United States Patent [19]

Pifer

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[54] **SURFING SIMULATOR**

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[52] **U.S. Cl.** ..... **272/57 B**, 272/54, 272/1 B, 46/88

[51] **Int. Cl.** **A63b 69/18**

[58] **Field of Search** ..... 272/54, 55, 57 A, 57 B, 272/57 D, 57 E, 60 R, 65, 66, 70; 280/11.28, 280/11.37 R, 87.04 R, 87.04 A; 267/182; 35/29 R

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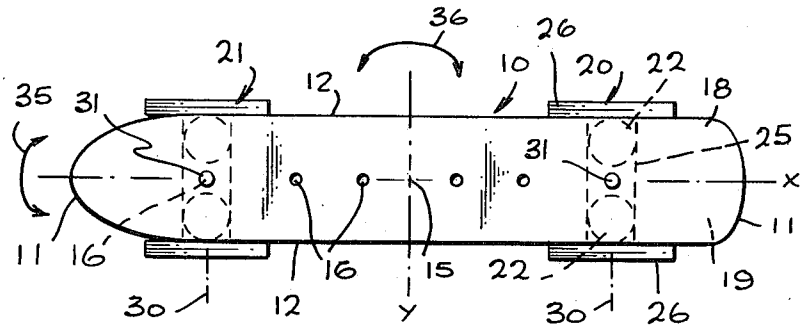
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[57] **ABSTRACT**

A surfing simulator consists of a top board which is suspended by a spring suspension system consisting of two units. In one embodiment, each unit includes two spaced apart parallel coil springs. The units are used to suspend the top board above an appropriate surface, e.g., ground. The rockability of the top board about one axis when a person steps on the board, is dependent on the orientations of the springs with this axis. The rockability of the board about a transverse axis depends on the spacing between the two units. Both the orientations of the springs and the spacing between the units is easily variable.

