# United States Patent [19]

**Brown**

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[54] **APPARATUS FOR SIMULATING CROSS-COUNTRY DRIVING CONDITIONS**


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[52] **U.S. Cl.** ......................**273/1 E**, 35/11, 272/31 R, 273/DIG. 24

[51] **Int. Cl.** ..................................................**A63f 9/14**

[58] **Field of Search** ...................27?/1 E, 101; 35/11, 35/12 L, 12 N, 12 W; 272/31


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*Assistant Examiner*—Paul E. Shapiro
*Attorney*—George R. Nimmer


[57] **ABSTRACT**


There is disclosed herein apparatus enabling an externally positioned operator to peer forwardly toward a light transmissive mirror located within and generally sub-dividing an upright hollow housing into a pair of internal chambers, a miniature vehicle in a first chamber is adapted to travel in annular paths of remotely controlled selectable radii through a first chamber environment which is an inverse mirror-image superimposition by said mirror of a diorama located in the housing second chamber. The apparatus also preferably includes a rollable vehicle remaining in contact with a moderately contoured shelf in the first chamber, remotely controlled speed control means for the annularly movable vehicle, means to sense and record proximity between the vehicle and selected first chamber environmental features, attractive lumination for the vehicle and the diorama while the shelf member remains relatively visually subdued, and sophisticated means for varying the vehicle's radial position so as to tax the operator's depth perception and coordination.

**15 Claims, 4 Drawing Figures**

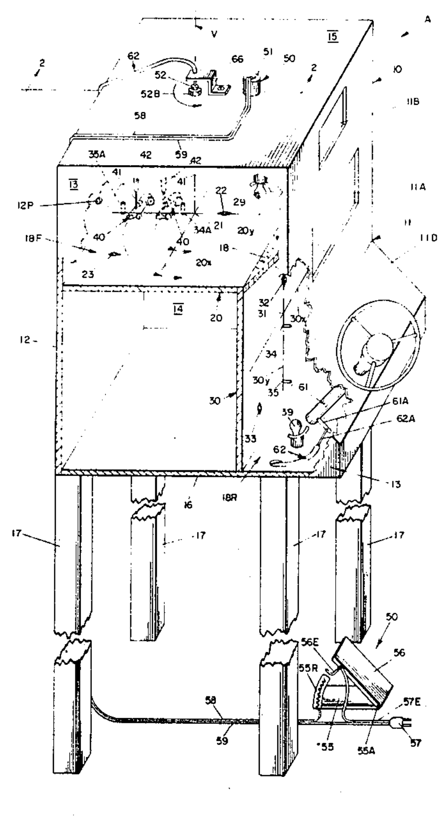
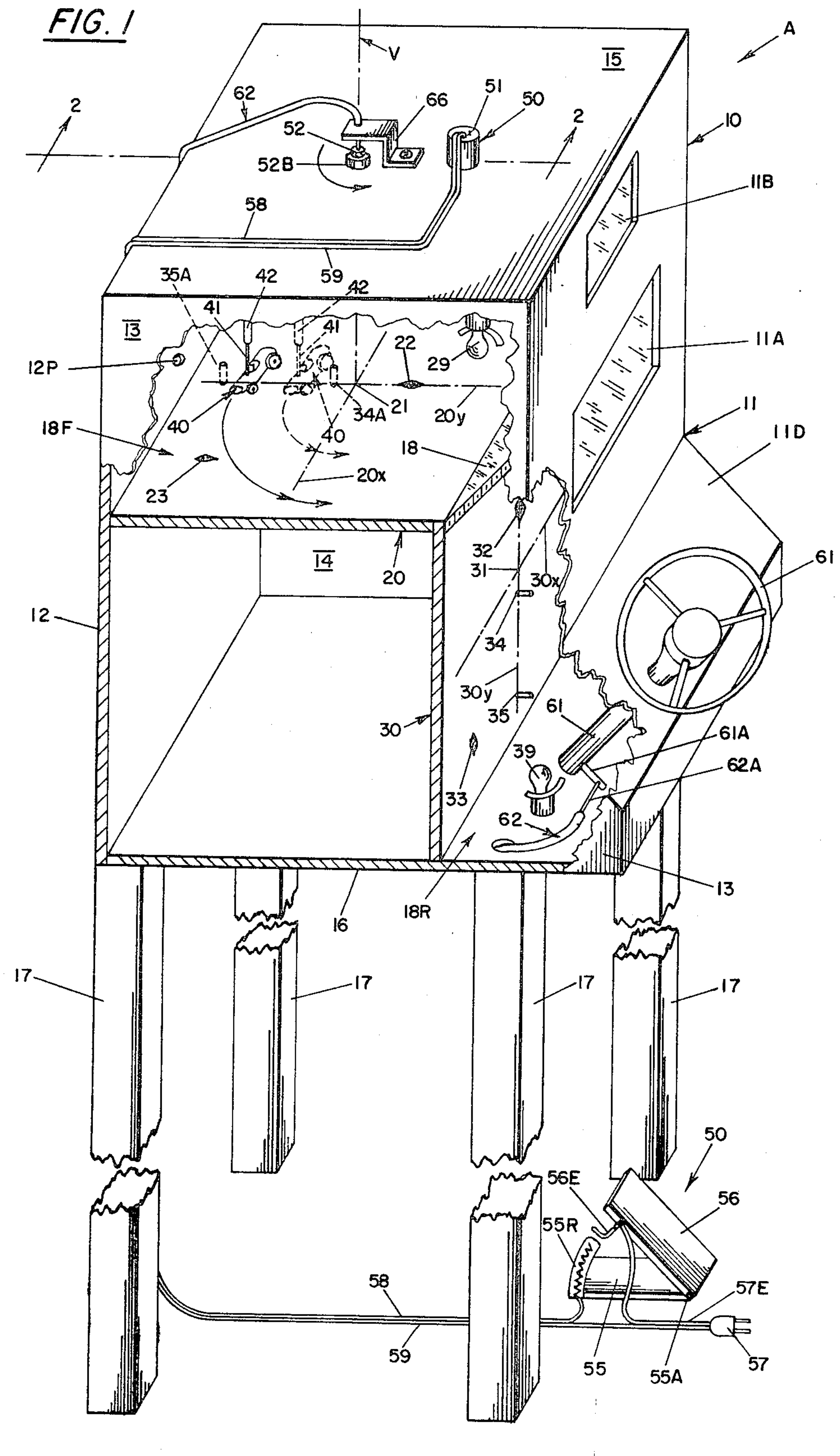



