United States Patent [19]

Barthel, Jr.

[11] **3,761,082**

[45] **Sept. 25, 1973**

[54] **HARNESS ASSEMBLY FOR EXERCISER AND WALKER DEVICES**

[76] Inventor: **Curtis Wallace Barthel, Jr.**, 114 S. Humphrey, Oak Park, Ill.

[22] Filed: **Dec. 5, 1972**

[21] Appl. No.: **312,253**

Related U.S. Application Data

[62] Division of Ser. No. 95,234, Dec. 4, 1970, Pat. No. 3,721,436.

[52] **U.S. Cl.** ..... **272/70,** 182/3, 244/151 R

[51] **Int. Cl.** **A61h 3/00**

[58] **Field of Search** ..... 272/70, 70.3, 70.4, 272/60, 57 R; 128/25 R, 25 B; 244/151 R, 151 A; 182/3

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Assistant Examiner—Arnold W. Kramer
Attorney—Basil Demeur

[57] **ABSTRACT**

A harness assembly is provided for use with an exerciser and walker apparatus which is mounted on mounting means and accommodates the torso of the user disposed therein, the harness assembly including a chest strap for engagement above the upper extremity of a torso, a waist strap for engagement about the waist of the torso, head and shoulder restraint means, a plurality of suspension straps interconnecting the chest strap, waist strap and head and shoulder restraint means, the suspension straps including connecting means for extending the harness and the lower ends of the suspension straps connected to the waist strap, and a pair of leg straps interconnecting the rear and front portions respectively, of the waist strap, thereby to secure the waist about the lower extremity of the torso.

