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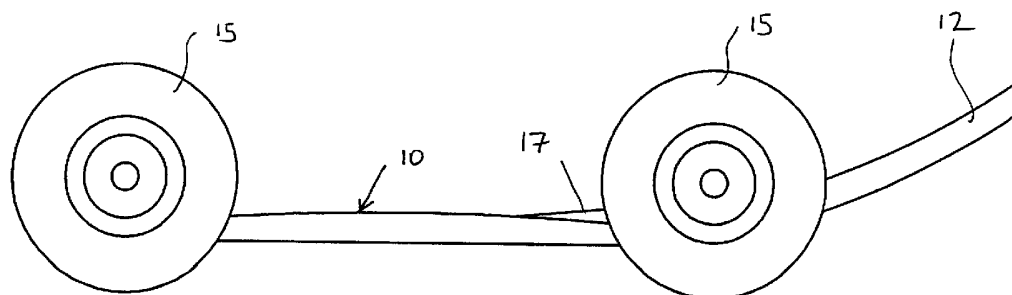
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(54) Title: ALL-TERRAIN BOARD



(57) Abstract: An all-terrain board comprises an elongate deck structure (10) having an upper surface on which front and rear axle assemblies (13, 14) are mounted, such that the deck structure (10) extends under the axis of wheel rotation. The rear end (12) of the deck structure (10) is upturned and extends rearwardly beyond the rear wheel (15), thereby providing a rear position for one of the rider's feet, which can be used as a kicktail to raise the front end (11) of the board to perform turns and other freestyle manoeuvres. The kicktail also enables the front of the board to be raised to clear or mount obstacles.



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ALL-TERRAIN BOARD

This invention relates to an all-terrain board.

Boards for use in the sport of all-terrain boarding, or mountain boarding are well known. Typically, such all-terrain boards comprise an elongate deck structure having axles
5 adjacent opposite ends thereof, which extend transversely under the deck structure and respectively carry a pair of wheels. Large all-terrain wheels having a diameter of perhaps 180 to 300mm are provided, since smaller wheels do not perform well on very uneven or rugged terrain and are therefore limited to
10 being used on fairly smooth off-road terrains.

Known all-terrain boards have had problems in achieving the levels of freestyle performance that are available from other board sports such as skateboarding, surfing or snow boarding. Accordingly, the sport of all-terrain boarding has
15 not managed to become a mainstream board sport and remains a peripheral activity with a very small percentage of board riders participating in the sport. Typically, a mainstream board sport will be dominated by 84 to 99% freestyle products, with only 1 to 16 % being accounted for by downhill style
20 products, such as known all-terrain boards.

One of the main reasons that known all-terrain boards have not had comparable freestyle performance to boards used in other board sports is because the large all-terrain wheels correspondingly raise the height of the deck structure, thereby
25 making the deck structure too high off the ground for good balance when riding the board: good balance from a low deck structure is necessary for a successful all-terrain board, since off road terrains can be very uneven.

Another problem of a high deck structure on uneven
30 terrain is that it causes speed wobbles. It has been proposed to overcome this problem by increasing the wheelbase of the board. However, a disadvantage of a long board is that they are unsuitable for effecting freestyle manoeuvres, and are thus limited to downhill boarding.

35 Also, a vital factor in good freestyle riding and board control is the provision of an upturned end or so-called kicktail at the rear of the deck structure, on which the rider

can place one foot rearwardly of the rear axle and use his weight to pivot the front end of the board upwardly about the rear axle. In this manner, turns can be effected by redirecting the front of the board whilst only the rear wheels are in
5 contact with the ground. The kicktail also enables the front of the board to be raised to clear or mount obstacles: this also allows the rider to effect considerable jumps by springing off the kicktail.

All-terrain boards are known which comprise a kicktail.
10 However, the combination of a kicktail with the relatively high deck structure makes it very difficult to balance when effecting turns and other manoeuvres using the kicktail. In order to overcome this problem, it has been proposed to use smaller wheels to correspondingly lower the deck structure.
15 Wheels on such boards usually range between 105 to 150mm in diameter, resulting in poor performance on uneven terrain. However, even with a reduced wheel size, known boards still have problems with the deck structure being too high for good balance. In addition to this, the kicktail itself is so high
20 off the ground that its performance is greatly reduced and does not match the sort of freestyle kicktail performance that is available from skate boards.

Another disadvantage of known all-terrain boards is that the axle on the underside of the deck structure can foul
25 obstacles such as rocks and logs. Thus, the board does not have the ability to ride over such obstacles.

I have now devised an all-terrain board which alleviates the above-mentioned problems and which can provide the combination and variety of performance criteria necessary
30 to allow complete board riding in all-terrain environments with a high level of freestyle performance comparable to that which is available from other board sports such as skateboarding, surfing and snow boarding.

In accordance with this invention, there is provided an
35 all-terrain board comprising an elongate deck structure and wheels mounted at front and rear ends of the deck structure for rotation about respective wheel axes extending transverse the

deck structure, the deck structure comprising a central portion disposed between said wheel axes and an upturned rear portion disposed rearwardly of the rearmost wheel axis at said rear end of the deck structure, said central portion of the deck structure extending below the level of a plane defined by said wheel axes and providing a front position for one of the rider's feet, said upturned rear portion of the deck structure extending rearwardly beyond said rearmost wheel and providing a rear position for the rider's other foot.

10 The all-terrain board has a comparable freestyle performance to boards used in other mainstream board sports, because the deck structure is mounted below the axis of wheel rotation. Thus, even with large wheels, the deck structure is not too high off the ground for good balance when riding the board: good balance from a low deck structure is necessary for
15 a successful all-terrain board, since off road terrains can be very uneven.

 Since the board is low, a useable upturned rear end can be provided as a so-called kicktail without significantly
20 affecting the riders balance. In use, the rider can place one foot rearwardly of the rear axle and use his weight to pivot the front end of the board upwardly about the rear axle. In this manner, turns or so-called kick-turns can be effected by redirecting the front of the board whilst only the rear wheels
25 are in contact with the ground. The kicktail also enables the front of the board to be raised to clear or mount obstacles. The kicktail also enables the rider to effect considerable jumps by springing off the kicktail.

 The low deck structure makes the board less susceptible
30 speed wobbles. Thus, the board can be made relatively short so that freestyle manoeuvres can be effected.

 The board is able to ride and slide over irregular obstacles, since the underside of the deck structure is not obstructed by any axles or other structures.

35 The board thus has a very high level of freestyle performance through providing the combination of a low deck structure, a kicktail, an unobstructed underside and large all-

terrain wheels. The all-terrain board also performs very well as a downhill board, therefore providing the variety and combination of performance criteria that are necessary to deliver a complete board riding experience that is comparable
5 skateboarding, surfing or snow boarding in all terrains.

Preferably, the rear upturned end of the board extends upwardly and rearwardly to a point substantially in-line with or above said plane defined by the wheel axes.

The deck structure may comprise raised portions which
10 respectively extend over the wheel axes and a lowered central portion which extends below said plane defined by the wheel axes. However, the deck structure preferably extends under the wheel axes.

Preferably, the wheels are mounted on respective axle
15 assemblies mounted to the upper surface of the deck structure, such that the deck structure is suspended below the wheel axes.

Preferably, the axle assembly of the rear wheels comprises an elongate base that is fixed to the deck structure and extends axially thereof between said central and upturned
20 rear portions of the deck structure. The base thus serves to strengthen the deck structure at the point where it curves upwardly, thereby alleviating the risk of the deck structure breaking under the large forces that would be applied to the upturned end by the rider during use. Alternatively, the deck
25 may be strengthened by a separate longitudinally-extending strengthening member fitted to the surface of the deck structure.

