

[54] MODEL RACING CAR

[72] Inventors: Gene Patrick Dennis, Pitman, N.J.; Cheng Ying Lai, Hong Kong

[73] Assignee: Tyco Industries, Inc., Woodbury Heights, N.J.

[22] Filed: Oct. 29, 1969

[21] Appl. No.: 872,027

[52] U.S. Cl. 104/149, 46/243, 104/60

[51] Int. Cl. A63h 29/22, B61b 13/12

[58] Field of Search.....104/60, 149, 242, 244.1, 245, 104/246, 247; 46/243

3,304,652 2/1967 Donofrio104/60
3,314,375 4/1967 Russell et al.....104/60
3,350,953 11/1967 Stewart.....104/60 X

Primary Examiner—Drayton E. Hoffman
Attorney—Robert K. Youtie

[57] ABSTRACT

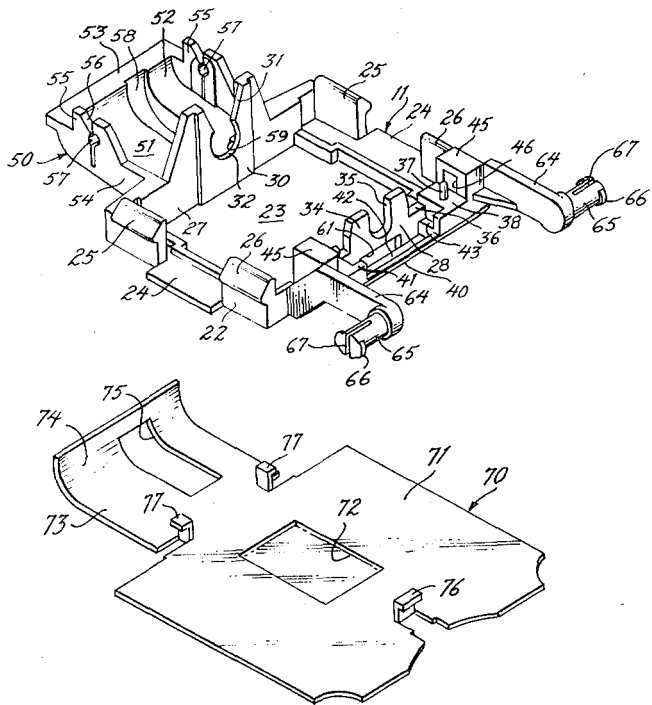
A model racing car frame having a motor mounted therein and provided with wheeled running gear, a depending guide shoe for guiding engagement in a roadway slot, the guide shoe being swingable about an upstanding axis, and resilient wipers carried for movement with the guide shoe and resilient engagement with the roadway.

[56] References Cited

UNITED STATES PATENTS

3,163,123 12/1964 Zirolì.....104/247

7 Claims, 12 Drawing Figures



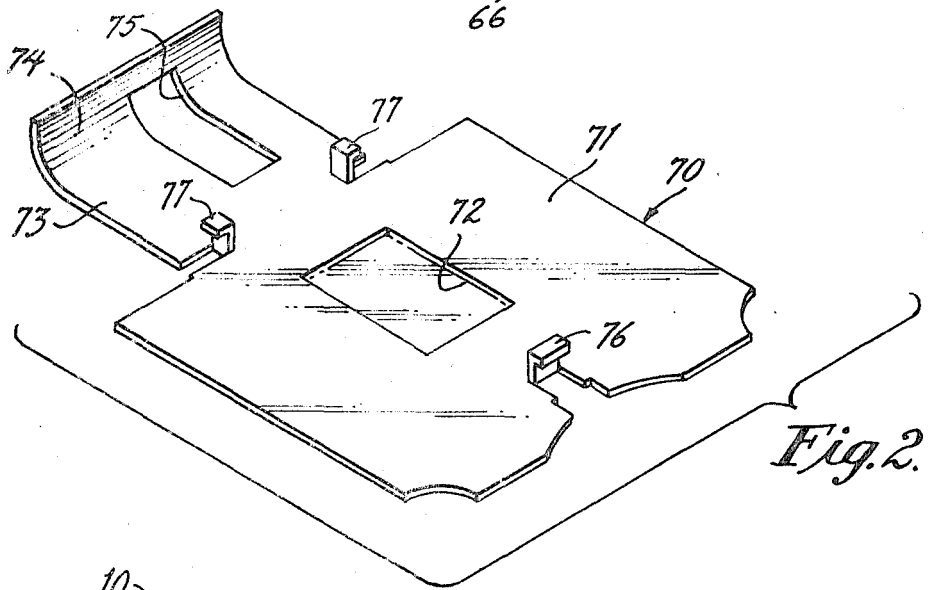
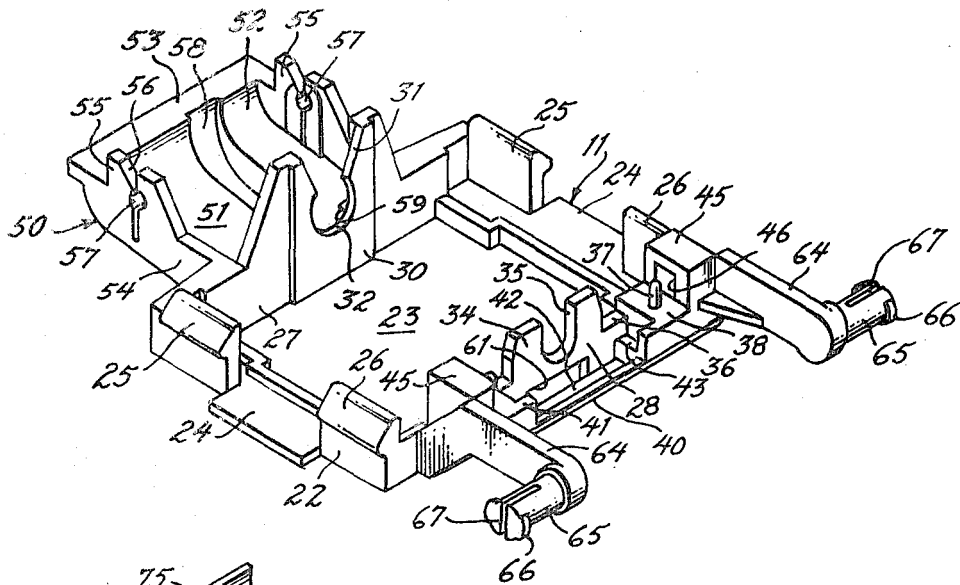