4 Claims, 9 Drawing Figures

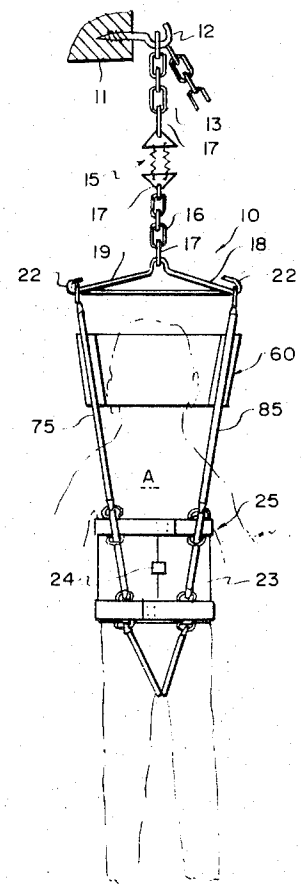


FIG. 1

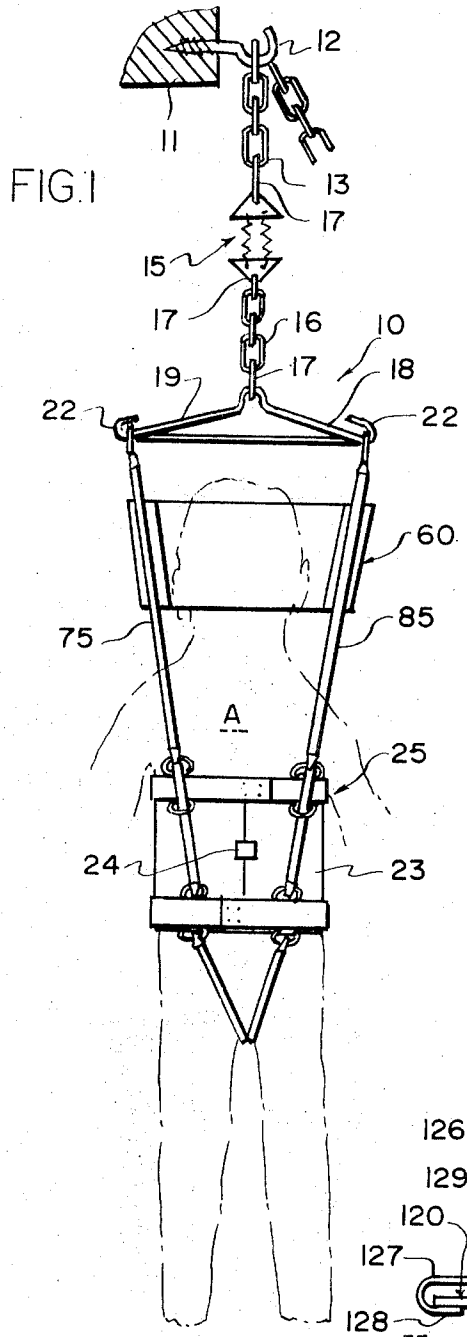


FIG. 2

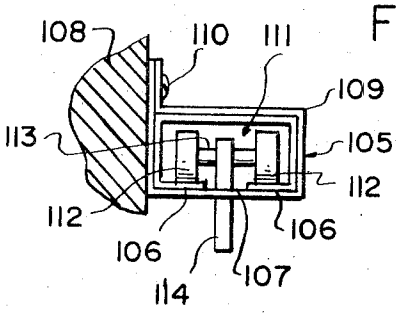


FIG. 3

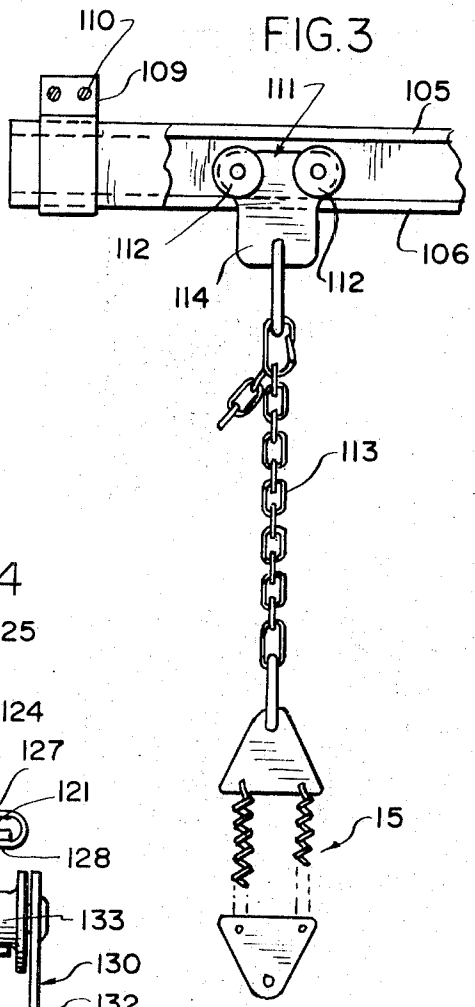


FIG. 4

