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(54) **MULTI-PIVOTING STEERING MECHANISM**

(71) Applicant: **Manik S. Prathamesh**, Lennox, CA (US)

(72) Inventor: **Manik S. Prathamesh**, Lennox, CA (US)

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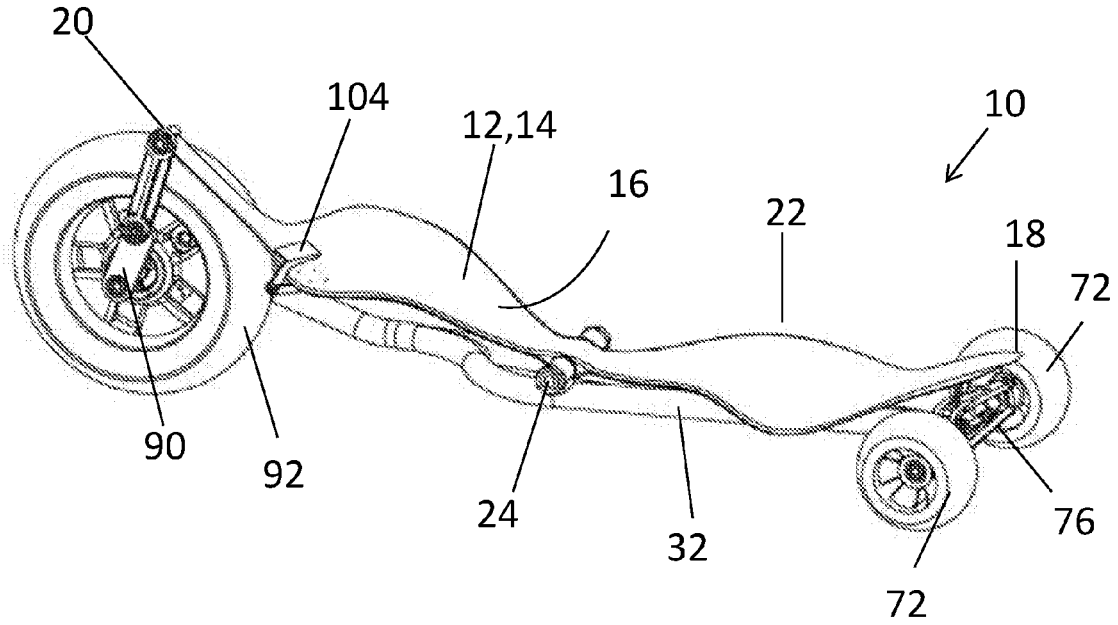
(57) **ABSTRACT**

A skateboard with positive camber steering includes a frame and a board pivotally coupled to the frame. A steering assembly is coupled to the end portion of the frame and includes an upper truck arm, a lower truck arm, and at least one wheel. The upper truck arm and the lower truck arm are spaced apart relative to the frame, and the wheel has an axis of rotation. The upper truck arm and the lower truck arm are each rotatable about an axis of travel parallel to the skateboard's line of travel, and the upper truck arm is coupled to the wheel above the axis of rotation relative to the surface, with the lower truck arm coupled to the wheel below the axis of rotation relative to the surface. Thus the upper truck arm extends farther from the frame than the lower truck arm, thereby imparting a positive camber in the direction of steering.



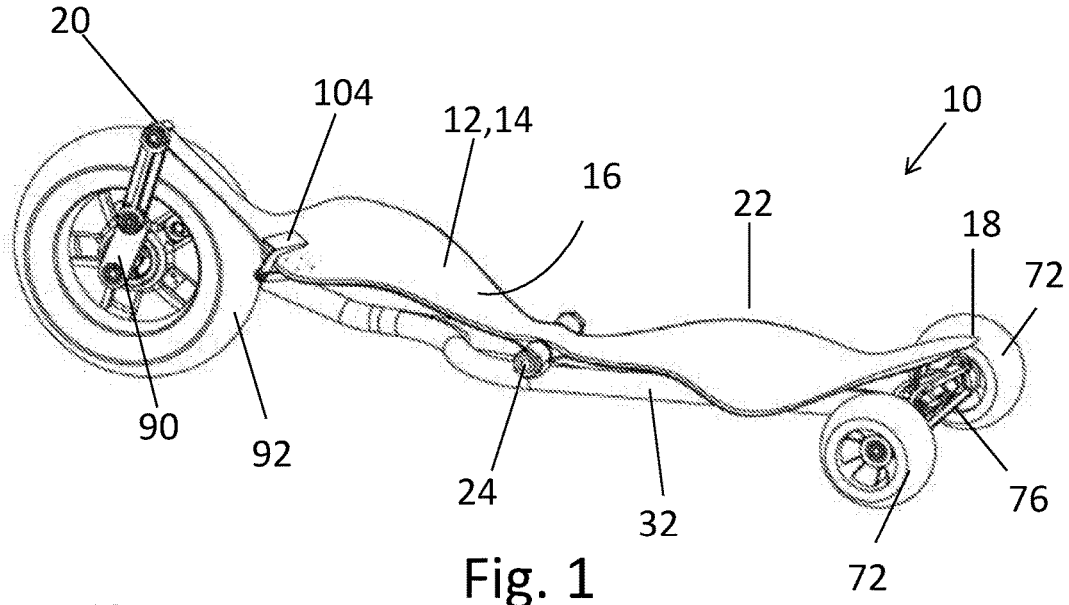

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Fig. 1

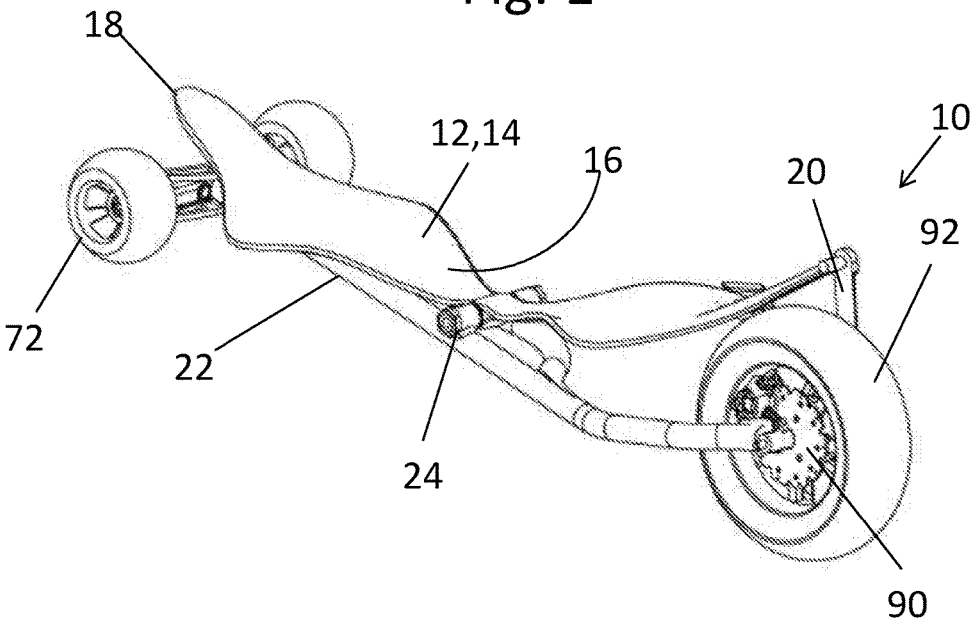
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Fig. 2

