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SUPERINTENDENCIA DE INDUSTRIA Y C
SUPER. DELEGADA PARA LA PROIEDA
DIVISIÓN DE NUEVAS CREACIONES.
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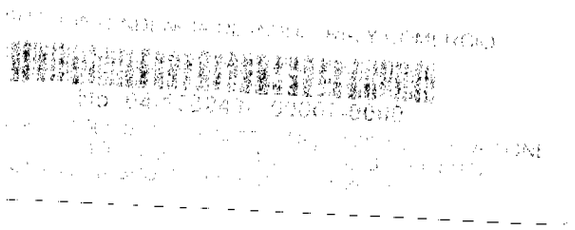

Ref: Exp. 04 128.249 Patente de Modelo de Utilidad. SILLA MULTIDIMENSIONAL de Maloka.

Para dar respuesta al oficio 16732 de ese Despacho de 21 de Diciembre de 2007, notificado el 27 de Diciembre de 2007, atentamente acompaño de nuevo las reivindicaciones.

Atentamente,

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SILLA MULTIMEDIAL

REIVINDICACIONES

1. Silla Multimedial, **CARACTERIZADA PORQUE** se compone de: 1. Una carcaza exterior, (2) La silla, (3) El mecanismo que permite el movimiento con un mecanismo de acople, (4).Un sistema de sonido, (5)Un sistema electrónico y (6). Un sistema para el manejo de imagen.

2. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** la carcaza exterior esta formada por: 1. La cavidad de forma orgánica, 2. Un espaldar semi-cilíndrico, con: A. una cavidad que aloja en su interior el altavoz para bajas frecuencias, en una caja en forma cuadrada, y se ve en forma de huso esférico, y B. Dos cavidades en forma de orejas elípticas inclinadas, que se encuentran en la parte superior, a lado y lado de la silla donde van los parlante traseros y 3. Una base circular en la parte inferior.

3. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** la silla esta formada por un cojín que va adherido a la base circular de la carcaza y al espaldar cilíndrico, con un centro

de masa que se encuentra por debajo del centro de masa del usuario.

4. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** el mecanismo que permite el movimiento esta conformado por: 1. La base circular, con seis tornillos para su fijación al suelo, y cuatro tuercas, para la fijación del conjunto rodillos. 2. El conjunto rodillos, formado por dos placas, unidas por cinco tubos, y en cuyas caras anteriores van las cuatro tuercas, que encajan con las tuercas de fijación de la base circular, entre las dos placas, van tres rodillos, sobre los cuales gira el conjunto para el movimiento frontal. El rodillo central se acopla al motor que va sobre la base circular. El conjunto para el movimiento lateral cuenta con un conjunto rodillos igual al anterior.

5. Silla Multimedial de la reivindicación 4, **CARACTERIZADA PORQUE** el mecanismo para el movimiento cuenta con: 1. Un conjunto para el movimiento frontal y 2. Un conjunto para el movimiento lateral, de radio menor al del conjunto del numeral 1, y colocado sobre él, rotado 90°.

6. Silla Multimedial de la reivindicación 5, **CARACTERIZADA PORQUE** los conjuntos para movimiento frontal y lateral están formados por: 1. Un arco metálico cuya superficie esférica reposa sobre el rodillo central, y 2. La parte plana 12, de la cual salen dos alas formando una cruz, las cuales tienen cuatro tuercas sobre las cuales va el conjunto rodillos del conjunto para movimiento lateral. Del lado largo de la cruz de la parte plana también sale una ala con pestañas sobre la cual va el motor del conjunto rodillos del conjunto para movimiento lateral.

7. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** el sistema de funcionamiento del mecanismo de acople, esta constituido por una rueda de tracción o rodillo de caucho, y dos rodillos soporte, de giro libre encargados de hacer la presión necesaria para que se transmita potencia. El rodillo de tracción, describe una trayectoria sobre una circunferencia guía, con centro, en el centro de masa del usuario garantizando que el mecanismo rote respecto a ese punto.

8. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** el sistema de sonido es un sistema 4:1, ubicado en el espacio entre la carcaza y la superficie silla en la que reposa el usuario, conformado por dos parlantes delanteros, dos parlantes

traseros, ubicados a una altura promedio del oído y un altavoz para bajas frecuencias, en la espalda.

9. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** su sistema electrónico esta conformado por: 1. Un Computador, que contiene el software que controla la línea de tiempo de la función, es el que sincroniza cada uno de los elementos periféricos y monitorea que cada uno de dichos periféricos se encuentra funcionando correctamente, dispone de una tarjeta de sonido para realizar un procesamiento global de la señal de audio, y distribuirla a las sillas de una sala, 2. Un Conversor de interfaz para el funcionamiento en red de los periféricos, cambia la señal que sale del puerto serial, diseñado para una comunicación punto a punto, a una señal que permita comunicación a múltiples puntos, 3. Una Tarjeta local de control, dispositivo periférico basado en microcontrolador, que funciona como un punto de red, recibe las instrucciones del computador, las procesa y las ejecuta, 4. Una Tarjeta local de procesamiento de audio.

10. Silla Multimedial de la reivindicación 9, **CARACTERIZADA PORQUE** la tarjeta local de control, controla los movimientos de la silla, con sensores que realimentan la posición, para que

mediante los algoritmos de control se ubique en la posición que solicite el Computador; controla de la misma manera la distribución de audio en la silla, habilitando o inhabilitando las diferentes fuentes de sonido, y seleccionando en una tarjeta de procesamiento de audio el efecto seleccionado, eco, reverberación, cambio de fase.