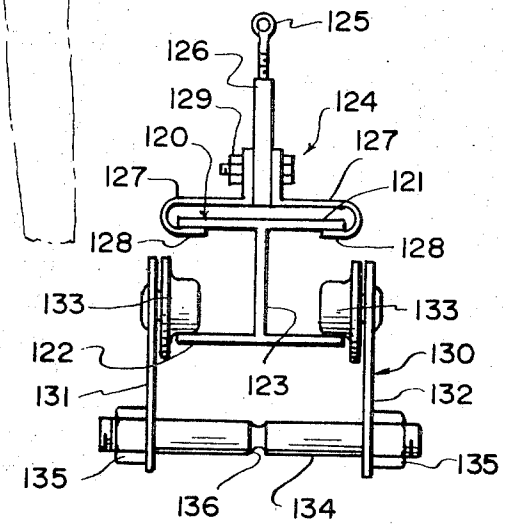


FIG.5

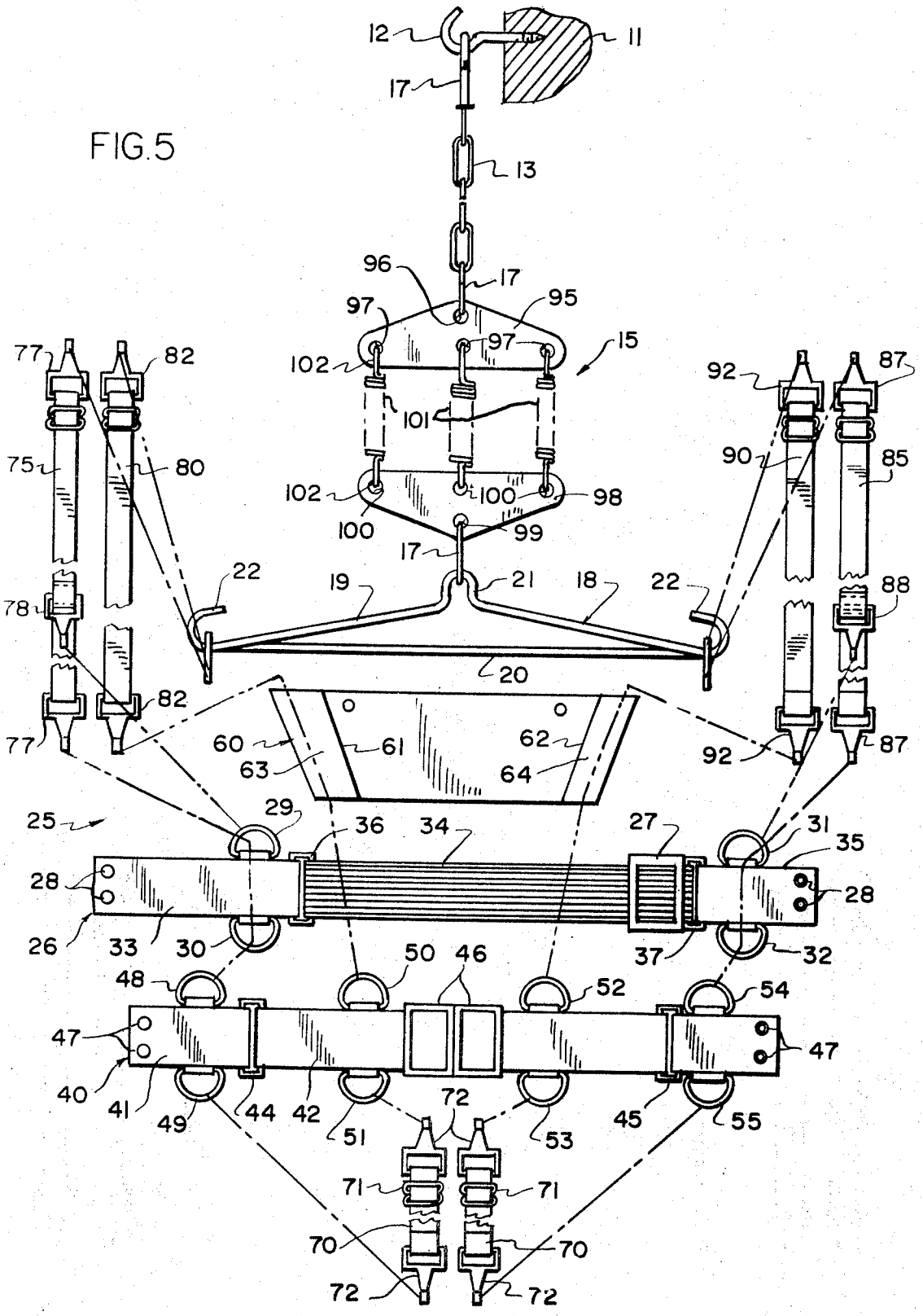

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FIG. 6

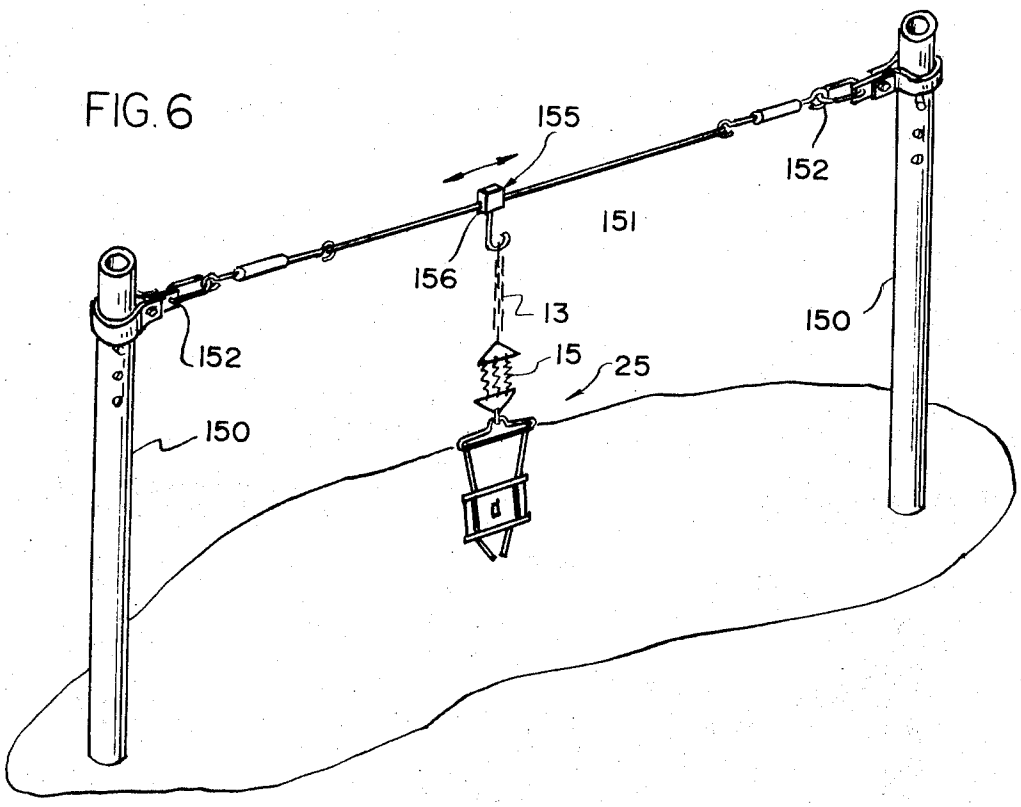
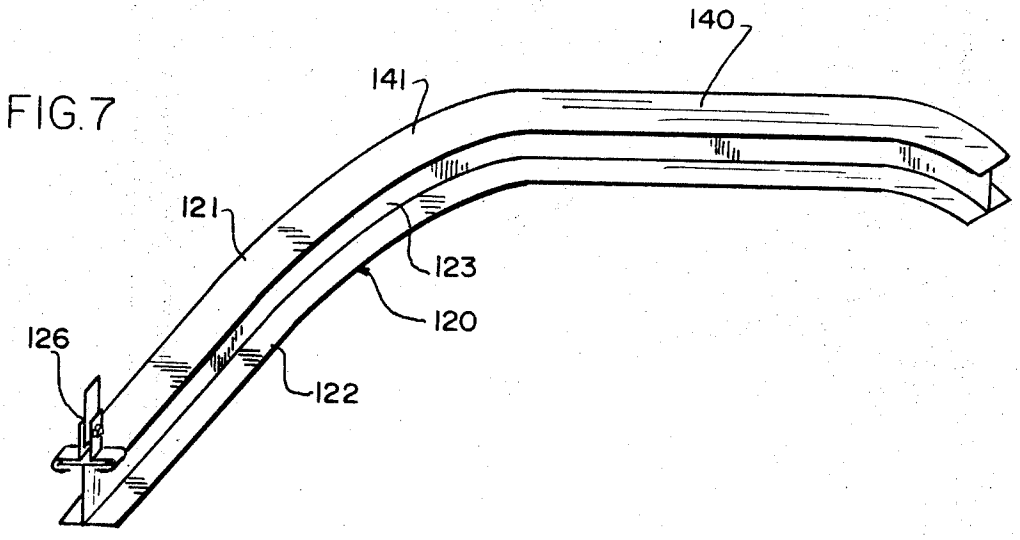


