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(54) Carriage and item of furniture comprising the carriage

(57) A carriage suitable for housing and supporting a foldaway item of exercise equipment, in particular a foldaway treadmill (10), comprises:

- a carriage (1) stable positioning structure (2);
- a device (3) for moving the stable positioning structure (2) which, when activated, causes the stable positioning structure (2) to move relative to at least a first part of the carriage (1);
- movement device (3) control means (7), the user being able to operate the control means (7).

There being a reference plane (130) coinciding with the

floor below the carriage (1), the action of the movement device (3) causes the carriage (1) to pass from a first to a second configuration and vice versa; in the second configuration the stable positioning structure (2) forming a supporting surface coinciding with the reference plane (130) when the latter coincides with the floor, thus allowing the carriage (1) to be stably positioned; in the first configuration the stable positioning structure (2) being distanced from the reference plane (130) and above the reference plane (130) when the latter coincides with the floor.

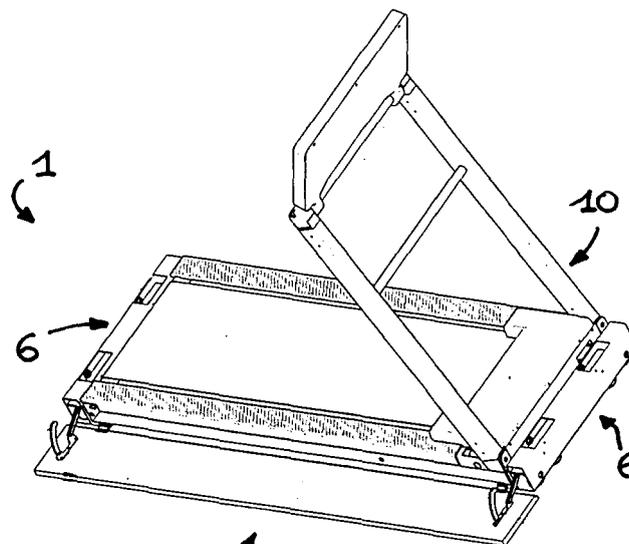


Fig.10

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Description

[0001] The present invention relates to a carriage for housing and supporting a foldaway item of exercise equipment and an item of furniture comprising the carriage.

[0002] Prior art items of furniture are described in patent application for an Italian invention MI2005A002448. In particular, said patent application describes an item of furniture below which there is a removable drawer. The drawer houses a foldaway treadmill. The drawer comprises wheels which run on the floor and allow easy, effortless extraction. In a first configuration the drawer is positioned below the item of furniture and the treadmill is folded away. In a second configuration the drawer is extracted from below the item of furniture and the treadmill can be positioned in an operating configuration ready for use.

[0003] The items of furniture described above have several disadvantages.

[0004] In particular, during exercise the treadmill transmits strong stresses to the drawer. This is particularly obvious if the item of exercise equipment is used by big people. Consequently, the drawer could move relative to the item of furniture, making it impossible to continue exercising or could transmit an unpleasant feeling of instability to the user. The movement of the item of equipment could also compromise safe exercising. In addition, after stresses from the user's run, the entire item of furniture could move relative to the floor on which it rests. This is particularly obvious if the drawer is made below a living room table, or a sofa, as referred to in some of the examples illustrated in the patent application for an Italian invention MI2005A002448. The present invention has for an aim to overcome the above-mentioned disadvantages by providing a carriage for housing and supporting a foldaway item of exercise equipment which allows maximum safety during exercising.

[0005] The present invention also has for an aim to provide a carriage for housing and supporting a foldaway item of exercise equipment which can be folded away in an item of furniture.

[0006] The present invention also has for an aim to provide an item of furniture comprising a carriage for housing and supporting a foldaway item of exercise equipment.

[0007] Yet another aim of the invention is to provide an item of furniture which allows users to make the most of spaces that often are not used enough.

[0008] Accordingly, the present invention achieves these aims and others, described in more detail below, with a carriage for housing and supporting a foldaway item of exercise equipment and an item of furniture comprising the carriage with the structural and functional features described in the independent claims herein, additional embodiments of the invention being defined in the dependent claims herein.

[0009] The invention is described in more detail below

with reference to the accompanying drawings, which illustrate a preferred, non-limiting embodiment, and in which:

- 5 - Figures 1 and 2 illustrate an item of furniture, in particular a bed, with a built in first embodiment of a carriage in accordance with the present invention;
- Figures 3 to 6 are respectively a front view, a bottom view, a cross-section according to the plane A - A of Figure 3, a perspective view of a first embodiment of a carriage in accordance with the present invention, the carriage being illustrated in a first operating configuration;
- 10 - Figures 7 to 10 are respectively a bottom view, a side view partly in cross-section, a detail from Figure 8, a perspective view of the first embodiment of the carriage in accordance with the present invention, the carriage being illustrated in a second operating configuration;
- 15 - Figures 11 to 14 illustrate one after another a sequence of operating steps relative to an item of furniture with a built in second embodiment of a carriage in accordance with the present invention;
- 20 - Figures 15 to 20 are respectively a front view, a cross-section according to the plane B - B of Figure 15, a cross-section according to the plane C
- 25 - C of Figure 16, a detail from Figure 16, a detail from Figure 17, a bottom view of the second embodiment of the carriage in accordance with the present invention, the carriage being illustrated in a first operating configuration;
- 30 - Figures 21 to 28 are respectively a partly interrupted front view, a cross-section according to the plane D - D of Figure 21, a partly interrupted view of the cross-section according to the plane E - E of Figure 22, a detail from Figure 22, a detail from Figure 23, a bottom view, a perspective view, a detail from Figure 27 of the second embodiment of the carriage in accordance with the present invention, the carriage being illustrated in a second operating configuration;
- 35 - Figures 29 to 34 illustrate one after another a sequence of operating steps relative to an item of furniture incorporating a third embodiment of a carriage in accordance with the present invention;
- 40 - Figures 35 to 37 are respectively a front view, a bottom view and a side view of the third embodiment of the carriage in accordance with the present invention, the carriage being illustrated in a first operating configuration;
- 45 - Figures 38 to 40 are respectively a side view, a bottom view and a cross-section according to the plane F - F of Figure 38, of a third embodiment of the carriage in accordance with the present invention, the carriage being illustrated in a second operating configuration;
- 50 - Figures 41 and 43 are respectively a side view and a perspective view of a treadmill of the type illustrated, in combination with the remaining parts of the
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carriage, in the previous figures;

- Figure 42 is a detail from Figure 41.

[0010] With reference to the accompanying drawings, the numeral 1 denotes a carriage for housing and supporting a foldaway item of exercise equipment, in particular a foldaway treadmill 10. The carriage 1, at least in a particular configuration, can move along a direction and/or move parallel with a plane below which is fixed in space. In this description it shall be understood that a first element is below a second element if the second element is higher than the first element. Similarly, in this description it shall be understood that an element is lowered or lifted if its movement has a motion component respectively concordant or discordant with the gravity acceleration vector.

[0011] The carriage 1 comprises:

- a carriage 1 stable positioning structure 2;
- a movement device 3 for moving the stable positioning structure 2 which, when activated, causes the stable positioning structure 2 to move relative to at least a first part of the carriage 1;
- movement device 3 control means 7 which can be operated by the user.

[0012] There being a reference plane 130 coinciding with the floor below the carriage 1, the action of the movement device 3 causes the carriage 1 to pass from a first to a second configuration and vice versa. In the second configuration the stable positioning structure 2 forms a supporting surface coinciding with the reference plane 130 when the latter coincides with the floor, thus allowing the carriage 1 to be stably positioned. This positioning is performed relative to a reference point that is fixed in space. In the first configuration the stable positioning structure 2 is distanced from the reference plane 130 and above the reference plane 130 when the latter coincides with the floor. Consequently, when the stable positioning structure 2 is in contact with the reference plane 130 the carriage 1 rests stably on the floor, limiting the risk of the carriage 1 moving parallel with the reference plane 130. This condition is fundamental to allow completely safe use of an item of exercise equipment. In the accompanying drawings the reference plane 130 coincides with the floor and is unequivocally indicated only in Figures 5, 9, 18, 19, 24, 25, 31, 35, 37, 38, 40.

[0013] In contrast, when the carriage 1 is in the first configuration it may be moved along at least one direction of movement and/or it can be moved along a trajectory parallel with the reference plane 130 when the latter coincides with the floor.

[0014] The stable positioning structure 2 comprises, or coincides with, at least one stable positioning foot 20 forming the supporting surface. If there is only one stable positioning foot 20, the latter has a geometric extension and surface extension such that they allow the carriage 1 to rest stably on the floor (solution not illustrated).

[0015] However, advantageously, the stable positioning structure 2 comprises, or coincides with, a plurality of stable positioning feet 20 located at a predetermined distance from one another, the stable positioning feet 20 forming the supporting surface. The lower ends of the stable positioning feet 20, at least in the carriage 1 second configuration, are coplanar to form the supporting surface and allow the carriage 1 to rest stably on the floor. The movement device 3 simultaneously moves all of the stable positioning feet 20.

[0016] Advantageously, the stable positioning feet 20 are opposite the reference plane 130 when the latter coincides with the floor. Advantageously, the portion of the stable positioning feet 20 designed to make contact with the reference plane 130 when the latter coincides with the floor is covered with a material that has a high friction coefficient, such as rubber.

[0017] With reference to the embodiments illustrated in Figures 1 to 28, the carriage 1 comprises means 5 for smooth sliding:

- in the carriage 1 first configuration they are in contact with the reference plane 130 when the latter coincides with the floor and allow the carriage 1 to move along a trajectory parallel with the reference plane 130 (see for example Figure 5 or 18);
- in the carriage 1 second configuration they are distanced from the reference plane 130 when the latter coincides with the floor (see for example Figure 9 or 24).

