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Smith

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(54) **SNOWBOARD TRAINING DEVICE**

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USPC 280/87.01, 87.021, 87.041, 87.042, 280/14.21, 14.22
See application file for complete search history.

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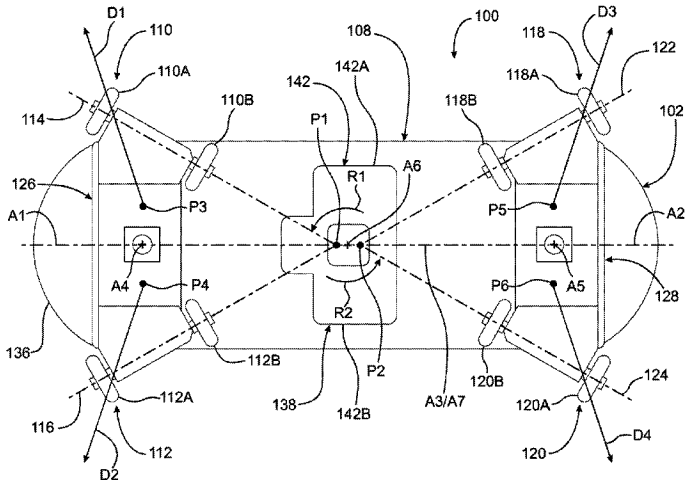
(57) **ABSTRACT**

A snowboard training device, including: a board; a first wheel assembly connected to an underside of the board and including first and second pairs of rotatable wheels with first and second axis of rotation, respectively; and a second wheel assembly connected to the underside of the board and including third and fourth pairs of rotatable wheels with third and fourth axis of rotation, respectively. The first and second axis are non-parallel. The third and fourth axis are non-parallel. The first and second portions of the first and second wheel assemblies, respectively, are displaceable with respect to the board.

20 Claims, 6 Drawing Sheets



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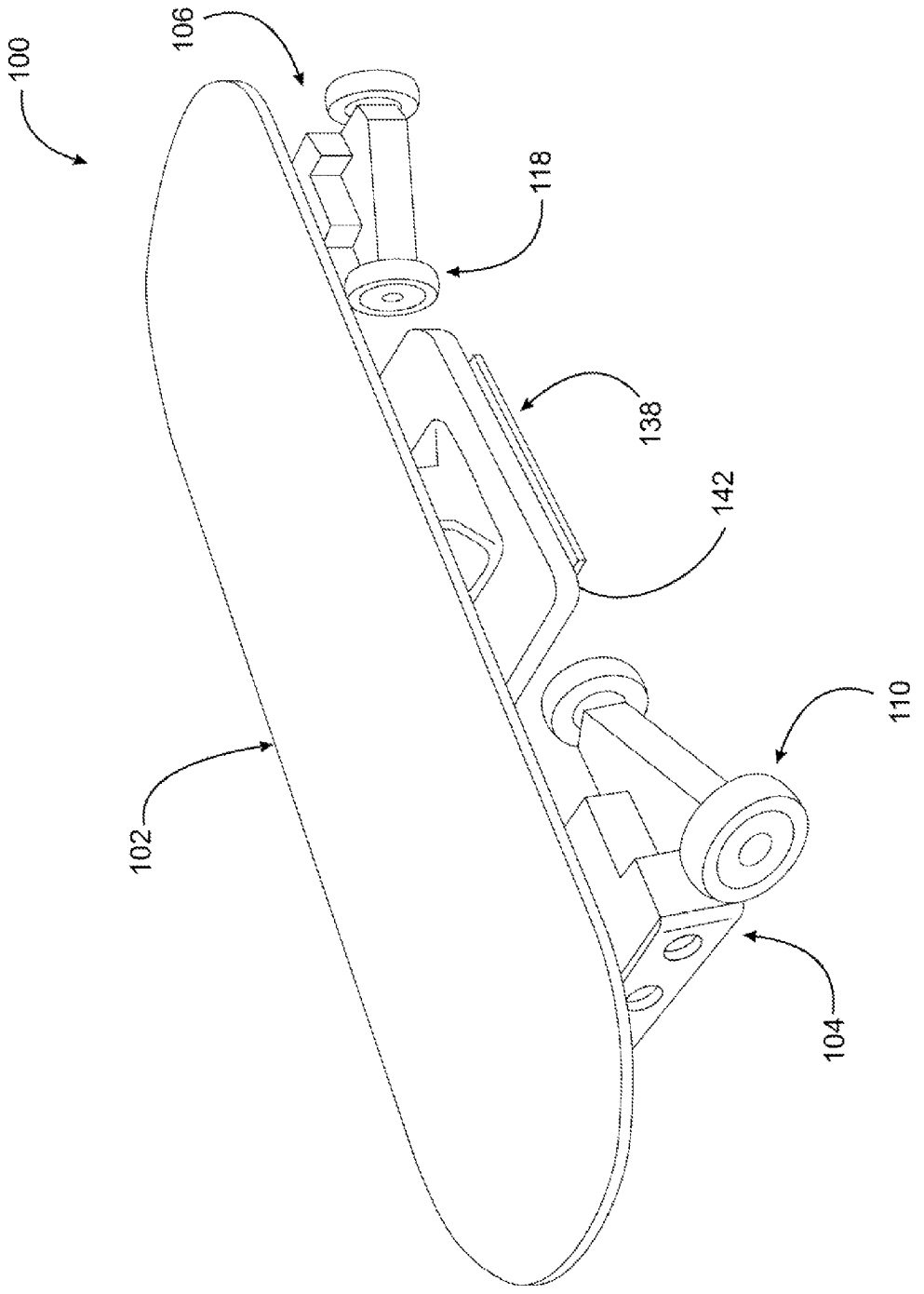


