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(71) Applicant(s):
Fillaball Holdings Ltd
(Incorporated in the United Kingdom)
New Luckhurst Farm, Bethersden Road,
SMARDEN, Kent, TN27 8QT,
United Kingdom

(72) Inventor(s):
Martin Philip Riddiford

(74) Agent and/or Address for Service:
Gallafents LLP
27 Britton Street, LONDON, EC1M 5UD,
United Kingdom

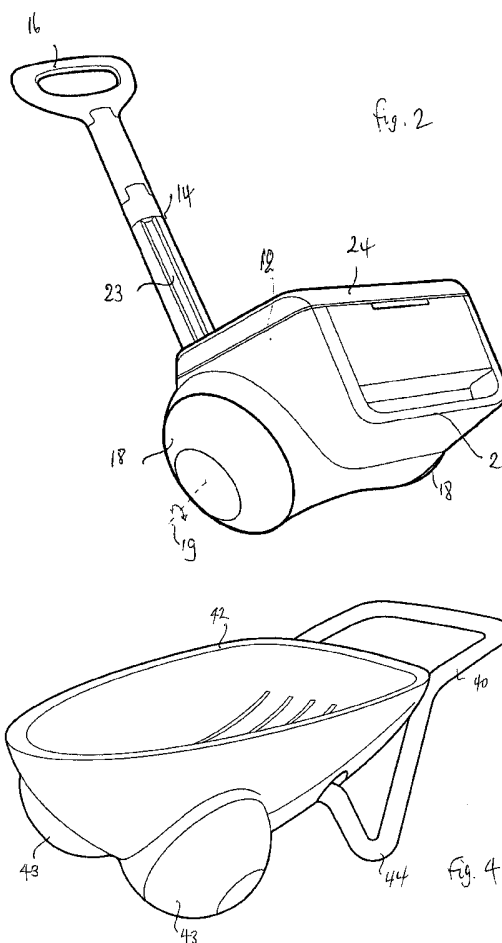
