



US 20160096064A1

(19) **United States**(12) **Patent Application Publication**  
**GATTI**(10) **Pub. No.: US 2016/0096064 A1**(43) **Pub. Date: Apr. 7, 2016**(54) **TREADMILL WITH REMOVABLE HANDLES  
AND RELATIVE ASSEMBLY METHOD**(52) **U.S. Cl.**CPC ..... *A63B 22/02* (2013.01); *A63B 23/04*  
(2013.01); *A63B 2210/50* (2013.01)(71) Applicant: **TECHNOGYM S.P.A.**,  
GAMBETTOLA (FORLI CESENA) (IT)(72) Inventor: **DAVIDE GATTI**, FORLI (IT)

(57)

**ABSTRACT**(21) Appl. No.: **14/858,620**(22) Filed: **Sep. 18, 2015**(30) **Foreign Application Priority Data**

Oct. 3, 2014 (IT) ..... BO2014A000542

**Publication Classification**(51) **Int. Cl.***A63B 22/02* (2006.01)*A63B 23/04* (2006.01)

Described is a treadmill (1) comprising a frame (2) having uprights (3) for supporting a control panel (5) equipped with a user interface; a belt (4) trained around rotatable rollers, defining a treadable surface (4a); a motor connected to at least one of the rollers for moving the belt (4); at least one handle (7) connected to a corresponding upright (3) and having a grip portion (7a) which can be accessed by the user, wherein the treadmill (1) comprises a shape coupling between the handle (7) and the upright (3) and a lock/release mechanism (16) for manually coupling and uncoupling the handle (7) with respect to the upright (3).