FIG. 7



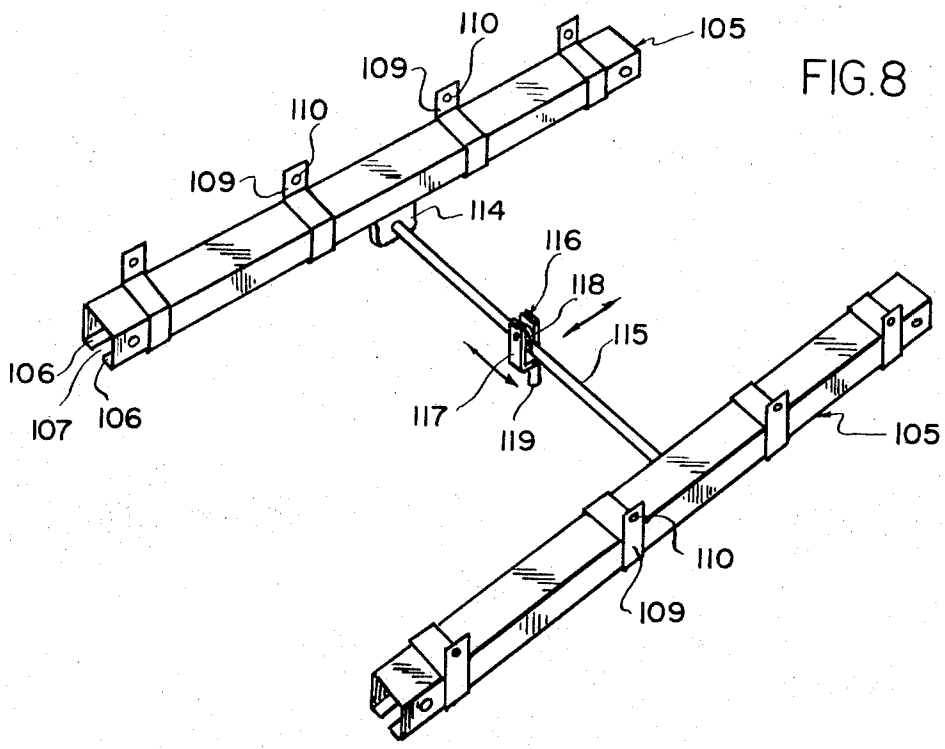

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FIG.8

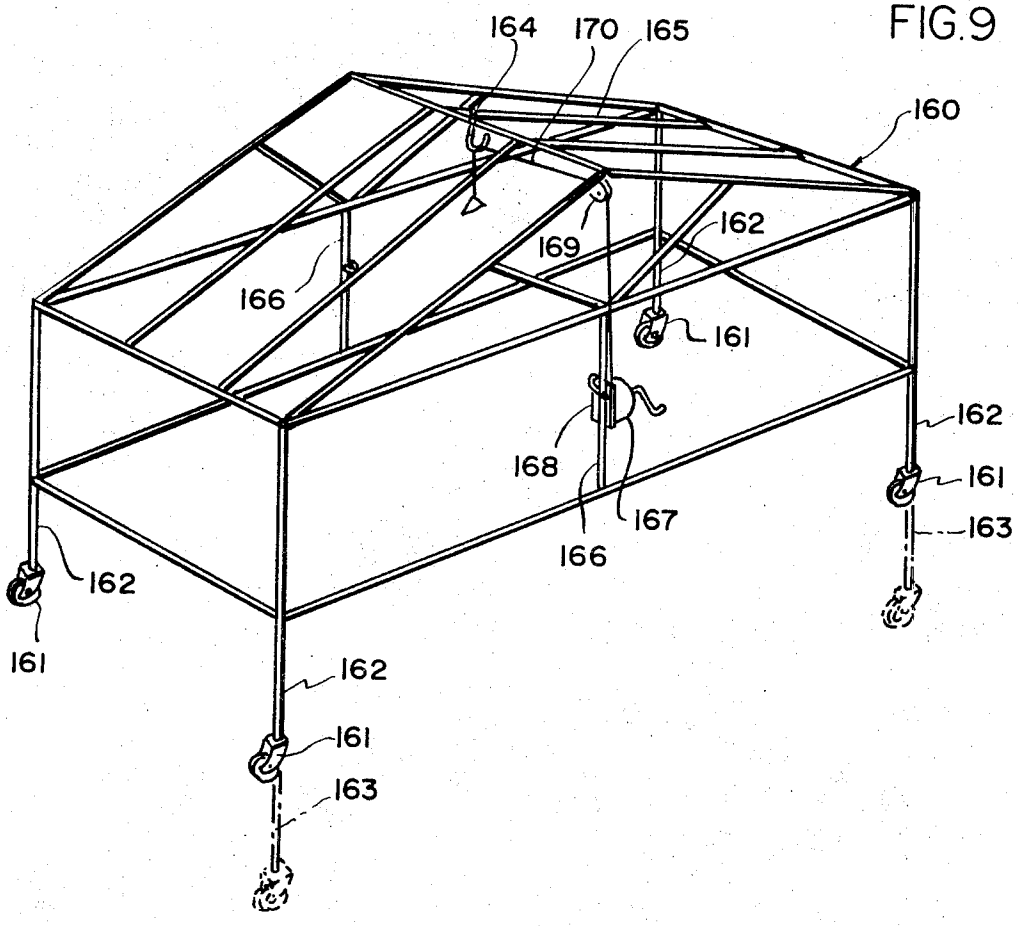

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FIG.9

HARNESS ASSEMBLY FOR EXERCISER AND WALKER DEVICES

This application is a division of parent application, Ser. No. 95,234, filed on Dec. 4, 1970, and now Pat. No. 3,721,436, in the name of Curtis Wallace Barthel Jr. and entitled EXERCISER AND WALKER APPARATUS.

BRIEF DESCRIPTION OF THE INVENTION

The present invention is directed to a novel exerciser and walker apparatus for aiding and permitting multidirectional movement of the user thereof, and which is particularly suited for use in connection with individuals stricken with such diseases as cerebral palsy, multiple sclerosis, and the like, as well as geriatric patients, and others requiring mechanical aid to permit ambulation.

The invention is particularly directed to an overall combination including an overhead support and guide means, such as a track or cable assembly, a moveable support means which is provided for movement along the track or guide means and which ultimately supports the user therefrom thereby to enable the user to ambulate in the area generally bounded by the track or guide means. The moveable support means ultimately support a harness assembly, which is completely adjustable circumferentially and vertically in order to accommodate the various shapes of the human torso, while at the same time providing firm support for the torso disposed therein. A principle feature of the invention is the provision of tension means, especially means such as tension springs, interposed between the moveable support means and the harness assembly which functions to counterbalance the weight of the user of the device, whereby the user thereof is suspended from the track or guide means in touching relationship with respect to the ground support surface. The invention is further related to and directed to a novel harness assembly for use in combination with a tensioned counterbalancing means having mounting means carried therefrom to support a human body in touching relationship with a lower support surface such as the ground.

In the past, therapists have experienced several problems in connection with rendering therapy to individuals with such diseases as cerebral palsy, or multiple sclerosis, or geriatric patients, wherein the individuals are not capable of unsupported ambulatory movement. In many cases, the individuals stricken with such diseases have little or no muscular control over their limbs in order to sustain themselves in any walking movement. Various types of therapeutic devices have been designed in the past in order to aid the patient in learning to walk or to otherwise gain control over their involuntary muscular reactions. Devices of this type are generally shown in several U. S. Pats. including U. S. Pat. No. 2,719,568 issued to N. E. Webb on Oct. 4, 1955, which shows a cage structure having a harness assembly suspended therefrom, the cage assembly being supported on casters whereby the patient is suspended from the harness assembly and grasps the side bars of the cage which is therefore moveably responsive to the movements of the patient. However, such devices present a danger in that if the patient should have uncontrollable muscle spasms or should be incapable of supporting himself by grasping the cage, the patient could conceivably injure himself by colliding

with some portion of the cage assembly. In addition, devices such as those disclosed in the aforementioned patent require that the patient, more or less, aid in their own support by physically grasping the side bars of the cage assembly. Other similar devices of the type disclosed in the aforementioned patent are shown in U. S. Pat. No. 1,661,807 issued to M. Bergh on Dec. 21, 1926; the walker assembly for invalids disclosed in U. S. Pat. No. 2,625,202 issued to L. Richardson et al on Jan. 13, 1953, which shows still another form of a cage or frame assembly on casters in which a patient is supported; a walker mechanism for invalids as shown in U. S. Pat. No. 2,327,671 issued to J. A. Rupprecht on Aug. 24, 1943, which again shows a cage or frame assembly supported on casters and including a hip truss for supporting the patient therefrom. Another similar device is disclosed in U. S. Pat. No. 3,252,704 issued to C. L. Wilson on May 24, 1966, which again shows a frame assembly having a harness assembly supported therefrom, and which requires that the patient ambulate within the cage assembly in order to gain movement. Another such device which shows a track supported walker is shown in U. S. Pat. No. 3,204,954 issued to T. D. Scannell on Sept. 7, 1965, which generally discloses an overhead track and supported by a pair of four legs and a dolly assembly disposed for lateral movement within the track and supporting therefrom a cage assembly wherein the patient may be suspended and which enables the patient to move in two directions, back and forth, along the restricted path encompassed by the overhead track member.

Hence, while the art has made several attempts to develop a device which will aid the patient in increasing the patient's muscular control over his limbs and to gain confidence and ambulatory movement, the devices noted above have presented many problems. One problem is that none of the devices proposed to date can provide a patient with multi-directional movement. For example, the devices which generally utilize cages or frames supported on casters, while appearing to provide a patient with multi-directional movement, nevertheless, because the patient must support himself within the cage assembly, and because such devices are cumbersome, such devices have not proved to be very successful. This is especially true where the patient is a child suffering from a disease such as cerebral palsy which necessarily means that the child patient would have very little control over his muscular movements, and therefore, the danger of an involuntary collision between the patient and the frame or cage assembly is not only possible but quite probable. Another problem imposed by the devices developed to date is that such devices cannot be conveniently used in a hospital or other similar facility where several patients are being given therapeutic treatment. For example, it would be quite cumbersome, and dangerous as well, if two or more patients were allowed to utilize a cage or frame assembly supported on casters in the same room. The danger of collision between a patient and a frame or cage assembly would be greatly enhanced and therefore, it would not be likely that more than one such device would be used at a time.