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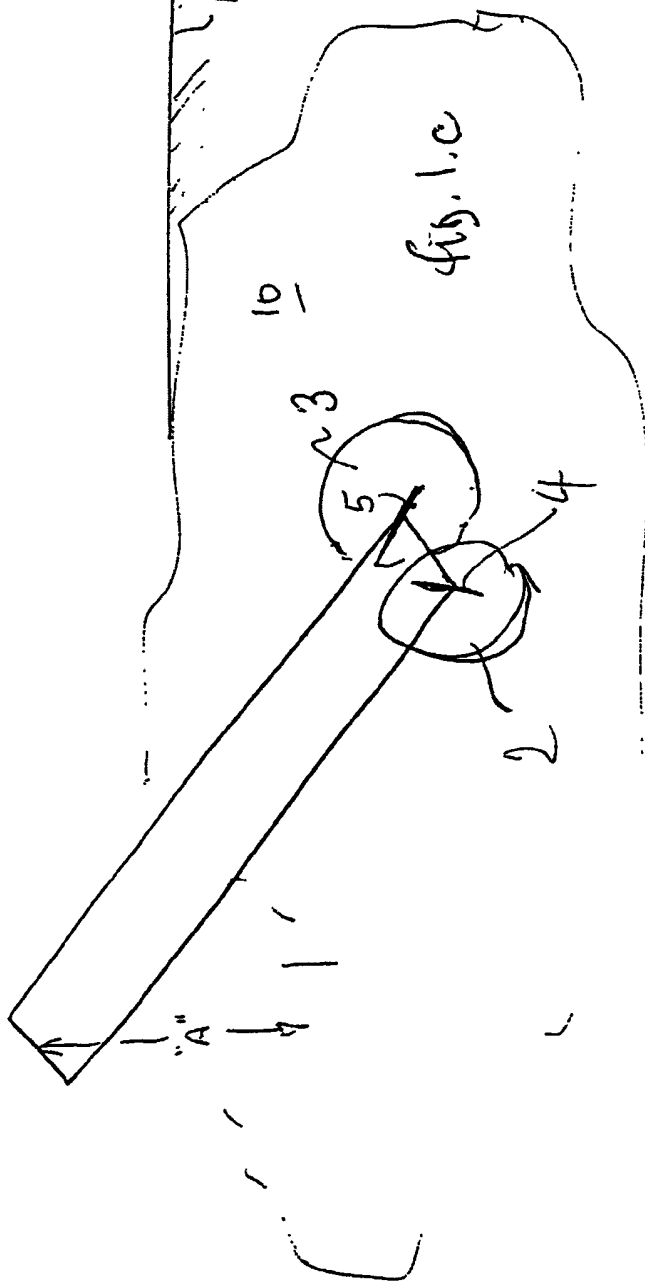
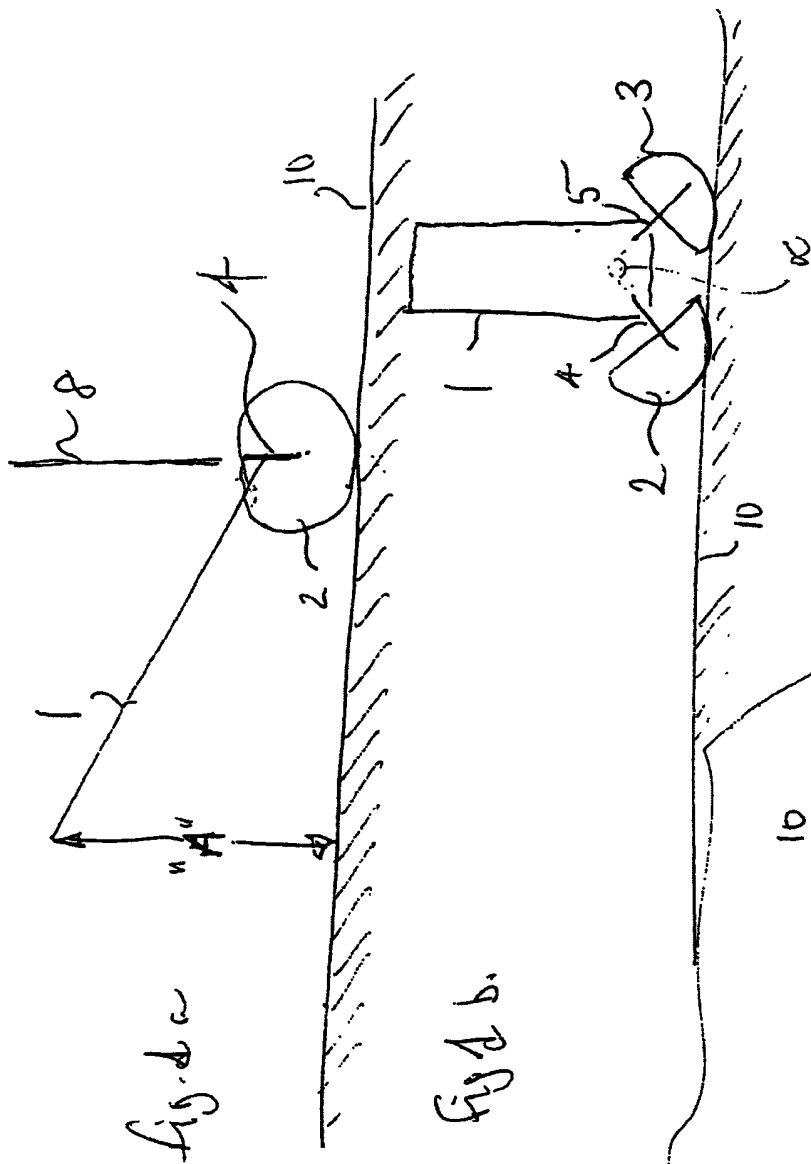
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FR 002823708 A1 **FR 002610586 A1**
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(58) Field of Search:
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Other: **Online: WPI, EPODOC.**