FIG. 1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11D
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31
30x
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34
30y
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30
61A
62A
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59
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57E
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FIG. 3

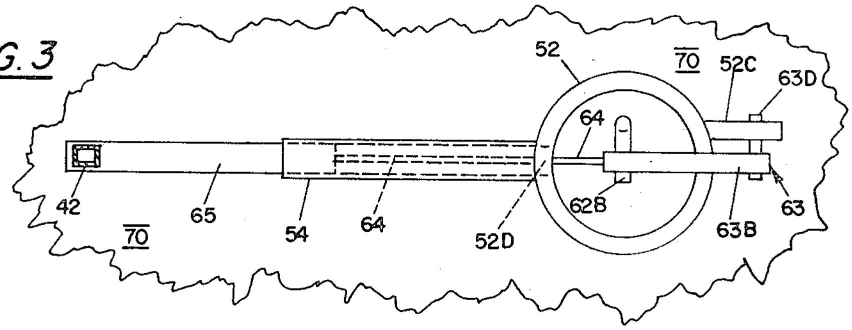
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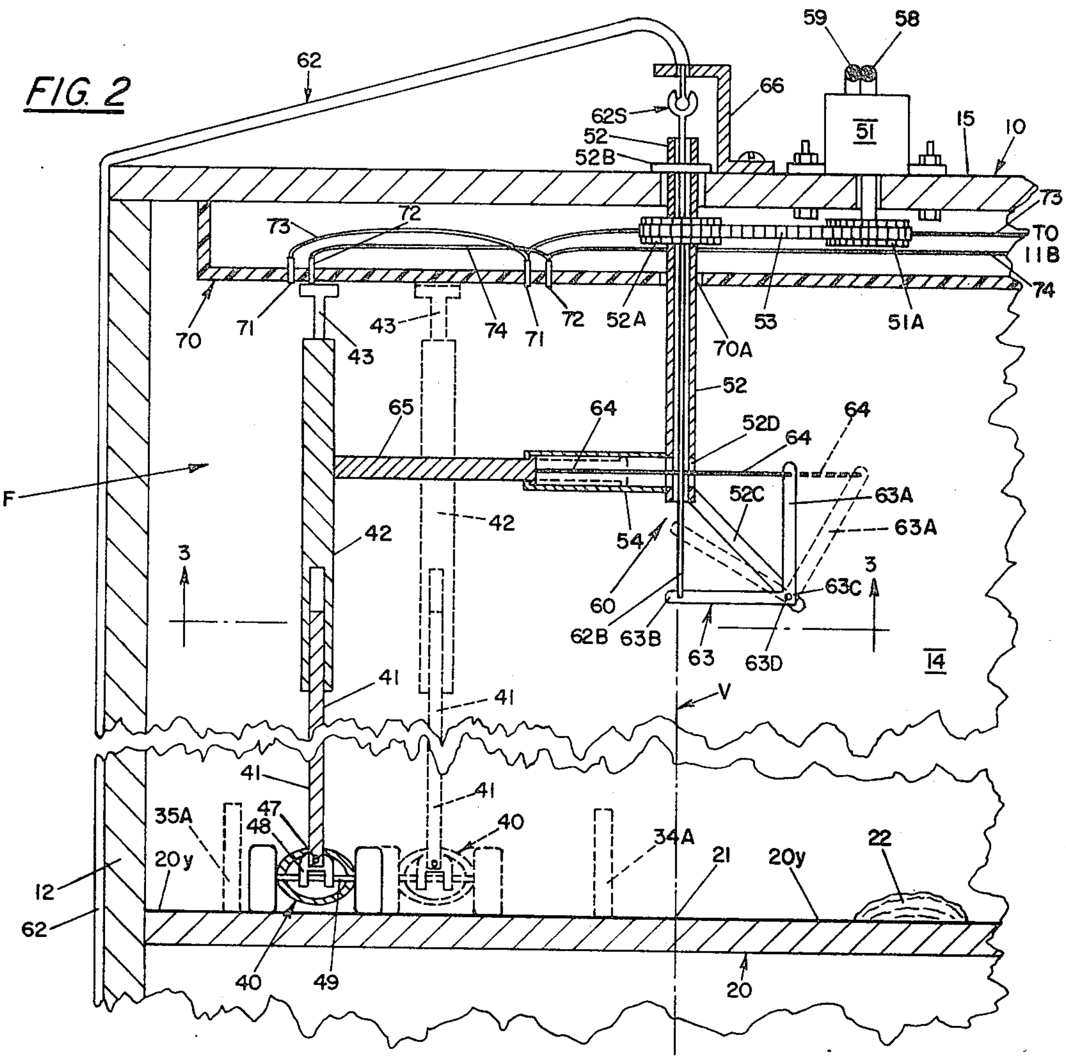
FIG. 2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52C
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63A
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62B
63B
63C
3
63
63D
14
41
41
V
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48
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34A
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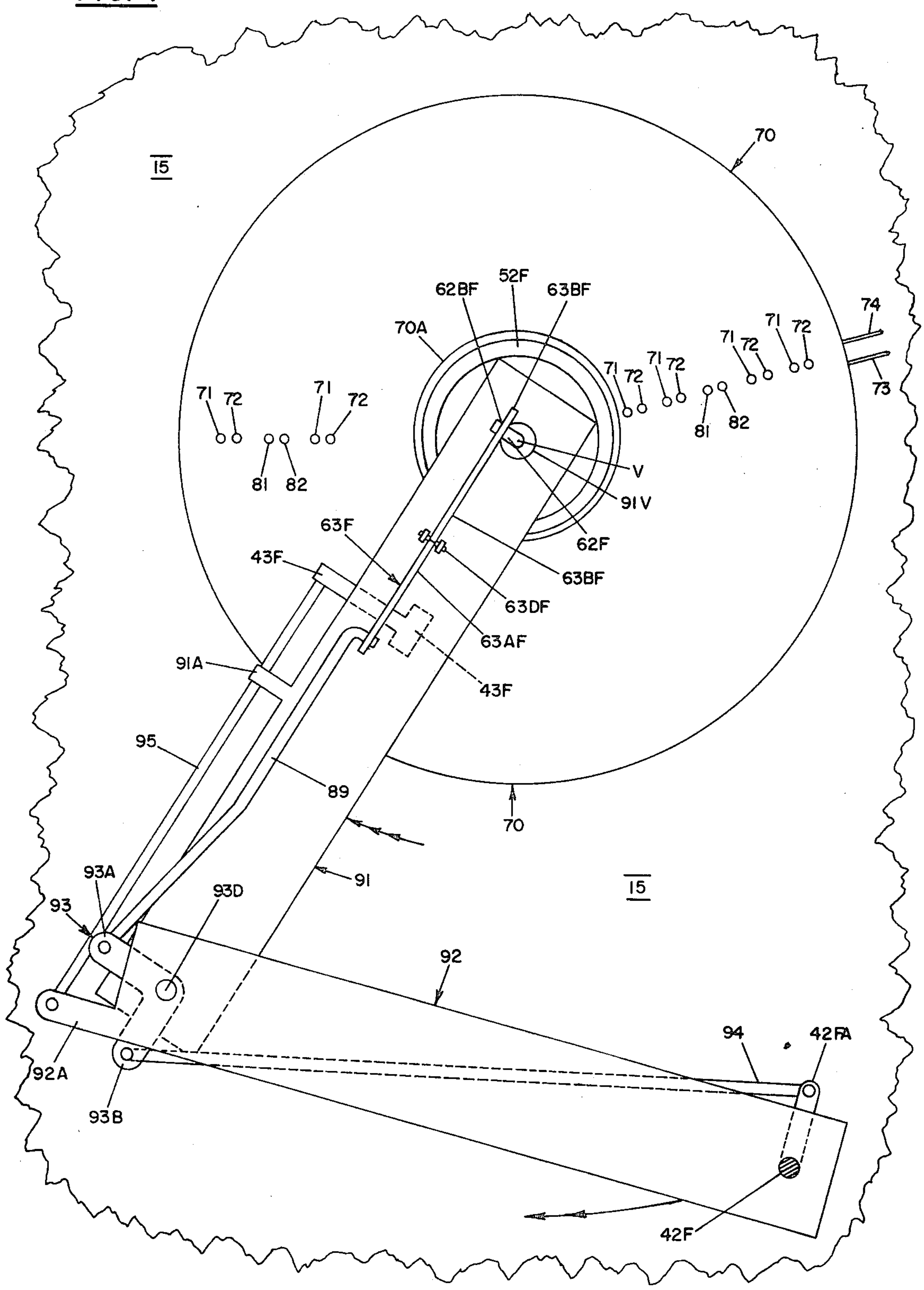
40
49
20

