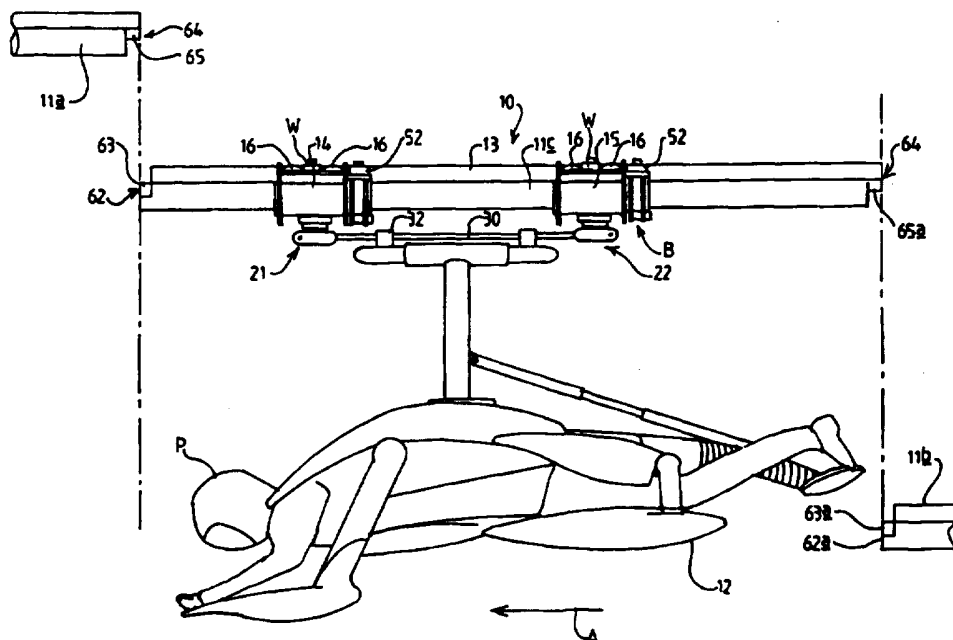




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A63G 21/20, 7/00		A1	(11) International Publication Number: WO 96/22821
			(43) International Publication Date: 1 August 1996 (01.08.96)
(21) International Application Number: PCT/GB96/00122 (22) International Filing Date: 22 January 1996 (22.01.96) (30) Priority Data: 9501270.4 23 January 1995 (23.01.95) GB (71) Applicant (for all designated States except US): D C F HICKMAN LIMITED [GB/GB]; Waterfall Lane Trading Estate, Cradley Heath, Warley, West Midlands B64 6PU (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): MADHAVAN, Dipak [MY/GB]; 45 Stourbridge Road, Dudley, West Midlands DY1 2DH (GB). GEORGE, Frank, Arthur [GB/GB]; 194 Rocky Lane, Great Barr, Birmingham B42 1QU (GB). (74) Agent: FORRESTER KETLEY & CO.; Chamberlain House, Paradise Place, Birmingham B3 3HP (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AZ, BY, KG, KZ, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	

(54) Title: TRANSPORT APPARATUS



(57) Abstract

A transport apparatus e.g. for use as an amusement apparatus or ride, for the amusement of a passenger, comprises a rail (11) from which a passenger is suspended and in use along which the passenger is moved, there being a first rail section (11a), at a first height, and a second rail section (11b) at a second, lower, height, and a third rail section (11c) movable upwardly and downwardly with the passenger suspended from the third rail section (11c) between the first (11a) and second (11b) rail sections, from a first position in which the third rail (11c) is collinear with the first rail section (11a) and a second position in which the third rail section (11c) is collinear with the second rail section (11b).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

Title: Transport Apparatus

Description of Invention

This invention relates to a transport apparatus comprising a rail from which a passenger is suspended and in use, along which the passenger is moved. The invention has been developed primarily but not exclusively as an amusement apparatus or ride, for the amusement of a passenger. However the invention may be used in other applications where it is desired to transport a passenger from one location to another.

According to one aspect of the invention we provide a transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, there being a first rail section at a first height, and a second rail section at a second, lower, height, and a third rail section movable upwardly and downwardly with the passenger suspended from the third rail section, between the first and second rail sections, from a first position in which the third rail is generally collinear with the first rail section, and a second position in which the third rail section is generally collinear with the second rail section.

Preferably, during movement of the third rail section, the third rail section is maintained generally horizontal. Lifting may be achieved by hydraulic, cable or any other motive means through a suitable drive transmission, and the third rail section may be carried by a structure which is constrained by upright guide means, such as rails, to move such that the third rail section remains generally horizontal.

One end of the third rail section which, when the third rail section is in its first position is collinear with the first rail section, may have a first formation and the end of the first rail section may have a corresponding second formation, the first and second formations interengaging when the third rail section is in its first position such as to provide rail continuity. Similarly, the end of the second rail section may have a first formation and the second end of the third rail section which in use, when a third rail section is in its second position is collinear with the second rail section, may have a corresponding second

formation, the first and second formations interengaging when the third rail section is in its second position, such as to provide rail continuity.

Preferably the passenger is suspended by means of at least one bogie which moves along the rail. By virtue of the movable third rail section, the bogie may be moved from the second rail section at the lower height, onto the third rail section, and subsequent to moving the third rail section to its first position, onto the first rail section.

