

The invention relates to a stomach training apparatus with a base member, an actuator which is guided on the base member so as to reciprocate and, on its side remote from the base member, has a substantially flat stomach support surface running transversely to the direction of reciprocating movement, a compression spring clamped between the base member and the actuator, in particular a helical compression spring, a stroke counter which can be incremented by reciprocating movements of the actuator relative to the base member and with a flexible waist belt which is held on the base member by means of at least two fixing elements spaced from one another transversely to the direction of reciprocating movement.

Such stomach training apparatus is known from Dr. med. Otto Greither's "Gesund durch Dich selbst", Sammlung Natur und Wissen, Verlag Kurt Desch GmbH, Munich, Vienna, Basle, 1961, pages 101 to 103. The apparatus is used for exercising the stomach muscles and for stimulating the intestinal tract. It is fastened tightly round the waist by means of the waist belt with the actuator resting on the stomach in such a way that the compression springs which are relaxed when the stomach is pulled in can be tightened by arching forward the stomach. The stroke counter is incremented when the apparatus is completely compressed and counts the number of compression cycles.

The known stomach training apparatus comprises two plates of which one is provided with belt eyelets for the waist belt and is movably guided on a stud which projects from the other plate transversely thereto. Between the two plates there is clamped a helical compression spring which surrounds the stud and rests by means of the plate, which moves relative to the stud, on a nut screwed onto the stud.

The known apparatus tends to tilt the two plates relative to one another, making handling more difficult. The spring and the counter are exposed. This not only impairs the appearance but also conceals the risk of injury and tends to become dirty. The known stomach training apparatus can be dismantled by unscrewing the nut, and the fitted spring can optionally be replaced by a spring having different temper for adjusting the pressing power of the apparatus. As the nut of the known apparatus is comparatively small, the exchange of springs requires some skill. No measures are provided for significantly changing the prestressing force of the fitted spring.

An object of the invention is to improve the stomach training apparatus described at the outset such that the prestressing force of the compression spring can be reproducibly adjusted without difficulty within comparatively wide limits while ensuring that the compression spring can be exchanged without difficulty even by inexperienced persons.

According to the invention this object is achieved by the features mentioned in the characterising part of claim 1.

Within the scope of the invention, the compression spring rests, not directly on the base member as in the known apparatus, but on a control member which is separate from stroke limiting stops of the actuator and of the base member. The control member is detachably locked in the manner of a bayonet fitting of the base member, the opening being sufficiently large to allow the removal or exchange of the compression spring and therefore the use of compression springs of differing temper when the control member is removed, without complete disassembly of the apparatus. The control member which is guided both axially movably and rotatably in the opening, for the bayonet fitting, is axially adjusted in the locking region of rotation of the bayonet

fitting by axial slide means by rotation relative to the base member, allowing precise adjustment of the initial stress of the compression spring. The bayonet fitting limits the rotational angle of adjustment of the control member to less than 360° , producing a completely reproducible adjustment. Optical markings can optionally simplify adjustment.

In a preferred embodiment, the control member is cylindrical and is guided rotatably and axially movably in a control bush projecting from the base member. In conjunction with such guidance, the axial slide means of one of the two members can be constructed as radially projecting cams which follow an axial sliding track of the other respective member. In this case, the axial slide means must not take up radial guiding forces. The cams which are preferably diametrically opposed are preferably provided on the control member and follow axial sliding tracks which are formed in each case by the front edge of the control bush. Axial slide means of this type can be produced easily, in particular in the case of plastics injection mouldings. A further advantage of the last-mentioned design of the axial sliding means is that notches for arresting the control member in predetermined rotational positions are made in the axial sliding track of each cam. The notches not only determine defined spring prestressing values but also prevent unintentional rotation of the control member when the apparatus is used, even when comparatively steep axial sliding tracks are used.

The axial sliding track can pass directly, in each case, into the cam through-orifice which allows removal of the control member. However, as this conceals the risk of unintentional release of the control member, front edge noses are preferably shaped on the control bush between the removal orifices and the axial sliding tracks, these front edge noses having to be overcome manually by pressing the control member into the

control bush before the control member can be rotated into its removal position.

In the known stomach training apparatus, the stud guiding the base member has a relatively small diameter. In an advantageous embodiment of the invention, the base member and the actuator carry guide tubes which are guided coaxially inside one another and coaxially surround the compression spring. The base member and the actuator are guided on one another over a relatively large diameter, improving the stability of guidance. The telescopically movable guide tubes protect not only the compression spring but also the stroke counter which can be read through a window, in particular of the guide tube on the base member side.

The stroke of the base member and of the actuator is preferably limited by at least one projecting catch which is radially resilient with respect to the guide tubes and engages in a guide slot which is elongated in the direction of reciprocating movement. In addition to stroke limitation, the further advantage arises that the actuator is guided non-rotatably on the base member.

