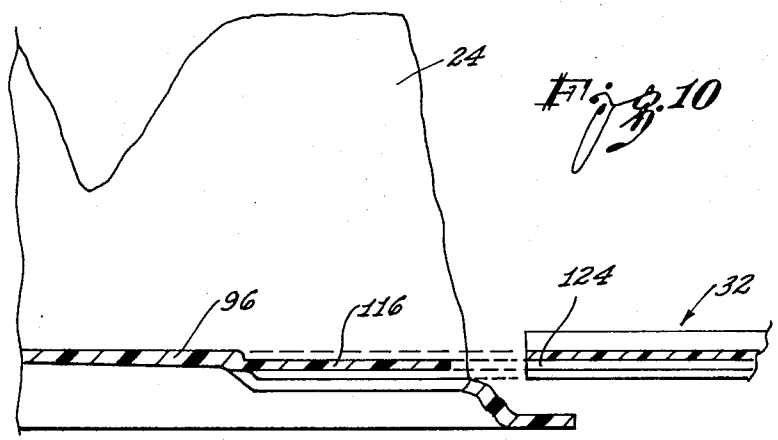


Fig. 10



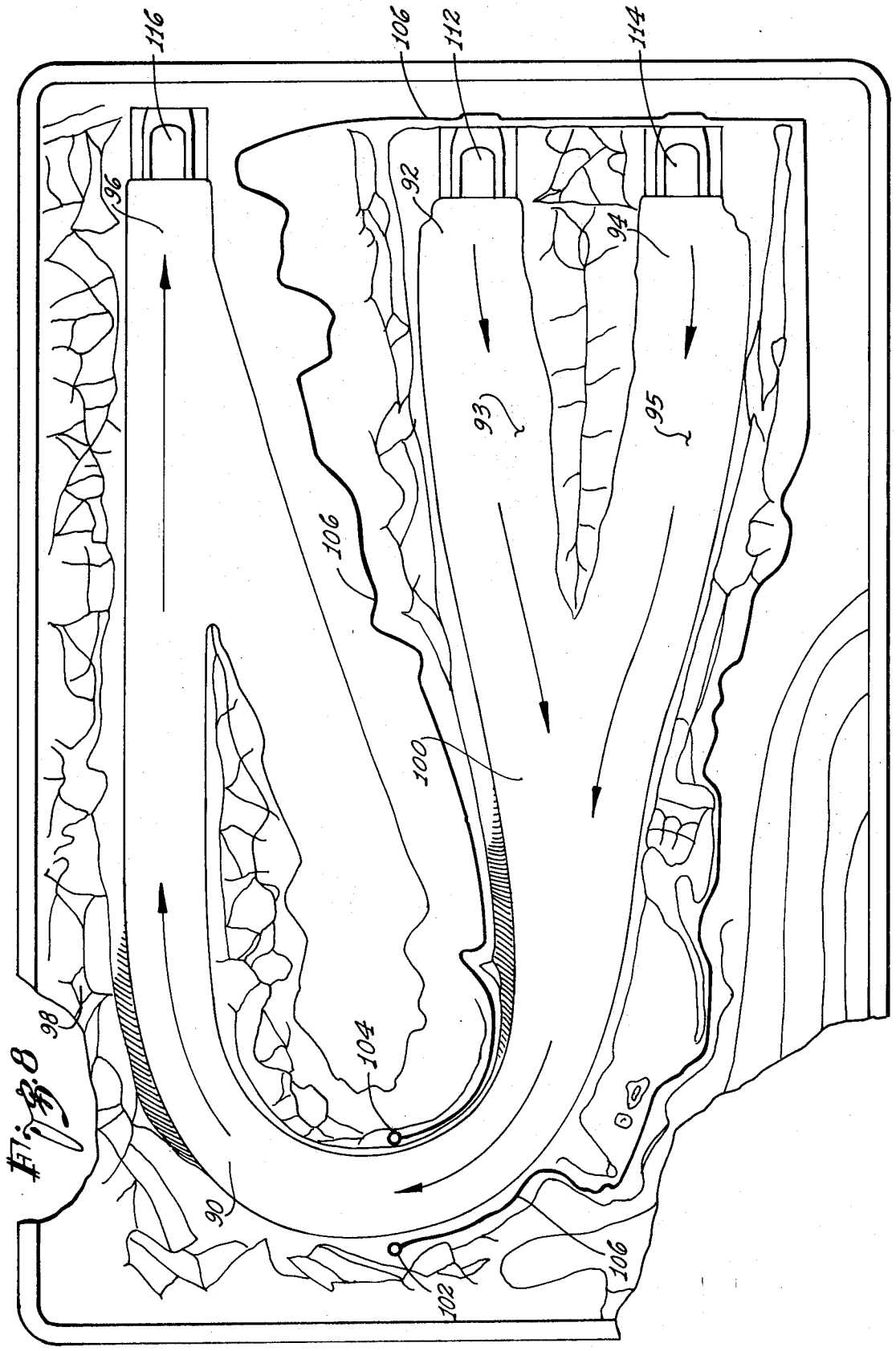


Fig. 8

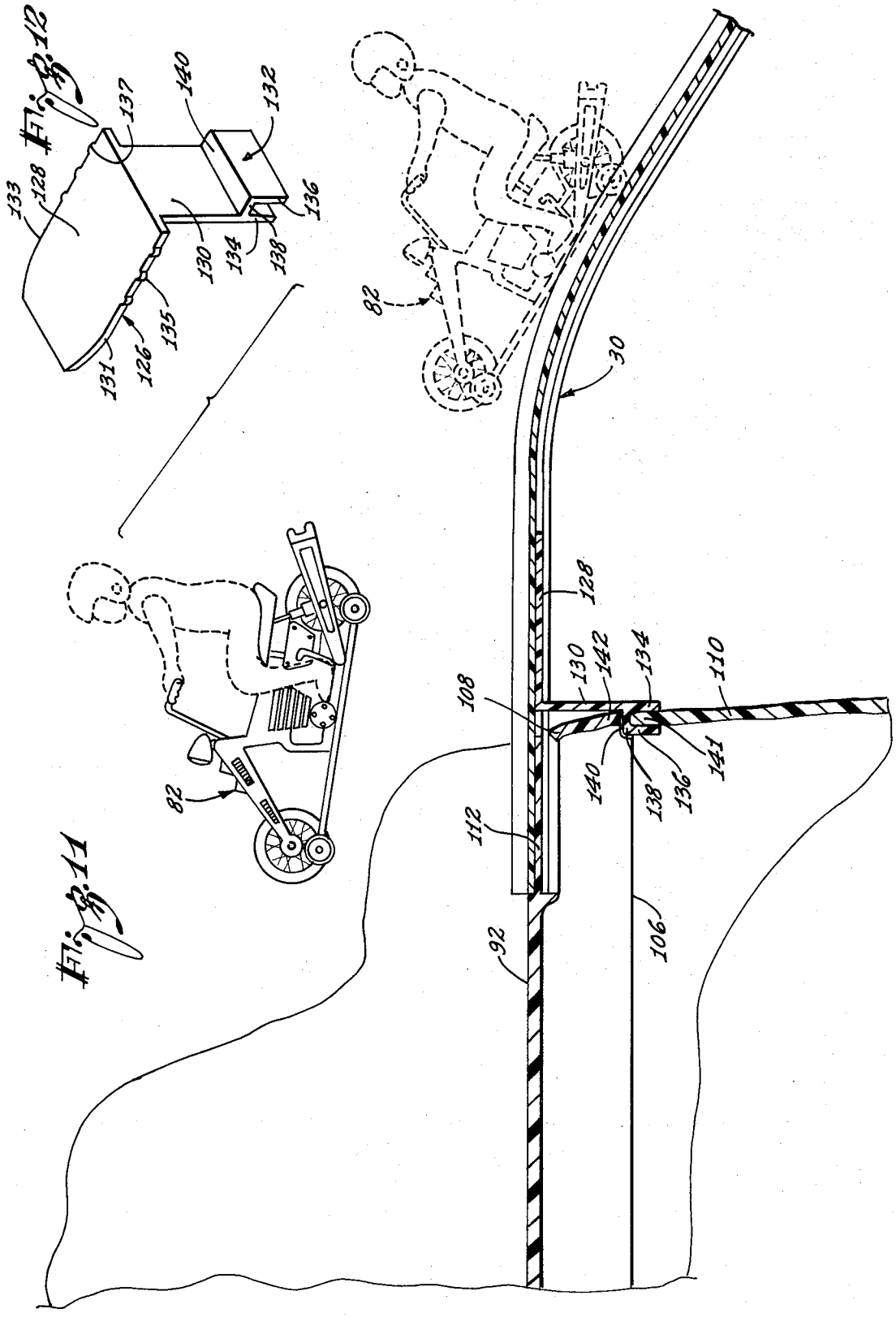

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Fig. 12

Fig. 11

TOY HILL-CLIMBING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a toy system having a vehicle and a path for the vehicle, and, more particularly, to a toy system for simulating a motorcycle hill-climbing competition.

2. Description of the Prior Art

Motorcycle hill-climbing is a sport that has been practiced for a good many years with somewhat scant public attention; however, with the rapidly increasing popularity of motorcycles, the sport of motorcycle hill-climbing has also become popular. In order to satisfy the desires of children to participate in this exciting sport, efforts were attempted to simulate motorcycle hill-climbing in a toy structure.

A major problem to overcome in the attempted simulation is the design of a system which is realistic enough to capture the thrilling features of motorcycle hill-climbing and yet may be effectively and efficiently manufactured so as to be inexpensively mass marketed.

SUMMARY OF THE INVENTION