[0018] Therefore, in the second configuration the smooth sliding means 5 cannot perform their action.

[0019] The smooth sliding means 5 comprise wheels 50. In particular, in the embodiments illustrated in Figures 1 to 28 the wheels 50 are of the unidirectional type. In an alternative embodiment, not illustrated, the wheels 50 could also be unidirectional, but capable of being angled and lockable at a plurality of angles which would allow motion in different directions. Alternatively, the wheels 50 could be self-centring wheels or ball casters 50.

[0020] The unidirectional wheels 50 capable of being angled or self-centring, or ball casters could advantageously be used above all in the case of the embodiment illustrated in Figures 1 to 10. At least in the case of the solutions illustrated in Figures 11 to 28 it could be advantageous to use unidirectional wheels 50 that cannot be angled, since there may be means present which constrain carriage 1 movement along the extraction and insertion direction only.

[0021] Moving between the first and second configurations, the carriage 1 adopts a third, intermediate configuration in which both the smooth sliding means 5 and the stable positioning structure 2 are in contact with the reference plane 130 when the latter coincides with the floor. During carriage 1 movement from the third to the second configuration, the stable positioning structure 2 causes the smooth sliding means 5 to move away from

the reference plane 130 when the latter coincides with the floor. During carriage 1 movement from the second to the third configuration the smooth sliding means 5 move towards the reference plane 130 when the latter coincides with the floor.

[0022] The first part of the carriage 1 comprises a base frame 61 to which the smooth sliding means 5, the movement device 3 and the stable positioning structure 2 are at least partly connected.

[0023] When the carriage 1 passes from the third to the second configuration, the stable positioning structure 2 lifts the smooth sliding means 5 and the base frame 61, moving them away from the reference plane 130 when the latter coincides with the floor. When the carriage 1 passes from the second to the third configuration, the stable positioning structure 2 lowers the smooth sliding means 5 and the base frame 61, moving them towards the reference plane 130 when the latter coincides with the floor.

[0024] When the carriage 1 passes between the second and the first configurations, there is no relative movement between the base frame 61 and the smooth sliding means 5, whilst there is a relative movement between the stable positioning structure 2 and the base frame 61. When the reference plane 130 coincides with the floor, the movement of the carriage 1 between the first and the third configurations causes a relative movement between the stable positioning structure 2 and the reference plane 130, whilst during movement between the third and the second configurations there is no relative movement between the reference plane 130 and the stable positioning structure 2.

[0025] Advantageously, the base frame 61 comprises two base portions 6 side by side. Connected to each of the two base portions 6 there is at least part of the movement device 3 and at least part of the smooth sliding means 5 and at least part of the stable positioning structure 2.

[0026] When the reference plane 130 coincides with the floor, passing from the third to the second configuration, not just the smooth sliding means 5, but also the base portions 6, are moved away from the reference plane 130. Consequently, the item of exercise equipment directly or indirectly connected to the base portions 6 is also lifted, moving it away from the reference plane 130.

[0027] With reference to the embodiments illustrated in Figures 1 to 28 the two base portions 6 both have a main direction of extension, are symmetrically positioned relative to a vertical plane of symmetry and are positioned in such a way that the main direction of extension is parallel with the plane of symmetry. Along each of the two base portions 6 there is a plurality of stable positioning feet 20. By way of example, but without limiting the scope of the invention, there are two stable positioning feet 20 for each base portion 6.

[0028] The two base portions 6 have the shape of tubular elements, each tubular element having an inner cavity 60 in which the smooth sliding means 5, the move-

ment device 3 and the stable positioning structure 2 are at least partly housed.

[0029] As Figures 9, 24, 28 show by way of example, without limiting the invention, the movement device 3 control means 7 comprise a control element 70 which:

- extends transversally, preferably at a right angle, to the two base portions 6 and is at one end of each of the two base portions 6;
- is connected to the two base portions 6;
- can move relative to the two base portions 6 to operate the movement device 3 which allows the carriage 1 to move between the first and the second configurations.

[0030] Advantageously, the control element 70 is rotatably connected to the two base portions 6. The control element 70 can move between a first position in which it is substantially vertical and a second position in which it is rotated by a predetermined angle relative to the vertical. Rotation of the control element 70 is accompanied by the action of the movement device 3. Assuming that the control element 70 is initially in the first position, when the user rotates the control element 70, moving it away from the two base portions 6, the movement device 3 causes the carriage 1 to pass from the first to the second configuration. Vice versa, when the user rotates the control element 70 in the opposite direction, the carriage 1 passes from the second to the first configuration.

[0031] In the solution illustrated in Figures 1 to 10, the control element 70 comprises a control panel 700 immediately accessible for the user. On the control panel 700 there are handles 701 designed to be gripped by the user to allow movement of the carriage 1. Advantageously, there is a locking device 702 which holds the control panel 700 in a substantially vertical position, that is to say, in the control element 70 first position. To move the control panel 700 from this position the user must first release the locking device 702.

[0032] In the embodiment illustrated in Figures 11 to 28 before being able to access the control element 70 the user must first lift a door 703 which is part of the carriage 1 aesthetic cover.

[0033] The movement device 3 comprises at least one slide 30 which, during carriage 1 movement between the first and second configurations, moves along a first direction 41 and can move relative to the at least one stable positioning foot 20. The first direction 41 is substantially parallel with the reference plane 130 when the latter coincides with the floor. The slide 30 is in at least one of the inner cavities 60. The slide 30 remains substantially in the inner cavity 60 when the carriage 1 moves between the first and second configurations. The first direction 41 along which the slide 30 moves coincides with the main direction of extension of the two base portions 6. Advantageously, the movement device 3 extends identically in both cavities 60 of the corresponding base portions 6.

[0034] The movement device 3 comprises first guide

means 31 which, during carriage 1 movement between the first and second configurations, force the at least one stable positioning foot 20 to move along a second direction 42 which is transversal, preferably at a right angle, to the first direction 41 along which the slide 30 moves. For each stable positioning foot 20 the first guide means 31 comprise a hollow bushing along which the stable positioning feet 20 can move.

[0035] The movement device 3 also comprises second guide means 32 relative to which the slide 30 can move along the first direction 41. The second guide means 32 comprise a plurality of wheels 320 positioned one after another which force the slide 30 to move along the first direction 41.

[0036] Advantageously, the slide 30 at least at a section at a right angle to the first direction 41 is "T"-shaped. The section at a right angle to the first direction 41 comprises both two horizontal tabs engaging with the wheels 320 of the second guide means 32 and a vertical leg whose free end can make contact with a portion of the at least one stable positioning foot 20.

[0037] The slide 30 comprises an operating surface 33 set at an angle both to the first direction 41 of slide 30 movement and to the second direction 42 of movement of the at least one stable positioning foot 20. The angled operating surface 33 is slidably in contact with a portion of the at least one stable positioning foot 20 at least during part of the carriage 1 movement from the first to the second configuration to transfer to said at least one stable positioning foot 20 a movement induced by the movement of the slide 30. The angled operating surface 33 is formed by the set of at least part of the free ends of the vertical legs of the above-mentioned "T"-shaped sections. Along the first direction 41 the operating surface 33 has a first and a second end. The slide 30 comprises a first and a second additional surface 33a, 33b extending respectively from the first and the second ends and at right angles to the second direction 42. The two additional surfaces 33a, 33b make contact with at least one portion of the stable positioning foot 20 respectively when the carriage 1 is in the first and the second configuration. During carriage 1 passage between the first and second configurations, the at least one portion of the stable positioning foot 20 remains in contact with the angled operating surface 33.

[0038] The carriage 1 comprises elastic operating means associated with the stable positioning structure 2. The elastic means accumulate potential energy during carriage 1 passage from the first to the second configuration, said potential energy then being returned to the stable positioning structure 2 during carriage 1 passage from the second to the first configuration.

[0039] In the non-limiting embodiment illustrated in Figures 29 to 40, the carriage 1 comprises:

- an upper body 91 suitable for sliding along supporting tracks and included in the first part of the carriage 1;

- a lower body 92 suitable for housing and supporting a foldaway item of exercise equipment (preferably a treadmill 10) and comprising in the lower part the stable positioning structure 2;
- means 93 for varying the relative distance between the upper and lower bodies 91, 92.

[0040] The lower body 92 is below the upper body 91. Advantageously, the supporting tracks previously referred to are part of slideways 140 described in more detail below.

[0041] At least during operation of the means 93 for varying the relative distance, the upper body 91 remains at a fixed distance from the reference plane 130 when the latter coincides with the floor, the means 93 for varying the relative distance being operatively inserted between the upper and lower bodies 91, 92.

[0042] In the carriage 1 first and second configurations, the upper body 91 and the lower body 92 are respectively at a first and a second distance from one another, the second distance being greater than the first distance. The means 93 for varying the distance comprise a kinematic actuator with a first end connected to the upper body 91 and a second end connected to the lower body 92. The user can control the kinematic actuator using a remote control, even of the wireless type.

[0043] The upper body 91 also comprises two vertical parallel bars rigidly connected to the remaining parts of the upper body 91, the vertical parallel bars extending downwards and extending next to the lower body 92. The lower body 92 comprises idle pulleys which engage the bars and, operating in conjunction with the latter, guide and render more stable the movement of the lower body 92 relative to the upper body 91. As shown by way of example in Figures 29 to 34, this embodiment can advantageously be used in applications in which the carriage 1 is built into items of furniture 100 which have a lower block, the items of furniture forming a compartment 110 for housing the carriage 1 positioned above the block.