11. Silla Multimedial de la reivindicación 9, **CARACTERIZADA PORQUE** la tarjeta local de procesamiento de audio es un procesador que se encarga de capturar la señal, realizar la transformación solicitada por el PC y enviar la señal de audio modificada a los parlantes en la silla.

12. Silla Multimedial de la reivindicación 1, **CARACTERIZADA PORQUE** el sistema de manejo de imagen esta conformado por: 1. Un computador de control, 2. Una Tarjeta de Video, 3. Dos Equipos de Video, de tecnología digital a partir de rayos de luz, 4. Un Filtro polarizador y 5. una Pantalla.

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Baker et al. (43) **Pub. Date: Aug. 22, 2002**

(54) **PERSONAL SIMULATOR**

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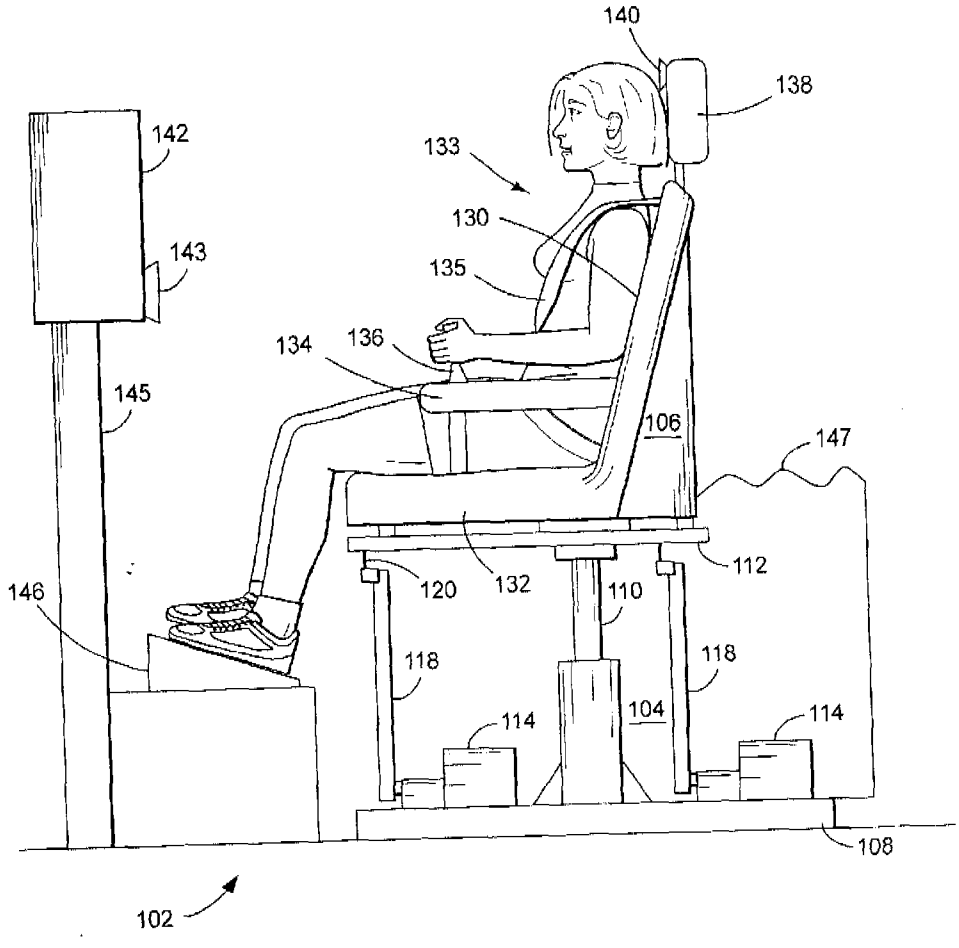
(52) **U.S. Cl.** **434/30**

(57) **ABSTRACT**

A reliable, cost effective motion simulator system wherein a motion platform controlled by three inexpensive fractional horsepower induction AC motors to provide n-axis of motion where n is two, three, four, five or six. A dynamic boost is applied to maintain the position of the motion platform at low speed or zero speed and to handle transient motion demands without use of an encoder. The personal simulator motion base includes a support structure for positioning a rider coupled to the motion platform. A support pedestal and a plurality of linkages support the motion platform. A plurality of motor assemblies **114** is coupled to the motion plate by the linkages. A control algorithm enables the use of low cost power electronics to drive the AC motor-linkage assemblies. The personal simulator may be controlled in response to user-initiated commands, remote-user initiated commands or by commands embedded in game software or the audio track of a video stream.



PERSONAL SIMULATOR

CROSS REFERENCES TO RELATED APPLICATION

[0001] This application claims is related to U.S. Provisional Patent Application Serial No. 60/264,610 filed Jan. 26, 2001, the disclosure of which is incorporated herein by reference in its entirety for all purposes.

FIELD OF THE INVENTION

[0002] The present invention relates to a motion simulator system and more particularly, to a compact, reliable and inexpensive single-person motion simulator system.

BACKGROUND OF THE INVENTION

[0003] Prior art motion simulator systems are typically large electromechanical systems to which one or more persons are positioned to experience motion in concert with a displayed image. The portion of the system devoted to generating motion, the motion simulator, includes a motion base moves in response to motion control commands provided from a computer or embedded in the video signal. When a person is positioned on the motion base, the person is moved while viewing visual and audio stimuli. This combination of motion, visual and auditory sensation generates a very realistic physical sensation that is far superior to merely seeing and hearing the audio/visual presentation. For this reason, motion simulator systems are widely used for military and commercial training applications. For examples, pilots are often trained in a motion simulator rather than in the aircraft and military tank crews are provided with a simulator that appears to the occupants to be a tank that rumbles across a variety of terrain. Unfortunately, due to the expense of these motion simulator systems, use is generally limited to military and commercial training applications. Further, the weight and complexity of the mechanical portion of such simulators preclude any use in a home or similar environment.

