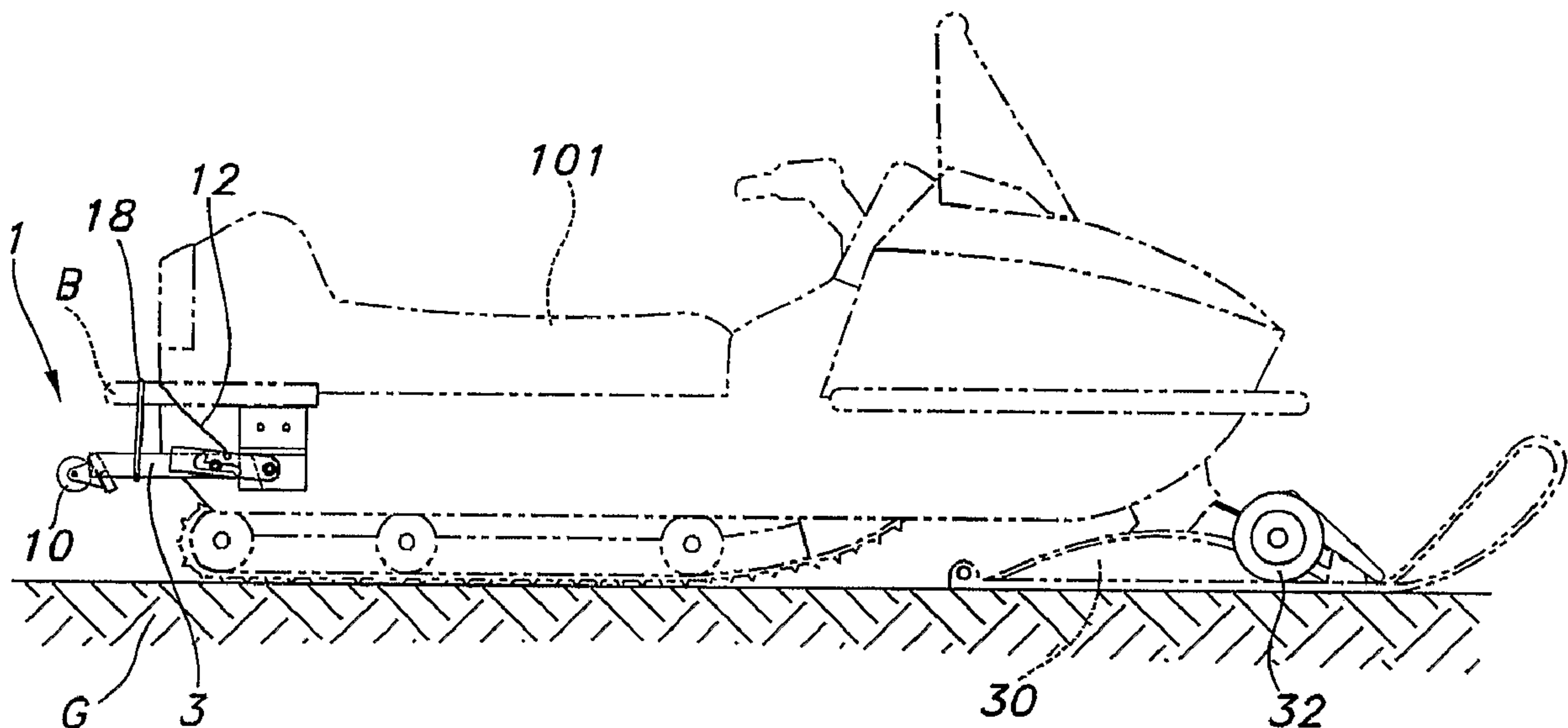




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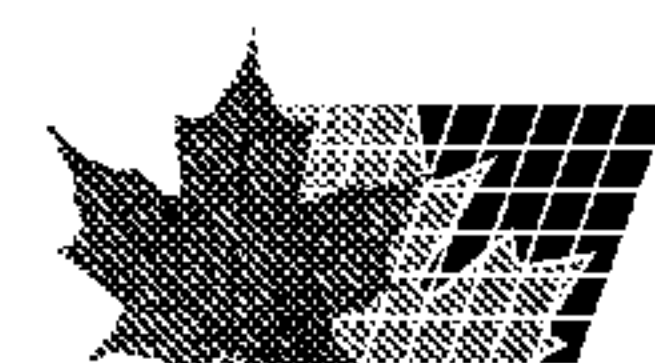
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A support stand (1) for supporting the rear-end of a snowmobile above the ground (G). The apparatus may be fitted with rollers of wheels (10, 32) in order to improve the maneuverability of the snowmobile when it is being transported across a non-snow or non-ice surface.



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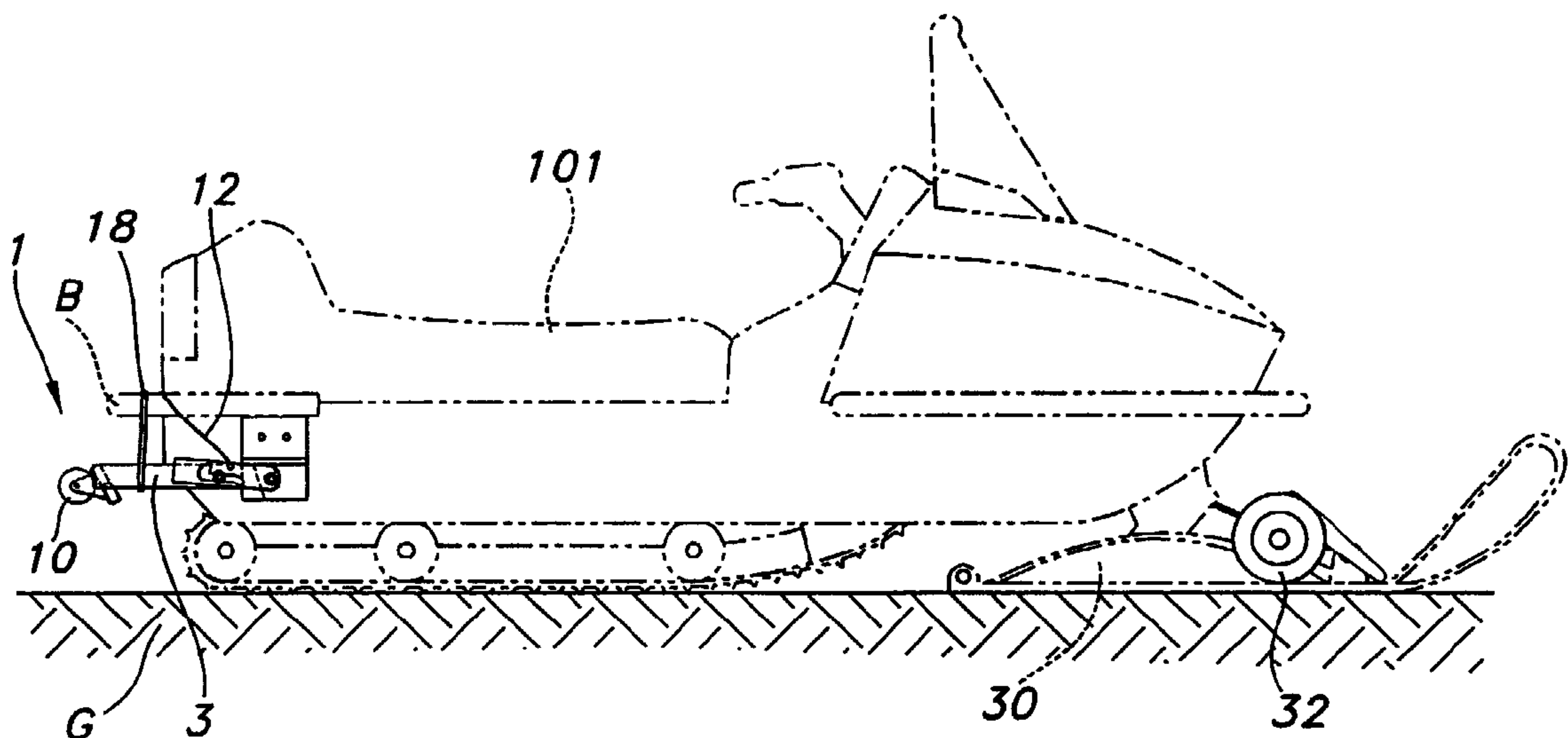
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(54) Title: SNOWMOBILE SUPPORT STAND



(57) Abstract: A support stand (1) for supporting the rear-end of a snowmobile above the ground (G). The apparatus may be fitted with rollers or wheels (10, 32) in order to improve the maneuverability of the snowmobile when it is being transported across a non-snow or non-ice surface.