[0044] In general, advantageously the carriage 1 comprises:

- i) a foldaway item of exercise equipment able to move between an open configuration for use and a home configuration in which it is folded away. Advantageously, said foldaway item of exercise equipment is connected to the remaining parts of the carriage 1;
- ii) a housing space 8 in which the item of exercise equipment is placed when folded away in its home configuration, and from which the item can be at least partly extracted to adopt its open configuration for use. Advantageously, said item of exercise equipment comprises, or coincides with, a foldaway treadmill 10.

[0045] The foldaway treadmill 10 comprises (for clarity the reference characters are shown in Figures 41, 42,

43, but the treadmill 10 illustrated in those figures is the same as those illustrated in the other figures):

- a platform 101 in turn comprising a sliding belt 102 and lateral safety bands 103 positioned laterally relative to the direction of sliding belt 102 feed;
- a handle unit 104 connected to the platform 101.

[0046] Appropriately, the handle unit 104 can move relative to the platform 101. In the folded away home configuration, the handle unit 104 extends close to the platform 101. In the open configuration for use, the handle unit 104 extends away from the platform 101. The treadmill 10 comprises at least one hinge 107 which allows rotation of the handle unit 104 relative to the platform 101, allowing the handle unit 104 to be moved towards or away from the platform 101.

[0047] The handle unit 104 comprises a grip zone 104a suitable for the user to grip with his hands while exercising. The handle unit 104 also comprises a panel 104b which the user uses to interface with the treadmill 10. Finally, the handle unit 104 comprises uprights 104c connecting the grip zone 104a and the platform 101.

[0048] With reference to the embodiment illustrated in Figures 1 to 10 the carriage 1 control panel 700 and the two base portions 6 of the carriage 1 define the housing space 8 suitable for containing the treadmill 10, the housing space 8 extending substantially parallel with the reference plane 130 when the latter coincides with the floor. Advantageously, in said embodiment the carriage 1 comprises rigid connection means which make the treadmill 10 platform 101 integral with the carriage 1 base frame 61. The rigid connection means may, for example, be screws or bolts.

[0049] To pass from being folded away in the home configuration to the open configuration for use, the user simply lifts the handle unit 104, rotating it relative to the platform 101. The latter remains rigidly connected to the carriage 1 base frame 61.

[0050] Alternatively, with reference to the embodiment illustrated in Figures 11 to 40, the housing space 8 extends substantially at a right angle to the reference plane 130 when the latter coincides with the floor. In said case, the carriage 1 comprises treadmill 10 tipping means 105. The treadmill 10 tipping means 105 move the treadmill 10 between the home position in which the platform 101 extends substantially at a right angle to the reference plane 130 when the latter coincides with the floor (usually in that configuration the platform 101 extends substantially vertically) and a semi-operating configuration in which the platform 101 extends substantially parallel with the reference plane 130 when the latter coincides with the floor (usually in that configuration the platform 101 extends substantially horizontally). The treadmill 10 is hinged to the carriage 1 base frame 61 by the tipping means 105 and can rotate about an axis of rotation to pass from the folded away home configuration to the semi-operating configuration or vice versa. Advanta-

geously, there are damping means (for example a gas spring) which slow the treadmill 10 descent. For safety reasons the carriage 1 may comprise a safety stop for the tipping means 105. The safety stop can be activated at least when the treadmill 10 is folded away in the home configuration. To allow the treadmill 10 to pass from being folded away in the home configuration to the open configuration for use, the user must first release the safety stop.

[0051] Advantageously, the semi-operating configuration is an intermediate configuration between the folded away home configuration and the open configuration for use. For example it is illustrated in Figure 13 or 33. In the semi-operating configuration the treadmill 10 handle unit 104 is still at least partly folded away.

[0052] In the embodiment illustrated in Figures 11 to 40, advantageously the carriage 1 comprises a framework 610 which defines the housing space 8 when the latter extends substantially at a right angle to the reference plane 130 coinciding with the floor. With reference to the embodiment illustrated in Figures 11 to 27 the base frame 61 is connected to the framework 610. With reference to that embodiment the base frame 61 can move relative to the framework 610 only in the vertical direction.

This is achieved thanks to at least one groove 611 integral with the base frame 61 which moves along a corresponding shoe 612 shaped to match it and made in the framework 610. During the passage between the first and second configurations, the base frame 61 changes its distance from the reference plane 130 when the latter coincides with the floor. In contrast, the framework 610 does not change its distance from the reference plane 130 when the latter coincides with the floor. This both reduces the extent of the user effort required to move the carriage 1 from the first to the second configuration and allows for the presence of any slideways 140 (described in more detail below) connected to the framework 610 which allow the framework 610 to move only along a horizontal direction.

[0053] As illustrated in Figure 20 the carriage 1 base frame 61 comprises two elements 62 which connect the two base portions 6 and extend at a right angle to the two base portions 6. This allows the two base portions 6 to be stiffened and stably connected. Advantageously, each of the two elements 62 which connect the two base portions 6 comprises two grooves 611 able to move relative to corresponding shoes 612 shaped to match them.

[0054] In general, the treadmill 10 also comprises connecting means 106 which lock the handle unit 104 in the open configuration for use.

[0055] The handle unit 104 comprises an actuator 107 for controlling the connecting means 106, to release the handle unit 104 from the open configuration for use and allow it to be folded away on the platform 101. In particular, the connecting means 106 comprise a pin 106a connected to the handle unit 104, a hole 106b in the platform 101 and a fork 106c. With the treadmill 10 in the open configuration for use, the pin 106a engages in the hole

106b in the platform 101, preventing the handle unit 104 from moving relative to the platform 101.

[0056] In particular, the pin 106a engages by snapping into the above-mentioned hole 106b upon completion of the passage from the folded away home configuration to the open configuration for use.

[0057] By moving the actuator 107 the user moves the fork 106c which, overcoming the elastic resistance of a spring, extracts the pin 106a from the hole 106b, thus allowing the handle unit 104 to move relative to the platform 101. The connecting means 106 are made at the zone where the handle unit 104 is connected to the platform 101. Operatively inserted between the actuator 107 and the pin 106a there is a wire 106d which, when operated by the actuator 107, moves the fork 106c which in turn releases the pin 106a from the hole 106b. Advantageously, the wire 106d extends inside the handle unit 104 upright 104c and is hidden from the user's view. Relative to the direction at a right angle to the direction of platform 101 belt 102 feed, the dimensions of the hinges for rotation of the handle unit 104 relative to the platform 101 are small, within the dimensions of the lateral safety bands 103.

[0058] In the accompanying drawings the reference numeral 100 denotes an item of furniture comprising a carriage 1 in accordance with the present invention.

[0059] The item of furniture 100 comprises a casing 111 defining a carriage 1 housing compartment 110. The carriage 1 can be at least partly housed in the housing compartment 110 and can be extracted from the housing compartment 110. Advantageously, the item of furniture 100 completely hides the treadmill 10 from view when it is completely inside the housing compartment 110.

[0060] Advantageously, the item of furniture 100 comprises slideways 140, operatively inserted between the casing 111 and the carriage 1, which allow the carriage 1 to be guided during extraction from the casing 111. The reference plane 130 coincides with the treadable surface on which the item of furniture 100 rests.

[0061] The slideways 140 may comprise a stop which is activated when the carriage 1 has been extracted from the casing 111 and prevents the carriage 1 and the casing 111 from moving relative to one another. To allow the carriage 1 to be inserted in the casing 111 again, the user must first release the stop.

[0062] Advantageously, in the embodiment illustrated in Figures 1 to 10, the slideways 140 inserted between the casing 111 and the carriage 1 are absent.

[0063] Figures 1 and 2 illustrate the item of furniture 100 comprising a bed 120. In that case the carriage 1 housing compartment 110 is made below the bed 120. The slideways 140 are not necessary between the carriage 1 and the bed 120. This means that the carriage 1 can also be retrofitted on existing beds 120 and in any case does not necessitate the use of a specific bed 120 with special dimensions. As already indicated, if the slideways 140 are absent, it may be useful to use unidirectional wheels 50 which can be angled manually or self-

centring wheels 50 or ball casters 50 or in any event wheels 50 which allow smooth sliding in any direction. In this way, once the carriage 1 has been extracted from the housing compartment 110 it can be moved with maximum simplicity to a place which may be far from the item of furniture 100.

[0064] In the embodiment illustrated in Figures 1 to 10, the carriage 1 is first extracted from the housing compartment 110. During extraction the carriage 1 is in the first configuration with the smooth sliding means 5 in contact with the reference plane 130 when the latter coincides with the floor. Then the carriage 1 is moved from the first to the second configuration by lowering the stable positioning feet 20. This causes the base frame 61 to be lifted and the smooth sliding means 5 to move away from the reference plane 130 when the latter coincides with the floor. Then the treadmill 10 is moved directly from the folded away home configuration to the open configuration for use by simply moving the handle unit 104 away from the platform 101.

[0065] In the embodiments illustrated in Figures 11 to 40 the casing 111 of the item of furniture is substantially a parallelepiped. One of the three directions of extension in space of the parallelepiped is less than the other two and the carriage 1 can be extracted at a right angle to said direction and parallel with the reference plane 130 when the latter coincides with the floor. In the embodiment illustrated in Figures 11 to 27 the carriage 1 is first extracted from the housing space 8 with the smooth sliding means 5 in contact with the reference plane 130 when the latter coincides with the floor. Then the carriage 1 is moved from the first to the second configuration by lowering the stable positioning feet 20. This causes the base frame 61 to be lifted and the smooth sliding means 5 to move away from the reference plane 130 when the latter coincides with the floor. Then using the tipping means 105 the treadmill 10 is rotated and moved to the semi-operating configuration with the platform 101 substantially parallel with the reference plane 130 when the latter coincides with the floor. During this step, treadmill 10 tipping takes place thanks to a rotation relative to an axis parallel with the direction of carriage 1 extraction from the housing space 8. Then the treadmill 10 is moved from the semi-operating configuration to the open configuration for use by simply moving the handle unit 104 away from the platform 101.