Conveniently, the second lower height of the second rail section is such that a passenger can be suspended on the second or third rail sections substantially at ground level, and hence moved upwardly by the third rail section so that the passenger can subsequently be transported along the first rail section.

The passenger may move along the rail from the first height under gravity, and the first and second rail sections may thus be the opposite ends of a continuous rail which may extend along a desired path. Preferably, the path includes only curved rail sections and straight rail sections, there being no sharp corners or the like, such that the passenger can be moved continuously along the rail from the first section to the second section. Thus at the beginning of a ride, a passenger would be at the first height, and at the end of the ride the passenger would be at the second, lower, height.

In a conventional aerial runway or rollercoaster and like amusement apparatus, it is necessary either for a passenger to climb or be raised to a height, before commencing the ride or else for there to be some means for raising the passenger up an inclined slope whilst moving along a rail. In the first case, the passenger can only commence the ride when at the higher height, and in the first and second cases, additional space is required to accommodate either the staircase or lift as the case may be, or the inclined slope, to raise the passenger up to the higher height. The present invention enables both of these disadvantages to be overcome.

In a preferred arrangement, the passenger is suspended from the rail in a carrier. The carrier may enable the passenger to lie in a prone position during the ride.

For example, the carrier may comprises a base part on which the passenger lies, which is separable from a top part which is secured to or on the rail to facilitate a passenger mounting and dismounting the carrier.

To enable a passenger to mount and dismount the carrier, there may be provided a mounting stage, along which the base part moves when separated from the top part, and means to secure the base and top parts of the carrier together e.g. at the second rail sections, so that the base and top parts are secured together prior to being raised to the first height by the third rail part.

Thus the apparatus may operate continuously with passengers dismounting from the carriers after completing a ride, and then other passengers mounting the carrier pair to commencement of their rides.

Preferably the carrier is suspended from a pair of bogies which move along the rail and are interconnected in a manner such as to permit of some relative movement of the carrier between them, so that the carrier can accommodate bends and the like in the railpath.

For example, the or each bogie may be constrained to move along the rail linearly, with little or no other movement relative to the rail being permitted. The carrier may be connected to the or each bogie by means of a universal joint which permits some movement of the carrier relative to the rail about two orthogonal axes, so that forces imposed on the carrier as it travels along the rail e.g. around bends, are not transmitted to the bogie rail connection, which could cause drag and friction between the bogie and rail resulting in slowing of the movement of the carrier along the rail.

Preferably, where a pair of bogies are provided, a member interconnects the bogies to constrain carrier movement relative to the rail. In one example, the bogies may each be connected to the carrier by means of a universal joint such as a Hooke's joint, which permits the carrier to move about a generally

horizontal axis, and about a second generally vertical axis, but the interconnecting member constrains free movement of the carrier about each of these axes.

The or each bogie may have a braking means so that the bogie and hence the passenger can be slowed and/or brought to a halt along the rail, for example at the end of the second rail section. The bogie may comprise one or preferably a pair of brake shoes which can be brought into engagement with the rail. In one arrangement, which is particularly applicable to the rearmost bogie in the direction of travel, where a pair of bogies are provided, a pair of brake shoes are provided on a mounting structure, for pivoting movement towards and away from one another, each shoe having means engageable with a brake applying member which is positioned alongside the rail at a desired position where it is desired to apply the brakes, to urge the shoes inwardly towards the rail. Preferably a spring means is provided which tends to move the shoes apart out of engagement with the rail, and the brake applying means moves the shoes together against the spring means.

In another arrangement, preferably provided on the frontmost bogie in the direction of travel, where a pair of bogies are provided, a cam and pinion arrangement is provided which, when one of the cam or pinion is moved relative to the other, causes each of a pair of brake shoes to move towards one another. The cam or pinion may be movable by means of an operating lever which may be arranged to abut a brake applying member position alongside the rail. In this latter arrangement, only one brake applying member need be required, whereas in the former arrangement, a pair of brake applying members are preferably provided, one for each of the brake shoes.

According to a second aspect of the invention we provide a transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, wherein the passenger is suspended from at least one bogie which is arranged to move along the rail, the bogie carrying a braking means comprising at least one brake shoe which is movable into engagement with the rail by means of a brake applying member positioned adjacent the rail.

The transport apparatus of the second aspect of the invention may have any of the features of the transport apparatus of the first aspect of the invention.

According to a third aspect of the invention we provide a transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, wherein the passenger is suspended from the rail in a carrier which is carried by at least one bogie which is movable along the rail, the carrier being connected to the bogie by means of a joint which permits relative movement between the carrier and the rail about at least two orthogonal axes.

The transport apparatus of the third aspect of the invention may have any of the features of the transport apparatus of the first and/or the second aspects of the invention.

The invention will now be described with reference to the accompanying drawings in which:

Figure 1 is an illustration of a possible arrangement of a transport apparatus in accordance with the invention;

Figure 2 is an illustrative more detailed view of part of a transport apparatus in accordance with the invention;

Figure 3 is an illustration of an alternative kind of passenger carrier;

Figure 4 is a detailed perspective view of part of the apparatus of Figure 1;

Figure 5a is an illustrative end view of part of the apparatus of Figure 1;

Figure 5b is an underneath view of the part of the apparatus shown in Figure 5a; and

Figure 6 is a detailed illustrative view of yet another part of the apparatus as seen in Figure 1.

