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(54) Apparatus for muscle training

(57) Summary

The present invention refers to an apparatus for muscle training, among those comprising a barbell connected by means of suitable transmission and connection means to a resisting apparatus capable of generating a resisting moment; such an apparatus being provided with means to adjust the motor moment generated by the user when hanging from the barbell in order to continuously balance it with the constant value of the resisting moment generated by the resisting apparatus, regardless of the user's weight.

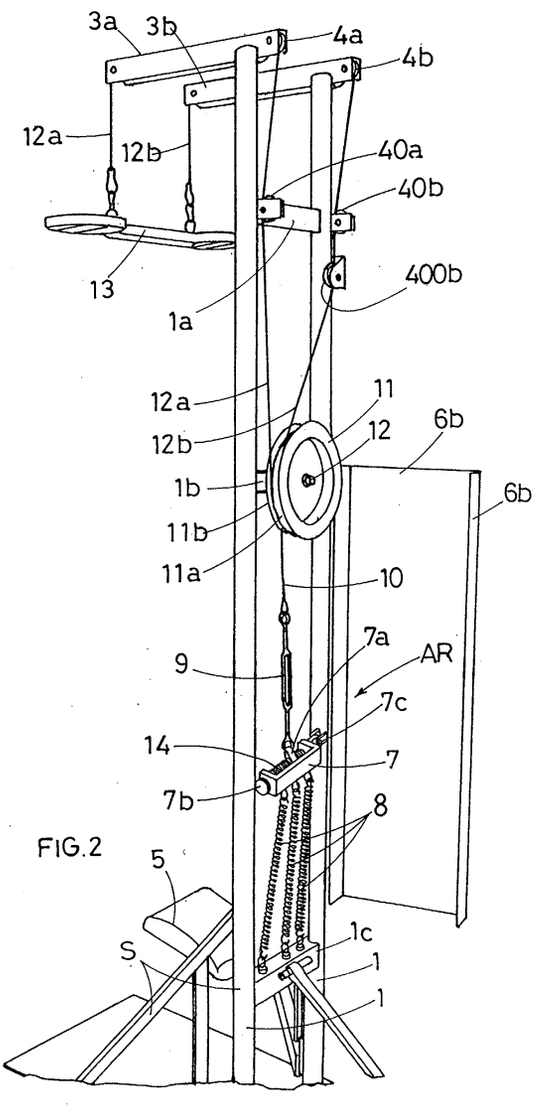

FIG.2

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Description

[0001] The present invention refers to an apparatus for muscle training, in which the user is required to overcome the resistance made by the apparatus through the simple application of his/her body weight.

[0002] The apparatus of the invention has been devised as alternative solution to traditional apparatuses for muscle training in which the user is required to lift weights.

[0003] As it is known, traditional apparatuses for muscle training are used to increase or shape muscular masses. To this purpose, users repeatedly undertake long training sessions with considerable physical efforts.

[0004] The correctness of this type of training has been questioned recently based on studies that shows the dangerous consequences off strong prolonged exertions. These studies have shown that the strain imposed to elastic bio-molecules can produce severe pathologies in 40/50 year-old users.

[0005] Another questionable aspect of traditional weight-lifting apparatuses refers to the fact that they exclusively contract the user's muscles, in detriment to the elastic relaxation that is required to maintain elasticity in the human body and favour the movement of heart, arteries and organic fluids.

[0006] In addition to the above, it must be noted that traditional weight-lifting apparatuses cannot be used by weak users with poor muscle tone, such as disabled, rehabilitated and elderly individuals, although they need to exercise their muscles to get back in shape and prevent the onset of arthritis and maintain muscle tone and elasticity.

[0007] The purpose of the present invention is to obtain an apparatus for muscle training, in which the user is not required to strain his/her muscles with contractions.

[0008] More precisely, the present invention is based on the idea that, by hanging from a suitable barbell, the user can overcome the resisting moment of a suitable resisting apparatus connected to the barbell, thanks to a motor moment of equal value generated by the body weight.

[0009] After seizing the barbell, the user simply lets himself/herself "fall" downwards, without opposing gravity, folding his/her legs and getting his/her pelvis close to the ground.

[0010] In this step, the downward traction generated on the barbell changes the position of the resisting apparatus, suitably provided with one or more elastic elements, thus producing their gradual stretching and loading.

[0011] At the end of the downward movement, the user reaches a basically squatting position, which is a sort of lower dead-end point, in which the "user-resisting apparatus" system can be defined as statically balanced.

[0012] However, by slightly pushing with his/her legs to lift his/her body, the user can interrupt the static balance and bring the "user-resisting apparatus" system to a new step, which is equal and contrary to the previous one.

[0013] More precisely, the small impulse generated by the user stimulates the spontaneous retraction of the elastic elements of the resisting apparatus that were loaded during the previous step.

[0014] Consequently, the resisting apparatus generates a motor moment capable of overcoming the resisting moment generated by the user when hanging from the barbell, thus causing the lifting of the barbell in idle position (i.e. a sort of upper dead-end point), and allowing the user to return to the initial upright position.

