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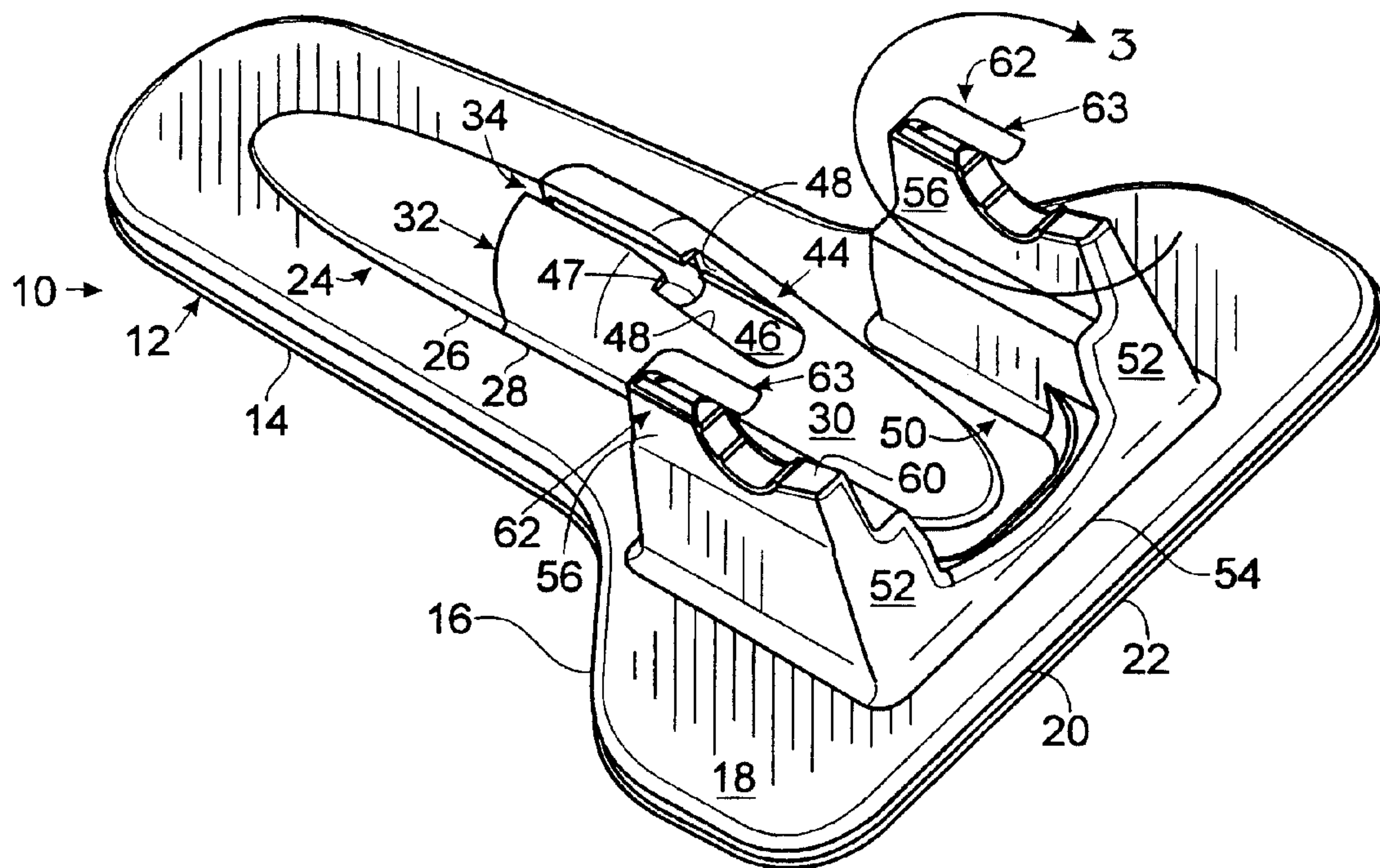
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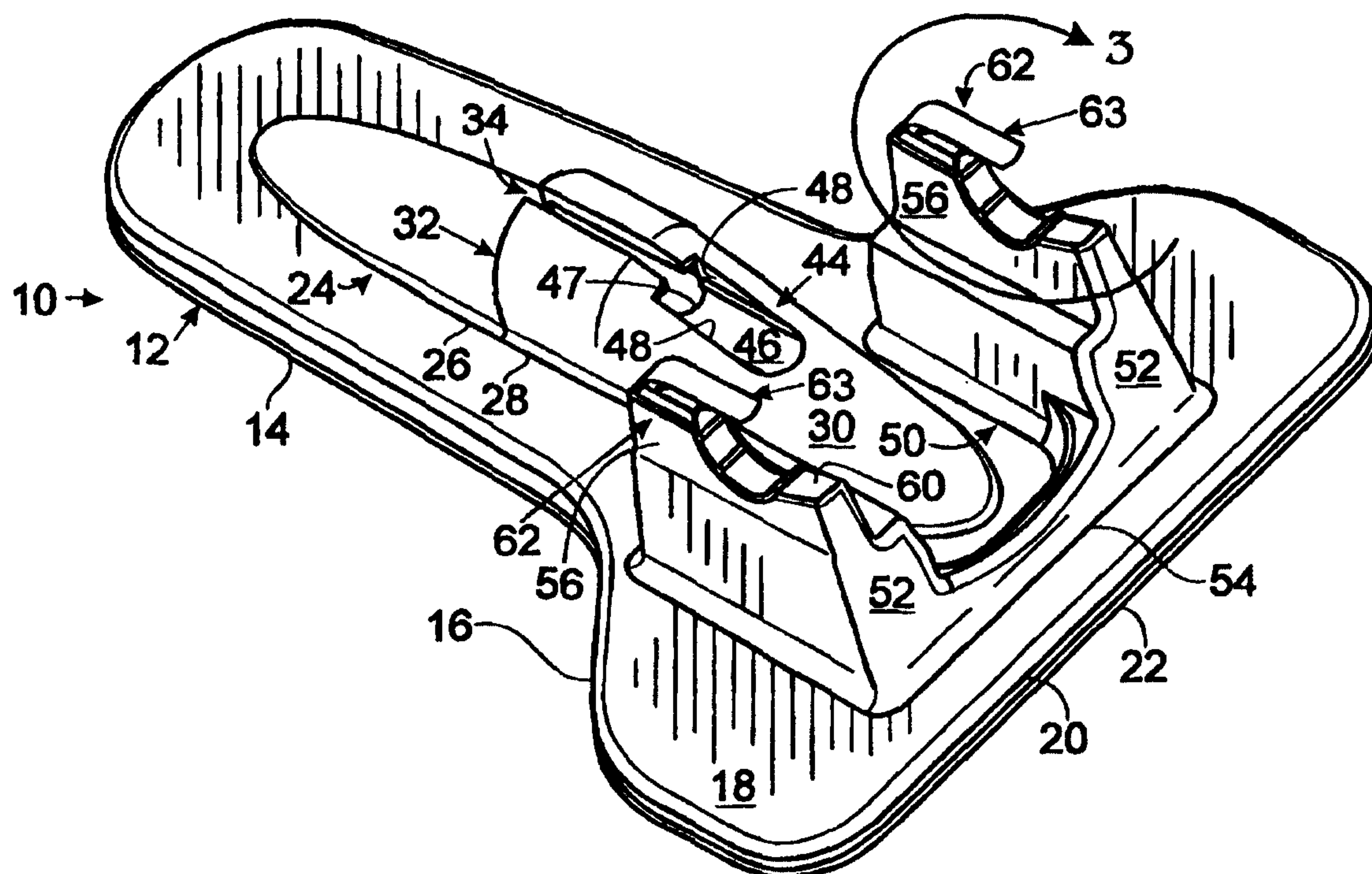
A ride simulator for use with a children's ride-on vehicle. The simulator includes a stationary base, a first support structure extending upwardly from the base for supporting at least a portion of the vehicle above the base, and an actuator for coupling to the vehicle to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator, thereby simulating ground-traveling movement of the vehicle.

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(54) Title: RIDE SIMULATOR FOR USE WITH A CHILDREN'S RIDE-ON VEHICLE



(57) Abstract

A ride simulator for use with a children's ride-on vehicle. The simulator includes a stationary base, a first support structure extending upwardly from the base for supporting at least a portion of the vehicle above the base, and an actuator for coupling to the vehicle to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator, thereby simulating ground-traveling movement of the vehicle.

RIDE SIMULATOR FOR USE WITH A CHILDREN'S RIDE-ON VEHICLE

Background and Summary of the Invention

The present invention relates generally to children's ride-on
5 vehicles. More specifically, the invention concerns a ride simulator for a
children's ride-on vehicle. The simulator maintains the vehicle in a supported,
localized position and simulates ground-traveling movement by horizontally
and vertically moving the vehicle along a defined path.

Children's ride-on vehicles come in many different shapes and
10 sizes to accommodate children of different ages and sizes. Typically the
vehicles are motorized, with a battery source connected to an electric motor
that drives one or more of the vehicle's wheels according to the speed and
direction selected by the child.

To operate the vehicle, a child will sit on or within the vehicle,
15 and by pressing a pedal or moving a switch or button on a control panel, the
vehicle's motor is energized by the battery source. The child then drives the
vehicle in much the same way as an adult operates an automobile. In addition,
most vehicles have more than one speed, and several have more than one
direction. In vehicles having more than one speed, there is usually a high and a
20 low speed. In vehicles having more than one direction, the second direction is
usually reverse.

When a child, and especially a young child, is first learning to
operate a motorized ride-on vehicle, the child is often unaccustomed to
controlling and steering the vehicle. As a result, the child may be injured, as

well as cause damage to the vehicle or other objects, as the child learns to maneuver and control the vehicle. Parents also want to let their children enjoy a ride-on vehicle at a very young age without allowing the vehicle to be actually driven. In addition, very young children often want to use a ride-on
5 vehicle, but lack the strength and coordination necessary to control and operate the vehicle. This can be particularly troublesome when a child has older siblings that are able to play with and enjoy a ride-on vehicle.

With the above problems in mind, a general object of the present invention is to provide a ride simulator for use with a children's ride-on
10 vehicle. The simulator removably supports the vehicle and simulates ground-traveling movement of the vehicle by moving the vehicle in a reciprocating path of horizontal and vertical movements about a defined location on the simulator. The simulator allows a child to become accustomed to the controls and motions associated with operating a motorized ride-on vehicle, while maintaining the
15 vehicle in a localized, supported position.

It is another object of the invention to provide a ride simulator for an independently operable children's ride-on vehicle that enables the vehicle to be mounted on the simulator to simulate ground-traveling movement, or to be removed from and used independently of the simulator.

20 Yet another object of the invention is to provide a ride simulator that supports the entire ride-on vehicle above the surface on which the simulator is placed.

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Still another object of the invention is to provide a ride simulator that is rugged enough to tolerate the abuses expected in the operating environment, yet is economical to manufacture by virtue of having relatively few parts, featuring components readily moldable from plastic, and not requiring precisely fitting parts.

The invention achieves these and other objects in the form of a ride simulator having a base, a first support structure extending upwardly from the base to removably and slidably support at least a portion of the vehicle above the base, and an actuator that is configured to be coupled to the vehicle to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator, thereby simulating ground-traveling movement of the vehicle.

According to a broad aspect of the invention, there is provided a children's amusement device, comprising the combination of: an independently operable children's ride-on vehicle having a motor, a battery adapted to power the motor, and a drive assembly in communication with the motor and including an axle and at least one wheel mounted on the axle; and a ride simulator adapted for use with the vehicle, the simulator comprising: a stationary base; a first support structure extending upwardly from the base for removably engaging and slidably supporting at least a portion of the vehicle above the base; and a mechanism for removably securing to the vehicle's drive assembly to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator upon rotation of the drive assembly, thereby simulating ground-traveling movement of the vehicle, wherein the mechanism includes a cam adapted to be mounted on the axle offset from the axle

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and an actuator connected to the base and configured to receive the cam and thereby be coupled to the drive assembly to cause the reciprocating horizontal and vertical motion of the vehicle when rotational motion is imparted to the drive
5 assembly and the cam is received by the actuator and rotated with the axle.