FIG. 4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V
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63DF
63AF
91A
95
89
91
93A
93
93D
92
94
42FA
92A
93B
42F

## APPARATUS FOR SIMULATING CROSS-COUNTRY DRIVING CONDITIONS

Over the years, self-propelled land vehicles, such as automobiles, trucks, bicycles, etc., have been intended primarily for speedy travel. Hence, they are commonly and idealy employed along fairly smooth graded roadways having a relatively narrow finite-width, such as public roadways, oval race-tracks, etc. More recently, however, the so-called "sports vehicles" have become increasingly popular, which vehicles are not constructed primarily for purposes of speedy travel along relatively smooth and narrow graded roadways, but rather constructed primarily for unimproved cross-country terrain, such as frozen lakes, overland fields, etc. In particular, cross-country sports vehicles need to have a built-in stability factor so as to conform to the unimproved and uneven terrain, and vehicular speed is accordingly limited. Nevertheless, driving of sports vehicles, such as snowmobiles, dune-buggies, articulated land vehicles, etc., commands the interest of many persons because of the opportunity to follow various types of cross-country terrains and unencumbered by the relatively narrow finite-width of conventional roadways. For the more avid, cross-country annular race-ways are constructed with barrels and similar artificial markers or obstacles. However, because of the heavy capital expenditure associated by such sports vehicles and because of the geographical inaccessibility to cross-country driving areas to many urban dwellers, a great many persons do not have the opportunity to participate in the endeavor of driving sports vehicles over the countryside.

It is accordingly the general object of the present invention to provide apparatus that will simulate in miniature cross-country driving conditions whereby the apparatus operator can vicariously and fairly realistically participate in the problems and experiences associated with the actual driving of sports vehicles along relatively unimproved cross-country terrains.

It is another object to provide amusement apparatus wherein the miniature vehicle is so positioned and supported with respect to a housed environment simulating cross-country terrain that the vehicle is subjected to phenomena very similar to that of a full-sized sports vehicle traversing along relatively unimproved cross-country terrain.