The above-mentioned problem has been obviated by the present invention which provides a toy hill-climbing system comprising a toy vehicle launcher; at least one track section connected to the launcher; and a roadway simulating rough terrain connected to the track section and positioned at a greater height than the launcher, at least a portion of the track section having an upwardly sloping disposition. The invention further includes a roadway comprising a curved pathway with having a first end at a level different from the level of a second end; and means for supporting the curved pathway with its ends at different levels, the supporting means being integral with the curved pathway and made of synthetic resin material, whereby toy vehicles are moved along the pathway from one level to the other level by the force of gravity. Further, the present invention includes a support and track section connector comprising a first portion for engaging a track section and a second portion disposed essentially perpendicular to the first portion and connected at one end to the first portion, the second portion having a U-shaped second end whereby the connector cooperates to support the roadway and connect the roadway to a track section. Still further, the present invention includes a toy vehicle comprising a vehicle body; at least two large wheels mounted to the body; a base removably attached to the vehicle body; and four small freely rotatable wheels mounted to the base, two wheels on each side of the base, whereby the toy vehicle is movable along a track system on the four small wheels and the large wheels are spaced from the track system. Also included in the invention is a toy vehicle launcher comprising a supporting base including a pathway; a pusher arm slidably connected to the supporting base and movable along the pathway; an elastic band connected to the supporting base and to the pusher arm for imparting motion to the pusher arm; and means for latching the pusher arm to selectively prevent movement of the pusher arm.

It is a general aim of the present invention to provide a toy system which simulates the sport of motorcycle hill-climbing and which can be inexpensively manufactured for mass marketing.

An allied object of the present invention is to provide a toy roadway which simulates a real roadway through a hilly terrain, which is collapsible to a compact size for facilitating transportation, handling and packaging and which is inexpensively manufactured.

