US 20030140815A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2003/0140815 A1

Norbury (43) Pub. Date: Jul. 31, 2003

(54) REAL-SIZE SIMULATED DRAG STRIP RIDE

(76) Inventor: **Steven A. Norbury**, St. Jacob, IL (US)

Correspondence Address:
DON W. WEBER
101 WEST VANDALIA
SUITE 325M
EDWARDSVILLE, IL 62025 (US)

(21) Appl. No.: **10/058,094**

(22) Filed: **Jan. 29, 2002**

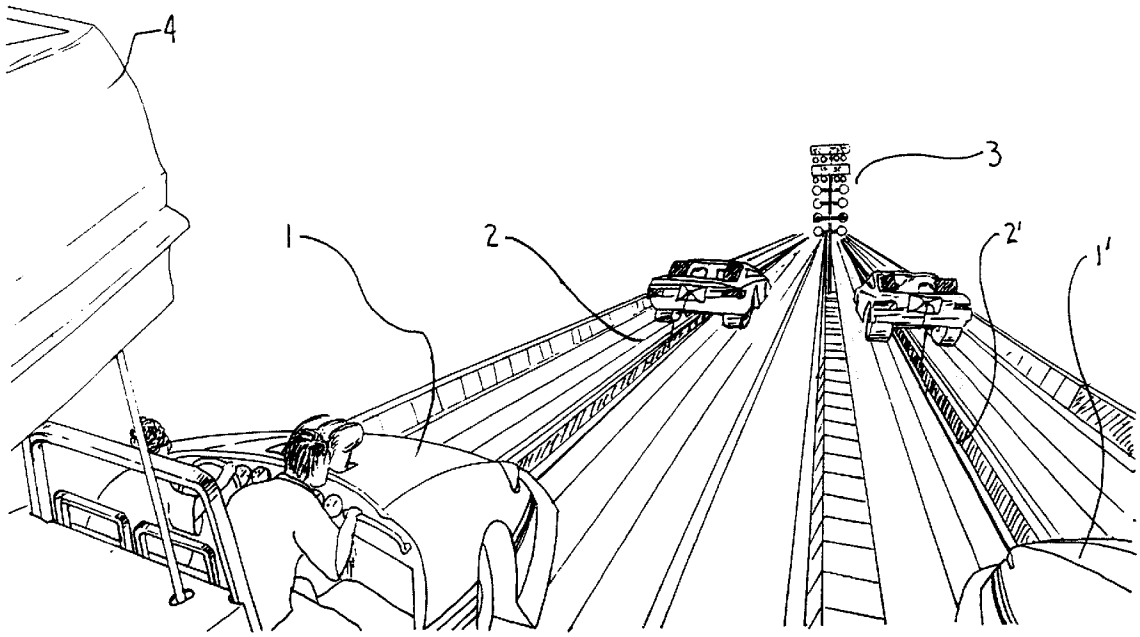
Publication Classification

(51) **Int. Cl.**[7] **A63G 1/00**

(52) **U.S. Cl.** **104/53**

(57) **ABSTRACT**

A real-size simulated drag strip ride is presented which recreates the physical and visual sensations of a drag race. A real-size dragster is located along a specified and controlled linear track. The rider is positioned inside the driver's compartment, with a specially adjustable safety helmet and full safety harness securing him in place in an adjustable seat. Once the simulated light tower signals that the dragster is set to race, each driver of two, side-by-side vehicles, may push the acceleration pedal to accelerate the vehicle through an initial acceleration zone. The dragsters are propelled by use of a linear induction motor and fin located out of sight underneath the vehicle. The race is finished when the cars pass the finish line. Speeds and the winner are displayed on the starting line tower. The cars are then returned to the loading and unloading area for the next riders.