Referring to the drawings there is shown part of a transport apparatus 10 comprising a rail 11 from which a passenger P can be suspended, in this

example, in a carrier 12. The passenger P is intended to lie in the carrier 12 in a prone position, and to be generally enclosed by the carrier 12.

The rail 11 is of generally round section, but having extending along an upper surface thereof, a continuous fin 13. The rail 11 is suspended from a ceiling or other support structure to provide a guideway for the carrier 12 during movement of the carrier.

The carrier 12 is suspended from the rail 11 by virtue of a pair of bogies 14 and 15. As seen in Figures 1 and 2a, bogie 14 is the frontmost bogie in the direction of travel A, and bogie 15 is the rearmost bogie in the direction of travel. Each bogie 14, 15 carries wheels 16 which are arranged to run along an upper surface of the rail 11 alongside, and preferably immediately adjacent to the fin 13. Preferably the constructions of the bogies 14 and 15 and the rail 11 is such that the bogies 14 and 15 may freely move along the rail 11, but are constrained against any other movement relative to the rail, for example around the centre axis of the round section of the rail 11. Each bogie 14, 15 has a pair of wheels 16 to one side of the fin 13, and a pair of wheels 16 at an opposite side of the fin 13. The wheels 16 may be arranged to rotate about axes which are not arranged at exactly 90° to the fin 13 to assist in constraining the bogies 14 and 15 from moving about the rail 11.

The carrier 12 is connected to each of the bogies 14 and 15 by respective joint arrangements 21 and 22. The joints 21 and 22 are generally the same but oppositely handed, and hence only joint 21 will now be described in more detail, with particular reference to Figure 6.

The joint 21 is a universal or Hooke's joint, comprising a yoke 23 which defines a first, generally horizontal pivot axis 24, and a carrier part 25 which defines a second generally vertical pivot axis 26. Hence the axes 24 and 26 defined by the joint components 23 and 25 are generally orthogonal to one another. The carrier 25 carries a spindle 27 which is movable about the axis 26 relative to the carrier 25, the spindle 27 terminating in a connecting block 28 which is welded or otherwise secured to the underside of the bogie 14. It can be

seen that the block 28 has a curved upper surface 29 for connection to the bogie 14.

The yoke 23 is connected to an interconnecting member 30, the purpose of which will become apparent hereinafter. However it will be appreciated that in isolation, the interconnecting member 30 may thus move about the axis 24, whilst the mounting block 28 can move about axis 26. However free movement is constrained as the interconnecting member 30 is also connected to the joint 22 which is secured to the rear bogie 15, as can be seen in Figure 2. Hence some relative movement of the yoke 23 i.e. of joint 21 relative to the yoke 23 of joint 22 can take place about both axes 24 and 26 so that the bogies 14 and 15 can run around curves in the rail 11 with the carrier 12 suspended between them.

It can be seen that the carrier 12 includes a pair of brackets 32 which are rigidly connected to the interconnecting member 30.

At least the rear bogie 15 carries a respective braking means B as will now be described with reference to Figures 5a and 5b.

A braking means for the front bogie 14 may also be provided and this may differ slightly from braking means B. In each case, the braking means comprises a pair of brake shoes 38 and 39 which are each pivoted about a pivot 40 to a mounting structure 42 of the bogie 14 and/or 15. The brake shoes 38, 39 are curved and extend around and conform to the outside surface of the rail 11 and each carries a respective brake lining 43 and 44.

At their ends remote from the pivot axis 40, the brake shoes 38 and 39 receive between them, the fin 13. A spring 46 around the pivot 40 tends to urge the brake shoes 38 and 39 apart at their free ends.

In the case of the braking means associated with bogie 15, each brake shoe 38 and 39 has an outwardly extending abutment assembly 50 and 51 respectively. Each assembly 50 and 51, comprises a mounting 41 for a rotatable wheel 52. Each wheel 52 is intended to engage a respective brake applying member (not shown) positioned alongside rail 11 at a position where it is desired

to apply the brakes. Each brake applying member may comprise a simple plate which extends alongside the rail 11, the plate preferably becoming increasingly close to the rail 11 in the direction of travel A of the carrier 12. Hence the amount of braking applied i.e. the amount of inward movement of the brake shoes 38 and 39 into engagement with the external surface of the rail 11, increases as the bogie 15 moves between the brake applying members.

In a slightly modified arrangement, particularly suited to front bogie 14, instead of or in addition to the brake shoes 38 and 39 carrying outwardly projecting abutment assemblies 50 and 51, a cam and pinion arrangement is provided, so that pivoting movement of the brake shoes may be occasioned by means of an operating lever which in use, engages an abutment alongside the rail 11, to apply the brakes. The abutment 61 may comprise a brake applying member which may be moved into position in an emergency situation for example when it is desired to bring the bogie 14, 15 and hence the carrier 12 to a rapid halt.

As can be seen in Figure 2, each bogie 14, 15 have in addition to the wheels 16 which engage the top round surface of rail 11, horizontally mounted wheels W to engage, one on either side, with the fin 13.