[0004] The motion simulator is also well suited for entertainment applications where motion adds a very real physical sensation to an otherwise audio/visual experience. Although a motion simulator system is often viewed as an enhancement to a viewing experience, relatively few such systems are found in entertainment complexes such as movie theaters or video arcades because of the complexity and high cost of prior art motion simulator system.

[0005] By way of example, a typical prior art motion simulator system can cost more than $125,000 primarily because motion is supplied by an expensive hydraulic mechanism. Substantial additional costs are also incurred to maintain the system. Motion simulators for arcade applications are somewhat less expensive because motion is obtained from several servo motors coupled to the motion base. In some applications, up to eight such servo motors are required. Unfortunately, servo motors are heavy and relatively expensive so the typical motion simulators in an arcade can cost up to about $50,000. Due to the high acquisition price there is only a limited market for arcade-style motion simulator systems. It should be apparent that regardless of the application, a substantial portion of the cost of the above described motion simulator systems resides in the mechanism that drives the motion base. Further, the high cost renders it impractical to use prior art motion simulator systems in the home or similar environment.

[0006] Another drawback of prior art motion simulator systems resides in the weight of the system and power requirements (that is 220 VAC, and possibly 3-phase) to drive the motion base. These parameters render motion simulator systems unfit for home use. What is needed is a lightweight motion simulator system that is inexpensive but that is well suited for use in the home or similar environment. However, since safety of the user is required, a lightweight motion simulator must also be sufficiently stable without relying on the heavy servo and gearbox combination of the prior art.

[0007] Clearly, with the advent of Internet gaming, the addition of motion would enhance the gaming experience for the home user. With a safe, low cost, lightweight motion simulator system, the gaming experience at home would approach the environment found in military or commercial training or high-end arcade applications. What is needed is an inexpensive and reliable motion simulator that is adapted for use in a home or similar environment that can be easily coupled to a home computer or other entertainment device, such as the television or stereo.

SUMMARY OF THE INVENTION

[0008] The present invention is a reliable, lightweight, low cost motion simulator system that is well suited for the home environment. The motion simulator system includes a television, computer display or other display devices to provide the physical sensation of motion together with the audio/visual viewing experience. In one preferred embodiment of the present invention, the motion simulator includes a motion base mounted on a base plate. A chair or similar supporting structure is coupled to the motion base. A controller, adapted to receiving motion commands, generates signals for controlling the motion base. In response to motion commands, the motion base is activated so that a person in the support structure experiences motion synchronized with the displayed audio visual display.

[0009] The motion base is controlled by at least two inexpensive induction motors, each of which drives a crank and pushrod assembly, the other end of which is coupled to the motion base. The left and right motors are used together to give the motion platform roll. To roll right, the left motor crank is turned up, and the right motor crank is turned down. For pitch, the left and right motors are driven in the same direction, and the rear motor is driven in the opposite direction from the other two. When the left and right motor cranks are turned up, and the aft motor crank is turned down, the moving platform will pitch up. An innovative control algorithm enables the use of low cost power electronics and control chips, typically used for fan and pump applications where only crude speed control is required, to drive the motors.

DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1** illustrates one embodiment of a personal simulator in accordance with the invention.

[0011] **FIG. 2** illustrates a side view of the motion base of the personal simulator in accordance with the present invention.

[0012] **FIG. 3** is a top view of the motion base shown in **FIG. 2**.

[0013] **FIG. 4** illustrates a front view of the motion base in a nominal and yawed to the right orientation.

[0014] **FIG. 5** illustrates a dynamic boost voltage.

[0015] **FIG. 6** illustrates a schematic diagram for one axis positional control for the personal simulator of the present invention

[0016] **FIG. 7** is a system block diagram of the personal simulator.

[0017] **FIG. 8** illustrates the operating sequence for the personal simulator.

[0018] **FIGS. 9 and 10** illustrate the drive voltage waveform used to control the operation of the fractional horsepower motors.

[0019] **FIG. 11** illustrates an embodiment of personal simulator system in accordance with the present invention incorporating a game motion engine for direct control of the motion base by a user.

[0020] **FIG. 12** illustrates an Internet game environment.

DETAILED DESCRIPTION

[0021] According to the principles of the present invention, a new, efficient personal motion simulator system is disclosed. The present invention provides a system that provides motion to a rider synchronized with either audio or a video display. In the following description, numerous specific details are set forth in order to provide one skilled in the art an understanding of the present invention. However, it will be apparent to one of ordinary skill in the art that these specific details need not be used to practice the present invention. In other instances, well known structures, circuits and interfaces have not been shown in detail in order to avoid unnecessarily obscuring the present invention.

[0022] With reference now to **FIG. 1, a** block diagram of a personal simulator system **102** of the present invention is illustrated. In the illustrated embodiment, personal simulator system **102** comprises a motion base **104** and a support structure **106** such as a chair. Motion base **104** provides three-axis of motion to support structure **106** although it will be apparent to one skilled in the art the following description is applicable to personal simulators having two-axis of motion (2-dof), four-axis of motion (4-dof), five-axis of motion (5-dof) and six-axis motion (6-dof) bases. To illustrate, two motors would control the motion base if the personal simulator system were a two-axis motion base. In general, the base must have one motor assembly (and related controls) per axis.