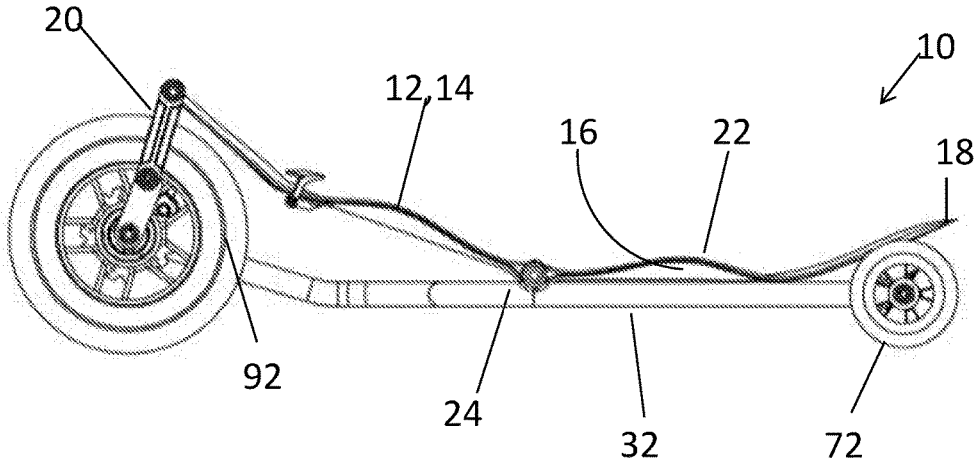

Fig. 3

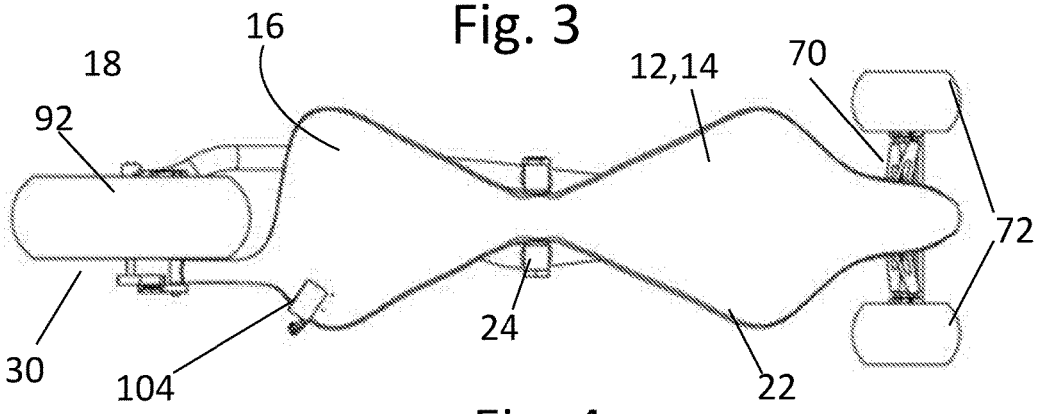

Fig. 4

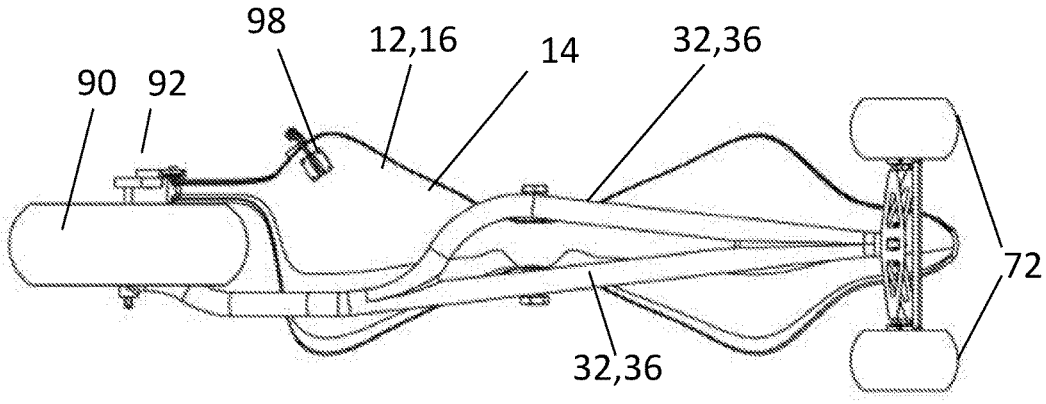

Fig. 5

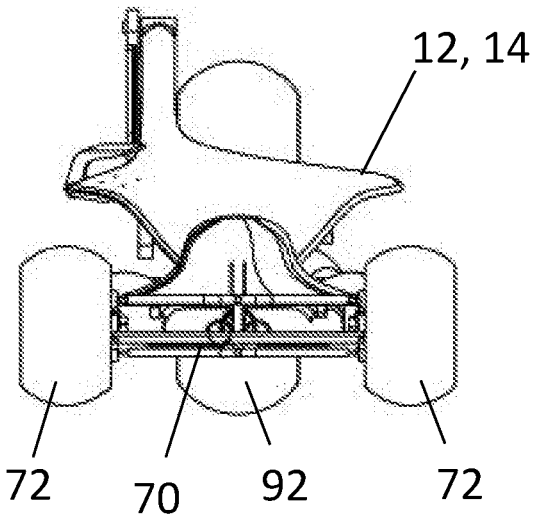

Fig. 6

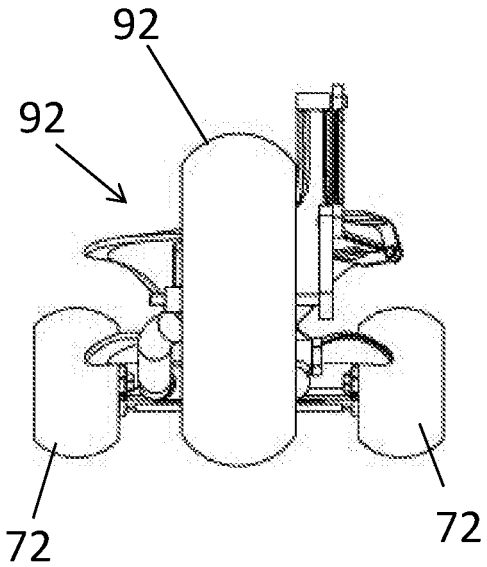

Fig. 7

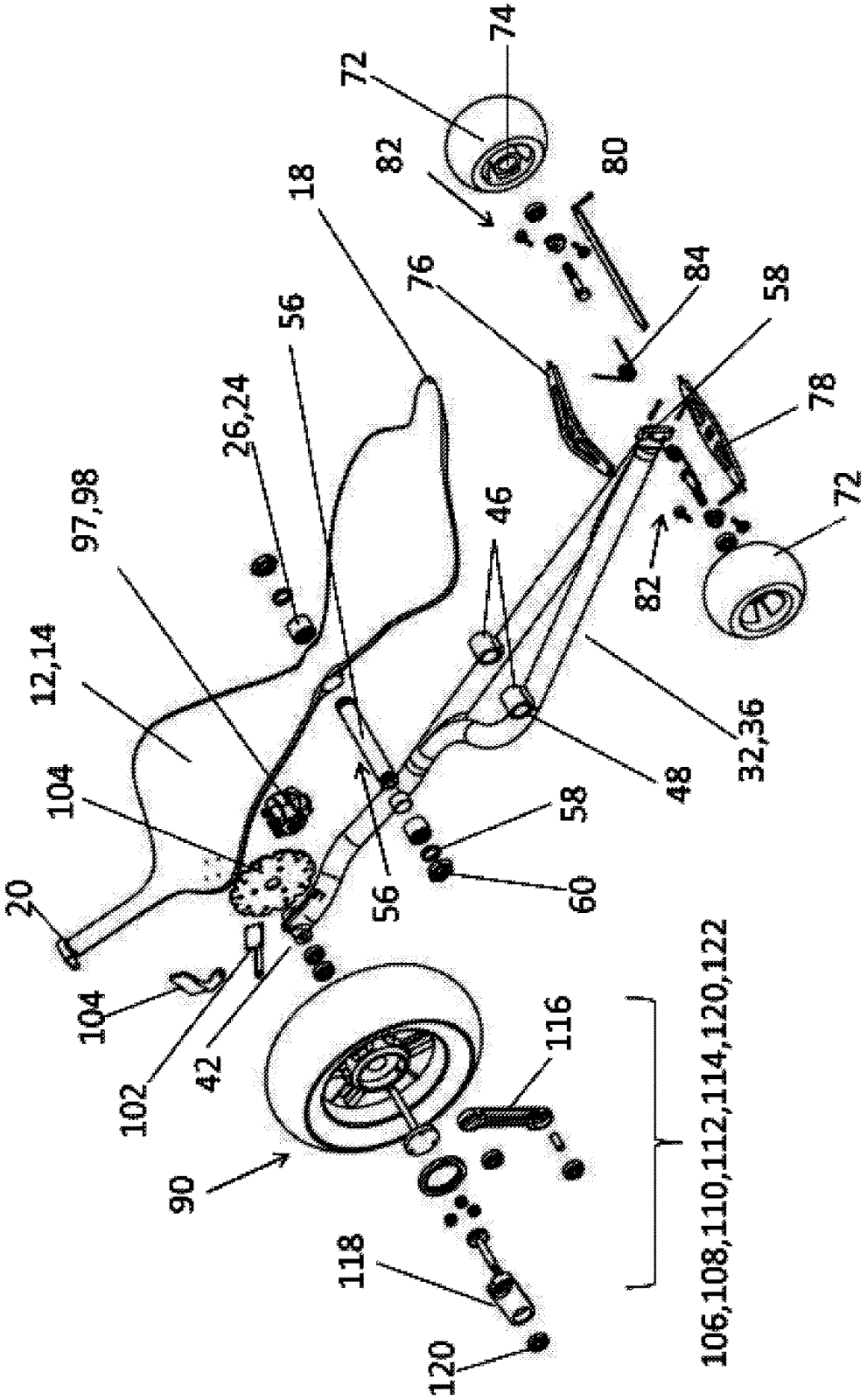
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Fig. 8

