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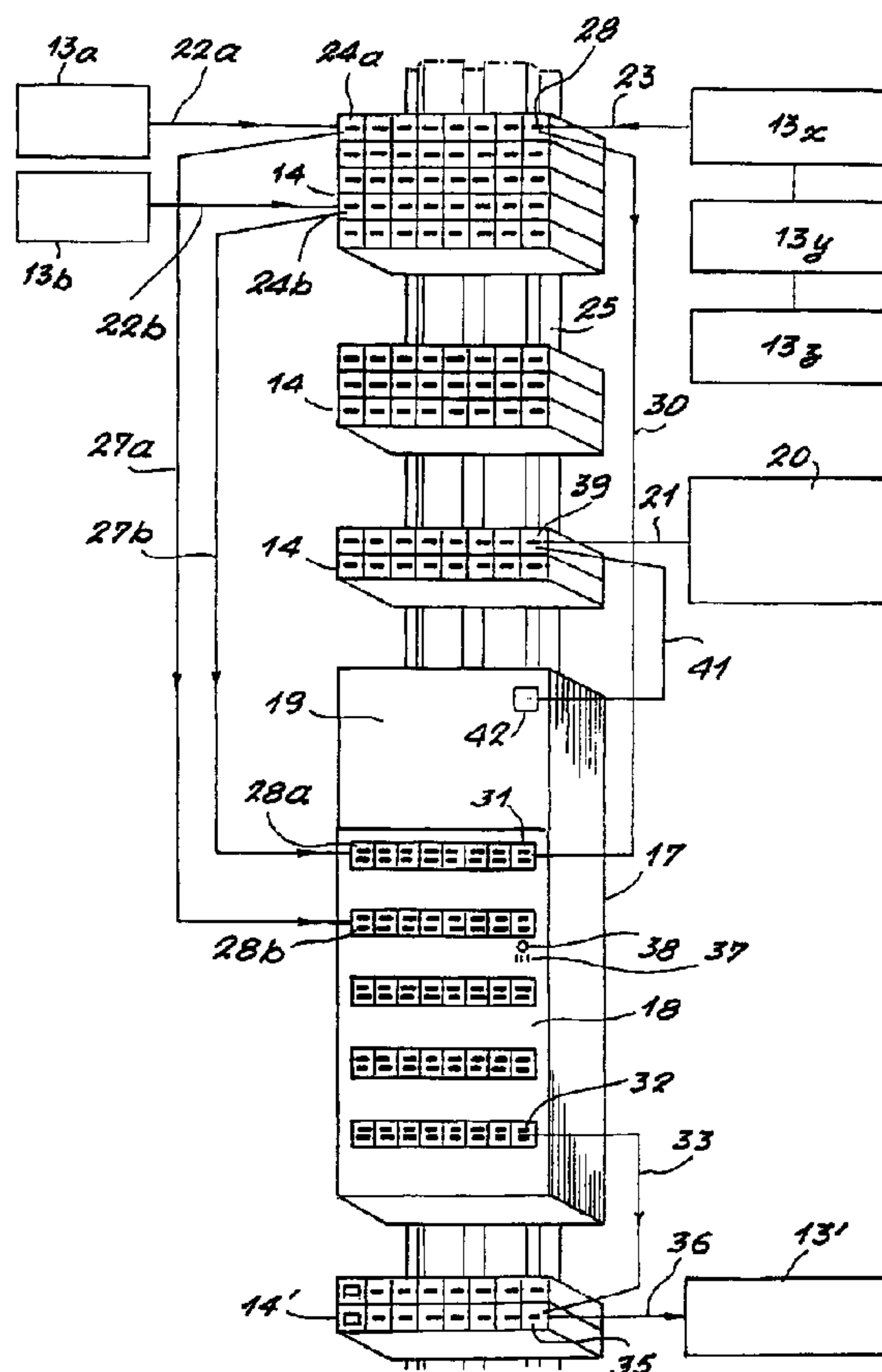
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(54) **SYSTEME ET DISPOSITIF DE PRE-AUTOMATISATION DES
INSTALLATIONS D'UN BATIMENT**

(54) **BUILDING FACILITY PRE-AUTOMATION SYSTEM AND
DEVICE**



(57) L'invention concerne l'automatisation des différentes installations d'un bâtiment. L'invention réside dans le fait qu'une unité de supervision (11) de l'ensemble des installations du bâtiment est connectée aux capteurs et actionneurs (13) par l'intermédiaire d'un réseau de pré-câblage (10) et de dispositifs de pré-automatisation (12) mis en place localement et communs à toutes les installations. Ce dispositif comprend un bornier et un microprocesseur qui sont connectés par un circuit d'entrées/sorties. L'invention est applicable à la gestion technique et administrative des bâtiments.