The front end may have a similar structure to the rear end, so that the board can be used in either direction.

30 Preferably, the axle assemblies comprises an axle the axle being pivotally mounted to the deck structure, so that the rider can steer the board by leaning to cause the assemblies to pivot relative to the deck structure.

Each axle may carry a pair of wheels, respectively
35 mounted at opposite ends of the axle. Alternatively, each axle may only carry a single wheel, thereby creating a board which only has a single front wheel and a single rear wheel.

Preferably, each axle is pivotable against a resilient bias, for example provided by an elastomeric member mounted between the axle and the base of the axle assembly.

In order to prevent undue movement of each end of the axle, each end of the axle is preferably connected to the deck structure or the base of the axle assembly by a member, which limits the angle through which the axle can pivot relative to the board.

Preferably, the member comprises a rigid strut having a coupling at one or both of its ends which allows movement of axle relative to the deck structure.

Embodiments of this invention will now be described by way of examples only and with reference to the accompanying drawings in which:

Figure 1 is a plan view of an embodiment of all-terrain board in accordance with this invention;

Figure 2 is a perspective view, from the rear, along the upper side of the deck structure of the board of Figure 1;

Figure 3 is a rear view of the board of Figure 1;

Figure 4 is a front view of the board of Figure 1;

Figure 5 is a side view of the board of Figure 1;

Figure 6 is a sectional view along the line VI-VI of Figure 1;

Figure 7 is a sectional view along the line VII-VII of Figure 1;

Figure 8 is a plan view of an alternative embodiment of all-terrain board in accordance with this invention;

Figure 9 is a side view of the board of Figure 8;

Figure 10 is a rear of the board of Figure 8;

Figure 11 is a front rear of the board of Figure 8;

Figure 12 is a perspective view, from the front and above, of the front end of the board of Figure 8;

Figure 13 is a perspective view, from the front and above, of the rear end of the board of Figure 8;

Figure 14 is a plan view of one end of the board of Figure 8;

Figure 15 is a sectional view along the line XV-XV of

Figure 14; and

Figure 16 is a sectional view along the line XVI-XVI of Figure 14.

Referring to Figures 1 to 5 of the drawings, there is shown an all-terrain board comprising an elongate deck structure 10 having a front end 11 and an upturned rear end 12. A pair of axle assemblies 13, 14 are respectively mounted transverse the deck structure 10 adjacent the front and rear ends 11, 12 thereof.

10 A pair of wheels 15 are mounted at respective opposite ends of each axle assembly 13, 14 for rotation about respective axes which extend transverse the deck structure 10. Each wheel 15 preferably carries a pneumatic tyre and has a diameter of 160 to 300mm.

15 A substantial portion of the deck structure 10, including the central portion between the axle assemblies 13, 14, is flat and lies in a plane which extends parallel to the ground-contacting bottom surface of the wheels 15. The front end 11 of the deck structure 10, which may be slightly upturned, does not project forwardly of the front pair of wheels 15. The rear end 12 of the deck structure 10 extends rearwardly, substantially beyond the rear pair of wheels 15, and upwardly to a point which is disposed above the axis of wheel rotation and below the top surface of the wheels 15.

25 The axle assemblies 13, 14 are mounted to the upper side of the deck structure 10, such that the axis of wheel rotation extends above the deck structure 10. Each axle assembly 13, 14 comprises an elongate axle 16, which is connected intermediate its opposite ends to a mounting or so-called base plate 17 that is securely attached to the upper surface of the deck structure 10.

Referring to Figure 6 of the drawings, the axle 16 comprises an elongate shaft 18 on which the wheels 15 are mounted at opposite ends thereof. An elongate axle plate 19 extends axially of the shaft and projects radially outwards therefrom towards the deck structure 10, at an angle (which is inclined rearwardly in the case of the front axle assembly 13

and forwardly in the case of the rear axle assembly 14. Thus, whilst the axle assemblies 13, 14 are substantially identical in construction, they are arranged at 180° to each other, as shown in Figure 1 of the drawings.

5 The base plate 17 of each axle assembly 13, 14 comprises two opposed L-section elongate members 20, which extend axially of the deck structure 10, and which are interconnected intermediate their opposite ends by a bar 21 extending transverse the deck structure 10. The centre of the
10 axle 16 is supported intermediate its opposite ends on an elastomeric mounting block 22, which is seated between the two elongate members 20 of the base 17.

An inverted U-shaped bar 23 is attached at its opposite ends to the transverse bar 21 of the base 17, intermediate
15 opposite ends thereof. A U-shaped bolt 24 extends through the eye formed by the inverted U-shaped bar 23, with opposite ends of the bolt 24 extending through respective apertures formed in the axle plate 19 of the axle 16. A pair of threaded nuts are fastened to respective opposite ends of the U-shaped bolt
20 24 to securely clamp the axle 16 to the base 17 of the axle assembly.

It will be appreciated that the aforementioned coupling between the axle 16 and the base plate 17 of the assembly allows opposite ends of the axle 16 to move upwardly,
25 downwardly, forwardly and rearwardly within the confines of a circle.

Referring to Figure 7 of the drawings, in order to initiate turning and prevent undue movement of each end of the axle 16, each end of the axle 16 is connected to the deck
30 structure 10 by a strut 26, which is connected at its opposite ends to the axle plate 19 and the deck structure 10 respectively. The strut 26 comprises a metal strip having apertures at its opposite ends which receive respective bolts 27 that secure the strut 26 to the relevant structure. An
35 elastomeric O-ring 28 is positioned on the bolt 27 on opposite sides of the strut 26. A pair of washers 29 are also positioned on the bolt 27, such that the strut 26 is resiliently

constrained between the two O-rings 28, when the securing nut 30 is tightened. The bolt 27 which fastens the strut 26 to the deck structure 10, preferably comprises a head which is countersunk into the underside of the deck structure, so that
5 the underside of the deck structure is free from protrusions.

The base plate 17 of the rear axle assembly 14 is more elongated than that of the front axle assembly 13, in order to provide the additional strength that is required to enable the board to be ridden with the front wheels 15 raised off the
10 ground, as will be described hereinafter. The elongate members 20 of the rear base 17 are curved upwardly at their rear ends to follow the shape of the upturned rear end 12 of the deck structure 10. The members 20, which are L-shaped in section, thereby serve to strengthen the upturned end and prevent the
15 deck structure 10 from breaking when the necessary large forces are applied to the upturned end 12 during use.

In use, a rider stands on the upper surface of the deck structure, placing one foot between the axle assemblies 13, 14 and the other foot behind the rear axle assembly 14, on the
20 upturned rear end 12 of the deck structure 10. Foot straps (not shown) are preferably provided at these positions.

In order to manoeuvre the board, the rider can apply their weight either to the right or left side of the deck structure, to cause the axle 16 to pivot relative to their
25 bases 17, about the central mounting block 22 thereof. In order to perform freestyle turns, the rider may apply weight to the upturned rear end 12 of the deck structure, to cause the front wheels 15 to lift off the ground. The board may then be redirected whilst the front wheels 15 are off the ground. Also,
30 the upturned end enables the rider to raise the front of the board to ride over obstacles or to mount objects such as logs.

It will be appreciated that the underside of the deck structure 10 is completely free of any protrusions and thus the board is able to slide over any obstacles which may be
35 encountered. Also, the rider is able to deliberately slide the board along obstacles such as logs. Considerably jumps can also be performed by springing off the kicktail or by using the

kicktail as a lever.

The arrangement of the deck structure 10 below the axle 16 substantially lowers the centre of gravity and makes the board much easier to ride and steer than conventional boards, in which the deck structure extends over the axles. The low centre of gravity also helps to reduce speed wobbles. Most importantly, the low deck structure enables an upturned rear end 12 of sufficient size to be provided to form a kicktail.