According to another broad aspect of the invention, there is provided a ride simulator for use with a children's ride-on vehicle having a rotatable drive assembly
10 with an axle and at least one driven wheel, the simulator comprising: a stationary base; a support structure extending from the base and adapted to removably engage and slidably support at least a portion of the vehicle above the base; and a mechanism for removably securing to the
15 vehicle's drive assembly to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator upon rotation of the drive assembly, thereby simulating ground-traveling movement of the vehicle, wherein the mechanism includes a cam adapted to be mounted
20 on the axle offset from the axle and an actuator connected to the base and including a clip configured to receive the cam and thereby be coupled to the drive assembly and cause the reciprocating horizontal and vertical motion of the vehicle when rotational motion is imparted to the drive
25 assembly, the clip including a recess into which the cam is received and a resilient shoulder that is biased to maintain the cam within the recess as the cam rotates with the axle when the cam is received by the actuator.

According to a further broad aspect of the
30 invention, there is provided a method for simulating ground-traveling movement of an independently operable children's ride-on vehicle having at least one wheel mounted on an axle, the method comprising: providing an independently

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operable children's ride-on vehicle having at least one wheel mounted on an axle, a cam mounted on the axle of the vehicle, and a ride simulator that includes a stationary base with a first support structure configured to receive
5 and slidably engage at least a portion of the vehicle and an actuator mounted on a second support structure for removably and rotatably receiving the cam; slidably engaging at least a portion of the vehicle with the first support structure while maintaining both the vehicle and the simulator in an
10 independently operable configuration; receiving the cam into the actuator without disassembling any portion of the cam or the actuator; and imparting a rotational velocity to the vehicle's axle to cause reciprocating horizontal and vertical motion of the vehicle as the cam rotates with the
15 axle, thereby simulating ground-traveling movement of the vehicle.

According to a further broad aspect of the invention, there is provided a ride simulator for use with a children's ride-on vehicle having a drive assembly including
20 a first wheel that is mounted on an axle and is adapted to be coupled to an actuator, the simulator comprising: a stationary base; a support structure extending from the base and adapted to removably engage and slidably support at least a portion of the vehicle above the base; and a
25 mechanism for removably securing to the vehicle's drive assembly, the mechanism including a first actuator adapted to be removably coupled to the first wheel, in a position offset from the axle, for effecting reciprocating horizontal and vertical motion of the vehicle with respect to the
30 simulator when motion is imparted to the vehicle's wheel, thereby simulating ground-traveling movement of the vehicle.

According to a further broad aspect of the invention, there is provided a children's amusement device,

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comprising the combination of: an independently operable children's ride-on vehicle having a motorized drive assembly including an axle and at least one wheel mounted on the axle; and a ride simulator adapted for use with the vehicle, 5 the simulator comprising: a stationary base; a support structure extending from the base and adapted to removably engage and slidably support at least a portion of the vehicle above the base; and a mechanism adapted to be removably secured to the vehicle's drive assembly, wherein 10 the mechanism includes a first actuator adapted to be removably coupled to at least one of the vehicle's wheels in a position offset from the axle for effecting reciprocating horizontal and vertical motion of the vehicle with respect to the simulator when rotational motion is imparted to the 15 wheel to which the actuator is coupled, thereby simulating ground-traveling movement of the vehicle.

According to a further broad aspect of the invention, there is provided a method for simulating ground-traveling movement of an independently operable children's 20 ride-on vehicle having at least one driven wheel mounted on an axle, the method comprising: providing an independently operable children's ride-on vehicle having at least one wheel mounted on an axle and including a receptacle, and a ride simulator that includes a stationary base with an 25 actuator configured to be removably coupled to the receptacle in a position offset from the axle; slidably engaging at least a portion of the vehicle with a first support structure on the base; coupling the actuator to the receptacle to support the wheel and at least a portion of 30 the vehicle above the base; and imparting a rotational velocity to the vehicle's axle to cause reciprocating horizontal and vertical motion of the vehicle as the wheel

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rotates with the axle, thereby simulating ground-traveling movement of the vehicle.

These and other objects and advantages are obtained by the invention, which is described below in
5 conjunction with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is an isometric view of a simulator for a children's ride-on vehicle.

Fig. 2 is a rear view of the simulator of Fig. 1.

10 Fig. 3 is an enlarged detail taken along curved line 3 in Fig. 1, showing one of the simulator's actuators.

Fig. 4 is a rear view of the simulator of Fig. 1 with a children's ride-on vehicle mounted on the simulator and one of the vehicle's rear wheels removed.

Fig. 5 is a fragmentary cross-sectional view of the vehicle of Fig. 4, taken along line 5-5 in Fig. 4 and showing the vehicle's axle, a cam and a wheel.

Fig. 6 is an enlarged perspective detail of the cam shown in Fig. 5.

Fig. 7 is a fragmentary rear detail of a portion of the vehicle's frame, taken along the curved line 7 in Fig. 4.

Fig. 8 is a side view of the portion of the vehicle's frame shown in Fig. 7.

Fig. 9 is a bottom view of the portion of the vehicle's frame shown in Fig. 7.

Fig. 10 is a side view of the simulator and vehicle shown in Fig. 4.

Figs. 11-12 are fragmentary side views of the simulator and vehicle shown in Fig. 10, with the vehicle moved along its reciprocating horizontal and vertical path about a defined location on the simulator.

Fig. 13 is a side view of an alternate embodiment of the simulator of Fig. 1 with a children's ride-on vehicle mounted on the simulator and one of the vehicle's rear wheels removed.

Fig. 14 is a rear view of the simulator and vehicle shown in Fig. 13.

Detailed Description of the Preferred Embodiments

A ride simulator constructed according to the present invention is shown in Fig. 1 and is generally indicated at 10. The simulator has a stationary base 12, which has a generally T-shaped configuration with an elongate front portion 14 that extends into a wider rear portion 16. Base 12 includes a generally planar surface 18 with a side wall 20 extending downwardly from the surface's perimeter. Side wall 20 terminates at a peripheral flange 22 that provides support and stability to the simulator 10.

A first support structure 24 extends upwardly from base 12 for removably engaging and slidably supporting at least a first portion, and preferably a forward portion, of a children's ride-on vehicle above base 12 in a manner to be described subsequently. As shown, first support structure 24 is centrally located on surface 18 and includes a forward region 26, a central platform 28, and a rearward region 30. The forward and rearward regions are generally tapered toward base 12 as they extend away from platform 28 and provide stability and increased support to the stabilizer, and especially the first support structure.

The first support structure's central platform 28 has a top portion 32 that defines an elongate slot 34. Slot 34 extends along the top portion in a direction transverse to the base's rear portion. As seen in Fig. 2, top portion 32 has a generally arcuate cross-sectional configuration and includes a pair of

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opposed members 32a that curve inwardly toward each other to define slot 34. Members 32a further define a slide plane 36 that is beneath top portion 32 and generally parallel to slot 34. Top portion 28, slot 34 and slide plane 36 may be collectively thought of as a track into which at the forward portion of the frame
5 may be slidably received. The track is generally indicated at 40 in Fig. 2.

The first support structure's rearward region 30 extends away from track 40 in the direction of the rear portion of the simulator. Rearward region 30 has a generally arcuate cross-sectional configuration, as seen in Figs. 1-2, and extends at an incline between the first support structure's top portion
10 32 and base 12. Rearward region 30 includes a landing 44 adjacent the rear portion of track 40. Landing 44 is disposed above base 12, yet below track 40, and includes a generally planar surface 46 with opposed side walls 48. As shown in Fig. 1, the front portion 47 of surface 46 is recessed to provide an enlarged entry into track 40. The landing provides a surface on which the
15 forward portion of the vehicle's frame may be initially rested and positioned prior to insertion into the track. This enables the frame to be properly aligned with track 40 before it is slidably received into the track.

The simulator further includes an actuator for coupling to the vehicle to effect reciprocating horizontal and vertical movement of the vehicle
20 about a defined location on the simulator, thereby simulating ground-traveling movement of the vehicle. The actuator is connected to the simulator and causes the vehicle to move horizontally and vertically about a defined path when motion is imparted to the vehicle. Typically, the vehicle includes an axle and

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wheel assembly that receives power from the vehicle's battery source and propels the vehicle in a selected direction. The actuator is removably coupled to the axle, wheels or other source of ground-traveling movement and causes the vehicle's reciprocating movement. Therefore, even though the actuator
5 does not require its own power source, it causes the vehicle to move along a horizontal and vertical path by coupling to the vehicle's axle or other source of ground-traveling movement, such as the vehicle's wheels or motor source.

Preferably, the vehicle includes a cam mounted on the axle along an axis laterally offset from, and generally parallel to, the axle's longitudinal
10 axis. When the vehicle includes a cam, the actuator is configured to receive the cam and to cause the reciprocating motion of the vehicle when the cam is rotated about the axle. Because the cam is mounted on the axle along an axis that is offset from the axle's longitudinal axis, the dual engagement of the cam by the actuator and the axle causes the entire vehicle to reciprocate along a
15 horizontal and vertical path as the cam rotates about the axle. When the vehicle includes a pair of cams, the simulator may include a pair of actuators, each configured to removably receive and support one of the cams.

As seen in Figs. 1 and 2, a second support structure 50 extends upwardly from the rear portion 16 of base 12. Second support structure 50
20 includes a pair of spaced-apart mounts 52 that extend upwardly from the base adjacent opposite sides of the first support structure's rearward portion. The mounts are joined by an elongate rib 54 that provides additional support and stability. As shown, each mount 52 includes an upper portion 56 that is

configured to receive and support a rearward portion of the vehicle. The top surface of each upper portion 56 is best seen in Fig. 3 and includes a forward region 58, which is generally parallel to base 12, followed by a trough-like arcuate region 59 into which the vehicle's rearward portion is seated, and
5 ending with an upwardly inclined region 60 that guides the rearward portion of the vehicle into the arcuate region.

As shown in Figs. 1-2, simulator 10 further includes a pair of actuators 62 that are configured to be coupled to the vehicle to effect reciprocating horizontal and vertical motion of the vehicle about a defined
10 location on the simulator to simulate ground-traveling movement of the vehicle. Each simulator is mounted on the upper portion 56 of one of the mounts and is configured to receive and support a rearward portion of the vehicle.

As seen in Fig. 3, each actuator 62 includes a clip 63 with a lower surface that generally conforms to the shape of the top surface of upper portion
15 56. Clip 63 defines a recess 64 into which the rearward portion of the vehicle is received and supported. Clip 63 includes a race 66 that provides a guide for the received portion of the vehicle as it rotates within the clip. A resilient shoulder 67 is attached to clip 63 distal race 66. Shoulder 67 extends upwardly above the clip to form at least a portion of the race. Clip 63 further includes a
20 plurality of ribs 68 that are spaced apart on race 66 and extend transverse to the race. Ribs 68 are configured to engage the rearward portion of the vehicle when it is inserted into the clip. The ribs reduce the friction between the

portion of the vehicle and each clip, thereby reducing the amount of force necessary to cause the portion to rotate within each clip.

It should be understood that the second support structure could include a single mount with an upper portion that includes the previously
5 described actuator or pair of spaced-apart actuators. In addition, actuator 50 should not be limited to the two embodiments described above. Other actuators are possible and are intended to be within the scope of the invention, as long as they are configured to be coupled to the vehicle to effect reciprocating horizontal and vertical motion of the vehicle. For example, the actuator may be
10 a cam that is rotatably mounted on the simulator about an axis that is offset from the cam's longitudinal axis. In that embodiment, the cam engages a portion of the vehicle, such as the vehicle's axle or wheels, and effects the reciprocating motion of the vehicle when motion is imparted to the axle or wheels from the vehicle's power source.

15 Simulator 10 is constructed of a durable structural material that is capable of supporting the weight of a children's ride-on vehicle and a child. An example of a suitable material is molded plastic. Furthermore, the entire simulator may be formed in a single unitary component, however, in the preferred embodiment, the clips are formed independent of the rest of the
20 simulator and are mounted on the upper portions of the second support structure's walls with a suitable mounting device, such as adhesive or screws.

