

A TRANSPORT CARRIER

TECHINICAL FIELD

5 [0001] Disclosed herein a transport carrier.

Brief description of drawings

[0002] Fig. 1A is a schematic diagram of a transport carrier according to a staircase
10 setting;

[0003] Fig. 1B is a schematic diagram of a transport carrier according to a step
setting;

15 [0004] Fig. 1C is a schematic diagram of a transport carrier according to a slope
setting;

[0005] Fig. 1D is a schematic diagram of a transport carrier according to an uneven
terrain setting;
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[0006] Fig. 1E is a schematic diagram of a transport carrier according to a valley
setting;

[0007] Fig. 2 is a side view of the a transport carrier according to an embodiment;
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[0008] Fig. 3 is a side view of the a transport carrier according to a preferred
embodiment;

[0009] Fig. 4 is a side view of a carriage assembly according to the preferred
30 embodiment;

[0010] Fig. 5 is a side view of a carriage assembly in cooperation with a support assembly, according to the preferred embodiment;

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[0011] Fig. 6 is a sectional view of view A-A according to the view of Fig. 5;

[0012] Fig. 7A is a side view of a sleeve according to the preferred embodiment;

[0013] Fig. 7B is a top view of the sleeve according to Fig. 7A;

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[0014] Fig. 7C is a front view of the sleeve according to Fig. 7A;

[0015] Fig. 8A is a detailed view of a safety assembly in cooperation with the a linear rack, according to the preferred embodiment;

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[0016] Fig. 8B is a detailed view of the safety assembly during normal operation disengaging from the linear rack, according to Fig. 8A

[0017] Fig. 8C is a detailed view of the safety assembly during failure of actuation cable in cooperation with the linear rack according to Fig. 8A;

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[0018] Fig. 9 is a top view of a pedestal according to the preferred embodiment;

[0019] Fig. 10A is a detailed view of a wire sensor when the pedestal is unfolded, according to the preferred embodiment;

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[0020] Fig. 10B is a detailed view of the wire sensor when the pedestal is folded, according to Fig. 10A;

[0021] Fig. 11 is a side view of a transport carrier according to another embodiment;

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[0022] Fig. 12A is a detailed view of a pedestal assembly according to another embodiment;

[0023] Fig. 12B is a top view of the pedestal assembly according to Fig. 12A;

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[0024] Fig. 12C is a sectional view B-B of the pedestal assembly in a “close” position, according to Fig. 12A;

[0025] Fig. 12D is a sectional view B-B of the pedestal assembly in a “ready” and an “operating” position, according to Fig. 12A;

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[0026] Fig. 13A is a detailed view of the pedestal assembly in the “operating” position showing a wire anchor, according to Fig. 12A;

[0027] Fig. 13B is a detailed view of the pedestal assembly in the “close” position showing the wire anchor, according to Fig. 13A.

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Detailed Description

[0028] It will be readily understood that the components of the embodiments, as generally described and illustrated in the figures herein, may be arranged and designed in a wide variety of different configurations in addition to the described example embodiments. Thus, the following more detailed description of the example embodiments, as represented in conjunction with the figures, is not intended to limit the scope of the embodiments, as claimed, but is merely representative of example embodiments.

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[0029] Reference throughout this specification to “one embodiment”, “another embodiment” or “an embodiment” (or the like) means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the appearance of the phrases “in one embodiment” or “in an embodiment” or the like in various places throughout this specification are not necessarily all referring to the same embodiment.

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[0030] Furthermore, the described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided to give a thorough understanding of
5 embodiments. One skilled in the relevant art will recognize, however, that the various embodiments can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, some or all known structures, materials, or operations may not be shown or described in detail to avoid obfuscation.

10 [0031] Figs. 1A/1B/1C/1D/1E illustrate a transport carrier 10 in various settings. The transport carrier 10 is configured to carry and move a person and/or an object between two points of differing elevation, an upper point 40 and a lower point 50. For example, the transport carrier 10 may be deployed along a staircase 60 between an upper point 40 of the staircase 60 to a lower point 50 of the staircase, or between a step 70 with an upper point
15 40 and a lower point 50, along a slope 80 with an upper point 40 and a lower point 50, or over an uneven inclining terrain 90 with an upper point 40 and a lower point 50, etc. Further, the transport carrier 10 may also be adapted between an upper point 40 and a lower point 50 wherein no inclining slope exists in between the points, such as across a valley 99 between two peaks 40/50, and in various other settings.