Referring to figures 8 to 14 of the drawings, there is shown an alternative embodiment of all-terrain board, which is similar in construction to the previous embodiment, and like parts are given like reference numerals.

In this embodiment, smaller wheels 15 are provided, with the wheels 15 of each axle assembly 13,14 being closer together and positioned in respective recesses 50 formed on opposite sides of the deck structure 10.

The main difference between this embodiment and the previous embodiment is the construction of the axle assemblies 13,14. This, referring particularly to figures 12 and 13 of the drawings, the axle assemblies 13,14 each comprise a base 17 in the form of an elongate strip of metal, which is securely fastened to the upper side of the deck structure by countersunk bolts passed through the deck structure 10. The elongate base 17 of each assembly extends actually of the deck structure 10 and comprises a bridge portion 51 intermediate its opposite ends.

Referring to Figure 15 of the drawings, a U-shaped bolt 52 extends under the bridge 51 and has its opposite balms extending through axially-spaced apertures in the axle plate 19. A pair of elongate tubular elastomeric members 54 are captively remounted on respective opposite sides of the U-shaped bolt 52, between the axle plate 19 and respective washers or other members 55 disposed on opposite sides of the base 17. Threaded nuts 53 are applied to respective opposite ends of the U-shaped bolt to securely fasten the axle 16 thereto.

It will be appreciated that the aforementioned

coupling between the axle 16 and the base plate 17 of the assembly allows opposite ends of the axle 16 to move upwardly, downwardly, forwardly and rearwardly in the confines of a circle.

5 Referring to Figure 16 of the drawings, in order to initiate turning and prevent an undue movement of each end of the axles 16, each end of the axle 16, is connected to the deck structure 10 by a strut 56, which is connected at its opposite ends to the axle plate 19 and the deck structure 10 respectively. The strut 56 comprises an elongate bar having balls 57 at its opposite ends, which are captively and rotatably received in respective sockets 59 secured to the relevant structure.

15 The board of the second embodiment can be ridden in exactly the same manner as that of the first embodiment. However, the wheels of each pair are mounted closer together and offer increased manoeuvrability, so that the board can be used by a high performance riders or younger riders with less height and body weight.

20 It will be appreciated that the board can be provided with a motor, brakes and suspension members. The underside of the deck structure may also be coated with a friction-reducing layer to enable the board to slide over obstacles.

25 An all-terrain board in accordance with this invention provides the combination and variety of performance criteria necessary to allow complete board riding in all-terrain environments with a high level of freestyle performance comparable to that which is available from other board sports such as skateboarding, surfing and snow boarding.

Claims

1. An all-terrain board comprising an elongate deck structure and wheels mounted at front and rear ends of the deck structure for rotation about respective wheel axes extending
5 transverse the deck structure, the deck structure comprising a central portion disposed between said wheel axes and an upturned rear portion disposed rearwardly of the rearmost wheel axis at said rear end of the deck structure, said central portion of the deck structure extending below the level of a
10 plane defined by said wheel axes and providing a front position for one of the rider's feet, said upturned rear portion of the deck structure extending rearwardly beyond said rearmost wheel and providing a rear position for the rider's other foot.
2. An all-terrain board as claimed in claim 1, in which
15 said upturned rear end of the board extends upwardly and rearwardly to a point substantially in-line with or above said plane defined by the wheel axes.
3. An all-terrain board as claimed in claims 1 or 2, in which deck structure may comprises raised portions which
20 respectively extend over the wheel axes and a lowered central portion which extends below said plane defined by the wheel axes.
4. An all-terrain board as claimed in claims 1 or 2, in which the deck structure extends under the wheel axes.
- 25 5. An all-terrain board as claimed in claim 4, in which the wheels are mounted on respective axle assemblies mounted to the upper surface of the deck structure, such that the deck structure is suspended below the wheel axes.
6. An all-terrain board as claimed in claim 5, in which
30 each axle assembly comprises an axle which is pivotally mounted relative to the deck structure.

7. An all-terrain board as claimed in claim 6, in which each axle is pivotable against a resilient bias.

8. An all-terrain board as claimed in claim 7, in which each axle is pivotable against a resilient bias provided by an elastomeric member mounted between the axle and the deck structure.

9. An all-terrain board as claimed in any of claims 6 to 8, in which the base of the rear axle assembly is elongate and extends axially of the deck structure between said central and upturned rear portions thereof.

10. An all-terrain board as claimed in claim 9, in which the underside of the base of the rear axle assembly is fitted at a point on the deck structure where said upturned end commences.

11. An all-terrain board as claimed in any of claims 6 to 10, in which each end of the axle is connected to the deck structure or the base of the axle assembly by a member, which limits the angle through which the axle can pivot relative to the board.

12. An all-terrain board as claimed in claim 11, in which the member comprises a rigid strut having a coupling at one or both of its ends which allows movement of axle relative to the deck structure.

13. An all-terrain board as claimed in any preceding claim, in which said front end of the deck structure has a similar structure to the rear end of the deck structure.

14. An all-terrain board as claimed in any preceding claim, comprising an elongate strengthening member fitted to the deck structure at a point on the deck structure where said up turned end commences.