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SNOWMOBILE SUPPORT STAND

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] This invention relates to the field of snowmobiles.

DESCRIPTION OF THE PRIOR ART

[0002] Snowmobiles are vehicles that are constructed to travel across snow and ice. As is generally known, the snowmobile is driven by an endless drive track arranged at the rear end of the underside of the snowmobile. The front end of the snowmobile is supported by, and rides along, two skis, which glide across the surface of the snow or ice. Typically, the skis have carbide inserts that run along a portion of the bottom surface of the ski runner and aid in the steering of the snowmobile.

[0003] A disadvantage of snowmobiles is that, when taken out of the their designed snow environment, they become quite difficult to transport because the skis and track drive do not readily glide along the surface when traveling across gravel, hardtop, or other non-snow surfaces. Therefore, even the most trivial of movements, such as, moving from one side of the garage to the other, requires a tremendous amount of effort and strength, because the snowmobile must repeatedly be lifted and dragged to its desired location. Often the owner resorts to alternating lifting and dragging the front of the snowmobile a few inches, then switches to lifting and dragging the back end to catch up with the front. It is easy to see understand that moving a snowmobile is difficult for riders who are not physically very strong, and is, at best, rather strenuous for even those riders who have a great deal of physical strength.

[0004] Such challenges are not limited to moving a snowmobile around a

driveway or garage. Loading and unloading the snowmobile onto a flat-bed or a trailer, a common task for most snowmobile riders, presents another physically challenging task, even for the strongest of riders. Although the track drive can provide some of the moving power, the snowmobile is not at all steerable on non-snow surfaces and still needs to be guided by the operators to ensure that it travels in the desired direction. Normally two riders team up to guide and/or push the snowmobile in the desired direction — one rider mounts the snowmobile and operates the throttle, and the other pushes and guides the snowmobile. This cooperative effort is potentially extremely hazardous to the person guiding the snowmobile, as an unexpected fluctuation in the throttle can cause the snowmobile to lurch or jump, presenting the potential of severely injuring that person if he or she is in the path of the lurching snowmobile.

[0005] Not only is snowmobile movement on non-snow surfaces difficult, such movement is potentially damaging to the snowmobile as well. For example, driving or dragging a snowmobile across a non-snow surface subjects the track and the carbide tips on the skis to excessive wear and, as a result, they may require more frequent replacement.

[0006] Lack of accessibility to the lower portions of the machine, such as the drive track, can also present a difficulty to the rider. For example, to make adjustments to the drive track, the back end of the snowmobile must be propped up off the ground to allow free track movement. Typically, this is achieved in the shop by propping it up on cinder blocks, bricks, or resting it on a jack. This solution is inadequate for reasons of safety and convenience. For example, propping a snowmobile up on blocks is unsafe as it may fall over if jostled. Additionally, the rider who needs to make adjustments while out for a ride, generally does not have blocks or a jack available to support the snowmobile in a raised position.

[0007] What is needed, therefore, is apparatus for securing a snowmobile in an

upright position, with the rear end of the snowmobile raised above the ground. What is further needed is such apparatus that is easily operable without requiring a great deal of physical strength. What is yet further needed is such apparatus that will allow the vehicle to be maneuvered easily over a surface that is not snow or ice. What is still yet further needed is such apparatus that will improve the steerability of a snowmobile while it is being maneuvered across a surface that is not snow or ice.

SUMMARY OF THE INVENTION

[0008] For the reasons cited above, it is an object of the present invention to provide apparatus that will secure a snowmobile in an upright position, with the rear end of the snowmobile raised above the ground. It is a further object to provide such apparatus that is easily operable by a single person, without requiring great physical strength. It is a yet further object to provide such apparatus that allows a single person to easily steer a snowmobile while maneuvering it across a surface that is not snow and/or ice.

[0009] The objects of the present invention have been achieved by providing a support stand, that is, a center stand or kick-stand, that is attached to the rear end of a snowmobile and is easily deployable. The support stand according to the invention is a collapsible support that is mounted on the rear end of the snowmobile and that, when deployed, provides a rigid support that lifts and supports the weight of the rear end of the snowmobile. The support stand may be equipped with a rolling means that allows the rear end of the snowmobile to roll along a floor or ground surface. The support stand also comprises a deployment mechanism for deploying and locking the stand into the deployed position, and, when stowed, for securing the stand in a stowed position.

[0010] In a first embodiment, a support stand support comprises side arms that are attached to each side of the chassis of the snowmobile. The side arms are

pivotable between a locked, deployed position and a stowed position. In the stowed position, the side bars are raised up off the ground and secured in place; in the deployed position, the side arms are dropped down and locked into a position that raises and supports the rear end of the snowmobile above the ground. If the support stand is equipped with a rolling means, deployment places the rolling means in contact with the ground surface, thereby allowing the rear end of the snowmobile to roll along the ground surface. In this first embodiment, a connecting bar or crossbar connects the lower ends of the side arms. The attachment and deployment mechanism comprises a pair of pivotable rails, one rail being attached to a respective side arm by means of a pin. The rail has a curved slot that includes a catch. When being deployed, the pin moves in the curved slot until it is caught in the catch. To secure the support stand in the stowed position, the crossbar is lifted up off the ground and secured in the stowed position by means of a cord or a latch mechanism.

[0011] In a second embodiment of the support stand according to the invention, the stand comprises two leg assemblies that are mounted at an upper end directly onto the chassis, one assembly on each side of the chassis. Each leg assembly includes a leg that is pivotable such that the lower end of the respective leg drops to the ground surface and is locked into a deployed position. The support stand may be equipped with a wheel, to provide a support stand that is rollable. The wheel is mounted at the lower end of the leg.

[0012] The attachment and deployment mechanism comprises a rail that is mounted on the chassis, along the side at the rear end of the snowmobile. The rail has a slot with a catch. The leg is linked to the rail by a pin that slides in the slot and that catches in the catch when the leg drops down into deployment position. Ideally, the leg assemblies are ganged together with a connecting bar at or near the upper end of the respective legs, so that the attachment and deployment means deploy both legs simultaneously.

[0013] The support stand according to the invention is retrofittable onto conventional snowmobiles. In such a case, the support stand assembly includes a mounting plate and/or brackets as required to attach the support stand to the chassis of the snowmobile. Also included within the scope of the invention is a support stand that is provided on a snowmobile as an integral part of the snowmobile construction. For example, the support stand may be provided as an option for a snowmobile that is equipped with a support stand mount for receiving the center stand assembly, or the support stand may be provided as a standard component of a snowmobile. In this case, the chassis of the snowmobile may include a well in which to stow the support stand when it is not deployed, and a mounting system and deployment means that is built into the walls of the well.

[0013.1] According to one aspect of the present invention there is provided an apparatus for supporting a rear end of a drive track of a snowmobile above a ground surface, the apparatus comprising a support stand mounted on the snowmobile, the support stand having two side arms; a rolling mechanism mounted on the support stand; and a deployment means linked with the two side arms for simultaneously releasing the two side arms from a deployed position; and a mounting bracket affixable to a chassis of the snowmobile, for mounting the deployment means on the snowmobile; wherein the deployment means includes a link with a guide groove having a deployment-position catch, wherein the link is pivotably connected at one end to the mounting bracket and slidably connected to the support stand by means of a fastener that has a first end that is attached to the support stand and a second end that is slidably restrained in the guide groove, and wherein the fastener is restrainable in the deployment-position catch when the support stand is deployed.

[0014] If the skis on the snowmobile are also equipped with wheels, the support stand with wheel now allows the snowmobile to glide easily and steerably across a non-snow, non-ice surface. Suitable ski wheels are disclosed in U.S. Patent Number 6,889,987, filed by the applicant of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] **FIG. 1** is a plan view of the first embodiment of the support stand according to the present invention.

[0016] **FIG. 2** is an elevational view of a snowmobile equipped with convertible skis with wheels and the support stand according to the present invention, the support stand and the wheels on the skis being in respective non-deployed positions.