As discussed, the ride simulator is intended for use with a children's ride-on vehicle. Preferably, the vehicle is independently operable so

that it may be used apart from the simulator as well as with the simulator. In Fig. 4, an independently operable children's ride-on vehicle is shown mounted on simulator 10. The vehicle is generally indicated at 70 and includes a frame 72, a pair of front wheels (shown in Fig. 10) coupled to a steering mechanism 76, and a pair of rear wheels 78 mounted on the vehicle's rear axle 80. Vehicle 70 further includes a seat 82 on the frame for a child, controls 84 mounted on the steering mechanism and a power switch 86. Power switch 86 is connected to a motor source and a power source, which are housed within the vehicle's frame and which include at least one motor and at least one battery, respectively. The power switch selectively completes a circuit between the motor and the power source to provide power for the vehicle. When the circuit is complete, the motor and power source collectively cause the vehicle's rear axle to rotate, thereby causing the vehicle's rear wheels to rotate. Preferably, the power switch is a button on the steering mechanism, as shown in Fig. 4, or a pedal that resembles a gas pedal on a conventional automobile, although other power switches are possible.

Rear wheels 78 are mounted in a spaced-apart relationship along a common axis, namely, the vehicle's rear axle 80. Fig. 5 is a cross-sectional view of the vehicle's left rear wheel. As shown in Fig. 5, wheel 78 is centrally mounted on axle 80. The axle extends through the vehicle's inner and outer walls, 88 and 90, respectively. Wheel 78 is secured on the axle by a clamp 92 that is attached to the end of axle 80. The vehicle's other wheels are similarly mounted on their respective axles.

A pair of cams 94 are mounted on axle 80, as shown in Fig. 4. The cams are mounted in a spaced-apart relationship, one adjacent each of the vehicle's rear wheels. The cams form at least a portion of the previously discussed rearward portion of the vehicle and are received and supported by the upper portions of the second support structure's mounts. Each cam is received within one of the actuators, and specifically within the recess formed by one of the clips. As shown, the cams are maintained within the clips by shoulders 67.

As shown in Figs. 4-5, cams 94 are mounted on axle 80 along an axis that is parallel to, yet spaced-apart from, the longitudinal axis of the axle. In Fig. 5, the axle's longitudinal axis is indicated with dash-dot line 96, while the cam's axis is indicated by dash-dot line 98. When the cams are received within actuators 62 and rotate about the axle's longitudinal axis, the offset relationship between the axle's axis and the cams' axis causes the entire vehicle to reciprocate vertically and horizontally about a defined location on the simulator. The path along which the vehicle reciprocates is generally defined by the shape of the cam and the actuator.

As shown in Figs. 5 and 6, each cam has a generally cylindrical configuration with opposed inner and outer faces 100 and 102, respectively, through which axle 80 passes. A hexagonal mount 104 is attached to each cam's outer face 102. Mount 104 is inserted into the inner wall of wheel 78 to couple the cam and wheel together. A generally circular disk 106 is mounted on each cam's inner face 100. Disks 106 are positioning guides that maintain the cams in a desired position when engaged by clips 63. It should be

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understood, however, that other configurations of cams are possible. By varying the shape or size of the cam, for example, it is possible to change the horizontal and vertical path along which the vehicle is moved.

By referring briefly back to Fig. 4, the reader can see that a
5 central portion 107 of frame 72 is engaged by the first support structure 24. As seen in Figs. 7-9, central portion 107 includes a slider 108 that extends downwardly from the frame and is configured to engage and slide along the top portion 32 of platform 28. Slider 108 extends in the plane generally parallel to the vehicle's rear axle 80 and has a bottom surface 110 that generally
10 corresponds to the shape of top portion 32. Specifically, slider 108 includes a pair of spaced-apart side walls 112 extending generally parallel to the vehicle's rear axle, and a pair of spaced-apart end walls 114 extending transverse to the side walls. The side walls and end walls collectively form a sturdy box-like structure that extends downwardly from the vehicle's frame 72 to engage and
15 removably slide along platform 28. Side walls 112 have curved lower surfaces that generally correspond to the shape of the platform's top portion. A passage 116 is also shown in Fig. 8. Passage 116 is defined through the slider's end walls and may be used to mount foot rests or other accessories on the vehicle.

Adjacent slider 108, frame 72 includes a downwardly descending
20 portion 118, as shown in Figs. 7-9. Downwardly descending portion 118 extends in a plane transverse to the slider's side walls 112 and further extends from frame 72 to a centrally-disposed position beneath the slider. A stabilizer 122 is mounted beneath frame 72 adjacent one of the slider's side walls 112

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and extends transverse to the downwardly extending portion. Portion 118 has a generally U-shaped configuration, extending downwardly from frame 72 along one of the slider's side walls 114, then further extending toward the front portion of the vehicle and finally returning upwardly to frame 72 along the
5 slider's other side wall 114.

Downwardly descending portion 118 includes a bottom region 126 that is configured to be received into track 40. Bottom region 126 further includes a pair of opposed tabs 128, one extending on each side of the bottom region generally toward one of the slider's end walls 114. As shown, each 128
10 includes interlocked horizontal and vertical members 130 and 132, respectively. When bottom region 126 is inserted into the simulator's track, tabs 128 are received within track 40 and are slidable along slide plane 36. Once inserted into the track, the tabs, which extend outwardly from region 126 beyond the edges of slot 34, retain the forward portion of the frame on the first support
15 structure, as seen in Fig. 4. The tabs cannot be removed from the track except through the track's rear portion, adjacent landing 46.

In Fig. 10, vehicle 70 is mounted on simulator 10. As shown, cams 94 are received within clips 63, the top portion 32 of platform 28 is engaged by slider 108, and downwardly descending portion 118 is received
20 within the track. As shown, the first and second support structures 24, 50 collectively support the entire vehicle above base 12. Specifically, mounts 52 and clips 63 receive and support cams 94, and thereby support the rearward portion of the vehicle above base 12, and platform 28 receives and supports

downwardly descending portion 118 and slider 108, and thereby supports the central and forward portions of the vehicle above base 12.

The reciprocating horizontal and vertical path of vehicle 70 on simulator 10 is shown in Figs. 10-12. In Fig. 10, cam 94 is oriented within clip 5 63 so that hexagonal mount 104 is closest to base 12. In this position, the vehicle is in the central-horizontal and low-vertical extent of the defined path of the vehicle about simulator 10. In Fig. 11, the cam has rotated approximately 90° in the counter-clockwise direction from its position in Fig. 10. This is seen by looking at the relative position of the cam's hexagonal 10 mount 104 in Figs. 10 and 11. In this position, the vehicle is in the forward-horizontal and central-vertical extent of the path. The change in horizontal and vertical position is also seen by looking at the relative positions of the slider 108 with respect to platform 28. In Fig. 12, the cam has rotated another 90° in the counter-clockwise direction. This position represents the central-horizontal 15 and high-vertical extent of the vehicle's reciprocating path. It should be understood that as the cam rotates another 90°, the resulting position will be the rearmost-horizontal and central-vertical extent of the defined path. Therefore, as the cams rotate about axle 80 along the path defined by the actuators and the shape of the cams, reciprocating horizontal and vertical motion is imparted to 20 the vehicle about a defined location on the simulator. This reciprocating horizontal and vertical path simulates ground-traveling movement of the vehicle, although the vehicle is maintained in a supported position above base 12.

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To use the ride simulator, the downwardly descending portion is inserted into the track in the simulator's first support structure. This step may include the substep of placing the downwardly descending portion on the landing to properly orient and balance the vehicle, then inserting portion into the track. Next, the cams are removably received into the clips on the simulator's second support structure. As the cams are inserted into the clips, the resilient shoulders deform slightly away from the base to allow the cams to be received. Once the cams are fully received and supported, the resilient shoulders return to their original positions, where they are biased to maintain the cams within the clips as the cams rotate about the vehicle's axle.

An alternate embodiment of simulator 10 is shown in Figs. 13 and 14 and is indicated generally at 140. Simulator 140 generally resembles simulator 110, and unless otherwise specified, has the same components and subcomponents. Simulator 10 includes a stationary base 142 and a first support structure 144 that extends upwardly from the base for removably engaging and slidably supporting at least a portion of the vehicle above base 142.

Simulator 140 further includes a pair of actuators 146 that are connected to base 112 and are each configured to be removably coupled to one of the vehicle's rear wheels 78 for effecting reciprocating horizontal and vertical motion of the vehicle about a defined location on simulator 140 when motion is imparted to the vehicle's wheels. This reciprocating motion simulates ground-traveling movement of the vehicle, although the vehicle remains fully supported above base 142. As shown, simulator 140 further

includes a pair of spaced-apart mounts 150 that extend upwardly from base 142. Mounts 150 each have upper portions 152 on which one of the actuators is mounted and thereby connected to base 142. Mounts 150 are connected by an elongate rib 153, which collectively forms a second support structure 154
5 with the mounts. Second support structure 154 cooperates with actuators 146 to support at least a portion of the vehicle above base 142 by removably engaging the vehicle's rear wheels and thereby support the wheels and at least a portion of the vehicle above base 142.

As shown in Fig. 14, the vehicle's rear wheels 78 have opposed
10 outer walls 156. Each outer wall includes a socket 158 that is offset from the vehicle's rear axle 80. Furthermore, each actuator 146 selectively engages one of the sockets on outer walls 156. Specifically, each actuator 146 is removably coupled to one of the sockets and causes the reciprocating horizontal and vertical motion of the vehicle when the socket revolves about the actuator as
15 the vehicle's wheels are rotated about their axle. Preferably, each socket 158 includes a receptacle 162 that extends from outer wall 156 into rear wheel 78 and is configured to receive actuator 146. The reciprocating horizontal and vertical path in which the vehicle is moved is generally defined by the shape of the actuators and the sockets, as well as by the placement of the sockets on the
20 outer walls of the wheels. As the distance between the sockets and the axle is increased or decreased, the horizontal and vertical extents of the vehicle's path are also increased or decreased.

As seen in Figs. 13 and 14, each actuator 146 includes a fastening mechanism, namely, a pin 164 with a shaft 166 that extends into the receptacle on one of the vehicle's rear wheels. The pins are received into wells 167 on the mounts, and each pin includes a spring 168 that is biased to urge shafts 166 into
5 receptacles 162 and to resist the unintentional removal of the shafts from the receptacles. Although the pins are configured to resist being unintentionally removed from the receptacles in the vehicle's rear wheels, the pin may be retracted from its resting position to allow the vehicle's wheels to be mounted on or removed from the pins. Each pin further includes a grip or handle 170
10 that a user can use to grasp that pin to remove it from the rear wheel's receptacle. As shown in Figs. 13 and 14, grip 170 is a generally circular ring that extends outwardly from the exterior walls of members 150.

Other suitable embodiments of fastening mechanisms are possible and are intended to be within the scope of the invention. The fastening
15 mechanisms should removably engage the socket on one of the vehicle's wheels and provide a moment about which the socket can revolve as the wheel rotates about its axle. For example, each fastening mechanism could include a pin that is completely removable from its corresponding mount or a cam or push rod assembly that removably engages the vehicle's rear wheels. It should
20 be further understood that the simulator could include a single actuator that is removably coupled to both of the vehicle's rear wheels, instead of the previously described pair of actuators.

It should be understood that children's ride-on vehicles come in many different shapes and sizes. In addition, the number of motors, power supplies and wheels may vary, as well as the specific wiring and structural configuration of the vehicle. Furthermore, the previously described ride
5 simulators could also be used with a manually powered ride-on vehicle in which the power switch motor and power source are replaced by a mechanical user-powered drive assembly, such as a series of pedals that are coupled to the vehicle's axle by a belt or gear assembly. The ride simulators can be used with any of these ride-on vehicles to simulate ground-traveling movement of the
10 vehicle by cooperating with the vehicle's power supply to cause reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator.

As discussed, the vehicle is removably mounted on the simulator. This enables the vehicle to be used either with the simulator or independently
15 of the simulator. This is particularly useful when children with different ages, sizes or experiences wish to play with the vehicle. In addition, parents do not have to purchase multiple vehicles. Instead, older children can use the ride-on vehicle either with the simulator or independently of the simulator. Younger children, on the other hand, can use the vehicle mounted on the simulator until
20 they become experienced at controlling and steering the vehicle. After that time, they can selectively use the vehicle either with or without the simulator.

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While the preferred embodiments of the invention have been described, it should be obvious that variations and modifications thereto are possible without departing from the spirit and scope of the invention.