20 [0032] Fig. 2 illustrates in an exemplary embodiment, a transport carrier 10 deployed along a staircase 60. The transport carrier 10 comprises a support assembly 100 spanning along the staircase 60, a carriage assembly 200 movably coupled to the support assembly 100, a rod 300 coupled on both ends to the support assembly and configured to
25 be generally parallel to the staircase 60 inclination, an actuation assembly 400 disposed on an upper point 40 of the staircase 60, and an actuation cable 500 coupled between the actuation assembly 400 and the carriage assembly 200.

[0033] The carriage assembly 200 is disposed partially interior of the support
30 assembly 100, and is configured such that it is slidable along the rod 300, hence allowing movement of the carriage assembly 200 relative to the rod 300 and the support assembly 100, along a line of movement 800. The rod 300 may be configured in a circular profile, or

may otherwise be configured in a non-circular profile with the carriage assembly 200 including corresponding features. The location of the carriage assembly 200, or in other words the relative position of the carriage assembly 200 to the support assembly 100 and the rod 300, is controlled by the pulling and releasing of the actuation cable 500 by the
5 actuation assembly 400.

[0034] The support assembly 100 defines an upper end located near the upper point 40 of the staircase 60, and a lower end located near a lower point 50 of the staircase 60. When it is desired for the carriage assembly 200 to move towards the upper end of the support assembly 100 along the line of movement 800, the actuation assembly 400 pulls
10 back on the actuation cable 500 hence providing a force on the carriage assembly 200, resulting in the carriage assembly 200 moving towards the upper end of the support assembly 100. Conversely, when it is desired for the carriage assembly 200 to move towards the lower end of the support assembly 100 along the line of movement 800, the
15 actuation assembly 400 releases the actuation cable 500, hence allowing the carriage assembly 200 to slide along the rod 300 due to its self-weight towards the lower end of the support assembly 100.

[0035] In a preferred embodiment, as illustrated in Fig. 3, the actuation assembly
20 400 is desired to be located at the upper point 40 of the staircase 60. The actuation assembly 400 comprises a housing 402, a torque source such as a motor 404 coupled to the housing 402, a winding drum 406 coupled to an output of the motor 404, a controller 412 configured to control the motor 404 and various other electrical components to provide electrical power thereto, and pulleys 408/410 placed to maximize the mechanical advantage of the actuation
25 assembly 400 and thus maximizing a force on the carriage assembly 200 applied by the actuation cable 500.

[0036] The actuation cable 500 is configured such that the force applied by the actuation cable 500 on the carriage assembly 200 is generally parallel to the rod 300 and
30 the line of movement 800, hence allowing maximum efficiency in force transfer between the actuation cable 500 and the carriage assembly 200. This allows for a smooth movement of the carriage assembly 200 relative to the support assembly 100. Actuation cable 500 is

wound around the winding drum 406, such that the motor 404 controllably rotates the winding drum 406 to pull the actuation cable 500 or to release the actuation cable 500. The motor 404 may also include reduction gear which reduces the turning speed of the motor 404, but increases the output torque as well as the holding torque on the actuation cable 500. In some cases, the motor 404 may be configured as a three phase AC motor, otherwise
 5 in other cases configured as a DC motor, or in any other motor configurations.

[0037] The support assembly 100 comprises a support structure 102 with a lower end disposed near the lower point 50 of the staircase 60 and an opposing upper end disposed
 10 adjacent to the actuation assembly 400, an upper positioning sensor 104 coupled to the upper end of the support assembly 100, a lower positioning sensor 106 coupled to the lower end of the support assembly 100, a cable guide chain 108, and a guide tray 110 for holding and guiding the cable guide chain 108.

[0038] The positioning sensors 104/106 are electrically coupled to the controller 412 through the cable guide chain 108, and the positioning sensors 104/106, such as micro switches, contact sensors, optic sensors, induction sensors, etc are configured to detect the position of the carriage assembly 200 in relative to the support assembly 100. When the carriage assembly 200 is detected to be near the upper end or lower end of the support
 15 assembly 100 beyond a safety position, the positioning sensors 104/106 send a signal to the controller 412 to slow down and stop the motor 404 hence halting the movement of the carriage assembly 200 in prevention of the carriage assembly 200 colliding with the support assembly 100. The flexible cable guide chain 108 is configured to establish electrical connection between the controller 412 and the movable carriage assembly 200. When the
 20 carriage assembly 200 moves relative to the support assembly 100, the cable guide chain 108 bends to a curvature according to the position of the carriage assembly 200 aided/guided by the guide tray 110, allowing continuous electrical connection between the controller 412 and the carriage assembly 200.