Another object of the present invention is to provide a connector which supports the roadway in a non-collapsed position, which connects and aligns a track section and the roadway and which is inexpensively manufactured.

Still another object of the present invention is to provide a toy vehicle which moves easily along a track and/or roadway system, which simulates a motorcycle and which may be inexpensively manufactured.

A further aim of the present invention is to provide a toy vehicle launcher which is simply constructed, inexpensively manufactured and easily used by a child, and which provides sufficient force to a toy vehicle to propel the vehicle up a steep incline.

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 partially broken away view of a toy hill-climbing system.

FIG. 2 is a perspective partially sectional view of a toy vehicle launcher.

FIG. 3 is an enlarged elevational sectional view taken along line 3—3 of FIG. 2.

FIG. 4 is an enlarged elevational sectional view partially broken away of the launcher of FIG. 2 and illustrating a toy vehicle positioned on the launcher.

FIG. 5 is a bottom view of the toy vehicle illustrated in FIG. 4.

FIG. 6 is an enlarged sectional view of a portion of the toy vehicle of FIG. 4 taken along line 6—6 of FIG. 4.

FIG. 7 is an elevational view of the roadway illustrated in FIG. 1.

FIG. 8 is an enlarged plan view partially broken away of the roadway illustrated in FIGS. 1 and 7 taken along line 8—8 of FIG. 7.

FIG. 9 is an elevational view partially in dotted line illustrating the collapsed position of the roadway shown in FIG. 7.

FIG. 10 is an enlarged elevational sectional view of a portion of the roadway taken along line 10—10 of FIG. 7.

FIG. 11 is an enlarged elevational sectional view of the roadway of FIG. 7 as viewed along line 11—11 of FIG. 7 and, including an example of the trajectory taken by a moving toy vehicle.

FIG. 12 is a perspective view of a support and track section connector which is used in conjunction with the roadway of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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

intention 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 toy hill-climbing system 20, including a toy vehicle launcher 22 and a roadway 24 which is situated on a table 26 so as to be at a greater vertical height than the launcher 22. Connecting the launcher and the roadway are two parallel tracks 28 and 30; a return track 32 is connected to the roadway and may direct a vehicle back to the vicinity of the launcher or to an additional track layout. The launcher has provision for launching two toy vehicles, one each along the tracks 28 and 30 so as to allow competition races up the tracks to the roadway. The roadway includes a merger portion (which will be described more clearly hereinbelow) so that the vehicles moving along each of the tracks 28 and 30 merge to move along the same pathway through the roadway. The tracks may be identical or similar to those described in U. S. Pat. No. 3,487,999 to A. W. B. Nash, et al., and assigned to the assignee of the present invention.

It is to be understood that while the preferred embodiment described herein is contemplated for a motorcycle-type toy vehicle, the hill-climbing system may be used to handle other types of toy vehicles such as small racing automobiles; for example, like that described in U. S. Pat. No. 3,510,981 to H. W. La Branche et al., and assigned to the assignee of the present invention.

In accordance with one of the important aspects of the present invention, provision is made for launching toy vehicles in a simple and expeditious fashion by a launcher which is simply constructed and inexpensively manufactured and which is exceedingly easy to use so that even a small child may act as an operator. In addition, the launcher is constructed to provide sufficient force to a vehicle to propel it along a relatively steep upwardly sloping track; the launcher may be operated to propel a single vehicle or two vehicles in side by side racing competition. Referring now to FIGS. 2, 3 and 4, the toy vehicle launcher 22 comprises a molded synthetic resin base 34 having two preformed pathways 36 and 38 disposed parallel to one another. Slideable along the pathway 36 is a vehicle engaging pusher arm 40 while slideable along the pathway 38 is a vehicle engaging pusher arm 42. Since both pathways are identically constructed as are the pusher arms, only the pusher arm 40 will be described in greater detail.

