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(54) **Rehabilitation device used in walking therapy**

(57) In a rehabilitation device (1) used in walking therapy and comprising a supporting or carrying structure (100), to which a running rail (20) is attached, situated above a exerciser person, along which a truck (30) moves with a suspended carrying device (40) for relieving the legs of the exerciser person placed in the carrying device (40), cooperating with a system (50) for adjusting the force of relieving legs of the exerciser person and a mechanism (70) for adjusting the height of the carrying device (40) over the base, the carrying construction (100) comprises at least two supports (101 and 102) of gate structure, whose elements surround a space in which, along the running rail fixed to the supports (101 and 102) and situated at the top of the space surrounded by elements of the supports (101 and 102), a truck moves with a suspended carrying device for relieving the legs of the exerciser person, where the carrying device is suspended on one end of a string or tension member which is scrolled through a roller placed in a rotary manner on the truck and a prop roller placed in a rotary manner on a movable element of the system (50) for adjusting the force of relieving the legs of the exerciser person, movable under the influence of the tension force of the string, while the other end of the string is scrolled on a drum joined with a self-locking drive of the mechanism (70) for adjusting the height of the carrying device (40) over the base.

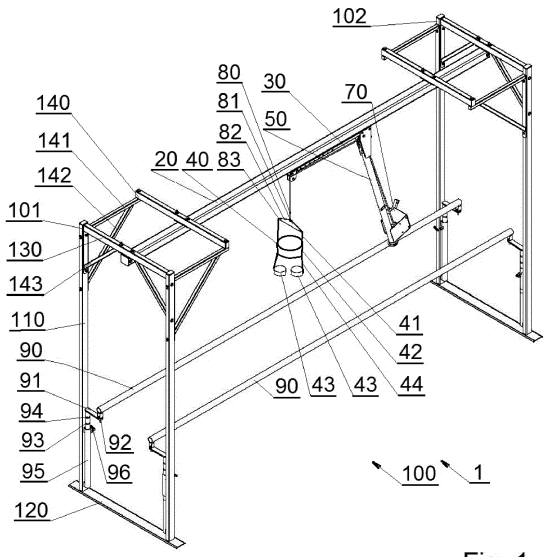

Fig. 1

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Description

[0001] The subject of the invention is a rehabilitation device used in walking therapy, especially in reeducation of gait, in line with the preamble of the claim 1, designed especially to after-treatment rehabilitation of patients who, due to their illnesses, have temporarily lost the ability to walk or have experienced limitations in the aforementioned ability.

[0002] Physical ability, including improvement in walking, may be achieved by means of a device presented in publication DE 10120187 of description of invention titled *"Verstellbare Handlaüfe & Armstützen zur Gewichtsentlastung und Sicherung des Patienten mit integrierter Fernsteuer-&STOP-Function auf dem Laufband Ergometer"*. The above-mentioned device comprises a treadmill and railings of adjustable heights. The railings are mounted to the sides of the treadmill.

[0003] In the publication US 6,821,233 B1 titled *"Device and method for automating treadmill therapy"* is described a rehabilitation device with a treadmill and an orthotic device which guides the patient's legs according to a specified pattern. The orthotic device may also have adjustable height of its mounting over the treadmill and may be tailored to various patients.

[0004] Both devices described above have complicated structure, which makes that they are expensive.

[0005] The purpose of this invention is to propose a rehabilitation device which has a simple structure and a reasonable price and which is suitable for people who, due to their illnesses, have temporarily lost the ability to walk or have experienced limitations in the aforementioned ability.

[0006] This task was solved by means of a rehabilitation device with features of claim 1. Preferred embodiments of its construction have been provided in the dependent claims.

[0007] The rehabilitation device according to the invention and used in walking therapy comprises a supporting or carrying construction with an attached running rail placed on the height exceeding the height of a rehabilitated person.

[0008] Although a running rail in its simplest form, as well as adjusted supporting construction, has a longitudinal symmetry axis which is a straight line, it is also possible to use a circular or semi-circular shape of a running rail on which a truck with a suspended carrying device for relieving legs of a rehabilitated person and a mechanism for regulating the height at which the carrying device is situated above the ground. In such case, the supporting or carrying construction could comprise more than two supports of gate structure, for example three, whose elements limit the space in which, along the running rail mounted to supports and situated above the space surrounded by supports, the truck would move with the suspended carrying device for relieving the legs of the rehabilitated person.

[0009] In the most advantageous embodiment of this invention, the carrying device is suspended on one end of a string or a tension member which is scrolled through a roller mounted in a rotatable manner on the truck and a support roller placed in a rotatable manner on a movable element of the system regulating the force of relieving legs of a rehabilitated person, which is moved by the pulling force of the string or the tension member, while the other end of the string or the tension member is scrolled on a drum coupled with a self-locking drive of the mechanism for regulating the height of the carrying device over the base.

[0010] In a solution with a straight-line running rail supports can be placed opposite to each other, for example in a parallel manner, at a distance not exceeding the length of the running rail, and each of them comprises two posts, a lower connector and the main upper connector, which, when joined, form a quadrangle, while the running rail is mounted to the main upper connector. It is recommended then that the running rail should be mounted in the middle of the main upper connector.

[0011] In another embodiment of this invention supports may comprise two joined stands of a reverse "U" letter, with arms at the top bent from each other from the vertical, to which, at their highest point from the bottom, the running rail is mounted. For the running rail to be mounted to all stands, the distance between the upper points of the arms of external stands cannot be longer than the length of the running rail.

[0012] Bearing in mind the simplicity of the solution, it is advisable for the running rail to be a polygon shape, for example a rectangular, with a longitudinal gap in its bottom wall, while the truck should comprise a running strip to whose upper surface the supports for running wheels sets would be mounted, with horizontal axes of rotation, transmitting weight onto the running rail. Pins can be attached to the strip, which form axes for running wheels with vertical axes of rotation, providing side stability of the truck, whose supports would be situated in the gap of the running rail after the running strip with running wheels and guiding wheels would be mounted inside the running rail.

[0013] Equally simple is the solution when the running rail it a double-tee bar and the truck comprises a running strip, to which from the top the bows are attached which enclose the bottom shelf of the running rail and designed for sets of running wheels with axes bent from the level and transmitting weight to the bottom shelf of the double-tee bar.