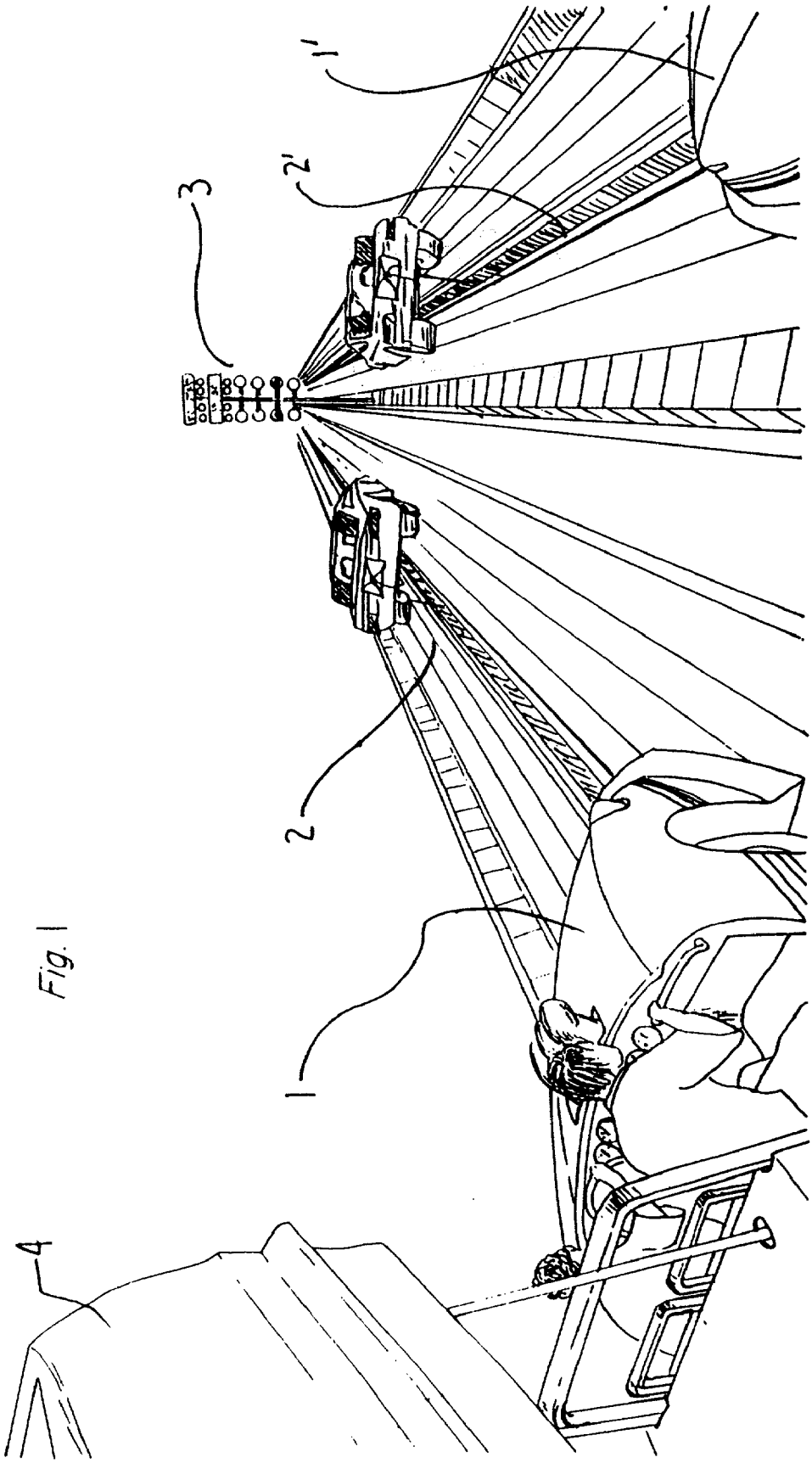


Fig. 1

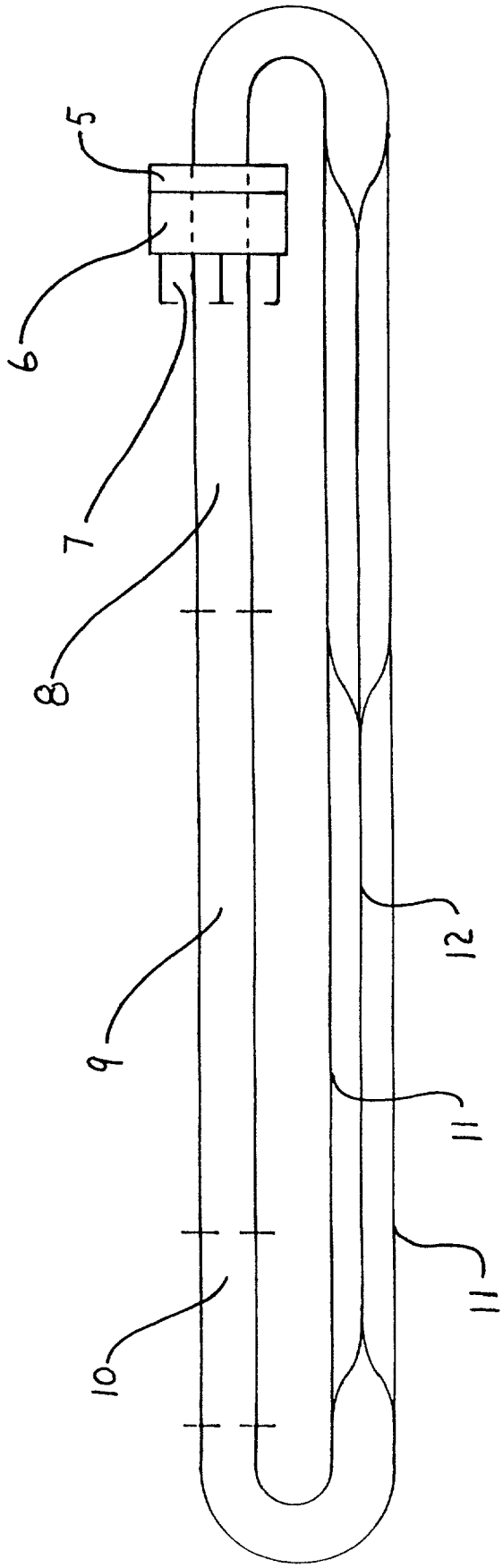


Fig. 2