The pusher arm 40 includes an elongated base element 44 which is attached to a hook portion 46 at one end of the base element and an upright vehicle engaging wall 48 at the other end. The wall 48, in turn, is attached integrally to a flange portion 50 which cooperates with an activating latch mechanism 52 described in more detail hereinbelow. Connected to the hook portion 46 is an elastic band 54 which may be an ordinary rubber band looped around the hook portion at one end, directed around a depending pin 55, and looped around a T-shaped lug 56 at the band's other end. The T-shaped lug 56 is attached to a control shaft 58 and a knob 60. The shaft 58 is constrained to be rotatable relative the supporting base so that the elastic band 54 may be wound about the shaft to increase tautness. A lower portion 62 of the shaft is restrained in a journal manner by an annular bearing 64 which is integral with a lower surface 66 of the supporting base. The upper portion 68 of the shaft is restrained by an upper surface 70 of the supporting base. The knob 60 projects above the upper surface 70 and is easily grasped to rotate the shaft to cause the desired tautness in the elastic band. The greater the tautness of the elastic band, the greater will be the biasing force on the pusher arm.

Restraining the biasing force of the elastic band is the activating latch mechanism 52. The activating mechanism includes an elongated arm portion 72 which is integral with the supporting base 34, but hinged so that the latch mechanism is movable as shown in FIG. 4 from the position illustrated in solid line to the position illustrated in dotted line. The elongated arm portion 72 includes a depressor surface 74 which gives an operator convenient access to depress the latch mechanism with a thumb or forefinger. At the end of the elongated arm opposite that integral with the supporting base is a hook portion 76 which is engageable with the flange portion 50 of the pusher arm. As shown in FIG. 4, when the pusher arm 40 is in its rearward position indicated by the dotted lines of the flange 50, and the latching mechanism 52 is in its upward or horizontal position as shown in solid line, the pusher arm is restrained from moving. However, when a force is placed on the depressor surface 74, such as by an operator's finger, the latching mechanism 52 pivots to the position shown in dotted line, thereby releasing the flange 50 and allowing the pusher arm to be moved to the left (as depicted in FIG. 4) due to the biasing force exerted by the elastic band.

As viewed in FIG. 4, leftward movement of the pusher arm will continue until a leading end portion 78 of the pusher arm strikes a depending lip 80 extending from the upper surface of the pathway 36. The end portion 78 also engages the toy vehicle. Thus, the toy vehicle, such as a motorcycle 82, is catapulted by the launcher with a force proportional to the tautness of the elastic band. It is to be noted that the toy vehicle may be pushed by the wall 48 if the vehicle is an automobile or, as mentioned, by the leading end portion 78 in the motorcycle embodiment illustrated and explained in more detail hereinbelow.

To further simulate competition-type racing, a housing 84, FIGS. 1 and 4, having two parallel columns of openings is provided. The purpose of the housing is to simulate a "Christmas tree" starting device which is now commonly used in actual drag race competitions. The actual starter operates by flashing a pair of lights, one from each column, in a serial manner descending from the two uppermost lights down the housing until the lowermost pair of lights are flashed providing the signal to start. The lights are colored so that the uppermost lights are orange while the lowermost lights are green with the lights between being of various shades along the spectrum from orange to green. Internal mechanisms in the housing provide the simulated sequencing of lights.

In accordance with another important aspect of the present invention, a roadway is provided which simulates an actual roadway through a hilly terrain, and yet, is inexpensively manufactured by a simple molding