[0014] It is recommended that the system for adjusting the power of relieving the legs of a rehabilitated person should comprise a casing firmly mounted to the truck, inside which there is the movable element of the system for force regulation, affected by a spring of pulling force regulated with a guide screw placed in the casing, whereas the longitudinal axis of the string, the longitudinal axis of the guide screw and the movement track of the movable element of the system for force regulation are on the same straight line.

[0015] It is preferred when the self-locking drive of the mechanism adjusting the height of the carrying device over the base is a worm gear mounted to the casing of the system regulating the power of relieving the legs of a rehabilitated person by means of a board.

[0016] In the presented embodiment it is advisable that the rehabilitation device has at least one railing with adjustable height, situated above the base and the adjustable distance from the longitudinal axis of a supporting or a carrying construction.

[0017] Preferred embodiments of the invention, their structure, functions and advantages are further presented in more detail with reference to the drawings, where:

Fig. 1 shows a schematic view of a rehabilitation device;
Fig. 2 shows a fragment of a running rail;
Fig. 3 shows a truck;
Fig. 4 shows the truck with a leading wheel;
Fig 5 shows a side view of the truck connected to the system of regulating the power of balancing the weight of the rehabilitated person;
Fig. 6 shows a longitudinal cross-section of the system of regulating the force for balancing the weight of the rehabilitated person;
Fig. 7 shows a longitudinal cross-section of the mechanism adjusting the height of the carrying device above the surface;
Figs. 8, 9 and 10 show a side view, a front view and a top view of another embodiment of a supporting or carrying construction of the rehabilitation device in line with the invention.

[0018] A rehabilitation device 1, which is shown schematically in Fig. 1, comprises a supporting or carrying construction 100 with a suspended running rail 20. In the solution shown in Fig. 1, the carrying construction has two supports 101, 102, to which the running rail 20 is mounted. The elements of supports 101, 102 surround the space in which a movable truck 30, moving along the running rail 20, is placed. Under the truck 30, on a string or a tension member 80, a carrying device 40 is suspended for a person who has mobility problems, in particular for a rehabilitated person who wants to regain the ability to walk. The carrying device 40 in the presented solution comprises braces 41, at least one upper belt 42 girding the trunk of the rehabilitated person and attached to the braces 41, as well as lower belts 43, girding the legs of the rehabilitated person, attached to the upper belt 42 or to the braces 41 by means of fasteners or connectors 44 with adjustable length. The string or tension member 80, on which the carrying device 40 is suspended, bifurcates at its end into two branches, 81, 82, of the string, which are spread by a bar 83 of adjustable length. This allows to catch symmetrically the braces 41 which join with the branches 81, 82 of the string, which accounts for the fact that the resultant force compensating, at least partially, the weight of the rehabilitated person, appearing in the upper single section of the string 80 is located centrally above the head of the rehabilitated person.

[0019] The carrying device 40 cooperates with a system 50 for regulating the force balancing the weight of the rehabilitated person and a mechanism 70 of adjusting the height of the carrying device 40 over the base on which the rehabilitation device is situated.

[0020] The rehabilitation device also has at least one railing 90, which helps the rehabilitated person to support walking by leaning with their hands on the railing 90. The railing 90 does not constitute an element of the carrying construction 100, but only ensures the comfort of training and the safety of the rehabilitated person. In the solution shown in Fig. 1, the rehabilitation device has two railings 90 located in a parallel way to the running rail 20. The railing 90, made, for example, from a pipe, on its both ends is connected with one end of extension arms 91 by means of vertical joints 92 enabling the railing 90 to move horizontally. Also, each of the extension arms, with its other end is connected to a supporting element 93 of the railing, placed in such a way that allows rotation and movement along its axis in vertical guide 95. Each of vertical guides 95 in this embodiment is connected to the nearest pole of the carrying construction 100. One of the ways of joining the vertical guide with the nearest construction pole of the carrying construction 100 is by means of welding. However, it is also possible to propose such construction in which vertical guides are mounted at the bottom to the lower connector. The movable supporting element 93, for example, with a circular cross-section, has on its outer surface, circumferential grooves 94, placed at various heights, in which the ends of blocking screws 96 screwed into openings of the vertical guide 95 are placed, wherein the supporting element 93 of the railing 90 is placed in such a way that allows rotation and movement along its axis. Such connection allows adjustment of distance between the railing 90 and the base on which the rehabilitated person moves, as well as adjustment of the spacing between the railings 90. At setting the extension arms 91 of both railings perpendicular to the railing, as shown in Figure 1, the spacing between the railings is the lowest. In another example of embodiment the railings 90, the vertical guides and movable support elements, not shown in the drawings, have through holes coming through their longitudinal axes and situated at different heights for the crosswise situated pin, which is placed in the hole appropriate for the selected height of mounting the railings and the spacing between them.

[0021] The supports 101, 102 shown in Fig. 1 are the supports of gate structure, whose elements surround the space with the running rail 20 mounted to the supports 101, 102 and situated at the top of the aforementioned space surrounded by elements of the supports 101, 102. Each support 101, 102, comprises two posts 110, a lower connector 120 and the main upper connector 130, which, when joined, form a quadrangle, for example a rectangle. The running rail 20 in this solution is mounted to the main

upper connectors 130 of the gate supports 101, 102, from the bottom, for example in the middle. Mounting the running rail to the gate supports 101, 102 is performed by screwing it down to boards 21 with holes 22, shown in Fig. 2, which are welded to the upper surface of the running rail 20. In order to stiffen the carrying construction 100 of the rehabilitation device 1 according to the invention, the gate supports 101, 102 have, at the top, additional upper connectors 140, so that each gate support 101, 102 is connected to the running rail 20 in an additional place. In the solution shown here, additional upper connectors 140 are situated parallel to the main upper connectors 130, and their distance to the main upper connectors 130 is half the length of the additional upper connectors 140. Each additional upper connector 140 on its ends, on the side, is mounted to the post 110 by means of a side horizontal connector 141 situated perpendicularly to the additional upper connectors 140 and propped at its end with a lateral angle strut 142, whose other end is mounted to the same post 110 below the place where the horizontal connector 141 joins the post 110. In order to increase the stiffness of the main upper connectors 130, they are propped with central angle struts 143, whose other ends are mounted to relevant posts. The side horizontal connectors 141 and the angle struts 142, 143 may be mounted by means of screws, however it is possible that some of them are mounted to other elements of a carrying construction 10 by means of welded joints.