[0039] Figs. 4, 5, and 6 illustrates a carriage assembly 200, comprising a carriage frame 210 which maintains the mechanical structure of the carriage assembly 200, a sensor plate 212 extending outwardly of the carriage frame 210 configured to cooperate with the
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positioning sensors 104/106 of support assembly 100, a sleeve 220 coupled to a bottom side of the carriage frame 210, a pedestal assembly 230 coupled to the sleeve 220, a safety assembly 240 coupled to the sleeve 220 configured to cooperate with a linear rack 112 of the support assembly 100, a handle 250 coupled to a top side of the carriage frame 210, a
 5 pedestal actuation assembly 260 for actuating the pedestal assembly 230, an upper guiding assembly 270 and a lower guiding assembly 280 configured to guide and support the relative movement between the carriage assembly 200 and the support assembly 100. The handle 250 and the pedestal assembly 230 are configured to partially extend externally of the support assembly 100.

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[0040] When the carriage assembly 200 is nearing the upper end or lower end of the support assembly 100, the positioning sensors 104/106 detects the extending sensor plate 212 and the incoming of the carriage assembly 200. Beyond a safety position, the positioning sensors 104/106 alert the controller 412 to stop the motor 404 hence halting the
 15 movement of the carriage assembly 200. Further, as another form of safety feature, the sensor plate 212 may act as a mechanical hard stop for the carriage assembly 200, configured to abut with the support structure 102 in preventing further movement of the carriage assembly 200.

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[0041] The handle 250 further comprises an up button 252 and a down button 254, both up and down buttons 252/254 configured to be electrically connected to the controller 412 through the cable guide chain 108, The buttons 252/254 allow a user to control the position of the carriage assembly 200 in relative to the support assembly by sending electrical signals to the controller 412 which in turn controls the motor 404 of the actuation
 25 assembly 400 to pull or release the actuation cable 500. There may further be control buttons (not shown) disposed on the support assembly 100, or a remote controller (not shown) to be activated for use, etc configured in allowing a user to control the position of the carriage assembly 200 in relative to the support assembly.

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[0042] Referring to Figs. 5 and 6, the upper guiding assembly 270 comprises three upper guiding wheels 272 each configured to cooperatively roll in a corresponding upper guiding channel 114 of the support assembly 100. The lower guiding assembly 280

comprises two lower guiding wheels 282 each configured to cooperatively roll in a corresponding lower guiding channel 116 of the support assembly 100. The upper and lower guiding assembly 270/280 aids in preventing the carriage assembly 200 from tilting in a roll direction 720 hence rolling over during movement of the carriage assembly 200.

5 Further, the multiple guiding wheels 272/282 are lined up along the direction of the guiding channels 114/116 in ensuring the carriage assembly 200 does not tilt over in a pitch direction 710 during movement of the carriage assembly 200.

[0043] Referring to Figs. 4, 5, 6, 7A, 7B, and 7C, the sleeve 220 defines a circular
10 aperture 228 extending through the sleeve 220, the aperture 228 is configured to receive the rod 300 with a corresponding profile, hence allowing the carriage assembly 200 to be slidable in relative to the rod 300 and the support assembly 100. The configuration of the aperture 228 and the rod 300 restricts the carriage assembly 200 from displacing/moving in the lateral direction 730 and the transverse direction 740 in relative to the support
15 assembly 100, hence ensuring stability during movement. The sleeve 220 further includes guiding wheels 222 configured to roll along channels formed to the support structure 102 to support the weight of the carriage assembly 200. The sleeve may further include bronze bushings 224 coupled to both ends of the aperture 228, the bronze bushings 224 allowing low friction during the relative motion between the sleeve 220 and the rod 300, hence
20 allowing the sleeve 220 to slide smoothly along the rod 300. A grease nipple 226 may also be included on a top side of the sleeve 220 in allowing a controlled release of lubricating grease between the sleeve 220 and the rod 300.

[0044] Referring to Figs. 8A and 8B, detailed view 2400 shows the safety assembly
25 240 comprising a plate member 242 coupled to the sleeve 220, a pawl member 244 pivotally coupled to the plate member 242 about pivot 244a, a lever member 246 pivotally coupled to the plate member 242 about pivot 246a, a biasing member 248 coupled between the pawl 244 and the lever 246, and a biasing member 249 coupled between the plate 242 and the lever 246.