Fig. 2.

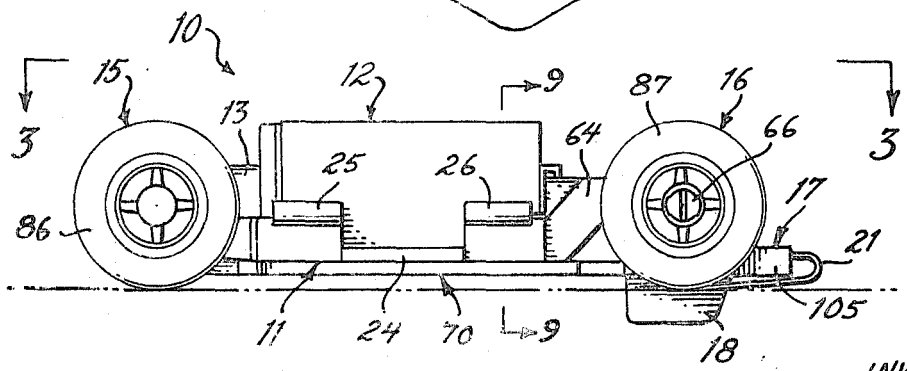


Fig. 1.

INVENTORS.
 GENE PATRICK DENNIS
 CHENG YING LAI
 BY *Robert K. Youtie*
 ATTORNEY.

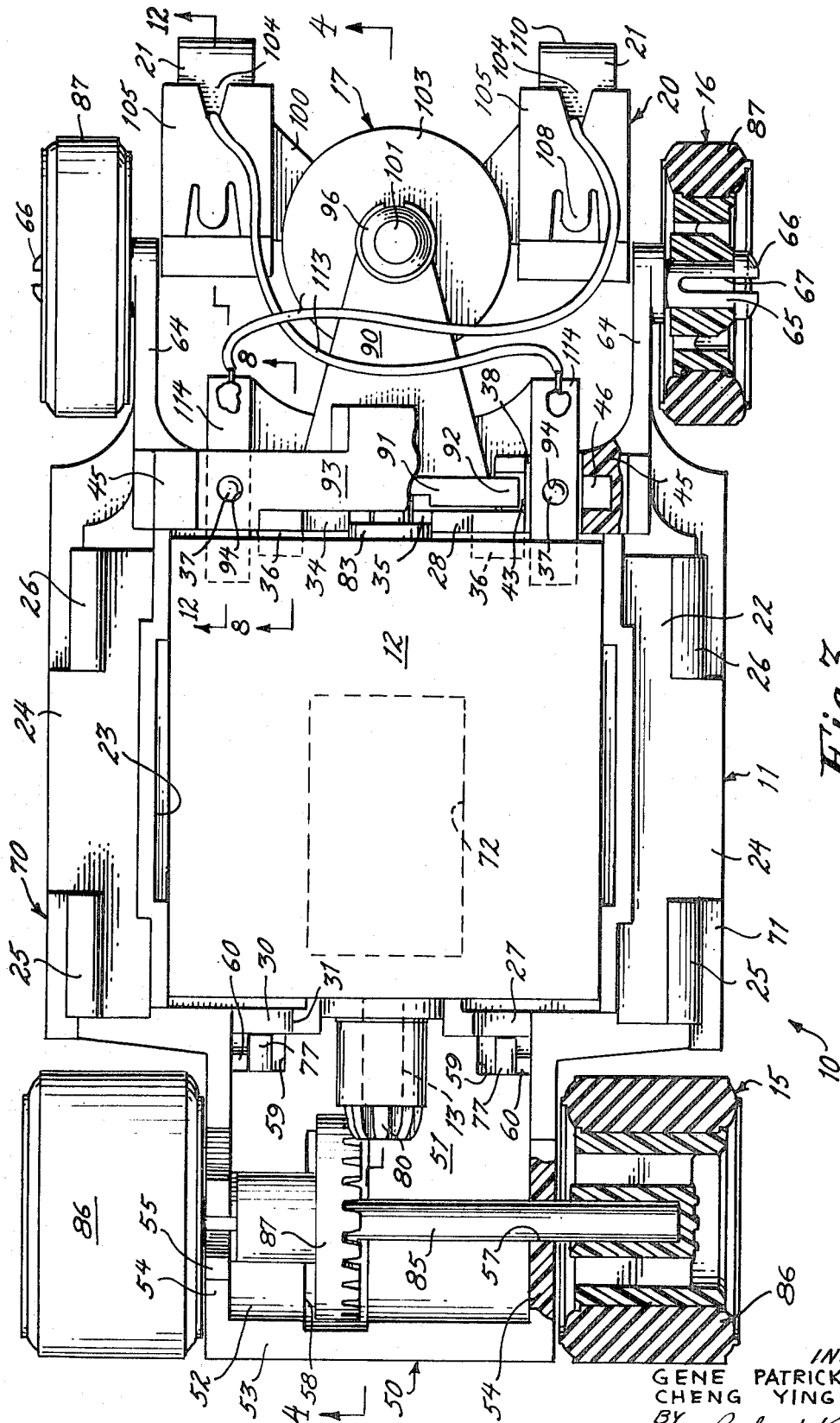


Fig. 3.