[0022] The running rail 20 shown in Fig. 2, in one variant of the invention, is a shape, preferably rectangular, which has a longitudinal gap 24 in its bottom wall 23. Inside the running rail there is a space in which a truck 30 is paced, presented in Figs. 3 and 4, whose dimensions allow its movement inside the running rail 20. In another variant of the invention, the running rail may be a double-tee shape, not shown here. In this case, sets of wheels of the truck have axes of rotation slightly swept-level, which allows their movement on the lower shelf of the double-tee shape.

[0023] The main element of the truck 30 cooperating with the running rail 20 with rectangular shape and the longitudinal gap shown in details in Figs. 2 and 4, is a running strip 31 shown in Fig. 3, to which supports 32 are mounted for sets 33 of wheels 34 with horizontal axes of rotation. In this solution, to the upper part of the running strip 31, pins 35 are mounted, forming axes for guiding wheels 36 with vertical axes of rotation. Four wheels 34 with horizontal axes of rotation convey the weight on the running rail 20, while two guiding wheels 36 with vertical axes of rotation ensure side stability of the truck 30.

[0024] On one end of the running strip 31, at which a string or a tension member hangs down, for example a suspension strand, a grip 37 is mounted with an axis 38, on which a front wheel 39 is placed in a rotary manner, on which the suspension strand is scrolled, at the end of which there is a carrying devise. In the running strip 31, holes 372 are made, allowing a grip 37 to be mounted in different places by means of screws 371.

[0025] The truck 30, shown also in Fig. 5, has a system 50 of regulating the force balancing the weight of an exerciser person, also known as the shock absorber of the relieving system attached by means of side boards, as shown in Figs. 5 and 6. The main element of the system 50 of regulating the force is a coil spring 51. Inside it, there is a feed screw 52 with a trapezoidal thread, cooperating with a non-rotating adjusting nut 53 with movable along the line and non-rotating guiding insert 59 pressing the spring 51 from one side and with a resistance sleeve 54 with a flange 55 blocking the spring 51 from the other end. At the external end of the feed screw 52, extended from a casing 57, there is a hand wheel 58 with a crank for adjusting the spring tension of the coil spring 51. The feed screw 52 is not movable in relation to the casing 57 thanks to the rotary mounting by means of the expanding ring, for example by means of the Seger ring placed on a cylindrical part of the feed screw. The Seger ring is pressed to an externally threaded sleeve 69, which prevents the screw from escaping outside the casing 57. On the other hand, the feed screw is prevented from inserting into an interior of the casing by means of the flange of the hand wheel 58. While turning the feed screw 52 a leading insert 59 prevents the nut 53 from turning in relation to the feed screw 52 inside the casing 57, thanks to which the distance between the ends of the spring may change. In one of the solutions, the coil spring may be preliminarily pressed with a specified force which balances at least partially the weight of the exerciser person. The flange 55, on which the spring 51 rests, touches a guide 60, to which a prop roller 61 is attached by means of slide elements 62, in relation to which the prop roller 61 placed in a rotary manner on its own axis may rotate. The guide 60 has a possibility of moving in a line bearing 64, made as a sleeve of plastic with good sliding properties, especially of polyamides. Through the prop roller 61, a string in shape of a cord is scrolled, not shown here. The cord, when stretching under the weight of the exerciser person, presses the prop roller 61, which, through the guide 60 presses the spring 51. The feed screw 52, after passing through the adjusting nut 53, which is located at the bottom of the spring 51, passes through the inside of the spring to its upper end, where it enters the spring support, which supporting the sleeve 54 with the flange 55, whose lower end closed by a bottom having a centrally arranged through-hole, non-threaded, for passage for the feed screw 52. The feed screw 52 has a head at its end, or an upper nut 56, non-rotating in relation to the feed screw. The head of the feed screw or the upper nut, having the possibility of moving inside the spring prop, rests in one extreme position on the bottom of the prop sleeve 54, and in the other extreme position on the movable guide 60, thus performing the function of a bumper limiting the range in which the string can be moved, and by doing so, the scope of the vertical movement of the carrying device with a specified length of the string. The size of the working stroke of the carrying de-

vice is adjusted to the changes of a hip height during walking, measured from the base. The change of the hip height may be determined as the difference between the height at which the hips of the exerciser person standing up straight are and the height of the hips of the person who is in a straddle position.

[0026] The whole device is closed in the casing 57, which may be a part of a tube or a square-shape. The longitudinal axis of the spring, the longitudinal axis of the feed screw and the track along which the movable elements move, including the resistance sleeve 54, the lead 60 and the sliding elements 62 with the prop roller 61, of the system 50 of adjusting force are on one straight line, on which also lies the rotation axis of the prop roller 61.

[0027] In the casing 57 there is a longitudinal opening 66 situated parallel to the longitudinal axis of the guide screw 52. Through it, to the leading insert 59 preventing the nut from turning inside the casing 57, a pin 67 is screwed down, serving as an indicator. While pressing the spring 51 the indicator moves along the longitudinal opening, showing on the scale the force of relieving the exerciser person. At the top of the casing 57, a block 65 of the guide 60 is installed. Activated block 65 prevents movement of the guide 60 caused by the pressure of the roller with the cord. The block 65 is activated by means of a small lever, not shown here.

[0028] At the bottom of the casing 57 of the system 50 for adjusting the force is mounted a mechanism 70 for adjusting the height of the carrying device over the base, presented in Fig. 7, on which the rehabilitation device rests. The mechanism 70 of adjusting the height of the carrying device comprises a plate 71, to which is attached a self-locking drive 73 for winding a string or a tension member or a cord 80. The self-locking drive 73 for winding the cord 80 is a worm gear 73, with a worm 74, on whose shaft a crank 75 is mounted, powering the whole mechanism, with a worm wheel 76, which has a rotatable output shaft, engageable by means of a clutch 77 with a drum 78, on which the cord 80 supporting the exerciser person is wound. The worm gear 73 and the rotating drum 78 are placed in a casing 79, for example in a plastic or metal, rectangular prism can. The driving crank 75 in one embodiment is equipped with a mechanism of changing the length of the arm on which the force is acting, propelling the drum in the rotating movement during winding or unwinding the cord. It is the mechanism which is blocked in two openings drilled in the arm of the crank. This enables to change the moment at which the drum is rotated. For quick rolling the cord and in unloaded state, it can operate on a shorter arm. A longer arm is used when it is necessary to lift a person of considerable weight, or when there is a need to precisely determine the relieving of the exerciser person.