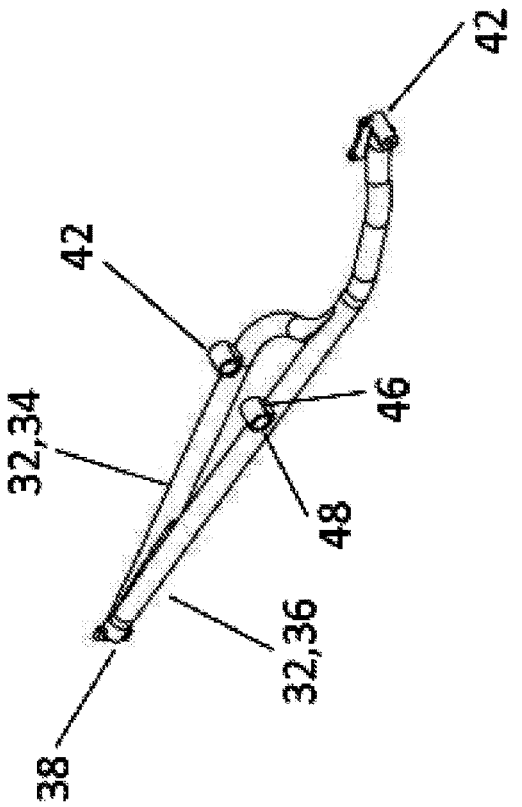


Fig. 10

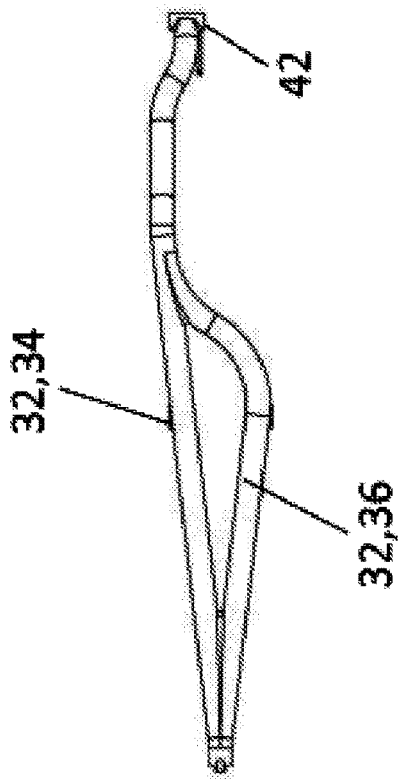
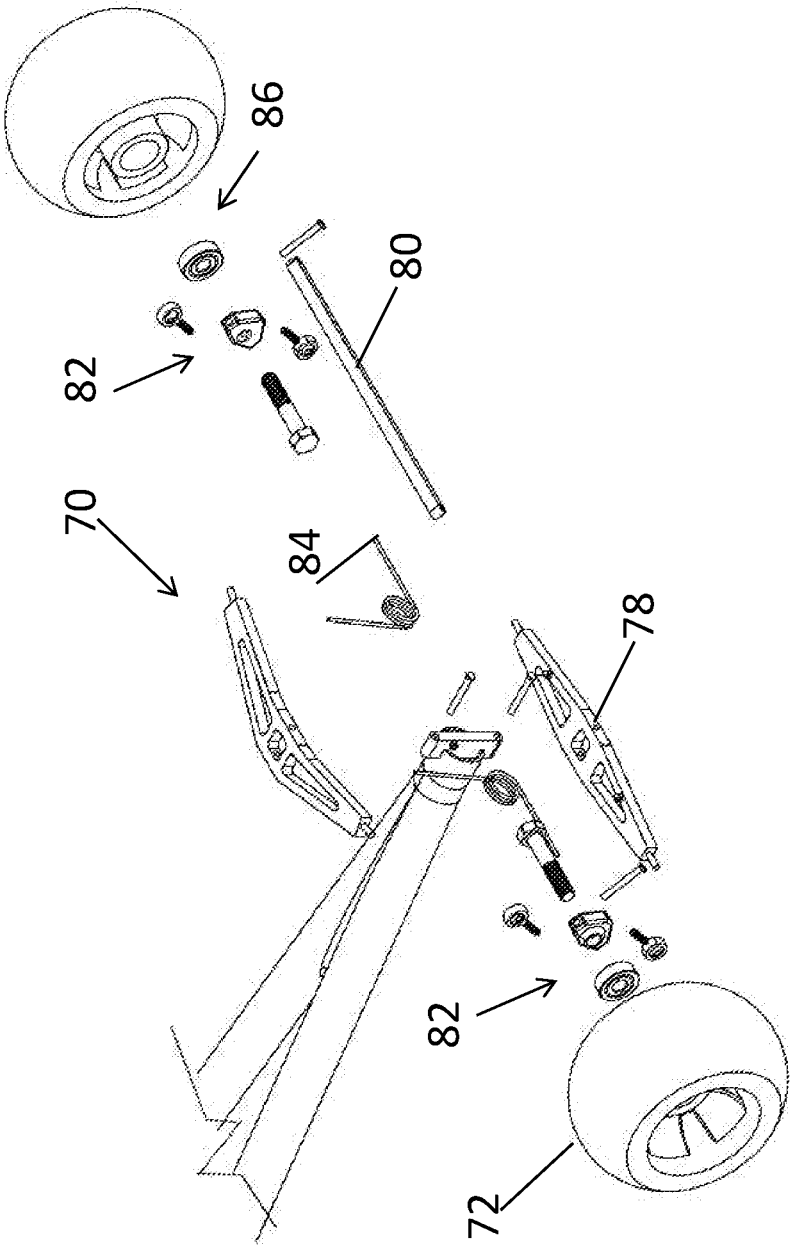


Fig. 9



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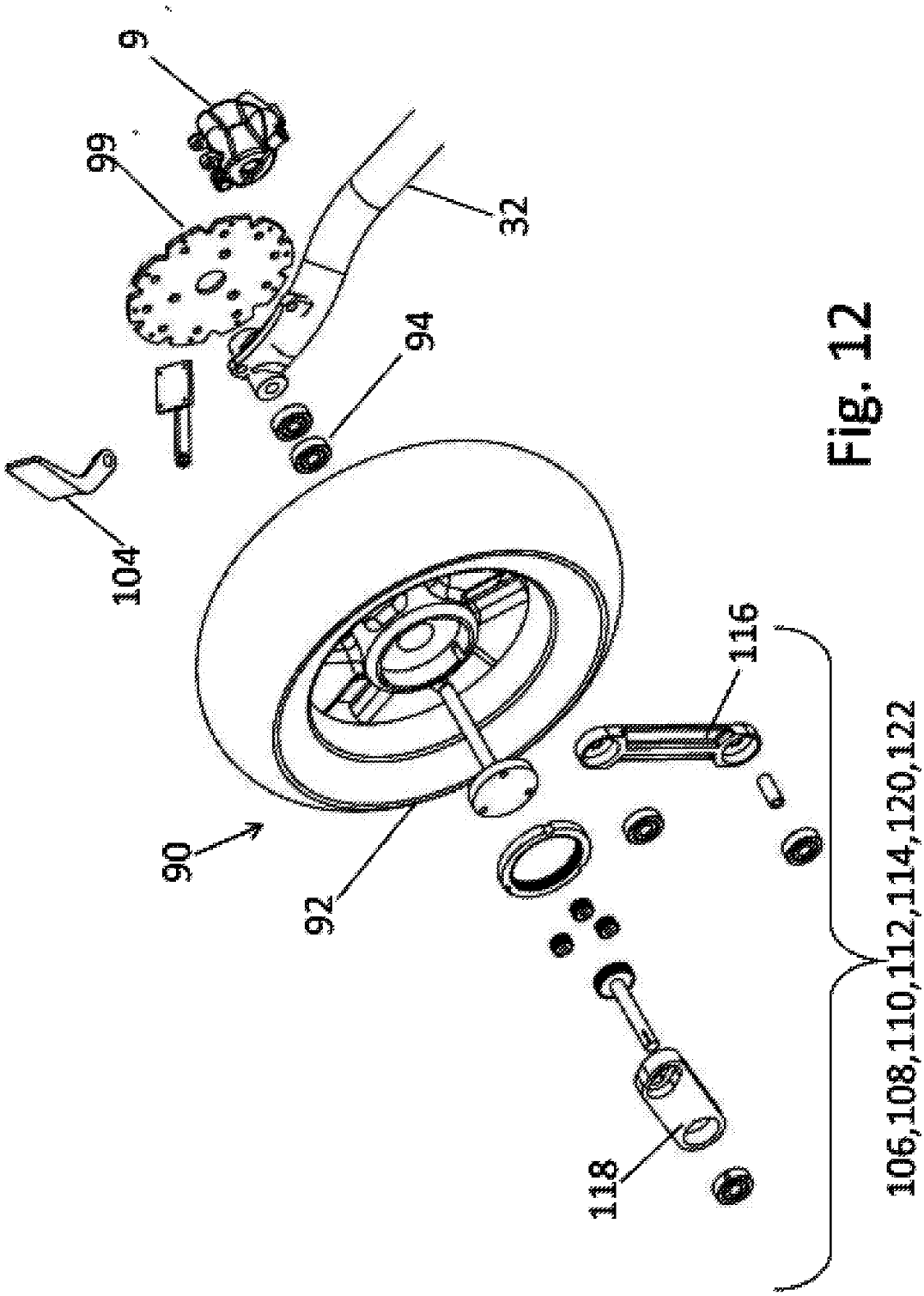