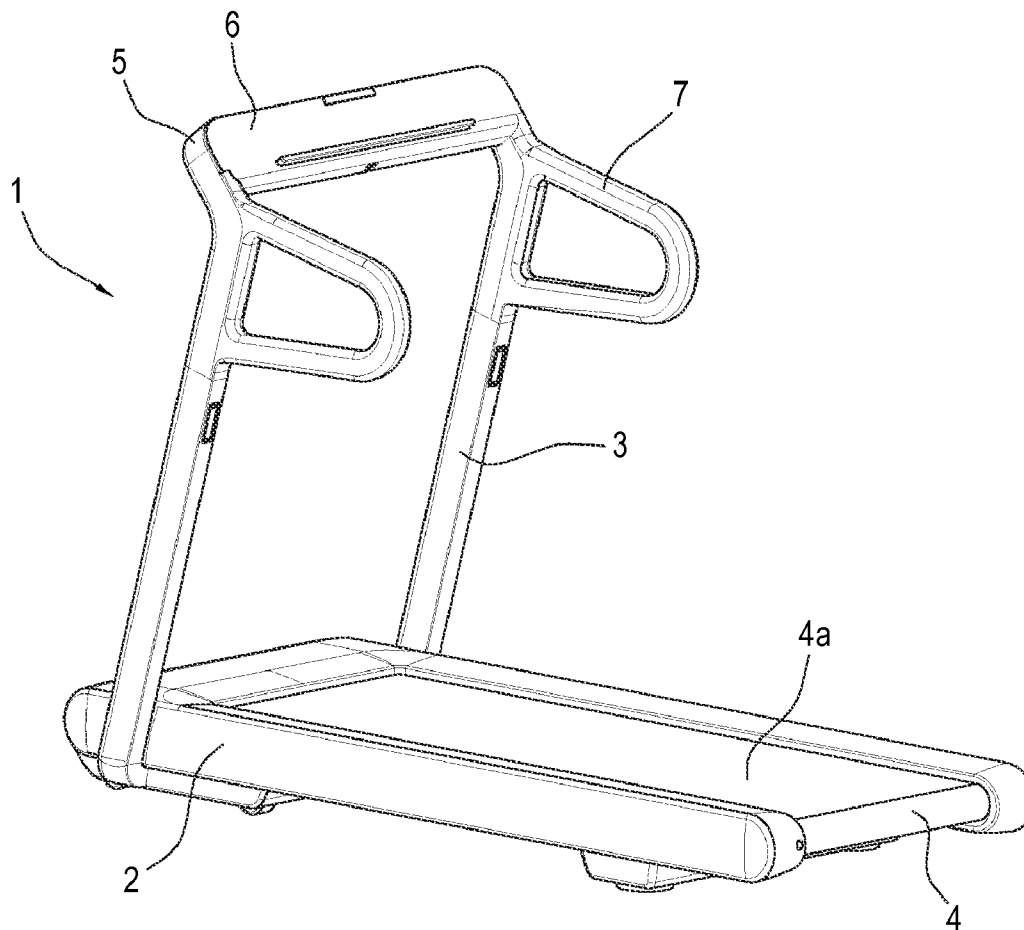


FIG. 1

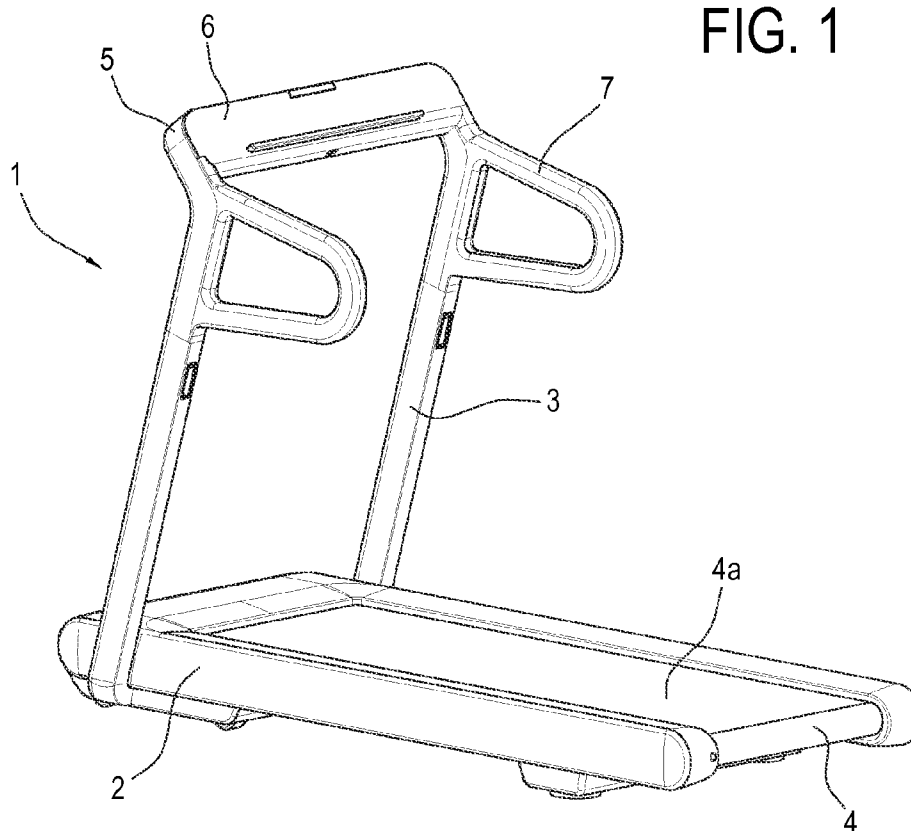


FIG. 2

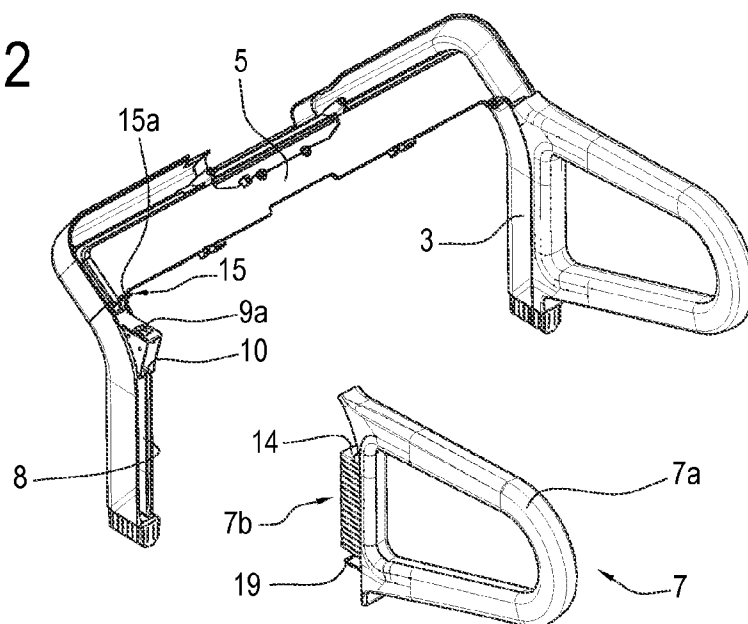


FIG. 3

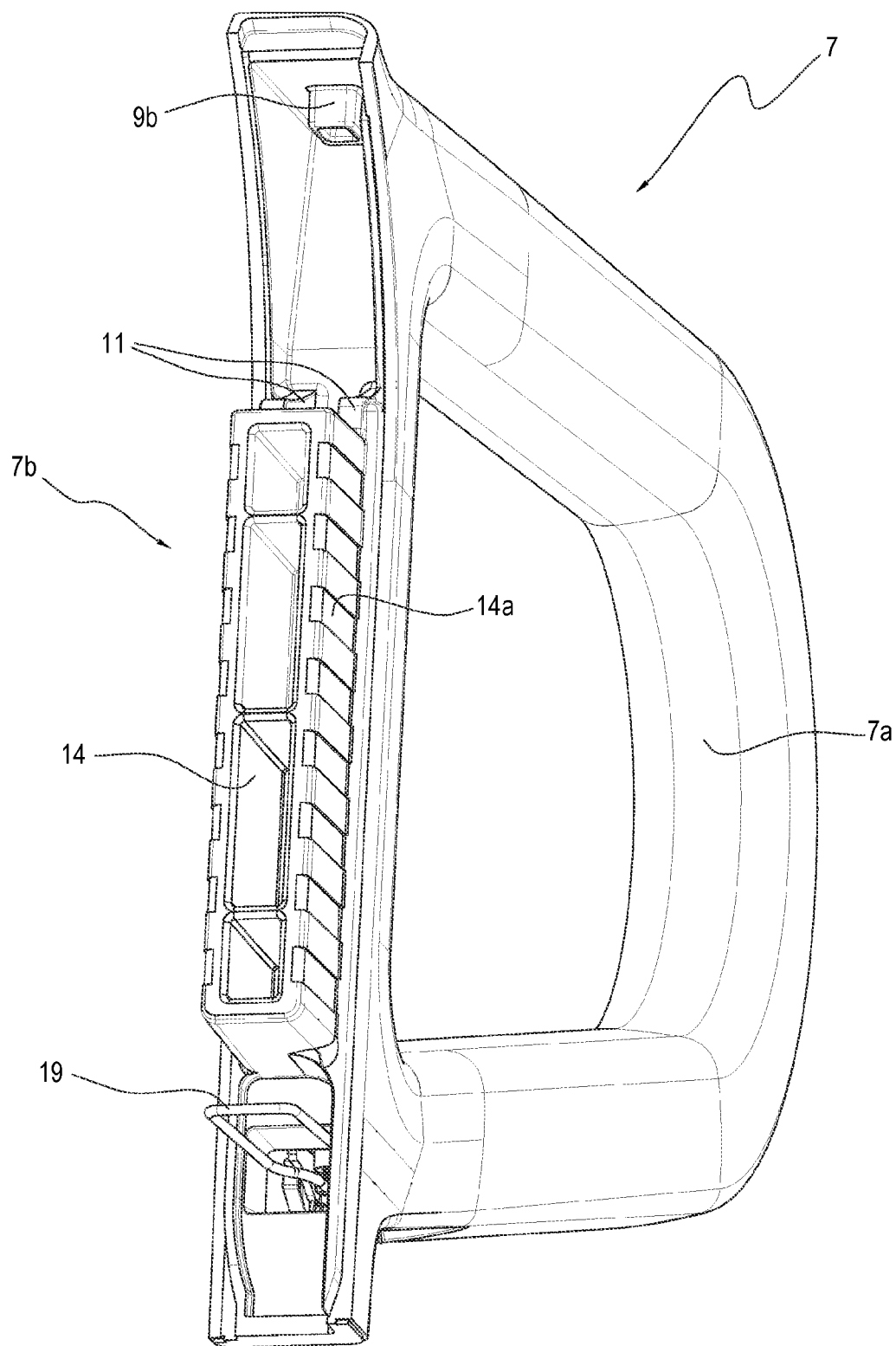
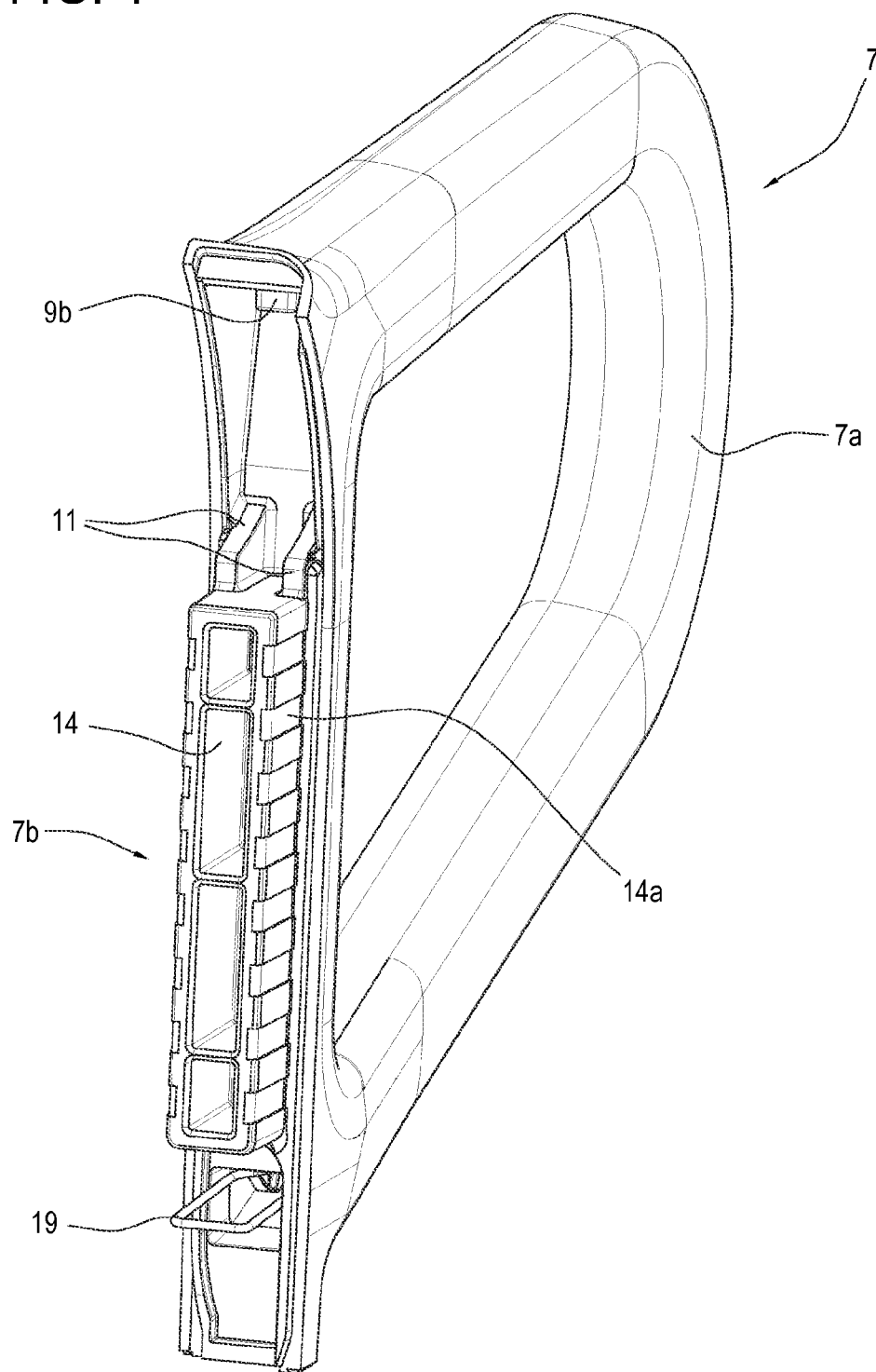