[0029] The string or the tension member or the cord 80, on whose one end the carrying device 40 is suspended, is rewound by a front roller placed in a rotary manner on one end of the running strip 31 from the bottom, and then is rewound by the prop roller 61 placed in a rotary manner in an area where the truck 30 is connected with the casing of the system 50 of adjusting the force balancing the weight of the exerciser person, which is the system of adjusting the force of spring stress. The longitudinal axis of the truck is situated at an angle to the longitudinal axis of the casing of the system of adjusting the force of spring stress, which lies on the straight line on which lies also the longitudinal axis of the spring causing the force offsetting the resultant force of the forces affecting on the string on both sides of the prop roller 61. Thanks to the fact that the string has two parts which are on both sides of the prop roller 61 and that these parts are not on the same straight line, the forces of tension of the string applied to the parts of the string placed on both sides of the prop roller 61 cause the resultant force affecting the movable element of the system of adjusting the force, causing its movement in relation to the casing of the system of adjusting force. The tension of the spring causing the force counteracting the resultant force of the forces affecting the string on both sides of the prop roller 61 can be adjusted depending on the height at which the carrying device is situated and, indirectly, depending on the height of the exerciser person, so that the legs of the exerciser person will not be initially relieved at a specified length of the string or will be relieved and then the string will be initially tensed by the string tension force. Assuming that the exerciser person has problems keeping a particular position and is unable to transfer the whole body weight onto their legs, even with the smallest bent of legs, some body weight will be transferred to the carrying device and to the string, causing the force which will be balanced with the resultant force affecting the spring. The greater the bent of the person's legs, the more body weight will be transferred to the string, which, when becoming tense, will cause, through the prop roller, the movement of the movable element of the system of adjusting force, which will lead to shortening the distance between the spring ends. The size of spring shortening multiplied by the spring constant will give the size of the force counteracting the movement of the movable element of the system of adjusting force. From this it follows that the greater the shortening of the distance between the spring ends, the greater the force with which the spring will affect the movable element of the system of adjusting force. With a spring which will not be initially tightened, only the down movement of the carrying device with a loose string, will lead to tightening the spring. With the spring initially tightened and determined length of the string measured from the point at which we hook the carrying device to the drum on which a definite section of the spring is wound, in order to achieve the down movement of the carrying device, the string must be tightened so that the resultant force caused by the tightening of the string should exceed the value of the initial tightening of the spring, which is adjusted by means of the guide screw.

[0030] From the prop roller 61, the string in shape of the cord is guided to the drum of the mechanism 70 of

adjusting the height of the carrying device over the base, on which the other end of the cord is wound, secured against slipping off the drum. The α angle measured between the string and a drum axis is greater than the 90° angle, so as to allow better placing of the string on the drum.

[0031] Turning the drum of the mechanism 70 of adjusting the height of the carrying device over the base to the right increases the height at which the carrying device is suspended, and turning the mechanism drum to the left decreases the height of the carrying device over the base. Directions of turning or rotating may be exchanged in any other embodiment of a worm gear construction. The height of the carrying device over the base may be changed with a cord not tightened or with a tightened cord at least partially burdened with the weight of the exerciser person.

[0032] In another embodiment of the rehabilitation device, a carrying construction 200, presented in Figs. 8, 9 and 10, comprises two supports 201, 202, to which the running rail 20 is connected. The supports 201, 202 are placed opposite each other, the distance between their external dimensions cannot exceed the length of the running rail 20. In one embodiment, the supports 201, 202 are placed parallel to each other. Each support in this solution has two stands, in shape of a reversed "U" letter, which is especially visible in front view presented in Fig. 9. In one preferred embodiment, the stands are made of a pipe or a section bar of rectangular cross section which, after obtaining a "U" shape, is bent from the perpendicular by an angle ranging from 30° to 60°, and in the bent section it has arms extending obliquely, directed away from each other. The angle between the obliquely arms of the joined stands which make up one support 201, 202, ranges from 60° to 120°. The bent of the stand is made at the height between 2/3 to 3/4 of the total height of the stand. Bent stands are connected with each other in points which belong to vertical sections of stand legs by means of connectors 230 or clamping, divided rings, for example when looking down, they have a shape of a divided eight and after joining them stand bents are converging, thanks to which the points in which the running rail is mounted to the supports 201, 202 are kept at distance from each other.

[0033] In one preferred embodiment the points of mounting the running rail are equally separated from each other. The running rail 20 is suspended from the bottom to the highest point of each stand 211 by means of a twisted, divided clamping ring 220, consisting of an upper nut 221 with semi-cylindrical recess with internal radius or a rectangular recess equaling half the pipe diameter, and a lower stand 222. The running rail 20 works also as an upper element joining both the stands and the props made of stands. After mounting the running rail 20 to the stands 211, both joined stands 211 create in a top view a hexagon, while both supports 201, 202 create in a top view two hexagons, whose longitudinal axes are situated along the longitudinal axis of the running rail 20. At the bottom, both stands and supports are connected to each other by means of two lower joint elements 250, one on each side of the carrying construction, which are fixed to each leg 215 of stands from the inside. In one embodiment, the legs 215 of the same stand 211 may be joined together by means of a lower crosspiece, not shown here. The stands 211 are joined together and with other elements in one embodiment detachably, which allows to pack the whole rehabilitation device to a small parcel. Thanks to this, the transport of such devices is relatively cheap.

[0034] Just like in case of the solution presented in Fig. 1, at least one railing 90 is attached to the carrying construction 200, shown in Figs. 8, 9 and 10. In the embodiment presented in Figs. 8, 9 and 10, the rehabilitation device has two railings 90 situated parallel to the running rail 20. The railing 90, made for example of a pipe, has both ends connected with one end of the extension arms 91 by means of vertical joints 92 that make it possible for the railing 90 to move horizontally. On the other hand, each of the extension arms, with its other end is attached to the supporting element 93 of the railing, mounted in a rotary and movable manner along its axis in a vertical guide 95. Each vertical guide 95 in this solution is placed, when taking a side look, between the stand legs and is attached to them so that the vertical guides are moved towards the inside in the direction of the longitudinal axis of the carrying construction 200, which allows a greater angle of rotating the supporting element 93 of the railing until the railing 90 contacts the stand legs. The supporting element 93 of the railing, for example in a circular cross-section, has, on an outer surface, circumferential grooves 94 located at different heights, in which the ends of the blocking screws 96 go, screwed down into the openings of the vertical guide 95, in which the supporting element 93 of the railing 90 is mounted in a rotary and movable manner along its axis. Such mounting of the supporting element allows adjustment of the distance between the railing 90 and the surface on which a exerciser person moves and adjustment of the spacing between the railings 90. At setting the extension arms 91 of both railings perpendicular to the railing, as shown in Fig. 9, the spacing of the railings 90 is the lowest.