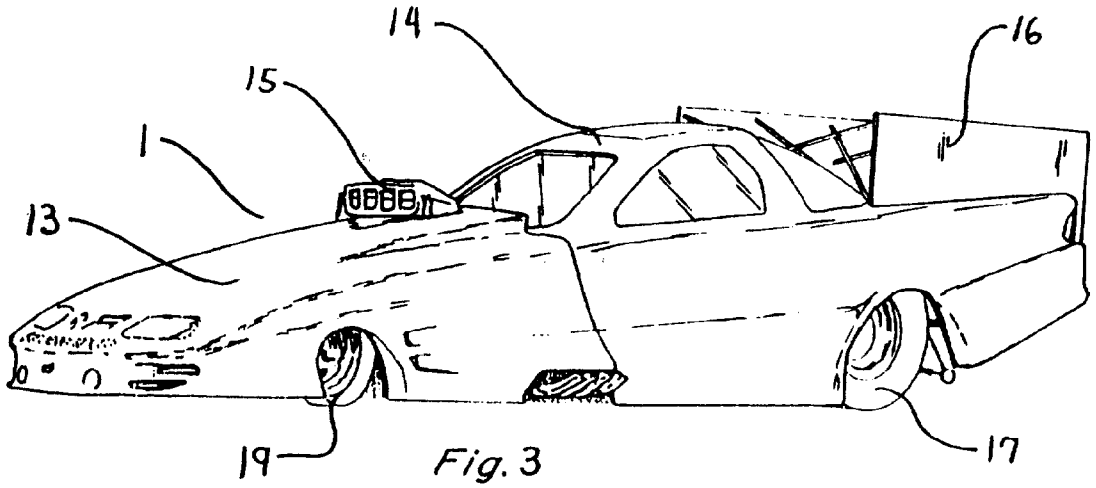


Fig. 3

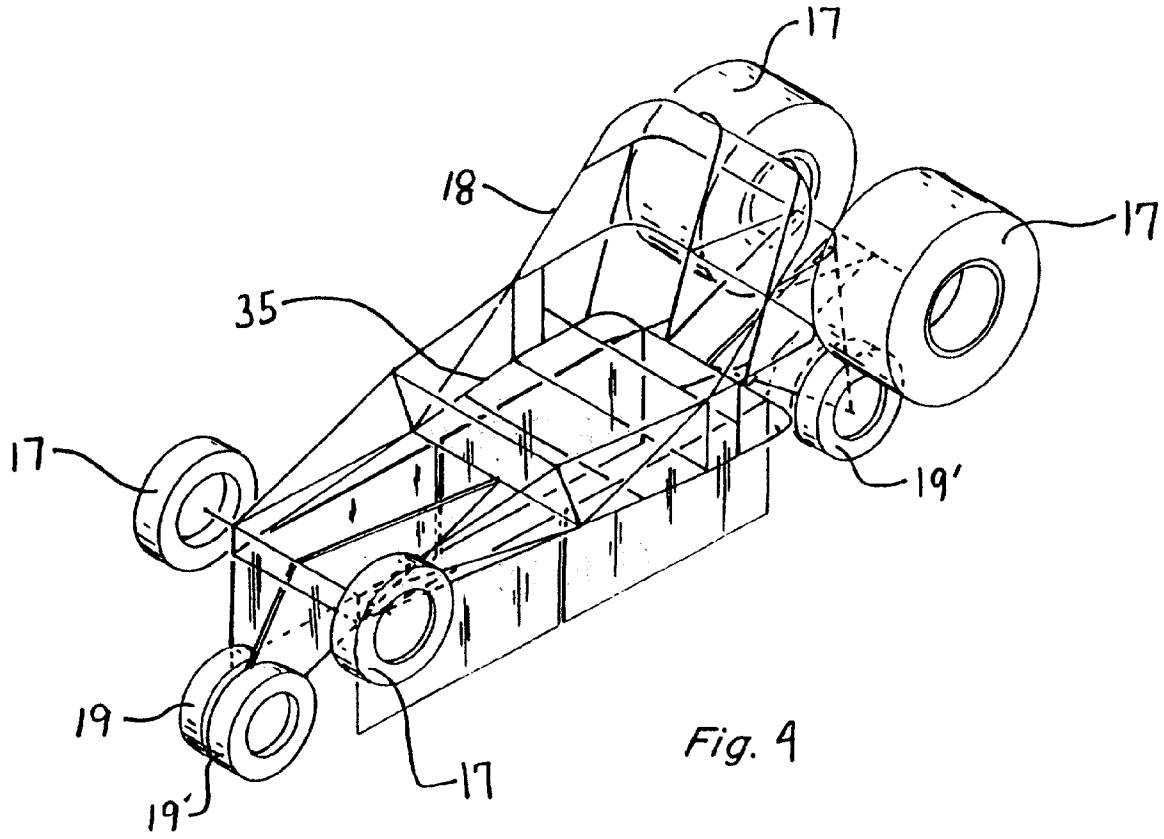
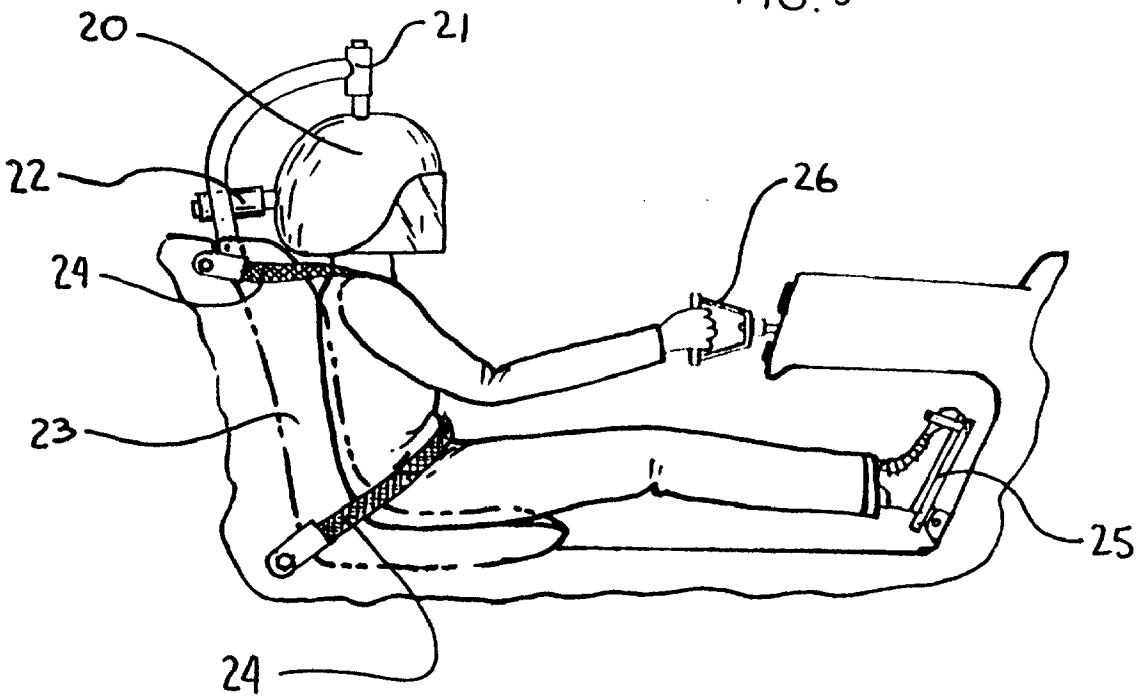