[0015] It must be noted that the apparatus of the invention provides for the possibility of balancing the resisting moment generated by the resisting apparatus also in case of users that cannot generate different values of motor moment due to their weight.

[0016] The possibility of adjusting the resisting apparatus allows both light-weighted teenagers and heavy elderly users to advantageously exercise with the same type of apparatus, with no muscle straining.

[0017] The resisting apparatus of the invention also provides for the possibility of adjusting the value of the resisting moment generated by it, by simply using a higher or lower number of elastic elements.

[0018] In view of the above, it appears evident that users are allowed to train their muscles by advantageously alternating elastic stretching and retraction movements, without excessive effort.

[0019] Constant training with the apparatus of the invention allows users to maintain their muscles tonic and active without any risk and create advantageous microcirculation for construction and regeneration of the bony structure.

[0020] For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration and not in a limiting sense, whereby Figure 1 and 2 are front and rear perspective views of a preferred embodiment of the apparatus of the invention, respectively.

[0021] With reference to the enclosed figures, the apparatus of the invention comprises a bearing structure (S) obtained with a parallel pair of metal uprights (1) and fixed to the ground by means of a pair of feet (2); it being provided that the uprights (1) are stiffened by means of three identical connection cross-pieces (1a, 1b, 1c) located at different heights.

[0022] A parallel pair of protruding horizontal arms (3a, 3b) is provided on the top of the bearing structure (S), with each arm provided at both longitudinal ends with grooved wheels (4a, 4b) capable of idling with respect with their horizontal axes.

[0023] Corresponding grooved wheels (40a, 40b) with horizontal axis are provided slightly under the arms (3a, 3b) on the rear part of the two uprights (1), in aligned coaxial position with the grooved wheels (4a, 4b) mount-

ed on the arms (3a, 3b); in particular, the two pairs of wheels (40a, 40 b) are located at the same height as the cross-piece (1a) that connects the two uprights (1) in the highest position.

[0024] An additional grooved wheel (400b) is provided in one of the uprights (1) slightly under the wheel (40b), idling with respect to its horizontal axis and provided with perpendicular axis to the axes of the grooved wheels (4a, 4b /40a, 40b).

[0025] The front of the bearing structure (S) is provided with a seat (5) for the user, while a case (C) is mounted in intermediate position between the uprights (1) to house the apparatus used to create the resistance to be overcome by the user; in particular, the case (C) is formed by a front fixed wall (6a) welded between the uprights (1) and a box-shaped rear cover (6b) hinged to one of the uprights (1).

[0026] With reference to Fig. 2, the apparatus (AR) basically consists in a lever (7) pivoted in internal position to one upright (1) of the bearing structure, under which the upper ends of three helical springs (8) are hooked, with the lower ends of the springs (8) being fixed to the cross-piece (1c) that connects the two uprights (1) in the lowest position.

[0027] A longitudinally sliding small bracket (7a) protrudes along the upper side of the lever (7) and is hooked to a first cable (10) by means of a joint (9) with adjustable length hooked to the first groove (11 a) of a large grooved wheel (11) with double groove.

[0028] The grooved wheel (11) freely rotates on a pin with horizontal axis (12) perpendicularly inserted in the centre of the cross-piece (1 b) that connects the two uprights (1) in intermediate position, approximately on the top of the case (6), in such a way that the grooved wheel (11) protrudes from the case (6) by approximately half of its height.

[0029] The second groove (11 b) of the grooved wheel (11) is used to hook a pair of cables (12a, 12b) capable of horizontally holding a barbell (13) on the front of the apparatus for muscle training of the invention, which can be advantageously grabbed by the user during the training session.

[0030] As shown in the enclosed figures, the barbell (13) hangs from the two horizontal arms (3a, 3b) over the user's seat (5).

[0031] It must be noted that the first (12a) of the two cables hooked to the large grooved wheel (11) is guided and driven by the two grooved wheels (4a) provided on the horizontal arm (3a), as well as by the grooved wheel (40a).

[0032] In addition to "matching" with the wheels (4b, 40b), the second cable (12b) is also driven by the wheel (400b) that allows it to converge with the adjacent cable (12a) in the ending part of its travel.

[0033] The operation of the apparatus of the invention appears evident from the description above.

[0034] During a training session, the user stands in front of the apparatus and lifts his/her arms to grab the barbell (13) with horizontal axis from opposite sides.

[0035] As mentioned earlier, the user lets himself/herself be overcome by gravity, folding his/her legs and lowering his/her pelvis towards the ground.

[0036] The weight of the body applied to the barbell (13) generates a motor moment that lowers the barbell (13), causing a chain of events in the other elements of the apparatus for muscle training of the invention.

[0037] More exactly, the lowering of the barbell (13) causes the rotation of the large grooved wheel (11) by means of the two cables (12a, 12b) hooked onto the second groove (11 b).