The transport apparatus 10 is intended primarily as an amusement apparatus whereby a passenger may ride along the rail 11 solely for amusement. The rail 11 may comprise a first rail section 11a as indicated in Figures 1 and 3, at one end of the rail 11, which section is at a first height above the ground, a second rail section 11b at the other end of the rail 11 located at a second lower height above the ground, and a third rail section as indicated at 11c. The third rail section 11c is movable with the carrier 12, and hence a passenger, suspended from the third rail section 11c, between the first and second rail sections 11a and 11b, is movable from a first position in which the third rail section 11c is collinear with the first rail section 11a, and a second position in which the third rail section 11c is collinear with the second rail section 11b.

The third rail section 11c is preferably carried on a supporting structure such that the third rail section 11c is movable whilst remaining generally horizontal, between its first and second positions. Movement of the third rail section 11c may be achieved by hydraulic, cable or any other motive means, via a suitable transmission. The structure which carries the third rail section 11c between its first and second positions, may be constrained by upright guide means such as rails provided at each corner of a tower T, to move such that the third rail section 11c remains generally horizontal.

To provide for rail continuity, when the third rail section 11c is in its first or second position, one end of the third rail section 11c indicated at 62, has a first formation 63, as can best be seen in Figure 4, comprising a reduced diameter portion and where the fin 13 is cut back.

The end 64 of the first rail section 11a with which the first end 62 of the third rail section 11c is collinear when the third rail section 11c is in its first position, has a formation 65 against best seen in Figure 6, in which the end 64 of the rail 11 is cut away in a lower region. The first and second formations 63 and 65 interengage when the third rail section 11c is in its first position, such that the first and third rail sections 11a and 11c are collinear and rail continuity is achieved. Thus the bogies 14 and 15 which suspend the carrier 12 from the third rail section 11c can smoothly move from the third rail section 11c onto the first rail section 11a.

Similarly, the end 62a of the second rail section 11b may have a first formation 63a substantially similar to formation 63 at the one end 62 of the third rail section 11c, and the opposite end 64a of the third rail section 11c which in use is brought to a second position collinear with the second rail section 11b, has a formation 65a generally similar to formation 65 provided at the end 64 of the first rail section 11a. Thus when the third rail section 11c is brought to its second position, in which it is collinear with the second rail section 11b, the first and second formations 63a and 65a interengage to provide for rail continuity. Hence

a carrier 12 suspended by a pair of bogies 14 and 15 on the second rail section 11**h** can smoothly and easily be moved onto the third rail section 11**c**.

Preferably the second rail section 11**h** is arranged at a height above the ground such that a carrier 12 suspended from the second rail section 11**h**, or by the third rail section 11**c** when in its second lower position, is located adjacent the ground, such that a passenger can be loaded into or mount the carrier 12 at ground level. The passenger may then commence his/her ride as the third rail section 11**c** is moved to its first position, and then the carrier 12 is moved onto the first rail section 11**a**.

Preferably, the first and second rail sections 11**a** and 11**h** are opposite end sections of a continuous rail which extends along a guidepath between them, such that the carrier 12 can accelerate and move along the rail 11 solely by means of gravity.

Looking particularly at Figure 1, it can be seen that the transport apparatus 10, where an amusement apparatus, may provide a mounting stage 70 at which in one position, 71 passengers can dismount the carrier 12 and at another position 72, can mount the carrier 12. In the arrangement shown, the carrier 12 comprises a base part 73 and a top part 74 which are separable at the mounting stage 70, to permit a passenger to mount the base part 73 as it moves along the mounting stage 70.

The top part 74 may automatically engage with the base part 73 to connect the base 73 and top 74 parts together prior to the carrier 12 moving from the second rail part 11**h** onto the third rail part 11**c** prior to lifting the third rail part 11**c** and carrier 12 to the first height.

A safety interlocking means needs to be provided, which preferably can only be released manually at or adjacent first position 71 of the mounting stage 70, as the base 73 engages the mounting stage 70. For example, the top or base part 73, 74 may have hook formations of an interlocking means, and the base and top part respectively a corresponding pin around which the hook of the locking means positively engages.

The mounting stage 70 may comprise tracks 75 and the carrier 12 may have means which ride in the tracks 75 when the base part moves along the mounting stage 70, to guide the base part 73 and prevent the base part 73 from slipping off the mounting stage 70.

The base part 73 may comprise a hand rail 76. With the passenger between the base 73 and top 74 parts of the carrier 12, and gripping the hand rail 76, a safe environment is provided for the passenger during transport along the rail 11 of the apparatus 10.

The height of the rail 11 above the ground, where the rail 11 is above the mounting stage 70, may be generally constant, perhaps with a small fall in height, until the second rail section 11**b**. An upper surface 77 of the mounting stage 70 drops away just prior to the first position 71 where the top 74 and base 75 parts of the carrier 12 may be separated, so that while a passenger is mounting or dismounting the base part 73, the corresponding top part 74 of the carrier 12 is located immediately above the base part 73. Once the passenger has mounted the base part 73, the upper surface 77 of the mounting structure 70 and the rail 11 move closer together to permit the top 74 and base 73 parts to engage.