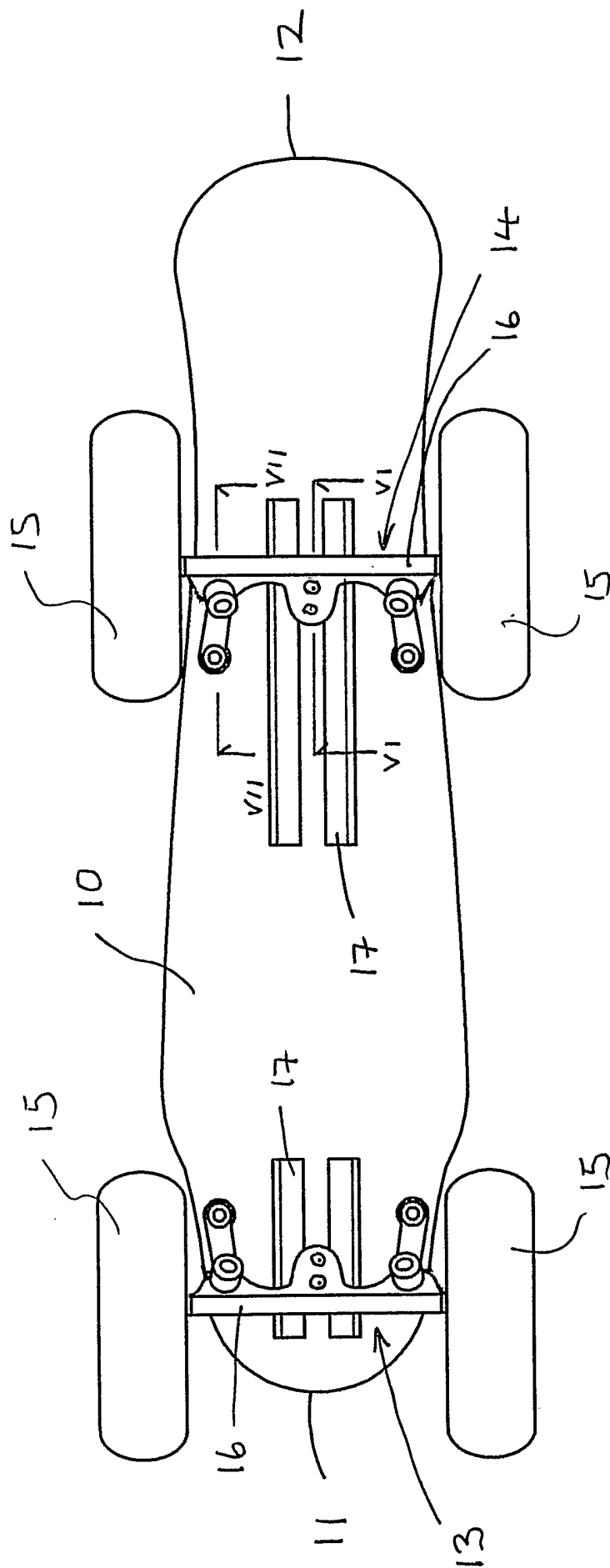


FIG. 1

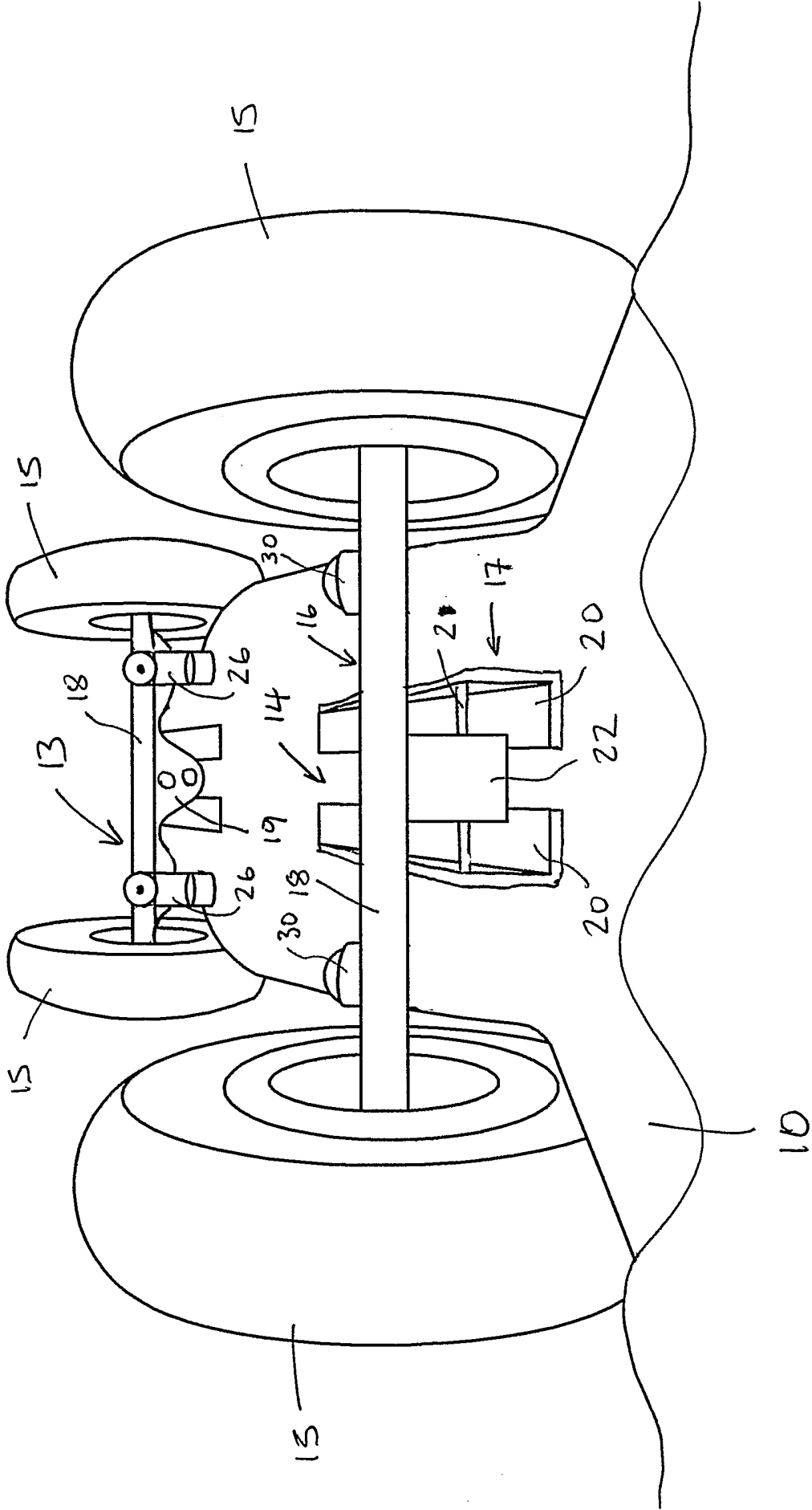


FIG. 2

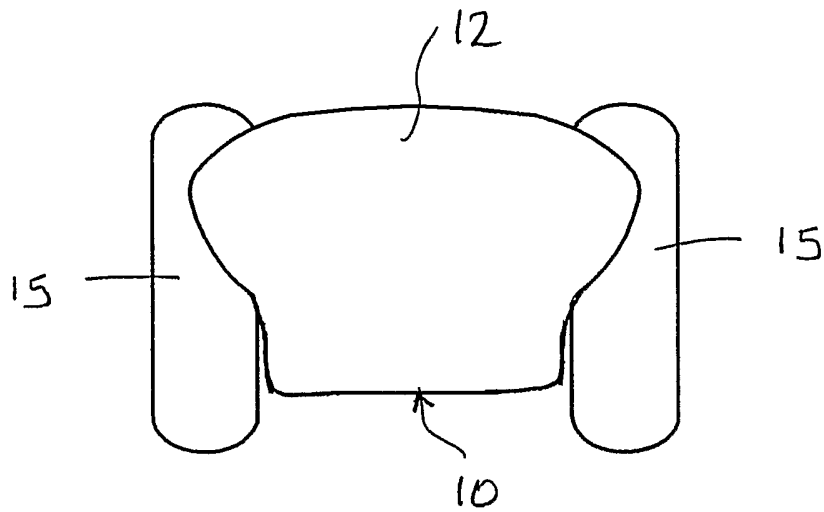


FIG. 3

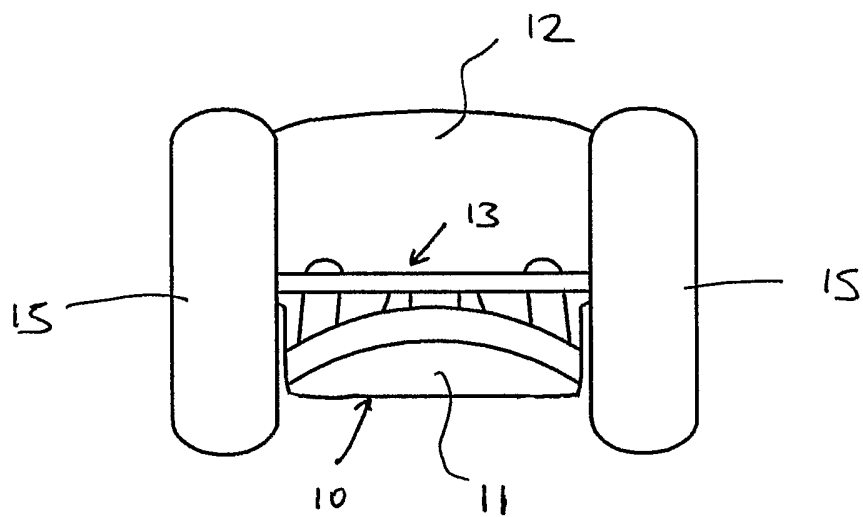


FIG. 4

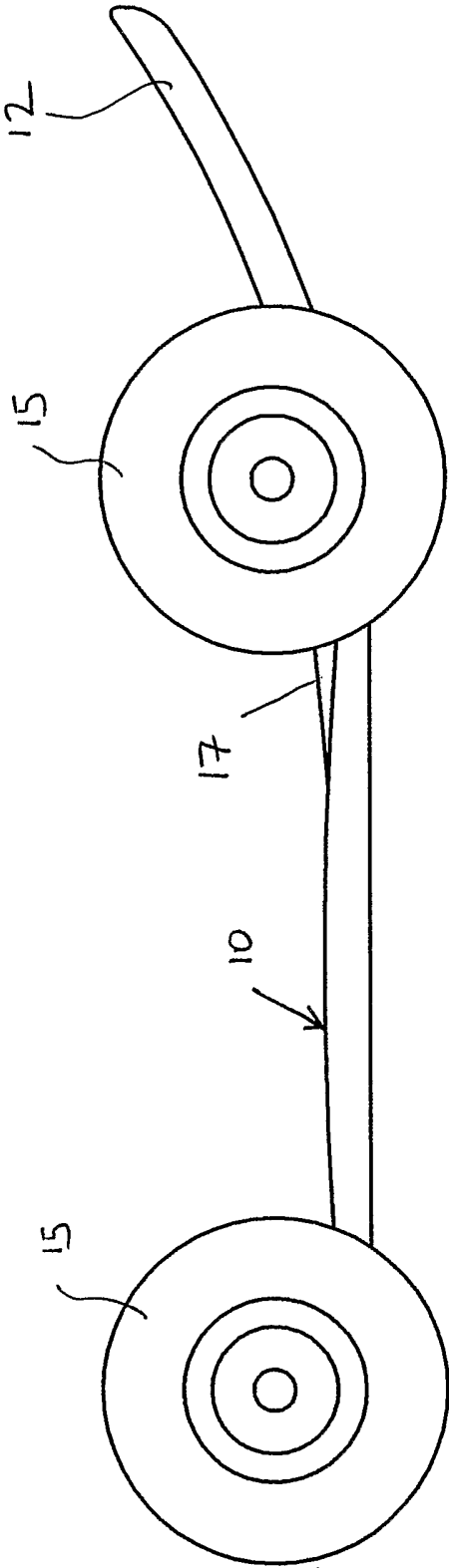


FIG. 5