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CLAIMS:

1. A children's amusement device, comprising the combination of:

an independently operable children's ride-on
5 vehicle having a motor, a battery adapted to power the motor, and a drive assembly in communication with the motor and including an axle and at least one wheel mounted on the axle; and

a ride simulator adapted for use with the vehicle,
10 the simulator comprising:

a stationary base;

a first support structure extending upwardly from the base for removably engaging and slidably supporting at least a portion of the vehicle above the base; and

15 a mechanism for removably securing to the vehicle's drive assembly to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator upon rotation of the drive assembly, thereby simulating ground-traveling movement of the vehicle,
20 wherein the mechanism includes a cam adapted to be mounted on the axle offset from the axle and an actuator connected to the base and configured to receive the cam and thereby be coupled to the drive assembly to cause the reciprocating horizontal and vertical motion of the vehicle when
25 rotational motion is imparted to the drive assembly and the cam is received by the actuator and rotated with the axle.

2. The device of claim 1, wherein the first support structure is adapted to removably engage and slidably support at least a portion of the vehicle above the base

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while maintaining both the vehicle and the simulator in an independently operable configuration.

3. The device of claim 1, wherein the simulator includes a second support structure that extends upwardly from the base and includes a mount with an upper portion on which the actuator is mounted.

4. The device of claim 3, wherein the first support structure includes a platform that engages and slidably supports at least a portion of the vehicle above the base, and the vehicle further includes a slider that is configured to engage and slide along the platform as the cam rotates with the axle.

5. The device of claim 4, wherein the platform includes a top portion that defines an elongate slot extending transverse to the cam's axis when the cam is received by the upper portion of the second support structure and a slide plane beneath the slot; the top portion, slot and slide plane defining a track into which at least a portion of the vehicle's frame is slidably received.

6. The device of claim 5, wherein the vehicle includes a downwardly descending portion adjacent the slider, the downwardly descending portion configured to be removably received into the track and to be slidable along the length of the track.

7. The device of claim 6, wherein the first and the second support structures are each adapted to support portions of the vehicle above the base.

8. The device of claim 1, wherein the actuator includes at least one clip into which the cam is removably and rotatably received while maintaining both the vehicle

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and the simulator in an independently operable configuration.

9. The device of claim 8, wherein the clip defines a recess into which the cam is received and includes a resilient shoulder that is biased to maintain the cam within the recess as the cam rotates with the axle.

10. The device of claim 8, wherein the clip includes a race that generally corresponds to the shape of the cam and provides a guide for the cam as it rotates within the clip.

11. The device of claim 10, wherein the clip includes a resilient shoulder that comprises at least a portion of the race and is biased to maintain the cam within the race.

12. The device of claim 1, wherein the mechanism is adapted to removably secure the vehicle to the simulator while maintaining both the vehicle and the simulator in an independently operable configuration.

13. A ride simulator for use with a children's ride-on vehicle having a rotatable drive assembly with an axle and at least one driven wheel, the simulator comprising:

a stationary base;

a support structure extending from the base and adapted to removably engage and slidably support at least a portion of the vehicle above the base; and

a mechanism for removably securing to the vehicle's drive assembly to effect reciprocating horizontal and vertical motion of the vehicle about a defined location on the simulator upon rotation of the drive assembly, thereby simulating ground-traveling movement of the vehicle, wherein the mechanism includes a cam adapted to be mounted

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on the axle offset from the axle and an actuator connected to the base and including a clip configured to receive the cam and thereby be coupled to the drive assembly and cause the reciprocating horizontal and vertical motion of the vehicle when rotational motion is imparted to the drive assembly, the clip including a recess into which the cam is received and a resilient shoulder that is biased to maintain the cam within the recess as the cam rotates with the axle when the cam is received by the actuator.

10 14. The simulator of claim 13, wherein the simulator is adapted for use with an independently operable children's ride-on vehicle.

15 15. The simulator of claim 13, wherein the simulator includes a support structure that extends upwardly from the base and includes a mount with an upper portion on which the actuator is mounted.

20 16. The simulator of claim 13, wherein the clip includes a race that generally corresponds to the shape of the cam and provides a guide for the cam as it rotates within the clip.

17. The simulator of claim 13, wherein the mechanism is adapted to be removably secured to the vehicle's drive assembly while maintaining both the vehicle and the simulator in an independently operable configuration.

25 18. The simulator of claim 13, wherein the clip is adapted to receive the cam while maintaining both the vehicle and the simulator in an independently operable configuration.

30 19. The simulator of claim 15, wherein the simulator is adapted for use with children's ride-on vehicles with a

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slider, and further wherein the support structure includes a platform that is adapted to engage and slidably support at least a portion of the vehicle above the base, and further adapted to provide a surface upon which the slider engages
5 and slides along as the cam rotates with the axle.

20. A method for simulating ground-traveling movement of an independently operable children's ride-on vehicle having at least one wheel mounted on an axle, the method comprising:

10 providing an independently operable children's ride-on vehicle having at least one wheel mounted on an axle, a cam mounted on the axle of the vehicle, and a ride simulator that includes a stationary base with a first support structure configured to receive and slidably engage
15 at least a portion of the vehicle and an actuator mounted on a second support structure for removably and rotatably receiving the cam;

slidably engaging at least a portion of the vehicle with the first support structure while maintaining
20 both the vehicle and the simulator in an independently operable configuration;

receiving the cam into the actuator without disassembling any portion of the cam or the actuator; and

imparting a rotational velocity to the vehicle's
25 axle to cause reciprocating horizontal and vertical motion of the vehicle as the cam rotates with the axle, thereby simulating ground-traveling movement of the vehicle.

21. A ride simulator for use with a children's ride-on vehicle having a drive assembly including a first wheel that

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is mounted on an axle and is adapted to be coupled to an actuator, the simulator comprising:

a stationary base;

a support structure extending from the base and
5 adapted to removably engage and slidably support at least a portion of the vehicle above the base; and

a mechanism for removably securing to the vehicle's drive assembly, the mechanism including a first actuator adapted to be removably coupled to the first wheel,
10 in a position offset from the axle, for effecting reciprocating horizontal and vertical motion of the vehicle with respect to the simulator when motion is imparted to the vehicle's wheel, thereby simulating ground-traveling movement of the vehicle.

15 22. The simulator of claim 21, wherein the simulator is adapted for use with a children's ride-on vehicle having a second wheel mounted on the axle, wherein the mechanism further includes a second actuator adapted to be removably coupled to the second wheel in a position offset from the
20 axle, and further wherein the first and the second actuators are each configured to be removably coupled to the first and second wheels, respectively, for supporting the wheels and at least a portion of the vehicle above the base and for effecting horizontal and vertical motion of the vehicle with
25 respect to the simulator when the vehicle's wheels are driven with the axle, thereby simulating ground-traveling movement of the vehicle.

23. The simulator of claim 22, wherein the mechanism is adapted to be removably secured to the vehicle's wheels
30 while maintaining both the vehicle and the simulator in an independently operable configuration.

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24. The simulator of claim 22, wherein the support structure extends upwardly from the base and includes upper portions on which the actuators are mounted to support at least a portion of the vehicle above the base when the first
5 and the second wheels are engaged by the first and the second actuators.

25. The simulator of claim 24, further including another support structure extending upwardly from the base to removably engage and slidably support at least a portion
10 of the vehicle above the base.

26. The simulator of claim 25, wherein the support structures are each adapted to support a portion of the vehicle above the base.

27. The simulator of claim 22, in combination with a
15 children's ride-on vehicle having first and second wheels mounted on an axle, wherein the first and the second wheels each include a side wall with a socket offset from the axle, and wherein the first and the second actuators each include a fastener for selectively engaging a corresponding one of
20 the sockets on the side walls.

28. The simulator of claim 27, wherein the side walls are outer side walls of the wheels.

29. The simulator of claim 27, wherein each of the sockets includes a receptacle adapted to receive a
25 corresponding one of the fasteners.

30. The simulator of claim 29, wherein each of the receptacles includes a recess into which at least a portion of the fastener is selectively inserted.

31. The simulator of claim 27, wherein each of the
30 fasteners includes a pin adapted to be received within a

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corresponding one of the sockets to support the wheel and at least a portion of the vehicle above the base and to cause the reciprocating horizontal and vertical motion of the vehicle about the pin when rotational motion is imparted to the vehicle's wheels, thereby simulating ground-traveling motion of the vehicle.

32. The simulator of claim 31, wherein each of the pins is selectively slidable between a retracted position in which the pin is free from engagement with the sockets and an engaged position in which the pin engages a corresponding one of the sockets.

33. The simulator of claim 32, wherein each of the pins includes a spring that biases the pin toward the engaged position.

34. A children's amusement device, comprising the combination of:

an independently operable children's ride-on vehicle having a motorized drive assembly including an axle and at least one wheel mounted on the axle; and

a ride simulator adapted for use with the vehicle, the simulator comprising:

a stationary base;

a support structure extending from the base and adapted to removably engage and slidably support at least a portion of the vehicle above the base; and

a mechanism adapted to be removably secured to the vehicle's drive assembly, wherein the mechanism includes a first actuator adapted to be removably coupled to at least one of the vehicle's wheels in a position offset from the

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axle for effecting reciprocating horizontal and vertical motion of the vehicle with respect to the simulator when rotational motion is imparted to the wheel to which the actuator is coupled, thereby simulating ground-traveling
5 movement of the vehicle.

35. The device of claim 34, wherein the simulator is adapted to be removably coupled to the vehicle while maintaining both the vehicle and the simulator in an independently operable configuration.

10 36. The device of claim 34, wherein the wheel to which the actuator is removably coupled includes a receptacle, and the actuator includes a fastener adapted to selectively engage the receptacle to support the wheel and at least a
15 reciprocating horizontal and vertical motion of the vehicle about the fastener when rotational motion is imparted to the vehicle's wheels, thereby simulating ground-traveling motion of the vehicle.

37. The device of claim 36, wherein the fastener
20 includes a pin adapted to be at least partially received within the receptacle.

38. The device of claim 37, wherein the pin is selectively slidable between a retracted position in which the pin is free from engagement with the receptacle and an
25 engaged position in which the pin is at least partially received within the receptacle.

39. The device of claim 38, wherein the pin includes a spring that biases the pin toward the engaged position.

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40. The device of claim 36, wherein the wheel to which the fastener is selectively coupled includes a side wall from which the receptacle extends.

41. The device of claim 40, wherein the side wall is
5 an outer side wall of the wheel.

42. The device of claim 34, wherein the support structure includes a platform that engages and slidably supports at least a portion of the vehicle above the base, and the vehicle further includes a slider that is configured
10 to engage and slide along the platform.

43. The device of claim 42, wherein the platform includes a top portion that defines an elongate slot and a slide plane beneath the slot; the top portion, slot and slide plane defining a track into which at least a portion
15 of the vehicle is slidably received.

44. The device of claim 34, wherein the base includes a second support structure extending upwardly from the base and having an upper portion to which the actuator is mounted.

20 45. The device of claim 44, wherein the support structures are adapted to support the entire vehicle above the base.

46. A method for simulating ground-traveling movement of an independently operable children's ride-on vehicle
25 having at least one driven wheel mounted on an axle, the method comprising:

providing an independently operable children's ride-on vehicle having at least one wheel mounted on an axle and including a receptacle, and a ride simulator that
30 includes a stationary base with an actuator configured to be

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removably coupled to the receptacle in a position offset from the axle;

slidably engaging at least a portion of the vehicle with a first support structure on the base;

5 coupling the actuator to the receptacle to support the wheel and at least a portion of the vehicle above the base; and

imparting a rotational velocity to the vehicle's axle to cause reciprocating horizontal and vertical motion
10 of the vehicle as the wheel rotates with the axle, thereby simulating ground-traveling movement of the vehicle.

FETHERSTONHAUGH & CO.