Fig. 4

FIG. 5



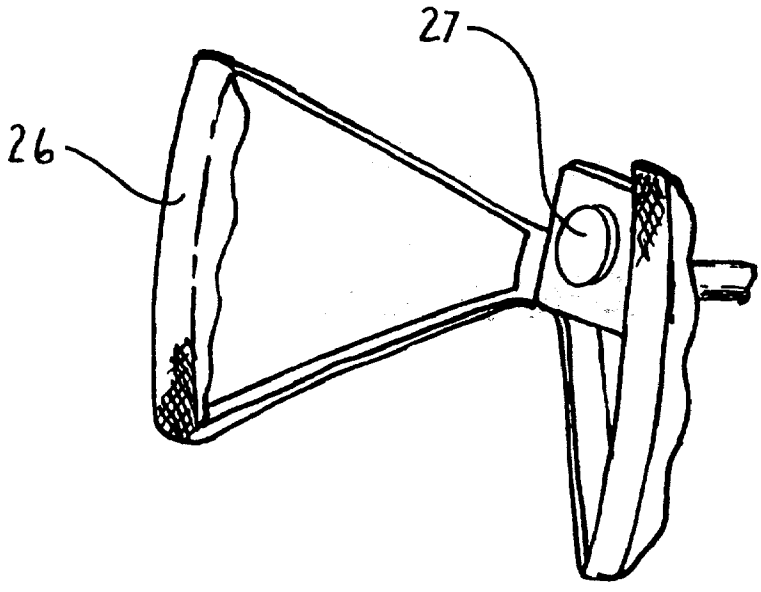


FIG. 6

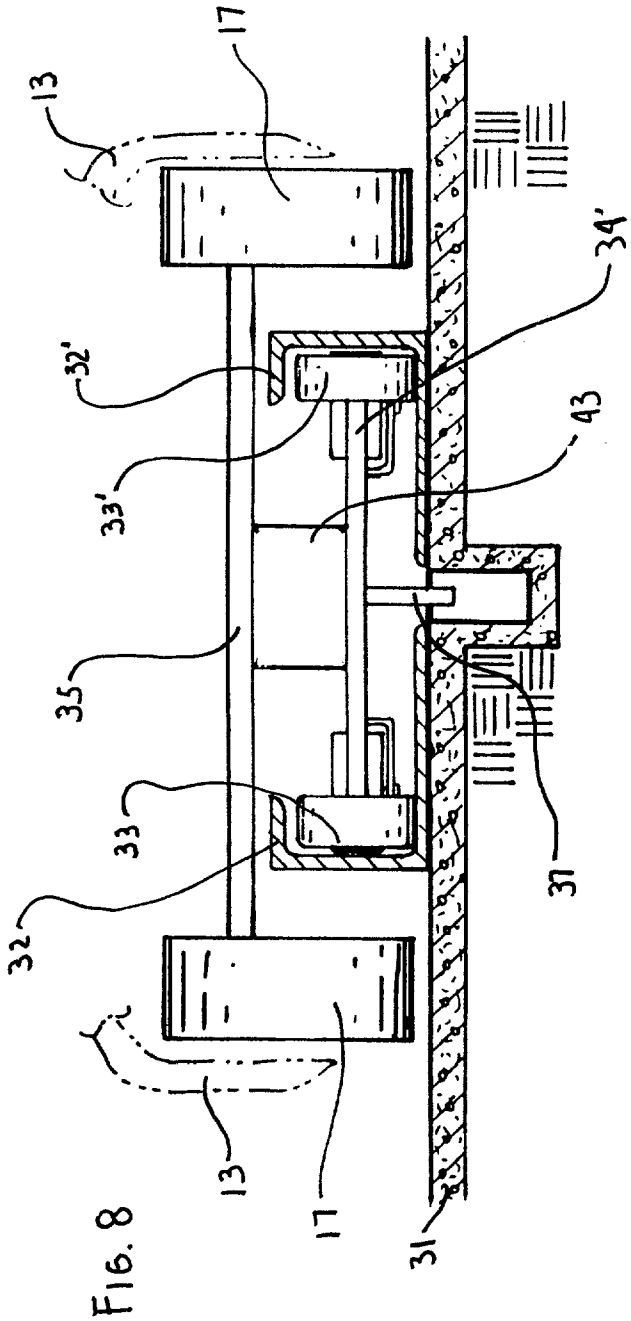


FIG. 8

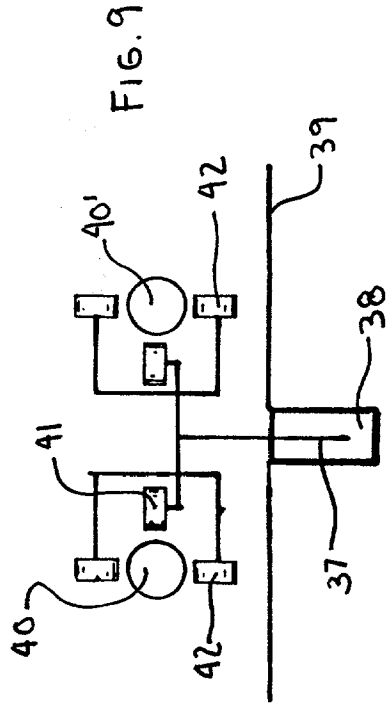


FIG. 9

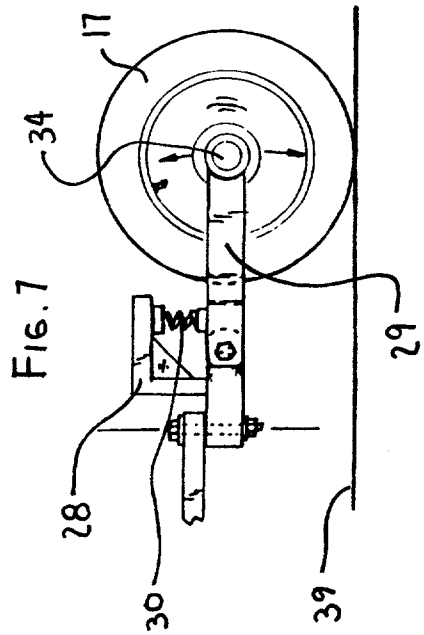
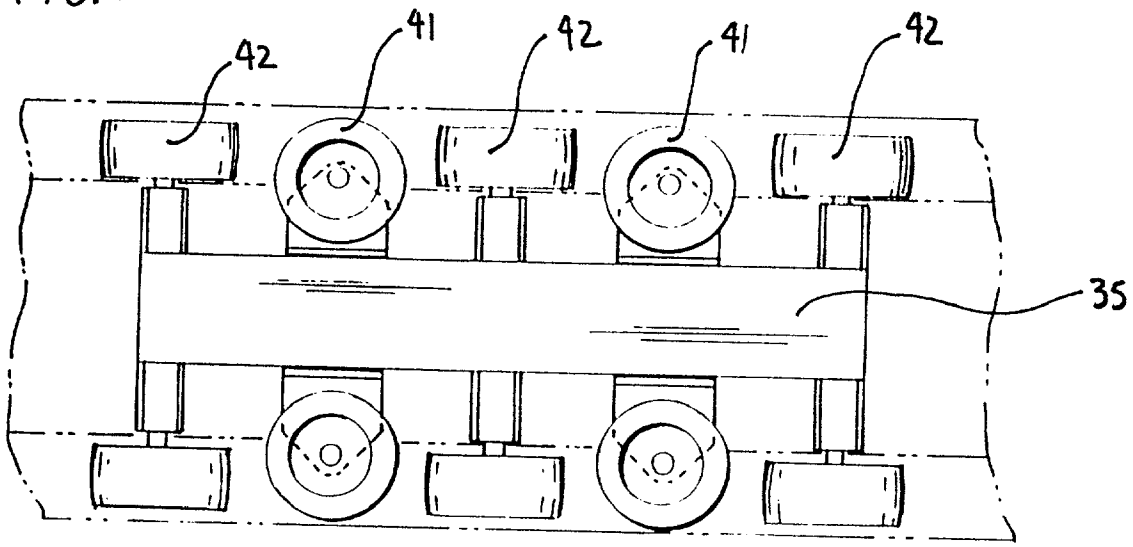