Fig. 1

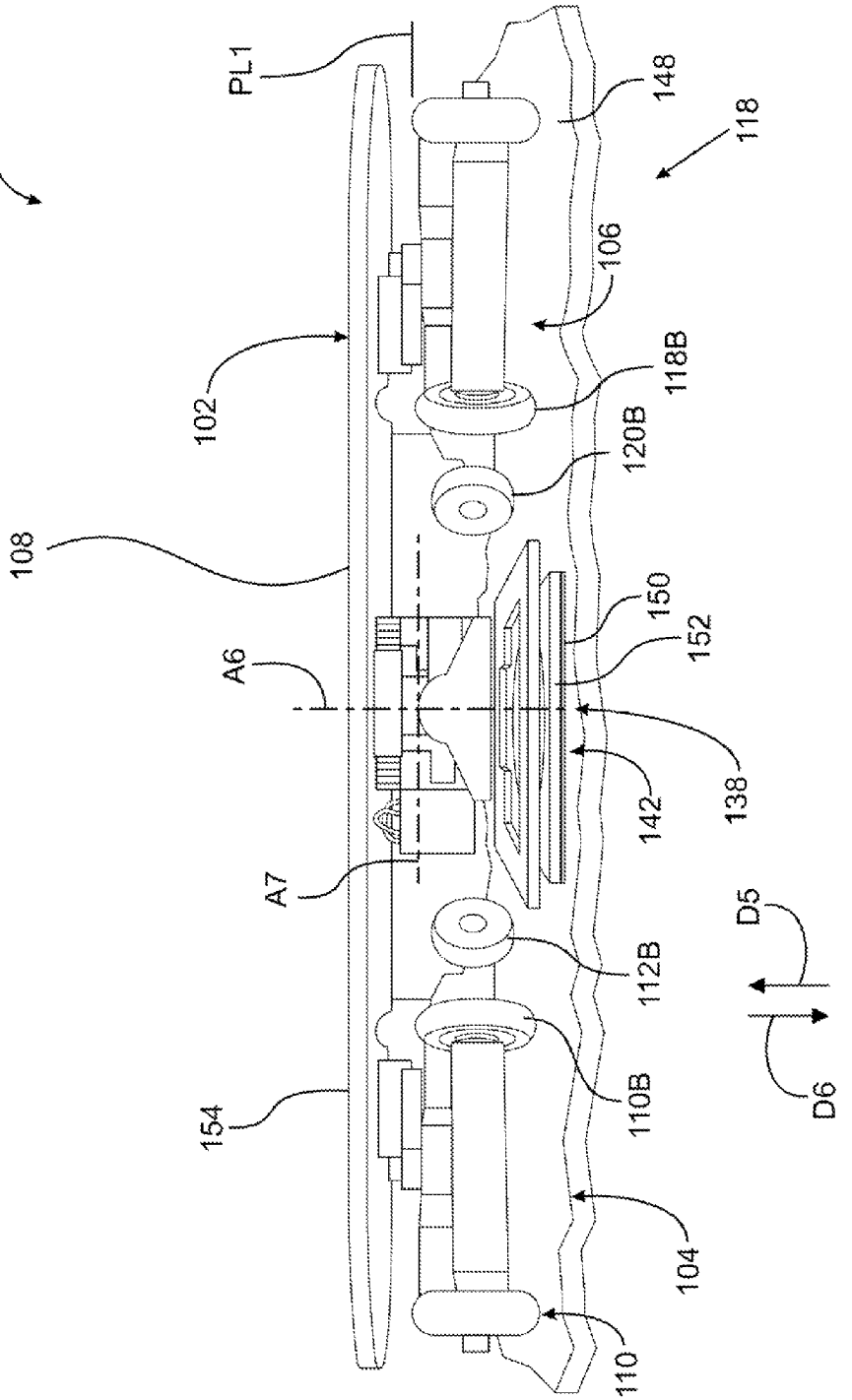
