



(11) **EP 2 169 241 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.11.2011 Bulletin 2011/44

(51) Int Cl.:
F16B 7/14 (2006.01) A63B 22/08 (2006.01)

(21) Application number: **09171537.5**

(22) Date of filing: **28.09.2009**

(54) **Regulating device**

Einstellvorrichtung

Dispositif de régulation

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **29.09.2008 IT RA20080040**

(43) Date of publication of application:
31.03.2010 Bulletin 2010/13

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Description

[0001] The present invention relates to a regulating device for gymnastic machines and the like.

[0002] The known gymnastic machines currently on the market, such as for example the stationary bikes or the machines for muscular development, are generally provided with a saddle, seat, support or the like, on which the user of the gymnastic machine sits to perform the gymnastic exercise, or on which he/she rests other parts of the body (the bust, the legs, the feet, or also other parts of the body).

[0003] Clearly, these saddles, seats or supports must be adjustable in vertical or horizontal position, or in both the directions, so as to allow the user to perform the gymnastic exercise in conditions of maximum comfort and safety relative to his/her size, furthermore adopting a bi-mechanically correct position on the machine.

[0004] In the sector of the gymnastic machines and the like, numerous mechanical solutions are known, suitable to allow the regulation, at the user's will, of the position of these saddles, seats or supports: some of these allow to obtain a continuous regulation of the position, whilst others allow to obtain a discrete regulation. A typical example of this latter type of regulation, which is of course the most widely used as it is faster, more economic and reliable, comprises a knob for manual activation, associated in a slidable manner with the frame of the gymnastic machine, to which a pin is connected, which is inserted selectively, at the user's will, in a distribution of holes provided in the sleeve of the saddle, seat or support, thus avoiding the lowering thereof due to the weight of the user.

[0005] Other known mechanical solutions similar to this latter are the solutions wherein a sort of tooth, interlocked to a lever for manual activation associated to the frame of the gymnastic machine, selectively engages, at the user's will, in a rack provided along the outer surface of the sleeve of the saddle, seat or support. An example of this kind of technical solution is disclosed in the European Patent Application No. 1297864 that shows a regulating device for the saddle of a static bike. This regulating device comprises a lever which is switchable between a first operative position, wherein the saddle is slidable relative to the frame, and a second operative position wherein the saddle is coupled to the frame in at least partially rigid manner. More in details, this lever activates a blocking pawl that is arranged to selectively engage a toothed rod when the lever is in the respective second operative position.

[0006] The mechanical solutions described above, as well as numerous other solutions present from a long time in this sector, are deemed no more qualitatively satisfying, as they are characterised by excessive backlashes between the frame and the sleeve of the saddle, seat or support. These backlashes are particularly annoying for the user while performing the exercise: actually, they cause oscillations of the sleeve in its seat, with conse-

quent impacts, noises and vibrations. These oscillations furthermore generate a sense of instability and insecurity to the user performing the exercise.

[0007] The above mentioned backlashes, which characterise the known regulations, cannot be currently eliminated in a substantial manner but with production costs for the mechanical components absolutely too high for the sector of the gymnastic machines.

[0008] The technical object of the present invention is therefore to overcome the drawbacks described above, by providing a regulating device for gymnastic machines and the like, which allows to regulate the position of saddles, seats, supports in a fast, intuitive, accurate and reliable manner, allowing at the same time the user to perform the gymnastic exercises in a condition devoid of mechanical backlashes between the support sleeve and the frame of the gymnastic machine.

[0009] Within this technical scope, an object of the present invention is to provide a regulating device for gymnastic machines and the like, which is extremely versatile to be applied and used, i.e. which can be adapted to all the types of gymnastic machines currently on the market.

[0010] A further object of the present invention is to provide a regulating device for gymnastic machines and the like, which has a simple structure, can be easily implemented, and operates safely at relatively limited costs.

[0011] This scope and objects are achieved through a regulating device for gymnastic machines and the like, comprising at least a lever for manual selective lock and release, associated with a first member, at least a toothed rod, associated to a second member slidable relative to this first member, and a pawl mechanically interlocked to this lever and selectively engageable in one of the teeth of this toothed rod to block rigidly this second member with respect to this first member in any position desired by the user of the gymnastic machine, **characterised in that** the lever is selectively movable from at least a first position of sliding of the second member relative to the first member, wherein said pawl can be released from said toothed rod, to at least a second position of blocking this second member relative to this first member, wherein this pawl is rigidly engaged in one of the teeth of this toothed rod, to at least a third position of substantial clearing of the mechanical backlashes between the second member and the first member.

[0012] The technical features of the invention, according to the above mentioned scopes, are clearly apparent from the attached claims, and the advantage of the invention will be more apparent in the following detailed description of a regulating device for gymnastic machines and the like, with reference to the attached drawings, which represent non limiting examples of embodiment thereof, wherein:

- figure 1 shows a crossed side elevation view of a regulating device according to the present invention in a first embodiment thereof, with the lever in the

- first angular position;
- figure 2 shows a crossed side elevation view of the same regulating device, with the lever in the second angular position;
- figure 3 shows a crossed side elevation view of the same regulating device, with the lever in the third angular position;
- figure 4 shows a crossed side elevation view of the regulating device, with the lever in a fourth angular position;
- figure 5 shows a detail of figure 2;
- figure 6 shows a rear perspective and exploded view of the regulating device according to the present invention;
- figure 7 shows a front perspective and exploded view of the same regulating device;
- figure 8 shows a crossed side elevation view of the regulating device according to the present invention in a second embodiment thereof, with the lever in the first angular position;
- figure 9 shows a crossed side elevation view of the regulating device of figure 8, in a phase of use;
- figure 10 shows a crossed side elevation view of the device of figure 8, with the lever in its second angular position.

[0013] According to the attached drawings, and with particular reference to figures 1 to 7, number 1 indicates as a whole a regulating device for gymnastic machines and the like according to the present invention, in a first embodiment thereof.

[0014] By way of non limiting example, the regulating device according to the present invention can be advantageously used to adjust the vertical or horizontal position of the saddle of a stationary bike, or in the same manner to adjust the position of the seat, of the support, or of other functional components, of a machine for developing muscular force, or to make adjustments of the position of components of other similar machines, without limiting the scope of the present invention.

[0015] The detailed description below refers therefore to a device for vertically regulating the position of a saddle of a stationary bike, i.e. the height above the floor, to allow users of different sizes to perform the gymnastic exercises in a correct and comfortable manner.

[0016] The regulating device 1 comprises a lever 2 for manual selective lock and release, associated with a first member 3 integral to a frame of the gymnastic machine, not shown for the sake of practicality in the attached figures, as it can be assimilated into a traditional frame of a stationary bike. The regulating device furthermore comprising at least a toothed rod 4, associated to a second member 5 slidable relative to the first member 3; in the embodiment described herein, one should imagine a traditional saddle, not shown in the figures for the sake of clarity, for stationary bikes, rigidly fixed to the second member 5. The device furthermore comprises a pawl 6 mechanically interlocked to the lever 2 and selectively

engageable in one of the teeth 7 of the toothed rod 4 to block rigidly the second member 5 relative to the first member 3 in any position desired by the user of the stationary bike, i.e. in such a manner that the saddle is positioned at the desired height above the floor. At this end, the pawl defines a blocking surface 8 of a geometry substantially conjugated with that of the teeth 7 of the toothed rod 4. In this particular embodiment, this blocking surface 8 has such a shape to allow the engagement of the pawl 6 with two teeth 7 of the toothed rod 4.

[0017] The first member 3 is formed by a tubular section of substantially square or rectangular shape, which is provided, at the free end 3a, with a substantially rectangular window 9. The second member 5 is formed by a tubular section, with a substantially D - shaped section, onto which the toothed rod 4 is fixed, at one of the side surfaces, through at least a screw 10.

[0018] According to the present invention, the lever 2 is selectively movable by the user from at least a first angular position of sliding of the second member 5 relative to the first member 3, wherein the pawl 6 can be released from the toothed rod 4, to a second angular position of blocking the second member 5 relative to the first member 3, wherein the pawl 6 is rigidly engaged in one of the teeth 7 of the toothed rod 4 (figure 2), to a third angular position of substantial clearing of the mechanical backlashes between the second member 5 and the first member 3 (figure 3), as it will be more apparent hereunder.