FIG. 7

FIG. 10



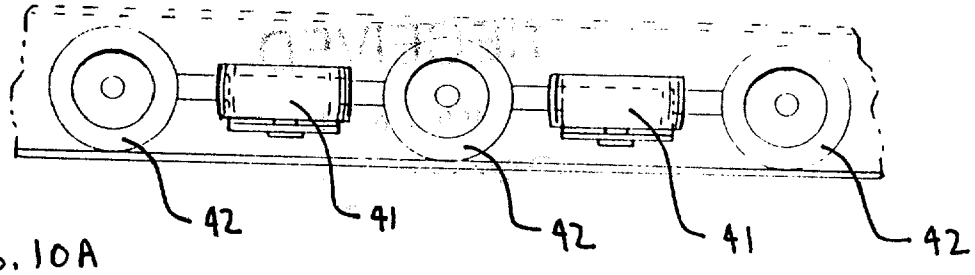
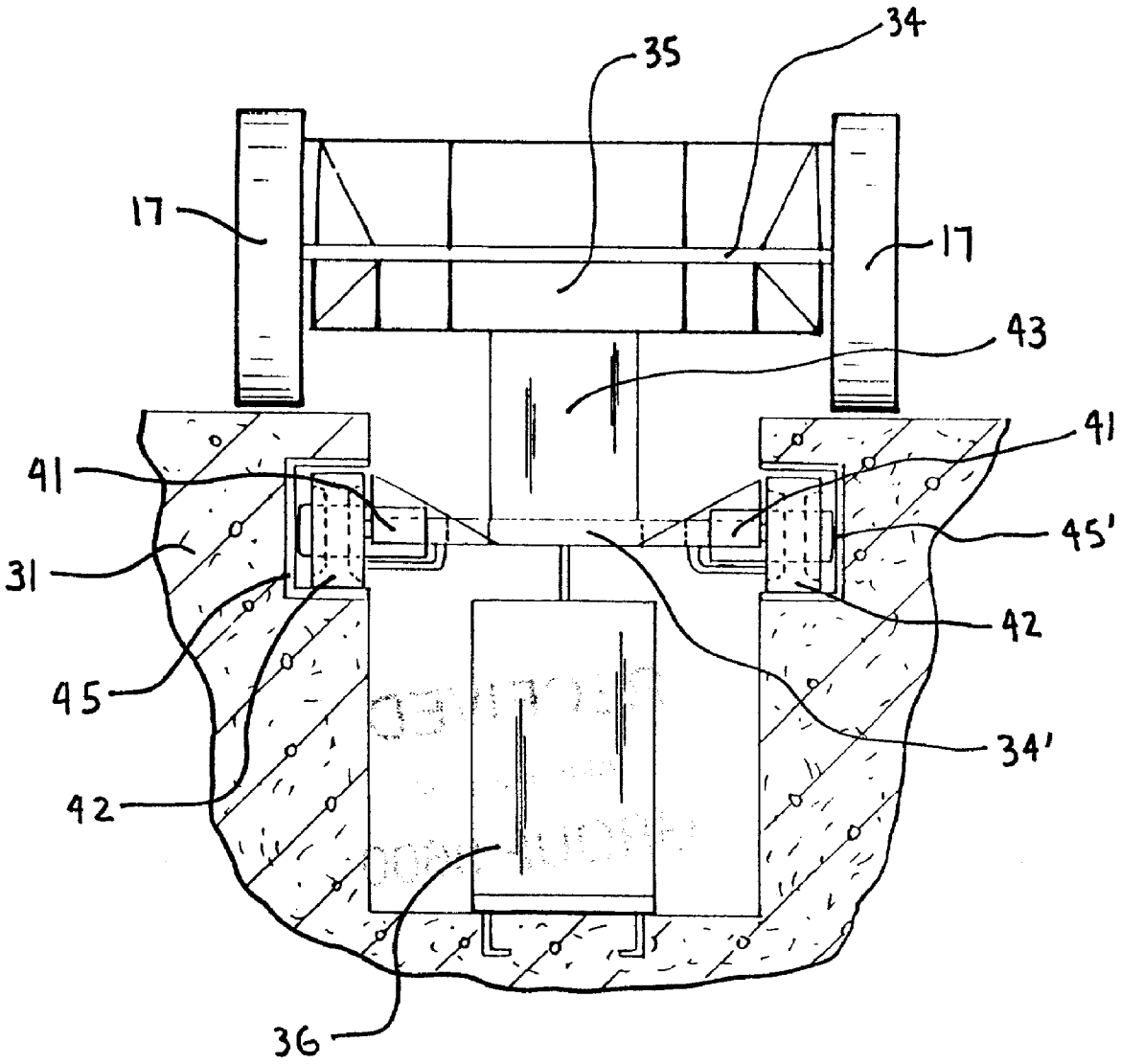


FIG. 10A

FIG. 11



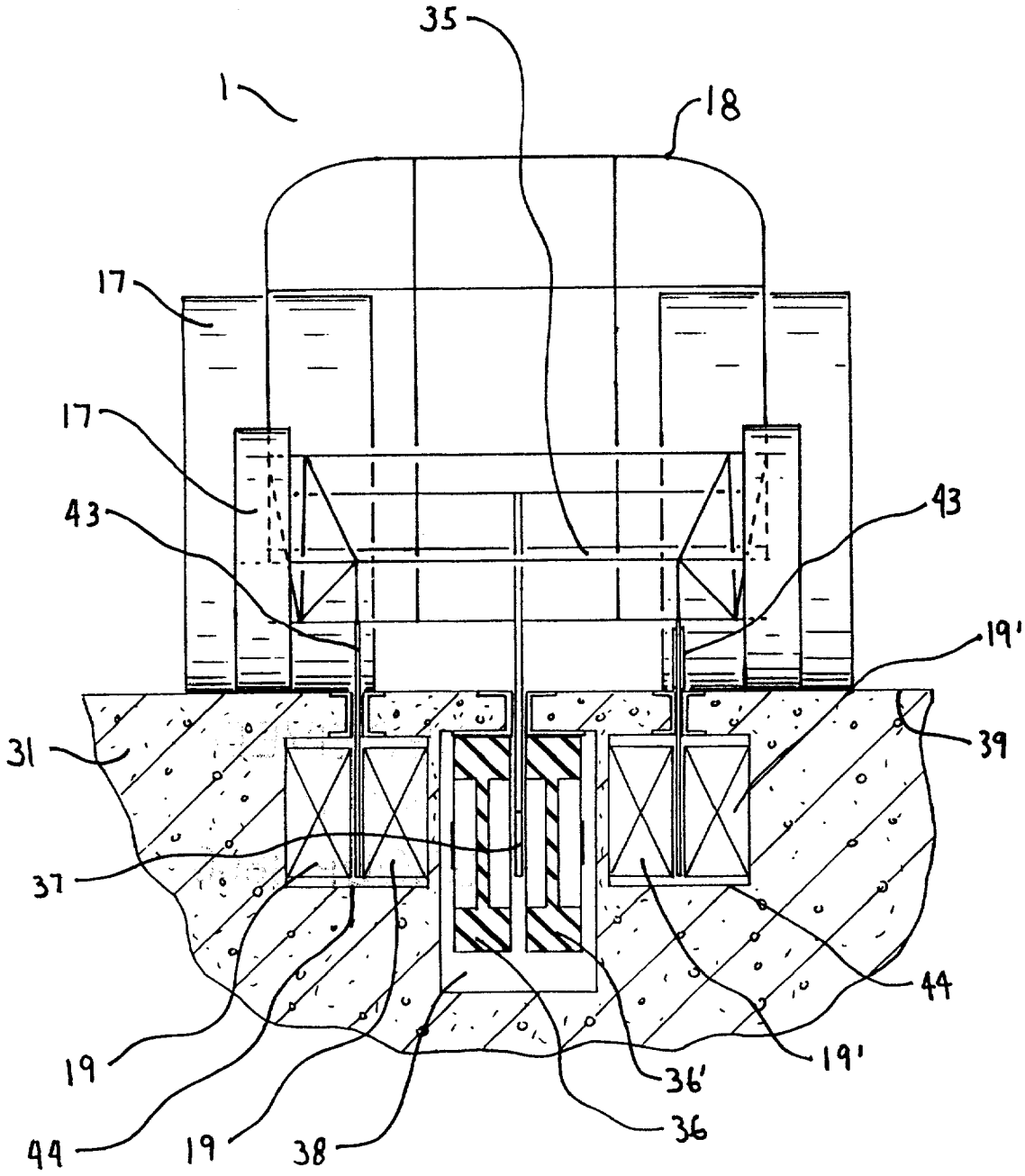


FIG. 12

REAL-SIZE SIMULATED DRAG STRIP RIDE

BACKGROUND OF THE INVENTION

[0001] This invention relates to the field of amusement rides. More particularly, a real-size simulated dragstrip ride is presented which is similar to the actual experiences one might encounter during a drag race.