[0066] Another example is the embodiment illustrated in Figures 28 to 40. This embodiment was designed to be used in order to have the item of furniture 100 blend in nicely in an environment in which there are items of furniture comprising a lower block (for example a household kitchen). This embodiment may advantageously be used even when the item of furniture 100 in normal conditions of use is connected, in cantilever fashion, to only one wall of the room. In such a case, the carriage 1 is first extracted from the housing compartment 110 using supporting tracks operatively inserted between the carriage 1 upper body 91 and the casing 111. Then the lower

body 92 containing the treadmill 10 is moved away from the upper body 91 and lowered until the at least one stable positioning foot 20 makes contact with the reference plane 130 below which coincides with the floor. The lower body 92 is not usually fitted with smooth sliding means 5. Then using the tipping means 105 the treadmill 10 is rotated and moved to the semi-operating configuration with the platform 101 substantially parallel with the reference plane 130 when the latter coincides with the floor. During this step, treadmill 10 tipping takes place thanks to a rotation relative to an axis parallel with the direction of carriage 1 extraction from the housing space 8. Then the treadmill 10 is moved from the semi-operating configuration to the open configuration for use by simply moving the handle unit 104 away from the platform 101.

[0067] The invention brings important advantages.

[0068] Firstly, it allows maximum operating safety to be achieved.

[0069] Secondly, it allows rapid access to an item of exercise equipment normally hidden in an item of furniture.

[0070] The invention described above may be modified and adapted in several ways, without thereby departing from the scope of the inventive concept.

[0071] Moreover, all details of the invention may be substituted by other technically equivalent elements.

[0072] In practice, the embodiments of the invention may be made from any material, and in size, depending on requirements.

Claims

1. A carriage suitable for housing and supporting a fold-away item of exercise equipment, in particular a fold-away treadmill (10), **characterised in that** it comprises:

- a carriage stable positioning structure (2) ;
- a movement device (3) for moving the stable positioning structure (2) which, when activated, causes the stable positioning structure (2) to move relative to at least a first part of the carriage (1);
- movement device (3) control means (7), the user being able to operate the control means (7); there being a reference plane (130) coinciding with the floor below the carriage (1), the action of the movement device (3) causes the carriage (1) to pass from a first to a second configuration and vice versa; in the second configuration the stable positioning structure (2) forming a supporting surface coinciding with the reference plane (130) when the latter coincides with the floor, thus allowing the carriage (1) to be stably positioned; in the first configuration the stable positioning structure (2) being distanced from the reference plane (130) and above the refer-

ence plane (130) when the latter coincides with the floor.

2. The carriage according to claim 1, **characterised in that** the stable positioning structure (2) comprises, or coincides with, at least one stable positioning foot (20) forming the supporting surface.

3. The carriage according to claim 1 or 2, **characterised in that** the stable positioning structure (2) comprises, or coincides with, a plurality of stable positioning feet (20) located at a predetermined distance from one another, the feet (20) forming the supporting surface.

4. The carriage according to claim 2 or 3, **characterised in that** the movement device (3) comprises:

- a slide (30) which, during carriage (1) movement between the first and second configurations, moves along a first direction (41) and can move relative to the at least one stable positioning foot (20);

- first guide means (31) which, during carriage (1) movement between the first and second configurations, force the at least one stable positioning foot (20) to move along a second direction (42) which is transversal to the first direction (41) along which the slide (30) moves;

- second guide means (32) relative to which the slide (30) can move along the first direction (41), the slide (30) comprising an operating surface (33) set at an angle to both the first direction (41) of movement of the slide (30) and the second direction (42) of movement of the at least one stable positioning foot (20); the angled operating surface (33) being slidably in contact with a portion of the at least one stable positioning foot (20) at least during part of the carriage (1) movement from the first to the second configuration to transfer to said at least one stable positioning foot (20) a movement induced by the movement of the slide (30).

5. The carriage according to any of the foregoing claims, **characterised in that** it comprises smooth sliding means (5) which:

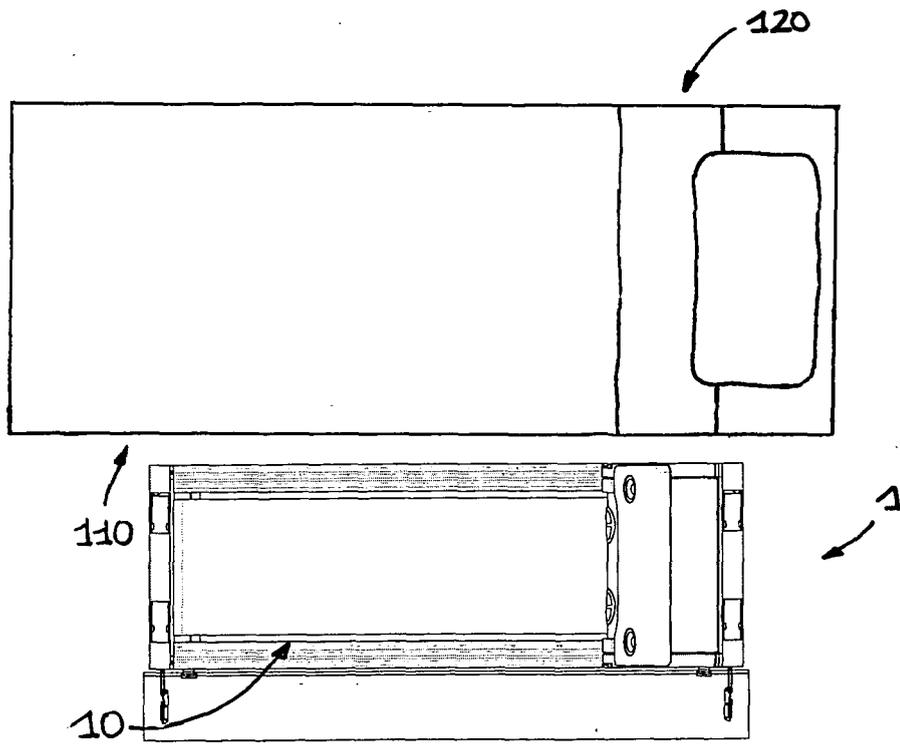
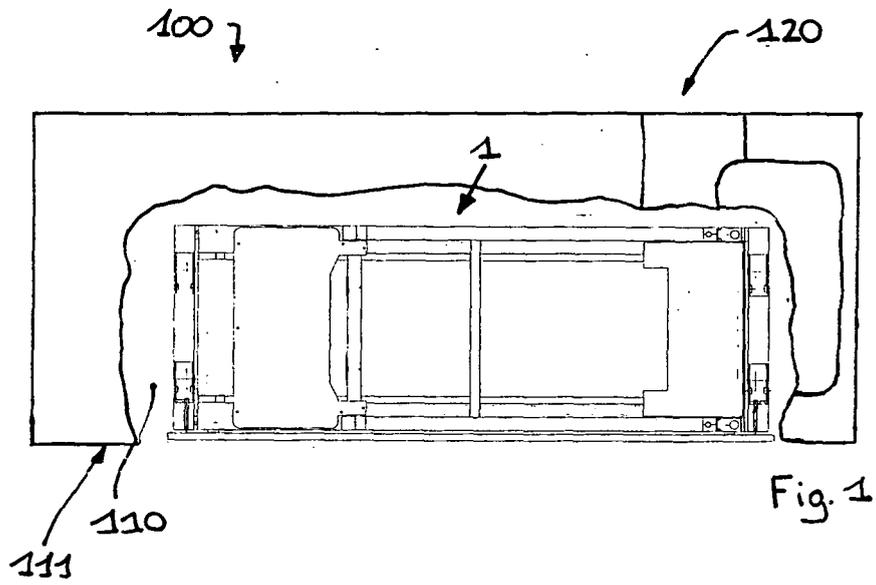
- in the carriage (1) first configuration are in contact with the reference plane (130) when the latter coincides with the floor and allow the carriage (1) to move along at least a trajectory parallel with the reference plane (130);