OTTAWA, CANADA

PATENT AGENTS

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Fig. 1

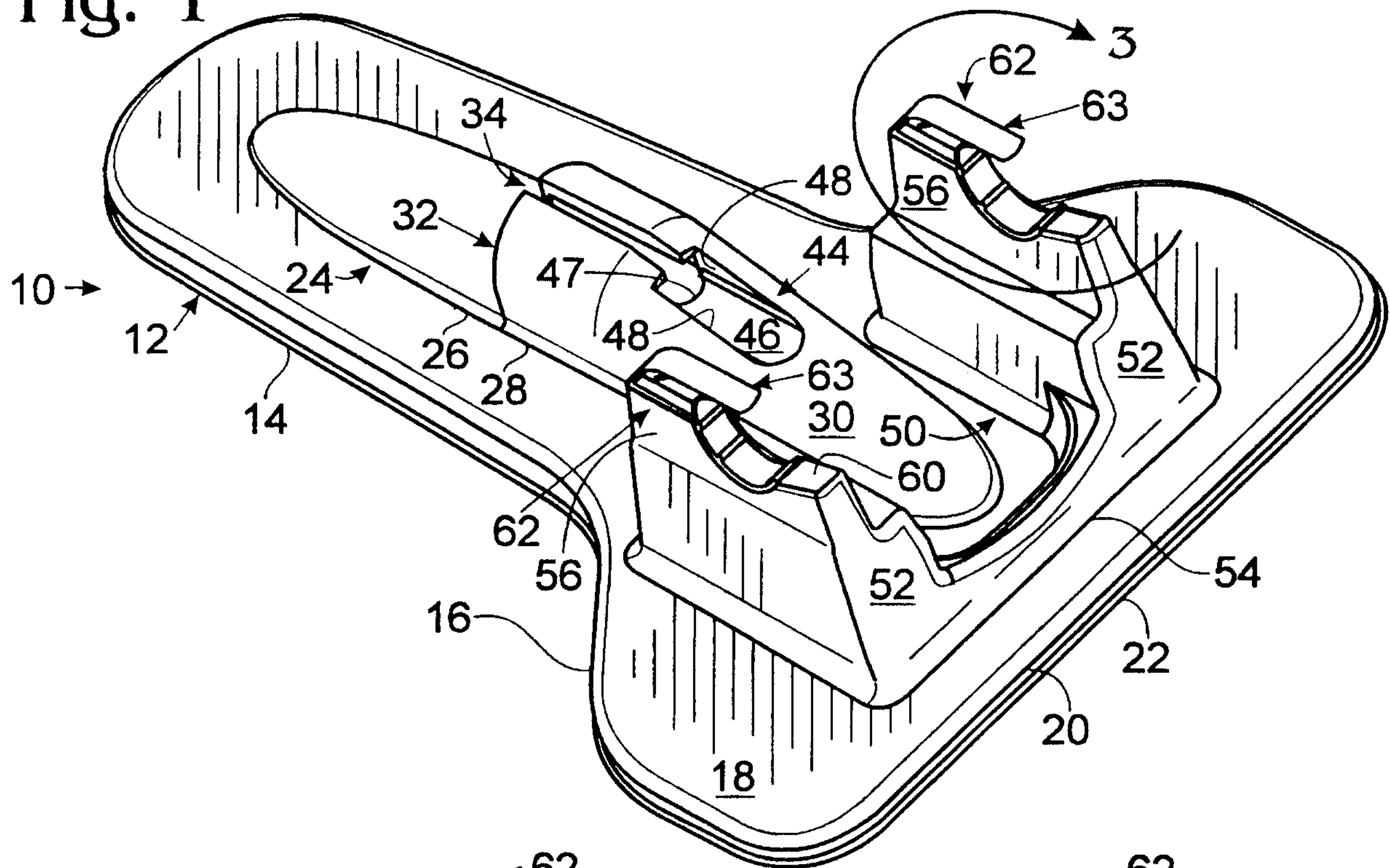


Fig. 2

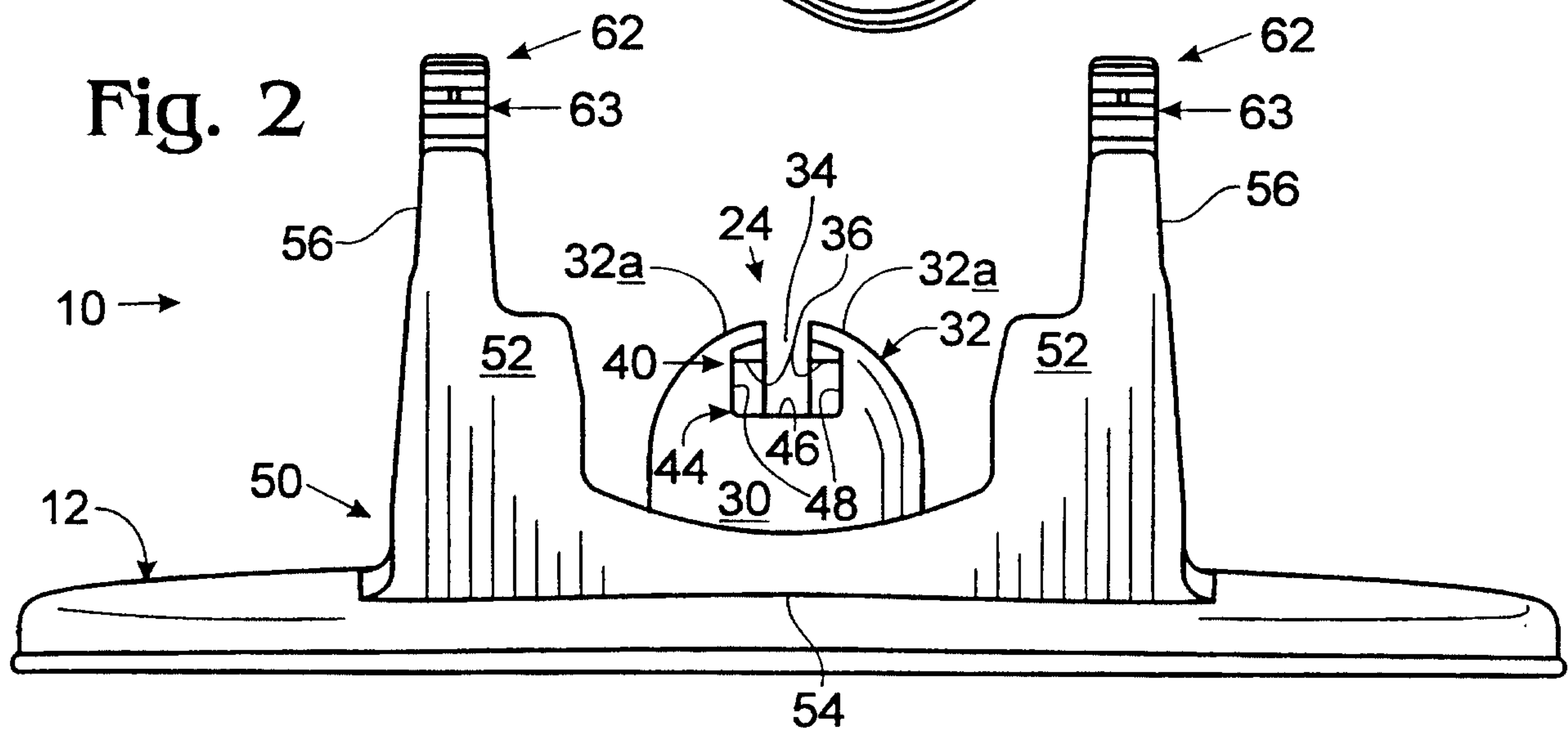
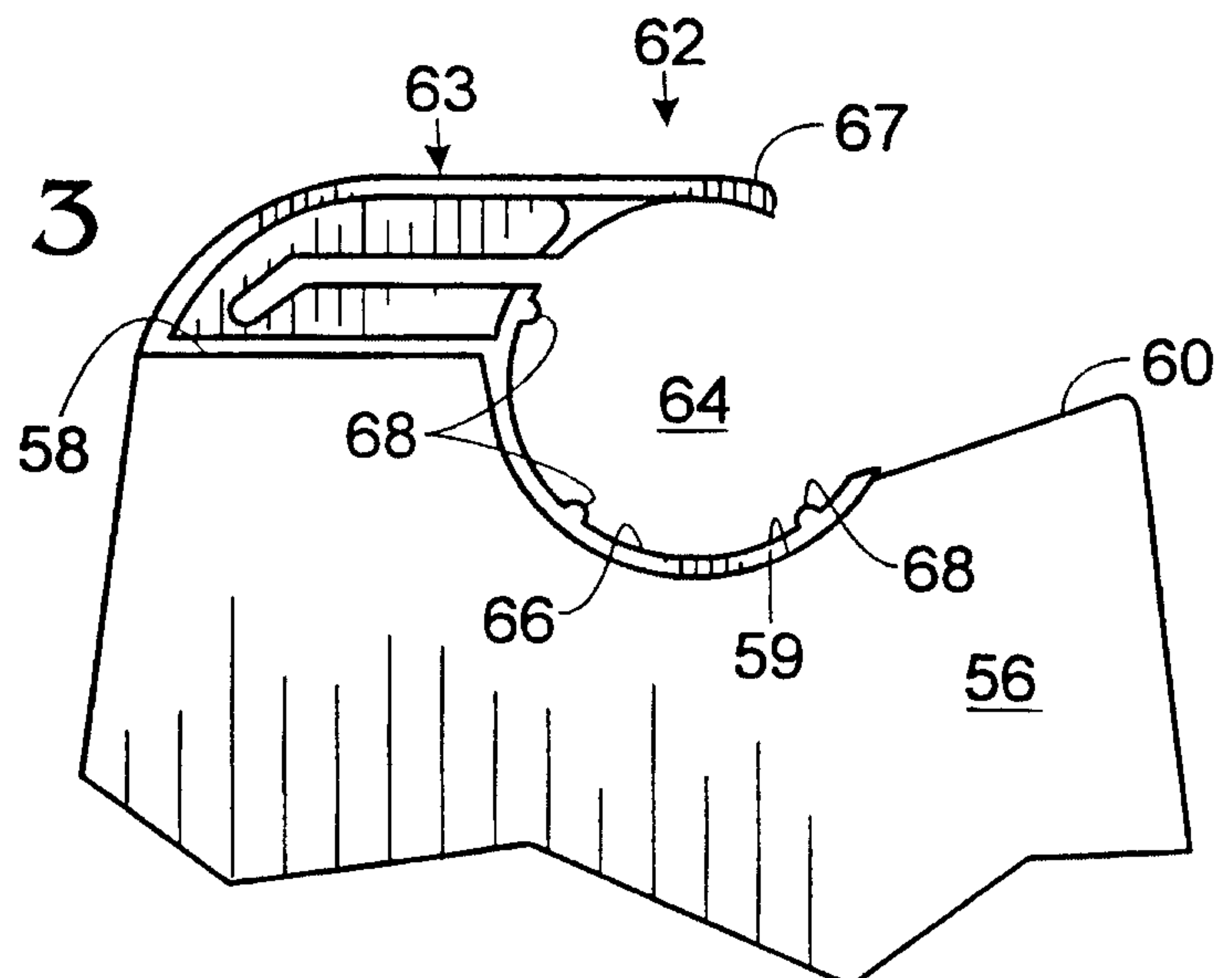