Claims

1. A rehabilitation device (1) used in walking therapy and comprising a supporting or a carrying construction (100, 200), to which a running rail (20) is attached, situated above an exerciser person, along which a truck (30) moves with a suspended carrying device (40) for relieving legs of the exerciser person placed in the carrying device (40), cooperating with a system (50) for adjusting force of relieving legs of the exerciser person and a mechanism (70) for adjusting a height of the carrying device (40) over a base, on which the carrying construction (100, 200)

is placed, **characterized in that** the carrying construction (100, 200) comprises at least two supports (101 and 102, 201 and 202) of gate structure, whose elements surround a space in which, along the running rail fixed to the supports (101 and 102, 201 and 202) and situated at the top of the space surrounded by elements of the supports (101 and 102, 201 and 202), the truck moves with the suspended carrying device for relieving the legs of the exerciser person, where the carrying device is suspended on one end of a string or a tension member which is scrolled on a roller placed in a rotary manner on a truck and a prop roller placed in a rotary manner on a movable element of the system (50) for adjusting the force of relieving the legs of the exerciser person, movable under the influence of the tension force of the string, while the other end of the string is scrolled on the drum joined with a self-locking drive of the mechanism (70) for adjusting the height of the carrying device (40) over the base.

2. The rehabilitation device according to claim 1, **characterized in that** the supports (101, 102) are placed at a distance not exceeding the length of the running rail, and each of them comprising two posts (110), a lower connector (120) and the main upper connector (130), which form a quadrangle after joining them, while the running rail is fixed to the main upper connector (130).

3. The rehabilitation device according to claim 1, **characterized in that** the supports (201, 202) are placed opposite each other, their external elements are placed at a distance not exceeding the length of the running rail (20), and each comprises two connected stands, in the shape of a reversed "U" letter, with arms at the top bent away from each other from the vertical, to which, from the bottom, in the highest point, the running rail (20) is attached.

4. The rehabilitation device according to one of preceding claims, **characterized in that** the running rail is in the polygon shape, comprising a longitudinal space (24) in its bottom wall (23), while the truck comprises a running strip (31), to which, from the top, supports (32) are attached for sets (33) of wheels (34) with horizontal axes of rotation, transferring the weight on the running rail (20) and pins (35), which form axes for guiding wheels (36) with vertical axes of rotation, ensuring side stability of the truck (30), whose the supports (32) are situated in a gap of the running rail after the running strip (31), with the wheels (34) and the guiding wheels (36) is placed inside the running rail.

5. The rehabilitation device according to claims 1, 2 or 3 **characterized in that** the running rail is double-tee shaped, and the truck comprises a running strip (31), to which, from the top, bows are fixed, surrounding a lower shelf of the running rail and dedicated for the set of wheels with axes parallel to a surface of the lower shelf on both sides of a vertical wall of the tee shape and going around the surfaces of the lower shelf of a vertical wall of the tee shape and transmitting the weight to the lower shelf of the double-tee shape.

6. The rehabilitation device according to one of preceding claims, **characterized in that** the system (50) for adjusting the force of relieving the legs of the exercises person comprises a casing permanently fixed to the truck (30), whereas inside the casing (59), there is the movable element of the system (50) of adjusting the force, affected by a spring (51) with the tension force adjusted by means of a guide screw (52) placed in the casing, whereas a longitudinal axis of the spring (51), a longitudinal axis of the guide screw (52) and the movement track of the movable element of the system (50) of adjusting the force moves with a prop roller (61) are all on one straight line.

7. The rehabilitation device according to one of preceding claims, **characterized in that** a self-locking drive of the mechanism (70) of adjusting the height of the carrying device (40) over the base is a worm gear fixed to the casing of the system (50) of adjusting the force to relieve the legs of the exerciser person by means of a plate (71).

8. The rehabilitation device according to one of preceding claims, **characterized in that** it has at least one railing with adjustable height above the base and adjustable distance from the longitudinal axis of the carrying device.

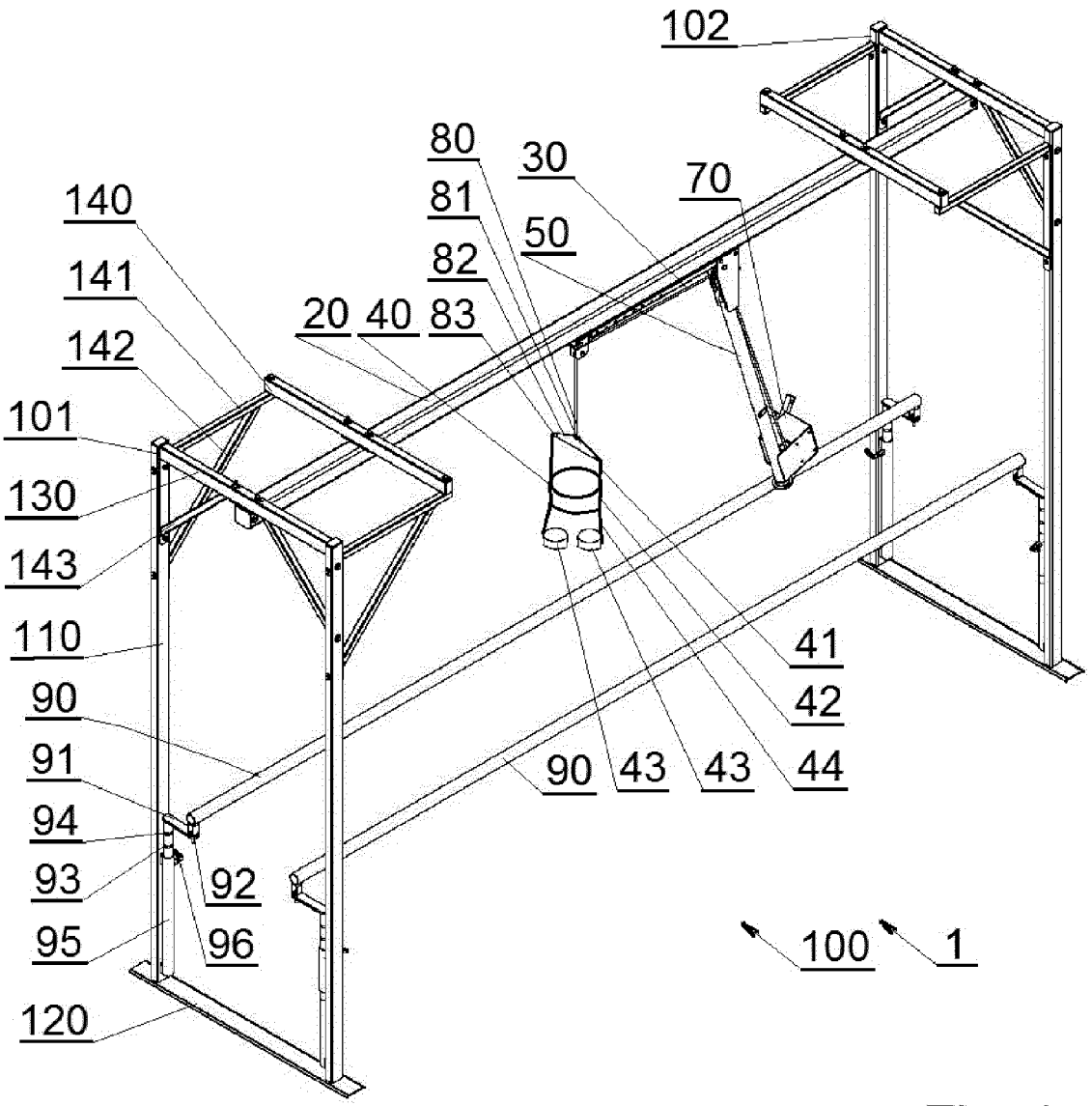
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Fig. 1

