

BRAKING AND STEERING LOAD-CARRYING ASSEMBLIES**Field of the Invention**

G00002

The present invention relates to improvements in hand-propelled, moveable load-carrying assemblies and refers particularly, but not exclusively to a steerable,
5 movable, load-carrying assembly.

Definitions

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Throughout this specification reference will be made to a stroller, pusher or push-chair for babies, invalids and the like. It should be understood that such preferred embodiments are given by way of example only and the invention is not
10 to be considered to be limited to such usage. Indeed, the present invention will be suitable for use in any assembly intended to be propelled by human effort rather than motive power including, for example, trolleys, carts, shopping trolleys, wheel barrows, prams, toy prams, trailers, caravans, boat trailers, wheeled jacks for vehicles, wheel chairs, gurnies, hospital beds, hospital stretchers mounted on a
15 wheeled base, work platforms, library trolleys, and other similar articles having a number of wheels and/or castors.

Throughout this specification, reference to a wheel or wheels is to be taken as including a reference to a castor or castors, or a wheel acting as a castor.

Furthermore, throughout this specification reference to a chassis is to be
20 taken as including reference to a framework.

Background of the invention

In accordance with the prior art, hand-propelled moveable assemblies can be said to be one of three forms:

(i) a first where all wheels are fixed and not in any way steerable (for
25 example, traditional forms of strollers);

(ii) a second (for example, child strollers and the like) having the rear wheels fixed, whilst the front wheel or wheels are swivelable; or

(iii) a third where all wheels are separately swivelable (for example, supermarket trolleys).

5 In practice it has been found that each of the three forms exhibit a number of advantages which make them suited to certain uses, but suffer from disadvantages which limit their suitability for all uses.

When all wheels are fixed (the first form), one advantage is that the wheels can be quite large in diameter, thus allowing the assembly to more easily traverse
10 uneven terrain. It has also been found that fixed wheel assemblies may traverse a slope or undulating ground without there being excessive exertion by the operator to keep the assembly in the desired direction other than when a change in direction is required. Such fixed wheel assemblies suffer from the disadvantage that it is difficult to change direction.

15 The second form of assembly is that with fixed rear wheels and a swivelable front wheel or wheels. Such assemblies have the advantages of being more easily manoeuvrable, in terms of both space and effort. In this form of assembly, the swivelable front wheel or wheels are normally castors, or operate as castor wheels. In consequence, in an assembly with a single front wheel for
20 example, the wheel will tend to follow the terrain, often making it extremely difficult for the operator to maintain control, especially when the assembly is traversing a sloping surface.

Assemblies with all wheels separately swivelable - the third form - have the advantages of being: very manoeuvrable; able to turn within their own length; and
25 able to be used equally well and efficiently when pushed and/or pulled in either direction. Such assemblies have therefore been found to be specially suited for use as shopping trolleys, baby strollers and the like.

Such assemblies also exhibit a number of disadvantages. Firstly, such

assemblies are best suited for use on horizontal, flat surfaces, since it is difficult to maintain control when moving such an assembly across a slope. As all swivel wheels are castor wheel sets, all may operate independently, especially when uneven surfaces are being traversed.

- 5 Problems also arise when it is necessary to provide braking means for each of the three forms of moveable assemblies.

Referring particularly to assemblies of the type having three wheels - two rear wheels and a single front wheel, in the first form where all wheels are non-steerable, a braking system may be provided on the rear wheels and in some
10 instances a brake is provided on the front wheel. The brake on the front wheel is typically connected to the handle of the assembly via a cable and operated in the same manner as a brake on a conventional push bike. The rear wheel brakes are generally used as the parking device and the hand brake is used only to slow down the assembly if it is moving too quickly down an incline for example. The
15 inclusion of a hand brake and the ability for a person to jog with the assembly are desirable features of this arrangement yet the non-steerable arrangement of the wheel makes the assembly difficult to manoeuvre.