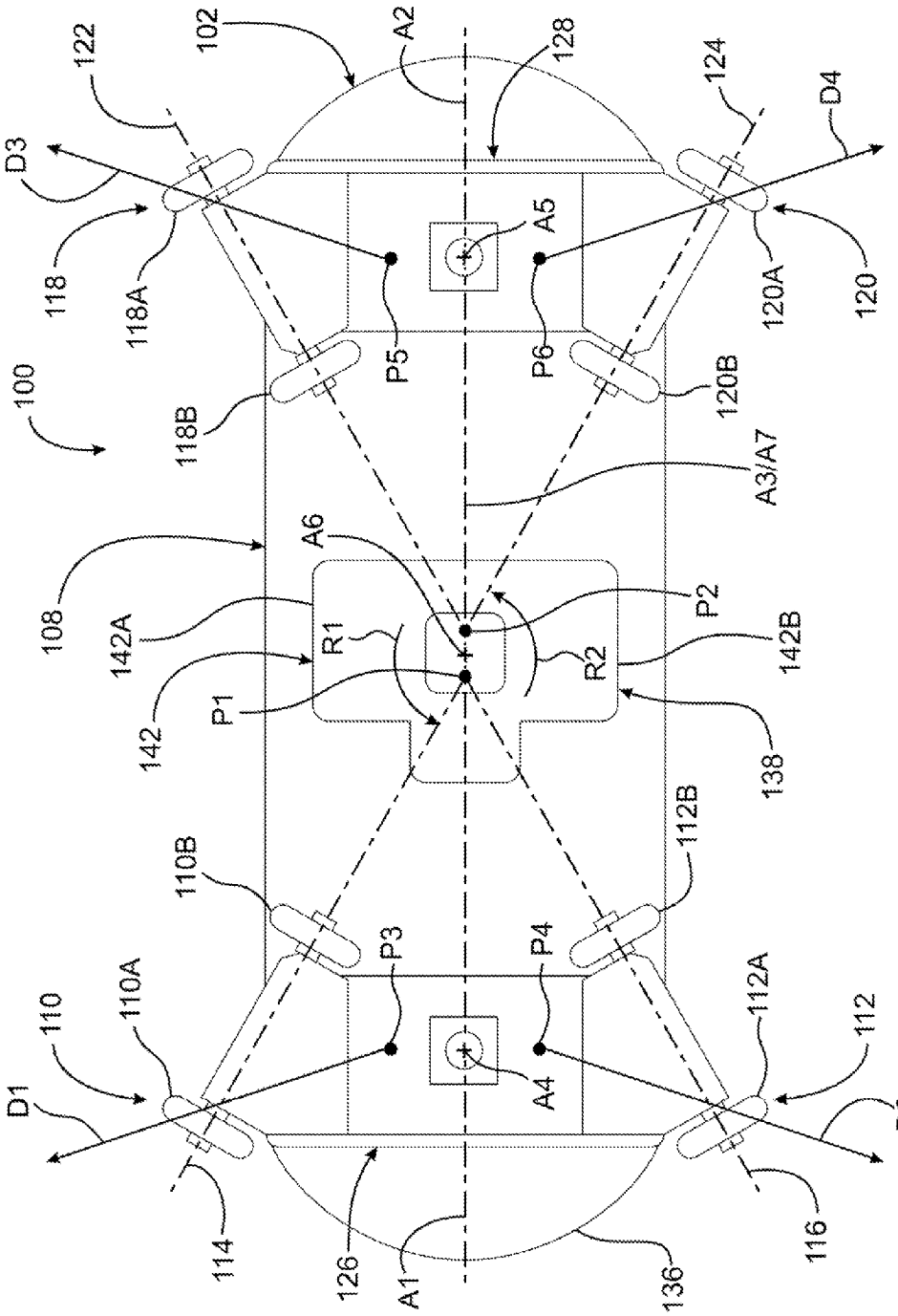