It is a further object to provide apparatus that will simulate in miniature the situation wherein a full-sized self-propelled vehicle travels along an annular obstacle course or similar broadly extending race-way.

It is yet another object to provide simulated apparatus having novel constructional features so as to present unusually realistic and challenging simulated cross-country driving conditions to the remotely positioned operator, such that the operator can become intensely interested and involved in the vicarious participation offered thereby.

It is a further object to provide a housed apparatus that not only offers amusement to the externally positioned operator, but also tests his dexterity in controlling the speed and annular pathway of the miniature vehicle with respect to individual simulated environmental features, both natural and artificial variety.

It is another object to provide apparatus wherein the simulated environment is relatively pronounced yet does not impede or damage the vehicle.



With the above and other objects and advantages in view, which will become more apparent as this description proceeds, the apparatus generally comprises an upright hollow housing containing therewithin a miniature vehicle adaptable to travel in annular paths of selectable radii about a reference-axis through a simulated environment, there being means accessible at the remotely positioned operator's station for varying the radial distance of the miniature vehicle from the reference-axis thereby permitting the annularly movable vehicle to be maneuvered with respect to individual features of the simulated environment.

In the drawing, wherein like characters refer to like parts in the several views, and in which:

FIG. **1** is a perspective view of a representative embodiment of the simulated cross-country driving apparatus of the present invention, portions of the shell-like hollow housing being broken away to show certain internal constructional details.

FIG. **2** is a sectional elevational view taken along line **2—2** of FIG. **1.**

FIG. **3** is a sectional plan view taken along line **3—3** of FIG. **2.**

FIG. **4** is a sectional plan view similar to FIG. **3** showing a more sophisticated radial steering mechanism portion for the apparatus.

Turning initially and briefly to FIG. **1**, which illustrates in perspective view apparatus embodiment "A" for simulating cross-country driving conditions. Apparatus "A" generally comprises: an upright hollow housing **10** including a forward part such as front-panel **12** and a rearward part **11** having a transversely extending light transmissive viewing opening **11A** therethrough whereby a rearwardly externally positioned operator might peer longitudinally forwardly through opening **11A** while also operating a radial steering means **61** for a miniature vehicle **40**; a transversely extending light-transmissive mirror **18** located within housing **10** and extending obliquely forwardly and downwardly with respect to opening **11A** whereby said mirror generally subdivides the housing internal spatial volume into two spatial chambers including a rear-space **18R** and a front-space **18F** extending along a vertical reference-axis "V"; a generally horizontally extending shelf member **20** located within front-space **18F** and supporting therealong the miniature vehicle **40** which is movable annularly about vertical-axis "V" as indicated by the double-headed curved arrow (solid line at **20**); a diorama **32–35** physically located within rear-space **18R** and optically superimposed by mirror **18** as in inverse mirror-image thereof to shelf **20** as a simulated environment; means (indicated by the single-headed curved arrow at the housing roof) for causing annular movement of vehicle **40** and controllable at the operator's station (at **56**); and means (indicated by the phantom line position of vehicle **40** at shelf **20**) for varying the radial distance of the vehicle from reference-axis "V" and relative to pronounced simulated environmental features, e.g. **34A**, **35A**.

Upright hollow housing **10** comprises a plurality of inter-connected rectangular panels **11–16**, such as horizontal roof-panel **15** overlying floor-panel **16**, a vertical left-panel **13** and a vertical right-panel **14**, and a vertical front-panel **12** herein providing the housing forward part. There is also an upright rearward part **11** for housing **10** herein comprising three rectangular panels including an upper-panel having a light transmissive viewing opening 11A therethrough and a scoreboard 11B and including an oblique dashboard 11D to which the column of steering wheel means 61 is rotatably secured. A plurality of legs 17, herein four in number, depend from the respective corners of floor-panel 16 to elevate the relatively stationary housing 10 above an underlying substrate, e.g. at 55. For reasons of optics, which will be described later, the several housing panels 11–16, with the exception of viewing opening 11A, are preferably visually opaque.

The miniature vehicle, e.g. 40, is located within and movably associated with the housing so as to be free to travel annularly about some reference-axis, such as vertical-axis "V". Annularly movable association with the housing 10 is herein provided by a cylindrically tubular sleeve 52 passing through roof-panel 15 along vertical-axis "V", sleeve 52 carrying a collar 52B to permit a rotatable relationship with roof-panel 15 about "V". Rotatable sleeve 52 carries a radially extending arm 54 co-revolvable therewith and vehicle 40 includes a vertically extending guide-rod 41 attached to arm 54 (herein through intervening elements 42 and 65). Thus, as sleeve 52 rotates (as indicated by the single-arrowed curved line at 15), vehicle 40 is caused to travel in an annular path about reference-axis "V" (as indicated by the double-arrowed curved line at 20). There are means for causing the annularly movable vehicle to travel at a finite annular velocity about the reference-axis, e.g. "V", said velocity commencing from substantially zero being controlled at the rearwardly remote operator's station, e.g. 56. Herein, the annular velocity is caused by an electric motor 51 attached to roof-panel 15, the motor revolvable sprocket 51A being connected with chain 53 to a sprocket 52A co-revolvable with tubular sleeve 52. The remote control means herein comprises a resiliently depressible foot pedal 56 pivotably attached at 55A to a horizontal floor-plate 55. Electrical energy is supplied to motor 51 from a remote source (not shown) via electrical-plug 57, one of the conductor wires 59 proceeding directly from 57 to a terminal of motor 51. Another conductor wire 57E proceeds from electrical-plug 57 to a conductive wiper blade 56E carried by foot pedal 56, blade 56E being adapted to ride along the length of sinuous resistor element 55R extending upwardly of floor-plate 55. Electrical lead 58 proceeds from the lower portion of resistor 55R to another terminal of variable speed motor 51. Thus, as foot pedal 56 is selectively increasingly depressed, the angular velocity of vehicle 40 about "V" is increased. If resistor 55R were replaced by a straight conductor, such as a lineal extension of uninsulated lead 58, the vehicle angular velocity would be substantially constant, i.e. non-variable.