An embodiment is described in more detail hereinafter with reference to drawings.

Figure 1 shows a section through a stomach training apparatus as viewed along a line I-I in Figure 2.

Figure 2 shows a section through the stomach training apparatus as viewed along a line II-II from Figure 1.

Figure 3 shows the development of a cylindrical control bush of the stomach training apparatus.

Figures 1 and 2 show a stomach training apparatus with a

substantially pot-shaped base member 1 and an actuator 3 which is slipped over the opening side of the base member 1. The actuator 3 is guided on the base member 1 so as to reciprocate between two end positions. The base member 1 and the actuator 3 surround a helical compression spring 5 which acts in the direction of reciprocating movement and is supported, on the one hand, in a centering guide means 7 of the actuator 3 and, on the other hand, by means of a control member 9 on the base member 1. A centering guide means 11 of the control member 9 guides the other end of the helical compression spring 5. The base member 1 is provided, on sides facing one another transversely to the stroke direction, with a respective belt eyelet 13 on which the ends of a flexible waist belt 15 of adjustable length are held. The actuator 3 has a substantially flat, but slightly convexly curved stomach support surface 19 which is covered with a layer 17 of natural rubber and with which the actuator is placed on the stomach during service. The waist belt 15 is fastened tightly round the waist such that the spring 5 is released when the stomach is pulled in, as in the end position shown in Figures 1 and 2. By forward arching of the stomach, the actuator 3 is pressed against the force of the spring 5 into the other end position relative to the base member 1 fixed by means of the waist belt 15. A stroke counter 23 which can be incremented by a rib 21 of the actuator 3 counts the strokes performed during training. The stroke counter 23, which is not shown in Figure 2 for the sake of clarity, is incremented close to the tension end position so that only complete strokes are counted. The stroke counter 23 can be read, when the stomach training apparatus is fastened, through a window 25 in the base member 1 which is open transversely to the stroke direction.

The base member 1 comprises a cylindrical guide tube 27 which is closed on its side axially removed from the stomach support surface 19, by a base 29. The belt eyelets 13 are

provided in the region of the base 29 on diametrically opposed sides of the guide tube 27. The actuator 3 comprises a wall part 31 which is closed in the form of a ring and of which the rim remote from the stomach support surface 19 passes into a guide tube 33 which equiaxially surrounds the guide tube 27 and projects axially from the stomach support surface 19. The stomach support surface 19 is formed by a substantially flat, slightly concavely curved cover 35 which is roughly rectangular in this case and is placed, symmetrically about the axis of the guide tubes 27, 33, on the rim of the wall part 31 facing the stomach support surface 19. The wall part 31 passes smoothly all round from the circular cross section at one end into a substantially rectangular cross section at its other end. Fixing pegs 37 hold the cover 35 on the wall part 31.

The guide tubes 27, 33 are arranged along the same axis as the helical compression spring 5 and are joined together non-rotatably but axially movably by snap connections. Two radially resilient tabs 41, each carrying a radially outwardly projecting catch 43 at their ends, are separated by axial slots 39 in the edge region of the guide tube 27 remote from the base 29 on diametrically opposed sides. The catches 43 engage in diametrically opposed, axially extending slots 45 of the guide tube 33 and guide the guide tube 27 non-rotatably but axially movably on the guide tube 33. The end position shown in Figures 1 and 2 is limited by end edges 47 of the slots 45 against which the catches 43 abut. The other end position is limited by an annular shoulder 49 of the base member 1 which is provided in the region of the base 29 and co-operates with the free front edge of the wall part 31. The resilient tongues 41 allow snap-on assembly of the base member 1 and the actuator 3.

The control member 9 has a cylindrical wall part 51 which rests rotatably and, in the manner described below,

axially movably in a cylindrical guide bush 53 having the same axis as the spring 5 and the guide tubes 27, 31. A knob 55 which is accessible from the exterior of the base 29 allows the control member 9 to be operated. Two cams 57 which co-operate with axial sliding tracks 59 on the front edge of the control bush 53 pointing axially toward the stomach support surface 19 project from the periphery of the wall part 51. During a rotation of the control member 9, the axial sliding tracks 59 cause the axial displacement thereof and therefore a change in the prestressing force of the compression spring 5.

Figure 3 shows details of the two axial sliding tracks 59 each traced by one of the cams 57 in a modification of the control bush 53. The peripherally located ends of each axial sliding track are limited by axial projections 61, 63 which limit the angle of rotation of the control member 9 in two end positions. Notches 65, 67 which cause the control member 9 to be locked in the end positions are provided in the end positions. The recesses 65, 67 therefore determine two defined spring prestressing adjustments.