INVENTORS.
GENE PATRICK DENNIS
CHENG YING LAI
BY Robert K. Youtie
ATTORNEY.

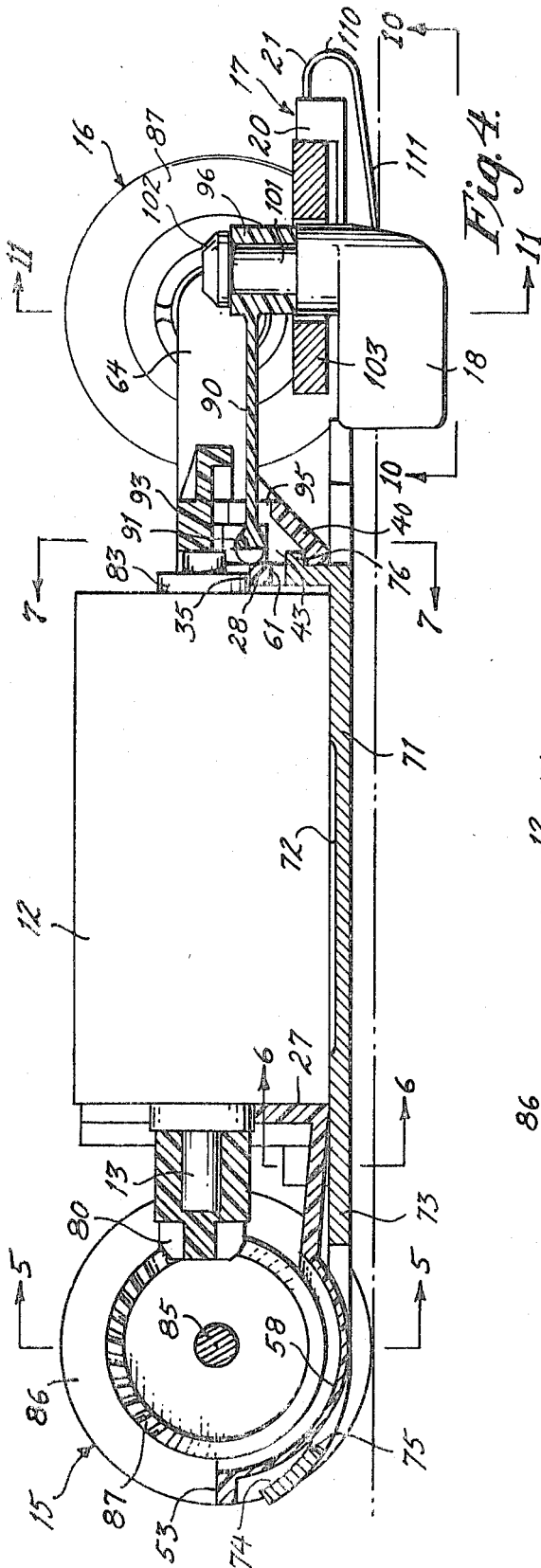


Fig. 4.

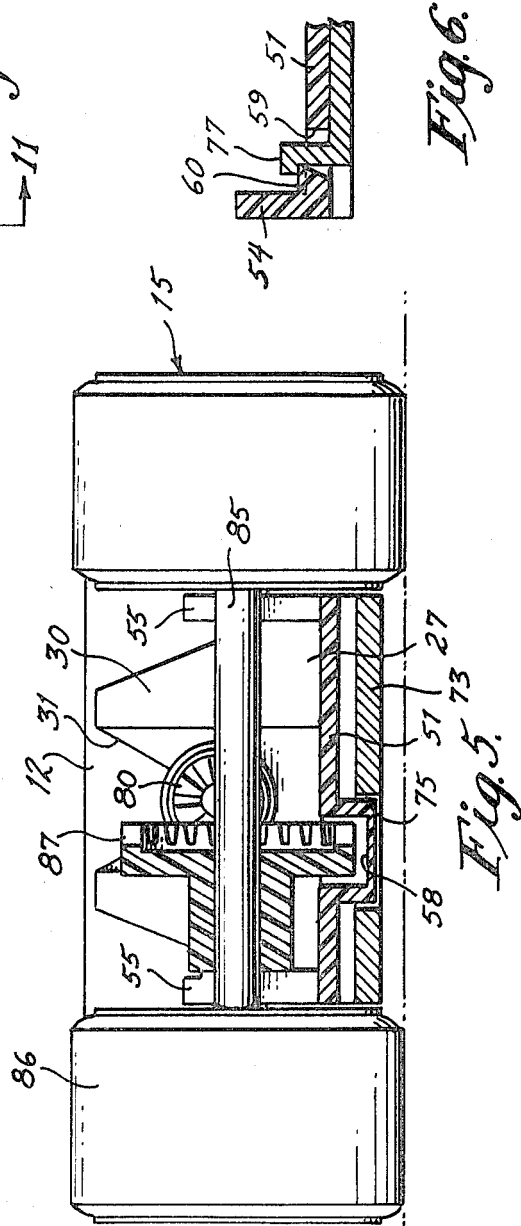


Fig. 5.