[0017] **FIG. 3** shows the mounting bracket and the deployment link of the present invention.

[0018] FIG. 4 is an elevational view of the snowmobile of FIG. 2, with the support stand and the ski wheels being in fully deployed position.

[0019] FIG. 5 is a partial view of the snowmobile of FIG. 2, equipped with the support stand according to the invention, the support stand having a fluid-pressure actuating means.

[0020] FIG. 6 is a perspective view of the second embodiment of the support stand according to the invention.

[0021] FIG. 7 is an elevational view of the support stand of FIG. 6, illustrating the assembly of the side arm with braces, the connecting bar, and the run of the deployment cable.

[0022] FIG. 8 is a perspective view of the rail and mounting plate of the support stand of FIG. 6, showing the side arm in deployed position.

[0023] FIG. 9 is a planar view of the rail and mounting plate of FIG. 8, showing the side arm and wheel in the stowed position.

[0024] FIG. 10 is a perspective view of the rear end of a snowmobile with the support stand of FIG. 6 mounted onto the chassis and deployed.

DETAILED DESCRIPTION OF THE INVENTION

[0025] FIG. 1 is an illustration of a first embodiment of a support stand 1 according to the present invention. The support stand 1 of this particular embodiment comprises a frame 3 and a rolling mechanism 10. Although in the description of this

embodiment that follows, the rolling mechanism **10** is described, it should be understood that it is possible to provide the support stand **1** without a rolling mechanism. In that case, the support stand **1** becomes a stationary support stand that lifts the rear end of a snowmobile **101** above a ground surface **G**, but does not promote easy rollability of the snowmobile **101**. The frame **3** in the embodiment shown includes a crossbar **2** and two side arms **4**. At the distal end of each side arm **4** is an attachment and deployment means **6** by which the support stand **1** is pivotably attached to the body of a conventional snowmobile. Other embodiments of the frame **3** may be U-shaped or otherwise contoured so that the frame **3** is connectable to the body of a snowmobile in a way that does not hinder or interfere with the conventional operations of the snowmobile. In the particular embodiment shown in **FIG. 1**, the attachment and deployment means **6** includes a mounting bracket **16** and a deployment link **8** that is pivotably attached to the respective mounting bracket **16** at one end and to the side arm **4** at the other end. The rolling mechanism **10** is mounted on the crossbar **2**. In the embodiment shown, the rolling mechanism **10** is a wheel. It is, of course, possible to mount more than one wheel on the crossbar **2** or to use some other suitable type of rolling mechanism **10** other than the wheel, such as a track with roller balls, or one or more rollers made of round stock that are assembled on the crossbar.

[0026] **FIG. 2** shows the support stand **1** mounted on a conventional snowmobile **101** and secured in a stowed position by a retainer **18**. The retainer **18** shown in this embodiment is a simple strap, but it should be understood that any suitable means for securing the support stand **1** can be used, such as a mechanical or electro-mechanical latch, a magnetic or electro-magnetic latch, a hasp and staple, etc. Also shown on the snowmobile **101** is a convertible ski **30** that has a ski-wheel **32** deployably attached to it. This convertible ski **30** is the subject of U.S. Patent Number 6,889,987, commonly owned by the inventor of the present invention. As shown in **FIG. 2**, the ski-wheel **32** is raised above the ground in a non-deployed position.

[0027] FIG. 3 illustrates the attachment and deployment mechanism 6 for releasing the support stand 1 from a stowed position to a deployed position. The deployment link 8 is pivotably attached to the mounting bracket 16 and slidably attached to the side arm 4 and has a groove 14 that has a catch 8A for securing the side arm 4 in the deployed position. The mounting bracket 16 is securely affixed to each side of the conventional snowmobile 101 such that the support stand 1, when in the stowed position, is in the vicinity of a bumper B that is conventionally mounted on the snowmobile 101. A deployment cable 12 is connected to the deployment link 8 attached to the mounting bracket 16 on one side of the support stand 1 to the mounting bracket 16 on the other side of the support stand 1. For the sake of clarity, a mudflap that is typically attached to the snowmobile 101 beneath the bumper B is not shown.

[0028] To release the support stand 1 from the stowed position shown in FIG. 2 to a deployed position shown in FIG. 4, one pulls the retainer 18. In the embodiment shown in the FIGS. 2 and 4, the deployment link 8 and the support stand 1 drop simply to the ground by force of gravity. By lifting slightly on the rear bumper of the snowmobile 101, the support stand 1 rolls under the snowmobile 101 and the deployment link 8 snaps into the catch 8A and holds the support stand 1 in the fully deployed position under the rear end of the snowmobile 101. FIG. 4 shows the snowmobile 101, equipped with the support stand 1 according to the present invention, and the convertible skis 30 with wheels 32. As shown, the rear end of the snowmobile is raised above ground level and supported on the rolling mechanism 10 when the support stand 1 is deployed. If the wheels 32 on the convertible skis 30 are deployed as well, the front end of the snowmobile 101 is also raised above ground level. In this position, the snowmobile 101 can be maneuvered easily across a surface that is neither snow nor ice. In addition, if the rolling mechanism 10 is a wheel that is swivel-mounted or roller balls that allow rotation in any direction, the snowmobile 101 can also be steered as it is pushed or pulled in a backward direction.

[0029] **FIG. 5** illustrates another embodiment of the invention in which the deployment means **6** is a drive means **34** that drives the frame **3** into a deployed position as well as to a stowed position. The drive means **34** includes a cylinder **24** and a piston **26**. As shown, the cylinder **24** is mounted on a side arm of the frame **4** and the operating end of the piston **26** is attached to the mounting block **16** so as to drive the frame **3** to a stowed position (shown with dotted lines) from a deployed position and vice versa. Fluid-pressure drive means such as the piston and cylinder drive means **34** shown in **FIG. 5** are generally well-known and the details of such means and their means of actuation are neither discussed nor shown herein. It is within the scope of the invention, however, that such drive means **34** may be driven by any suitable pressurized fluid system, such as air or hydraulic fluid.

[0030] **FIGS. 6 - 10** illustrate a second embodiment of the support stand **100** according to the invention. **FIG. 6** is a perspective view and **FIG. 7** a frontal view of the support stand **100**. As best shown in **FIG. 7**, the support stand **100** comprises two essentially identical leg assemblies **121**, each of the assemblies ganged together by a ganging bar **128**. In the embodiment shown, each leg assembly **121** comprises a support leg **120** with a wheel **124** mounted at the lower end and a deployment mechanism **108**. The deployment mechanism **108** includes a means of allowing the leg assembly **121** to drop from a stowed position, illustrated in **FIG. 9**, to a deployment position, shown in **FIG. 6**. In this second embodiment, the deployment mechanism **108** comprises a pair of rails, **104** and **106**, each rail having a groove **109** for slidably receiving a pin **109A**. The pin **109A** pivotably links the upper end of the leg **120** to the two rails, **104**, **106**. A catch is provided in one end of the groove **109** in which the pin **109A** catches when the leg **120** is allowed to drop, and locks the leg **120** into a deployed position.

[0031] In this second embodiment, the support stand **100** is designed to be

retrofitted onto a conventional snowmobile **101** and one of the rails, a first rail **104**, serves a dual function. Not only does it serve as part of the deployment mechanism **108**, but also as a mounting bracket to mount the support stand **100** to the chassis of the snowmobile **101**. As shown in **FIG. 6**, the first rail **104** has a contour that fits a conventional snowmobile. A portion **104A** of the rail **104** extends downward sufficiently to provide a convenient location for mounting the ganging bar **128** without interfering with the operation of the snowmobile or the support stand. A plate **112** is provided on the first rail **104** to accommodate a bogey wheel on the snowmobile.

[0032] The legs **120** are braced with braces **122**. In the embodiment shown, an upper end of a first brace **122** is pivotably attached to the first rail **104** and an upper end of a second brace **122** is attached to the second rail **106**; the lower ends of the braces **122** are pivotably attached to the respective legs **120** as shown in **FIGS. 6** and **7**. The leg assembly **121** further comprises assembly spacer bars **111** which hold the first rail **104** and the second rail **106** a distance apart to accommodate the width of the leg **120** and bushings.