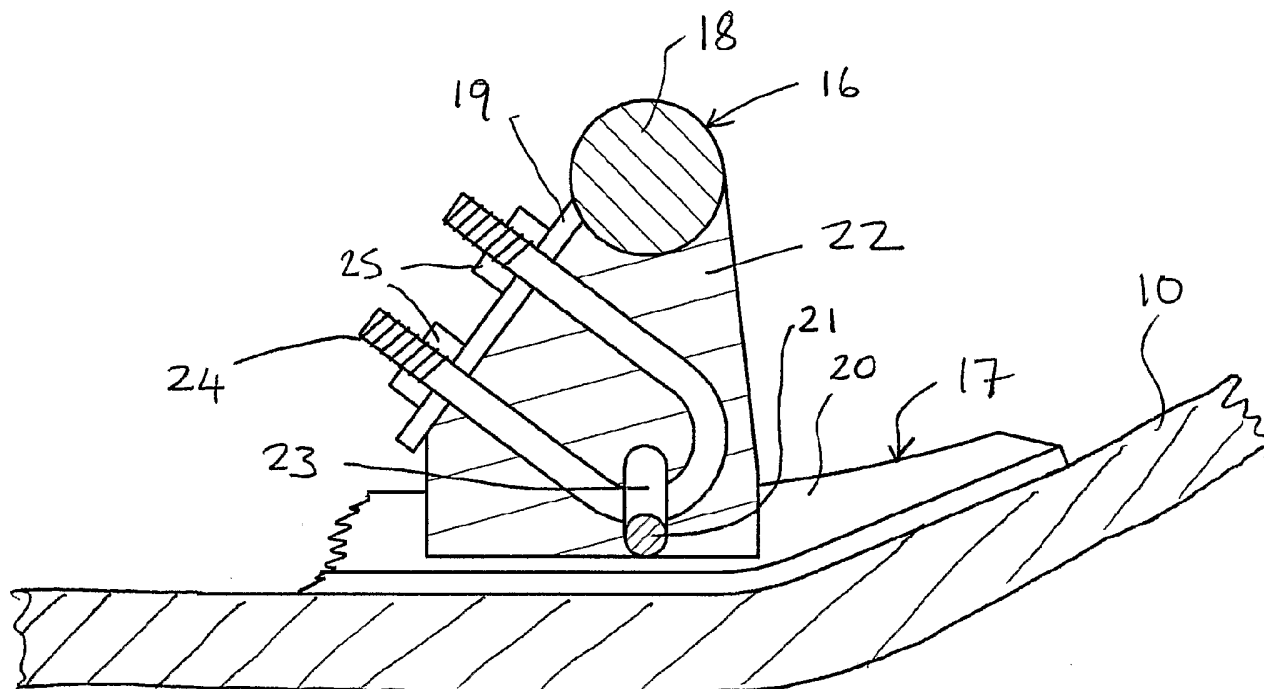


FIG. 6

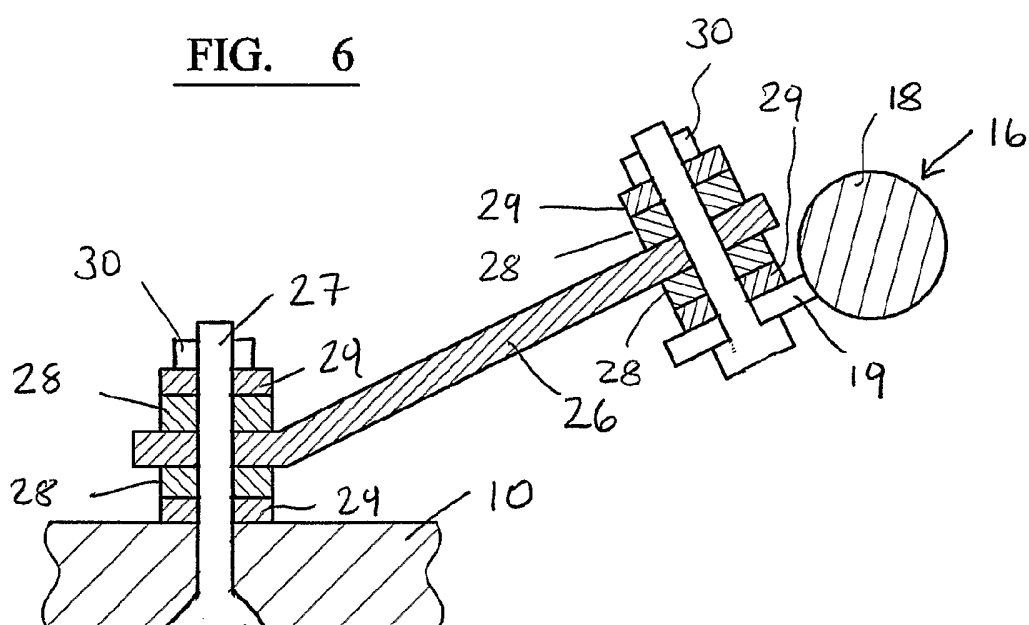


FIG. 7

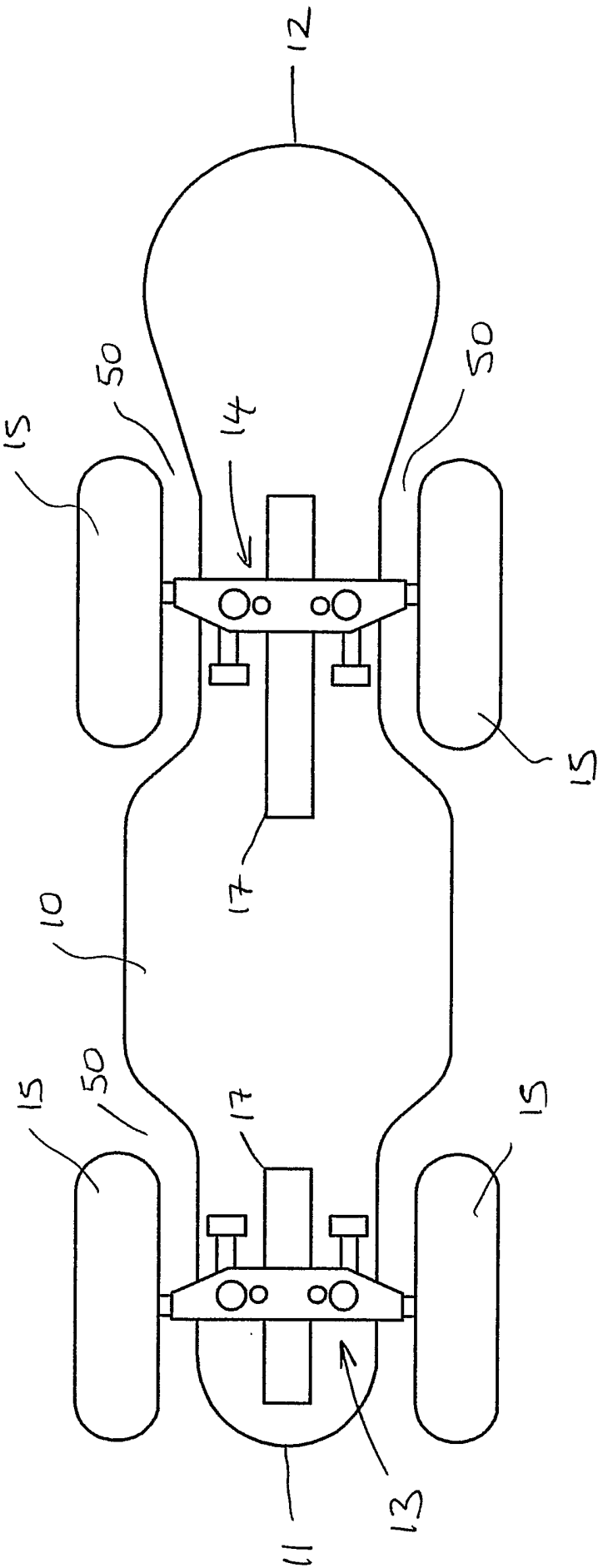


FIG. 8

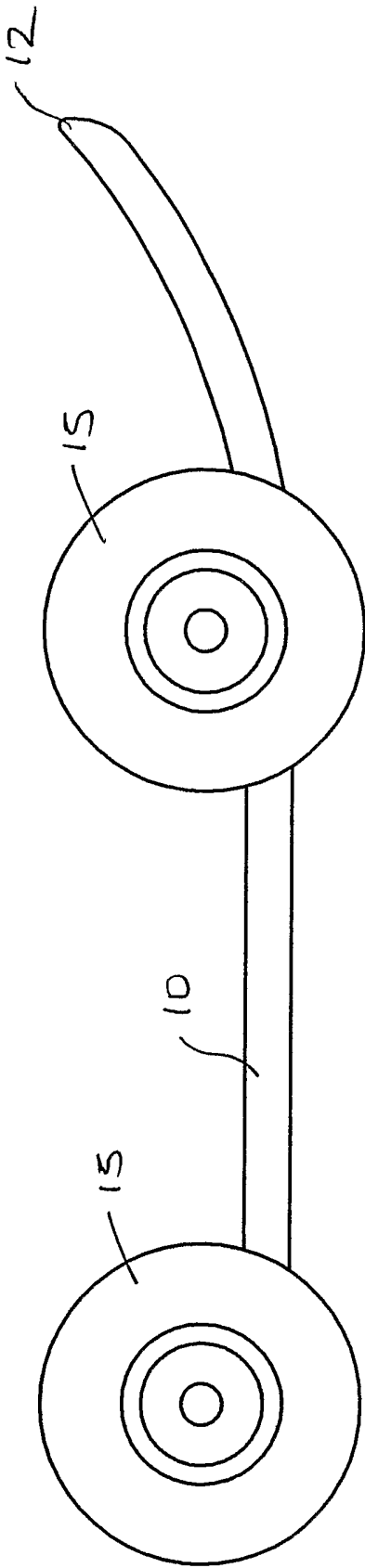


FIG. 9

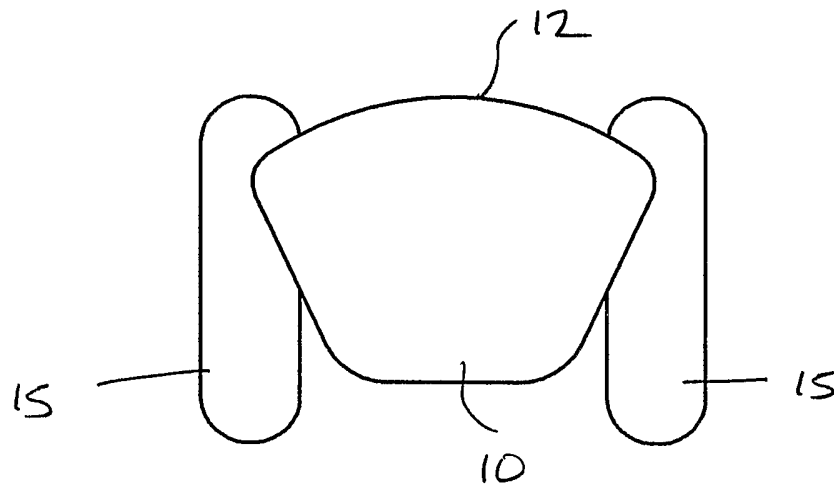


FIG. 10