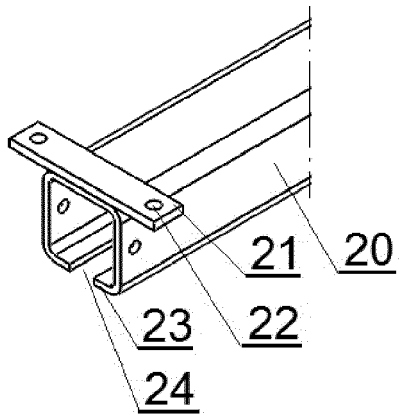
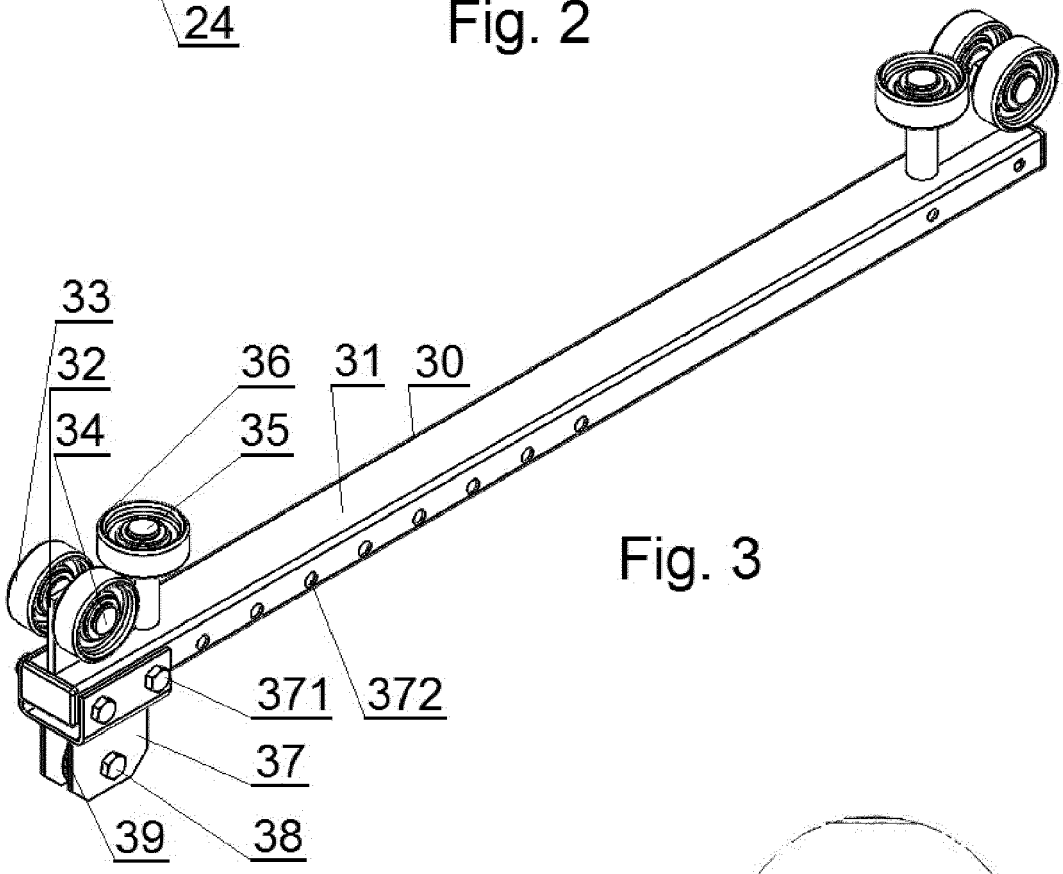


Fig. 2



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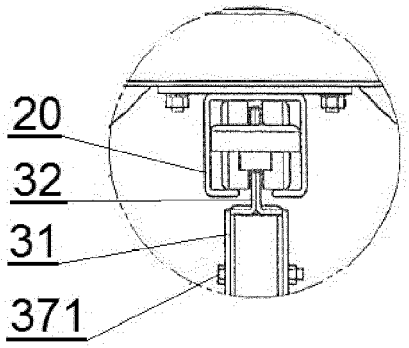