[0033] **FIG. 8** illustrates a leg assembly **121A** that is used on a snowmobile having a chassis that is constructed to receive or hold the support stand **100** according to the invention. In this case, the first rail **104** is essentially identical to the second rail **106**, and is mounted on a mount provided on the chassis.

[0034] **FIG. 9** shows the leg assembly **121** with the leg **120** retracted in a stowed position. Also shown in this view is a bracket **130** that is used to provide an additional attaching point to the chassis of the snowmobile **101**.

[0035] **FIG. 10** is a perspective illustration of the second embodiment of the support stand **100** according to the invention, mounted on a conventional snowmobile

101. Only one side of the rear end of the snowmobile **101** is shown, and that with only sufficient detail to properly illustrate the mounting of the support stand **100** on the snowmobile **101**. As shown, the leg assembly **121** is attached to the chassis of the snowmobile **101**, one assembly on each side of the snowmobile **101**. The ganging bar **128** connects the two leg assemblies **121** and is shown in this illustration extended from the one leg assembly **121** through the chassis of the snowmobile. The bracket **130**, mentioned earlier, is attached to the bottom surface of a horizontally extending panel on the chassis. Whether this bracket **130** is necessary depends on the specific geometry of the conventional snowmobile and it should be understood it is within the scope of the present invention to use one or more brackets as required to fasten the support stand **100** to the conventional snowmobile.

[0036] The support stand **100** according to the invention also includes an actuation mechanism **140**, which, in this case, is a spring-biased tension cord **141** that extends around the bumper of the conventional snowmobile and is attached to each leg **120** of the support stand **100**. As shown in **FIG. 10**, the tension cord **141** feeds into the leg assembly **121** through assembly spacer bars **111A** and **111B**, runs down to a lower assembly spacer bar **111C**, and then up to the upper end of the leg **120** where it is attached. By pulling on the tension cord **141**, the pin **109A** is moved from a first position in the groove **109** which is a stowed position toward a second position in the groove, which is a deployed position. Other actuating mechanisms as described above in conjunction with the first embodiment of the support stand **1** are also applicable to this second embodiment. Such actuating mechanisms include pressurized fluid systems, such as a pneumatically driven piston and cylinder unit. For example, with such an actuating mechanism, one end of the piston is connected to the leg **120** and the other captured in a cylinder that is mounted on the chassis of the snowmobile **101** or on a bracket or rail of the support stand **100**.

[0037] The illustration of the second embodiment shows the support stand **100** having a wheel **124** at the lower end of each leg **120**. It is within the scope of the invention to provide the support stand **100** without the wheels mounted on the legs. The support stand **100** is then a stationary support stand that raises the rear end of the snowmobile above the ground surface **G**.

[0038] The embodiments described herein are merely illustrative of the present invention. It should be understood that variations in construction of the present invention may be contemplated in view of the following claims, without straying from the intended scope and field of the invention herein disclosed.

WHAT IS CLAIMED IS:

1. Apparatus for supporting a rear end of a drive track of a snowmobile above a ground surface, said apparatus comprising:
 - a support stand mounted on said snowmobile, said support stand having two side arms;
 - a rolling mechanism mounted on said support stand; and
 - a deployment means linked with said two side arms for simultaneously releasing said two side arms from a deployed position;
 - and a mounting bracket affixable to a chassis of said snowmobile, for mounting said deployment means on said snowmobile;
 - wherein said deployment means includes a link with a guide groove having a deployment-position catch, wherein said link is pivotably connected at one end to said mounting bracket and slidably connected to said support stand by means of a fastener that has a first end that is attached to said support stand and a second end that is slidably restrained in said guide groove, and wherein said fastener is restrainable in said deployment-position catch when said support stand is deployed.
2. The apparatus of claim 1, wherein said deployment means is a drive means that includes a cylinder and a piston, wherein said cylinder is mounted on said mounting bracket and an operating end of said piston is connected to said frame so as to move said frame from said stowed position to said deployed position and from said deployed position to said stowed position.
3. The apparatus of claim 1, wherein said support stand is a U-shaped frame with a crossbar that couples said two side arms.
4. The apparatus of claim 3, wherein said rolling mechanism includes a wheel that is mounted on said crossbar.
5. The apparatus of claim 4, wherein said wheel is a swivel caster.

6. The apparatus of claim 3, wherein said rolling mechanism comprises a roller mounted on said crossbar.
7. The apparatus of claim 3, wherein said mounting bracket includes two mounting brackets that are adapted for mounting said U-shaped frame on a chassis of said snowmobile.
8. The apparatus of claim 1, wherein said rolling mechanism comprises a wheel that is mounted on said lower end of at least one of said side arms.
9. The apparatus of claim 8, wherein said wheel is a swivel caster.
10. The apparatus of claim 1, wherein said support stand comprises a leg assembly that includes a leg having an upper leg end and a lower leg end;
wherein said leg assembly includes two brackets, each of said brackets having a guide groove;
wherein said guide groove of one of said brackets extends parallel and opposite to said guide groove of another of said brackets;
wherein each said guide groove has a deployment end with a deployment locking slot, each deployment locking slot being parallel and opposite one another;
wherein said deployment means includes a pin having two ends, each end of said pin being captured in a respective guide groove of said two brackets; and
wherein said upper leg end is pivotably suspended by means of said pin between said two brackets.
11. The apparatus of claim 10, wherein the deployment means further includes a deployment device and wherein said leg assembly includes a first leg assembly and a second leg assembly, said first leg assembly being mountable on a first side of said snowmobile and said second leg assembly mountable on a second side of said snowmobile; and

wherein said deployment device has a first end that is linked to said first leg assembly and a second end linked to said second leg assembly.

12. The apparatus of claim 11, wherein said deployment means is a cable having a first cable end that is linked to said first leg; and

wherein, when said cable is pulled away from said snowmobile, said pin slides in said two guide grooves of said leg assembly until said pin moves into said deployment locking slot.

13. The apparatus of claim 11, wherein said deployment means is a fluid-pressurized unit including a piston attached at a first end to said leg and captured at a second end in a pressurized cylinder.

14. The apparatus of claim 11, further comprising a connecting bar that connects said first leg assembly with said second leg assembly such that, when said first leg assembly is deployed and said first leg moves, said second leg assembly deploys and said second leg moves substantially commensurate with and parallel to said first leg.

15. The apparatus of claim 10, mountable on said snowmobile, wherein one of said two brackets is a mounting bracket that is adapted for mounting said leg assembly on a chassis of said snowmobile.