Fig. 3



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Fig. 4

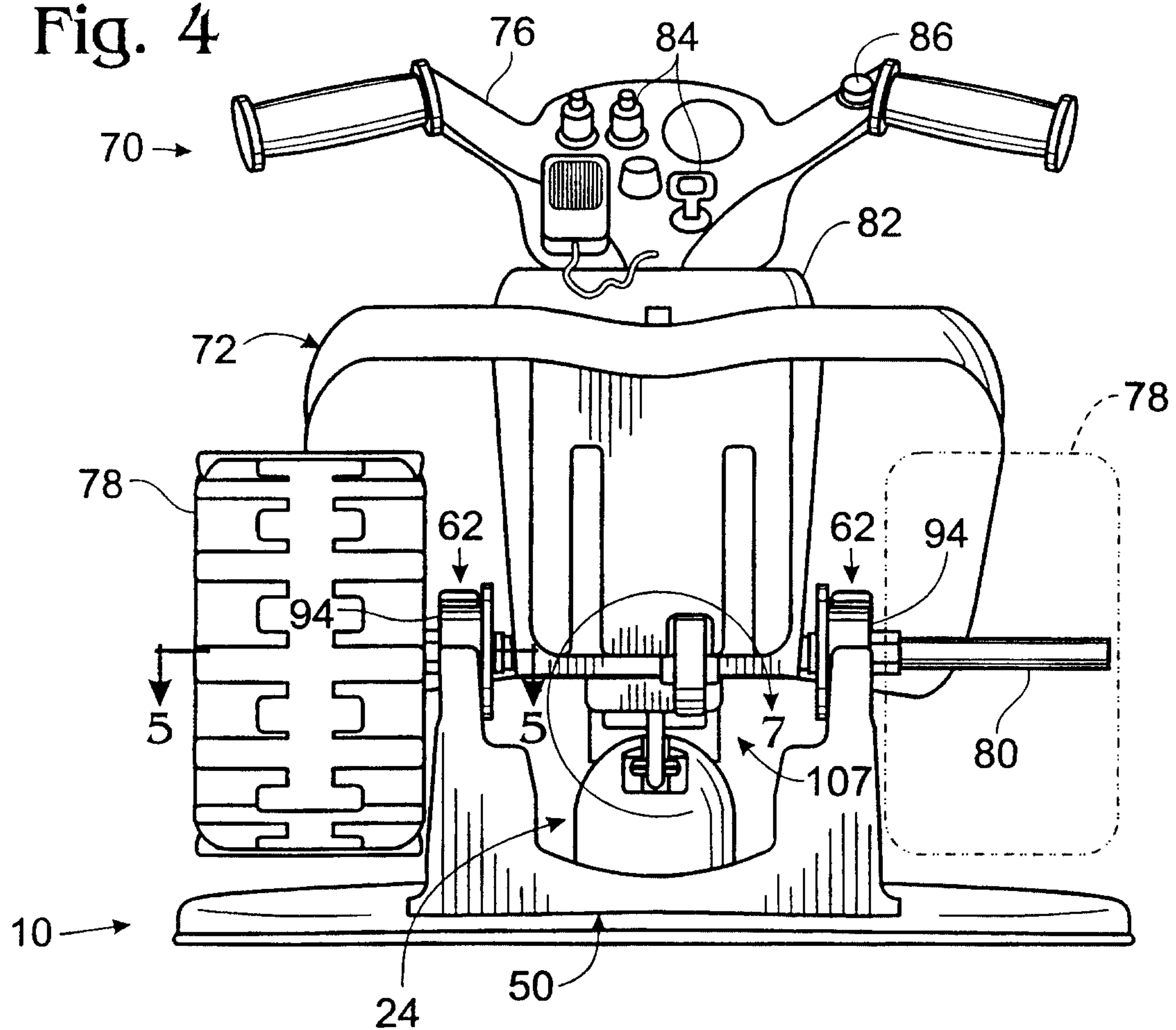


Fig. 6

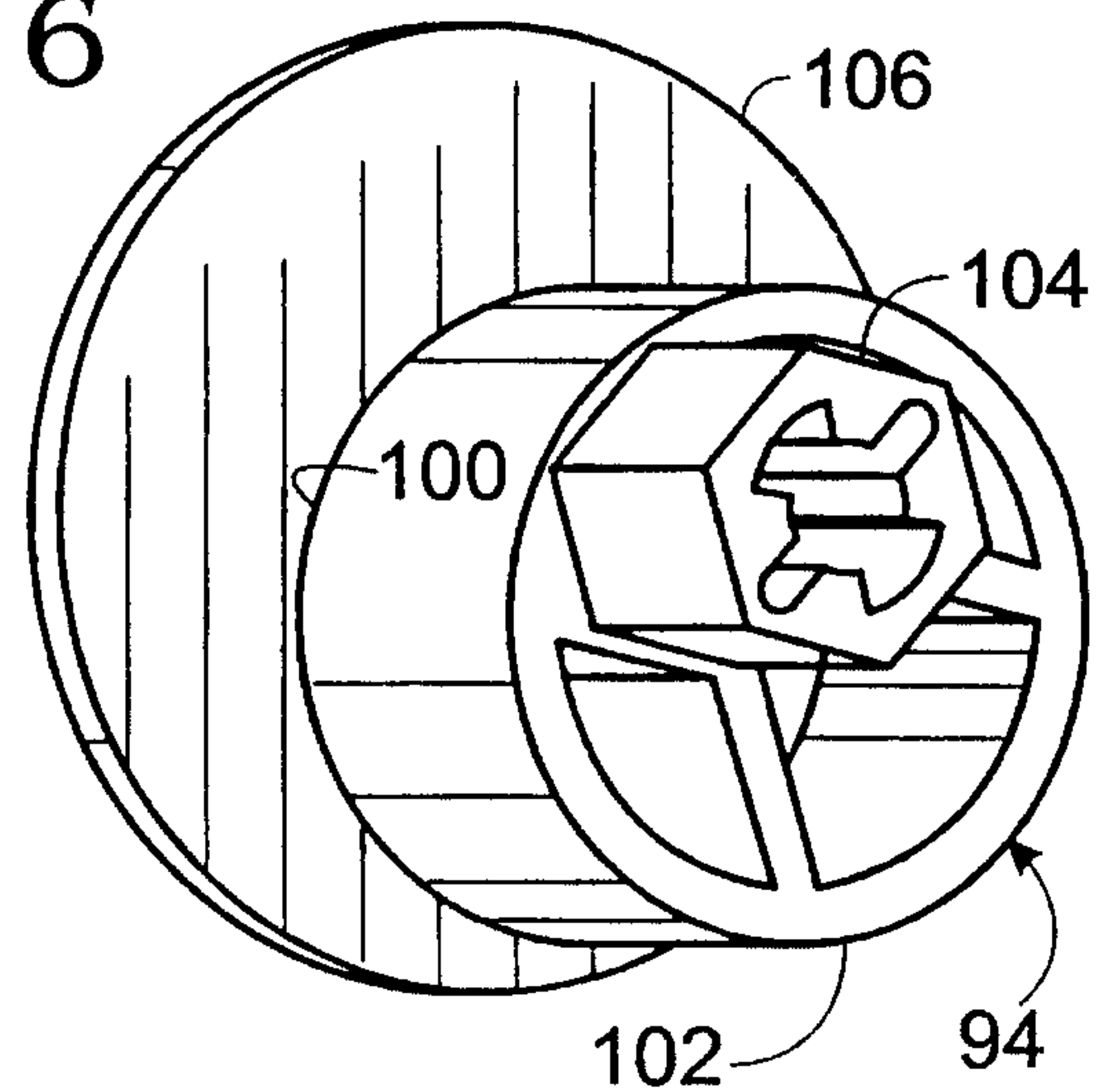
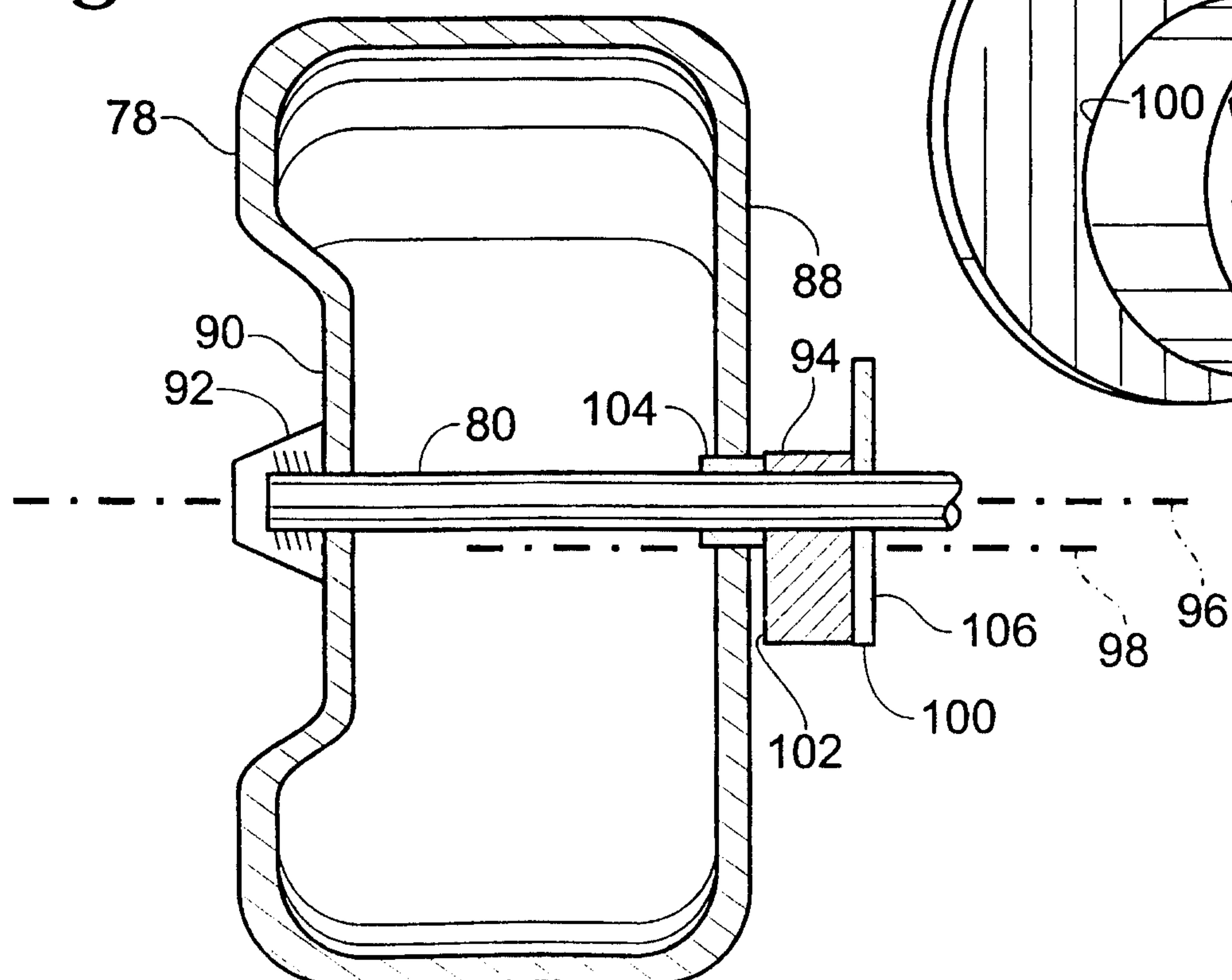