Various modifications are possible without departing from the scope of the invention.

The form of carrier 12 illustrated in Figures 1 and 2 of the drawings is only one example and of course many alternative designs are possible such as shown in Figure 3. Preferably the carrier 12 is suspended from a pair of bogies 14 and 15, although the carrier 12 may be suspended from a single bogie in some applications. In any event, the length of the third rail section 11**c** must be such as to accommodate the carrier 12 and passenger.

In another arrangement, a passenger may be carried in a harness or the like in either an upright or a prone position. Preferably though the invention is intended for the passenger to ride in a prone position.

The interengaging formations 63 and 65, and 63**a** and 65**a** provided at the ends of the first 11**a** and third 11**c** and second 11**b** and third rail 11**c** sections

are only examples of suitable interengaging formations which may be provided for rail continuity where the first 11a and third 11c and second 11b and third 11c rail sections meet.

The braking means described are only examples of suitable braking means which may be provided. Typically brake applying members would be provided adjacent the end of the second rail section 11b although may be provided otherwise along the rail anywhere where it is desired to slow or brake the movement of the carrier 12 along the rail 11.

Alternative braking arrangements to the relatively pivoted pairs of brake shoes described, and/or the cam and pinion arrangement described are of course possible.

Whereas connections between the carrier 12 and the bogies 14 and 15 in the form of universal joint as indicated at 21 and 22 are preferred, other means for connecting one or more bogies to a carrier 12 or other means by which a passenger is suspended from the rail 11 may be utilised.

Although in the examples described the rail 11 has comprised a round section with a fin 13, by suitable alternative design of the bogies, other rail sections are no doubt possible.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, there being a first rail section at a first height, and a second rail section at a second, lower, height, and a third rail section movable upwardly and downwardly with the passenger suspended from the third rail section, between the first and second rail sections, from a first position in which the third rail is generally collinear with the first rail section, and a second position in which the third rail section is generally collinear with the second rail section.
2. An apparatus according to Claim 1 characterised in that during movement of the third rail section, the third rail section is maintained generally horizontal.
3. An apparatus according to Claim 2 characterised in that lifting is achieved by a motive means through a suitable drive transmission, and the third rail section is carried by a structure which is to move such that the third rail section remains generally horizontal.
4. An apparatus according to any one of the preceding claims characterised in that the one end of the third rail section which, when the third rail section is in its first position is collinear with the first rail section, has a first formation and the end of the first rail section has a corresponding second formation, the first and second formations interengaging when the third rail section is in its first position such as to provide rail continuity.
5. An apparatus according to claim 4 characterised in that the end of the second rail section has a first formation and the second end of the third rail section which in use, when a third rail section is in its second position is collinear with the second rail section, has a corresponding second formation, the first and

second formations interengaging when the third rail section is in its second position, such as to provide rail continuity.

6. An apparatus according to any one of the preceding claims characterised in that the passenger is suspended by means of at least one bogie which, in use, moves along the rail.

7. An apparatus according to any one of the preceding claims characterised in that the second lower height of the second rail section is such that a passenger can be suspended on the second or third rail sections substantially at ground level, and then moved upwardly by the third rail section so that the passenger can subsequently be transported along the first rail section.

8. An apparatus according to any one of the preceding claims characterised in that the passenger is movable along the rail from the first height under gravity, the first and second rail sections being the opposite ends of a continuous rail which extends along a desired path, the path including only curved rail sections and straight rail sections, there being no sharp corners or the like, such that the passenger can be moved continuously along the rail from the first section to the second section.

9. An apparatus according to any one of the preceding claims characterised in that the passenger is suspended from the rail in a carrier which enables the passenger to lie in a generally prone position during the ride.

10. An apparatus according to claim 9 characterised in that the carrier comprises a base part on which the passenger lies, which is separable from a top part which is secured to or on the rail to facilitate a passenger mounting and dismounting the carrier.

11. An apparatus according to claim 10 characterised in that the apparatus comprises a mounting stage along which the base part moves when separated from the top part, and means to secure the base and top parts of the carrier together so that the base and top parts are secured together prior to being raised to the first height by the third rail part.
12. An apparatus according to anyone of claims 9 to 11 characterised in that the carrier is suspended from a pair of bogies which move along the rail and are interconnected in a manner such as to permit of some relative movement of the carrier between them, so that the carrier can accommodate bends and the like in the rail path.
13. An apparatus according to claim 12 characterised in that the or each bogie is constrained to move along the rail linearly, with little or no other movement relative to the rail being permitted.
14. An apparatus according to claim 12 or claim 13 characterised in that the carrier is connected to the or each bogie by means of a universal joint which permits some movement of the carrier relative to the rail about two orthogonal axes, so that forces imposed on the carrier as it travels along the rail are not transmitted to the bogie rail connection.
15. An apparatus according to any one of claims 12 to claim 14 characterised in that a member interconnects the pair of bogies to constrain carrier movement relative to the rail, the bogies each being connected to the carrier by means of a universal joint which permits the carrier to move about a generally horizontal axis, and about a second generally vertical axis, but the interconnecting member constrains free movement of the carrier about each of these axes.

