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### (54) Set of weights and blocking device

(57) The invention relates to a set of weights for training machines, comprising a plurality of regular weights (4) arranged on each other and a lever (6) movable through openings (5) in the weights, which lever includes a plurality of axially separated grips (7), with the purpose of housing a blocking device (8) insertable in the set of weights (1) at each regular weight (4). According to the invention, the set of weights (1) comprises an extra weight (9) being arranged beside the regular weights (4) and having an extra lever (10), which is arranged in the vicinity of the regular lever (6) of the set of weights and which includes a plurality of axially separated grips (11) that in the axial direction are arranged in line with the grips (7) in the regular lever (6), seen in the insertion direction of the blocking device (8). Furthermore, the invention relates to a blocking device (8) that is intended to co-operate with the set of weights (1).

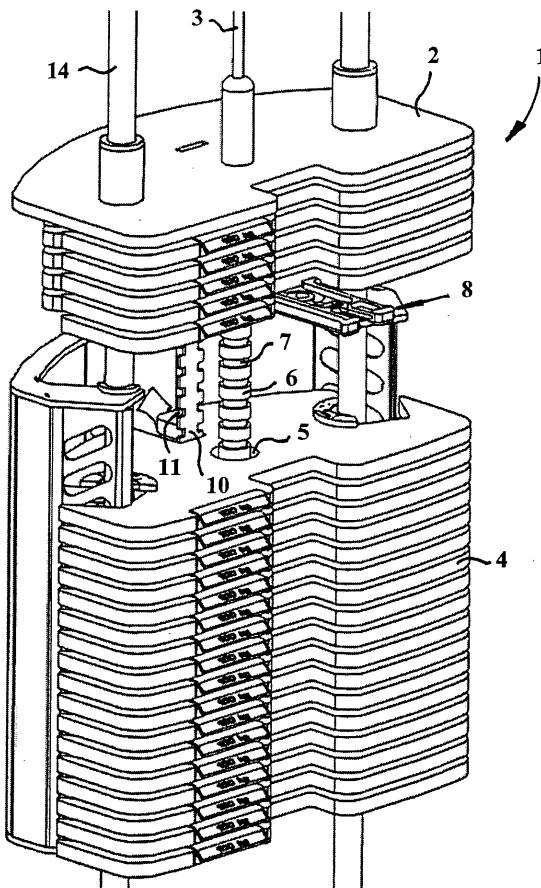


Fig 1

**Description****Technical Field of the Invention**

**[0001]** In a first aspect, the present invention relates to a set of weights for training machines comprising a plurality of regular weights arranged on each other and a lever movable through openings in the weights, which lever includes a plurality of axially separated grips, with the purpose of housing a blocking device insertable in the set of weights at each regular weight.

**[0002]** In a second aspect, the invention also relates a blocking device for training machines of the type that includes a set of weights comprising a plurality of regular weights arranged on each other, the blocking device being insertable in the set of weights, at each regular weight, in order to co-operate with grips in a lever included in the set of weights.

**Background of the Invention and Prior Art**

**[0003]** Training machines of the above-mentioned type comprising sets/packages of weights having a plurality of loose weights piled on each other, have for a long time been and still are the most functional and most used machines for muscular training. In modern training establishments, in particular those having many specially designed machines adapted for the training of individual muscles or muscle groups, there is a generally expressed desire that the machine stands should be smaller and above all lower, so that the training room becomes more inviting and more well-arranged. This is in order to facilitate for the training persons and possible personnel to see who is in the room and which machines that are free. An airy and inviting establishment attracts, apart from traditional body builders, also persons with another background and having other goals with their training. A bigger variation of the needs of the training persons entails that the sets of weights in the different machines must have more weight intervals so that all training persons should be able to obtain a suitable and adjusted load during an entire training session. However, this entails that the sets of weights must include more weight intervals, which entails more weights that in turn results in the sets of weights requiring bigger and higher machine stands in order to allow space for sufficient training movements.

**[0004]** In order to manage the problem of offering more load intervals at the same time as the machine demands less space, different proposals have been presented that include extra weights, which are hung onto or are connected to the existing set of weights if required. For instance, if a training person wants to decrease the regular load interval from 20 kg to 30 kg by half, a 5 kg weight is hung on the 20 kg weight. However, existing solutions demand cumbersome handling of loose extra weights and/or various extra levers and extra handles in order to connect and disconnect an extra weight between each regular load interval, which entails that the same are not

used in practice. This results in the set of weights instead getting larger and fewer load intervals than earlier and thereby poorer functionality and usefulness.

**5 Objects and Features of the Invention**

**[0005]** The present invention aims at obviating the above-mentioned shortcomings of previously known sets of weights and at providing an improved set of weights.

10 Thus, a primary object of the invention is to provide a set of weights, where an extra weight easily can be connected and disconnected by means of the ordinary blocking device of the set of weights. An additional object of the invention is to provide a set of weights with the extra 15 weight being included in the set of weights as a permanent part and not as a loose extra weight. It is furthermore an object of the invention to provide a set of weights that require less space than sets of weights without extra weight.