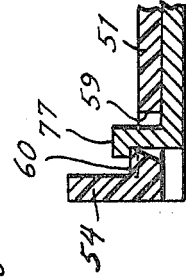


Fig. 6.

INVENTORS.
GENE PATRICK DENNIS
CHENG YING LAI

BY *Robert K. Youtie*
ATTORNEY.

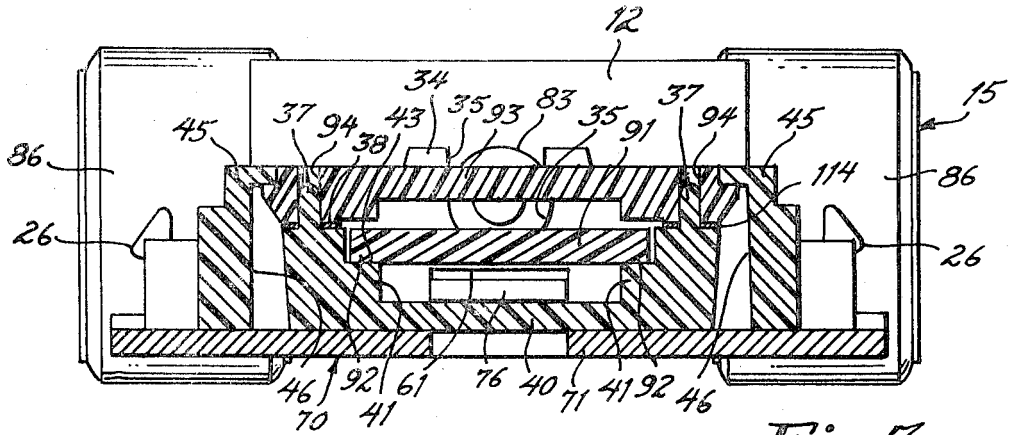


Fig. 7

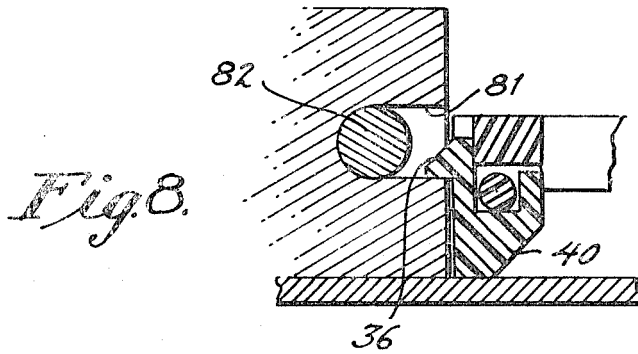


Fig. 8

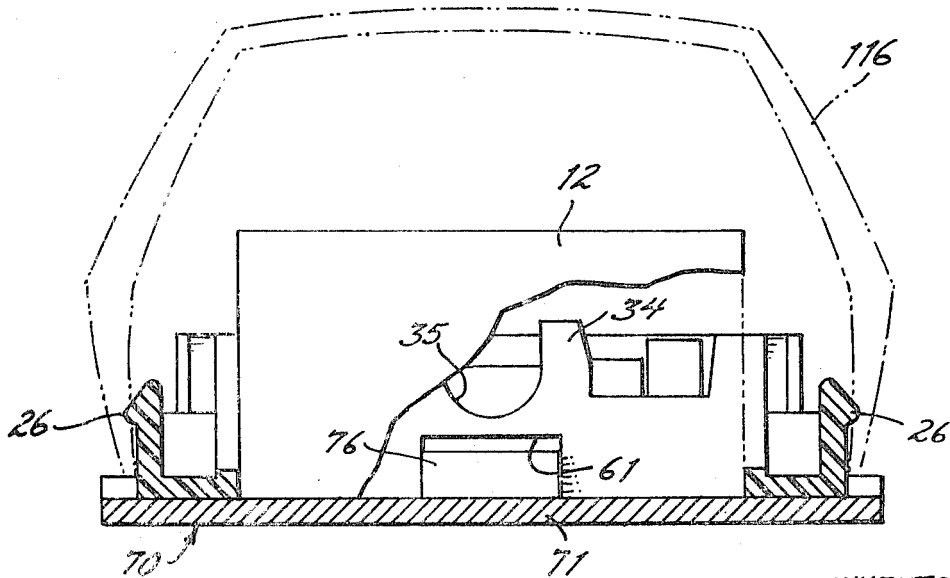


Fig. 9

INVENTORS.
 GENE PATRICK DENNIS
 CHENG YING LAI
 BY

Robert H. Youtie
 ATTORNEY.