2 Claims, 5 Drawing Figures



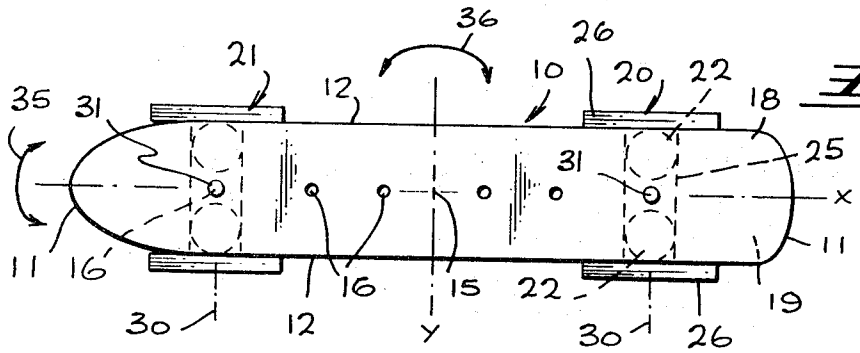


Fig. 1

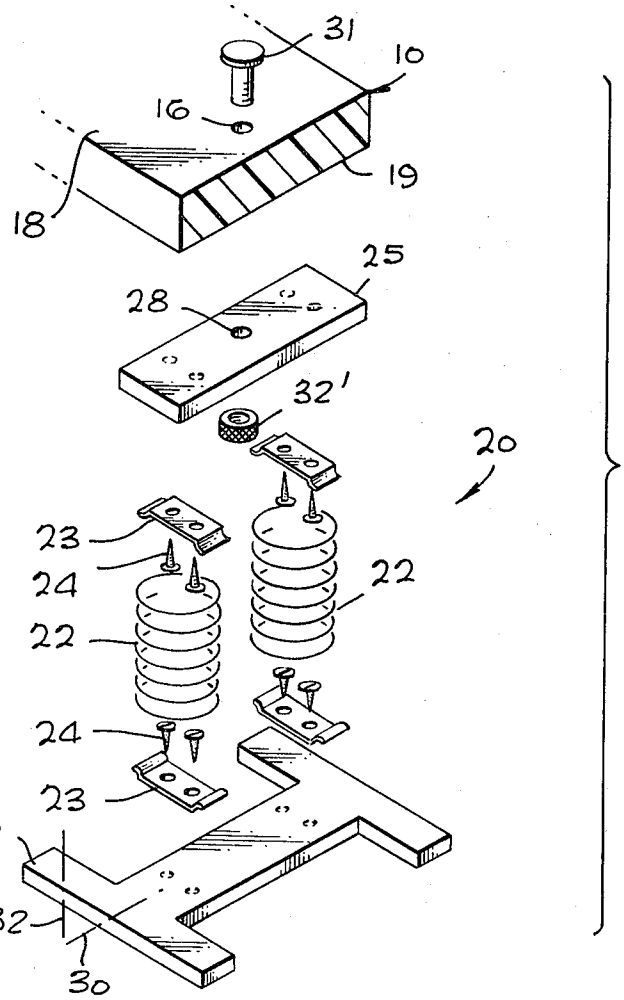


Fig. 2

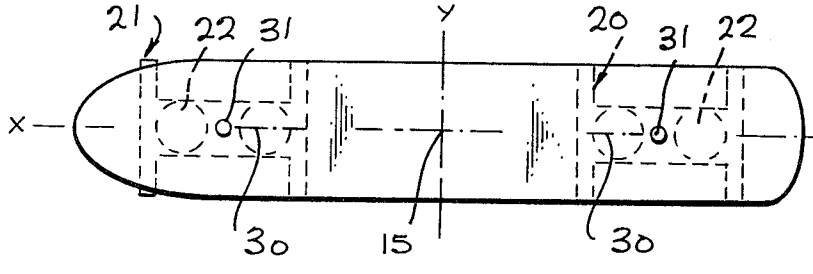


Fig. 3

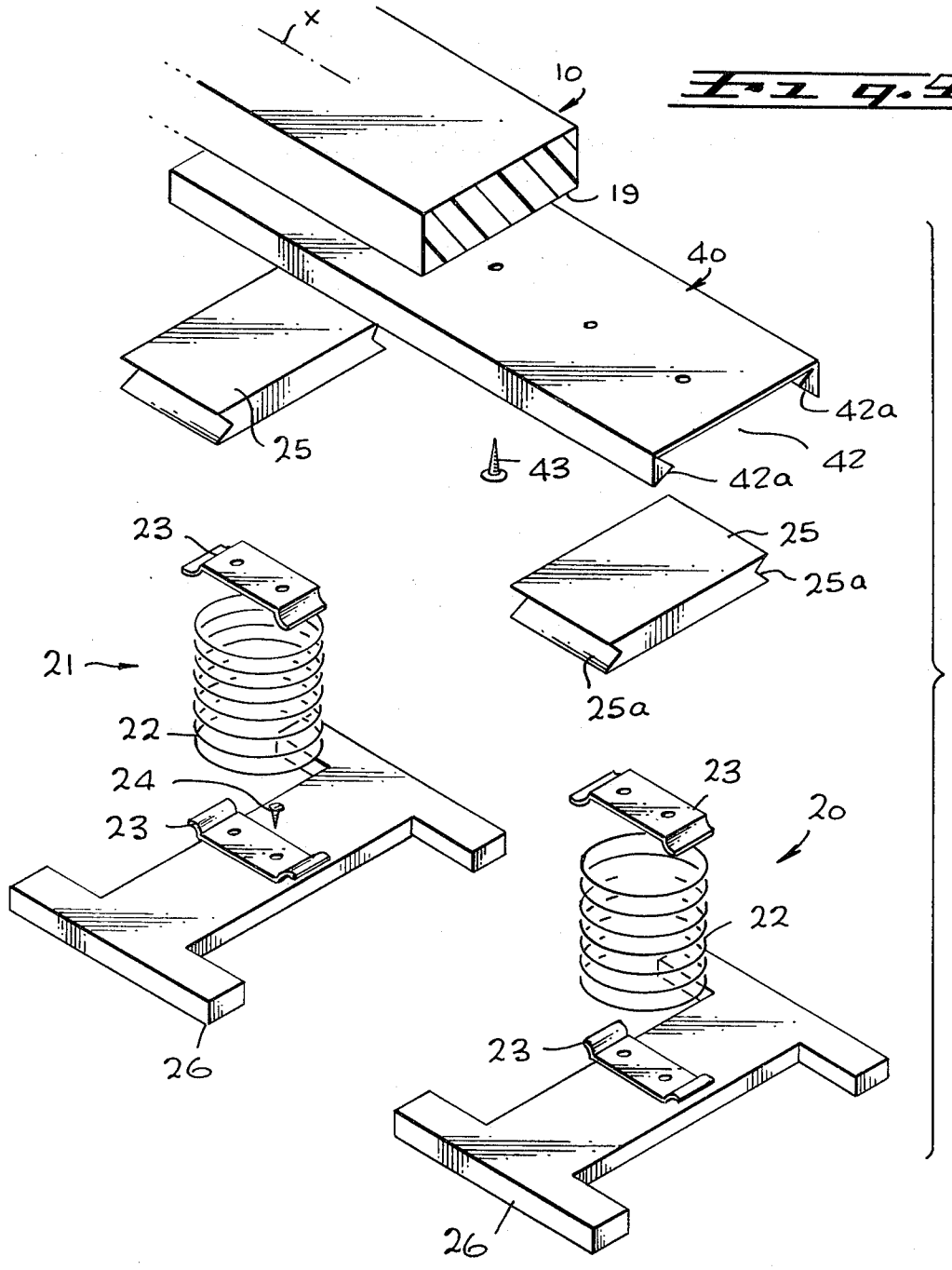

X
10
19
40
42a
42
25
43
42a
25
25a
25a
23
21
22
24
23
26
23
20
22
23
26

Fig. 4

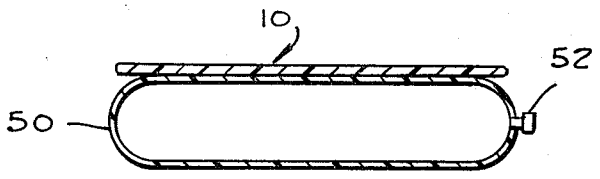

10
52
50

Fig. 5

SURFING SIMULATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a surfing simulator and, more particularly, to a simulator for learning and practicing the art of water surfing without resort to any body of water.

2. Description of the Prior Art

In recent years water surfing has become a very popular sport, particularly among young people. The development of the dexterity and skill necessary to become a competent surfer requires months of daily practice, all of which must take place in a relatively large body of water, such as the ocean or a large lake, and only when waves of reasonable size and intensity are present.

OBJECTS AND SUMMARY OF THE INVENTION

It is a primary object of the present invention to provide a novel surfing simulator with which the art of surfing can be learned without the need for a body of water.

Another object of the present invention is to provide a novel surfing simulator with which a beginner can teach himself the art of surfing without resort to a body of water and waves.

A further object of the invention is to provide a novel surfing simulator with which the art of surfing can be learned by a beginner and which is adjustable to enable experienced surfers to improve and/or retain their surfing skills, all without the need for a surfboard or any body of water, and which can be used within the confines of a small area, either indoor or outdoor.

These and other objects of the invention are achieved by providing a surfing simulator, hereinafter simply referred to as the simulator, which includes a top board, supported by an adjustable suspension system. The top board is generally shaped like a conventional surfboard, defining a longitudinal axis extending along the board length and a transverse axis extending along the board width. The suspension system is adjustable to control the rotation or rockability of the board about either or both axes.