[0002] Amusement rides are often simulations of much more dangerous real life rides or adventures. Many examples of these real life amusement rides have been created at large and small amusement parks across the United States and the world. Some examples include roller coaster rides, bumper car rides, and go-cart rides. These rides often attempt to simulate the actual, true-life experience and create many of the same visual and physical sensations associated with those real life rides.

[0003] One type of real life race in which the average person is not allowed to participate directly due to the dangers involved is the drag race. A drag race comprises two highly powered cars located side-by-side on parallel tracks. When a signal tower is illuminated at the opposite end of the track, both drivers of the dragsters accelerate their cars in order to reach the finish line first. The signal tower at the finish line will allow spectators to see the actual winner as well as to see the times that have been posted. These dragster automobiles have high-powered gasoline engines and often accelerate to speeds in excess of 175 miles per hour. This acceleration causes G-forces to be exerted on the driver and any passengers in the dragster. In addition, the noise and exhaust of the dragsters contribute to the real life sensation of the race.

[0004] It is an object of this invention to create a real-size simulated dragstrip race that reproduces the physical and visual sensations of an actual race. Accordingly, it is an object of this invention to simulate acceleration that will apply G-forces to the passenger and driver of the dragster. It is a further object of this invention to create both the sights and sounds of the drag race and to simulate the visual appearance of the dragster, racecourse and finish line.

[0005] Many amusement rides involve high velocity, dangerous curves and other safety hazards. However, since these rides are designed for laymen, rather than professional riders, safety enhancements and special features of any such ride must be included in the basic design package of any amusement ride. It is a further object of this invention to provide various safety devices, such as helmets, harnesses, brake systems and other safety features to enable a driver and passenger to simulate a real dragstrip race while still being completely safe.

[0006] Due to the new and unique nature of this particular simulated drag strip race, many innovations and special design features have been incorporated into the below described Specification in order to closely simulate a real life dragster race and to make it safe and exciting to use.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

[0007] This particular ride is designed to recreate a dragster race such as to simulate the actual dragster experience. The dragster vehicle is designed to look like the well-known funny car, dragster or other racecar. The simulated dragster will have the same appearance of a regular dragster, and will have the same size and body construction as a real vehicle. The dragstrip ride consists of at least two vehicles on separate, side-by-side tracks, with a parallel straight track of about 1,500 feet. A sophisticated, highly redundant control system utilizes multiple locks to keep vehicles separated during the ride. The vehicles appear to ride on upper, simulated wheels. However, the vehicle actually rides on lower actual wheels. The vehicles in the preferred embodiment are powered by a linear induction motor and can achieve speeds of up to 125 miles per hour, creating approximately 3.5 to 4.5 Gs of force on the driver and passenger of the dragster. The racecourse is laid out like a real dragstrip, having a light tower at the finish line. The dragster itself is started and accelerated by the driver. For safety reasons, individual adjustable seats, safety helmets and harnesses are provided.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0008] **FIG. 1** is a perspective view of the drag race showing the side-by-side parallel tracks and the light tower and start line.

[0009] **FIG. 2** is a plan view of the drag race strip and return track.

[0010] **FIG. 3** is a perspective view of the simulated dragster body.

[0011] **FIG. 4** is a perspective view of one embodiment of the dragster frame, including the simulated and actual wheels and the lower frame portions of the dragster.

[0012] **FIG. 5** is a side cutaway view of the driver compartment of the dragster.

[0013] **FIG. 6** is a side view of the steering wheel and shift button.

[0014] **FIG. 7** is a partial side view of the simulated wheel.

[0015] **FIG. 8** is a front cutaway view of another embodiment of the above ground embodiment of the dragster raceway.

[0016] **FIG. 9** is a schematic view of a rail and caster track embodiment of the invention.

[0017] **FIG. 10** is a cutaway plan view of the horizontal and vertical caster arrangement of one embodiment of the invention.

[0018] **FIG. 10*a*** is a side view of the horizontal and vertical caster arrangement of one embodiment of the invention.

[0019] **FIG. 11** is a front cutaway view of the track showing one below ground embodiment of the invention.

[0020] **FIG. 12** is a front cutaway view of another below ground embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] A real-size, simulated dragster race includes an essentially oval raceway with two side-by-side parallel acceleration strips as best shown in **FIGS. 1 and 2**. Left **1** and right **1'** simulated dragsters are located on left **2** and right

2' parallel tracks. The race runs for approximately ⅛ of a mile from start to finish. At the starting line is a signal tower **3**. This starting line signal tower has a number of lights such as are usually found in a real life drag race. The lights include a set of green lights to signal "go", a set of red lights to signal "finish" and an electronic readout to signify the winner and the speeds at which each simulated dragster proceeded down the track. Different light systems can be used in practicing this invention.

[**0022**] Each dragster has an upper, pivotable top **4**. This pivotable top **4** moves upwardly (as shown in **FIG. 1**) to allow passengers to enter the vehicle. The dragster top **4** is then closed (as shown in **FIG. 3**) for the duration of the ride.

[**0023**] The entire simulated dragstrip ride consists of an essentially oval course as best shown in **FIG. 2**. The main part of the oval course includes an unloading area **5**, an instructional area **6** and a loading area **7**. These particular areas are used to unload passengers, to instruct passengers on the proper operation of the ride and an area in which passengers may be loaded.

[**0024**] After the passengers are loaded in area **7**, the ride is commenced. One passenger in each vehicle is allowed to control the take off of the dragster. The take off is commenced by the traditional signal tower lights at the starting line of the track. Acceleration starts with a push of the accelerator pedal by the driver of the simulated dragster. Simulated shifting is accomplished by a push button also operated by the driver.

[**0025**] The dragster is accelerated for approximately 185 feet in an acceleration area **8**. Each dragster may accelerate to approximately 125 miles per hour, during which each driver and passenger would experience a force reaching approximately 3.5 to 4.5 Gs. Once each dragster has accelerated through the acceleration area **8**, the dragsters enter a coasting area **9** (approximately 260 feet) and a braking area **10** (approximately 260 feet). In the braking area, the dragster is automatically braked through means to be described later. The total length of the drag race from the loading area to the finish line is approximately ⅛ of a mile.

[**0026**] When the ride is finished, each simulated dragster slowly moves through the curved area and back onto the return tracks **11**. A middle maintenance track **12** is also provided for maintenance of the vehicle if desired. Once the dragsters return to the unloading area **5**, passengers are unloaded and the ride is completed.