20 **[0006]** According to the invention, at least the primary object is attained by means of the set of weights defined by way of introduction, which is characterized in that the set of weights comprises an extra weight being arranged beside the regular weights and having an extra lever, 25 which is arranged in the vicinity of the regular lever of the set of weights and which includes a plurality of axially separated grips that in the axial direction are arranged in line with the grips in the regular lever, seen in the insertion direction of the blocking device. Preferred 30 embodiments of the set of weights according to the invention are further seen in the dependent claims 2-6, as well as in the following, detailed description of preferred embodiments.

35 **[0007]** In a second aspect, the invention relates to a blocking device according to the independent claim 7, arranged to co-operate with the set of weights according to the invention. Preferred embodiments of the blocking device according to the invention are further seen in the dependent claims 8-11.

40 **[0008]** In a third aspect, the invention also relates to a machine according to the independent claim 12, comprising the set of weights according to the invention as well as the blocking device according to the invention.

**45 Brief Description of the Drawings**

**[0009]** In the drawings:

50 Fig. 1 is a perspective view from the front of a set of weights according to the invention having a blocking device according to the invention positioned in a first, partly active position,

55 Fig. 2 is a perspective view of a blocking device according to the invention with the branches in a collected position,

Fig. 3 is a schematic perspective view from above of

a set of weights, with a few weights removed, and a blocking device, which is positioned in a first, partly active position,

Fig. 4 is a perspective view corresponding to figure 3 with the blocking device in a second, fully active position,

Fig. 5 is a perspective view of an extra weight,

Fig. 6 is a perspective view of a regular weight,

Fig. 7 is a perspective view from behind corresponding to figure 1 with the extra weight disconnected, and

Fig. 8 is a perspective view corresponding to figure 7 with the extra weight connected.

#### Detailed Description of Preferred Embodiments of the Invention

**[0010]** In figure 1, a set of weights according to the invention is shown, in its entirety designated 1, which is arranged in a stand (not shown). The stand in turn is included in a machine, which may be wall mounted as well as freestanding and be formed in all sorts of feasible ways without the general idea according to the invention being deviated from. The set of weights 1 comprises an upper weight plate 2, in which a line 3 is fixedly connected. The line 3 run over various pulleys in order to subsequently be terminated by some form of training apparatus (not shown). Furthermore, the set of weights 1 comprises a plurality of regular weights 4 piled on each other (see figure 6) and a regular weight lever or weight collector 6, movable through openings 5 in the weights 4. Said lever 6 includes a plurality of axially separated grips 7, with the purpose of housing a blocking device 8 according to the invention, which device is insertable in the set of weights 1 at each regular weight 4, (see figure 2). Furthermore, the set of weights 1 comprises an extra weight 9 (see figure 5), which is arranged beside and partly surrounds the regular weights 4 and which comprises an extra lever 10, which includes a plurality of axially separated grips 11. In the axial direction, the grips 11 of the extra lever 10 are arranged in line with the grips 7 of the regular lever 6, seen in the insertion direction of the blocking device 8, when the set of weights 1 is in an unloaded state. Furthermore, the extra lever 10 and the regular lever 6 have the same number of grips.

**[0011]** Now reference is made also to figure 2, which shows a blocking device 8 according to the invention, comprising two engagement portions 12, 13, intended to alternately co-operate with the grips 7 in the regular lever 6 of the set of weights 1 with the purpose of positioning the blocking device 8 in a first and a second position, respectively, in relation to the set of weights 1. The regular weights 4 are arranged to slide and be guided along

guides or sliding bars 14, which are fixedly connected to said stand. The blocking device 8 is, in the preferred and shown embodiment, insertable between two adjacent regular weights 4 in order to primarily co-operate with the regular lever 6 with the purpose of causing all regular weights 4 located above the blocking device 8 to collectively follow said lever 6 and run along the guides 14 when the same is lifted in any way by means of the line 3 as a consequence of a training repetition executed in the training machine 1.

**[0012]** Now reference is made also to figures 5 and 6. The regular weights 4 have a substantially rectangular basic shape, including centrally located openings or holes 5, through which the regular lever 6 is movable. In a preferred embodiment, the regular lever 6 has the shape of a round shaft in which the grips 7 consist of circumferential grooves. In the rear edges of the regular weights 4, which in practice are somewhat curved, recesses 15 are arranged in the immediate vicinity of the openings 5 in order to house the extra lever 10. The extra lever 10 is furthermore arranged substantially parallel to the regular lever 6 at a distance less than 50 mm and preferably less than 30 mm, in addition the two levers 6, 10 are substantially equally long. In addition, in the front edge, each regular weight 4 can have a seating-like recess 16, intended to laterally position the blocking device 8, when the same is inserted into the set of weights 1. Furthermore, recesses 17 are arranged in the side edges of the regular weights 4, the bottoms of which recesses are intended to house the guides 14, more precisely in such a way that the recesses 17 of the regular weights 4 abut against only a part of the circumference of each guide 14. On arbitrary location along the circumferential edge of the regular weights 4, preferably on the front edges thereof, weight labels or weight markings 18 are arranged at an angle of about 45° to the vertical plane. Said angle allows that also the weight labels 18 on the regular weights 4 located at the bottom are fully visible to the person training in the training machine 1.