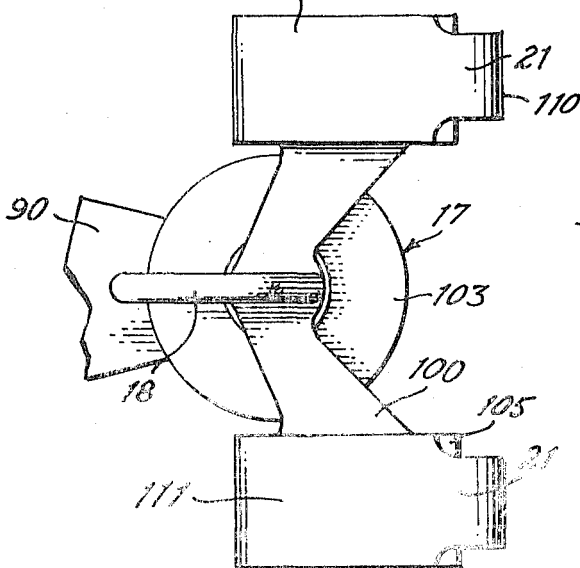
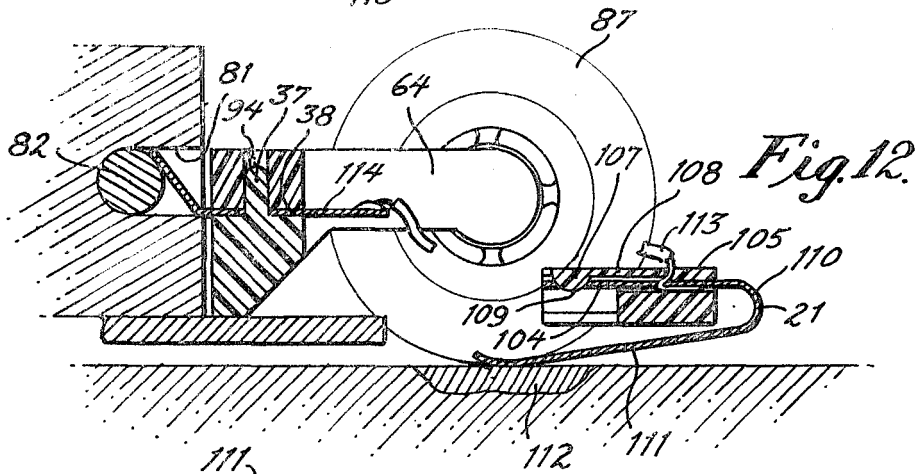
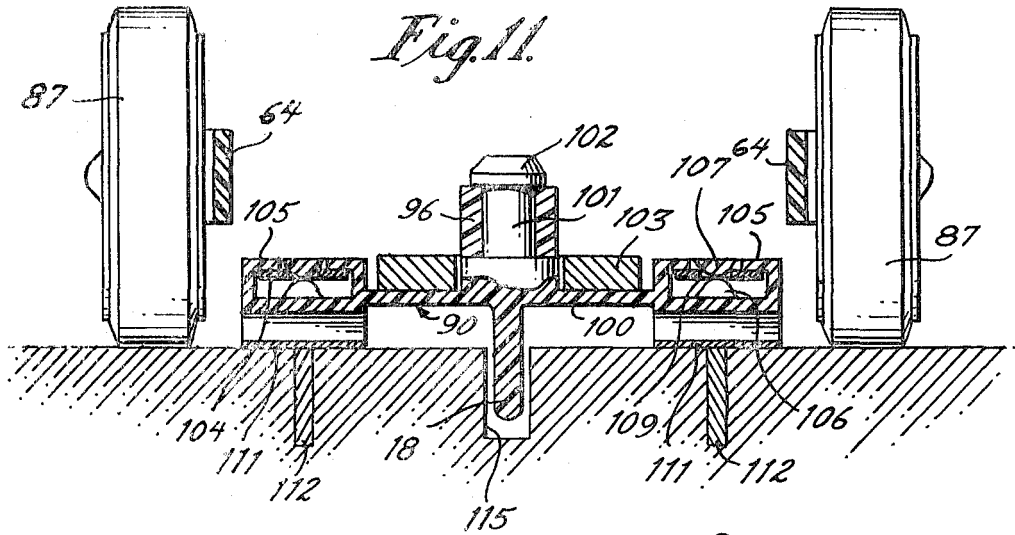


Fig. 10.

INVENTORS.
 GENE PATRICK DENNIS
 CHENG YING LAI

BY *Robert K. Youtie*
 ATTORNEY.

MODEL RACING CAR

BACKGROUND OF THE INVENTION

As is well known to those versed in the field of model racing cars, the problems are those of simulating the operating and handling characteristics of full size racing cars in the miniature construction of the model racing cars. Heretofore, the miniaturization has resulted in loss of accurately simulated handling characteristics, as it was not possible to accurately simulate in miniature models the relative weight, weight distribution, and ground holding qualities of larger racing cars.

SUMMARY OF THE INVENTION

It is, therefore, an important object of the present invention to provide a model racing car which is highly miniaturized, say of HO gauge, which accurately simulates larger and full size race cars, not only in appearance, but in the full range of its operation and throughout its handling characteristics.

It is a further object of the present invention to provide a model racing car of the type described wherein the center of gravity is extremely low and the weight is properly distributed for maximum stability, traction, responsiveness and resistance to roll.

It is a further object of the present invention to provide a racing car construction of the type described which includes unique features of structure in improved chassis design for better cornering, hypoid type transmission for lowered center of gravity and minimal power train losses, and wherein unique improvements are incorporated in a guide construction having a guide fin engageable in a track slot.

It is a more particular object of the present invention to provide a model racing car wherein a guide construction includes a drop arm and depending guide fin or shoe for assured engagement in a guiding slot under all angular positions or attitudes of the racing car.

Still another object of the present invention resides in the provision of improved wiper means associated with the guide construction for swinging movement with the guide fin to assure the continuous electrical contact with track conductors.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing a racing car chassis constructed in accordance with the teachings of the present invention, and illustrating a racing or roadway surface in dot-and-dash outline.

FIG. 2 is an exploded perspective view of the frame and bottom plate of the chassis.

FIG. 3 is a top plan view, taken generally along the line 3-3 of FIG. 1, with parts broken away for clarity.

FIG. 4 is a longitudinal sectional elevational view taken generally along the line 4-4 of FIG. 3.

FIG. 5 is a transverse sectional elevational view taken generally along the line 5-5 of FIG. 4.