An alternate form of a three wheel assembly is one in which the front wheel is a castor wheel. The rear wheels are braked in the same manner as the non-
20 steerable version above, but the front wheel is not braked, as it has to be able to rotate 360°, and it is not possible using a conventional push bike brake and cable to brake the castor wheel. However, this arrangement has the advantage that the assembly is more manoeuvrable than the non-steerable counterpart. The disadvantages are that the assembly is not suited to jogging as the front wheel
25 tends to follow the terrain and is difficult to control. Further, while the assembly is more manoeuvrable, a wide berth is required to turn a corner since the assembly pivots around the inside rear wheel and the turn cannot be commenced until the rear wheels have reached the corner.

It is therefore an object of the invention to at least in part alleviate one or
30 more of the above disadvantageous features. In this regard, the disclosure of

International patent publications WO99/19198 and WO99/43531 are incorporated herein by reference.

International patent publication WO99/19198 describes a steerable load carrying assembly wherein the means are included to provide three distinct modes of operation for a set of wheels, the modes corresponding to straight-line travel, fully steerable travel, and a braking mode.

International patent publication WO99/43531 describes a steering system for a vehicle having a plurality of wheels in which each wheel is attached to the vehicle via a separate axle. Each axle cooperates with driven means such that rotation of one axle about its longitudinal axis causes all other axles to also rotate about their longitudinal axes.

Summary of the Invention

In a first aspect, the invention provides a moveable load carrying assembly including a chassis having a first end and a second end, there being provided one or more wheels at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis, wherein braking means are provided to act on at least one of the front wheel or wheels in order to brake the front wheel or wheels and wherein the braking means is arranged to enable the front wheel or wheels to be braked in any swivelled position relative to the chassis.

Advantageously, the assembly includes a single front wheel.

Preferably, the front wheel is attached to the chassis via a hollow shaft. Preferably the hollow shaft is substantially vertically arranged with respect to the chassis and adapted to rotate about its longitudinal axis when the front wheel swivels.

Advantageously, the braking means is provided coaxially with the hollow shaft and is arranged to rotate with the hollow shaft as the front wheel swivels.

The braking means preferably include a lever assembly actuated by a brake cable. The brake cable is preferably manually controlled by a hand lever.

Activation of the brake cable advantageously causes the lever assembly to push downwardly on a push-rod extending coaxially with the hollow shaft. The push-rod in turn preferably pushes plate means adapted to selectively contact the front wheel and thereby brake the front wheel.

Alternatively, the means to act on the front wheel may include a hollow shaft through which a brake cable extends. The brake cable is preferably connected at one end to a manually operable hand lever and extends through the hollow shaft. The brake cable is preferably connected at its other end to a pair of opposed brake arms. The brake arms are adapted to pivot, when pulled by the brake cable, such that the brake arms grip opposite sides of the front wheel in order to brake the front wheel.

In a second aspect, the invention provides a moveable load carrying assembly including a chassis having a first end and a second end, there being provided one wheel at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis, wherein means are provided to switch the front wheel between a first steering mode in which the front wheel is swivelable relative to the chassis, and a second steering mode in which the front wheel is fixed in a straight-ahead direction relative to the chassis, and wherein the switch between steering modes occurs independently of the rear wheel or wheels.

Preferably, the front wheel is attached to the chassis via a hollow shaft. Preferably the hollow shaft is substantially vertically arranged relative to the chassis and adapted to rotate about its longitudinal axis when the front wheel swivels.

Advantageously, the assembly further includes a horizontally disposed pulley which is rotatable relative to the chassis. The pulley is preferably formed with at least one notch in the perimeter thereof. The notch is advantageously

located at the front and centre of the pulley when the assembly is directed in a straight-ahead direction.

Rotation of the pulley is advantageously effected by a pair of steering cables operably connected to the mounting of the rear wheel or wheels, such that swivelling of the rear wheel or wheels causes the pulley to rotate. In the same fashion, rotation of the pulley causes movement of the steering cables which in turn cause swivel movement of the rear wheel or wheels.

Advantageously, there is further provided in association with the front wheel, a locking means. The locking means preferably is in the form of a tab operably connected to and pivotable in relation to the hollow shaft. The tab preferably pivots in a vertical direction between a lowered position and a raised position, so as to switch the front wheel between steering modes.

