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(54) **SKATEBOARD SIMULATOR**

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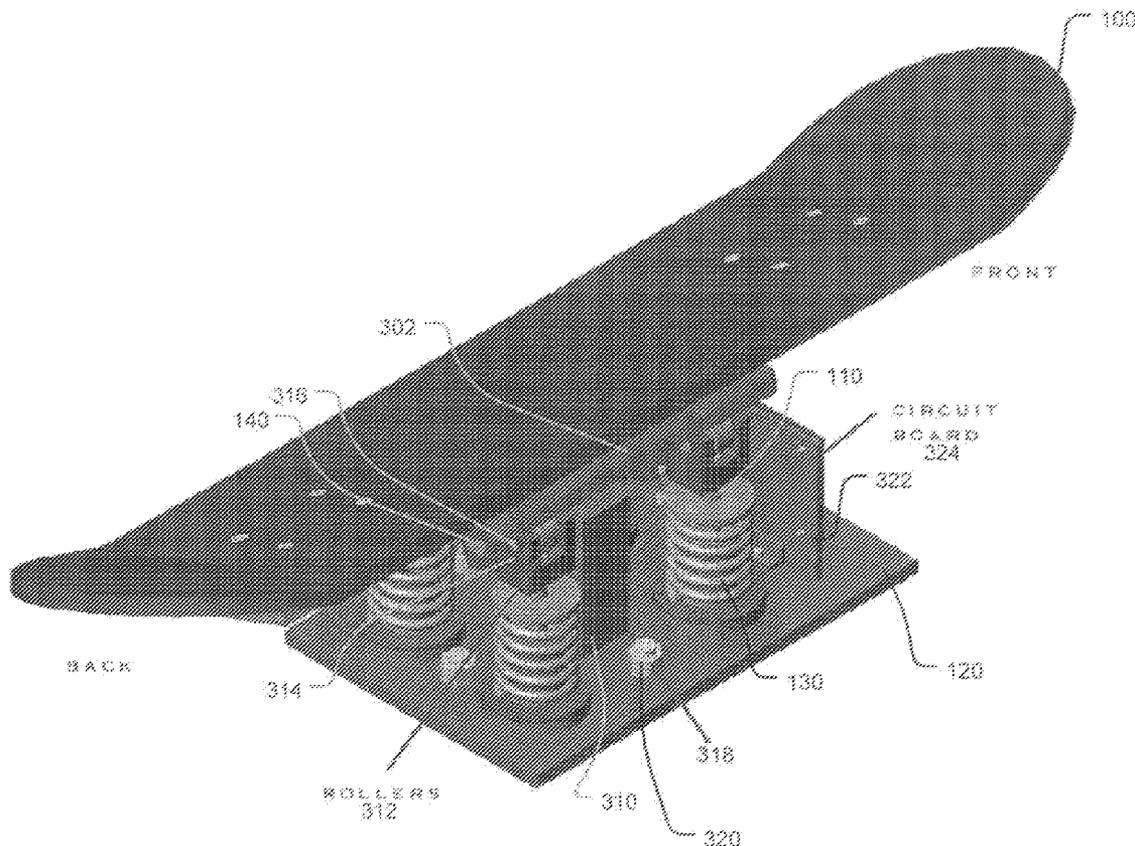
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(60) Provisional application No. 60/759,020, filed on Jan. 17, 2006.

(57) **ABSTRACT**

A skateboard simulator includes a base, at least one support, a skateboard deck and a display. The skateboard deck is moveably mounted on the base by the at least one support. As a user moves the skateboard deck, the image presented on said display is responsive to movement of the skateboard deck.