FIG. 4



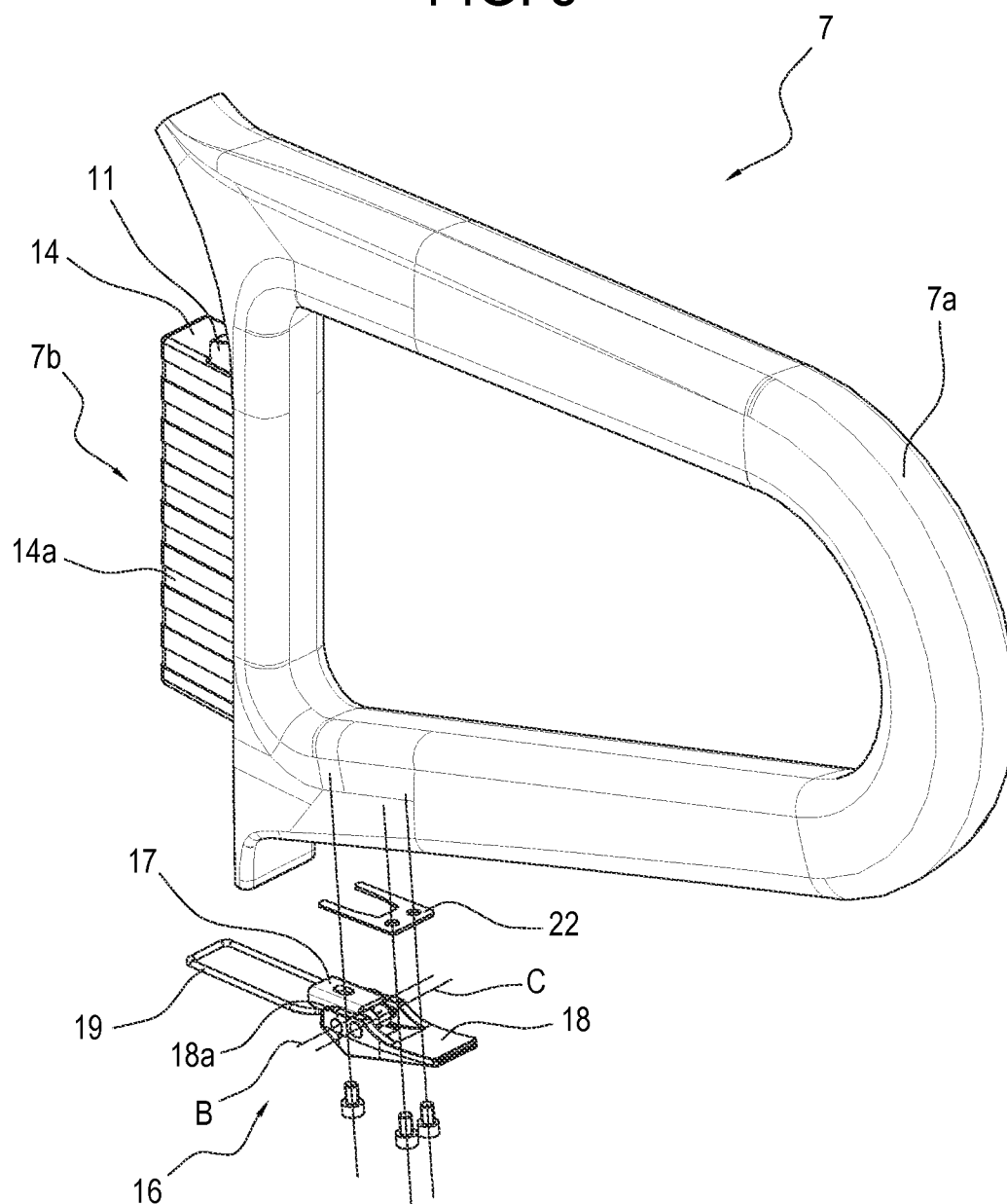


FIG. 6

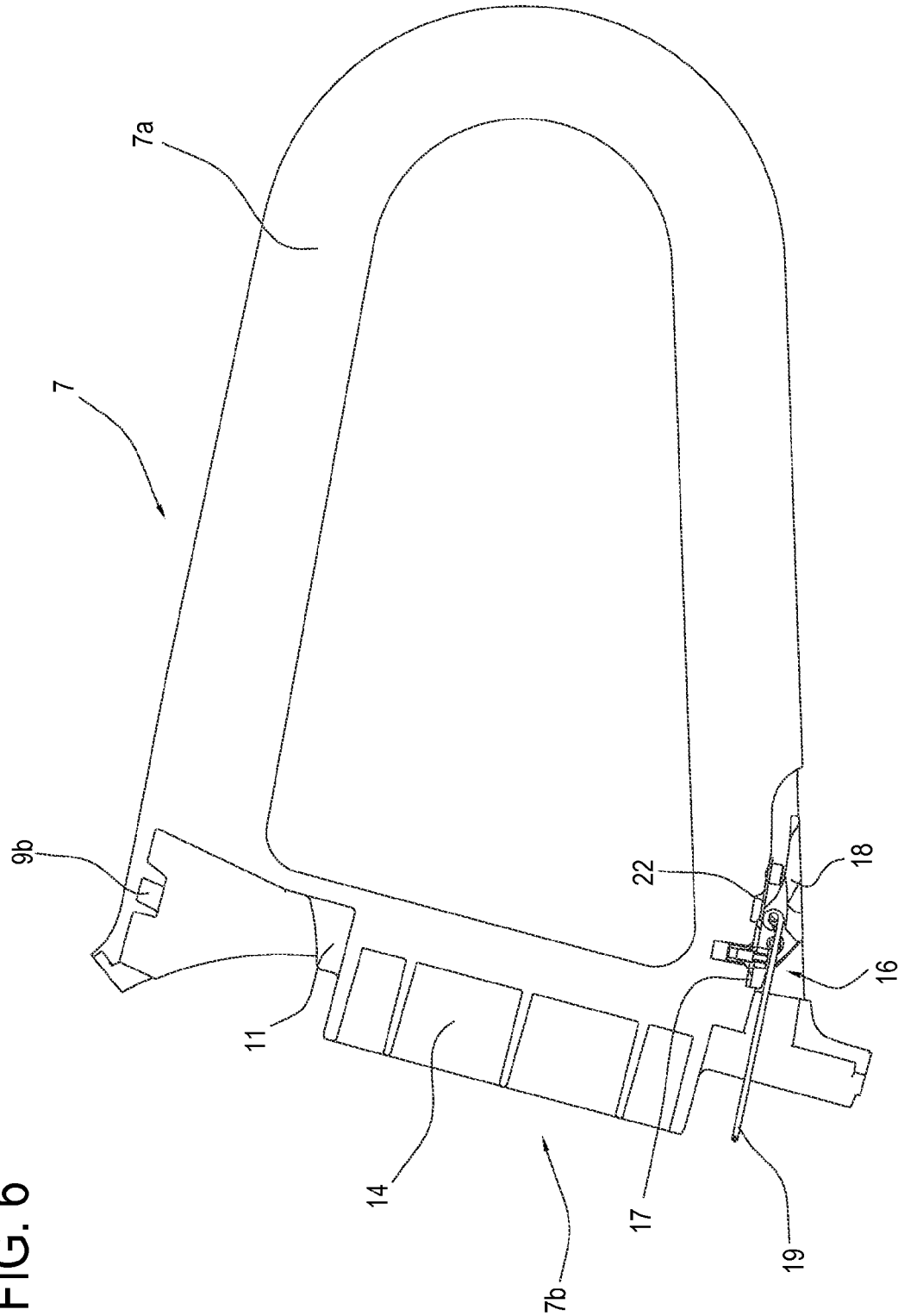


FIG. 7

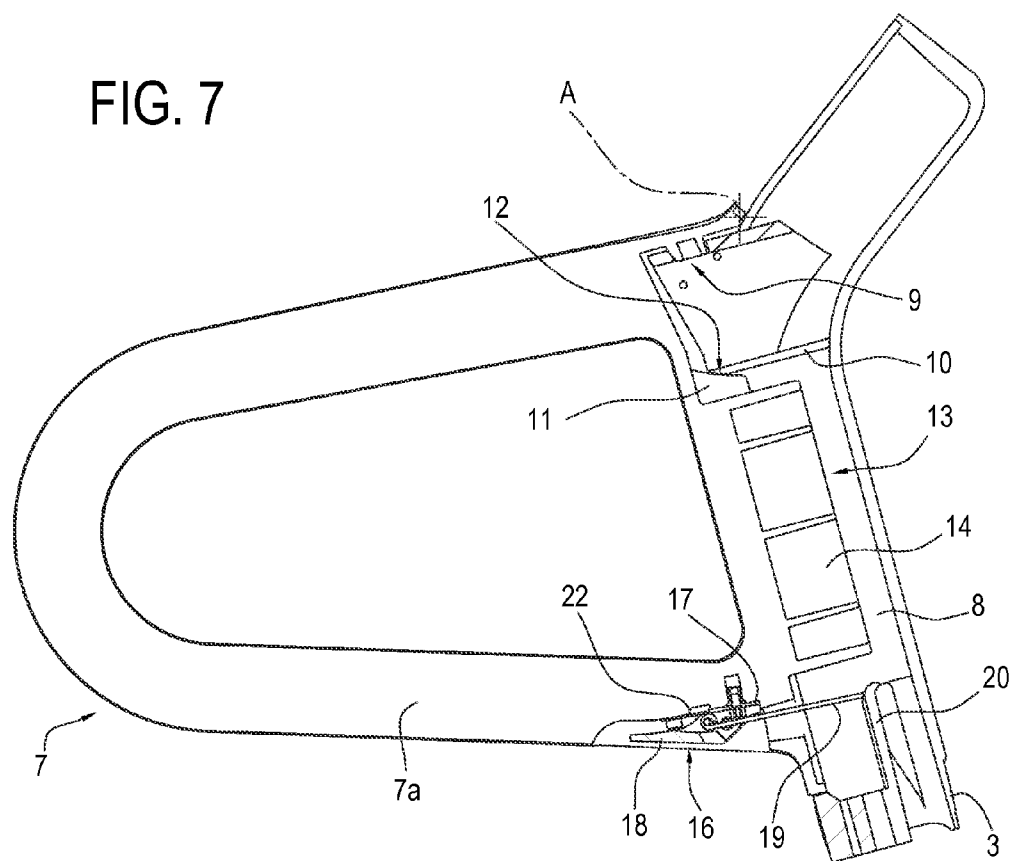


FIG. 8

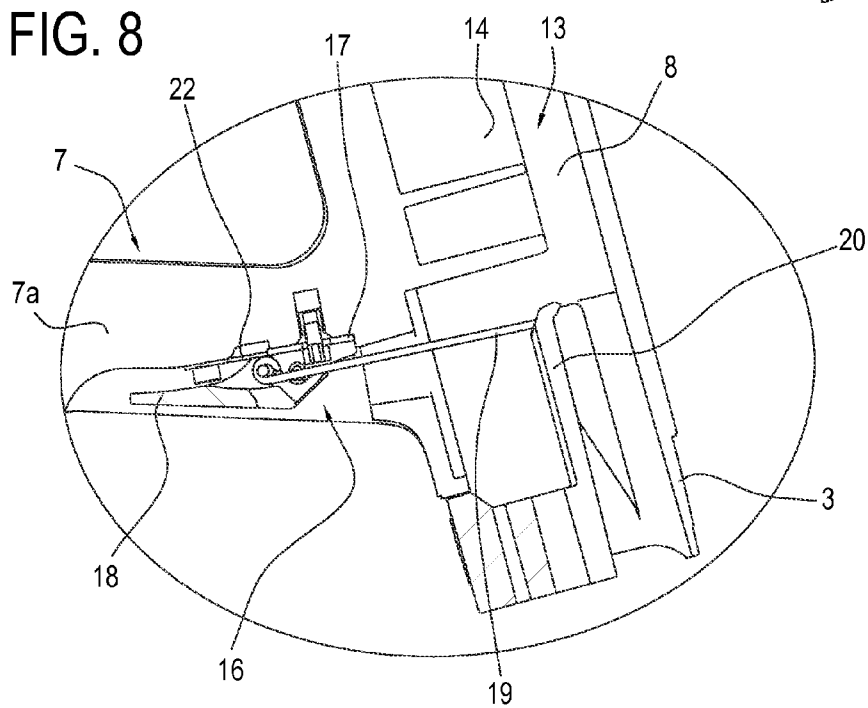


FIG. 9

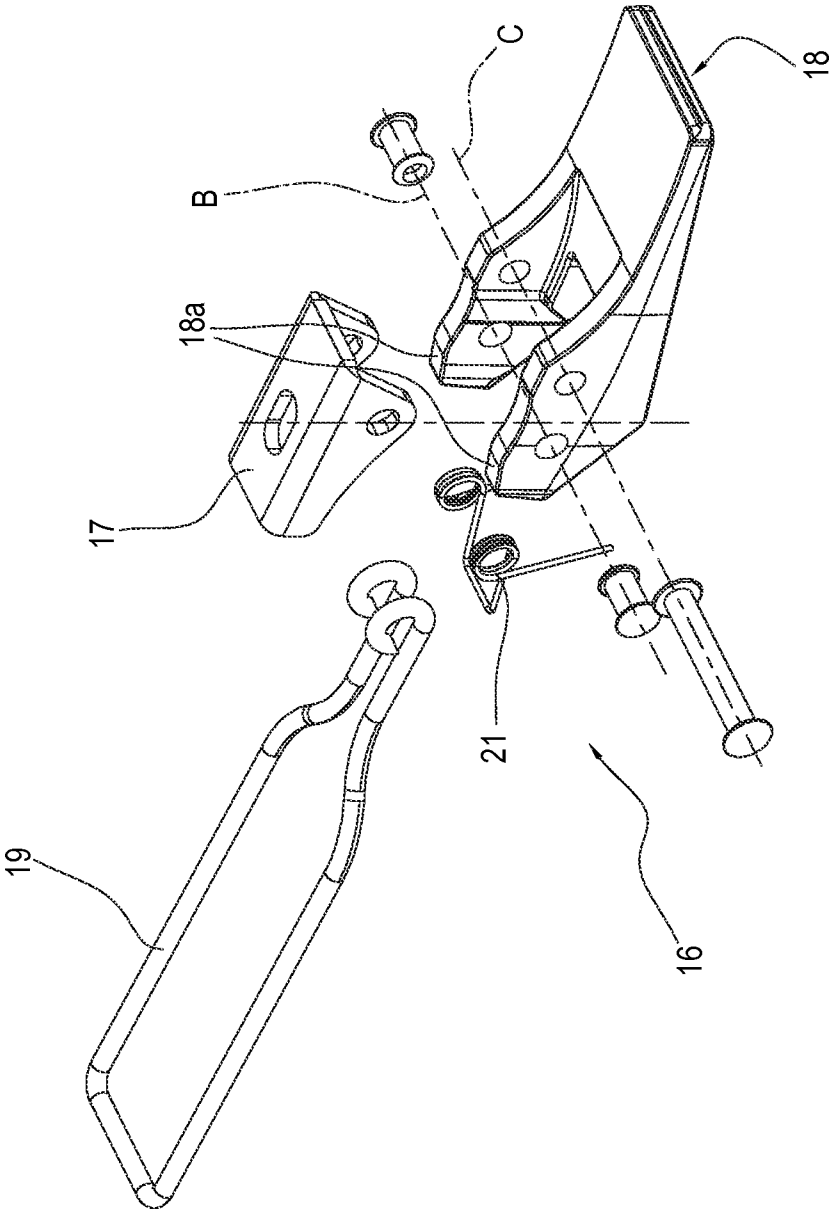


FIG. 10

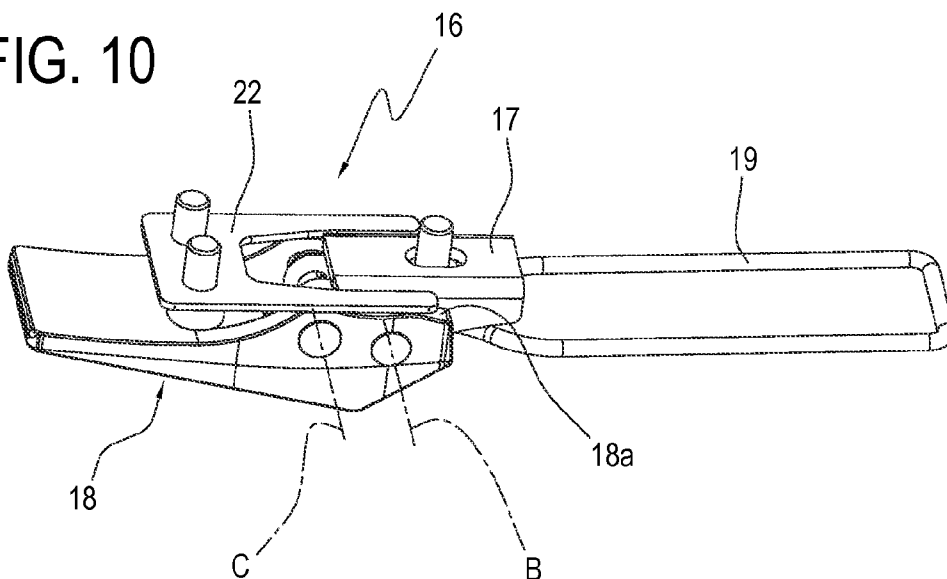


FIG. 11

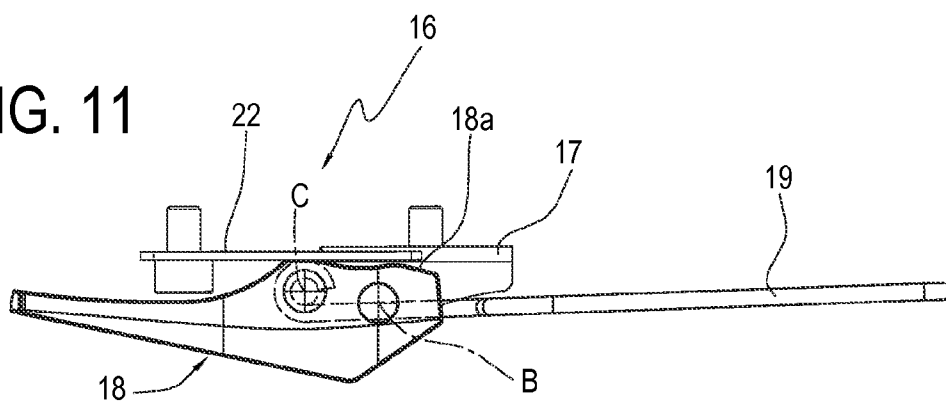


FIG. 12

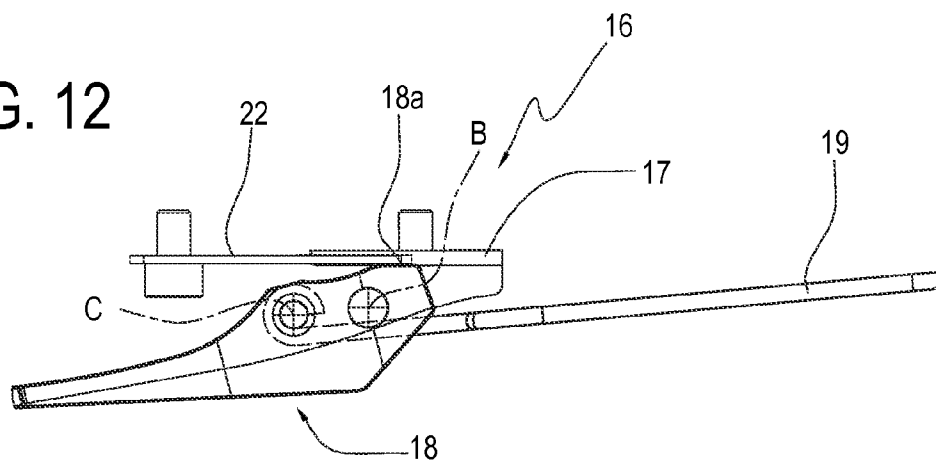


FIG. 13

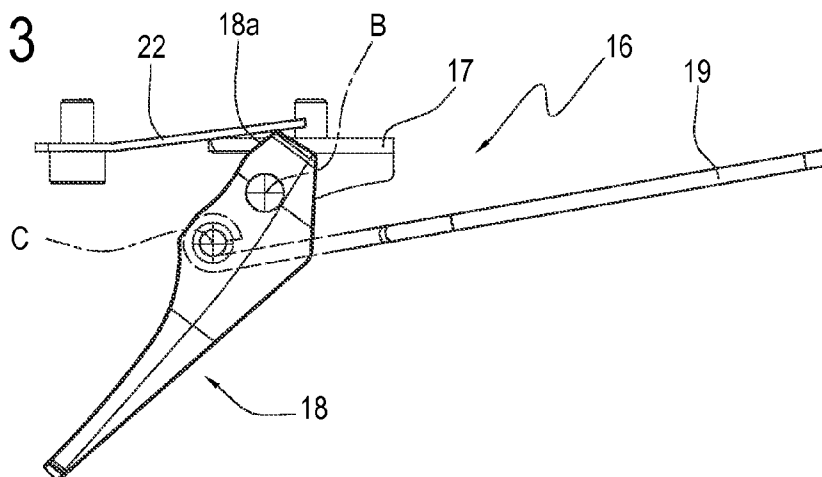


FIG. 14

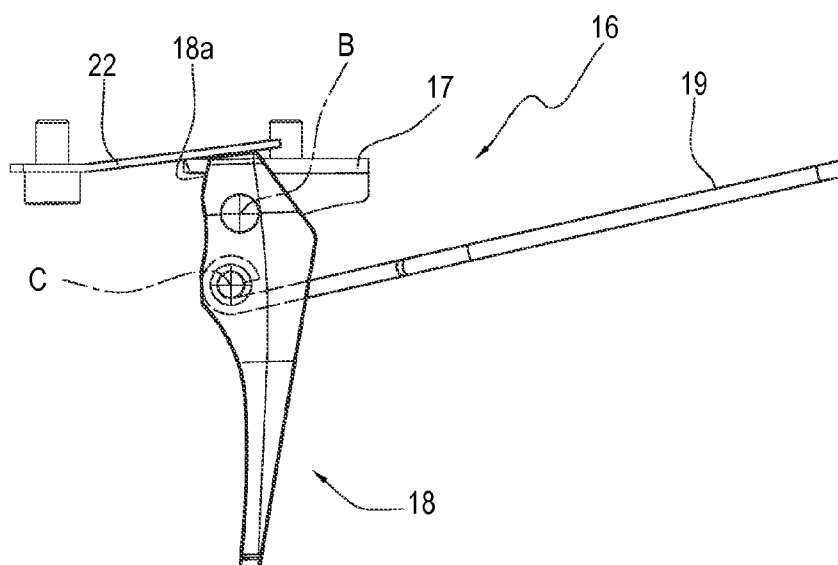
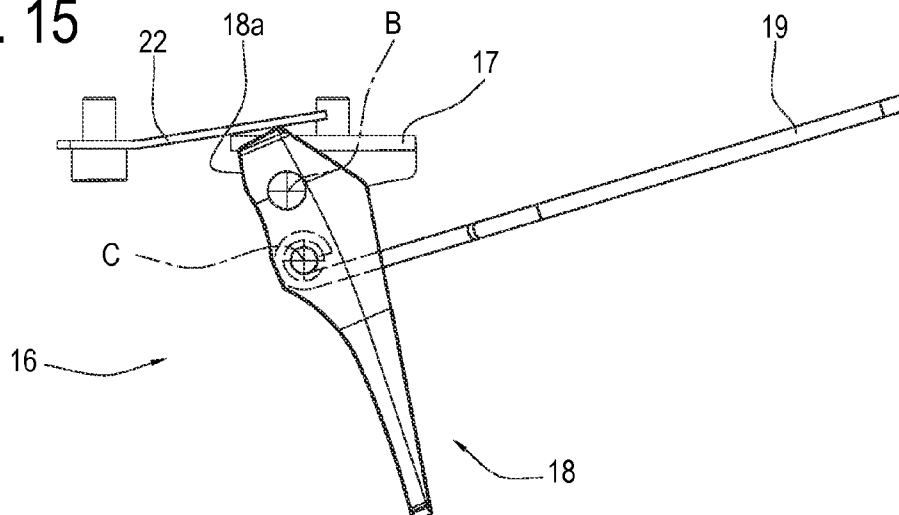


FIG. 15



# **TREADMILL WITH REMOVABLE HANDLES AND RELATIVE ASSEMBLY METHOD**

**[0001]** This invention relates to a treadmill with removable handles and a relative assembly method.

**[0002]** The invention is applicable in particular to the fitness sector and for fitness training equipment, which may be located, for example, in a gym or in a home.

**[0003]** The invention addresses the technical field of exercise machines; in particular, the invention addresses the technical field of treadmills, that is, the exercise machines designed to simulate walking and running, aerobic activities which can be performed at various intensities. The machines allow the user to walk run on the spot.

**[0004]** The treadmills allow the user to walk or run in gradual and controlled fashion, to perform efficient and safe cardiovascular training. There may be various aims for the training, for example, weight loss or toning of the muscles of the lower limbs. The treadmill can also be applied for exercise for articular and cardiovascular rehabilitation.

**[0005]** The range of users for whom it is intended is therefore large and diversified. Individuals who practice sport competitively, those who wish to achieve and maintain a good level of fitness and persons in need of rehabilitation to improve their mobility can obtain benefits from the use of treadmills.

**[0006]** In addition to gyms, there is a wide and varied range of environments in which treadmills can be used, for example in private homes, hotels, spas and all spaces dedicated to training.

**[0007]** Typically, the prior art treadmills comprise a frame comprising a base and at least one upright.

**[0008]** The base of the frame constitutes the support for the belt. The belt consists of a belt trained around at least two rotatable drive rollers (that is, pulleys) coupled to the base. A motor, located in a compartment of the base, controls the operation of at least one of the rollers for moving the belt. The belt rotated by the drive rollers defines a walking or running surface (that is, a treadable surface). The treadable surface is substantially parallel to the plane defined by the floor.

**[0009]** The drive rollers, connected to the driving axis by means of a transmission belt, transfer the motion of the motor to the belt. Moreover, the majority of treadmills are provided with a shock absorbing system which is able to absorb the micro-injuries which running can generate, especially when performed on hard ground whilst wearing unsuitable footwear. The prior art treadmills also comprise mechanisms for tilting the base, generally driven by an actuator, which are configured to vary the slope of the belt, by tilting the walking surface relative to the plane defined by the floor.