The annularly movable vehicle seemingly travels through an environment which might include natural terrestrial features such as broadly extended fields having trees, rocks, rivers, etc., or artificial features such as barrells, flags, bridges, etc., or both. In the preferred situation, as exemplified by the FIGS. 1–3 embodiment, the simulated environment through which the miniature vehicle apparently travels is a superimposed inverse mirror-image (as by mirror 18) of a diorama located remote from the vehicle's permitted annular pathways. This optically superimposed diorama technique eliminates the problem of actual disabling collisions between the moving vehicle and severely pronounced enviromental features, such as lofty rocks,



barrels, etc. There are means for varying the radial distance of the miniature vehicle from the reference-axis (e.g. "V") thereby permitting the operator to maneuver the vehicle with respect to the simulated environment through which the annular vehicle seemingly travels. In the FIGS. 1–3 embodiment, the radial distance changing means comprises a bar 65 radially reciprocatably associated along the radially extending tubular arm 54 (members 42, 54, and 65 being of rectangular cross-sectional configuration), vertical member 42 being securely non-rotatably connected to bar 65. A push-pull sheathed cable structure 62 actuatably extends from a radially extending arm 61A of the rotatable steering column 61 to the radially movable bar 65 (herein via elements 63 and 64). For example, if the operator turns the steering wheel 61 leftwardly (the FIG. 1 counterclockwise direction), the miniature vehicle 40 radial distance from vertical-axis "V" is decreased as indicated in phantom line 40 in FIG. 1. Similarly, a rightward or clockwise turn of steering wheel 61 would increase the radial distance of the annularly movable vehicle from "V". Herein, sheathed cable 62 proceeds from its trailing end 62A (at arm 61A) forwardly beneath floor-panel 16, thence upwardly along front-panel 12, thence rearwardly above roof-panel 15, and the sheath portion leading end is secured to a bracket 66 which is secured to roof-panel 15. As best seen in FIGS. 1 and 2, there is a bell-crank 63 pivotably attached at 63D to a lug 52C which lug extends at a fixed downward angle from rotatable tubular sleeve 52. Cable 62 proceeds downwardly through bracket 66 and along vertical-axis "V" within sleeve 52 whereby the cable leading end 62B is attached to the bell-crank leg 63B. Cable 62 between bracket 66 and the upper end of rotatable sleeve 52 is provided with a swivel joint 62S to prevent twisting and kinking of cable 62. A generally horizontally extending auxiliary cable 64 extends from bell-crank leg 63A radially through sideward openings 52D of sleeve 52 and ultimately connected to bar 65. Thus, as indicated in phantom line in FIG. 2, a leftward turn of steering column 61 causes an upward movement of bell-crank leg 63B, which causes the cable 64 to pull the vehicle 40 (and intervening elements 65 and 41–42) radially inwardly toward vertical-axis "V". When this happens, there is a change in spatial relationship between the radially movable vehicle 40 and individual features e.g. 34A,35A, etc., of the environment through which the annularly moving vehicle seemingly travels.

A substantially rectangular broad planar mirror 18, of the so-called "two-ways" or light-transmissive type, is located linearly forwardly of viewing opening 11A so as to generally subdivide the housing internal space into two chambers including a front-space 18F (between front-panel 12 and mirror 18) and a rearspace 18R (between rear-panel 18R and mirror 18). Mirror 18 extends from left-to-right, herein attached along the juncture 18T of a horizontal shelf member 20 with vertical diorama plate 30, and mirror 18 is also oblique with respect to opening 11A and to the reference-axis e.g. "V". Herein oblique mirror 18 extends upwardly and rearwardly from the 18T juncture line at a 45° angle with respect to members 20 and 30. The annularly movable miniature vehicle 40 is positioned on one side of the two-ways mirror (herein within housing front-space chamber 18F) and the diorama e.g. 32–35, is positioned on the other side of the mirror (herein within rear-space chamber 18R).

The diorama, which is located within the second of the housing's internal spatial chambers, e.g.18R, is optically superimposed as an inverse mirror image thereof by said mirror thereby providing a visually apparent environment along the permitted annular paths of the miniature vehicle. The diorama might include natural terrestrial features, such as broad land or ice fields, isolated trees, rocks, field undulations, etc., or artificial features, such as bridges, barrels, markers, etc., or a combination of natural and artificial environmental features. The diorama is located at an elevation differing from that of the housing viewing opening e.g. 11A, and herein below 11A. The rearwardly remote operator peering linearly forwardly through viewing opening 11A toward oblique mirror 18 will see the diorama thereat which optically merges with the annularly movable vehicle. Thus, to the rearwardly remote operator, individual dioramic features e.g. simulated lofty barrels 34,35,etc., will appear to exist in the housing chamber 18F at inverse mirror-image locations thereof e.g. at 34A, 35A,etc. It might be noted parenthetically that to a hypothetical forwardly remotely positioned operator peering rearwardly into the FIG. 1 housing 10 (as through peep-hole 12P), the dioramic features 34(34A) and 35(35A) would not appear to exist in front-space 18F.