The present invention obviates the above as well as many other problems by providing an exerciser and walker apparatus which permits multi-directional movement by the patient utilizing the same.

It is therefore one of the important objects of this invention to provide an exerciser and walker apparatus for aiding and permitting multi-directional movement of the user thereof which includes guide means for guiding the movement of the apparatus, moveable support means carried by the guide means to provide movement along the length of the guide means, mounting means supported and spaced from the moveable support means for supporting the user therefrom, a harness assembly mounted on the mounting means for accommodating the torso of the user disposed therein, and tension means interposed between the moveable support means and the mounting means for counterbalancing the weight of the user carried by the harness assembly, whereby a user positioned within the harness assembly is supported in touching relationship with respect to the ground support surface and is permitted to ambulate in the area generally encompassed by the guide means.

Another object of this invention is to provide an exerciser and walker apparatus of the type set forth above, wherein the guide means comprises an I-beam track and the moveable support means comprises a moveable dolly assembly stratling the base of the I-beam and disposed in rolling engagement therein, the dolly assembly supporting the harness assembly therefrom whereby the user disposed in the harness assembly is permitted multi-directional movement in the area generally encompassed by the I-beam track.

Still another object of this invention is to provide an exerciser and walker apparatus of the type set forth which eliminates the need for cumbersome mechanical cages or frames disposed about and around the user thereof thereby to eliminate the danger of injury to the user through collision with the cage or frame.

Another object of the present invention is to provide an exerciser and walker apparatus of the type set forth above wherein the guide means consists of a pair of track members mounted on sidewall support surfaces, such as indoor walls, the track members disposed in horizontal alignment with respect to one another and each of the track members having moveable means carried thereby, such moveable means being disposed thereon for movement along the length of the track member, a support member having the opposed ends mounted on corresponding ones of the moveable means whereby the support member is moveably responsive to the movement of the moveable means, moveable support means carried by the support member, the moveable support means being moveable along the length of the support member, a harness assembly being supported by the moveable support means, and tension means interposed between the harness assembly and the moveable support means whereby the user thereof is capable of multi-directional movement throughout 360° in any given area encompassed by the pair of track members.

Yet another object of this invention is to provide a harness assembly for use in combination with tensioned counterbalancing means having mounting means carried therefrom to support a human body in touching relationship with a lower support surface, the harness assembly including an adjustable chest strap for engagement about the upper extremity of the torso, an adjustable waist strap for engagement about the waist of the torso, head and shoulder restraint means, a plurality of suspension straps interconnecting the chest strap, the waist strap, and the head and shoulder restraint means, the upper ends of the suspension straps including connecting means for suspending the harness assembly and the lower ends of the suspension straps connected to the waist strap, and a pair of leg straps interconnecting the rear and front portions respectively of the waist strap thereby securing the waist strap about the lower extremity of the torso.

In connection with the foregoing object, it is still another object of this invention to provide a harness assembly of the type set forth wherein all of the straps are completely adjustable in order to accommodate any shape and size human torso.

Still another object of the present invention is to provide an exerciser and walker apparatus of the type set forth hereinabove wherein the height of the harness assembly in relation to the ground support surface is completely adjustable in order to accommodate the varying heights of individuals utilizing the apparatus.

Further features of the invention pertain to the particular arrangement of the parts whereby the above-outlined and additional operating features thereof are obtained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof will best be understood by reference to the following specification taken in connection with the accompanying drawings, in which:

FIG. **1** is a side elevational plan view showing the harness assembly suspended from an overhead support, indicating a patient disposed therein in phantom;

FIG. **2** is a front cross-sectional view of one embodiment of a track and dolly assembly;

FIG. **3** is a side party cross-sectional view showing the embodiment of a track and dolly assembly for supporting a harness assembly therefrom of the type illustrated in FIG. **2**;

FIG. **4** is a front elevational view showing an I-beam track structure which is mounted from an overhead support surface and includes a dolly assembly provided for rolling movement along the base of the I-beam track;

FIG. **5** is an exploded plan view showing the details of the novel harness assembly;

FIG. **6** is a plan view showing another form of a track and pulley assembly in accordance with the present invention;

FIG. **7** is a plan view showing a track assembly similar to the track illustrated in FIG. **4**, but including curve sections particularly suited for indoor use;

FIG. **8** illustrates still another embodiment of a track assembly which is particularly adapted for mounting on opposed sidewall support surfaces and which enables the patient to have complete 360° multi-directional movement;

FIG. **9** illustrates still another embodiment of the present invention wherein the harness assembly, as shown in FIG. **5** of the drawings, may be utilized in connection with a cage or frame assembly.

Referring now specifically to FIG. **1** of the drawings, there is shown an exerciser and walker apparatus generally referred to by the numeral **10** which is shown to be supported from an overhead support structure **11** in which is mounted a hook **12** for suspending the apparatus **10** for purposes of illustration. The exerciser and walker apparatus **10** is suspended by means of a first length of chain **13** which engages the hook **12** at its

upper end and the tension means **15** at its lower end. The first length of chain **13** is adjustable thereby to either raise or lower the exerciser-walker apparatus **10.** A second length of chain **16** extends from the lower portion of the tension means **15** and is connected thereto at its upper end, and extends downwardly therefrom. Once again, the second length of chain **16** is adjustable in order to vary the positioning of the remainder of the apparatus **10** with respect to the ground support surface. The lower end of the second length of chain **16** is connected to a hanger bar **18,** which generally consists of an upper support bar **19** and a lower support bar **20.** The upper support bar includes an inverted U-shaped section **21** whereat the lower end of the second length of chain **16** is connected. The chains **13** and **16** are connected to their respective elements as indicated above by means of safety hooks **17,** if desired, whereby the chains **13** and **16** are disengagably connected with the elements as indicated. The outer ends of the hanger bar **18** are up-turned to form hook ends **22** for supporting the remainder of the apparatus. The remainder of the apparatus comprises a harness assembly generally referred to by the numeral **25** which is suspended from the hanger bar **18** at the up-turned hook ends **22** by means of suspension straps **75** and **85** as will be more fully described hereinafter. The support straps **75** and **85** are suspended from the hook ends **22** by means of snap hooks **77, 87** which are disengagably connected to the hook ends **22.** The details of the harness assembly **25** are more particularly shown in FIG. **5** of the drawings, and will now be described.