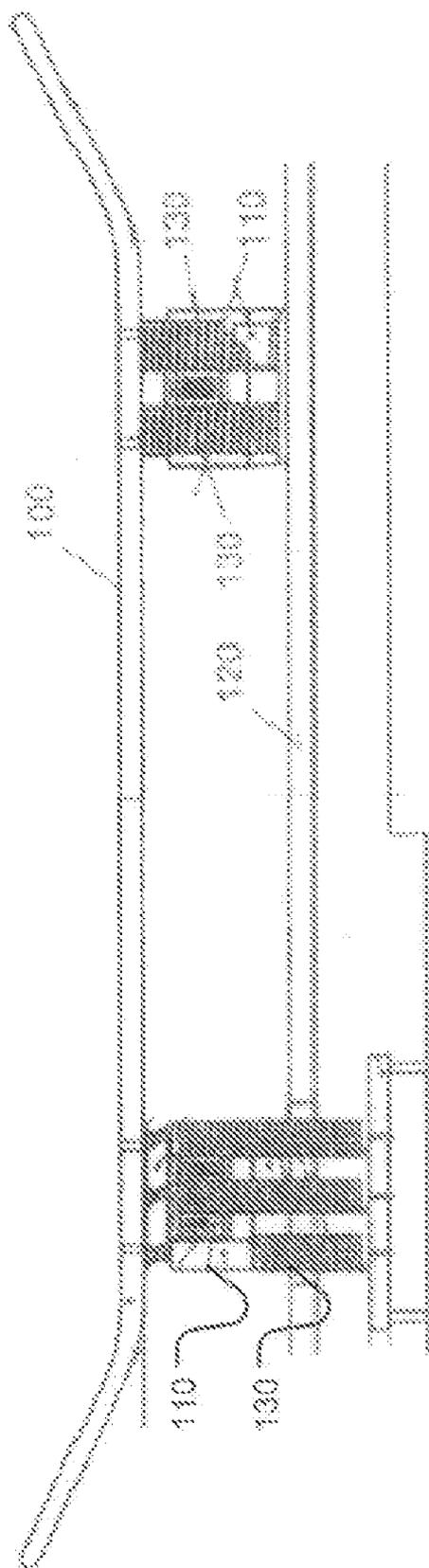


FIGURE 1

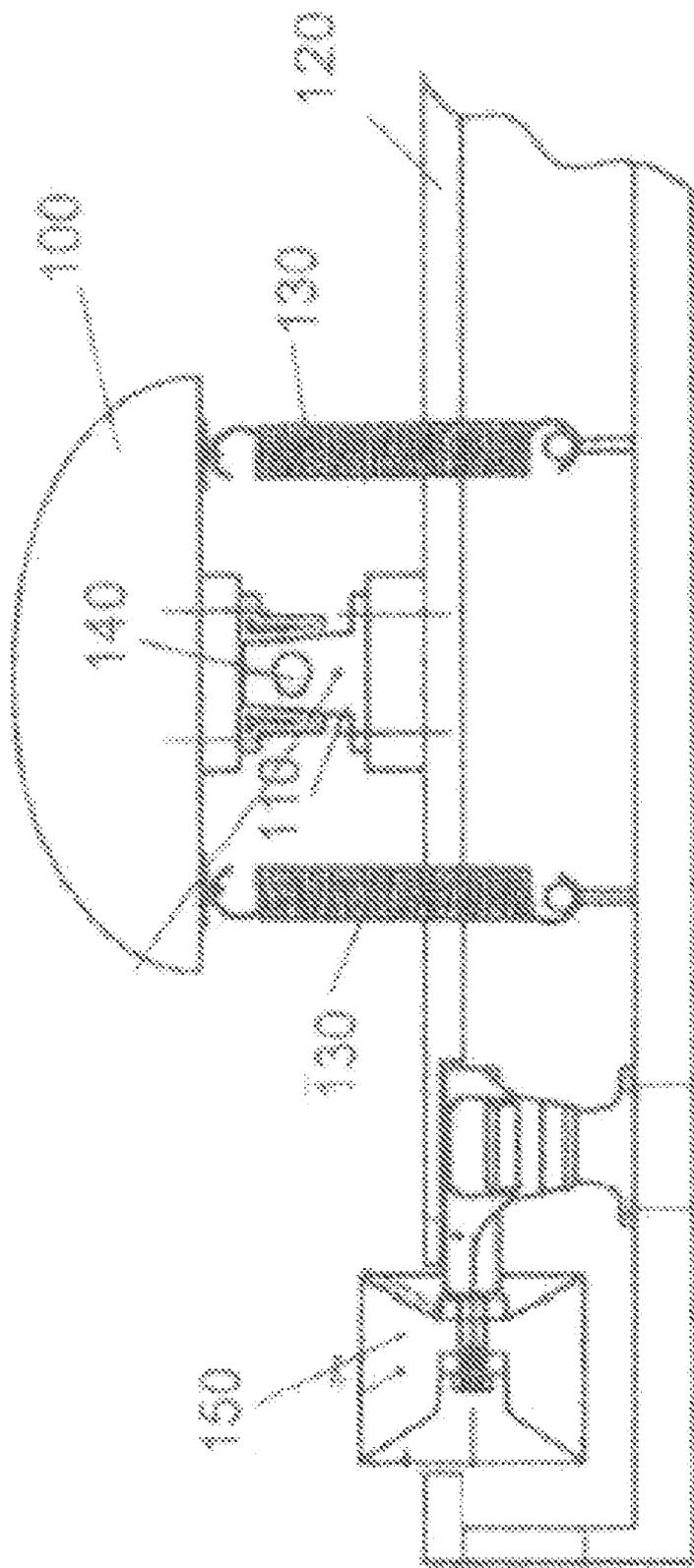


FIGURE 2





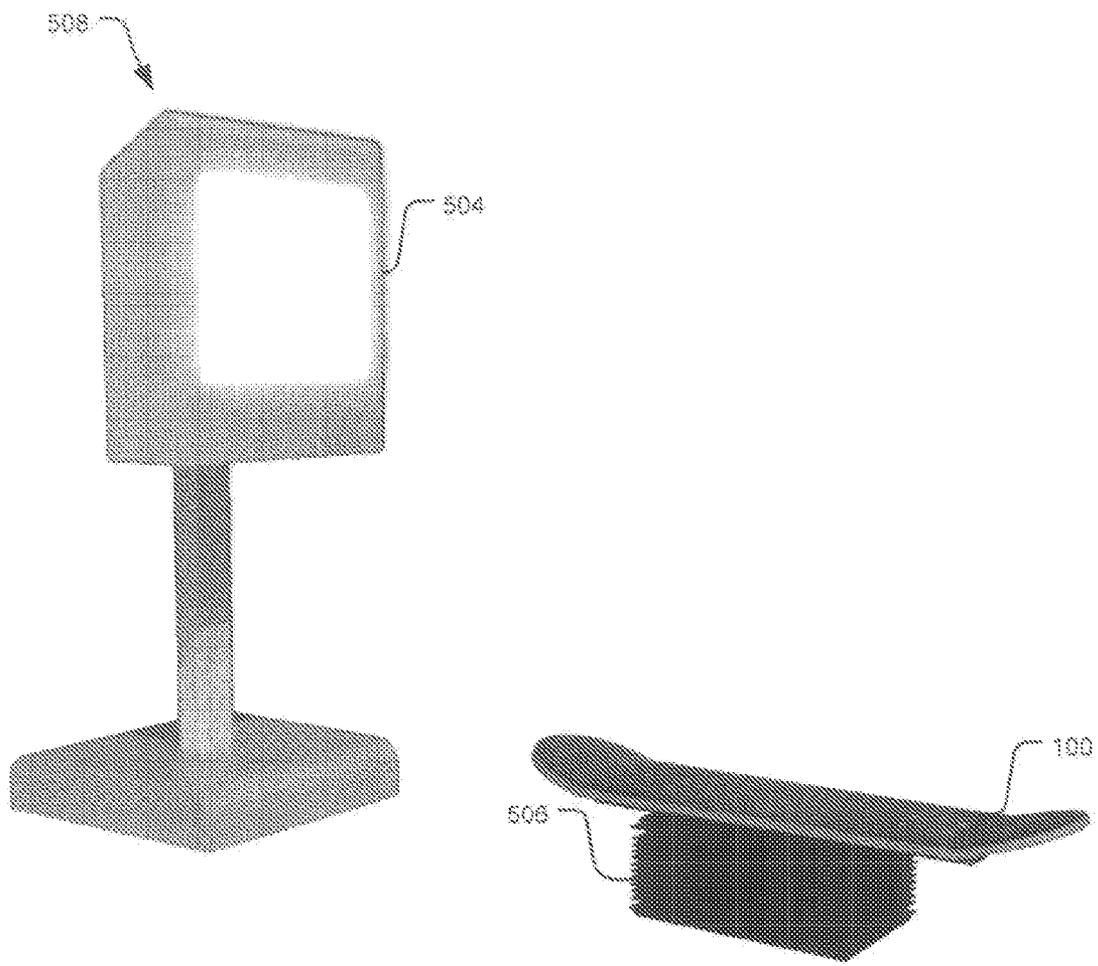


FIGURE 5

## SKATEBOARD SIMULATOR

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. §119(e) to provisional U.S. Patent Application No. 60/759,020, filed on Jan. 17, 2006, the disclosure of which is expressly incorporated by reference herein in its entirety.