As also shown in Figure 3, axially continuous orifices 69 which allow the passage of the cams 57 and therefore the removal of the control member 9 from the control bush 53 are provided between adjacent projections 61, 63. A labyrinthine angle 71 at the internal end of each of the orifices 69 makes unintentional release of the control member 9 more difficult. The labyrinthine angle 71 embraces the projection 61 at the end of the axial sliding track 59 axially removed from the actuator 3. To release the control member 9, the control member 9 has to be pressed against the force of the spring 5 into the base member 1 and introduced via the projection 61 into the orifice 69.

The internal diameter of the control bush 53 is greater than the external diameter of the helical compression spring 5 so that, when the control member 9 is removed, the helical compression spring 5 can be removed from the apparatus and can be exchanged for a spring of different temper from a set of springs of different temper according to the desired properties of the stomach training apparatus.

The waist belt 15 can be provided with a closure of any design. "Velcro"-type closures are particularly suitable.

Claims

1. Stomach training apparatus with a base member (1), an actuator (3) which is guided on the base member (1) so as to reciprocate between two end positions and, on its side remote from the base member (1), has a substantially flat stomach support surface (19) running transversely to the direction of reciprocating movement, a compression spring (5) clamped between the base member (1) and the actuator (3), in particular a helical compression spring, a stroke counter (23) which can be incremented by reciprocating movements of the actuator (3) relative to the base member (1) and with a flexible waist belt (15) which is held on the base member (1) by means of at least two fixing elements (13) spaced from one another transversely to the direction of reciprocating movement, characterised in that the compression spring (5) is clamped between the actuator (3) and a control member (9) mounted rotatably about a pivot axis running substantially in the direction of reciprocating movement and axially movably in an opening in the base member (1), the diameter of which is greater than the diameter of the compression spring (5), in that axial slide means (57, 59) allocated to one another on the control member (9) and the base member (1) are provided in the support path of the compression spring (5) and alter the relative axial position of the members (1, 9) during the relative rotation of the members (1, 9), in that one (1) of the two members (1, 9) has axially running orifices (69) which are offset at an angle to its axial slide means (59), allow the passage of the axial slide means (57) of the other member (9) and are axially open for removal of the control member (9) from the opening in the base member (1), and in that the control member (9) has an adjusting handle (55) on the side remote from the actuator (3) in the direction of reciprocating movement.



2. Stomach training apparatus according to claim 1, characterised in that the control member (9) is cylindrical in shape and is guided rotatably and axially movably in a control bush (53) projecting from the base member (1).

3. Stomach training apparatus according to claim 2, characterised in that the control member (9) carries at least one radially projecting cam (57) and the edge of the control bush (53) facing the actuator (3) forms an axial sliding track (59) allocated to the cam (57) in each case.

4. Stomach training apparatus according to claim 3, characterised in that the axial sliding track (59) has notches (65, 67) for arresting the control member (9) in predetermined rotational positions.

5. Stomach training apparatus according to claim 3 or 4, characterised in that the axial removal orifice (69) in the control bush (53), allowing the passage of the cam (57), is separated from the axial sliding track (59) allocated to the cam (57) by an axial edge nose (61).

6. Stomach training apparatus according to claim 3 or 4, characterised in that the control member (9) carries two diametrically opposed cams (57).

7. Stomach training apparatus according to one of the preceding claims, characterised in that the base member (1) and the actuator (3) carry guide tubes (27, 31) which are guided coaxially inside one another and coaxially surround the compression spring (5).

8. Stomach training apparatus according to claim 7, characterised in that a first one of the guide tubes (27) carries at least one radially resilient projecting catch (43) projecting radially from the second guide tube (33) and the



second guide tube (33) has a guide slot (45) which extends in the direction of reciprocating movement for each projecting catch (43), into which the projecting catch (43) engages radially and which limits the reciprocating movement of the projecting catch (43) in the compression direction of the compression spring (5).

9. Stomach training apparatus according to claim 8, characterised in that the projecting catches (43) are provided on axially projecting resilient tabs (41) shaped on the first guide tube (27).

10. Stomach training apparatus according to claim 8 or 9, characterised in that the second guide tube (33) is provided on the actuator (3) and radially and externally surrounds the first guide tube (27).

11. Stomach training apparatus according to claim 10, characterised in that the actuator (3) is constructed as a pot whose base (35) forms the stomach support surface (19) and whose wall (31) is connected, in the region of its edge remote from the base (35), to the second guide tube (33).

12. Stomach training apparatus according to one of claims 7 to 11, characterised in that the stroke counter (23) is arranged inside the guide tube (27) of the base member (1) and can be read through a window (25) in the guide tube (27) located substantially in the centre between the two fixing elements (13).

13. Stomach training apparatus according to one of the preceding claims, characterised in that the stomach support surface (19) is coated with rubber material, in particular natural rubber.