(54) Abstract Title: **Wheeled load-carrying device**

(57) A Two-wheeled cart, trolley, wheelbarrow or like load-carrying apparatus comprises two wheels 18,43 mounted on a frame that rotate about separate axes of rotation 19 such that they are inclined to one another, preferably at an angle between 80° and 100°. The two wheels may have a high-friction exterior surface and are preferably spherical or hemispherical. The wheels and frame are arranged such that when the other end of the frame from the two wheels is at a convenient height for a user to grasp a handle 16,40 mounted thereupon, the axes of rotation of the wheels are in a vertical plane and the cart, trolley, wheelbarrow or like load-carrying apparatus may move freely. In use, if the handle is raised or lowered the wheel axles no longer lie in a vertical plane with the result that the two wheels try to travel in different directions across the ground so as to have a braking effect on the cart, trolley, wheelbarrow or like load-carrying apparatus.





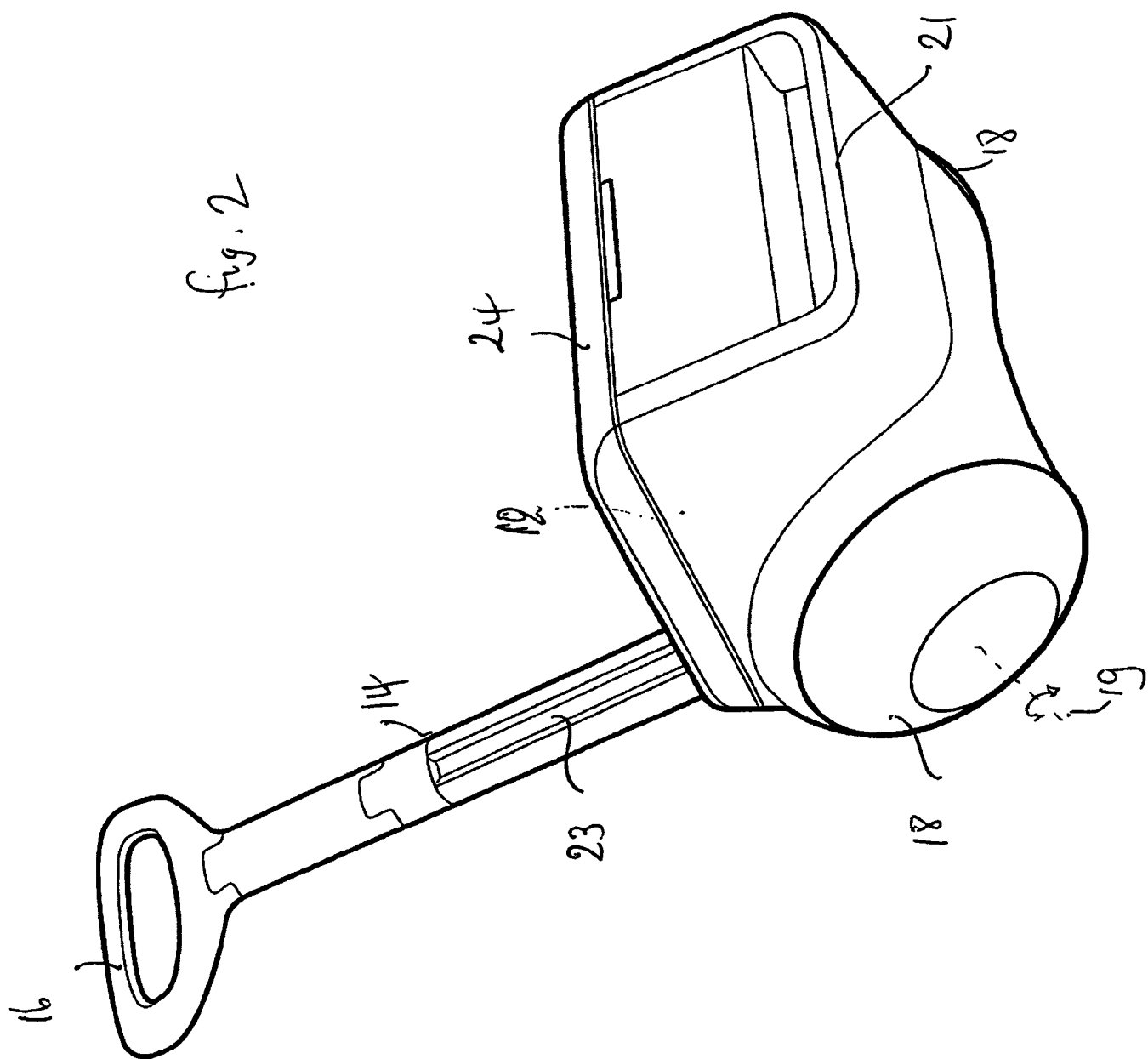


fig. 2

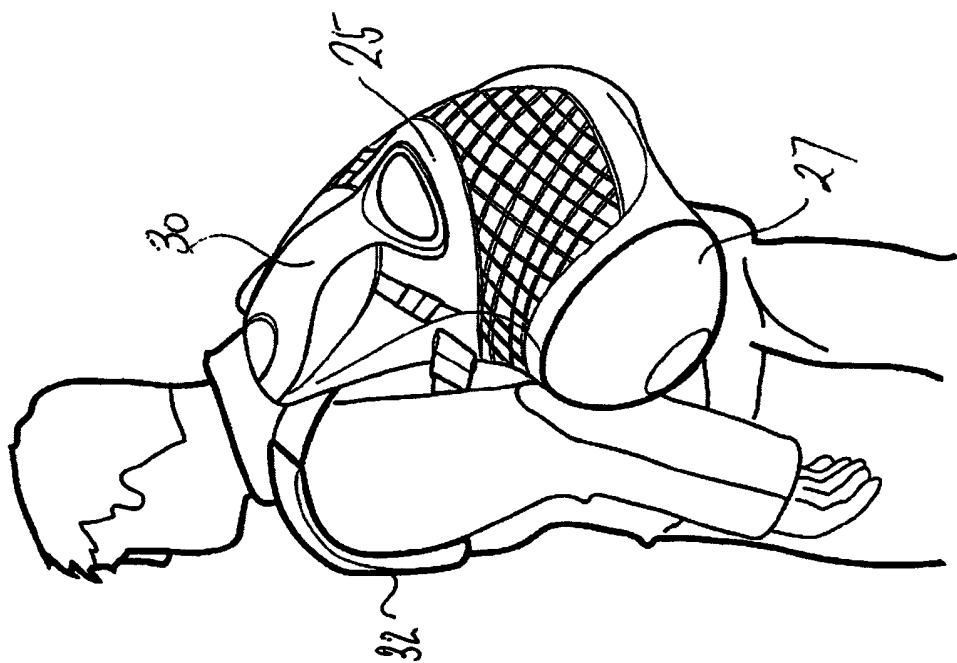
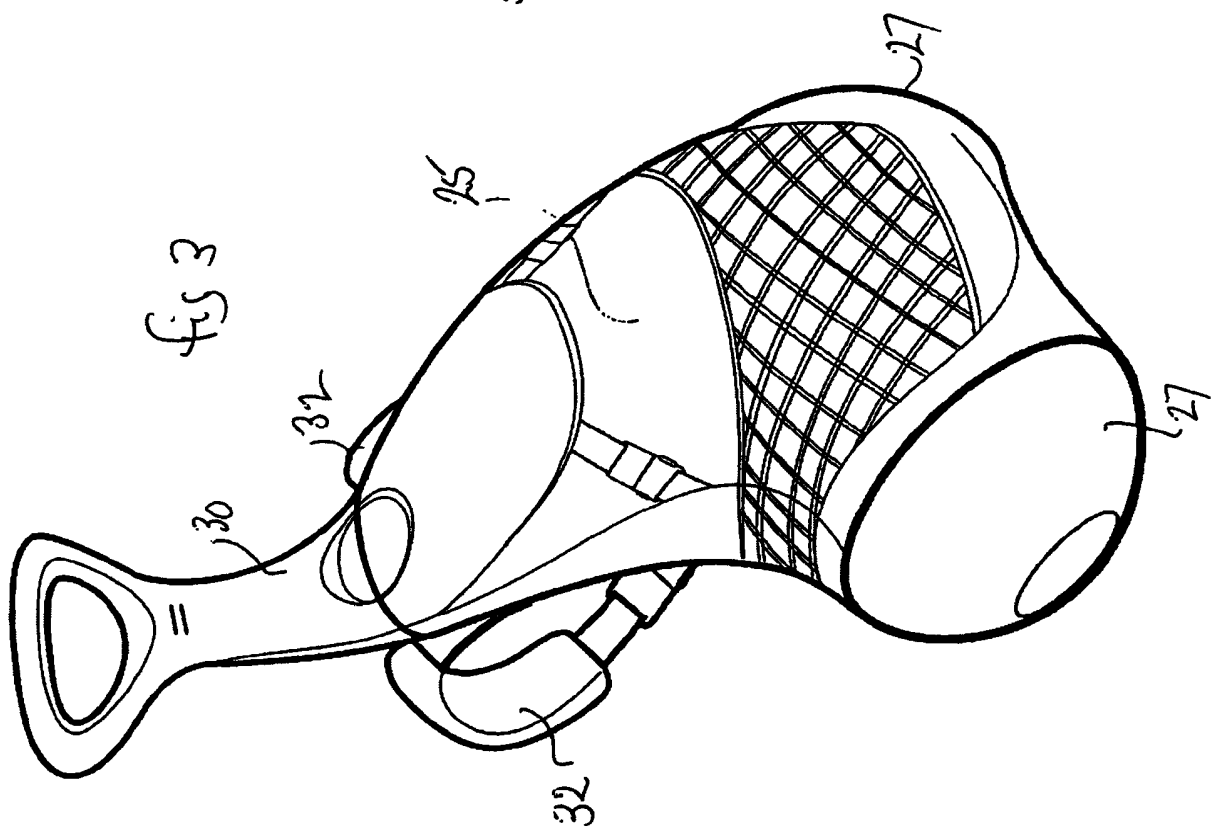