[**0027**] In order to closely simulate a real life drag race, dragsters or "funny car" designs are adopted. One such design is best shown in **FIG. 3**. It is to be noted that the dragsters themselves may take on any design desirable, from drag race type cars to stock cars, to Indy cars. A typical dragster design would include a front, upper body **13** and a rear body **14**. The rear body **14** may be raised in order for riders to enter the car at the loading area **7**. However, when the car is in motion, the rear **14** of the body is in its closed and secured position as best shown in **FIG. 3**. To simulate an actual dragster, a cowl **15** and a spoiler **16** may also be incorporated into the outer appearance of the dragster. The simulated portion of the dragster is completed with the addition of simulated track wheels **17**, as shown in **FIGS. 3 and 4**. These simulated track wheels actually contact the track and may visually be observed by the driver and spectators of the simulated drag race.

[**0028**] The front **13** and rear **14** portions of the outer body of one embodiment of the dragster are supported by frame supports **18**, as best shown in **FIG. 4**. These frame supports **18** are preferably made of a strong yet lightweight metal. The dragster body itself may be made of fiberglass using a biaxial cloth with a modified vinyl ester resin. This fiberglass body and frame insures a lightweight dragster with superior strength.

[**0029**] Although the observer is able to see only the simulated track wheels **17**, the vehicle actually rides on actual rubber or metal wheels **19** and **19'** (**FIGS. 4 and 12**) or casters **33** and **33'** (FIGS. **8-11**). In the preferred embodiment, a set of front wheels **19** and **19'** and a set of rear wheels support the weight of the dragster as it moves down the track.

[**0030**] As shown in **FIG. 5, a** number of unique safety features are incorporated into this particular ride in order to insure the safety of the driver and passenger of the simulated dragstrip race. These safety features include an adjustable helmet **20**. This adjustable helmet has a vertical adjustment member **21** and a horizontal adjustment member **22**. These adjustment members allow the attendant of the ride to adjust the helmet of the driver or passenger of the dragster according to his or her particular size. In addition, an adjustable seat **23** moves upward and forward, depending on the size of the driver or passenger. Finally, a safety seat harness **24** is provided for both the driver and the passenger of this dragstrip ride. In normal amusement rides, a simple padded bar around the rider's waist would be utilized to keep the passenger in the ride. However, due to the special considerations in constructing a simulated dragstrip race, a safety harness is incorporated into the overall design of the device.

[**0031**] The race begins when the starting line signal tower flashes green for "go". At that point, each of the two side-by-side dragster drivers will push the acceleration pedal **25**. In real life this acceleration pedal feeds gasoline to the carburetor or fuel injectors of the engine. In this simulated ride, the acceleration pedal gives a signal to the linear induction motor, or other drive means to begin the race. A brake pedal (not shown on the drawing figures) is also provided to brake the vehicle should such a procedure be necessary.

[**0032**] The dash panel of the vehicle also includes a steering wheel **26**. Although the steering wheel is included for purposes of making the ride realistic, the vehicle actually rides on a straight and clearly defined track. While no steering of the vehicle is actually necessary or desirable, the presence of the steering wheel is used to enhance the realism of the device. However, a shift button **27** is present on the instrument panel, as best shown in **FIG. 6**. This shift button simulates the actual shifting done in a dragster in real life. Using the linear induction motor means of accelerating the vehicle, simulating shifting can be readily incorporated as a feature of this ride. Such a simulated shifting is described later.

[**0033**] As previously noted, the dragster itself rides on actual wheels **19** and **19'**, which are hidden from the view of the spectators or riders of the vehicle. However, in order to provide a realistic depiction of the actual ride, simulated wheels **17** are provide on the front and rear of the vehicle. These simulated wheels **17** are held in contact with the upper track surface **39** by means of a wheel strut bracket **28** and a

wheel strut spring **30**. This bracket and spring bias the simulated wheel strut **29** downwardly towards the track surface **39**, as best shown in **FIG. 7**. Each left and right front and rear simulated wheel **17** has such a spring mechanism.

[**0034**] Turning now to the linear track design, **FIGS. 8 and 9** show two such above track embodiments.

[**0035**] **FIG. 8** shows the basic concrete track **31**. This concrete track **31** is normally comprised of concrete reinforced with approximately ½ inch rebar, as shown. Inside the simulated wheels **17** and underneath the dragster frame lower base **35** are side-by-side steel channel guide systems. These guide systems include a left channel **32** and a right channel **32'**. These channels are generally C-shaped as shown, and face each other as illustrated in **FIG. 8**. The dragster frame lower base **35** is connected to an actual axle **34'** by a dragster lower base frame-actual wheel connection column **43**. The lower base frame **35** thus rides on the actual axle **34'**.

[**0036**] The actual axle **34'** is connected to a series of casters, as best shown in **FIGS. 8, 9, 10** and **10***a*. A left actual caster wheel **33** and a right actual caster wheel **33'** are located vertically. Although the axle **34'** does not turn, the caster wheels **33** and **33'** do turn. The vehicle itself is accelerated in the preferred embodiment by a linear induction motor **36**. While the actual axle **34'** supports the weight of the vehicle and passengers, a simulated axle **34** (as shown in **FIGS. 7 and 11**) connects the left and right simulated wheels. However, as previously noted, these wheels are simulated wheels only and do not actually operate to move or drive the vehicle forward.

[**0037**] Turning to **FIG. 12**, the linear induction motor **36** and **36'** is shown in one embodiment. This linear induction motor **36** and **36'** creates a magnetic field in a reaction plate **37** that propels the vehicle down the track through the acceleration zone **8**. In order to understand the acceleration means of the preferred embodiment, a brief discussion of electromotive accelerating means would be beneficial.

[**0038**] Rotary induction motors, often referred to as "squirrel cage motors," were invented decades ago. Their usage is now widespread. The compressor motor used in a typical refrigerator is an example of a squirrel cage motor. Electromagnetic induction, the principle by which linear induction motors function, was discovered about 250 years ago by Michael Faraday. Further experiments by pioneers in this field such as Linz vastly increased the understanding of this phenomenon. Electromagnetism functions within an induction motor when a current is passed through wire coiled around a conductive core (referred to as a motor). When a current is passed through such a coiled wire, the core produces a magnetic field. The direction of this field is dependent upon the direction of the current. The strength of the field is dependent upon the number of windings in the coil as well as the strength of the current.

[**0039**] If a non-ferrous, conductive metal (referred to as a "reaction plate") is introduced into this magnetic field and there is relative motion between the field and the conductor, a current is induced in the conductor. This is known as electromagnetic induction. The induced current will flow within the conductor in a coil-like pattern, thus producing a secondary magnetic field, with the conductor as its core. It is the interaction between these two magnetic fields that creates motion.

[**0040**] A linear induction motor consists of one top **36** and one bottom **36'** of a motor bolted into a housing. There is a small air gap (approximately 18 mm in this application) in which the magnetic field produced by the motors is contained. The reaction plate **37** is an aluminum fin attached to the vehicle, as shown in **FIG. 12**.