[0019] In more detail, the lever 2 adequately defines a cam projection 11 which, together with the lever 2 in the above mentioned first angular position of sliding of the second member 5 relative to the first member 3, engages in correspondence of an adequate recess 12, obtained in the pawl 6, causing the snap release thereof from the toothed rod 4 when a traction is exerted on the second member 5, i.e., in the particular embodiment described herein, when the user wants to lift the saddle; in the second angular position of blocking the second member 5 relative to the first member 3, the cam projection 11 abuts a corresponding contact surface 13 provided in the pawl 6, blocking this latter rigidly engaged in one of the teeth 7 of the toothed rod 4; lastly, in the third angular position of substantial clearing of the mechanical backlashes between the second member 5 and the first member 3, the cam projection 11, due to its particular profile, exerts a pressure of geometrical interference on the same contact surface 13 of the pawl 6 so as to maintain the second member 5 stably and rigidly into contact with the inner surface 14 of the first member 3, without relative displacements, vibrations, impacts, noises or the like.

[0020] The particular geometry of the cam projection 11 and of the corresponding recess 12 of the pawl 6 advantageously allow the lever 2 to be selectively movable also in a further fourth position of free sliding of the second member 3 relative to the first member 5, i.e. in a position wherein the pawl 6 is completely released from the toothed rod 4, as it will be explained hereunder. This

fourth angular position of the lever 2 allows the second member 5 to be freely lifted, and, most of all, lowered relative to the first member 3: the lowering action cannot be actually performed in the first angular position of the lever 2, as the geometry of the teeth 7 and of the blocking surface 8 of the pawl 6, which is asymmetric relative to the vertical direction of sliding of the second member 5 relative to the first member 3, does not allow a relative displacement if the pawl 6 is not completely released from the toothed rod 4.

[0021] The lever 2 is carried rotatable, in correspondence of a first hinge pin 15 inserted in a through channel 15a, in a plate 16 integral with the first member 3 substantially in correspondence of the window 9.

[0022] The plate 16 forms a pair of mutually opposite ears 17, defining between them an aperture 17a, through which the action of the pawl 6 is exerted, provided with first through holes 18a, in which the first hinge pin 15 is engaged, and with second through holes 18b, and it is furthermore provided, in correspondence of the inner face of one of these ears 17, with a sliding groove 19 for a stop pin 20 for stopping the rotation of the lever 2 obtained in one of its lateral surfaces 21. The plate 16 furthermore presents an abutment edge 22 on the open free end 3a of the first member 3; in order to assure a correct shape coupling between the first member 3 and the second member 5, it is positively provided that at the above mentioned open free end 3a of the first member 3 a sort of inner sheath 23 is inserted, with cross section which is externally conjugated to that of the first member 3 and internally to that of the second member 5, with lateral edges that, once the assembling has been performed, match that of the plate 16.

[0023] The inner sheath 23 is provided, at one of its lateral surfaces, with a substantially U-shaped notch, which defines an elastically flexible tab having a disk-shaped end projection 24 (figure 7), suitable to engage at a corresponding hole 25 obtained in the first member 3, so as to fix the inner sheath 23 to the first member 3 in an immovable manner. In more detail, for assembling the inner sheath 23 in the first member 3 it is necessary to insert the sheath 23 in the open free end 3a, so that the projections 24 snap engages the hole 25; on the contrary, for removing the inner sheath 23 it is necessary to exert a pressure on the projection 24 so as to remove it from the hole 25, and allow the inner sheath 23 to slip out of the first member 3.

[0024] The lever 2 is associated to a first return spring 26 which maintains it, in an elastically stable manner, in the second angular position of blocking the second member 5 relative to the first member 3. This first return spring 26 is of the cylindrical torsion type, is engaged along the first hinge pin 15 and comprises a first end 26a arranged in abutment on a housing 27 provided in the lever 2, and a second end 26b abutting on a stop 28 provided in the plate 16.

[0025] The regulating device according to the present invention adequately comprises an elastic return mem-

ber 29, associated in a rotatable manner with the plate 16 and suitable to maintain the pawl 6 engaged in one of the teeth 7 of the toothed rod 4, in an elastically stable arrangement of blocking the second member 5 relative to the first member 3 in the desired position, corresponding to the first angular position of the lever 2. In this way, the pawl 6 is therefore maintained engaged in the toothed rod 4 due to the action of the elastic return member 29, but the geometry of the teeth 7 of the toothed rod 4 and of the blocking surface 8 of the pawl 6, which is substantially asymmetrical relative to the direction of sliding of the second member 5 relative to the first member 3, allows manually to drag the second member 5 relative to the first member 3 in such a manner that sliding of the pawl 6 on the surface of the teeth 7 of the toothed rod 4 causes a "jumping" of the pawl 7 from a tooth 7 to the other.

[0026] The elastic return member 29 is carried rotatable in the plate 16 in correspondence of a second hinge pin 30, engaged in the second through holes 18b: the elastic return member 29 defines a first coupling surface 31 for coupling with the pawl 6 and a second coupling surface 32 for coupling with a second return spring 33. The second return spring 33 is of the cylindrical torsion type, is engaged along the second hinge pin 30 and comprises a first end 33a abutting on the second coupling surface 32 of the elastic return element 29, and a second end 33b abutting on an adequate abutment surface 34 provided in the plate 16.

[0027] Advantageously, the pawl 6 is articulated to the elastic return member 29 in correspondence of a third hinge pin 35; the elastic return member 29 is provided with a third through hole 36 for the third hinge pin 35 and with a centreline notch 37, which intercepts the third through hole 36, defining the first coupling surface 31 for coupling with the pawl 6. This first coupling surface 31 of the elastic return member 29 is preferably constituted by an inclined plane, to which a corresponding flattened face 38 of the pawl 6 can be coupled.

[0028] The cam projection 11 presents a profile substantially shaped as an arc of a circle, with radius increasingly higher from an end to the other (see in particular figure 5). Advantageously the cam projection 11 forms an end corner 39 (corresponding to the end with greater radius of the cam projection 11), whilst the pawl 6 forms a first coupling edge 40 with this corner 39; analogously, the elastic return member 29 forms a second coupling edge 41 with the same end corner 39, with a geometry reproducing that of the first coupling edge 40. The selective manual rotation of the lever 2 from the first angular position of snap sliding to the fourth angular position of free sliding is therefore suitable to put the elastic return member 29 into rotation around the second hinge pin 30, and consequently the pawl 6 around the third hinge pin 35, so as to release the pawl 6 from the toothed rod 4 and to allow the manual free displacement of the second member 5 relative to the first member 3.

[0029] The way of use of the regulating device accord-

ing to the present invention is as follows.

[0030] Assuming that at the beginning the regulating device is in an arrangement, wherein the lever 2 is in the third angular position of substantial clearing of the mechanical backlashes, a position in which the gymnastic exercises can be performed in a reliable manner, it is necessary, in order to lift the saddle, that the user manually acts on the lever 2 by rotating it (in anticlockwise direction in the figures) and bringing it firstly, temporarily, in the second angular position of blocking, and then in the first angular position of sliding, by supporting it with the hand to win the action of the first return spring 26: as mentioned, in this position the cam projection 11 engages in the recess 12 of the pawl 6, and this latter is therefore snap elastically yielding along the toothed rod 4. The user can therefore exert traction upwards on the second member 5 relative to the first member 3, and he/she can lift the saddle by a tooth 7 at a time, thus obtaining a discrete and fine regulation. On the contrary, if the user wants to lift the saddle in a quickly manner and without particular accurateness, or if he/she wants to lower it by a single tooth 7, he/she must further rotate the lever 2 in anticlockwise direction, until it is in the fourth angular position (figure 4), always supporting it with the hand. In this way, the end corner 39 of the cam projection 11 of the lever 2 pushes on the first and on the second coupling edge 40, 41, thus causing the anticlockwise rotation of the pawl 6 and therefore its complete release from the toothed rod 4. Once the optimum height has been set manually with the pawl 6 released from the toothed rod 4, the user releases the lever 2: thanks to the action of the elastic return member 29, the pawl 6 engages again in the toothed rod 4, thus avoiding further lowering of the second member 5, whilst the lever 2, under the action of the first return spring 26, spontaneously returns in the second angular position of blocking, so that the cam projection 11 matches the contact surface 13 of the pawl 6, which is thus rigidly fixed. Already in this arrangement the user could perform the gymnastic exercises in a safe manner, thanks to the fact that, as mentioned above, the lowering of the second member 5 is prevented. Lastly, to block the saddle at the desired height without backlashes, and to perform the gymnastic exercises in maximum comfort, the user further rotates the lever 2 in the third angular position of substantial clearing of the mechanical backlashes, a position in which the cam projection 11, thanks to the geometrical interference due to its particular profile, exerts a pressure of preset entity onto the contact surface of the pawl 6, and this pressure is then transmitted to the second member 5, which is maintained rigidly into contact with the inner surface 14 of the first member 3.