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[0045] With reference to Fig. 8A and 8B, during normal operation of the transport carrier 10, actuation cable 500 is coupled to the lever 246 in providing a force to the carriage

assembly 200 in a direction 810. When the force is provided by the actuation cable 500, the force overcomes biasing member 249, rotating lever member 246 relative to plate member 242 in a rotating direction 820 about a pivot 246a and abuts a stopping protrusion 242a of plate member 242 to form a mechanism hard stop. The rotation of lever member 246 about
 5 pivot 246a causes the biasing member 248 to exert a force to rotate pawl member 244 relative to plate member 242 in a rotating direction 840 about a pivot 244a, resulting in the pawl member 244 disengaging from linear rack 112 of the support assembly 100. Fig. 8B illustrates the safety assembly 240 during the normal operation wherein pawl member 244 is disengaged from the linear rack 112, allowing relative motion between the carriage
 10 assembly 200 and the support assembly 100.

[0046] During a failure of the actuation cable 500, with reference to Fig. 8C, the force in direction 810 provided by the actuation cable 500 is released suddenly. Force previously applied on biasing member 249 is released, causing biasing member 249 to exert
 15 a biasing force on lever member 246, causing lever member 246 to rotate in a rotating direction 830 opposite to rotating direction 820 about pivot 246a and away from stopping protrusion 242a. The rotation of the lever member 246 causes the biasing member 248 to apply a force on pawl member 244, causing pawl member 244 to rotate in a rotating direction 850 opposite to rotating direction 840 about pivot 244a, and the pawl member
 20 244 to engage the linear rack 112 of support assembly 100. Engagement of pawl member 244 with linear rack 112 prevents relative motion between the carriage assembly 200 and the support assembly 100 towards the lower end of the support assembly 100, hence stopping the carriage assembly 200 from sliding due to self-weight in time of actuation cable 500 failure.

[0047] Figs. 4 and 9 illustrates the details and the coupling relationship between the pedestal assembly 230 and pedestal actuation assembly 260. The pedestal assembly includes a pedestal support arm 234 coupled to the sleeve 220, a pedestal 232 hingedly coupled to the pedestal support arm 234, a biasing member coupled between the pedestal
 30 232 and the pedestal support arm 234, contact sensors 238 coupled to a peripheral of the pedestal 232, and a wire anchor 239 coupled on a far edge of the pedestal 232. The coupling of pedestal support arm 234 to the sleeve 220 is configured such that the weight of the

pedestal assembly 230 is generally along the center of mass of the carriage assembly 200, such that it improves the stability of the carriage assembly 200 during movement. The pedestal assembly 230 is disposed partially external of the support assembly 100, hence allowing easy maintenance and replacement of components.

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[0048] When the carriage assembly 200 is in motion, the contact sensors 238 are configured such that when in contact with an object/person, the contact sensors 238 send a “contacted” signal through the cable drag chain 108 to the controller 412, the controller 412 in turn halts the movement of the carriage assembly 200 by stopping motor 404 from
10 actuating. This prevents accidentally hurting a person in the way or accidental damage to the transport carrier 10 due to large obstruction.

[0049] The pedestal actuation assembly 260 includes a torque source such as a motor 262, a tension member 264 coupled on one side to the carriage frame 210 and on the
15 other side to a wire rope 268, the wire rope extends around the motor 262 forming a friction coupling therewith, extending to a wire sensor 266 and further extending to couple with a wire anchor 239 formed on the pedestal 232. Wire rope 268 extends from interior of the carriage frame 210, through the pedestal support arm 234 and across a bottom side of the pedestal 232. There may be disposed guide member 214 to guide the wire sensor 266 and
20 the wire rope 268 interiorly of the carriage frame 210. The motor 262 is configured to pull or release the wire rope 268 in effecting the position of the pedestal 232. Tensioning member 264 functions to apply tension on the wire rope 268 in ensuring there is no slack in the wire rope 268 and to reduce the torque requirement of the motor 262. The wire sensor 266 is configured to detect the relative position of the pedestal 232 through monitoring
25 various parameters such as the displacement of the wire rope 268, position of the wire rope 268, the tension in the wire rope 268, etc. The wire sensor 266 may be configured such that the wire rope 268 is connected on both ends of the wire sensor 266, or the wire sensor 266 may be configured such that the wire rope 268 passes through the wire sensor 266.