[0023] For the illustrated three-axis motion base, motion base **104** comprises a support plate **108**, support pedestal **110**, a motion plate **112** and a three motor assemblies **114** mounted on support plate **108** coupled to the motion plate by linkages **118**. The support plate **108** provides stability to personal simulator system **102** as support structure **106** is moved through its full range of motion even when a rider **133** is seated or otherwise coupled to the support structure. Depending on the application, support plate **108** consists of a sheet of metal having a thickness of between about 0.7 cm to 1.2 cm. Support plate **108** may be either aluminum or steel with steel preferred. Support plate **108** has a length (front to rear) of about 75 cm (approximately 30 inches) and a width of about 54 cm (approximately 20 inches). With these dimensions, personal simulator system **102** has a capacity of about 300 pounds. Other geometric shapes, such as circular, or a pattern of radiating arms may be used for support plate **108** so long as sufficient stability is provided. If the center of gravity (COG) of the rider is positioned higher above the support plate, such as when the rider is standing, then a wider, heavier support plate must be provided. The weight limitation for the rider is due in part to the length of the linkages, the moment arm associated with the riders COG above the support plate and the overall dimensions of support plate **108**. It should be apparent that the weight capacity of the present personal simulator system **102** is sufficient to support a single adult rider. Increasing the dimensions of support plate **108** or adding additional weight can help to prevent the personal simulator system **102** from tipping over. For example, if a lightweight aluminum support plate **108** included a chamber, a fluid, such as water, could provide the necessary counter ballast to compensate for a heavier rider. Similarly, adding additional weight to the corners of support plate **108** could increase the capacity of personal simulator system **102**.

[0024] Support pedestal **110** is rigidly attached to support plate **108**. Rigidity is enhanced by welding a plurality of gussets along the lower length of pedestal **110** and to the support plate **108**. The end portion of support pedestal **110** extends through a hole in support plate **108** (not shown) that conforms to the dimensions of the support pedestal **110**. A weld bead around the periphery of support pedestal **110** welds support pedestal to support plate **108** to prevent rotation and to maintain the relationship of the pedestal to the support plate. If material other than steel is used for the support plate, the pedestal may be bolted or otherwise permanently attached to the support plate **108**. Support pedestal **110** extends upward from support plate **108** for a distance of between 15 to 18 inches, with the actual height being dependent on the desired height of support structure **106** above support plate **108**. It is preferred that the height of support pedestal is less than or equal to the width of the support plate **108**. Support pedestal **110** has a slip or sliding spine shaft and a coupling mechanism for attaching to support plate **112**. In the embodiment shown in **FIG. 2**, the attachment mechanism is a universal joint **228** that is bolted to the support plate **112**. Support pedestal **110** is positioned to the center of motion plate **112** and equal distance from either side of support plate **108**. In the preferred embodiment, the support pedestal **110** is toward the front of support plate **108**. More specifically, in one embodiment, the center of support pedestal **110** is about 21.6 centimeters from the leading edge of support plate **108**. In general, the attachment point of the support pedestal is offset from the front edge of the support plate by a distance that is between 28.5% and 37.0% of the overall length of the support plate **108**.

[0025] The moving plate is constrained in x, y, and yaw by the center post, u-joint and sliding spline. The sliding spline prevents the moving plate from rotating in yaw, but allows it to move up and down in heave. The U-joint allows the moving platform to move in roll and pitch while constraining it in x (fore and aft or surge) motion and y (side to side or sway) motion. X is a linear motion fore and aft, while pitch is a fore and aft movement in rotation. Similarly, y is a linear motion side to side, while roll is a rotational motion

side to side. In comparison, an object like an aircraft is free to move in six degrees of freedom: x, y, z, roll, pitch, and yaw. Thus, the illustrated embodiment discloses a three axis motion base for use as a personal simulator that is an inexpensive solution for many motion applications.

[0026] Three motor assemblies **114** are mounted on support plate. Each motor assembly **114** controls one axis of motion in personal simulator system **102**. A crank and pushrod or drive-arm linkage **118** couples each motor assembly **114** to motion plate **112**. Each drive arm linkage **118** connects to a flange **120** extending downward from the bottom side of motion plate **112**.

[0027] Support structure **106** is attached to the top surface of motion plate **112**, its primary purpose being to hold up or support the rider as motion plate moves. In one preferred embodiment, support structure **106** supports the rider in a seated position and comprises a chair where the rider is seated with their legs extending downward towards support plate **108**. In this embodiment, a chair is bolted or welded to motion plate **112**. The bottom of the chair includes a U-shaped base portion attached to motion base **112** by bolts or welding. Inside of the U-shaped channel is an adjustable mechanism so that the chair can be slid forward or backward to fit the user similar to the mechanism found in a front seat of an automobile. The chair may include a back support **130**, a seat **132**, and an arm support **134**. The chair may be a molded plastic seat where the back portion **130** and seat portion **132** are integrated with arm support **134**. In another embodiment, seat portion **134** may be separate from back portion **130** or the support structure **106** may not include an arm support **134**. In another embodiment, the rider stands on support structure **106** and holds on to a bar or other devices adapted to maintain the rider in alignment with the support structure **106**. In yet another embodiment, the rider straddles a saddle as if they were riding a horse or motorcycle. The support structure is oriented so that it places the center of gravity of the rider approximately over the center of gravity of motion plate **112**. More specifically, the rider's center of gravity is preferably over the support pedestal.