Fig. 4

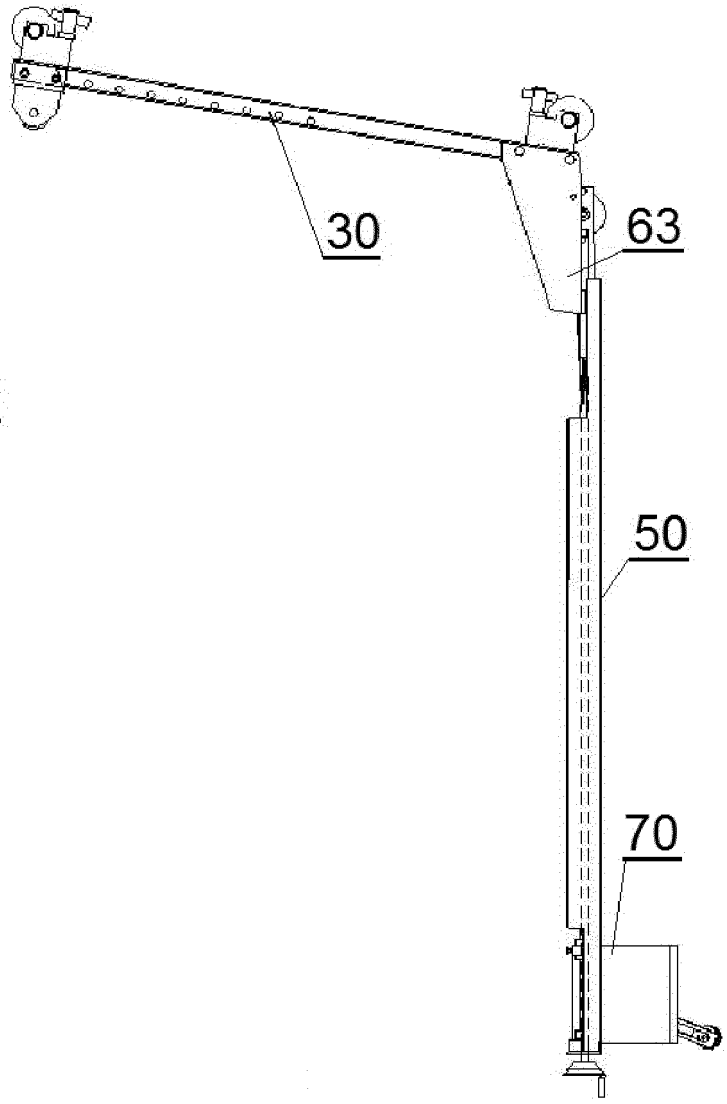


Fig. 5

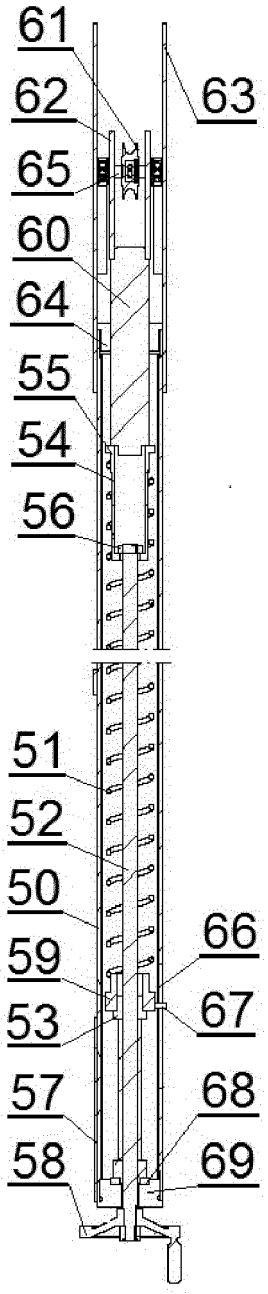
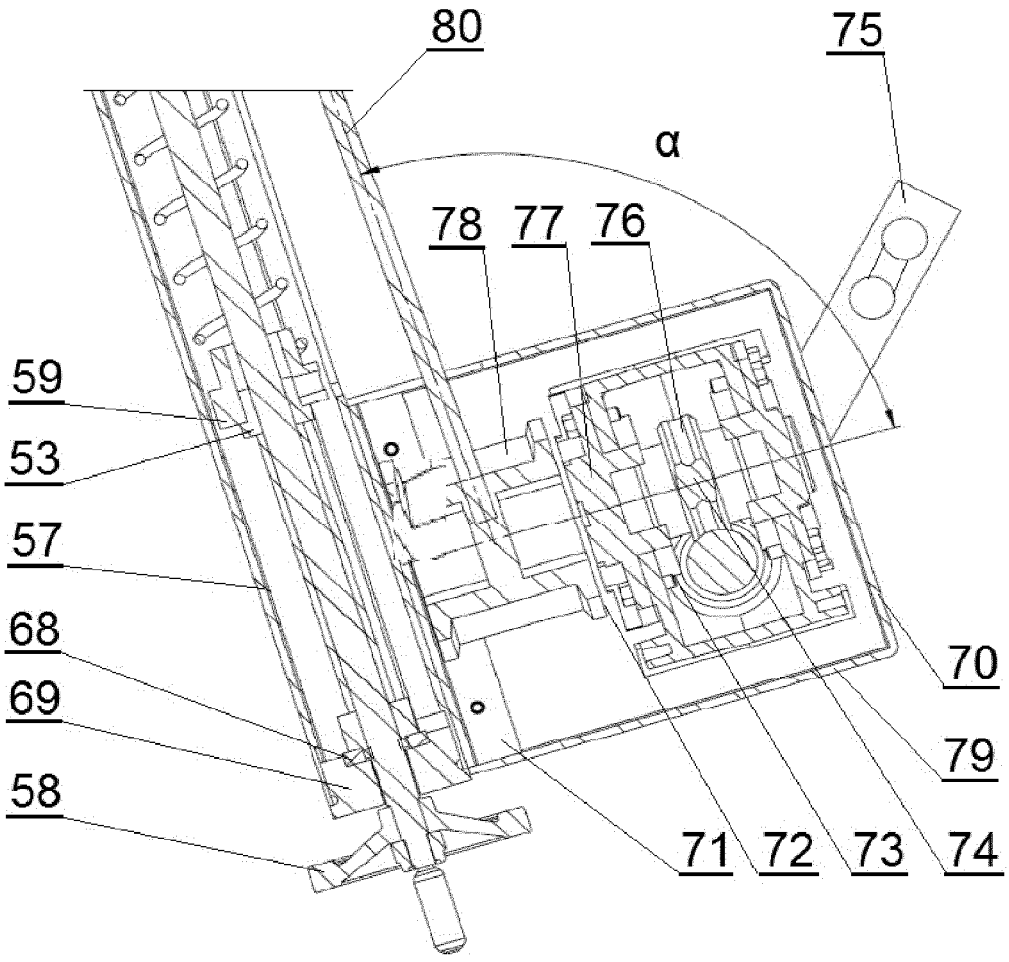