fig. 4

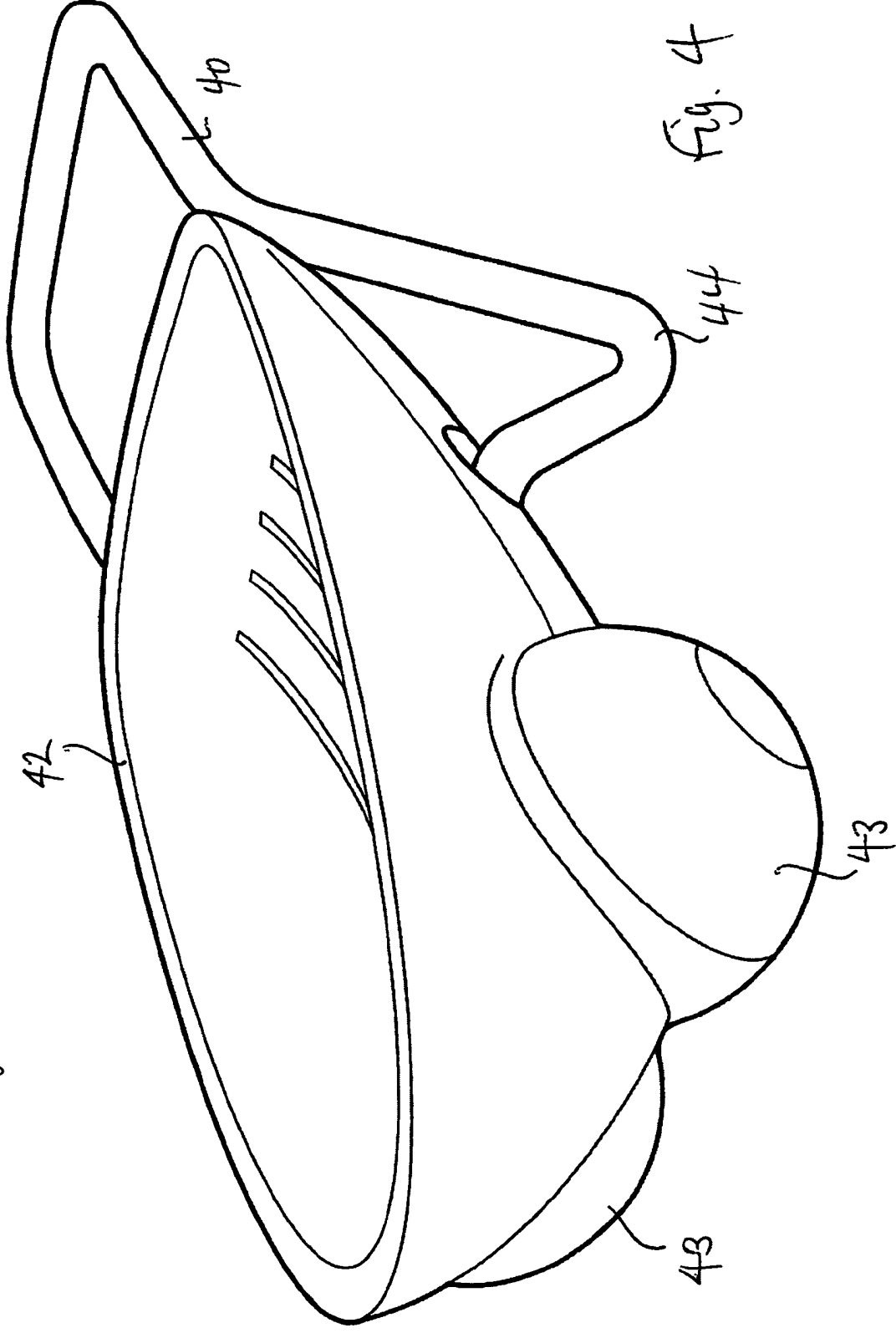


Fig. 4

WHEELED APPARATUS FOR TRANSPORTING LOADS

This invention relates to wheeled apparatus for transporting loads. It is applicable to such apparatus which is designed to carry a load placed on it,
5 for example a cart, trolley or wheelbarrow, as well as to apparatus where there is some form of container which is fitted with wheels to assist in transporting the container, for example an article of luggage such as a suitcase or rucksack.

10 Carts, trolleys and wheeled luggage are known in a very wide variety of shapes, sizes and designs. Common to all of them is a pair of wheels which are designed to engage the ground and which are mounted on one or two axles. The arrangement is such that, on a horizontal support surface, the wheels are vertical and the axis of the axle or axles about which they rotate
15 is horizontal.

Arrangements are known in which the two wheels or two major wheels of certain wheeled load-supporting apparatus are slightly outwardly inclined. This is the case with certain designs of wheelchair and FR-A-2823708
20 describes a luggage-carrying cart on to which, for example, a rucksack may be strapped and which is pulled by means of a harness attached to the user. As shown in Figure 2 of the specification, the two wheels are slightly

outwardly inclined, i.e. when the item is on flat ground, the tops of the wheels away from the ground are closer to one another than the ground-engaging bottoms of the wheels.

- 5 In accordance with the present invention, there is provided load-carrying apparatus comprising a frame carrying a pair of rotatable ground-engaging members each mounted for rotation on the frame, the axes of rotation of the respective rotatable members being at an angle to one another of at least 10 degrees, and the arrangement being such that the frame extends to one side
10 of the pair of rotatable members at an angle to the plane in which both of the axes of rotation of the rotatable members lie such that when that plane is vertical, the end of the frame remote from the rotatable members is from 50 to 150 centimetres above a horizontal supporting surface on which the rotatable members rest.