[0028] If the support structure comprises a stand-up plate where the rider either kneels or stands upright on the plate, it is preferably a two-layer device so that mounting screws do not protrude through to the surface exposed to the rider. Alternatively, the mounting screws attaching the support structure to motion plate **112** should be recessed. A non-skid surface (not shown) is then applied to the motion plate so that the rider may resist slipping when the motion plate is canted. In another embodiment, not shown, ski or snowboard bindings may be attached to the support structure to simulate the experience of a skier. It is possible that the rider could exert sufficient pressure to release the bindings and be thrown from the personal simulator system **102**. Accordingly, a cushion or air mattress (not shown) may surround personal simulator system **102** to minimize the potential for injury to the rider.

[0029] Regardless of the configuration, support structure should be padded and without sharp edges or protrusions that the rider could be thrown against when simulator system **102** is in use. A restraint system, such as a seat belt or harness **135** is also preferably included as a part of support structure **106**. Additional safety devices are also preferably included, such as switch under the support structure that requires a minimum weight be applied on the support structure before enabling operation to avoid small children from using the system. Within easy reach of a person seated or otherwise positioned in support structure **106** is a joystick **136** or other similar input control device. It should be clear to one skilled in the art that support structure **106** may include additional joysticks or other control mechanisms, such as a steering wheel, foot pedals, or other control mechanisms specific to a particular application. By way of example, the control mechanism may comprise a pair of video cameras adapted to detect motion of the person and interpret the motion to control the simulator operation. In addition, a "panic button," incorporated into the joystick or other control device, must be pressed at all times for system **102** to operate, otherwise operation is immediately shutdown for safety reasons or, by way of example, if the user feels sick from motion sickness.

[0030] In one preferred embodiment, support structure **106** includes a headrest **138** positioned to assist a person seated, standing or kneeling on support structure **106**. Headrest **138** includes speakers **140** to broadcast audio signals proximate to the rider to impart audio sensations.

[0031] To the front of personal simulator system **102**, a display device **142** is positioned at approximately eye level of the rider positioned in support structure **106**. Display **142**, which may be a computer monitor, a television, a movie screen or other display device, may further include additional speakers **143** and a microphone **144**. Although there are many conceivable ways to position display **142**, in one embodiment, a stand **145** is used to position the display at approximate eye level. Display **142** could also be positioned on a table or other supporting structure. In other embodiments, display **142** is a movie screen that is separately positioned relative to a plurality of motion bases controlled in parallel. In this configuration, patrons at a movie theater may each experience motion while watching the movie.

[0032] In the preferred embodiment, support structure **106** also includes a base enclosure **147** that is positioned underneath the support structure to prevent the clothing, hands or feet of the rider or a bystander from contacting any of the mechanical or electrical elements used to generate the simulated motion. In one preferred embodiment, base enclosure **147** is a semi-rigid plastic molded skirt that allows the rider's legs to dangle to the front of the chair but prevents the rider from kicking their legs backward into drive arm linkage **118**. Enclosure **147** may include a footrest **146** to support the feet above floor level. Advantageously, base enclosure **147** also tends to minimize transmission of noise generated by motor assemblies **114**.

[0033] In operation, the person riding the personal simulator is positioned and secured in support structure **106** prior to initiating a simulation event. A simulation event may be any audiovisual presentation provided by the display source that is enhanced with motion control signals. Once securely positioned in support structure **106**, the user may initiate the simulation event by pressing a control switch on joystick **136** or by initiating a verbal start command that is detected by microphone **144**. At that time, video signals are displayed on display **142** and audio signals are generated at speakers **140** and **143**. Simultaneous with the display of the video signal on display **142**, motion base **104** receives motion control signals that are synchronized to the displayed image.

[0053] The output amplifier and filter circuit **608** is provided as a voltage reference to a first input of a three-phase pulse width modulator generator and inverter **610**. The other output of amplifier **606** is provided as a frequency demand reference to a second input of the generator and inverter **610**. DC power source **612** rectified and doubled supplied 120 volt AC power to provide at least 340 volts of DC power. Voltage doubler circuits are well known in the art.

[0054] The output of generator and inverter **610** is a three-phase AC signal with an output voltage and frequency proportional to the rate of change and direction the motion platform is to move and the demanded rate of change. This AC signal is supplied to the associated one of the induction motors **208** (see **FIG. 2**). Feedback potentiometer **306** generates signals to control the induction drive via microcontroller **614** without the need for an encoder. In response to the applied signal, the motor drives the gearbox **210** with potentiometer **306** providing a negative feedback signal of the position to summer **604**. When the motion platform is correctly positioned, the feedback signal will match the motion control signal and the motors, and correspondingly the motion of motion platform, will stop. Thereafter, a static boost voltage is applied to maintain motor torque at a zero frequency (or a low frequency sufficient to provide enough torque to hold the motor and platform stationary regardless of the load). Potentiometer **306** is also monitored by microprocessor **706**.

[0055] Refer now to **FIG. 7** where controller **211** is further illustrated. In addition to APC **600**, controller **211** includes an RS-232 or network interface circuit **702** although any transmission protocol could be used. For example, an infrared, Internet or Ethernet transmission protocol could be readily adapted to interface the controller to the motion source. In other embodiments, a home area network such as commercially available from Intel Corporation, or telephone cable signaling, Universal Serial Bus (USB), radio frequency or Bluetooth communication protocol for PC-to-PC communication. The motion commands could also be received from a dedicated game computer such as Nintendo, Sega or PlayStation2 available from Sony Corporation. An MP3 card **704** receives the motion command. MP3 card **704** routes the audio signal to speakers **140** and video signals to display **142**. In another embodiment, the MP3 card may be omitted if the positional information is provided from the joystick or the external source in digital form. Typically, the MP3 card **704** is a part of microprocessor **706**.