**[0013]** The extra weight 9 comprises two opposite horizontally arranged end plates 19, a number of vertical stays 20, which extend between and stabilize the end plates 19 and which also serve as the actual weight of the extra weight 9. In the embodiment shown in the figures, the extra lever 10 has the form of a flat steel that has recesses along opposite long edges and that extends between the end plates 19. Furthermore, the end plates 19 have a shape that partly surrounds the regular weights 4, in such a way that the extra weight 9 and the regular weights 4 can run up and down along the guides 14 without affecting each other. In practice, each end plate 19 may be shaped like a "3" or an "E", where the intermediate arm 21 is connected to the extra lever 10 and the side arms 22 are arranged to run along the part of the envelope surface of the guides 14 that is not used by the regular weights 4. This is realized by the fact that the side arms 22 extend into the recesses 17 on the regular weights 4, and abut against the part of the circumference of the

guides that is facing away from the recesses 17. In other words, both the regular weights 4 and the extra weight 9 run along the guides 14. Furthermore, the recesses 17 of the regular weights 4 and the side arms 22 of the extra weight 9 are provided with semicircular slide bushes 23 in order to decrease the friction between the same and the guides 14. Furthermore, the slide bushes 23 are preferably manufactured from nylon in order to decrease the friction additionally.

**[0014]** Each slide bush 23 on the regular weights 4 has a collar 24 that abuts against the top side of the respective regular weight plate 4, the collar 24 serving as a distance sleeve between the individual regular weights 4 in order to enable introduction of the blocking device 8 into the gap that is formed between two adjacent regular weights 4. Furthermore, said slide bushes 23 and the collars 24 also have an absorbing effect against noise and impacts, which protects the hearing of the training persons and the regular weights 4 from being impaired and damaged, respectively, when the same are dropped against each other. The gap between two adjacent regular weights 4 is desired to be as small as possible in order for the total height of the set of weights 1 to be as small as possible, and that is why the blocking device 8 has to be thin in order to be insertable into said gap, however, the same may not be so thin that it is deformed by the load that the same is subjected to during training. In order for the blocking device 8 to have good strength and manage the space limitation, it is suitable to make at least the part that is inserted into the set of weights from metal, or some other material having similar, requisite properties.

**[0015]** Now reference is made to figures 3, 4 and 7, 8, which together illustrate the function of the blocking device 8 and of the set of weights 1. In figures 3 and 4, a number of regular weights 4 are removed in order to promote the visualisation of otherwise hidden events. In figures 3 and 7, the blocking device 8 is intended to be inserted between two adjacent regular weights 4, the front engagement portion 12 being in engagement with a grip 7 in the regular lever 6. As is seen, the front end of the blocking device 8 does not reach up to the extra lever 10, and therefore only regular weights 4 act as counterweight for a training person in the training machine 1, i.e., the blocking device 8 is in a first, partly active position. In figures 4 and 8, the blocking device is further inserted between two adjacent regular weights 4, the rear engagement portion 13 being in engagement with a grip 7 in the regular lever 6. In this second, fully active position, the front end of the blocking device 8 reaches up to co-operate with a grip 11 in the extra lever 10. More precisely, in this position, also the extra weight 9 acts as counterweight in the training machine 1. Thus, the engagement portions 12 and 13 are in an alternate way active and inactive, respectively. It should be pointed out that the extra weight 9 should be connected and disconnected when the set of weights 1 is in an unloaded state, in order not to risk damaging the machine.

**[0016]** In the preferred embodiment, the blocking de-

vice 8 comprises two front branches 25 (see figure 2), which are turnably arranged around a hinge 27 and separable against the action of a spring force. The blocking device 8 also comprises a handle part 28, which extends rearward from the hinge 27 and which in the embodiment shown consists of two compressible arms, which constitute extensions of the branches 25. In practice, the spring force may be obtained from a compression spring 29 situated between the arms behind the hinge 27 seen in the insertion direction of the blocking device 8. Furthermore, the engagement portions 12, 13 preferably consist of recesses in the branch edges facing each other. Between the recesses 12, 13 in the respective branch 25, a shoulder 26 projects in the direction of the second branch 25. However, said shoulder 26 is lower than the depth of the recesses 12, 13, which entails that the branches 25 have to be separated less when the blocking device 8 is to be moved between the first, partly active position and the second, fully active position, than when the entire blocking device 8 is to be pulled out of or inserted into the set of weights 1. In the preferred embodiment of the blocking device 8, the same has a third engagement portion 31, located in the front end of the blocking device 8, which co-operates with the extra lever 10 in the second, fully active position. The third engagement portion 31 comprises hooks 32, which guarantee that the extra lever 10 cannot come out of engagement with the blocking device 8. In the front ends thereof, furthermore the branches 25 have a couple of sliding surfaces 33, which are arranged at an angle to each other that should be less than 150°. Preferably, this angle should be acute, in order to, in a reliable way, position the regular lever 6 upon introduction of the blocking device 8, whereupon the arms of the blocking device 8 can be compressed and allowing the same to be inserted into the set of weights 1, without ending up beside the regular lever 6. **[0017]** In level with or immediately in front of the hinge 27, the branches 25 may have one or more wings or stop flanges 30, which project from the branches 25 with the purpose of providing the blocking device 8 a distinct maximum insertion depth, when the wings 30 are pressed against a seating-like recess 16 of a regular weight 4, wherein the recesses 13 are in engagement with the regular lever 6 and the front ends of the branches 25 are in engagement with the extra lever 10. The distinct insertion depth counteracts that the blocking device 8 is pressed in too far, which reduces the risk of the branches 25 and/or the hinge 27 being damaged. A short distance between the seating-like recesses 16 and the wings 30 gives an indication of the recesses 12 being in engagement with the regular lever 6 and the front ends of the branches 25 not being in engagement with the extra lever 10, i.e., the extra weight 9 being disconnected. **[0018]** In an alternative embodiment, not shown, the recesses 12 may be arranged further forward on the branches 25, a distance being formed between the recesses 12 and the recesses 13 that corresponds to the distance between the regular lever 6 and the extra lever