In the preferred situation the annularly movable vehicle is a rollable vehicle capable of riding-over moderately pronounced environmental features (such as gently undulating terrain, etc.), but which incapable of riding-over severely pronounced environmental features (such as large rocks, lofty barrels,etc.). In such preferred situation, and for purposes of providing interesting and realistic motions to the vehicle, the miniature vehicle throughout its permitted annular paths remains in rollable contact with a broadly extending shelf, the shelf's uneven or undulating riding surface depicting in inverse mirror-image locations the moderately pronounced dioramic features. However, the severally upwardly pronounced environmental features for the annularly movable vehicle, which would provide insurmountable obstacles to the vehicle, are excluded from actual physical existence at the shelf member and only exist at the diorama located in the other housing chamber. In this vein, the upper or vehicle riding surface of shelf member 20 might be of a moderately undulate (e.g. relatively low mounds 22 and 23) configuration so as to simulate the situation of a sports vehicle traveling over relatively rough undeveloped countryside. The herein horizontal shelf member 20 is located between roof-panel 15 and floor-panel 16 and in constant elevation below viewing opening 11A, said elevation herein being maintained by diorama plate 30 which extends vertically upwardly from floor-panel 16. Shelf 20 and plate 30 are herein of square shape and of substantially equal dimensional size. Shelf 20 has a geometric center (at vertical-axis "V") and plate 30 has a geometric center 31, said geometric centers 21 and 31 being spaced like distances from juncture 18T. The generally horizontal upper surface of shelf 20 is defined by a pair of mutually perpendicular horizontal coordinates 20$x$ and 20$y$(intersecting at 21 and "V"), and the generally vertical rearward side of plate 30 is defined by mutually perpendicular coordinates 30$x$(horizontal) and 30$y$(vertical) which intersect at 31. This, by virtue of mirror 18 along 18T and the perpendicular coordinates 30$y$ and 20$y$ at 18T, dioramic features (e.g. 32–35) are optically superimposed to the shelf upper riding surface, there being an inverse mirror-image relationship of each with respect to coordinates 20$y$ and 30$y$ and geometric centers 21 and 31. For example, the dioramic moderate undulations 32 and 33 are at inverse mirror-image locations with the shelf similarly pronounced undulations 22 and 23, respectively. There is preferably a vehicle stabilization means such as a flexible joint between guide-rod 41 and vehicle 40 to permit the vehicle to ride-over the moderately low mounts 22 and 23. In the FIG. 2 situation, there is a universal joint connection 47–49 comprising a pivot pin 47 extending longitudinally along vehicle 40 to connect the lower end of vertical guide-rod 41 to adapter 48, and a transverse pivot pin 49 connects adapter 48 to the body of four-wheels vehicle 40. Thus, vehicle 40 has two degrees of freedom with respect to guide-rod 41. If the miniature vehicle were of the two-wheels type, such as a motorcycle, then only one degree of freedom is appropriate and only the transverse pivot pin (49) would connect guide-rod 41 to the vehicle. Preferably, guide-rod 41 is vertically movable, and herein free to vertically slide within vertical rod 42(41 and 42 being of polygonal cross-sectional shape) as the vehicle rides-over a shelf undulation.

The actual riding surface contour of shelf 20 is devoid of those environmental features which are so severely pronounced that would impede the vehicle's annular path. For example, the barrel-like severely pronounced environmental features 34 and 35, which are herein loftier than vehicle 40, are physically present in the rear-space diorama only and do not physically exist in the front-space 18F. The severely pronounced dioramic features 34 and 35 are, however, optically superimposed by mirror 18 to seemingly appear as like-identifiable environmental features at inverse mirror-image locations (e.g.34A,35A) along shelf 20. Thus, a "collision" seen by the remotely rearward operator to apparently exist between the annularly moving vehicle and a severely pronounced environmental feature is only true in the optical sense (e.g. with 34A, 35A), no actual physical collision being possible.

The housing front-space 18F is provided with a suitable lumination source (e.g. ultraviolet light 29) and the vehicle located within the same housing chamber 18F is fluorescent to said light source. However, for the purposes of enhancing realism, the vehicle's guide-rod 41 and the shelf's entire upper riding surface (herein including mounds 22 and 23) are non-fluorescent to the light source of the same chamber. Those dioramic features, which are intended to appear as a seeming environment for the annularly moving vehicle, are fluorescent to a suitable lumination means (e.g. visible light 39) located in the dioramic chamber e.g. 18R. Other types of pronounced environmental features, such as lakes, rivers, bridges, markers, etc., might be carried by plate 30 and similarly optically superimposed to the vehicles permitted annular paths (e.g. along shelf 20), thereby providing a multitude of selected environmental scenes for the vehicle.

The apparatus desireably includes proximity sensing means to record at the operator's station the optically apparent proximity attained by the remotely maneuverable vehicle with respect to various of the identifiable environmental features e.g. 34(34A), 35(35A), etc. In this way, the operator's skill at maneuvering the annularly and radially moving vehicle can be recorded or otherwise indicated at a suitable scoreboard, such as 11B. Herein, the proximity sensing means preferably includes electrical contacts located in some fixed physical relationship to the individual identifiable environmental features apparently exhibited along the vehicles paths e.g. at shelf member 20. There are herein electrical contacts pairs 71–72 in overlying vertical registry with the apparent location of each identifiable environmental feature e.g. 34A, 35A, and there is a springy T-shaped electrically conductive wiper 43 carried at the upper end of bar 42 and remaining in vertical alignment with vehicle 40. Each of the electrical contacts pairs 71–72 is actuatably connected, as through wiring 73–74, to record at 11B the proximity between vehicle 40 and some specific environmental feature. For example, as indicated in FIGS. 1 and 2, assuming a scoring program wherein the operator is to avoid environmental feature 35 lest a penalty be recorded at 11B, then the operator would need to turn steering column 61 leftwardly to move the vehicle 40 radially to the phantom line position thereby keeping wiper 43 away from the contact pair 71–72 aligned in FIG. 2 with 35A. Preferably, the several contact pairs 71–72 extend only a short distance downwardly from a horizontal scoring-plate 70 which intersects vertical-axis "V" at 70A, thereby allowing the springy wiper 43 to ride continuously annularly along scoring-plate 70.