**[0010]** The prior art treadmills usually comprise one or more uprights coupled to the frame and elongate in a substantially vertical direction to support a control panel which can be reached by the user in an upright position. The control panel may have keys which can be reached by the user during use of the exercise machine. Typically, the keys allow the immediate control of the exercise parameters (for example, speed and slope). The control panel usually comprises a display (possibly touch-screen type) which allows the user to display the exercise data in real time. The control panel for the touch-screen display) has a variable number of keys based on the quantity of data and the number of programs held by the specific exercise machine. On the majority of treadmills it is possible to program exercises with aims of distance, time, heart rate and calories, at different speeds or slopes which can

be set up by the user both during programming and during training. Moreover, the majority of treadmills comprise a memory with preset exercise programs. Many models offer the possibility of setting up new programs, with a number depending on the capacity of the memory and a software program configured to process data coming from one or more sensors with which the exercise machine is equipped. The adjustment of the speed and slope allows the effort exerted to be modulated, adapting it to the individual capabilities and the progress achieved thanks to the exercising.

**[0011]** The prior art treadmills are usually equipped with a braking system which slows down the speed of the belt gradually, even in the case of sudden switching off.

**[0012]** The treadmills generally comprise at least one supporting structure for the upper limbs of the user (that is, handles), designed to help the user maintain balance.

**[0013]** At the sides of the walking or running surface, the belt usually comprises a pair of side footrests. Typically, before starting the exercise, the user steps onto the belt, placing a foot on each side footrest and, facing towards the control panel, grips a handle with one hand and sets a program on the control panel with the other hand.

**[0014]** In order to have a break without stopping the treadmill or without operating the controls, the user can rest on the handles and move the feet to the side footrests.

**[0015]** It may be useful for the user to rest the hands on the handles even during the exercise; for example, unskilled users and users with serious equilibrium problems can exercise more safely by walking with the hands resting on the handles. In treadmills configured for varying the slope of the belt, the walking or running on a slope, which tends to unbalance the user, may require the use of handles as a balancing aid.

**[0016]** It is sometimes the case, especially with unskilled users, that a feeling of veering to the side is felt at the end of the exercise; in these cases, the role played by the handles may be fundamental for the safety of the user. The shape of the handles is designed for the safety of the user without obstructing movements. Moreover, the design of the handles must balance functional aspects, linked to the correct use of the exercise machine and the safety, with appearance and design aspects.

**[0017]** Patent document U.S. Pat. No. 6,045,490 shows a treadmill with handles coupled to the uprights of the frame. The coupling is such as to make the handles movable, by rotation, between an extended position, where they can be easily reached by the user, and a withdrawn position in which the space available to the user during use of the exercise machine is greater.

**[0018]** The prior art treadmills have different features depending on the environment for which they have been designed. More specifically, for home applications in which the space available may be limited, the prior art comprises reclosable (that is, foldable) treadmills, designed to adopt a configuration which reduces as much as possible the overall dimensions (that is, the folded configuration) when the exercise machine is not used. The frame of the reclosable treadmills comprises an opening and/or closing mechanism, which allows the plane of the belt to be moved, typically by rotation, towards the plane in which the directions of extension of the uprights lie.

**[0019]** Patent document U.S. Pat. No. 8,182,399 shows a reclosable treadmill wherein the handles are pivoted to the frame to rotate in such a way as to adopt an extended position during use, and a withdrawn position wherein, once the tread-

mill is reclosed, the direction along which they extend is substantially parallel to the plane defined by the treadable surface.