(57) A system and a device for automating the various facilities of a building, wherein a supervising unit (11) for supervising all the facilities of the building is connected to sensors and actuators (13) via a prewired network (10) and local pre-automation devices (12) common to all the facilities. The device includes a terminal block and a microprocessor connected via an input/output circuit. The system and device are useful for the technical and administrative management of buildings.

ABSTRACT**DISK FOR THE SKIS OF A SNOWMOBILE**

5 A front ski assembly for mounting on a steering column of a snowmobile
is provided. The front ski assembly includes a ski, a disk-shaped rigid wheel and
a bearing assembly to mount the wheel on the steering column. A slit is made in
the ski along its longitudinal direction, beside the lower portion of the steering
column. A runner shoe is fixed on the bottom surface of the ski and projects
10 from the same. The wheel is sized so it partially extends in the slit when
mounted on the steering column, and projects from the bottom surface of the ski
further than the runner shoe. The wheel therefore allows to better control the
snowmobile when circulating on hard surfaces. The invention also concerns a
snowmobile provided with two such front ski assemblies and a kit to allow
15 manufacturers, resellers or owners to install a wheel assembly on a snowmobile.

DISK FOR THE SKIS OF A SNOWMOBILE**FIELD OF THE INVENTION**

The present invention relates to the field of snowmobiles, and particularly
5 concerns an assembly for a front ski of a snowmobile.

BACKGROUND

Snowmobiles are used for driving or travelling on snow, and are usually
provided for this purpose with a set of two front skis. While they allow for
10 better adherence to snow, controlling these skis can however cause serious
problems to snowmobile users when they encounter hard surfaces, such as
patches of ice or asphalt. In such circumstances, the skis both hinder the
progression of the vehicle and tend to be damaged. The runner shoes, fixed
under each of the skis, are especially sensible to damages under these
15 conditions. There is therefore a need to provide a snowmobile with means to
temporarily travel on hard surfaces easily and without damaging the skis.

Known in the art is U.S. patent no. 3,552,515 (TOMITA) disclosing a front
wheel device for a snowmobile. TOMITA provides a set of removable wheels
mountable on a side of each front ski when the snowmobile encounters a hard
20 surface. Each wheel is fixed to the end of a strut which, when needed, is
mounted on a steering column of the snowmobile by a bolt.

Also known in the art is U.S. patent no 3,493,814 (BAULER). BAULER
teaches to provide each ski of a snowmobile with a rigid running wheel which
supports the snowmobile on ice or bare highway surfaces. The running wheel is
25 permanently mounted on an axle coupled to a support runner fixed to the upper
surface of the ski, and extends through a slit in the ski. The running wheel being
however connected directly to the ski and not to the steering column, it is not
easily controllable by the user.

U.S. patent no. 3,664,446 (BURTIS et al.) also describes a snowmobile
30 vehicle provided with wheels. In this patent each front ski is fixed to a mounting
post having two laterally spaced arms. The wheel is rotationally mounted

between the two arms, and is displaceable between two positions, an operation position, where it extends through a slit in the middle of the ski to contact the ground, and a retracted position.

5 The following U.S. patents also relate to the field of wheels for snowmobiles: U.S. patents no. 3,570,616; 3,696,877; 3,709,512; 3,750,774; 3,777,829; 3,860,078; 3,881,740; 5,340,206; 5,439,237; 5,564,517; and canadian patent no. 987,707.

10 None of the above-mentioned patents provide an assembly for a front ski of a snowmobile that is permanently mounted on a snowmobile, in such a manner that it allows a good direction control of the snowmobile when it circulates on hard surfaces without interfering with its operation when on snow.

OBJECT AND SUMMARY OF THE INVENTION

15 Accordingly, an object of the present invention is to provide an assembly that is permanently installed on the front ski of a snowmobile, and both allows a good direction control of the snowmobile when on hard surfaces and does not interfere with the snowmobile operation when on snow.

Another object of the present invention is to provide such an assembly that is easy to install on the snowmobile.

20 Yet another object of the invention is to provide a wheel assembly kit to allow snowmobile manufacturers, resellers or owners to install such an assembly themselves on the front skis of a snowmobile, according to the present invention.

A further object of the invention is to provide a snowmobile having two front skis each provided with an assembly according to the present invention.