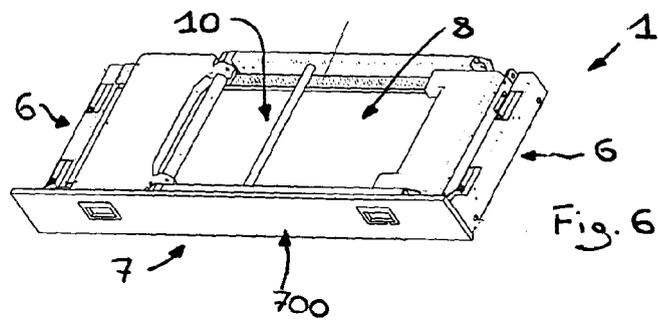
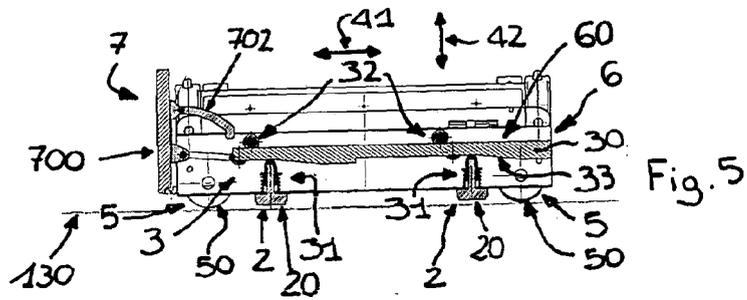
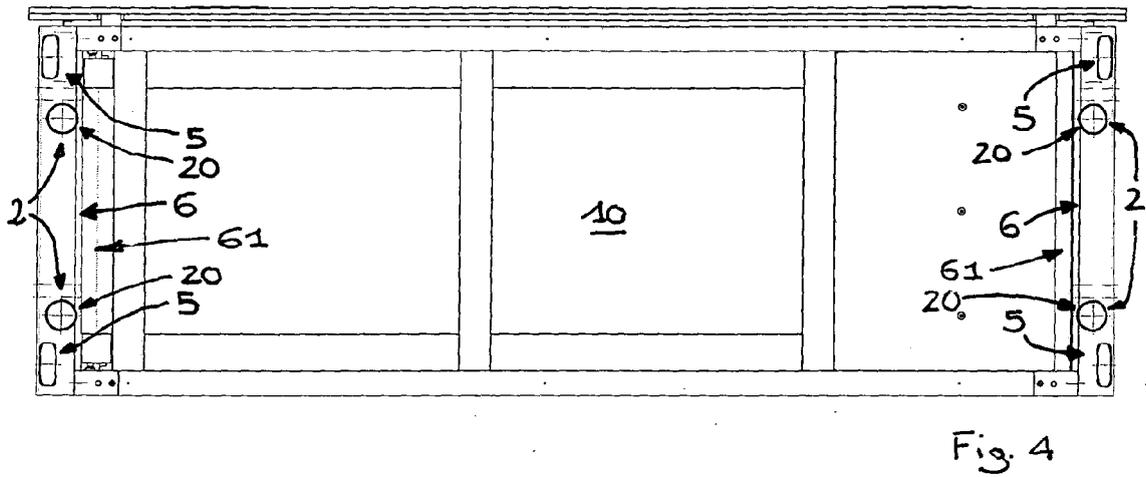
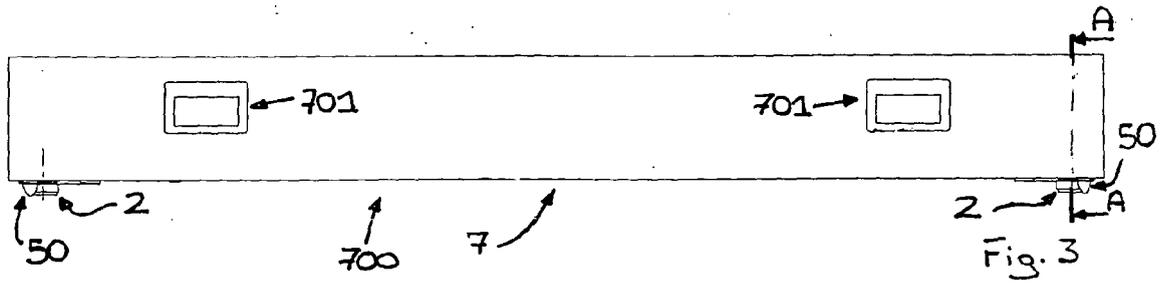
- in the carriage (1) second configuration are distanced from the reference plane (130) when the latter coincides with the floor.

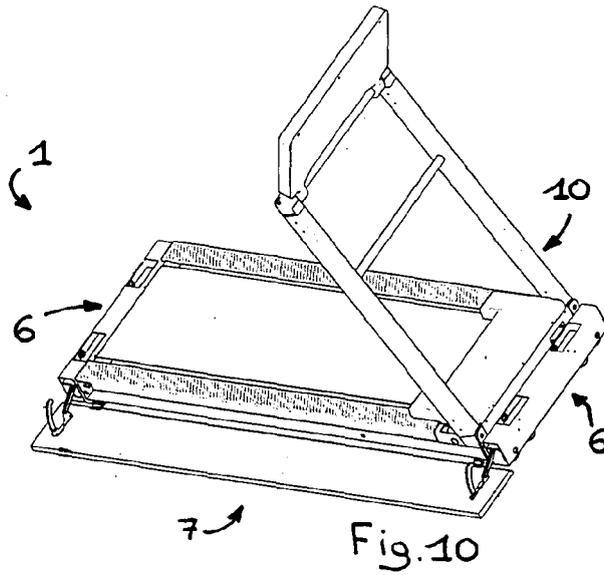
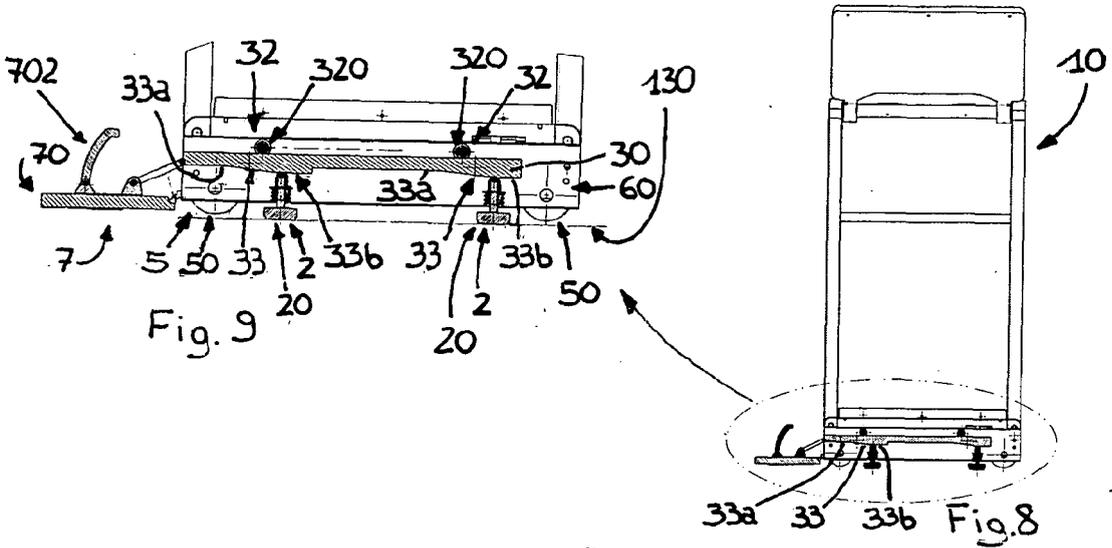
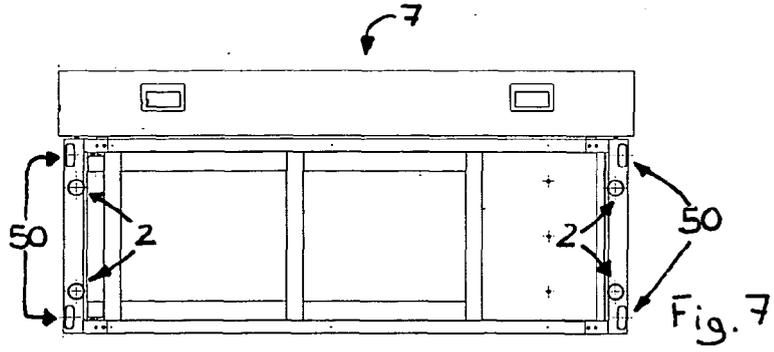
6. The carriage according to claim 5, **characterised in**

- that moving between the first and second configurations, the carriage adopts a third, intermediate configuration in which both the smooth sliding means (5) and the stable positioning structure (2) are in contact with the reference plane (130) when the latter coincides with the floor; during carriage (1) movement from the third to the second configuration, the stable positioning structure (2) causing the smooth sliding means (5) to move away from the reference plane (130) when the latter coincides with the floor; during carriage (1) movement from the second to the third configuration the smooth sliding means (5) moving towards the reference plane (130) when the latter coincides with the floor.
- 5
7. The carriage according to claim 5 or 6, **characterised in that** at least a first part of the carriage (1) comprises a base frame (61) to which the smooth sliding means (5), the movement device (3) and the stable positioning structure (2) are at least partly connected.
- 10
8. The carriage according to claim 7, **characterised in that** when the carriage (1) passes from the third to the second configuration, the stable positioning structure (2) lifts the smooth sliding means (5) and the base frame (61), moving them away from the reference plane (130) when the latter coincides with the floor; when the carriage (1) passes from the second to the third configuration, the stable positioning structure (2) lowers the smooth sliding means (5) and the base frame (61), moving them towards the reference plane (130) when the latter coincides with the floor.
- 15
9. The carriage according to claim 7 or 8, **characterised in that** the base frame (61) comprises two base portions (6) side by side, there being connected to each of the two base portions (6) at least part of the movement device (3), at least part of the smooth sliding means (5) and at least part of the stable positioning structure (2).
- 20
10. The carriage according to claim 9, **characterised in that** the two base portions (6) have the shape of tubular elements, each tubular element having an inner cavity (60) in which the smooth sliding means (5), the movement device (3) and the stable positioning structure (2) are at least partly housed.
- 25
11. The carriage according to claim 9 or 10, **characterised in that** the movement device (3) control means (7) comprise a control element (70) which:
- 30
- extends transversally to the two base portions (6) and is at one end of each of the two base portions (6);
 - is connected to the two base portions (6);
- 35
12. The carriage according to any of the foregoing claims, **characterised in that** it comprises elastic means operatively associated with the stable positioning structure (2), the elastic means accumulating potential energy during carriage (1) passage from the first to the second configuration, said potential energy then being returned to the stable positioning structure (2) during carriage (1) passage from the second to the first configuration.
- 40
13. The carriage according to claim 1 or 2 or 3, **characterised in that** it comprises:
- an upper body (91) included in said at least one first part of the carriage (1) and suitable for sliding along supporting tracks;
 - a lower body (92) suitable for housing and supporting a foldaway item of exercise equipment and comprising in the lower part the stable positioning structure (2);
 - means (93) for varying the relative distance between the upper and lower bodies (91, 92); at least during operation of the means (93) for varying the relative distance, the upper body (91) remaining at a fixed distance from the reference plane (130) when the latter coincides with the floor, the means (93) for varying the relative distance being operatively inserted between the upper and lower bodies (91, 92); in the carriage (1) first and second configurations, the upper body (91) and the lower body (92) being respectively at a first and a second distance from one another, the second distance being greater than the first distance.
- 45
14. The carriage according to any of the foregoing claims, **characterised in that** it comprises:
- i) a foldaway treadmill (10) able to move between an open configuration for use and a home configuration in which it is folded away;
 - ii) a housing space (8) in which the treadmill (10) is placed when folded away in its home configuration, and from which the treadmill can be at least partly extracted to adopt its open configuration for use.
- 50
15. The carriage according to claim 14, **characterised in that** the foldaway treadmill (10) comprises:
- a platform (101) in turn comprising a sliding belt (102) and lateral safety bands (103) positioned laterally relative to the direction of sliding
- 55