Fig. 12

Fig. 13

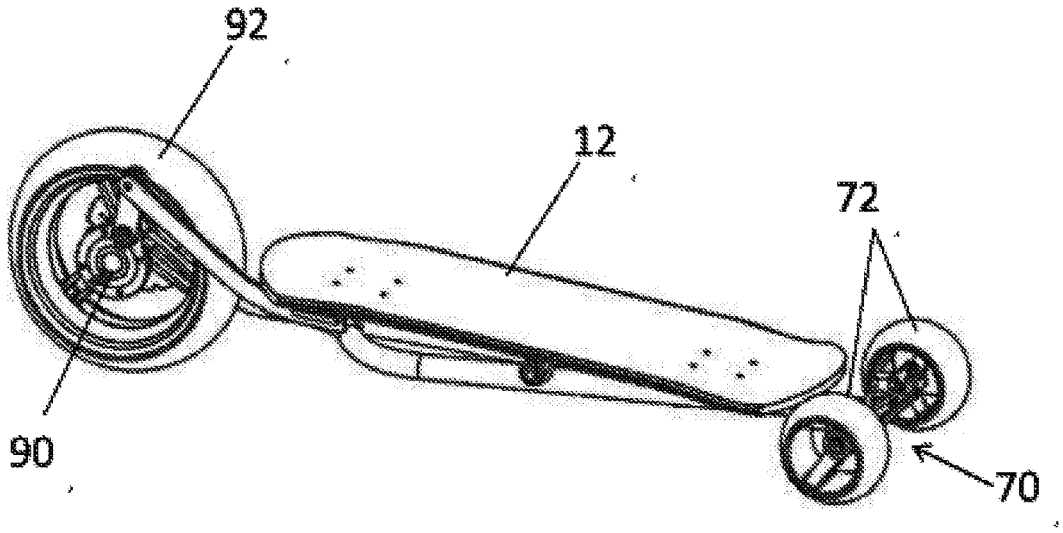


Fig. 14

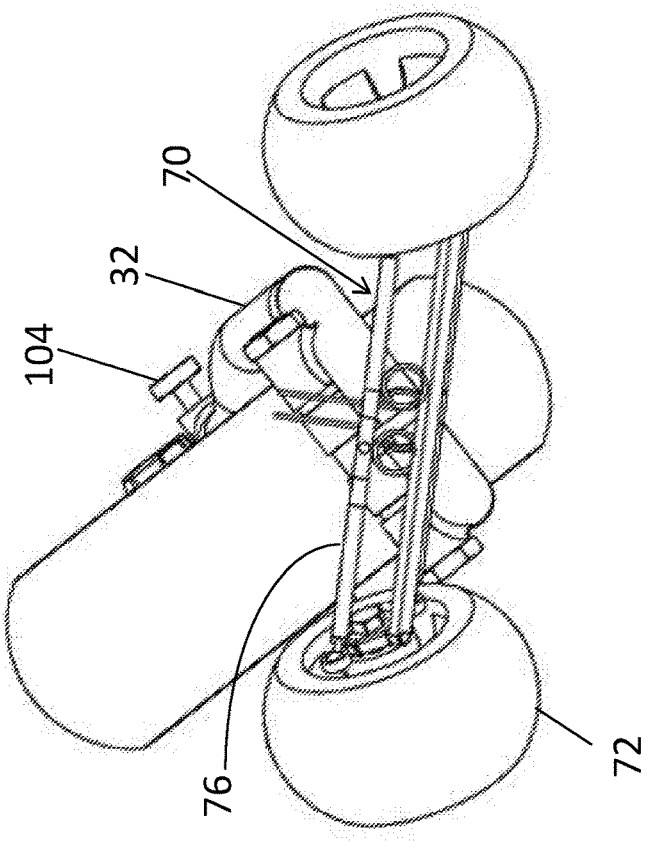
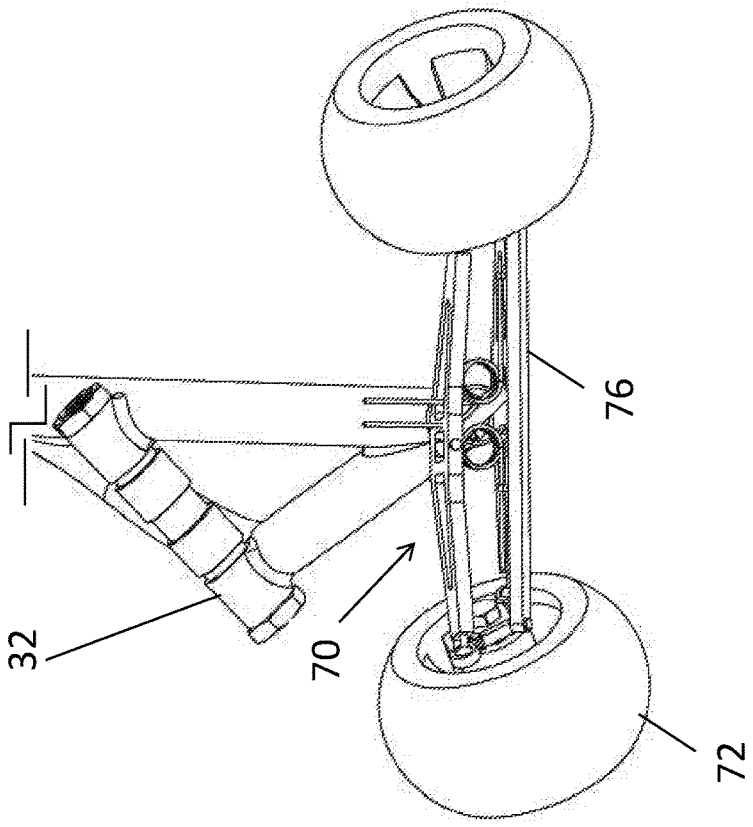


Fig. 16



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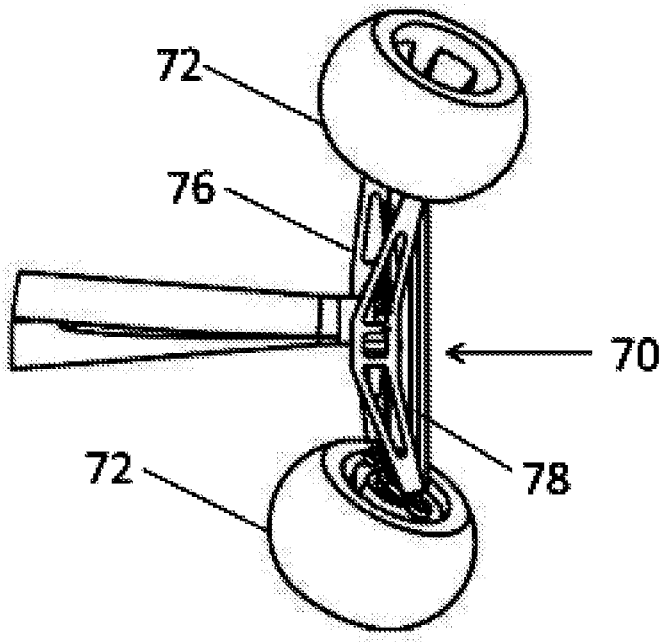

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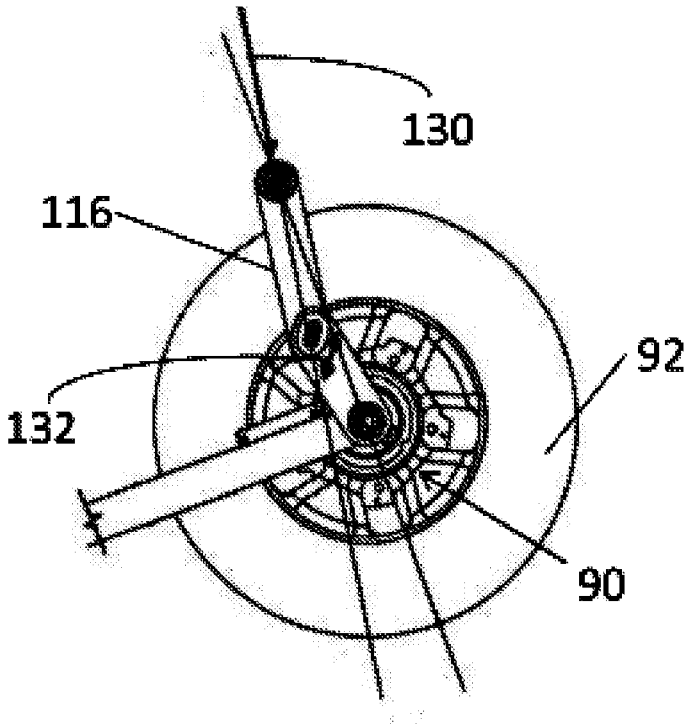