25 In accordance with the present invention, there is provided a front ski assembly for a snowmobile having a front steering column. The front ski assembly comprises a ski attached to a lower portion of the steering column. The front ski has a slit therein extending along a longitudinal direction of the ski and beside the lower portion of the steering column. The front ski assembly
30 also comprises a runner shoe, fixed to a bottom surface of the ski and projecting

therefrom at a projecting distance. A disk-shaped rigid wheel is provided, sized for partial extension through the slit. The front ski assembly further comprises a bearing assembly rotationally mounting the wheel on the lower portion of the steering column, in a position where the wheel partially extends through the slit and projects from the bottom surface of the ski beyond the projecting distance of the runner shoe.

Preferably, the present invention also provides a snowmobile having two lateral steering columns projecting from a front part thereof, each steering column having a lower portion provided with a front ski assembly as described above.

According to the present invention, there is also provided a wheel assembly kit for installation onto a front ski of a snowmobile, the ski being attached to a lower portion of a steering column of the snowmobile, the ski having a slit therein extending along a longitudinal direction of the ski and beside the lower portion of the steering column, a runner shoe being fixed to a bottom surface of the ski and projecting therefrom at a projecting distance. The wheel assembly kit comprises a disk-shaped rigid wheel sized for partial extension through the slit, and a bearing assembly for rotationally mounting the wheel on the lower portion of the steering column, in a position where the wheel partially extends through the slit and projects from the bottom surface of the ski beyond the projecting distance of the runner shoe.

The present invention and its advantages will be better understood upon reading the following non-restrictive description of a preferred embodiment thereof, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side elevational view of a front steering column provided with a front ski assembly according to the present invention.

Figure 2 is a cross-sectional view along lines II-II of figure 1.

Figure 3 is a perspective view of a snowmobile having two front skis provided with an assembly according to a first preferred embodiment of the invention.

Figure 4 is a perspective view of a snowmobile having two front skis provided with an assembly according to a second preferred embodiment of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring to figures 1 and 2, a front ski assembly 6, in accordance with a preferred embodiment of the present invention, is shown mounted on a steering column 8 of a snowmobile.

The front ski assembly 6 includes a ski 10 attached to a lower portion 18 of the steering column 8, as better seen on figure 2. Preferably, the ski 10 has a support member 26 fixed on its top surface 28. A slit 20 is provided in the ski 10, extending along its longitudinal axis and positioned beside the lower portion 18 of the steering column 8. The ski also has a runner shoe 12 fixed to its bottom surface 22. The runner shoe 12 projects from the ski 10 at a projecting distance a.

A disk shaped rigid wheel 14 and a bearing assembly 16 are also included in the front ski assembly 6. Preferably, the wheel is made of metal, for example steel. The wheel 14 is mounted on the lower portion 18 of the steering column 8 by the bearing assembly 16, in a position where it partially extends through the slit 20. When in place, the wheel 14 also projects from the bottom surface 22 of the ski 10, at a projecting distance b which is greater than the projecting distance a of the runner shoe 12. In this manner, the wheel 14 is the lowest point of contact of the front ski assembly 6 with the ground 24.

In the preferred embodiment shown in figure 2, the bearing assembly 16 has a ball bearing 30 made of two main parts, a first part 32 provided with a shaft 34, and a second part 36 rotatable with respect to the first part 32. Preferably, the lower portion 18 of the steering column 8 has a transverse cavity

42 therein, where the shaft 34 is inserted. Fasteners are also provided as part of the bearing assembly 16, to secure the shaft 34 to the lower portion 18 of the steering column 8. The fasteners may for example include a nut 38 and a washer 40, the nut being screwed on a threaded free extremity of the shaft 34 with the washer 40 standing between the nut 38 and the support member 26. The wheel 14 is mounted onto the second part 36 of the ball bearing 30, and is therefore rotatable with respect to the shaft 34. To prevent rotation of the first part 32 of the ball bearing 30 with respect to the lower portion 18 of the steering column 8, the fasteners may also include locking means. For example, these locking means may include a retaining pin 48, as shown in figure 2. The retaining pin 48 is preferably inserted into pin holes 52 and 54, provided in the support member 26 and the first part 32 of the ball bearing 30, respectively.

In a preferred embodiment, the steering column 8 is received in a first bore 44 of the support member 26 to position the lower portion 18 of the steering column inside of the support member. The support member 26 also has a second bore 46 receiving the shaft 34 of the ball bearing 30. In this manner, the shaft 34 extends in both the second bore 46 and the transverse cavity 42 of the lower portion 18 of the steering column 8, thereby attaching the support member 26 to the lower portion 18 of the steering column 8. The bearing assembly 16 is therefore used to hold the ski 10 on the steering column 8, eliminating the need for additional components to the assembly 6.