**[0020]** Patent document US20130237381 shows a reclosable treadmill wherein the handles have an elongate shape in one direction and are coupled rigidly to the control panel. The control panel is coupled to the uprights in such a way as to rotate during the closing of the treadmill. When the treadmill is in the closed position, the treadable surface, the directions in which the uprights are elongate and the directions in which the handles are elongate are contained in substantially parallel planes.

**[0021]** Other solutions regarding treadmills provided with handles are described in patent documents US2007/066448A1, U.S. Pat. No. 6,761,669B1 e U.S. Pat. No. 5,676,624A. However, these treadmills have certain limitations.

**[0022]** The hinge coupling which allows the rotation of the handles is subject to forces which limit the duration and reliability and, also, do not guarantee the absence of residual clearance. Moreover, the reduction of the overall dimensions by rotating the handle is applicable only to the handles having a shape elongate in a direction.

**[0023]** The curved handles, which are preferably since they improve the ergonomics of the exercise machine and the safety for the user, are typically coupled rigidly to the frame, through an attaching system (for example, by screws) which requires the intervention of a skilled technician to carry out the maintenance or the replacement of the component.

**[0024]** The aim of this invention is to provide a treadmill which is particularly simple and easy to assemble and reduces the dimensions during storage or transport.

**[0025]** A further aim of this invention is to provide a treadmill which is particularly comfortable and safe for the user.

**[0026]** Another aim of this invention is to provide a treadmill which is aesthetically very pleasing.

**[0027]** These aims are fully achieved by the treadmill according to this invention as characterised in the appended claims.

**[0028]** More specifically, the treadmill according to this invention comprises a frame having uprights for supporting a control panel, a belt treadable by the user and handles connected to the uprights to provide the user with a surface on which to rest or grip.

**[0029]** According to this invention, the handles are connected to the uprights in a removable fashion by rapid lock release elements which can be operated manually, so that coupling or uncoupling of the handles from the uprights can be performed manually, without the aid of any tool, and in a particularly rapid and easy manner.

**[0030]** The treadmill is configured so that it can rest on a horizontal supporting surface, for example a floor. The uprights are inclined respect to this horizontal plane, for example they are vertical or substantially vertically (but they might also have different inclinations); in any case, the handles are elongate along respective longitudinal directions.

**[0031]** According to one aspect of this description, the treadmill is foldable, that is, it comprises parts movably connected to each other (for example by hinges) for being moved between an open position, wherein the treadmill is designed to perform its fitness exercise functions, and a closed position, folded, wherein the treadmill occupies a particularly reduced size, so as to be packed, stored or simply placed in an area of

a home or of a gym. In light of this, preferably, the uprights rotate relative to a portion of the frame designed to support the belt.