The tab advantageously includes a projection on its upper surface. When the tab is in its lowered position, the front wheel is free to rotate relative to the chassis and acts as a castor.

When the tab is raised, the projection is adapted to engage the notch of the pulley. With the tab in the raised position, steering of the front wheel and rear wheel or wheels occurs in unison. That is, if the rear wheel or wheels are in a steerable mode, the front wheel swivels according to how the rear wheel or wheels swivel and vice versa. When the rear wheel or wheels are fixed in a straight-ahead direction, the front wheel is also fixed in a straight-ahead direction.

In a third aspect, the invention provides a moveable load-carrying assembly including a chassis having a first end and a second end, there being provided one wheel at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis; wherein a lever means is provided to act on at least one of the wheel or wheels at the second end of the chassis to set the assembly in at least three distinct modes of operation, the three modes including: straight-line travel such that none of the plurality of wheels are steerable (either forward or in reverse) but

all remain rotatable, fully-steerable travel in which all the plurality of wheels are steerable (either forward or in reverse) and rotatable, and a braking mode to prevent rotation of at least one of the second set of wheels.

In a fourth aspect, the invention provides a moveable load-carrying
5 assembly having a plurality of spaced-apart wheels arranged as one front wheel and a rear pair of wheels, each wheel being attached to the vehicle by means of an axle, there being a separate axle for each wheel, each axle having a longitudinal axis; the arrangement being such that rotation of one axle about its longitudinal axis will cause the wheel mounted thereon to change direction relative
10 to the vehicle, each axle having attached thereto a driven means, each driven means being adapted to be driven by a drive means such that rotation of one axle about its longitudinal axis relative to the vehicle causes the driven means of that axle to drive the drive means to cause all other axles to also rotate about their longitudinal axis with the rotation of the axles of the front wheel or wheels being in
15 the one direction and the rotation of each of the axles of the rear pair of wheels being in the opposite direction.

It will be appreciated that the invention extends to a vehicle incorporating any two or more of the above aspects of the invention.

Brief Description of the Drawings

20 The Invention will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a top perspective view of a three-wheeled stroller according to an embodiment of the invention;

Figure 2 is an enlarged view of the front part of the stroller of Figure 1,
25 showing the front wheel and its mounting;

Figure 3 is a central vertical sectional view of the front part of the stroller of Figure 1 showing the front brake not actuated;

Figure 4 is a view similar to Figure 3 but with the front brake actuated;

Figure 5 is a partially sectioned plan view of the front part of the stroller of Figure 1 showing the front wheel mounting;

Figure 6 is a diagrammatic sketch of an alternate form of braking the front wheel of an assembly according to an embodiment of the invention;

Figure 7 is a diagrammatic view of a rear part of the stroller of Figure 1 showing a rear wheel mounting;

Figure 8 is a view similar to that of Figure 7 in which the rear wheel is being steered; and

Figure 9 is a sectional side view of the rear wheel mounting of Figure 7 showing the movement of the foot pedal.

Description of Preferred Embodiments

Referring to Figure 1 there is illustrated a moveable load-carrying assembly in the form of a three-wheeled stroller 10 also known as a jogger because of its suitability for use when jogging. The stroller 10 can be divided into two operational zones for clarity: a front part 20 which includes the front wheel and front wheel mounting and a rear part 40 which includes each of the rear wheels, the rear wheel mounting and a foot pedal. The features of the front and rear parts will be discussed in detail in the following description.

Stroller 10 includes chassis or framework 12 which serves to support a baby or child carrying seat 14. At the rear end of the framework 12 a handle 14 is provided to assist in controlling and steering the stroller 10. At the lower ends of the stroller 10, a set of three wheels are provided in contact with the ground or a supporting surface. The wheel set is made up of a pair of rear wheels 16 and a single front wheel 18. In this embodiment, front wheel 19 is a castor wheel i.e. the front wheel is free to swivel about 360°. The rear wheels 16 are mounted at either end of a crossbar 17 of the framework 12. As will be described in more detail

below, each of the rear wheels 16 is mounted for swivel movement relative to the framework 12 but they do not act as castor wheels.