10. This accordingly entails that the shoulder 26 gets a longer extension in the length extension of the blocking device 8. In an analogous way, the recesses 12 come into engagement with a grip 7 on the regular lever 6 in the first, partly active position and the recesses 13 are inactive. When the blocking device 8 is further inserted so that the recesses 13 should come into engagement with a grip 7 on the regular lever 6, the recesses 12 come into engagement with a grip 11 on the extra lever 10 instead of being inactive. Thereby, no third engagement portion is required in the front end of the blocking device 8.

#### Feasible Modifications of the Invention

**[0019]** The invention is not solely limited to the embodiments described above and illustrated in the drawings. Thus, it is feasible that the regular weights do not need to have the shape that is shown in drawings but they can have any another suitable shape as long as the same allows co-operation with an extra weight and the blocking device. The distance between the grips of the two levers may vary along the length extensions thereof as long as each pair of grips is arranged in line with each other, seen in the insertion direction of the blocking device. It shall be pointed out that the cross-section of the levers and thereby the grips may be varied endlessly without the general idea according to the invention being deviated from, the may have the same or different cross-sections. Furthermore, the blocking device does not need to enclose the two levers but the same may, for instance, be arranged to be stuck into corresponding holes in the levers. For instance, the engagement portions may be composed of, transverse to the length extension of the blocking device, spring-loaded balls that co-operate with corresponding seatings in the levers. Furthermore, the handle part of the blocking device may be formed in multiple ways within the scope of the invention, and hence does not need to consist of two compressible arms.

#### **Claims**

1. Set of weights for training machines, comprising a plurality of regular weights (4) arranged on each other and a lever (6) movable through openings (5) in the weights, which lever includes a plurality of axially separated grips (7), with the purpose of housing a blocking device (8) insertable in the set of weights (1) at each regular weight (4), **characterized in that** the set of weights (1) comprises an extra weight (9) being arranged beside the regular weights (4) and having an extra lever (10), which is arranged in the vicinity of the regular lever (6) of the set of weights and which includes a plurality of axially separated grips (11) that in the axial direction are arranged in line with the grips (7) in the regular lever (6), seen in the insertion direction of the blocking device (8).

2. Set of weights according to claim 1, **characterized in that** the extra lever (10) is arranged parallel to the regular lever (6) of the set of weights.

5 3. Set of weights according to claim 1 or 2, **characterized in that** the same comprises a set of guides (14), along which the regular weights (4) as well as the extra weight (9) are arranged to run.

10 4. Set of weights according to claim 3, **characterized in that** the regular weights (4) abut against a part the circumference of each guide (14).

15 5. Set of weights according to any one of claims 1-4, **characterized in that** the lever (10) of the extra weight and the regular lever (6) have the same number of grips.

20 6. Set of weights according to any one of claims 1-5, **characterized in that** the extra lever (10) is arranged at a distance from the regular lever (6) that is less than 50 mm.

25 7. Blocking device for training machines of the type that includes a set of weights (1) comprising a plurality of regular weights (4) arranged on each other, the blocking device (8) being insertable in the set of weights (1), at each regular weight, in order to co-operate with grips (7) in a regular lever (6) included in the set of weights (1), **characterized in that** the blocking device (8) has two engagement portions (12, 13) separated in the longitudinal direction thereof, which are intended to co-operate with grips (7) in the regular lever (6) of the set of weights with the purpose of positioning the blocking device (8) in a first, partly active position and a second, fully active position, respectively, the blocking device (8) being arranged to co-operate with an extra weight (9) included in the set of weights (1) when the same device is positioned in the second, fully active position.

30 8. Blocking device according to claim 7, **characterized in that** the same comprises two front branches (25), which are separable against the action of a spring force.

35 9. Blocking device according to claim 7 or 8, **characterized in that** said engagement portions (12, 13) consist of two pairs of opposite recesses located in the opposite edges of the front branches (25), which recesses (12, 13) are arranged to come into engagement with said grips (7) in the regular lever (6).