**[0032]** However, it should be noted that this invention not be considered limited to foldable treadmills.

**[0033]** Preferably, the handles have a U-shaped grip portion. This favours the safety and ease of use by the user.

**[0034]** According to this description, the treadmill comprises a shape coupling between handle and upright.

**[0035]** Moreover, the treadmill comprises a lock/release mechanism movable between (at least) two configurations, one for locking, wherein the handle is fixed stably to the respective upright, and one for releasing, wherein the handle may be manually removed from the upright.

**[0036]** As regards the shape coupling between the upright and the handle, the following should be noted.

**[0037]** Preferably, the upright has a shaped hollow seat to house a corresponding projecting portion of the handle. This is the solution according to the embodiment illustrated; however, it should also be noted that, in a variant embodiment not illustrated, the male and female role is exchanged between handle and upright, in the shape coupling (this circumstance also applies in consideration of the further features described below regarding the shape coupling).

**[0038]** In an embodiment, this shape coupling defines an interlocking. In one embodiment, the shape coupling is extended along a straight portion of the upright; the shape coupling occupies an area of the upright and a corresponding area of the handle elongated along a longitudinal axis (the axis in which the upright is oriented).

**[0039]** The shape coupling preferably comprises a taper coupling by interference, made, for example, by a wedge which can be inserted in a seat.

**[0040]** Thus, the taper coupling defines a transversal axis of moving towards (that is, insertion) and away (that is, extraction) of the wedge from the respective seat, that is, of the handle from the upright.

**[0041]** This transversal direction is substantially parallel to the sliding direction of the belt of the treadmill, when it is parallel to the horizontal plane for supporting the treadmill.

**[0042]** In the example illustrated, the handle has a wedge which can be inserted in a seat defined by the upright. Preferably, the wedge has tapered lateral faces; preferably, the tapered lateral faces of the wedge define a plurality of protrusions alternated with grooves, elongated in the transversal direction of the wedge towards and away from the respective seat.

**[0043]** The purpose of the tapered coupling is to eliminate the clearances of the handle relative to the upright in a direction perpendicular to the longitudinal direction of the upright and relative to the transversal direction of inserting and removing.

**[0044]** Preferably, the shape coupling comprises a slot-in coupling between a tooth and a corresponding slot.

**[0045]** In the example illustrated, the tooth is integral with the handle and defined by the upright.

**[0046]** The purpose of the slot-in coupling, by inserting teeth in the corresponding slot, is to generate a robust and safe constraint against accidental movement of the handle along the transversal direction, that is, in the direction of extraction from the upright.

**[0047]** Preferably, the slot constitutes a hole oriented along the longitudinal axis; the tooth protrudes downwards from a

ledge defined by the handle and, when the handle is coupled to the upright, protrudes longitudinally downwards and engages the slot.

**[0048]** Preferably, the shape coupling comprises (a guide defining) a contact surface defining a constraint to a longitudinal movement of the handle relative to the upright.

**[0049]** In the example illustrated, the contact surface (of the guide) is integral with the upright and acting in conjunction with a corresponding surface defined by the handle.

**[0050]** Preferably, the contact surface faces downwards, that is, towards the supporting surface of the treadmill; preferably, the contact surface is inclined relative to the supporting surface of the treadmill about an axis perpendicular to the longitudinal direction (along which the upright is elongate) and to the transversal direction (for inserting and removing the handle of the upright).

**[0051]** The purpose of the contact surface is to eliminate the clearances of the handle relative to the upright in the longitudinal direction in which the upright extends.

**[0052]** Also, preferably, the upright comprises a reference profile, comprising at least one rectilinear portion defining a first axis of rotation about which the handle is rotatable to produce the shape coupling.

**[0053]** Preferably, the rectilinear portion is formed by the upright at an upper end of the shape coupling, distal from a treadmill supporting surface.

**[0054]** Preferably, the rectilinear portion is oriented along an axis perpendicular to the longitudinal direction (along which the upright is elongate) and to the transversal direction (for inserting and removing the handle of the upright). This rectilinear portion defines a contact zone for a corresponding portion of the handle, shaped, for example, in the form of a step.

**[0055]** The purpose of this rectilinear portion is to define with precision and uniquely an initial position wherein the handle must be located relative to the upright, for then coupling the handle to the upright.

**[0056]** In effect, the initial position is a position wherein a predetermined contact surface of the handle (at an upper end of the upright) is in contact with the rectilinear portion of the upright, and wherein the opposite end of the handle is offset from the upright; so the handle is located in a position rotated relative to a position for coupling to the upright, rotated about the axis defined by the rectilinear portion of the upright.

**[0057]** This facilitates and guides the movement of handle relative to the upright in the locking direction, favouring the correct execution of the shape coupling.

**[0058]** As regards the lock/release mechanism, attention is drawn to the following.

**[0059]** Preferably, the lock/release mechanism is configured to adopt two stable equilibrium positions and to switch from one to the other by means of snap-in connection.

**[0060]** Preferably, the lock/release mechanism comprises a hook connected to the handle and a pin connected to the frame.

**[0061]** Preferably, the hook is connected to a movable lever, accessible to the user. Preferably, the lever is pivoted on the handle and rotates about a second axis of rotation to move the hook towards or away from the pin.

**[0062]** Preferably, the lock and release mechanism comprises a first elastic element operating in conjunction with the lever and the hook to keep them in a predetermined position relative to one another in the absence of external forces.

**[0063]** Preferably, the lock/release mechanism also comprises a second elastic element configured to oppose the rotation of the lever in a locking direction, until reaching a predetermined angular position of the lever, beyond which the elastic element promotes the rotation of the lever in the releasing direction.

**[0064]** Moreover, preferably, the second elastic element is configured to define at least one angular position of stable equilibrium for the lever.

**[0065]** Moreover, preferably, the second elastic element is configured to oppose the rotation of the lever in a locking direction until a predetermined angular position of the lever has been reached, beyond which the elastic element promotes the rotation of the lever in the releasing direction.

**[0066]** Preferably, the pin of the lock/release mechanism is connected to the upright in a lower area of the shape coupling, proximal to a supporting surface of the treadmill; this increases the robustness and the safety of the handle, since the force applied by the user on the handle directed downwards does not bear directly on the lock release mechanism but only on the contact surface.

**[0067]** This invention also provides a method for assembling a treadmill, comprising a connection of at least one handle to a corresponding upright of a frame of the treadmill.

**[0068]** More specifically, this connection of the handle (that is, of the handles, because preferably there are two or more) to the upright is removable. According to this invention, this connection of the handle to the upright comprises the following steps:

**[0069]** coupling of the handle to the upright by means of a shape coupling between the handle and the upright;

**[0070]** activation of a lock and release mechanism for fixing the handle to the upright in a stable and removable fashion.

**[0071]** More specifically, the fastening comprises a step for the mutual preparatory positioning of the handle relative to the upright.

**[0072]** In light of this, the method preferably comprises the following steps, prior to the activation of the lock mechanism:

**[0073]** positioning one end of the handle on a reference profile made on the top of a shape coupling portion formed by the upright;

**[0074]** rotating the handle about a first axis of rotation defined by the reference profile for producing a shape coupling.

**[0075]** According to one aspect of this description, the treadmill is of the foldable or re-foldable type and the assembly method comprises a step of rotating the upright relative to a belt, to bring the treadmill to an open working position, from a closed position folded.

**[0076]** Preferably, in the positioning step, it is an upper end of the handle, distal from the supporting surface of the treadmill, which rests on the reference profile of the upright.

**[0077]** Moreover, preferably, the rotation of the handle is carried out about an axis perpendicular to the longitudinal direction of extension of the upright and to a direction of sliding of the belt of the treadmill, when the belt is positioned horizontally, parallel to the supporting surface of the treadmill. Preferably, this rotation also comprises, in particular in a relative final part, a pushing of the handle against the upright along a transversal direction, parallel to the sliding direction of the belt of the treadmill, when the belt is positioned horizontally, parallel to the supporting surface of the treadmill;

this is to make a coupling with interference between a portion of the handle and a corresponding portion of the upright.

[0078] According to another aspect of the invention, it should be noted that this description also concerns an exercise machine generally speaking having a frame equipped with uprights and handles designed to be fixed to the uprights, wherein the handles are fastened in such a way as to be removable manually from the uprights, according to one or more of the features described in this invention.

[0079] Moreover, the invention also relates to a handle, having a grip portion (designed to be gripped by the user) and a portion for coupling to the upright of a frame of an exercise machine (in particular a treadmill).

[0080] The coupling portion of the handle is configured for defining a shape coupling according to one or more of the features described in this invention, in conjunction with a corresponding coupling portion defined by the upright.

[0081] Preferably, the coupling portion of the handle comprises one or more of the following features (for a detail of which reference should be made to the rest of this description), in short; a wedge which can be inserted in a seat of the handle by interference; a tooth of the handle which can be inserted in a slot of the upright (and orientated longitudinally); a contact surface designed to interact by interference with a corresponding surface of the upright, to form a constraint to a longitudinal movement of the handle coupled to the upright; a movable hook for coupling to a the pin of the handle.

[0082] For this reason, this invention allows a handle to be fitted to and removed from a treadmill (and in more general terms, to and from an upright of an exercise machine) quickly and easily, guaranteeing at the same time the robustness of the handle fitted.

[0083] This applies for all types of handles, but in particular for U-shaped handles which are particularly ergonomic and safe.

[0084] This solution has various advantages.

[0085] Firstly, the solution according to this invention simplifies and speeds up the assembly operation of the handle, even allowing an unskilled person to quickly fit the handle; this is particularly useful for exercise machines intended for use at home; moreover, this facilitates a replacement of handles over time (because they are worn or for reasons of appearance). Moreover, the solution according to this invention is particularly attractive in appearance, since screws or other fastening means cannot be seen from the outside, except for the lock release mechanism; in effect, the shape coupling, when the handle is fixed to the upright, is completely enclosed in a space formed inside the upright and the handle.