Referring to Figure 2 which is an enlarged view of the front part 20 of the stroller 10, the mounting of front wheel 18 is illustrated. Front wheel 18 includes a
5 tyre 19, rim 21, spokes 22, and a hub 23.

The hub 23 of the front wheel 18 is rotatably connected to front fork 24, which in turn is attached to hollow cylindrical vertical housing 25. The housing 25 contains a hollow vertical shaft 26 which in turn coaxially houses slidable vertical push-rod 27 for a purpose to be described shortly.

10 Housing 25 is free to rotate relative to the shaft 26 and is mounted to the framework 12 in bearings 28 and bearing housing 29.

The shaft 26 includes at its upper end an outwardly extending flange 30 which rests on top of the housing 25. Push-rod 27 is moveable upwardly and downwardly within shaft 26. Movement of the push-rod 27 is controlled by a lever
15 assembly at the upper end of the push-rod 27, the assembly including pivot plate 31 and fixed plate 32. Fixed plate 32 is attached to the bearing housing 29. One end of the pivot plate 31 is hingedly mounted to fixed plate 32 at pivot point 33. The opposite end of the pivot plate 31 is connected to brake cable 34. Movement of plate 31 about pivot 33 is controlled by actuation of the brake cable 34 as will
20 be described below.

Downward movement of the push-rod 27 brings the push-rod 27 into contact with the brake assembly 35 in the form of a fixed plate 36 and a pivot plate
37. The lower portion of the pin 27 passes through the upper fixed plate 36 and is in contact with the lower pivot plate 37. As the push-rod 27 moves downwardly,
25 pivot plate 37 pivots about pivot connection 38 until it contacts the tyre 19 of the front wheel 18, thereby acting as a brake. The pivot connection 38 includes a return spring 39 such that the push-rod 27 is biased to its upward, non-braking position.

Brake cable 34, as described above, is connected at one end to pivot plate 31. At its other end, brake cable 34 is connected to a hand-lever 44 mounted on the handle 14 of the stroller 10. Therefore, in order to apply a brake to the front wheel 18, hand-lever 44 is operated to retract the brake cable, thereby causing
5 pivot plate 31 to push downwardly onto the upper end of push-rod 27. The push-rod 27 is pushed downwardly onto pivot plate 37 which brakes the front wheel. As shown in Figure 4, plate 37 is pushed downwardly into contact with the tyre of the front wheel 18 thereby braking the front wheel. The degree of braking required is controlled, to some extent, by operation of the hand lever in a similar manner to
10 the handle mounted brake levers of pushbikes.

It will be appreciated that the front wheel 18 can be braked regardless of which direction the front wheel is facing. This is due to the axial mounting of the front brake, allowing the brake assembly 35 to rotate with swivel movement of the front wheel 18, and the central location of the brake cable 34 relative to the
15 framework 12 as shown in Figure 5.

Figure 6 illustrates an alternate form of front wheel braking in accordance with a modified embodiment of the invention. In this embodiment, front wheel 18' is connected to framework 12' via front fork 24' which in turn is connected to hollow housing 25' and shaft 26' in a similar fashion to the embodiment of Figures
20 1-4. Brake cable 34' passes over a guide pulley above the hollow shaft 26', through the hollow shaft 26' and is attached to a pair of opposed brake arms 41. Each of the brake arms 41 is provided with a brake pad 42. The brake cable 34' is connected at its other end to a hand lever 44 mounted on the handle 14 of the stroller 10 such that operation of the hand lever 44 serves to retract the brake
25 cable 34' which in turn serves to pivot each of the brake arms 41 until the respective brake pads 42 contact or grip the rim 21' of the front wheel 18'. The degree of braking is determined by how firmly the brake pads 42 grip the rim 21'.

Returning to Figures 2 to 5, there is illustrated means by which the front wheel 18 may be manually switched between a steering mode in which the wheel
30 18 acts as a castor wheel and a steering mode in which the front wheel 18 is swivelable relative to the framework in unison with the swivelling of the rear

wheels 16.