100
PL1
148
118
106
102
118B
120B
108
150
152
A6
138
142
A7
D5
112B
D6
110B
154
104
110

Fig. 2


102
A2
128
122
124
D3
D4
118
118A
120A
120
A5
P5
P6
100
118B
120B
A3/A7
A6
108
142A
R1
P2
142B
142
P1
R2
138
110B
112B
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D1
D2
A4
114
126
A1
136
116

Fig. 3

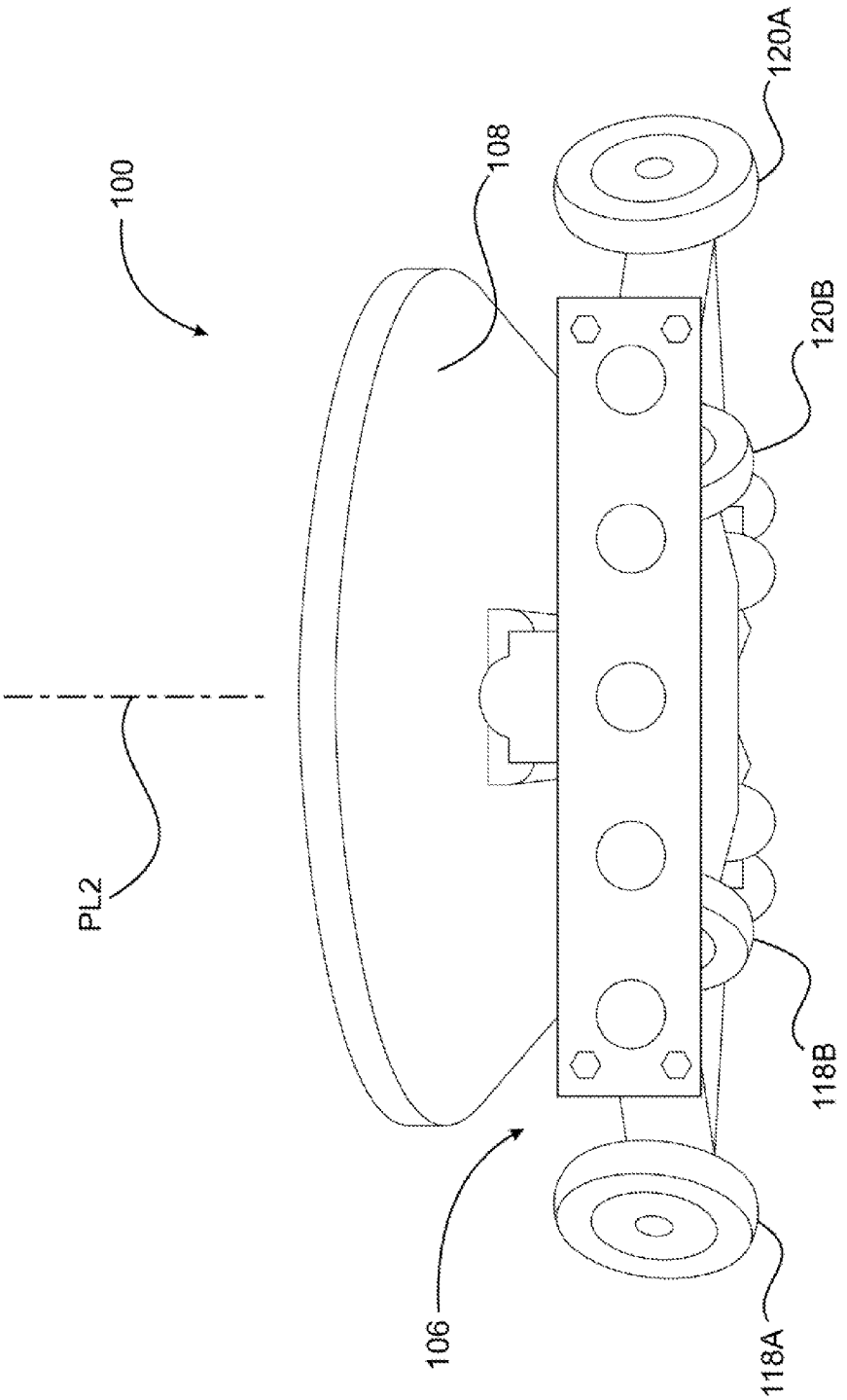

Fig. 4

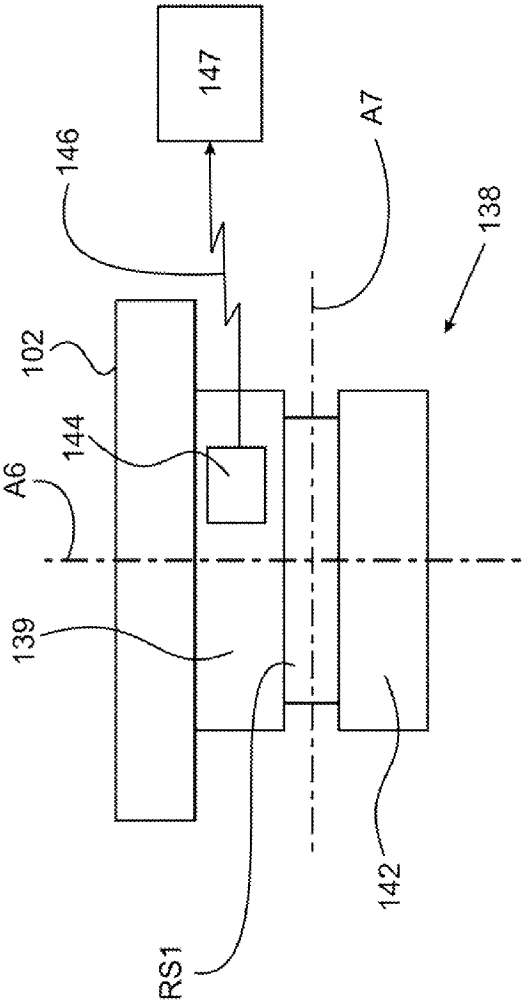
147
146
A7
138
102
144
A6
139
142
RS1

Fig. 5B

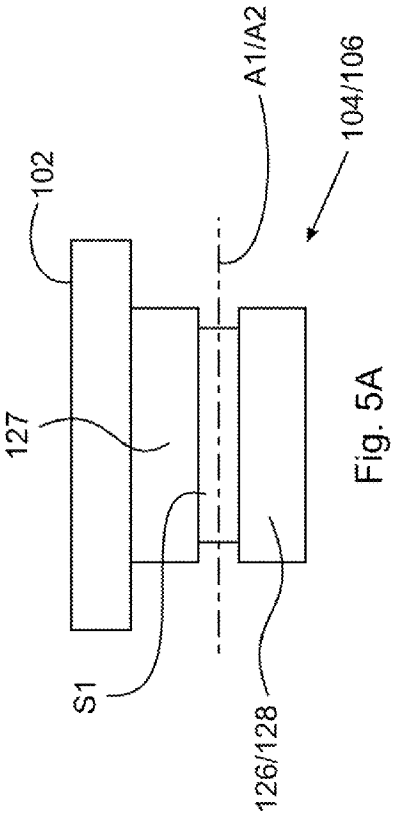
A1/A2
104/106
102
127
S1
126/128

Fig. 5A

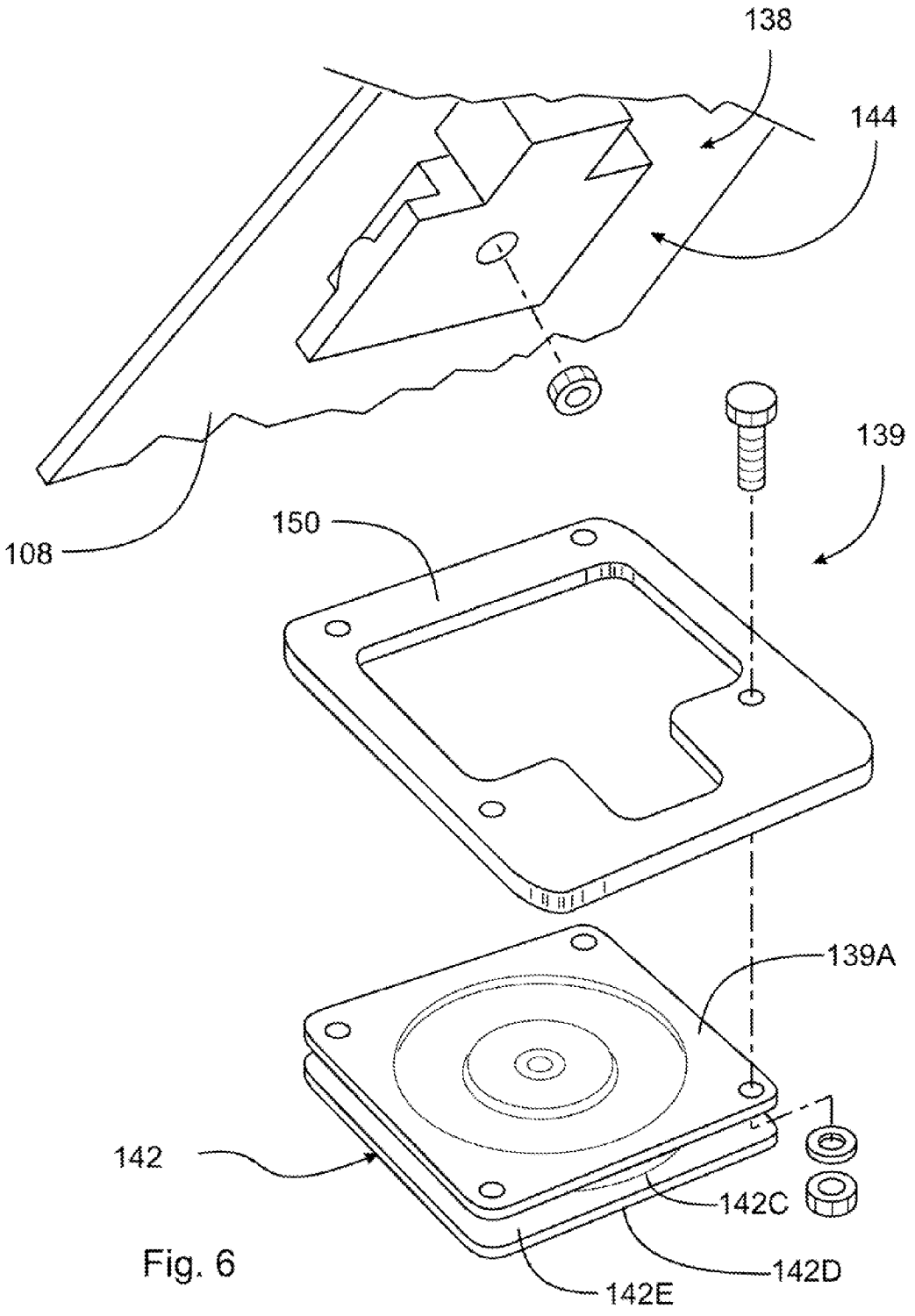

Fig. 6

SNOWBOARD TRAINING DEVICE

TECHNICAL FIELD

The present disclosure relates to a snowboard training device, in particular a device enabling realistic simulation of snowboarding movements. The present disclosure also relates to a device for generating and transmitting a signal to simulate snowboard activity based on the motion of the device.

BACKGROUND

Snowboarding is a sport rapidly increasing in popularity. The known prior art does not teach a means for providing training in snowboarding in a location remote from a ski slope.

SUMMARY

According to aspects illustrated herein, there is provided a snowboard training device, including: a board; a first wheel assembly connected to an underside of the board and including first and second pairs of rotatable wheels with first and second axis of rotation, respectively; and a second wheel assembly connected to the underside of the board and including third and fourth pairs of rotatable wheels with third and fourth axis of rotation, respectively. The first and second axis are non-parallel. The third and fourth axis are non-parallel. The first and second portions of the first and second wheel assemblies, respectively, are displaceable with respect to the board.

According to aspects illustrated herein, there is provided a snowboard training device, including: a board; first and second wheel assemblies connected to an underside of the board and including respective pluralities of wheels; and a center assembly connected to the underside of the board. At least a portion of the center assembly is rotatable with respect to the board, and respective portions of the first and second wheel assemblies are pivotable with respect to the board.