The harness assembly **25** consists of a chest strap **26,** which is formed of a heavy fabric material and is adjustable circumferentially by means of a buckle **27** through which a portion of the strap **26** is overlapped. The strap **26** is fastened about the upper extremity of the torso by means of snap fasteners **28,** although other fastening means may similarly be utilized. The strap **26** is also provided with a series of four hook receivers **29, 30, 31, 32** which are permanently affixed to the strap **26.** Hook receivers **29** and **30** are carried by the chest strap **26** adjacent one end thereof, while hook receivers **31** and **32** are carried adjacent the opposed end of the strap **26,** and are disposed so that in use, the hook receivers **29, 30, 31** and **32** are disposed along the front of the torso, hook receivers **29** and **31** being carried along the upper edge of the strap **26,** and hook receivers **30** and **32** being carried along the lower edge thereof. As shown in FIG. **5,** the strap **26** is formed in three sections **33, 34,** and **35** which are held together by means of two connectors **36** and **37.** This construction renders the strap **26** more conformable to the circumferential positioning about the torso. The central section **34** of the chest strap **26** is formed of an elastic material thereby to render the chest strap **26** more adjustable and conformable to the torso of the user.

Disposed below the chest strap **26** is a waist strap **40** which is similarly formed of a heavy fabric material. Once again, as shown in FIG. **5,** the waist strap **40** is formed in three sections **41, 42** and **43** which are held together by two connectors **44** and **45** to render the strap more easily conformable to circumferential positioning about the waist portion of the torso. The strap **40** similarly is circumferentially adjustable by means of a pair of buckles **46** carried by the second section **42** of the strap **40** through which a portion of the strap **40** is overlapped, and the strap **40** is fastened about the waist portion by snap fasteners **47** positioned to engage one another in the known manner. The waist strap **40** carries a series of eight hook receivers **48, 49, 50, 51, 52, 53, 54** and **55,** whereby in use, and as worn by the user, hook receivers **48, 54** are disposed along the upper front portion of the strap **40,** hook receivers **49, 55** being disposed along the lower front portion of the strap **40,** hook receivers **51, 52** being disposed along the upper rear portion of the strap **40,** and hook receivers **51, 53** being disposed along the lower rear portion of the strap **40.**

The harness assembly **25** also includes a head and shoulder restraint **60** which, in use, is positioned substantially between the hanger bar **18** and the chest strap **26.** The restraint **60** consists of a single thickness of heavy fabric and functions to help support the head and shoulders of the patient when positioned in the harness **25.** The lateral edges **61, 62** of the restraint **60** are each folded over upon themselves for a short distance and secured to the restraint, such as by sewing, to form a pair of channels **63, 64** for a purpose to be described more clearly hereinafter. A pair of grommets **65** are provided adjacent the upper edge of the restraint **60** through which attachment cords or hooks (not shown) may be inserted and connected to the lower support bar **20** of the hanger bar **18** to provide additional support for the harness assembly **25.**

The harness assembly also includes a pair of leg straps **70,** each strap **70** formed, once again, of a heavy fabric material. Each strap **70** is provided with a buckle **71** through which a portion of the strap **70** is overlapped to allow the straps **70** to be adjustable. Each end of each of the straps **70** is provided with a snap hook **72** for a purpose to be more fully described hereinafter.

The harness assembly **25** is completed with a series of four suspension straps **75** which function to support and suspend the harness assembly **25** from the hanger bar **18.** Each of the straps **75, 80, 85** and **90** is provided with adjustment buckles **76, 81, 86** and **91,** respectively, through which a portion of the straps are overlapped in order to render each of the straps adjustable depending upon the size of the user thereof. Each of the straps **75, 80, 85, 90** is provided with a snap hook **77, 82, 87** and **92** respectively at each end thereof, and in addition, the two outer straps **75, 85** (as viewed in FIG. **5**) are each provided with a third snap hook **78** and **88** respectively, disposed adjacent to the lower snap hooks thereof.

To assemble the harness assembly **25,** the lower ends of the two inner suspension straps **80** and **90** are each passed through the corresponding channels **63** and **64** respectively of the head restraint **60,** after which the lower snap hooks **82** and **92** are connected to hook receivers **50** and **52** respectively. The lower ends of each of the two outer straps **75** and **85** are passed through hook receivers **29, 30** and **31, 32** respectively, and connected to hook receivers **48** and **54** respectively. The third snap hooks **78** and **88** are each then connected to hook receivers **29** and **31** respectively. The leg straps **70** each have upper snap hooks **72** connected to hook receivers **51** and **53** respectively, and the lower snap hooks **72** connected to hook receivers **49** and **55** respectively.

Hence, when the patient is inserted in the harness assembly **25,** the chest strap **26** is snapped about the upper extremity of his torso by interconnecting snap fasters **28** and the waist strap **40** is snapped about the

lower extremity of his torso by interconnecting snap fasteners **47.** The third snap hooks **78** and **88** of the outer suspension straps **75** and **85** are connected to hook receivers **29** and **31** respectively, while the lower snap hooks **77** and **87** are passed through hook receivers **29, 30** and **31, 32** respectively and connected to hook receivers **48** and **54** respectively, thereby supporting the front of the harness assembly **25** on the patient. The lower ends of the two inner straps **80** and **90** are passed through the channels **63** and **64** respectively of head restraint **60** and connected to hook receivers **50** and **52** respectively to support the rear of the harness assembly **25** on the patient. The leg straps **70** have the upper snap hooks **72** connected to hook receivers **51** and **53** respectively, the lower ends of the leg straps **70** then being passed between the legs of the patient and having the lower snap hooks **72** connected to hook receivers **49** and **55** respectively to support and position the front and rear portions of the waist strap **40** in place on the patient. The upper snap hooks **77, 82, 87** and **92** are each connected to and suspended from the hook ends **22** of hanger bar **18** to support and suspend the harness assembly **25** from an overhead support.

As shown in FIG. **1,** prior to positioning the patient within the harness assembly, a cushioning pad **23** is provided which is worn about the patient's torso in order to prevent the various straps of the harness assembly **25** from cutting into the patient's body. The pad **23** is fastened about the patient's torso by means of a suitable connector **24,** which may be in the form of a buckle, or snap fastener, or other suitable fastening means.