### BACKGROUND OF THE INVENTION

#### [0002] 1. Field of the Invention

[0003] The invention is directed generally to a providing a simulated boarding activity and more particularly to a simulated skateboard.

#### [0004] 2. Related Art

[0005] Skateboarding is a popular pastime and sport for many people. However, it requires a large amount of space and/or specialized facilities. In some urban areas, it may be difficult to find the necessary space to participate in the sport. Moreover, specialized facilities may be expensive to build and maintain. Additionally, skateboarding is subject to the weather, daylight and direct participation in the sport may be dangerous and cause injuries.

[0006] Accordingly, there is a need for an alternative to traditional skateboarding that is not subject to the drawbacks noted above.

### SUMMARY OF THE INVENTION

[0007] The invention meets the above needs and avoids the disadvantages and drawbacks of the prior art by providing a simulated skateboard system. The invention may be implemented in a number of ways. According to one aspect of the invention, a skateboard simulator includes a base, at least one support, a skateboard deck moveably mounted on the base by the at least one support, and a display that presents an image. The image presented on the display is responsive to movement of the skateboard deck.

[0008] Accordingly, in one aspect of the invention a skateboard simulator includes a base, at least one support, a skateboard deck moveably mounted on the at least one support, and a display that presents an image, where the image presented on the display is responsive to movement of the skateboard deck.

[0009] According to another aspect of the invention, a board sport simulator includes a base, at least one support, a board deck moveably mounted on the at least one support, and a display that presents an image, where the image presented on the display is responsive to movement of the board deck.

[0010] Additional features, advantages, and embodiments of the invention may be set forth or apparent from consideration of the following detailed description, drawings, and claims. Moreover, it is to be understood that both the foregoing summary of the invention and the following detailed description are exemplary and intended to provide further explanation without limiting the scope of the invention as claimed.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are included to provide a further understanding of the invention, are incor-

porated in and constitute a part of this specification, illustrate embodiments of the invention and together with the detailed description serve to explain the principles of the invention. No attempt is made to show structural details of the invention in more detail than may be necessary for a fundamental understanding of the invention and the various ways in which it may be practiced. In the drawings:

[0012] FIG. 1 illustrates a side view of a skateboard simulator constructed according to principles of the invention;

[0013] FIG. 2 is an end view of the skateboard simulator of FIG. 1;

[0014] FIG. 3 shows a perspective view of another embodiment of the skateboard simulator constructed according to the principles of an invention;

[0015] FIG. 4 is a side view of the skateboard simulator according to FIG. 3; and

[0016] FIG. 5 is a perspective view of the invention, useable with the embodiment of FIGS. 1 and 3, including a monitor constructed according to the principles of the invention.

### DETAILED DESCRIPTION OF THE INVENTION

[0017] The embodiments of the invention and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments and examples that are described and/or illustrated in the accompanying drawings and detailed in the following description. It should be noted that the features illustrated in the drawings are not necessarily drawn to scale, and features of one embodiment may be employed with other embodiments as the skilled artisan would recognize, even if not explicitly stated herein. Descriptions of well-known components and processing techniques may be omitted so as to not unnecessarily obscure the embodiments of the invention. The examples used herein are intended merely to facilitate an understanding of ways in which the invention may be practiced and to further enable those of skill in the art to practice the embodiments of the invention. Accordingly, the examples and embodiments herein should not be construed as limiting the scope of the invention, which is defined solely by the appended claims and applicable law. Moreover, it is noted that similar reference numerals represent similar parts throughout the several views of the drawings.

[0018] FIG. 1 illustrates a side view of a skateboard simulator designed according to principles of the invention, and FIG. 2 is an end view of a skateboard simulator of FIG. 1. The stationary skateboard simulator includes a stationary skateboard deck **100** mounted to a shaft mount **110** of a base **120** by one shaft **140** in the center of the skateboard deck **100**. The shaft **140** allows the deck **100** to rotate (side to side) along the axis of the shaft **140**, mimicking the way a normal skateboard flexes.