[**0041**] When current is supplied to motors **36** and **36'**, the windings of the motors produce a magnetic field which "appears" to be traveling forward. A second magnetic field is subsequently produced in the reaction plate, and this magnetic field (and hence the reaction plate and drag strip car) attempts to "catch up to" the first field. This effect is similar to moving one magnet on top of a table by using a second magnet on the bottom of the table.

[**0042**] The setup of the windings within the motors greatly effects how the reaction plate behaves. Each setup is dependent upon the estimated speed of the car as it passes through the respective LIM. This system is similar to gears in a transmission. Since the system is similar to gears in a transmission, the shift button **27** can simulate the shifting of gears in a dragster. A series of LIMs are utilized in this particular invention to create a launch time of the dragster through the acceleration area **8**.

[**0043**] The actual energy inputs, number of LIMS and LIM assemblies, launch amps and launch volts, as well as programmable launching controller systems are well known in the art and may be adapted to this particular dragstrip race by someone with ordinary skill in the art. However, the use of a LIM to propel a dragstrip ride for sudden acceleration such as this is new and unique to the amusement ride industry.

[**0044**] It is to be noted that the programmable launching controller system continually monitors the position and velocity of each dragster vehicle as it travels along the acceleration area **8**. Each LIM is switched on just before the vehicle enters and is switched off just after the vehicle exits. Once the vehicle reaches the required speed, (a maximum of approximately 125 miles per hour) all LIMs are switched off. The dragster vehicle then coasts through coasting area **9** and into braking area **10**. The dragster is braked by means of magnetic brakes and a redundant mechanical brake system on the vehicle. The mechanical footbrake also shuts down all LIMS.

[**0045**] The LIM housings used are designed and fabricated to very strict tolerances. The power to each pair of LIM is channeled through dedicated control panels having individual control panels and redundant fuses. Each LIM has three internal thermal protection circuits that will disrupt the power to the motor if it overheats.

[**0046**] Returning now to **FIG. 12**, the operation of the vehicle in its preferred embodiment can be readily ascertained. The vehicle itself has upper frame supports **18** attached to the front **13** and rear **14** of the dragster bodies. The frame **18** is attached to left **19** and right **19'** actual wheels, which ride along in a predetermined track. The left **19** and right **19'** actual wheels are attached to the lower frame base **35** through the dragster lower base frame-actual wheel connection column **43**, as shown on **FIG. 12**. The actual wheels ride in troughs **44**.

[**0047**] In addition to the guide troughs **44** a LIM trough **38** is also provided. This LIM trough **38** houses the linear

induction motor utilized to accelerate the dragster as described above. While the simulated wheels **17** ride on the track surface **39**, the actual dragster **1** rides on the actual wheels **19**. The wheels **19** are accelerated by the linear induction motor **36** and **36'** and the reaction plate **37**.

[**0048**] One embodiment of this invention is best shown in **FIG. 12**. However, the below surface embodiment shown in **FIG. 12** could be modified such that the actual wheel trough upon which the dragster vehicle **1** rides is above the ground, as shown in **FIGS. 8 and 9**.

[**0049**] In another embodiment, shown in **FIG. 9**, the C-shaped steel channeled guide system **32** shown in **FIG. 8** is replaced with a guide system that includes a left side rail or pipe **40** and a right side rail or pipe **40'**. These left and right circular side rails would be attached in the center of and underneath the dragster **1**, as shown. These side rails would be attached to left and right inner walls. However, in order to keep the dragster **1** on its correct path, horizontal **41** and vertical **42** restraining casters would be attached to the dragster frame lower base **35**. These restraining casters **41** and **42** are best shown in **FIGS. 10 and 10*a***.

[**0050**] As shown in **FIGS. 10 and 10*a***, the horizontal **41** and vertical **42** restraining casters are attached alternately to the dragster frame lower base **35**. The horizontal restraining casters **41** would keep the dragster vehicle **1** from moving sideways along the linear track. The vertical restraining casters **42** would keep the vehicle from moving up and down in a vertical direction along the track. The side rails and horizontal and vertical casters would be a modification of the steel-channeled guide system **32** as shown in **FIG. 8**.

[**0051**] One final alternate embodiment of the guide system for the dragster ride is shown in **FIG. 11**. In this embodiment, the dragster frame lower base **35** is connected to the actual wheel axle **34'** by the dragster lower base frame-actual wheel connection column **43** as shown. The linear induction motor system shown at **36** would drive the vehicle as previously noted. However, in this embodiment, the horizontal **41** and vertical **42** restraining casters would be driven along below-surface steel channel guides, as shown. These below surface steel channel guides **45** and **45'** are similar to the steel channel guides **32** and **32'** shown in **FIG. 8**.

[**0052**] The dragster **1** also has simulated exhaust smoke, which would be coordinated with the movement of the acceleration pedal by the driver of the vehicle. In addition, the acceleration pedal could be connected and coordinated with real sounds of a drag race through a sound system. The simulated sounds and vibrations of a real drag race are simulated through speakers in each driver's and passenger's helmet.

[**0053**] It is to be appreciated that this device is new and novel as a general concept with respect to amusement rides. Both the creation of the actual physical and visual sensations involved in this drag strip ride, as well as the numerous innovations required to make such a ride safe and realistic have not heretofore been disclosed by any known devices. However, the actual embodiment of this device is meant as a means of illustration only. Minor variations of the appearance of the device, the location and shape of the track, as well as the drive mechanisms is still within the keeping and spirit of this invention. For example, the racetrack could be ¼ mile or longer. Further, for very short rides, the linear induction motor system of propelling the vehicle could be replaced by a simple bungee cord type of propulsion system, by a spring mechanism, or by pneumatic or air powered drivers. However, the preferred embodiment of this invention includes the linear induction means of propulsion as previously set out.

Having fully described my invention, I claim:

1: A real-size dragstrip amusement ride, comprising:

(a) at least two simulated dragsters located on side-by-side tracks;

(b) at least two side-by-side parallel tracks, having a means to constrain each dragster to remain on its respective track;

(c) an acceleration means to accelerate each dragster down the track;

(d) a starting line signal tower to signal when to start the race and to display information about the speed of each dragster during the race.

2: A real-size dragstrip amusement ride as in claim 1, wherein each dragster further comprises an adjustable safety helmet and seat and a reliable safety harness for each rider of said dragster.

3: A real-size dragstrip amusement ride as in claim 1, wherein said constraining means comprises left and right C-channels and left and right actual caster wheels for supporting said dragster.

4: A real-size dragstrip amusement ride as in claim 3, further comprising horizontal restraining casters.

5: A real-size dragstrip amusement ride as in claim 1, wherein said acceleration means comprise a series of linear induction motors located in a trough below each dragster and a reaction plate connected to said dragster.

6: A real-size dragstrip amusement ride as in claim 1, wherein said acceleration means comprises an elastic cord having one end attached near the starting or finish line of said track and the other end attached to said dragster.

* * * * *