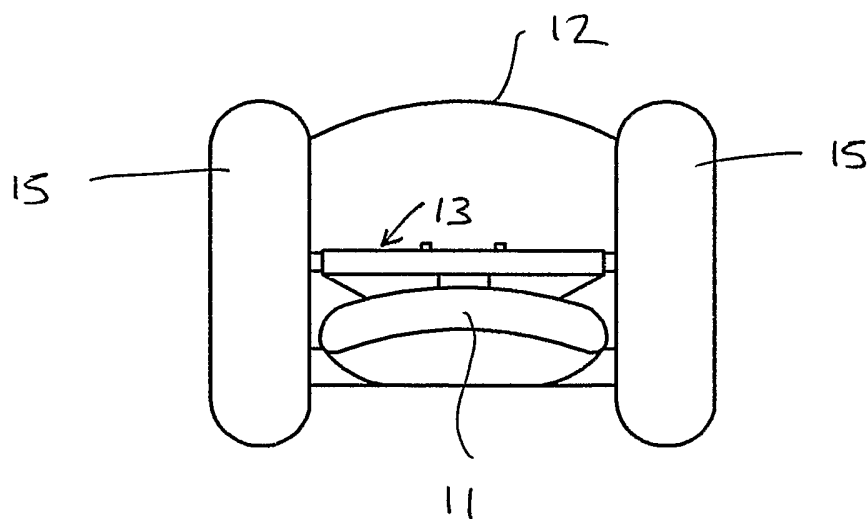


FIG. 11

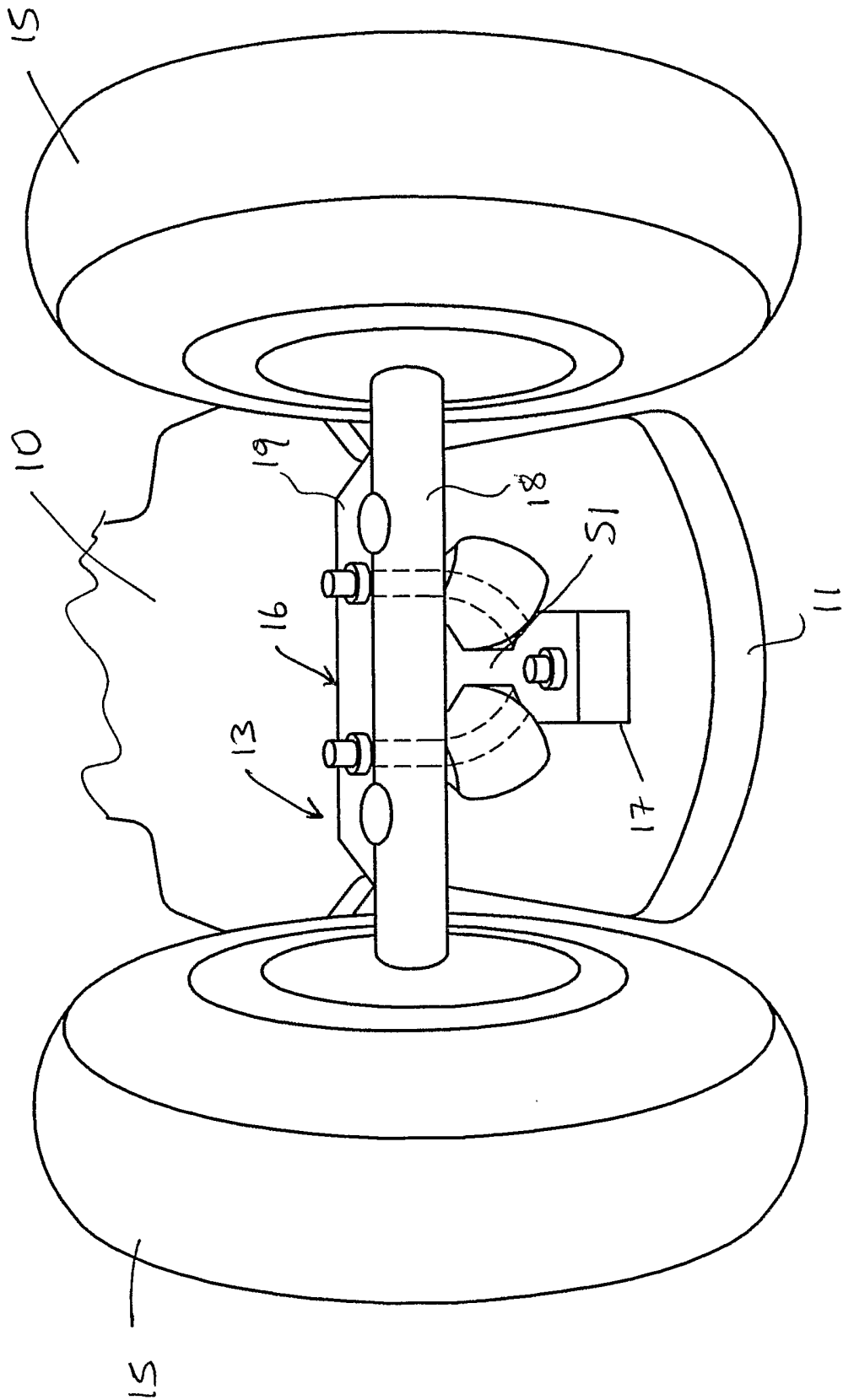


FIG. 12

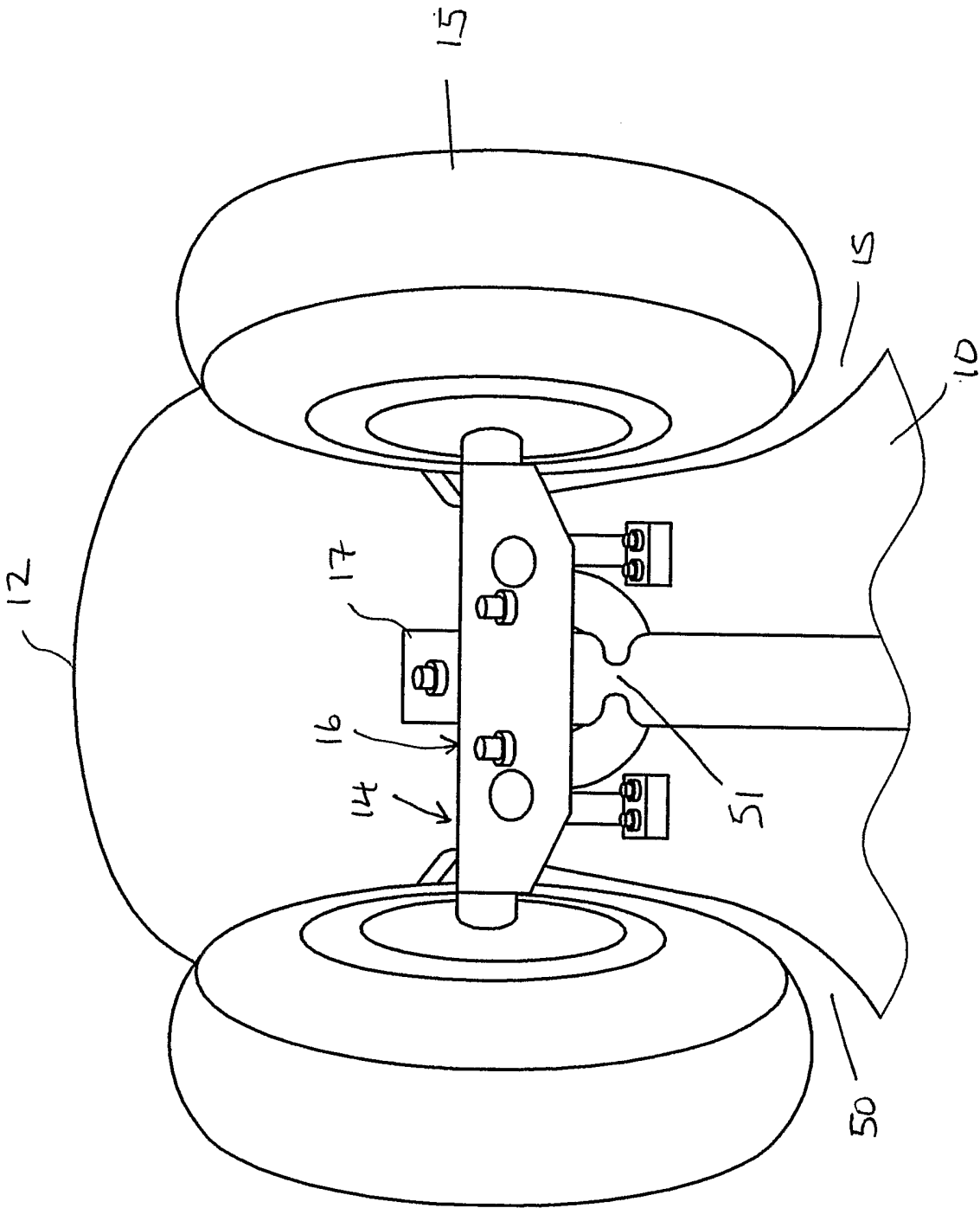


FIG. 13

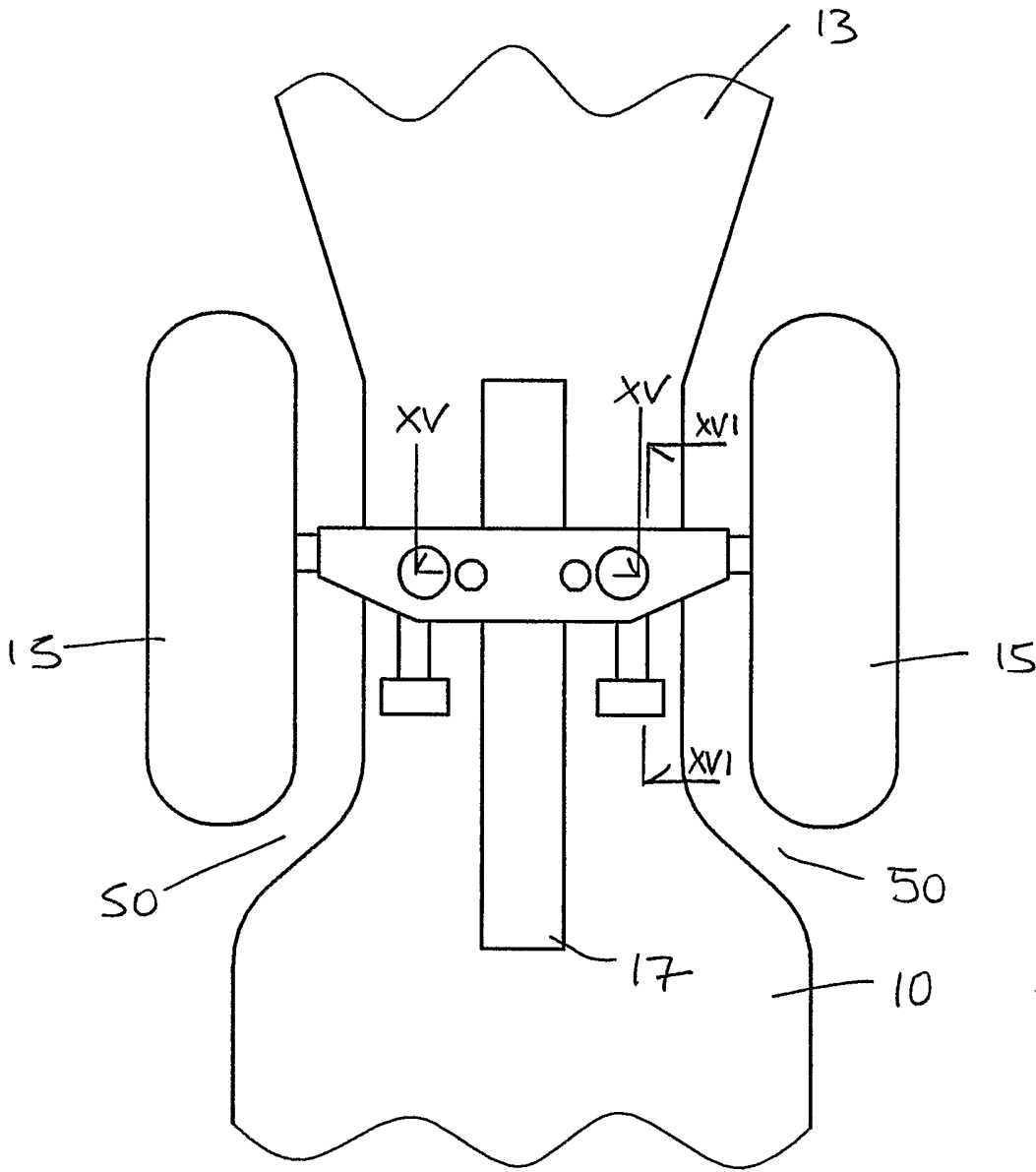


FIG. 14

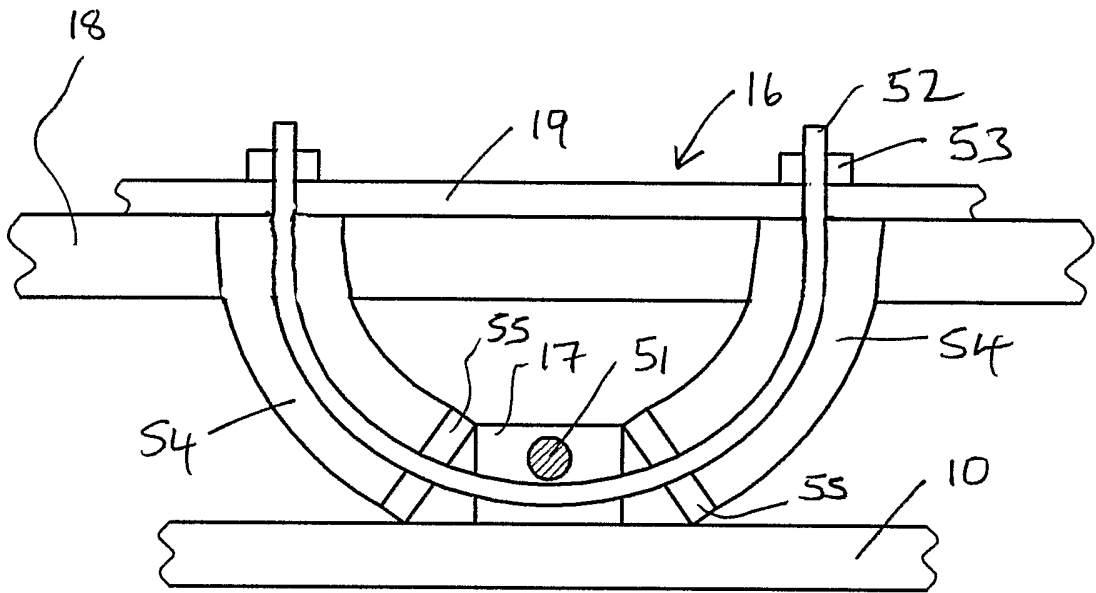


FIG. 15