The tension means **15** is also particularly illustrated in FIG. **5** and is shown to include an upper support plate **95** having an opening **96** disposed adjacent the upper edge thereof, and a series of three spring receiving openings **97** disposed adjacent the lower edge thereof, a lower support plate **98** having an opening **99** disposed adjacent the lower edge thereof, and a series of three spring receiving openings **100** disposed adjacent the upper edge thereof, and a series of three tension springs **101** having hooked ends **102** at both ends of each of the springs **101.** The upper hooked ends **102** are received in and carried by spring receiving opening **97** and the lower hooked ends **102** are received in and carried by spring receiving openings **100.** The tension means **15** is connected to the assembly by inserting a safety hook **17** through the upper opening **96** and through one link in chain **13,** and by another safety hook **17** which is passed through the lower opening **99** and either through the U-shaped section **21** of hanger bar **18** (as shown in FIG. **5**), or through one link of another length of chain **16** (as shown in FIG **1**).

Of course, depending upon the weight of the patient positioned in the harness assembly **25** and the resulting weight to be counter-balanced as a result, more or fewer springs **101** may be utilized. Similarly, tension springs **101** of various tension grades may be employed merely by removing and replacing springs as indicated above. In this manner, as a patient improves his muscular strength and coordination, springs having a lesser tension grade may be used to thereby counterbalance less of the patient's weight requiring the patient to support and carry more of his own weight as he uses this apparatus.

The complete apparatus envisions the use of a guide means having disposed thereon moveable support means from which is supported the tension means **15** and the harness assembly **25.** Referring now to FIGS. **2, 3** and **8** of the drawings, there is shown one embodiment of a guide means and moveable support member which is particularly useful in connection with the present invention. In FIG. **2,** there is shown a box channel **105** which is in the form of an inverted U-shaped structure having lateral flanges **106** extending inwardly toward the center thereof from the lower edges of the channel **105,** thereby to form an open slot **107** between the inner edges of the respective flanges **106.** The box channel **105** may be affixed to any suitable surface **108** such as by means of a clamp **109** affixed to the surface **108** by means of a bolt **110.** A dolly assembly **111** is disposed within the box channel **105** and generally consists of a pair of wheels **112** mounted on a common axle **113** with a support plate **114** similarly mounted on the axle **113** and extending downwardly therefrom through the slot **107.** The lateral flanges **106** are of sufficient width in order to provide a track for the wheels **112** to ride upon. If desired, a box channel **105** of the type described may be used individually with a dolly assembly **111** from which would be supported a length of chain (**13** of FIG. **1**) which in turn would support and carry the tension means **15** and the harness assembly **25,** as illustrated in FIG. **3.** However, a preferred embodiment of this invention is more clearly shown in FIG. **8** of the drawings wherein there is shown a pair of box channels **105** of similar construction and mounted to a pair of side support surfaces (not shown) such as for example, opposed walls in an interior room. A support rod **115** is shown to have the opposed ends thereof mounted on respective ones of the dolly assemblies **111** carried in each of the box channels **105,** the opposed ends of the support rod **115** being mounted on and carried by the support plate **114** of opposed dolly assemblies **111.** A pulley assembly, generally indicated by the numeral **116,** is disposed upon the support rod **115,** the pulley assembly generally consisting of a U-shaped clamp **117** carrying a pulley wheel **118** above the support rod **115,** the pulley wheel **118** being disposed for rolling movement along the support rod **115.** A suspension plate **119** is provided adjacen the lower end of the U-shaped clamp **117** from which is suspended the remainder of the apparatus. It will be seen therefore that when a patient is inserted in a harness assembly **25** and suspended from the suspension plate **119** of the pulley assembly **116,** the patient is capable of 360° multi-directional movement throughout a complete room since the support rod **115** is moveably responsive to the movement of the dolly assemblies **111** in each of the box channels **105** and the pulley assembly may be moved along the length of the support rod **115.** If a sufficiently large room is provided, such as for example, a clinic or therapuetic institution, several dolly assemblies and corresponding support rods could be supported by a pair of box channels **105** mounted along the side walls of the room. In addition, if the dimensions of the room are sufficiently large, additional pulley assemblies **116** could be mounted on each of the support rods **115** in order to enable the institution or clinic to render therapuetic treatment to several patients at the same time.

With reference to FIGS. **4** and **7** of the drawings, there is illustrated still another preferred embodiment of the present invention which, once again, enables a patient to have multi-directional movement when sup-

ported by a harness assembly **25** in the manner indicated hereinabove. With reference to FIG. **4**, there is shown an I-beam, generally referred to by the numeral **120**, and which consists of an upper horizontal plate **121**, a lower horizontal plate **122**, and interconnecting vertical plate **123** interconnecting the upper horizontal plate **121** with the lower horizontal plate **122**. The I-beam **120** may be supported from an overhead surface, such as a ceiling structure, by means of a clamp assembly **124** bolted to the ceiling by bolts **125**. The clamp assembly **124** consists of a central rib **126** having an opening (not shown) disposed therethrough and a pair of oppositely extending arms **127** having inwardly turned edges **128** thereby to provide a space between the inwardly turned edge **128** and the under portion of the arm **127**. The arms **127** are designed to engage the opposed edges of the upper horizontal plate **121** of the I-beam **120** and bolted in place on the rib **126** by means of a bolt and nut assembly **129**. As many clamp assemblies **124** may be utilized as will sufficiently support the I-beam **120** from an overhead support structure.

The lower horizontal plate **122** of the I-beam **120** carries a dolly assembly generally referred to by the numeral **130**. The dolly assembly **130** generally consists of a pair of side plates **131** and **132**, each of which has a wheel assembly **133** mounted thereon adjacent the upper edge thereof, each wheel being mounted thereon for rotational movement. A mounting bar **134** is carried adjacent the lower edges of the plates **131** and **132**, the bar **134** being disposed through openings (not shown) provided in each of the plates **131** and **132** and held in place by means of nuts **135** threadedly secured thereon. A groove **136** is provided in the mounting rod **134**, the groove **136** being centrally disposed therein. Hence, the lower horizontal plate **122** of the I-beam **120** provides a convenient track upon which the wheels **133** of the dolly assembly **130** ride upon. Once a patient has been inserted in the harness assembly **25**, the upper length of chain may be connected to the mounting rod **134** by inserting a safety hook in the groove **136** thereof. In this manner, the hook is prevented from moving laterally thereby insuring that the patient is supported in the central portion of the mounting rod **134**.