15

- By constructing a trolley, cart, wheelbarrow, piece of luggage or similar piece of apparatus in this way, the ease with which the apparatus may be rolled across a generally horizontal surface varies with the angle at which the item is. The simplest case to consider is that of a two-wheeled luggage trolley
20 having a frame with a pair of wheels mounted at one end and a pulling handle located at the other.

- When the handle is grasped by someone using the luggage trolley, the plane in which both axes of rotation of the wheels are located is substantially
25 vertical and the wheels turn without difficulty as the luggage trolley is pulled along. If, on the other hand, the trolley is rotated about a horizontal axis close to its base, so that it is either stood up with the handle extending substantially vertically, or laid down, for example to allow access to a side opening case mounted thereon, and with the handle resting on the ground,
30 then the angle at which the wheels are is such that movement of the trolley is essentially braked. This is achieved simply because the wheels are now at a substantial angle to one another relative to the ground and accordingly

the trolley can only be swivelled about a vertical axis or slid with dragging of the wheels on the ground.

The rotatable members are preferably ones having a fairly substantial
5 ground-engaging surface, so that they do not dig into soft ground, mud or sand. A preferred construction is to make the members essentially hemispherical. The rotatable members may be constructed of a fairly high friction material, for example rubber, or may be faced with such material; the greater the frictional properties, the more effective the braking action when
10 the plane of the axles is not perpendicular to the ground on which the device sits. The frictional properties of the exterior surface of the rotatable members can vary, for example as between a relatively low friction area which contacts the ground when the apparatus is being wheeled along and relatively higher friction areas which contact the ground when the plane
15 containing the axes of rotation is not vertical.