Fig. 5



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Fig. 7

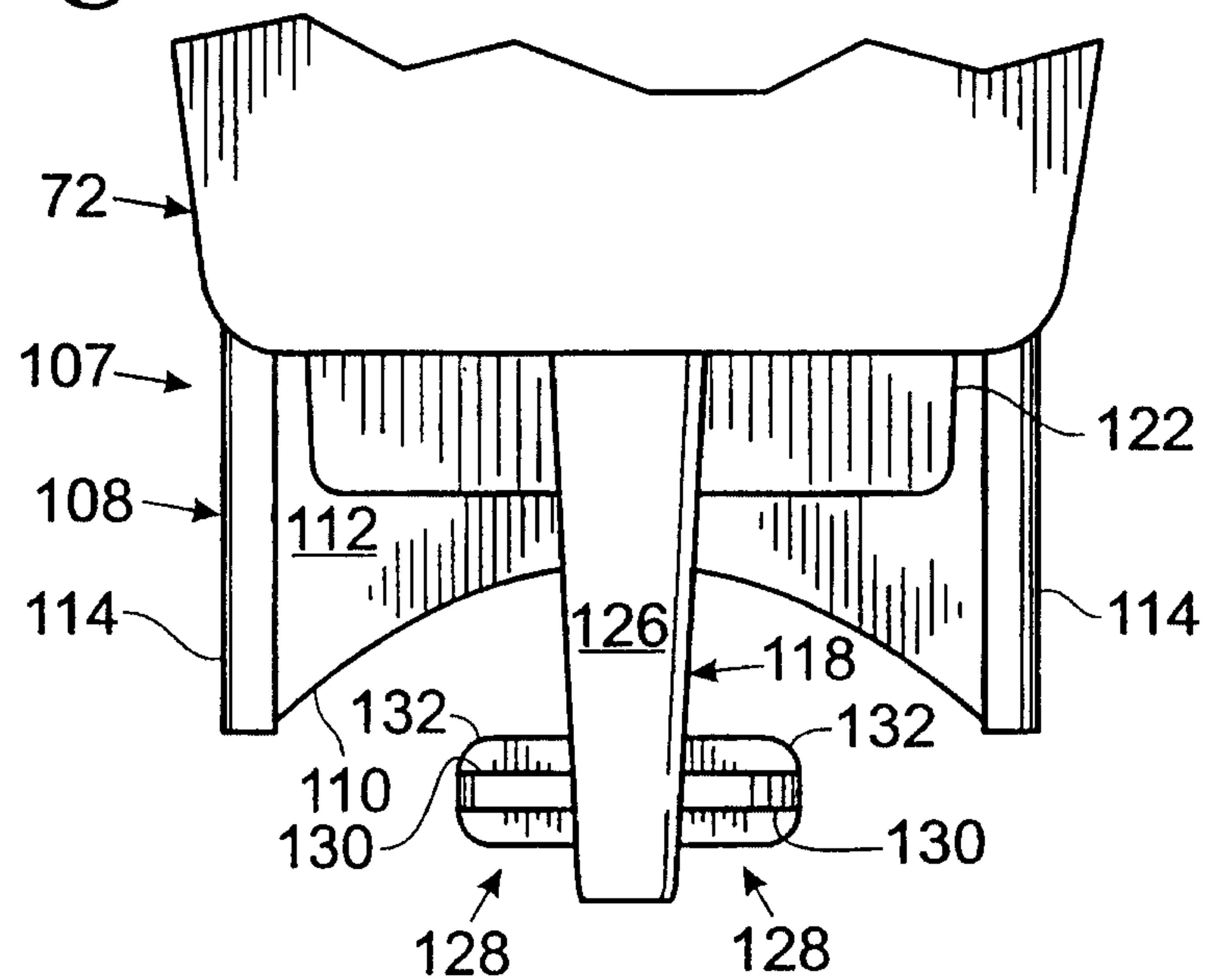


Fig. 8

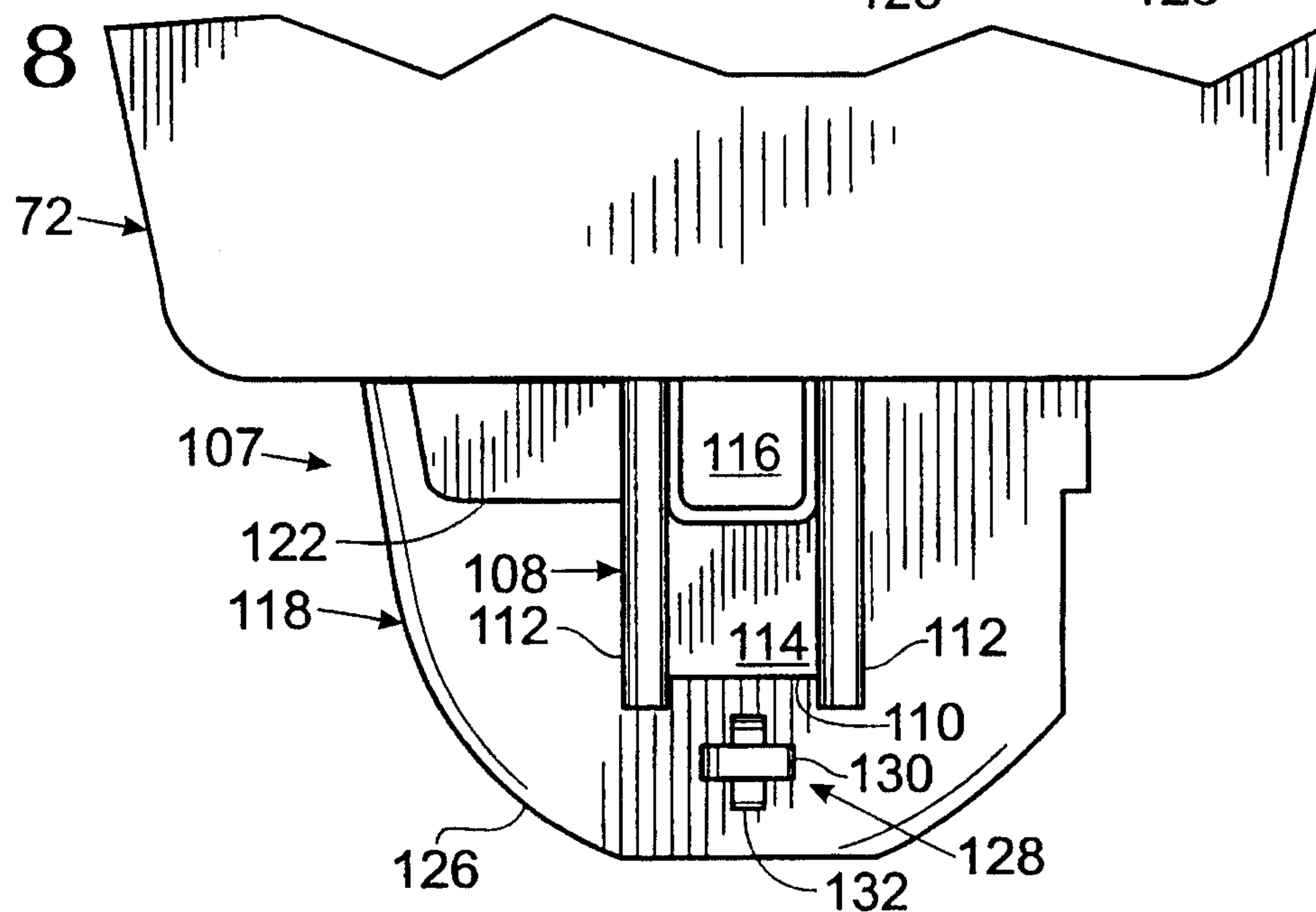
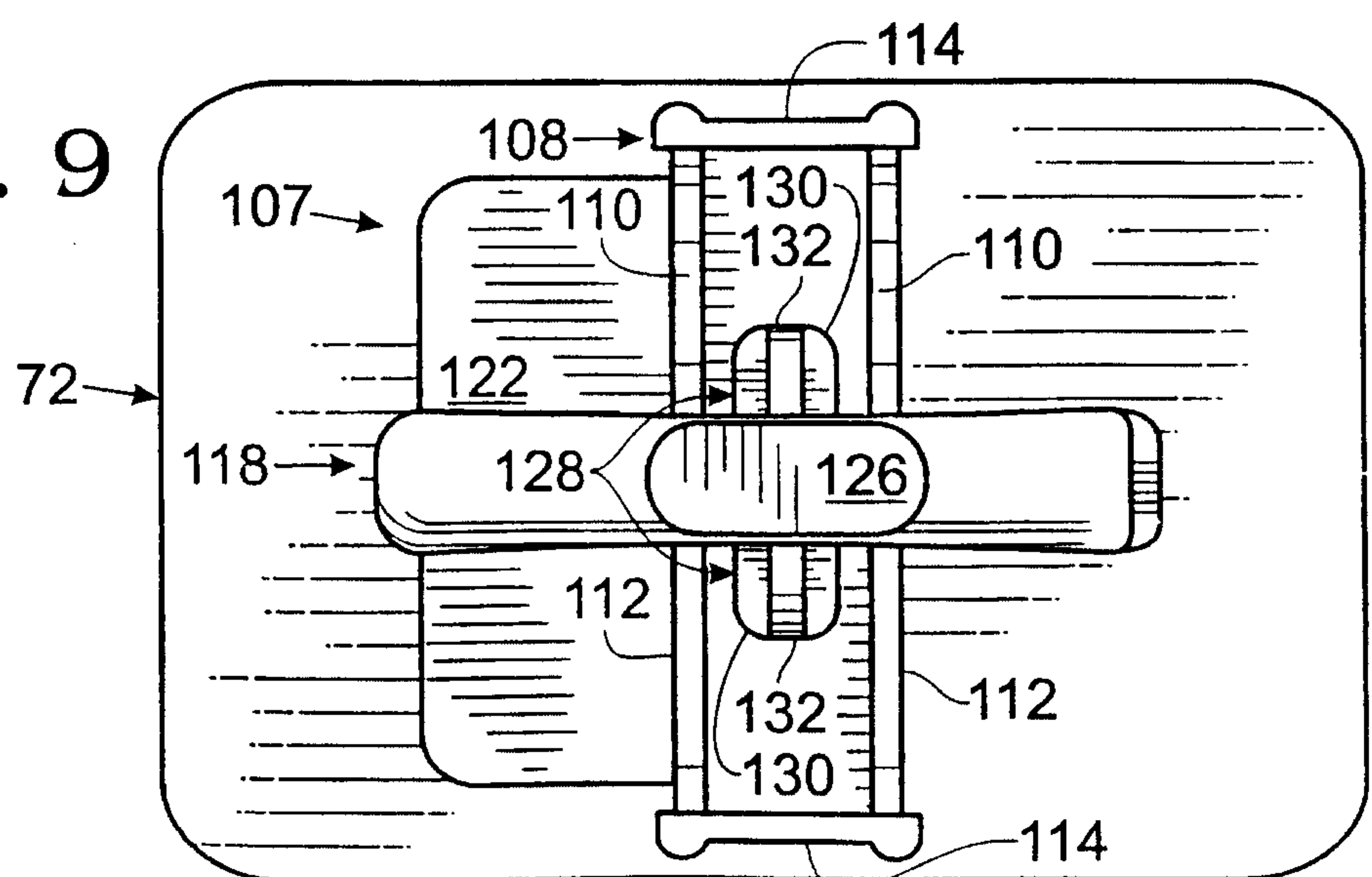