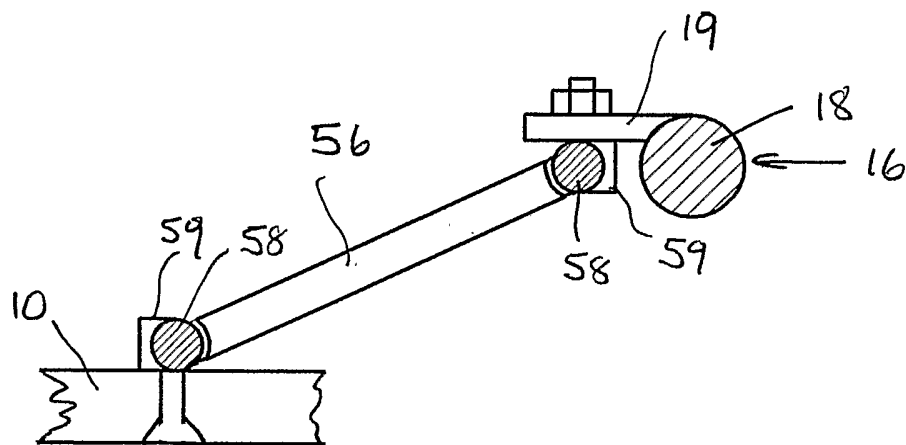


FIG. 16

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63C17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 622 759 A (FUSTER) 22 April 1997 (1997-04-22) column 3, paragraph 1; figure 1	1
A	US 5 267 743 A (SMISEK) 7 December 1993 (1993-12-07) figure 4	1,13
A	US 3 767 220 A (PETERSON) 23 October 1973 (1973-10-23) figures 1-3	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Information on patent family members

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