[0086] The solution according to this invention is also particularly reliable and safe, because the coupling between handle and upright allows vibrations and clearances which might disturb the person during use of handle to be eliminated.

[0087] This and other features of the invention will become more apparent from the following detailed description of a preferred, non-limiting example embodiment of it, with reference to the accompanying drawings, in which:

[0088] FIG. 1 is a perspective view of one particular embodiment of the treadmill according to this invention;

[0089] FIG. 2 is a perspective view of a detail of the treadmill according to this invention in which a handle is separated from the frame;

[0090] FIGS. 3 and 4 show two different perspective views of the handle of the treadmill of FIG. 1;

[0091] FIG. 5 shows a perspective view of the handle of FIG. 3 wherein the lock/release mechanism is shown in an exploded view;

[0092] FIG. 6 shows a side view in cross section of the handle of FIG. 3;

[0093] FIG. 7 shows a side view in cross section of the handle of FIG. 3 attached to the frame of the treadmill of FIG. 1;

[0094] FIG. 8 shows a detail of the lock/release mechanism of the treadmill of FIG. 1, hooked to the frame;

[0095] FIGS. 9 and 10 show the lock/release mechanism according to this description, in an exploded view and a perspective view, respectively;

[0096] FIG. 11 shows the lock/release mechanism of FIG. 9 in a first configuration;

[0097] FIG. 12 shows the lock/release mechanism of FIG. 9 in a second configuration;

[0098] FIG. 13 shows the lock/release mechanism of FIG. 9 in a third configuration;

[0099] FIG. 14 shows the lock/release mechanism of FIG. 9 in a fourth configuration;

[0100] FIG. 15 shows the lock/release mechanism of FIG. 9 in a fifth configuration;

[0101] With reference to the accompanying drawings, the numeral 1 denotes a treadmill, that is to say, an exercise machine designed to simulate walking and running, which allows the user to walk/run on the spot.

[0102] A treadmill 1 comprises a frame 2 having at least one upright 3; preferably, the frame 2 comprises two uprights 3.

[0103] The treadmill 1 comprises a belt 4 trained around at least two rotatable rollers (not shown in the drawings, of per se known type), which defines a treadable surface 4a, that is to say, a walking or running surface. Preferably, the treadable surface 4a is parallel to a supporting surface of the treadmill 1.

[0104] Preferably (but not necessarily), the treadmill 1 comprises a motor (not illustrated in the drawings, of per se known type), connected to at least one of the rollers and to move the belt 4.

[0105] In one embodiment, the treadmill 1 comprises an actuator (not illustrated in the drawings, of per se known type) associated with the frame to angle the treadable surface 4a with respect to the supporting surface of the treadmill 1.

[0106] Preferably (but not necessarily), the treadmill 1 comprises a control panel 5. The control panel 5 is coupled with frame 2; preferably, the control panel 5 is supported by the uprights 3 at a predetermined height from the supporting surface of the treadmill 1. Preferably, the control panel 5 is provided with a user interface. Preferably, the control panel 5 comprises one or more control means, to allow the user to control parameters relative to the operation of the treadmill 1. Preferably, the control panel 5 comprises a display 6 for displaying, by the user, parameters of the treadmill 1 and of the workout. Preferably, the display 6 is of the touchscreen type.

[0107] The treadmill 1 has at least one handle 7 (preferably at least two handles 7), designed as an aid for the balance of the user. The handle 7 (or, each handle 7) has a grip portion 7a which can be grasped by the user. In an embodiment, the grip

portion 7a is U-shaped; this guarantees a particularly comfortable and firm grip. In use, each handle is stably connected to a respective upright 3.

[0108] The handles are removably connected to the respective uprights 3, so that they can be easily attached and detached by the user or by another person.

[0109] The handle 7 also has a coupling portion 7b, configured for allowing a coupling of the handle 7 to the upright 2.

[0110] Preferably, the coupling portion 7b can be coupled to a corresponding coupling portion of the upright 3, to define the shape coupling.

[0111] Preferably, the upright 3 (that is, the coupling portion of the upright 3) comprises a shaped hollow seat 8, which constitutes a female portion in the shape coupling with the handle 7 (alternatively, the role of male and female in the shape coupling can be reversed, between coupling portion of the handle 7 and of the upright 3).

[0112] In the embodiment illustrated, the shaped hollow seat 8 is made in the upright 3; the shaped hollow seat 8 is elongate in a longitudinal direction (along which the upright 3 is elongate).

[0113] In use, when the treadmill 1 is resting on the ground, the longitudinal direction is vertical or substantially vertically (that is, perpendicular to the supporting surface of the treadmill).

[0114] The coupling portion 7b of the handle 7 is also preferably elongate in a direction; when the handle 7 is coupled with the corresponding upright 3, the direction of extension of the coupling portion 7b of the handle 7 is parallel to the direction in which the shaped hollow seat 8 is also elongate. In an exemplary embodiment, the grip portion 7a of the handle has at least a segment positioned substantially cantilevered with respect to the coupling portion 7b. In particular, in an exemplary embodiment, the grip portion 7a of the handle has a stretch elongated (extending) along the direction of movement of the treadmill (or a direction substantially parallel to the ground, i.e. to a bearing plane of the treadmill), while the coupling portion 7b is disposed in a longitudinal direction, substantially perpendicular to said stretch of the grip portion 7a.

[0115] Preferably, the coupling portion 7b has an elongated shape (elongated in longitudinal direction) and has a first and a second end; for example, the coupling portion 7b is straight and shaped as a (rectilinear) segment.

[0116] In an exemplary embodiment, the gripping portion 7a of the handle has a first and a second end facing in a same direction. For example, such a gripping portion 7a is shaped as a “U” or “V”.

[0117] Preferably, said first and second end of the gripping portion 7a of the handle are connected (joined) to said first and second ends of the coupling portion 7b, to form a ring (or triangle or another shape having a closed perimeter); this ring preferably has a straight portion (side), formed by the coupling portion 7b.

[0118] Preferably, the coupling portion 7b of the handle 7 connects two ends of the grip portion 7a (especially if the grip portion 7a is U-shaped). Preferably, the shape coupling comprises a slot-in coupling 9, to prevent the movement of the handle 7 away from the upright 3, in a direction parallel to the supporting surface of the treadmill 1.

[0119] In an example embodiment, the upright 3 comprises a slot 9a; the slot 9a is preferably formed in the shaped hollow seat 8; more specifically, it is made on a protruding portion of

the shaped hollow seat 8. Moreover, the handle 7 comprises a tooth 9b which can be inserted in the slot 9a for making the slot-in coupling 9.

[0120] Preferably, the slot-in coupling 9 is located in the upper part of the shape coupling, that is, in the part of the upright 3 (and of the handle 7 coupled thereto) distal from the supporting surface of the treadmill 1.

[0121] Moreover, preferably, the upright (that is, the shaped hollow seat 8 of the upright) comprises a guide 10. The handle 7 (that is, the coupling portion 7b of the handle 7) has a trapezoidal element 11. The guide 10 is configured to guide a movement of the trapezoidal element 11. Preferably, the coupling portion 7b of the handle 7 comprises two trapezoidal elements 11.

[0122] The contact surface between the guide 10 of the upright 3 and the trapezoidal element 11 (or the trapezoidal elements 11) of the handle 7 forms a contact surface 12. Preferably, this contact surface 12 forms part of the shape coupling, to prevent a movement of the handle 7 away from the supporting surface of the treadmill 1, in the direction perpendicular to the supporting surface. Preferably, the coupling between the guide 10 and the trapezoidal element 11, defining the contact surface 12, is at a lower height than the slot-in coupling 9 that is, it is relatively closer to a supporting surface of the treadmill 1, when the handle 7 is connected to the upright 3.

[0123] It should be noted that the couplings comprising the pin 9b and the slot 9a, on the one hand, and the trapezoidal elements 11 and the guide 10, on the other hand, have the purpose of preventing the movement of the handle in a direction perpendicular to the supporting surface of the treadmill, in both directions; more specifically, towards and away from the supporting surface of the treadmill, respectively.

[0124] Preferably, the shape coupling comprises (also) a taper coupling 13, to prevent a movement of the handle 7 away from the upright 3 along a direction parallel to the supporting surface of the treadmill 1 (preferably, the direction is perpendicular or transversal to the movement direction of the belt 4 of the treadmill 1).

[0125] In this context, preferably, the coupling portion 7b of the handle 7 defines a wedge 14. The shaped hollow seat 8 of the upright 3 has a portion shaped to match the wedge 14 of the handle, to define the taper coupling 13.

[0126] Preferably, the wedge 14 has a cross section with a variable width, that is, the wedge 14 is tapered, for coupling with interference with the shaped hollow seat 8 of the upright 3. Preferably, the wedge 14 has a trapezoidal cross section.

[0127] Preferably, the wedge 14 has grooved lateral faces 14a, to improve the stability of the taper coupling 13. More specifically, the lateral faces 14a of the wedge have a plurality of grooves alternated with corresponding protrusions, oriented in the direction of insertion and removal of the wedge 14 from the corresponding coupling portion of the shaped hollow seat 8 of the upright 3. In this way, the interference of the coupling is concentrated in the protrusions. This guarantees a particularly stable coupling, avoiding the risk of damaging the shaped hollow seat 8.

[0128] Preferably, the taper coupling 13 is at a lower height (that is, proximal to the supporting surface of the treadmill 1) relative to the contact surface 12 (that is, relative to the guide 10 of the upright 3).

[0129] Preferably, the shaped hollow seat 8 comprises, at one end distal from the supporting surface of the treadmill 1, a reference profile 15 which is configured for facilitating the

user during connection of the handle 7 to the upright 3 (of the frame 2) of the treadmill 1. Preferably, the reference profile 15 comprises a rectilinear portion defining a first axis of rotation A, located in a plane parallel to the supporting surface of the treadmill 1.