Referring to figures 3 and 4, the present invention also provides a snowmobile 50 having two lateral steering columns 8, each provided with a front ski assembly 6 as described above. In a first embodiment shown in figure 3, the two wheels 14 are disposed inside the snowmobile 50, facing toward the other steering column 8. In a second embodiment, shown in figure 4, the wheels 14 are disposed outside, facing away from the other steering column 8. Either embodiment may be appropriate, depending on a particular snowmobile design and wheel size. For example, tests showed that for most popular snowmobile models wheels having 5 to 6 inches in diameter are more stable when mounted

on the inside, and wheel of 6 inches and higher are preferably mounted on the outside.

In accordance with an embodiment of the present invention, there is also provided a wheel assembly kit to allow a snowmobile manufacturer, reseller or user to provide a wheel on a front ski of a snowmobile. The front ski to be so equipped has a runner shoe fixed to its bottom surface, and a slit is made in the front ski along its longitudinal direction, beside the lower portion of the steering column. The wheel assembly includes two main elements which are shown in Figure 2. These elements are a disk-shaped rigid wheel 14, sized for partial extension through the slit, and a bearing assembly 16, for rotationally mounting the wheel on the lower portion of the steering column, in a position where the wheel partially extends through the slit and projects from the bottom surface of the ski beyond the projecting distance of the runner shoe. As mentioned above with respect to the installed front ski assembly, the wheel is preferably made of metal. The bearing assembly may comprise the above described ball bearing having a first and a second part rotatable with respect to each other, the first part being provided with a shaft and the wheel being mountable onto the second part. The ball bearing may for example be 3205 2RS bearing. Fasteners, as shown in Figure 2, may also be included for securing the first part to the lower portion of the steering column. These fasteners preferably include a nut and a washer to be fixed to the free extremity of the shaft, and a locking pin as previously described.

It may be particularly advantageous to provide different wheel assembly kits adapted for different types of snowmobiles. For example, wheels of different diameters may be offered, depending on the snowmobile size and the type of steering column.

The advantages of the present invention are numerous. Since the wheel is disk-shaped and permanently mounted on the front ski, it does not interfere with the normal operation of the snowmobile while still being readily accessible when needed, without the necessity for the user to stop his vehicle to install a different device when he encounters a hard surface. The positioning of the wheel

allows a good control of the snowmobile when circulating on asphalt or ice. It is therefore easier to cross roads, stop at intersections when necessary, drive to a gas station or storage facilities, etc. In addition, the life time of the runner shoes under the skis is improved since they are not damaged by hard surfaces.

5 Of course, numerous modifications could be made to the preferred embodiments disclosed hereinabove without departing from the scope of the invention as defined in the appended claims.

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WHAT IS CLAIMED IS:

1. A front ski assembly for a snowmobile having a front steering column, the front ski assembly comprising:

5 - a ski attached to a lower portion of the steering column and having a slit therein extending along a longitudinal direction of the ski and beside the lower portion of the steering column;

 - a runner shoe fixed to a bottom surface of the ski and projecting therefrom at a projecting distance;

10 - a disk-shaped rigid wheel sized for partial extension through the slit; and
 - a bearing assembly rotationally mounting the wheel on the lower portion of the steering column in a position where the wheel partially extends through the slit and projects from the bottom surface of the ski beyond the projecting distance of the runner shoe.

15 2. The front ski assembly according to claim 1, wherein the ski has a support member fixed on a top surface thereof, the support member being attached to the lower portion of the steering column by the bearing assembly.

20 3. The front ski assembly according to claim 1, wherein the disk-shaped rigid wheel is made of metal.

 4. The front ski assembly according to claim 1, wherein the bearing assembly comprises:

25 - a ball bearing having a first part provided with a shaft and a second part rotatable with respect to the first part;

 - fasteners securing the shaft of the first part of the ball bearing to the lower portion of the steering column, and

30 wherein the disk-shaped rigid wheel is mounted onto the second part of the ball bearing.

5. The front ski assembly according to claim 4, wherein the fasteners include locking means for preventing a rotation of the first part of the bearing assembly with respect to the lower portion of the steering column when the bearing assembly mounts the wheel thereon.

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6. The front ski assembly according to claim 5, where the lower portion of the steering column has a transverse cavity therein, the shaft of the first part of the ball bearing extending into said transverse cavity.

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7. The front ski assembly according to claim 6, wherein the ski has a support member fixed on a top surface thereof, the support member having a first bore receiving the steering column to position the lower portion thereof inside the support member, the support member further having a second bore receiving the shaft of the ball bearing which also extends into the transverse cavity of the lower portion of the steering column, thereby attaching the ski to said lower portion of the steering column.