Thus, there has now been described an apparatus as embodiment "A" for simulating cross-country driving conditions wherein a remotely positioned operator can control the velocity and radial position of a miniature vehicle moving annularly through a spatial chamber, thereby permitting the operator to control the proximity of the vehicle with respect to pronounced environmental features apparently existing along the vehicle's permitted annular paths.

In the FIGS. 1–3 embodiment, the vehicle radius control means is of a relatively simple nature wherein the vehicle longitudinal axis (e.g. 47) remains at all times tangential to the annular path being circumscribed by the vehicle. Moreover, this simpler radius control means is operable even when the vehicle annular velocity is zero. However, the more sophisticated radius control means of FIG. 4 is intended to more closely duplicate the real-situation for operator-controlled sports vehicles wherein radius control can be effected only when there is a finite vehicle speed and the operator initiates a momentary non-tangential position of the vehicle longitudinal axis with respect to the previously existing annular pathway.

In FIG. 4 there is an elongate leading-arm 91 fixedly attached to the lower end of revolvable tubular sleeve 52F, whereby leading-arm 91 is directly co-revolvable with sleeve 52F and remains radially extending from vertical-axis "V". An elongate trailing-arm 92 is pivotably attached to leading-arm 91 with pivot-pin 93D, a bell-crank 93 being also pivotably attached to 93D. There is another bell-crank 63F pivotably attached at 63DF to the underside of leading-arm 91 whereby the two legs 63AF and 63BF extend downwardly of 63DF. A springy cable 62F proceeds downwardly along vertical-axis "V" through hole 91V of 91 and the lower leading end 62BF of cable 62F is revolvably attached to bell-crank leg 63BF. The respective two ends of elongate linking-rod 89 are revolvably secured to the respective bell-crank legs 63AF and 93A. The vertical guide-rod 42F from vehicle 40 is revolvably secured to trailing-arm 92 remote of 93D, and guide-rod 42F includes an integrally connected ear 42FA located above trailing-arm 92. There is another elongate linking-rod 94 located above trailing-arm 92, the two ends of 94 being revolvably secured to the bell-crank leg 93B and ear 42FA, respectively. Thus, assuming that the tubular sleeve 52F and the miniature vehicle 40 are traveling annularly about "V", such as in the tri-arrowed clockwise direction of FIG. 4. Accordingly, when cable 62F is moved along "V" (as initiated upwardly by 61A), then bell-crank leg 63AF pulls linking-rod 89 toward "V", and bell-crank 93 through elements 94 and 42FA causes guide-rod 42F and vehicle 40 to pivot in 92 (in the FIG. 4 counterclockwise direction) whereby the vehicle longitudinal axis (47) is made abruptly non-tangential to the prior existing double-arrowed annular path of vehicle 40. Then, vehicle 40 riding along shelf 20 causes trailing-arm 92 to pivot with respect to leading-arm 91 until the longitudinal axis (47) of the radially displaced vehicle (40) once more becomes tangential to the vehicles new-radius annular path.

Also in the FIG. 4 embodiment, the T-shaped wiper 43F is not vertically aligned with the vehicle, but there is a proportional arrangement relationship between wiper 43F and the vehicle. Specifically, wiper 43F is mounted at one end of an elongate linking-rod 95 that is slidably disposed along an ear 91A of leading-arm 91, the second end of 95 being pivotably secured to an ear 92A of trailing-arm 92. The several paired contacts 71–72 when contacted by wiper 43F are programmed through the scoring 11B to give penalty while the similarly paired contacts 81–82 might give a merit score if contacted by 43F. It can be seen that wiper 43F's contacts 71–72 and 81–82 can be arranged along the scoring-plate 70 appropriate to the dioramic environmental features. For example, the ten aligned contacts might simulate a bridge goal 81–82 over a dangerous creek (several consecutive 71–72 pairs).

From the foregoing, the construction and operation of the apparatus for simulating cross-country driving conditions will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

I claim:

1. Apparatus for simulating driving conditions of a self-propelled vehicle traveling in cross-country fashion in annular paths of selectable radii, said apparatus comprising:

A. An upright hollow housing as a frame for the apparatus and including a rearward part with a light transmissive opening therethrough whereby an operator positioned immediately rearwardly of the housing at an operator's station might have a forwardly extending view into the housing interior;

B. A transversely broad mirror of the light transmissive type attached to the housing and located therewithin lineally forwardly of the housing viewing opening, said mirror generally sub-dividing the housing internal spatial volume into two spatial chambers including a rear-space and a front-space located on opposite sides of said mirror, a first selected of said housing chambers extending along a reference-axis;

C. A miniature vehicle located within said first of the two housing chambers and movably associated with the housing so as to be free to travel annularly about said reference-axis;

D. a diorama located within the second of said housing chambers and being optically superimposed by said mirror as an inverse mirror-image thereof to the first housing chamber to provide a visually apparent environment along the permitted annular paths of the miniature vehicle;

E. Velocity control means accessible from the said rearwardly positioned operator's station for causing the annularly movable vehicle to travel at a finite angular velocity about said reference-axis; and

F. Radial distance control means accessible from said operator's station for varying the radial distance of the miniature vehicle from said reference-axis thereby permitting the operator to maneuver the vehicle with respect to the environment provided by the optically superimposed diorama.