16. The apparatus of claim 10 further comprising a rolling mechanism that is mounted at said lower leg end of said leg.

17. The apparatus of claim 16, wherein said rolling mechanism is a wheel.

18. The apparatus of claim 16, wherein said rolling mechanism is a swivel caster.

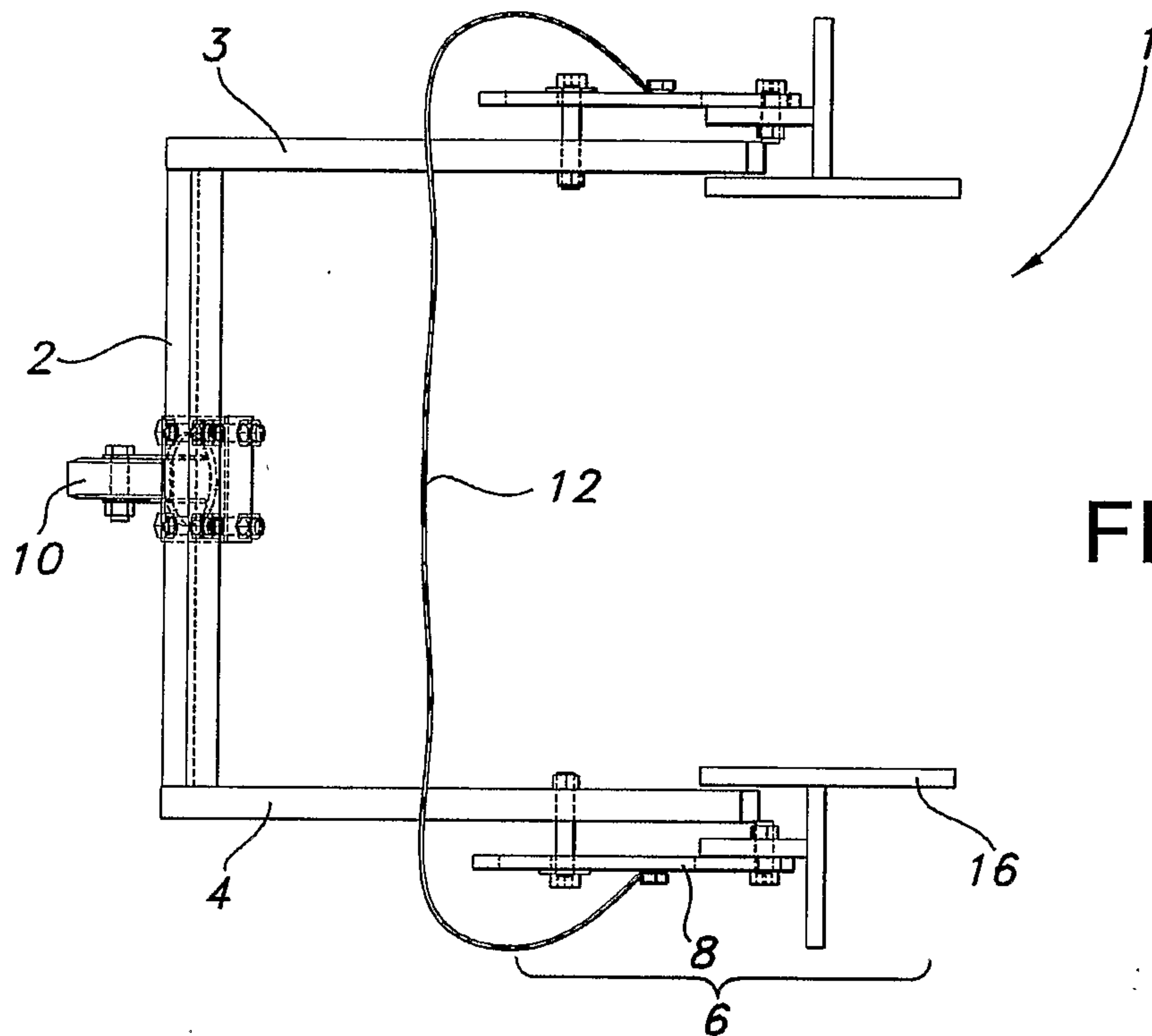


FIG. 1

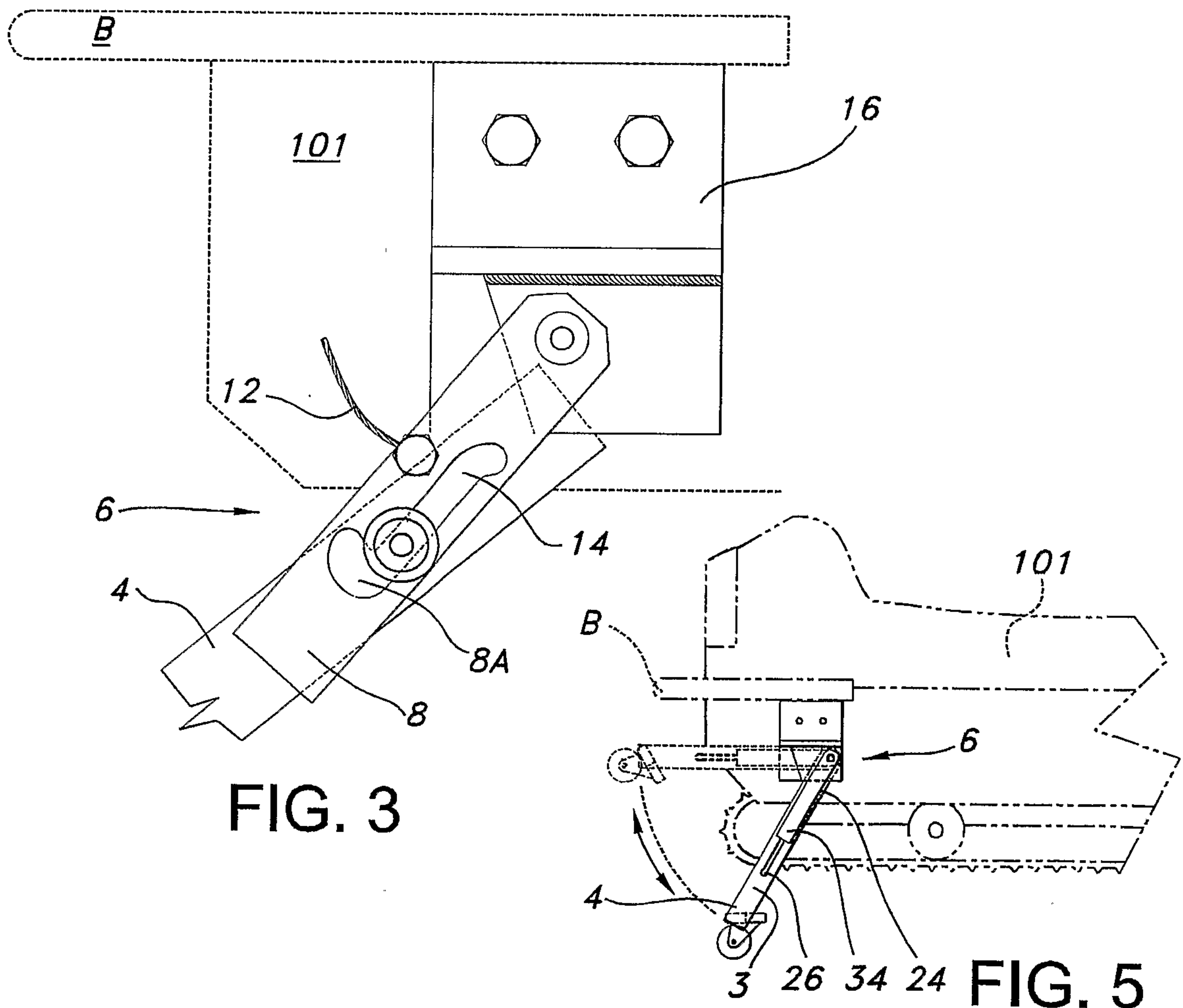
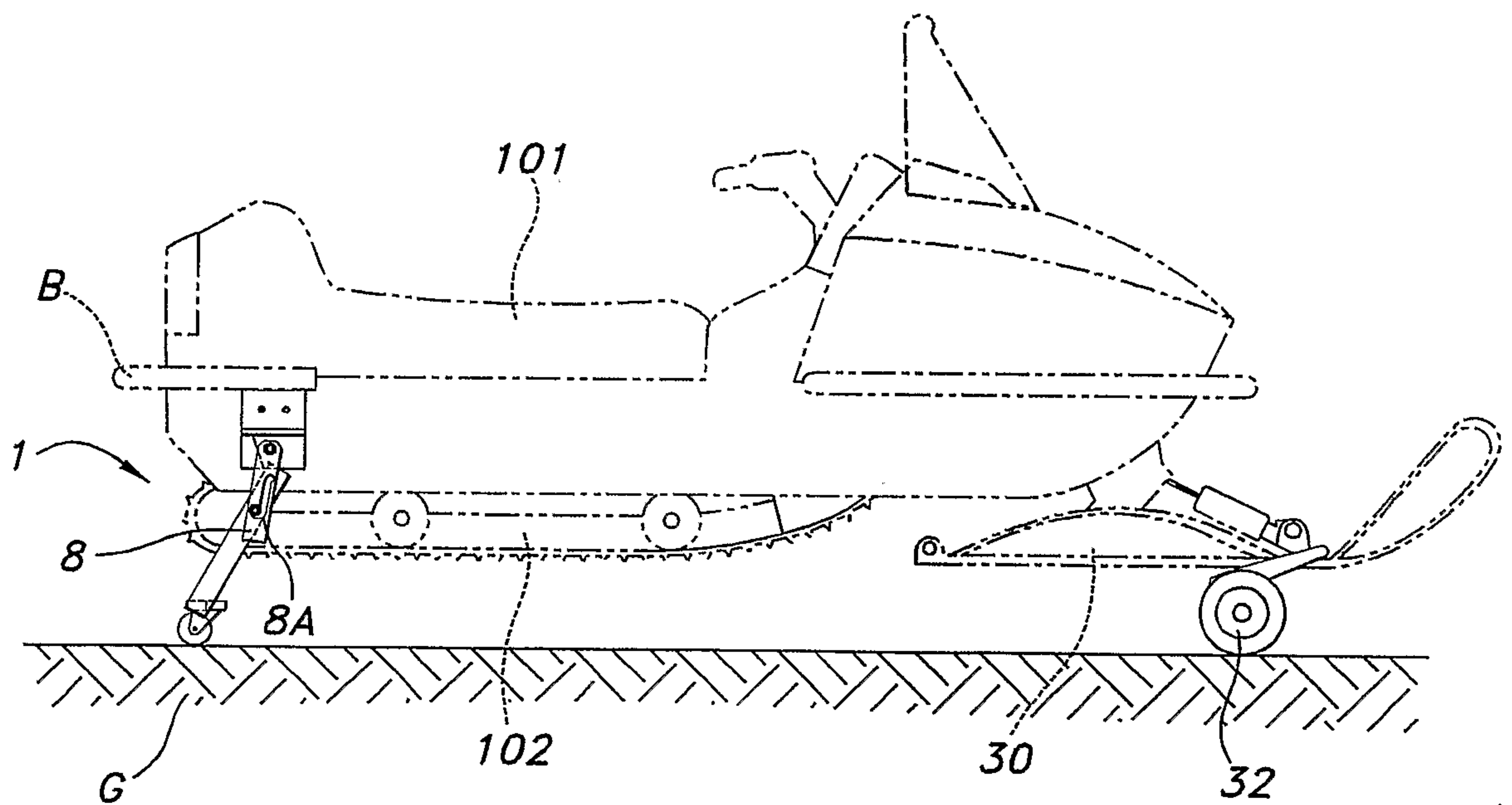
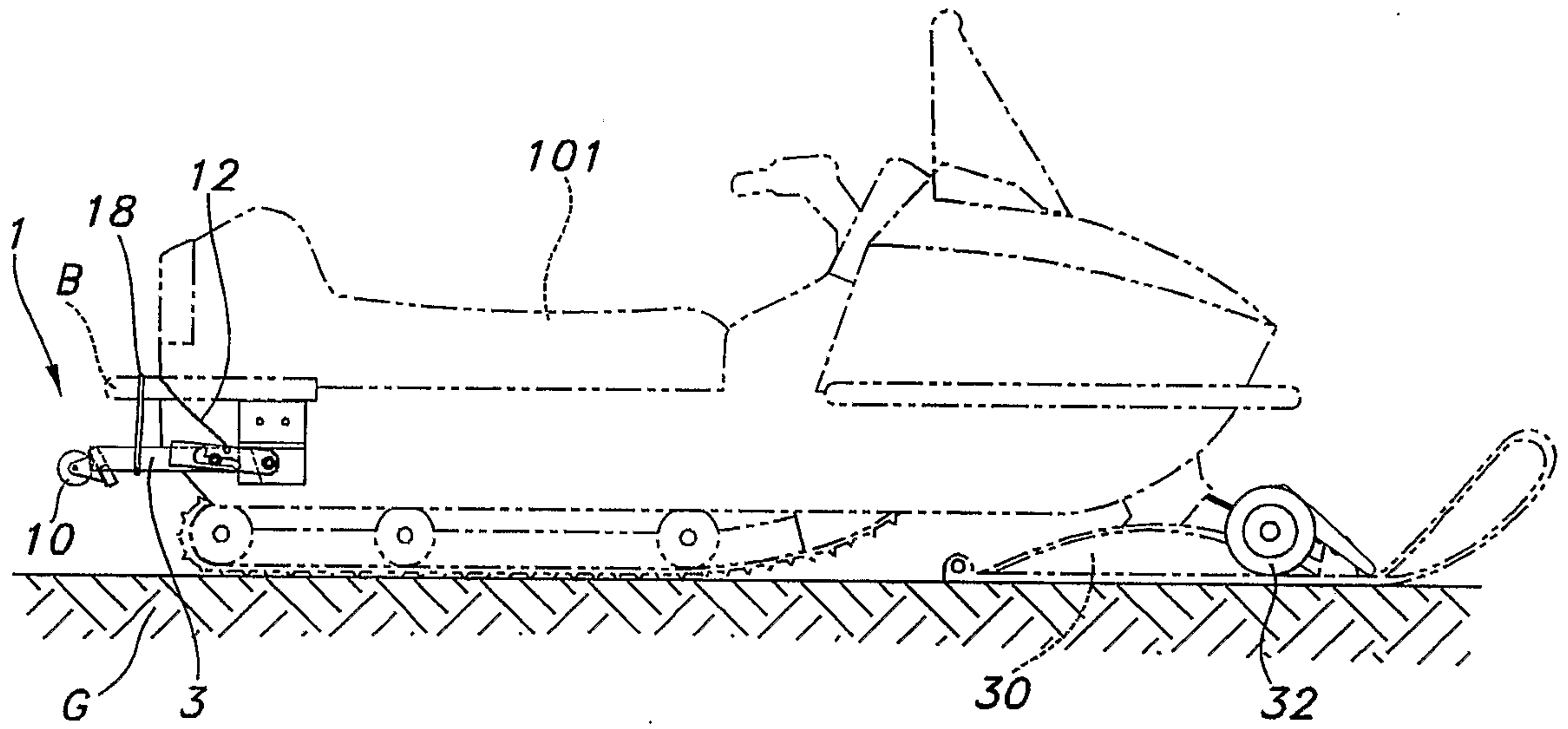