Fig. 18

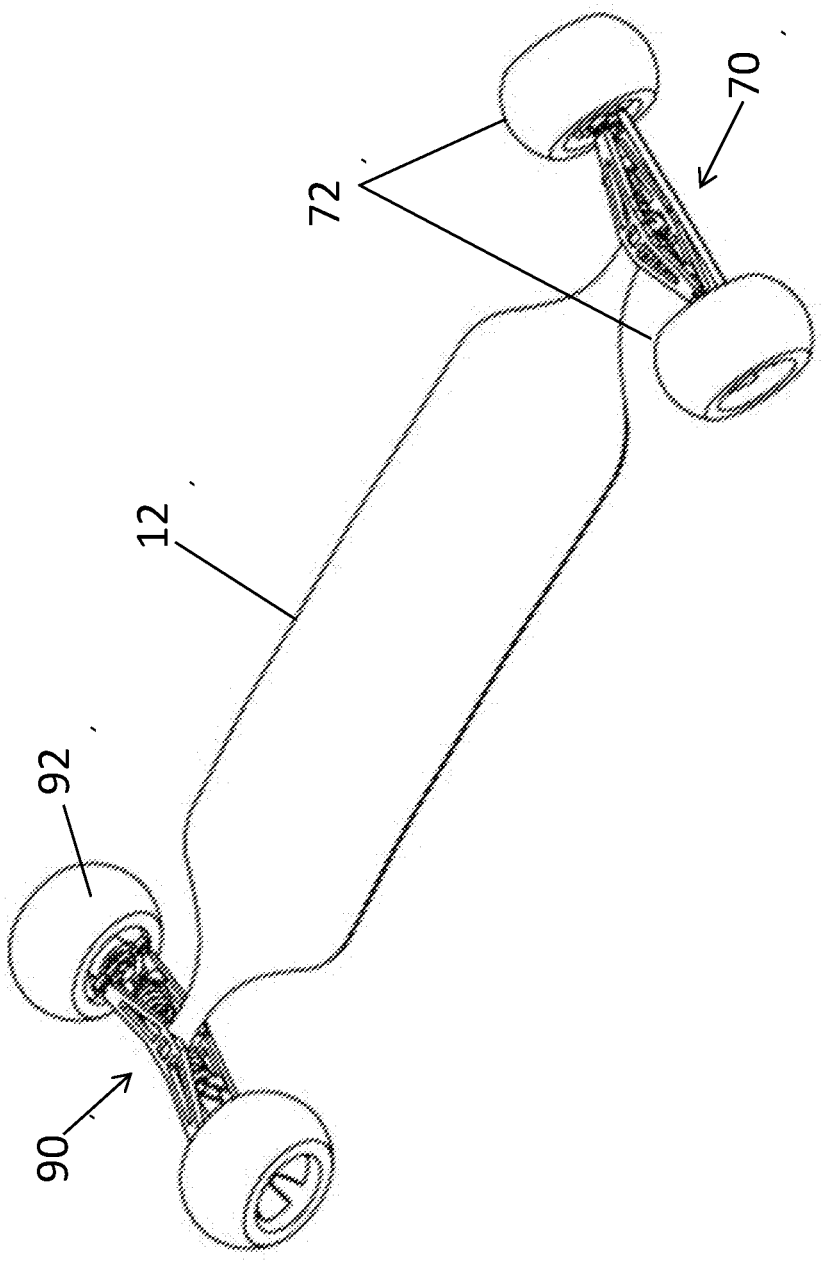


Fig. 19

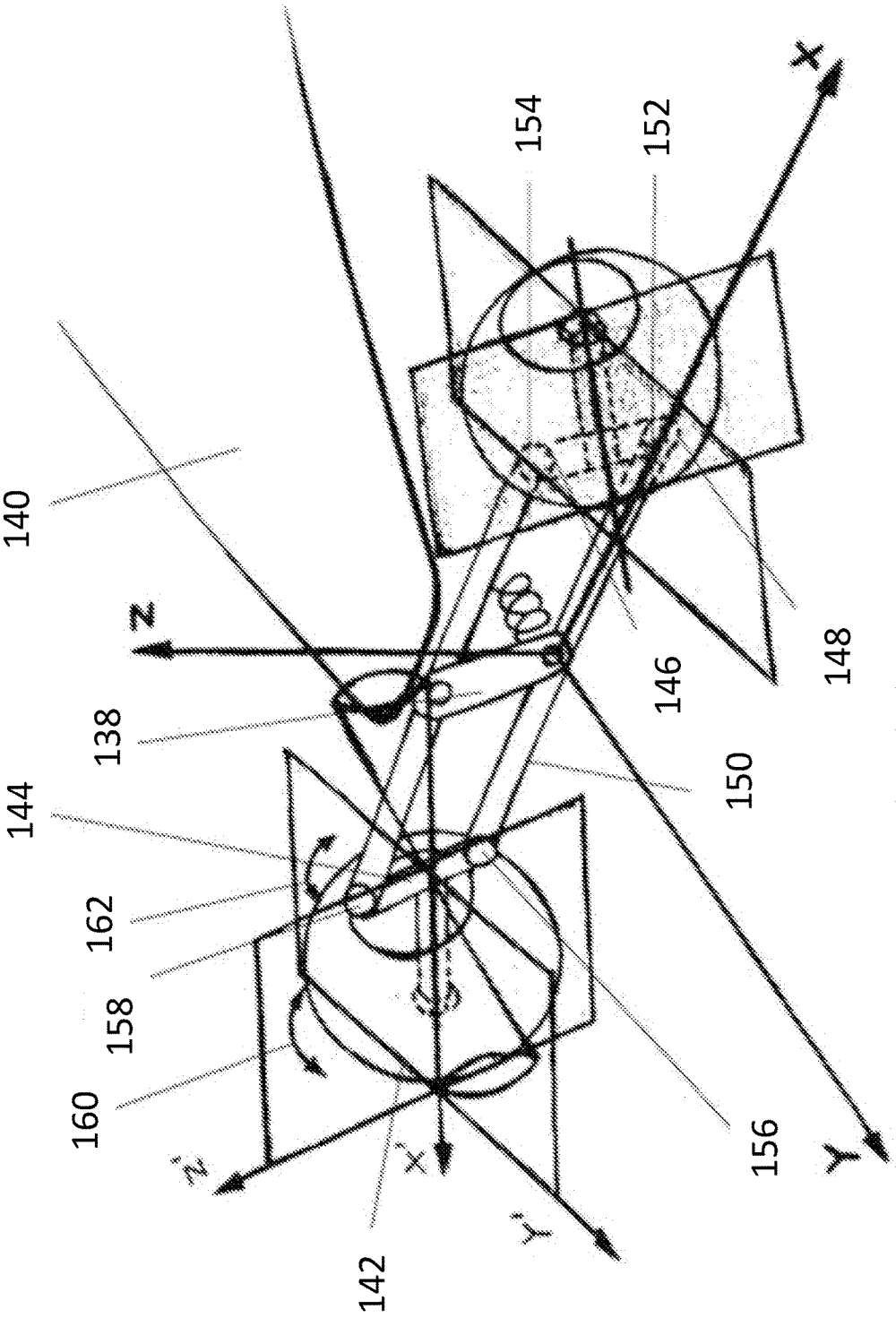
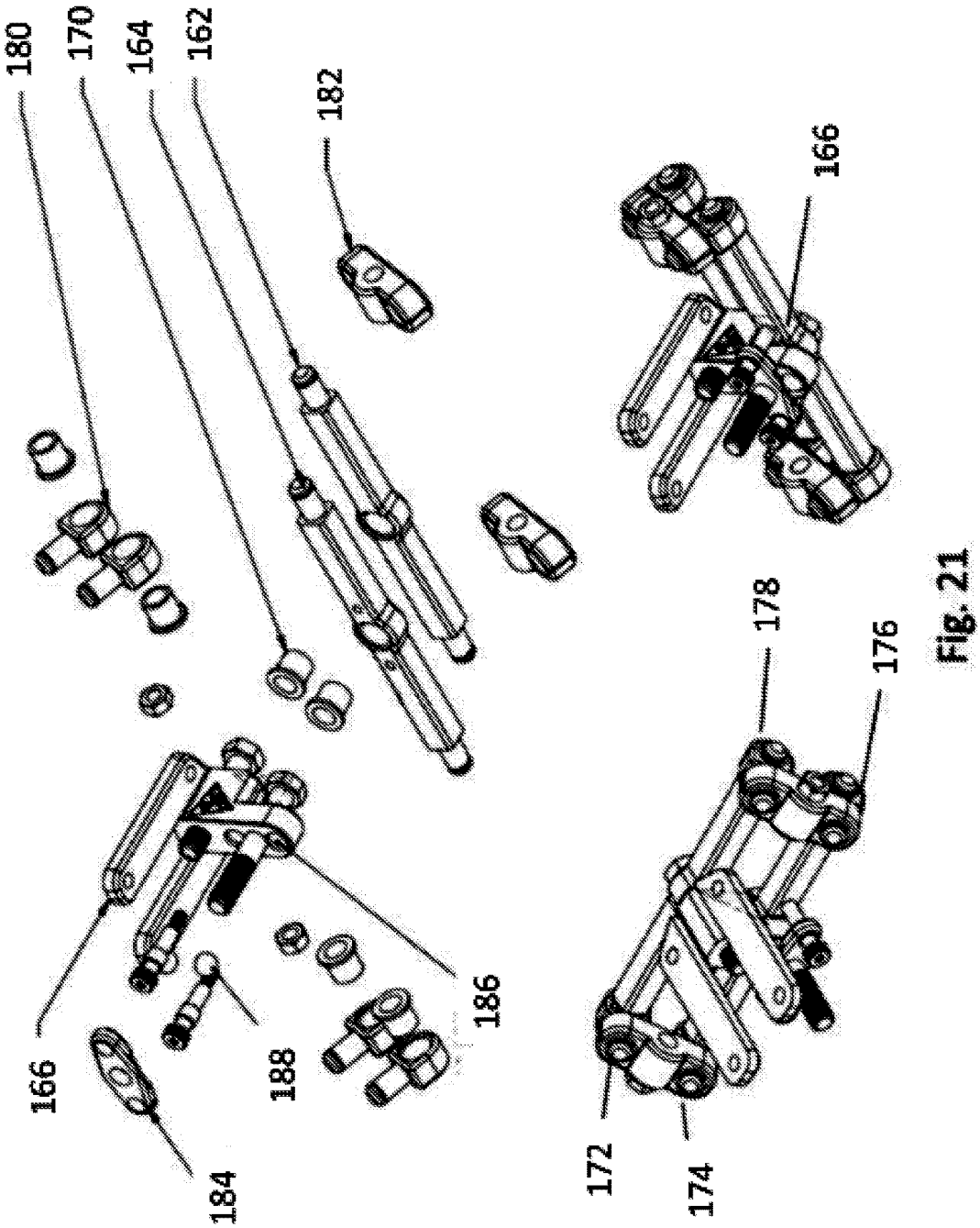


Fig. 20



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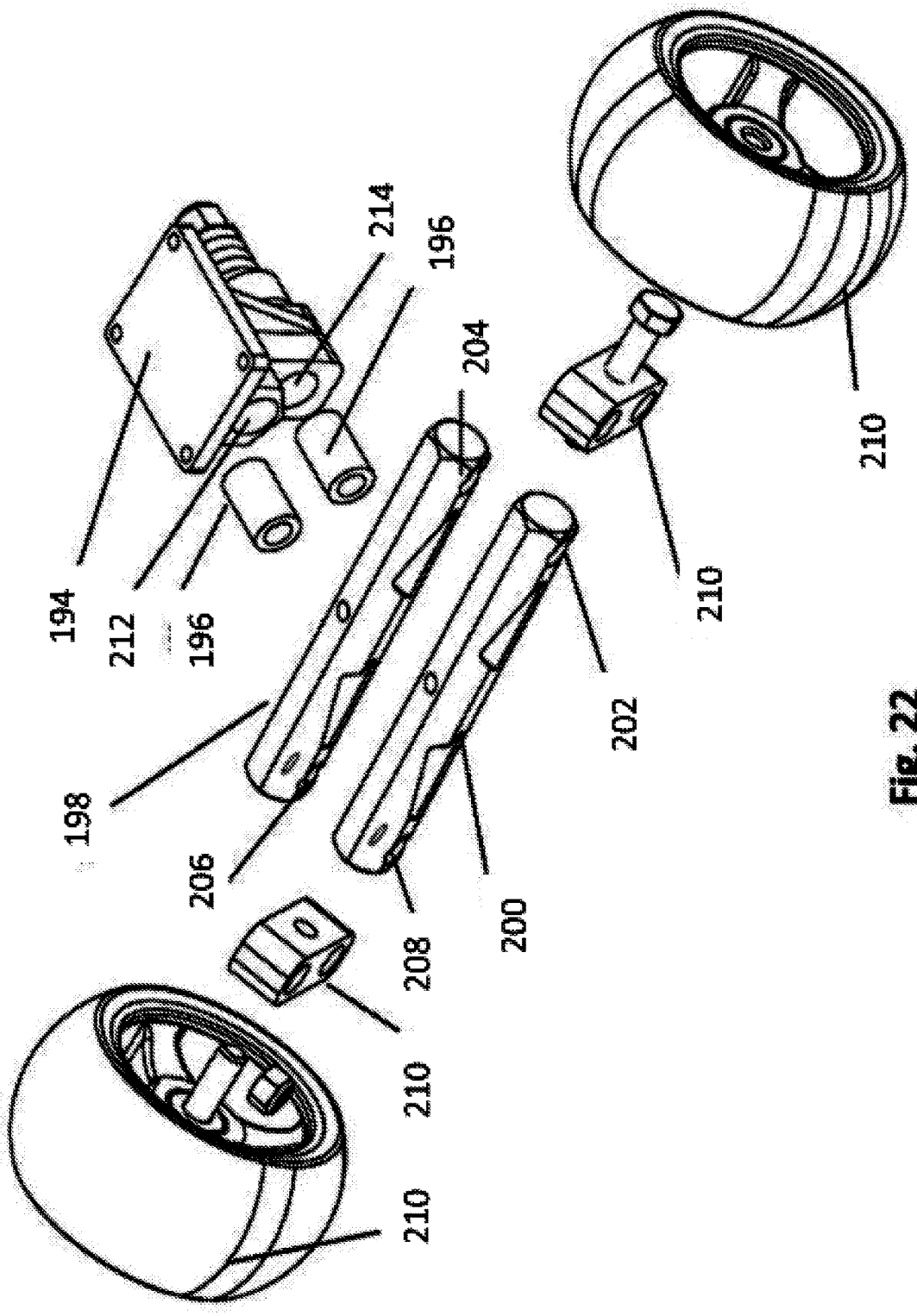