[0056] Motion commands are received by microprocessor **706** and passed to microcontroller (within each motion base axis) that, by way of example, may be the Infineon SABC504 single chip microcontroller. Microcontroller **614** is responsible for determining which axis of motion needs to be adjusted in response to the detected motion command. This determination is made by first recovering the embedded motion commands and using a lookup table to translate the command to a positional signal. Thereafter, microcontroller **614** monitors operation of each axis of operation and performs any safety checks such as determining whether the motion commands are requesting a rate of change or a position that exceeds preselected safety limits. Microcontrollers (within each motion base axis) are responsible for detecting when to apply a dynamic boost. When a dynamic boost is required, microcontroller for each motion base axis generates the appropriate input signal within **608** of APC **600**. So that motion of personal simulator matches the displayed image, microprocessor synchronizes the motion to the displayed images taking into account the time constants of personal simulator and any lag factors that may arise from inertia etc. Lag factors and time constant calculations are engineering factors that are implementation dependant. Where motion control signals are supplied by motion source, the sequence of motion can be downloaded in advance of the video and audio transmission together with timing information. Alternatively, the video and audio transmission may include simultaneously transmitted embedded tags indicating that motion is required. In this manner, microcontroller **614** can perform the necessary calculations and supply the positional information to APC **600** upon receipt of each tag. Thus, the signal supplied by the motion source does need to be concerned with the lag factors and time constants for each personal simulator system **102**.

[0057] In another preferred embodiment, a dedicated microprocessor is provided for each APC **600**. Since each motor operates independently, the microcontrollers need not be linked. However, each microcontroller **614** may receive and monitor the positioning information obtained from the potentiometers **306** associated from the other APC **600**.

[0058] Referring now to **FIG. 8**, an algorithm for the dynamic boost is illustrated. This algorithm is executed by the controller in response to a movement transient or static motion of the motor. In step **802**, transients coming in a future period are detected by microcontroller (within each motion base axis). In step **804**, the absolute magnitude of the transient is determined. Accordingly, it does not matter if the transient is positive-going or negative-going. Based on the detected amplitude, in step **806**, the amplitude and duration of a positive dynamic boost component signal is calculated based on the current motor speed and position. In step **808**, the dynamic boost signal is applied to the motor **208**.

[0059] In order to slow the motor down from a high rate of speed to a slow rate of speed, the dynamic boost may need to be increased in terms of both voltage and duration. This is required because slowing the mechanical motion of motion plate **112** (and the associated mass) requires additional torque. Further, when the induction motor is operating at a slow speed or is static, the dynamic boost is critical to maintaining sufficiently high torque. In a similar manner, when it is required to increase the rate of speed of movement of the motion plate **112**, the dynamic boost component must be increased in order to increase torque and to maintain load capacity.

[0060] To aid in slowing the motion plate, DC capacitor **616** is coupled to across the positive and negative terminals of the output of the DC power source. Capacitor **616** enables the controllers to work without tripping due to an overvoltage condition during rapid deceleration of one or more of the motors. In this case, energy from the motor is fed back into the DC power supply. Without sufficient capacitance, this energy would otherwise cause the motor to trip and shutdown suddenly. Thus, in one preferred embodiment, inverters **610** are each driven by a common DC power source that provides a sink for the regenerative energy to be dissipated without tripping the controllers and causing the simulator to function in a non-linear manner.

[0061] **FIGS. 9 and 10** illustrate the conversion process for generating a pulse width modulated control signal that