FIG. 3

FIG. 5



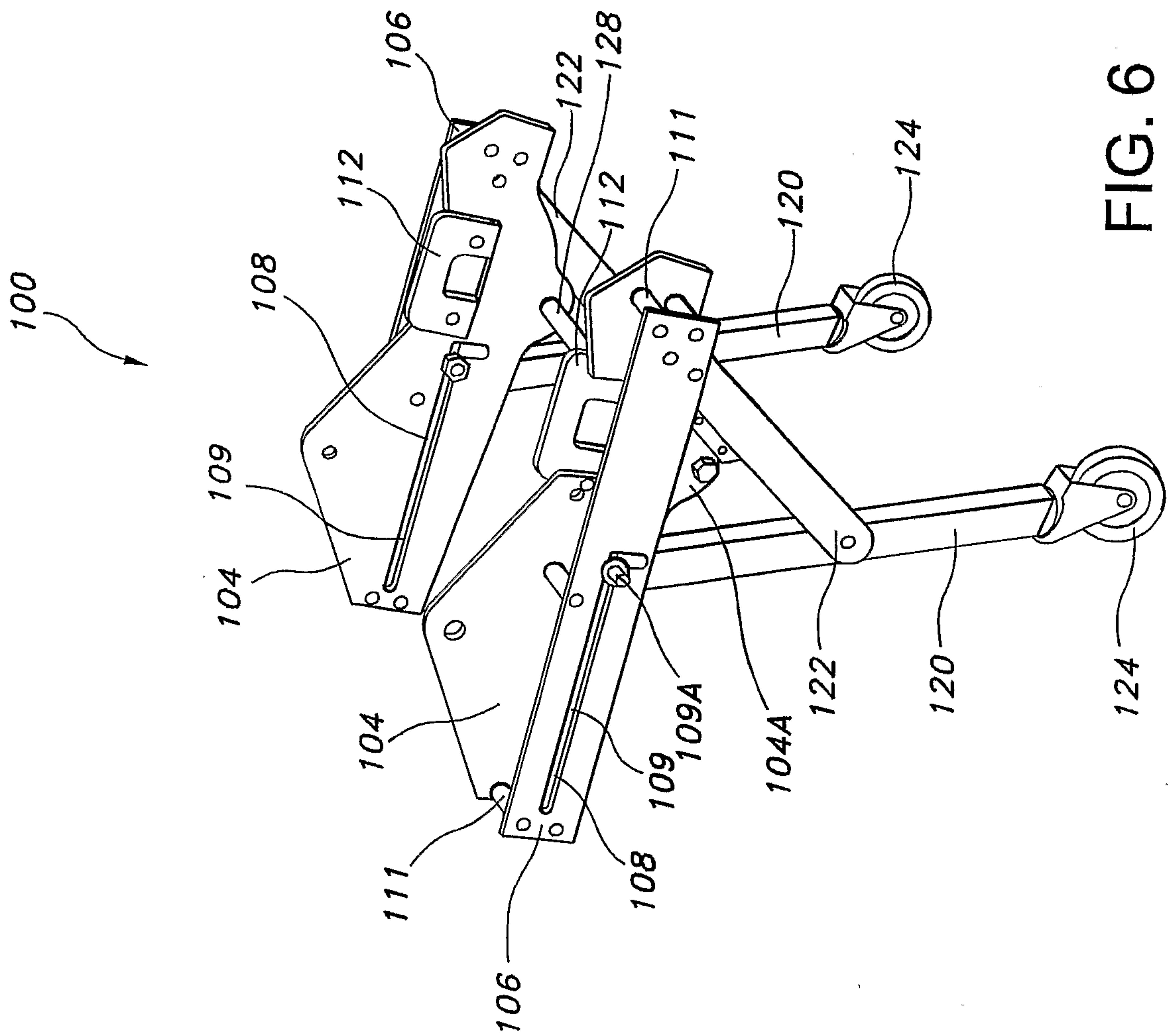


FIG. 6

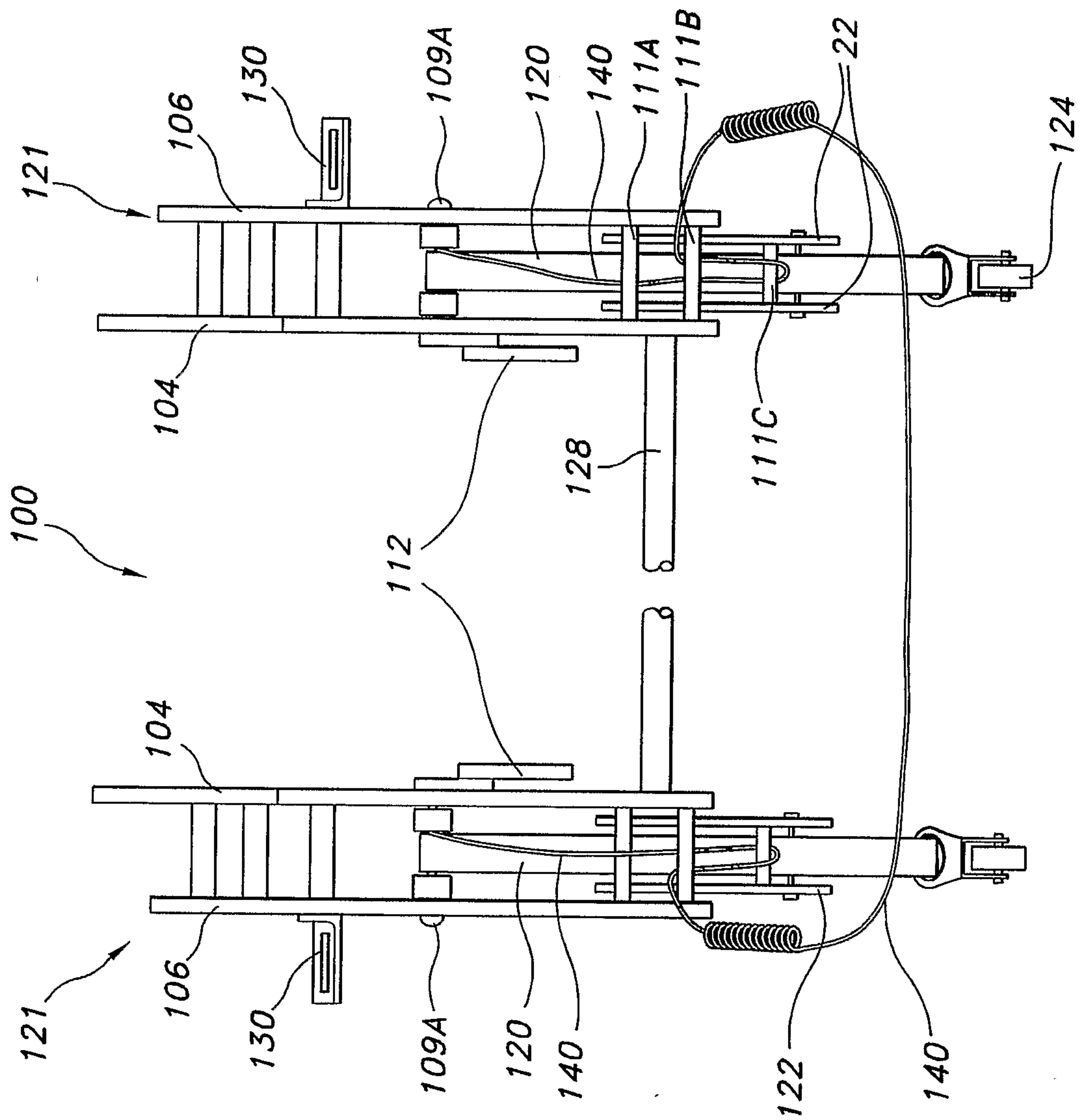


FIG. 7