[0031] It has been described how the present invention achieves the provided objects and scopes.

[0032] The regulating device according to the present invention allows to perform the accurate, fast, safe and reliable registration of the saddle, seat or support of any type of gymnastic machine, in a plurality of horizontal or vertical positions, in which there is a substantial clearing

of the mechanical backlashes between the sleeve of the saddle, seat or support and the frame; this allows the user to perform the physical exercises in conditions of maximum comfort, without feeling the undesired sense of instability and oscillation of the saddles, seats or supports of the traditional regulating devices. These clear advantages are furthermore obtained with a device of extremely limited cost, as well as easy to be produced and assembled.

[0033] Modifications and variants can be applied to the present invention, without however departing from the protective scope of the present invention.

[0034] Figures 8, 9, and 10 illustrate a second embodiment of the regulating device for gymnastic machines and the like according to the present invention, wherein the same reference number are used, for the sake of convenience and simplicity, as that used for the first embodiment above. In particular, figure 8 shows the device with the lever 2 in the first angular position, figure 9 shows the device in a phase of use, wherein the first member 3 is translated relative to the second member 5, in this case integral to the frame of the gymnastic machine, whilst figure 10 shows the device according to the present invention with the lever 2 in the second angular position.

[0035] The second embodiment of the present invention is constituted by a regulating device for horizontally regulating the position of a saddle of a stationary bike (known and therefore not shown in the attached figures), i.e. the distance thereof from the handlebar, to allow users of different sizes to perform the gymnastic exercises in a correct and comfortable manner. The second member 5 is formed by a tubular metal section with a substantially D - shaped cross section (preferably a horizontal elongation of the sleeve of the saddle of the stationary bike), whilst the first member 3 is formed by a segment of tubular metal section with substantially rectangular cross section, inside which an inner sheath 23 is inserted with section complementary to that of the second member 5. A support 42 is integral with the first member 3, to which the saddle, not shown in the figures, can be connected. The toothed rod 4, fixed to the second member 5 through a screw 10, presents teeth 7 with substantially symmetrical geometry relative to the direction of displacement of the first member 3 relative to the second member 5, as well as the blocking surface 8 of the pawl 6.

[0036] In this second embodiment, the lever 2 is selectively movable in the first three angular positions described with reference to the first embodiment. The particular design of the components of this second embodiment, destined to satisfy implementation requirements different from that of the first embodiment, does not provide for the lever 2 to be positioned in the fourth angular position described above, that is not necessary in this case. In more detail, by comparing the first embodiment, the pawl 6 is devoid here of the first coupling edge 40, whilst the elastic return member 29 is devoid of the second coupling edge 41. The previously described action is therefore not provided of dragging the cam projections

11, causing the rotation of the pawl 6 with consequent release thereof from the toothed rod 4. The horizontal displacement of the first member 3 relative to the second member 5, with the lever in the first angular position of sliding, can therefore occur by a tooth 7 at a time, and, indifferently, towards or backwards, as the horizontal regulation of the saddle of a stationary bike must preferably occur within a more limited path and in a more accurate manner relative to the vertical regulation thereof.

[0037] The invention is therefore provided with industrial applicability; modifications and variants can be however applied to it, without departing from the protective scope of the invention; furthermore, all the details can be replaced with technically equivalent elements, without however departing from the protective scope of the following claims.

Claims

1. A regulating device for adjusting gymnastic machines and the like, comprising at least a lever (2) for manual selective lock and release, associated with a first member (3), at least a toothed rod (4), associated to a second member (5) slidable relative to said first member (3), and a pawl (6) mechanically interlocked to said lever (2) and selectively engageable in one of the teeth (7) of said toothed rod (4) to block rigidly said second member (5) with respect to said first member (3) in any position desired by the user of the gymnastic machine; said lever (2) being, in use, selectively movable from at least a first position of sliding of said second member (5) relative to said first member (3), wherein said pawl (6) can be released from said toothed rod (4), to at least a second position of blocking said second member (5) relative to said first member (3), wherein said pawl is rigidly engaged in one of said teeth (7) of said toothed rod (4); **characterised in that** said lever (2) is, in use, selectively movable from said second position of blocking said second member (5) relative to said first member (3) to at least a third position of substantial clearing of the mechanical clearance between said second member (5) and said first member (3).
2. A device according to claim 1, **characterised in that** said lever (2) defines at least a cam projection (11) which, together with said lever (2) in said first position of sliding of said second member (5) relative to said first member (3), engages in correspondence of a recess (12) of said pawl (6) causing the snap release thereof from said toothed rod (4), in said second position of blocking said second member (5) relative to said first member (3), abuts on a corresponding contact surface (13) of said pawl (6) and which, in said third position of clearing of the mechanical clearance between said second member (5) and said first member (3) exerts a pressure of geometrical interference on said contact surface (13) of said pawl (6) so as to maintain said second member (5) stably and rigidly into contact with the inner surface (14) of said first member (3).
3. A device according to one or more of the previous claims, **characterised in that** said lever (2) is carried rotatable, in correspondence of a first hinge pin (15) engaged in a first through hole (18a), in a plate (16) integral with said first member (3) substantially in correspondence of the free end (3a) thereof.
4. A device according to one or more of the previous claims, **characterised in that** said lever (2) is associated with a first return spring (26) suitable to maintain, in an elastically stable manner, said lever (2) in said second position of blocking said second member (5) relative to said first member (3).
5. A device according to claims 3 and 4, **characterised in that** said first return spring (26) is of the cylindrical torsion type, engaged along said first hinge pin (15) and comprising a first end (26a) arranged in abutment on a housing (27) provided in said lever (2), and a second end (26b) abutting on a stop (28) provided in said plate (16).
6. A device according to any one of claims 3, 5 or claims 3 and 4, **characterised by** comprising at least an elastic return member (29), associated with said plate (16) and suitable to maintain said pawl (6) engaged in one of said teeth (7) of said toothed rod (4), in an elastically stable position of blocking said second member (5) with respect to said first member (3).
7. A device according to claim 6, **characterised in that** said elastic return member (29) is carried rotatable in said plate (16) in correspondence of a second hinge pin (30) engaged in a second through hole (18b), said elastic return member (29) defining a first coupling surface (31) for coupling with said pawl (6) and a second coupling surface (32) for coupling with a second return spring (33).
8. A device according to claim 7, **characterised in that** said second return spring (33) is of the cylindrical torsion type, engaged along said second hinge pin (30) and comprising a first end (33a) abutting on said second coupling surface (32) of said elastic return element (29), and a second end (33b) abutting on a suitable abutment surface (34) provided in said plate (16).
9. A device according to any one of claims 6-8, **characterised in that** said pawl (6) is articulated to said elastic return member (29) in correspondence of a third hinge pin (35).