- belt (102) feed;
 - a handle unit (104) connected to the platform (101) and able to move relative to the platform (101); in the folded away home configuration, the handle unit (104) extending close to the platform (101), in the open configuration for use, the handle unit (104) extending away from the platform (101). 5
16. The carriage according to claim 15, **characterised in that** it comprises connecting means (106) which lock the handle unit (104) in the open configuration for use, the handle unit (104) comprising an actuator (107) for controlling the connecting means (106), to release the handle unit (104) from the open configuration for use and allow it to be folded away on the platform (101). 10
15
17. The carriage according to claim 14 or 15 or 16 when it depends directly or indirectly on claim 10, **characterised in that** the carriage (1) control panel (700) and the two base portions (6) of the carriage (1) define the housing space (8) suitable for containing the treadmill (10), the housing space (8) extending substantially parallel with the reference plane (130) when the latter coincides with the floor. 20
25
18. The carriage according to claim 15 or 16, **characterised in that** the housing space (8) extends substantially at a right angle to the reference plane (130) when the latter coincides with the floor, and **characterised in that** it comprises means (105) for tipping the treadmill (10) which move the treadmill (10) between the folded away home position in which the platform (101) extends substantially at a right angle to the reference plane (130) when the latter coincides with the floor and a semi-operating configuration which is intermediate between the folded away home configuration and the open configuration for use, in the semi-operating configuration the platform (101) extending substantially parallel with the reference plane (130) when the latter coincides with the floor. 30
35
40
19. An item of furniture, **characterised in that** it comprises: 45
- a casing (111) forming a housing compartment (110);
 - a carriage (1) according to any of the claims from 1 to 18, there being the possibility of at least partly housing the carriage (1) in the housing compartment (110) and the possibility of extracting it from the housing compartment (110). 50
20. The item of furniture according to claim 19, **characterised in that** it comprises a bed (120), the carriage (1) housing compartment (110) being made below the bed (120). 55