According to aspects illustrated herein, there is provided a method of forming a snowboard training device, including: connecting a first wheel assembly, including first and second pairs of rotatable wheels with first and second axis of rotation, respectively, to an underside of a board such that a first portion of the first wheel assembly is displaceable with respect to the board; connecting a second wheel assembly, including third and fourth pairs of rotatable wheels with third and fourth axis of rotation, respectively, to the underside of the board such that a second portion of the second wheel assembly is displaceable with respect to the board; orienting the first and second axis such that the first and second axis are non-parallel; and orienting the third and fourth axis such that the third and fourth axis are non-parallel.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments are disclosed, by way of example only, with reference to the accompanying schematic drawings in which corresponding reference symbols indicate corresponding parts, in which:

FIG. **1** is a top perspective view of a snowboard training device;

FIG. **2** is a side view of the snowboard training device shown in FIG. **1**;

FIG. **3** is a bottom view of the snowboard training device shown in FIG. **1**;

FIG. **4** is an end view of the snowboard training device shown in FIG. **1**;

FIG. **5**A is a schematic block diagram of a swiveling wheel assembly;

FIG. **5**B is a schematic block diagram of a swiveling and rotating center assembly; and

FIG. **6** is an exploded view of a wheel assembly shown in FIG. **1**.

DETAILED DESCRIPTION

At the outset, it should be appreciated that like drawing numbers on different drawing views identify identical, or functionally similar, structural elements of the disclosure. It is to be understood that the disclosure as claimed is not limited to the disclosed aspects.

Furthermore, it is understood that this disclosure is not limited to the particular methodology, materials and modifications described and as such may, of course, vary. It is also understood that the terminology used herein is for the purpose of describing particular aspects only, and is not intended to limit the scope of the present disclosure.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this disclosure belongs. It should be understood that any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the disclosure.

FIG. **1** is a top perspective view of snowboard training device **100**.

FIG. **2** is a side view of snowboard training device **100** shown in FIG. **1**.

FIG. **3** is a bottom view of snowboard training device **100** shown in FIG. **1**.

FIG. **4** is an end view of snowboard training device **100** shown in FIG. **1**. The following should be viewed in light of FIGS. **1** through **4**. Device **100** includes board **102** and wheel assemblies **104** and **106**. The wheel assemblies are connected to underside **108** of the board. Wheel assembly **104** includes pair **110** and **112** of wheels rotatable about axis of rotation **114** and **116**, respectively. Wheel assembly **106** includes pairs **118** and **120** of rotatable wheels axis of rotation **122** and **124**, respectively. In an example embodiment, axis of rotation **114** and **116** are non-parallel. In an example embodiment, axis of rotation **122** and **124** are non-parallel. In an example embodiment, axis **114** and **116** intersect at point P**1** between assemblies **104** and **106**. In an example embodiment, axis **122** and **124** intersect at point P**2** between assemblies **104** and **106**.

Board **102** can be made of any material known in the art, including, but not limited to laminates or natural and/or synthetic materials. Board **102** is not limited to a particular size, shape, or thickness. The wheels for pairs **110**, **112**, **118**, and **120** can be any wheels known in the art.

FIG. **5**A is a schematic block diagram of a swiveling wheel assembly. The following should be viewed in light of FIGS. **1** through **5**A. In an example embodiment, portions **126** and **128** of assemblies **104** and **106** are displaceable with respect to the board. In an example embodiment, portions **126** and **128** are arranged to swivel about axis A**1** and A**2**, passing through assemblies **104** and **106**, respectively. For example, as shown in FIG. **5**A, portion **127** is fixed to board **102** and portion S**1** enables portions **126**/**128** to swivel about axis A**1**/A**2** with respect to portion **127** and board **102**. It should be understood that portions **127** and S**1** could be integral and that portion **127** could be integral to board **102**. Any means known in the art can be used for portion **127**, including, but not limited to, various spring and torsion bar configurations.

In an example embodiment, axis A1 and A2 are part of a single axis A3 passing through assemblies **104** and **106**. In an example embodiment, axis A1, A2, and A3 are substantially parallel to board **102**. In an example embodiment, axis A1, A2, and A3 do not intersect board **102**. In an example embodiment, the board includes outer peripheral edge **136** enclosing the underside. Wheel **110**A extends beyond the outer peripheral edge in a direction D1 from a point P3 on wheel assembly **104** to the outer peripheral edge. Wheel **112**A extends beyond the outer peripheral edge in a direction D2 from a point P4 on wheel assembly **104** to the outer peripheral edge. In an example embodiment, wheels **118**A and **120**A extend beyond the outer peripheral edge in directions D3 and D4 from point P5 and P6 on wheel assembly **104**, respectively, to the outer peripheral edge.

In an example embodiment, assembly **104**, in particular, portion **126**, is arranged to swivel such that as wheel **110**B approaches side **108** (moves in the general direction of D5), wheel **112**B moves away from side **108** (moves in the general direction of D6). That is, portion **126** rocks about axis A1. In like manner, portion **128** is arranged to swivel such that as wheel **118**B approaches side **108** (moves in the general direction of A5), wheel **120**B moves away from side **108** (moves in the general direction of A6). That is, portion **128** rocks about axis A2.