10. A device according to claim 9, **characterised in that** said elastic return member (29) is provided with a third through hole (36) for said third hinge pin (35) and with a centreline notch (37), which intercepts said third through hole (36), defining said first coupling surface (31) for coupling with said pawl (6). 5
11. A device according to any one of claims 6-10, **characterised in that** said first coupling surface (31) of said elastic return member (29) is constituted by at least an inclined plane, to which a corresponding flattened face (38) of said pawl (6) can be coupled. 10
12. A device according to any one of claims 2-11, **characterised in that** said lever (2) is selectively movable in a fourth angular position of free sliding of said second member (5) with respect to said first member (3), in said fourth angular position said cam projection (11) acting in correspondence of said recess (12) of said pawl (6) in such a way so as to cause the rotation of said pawl (6) around a third hinge pin releasing it from said toothed rod (4). 15
13. A device according to any one of claims 9-11 or to claim 12 and any one of claims 9-11, **characterised in that** said cam projection (11) forms at least an end corner (39), **in that** said pawl (6) forms a first coupling edge (40) with said end corner (39) and that said elastic return member (29) forms a second coupling edge (41) with said end corner (39), the selective rotation of said lever (2) from said first position of snap sliding to said fourth angular position of free sliding being suitable to put said elastic return member (29) into rotation around said second hinge pin (30) and said pawl (6) around said third hinge pin (35), so as to release said pawl (6) from said toothed rod (4) and to allow the free sliding of said second member (5) with respect to said first member (3). 20
14. A device according to one or more of the previous claims, **characterised in that** said pawl (6) defines at least a blocking surface (8) of a geometry substantially conjugated with that of said teeth (7) of said toothed rod (4). 25
15. A device according to any one of claims 3-14, **characterised in that** said plate (16) forms a pair of mutually opposite ears (17), defining between them an aperture (17a) through which the action of said pawl (6) is exerted, provided with said first and second through holes (18a), (18b) for supporting said first hinge pin (15) and second hinge pin (30), said plate (16) being furthermore provided, in correspondence of the inner face of one of said ears (17), with a sliding groove (19) for a stop pin (20) for stopping the rotation of said lever (2) obtained in one of its lateral surfaces (21). 30
16. A device according to claim 13 or to claim 13 and claim 14 or 15, **characterised in that** said cam projection (11) presents a profile substantially shaped as an arc of a circle, with radius increasingly higher from an end to the other toward said end corner (39). 35
17. A device according to one or more of the previous claims, **characterised in that** said first member (3) is integral with the frame of the gymnastic machine. 40
18. A device according to one or more of the previous claims, **characterised in that** said second member (5) is integral with the frame of the gymnastic machine. 45

Patentansprüche

1. Regelungsvorrichtung zum Anpassen von Gymnastikmaschinen und Ähnlichem, umfassend wenigstens einen Hebel (2) zur manuellen auswählenden Verriegelung und Entriegelung, welcher einem ersten Element (3) zugeordnet ist, wenigstens einer Zahnstange (4), welche einem zweiten Element (5) zugeordnet ist, das relativ zum ersten Element (3) gleitfähig ist, und eine Sperrklinke (6), welche mechanisch mit dem Hebel (2) wechselseitig verriegelt ist und ausgewählt in einen der Zähne (7) der Zahnstange (4) eingreifen kann, um das zweite Element (5) in Bezug auf das erste Element (3) in jeder Position, die vom Benutzer der Gymnastikmaschine gewünscht ist, starr zu blockieren; wobei der Hebel (2) im Einsatz ausgewählt bewegbar ist von wenigstens einer ersten Position des Verschiebens des zweiten Elements (5) relativ zum ersten Element (3), wobei die Sperrklinke (6) aus der Zahnstange (4) freigebbar, zu wenigstens einer zweiten Position des Blockierens des zweiten Elements (5) relativ zum ersten Element (3), wobei die Sperrklinke fest im Eingriff mit einem der Zähne (7) der Zahnstange (4) steht; **dadurch gekennzeichnet, dass** der Hebel (2) im Einsatz ausgewählt bewegbar ist von der zweiten Position des Blockierens des zweiten Elements (5) relativ zum ersten Element (3) zu wenigstens einer dritten Position zur wesentlichen Aufhebung des mechanischen Abstands zwischen dem zweiten Element (5) und dem ersten Element (3). 50
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Hebel (2) wenigstens einen Nockenvorsprung (11) definiert, welcher gemeinsam mit dem Hebel (2) in der ersten Position des Verschiebens des zweiten Elements (5) relativ zum ersten Element (3) in Entsprechung mit einer Vertiefung (12) der Sperrklinke (6) eingreift, was die leichte Freigabe davon von der Zahnstange (4) verursacht, wobei in der zweiten Position des Blockierens das zweite Element (5) relativ zum ersten Element (3) auf 55

- eine entsprechende Kontaktfläche (13) der Sperrklinke (6) stößt und welches in der dritten Position des Beseitigens des mechanischen Spielraums zwischen dem zweiten Element (5) und dem ersten Element (3) einen Druck von geometrischem Aufeinandertreffen auf der Kontaktfläche (13) der Sperrklinke (6) ausübt, um so das zweite Element (5) stabil und starr in Kontakt mit der inneren Fläche (14) des ersten Elements (3) zu halten.
3. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Hebel (2) drehbar in Verbindung mit einem ersten Scharnierstift (15) getragen wird, welcher mit einem ersten Durchgangsloch (18a) in einer Platte (16) in Eingriff steht, die einstückig mit dem ersten Element (3) im Wesentlichen in Verbindung mit dem freien Ende (3a) davon ist.
4. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Hebel (2) mit einer ersten Rückholfeder (26) zusammengefügt ist, welche geeignet ist, in einer elastisch stabilen Weise den Hebel (2) in der zweiten Position des Blockierens des zweiten Elements (5) relativ zum ersten Element (3) zu halten.
5. Vorrichtung nach Anspruch 3 und 4, **dadurch gekennzeichnet, dass** die Rückholfeder (26) vom zylindrischen Torsionstyp ist, welche entlang dem ersten Scharnierstift (15) in Eingriff steht und ein erstes Ende (26a), welches anstoßend an einem Gehäuse (27), das im Hebel (2) vorgesehen ist, angeordnet ist, und ein zweites Ende (26b) umfasst, welches an einem Anschlag (28) anstößt, der in der Platte (16) vorgesehen ist.
6. Vorrichtung nach einem beliebigen der Ansprüche 3, 5 oder der Ansprüche 3 und 4, **gekennzeichnet durch** Umfassen wenigstens eines elastischen Rückholelements (29), welches der Platte (16) beigefügt und geeignet ist, die Sperrklinke (6) in einem der Zähne (7) der Zahnstange (4) in einer elastisch stabilen Weise des Blockierens des zweiten Elements (5) relativ zum ersten Element (3) zu halten.
7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** das elastische Rückholelement (29) drehbar in der Platte (16) in Verbindung mit einem zweiten Scharnierstift (30) getragen wird, welcher in einem zweiten Durchgangsloch (18b) in Eingriff steht, wobei das elastische Rückholelement (29) eine erste Kuppelfläche (31) zum Kuppeln mit der Sperrklinke (6) und eine zweite Kuppelfläche (32) zum Kuppeln mit einer zweiten Rückholfeder (33) definiert.
8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** die zweite Rückholfeder (33) vom zylindrischen Torsionstyp ist, welche entlang dem zweiten Scharnierstift (30) in Eingriff steht und ein erstes Ende (33a), welches an der zweiten Kuppelfläche (32) des elastischen Rückholelements (29) anstößt, und ein zweites Ende (33b) umfasst, welches an einer geeigneten Anstoßfläche (34) anstößt, die in der Platte (16) vorgesehen ist.
9. Vorrichtung nach einem beliebigen der Ansprüche 6-8, **dadurch gekennzeichnet, dass** die Sperrklinke (6) gelenkig zum elastischen Rückholelement (29) in Verbindung mit einem dritten Scharnierstift (35) ist.
10. Vorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** das elastische Rückholelement (29) mit einem dritten Durchgangsloch (36) für den dritten Scharnierstift (35) und mit einer Mittellinienkerbe (37) ausgestattet ist, welche das dritte Durchgangsloch (36) schneidet, wobei es die erste Kuppelfläche (31) zum Kuppeln mit der Sperrklinke (6) definiert.
11. Vorrichtung nach einem beliebigen der Ansprüche 6-10, **dadurch gekennzeichnet, dass** die erste Kuppelfläche (31) des elastischen Rückholelements (29) durch wenigstens eine schräge Ebene aufgebaut ist, an welche eine entsprechende abgeflachte Fläche (38) der Sperrklinke (6) gekuppelt werden kann.
12. Vorrichtung nach einem beliebigen der Ansprüche 2-11, **dadurch gekennzeichnet, dass** der Hebel (2) ausgewählt in eine vierte winkelige Position des freien Verschiebens des zweiten Elements (5) in Bezug auf das erste Element (3) bewegbar ist, wobei in der vierten winkligen Position der Nockenvorsprung (11) in Verbindung mit der Vertiefung (12) der Sperrklinke (6) auf solch eine Weise wirkt, um die Drehung der Sperrklinke (6) um einen dritten Scharnierstift zu veranlassen, um sie von der Zahnstange (4) freizugeben.
13. Vorrichtung nach einem beliebigen der Ansprüche 9-11 oder nach Anspruch 12 und einem beliebigen der Ansprüche 9-11, **dadurch gekennzeichnet, dass** der Nockenvorsprung (11) wenigstens eine Endecke (39) ausbildet, **dadurch** dass die Sperrklinke (6) eine erste Kuppelkante (40) mit der Endecke (39) ausbildet und **dadurch** dass das elastische Rückholelement (29) eine zweite Kuppelkante (41) mit der Endecke (39) ausbildet, wobei die ausgewählte Rotation des Hebels (2) von der ersten Position des leichten Verschiebens zur vierten winkligen Position des freien Verschiebens geeignet ist, um das elastische Rückholelement (29) in Rotation um den zweiten Scharnierstift (30) und die Sperrklinke (6) in Rotation um den dritten Scharnierstift (35)

zu setzen, um so die Sperrklinke (6) von der Zahnstange (4) freizugeben und das freie Verschieben des zweiten Elements (5) in Bezug auf das erste Element (3) zu erlauben.

14. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Sperrklinke (6) wenigstens eine Blockierfläche (8) von einer Geometrie definiert, welche im Wesentlichen mit jener der Zähne (7) der Zahnstange (4) zusammenpasst.
15. Vorrichtung nach einem beliebigen der Ansprüche 3-14, **dadurch gekennzeichnet, dass** die Platte (16) ein Paar von einander gegenüberliegenden Ohren (17), welche zwischen sich eine Öffnung (17a) definieren, durch die die Wirkung der Sperrklinke (6) ausgeübt wird, wobei sie mit den ersten und zweiten Durchgangslöchern (18a), (18b) zum Tragen des ersten Scharnierstifts (15) und des zweiten Scharnierstifts (30) ausgestattet sind, wobei die Platte (16) des Weiteren in Verbindung mit der inneren Seite eines dieser Ohren (17) mit einer Verschiebenut (19) für einen Anschlagstift (20) zum Stoppen der Rotation des Hebels (2) ausgestattet ist, wobei die Nut in einer seiner seitlichen Flächen (21) vorgesehen ist.
16. Vorrichtung nach Anspruch 13 oder nach Anspruch 13 und Anspruch 14 oder 15, **dadurch gekennzeichnet, dass** der Nockenvorsprung (11) ein Profil darstellt, welches im Wesentlichen als ein Bogen eines Kreises mit einem Radius zunehmend höher von einem Ende zu dem anderen in Richtung zur Endekke (39) ausgeformt ist.
17. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Element (3) einstückig mit dem Rahmen der Gymnastikmaschine ausgebildet ist.
18. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das zweite Element (5) einstückig mit dem Rahmen der Gymnastikmaschine ausgebildet ist.

Revendications

1. Dispositif de régulation pour le réglage de machines de gymnastique et analogues, comprenant au moins un levier (2) pour un verrouillage et une libération sélectifs manuels, associé à un premier élément (3), au moins une tige dentée (4), associée à un second élément (5) apte à coulisser par rapport audit premier élément (3), et un cliquet (6) interverrouillé mécaniquement avec ledit levier (2) et apte à venir sélectivement en prise dans l'une des dents (7) de ladite tige dentée (4) pour bloquer rigidement ledit second

élément (5) par rapport audit premier élément (3) dans n'importe quelle position souhaitée par l'utilisateur de la machine de gymnastique ; ledit levier (2) étant, en utilisation, mobile sélectivement d'au moins une première position de coulissement dudit second élément (5) par rapport audit premier élément (3), position dans laquelle ledit cliquet (6) peut être libéré de ladite tige dentée (4), à au moins une deuxième position de blocage dudit second élément (5) par rapport audit premier élément (3), position dans laquelle ledit cliquet est en prise rigide dans l'une desdites dents (7) de ladite tige dentée (4) ; **caractérisé par le fait que** ledit levier (2) est, en utilisation, mobile sélectivement de ladite deuxième position de blocage dudit second élément (5) par rapport audit premier élément (3) à au moins une troisième position de dégagement substantiel du jeu mécanique entre ledit second élément (5) et ledit premier élément (3).

2. Dispositif selon la revendication 1, **caractérisé par le fait que** ledit levier (2) définit au moins une saillie de came (11) qui, avec ledit levier (2) dans ladite première position de coulissement dudit second élément (5) par rapport audit premier élément (3), vient en prise en correspondance d'une cavité (12) dudit cliquet (6), provoquant la libération par détente de celui-ci vis-à-vis de ladite tige dentée (4), dans ladite deuxième position de blocage dudit second élément (5) par rapport audit premier élément (3), vient en butée sur une surface de contact correspondante (13) dudit cliquet (6) et qui, dans ladite troisième position de dégagement du jeu mécanique entre ledit second élément (5) et ledit premier élément (3) exerce une pression d'interférence géométrique sur ladite surface de contact (13) dudit cliquet (6) de façon à maintenir ledit second élément (5) de manière stable et rigide en contact avec la surface interne (14) dudit premier élément (3).

3. Dispositif selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit levier (2) est porté rotatif, en correspondance d'un premier axe de charnière (15) qui vient en prise dans un premier trou traversant (18a), dans une plaque (16) formée d'un seul tenant avec ledit premier élément (3) sensiblement en correspondance de l'extrémité libre (3a) de celui-ci.

4. Dispositif selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit levier (2) est associé à un premier ressort de rappel (26) approprié pour maintenir, d'une manière stable élastiquement, ledit levier (2) dans ladite deuxième position de blocage dudit second élément (5) par rapport audit premier élément (3).

5. Dispositif selon les revendications 3 et 4, **caracté-**

- risé par le fait que** ledit premier ressort de rappel (26) est du type de torsion cylindrique, en prise le long dudit premier axe de charnière (15) et comprenant une première extrémité (26a) agencée en butée sur un boîtier (27) disposé dans ledit levier (2), et une seconde extrémité (26b) en butée sur un élément d'arrêt (28) disposé dans ladite plaque (16).
6. Dispositif selon l'une quelconque des revendications 3 et 5 ou des revendications 3 et 4, **caractérisé par le fait qu'**il comprend au moins un élément de rappel élastique (29), associé à ladite plaque (16) et approprié pour maintenir ledit cliquet (6) en prise dans l'une desdites dents (7) de ladite tige dentée (4), dans une position de blocage stable élastiquement dudit second élément (5) par rapport audit premier élément (3).
7. Dispositif selon la revendication 6, **caractérisé par le fait que** ledit élément de rappel élastique (29) est porté rotatif dans ladite plaque (16) en correspondance d'un deuxième axe de charnière (30) en prise dans un deuxième trou traversant (18b), ledit élément de rappel élastique (29) définissant une première surface d'accouplement (31) pour l'accouplement avec ledit cliquet (6) et une seconde surface d'accouplement (32) pour l'accouplement avec un second ressort de rappel (33).
8. Dispositif selon la revendication 7, **caractérisé par le fait que** ledit second ressort de rappel (33) est du type de torsion cylindrique, en prise le long dudit deuxième axe de charnière (30) et comprenant une première extrémité (33a) en butée sur ladite seconde surface d'accouplement (32) dudit élément de rappel élastique (29), et une seconde extrémité (33b) en butée sur une surface de butée appropriée (34) disposée dans ladite plaque (16).
9. Dispositif selon l'une quelconque des revendications 6-8, **caractérisé par le fait que** ledit cliquet (6) est articulé audit élément de rappel élastique (29) en correspondance d'un troisième axe de charnière (35).
10. Dispositif selon la revendication 9, **caractérisé par le fait que** ledit élément de rappel élastique (29) comporte un troisième trou traversant (36) pour ledit troisième axe de charnière (35) et une encoche de ligne centrale (37), qui croise ledit troisième trou traversant (36), définissant ladite première surface d'accouplement (31) pour l'accouplement avec ledit cliquet (6).
11. Dispositif selon l'une quelconque des revendications 6-10, **caractérisé par le fait que** ladite première surface d'accouplement (31) dudit élément de rappel élastique (29) est constituée d'au moins un plan incliné, auquel une face aplatie correspondante (38) dudit cliquet (6) peut être accouplée.
12. Dispositif selon l'une quelconque des revendications 2-11, **caractérisé par le fait que** ledit levier (2) est mobile sélectivement dans une quatrième position angulaire de coulissement libre dudit second élément (5) par rapport audit premier élément (3), dans ladite quatrième position angulaire, ladite saillie de came (11) agissant en correspondance de ladite cavité (12) dudit cliquet (6), de telle sorte qu'elle provoque la rotation dudit cliquet (6) autour d'un troisième axe de charnière, le libérant de ladite tige dentée (4).
13. Dispositif selon l'une quelconque des revendications 9-11 ou selon la revendication 12 et l'une quelconque des revendications 9-11, **caractérisé par le fait que** ladite saillie de came (11) forme au moins un coin d'extrémité (39), **par le fait que** ledit cliquet (6) forme un premier bord d'accouplement (40) avec ledit coin d'extrémité (39) et **par le fait que** ledit élément de rappel élastique (29) forme un second bord d'accouplement (41) avec ledit coin d'extrémité (39), la rotation sélective dudit levier (2) de ladite première position de coulissement par détente à ladite quatrième position angulaire de coulissement libre étant appropriée pour disposer ledit élément de rappel élastique (29) en rotation autour dudit deuxième axe de charnière (30) et ledit cliquet (6) autour dudit troisième axe de charnière (35), de façon à libérer ledit cliquet (6) de ladite tige dentée (4) et à permettre le coulissement libre dudit second élément (5) par rapport audit premier élément (3).
14. Dispositif selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit cliquet (6) définit au moins une surface de blocage (8) d'une géométrie sensiblement conjuguée avec celle desdites dents (7) de ladite tige dentée (4).
15. Dispositif selon l'une quelconque des revendications 3-14, **caractérisé par le fait que** ladite plaque (16) forme une paire de pattes mutuellement opposées (17), définissant entre celles-ci une ouverture (17a) à travers laquelle l'action dudit cliquet (6) est exercée, comportant lesdits premier et deuxième trous traversants (18a), (18b) pour le support dudit premier axe de charnière (15) et dudit deuxième axe de charnière (30), ladite plaque (16) comportant en outre, en correspondance de la face interne de l'une desdites pattes (17), une rainure de coulissement (19) pour une goupille de blocage (20) pour bloquer la rotation dudit levier (2) obtenue dans l'une de ses surfaces latérales (21).
16. Dispositif selon la revendication 13 ou selon la revendication 13 et la revendication 14 ou 15, **carac-**