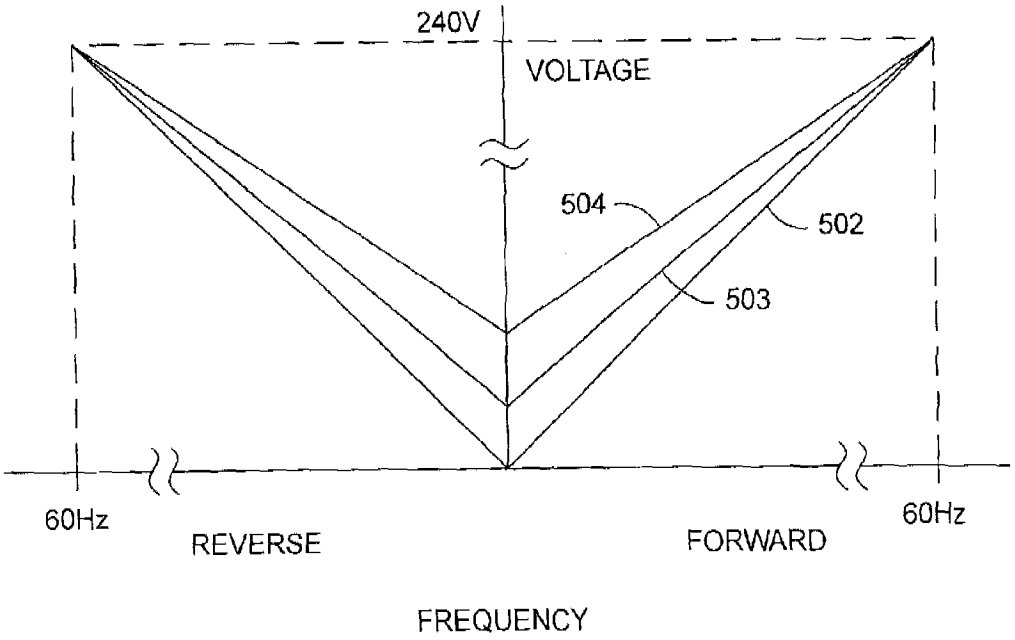

240V
VOLTAGE
504
502
503
60Hz
REVERSE
FORWARD
60Hz
FREQUENCY

FIG. 5

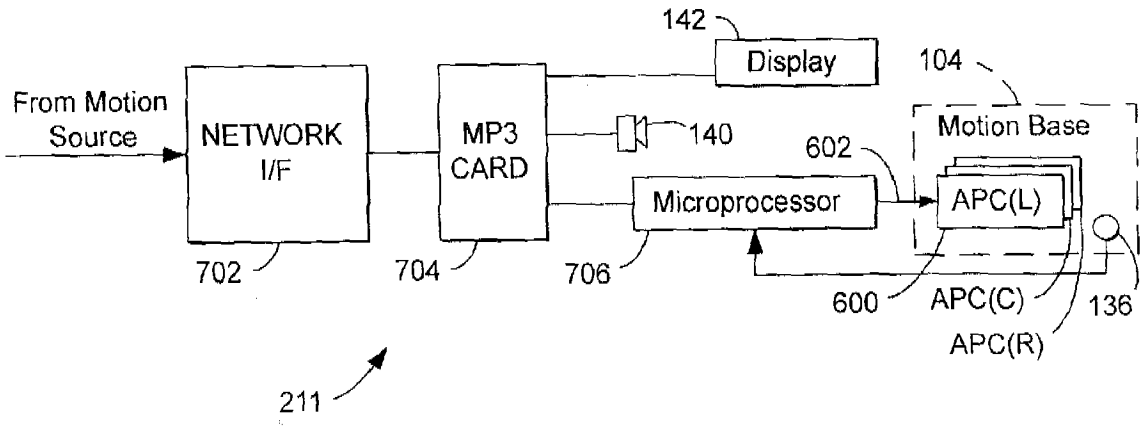

142
Display
104
From Motion Source
NETWORK I/F
MP3 CARD
140
602
Motion Base
Microprocessor
APC(L)
702
704
706
600
APC(C)
136
APC(R)
211

FIG. 7

81

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.,

Abogada
CLARA INES ALVAREZ GIRALDO

ASUNTO	Radicación	04128249
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	[illegible]
	Folios	010

Patente de Invención	[ ]	Patente de Modelo de Utilidad	[X]		
Vía Nacional	[X]				
Vía PCT (fase nacional)	[ ]	Cap.I	[ ]	Cap. II	[ ]

No. Sol. Internacional _____
Fecha de Presentación Internal. _____

Como resultado del examen de fondo, realizado con fundamento en el artículo 85 y en concordancia con el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

1.1. Descripción:	Folios:	8	a	27	como se radicó inicialmente.
1.2. Reivindicaciones:	Folios:	28	a	32	como se radicó inicialmente.
	Folios:	70	a	74	modificadas.
1.3. Dibujos:	Folios:	33	a	40	como se radicó inicialmente.

2. Objeto de la invención

Título de la solicitud: "Silla multimedial".

El objeto de la presente solicitud de patente de modelo de utilidad, se refiere a una Silla Multimedial o Sistema Simulador que permite que sus usuarios tengan sensaciones auditivas, visuales y de movimiento, dirigido a la industria del entretenimiento.

El problema planteado en esta solicitud se debe a que en Colombia no existe una empresa dedicada al desarrollo, producción y comercialización de teatros con

efectos especiales. Por otra parte, actualmente los teatros están dotados de sillas ergonómicas, en algunos casos con movimiento en una dirección, sin ser interactivas o que permitan comunicación y decisión sobre la experiencia.

Para solucionar este problema técnico, la solicitud en estudio proporciona una silla y un software que permite sincronizar los efectos visuales con las sensaciones, por medio de los movimientos y posibilidades de la silla, de tal manera que los usuarios logren una vivencia lúdica e interactiva.

El objeto de la invención definido anteriormente se clasificó de acuerdo con el IPC así: G09B 9/00.

3. De la solicitud de Patente

3.1. Reivindicaciones *(artículo 30 D 486)*

La reivindicación independiente 1 y principal del capítulo reivindicatorio, debe establecer el aspecto técnico novedoso de la invención, definiendo todas las características técnicas esenciales, de acuerdo a la descripción, que aparten la invención del estado de la técnica.

Las características de la invención no deben ser definidas como un simple listado de sus componentes, sin ser relacionados éstos entre si.

En la reivindicación independiente 1 se debe caracterizar el objeto de la invención, relacionando todos sus componentes entre si. Para mayor claridad sobre esta observación se presenta un ejemplo a modo ilustrativo:

Reivindicaciones

1- Máquina frigorífica de absorción con un condensador (5), un evaporador (6) a través del cual se puede conducir una mezcla de refrigerante y un colector de refrigerante (4) conectado al condensador, en el mismo circuito, ***caracterizado porque*** *en el colector de refrigerante (4) está presente una válvula de regulación hidrostática (1) y en uno de sus extremos se ubica un tubo capilar (8), dispuesto entre el colector de refrigerante (4) y el condensador (5). La válvula de regulación (1) es conectada al condensador (3) y a un separador de vapor (2) por medio del elementó de unión (7).*

2- Maquina frigorífica de absorción de acuerdo con la reivindicación 1, ***caracterizada porque*** *el elemento de unión (7) de sección transversal circular, es de una entrada y dos salidas.*

4. Determinación del Estado de la Técnica

Fecha de presentación de la solicitud nacional, Diciembre 23 de 2004.