16. An apparatus according to any one of claims 12 to 15 characterised in that at least one of the pair of bogies has a braking means so that the bogie and hence the passenger can be slowed and/or brought to a halt along the rail, the braking means comprising a pair of brake shoes which can be brought into engagement with the rail.
17. An apparatus according to claim 16 wherein the pair of brake shoes are provided on a mounting structure, for pivoting movement towards and away from one another, at least one of the shoes having means engageable with a brake applying member which is positioned alongside the rail at a desired position where it is desired to apply the brakes, to urge the shoes inwardly towards the rail.
18. An apparatus according to claim 16 or claim 17 characterised in that a spring means is provided which tends to move the shoes apart out of engagement with the rail, and the brake applying means moves the shoes together against the spring means.
19. An apparatus according to claim 16 characterised in that a cam and pinion arrangement is provided which, when one of the cam or pinion is moved relative to the other, causes each of the pair of brake shoes to move towards one another.
20. An apparatus according to claim 19 characterised in that the cam or pinion is movable by means of an operating lever.
21. A transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, wherein the passenger is suspended from at least one bogie which is arranged to move along the rail, the bogie carrying a braking means comprising at least one brake shoe which is

movable into engagement with the rail by means of a brake applying member positioned adjacent the rail.

22. The transport apparatus according to claim 21 having any of the features of the transport apparatus of any one of claims 1 to 20.

23. A transport apparatus comprising a rail from which a passenger is suspended and in use along which the passenger is moved, wherein the passenger is suspended from the rail in a carrier which is carried by at least one bogie which is movable along the rail, the carrier being connected to the bogie by means of a joint which permits relative movement between the carrier and the rail about at least two orthogonal axes.

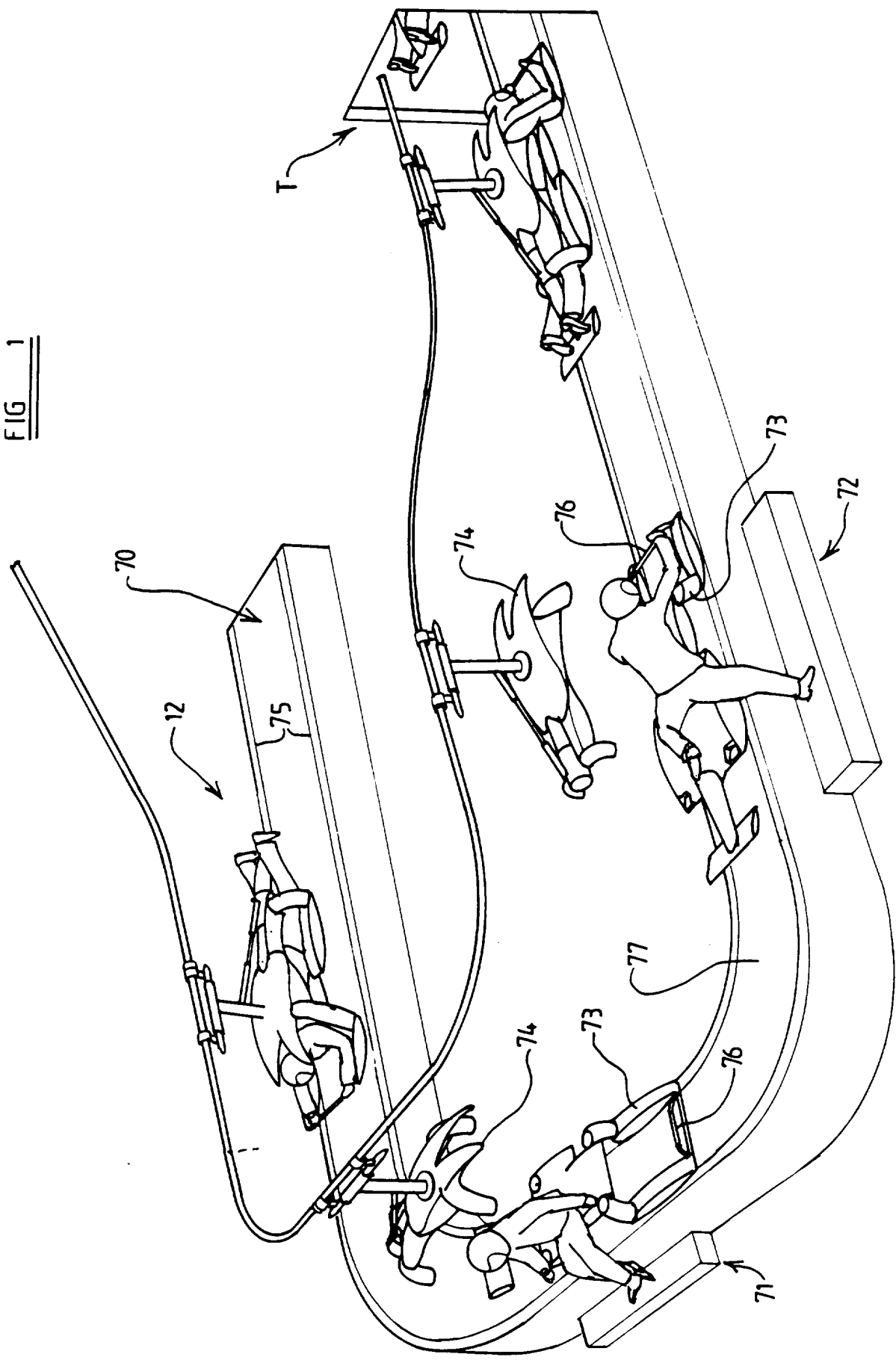
24. A transport apparatus according to claim 23 having any of the features of the transport apparatus of any one of claims 1 to 22.