térisé par le fait que ladite saillie de came (11) présente un profil sensiblement conformé sous la forme d'un arc de cercle, avec un rayon de plus en plus grand d'une extrémité à l'autre vers ledit coin d'extrémité (39).

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17. Dispositif selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit premier élément (3) est formé d'un seul tenant avec le cadre de la machine de gymnastique.

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18. Dispositif selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit second élément (5) est formé d'un seul tenant avec le cadre de la machine de gymnastique.

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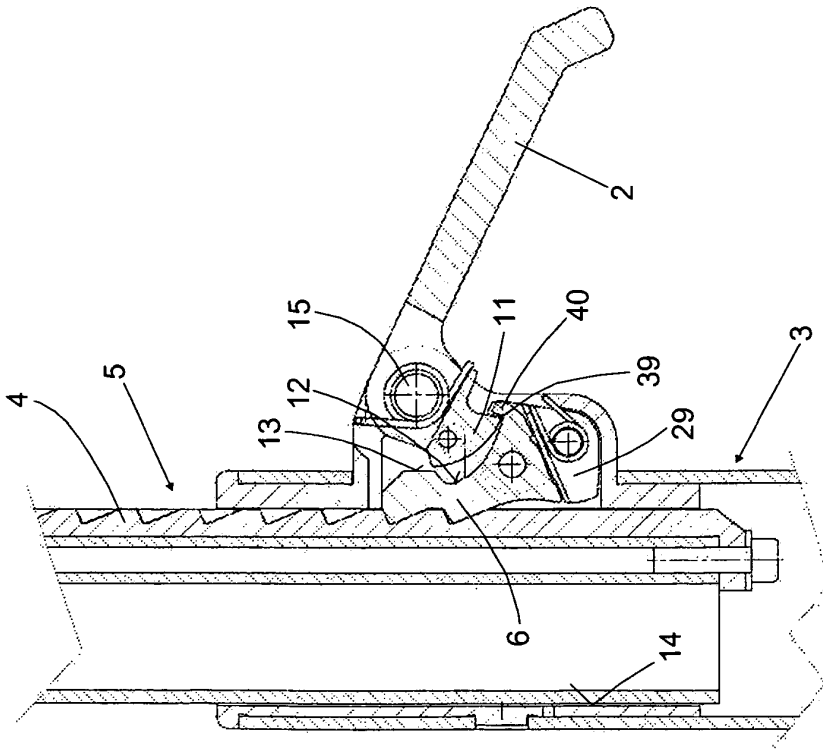