[0019] The board has a series of springs **130** on either side of the skateboard deck **100** attached to the bottom of the skateboard deck **100** to the stationary base **120**. The springs **130** provide resistance to keep the skateboard deck **100** centered as the user turns on the skateboard deck **100**. The shaft **140** may have an optical sensor, accelerometer, or any

other type of sensor that measures the rotation of the shaft or the like. The sensor outputs an electrical signal transmitted through a cable or the like that may run down through the base **120** to a microcontroller mounted inside the stationary base.

[0020] Additionally, the stationary skateboard may also optionally include rotating wheels **150** on either side or both of the board. The wheels **150** may be spun by the user pushing with their foot, simulating the way one would push off the ground to propel a skateboard forward. This optional arrangement is shown in FIG. **2** only, but may also be applied to the FIG. **3** embodiment.

[0021] In particular, FIGS. **3** and **4** show another embodiment of the invention. In particular, the skateboard deck **100** as shown in FIGS. **3** and **4** may be mounted to a first support plate **304** and a second support plate **306**. The first support plate **304** and the second support plate **306** may in turn be attached to a main support plate **302**. Attachment of the plates **302**, **304**, **306** may be through adhesive, mechanical fasteners, and so on. The main support plate **302** may in turn be attached to a support **308** again through any known attachment. The support **308** is rotationally connected to the shaft **140** allowing the skateboard deck **100** to rotate side to side freely. The shaft is held by a shaft support **322**.

[0022] The support **308** may also contact a series of rollers **312** that are mounted on roller shafts **316** mounted in roller holders **314**. The rollers **312** provide a smooth contacting force between the roller side of the support **308** and the base **120**. In this regard, the roller **312** and roller holder **314** are spring loaded on the shaft **110** biased by springs **130**. It should be noted that although an exemplary structure of rollers and springs and shafts are shown with regard to FIGS. **1** through **4**, any type of structure that provides a smooth realistic side to side motion with respect to the skateboard deck **100** is contemplated with respect to the invention. The skateboard deck **100** is further supported on a base **120**. The base **120** may be attached to the floor or other type of support structure through for example, a bolt **320** and a securing nut **318**. The bolt **320** may be for example, a lag bolt that is embedded into the floor below the skateboard deck **100**.

[0023] Operation of the skateboard simulator may be provided through various sensor controls such as for example, an encoder hub disc **402** that may be mounted on the shaft **140** or the shaft support **322**. The shaft support **322** may also support an encoder reader **404** that may be attached thereto with mechanical fasteners such as screws as well known in the art. The various sensor devices that are arranged in and about the skateboard deck **100** may initially send their signals to a circuit board **324** that may be arranged in or about the skateboard deck. The circuit board may be for example, attached to a circuit board support **322** as shown in FIGS. **3** and **4** and may include a microcontroller.

[0024] The microcontroller may send a signal as a simulated mouse position representing the direction Left=Negative or Right=Positive followed by a number representing an integer value of the number of degrees the board is tilted from its centered state, through a USB cable or the like leading out the front of the stationary base to a PC or the like.

[0025] This particular configuration allows the entire skateboard assembly to be powered through a single cable,

in this case a USB cable. The microcontroller connects to the PC as a Human Interface Device (HID) which is a standard protocol used to send key strokes and mouse positions to an operating system. The microcontroller may send the tilt of the skateboard deck encoded as a mouse position at a regular interval. The PC runs a game based on the Torque game engine which captures system events, including mouse and keyboard events. The game may use the mouse events to control the turning of the character in the game.

[0026] FIG. **5** shows exemplary arrangements of the skateboard simulator including skateboard deck **100**. The skateboard deck **100** and supporting structure may be mounted in and about a set of bellows **506**. In particular, the skateboard **100** may be mounted above the bellows **506** while the remaining structures shown in FIGS. **1** to **4** may be mounted inside the bellows structure **506**. The bellows structure **506** provides a safe operating environment for the user of the skateboard simulator that is standing on top of the skateboard deck **100**. In particular, the bellows **506** prevent hands, fingers and the like from being injured with respect to that internal structure.