Fig. 22

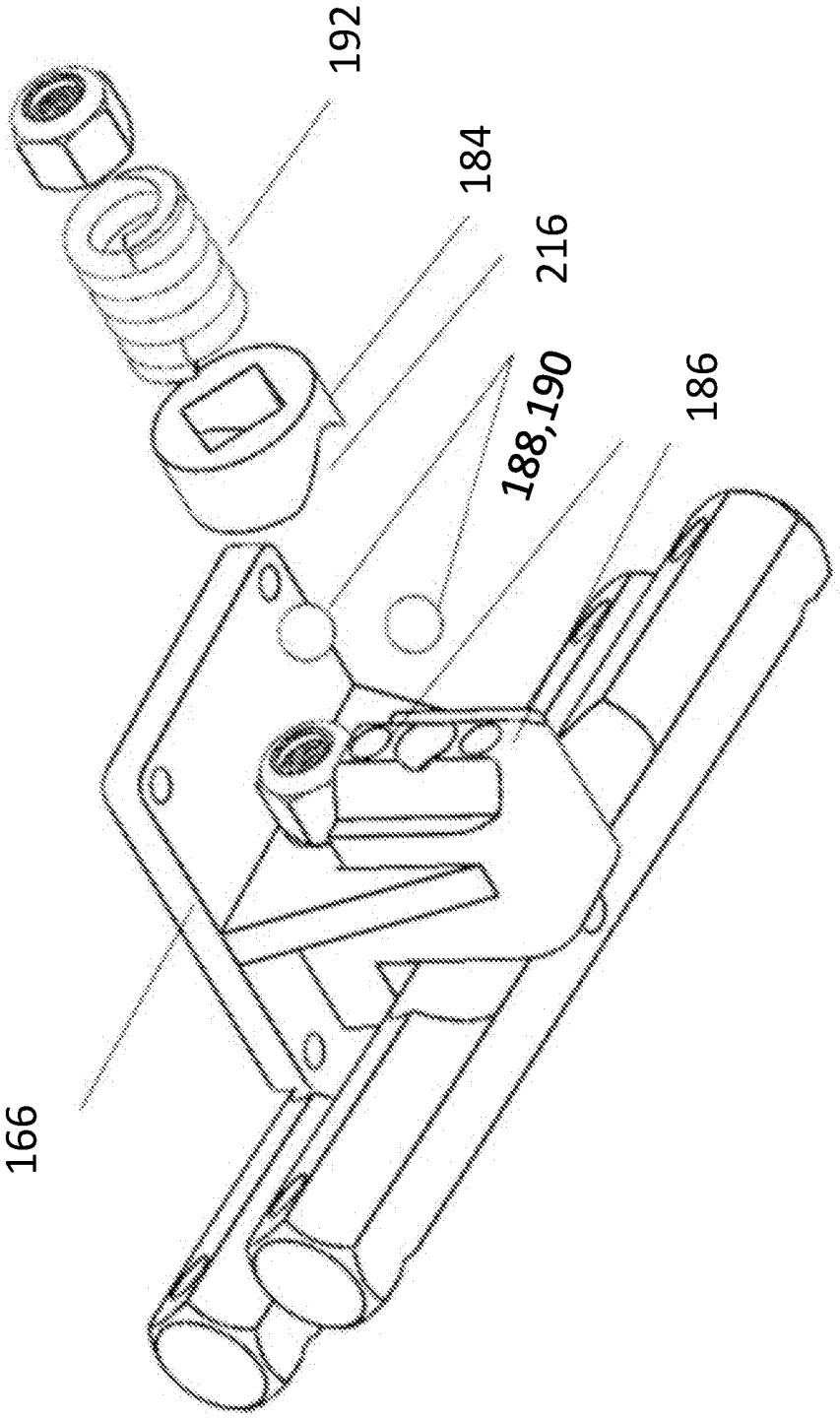

Fig. 23

MULTI-PIVOTING STEERING MECHANISM

RELATED APPLICATIONS

[0001] This application claims priority to provisional U.S. Patent Application Ser. No. 62/229,993, "Multi-Pivoting Steering Mechanism," filed on 25 Aug. 2015, and incorporated by reference in its entirety.

BACKGROUND

[0002] Disclosed are preferred embodiments of a multi-pivoting skateboard. The majority of conventional skateboards utilize an elongated board that has a front truck and a rear truck, each having a two wheel assembly. Each assembly consists of two wheels fixed relative to the truck in a straight forward-and-reverse orientation. In order to turn a conventional skateboard, a person riding the skateboard will lean to the right or left, forcing the trucks to slightly angle the wheels in the chosen direction. Although the skateboard will turn to the right or left, the turning radius is typically limited by the amount of resistance from the trucks and wheels. In order to provide motive force, forward or backward, a rider must push the skateboard.

[0003] Due to the limited turning radius, an improved steering mechanism is needed that provides significantly improved control, including turning capability. An improved skateboard is also needed wherein a board can move up or down along the side edges of the frame. Another needed improvement is a skateboard having front wheels that can pivot perpendicularly to the frame, thus a skateboard that makes the wheels lean and turn at the same time when turning, to provide greater turning control to a rider. Additionally, a skateboard having such a steering mechanism is advantageous when the steering mechanism can be deployed on any other vehicle where wheel leaning while turning is desired.

SUMMARY

[0004] A skateboard is disclosed having positive camber steering when steered along a surface. The skateboard comprises a frame having a center portion and an end portion, and a board pivotally coupled to the center portion of the frame by a board pivot assembly. At least one steering assembly is coupled to the end portion, with the steering assembly including an upper truck arm, a lower truck arm, and at least one wheel. The upper truck arm and the lower truck arm are spaced apart relative to the frame, and the wheel has an axis of rotation.

[0005] The upper truck arm and the lower truck arm are each rotatable about an axis of travel parallel to the skateboard's line of travel. The upper truck arm is coupled to the wheel above the axis of rotation relative to the surface, and the lower truck arm is coupled to the wheel below the axis of rotation relative to the surface. Thus the upper truck arm extends farther from the frame than the lower truck arm, thereby imparting a positive camber in the direction of steering. A lever connected to a drive assembly is provided, wherein pivoting the board moves the lever and rotates the drive assembly, thereby moving the skateboard forward.

[0006] The frame preferably has a straight section and a curved outward section, and includes a board pivot interface for engaging the board pivot assembly. The frame also has an elevated rear end portion. The board preferably includes a variable width. Ball joints may couple the lower truck arm and the upper truck arm to the wheel, and the drive assembly preferably comprises a one way bearing coupled to a rear wheel. The drive assembly may also include a planetary gear around a one-way bearing coupled to a rear wheel. The skateboard also preferably includes a disk brake coupled to a rear wheel, the disk brake governed by an actuator on the board.

[0007] In an alternative embodiment, the skateboard has positive camber steering along a surface with a frame having an end portion and a board coupled to the frame. A steering assembly coupled to the end portion includes an upper truck arm, a lower truck arm and at least one wheel. The upper truck arm and the lower truck arm are spaced apart relative to the frame, and the wheel having an axis of rotation. The upper truck arm and the lower truck arm are also each rotatable about an axis of travel parallel to the skateboard's line of travel. The upper truck arm is coupled to the wheel above the axis of rotation relative to the surface and the lower truck arm is coupled to the wheel below the axis of rotation relative to the surface, such that the upper truck arm extends farther from the frame than the lower truck arm, thereby imparting a positive camber in the direction of steering.

[0008] The second embodiment skateboard frame may also have a straight section and a curved outward section, and the frame may include an elevated rear end portion. The board may have a variable width, ball joints may couple the lower truck arm and the upper truck arm to the wheel, and the board may be coupled to a center portion of the frame by a board pivot assembly. The skateboard may also include a lever connected to a drive assembly, wherein pivoting the board moves the lever and rotates the drive assembly. The drive assembly preferably includes a one way bearing coupled to a rear wheel, and may include a planetary gear around a one-way bearing coupled to a rear wheel. The skateboard preferably includes a disk brake coupled to a rear wheel, the disk brake governed by an actuator on the board.

BRIEF DESCRIPTION OF THE FIGURES

[0009] FIG. **1** illustrates an orthographic left side view of a multi-pivoting skateboard;

[0010] FIG. **2** illustrates an orthographic right side view of the multi-pivoting skateboard;

[0011] FIG. **3** illustrates an elevational left side view of the multi-pivoting skateboard;

[0012] FIG. **4** illustrates a top plan view of the multi-pivoting skateboard;

[0013] FIG. **5** illustrates a bottom plan view of the multi-pivoting skateboard;

[0014] FIG. **6** illustrates a front elevational view of the multi-pivoting skateboard;

[0015] FIG. **7** illustrates a rear elevational view of the multi-pivoting skateboard;

[0016] FIG. **8** illustrates an exploded view of the multi-pivoting skateboard;

[0017] FIG. **9** illustrates a bottom view of a frame of the multi-pivoting skateboard;

[0018] FIG. **10** illustrates an orthographic top view of the frame;

[0019] FIG. **11** illustrates an exploded view of a front steering assembly of the multi-pivoting skateboard;

[0020] FIG. **12** illustrates an exploded view of a rear drive assembly of the multi-pivoting skateboard;

[0021] FIG. **13** illustrates an orthographic view of a person riding the multi-pivoting skateboard;

[0022] FIG. **14** illustrates an orthographic right side view of a first alternative embodiment of the multi-pivoting skateboard having straight sides;

[0023] FIG. **15** illustrates a first orthographic front view of the front steering assembly showing two front tires/wheels in a pivoted position;

[0024] FIG. **16** illustrates a second orthographic front view of the front steering assembly showing two front tires/wheels in a pivoted position;

[0025] FIG. **17** illustrates a top view of the front steering assembly showing two front tires/wheels in a pivoted position;

[0026] FIG. **18** illustrates a side elevational view of the multi-pivoting skateboard's rear tire/wheel with two levers.