30 [0050] With reference to Fig. 6, when the transport carrier 10 is not in operation, pedestal 232 is biased to a “close” position 232a by biasing member 236, wherein wire sensor 266 concurrently detects the pedestal to be in the “close” position 232a. When a user

is intending to use the transport carrier 10, controller 412 sends a signal to the pedestal actuation assembly 260 for the motor 262 to pull on the wire rope 268 overcoming the biasing member 236, thus unfolding the pedestal 232 to a “ready” position 232b, wherein the wire sensor 266 detects the pedestal to be in the “ready” position 232b. In the “ready” position” 232b, a user and/or an object stepping or being placed on the pedestal 232 further unfolds the pedestal 232 to the generally horizontal “operating” position 232c, wherein the holding torque of motor 262 holds the position of the pedestal 232. Concurrently, the wire sensor 266 detects the pedestal to be in the “operating” position 232c and sends a signal to the controller 412 allowing the up and down buttons 252/254 on the handle 250, the control buttons (not shown) disposed on the support assembly 100, or the remote controller (not shown) to be activated for use, etc. A user can thus control the position of the carrier assembly 200 relative to the support assembly 100 through the various means.

[0051] Upon a user and/or object dismounting from the pedestal 232, the pedestal 232 resumes the “ready” position 232b awaiting further operation. The wire sensor 266 detects the pedestal to be back in the “ready” position 232b, causing the controller 412 to deactivate the various means of controlling the position of the carrier assembly 200, preventing any accidental movement of the carriage assembly 200. Upon no further operation, the controller 412 sends a signal to the pedestal actuation assembly 260 for the motor 262 to release the wire rope 268, allowing biasing member 236 to fold the pedestal 232 back to the “close” position 232a.

[0052] In an embodiment as illustrated in Figs. 10A and 10B, wire sensor 266 may include a biasing member 2662 coupled to the carriage frame 210, a movable frame 2660 coupled to the biasing member 2662 configured to move relative to carriage frame 210 with movement guided by a guide member 214, a pair of contact plates 2664/2666 coupled to ends of the movable frame 2660, and corresponding pair of contact sensors 2668/2669 coupled to the carriage frame 210 configured to cooperate with and detect the position of the contact plates 2664/2666. Wire rope 268 are coupled to both ends of the movable frame 2660, with wire rope 268a on the upper end of the movable frame 2660 coupled to the motor 262 and wire rope 268b on the lower end of the movable frame coupled to the pedestal 232. The guide member 214 formed on the carriage frame 210 guides and restricts

the movement of the movable frame 2660 to be relatively parallel to the transverse direction 740 hence ensuring wire rope 268 is taut.

[0053] Fig. 10A illustrates the state of the wire sensor 266 when the pedestal 232 is in the unfolded “operating” position. Wire rope 268a is pulled by motor 262 to overcome biasing member 2662 to an extended state and causes movable frame 2660 to move towards the motor 262 along the transverse direction 740. Movement of movable frame 2660 pulls on wire rope 268b to overcome biasing member 236 and unfold the pedestal 232. Consequentially, contact plate 2664 and contact sensor 2668 pair are caused to be in physical contact due to movement of movable frame 2660, while contact plate 2666 is moved away from contact sensor 2669 to form a gap therebetween.

[0054] Conversely, when wire rope 268a is released by motor 262, biasing member 2662 is allowed to resume a non-extended state and causes movable frame 2660 to move away from the motor 262 along the transverse direction 740. The movement of the movable frame 2660 releases on wire rope 268b, allowing biasing member 236 to fold the pedestal 232 to the “close” position. Consequentially, contact plate 2666 is caused to be in contact with contact sensor 2669, while contact plate 2664 is moved away from contact sensor 2668 to form a gap therebetween. The detection of contact plates 2664/2666 by contact sensors 2668/2669 allows the controller 412 to determine the position of the pedestal 232.