Typically, the suspension system includes two identical suspension units. When used by a beginner, the two suspension units are oriented with respect to the board and with respect to one another, so as to minimize the rockability of the board about either axis. As the surfing skill increases, the units are alignable in a direction parallel to the longitudinal axis so as to provide maximum board rockability about the longitudinal axis. The units are also adjustably movable with respect to one another. By reducing the distance between them, the rockability of the board about the transverse axis is increased.

The novel features of the invention are set forth with particularity in the appended claims. The invention will best be understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of one embodiment of the invention;

FIG. 2 is an expanded view of a suspension unit **20**, shown in FIG. 1;

FIG. 3 is another top view of the embodiment shown in FIG. 1;

FIG. 4 is an expanded view of another embodiment of the invention; and

FIG. 5 is a side cross-sectional view of yet another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Attention is first directed to FIG. 1 which is a top view of one embodiment of the invention. The novel simulator is shown comprising a top board **10**, which may be shaped as a surfboard. Board **10**, which is essentially rectangular, except for its short sides **11**, which are shown as curved, defines a longitudinal axis, designated X which extends parallel to the long sides **12** and through the board center **15**. The board also defines a transverse axis Y which also extends through the center **15** and is perpendicular to the board's long sides **12**. A plurality of holes **16** along the X axis, spaced on opposite sides of center **15**, extend from the board's top side **18** to its bottom side **19**.

The board **10** is suspended above an appropriate surface, such as the ground, by means of two identical suspension units **20** and **21**, which together form an adjustable spring suspension system. An expanded view of one of the units, such as unit **20**, is shown in FIG. **2**. The unit includes a pair of coil springs **22** which are spaced apart and secured by means of clips **23** and screws **24** between a top member **25** and a base member **26**. The top member **25** has a hole **28**.