If the rotatable members are hollow hemispherical ones, then the interior of the rotatable members may be used as a space for stowing part of the load. The rotatable members may be integrated into the overall designs so that
20 their edge lies flush with the contour of a load-carrying chamber mounted on the frame.

Although the rotatable members may be supported on axles of any length, it is preferred to mount them on short stub axles fixed to either side of the
25 frame so as to reduce the bending moment on each. Using hemispherical members, the stub axle is preferably substantially vertically above the ground-contacting part of the rotatable member.

The angle between the two axes about which the two rotatable members
30 rotate is, as noted above, more than 10 degrees. It is very convenient in design terms to make the angle between 80 and 100 degrees which enables the rotatable members essentially to be placed one side of a load or load-

carrying member such as a case or box. This lowers the centre of gravity of the loaded apparatus, leading to easier manoeuvrability.

The attached drawings show by way of example a number of ways in which
5 the present invention may be put into effect. In the drawings:

Figures 1a, 1b and 1c show respectively diagrammatic side end and perspective views of the underlying structure of apparatus according to the present invention;

10

Figure 2 is a perspective drawing of a wheeled picnic hamper in accordance with the invention;

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Figure 3 is a backpack constructed in accordance with the invention; and

Figure 4 is a wheelbarrow constructed in accordance with the present invention.

Referring to Figures 1a to 1c, the load-carrying apparatus shown
20 diagrammatically there consists of a frame 1 on to which are mounted a pair of hollow hemispherical wheels 2 and 3. Wheels 2 and 3 are mounted on stub axles 4 and 5 respectively which are mounted at the lower end of frame 1 as shown in the drawings.

25 As can be seen from the drawings, when the apparatus is in the position illustrated, the frame 1 is inclined relative to the ground (horizontal surface 10) and the higher end of the frame is a distance "A" from the ground of between 50 and 150 cm.

30 As evident from an inspection of Figure 1a, in this position, the axles 4 and 5 lie in a vertical plane (denoted 8) which is perpendicular to the ground 10.

In this position, the apparatus may be moved to the left or right as seen in Figure 1a, or towards or away from the observer as seen in Figure 1b, with rotation of wheels 2 and 3 about their respective axles 4 and 5. While the position of the apparatus is as shown in these Figures, it may thus be rolled
5 along easily. However, if the upper end of frame 1 as shown in the drawings is either placed adjacent to ground 10 or, for example, placed vertically above the wheels (i.e. rotating frame 1 as shown in Figure 1a clockwise until it lies in plane 8) then the two wheels are essentially splayed one with respect to another, and will not rotate easily if at all. The item might be
10 swivelled somewhat about a vertical axis, but the directions in which each wheel wishes to travel when rotating on its axle are now non-coincident, and accordingly the device is essentially braked against lateral movement.

Put very simply, a two-wheeled trolley constructed on a framework of the
15 type diagrammatically illustrated in Figures 1a to 1c can be easily pushed or pulled along when the upper end of frame 1 is at the proper height. As soon as the upper end is raised or lowered from that height, the trolley becomes progressively more difficult to push or drag along, and fairly rapidly becomes essentially braked as the top end of the frame 1 approaches the ground or
20 moves towards a position over the wheels.

Figure 2 shows a picnic basket constructed on these principles. It consists of a generally box-like container 12 having an extendable handle 14 fitted to one side thereof. The top of handle 14 has a hand grip 16 which is grasped
25 by the user.

Mounted to each side of the box-like structure 12 are hollow part spherical wheels 18 which are mounted on short stub axles so that they rotate around an axis 19. Axis 19 is in a vertical plane when the wheels 18 are rested on
30 the ground and the handle grip 16 is held in the hand of the user and from 50 to 150 cm above the ground. It can be easily pulled across the ground to the desired picnic site, at which point it may be swivelled to allow the handle

14 to extend generally vertically and the front end of the box-like structure, denoted 21 in Figure 2, to rest on the ground.

As visible in Figure 2, the handle 14 includes a track 23 and the box-like structure has a lid 24 which is mounted by means not shown so as to be
5 slidable in track 23. When the handle 14 is in the vertical position, the lid 24 can accordingly be raised up track 23 and clipped or latched into position at the top of the track 23 to form a picnic table. The provender is then available in box-like structure 12 and can be extracted and consumed.