40 10. Blocking device according to any one of claims 7-9, **characterized in that** the recesses (12, 13) in each front branch (25) are spaced apart by a shoulder (26) that projects a shorter distance from the bottom of the recesses than the depth of the recesses from the

respective branch edge.

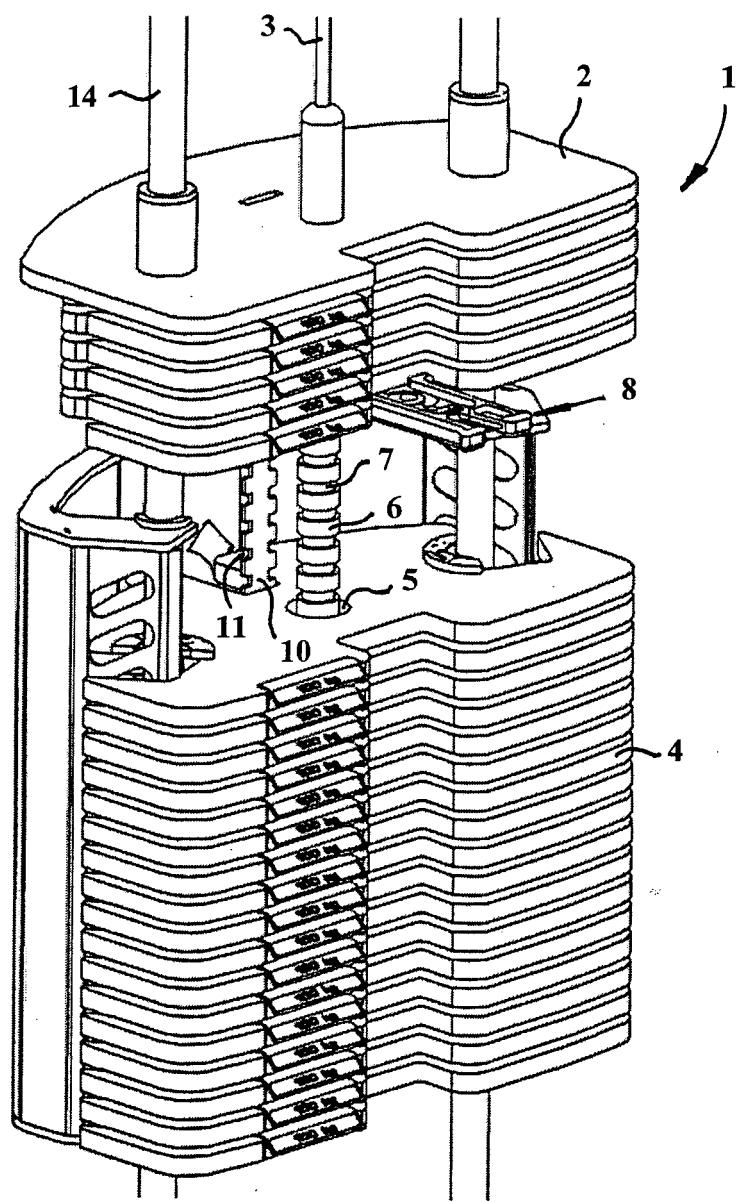
11. Blocking device according to any one of claims 7-10, **characterized in that** the front end of the blocking device (8) has a third engagement portion (31) arranged to co-operate with the extra weight (9) when the blocking device is positioned in the second, fully active position. 5

12. Machine for muscular training comprising a set of weights (1) and a blocking device (8), the set of weights (1) in turn comprising a plurality of regular weights (4) arranged on each other and a lever (6) movable through openings (5) in the weights, which lever includes a plurality of axially separated grips (7), the blocking device (8) being insertable in the set of weights (1), at each regular weight (4), in order to co-operate with said grips (7), **characterized in that** the set of weights (1) comprises an extra weight (9) being arranged beside the regular weights (4) and having an extra lever (10), which is arranged in the vicinity of the regular lever (6) of the set of weights and which includes a plurality of axially separated grips (11) that in the axial direction are arranged in line with the grips (7) in the regular lever (6), seen in the insertion direction of the blocking device (8), and that the blocking device (8) has two engagement portions (12, 13) separated in the longitudinal direction thereof, which are intended to co-operate with the grips (7) in the regular lever (6) of the set of weights with the purpose of positioning the blocking device (8) in a first, partly active position and a second, fully active position, respectively, the set of weights, independently of at which regular weight (4) the blocking device (8) is inserted, having a state with the extra weight (9) connected when the blocking device (8) is arranged to co-operate with the set of weights (1) when the same device is positioned in the second, fully active position and a state with the extra weight (9) disconnected, when the blocking device (8) is 20 displaced to the first, partly active position. 25 30 35 40