FIG. 6 is a partial longitudinal sectional elevational view taken generally along the line 6-6 of FIG. 4.

FIG. 7 is a transverse sectional elevational view taken generally along the line 7-7 of FIG. 4.

FIG. 8 is a partial longitudinal sectional elevational view taken generally along the line 8-8 of FIG. 3.

FIG. 9 is a transverse sectional elevational view taken generally along the line 9-9 of FIG. 1, and illustrating an outer covering or housing in phantom.

FIG. 10 is a partial bottom plan view taken generally along the line 10-10 of FIG. 4.

FIG. 11 is a transverse sectional elevational view taken generally along the line 11-11 of FIG. 4.

FIG. 12 is a partial longitudinal sectional view taken generally along the line 12-12 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, and specifically to FIGS. 1-3 thereof, the model racing car of the present invention is there generally designated 10, and includes a generally horizontal frame 11 carrying a motor 12 with a rearwardly projecting drive shaft 13. Also mounted on the frame 11 are ground engageable rear wheel means 15 and ground engageable front wheel means 16, while a guide construction is generally designated 17 and extends forwardly from the frame 11 carrying a depending guide member 18 for engagement in a roadway guide slot. The guide construction 17 may include wiper holder means 20 for carrying wipers 21 in wiping engagement with track conductors to conduct electricity to the motor 12.

Considering the frame 11 in greater detail, the frame is normally generally horizontally disposed, being preferably integrally fabricated of any suitable material, say by molding of plastic, and being formed with a major central frame region 22, best seen in FIG. 2, having formed therein a vertical through opening 23. The major frame region 22 includes a pair of laterally spaced, longitudinally extending side members 24, each being provided with a pair of forwardly and rearwardly spaced, upstanding snap catches 25 and 26, for a purpose appearing presently. A rear partition or wall 27 extends laterally between the rear ends of side members 24, and a forward partition or wall 28 extends laterally between the forward end of side members 24. Laterally medially of the rear partition 27, there is formed an upstanding portion 30 having a cutout 31 extending downwardly through a downwardly tapering upper portion and terminating in a generally circular, enlarged lower portion 32.

The forward laterally extending wall or partition 28 includes a laterally medial upstanding wall portion 34 formed with a generally U-shaped upwardly opening cutout 35. On opposite sides of the upstanding medial portion 34, the partition 28 is formed with rearward projections or detents 36, and laterally outward of each detent 36, the partition 28 is provided with an upstanding locator or pin 37. The pins or locators 37 each upstand centrally from an upper surface 38, which extends forwardly beyond the upstanding portion 34 and adjacent detent portions 36. A troughlike formation 40 extends laterally along and in front of the upstanding portion 34 of forward wall 28, along a lower region thereof, and terminating proximate to the surfaces 38 carrying locators 37. The trough formation 40, at opposite end regions thereof, is formed with raised wall portions 41 adjacent to and extending slightly above respective surfaces 38. The inner or recessed region 42 of the troughlike formation 40 has its end portions 43, each adjacent to a respective raised wall portion 41 and adjacent surface 38, slightly raised to define a bearing surface, as will appear presently.

Adjacent to opposite ends of the forward partition or wall 28, there are formed upstanding block portions 45, each of which may be formed with an internal downwardly opening hollow, as at 46, if desired.

Extending rearwardly from the rear frame wall or partition 27, being laterally reduced with respect to the major frame region 22, so as to be generally laterally coextensive with the upstanding partition portion 30, is a rearward frame region generally designated 50. The rear frame region 50 includes a bottom wall 51 extending generally rearwardly from a lower region of rear partition 27 and curving upwardly, as at 52 to form a rearmost wall having a rigidifying upper edge flange 53. A pair of upstanding side edge walls or flanges 54 extend along respective side edges of the bottom wall 51 forwardly and rearwardly between the partition wall 27 and rearmost wall 52. The side edge walls 54 are each formed with an upstanding

region 55 having an upwardly opening cutout 56 formed with a generally circular region 57. The circular regions 57 of the pair of upstanding side edge portions 55 are insubstantial alignment with each other laterally of the frame 11 to define pedestal journals for a shaft, as will appear presently. The slot-like formations of cutouts 56, with the generally circular medial regions 57, afford a resilient distensibility to the upright edge wall portions 55, for snap engagement of a shaft into the journal bearing regions 57.

A depressed portion 58 may be formed in the rear region wall 51 for spacedly receiving a gear, as will appear presently. Also, the rearward region bottom wall or floor 51 is formed in its forward corners with a pair of laterally spaced through openings 59, each being provided adjacent thereto with a raised formation 60. The forward partition or wall 28 is further formed with a laterally extending cutout or slot 61 in the lower region of the upstanding laterally medial portion 34. Thus, the cutout or slot 61 opens forwardly through the partition 28 into a medial region of trough recess 42, also for purposes appearing presently.

The block formations 45 are each provided on its outer side with a forward extension or arm, as at 64, which extensions project generally horizontally forwardly in laterally spaced parallelism with each other. At the forward, distal end of each extension or arm 64, there is provided a laterally outwardly projecting stub shaft 65. Each stub shaft 65 may be provided on its laterally outer end with an enlarged region 66; and may be formed with a slot 67 extending longitudinally inwardly from the outer end to a point adjacent to the inner end. The slots 67 afford a resilient flexibility to the stub shafts 65, so that the shafts may be squeezed to contract the free end enlargements 66.