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Figure 3 shows load-carrying apparatus according to the invention configured as a backpack. On the right-hand side, this is shown on a person. The load-carrying compartment generally denoted 25 has two rotatable wheels 27 fixed to its base and rotating about axes which are at an
15 angle to one another. A handle 30 extends from the top of the load-carrying compartment 25, and is foldable from a deployed position as shown in the left-hand portion of Figure 3 to a folded down position when the backpack is being worn. The wearer carries the backpack by way of a pair of conventional straps 32 mounted on the main load compartment 25. Such a
20 backpack may be carried as a backpack or, when the handle 30 is deployed, pulled along like a trolley.

Figure 4 shows a wheelbarrow constructed in accordance with the principles of the present invention. As can be seen, there is a tubular steel frame 40
25 on to which is mounted a moulded plastics load-receiving bowl 42. At the front of the frame 40 are mounted two hemispherical wheels 43 on stub axes which are so angled that they do not lie in a vertical plane when the feet of the frame 44 rest on the ground at the same level as the ground-engaging portions of wheels 43. This provides an automatic braking effect in
30 addition to the friction between the feet 44 and the ground.

When the right-hand end of the frame 40 as shown in Figure 4 is lifted by the

user, the axles on which wheels 43 are mounted come to lie in a generally vertical plane when the barrow is being wheeled along. It can be wheeled along easily because the axles are in a vertical plane. When it is desired to tip material in the wheelbarrow on to a desired location, for example earth on

5 to a garden bed or garden waste into a compost pit, the right-hand end of frame 40 is raised and at this point the automatic braking effect comes into play so that the front end of the barrow is then held against further movement forward and the barrow may be tipped and its contents discharged. The physical effort required to do this is reduced because the

10 user does not have to be trying to raise the barrow at the same time as holding it back from rolling further forward.

CLAIMS

1. Load-carrying apparatus comprising a frame carrying a pair of rotatable ground-engaging members each mounted for rotation on the frame, the axes
5 of rotation of the respective rotatable members being at an angle to one another of at least 10°, and the arrangement being such that the frame extends to one side of the pair of rotatable members at an angle to the plane in which both the axes of rotation of the rotatable members lie such that when that plane is vertical, the end of the frame remote from the rotatable
10 members is from 50 to 150 cm above a horizontal supporting surface on which the rotatable members rest.
2. Apparatus according to Claim 1 wherein the rotatable members have an external substantially hemispherical ground-engaging surface.
15
3. Apparatus according to Claim 1 or 2 wherein the ground-engaging members have an exterior surface of high friction material.
4. Apparatus according to any one of Claims 1 to 3 wherein the coefficient
20 friction of the exterior surface of the rotatable ground-engaging members varies across its surface.
5. Apparatus according to any one of Claims 1 to 4 wherein the angle
25 between the two axes about which the two rotatable members rotate is between 80 and 100°.

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Application No: GB0802312.9

Examiner: Mr Mike Leaning

Claims searched: 1-5

Date of search: 4 June 2008

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1&3	GB2431381 A (100 WATT LTD.) Please see the figures noting the wheels 39 having differing axes of rotation.
X	1&3	GB651501 A (STABLEFORD) Please see especially figure 3 noting how the wheels 26 will have different axes of rotation when deployed.
X	1&3	US2004/0026896 A1 (CRISP) Please see the figures noting inclined wheels 12
X	1&3	FR2823708 A1 (GUISLAIN) Please see especially figure 2.
A	-	GB138218 A (CUMBERLAND) Please see figures 3 and 4 noting the hemispherical wheels.
A	-	GB757663 A (AGHNIDES) Please see the figures noting conoidal wheels 62. A load-carrying 'device' having ground engaging members with different axes of rotation.
A	-	FR2610586 A1 (COLLIER) Please see the figures. A shopping cart/basket with hemispherical wheels.
A	-	US4523774 A (DICKERSON) Please see the figures. A 'tow cart' with hemispherical wheels.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

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Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^x:

A4G

Worldwide search of patent documents classified in the following areas of the IPC

B62B

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC.

International Classification:

Subclass	Subgroup	Valid From
B62B	0001/00	01/01/2006
A45C	0005/14	01/01/2006