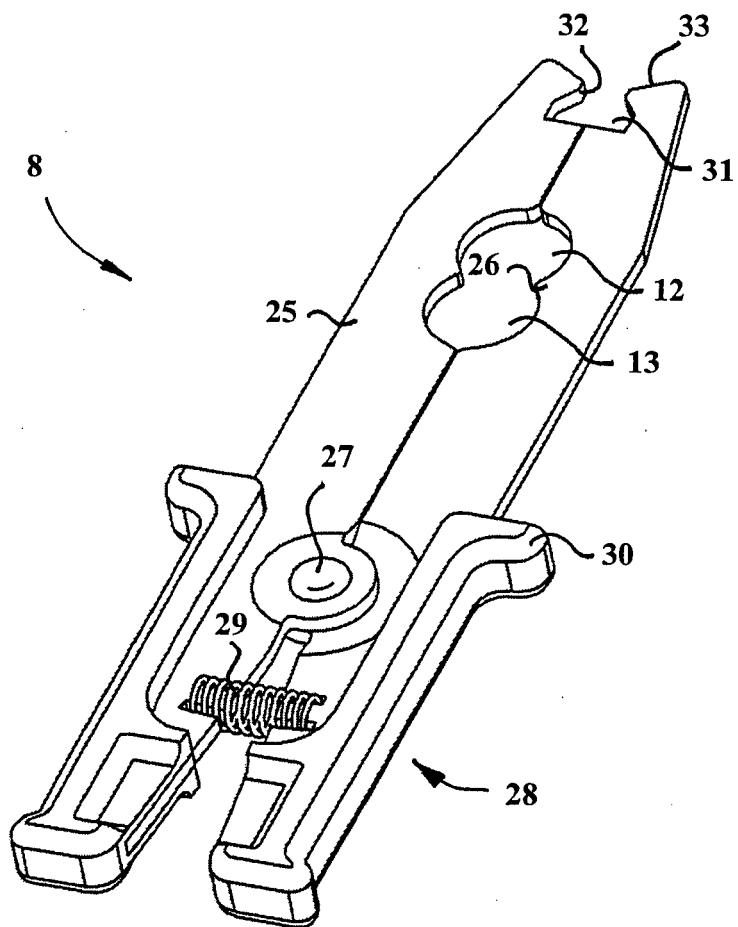
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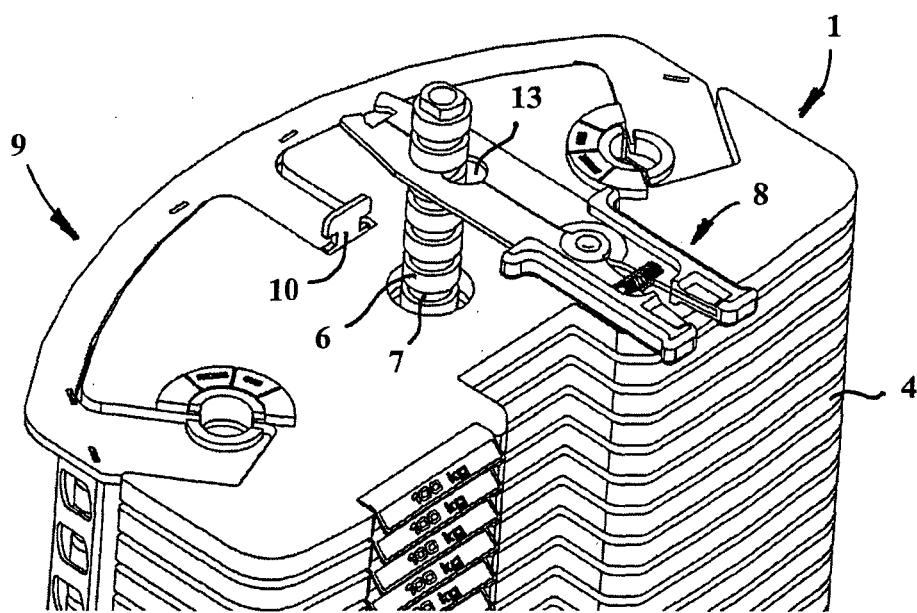
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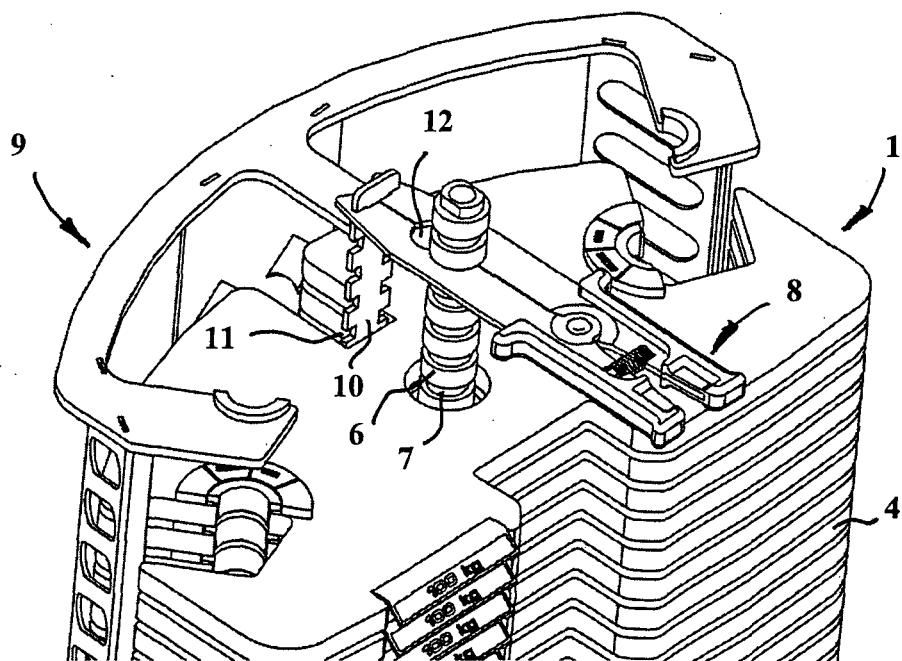
*Fig 1*