The frame 11, as described hereinbefore, may be integrally fabricated of suitable material, such as plastic. However, it is desirable to weight the chassis of the instant racing car, in the lower region of the chassis, to insure the relatively low location of the center of gravity. Toward this end, a relatively high density member 70 is secured in neither relation with respect to the frame 11. The high density member 70 is advantageously of metal, say steel or the like, and includes a generally rectangular major region 71 adapted to closely underlie the major frame region 22, as best seen in FIGS. 1 and 4. The metal sheet or plate 70 may have its major region extending across the underside of and in closing relation with respect to the vertical opening 23 of the major frame region. The major plate portions 71 may be formed generally centrally, on its upper side, with a recess, as at 72, for a purpose appearing presently.

In addition, a laterally reduced rearward plate portion 73 extends from a laterally medial rearward region of major plate portion 71, and may have its rearward terminal region 74 curved upwardly, all for general conforming engagement with the bottom wall 51 of rearward frame region 50. The rearward plate portion 73 may be formed with an elongate opening or cutout 75 for receiving the depressed or recessed portion 58 of rearward wall region 51.

In addition, the major plate region 71 may be formed in a forward, laterally medial region thereof, with an upstanding, forwardly projecting holding member of hook 76 engageable forwardly through the cutout or slot 61 of frame wall or partition 68. A pair of laterally spaced upstanding holding members or hooks 77 are formed from material in the forward region of rearward frame region 50, and hooked engagement on the raised wall portions 60. In this manner, the high density weighting member 70 may be securely fastened in its underlying relation with respect to the frame 11.

The motor 12 may be conventional, of any desired construction, and seats conformably within the opening 23 of the frame 11 on the major portions 71 of plate 70. The drive shaft 13 projects loosely through the lower enlarged region 32 of cutout 31, being retained therein by the reduced intermediate portion of the cutout. The rearward end of drive shaft 13 may be provided with gear teeth 81, see FIGS. 8 and 12, wherein

conductor pins 82 may be located. The cutouts 81 are positioned to face forwardly toward the holding members or detents 36, for snap engagement of the latter in respective openings 81. In this manner, the motor 12 is effectively retained in position in the frame 11, assembly being simply accomplished by snap interfitting engagement, and disassembly being facilitated, as for repair, replacement or the like. The forward side of the motor 12 is provided with a generally circular boss 83 conformably received in the cutout 35 to further insure proper location of the motor.

The rear wheel means 15 may include a single shaft or axle 85 extending through and rotatably journaled in the aligned openings 57 of pedestal bearings 55. The shaft or axle 85 extends beyond the pedestal bearings 55, being provided on its opposite ends with respective drive wheels 86. Relatively wide, racing type drive wheels 86 may be accommodated on the ends of shaft 85 on opposite sides of the rearward frame region 50, without sacrificing accurate simulation of racing car appearance. Keyed to the axle or shaft 85 may be a gear 87, which rotates with the shaft being conformably received in the frame recess 58, and in meshing driven engagement with the gear teeth 80. More specifically, the meshing gears 80 and 87 may be of a hypoid type, the axes of the gears being nonintersecting and nonparallel. This permits of maximum lowering of the centering of gravity without limitation to such lowering by the gear train.

The forward ground engageable wheel means 16 may include a pair of relatively narrow wheels 87, each rotatably supported on a respective forward stub shaft 65. In this manner, the front wheels 87 are independently rotatable for improved handling in cornering, and the like.

The guide construction 17 is located between the forward frame projections 64, and may include a drop arm 90 extending forwardly from the forward frame partition 28, and mounted thereby for upwardly and downwardly swinging movement. More specifically, the drop arm 90 may be defined by a generally horizontal elongate plate of forwardly tapering configuration, see FIG. 3. The rearward region of the drop arm or plate 90 is formed with a laterally extending enlargement or bead 91, which is loosely received in the trough structure 40. The rear end enlargement or bead 91 or drop arm 90 may have lateral projections 92 on opposite sides each resting on a respective bearing surface 43. An elongate, laterally extending retaining member 93 overlies the trough formation 40, extending therebeyond to overlie the surfaces 38, and having its end portions snap engageable in respective hollows 46 of blocks 45. The retaining member 93 is formed with openings 94 respectively receiving pins or lugs 37, and the retaining member may be considered as covering the upper side of trough formation 40, combining with the latter to define a slot or passageway 95 opening from the trough formation forwardly and spacedly receiving the drop arm plate member 90 to permit up and down swinging movement thereof. Thus, the drop arm or plate member 90 is retained at its rear end and there mounted on the frame 11 for up and down swinging movement. The forward end of the drop arm 90 may be formed with a vertically extending sleeve or bearing 96 swingable with the drop arm.

A laterally disposed yoke member 100 extends beneath the forward end of drop arm 90, including an upstanding pintle or pin 101 rotatably received in the sleeve or bearing of the drop arm. A head 102 on the upper end of the pin 101 retains the yoke connected to the drop arm while permitting relative pivotal movement therebetween. A weight 103, say in the form of an annular member or metal washer, may be circumposed about the pin 101, resting on the yoke 100 to constantly urge the latter downwardly about the axis of pivotal movement at the rearward end of drop arm 90.

At opposite ends of the yoke 100 are provided the wiper holder means 20, each including a wiper holder or sleeve 105 carried on opposite ends of the yoke 100. Each sleeve of holder 105 may extend generally forwardly and rearwardly, having its opposite ends open, and being swingable with the

yoke 100 about the vertical axis of pin 101, as well as swingable up and down about the rear end of drop arm 90. As best seen in FIGS. 11 and 12, each wiper holder of sleeve 105 is a generally rectangular cross-sectional configuration, being formed in its lower interior region with a central upstanding projection 106, and being formed in its upper rearward interior region with a resiliently downwardly biased depending projection 107. The downwardly biased projection 107 may be carried by a tongue 108, see FIG. 3, for increased resilient yieldability thereof.