In an example embodiment, assemblies **104** and **106** are fixed with respect to rotation about axis A4 and A5, substantially orthogonal to the underside of the board and passing through assemblies **104** and **106**, respectively. Thus, in an example embodiment, assemblies **104** and **106** are fixed with respect to movement, in particular, rotation in plane PL1 parallel to side **108**, but can swivel with respect to side **108**, for example, in plane PL2, respectively, orthogonal to PL1 and passing through axis A4 and A5.

FIG. **5**B is a schematic block diagram of swiveling and rotating center assembly **138**. The following should be viewed in light of FIGS. **1** through **5**B. Device **100** includes center assembly **138** connected to the underside of the board between assemblies **104** and **106**. At least a portion of assembly **138** is able to rotate independently of the board, for example, about axis A6 passing though the board. For example, portion **139** is fixed to board **102** and portion **142** is able to rotate about axis A6 via rotation/swivel device RS1. Any means known in the art can be used for the rotating portion of RS1. It should be understood that portions **139** and RS1 can be integral and that portion **139** can be integral to board **102**.

In an example embodiment, portion **142** of assembly **138** is arranged to swivel about axis A7, passing through assembly **138**, in a manner similar to that described for portions **126**/**128** of assemblies **104**/**106**. In an example embodiment, axis A7 is part of axis A3. For example, as shown in FIG. **5**B, portion **139** is fixed to board **102**, or integral to the board, and portion RS1 enables portion **142** to swivel about axis A7 with respect to portion **139** and board **102**. Any means known in the art can be used for the swiveling portion of RS1, including, but not limited to, various spring and torsion bar configurations.

In an example embodiment, assembly **138**, in particular, portion **142**, is arranged to swivel such that as end **142**A approaches side **108** (moves in the general direction of D5), end **142**B moves away from side **108** (moves in the general direction of D6). That is, portion **142** rocks about axis A7.

In an example embodiment, the center assembly includes positional assembly **144** arranged to generate signal **146** including information regarding a position of the center assembly with respect to the board or movement of the center assembly with respect to the board. The positional assembly is arranged to transmit the signal to a computer-based device **147** so that, for example, the signal can be used to generate a video image simulating movement of the board. In an example embodiment, the positional assembly is arranged to generate the signal including information regarding rotation of the center assembly about axis A6 and swiveling of the center assembly with respect to axis A7.

Assembly **144** can include any mechanical and electrical components known in the art. Assembly **144** can be powered by line power or by an on-board power source, such as a battery, or rechargeable battery. Assembly **144** can transmit the signal using any means known in the art, including, but not limited to hard wire transmission and wireless transmission. In the figures, signal **146** is shown as a wireless signal.

In use, device **100** can be placed on a substantially planar and level surface, for example, surface **148** in FIG. **2**. Contact of assembly **138** with the surface fixes assembly **138** with respect to the floor. In an example embodiment, on-skid pads or material **150** is placed on surface **152** of portion **142** such that material **150** firmly contacts the surface. Wheels pairs **110**, **112**, **118**, and **120** are in contact with the surface. The user mounts top surface **154** of the board and by shifting balance and weight distribution causes the board to rotate about assembly **138** (in particular, portion **142**) and swivel with respect to assemblies **104**, **106**, and **138** in a manner simulating movement of a ski board in use. Wheels pairs **110**, **112**, **118**, and **120** are oriented, in particular, axes **114** and **116** and axes **122** and **124** are oriented, to cause the board rotate about axis A6, for example, in directions R1 and R2, in response to movement or shifting by the user. Assembly **144** tracks and monitors the displacement of the board. Thus signal **146** enables an accurate approximation of how the movements of the center assembly, and by extension of the user, translate into use of a snowboard.

FIG. **6** is an exploded view of wheel assembly **138** shown in FIG. **1**. The following provides further example detail regarding device **100**. In an example embodiment, portions **139** and RS1 include a rotating spring loaded top plate **139**A fixed to board **102** via spacer **150**. Portion **142** includes portion **142**C including bearings and one or more springs, which enable the swiveling motion of **142**. **142** also includes resilient pad **142**D, connected to fixed bottom plate **142**E, which counters and cushions the swiveling motion of **142**. For example, the pad enables **139**A to "bounce back" from an extreme swiveling position.

It will be appreciated that various of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Various presently unforeseen or unanticipated alternatives, modifications, variations, or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

What I claim is:

1. A snowboard training device, comprising:

a board;

a first wheel assembly connected to an underside of the board and including first and second pairs of rotatable wheels with first and second axes of rotation, respectively; and,

a second wheel assembly connected to the underside of the board and including third and fourth pairs of rotatable wheels with third and fourth axes of rotation, respectively, wherein:

the first and second axes are non-parallel;

the third and fourth axes are non-parallel; and,

first and second portions of the first and second wheel assemblies, respectively, are displaceable with respect to the board.

2. The snowboard training device of claim **1**, wherein:

the first and second portions of the first and second wheel assemblies, respectively, are arranged to swivel about fifth and sixth axes, respectively, passing through the first and second wheel assemblies, respectively.