The unit, when assembled, can be thought of as defining a plane **30** with the longitudinal axes of the two springs **22** parallel to one another and in plane **32**. The hole **28** is preferably equidistant from the two springs **22**. Each unit is attachable to the top board **10** by means of a bolt **31**, which extends through one of the holes **16**, the unit's hole **28**, and a nut **32**. By tightening the nut on the screw, the unit's top member **25** is biased against the bottom side **19** of board **10**.

As shown in FIG. **1**, the two suspension units **20** and **21** are positioned so that their planes **30**, represented by dashed lines **30**, are parallel to the transverse axis Y. In this orientation, the two springs of each unit are on either side of the longitudinal axis X. Consequently, they minimize the rotation or the rockability of the board **10** about axis X, represented by arrow **35** when a person using the simulator attempts to get on top of the board **10**. The rockability of the board **10** about the axis X may easily be adjusted by varying the orientations of the planes **30** of the two units with respect to the board's axis X. For example, as shown in FIG. **3**, the planes **30** of the two units are aligned along the axis X, i.e., are perpendicular to the Y axis. Clearly in such an orientation, the support which the springs provide on either side of axis X is a minimum. Consequently, the rockability of the board about the axis X is maximized.

From the foregoing, it should thus be apparent that the rockability of the board **10** about the longitudinal axis X is dependent on the orientations of the support units with respect to the board's axis X. These orientations are easily variable by means of the two screws **31** and the nuts **32** with which the units are releasably clamped to the board. Clearly, the rockability of the board **10** about axis X may be varied to any desired value between the minimum represented by the units' orientations shown in FIG. **1**, and the maximum shown

by the units' orientations in FIG. 3 by orientations of one or both units in which either or both are neither parallel nor perpendicular to the transverse axis Y. That is, either unit may be oriented so that its plane **30** forms an angle ϕ with respect to the axis X where $0 \leq \phi \leq 90°$.

It should be appreciated that the rockability of the top board **10** about the transverse axis Y (or an axis parallel thereto), as represented in FIG. **1** by arrow **36,** depends on the spacing between the two units. The spacing is easily varied by providing more than two holes **16** in board **10,** as shown in FIG. **1.** In FIGS. **1** and **3,** the units are shown clamped through two holes **16** which are farthest from center **15** and at equal distances on opposite sides thereof. In this position, the rockability of the board about the axis Y is at a minimum level. The rockability is increased by clamping the units through holes **16** which are closer to center **15.** It should also be appreciated that the two holes **16** through which the units are clamped need not be at equal distances and on opposite sides of center **15.** Any two holes **16** may be used to control the rockability of the board **10** about any axis parallel to the axis Y which passes through any point between the two units.

The previously described simulator is particularly advantageous to one, beginning to learn the art of surfing, since therein the board's rockability is controllable about the longitudinal axis X as well as the transverse axis Y. If controlling the rockability of the board about the longitudinal axis X is not required, a simulator, such as the one shown in FIG. **4** may be used. Therein elements like those previously described are designated by like numerals. The primary difference between the two simulators is that in the one shown in FIG. **4,** each unit includes only one coil spring **22.** In this embodiment a member **40** which defines a channel **42** is secured to the bottom side **19** of board **10** by means of screws **43.** The top member **25** of each of units **20** and **21** defines grooved sides **25***a* which engage complementary sides **42***a* of channel **42.** Thus, the units are secured to the board **10** by sliding their top members **25** into the channel **42.** Again, the rockability of the board about any axis perpendicular to the longitudinal axis X is controlled by the spacing between the two units in the channel. It should be clear that in the embodiment of FIG. **4,** the board's rockability about the longitudinal axis X is not controllable, which is the case in the simulator described in connection with FIGS. **1–3.**

From the foregoing, it is thus seen that in accordance with the present invention, a simulator is provided in which the rockability of its top board on which a person, learning or developing the skills of surfing, attempts to get on and stand is easily controllable. The board is suspended by two separate suspension units which together form a spring suspension system for the board. By controlling the orientations of the units with respect to the board and/or the spacing between them, the board's rockability about one or more axes is easily controllable. Clearly, in the simulator of the present invention, this is easily achievable. In the embodiment shown in FIGS. **1–3,** the adjustment is achieved by first loosening the nuts **32,** adjusting the units to the desired orientation and then tightening the nuts. Also, the spacing between units is easily variable in either of the above described embodiments.