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8. The front ski assembly according to claim 7, wherein the locking means comprises a retaining pin inserted into pin holes provided in the support member and the first part of the ball bearing, respectively.

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9. The front ski assembly according to claim 8, wherein the disk-shaped rigid wheel is made of metal.

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10. A snowmobile having two lateral steering columns projecting from a front part thereof, each steering column having a lower portion provided with a front ski assembly according to claim 1.

11. The snowmobile according to claim 10, wherein the disk-shaped rigid wheel of each front ski assembly is mounted on a side of the respective steering column facing toward the other steering column.

12. The snowmobile according to claim 10, wherein the disk-shaped rigid wheel of each front ski assembly is mounted on a side of the respective steering column facing away from the other steering column.

5 13. A wheel assembly kit for installation onto a front ski of a snowmobile, the ski being attached to a lower portion of a steering column of the snowmobile, the ski having a slit therein extending along a longitudinal direction of the ski and beside the lower portion of the steering column, a runner shoe being fixed to a bottom surface of the ski and projecting therefrom at a projecting distance, the
10 wheel assembly kit comprising:

- a disk-shaped rigid wheel sized for partial extension through the slit; and
- a bearing assembly for rotationally mounting the wheel on the lower portion of the steering column in a position where the wheel partially extends through the slit and projects from the bottom surface of the ski beyond the
15 projecting distance of the runner shoe.

14. The wheel assembly kit according to claim 13, wherein the disk-shaped rigid wheel is made of metal.

20 15. The wheel assembly kit according to claim 13, wherein the bearing assembly comprises:

- a ball bearing having a first part provided with a shaft and a second part rotatable with respect to the first part; and
- fasteners for securing the shaft of the first part of the ball bearing to the
25 lower portion of the steering column, and

wherein the disk-shaped rigid wheel is mountable onto the second part of the ball bearing.

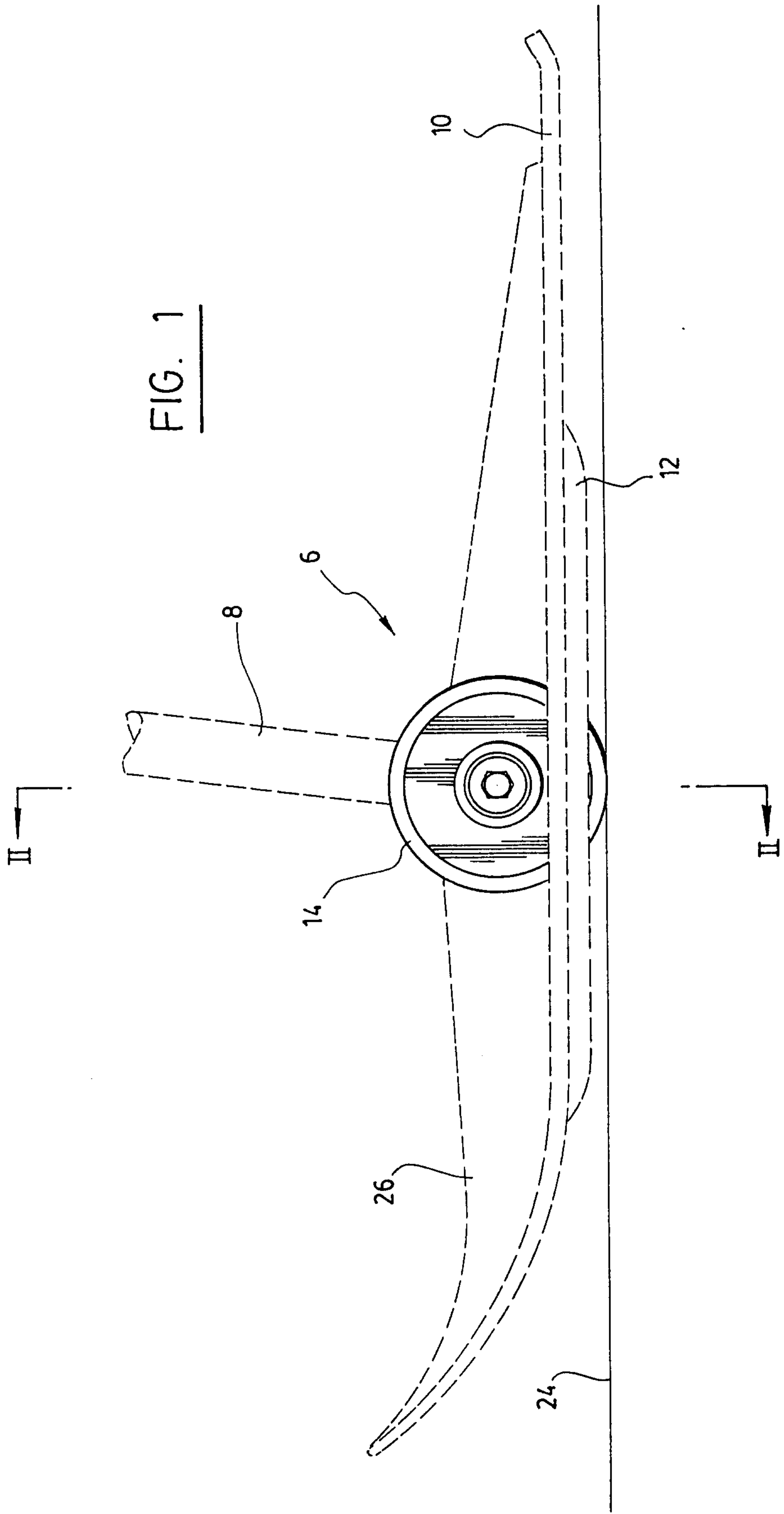
30 16. The wheel assembly kit according to claim 15, where the ski has a support member fixed on a top surface thereof, the support member having a first bore for receiving the steering column to position the lower portion thereof inside the