technique. Additionally, the roadway is hinged so that it may be collapsed with one portion situated within the remainder so as to lessen the volume required for the package in which the roadway and/or the hill-climbing system is marketed. Referring now to FIGS. 7, 8 and 9, the roadway is comprised of a curved pathway 90 having a first end divided into two sections 92 and 94 and a second end 96 which is positioned at a lower height or vertical level than the two sections 92 and 94 of the first end which are at the same level. The curved pathway 90 is formed in a terrain support structure 98 which is molded to simulate a rough, hill-like terrain, such as commonly used for motorcycle racing. The roughness is best illustrated in FIGS. 1 and 7. Because of the difference in height between the first end and the second end of the pathway, a vehicle placed at the first end will move along the sloped pathway due to the force provided by gravity. It is noted that the pathway is split into two sections 93 and 95 corresponding to the two sections of the first end. The pathway sections converge and merge at a location designated 100 with the pathway continuing toward the second end having a width sufficient for just one toy vehicle. In this fashion, when there is competition between two vehicles, the winning vehicle will be that one which first reaches and passes through the merger location. Prior to reaching the merger, the vehicles move along parallel but separate tracks or pathways; however, once past the merger, the single vehicle width pathway causes the vehicles to move in a single file.

As shown in FIG. 8, the terrain support structure has two openings 102 and 104, located about midway along the curved pathway 90. Emanating from the two openings is a slit 106 which extends from the opening 102 to the opening 104 and encompasses the first end of the pathway. The slit is depicted in the drawing of FIG. 8 as a very dark wide line. The slit effectively divides the support into a first portion which includes the two sections of the first end of the pathway and the merger location, and the remaining portion which includes the second end of the pathway and the lower or base terrain portion of the support structure. For purposes of illustration, the first mentioned portion will be termed the upper portion 108, while the remainder of the support structure will be termed the lower portion 110, FIG. 7.

The upper portion 108 is movable between two positions, an upper position as shown in FIG. 7 where the upper portion is essentially above the bottom portion and where the first end sections 92 and 94 are at a greater vertical height than the second end 96, and a lower position in which the upper portion 108 is pivoted about a hinge formed along an imaginary line connecting the two openings 102 and 104 to allow the upper portion to be disposed within the lower portion as illustrated in FIG. 9. By comparing FIGS. 7 and 9, which are elevation views, it is quite clear that the total vertical height of the roadway is reduced by almost half when the upper portion is moved to its lower position. Thus, by having the upper portion retract into the lower portion, the roadway becomes a relatively compact unit which can be much more economically and easily packaged for marketing purposes. Further, the lower portion acts to protect the "peaks" designed into the upper portion. The nesting of the upper portion into the lower portion is easily accomplished since the roadway is constructed as a hollow mound or shell form. Thus, the interior of the shell offers more than sufficient room for the upper portion while the gauge of the roadway allows the simplistic hinge to be formed between the openings 102 and 104.

Attached integrally to the two sections of the first end and the second end are respectively track section connectors 112, 114 and 116, FIG. 8. Referring to FIG. 10, the connection made between the track 32 and the track section connector 116 is illustrated in greater detail where the track section connector 116 is received within a channel 124 and thus, provides a continuation for the pathway 90. Attached integrally at the end of the pathways 36 and 38 of the launcher are two track section connectors 118 and 120, FIG. 2. Each of the track section connectors are receivable within the channels formed in the tracks 28, 30 and 32, FIG. 1, in a fashion more completely described in the abovementioned patent to Nash, et al. Thus, it is now apparent how easy it is to achieve the system layout illustrated in FIG. 1 where the roadway 24 is positioned some 25 to 30 inches above the floor 122 on which is positioned the launcher 22.