25. A transport apparatus substantially as hereinbefore described with reference to and as shown in any of the accompanying drawings.

24. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

1 / 4

FIG 1



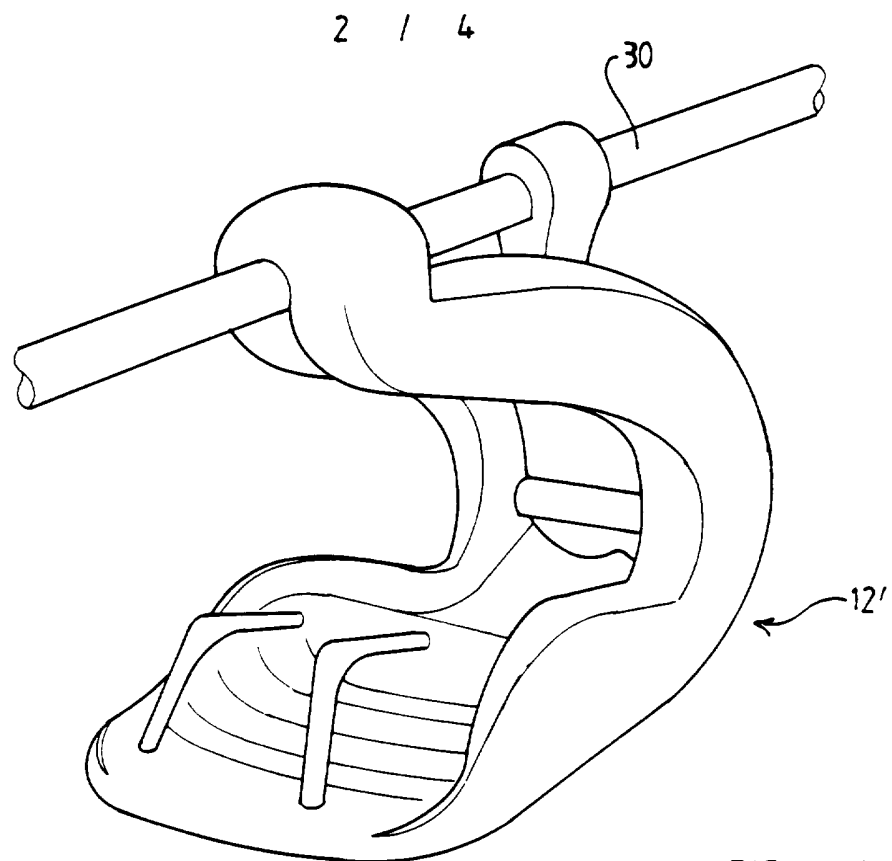


FIG 3

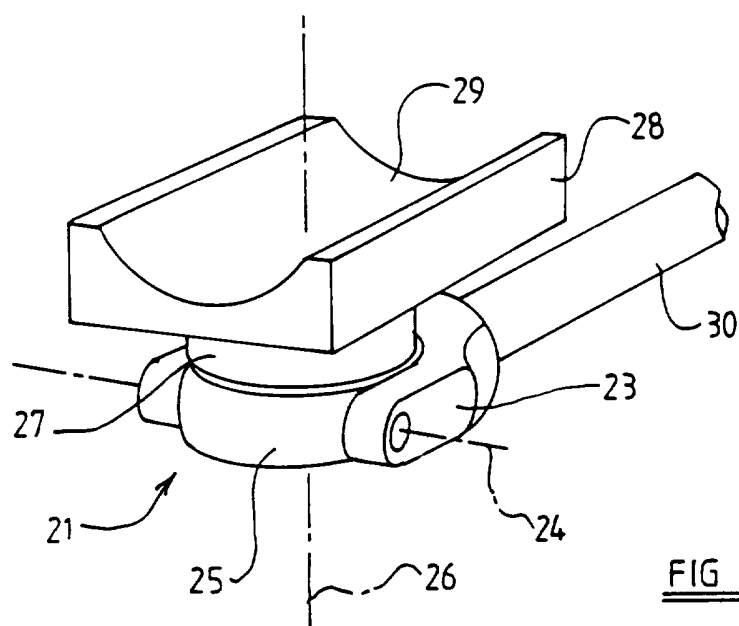


FIG 6

FIG 4

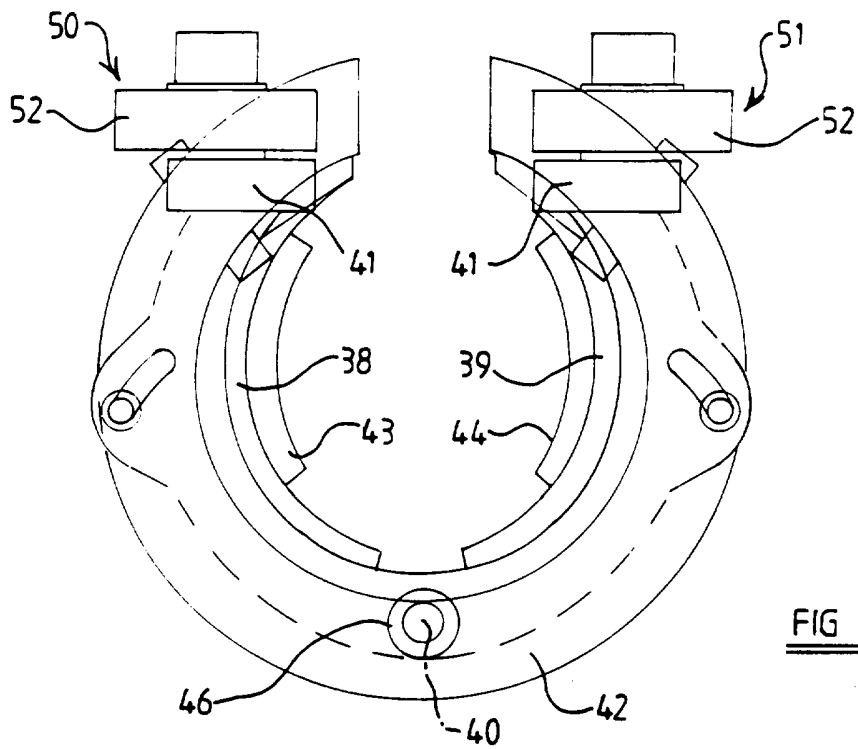
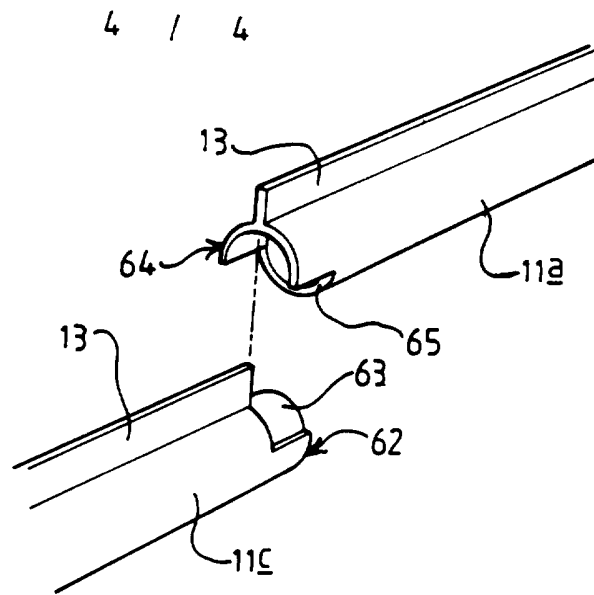


FIG 5a

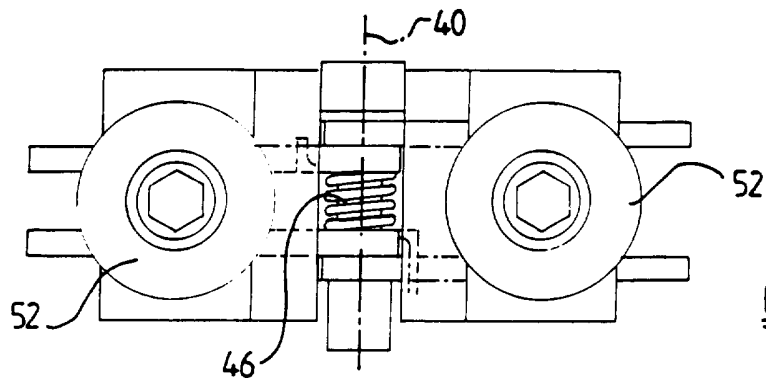


FIG 5b

INTERNATIONAL SEARCH REPORT

Inter nal Application No

PCT/GB 96/00122

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A63G21/20 A63G7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A63G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	FR,A,455 895 (BOURACIER) 11 August 1913 see page 2, line 73 - page 3, line 24; figures	1-3,6-8 4,5,9, 12-15
X	FR,A,473 415 (BOENISCH) 12 January 1915 see the whole document	1-3,6-8
Y	DE,A,16 03 176 (SCHWARZKOPF) 18 December 1969 see page 9, line 6 - line 9; figures 3,4	4,5,9, 12-15
Y X	US,A,5 224 425 (REMINGTON) 6 July 1993 see column 3, line 38 - line 42; figure 3	9 21
Y X	US,A,1 762 507 (CUSTER) 10 June 1930 see figures 9,10	12-15 23
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

14 May 1996

Date of mailing of the international search report

04. 06. 96

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Godot, T

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 96/00122

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,A,25 50 556 (HAUBNER) 12 May 1977 see claims 11,12; figures 3,4 ---	21
A	DE,C,288 600 (LANGE) 8 November 1915 see the whole document -----	1,2

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 96/00122

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-455895		NONE	
FR-A-473415		NONE	
DE-A-1603176	18-12-69	NONE	
US-A-5224425	06-07-93	NONE	
US-A-1762507	10-06-30	NONE	
DE-A-2550556	12-05-77	NONE	
DE-C-288600		NONE	