Fig. 6



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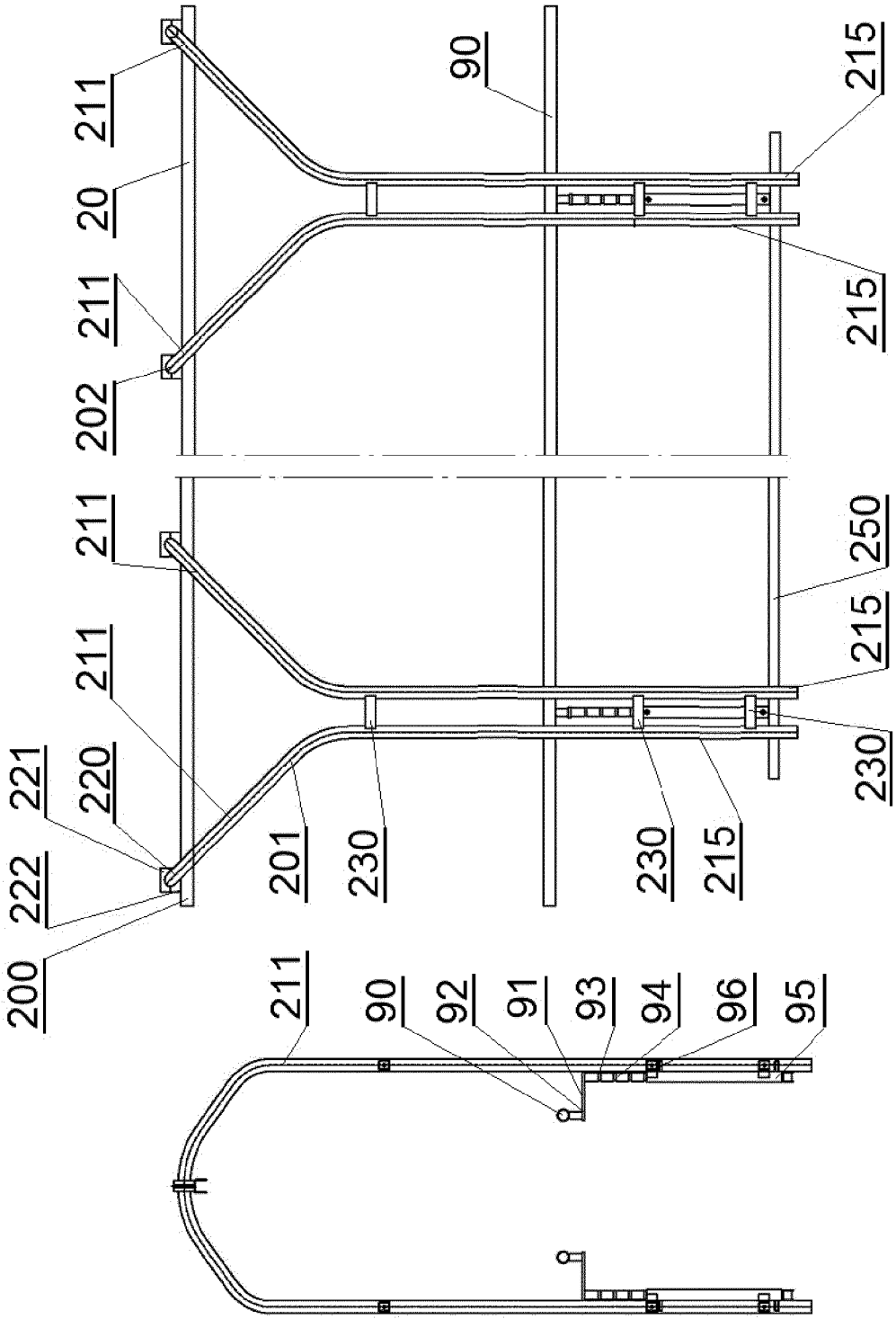
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Fig. 8

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Fig. 9

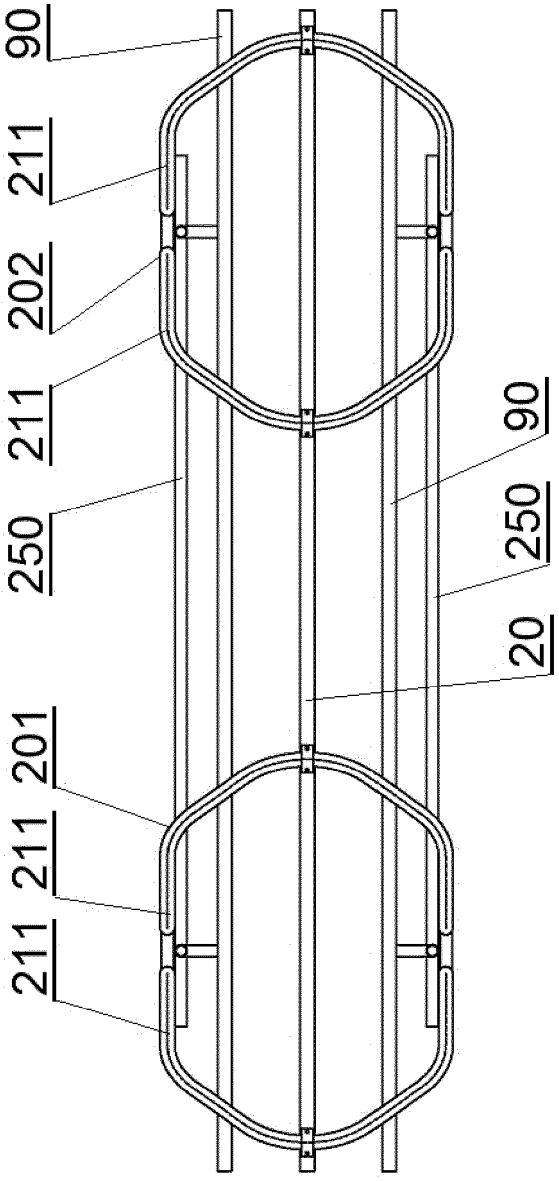

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 14 46 1510

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 June 2014	Knoflacher, Nikolaus

CATEGORY OF CITED DOCUMENTS

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