In accordance with still another important aspect of the present invention, a combination support and track section connector is provided for supporting the roadway in its non-collapsed or non-nested position as shown in FIG. 7, while at the same time, cooperating to more substantially connect and align a track section to the roadway. Referring to FIGS. 11 and 12, there is illustrated a support and track section connector 126 which is comprised of a first flat portion 128 for engaging the channel of a track section and a second portion 130 which is disposed perpendicular to the first portion 128 and integral at one end with the first portion. At the other end of the second portion 130 is a U-shaped section 132 having two legs 134 and 136 and a base 138. The U-shaped section 132 is attached integrally to the second portion in such a fashion that a top surface 140 of the base 138 forms a shoulder. As more clearly shown in FIG. 11, the upper rim 141 of the lower portion 110 of the roadway formed by the slit 106 is received within the channel shaped confines of the U-shaped section so that the support and track section connector may be mounted to the lower portion 110. The shoulder surface 140 acts as a ledge on which to receive the rim 142 of the upper portion 108 and thus acts as a relatively wide support surface for the upper portion of the roadway when the roadway is set up in operation, such as shown in FIG. 7. The first portion 128 of the connector aligns with the roadway track section connector 112 to help align and strengthen the connection made to the track 30 so as to act as an extension of the pathway 90. To provide an optimum nonslip connection between the first portion 128 and the track, the first portion has longitudinal peripheral edges 131 and 133 having a series of protuberances 135 and 137, respectively. The connected track 30 also functions as an anchor to firmly bias the upper portion 108 of the roadway onto the shoulder surface 140, thereby assuring a stable roadway.

In accordance with yet another important feature of the present invention, there is disclosed a toy vehicle with freely rotating wheels which are easily movable

along the track and roadway system and which closely simulates a full-sized motorcycle. Nevertheless, the vehicle can be inexpensively manufactured while retaining an extremely rugged construction. Referring now to FIGS. **4**, **5** and **6**, the vehicle **82** is comprised of a simulated motorcycle body **150** of a molded synthetic resin material attached to two rotatable large wheels **152** and **154**. Removably attached to the vehicle body **150** is a relatively flat vehicle base **156** having a forward recess **158** and a rearward recess **160** to accommodate the wheels **152** and **154**, respectively. The connection between the vehicle base **156** and the vehicle body **150** may be achieved by any convenient fastening means such as the screw **162**.

Attached to the vehicle base are four relatively small and freely rotatable wheels **164**, **166**, **168** and **170**. Each of the wheels is mounted to a small diameter wire, such as the wire **172** connected to the wheel **164**, the wire **173** connected to the wheel **166**, the wire **175** connected to the wheel **168** and the wire **177** connected to the wheel **170**; the wires are in turn embedded in cylindrical receivers **165**, **167**, **169** and **171**, respectively, integral with the vehicle base **156**. The vehicle base is flexible to allow vertical movement of the wheels without damaging the small diameter wire axles. It is to be noted that each of the small wheels **164**, **166**, **168** and **170** has a relatively wide smaller diameter portion and a narrow larger diameter portion. As is more fully explained in the above-mentioned La Branche, et al. patent, the smaller the running surface of the vehicle in contact with the running surface of the roadway, the lower the friction upon the vehicle; and, therefore, the lower the drag on the vehicle's movement. It is also noted that the sidewalls **174** and **176** of the pathway **36** are obliquely disposed so that any contact between the wheels and the sidewalls will be along a minimum of wheel area thereby again keeping drag to a minimum. The larger wheels **152** and **154** are mounted so that they do not come into contact with the running surface. This is clearly shown in FIG. **6**; once again, the purpose of the spacing is to insure a minimum of friction and thereby drag to the moving vehicle.

Referring now to FIG. **11**, there is illustrated the realistic effect which can be achieved by the toy hill-climbing system of the present invention. Once the launcher imparts motion to the toy vehicle **82** and the vehicle moves up the inclined track **30**, abruptly changing the direction of the track from an upward slope to a relatively horizontal position causes the propelled vehicle to leave the track in a jumping fashion. This is very analogous to an actual motorcycle hill-climb where there is a tendency of the vehicle to leave the ground upon reaching the top of the hill. Stability of the motorcycle is no problem because of the addition of the vehicle base and four wheels to the vehicle body. Thus, since the track **30** and the pathway **90** are aligned, the vehicle will simply jump over a portion of the track and pathway, land on the pathway and continue along.