The means to switch the front wheel 18 between steering modes takes the form of a tab 50, located above the front fork 24 at the front end 20 of the stroller 10. The tab 50 is connected to the hollow housing 25 and is pivotable relative thereto between an upper position shown in Figure 3 and a lower position shown in Figure 4.

The tab 50 is provided on its upper surface with a projection 52 in the form of a cylindrical pin. Projection 52 extends generally perpendicularly to the upper surface of the tab 50.

10 Located above tab 50 is a horizontally disposed pulley 54. Pulley 54 includes a central aperture 55 through which the hollow housing 25 passes such that the pulley 54 is rotatably mounted to the housing 25. Pulley 54 is supported by an annular flange 56 formed on the lower portion of the housing 25.

As best illustrated in Figure 2, pulley 54 is provided with a notch 56 formed in the perimeter of the pulley 54. The notch 56 is formed in the front and centre portion of the pulley 54 when the stroller 10 is facing in a straight-ahead direction. Notch 56 is sized and shaped to receive projection 52 of the tab 50 when the tab 50 is moved to its upper position.

When tab 50 is in its lowered position as shown in Figure 4, wheel 18 is free to swivel about 360° relative to the chassis 12, effectively acting as a castor wheel. This is the first mode of steering of the front wheel 18.

In order to switch the front wheel to its second steering mode, tab 50 is lifted either by hand or foot, so that projection 52 engages notch 56 of the pulley 54. Swivel movement of the front wheel 18 thereafter causes rotation of the pulley 54, and vice versa - rotation of the pulley 54 causes swivel movement of the front wheel 18.

Rotation of the pulley 54 is also effected by movement of steering cables

60,61. It follows that rotation of the pulley 54 caused by swivel movement of the front wheel 18, causes corresponding movement of the steering cables 60, 61. Each steering cable 60, 61 is attached at one end to the pulley 54, one either side of notch 56. Movement of either one of the steering cables 60, 61 backwards i.e. away from the front end of the stroller 10, causes the pulley 54 to rotate towards that cable and vice versa. The steering cables 60, 61 are connected at their opposite ends to each of the rear wheel mountings respectively, as will be discussed in further detail below.

Referring to Figures 7 and 8 in conjunction with Figure 5, the relationship between the steering cables 60, 61, the pulley 54, and the rear wheels 18 will now be discussed.

Mounted at or in the vicinity of each end of the crossbar 17 are rear wheel assemblies 70. Each of the wheel assemblies 70 is made up of a wheel 16 and a stub axle 71 on which the wheel 16 is mounted for rotation. The stub axle is mounted to a pivotable assembly including mounting 72, arm 73, and sector 74, with the use of brushings or bearings of an appropriate type. Arm 73 is pivotable connected at one end thereof to the mounting 72 such that the arm 73 can pivot in the vertical direction relative to the mounting 72. The other end of arm 73 is connected to foot pedal 65 via connection 73. Foot pedal 65 extends between each of the rear wheel assemblies 70 and assists in switching the rear wheels between steering modes as it is raised and lowered, as discussed below.

The mounting 72 is connected to sector 74 which pivots relative to the framework 12 about pivot 75. Pivot point 75 acts as the pivot of the pivot assembly as a whole and is the point about which the rear wheel 16 swivels. .

The steering cables 60, 61 are connected to each of the sectors 74 at the curved side of the sector as illustrated. The connection is via a notch or any other suitable connection means. The steering cables 60, 61 run from each of the sectors 74 at the rear of the stroller 10, towards the front end of the stroller 10 where it is connected to the pulley 54 at either side of the notch 56.

Referring particularly to Figure 8, it can be seen that swivelling of one of the rear wheels 16 automatically causes the other rear wheel to move accordingly by means of the cross-bar 17. Swivel movement of the rear wheels 16 causes corresponding movement of the steering cables 60, 61 and thereby pulley 54. If the front wheel 18 is connected to the pulley 54 via locking tab 50, the front wheel 16 is then caused to swivel in a direction opposite to that of the rear wheels 16.