support member, the support member further having a second bore receiving the shaft of the ball bearing which also extends into a transverse cavity of the support member in addition to extending into the transverse cavity of the lower portion of the steering column, wherein:

- 5 - the fasteners include a nut, a washer, and locking means for preventing a rotation of the first part of the bearing assembly with respect to the lower portion of the steering column when the bearing assembly mounts the wheel thereon; and
- 10 - the shaft of the first part of the ball bearing has a free extremity opposed to the second part of the ball bearing, said free extremity being threaded so that the shaft is secured to the lower portion of the steering column, by screwing the nut on the free extremity of the shaft as the washer stands between the nut and support member.

15 17. The wheel assembly kit according to claim 16, wherein the locking means includes a retaining pin insertable into pin holes made in the support member and the first part of the ball bearing respectively.

20 18. The wheel assembly kit according to claim 17, wherein the disk-shaped rigid wheel is made of metal.



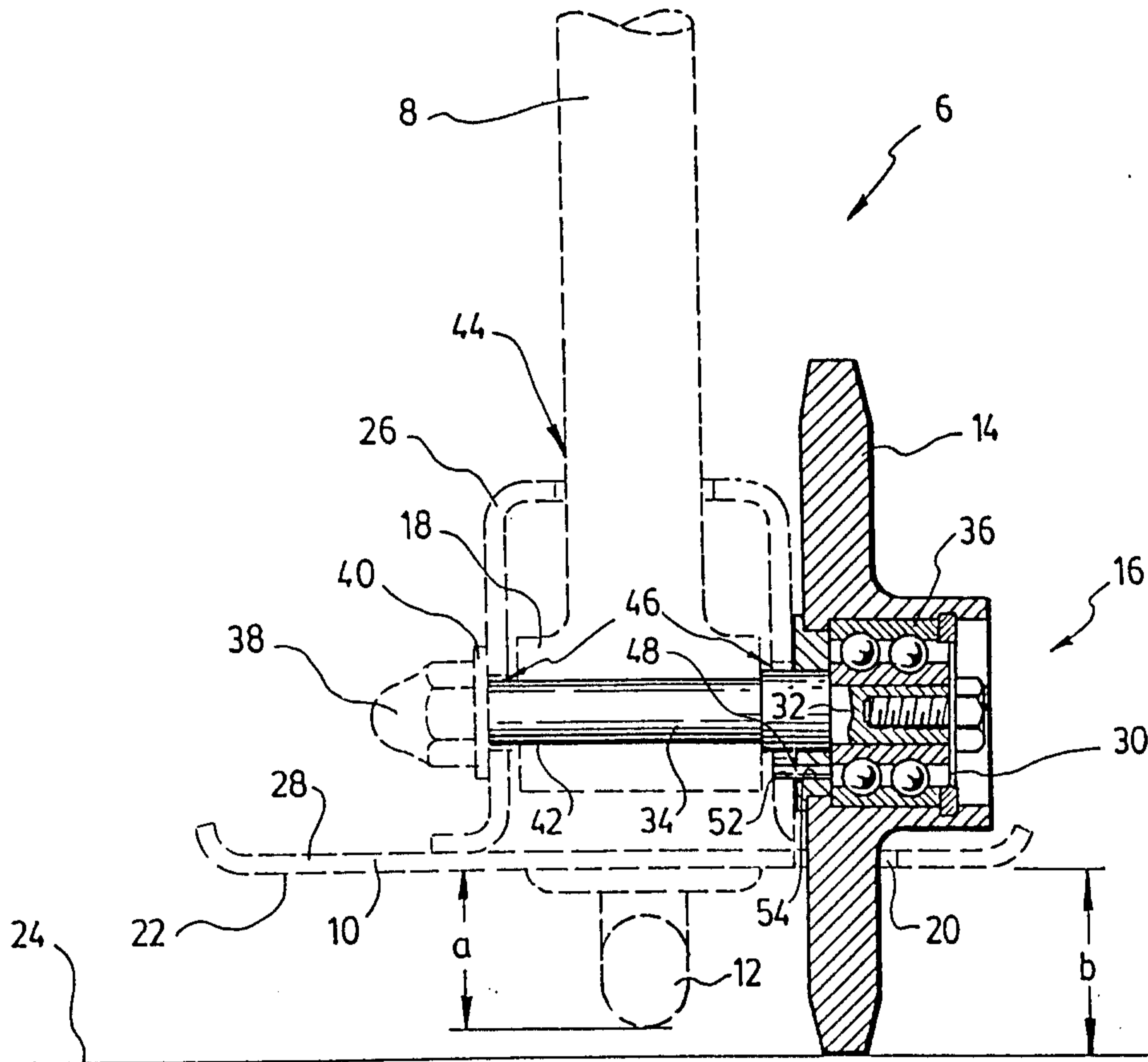


FIG. 2

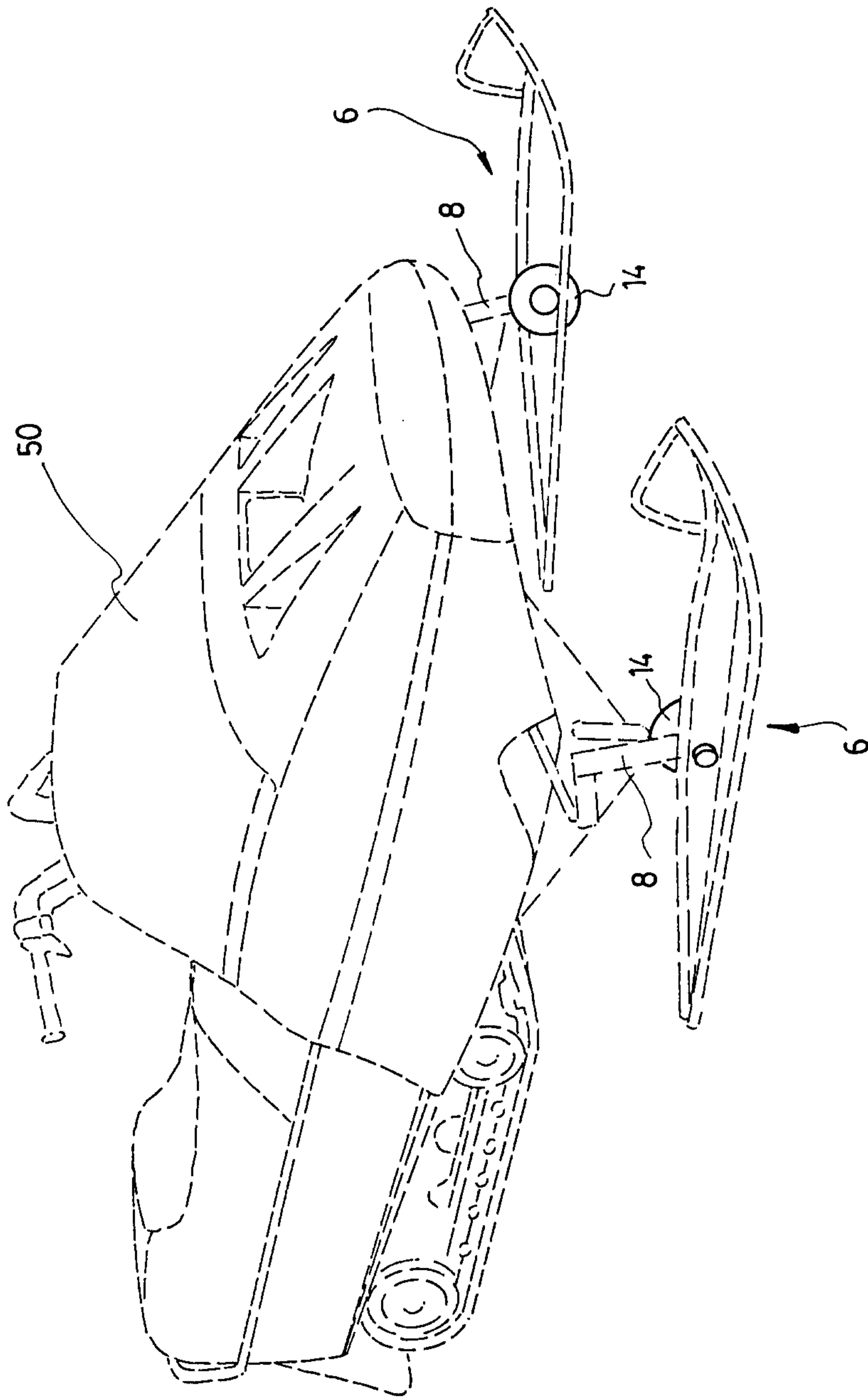


FIG. 3

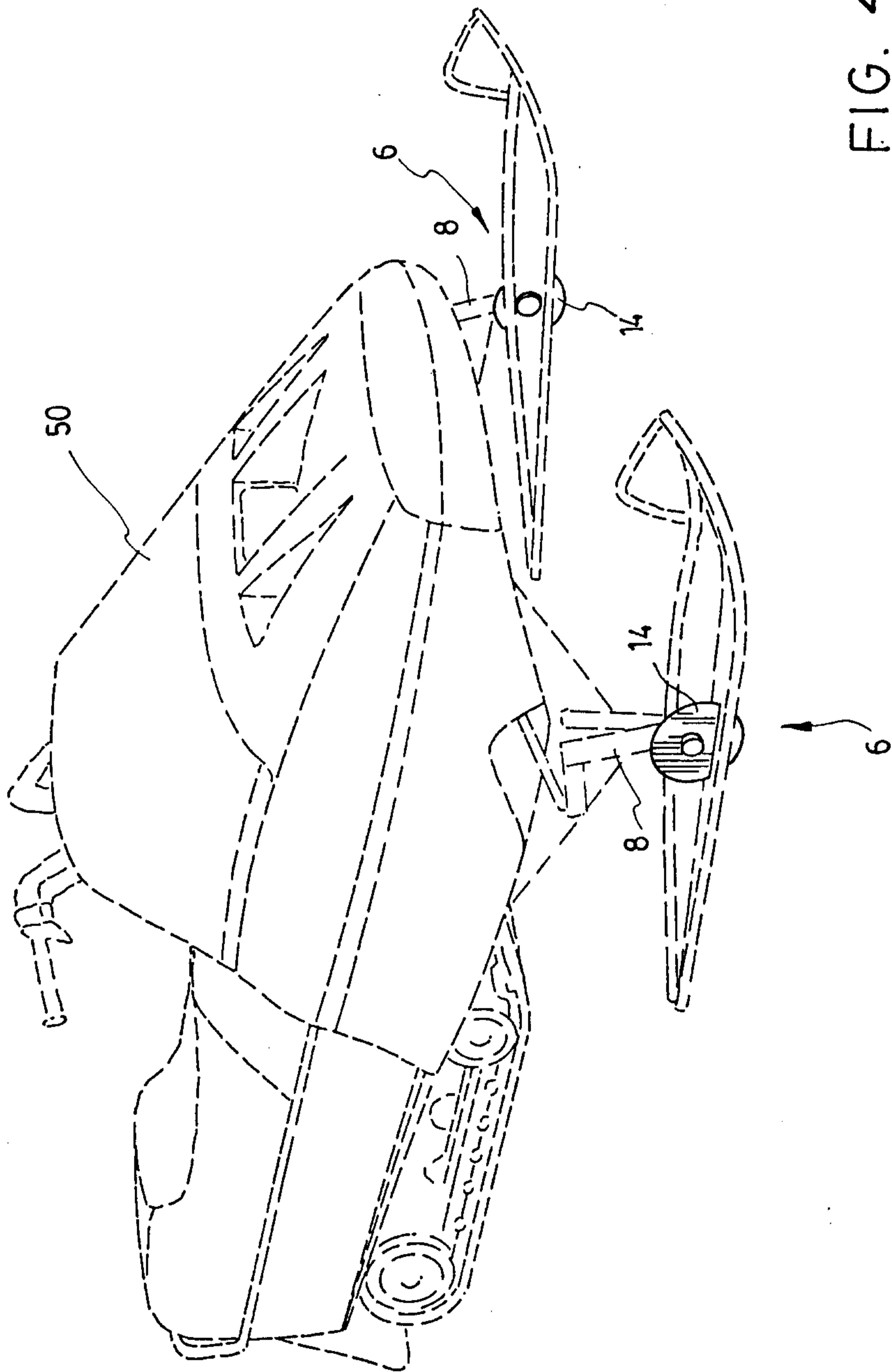


FIG. 4