In operation, the roadway **24** is set up with two support and track section connectors **126**, one each attached adjacent the two sections **92** and **94** of the first end of the pathway **90**; the upper portion of the roadway is placed in the upper position so that the roadway assumes the profile shown in FIG. **7**. The roadway is placed at an elevated position relative to the launcher **22**, such as upon a table top with the launcher remaining on the floor; track sections are connected to a suitable length to create the tracks **28**, **30** and **32**. Two vehicles may then be placed adjacent the two pusher arms **40** and **42** of the launcher while the respective knobs are rotated so as to increase the tautness of the elastic bands. Upon an appropriate signal, the latching mechanism is depressed to allow the biasing force of the elastic bands to catapult the vehicles along the parallel tracks **28** and **30**. This is accomplished by having the vehicle engaging end portion **78** engage the cylindrical receivers **165**, **167**, FIGS. **4** and **6**. Upon reaching the crest of the tracks and before entering the pathway **90**, the vehicles will leave the track momentarily in a jumping or leaping fashion and return to the track and continue along the pathway **90**. The first vehicle to reach and pass through the merger **100** and lead the single file around the remaining portion of the pathway is considered the winner of the competition. Because of the force of gravity, the vehicles will move from the pathway to the track **32** and return to floor level. It is to be understood that the launcher **22** may be used with only one vehicle or that a single launcher, using the same principles as that described for the dual launcher **22** may be provided when race competition is not desired.

Thus, what has been described is an inexpensive, yet highly exciting, simulated motorcycle hill-climbing system which is rugged, yet simply constructed and easily operated.

We claim:

1. A toy vehicle movable along a track comprising:
a vehicle body;
at least two large wheels mounted to said body;
a base removably attached to said vehicle body; and
four small freely rotatable wheels mounted to said base, two wheels on each side of said base such that said large wheels mounted to said body are spaced from the track whereby said toy vehicle is movable along said track system on said four wheels.

2. A toy vehicle, as claimed in claim **1**, wherein said small wheels are mounted on small diameter wires which in turn are embedded in the base.

3. A toy vehicle as claimed in claim **1** wherein said base is flat with recesses at each longitudinal and for receiving said large wheels and with cylindrical receivers for receiving axles connected to said wheels.

4. A toy vehicle as claimed in claim **1**, wherein said vehicle body simulates the shape of a motorcycle.

5. A toy vehicle comprising:
a vehicle body;
at least two large wheels mounted to said body;
a base removably attached to said vehicle body; and
four small freely rotatable wheels mounted to said base, two wheels on each side of said base, said small wheels are mounted on small diameter wires which in turn are embedded in the base, and said base is flat with recesses at each longitudinal end for receiving said large wheels and with cylindrical receivers for receiving said wires whereby said toy vehicle is movable along a track system on said four small wheels and said large wheels are spaced from the track system.

6. A toy vehicle comprising:
a vehicle body connected to a first set of wheels; and

a supporting base connected to said vehicle body for supporting said vehicle body and said first set of wheels, said base mounted to a second set of spaced apart wheels.

7. A toy vehicle as claimed in claim 6 wherein said base and said second set of wheels retain said vehicle body and said first set of wheels at a level above a surface upon which said second set of wheels move.

8. A toy vehicle comprising:

a vehicle body connected to two wheels linearly aligned with the longitudinal axis of said vehicle body so as to be unstable if placed on a horizontal surface; and

a base to which said vehicle is mounted, said base connected to four spaced apart wheels whereby said vehicle body and aligned wheels are placed in a stabilized position.

9. A toy vehicle as claimed in claim 8 wherein said base includes two recesses for receiving said aligned wheels.

10. A toy vehicle for moving along a track system comprising:

a vehicle body attached to a set of wheels; and

a base mounted to said vehicle body, said base connected to four spaced apart wheels for retaining said vehicle body in an upright position and for moving said body along said track system.

* * * * *