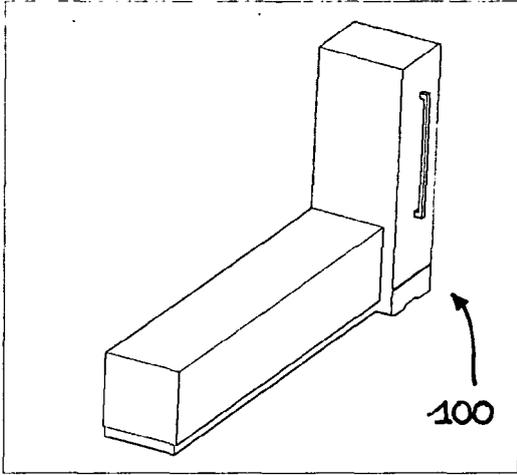


Fig. 11

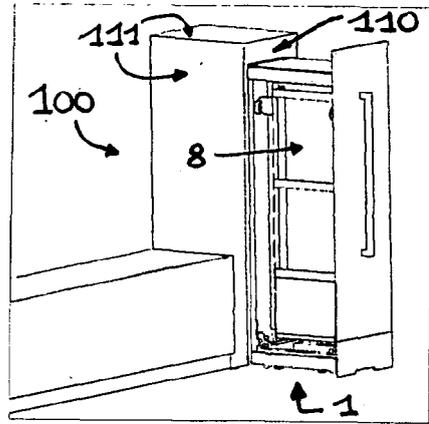


Fig. 12

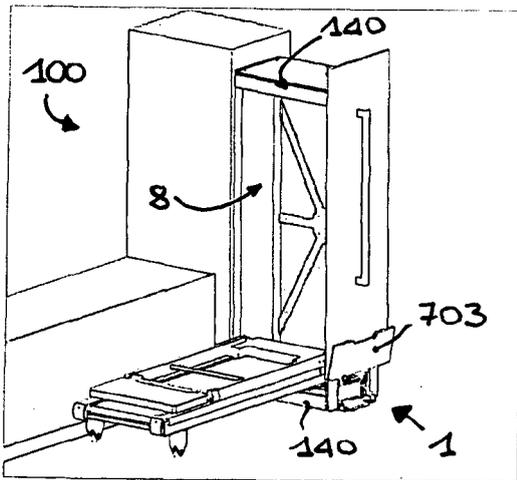


Fig. 13

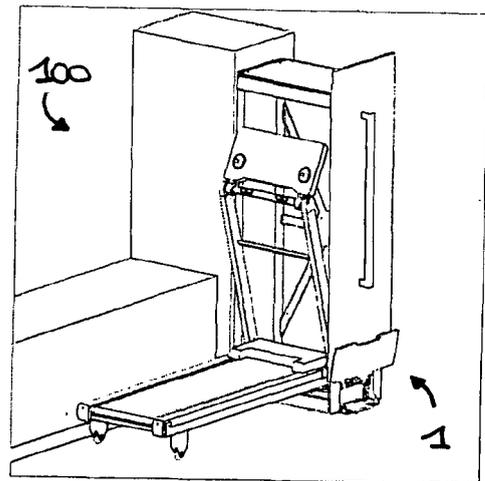
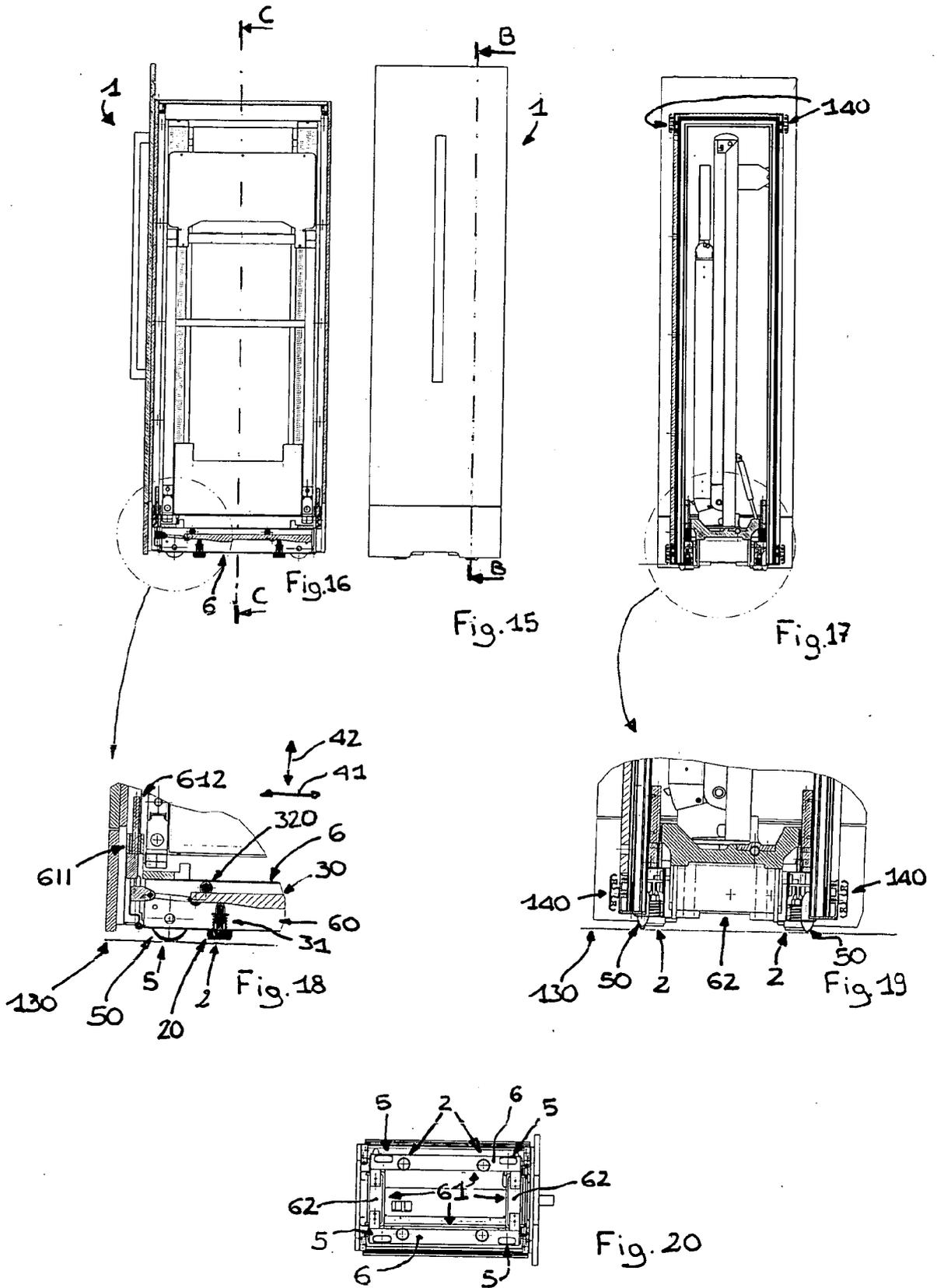
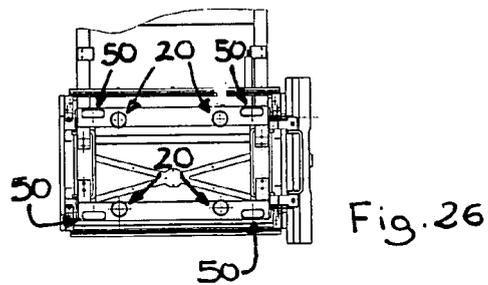
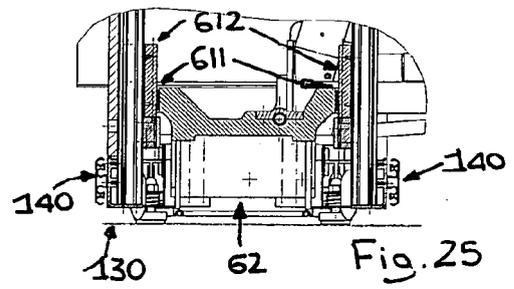
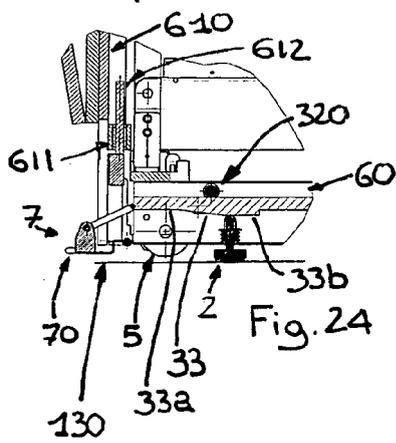
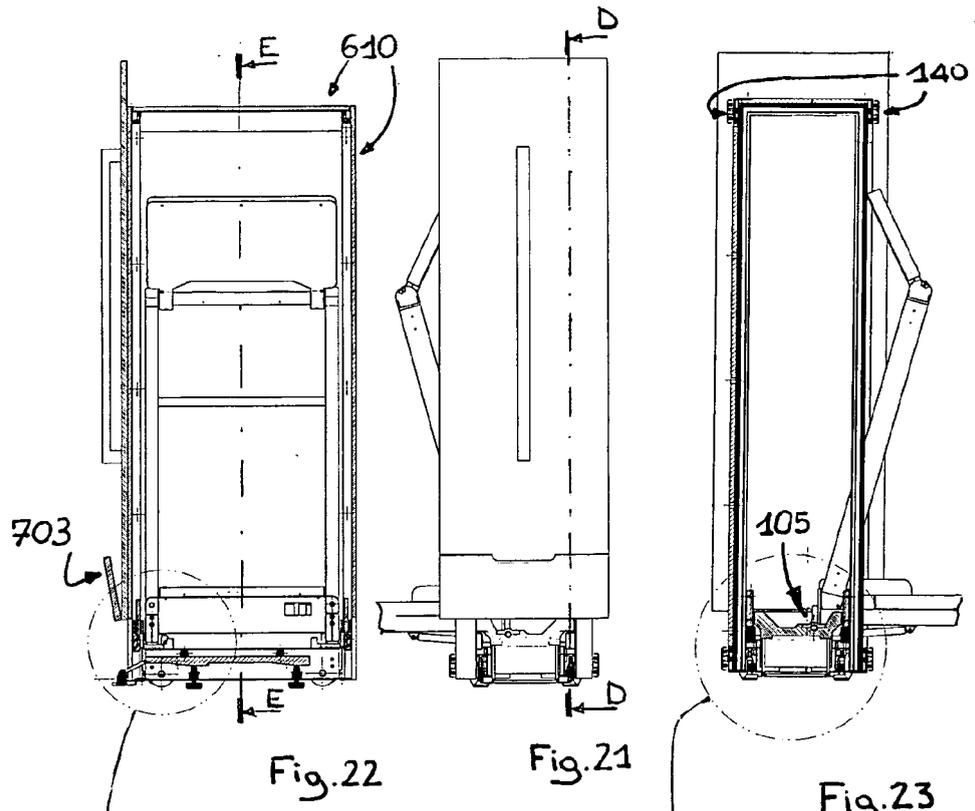
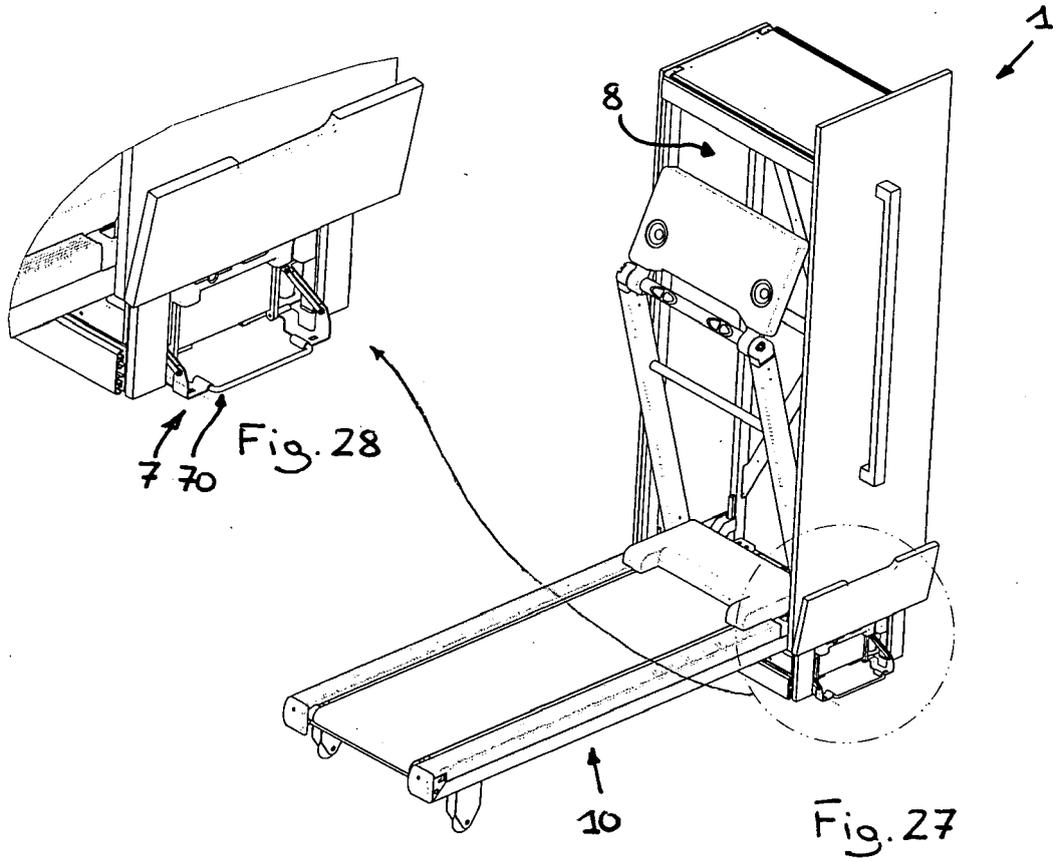