It will be appreciated that operation of the pulley 54 and steering cables 60, 61 also takes place in reverse. That is, if front wheel 18 is connected to the pulley 54 via tab 50, swivel movement of the front wheel caused the pulley 54 to rotate. The steering cables 60, 61 are moved accordingly and the rear wheels 16 are caused to swivel in unison with the front wheel 18.

Figure 9 illustrates the means by which the rear wheels 16 can be switched between three operating modes. Operation of the device illustrated in Figure 9 is described in detail in International patent application PCT/AU98/00214, the disclosure of which is incorporated herein by reference. Associated with the rear wheel assembly are respective lever members 64, pivotally mounted with respect to each rear wheel 16 and connected by rigid foot pedal 65. Movement of the foot pedal causes each of the lever members 64 to move between three positions, each position corresponding to the three modes of operation:

1. an upper position in which swivelling movement of the rear wheels 16 - and in turn the front wheel 18 - is prevented. In this mode, all wheels 16, 18 are in a position to allow straight ahead motion;
2. a middle position in which all wheels are swivelable, the overall assembly thus being steerable; and
3. a lower position in which the rear wheels 16 are locked against rotation and the assembly as a whole is braked.

It will be appreciated that the assembly incorporating all aspects of the invention can operate in a number of different steering modes as set out below:

- 5
- (a) Rear wheels fixed straight ahead, front wheel acting as a castor: the foot pedal 64 is in its upper position and the tab 50 is in its lowered position;
 - (b) Rear wheels fixed straight ahead, front wheel fixed straight ahead: the foot pedal 64 is in its upper position and the tab 50 is in its upper position; and
 - (c) Rear wheels and front wheel swivelable: the foot pedal 64 is in its middle position and the tab 50 is in its upper position.

10 When the assembly is in either steering mode (b) or (c) above, it will be appreciated that the assembly may traverse a slope or undulating ground without the wheels tending to follow the slope, resulting in the assembly being easy to manoeuvre across inclines.

15 In addition, brake means are provided to brake the rear wheel set and to effectively act as a parking brake. Brake means are also provided to brake the front wheel in any of the above steering modes.

It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

CLAIMS

1. A moveable load carrying assembly including a chassis having a first end and a second end, there being provided one or more wheels at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis, wherein
5 braking means are provided to act on at least one of the front wheel or wheels in order to brake the front wheel or wheels and wherein the braking means is arranged to enable the front wheel or wheels to be braked in any swivelled position relative to the chassis.
- 10 2. A moveable load carrying assembly according to claim 1, wherein the assembly includes a single front wheel.
3. A moveable load carrying assembly according to claim 2, wherein the front wheel is attached to the chassis via a hollow shaft.
4. A moveable load carrying assembly according to claim 3, wherein
15 the hollow shaft is substantially vertically arranged with respect to the chassis and adapted to rotate about its longitudinal axis when the front wheel swivels.
5. A moveable load carrying assembly according to claim 3 or 4, wherein the braking means is provided coaxially with the hollow shaft and is arranged to rotate with the hollow shaft as the front wheel swivels.
- 20 6. A moveable load carrying assembly according to any one of claims 3 to 5, wherein the braking means includes a lever assembly actuated by a brake cable.
7. A moveable load carrying assembly according to claim 6, wherein the brake cable is manually controlled by a hand lever.
- 25 8. A moveable load carrying assembly according to claim 6 or 7, wherein activation of the brake cable causes the lever assembly to push downwardly on a push-rod extending coaxially with the hollow shaft, the push-rod

in turn pushing plate means adapted to selectively contact the front wheel and thereby brake the front wheel.

9. A moveable load carrying assembly according to claim 3 or 4, wherein the braking means includes a brake cable extending coaxially with the hollow shaft, the brake cable being connected at one end to a manually operable hand lever and at its other end to a pair of opposed brake arms.

10. A moveable load carrying assembly according to claim 9, wherein the brake arms are adapted to pivot, when pulled by the brake cable, such that the brake arms grip opposite sides of the front wheel in order to brake the front wheel.