Each wiper 21 may be formed of a resiliently flexible strip of conductive sheet material, such as copper or the like, having an upper portion 104 inserted rearwardly into the respective holder 105 and formed with an opening 109 for snap engagement therethrough of the associated depending projection 107. The remainder of the wiper 21 extends forwardly from its respective holder 105, there being bent downwardly, as at 110 to extend rearwardly, as at 111 in wiping engagement with a track conductor 112. By flexible electrical conductor means or wires 113 connected to each wiper 21, electricity may be conducted to the motor 12 for energizing the same.

More specifically, a flexible electrical conductor 113 extends from each wiper 21 to a conductor strip 114 which is secured in position by retainer 93 and maintained in bearing engagement with a motor contact 82. That is, a pair of conductor strips 114 are each disposed forwardly and rearwardly across a respective surface 38, receiving the associated locating pin 37, and retained thereon by the retainer 93. The rearward end of each conductor strip 114 extends into the adjacent recess or cavity 81 for bearing engagement with the corresponding conductor pin 82.

Depending from a medial region of the yoke 100 is the guide fin or shoe 18. The guide fin or shoe 18 may be of elongate configuration in the direction longitudinally of the racing car, as best seen in FIGS. 1 and 4, and engageable in a track slot 115 to constrain the car to movement along the track. Further, by the longitudinal extent of the guide fin or shoe 18, the fin is swung about the generally vertical axis of pin 101, which effects swinging or rotation of the yoke 100 and its wiper holders 105 to maintain the latter in continuing electrical engagement with track contacts. Also, by the up and down swingability of the guide construction 17, and the downward urgency of the yoke 100, the guide fin or shoe 18 is assured of proper engagement in a track slot 15 regardless of the attitude or angular disposition of the vehicle frame 11.

While the embodiment illustrated herein exposes the functional structure, an enclosure, housing or body may be engaged over the frame 11, as illustrated in phantom at 116 in FIG. 9, being snap engaged on the retainer lugs 26, if desired.

From the foregoing, it is seen that the present invention provides a model racing car construction which fully accomplishes its intended objects and is otherwise well adapted to meet practical conditions of manufacture, operation, and maintenance.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention.

What is claimed is:

1. A model racing car comprising a generally horizontal frame, a motor mounted within said frame and having a rearwardly extending drive shaft, ground engageable rear wheel means rotatably carried by a rearward region of said frame and connected in driven relation with said drive shaft, ground engageable front wheel means rotatably carried by a forward region of said frame, a depending guide construction carried by a forward region of said frame and connected thereto for lateral swinging movement in guiding engagement in a road-

way slot, wiper holder means carried by said guide construction for swinging movement therewith, a pair of laterally spaced wipers carried by said wiper holder means for engagement with roadway conductors, flexible wires electrically connected between said wipers and said motor, and a high density member carried on the under side of said frame for effectively lowering the center of gravity, said frame having a vertical through opening, said high density member comprising a plate extending beneath and in closing relation across said opening, and said motor being disposed in said opening directly on said plate.

2. A model racing car according to claim 1, said plate including a rearward extension beneath said drive shaft to shift the center of gravity rearwardly.

3. A model racing car according to claim 1, said guide construction comprising a drop arm having one end swingably connected to said frame and extending forwardly for up and down swinging movement of its forward end, and a guide fin carried by the forward end of said drop arm and depending therefrom for continuous engagement in a guide slot upon varying attitudes of said frame.

4. A model racing car according to claim 3, in combination with a weight on the forward end of said drop arm to maintain said guide fin urged downwardly.

5. A model racing car according to claim 3, said drop arm comprising an elongate generally horizontally disposed plate, and a laterally extending bead on the rear of said plate, said frame having a laterally extending forwardly opening recess pivotally receiving and retaining said bead to mount said drop arm plate for its up and down swinging movement.

6. A model racing car according to claim 1, said frame comprising a generally central major region having said vertical opening, a laterally reduced rearward region extending rearwardly from said major region, a pair of laterally spaced pedestal journal bearings upstanding from said rearward region for journaling said rear wheel means, a pair of laterally spaced forward extensions extending from said major region on opposite sides of said guide construction, and a stub shaft projecting laterally outwardly from each forward extension for rotatably supporting said front wheel means.

7. A model racing car comprising a generally horizontal frame, a motor mounted within said frame and having a rearwardly extending drive shaft, ground engageable rear wheel means rotatably carried by a rearward region of said frame and connected in driven relation with said drive shaft, ground engageable front wheel means rotatably carried by a forward region of said frame, a depending guide construction carried by a forward region of said frame and connected thereto for lateral swinging movement in guiding engagement in a roadway slot, wiper holder means carried by said guide construction for swinging movement therewith, a pair of laterally spaced wipers carried by said wiper holder means for engagement with roadway conductors, and flexible wires electrically connected between said wipers and said motor, said guide construction comprising a drop arm having one end swingably connected to said frame and extending forwardly for up and down swinging movement of its forward end, and a guide fin carried by the forward end of said drop arm and depending therefrom for continuous engagement in a guide slot upon varying attitudes of said frame, said wiper holder means comprising a yoke pivotally connected to the forward end of said drop arm for up and down swinging movement therewith and pivotal movement about a generally upright axis, wiper receivers at opposite ends of said yoke, said guide fin depending rigidly from said yoke and being of forward and rearward extent for movement longitudinally along the slot to pivot the yoke upon curvature of the slot.

* * * * *

70

75