[0055] In another embodiment as illustrated in Fig. 11, a transport carrier 20 is deployed along a staircase 60. The transport carrier 20 comprises a support assembly 100 spanning along the staircase 60, a carriage assembly 200 movably coupled to the support assembly 100, a rod 300 coupled on both ends to the support assembly and configured to be generally parallel to the staircase 60 inclination, an actuation assembly 400 disposed on the lower point 50 of the staircase 60, and an actuation cable 500 coupled between the actuation assembly 400 and the carriage assembly 200. The actuation assembly 400 is desired to be located on the lower point 50 of the staircase 60. The support assembly 100 further comprises a pulley assembly 600, wherein a set of pulleys 602/604/606/608 guides the actuation cable 500 from the actuation assembly 400 along a top side of the support assembly 100, dropping to a bottom side of the support assembly 100 and coupling with

the carriage assembly 200. The carriage assembly 200 is configured such that it is slidable along the rod 300, hence allowing movement of the carriage assembly 200 relative to the rod 300 and the support assembly 100 along a line of movement 800. The location of the carriage assembly 200, or in other words the relative position of the carriage assembly 200 to the support assembly 100 and the rod 300, is controlled by the pulling and releasing of the actuation cable 500 by the actuation assembly 400. The pulley assembly 600 ensures that the actuation cable 500 is configured such that a force applied by the actuation cable 500 on the carriage assembly 200 is generally parallel to the rod 300, hence allowing maximum efficiency in force transfer between the actuation cable 500 and the carriage assembly 200. This allows for a smooth movement of the carriage assembly 200 relative to the support assembly 100.

[0056] As illustrated in Fig. 12A, 12B, 12C, 12D, 13A, and 13B the pedestal assembly 290 in another embodiment may include a pedestal support arm 294 coupled to the sleeve 220, a pedestal 292 hingedly coupled to the pedestal support arm 294, a biasing member 296 coupled between the pedestal 292 and the pedestal support arm 294, a spring loaded stopper 298 coupled to the pedestal support arm 294, contact sensors coupled to a peripheral of the pedestal 232, and a wire anchor 299 coupled to the pedestal 292 configured to connect with the wire rope 268. The wire anchor 299 is provided with an arc 299a to guide the wire rope 268 during the folding and unfolding of the pedestal 292. The arc 299a ensures constant tension in the wire rope 268, hence preventing failure in the wire rope 268 due to stress build up.

[0057] When the transport carrier 10 is not in operation, as illustrated in Fig. 12C and Fig. 13B, biasing member 296 biases the pedestal 292 to a “close” position 292a. When a user is intending to use the transport carrier 10, controller 412 sends a signal to the pedestal actuation assembly 260 for the motor 262 to pull the wire rope 268, the wire rope 268 coupled to the wire anchor 299 applies a rotational force on the pedestal 292, overcoming biasing member 296, for the pedestal 292 to assume a “ready” position 232b.

[0058] In the “ready position” 292b, as illustrated in Fig. 12D, a user and/or an object stepping or being placed on the pedestal 292 overcomes the spring loaded stopper

298, unfolding the pedestal 292 to the generally horizontal “operating” position 292c wherein the pedestal 292 abuts the stopper 298 to a mechanical hard stop. Stopper 298 prevents the pedestal 292 from further unfolding due to weight of the user and/or the object, hence reducing the holding torque requirement of the motor 262. Further, the mechanical
5 hard stop ensures the “operating” position 292c of the pedestal 292 to be generally horizontal, alleviating the need for fine control requirement of the pedestal actuation assembly 260 and ensures operation even when there is over pulling from the wire rope 268. Upon the user and/or object dismounting from the pedestal 292, the spring loaded stopper 298 biases the pedestal 292 to resume the “ready” position 292b awaiting further
10 operation, the controller 412 deactivates the up and down buttons 252/254 preventing any accidental movement of the carriage assembly 200. Upon no further operation, the controller 412 sends a signal to the pedestal actuation assembly 260 for the motor 262 to release the wire rope 268, allowing biasing member 296 to fold the pedestal 292 back to the “close” position 292a.

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[0059] As used herein, the singular “a” and “an” may be construed as including the plural “one or more” unless clearly indicated otherwise.

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[0060] This disclosure has been presented for purposes of illustration and description but is not intended to be exhaustive or limiting. Many modifications and variations will be apparent to those of ordinary skill in the art. The example embodiments were chosen and described in order to explain principles and practical application, and to enable others of ordinary skill in the art to understand the disclosure for various
embodiments with various modifications as are suited to the particular use contemplated.

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[0061] Thus, although illustrative example embodiments have been described herein with reference to the accompanying figures, it is to be understood that this description is not limiting and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the disclosure.

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CLAIMS

1. A transport carrier, comprising:

a support structure;

5 a rod coupled to the support structure;

a carriage receiving the rod therethrough, movable relative to the rod;

an actuating assembly;

a cable provided between the carriage and the actuating assembly

10 wherein the actuating assembly is controllable to pull the carriage along the rod
from a first position to a second position, the second position higher in elevation
relative to the first position.