11. A moveable load carrying assembly including a chassis having a first end and a second end, there being provided one wheel at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis, wherein means are provided to switch the front wheel between a first steering mode in which the front wheel is swivelable relative to the chassis, and a second steering mode in which the front wheel is fixed in a straight-ahead direction relative to the chassis, and wherein the switch between steering modes occurs independently of the rear wheel or wheels.

12. A moveable load carrying assembly according to claim 11, wherein the assembly includes a single front wheel.

13. A moveable load carrying assembly according to claim 12, wherein the front wheel is attached to the chassis via a hollow shaft.

14. A moveable load carrying assembly according to claim 13, wherein the hollow shaft is substantially vertically arranged relative to the chassis and adapted to rotate about its longitudinal axis when the front wheel swivels.

15. A moveable load carrying assembly according to any one of claims 11 to 14, wherein the assembly further includes a horizontally disposed pulley

which is rotatable relative to the chassis.

16. A moveable load carrying assembly according to claim 15, wherein the pulley is formed with at least one notch in the perimeter thereof.

17. A moveable load carrying assembly according to claim 16, wherein
5 the notch is located at the front and centre of the pulley when the assembly is directed in a straight-ahead direction.

18. A moveable load carrying assembly according to any one of claims 15 to 17, wherein rotation of the pulley is effected by a pair of steering cables operably connected to the mounting of the rear wheel or wheels, such that
10 swivelling of the rear wheel or wheels causes the pulley to rotate.

19. A moveable load carrying assembly according to any one of claims 15 to 17, wherein rotation of the pulley causes movement of the steering cables which in turn cause swivel movement of the rear wheel or wheels.

20. A moveable load carrying assembly according to any one of claims
15 15 to 19, further including in association with the front wheel, a locking means.

21. A moveable load carrying assembly according to claim 20, wherein the locking means is in the form of a tab operably connected to and pivotable in relation to the hollow shaft.

22. A moveable load carrying assembly according to claim 21, wherein
20 the tab pivots in a vertical direction between a lowered position and a raised position, so as to switch the front wheel between steering modes.

23. A moveable load carrying assembly according to claim 21 or 22, wherein the tab includes a projection on its upper surface.

24. A moveable load carrying assembly according to claim 22, wherein
25 when the tab is in its lowered position, the front wheel is free to rotate relative to the chassis and acts as a castor.

25. A moveable load carrying assembly according to claim 23, wherein when the tab is raised, the projection is adapted to engage the notch of the pulley and steering of the front wheel and rear wheel or wheels occurs in unison.

26. A moveable load-carrying assembly including a chassis having a first
5 end and a second end, there being provided one wheel at or adjacent to the first end of the chassis and one or more wheels at or adjacent to the second end of the chassis, each wheel being swivelable relative to the chassis; wherein a lever means is provided to act on at least one of the wheel or wheels at the second end of the chassis to set the assembly in at least three distinct modes of operation, the
10 three modes including: straight-line travel such that none of the plurality of wheels are steerable (either forward or in reverse) but all remain rotatable, fully-steerable travel in which all the plurality of wheels are steerable (either forward or in reverse) and rotatable, and a braking mode to prevent rotation of at least one of the second set of wheels.

15 27. A moveable load-carrying assembly having a plurality of spaced-apart wheels arranged as one front wheel and a rear pair of wheels, each wheel being attached to the vehicle by means of an axle, there being a separate axle for each wheel, each axle having a longitudinal axis; the arrangement being such that rotation of one axle about its longitudinal axis will cause the wheel mounted
20 thereon to change direction relative to the vehicle, each axle having attached thereto a driven means, each driven means being adapted to be driven by a drive means such that rotation of one axle about its longitudinal axis relative to the vehicle causes the driven means of that axle to drive the drive means to cause all other axles to also rotate about their longitudinal axis with the rotation of the axles
25 of the front wheel or wheels being in the one direction and the rotation of each of the axles of the rear pair of wheels being in the opposite direction.