Hereinbefore, it was assumed that in each simulator, the two suspension units are identical. Clearly, such limitation is not necessary. If desired, one unit may include two springs, as shown in FIG. **2,** and the other unit may include a single centered spring, as shown in FIG. **4.** In such a case, the rockability of the board **10** about the longitudinal axis X may be made to vary along the board's length. For example, in the arrangement shown in FIG. **1,** by replacing unit **21** with a unit with a single centered-spring, the rockability of the board about the axis X is increased from a minimum near the board's back end due to the orientation of unit **20** to a maximum due to the single spring unit near the board's front end.

In practice, several factors control the selection of the springs. The springs should be long enough and have a spring constant so as to support the user on the top board, yet not be fully compressed when the user stands on the top board. In the embodiment, using two springs per suspension unit, smaller diameter springs with lower spring constants can be used than for the springs in the embodiment, shown in FIG. **4,** wherein each unit includes one spring. As an example, rather than to limit the invention thereto, each of the springs in the embodiment of FIGS. **1–3** may be 12 inches long, 4 inches in diameter. For a user weighing approximately 150 ±35 lbs., springs with a constant k of 20 lbs/in can be used. The constant k may be about 12 lbs/in for a user weighing between 50–115 lbs. In the embodiment shown in FIG. **4,** each spring may be 12 inches long, 6 inches in diameter with k of about 50 lbs/in. It should again be stressed that the specific springs are described only as examples and are not intended to limit the invention thereto.

Although in the previously described embodiments the simulator's board is shown supported by a spring suspension system, the invention need not be limited thereto. It has been discovered that many of the surfing skills can be acquired by using a simulator which consists of board **10** connected to the top and suspended by an inflatable flexible container **50,** as shown in FIG. **5.** Gas, e.g., air and/or fluid, e.g., water or a combination of both is used to inflate the container through opening **52.** The board's stability on the container **50** is adjusted by varying the amount of gas and/or fluid in the container.

Although particular embodiments of the invention have been described and illustrated herein, it is recognized that modifications and variations may readily occur to those skilled in the art and consequently, it is intended that the claims be interpreted to cover such modifications and equivalents.

What is claimed is:

1. A surfing simulator comprising:

an elongated board having top and bottom sides and defining a longitudinal axis in a plane parallel to said sides;

spring suspension means including first and second spring assemblies, each assembly including at least one coil spring and top and bottom members with the spring connected therebetween, with the spring axis extending between said members; and

connecting means for selectively connecting each assembly to the board by securing the assembly top member to the board's bottom side with the spring's axis perpendicular to said longitiduinal axis, whereby said springs suspend said board above a support surface with which the bottom members of said assemblies are in contact, with the

rockability of said board about an axis perpendicular to said longitudinal axis being a function of the spacing between said assemblies, each of said assemblies includes first and second coil springs spaced apart and parallel between the top and bottom members of the assembly, each assembly defines a plane in which the axes of the springs of the assembly lie, and said connecting means connect each assembly to said board at a selectable angular orientation of the assembly's plane with respect to the board's longitudinal axis so as to control the rockability of the board about said longitudinal axis, the top member of each assembly defining an aperture equidistant from the two springs of the assembly, said board defining a plurality of apertures along its longitudinal axis, and said connecting means include a pair of bolts, extending through one of said board apertures and the aperture of the top member of one assembly, with the rockability of the board about an axis perpendicular to its longitudinal axis being a function of the distance between the board's apertures through which the bolts extend.

2. A surfing simulator comprising:

an elongated board having top and bottom sides and defining a longitudinal axis in a plane parallel to said sides;

first and second identical spring assemblies, each assembly including a pair of similar coil springs, top and bottom members and means for securing said springs between said members, with the springs being spaced from one another and with the axis of each spring extending between said members, the axes of the two springs being an imaginary plane extending through said assembly; and

connecting means for connecting said assemblies to the bottom side of said board so as to suspend said board above said assemblies with each assembly being connected at a variable selected angular orientation of its plane with respect to said longitudinal axis, each assembly being connected to said board so that its springs are at equal distances from said longitudinal axis, with the planes of said assemblies being vertically oriented and said longitudinal axis is in a horizontal plane and the angular orientation of each assembly plane with respect to said longitudinal axis being variable between zero and ninety degrees, said board defining a plurality of apertures along said longitudinal axis, each aperture extending between the board's top and bottom sides, and said connecting means include means for each assembly which extend through a selected one of said apertures to connect the assembly to the board through the selected aperture to thereby vary the spacing between the assemblies connected to said board.

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