[0027] FIG. **19** illustrates an orthographic top view of a second alternative embodiment multi-pivoting skateboard having a front steering assembly with two tires/wheels, a rear assembly having two tires/wheels and an alternative board shape;

[0028] FIG. **20** illustrates a first alternative embodiment front steering assembly annotated with an XYZ coordinate system;

[0029] FIG. **21** illustrates an exploded view, a top orthogonal view and a bottom orthogonal view of the alternative embodiment steering assembly;

[0030] FIG. **22** illustrates an exploded view of a second alternative embodiment front steering assembly; and

[0031] FIG. **23** illustrates an exploded view of a damping system.

DETAILED DESCRIPTION

[0032] The following description is presented to enable any person skilled in the art to make and use the invention, and is provided n the context of a particular application and its requirements. Various modifications to the disclosed embodiments will be readily apparent to those skilled in the art, and the general principles defined herein may be applied to other embodiments and applications without departing from the spirit and scope of the present invention. For example, although a multi-pivoting skateboard is discussed herein, any other wheeled vehicle is contemplated. Additionally, although the expression 'wheel' is used herein, that expression contemplates, tires and other rotating structures on which a wheeled vehicle travels. Thus, the present invention is not limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

[0033] As shown in FIGS. **1-19**, an improved skateboard **10** includes the following major elements: a board **12**, a frame **32**, a front steering assembly **70** and a rear drive assembly **90**. The board **12**, as shown in FIGS. **1-8**, includes an upper surface **14**, a lower surface **16**, a board front end **18**, a board rear end **20** and a perimeter edge **22**. Located substantially centrally of the board **12** on the lower surface **16** is a board pivot assembly **54**. Traditional skateboards have elongated flat decks (i.e. boards) with straight sides and radiused front and rear ends. As shown in FIGS. **1-8**, the skateboard **10** utilizes a unique board **12** shape that curves upward at the front and rear, with a perimeter edge **22** that curves inward along the board **12**. This creates a board **12** with wider sections toward the board front end **18** and the rear end **20**, and narrowed near the board pivot assembly. The board rear end **20** of the board **12** tapers to be substantially rectangular with preferable dimensions of 1.0-2.0 inches (2.54-5.08 cm) in width, extending along the side of the rear wheel **92** preferably to the left. Additionally, although the illustrated skateboard **10** utilizes a specific board **12** shape, other shapes and dimensions of the board **12** are contemplated, such as the board **12** with straight sides shown in FIG. **14**.

[0034] Referring to FIGS. **1-10**, the frame **32** is comprised of a straight section **34**, an outward curved section **36**, a frame front end **38** having an open ended hollow cylinder **40** and a frame rear end **42** having a frame opening **44**. As shown in FIGS. **8-10**, the straight section **34** spans the skateboard **10** with the straight section **34** having an upward curve as it approaches the frame rear end **42**. The outward curved section **36** branches off from the frame front end **38** and continues at an outward angle to approximately the board pivot assembly **54**, and then curves back inward with an S-shape until it contacts the straight section **34** at a point substantially two-thirds the length of the straight section **34**.

[0035] Located on both the straight section **34** and the outward curved section **36** is a circular pivot board interface **46**, each for interfacing the board pivot assembly **54** for anchoring the board **12** to the frame **32**, and allowing the board **12** to smoothly pivot about the board pivot assembly **54**.

[0036] The board pivot assembly **54** comprises a center rod **56** with two spacers **58** and two nuts **60**. A first bearing **24** and a second bearing **26** are located between the circular board pivot interfaces **46** and the center rod **56**. Thus, when the board **12** is placed on top of the frame **32**, the first bearing **24** and second bearing **26** are located on the straight section **34** and outward curved section **36**, respectively. Circular board pivot interfaces **46** and board **12** are aligned so that the opening on the first bearing **24** and second bearing **26** and the respective openings **48** on each of the circular pivot board interfaces **46** creates a unitary axial opening as shown in FIG. **8**. The center rod **56** is preferably threaded at each end, allowing one of the nuts **60** to be screwed onto each end. Once the nuts **60** are screwed on the board **12** is securely attached to the frame **32** and can be raised or lowered along each side. Preferably to attach the board **12** to the frame **32** by the board pivot assembly **54**, the first bearing **24** and second bearing **26** are inserted into the center circular bore of the board **12**. The center rod **56** goes through the center circular bore of the board **12** and is inserted through the first bearing **24** and the second bearing **26**. Both sides of the center rod **56** are fitted inside the openings **48** of the circular board pivot interfaces **46** on the frame **32** and fixed by nuts **60**. Thus, the whole board pivot assembly **54** allows a smooth rocking up and down pivoting movement to the board **12**.

[0037] FIGS. **1**, **4**, **5**, **6**, **8**, **11**, **15** and **16** show the front steering assembly **70**. The front steering assembly **70** includes two front wheels **72**, two trucks **74**, a truck upper arm **76**, a truck lower arm **78**, a stabilizer **80** and attachment components **82** which include ball joint rod ends **86** proximal each wheel. A wheel **72** is located on each side of the board **12** and the frame **32** at the front. The attachment components **82**, in conjunction with the open ended hollow cylinder **40** at the front end **38** of the frame **32**, are utilized to secure the two front wheels **72**, with the ball joint ends **86** attached terminally thereto. The stabilizer **80**, as its name implies, is utilized to stabilize the front wheels **72** when the

skateboard **10** is being ridden. The upper arm **76** and the lower arm **78** are attached to each respective wheel **72**. The upper arm **76** and the lower arm **78** allow the two front wheels **72** to pivot about the frame **32**. A compression spring **84** is located on each side of the frame **32** and is utilized to provide resiliency to each wheel **72** as the front wheels **72** pivot, urging them back to an upright orientation

[0038] The front steering assembly **70** is made in such a way that when rider pushes the board **12** down either to the left or right, both front wheels **72** tilt relative to a vertical plane and also turn into the pushed direction as shown in FIGS. **13**,**15**, **16** and **17**. The principal difference between the upper arm **76** and the lower arm **78** is that the upper arm **76** is not straight, but rather angled frontward from the frame **32** to the front wheels **72**, while the lower arm **78** is straight. Both the upper arm **76** and lower arm **78** have a bore in the middle for attachment to the frame front end **38**.

[0039] When the board **12** is tilted to the left or right, the upper arm **76** and lower arm **78** move parallel to each other so that the front wheels **72** also tilt, as shown in FIGS. **13**, **15**, **16** and **17**. The front wheels **72** turn left or right as a result of the upper arm **76** moving side-to-side and bending slightly forward. The stabilizer **80** maintains both front wheels **72** parallel to each other and also it pushes the wheels **72** left or right (while keeping the wheels **72** parallel) as the board is pushed left or right while maintaining good control.

[0040] The rear assembly **90**, as shown in FIGS. **2**, **7**, **8** and **12**, includes a single rear wheel **92**, first rear wheel attachment components **94**, bearings **96**, an internal gear hub/planetary gear system **106**, and second rear wheel attachment components **120**. The planetary gear system **106** includes a planetary gear carrier **108**, a sun gear **110**, three planet gears **112**, an annulus **114**, a first lever **116**, a second lever **118**, and a one-way bearing **122**.

[0041] As shown in FIGS. **1**-**5** and **8**, the rear drive assembly **90** is located at the rear of the skateboard **10**. The rear wheel **92** is attached to the frame rear end **42** by use of the first attachment components **94** in conjunction with the frame opening **44** at the frame rear end **42**. The rear wheel **92** is attached to the frame rear end **42** using of the internal gear hub/planetary gear system **106** and the first attachment components **94**.

[0042] The rear drive assembly **90** is the main driving mechanism of the skateboard **10**. The rear end **20** of the board **12** is attached to the second lever **118** with a pressed fit bearing. One end of the first lever **116** is attached to the internal gear hub/planetary gear system **106** with the one-way bearing **122** between them. The other end of the first lever **116** is attached to the second lever **118**. The second lever **118** has a cylindrical extruded cut on both ends for bearings which are pressed fit into it. The first lever **116** has a different shape on both ends. The first end of the lever **116** also has a cylindrical extruded cut, with a key way slot so that the one-way bearing **122** fits into it. The other end has a straight slot shape extruded cut which acts as a slider.

[0043] As the board **12** is pivoted up and down by a rider, the rear end **20** pushes the second lever **118**, and the second lever **118** pushes the first lever **116**, as shown in FIG. **18**. The first lever **116** rotates the internal gear hub planetary gear assembly **106** and the rear wheel **92**. The one way bearing **122** is attached in between the lever **116** and the system **108**. The one-way bearing **122** forces the internal gear hub/planetary gear assembly **108** and the rear wheel **92** to rotate in one direction only. As also shown in FIG. **18**, a downward force is indicated by the arrow **130** and a sliding motion which is caused by the force is indicated by the arrows **132**. The one way bearing **122** also helps a rider when he/she does not want to push the board **12** up and down and instead wishes to stand neutral and just cruise.

[0044] The first lever **116** has a straight slot shape extruded cut on the second end. The cut is made because when a vertical force is applied to the first lever **116** the internal gear hub/planetary gear assembly **106** and the rear wheel **92** will not rotate because the vertical force is moving through the center of the internal gear hub/planetary gear assembly **106** and rear wheel **92**. So the straight slot shape on the second end of the first lever **116** shifts the force direction/angle. The shift of the force direction/angle causes the internal gear hub/planetary gear assembly **106** and rear wheel **92** to rotate when the board **12** is pushed up and down.

[0045] Located inside the left side of the rear wheel **92** is the planetary gear system **106** and the bearings **96**. The skateboard **10** can selectively engage various gears depending on the speed and riding conditions that are encountered. The internal gear hub/planetary gear system **106** has gear ratios so that rider can go faster, as best shown in FIG. **8**. The planet gear carrier **108**, sun gear **110**, three planet gears **112** and annulus **114** are attached inside the rear wheel **92** and the whole assembly is attached to the frame rear end **42**. It should be noted that while the internal gear hub/planetary gear assembly **106** is disclosed and shown, the skateboard **10** is not limited to any specific number of gear ratios. Other numbers of gears, or no gears, can also be utilized without departing from the scope of the invention.