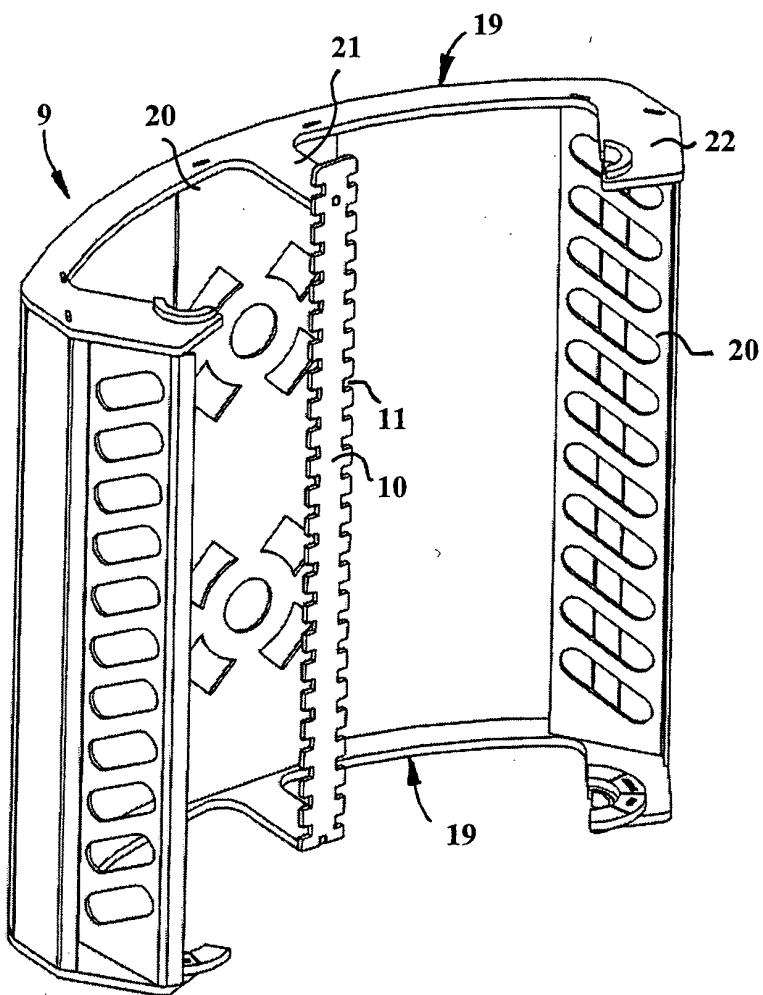
*Fig 2*



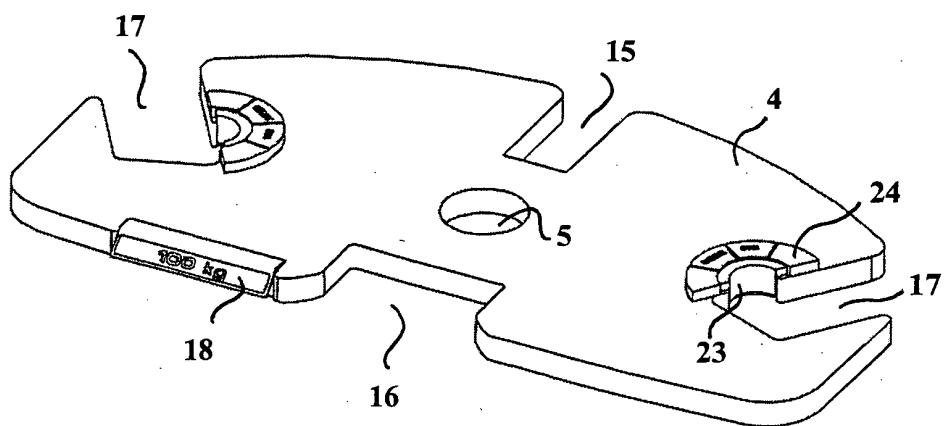
*Fig 3*



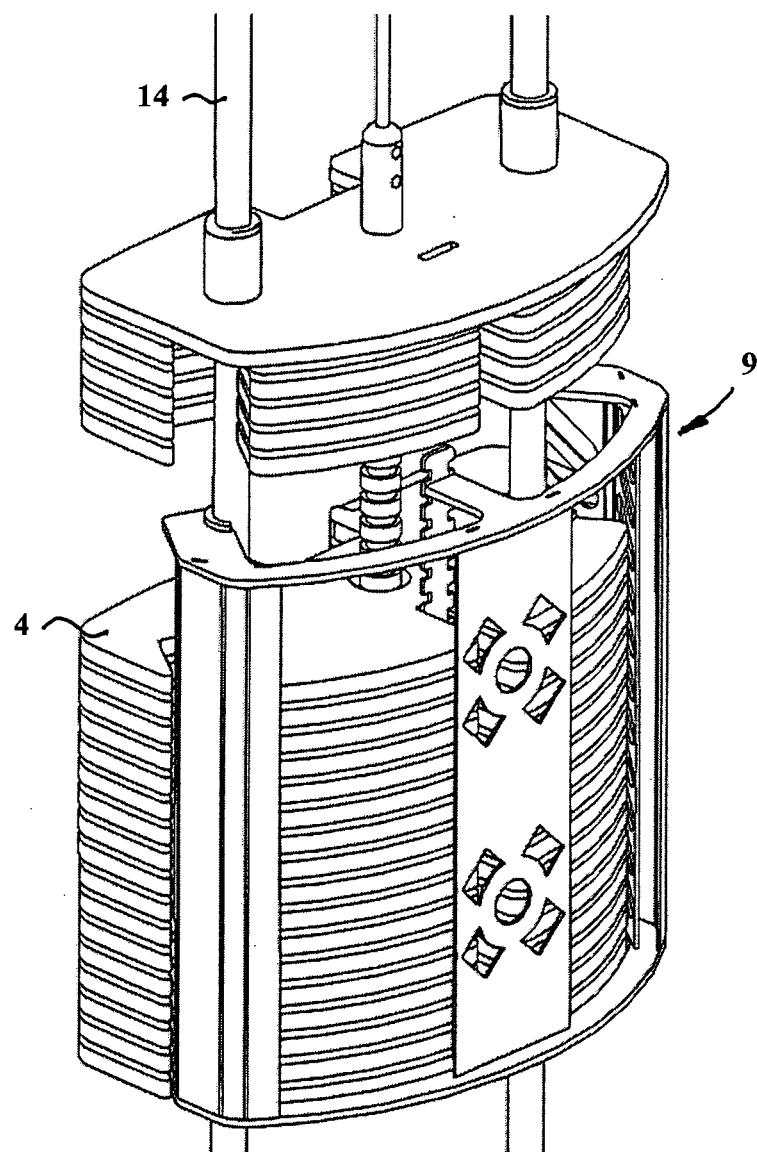
*Fig 4*



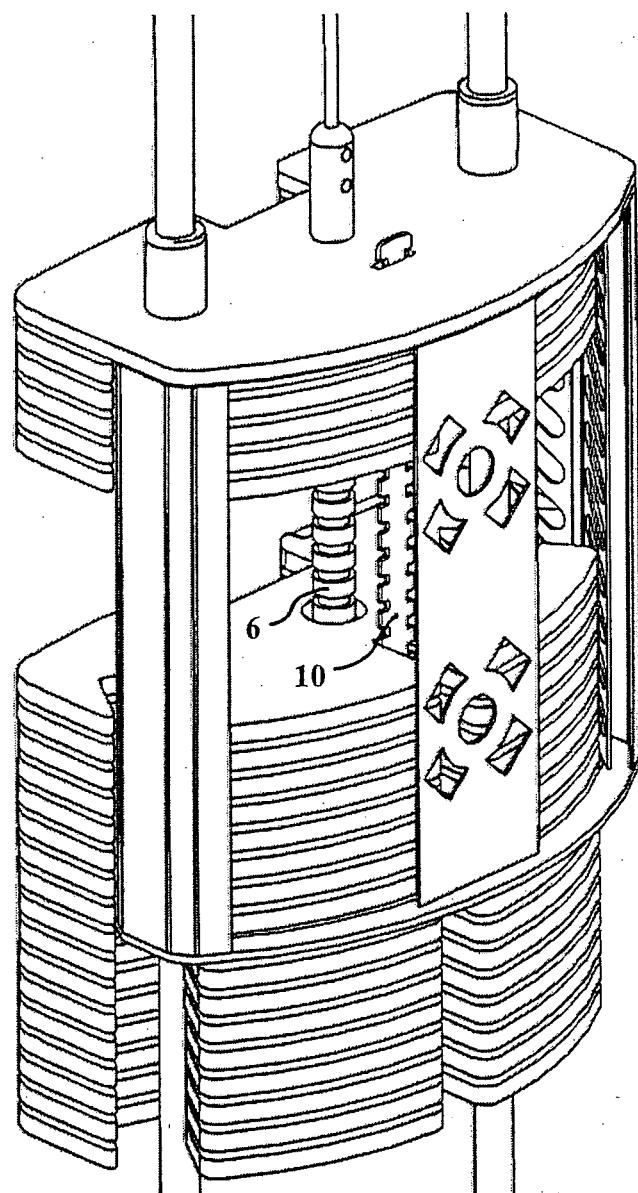
<sup>8</sup>  
*Fig 5*



*Fig 6*



*Fig 7*



*Fig 8*



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ANNEX TO THE EUROPEAN SEARCH REPORT  
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