Fig. 1

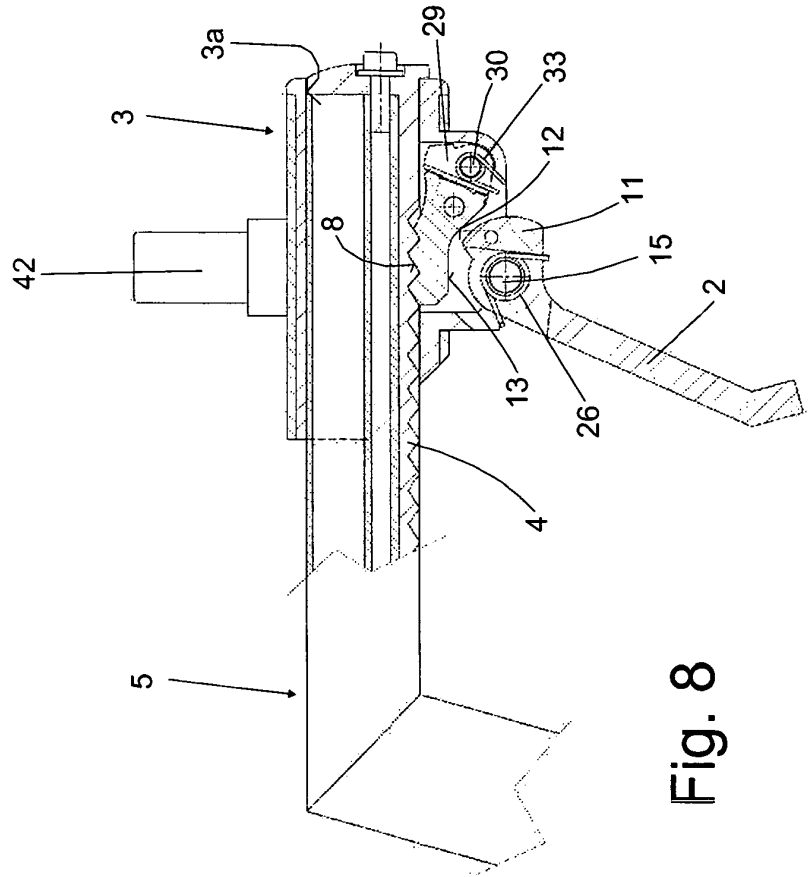


Fig. 8

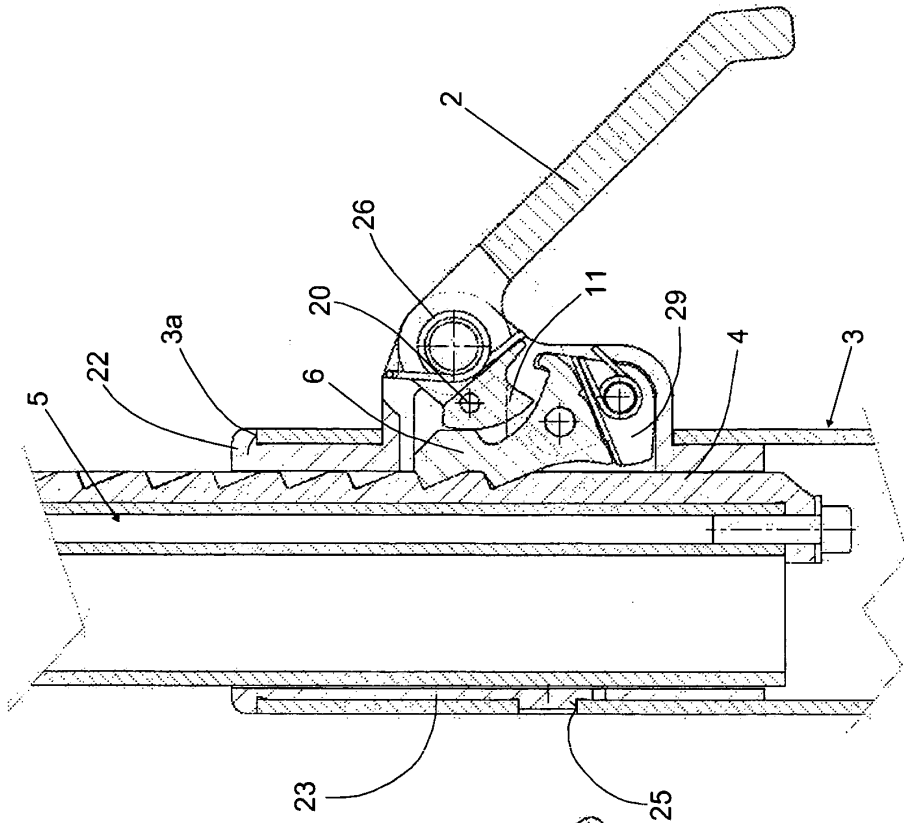


Fig. 2

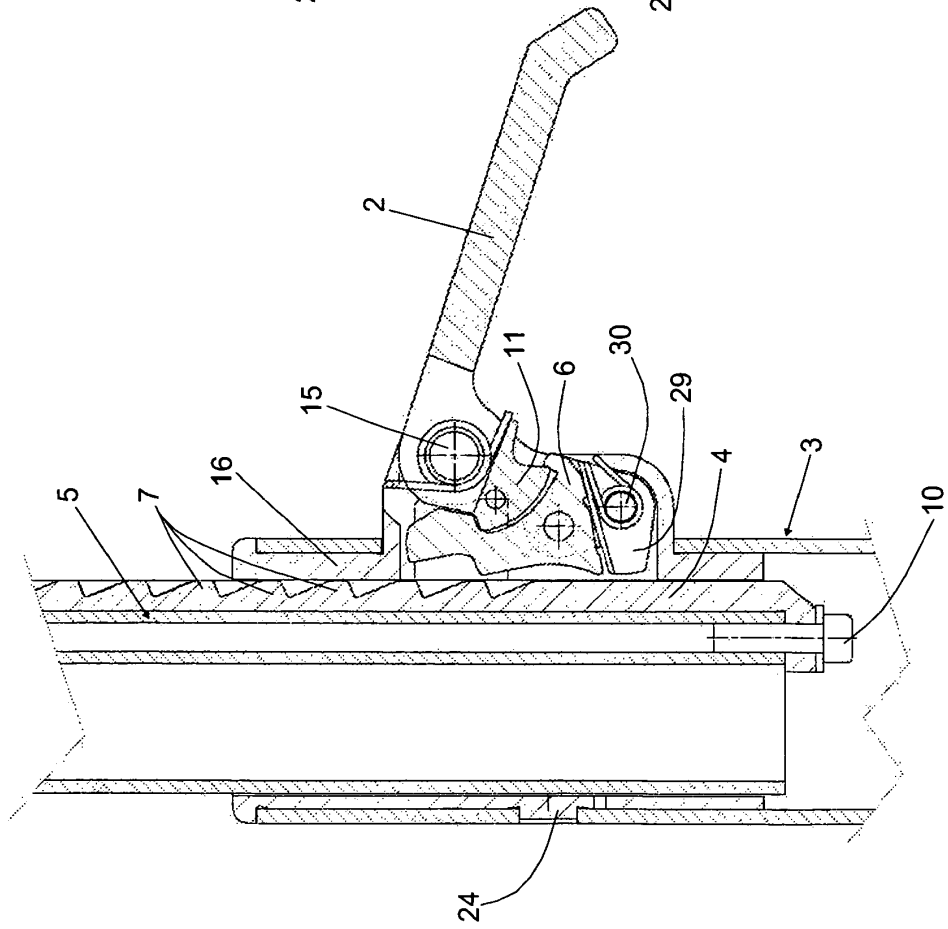


Fig. 4

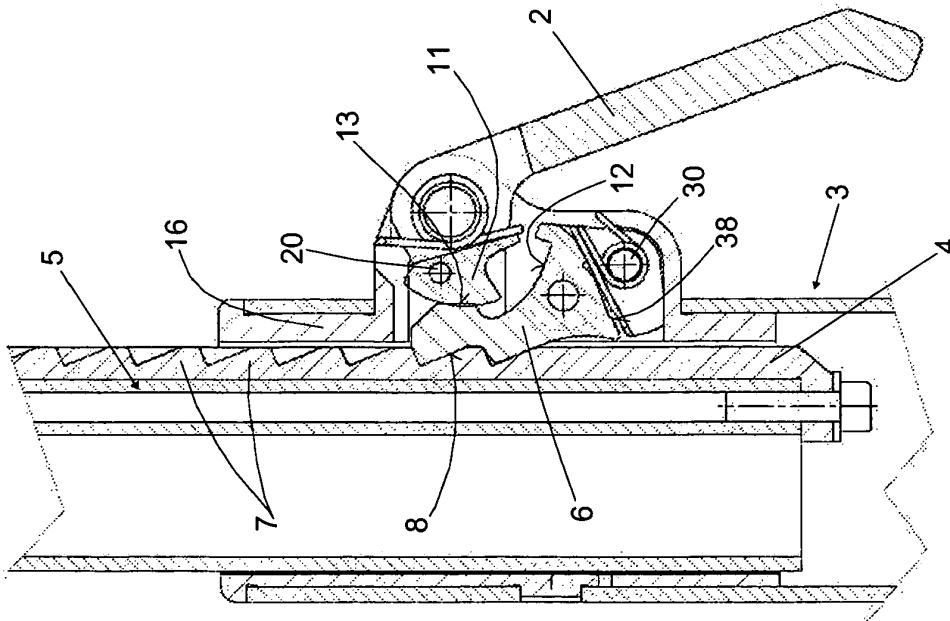


Fig. 3

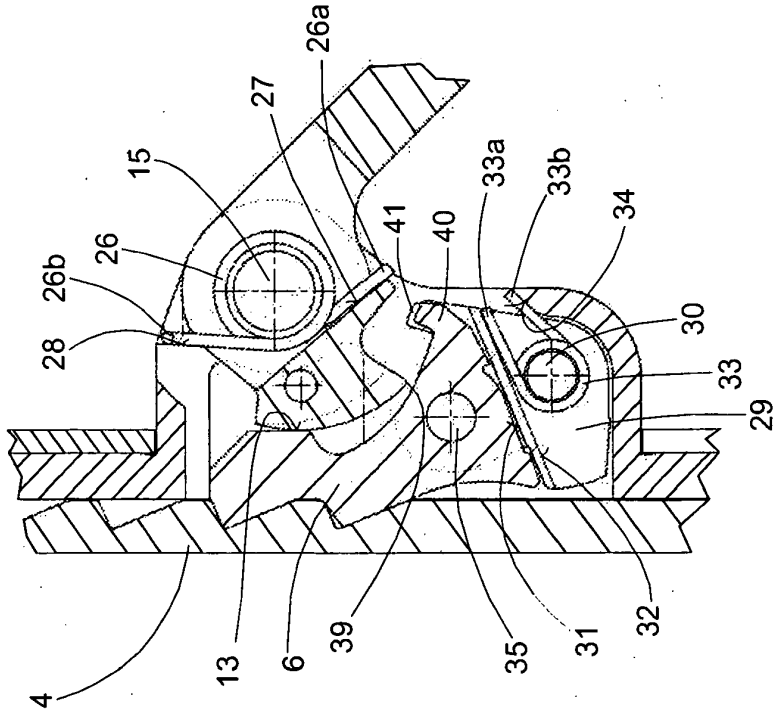


Fig. 5