Teniendo en cuenta la fecha indicada se realizó la búsqueda en el estado de la técnica de documentos relacionados con la solicitud, encontrándose los siguientes documentos más relevantes:

Nº	Documento	Título	Fecha de publicación*
D1	US 2002115043	"Personal simulator"	22-08-2002

5. Análisis de patentabilidad (artículo 14 D486)

5.1. Novedad *(artículo 16 D486)*

De acuerdo con la definición de novedad del Artículo 16 de la Decisión 486 de la Comisión de la Comunidad Andina y basándonos en el objeto de la invención se realizó el siguiente análisis:

5.1.1. La reivindicación independiente número 1 enseña:

Silla Multimedial, caracterizada porque se compone de:

1. *Una carcaza exterior ,*
2. *La silla,*
3. *El mecanismo de acople,*
4. *Un sistema de sonido ,*
5. *Un sistema electrónico y*
6. *Un sistema para manejo de imagen.*

5.1.2. El documento **US 2002115043** (mencionado de ahora en adelante como **D1**) se refiere a un simulador personal de realidad virtual, que comprende:

Una carcaza exterior (106)
Una silla (132)
Un mecanismo de acople (110)
Un sistema de sonido (143)
Un sistema electrónico (211)
Un sistema para manejo de imagen (136)

*Ver el resumen, parte de la descripción y figuras 1 , 7 del documento **D1**, en folios 75 a 79.*

Figura 1 del documento D1 US 2002115043

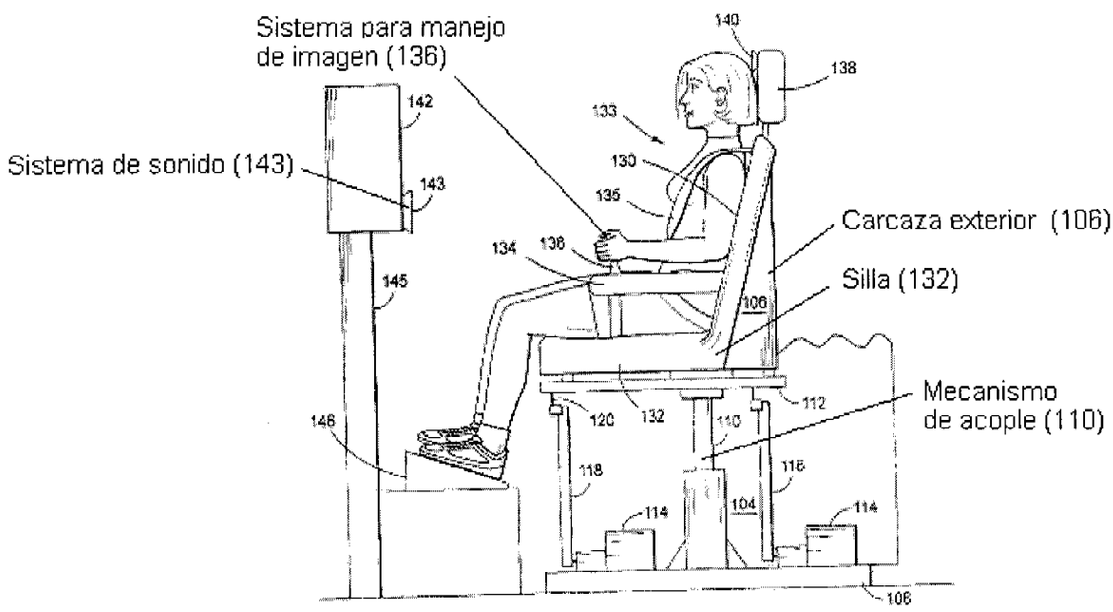
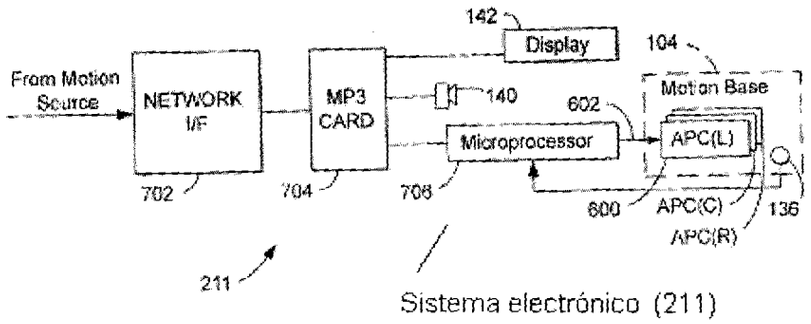


Figura 7 del documento D1 US 2002115043



5.1.3 Al comparar elemento por elemento de la invención, tal como está definida en la reivindicación independiente número 1 con el documento **D1**, vemos que todas las características de dicha reivindicación 1, fueron anticipadas por el documento **D1**.

Se observa que la reivindicación independiente 1 está formulada en un sentido demasiado amplio, definiendo características generales que son comunes y conocidas en el estado de la técnica. La reivindicación 1 debe contener lo novedoso de la invención, destacando lo que la hace diferente de lo comprendido en el estado de la técnica.

6. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

N°	Documento N°	Reivindicaciones afectadas	Requisito que afecta
D1	US 2002115043	1	Novedad

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de treinta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha _____

CONCEPTO TÉCNICO No. 1064	**EXAMINADOR TÉCNICO** Código No. 202065