2. The apparatus of claim 1 comprising a shelf member having a broadly extending riding surface located within the housing first chamber and intersecting said reference-axis whereby the optically superimposed diorama extends along the shelf member broadly extending riding surface and wherein the miniature vehicle is a rollable vehicle capable of riding along the broadly extending surface.

3. The apparatus of claim 2 wherein the shelf member broad riding surface includes moderately pronounced undulations capable of being ridden-over by the rollable vehicle and corresponding in inverse mirror-image location to moderately pronounced features of the diorama, said vehicle including stabilization means to permit the vehicle to stably ride-over the shelf undulate contour.

4. The apparatus of claim 3 wherein the shelf member extends generally horizontally and is located within the housing front-space chamber so as to intersect a vertical reference-axis and whereby the miniature vehicle is adapted to travel annularly about the said vertical-axis; and wherein the diorama is located within the housing rear-space chamber in elevation below the housing viewing opening and optically superimposed by the mirror at the front-space shelf and viewable thereat by an operator peering forwardly toward said mirror, said diorama including severely pronounced features which optically extend upwardly from the shelf member higher than the undulations thereof.

5. The apparatus of claim 4 wherein there is a light source located within the housing front-space, the miniature vehicle being fluorescent to the front-space light source and the shelf member riding surface being relatively non-fluorescent to said front-space light source; and wherein there is a light source located within the housing rear-space, the diorama features being fluorescent to the rear-space light source.

6. The apparatus of claim 5 wherein there is an ultraviolet light source within the housing front-space, the miniature vehicle being fluorescent and the shelf riding surface being relatively non-fluorescent to the ultraviolet light spectrum; and wherein there is a visible spectrum light source within the housing rear-space, the diorama features being fluorescent to the visible light spectrum.

7. The apparatus of claim 6 wherein the velocity control means is capable of varying the annular speed of the miniature vehicle through a selectable range of velocities; and wherein there are proximity sensing means to record at the operator's station proximal conditions between the annularly movable vehicle and environmental features of the optically superimposed diorama.

8. The apparatus of claim 7 wherein the radial distance control means includes a rotatable steering column at the operator's station, said radial distance control means being functionable only when the miniature vehicle is traveling annularly at a finite velocity along the shelf member and the vehicle radial distance change depending upon the degree of the prior rotation of the steering column by the operator.

9. The apparatus of claim 8 wherein the annularly movable relationship between the miniature vehicle and the housing includes a tubular sleeve extending along the said vertical reference-axis and rotatably secured to the housing, said tubular sleeve carrying a radially extending leading-arm directly co-revolvable therewith; and wherein the radial distance control means also includes a substantially horizontal elongate trailing-arm located above the miniature vehicle and pivotably associated with the leading-arm radially remote of said tubular sleeve, the underlying vehicle including an uprightly extending guide-rod rotatably secured to the trailing-arm, the degree of rotation of the guide-rod being initiatable at said steering column.

10. The apparatus of claim 2 wherein the shelf member broad riding surface is capable of being ridden-over by the miniature vehicle; and wherein the diorama includes severely pronounced features which optically extend upwardly from the shelf riding surface higher than said vehicle's rollable capability.

11. The apparatus of claim 10 wherein the shelf member extends generally horizontally and is located within the housing front-space chamber so as to intersect a vertical reference-axis and whereby the miniature vehicle is adapted to travel annularly about the said vertical-axis; wherein the diorama is located within the housing rear-space chamber of different elevation than the housing viewing opening and optically superimposed by the mirror so as to appear to exist at the front-space shelf; wherein there is a light source located within the housing front-space, the miniature vehicle being fluorescent and the shelf riding surface being relatively non-fluorescent to the front-space light source; and wherein there is a light source located in the housing rear-space, the diorama features being fluorescent to the rear-space light source.

12. The apparatus of claim 1 wherein the velocity control means is capable of varying the angular velocity of the miniature vehicle through a selectable range of velocities; and wherein there are proximity sensing means to record at the operator's station proximal conditions between the annularly moving vehicle and recognizeable individual features of the optically superimposed diorama.

13. The apparatus of claim 12 wherein the radial distance control means includes a rotatable steering column at the operator's station, said radial distance control means being functionable only when a rollable miniature vehicle is traveling annularly at a finite velocity along a shelf member and the vehicle radial distance

change depending upon the degree of prior rotation of the steering column.

14. Apparatus for simulating driving conditions of a self-propelled vehicle traveling in annular paths of selectable radii over an obstacle course, said apparatus comprising:

A. An upright hollow housing as a frame for the apparatus and extending along a vertical-axis and including an upright rearward part with a light transmissive opening therethrough whereby a remote operator positioned immediately rearwardly of the housing at an operator's station might have a view into the housing interior;

B. A simulated dioramic environment located within the housing, said environment including pronounced individually recognizeable features which are viewable by an operator peering forwardly through the housing rearward opening;

C. A miniature vehicle located within and movably associated with the housing so as to travel annularly about the housing vertical-axis and;

D. Means to cause said simulated dioramic environment to appear to surround the said vertical — axis whereby said miniature vehicle will appear to travel through said simulated dioramic environment;

E. Velocity control means accessible from the said rearwardly remotely positioned operator's station for causing the miniature vehicle to travel at a finite velocity annularly about the housing vertical-axis;

F. Control means accessible from the said operator's station for varying the radial distance of the miniature vehicle from the housing vertical-axis while the vehicle remains at substantially constant elevation thereby permitting the operator to maneuver the annularly moving vehicle with respect to the simulated dioramic environment; and

G. Proximity sensing means to record at the operator's station the proximity apparently existing between the annularly moving vehicle with individually recognizeable features of said simulated environment.

15. The apparatus of claim 14 wherein the remotely positioned velocity control means is capable of selectively continuously varying the speed of the annularly movable miniature vehicle about said vertical-axis.

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