3. The snowboard training device of claim **2**, wherein the fifth and sixth axes are substantially parallel to the board and do not pass through the board.

4. The snowboard training device of claim **1**, wherein:

the board includes an outer peripheral edge enclosing the underside;

a first wheel from the first pair of rotatable wheels extends beyond the outer peripheral edge; and,

a second wheel from the second pair of rotatable wheels extends beyond the outer peripheral edge.

5. The snowboard training device of claim **1**, wherein:

the board includes an outer peripheral edge;

a respective wheel from each of the first and second pair of rotatable wheels extends beyond the outer peripheral edge; and,

a respective wheel from each of the third and fourth pair of rotatable wheels extends beyond the outer peripheral edge.

6. The snowboard training device of claim **1**, wherein the first wheel assembly is arranged to swivel such that:

as a first wheel from the first pair of rotatable wheels approaches the underside of the board a second wheel from the second pair of rotatable wheels moves away from the underside of the board.

7. The snowboard training device of claim **1**, wherein the first and second wheel assemblies are arranged to swivel such that:

as respective first wheels from the first and third pairs of rotatable wheels approach the underside of the board respective second wheels from the second and fourth pairs of rotatable wheels move away from the underside of the board.

8. The snowboard training device of claim **1**, wherein:

the first and second axes intersect at a first point between the first and second wheel assemblies; and,

the third and fourth axes intersect at a second point between the first and second wheel assemblies.

9. The snowboard training device of claim **1**, wherein the first wheel assembly is fixed with respect to rotation about an axis passing through the board and the first and second wheel assemblies are fixed with respect to rotation about an axis passing through the board and the second wheel assembly.

10. The snowboard training device of claim **1**, further comprising a center assembly connected to the underside of the board, between the first and second wheel assemblies, so as to rotate independently of the board.

11. The snowboard training device of claim **10**, wherein:

at least a portion of the center assembly is arranged to swivel such that:

as a first end of the center assembly approaches the underside of the board a second end of the center assembly, opposite the first end of the center assembly, moves away from the underside of the board.

12. The snowboard training device of claim **10**, wherein at least a portion of the center assembly is arranged to swivel about an axis passing through the first and second wheel assemblies.

13. The snowboard training device of claim **10** wherein:

the center assembly includes a positional assembly arranged to generate a signal including information regarding a position of the center assembly with respect to the board or movement of the center assembly with respect to the board; and,

the positional assembly is arranged to transmit the signal to a computer-based device so that the signal can be used to generate a video image simulating movement of the board.

14. The snowboard training device of claim **13** wherein:

the center assembly is arranged to rotate about a seventh axis passing through the board;

the center assembly is arranged to swivel about an eighth axis orthogonal to the seventh axis; and, the positional assembly is arranged to generate the signal including information regarding:

rotation of the center assembly with respect to the seventh axis; and,

swiveling of the center assembly with respect to the eighth axis.

15. A snowboard training device, comprising:

a board;

first and second wheel assemblies connected to an underside of the board, wherein each of the first and second wheel assemblies is non-parallel with respect to a longitudinal axis of the board and each of the first and second wheel assemblies supports a plurality of wheels, respectively; and,

a center assembly connected to the underside of the board, wherein:

at least a portion of the center assembly is rotatable about an axis, wherein the axis is substantially perpendicular with respect to the board; and,

respective portions of the first and second wheel assemblies are pivotable with respect to the board about respective axes parallel to the longitudinal axis of the board and each wheel of the first and second wheel assemblies is secured such that each wheel is non-parallel with respect to the longitudinal axis of the board, respectively.

16. A method of forming a snowboard training device, comprising:

connecting a first wheel assembly, including first and second pairs of rotatable wheels with first and second axes of rotation, respectively, to an underside of a board such that a first portion of the first wheel assembly is displaceable with respect to the board;

connecting a second wheel assembly, including third and fourth pairs of rotatable wheels with third and fourth axes of rotation, respectively, to the underside of the board such that a second portion of the second wheel assembly is displaceable with respect to the board;

orienting the first and second axes such that the first and second axes are non-parallel; and,

orienting the third and fourth axes such that the third and fourth axes are non-parallel.

17. The method of claim **16**, wherein:

connecting the first and second wheel assemblies to the underside includes arranging the first and second portions to swivel about fifth and sixth axes, respectively passing through the first and second wheel assemblies, respectively; or,

connecting the first and second wheel assemblies to the underside includes arranging the first and second portions to swivel about fifth and sixth axes, respectively, that do not pass through the underside.

18. The method of claim **16**, wherein connecting the first and second wheel assemblies to the underside includes arranging the first and second portions such that:

the first and second axes intersect at a first point between the first and second wheel assemblies; and,

the third and fourth axes intersect at a second point between the first and second wheel assemblies.

19. The method of claim **16**, further comprising connecting a center assembly to the underside of the board such that at least a portion of the center assembly is:

rotatable with respect to a seventh axis passing through the board; and,

pivotable with respect to the board about an eighth axis orthogonal to the seventh axis.

20. The method of claim **16**, further comprising using the center assembly to:

generate a signal including information describing position or movement of the center assembly with respect to the board; and,

transmit the signal to a computer-based device.

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