[0130] In order to fasten the handle 7 to the upright 3 (thus providing the shape coupling), the user positions a first end of the handle 7 in contact with the reference profile 15, and rotates the handle 7 about the first axis A in a first direction (of moving the handle 7 towards the upright 3); in this way, the handle 7 rotates relative to the upright pivoting on the reference profile 15.

[0131] The rotation of the handle 7 relative to the upright 3 brings the coupling portion 7b of the handle 7 to be inserted into the shaped hollow seat 8 of the upright 3, so that it forms the shape coupling.

[0132] More specifically, the insertion of the coupling portion 7b of the handle 7 into the shaped hollow seat 8 of the upright 3, through the rotation, performs the following steps, in succession:

[0133] the tooth 9b (of the handle 7) couples in the slot 9a (of the upright 3), forming the slot-in coupling 9;

[0134] the trapezoidal elements 11 (of the handle 7) are in contact with the guide 10 (of the upright 3) to form the contact surface 12;

[0135] the wedge 14 (of the handle 7) inserted in the shaped hollow seat 8 (of the upright 3), to form the taper coupling 13.

[0136] It should be noted that the shape coupling thus, preferably, comprises a plurality of complementary elements belonging to the coupling portion 7b of the handle 7 and to the shaped hollow seat 8. It should also be noted that this particular embodiment allows the handle 7, thanks to the shape coupling and the position of the elements of which it is composed, to withstand without moving a stress applied in a substantially vertical direction, in the direction of approach to the belt 4.

[0137] The treadmill 1 also comprises a lock/release mechanism 16 removable manually. The lock/release mechanism 16 allows the user to fix the handle 7 to the upright 3 (of the frame 2), to prevent an accidental disconnecting of the handle 7 from the upright 3. More specifically, the purpose of the lock/release 16 mechanism is to prevent a force applied in the direction parallel to the upright (in the direction away from the supporting surface of the treadmill 1) from causing an accidental rotation of the handle 7 about the first axis of rotation A, in a (second) direction (opposite the first direction), causing the uncoupling of the coupling portion 7b from the shaped hollow seat 8.

[0138] Preferably, the lock/release mechanism 16 is connected to a second end of the handle 7, proximal to the supporting surface of the treadmill 1, when the handle 7 is coupled to the upright 3.

[0139] In an embodiment, the lock/release mechanism 16 comprises a connecting plate 17, to connect the lock/release mechanism 16 to the handle 7. Moreover, the lock/release 16 mechanism comprises a lever 18 coupled to the connecting plate 17. The lever 18 is coupled to the plate 17 so as to rotate about a second axis of rotation B; the second axis of rotation B is oriented in such a way that, when the handle 7 is coupled to the upright 3, the second axis of rotation B is parallel to the supporting surface of the treadmill 1 and perpendicular to the movement direction of the belt 4.

[0140] Preferably, the lock/release mechanism 16 comprises a hook 19 having a first and a second end. The first end of the hook 19 is coupled to the lever 18 to define a rotation constraint. The hook is rotatably coupled to the lever 18 so that it rotates about a third axis of rotation C, parallel (substantially) to the second axis of rotation B. The second end of the hook 19 is configured for coupling with a pin 20 of the upright 3, positioned in the shaped hollow seat 8. Preferably, the second end of the hook 19 forms a slot. Preferably, the pin 20 has a shaped end, defining a portion inclined towards the direction of movement of the hook 19, so as to form an undercut for locking the hook 19, when the hook 19 is connected to the pin 20.

[0141] The lock release mechanism 16 also comprises a first elastic element 21 (for balancing). The first elastic element 21 is interposed between the lever 18 and the hook 19. The first elastic element 21 is preferably configured to define a predetermined reciprocal position relative of the hook 19 with respect to the lever 18, in the absence of external forces. Preferably, the first elastic element 21 is a helical spring.

[0142] Preferably, the lock/release mechanism 16 also comprises a second elastic element 22; preferably, the second elastic element 22 is connected to the handle 7. For example, the second elastic element 22 is a leaf spring.

[0143] The second elastic element 22 is configured to interact with a surface of the lever 18 defining a cam profile 18a. The lever 18 can rotate in a first direction (that is, a release direction) and in a second direction (that is, a lock direction).

[0144] During the rotation in the release direction, the second elastic element 22 does not interact with the lever 18 until reaching a first predetermined angular position (illustrated in FIG. 12), wherein the cam profile 18a enters into contact with the second elastic element 22.

[0145] The second elastic element 22 generates a force which opposes the rotation of the lever 18 in the release direction, until reaching a predetermined angular position of the lever 18 (illustrated in FIG. 13). A further rotation of the lever 18 (facilitated by the second elastic element 22), beyond that angular position, allows the lever 18 to reach a second position of its stable equilibrium (FIG. 14).

[0146] To uncouple the hook 19 from the pin 20, the user must therefore overcome the resistance of the second elastic element 22, rotating further the lever 18 in the release direction. The rotation of the lever 18 causes the movement, by roto-translation, of the second end of the hook 19 towards the upright 3. It should be noted that the roto-translation occurs thanks to the first elastic element 21, which allows the relative position between the hook 19 and the lever 18 to be maintained, allowing the second end of the hook 19 to move in the direction away from the supporting surface of the treadmill 1, and hence uncouple the hook 19 from the pin 20. It should be noted that, preferably, a further rotation of the lever 18 in the release direction, relative to the second stable equilibrium position, causes the interaction between the cam profile 18a and the second elastic element 22 (this situation is illustrated in FIG. 15); the second elastic element 22 applies a force which tends to bring the lever 18 to the stable equilibrium position, in the absence of external forces.

[0147] Vice versa, during the rotation in the lock direction, starting from the stable equilibrium position, the second elastic element 22 interacts with the lever 18 obstructing the rotation, until reaching a predetermined angular position,

beyond which the second elastic element **22** interacts with the profile of the cam surface **18a**, favouring the rotation in the lock direction.

1. A treadmill comprising:  
a frame equipped with uprights;  
a belt looped on rotary rollers, forming a treadable surface;  
at least one handle connected to a corresponding upright and comprising a grip portion accessible to the user;  
a shape coupling between the handle and the upright and a lock and release mechanism for manually coupling and uncoupling the handle relative to the upright.
2. The treadmill according to claim 1, wherein said shape coupling comprises a taper coupling with interference fit.
3. The treadmill according to claim 1, wherein said shape coupling comprises a slot-in coupling between a tooth and a corresponding slot.
4. The treadmill according to claim 1, wherein the shape coupling comprises a guide forming a contact surface for the handle.
5. The treadmill according to claim 4, wherein said contact surface is facing towards a treadmill supporting surface and is angled relative to said surface about an axis perpendicular to a line along which the upright extends and to a line of insertion and removal of the handle in/from the upright.
6. The treadmill according to claim 1, wherein the shape coupling comprises a reference profile, comprising at least one straight portion defining a first axis of rotation about which the handle is rotatable to produce the shape coupling.
7. The treadmill according to claim 6, wherein said straight portion is formed by the upright at an upper end of the shape coupling, distal from a treadmill supporting surface.
8. The treadmill according to claim 1, wherein the lock and release mechanism comprises a hook connected to the handle and a pin connected to the frame.
9. The treadmill according to claim 8, wherein said hook is connected to a movable lever, which can be operated by the user, pivoting at the handle and rotatable about a second axis of rotation for moving said hook towards or away from the pin.
10. The treadmill according to claim 9, wherein the lock and release mechanism comprises a first elastic element operating in conjunction with the lever and the hook to keep them in a predetermined position relative to one another in the absence of external forces.
11. The treadmill according to claim 10, wherein the lock and release mechanism comprises a second elastic element designed to:  
oppose the rotation of the lever in a releasing direction until a predetermined angular position of the lever has been

reached, beyond which said second elastic element promotes the rotation of the lever in the releasing direction; define at least one angular position of stable equilibrium for said lever;

oppose the rotation of the lever in a locking direction until a predetermined angular position of the lever has been reached, beyond which said second elastic element promotes the rotation of the lever in the releasing direction.

12. The treadmill according to claim 8, wherein the pin of the lock and release mechanism is connected to the upright in a lower zone of the shape coupling, proximal to a treadmill supporting surface.

13. The treadmill according to claim 1, wherein the upright forms a shaped hollow seat for housing a corresponding coupling portion of the handle by means of said shape coupling.

14. The treadmill (1) according to claim 13, wherein the upright is oriented along a longitudinal axis and the shaped hollow seat (8) is elongated in said longitudinal axis.

15. The treadmill according to claim 1, wherein the grip portion of the handle is "U"-shaped.

16. The treadmill (1) according to claim 1, wherein the grip portion (7a) of the handle has a first and a second end, and wherein the treadmill (1) comprises a coupling portion (7b) configured for connecting the handle (7) to the upright (3) and having an elongate shape, wherein the coupling portion (7b) of the handle (7) connects said first and second end of the grip portion (7a).

17. The treadmill according to claim 1, wherein the treadmill is foldable by rotation of the uprights relative to the treadable surface.

18. A method for assembling a treadmill, comprising a connection of at least one handle to a corresponding upright of a frame of the treadmill, wherein said connection is removable and comprising the following steps:

- coupling of the handle to the upright by means of a shape coupling between the handle and the upright;
- activation of a lock and release mechanism for stably fixing the handle to the upright.

19. The method according to claim 18, wherein said coupling step comprises the following steps:

- positioning one end of the handle on a reference profile made on the top of a shape coupling portion formed by the upright;
- rotating the handle about a first axis of rotation defined by the reference profile for producing a shape coupling.

20. The method according to claim 18, comprising a step of rotating the upright relative to the treadable surface, for moving the treadmill into an open operating position, from a closed folded position.

\* \* \* \* \*