FIG. **7** is intended to illustrate that the I-beam track **120** may be provided in terms of a straight section **140** and a curved section **141**, the respective section being provided either separately and joined together by a suitable clamp structure, or the I-beam track **120** may be formed as an integral piece having both curved and straight section. The advantages of providing the I-beam track **120** in both straight sections **140** and curved sections **141** is that this particular embodiment may be adaptable for use in homes by installing the appropriate straight sections **140** and curved sections **141** whereby the patient would be able to ambulate from room to room without requiring any additional apparatus, or having to use any apparatus which would hinder movement through doorways and the like.

FIG. **6** of the drawings illustrates still another embodiment of the guide means which may be utilized in connection with the present invention. In FIG. **6**, there is shown a pair of stationery support posts **150** suitably mounted in a ground support surface. A cable **151** is stretched across the opposed stationery support posts **150** and is kept in tensioned position by means of tension clamps **152** provided on each of the support posts **150**. A pulley assembly **155** is mounted upon and carried by the cable **151**, the pulley assembly generally consisting of an inverted U-shaped clamp **156**, which carries a pulley wheel (not shown) disposed for rolling movement along the cable **151**. The lower edge of the U-shaped clamp **156** carries a hook **157** from which the harness assembly **25** is supported. The embodiment as shown in FIG. **6** of the drawings is particularly suitable for outdoor use and it will be appreciated that by having the support posts **150** disposed a substantial distance from one another, and having the cables stretched and tensioned therebetween, the patient is provided with multi-directional movement in the outdoors.

In FIG. **9** of the drawings, there is illustrated still another embodiment of the present invention which is intended to show the usefullness of the harness assembly in connection with a cage assembly where desireable. Hence, there is shown a cage assembly generally referred to by the numeral **160** which is formed of a tubular metallic material, such as tubular steel or tubular aluminum. The cage assembly is mounted and supported on a series of four casters **161**, which thereby render the cage **160** moveably responsive to the movement of the patient disposed and supported therein. In the embodiment shown in FIG. **9**, it will be noted that each of the four corner legs **162** have a caster support leg **163** telescopically disposed therein. Suitable stops may be provided whereby the relative height of the cage assembly **160** from the ground support surface may be adjusted to accommodate patients of varying heights by adjusting the caster support legs **163** to the height desired and tripping the stops to hold the legs **163** in place. The cage **160** is provided with a support hook **164** mounted in the central portion of the roof assembly **165**. Each of the sides of the cage assembly **160** includes a lateral support bar **166**, one of the lateral support bars carrying a master pulley assembly **167** mounted upon a pulley mount **168**. The roof assembly **165** of the cage **160** is provided with a second pulley assembly **169**, which is disposed in vertical alignment with the master pulley assembly **167**. The master pulley assembly **167** is of course provided with a cable **170** which in use extends upwardly and around the second pulley **169** and is supported and carried by the support hook **164** in the central portion of the cage assembly **160**. In this manner, the positioning of the patient within the cage assembly **160** is adjustable by means of the master pulley assembly **167**. Hence, in this embodiment, both the cage assembly **160** is adjustable by means of the caster support legs **163** and the height relationship of the patient with respect to the ground support surface adjustable by means of the master pulley assembly **167**.

In the practice of the present invention, a patient is positioned within the harness assembly **25** in the manner indicated hereinabove. After the various straps of the harness assembly **25** have been appropriately adjusted in order to comfortably accommodate the patient, the harness assembly **25** is mounted on and supported by the hanger bar **18**. The hanger bar **18** is in turn mounted on and carried by the tension means, which as previously descrbed, may be varied according to the size and weight of the patient. The tension means **15** is in turn connected to and supported by the particular moveable support member which is provided. For example, with reference to FIGS. **2** and **3** of the draw-

ings, the tension means **15** would have a length of chain **13** connected to the upper end thereof, and the upper length of the chain length **13** is mounted upon the support plate **114** of the dolly assembly **111.** Since the dolly assembly **111** is disposed for rolling movement in the box channel **105,** as the patient moves his legs, he will move in an area generally encompassed by the box channel **105.** Similar ambulatory movement is provided by using the I-beam track and dolly assembly as shown in FIGS. **4** and **7** of the drawings, wherein the length of chain **13** which carries the tension means **15** would have its upper end mounted in the groove **136** of the mounting rod **134.** As the patient moves his legs, the movement of his body causes the dolly assembly **130** to move along the lower horizontal plate **122** of the I-beam track **120.** Similarly, as discussed with reference to FIG. **9** of the drawings, once the patient has been adequately secured to the cable **170** carried by the cage assembly **160,** and the caster support legs **163** and master pulley assembly **167** has been appropriately adjusted to accommodate the patient, the movement by the patient along the ground support surface will cause the cage assembly **160** to move in response to his movements by way of the casters **161.**

Hence, there has been provided by virtue of this invention, a novel exerciser and walker apparatus for aiding and permitting multi-directional movement of the user thereof which generally consists of a guide means, a moveable support means disposed for movement along the guide means, a harness assembly for supporting the user therein, and tension means for counterbalancing the load carried by the harness assembly with respect to the ground support surface. There has further been provided as a subcombination herein, a novel harness assembly which is substantially completely adjustable in order to accommodate the various shapes and sizes of different patients or users thereof.

While there has been described what is at present considered to be the preferred embodiments of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. A harness assembly to support a human body in touching relationship with respect to a lower support surface comprising a chest strap for engagement about the upper extremity of a torso, a waist strap for engagement about the waist of the torso, head and shoulder restraint means, a plurality of front and rear suspension straps interconnecting said chest strap said waist strap and said head and shoulder restraint means, said front suspension straps interconnecting said chest and waist straps, and said rear suspension straps interconnecting said head and shoulder restraint means with said waist strap such that said front and rear suspension straps cooperate to mutually interconnect said chest and waist straps with said head and shoulder restraint means, the upper ends of said suspension straps including connecting means for suspending the harness and the lower ends of said suspension straps being connected to said waist strap, and a pair of leg straps interconnecting the rear and front portions respectively of said waist strap thereby securing said waist strap about the lower extremity of the torso.

2. The harness assembly as set forth in claim **1** wherein each of said chest straps, waist straps, suspension straps and leg straps are adjustable to accommodate variously shaped torsos.

3. The harness assembly as set forth in claim **1** wherein the lower ends of said suspension straps are disengagably connected to said waist strap and the opposed ends of each of said leg straps are disengageably connected to the rear and front portions respectively of said waist strap thereby to facilitate the insertion and removal of the harness assembly from the torso.

4. The harness assembly as set forth in claim **1,** which further includes a resilient pad removably fastened about the torso and interposed between the torso and said chest strap and said waist strap thereby to prevent the respective straps from applying direct pressure against the torso.

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