[0027] FIG. **5** further shows the arrangement of a monitor **504** which may be arranged in front of the skateboard simulator including skateboard deck **100**. In particular, the monitor **504** may include a housing of **508**. The housing **508** may contain the aforementioned PC computer or may hold additional structure or less structure.

[0028] The PC has an update system that allows the operator to easily change the content on the PC so it may be used as a dynamic media delivery device. The operator may log onto a website on a separate computer, select new and upcoming content and download it to a storage device (for example to a USB stick or the like) as a single file. When the operator inserts the USB stick into the PC, the computer may automatically install the new content without any user intervention. The update system allows an operator to install upcoming updates that may only become active at a later date. This way an operator may install the same update on multiple machines and have the updates all activate at the same time at a future date. Multiple updates may be installed at once so that content can change from time to time without any further user intervention.

[0029] Although the examples of the invention have been directed to a skateboard, other sports based devices may be utilized using the same configuration as described above. In particular, the skateboard arrangement noted above may be replaced with a snowboard type of arrangement with the same simulation as a skateboard being replaced with a snow ski scene; or surfboard type of arrangement with the simulation being that of surf and waves. Similarly, the skateboard arrangement noted above may be replaced with a ski type of arrangement including snow skiing or water skiing and again the image being replaced with that of down-hill skiing or a water-based environment.

[0030] While the invention has been described in terms of exemplary embodiments, those skilled in the art will recognize that the invention can be practiced with modifications in the spirit and scope of the appended claims. These examples given above are merely illustrative and are not meant to be an exhaustive list of all possible designs, embodiments, applications or modifications of the invention.

What is claimed is:

- 1. A skateboard simulator comprising:
  - a base;
  - at least one support;
  - a skateboard deck moveably mounted on said at least one support; and
  - a display that presents an image;
 wherein the image presented on said display is responsive to movement of said skateboard deck.
- 2. The skateboard simulator according to claim 1 wherein said base is configured to be attached to a floor surface.
- 3. The skateboard simulator according to claim 1 wherein said base is configured to support a circuit board.
- 4. The skateboard simulator according to claim 1 wherein said base is configured to hold at least one support.
- 5. The skateboard simulator according to claim 4 wherein said at least one support comprises a shaft for rotatably connecting to said skateboard deck.
- 6. The skateboard simulator according to claim 1 further comprises spring mounted rollers arranged on said base and engaging said skateboard deck.
- 7. The skateboard simulator according to claim 1 further comprises bellows, wherein said bellows house at least one of said base and said at least one support.
- 8. The skateboard simulator according to claim 1 wherein said display comprises a housing and a monitor.
- 9. The skateboard simulator according to claim 1 further comprising a sensor that is configured to sense the orientation and/or movement of said skateboard deck.
- 10. The skateboard simulator according to claim 9 further comprising one of a personal computer and microcontroller configured to receive sensor outputs from said sensor and forward said sensor outputs to said display in order to present the image.

- 11. A board sport simulator comprising:
  - a base;
  - at least one support;
  - a board deck moveably mounted on said at least one support; and
  - a display that presents an image;
 wherein the image presented on said display is responsive to movement of said board deck.
- 12. The board sport simulator according to claim 11 wherein said base is configured to be attached to a floor surface.
- 13. The board sport simulator according to claim 11 wherein said base is configured to support a circuit board.
- 14. The board sport simulator according to claim 11 wherein said base is configured to hold at least one support.
- 15. The board sport simulator according to claim 14 wherein said at least one support comprises a shaft for rotatably connecting to said board deck.
- 16. The board sport simulator according to claim 11 further comprises spring mounted rollers arranged on said base and engaging said board deck.
- 17. The board sport simulator according to claim 11 further comprises bellows,
  - wherein said bellows house at least one of said base and said at least one support.
- 18. The board sport simulator according to claim 11 wherein said display comprises a housing and a monitor.
- 19. The board sport simulator according to claim 11 further comprising a sensor that is configured to sense the orientation and/or movement of said board deck.
- 20. The board sport simulator according to claim 19 further comprising one of a personal computer and microcontroller configured to receive sensor outputs from said sensor and forward said sensor outputs to said display in order to present the image.

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