[0046] The rectangular section of the board **12** is attached to the rear end **42** of the frame by use of the first levers and the second lever **118**. The first lever **116** and the second lever **118** allow the rear end **20** of the board **12** to pivot up down about the frame **32**. As shown in FIGS. **1**, **3** and **8**, the first lever **116** is attached to the frame rear end **42**, and the second lever **118** is attached to the one-way bearing **122**. The one-way bearing **122** is attached to the internal gear hub/planetary gear system **106** and the internal gear hub/planetary gear system **106** is attached to the rear wheel **92**. The first lever **116** is also attached to the rear end **20** of the board **12** which is attached to the rear drive assembly **90**. As a rider pushes the board **12** up and down the rear wheel **92** rotates with the help of the assembly **90**.

[0047] The disc brake assembly **97** comprises a caliper **98**, a disc **99**, a wire **100**, a brake actuator support **102** and a brake actuator **104**. In order to slow down or stop the skateboard **10**, the disc brake assembly **97** is utilized. As best shown in FIG. **8**, the disc brake assembly **97** is located on the right side of the rear wheel **92** (when viewed from the front). The disc brake assembly **97** functions as other conventional disc brake systems. In order to slow down or stop, a person riding the skateboard **10** will step downward on the brake actuator **104**, which is accessed from the upper surface **14** of the board **12** and is located on the left side adjacent the rear end **20** of the board **12**.

[0048] When the brake actuator **104** is engaged the disc brake assembly **97** puts pressure **10** upon the brake disc **106** thereby reducing the rotational capability of the rear wheel **92**. The disc brake assembly **97** is maintained in position adjacent the rear wheel **92** by the brake support **102**.

[0049] Additionally, the disc brake assembly **97** is disclosed and shown on the right side of the rear wheel **92**, and the gear system **106** is disclosed and shown on the left side

of the rear wheel **92**. Both the disc brake assembly **97** and the gear system **106** can be manufactured on opposite sides of the rear wheel **92** by the use of minor modification to the skateboard's **10** design. Also, other types/designs of brake systems can be utilized. Also, in this disclosure the multi-pivoting skateboard **10** has been described and shown with a front assembly having two front wheels **72** and a rear assembly having a single rear wheel **92**. The fundamental inventive operation of the multi-pivoting skateboard **10** is not limited to the disclosed design. Other alternative embodiment skateboard design, having front and rear assemblies each having two wheels and with an appropriately modified board, is shown in FIG. **19**.

[0050] The multi-pivoting skateboard **10** provides a rider with significantly improved control. A person riding the skateboard **10** can pivot the board up or down and to the right or left, as shown in FIG. **13**. The control is also increased by the ability of the wheels to pivot, as previously disclosed. And, in conclusion, the unique scrape of the board **12** provides a platform that allows a rider to fully utilize the capabilities of the multi-pivoting skateboard **10** while maintaining balance and riding comfort.

[0051] When riding the skateboard **10**, the rider stands on the board **12** and uses both legs to push skate board **10** up and down to go forward, and left and right to steer into a turn, as shown in FIG. **13**. The board **12** pivots about the frame interface **24** with the help of the board pivot assembly **54**. The up and down oscillating movement causes the skateboard **10** to move forward with the help of rear drive assembly **90**. The front steering assembly **70** helps a rider to turn left and right by pushing the skateboard left and right.

[0052] FIG. **20** shows an XYZ coordinate system and Parallelogram linkage system **136** and the two wheels **142** (front or back, depending on the embodiment). The parallelogram linkage system **136** has four sides **144**,**146**,**148**,**150** and it is held by the center part **138** and attached at the bottom of the board **140**. The wheels **142** are attached to two sides **144**,**148** of the parallelogram. The wheels **142** are resting on the bottom plane X-Y. And Z-X is vertical plane. All linkages **144**,**146**,**148**,**150** are attached to each other with joints **152**,**154**,**156**,**158** these joint allow for the rotation of the linkages as shown with arrows **160**,**162**. In assembly **70** shown in FIGS. **13**, **15**,**16** and **17** the ball joints **86** are used to allow degrees of freedom of rotation and in the assembly in FIG. **21** sleeve bearings **170** are attached at every joint **152**,**154**,**156**,**158**. And in FIG. **22** joints **200**,**202**,**204**,**206** are used.

[0053] FIG. **21** shows assembly **160**. Unlike upper aim **76** and the lower arm **78** from assembly **70** from FIG. **11**, the Top Rod **162** and Bottom Rod **164** are straight and they are attached to the Mid **166** with nuts **168** and Bolts **170**. There are sleeve bearings **170** at every joint point **172**,**174**,**176**, **178**. Side pin **180** is used to attach the upright **182** to both the Top Rod **162** and the Bottom Rod **164**. Wheels **72** are attached to the upright **182** with the nut **184** which is going through opening **186**. This whole assembly **160** makes the parallelogram linkage system which makes the wheels lean and turn at the same time.

[0054] FIG. **22** shows assembly **188**, in this assembly parallelogram linkage system has different joints that assembly **70** and **160**. Top bar **200** and Bottom bar **198** has bore **202**,**204**,**206**,**208** at both ends. This bore openings **202**,**204**, **206**,**208** are at an angle. A bolt goes through opening **202**,**204**,**206**,**208** and attached to wheel holder **210**. The rubber bushings **194**,**196** are inserted into counterbore **212**, **214** of center Part **194**. The rubber bushings **194**,**196** has through opening **212**,**214** where Top bar **200** and Bottom bar **198** are attached to center Part **194** with the bolt.

[0055] FIG. **23** shows the damping system. The spherical balls **188**, **190** rests in spherical concave **186** which is inside Mid **166**, suspension Push **184** is between spring **192** and Mid **166** and its inclined surfaces **216** are touching spherical balls **188**,**190**. When the Parallelogram moves at an angle the Spherical balls **188**,**190** slide over incline surfaces **216** of suspension Push **184** and compresses the spring **192**.

[0056] While the invention has been described in detail and pictorially shown in the accompanying drawings it is not to be limited to such details, since many changes and modification may be made to the invention without departing from the spirit and the scope thereof.

[0057] The foregoing descriptions of embodiments of the present invention have been presented only for purposes of illustration and description. They are not intended to be exhaustive or to limit the present invention to the forms disclosed. Accordingly, many modifications and variations will be apparent to practitioners skilled in the art. Additionally, the above disclosure is not intended to limit the present invention. The scope of the present invention is defined by the appended claims.

What is claimed is:

1. A skateboard with positive camber steering along a surface, the skateboard comprising:

a frame having a center portion and an end portion;

a board pivotally coupled to the center portion of the frame by a board pivot assembly;

at least one steering assembly coupled to the end portion, the steering assembly comprising an upper truck arm, a lower truck arm and at least one wheel, the upper truck arm and the lower truck arm spaced apart relative to the frame, and the wheel having an axis of rotation;

the upper truck arm and the lower truck arm each rotatable about an axis of travel parallel to the skateboard's line of travel;

the upper truck arm coupled to the wheel above the axis of rotation relative to the surface;

the lower truck arm coupled to the wheel below the axis of rotation relative to the surface;

wherein the upper truck arm extends farther from the frame than the lower truck arm, thereby imparting a positive camber in the direction of steering; and

and a lever connected to a drive assembly, wherein pivoting the board moves the lever and rotates the drive assembly, thereby moving the skateboard forward.

2. The skateboard of claim **1** wherein the frame has a straight section and a curved outward section.

3. The skateboard of claim **1** wherein the frame comprises a board pivot interface for engaging the board pivot assembly.

4. The skateboard of claim **1** wherein the frame comprises an elevated rear end portion.

5. The skateboard of claim **1** wherein the board comprises a variable width.

6. The skateboard of claim **1** further comprising ball joints coupling the lower truck arm and the upper truck arm to the wheel.

7. The skateboard of claim **1** wherein the drive assembly comprises a one way bearing coupled to a rear wheel.

8. The skateboard of claim **1** wherein the drive assembly comprises a planetary gear around a one-way bearing coupled to a rear wheel.

9. The skateboard of claim **1** further comprising a disk brake coupled to a rear wheel, the disk brake governed by an actuator on the board.

10. A skateboard with positive camber steering along a surface, the skateboard comprising:

a frame having an end portion;

a board coupled to the frame;

at least one steering assembly coupled to the end portion, the steering assembly comprising an upper truck arm a lower truck arm and at least one wheel, the upper truck arm and the lower truck arm spaced apart relative to the frame, and the wheel having an axis of rotation;

the upper truck arm and the lower truck arm each rotatable about an axis of travel parallel to the skateboard's line of travel;

the upper truck arm coupled to the wheel above the axis of rotation relative to the surface;

the lower truck arm coupled to the wheel below the axis of rotation relative to the surface; and

wherein the upper truck arm extends farther from the frame than the lower truck arm, thereby imparting a positive camber in the direction of steering.

11. The skateboard of claim **10** wherein the frame has a straight section and a curved outward section.

12. The skateboard of claim **10** wherein the frame comprises an elevated rear end portion.

13. The skateboard of claim **10** wherein the board comprises a variable width.

14. The skateboard of claim **10** further comprising ball joints coupling the lower truck arm and the upper truck arm to the wheel.

15. The skateboard of claim **10** further wherein the board is coupled to a center portion of the frame by a board pivot assembly.

16. The skateboard of claim **10** further comprising a lever connected to a drive assembly, wherein pivoting the board moves the lever and rotates the drive assembly.

17. The skateboard of claim **16** wherein the drive assembly comprises a one way bearing coupled to a rear wheel.

18. The skateboard of claim **16** wherein the drive assembly comprises a planetary gear around a one-way bearing coupled to a rear wheel.

19. The skateboard of claim **10** further comprising a disk brake coupled to a rear wheel, the disk brake governed by an actuator on the board.

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