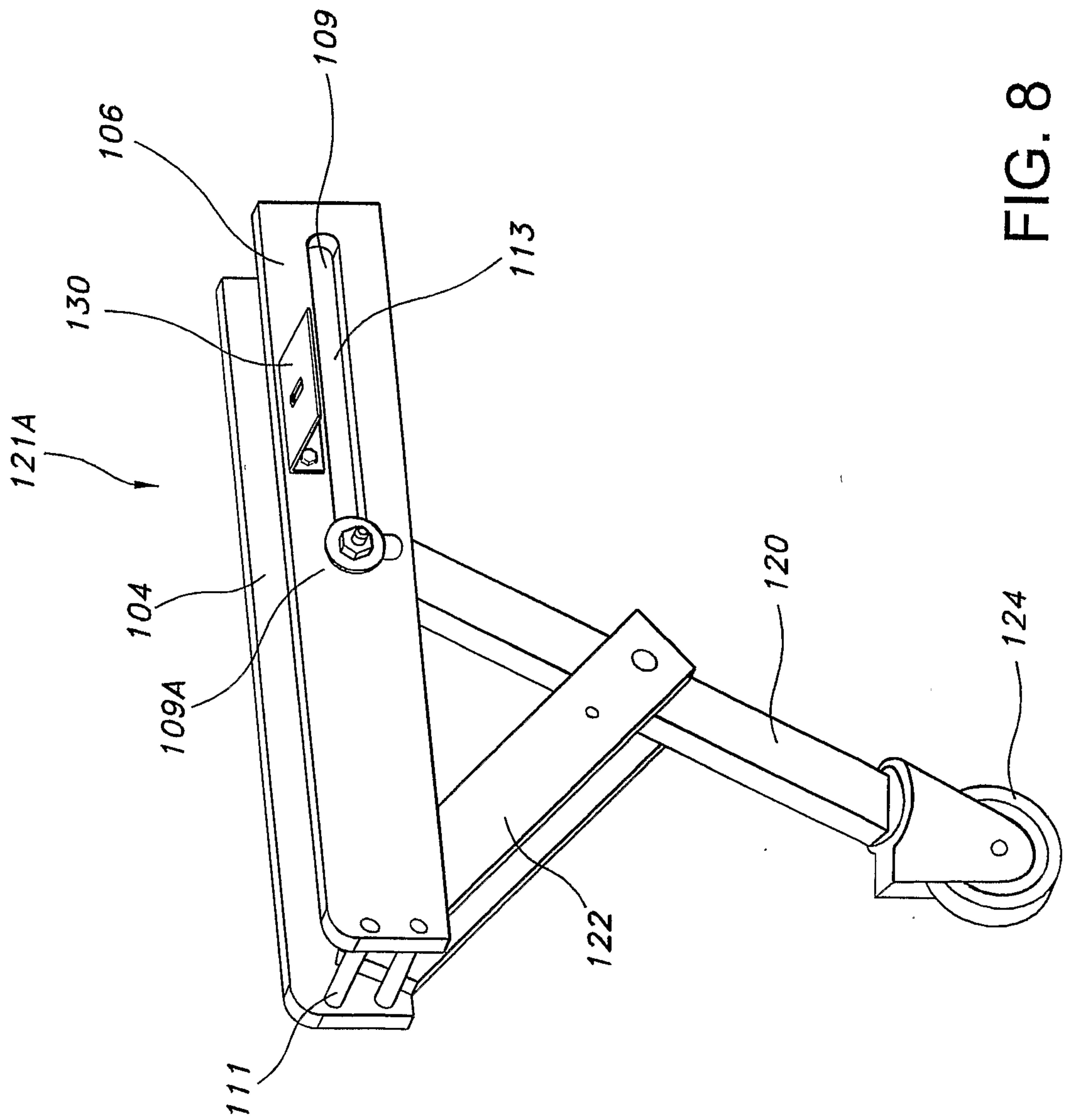


FIG. 8

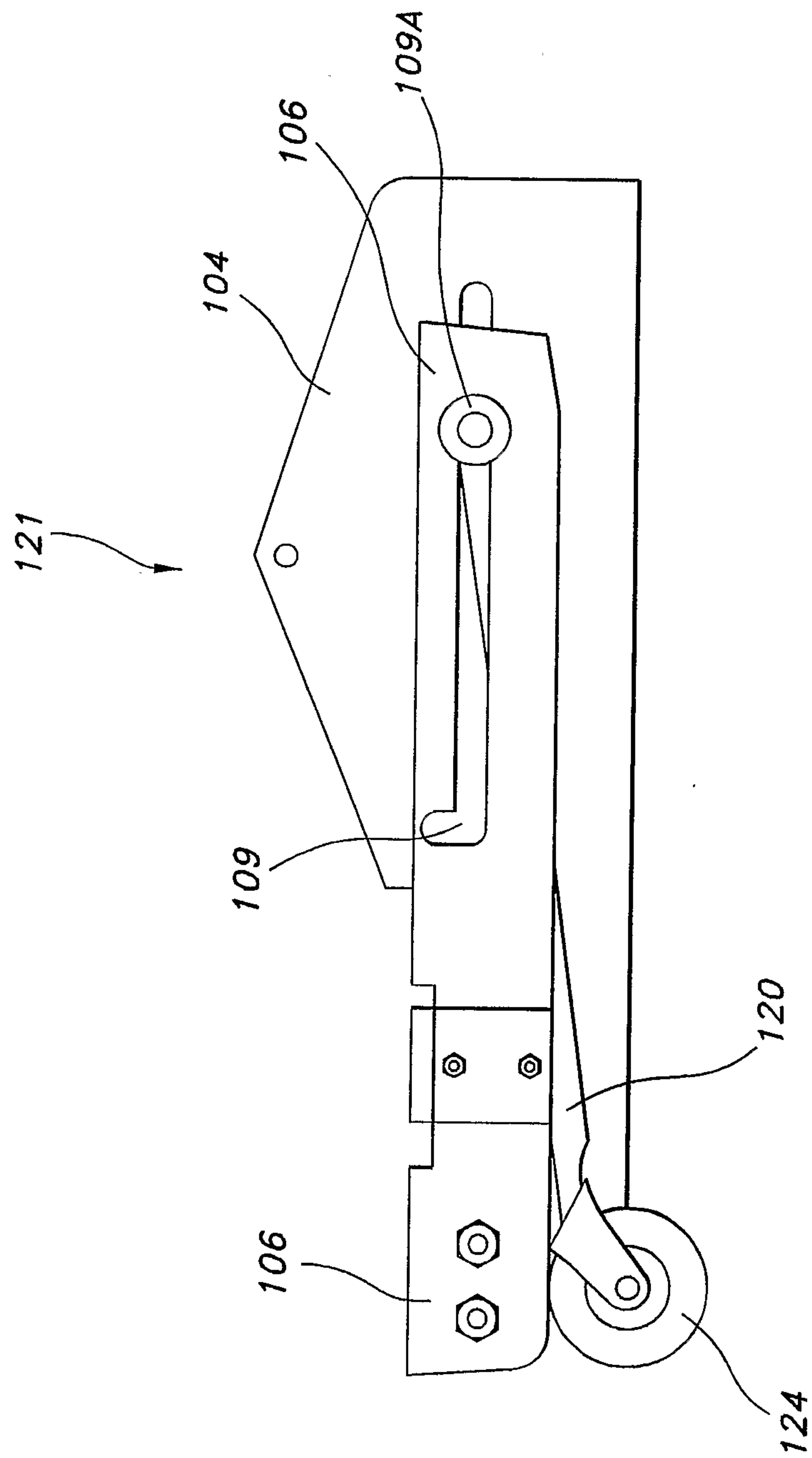


FIG. 9

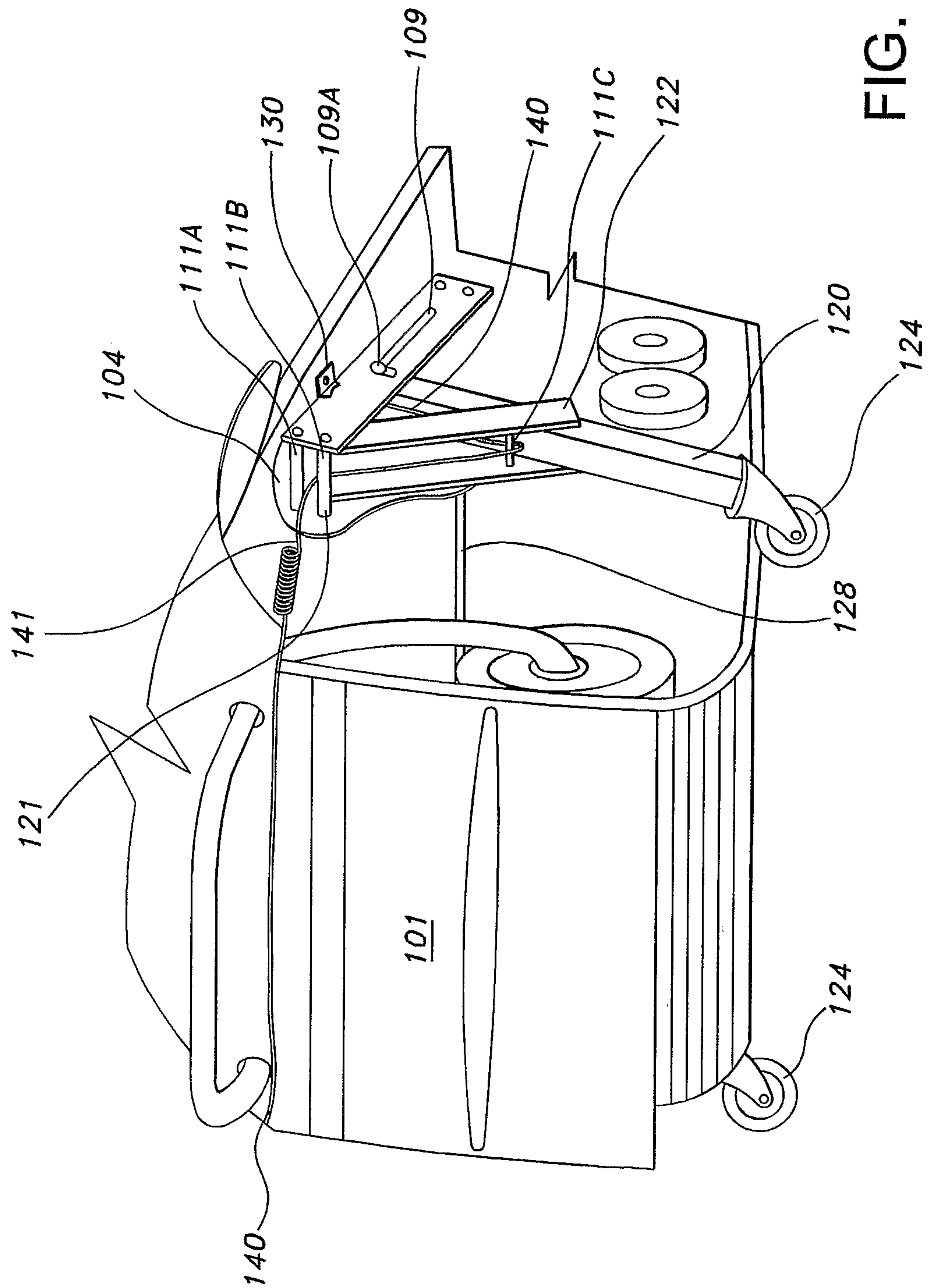


FIG. 10