Fig. 9



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Fig. 10

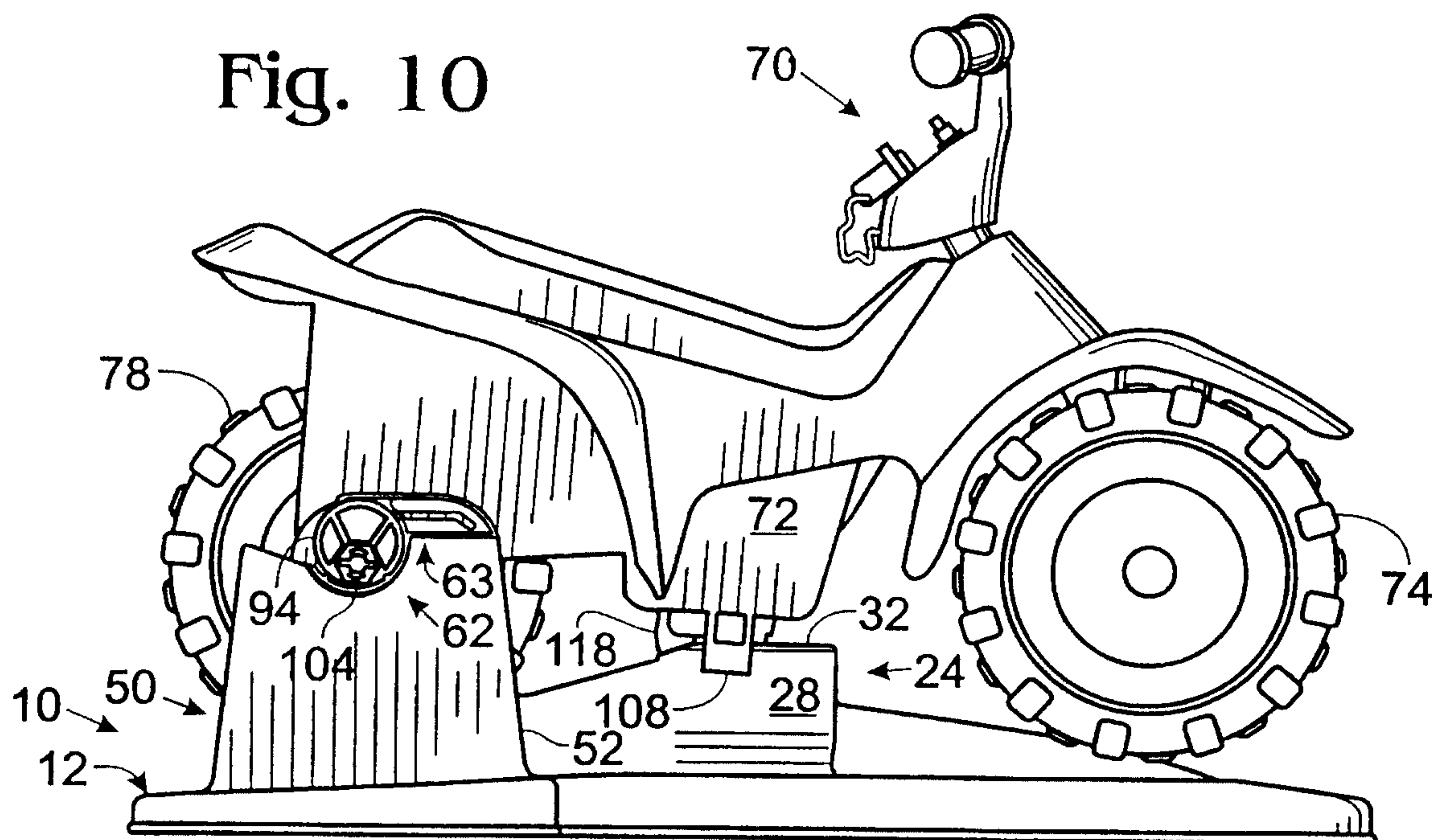


Fig. 11

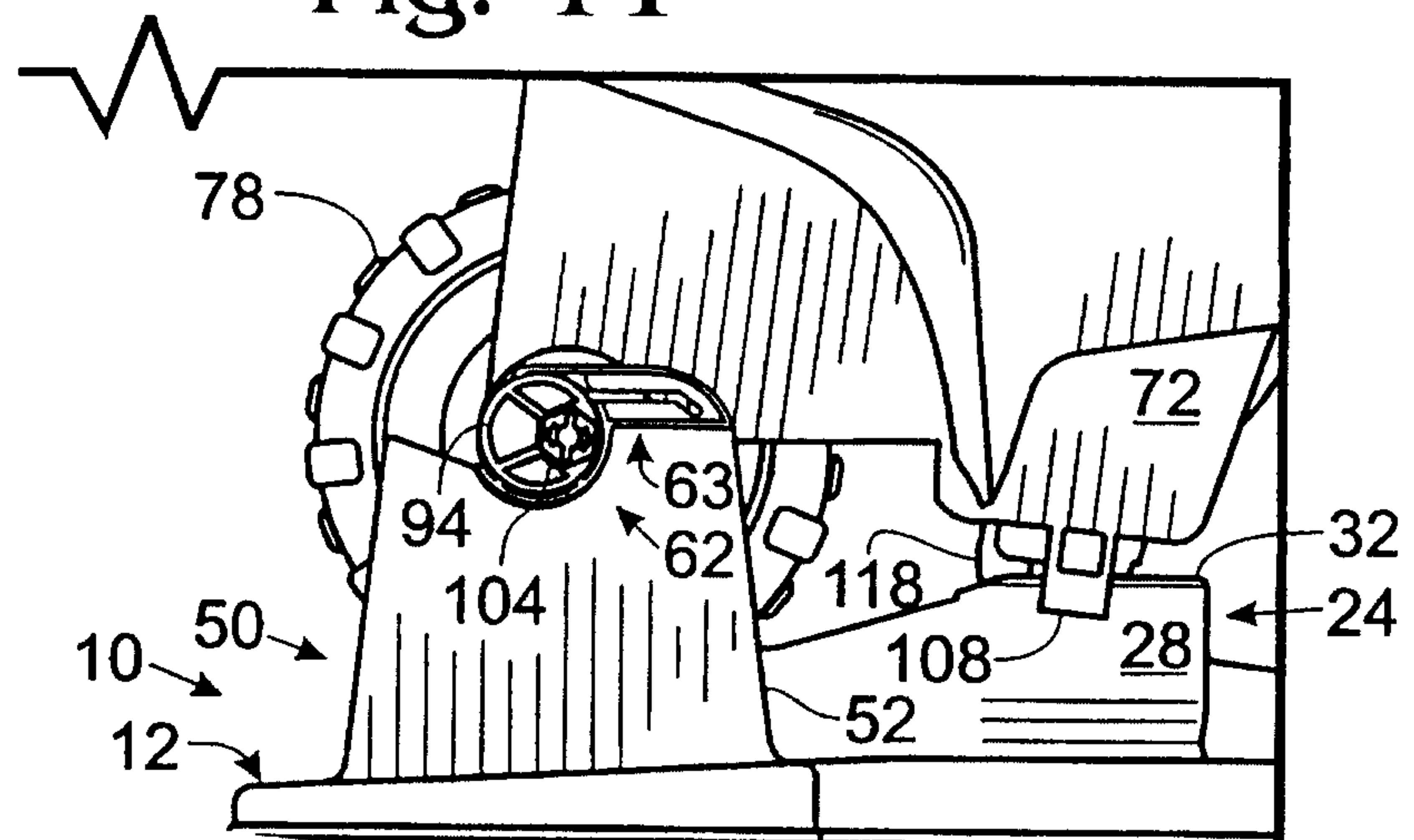


Fig. 12

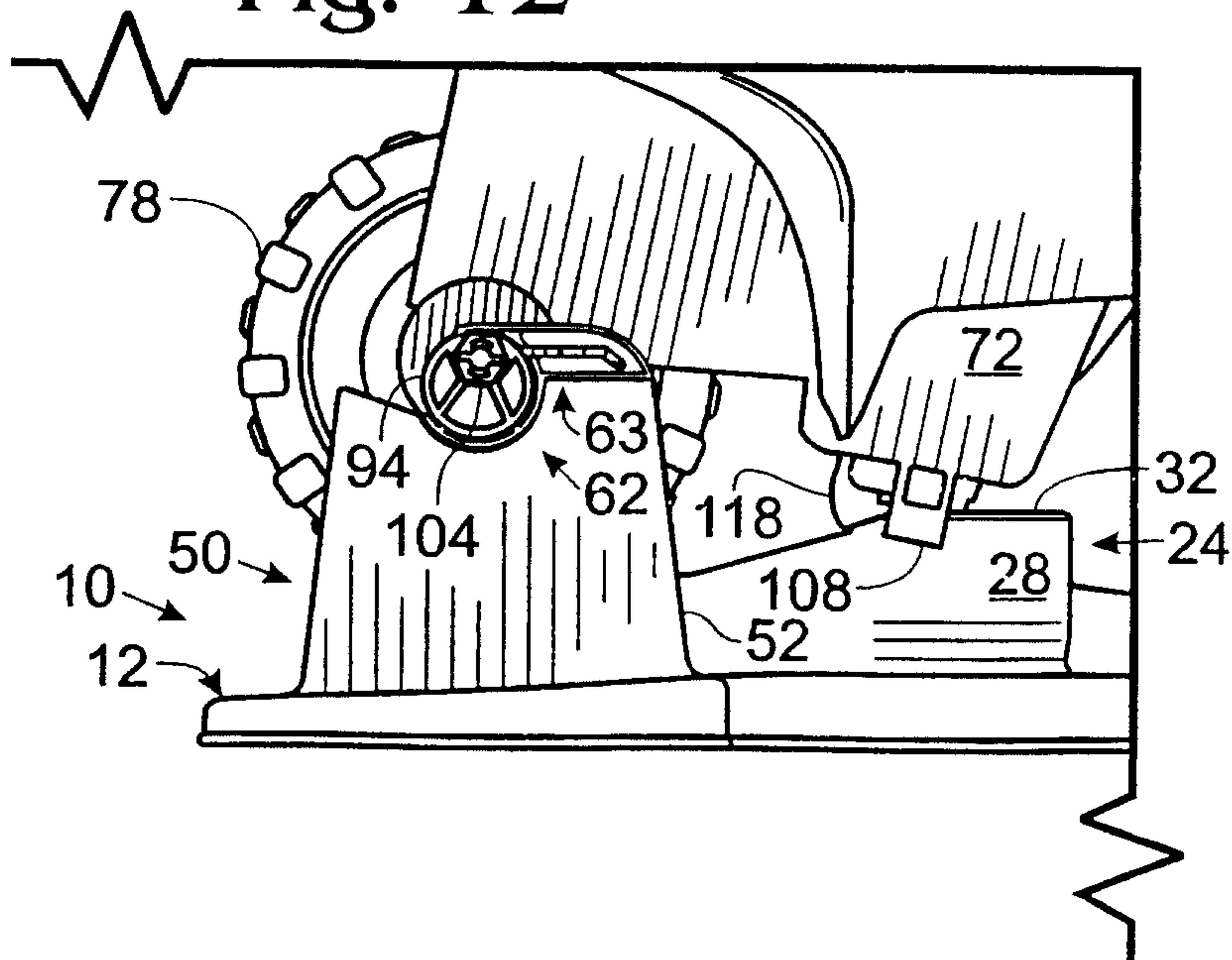


Fig. 13

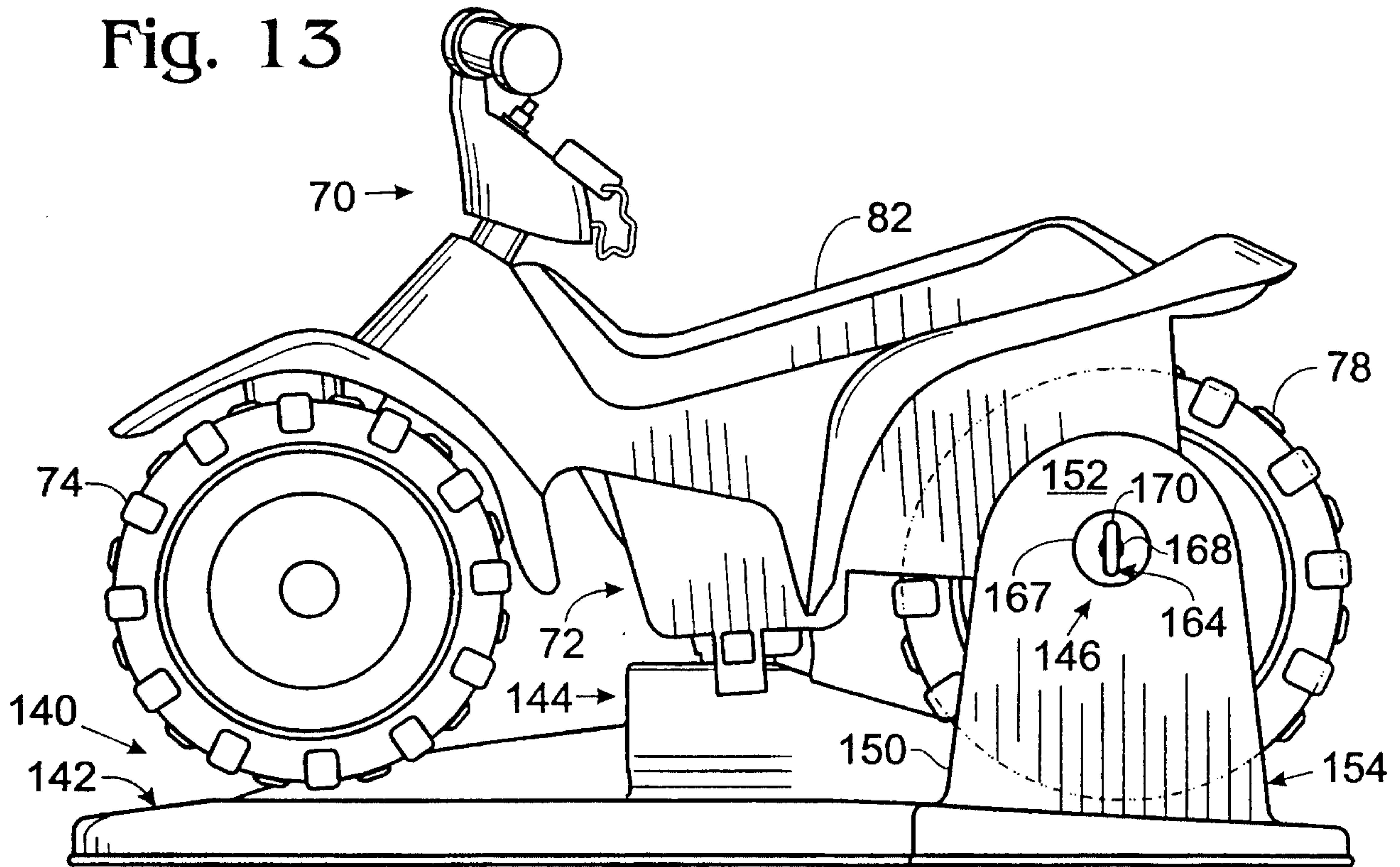


Fig. 14