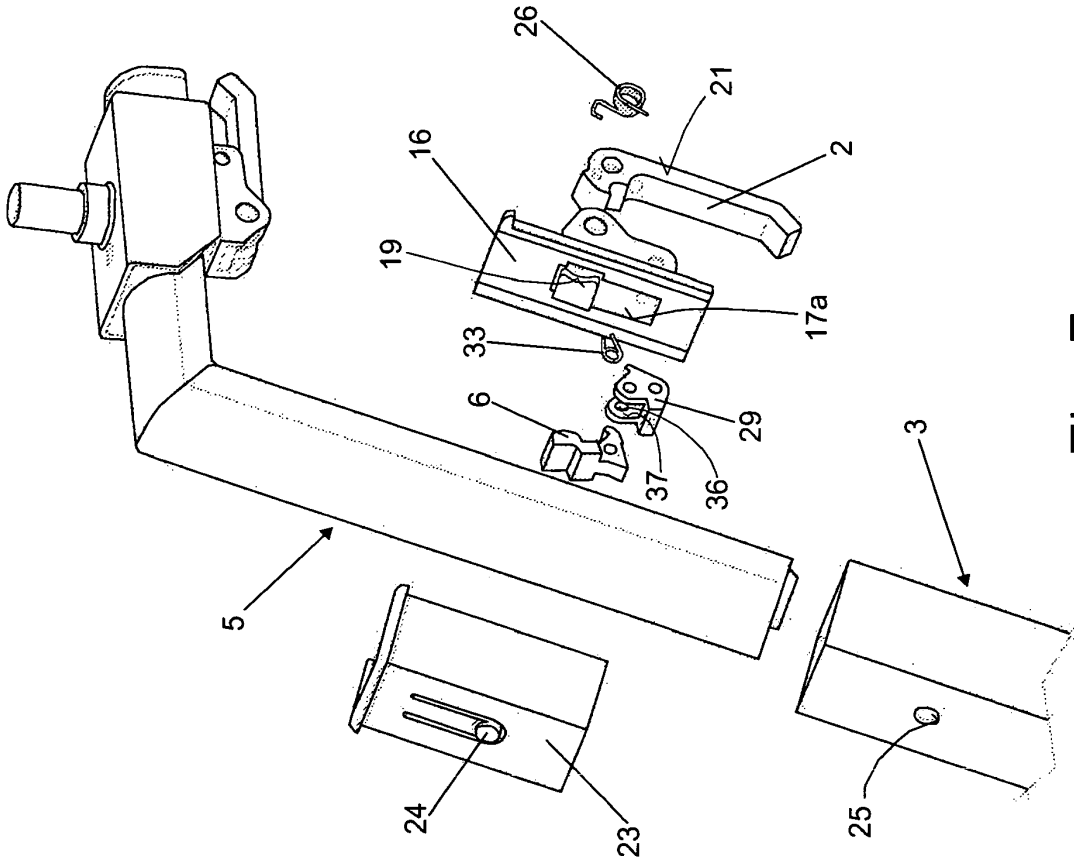


Fig. 7

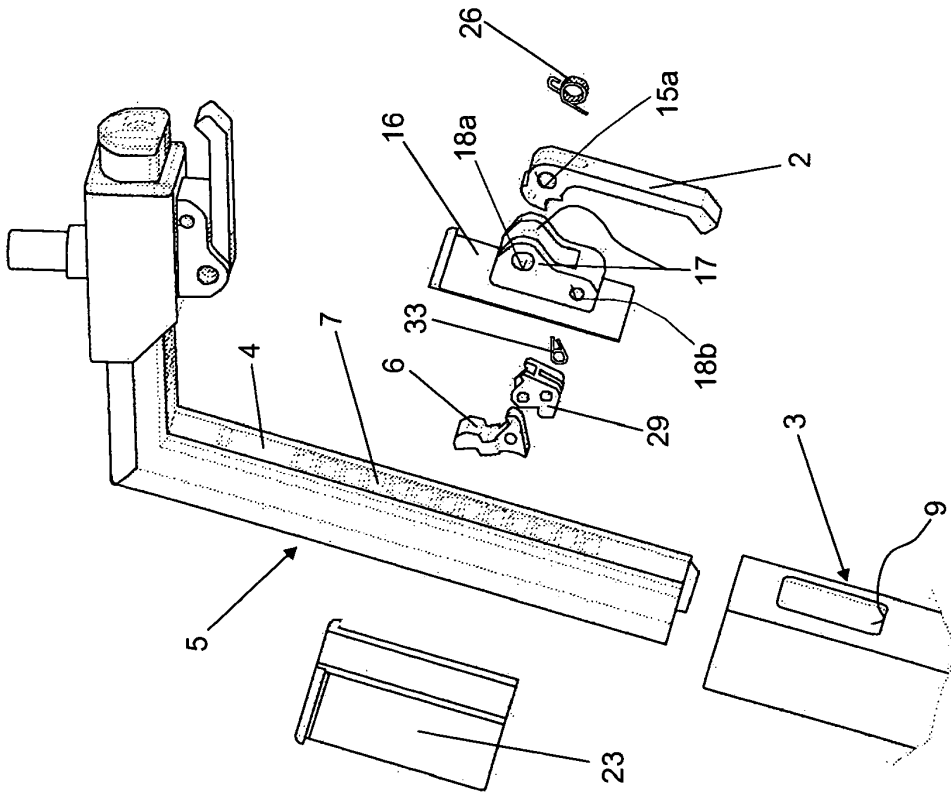


Fig. 6

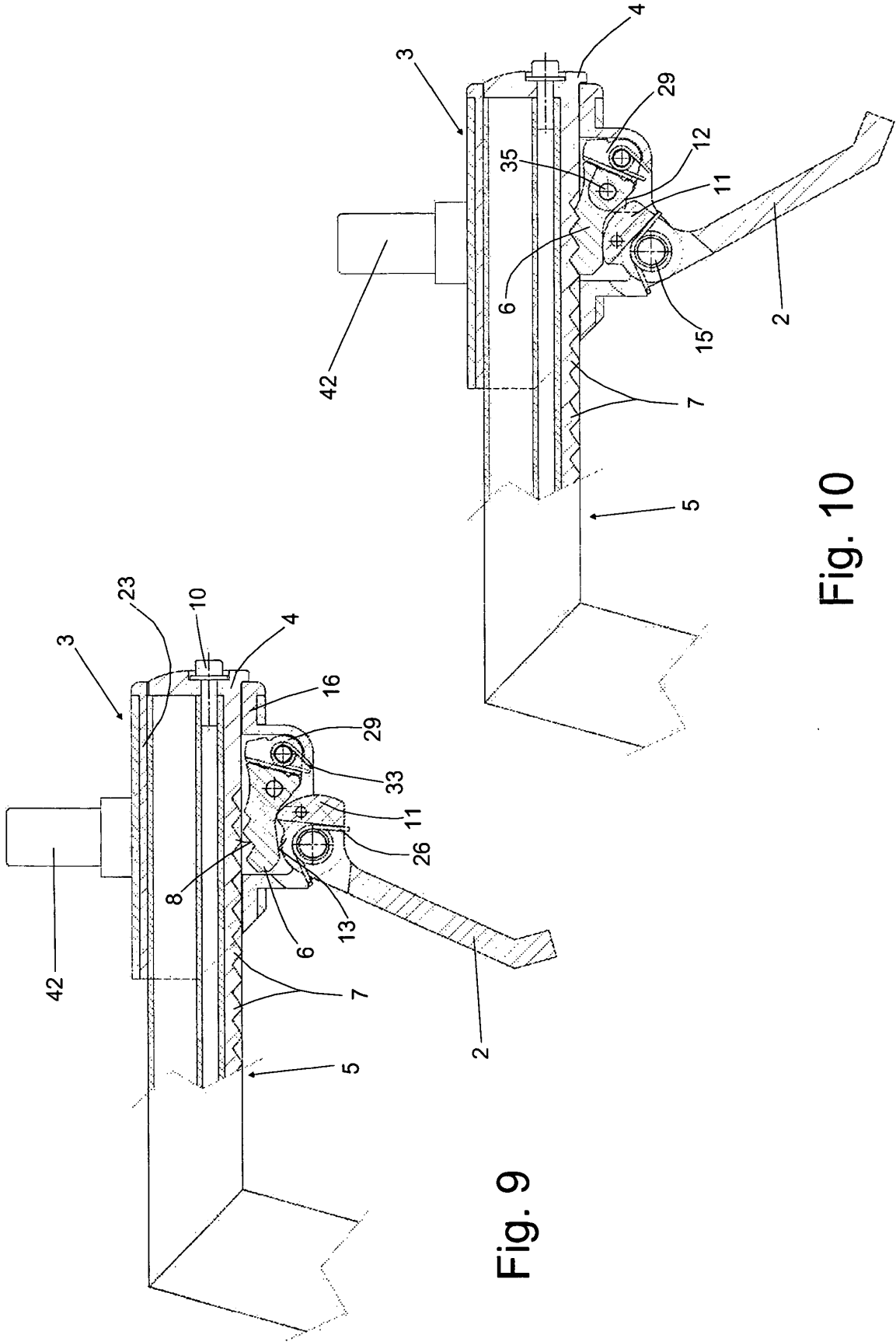


Fig. 9

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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