Fig. 14







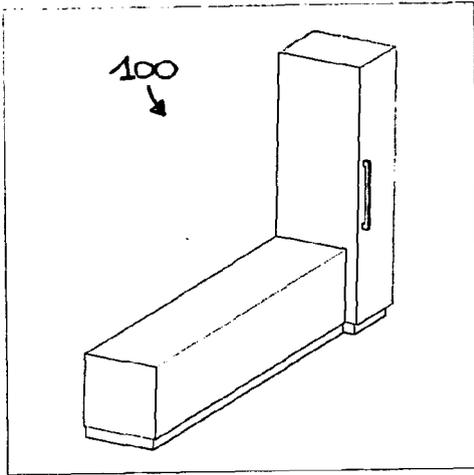


Fig. 29

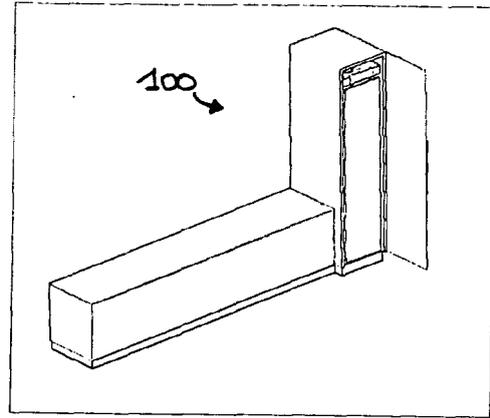


Fig. 30

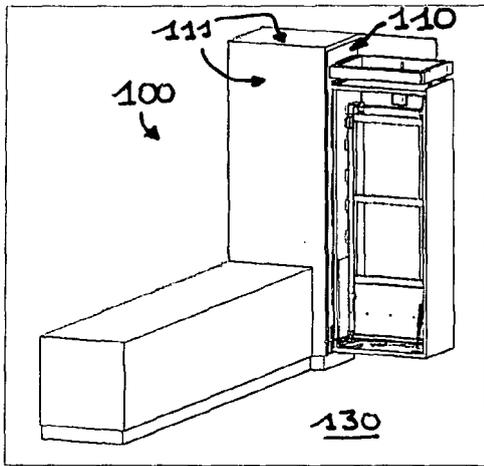


Fig. 31

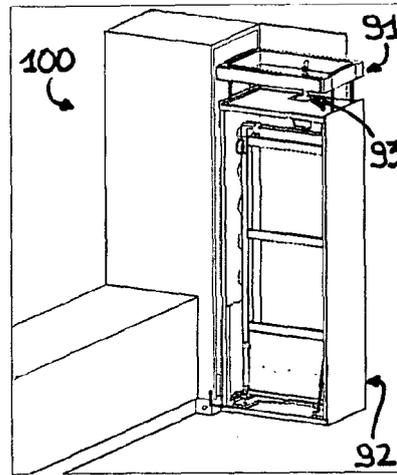


Fig. 32

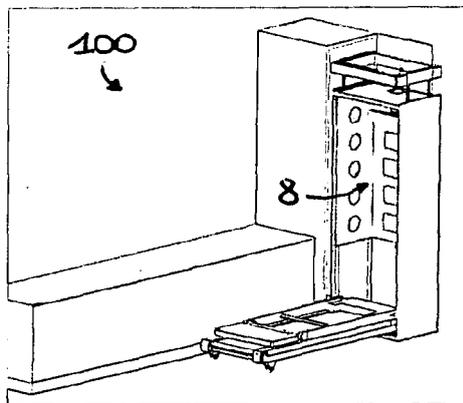


Fig. 33

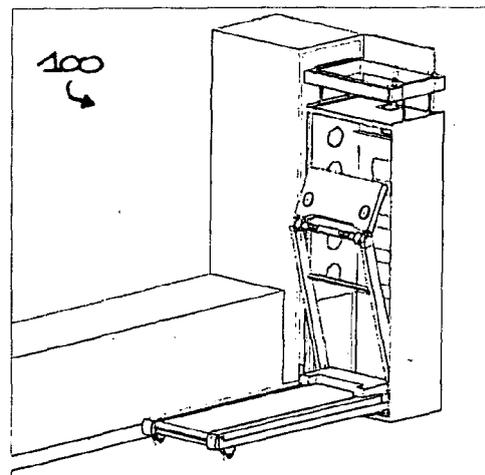


Fig. 34

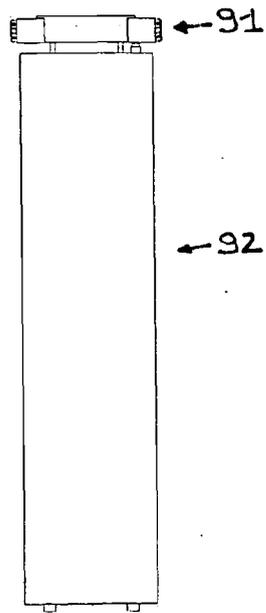


Fig. 35

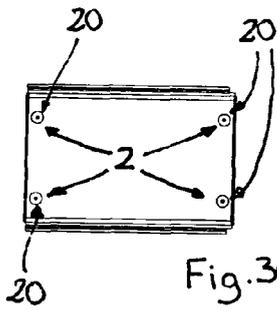


Fig. 36

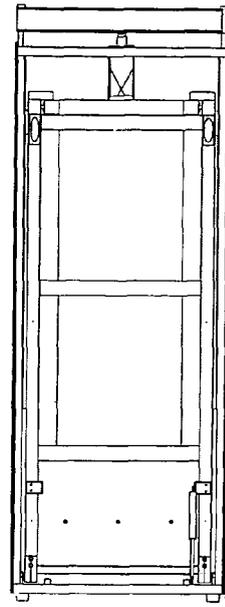


Fig. 37

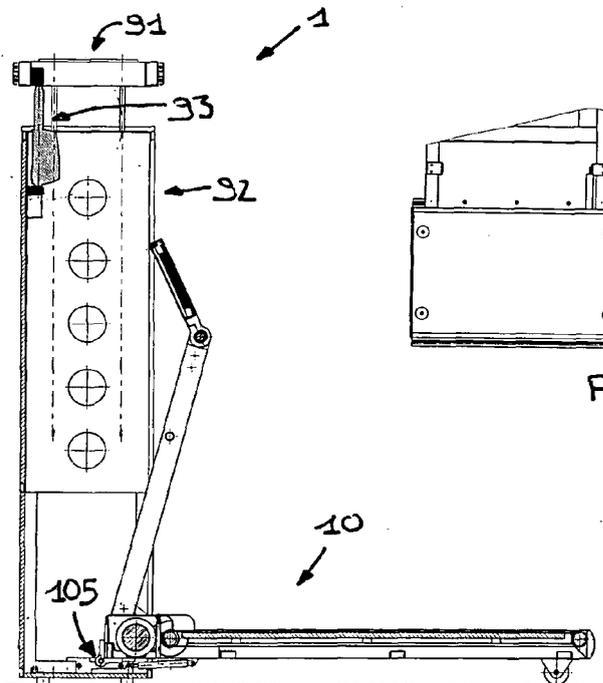


Fig. 40

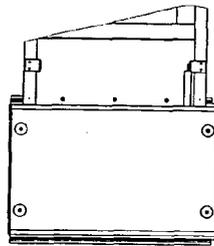


Fig. 39

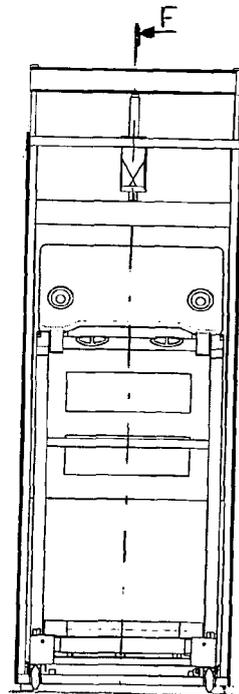
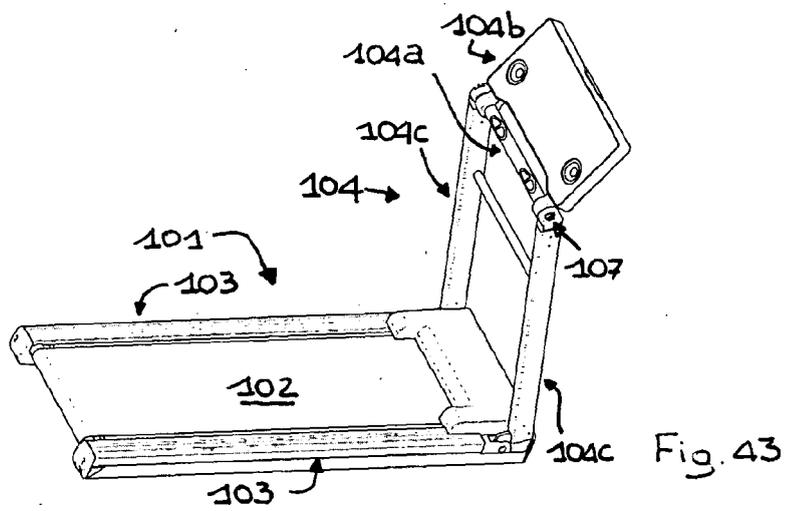
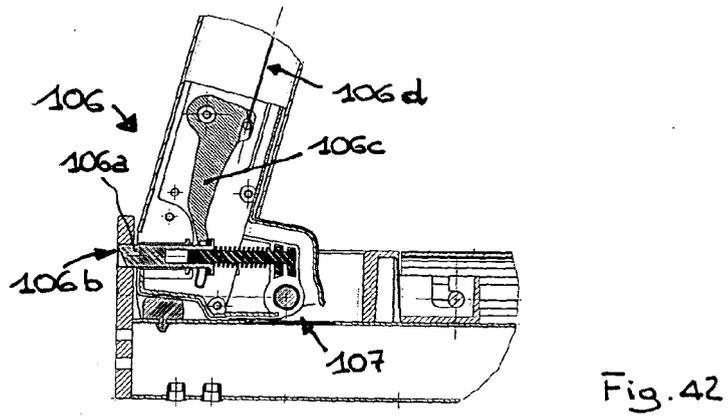
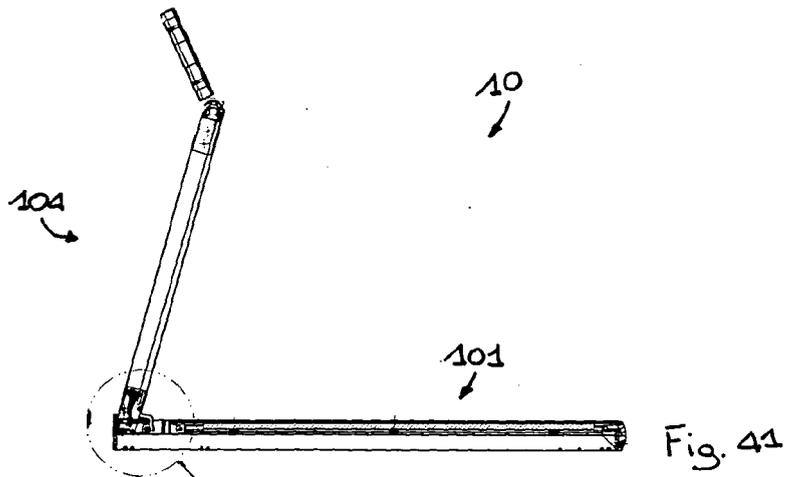


Fig. 38





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/072180 A (CLUB DESIGN S R L [IT]; TAKAHIDE SANO [JP]; LANCIAPRIMA MAURIZIO [IT]) 28 June 2007 (2007-06-28) * page 4, line 25 - page 17, line 28; figures 1-11 *	1-3, 19, 20	INV. A47B81/00 A47B85/08 A47C17/86
A	----- US 4 597 122 A (HANDLER MILTON E [US] ET AL) 1 July 1986 (1986-07-01) * column 2, line 25 - column 4, line 19; figures 1-7 *	4-18	
A	----- JP 2004 201795 A (SANYU TECHNOS KK; ASSIST KK) 22 July 2004 (2004-07-22) * abstract; figures 1-5 *	1-20	
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			A47B A47C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 March 2008	Examiner Klintebäck, Daniel
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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03-03-2008

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