[0038] The rotation of the wheel (11) causes the upward traction of the cable (10) hooked to the first groove (11a); this movement lifts the lever (7) and consequently stretches and loads the springs (8) that are the resisting apparatus (AR) of the apparatus of the invention, in cooperation with the lever (7).

[0039] As mentioned above, the resisting apparatus must be adjusted according to the user's weight, as illustrated below, in order to balance the resisting moment of the apparatus and the motor moment generated by the user.

[0040] This allows for creating the correct alternation of operational steps regardless of the user's weight as described above, from the upper to the lower dead-end point and vice versa.

[0041] Thanks to the adjustment and regardless of the user's weight, the user can obtain the maximum stretching of the springs (8) hooked to the lever (7) by hanging from the barbell (13).

[0042] Once loaded, the springs (8) can pull the lever (7) downwards, rotate the large grooved wheel (11) in contrary direction, lift the barbell (13) to the upper end of its travel and finally bring the user back to the initial upright position.

[0043] It must be noted that the alternate movements of the user's body (i.e. initial lowering and lifting) are produced without strain; it being evident that lowering is caused by gravity and lifting is caused by the retraction generated by the springs (8).

[0044] The description continues with an explanation of the procedure used to adjust the apparatus of the invention according to the body weight of each user.

[0045] Practically speaking, the adjustment is guaranteed by the possibility of changing the position of the small bracket (7a) to which the cable (10) is hooked, along the upper side with opening of the lever (7) of the resisting apparatus (AR).

[0046] This is made possible by the fact that the bracket (7a) is welded over a nut matched with a threaded bar (14) axially mounted inside the lever (7) and actuated by means of an external locking ring (7b).

[0047] The locking ring (7b) allows to change the length of the "arm" between the lifting bracket (7a) and the pivoting pin (7c) of the lever (7); it being provided that a decrease of the arm length shall result in a decrease of the motor moment generated by the traction

force acting on the cable (10) according to the user's weight and, vice versa, an increase of the arm length shall result in the opposite effect.

[0048] In spite of the initial constant value of the resisting moment generated by the resisting apparatus (AR), it is always possible to balance the resisting moment with the motor moment, even in the presence of different motor forces caused by different user's weights.

[0049] The invention also provides for the possibility of changing the resisting force of the apparatus (AR) by simply changing the number of springs (8) hooked to the lower part of the lever (7).

[0050] For example, the enclosed figures show the three springs (8) of the apparatus of the invention hooked to the lever (7); however, it is possible to unhook one or two springs according to specific user's requirements.

[0051] It must be said that, although the general structure of the apparatus of the invention has been illustrated so far with reference to the enclosed figures, the apparatus can have a different general structure without leaving the scope of the invention in order to provide different training sessions for the user.

[0052] Although the description requires to user to start the training session in upright position (by taking advantage of his/her body weight thanks to gravity), it is also possible to provide for a training session in which the user is in sitting or lying position, taking advantage of his/her trunk or arm weight thanks to gravity.

[0053] Likewise, the invention may be provided with two individual handles to replace the barbell (13), or use a single horizontal arm and, consequently, a single cable located between the barbell (13) and the large grooved wheel (11).

Claims

1. Apparatus for muscle training, among those comprising a suitable bearing structure (S) with a barbell (13) connected by means of suitable transmission and connection means to a resisting apparatus (AR) capable of changing its position due to the downward traction exercised on the barbell (13) by the user's weight and spontaneously recovering the initial position due to the retraction exercised by one or more elastic elements (8) suitably loaded during the preceding lowering step of the barbell (13), apparatus being **characterised in that** it is provided with suitable means to adjust the motor moment generated by the user when hanging from the barbell (13) in order to continuously balance it with the constant value of the resisting moment generated by the resisting apparatus (AR), regardless of the user's weight.

2. Apparatus as defined in claim 1, **characterised in that** the resisting apparatus (AR) is composed of a lever (7), pivoted with respect to a pin (7c) to the bearing structure (S) and provided on top with a hooking bracket (7a) used for connection with the barbell (13); it being provided that the upper ends of one or more elastic elements (8) are hooked under the lever (7), with the lower ends of the springs (8) being fixed to the bearing structure (S) of the apparatus for muscle training of the invention.

3. Apparatus as defined in the two preceding claims, **characterised in that** the means used to adjust the motor moment generated by the user when hanging to the barbell (13) consists in a threaded bar (14) axially mounted inside the lever (7) and matched to a corresponding nut on which the hooking bracket (7a) of the lever (7) is welded; it being provided that, further to the rotation imposed to the threaded bar by means of a suitable locking ring /7b), the bracket (7a) can slide along the upper side with suitable opening of the lever (7), in order to change the distance with respect to the fixed pin (7c) of the lever (7).

4. Apparatus as defined in one or more of the preceding claims, **characterised in that** the elastic elements hooked to the lower part of the lever (7) consist in one or more helical springs (8).

5. Apparatus as defined in the first or both preceding claims, **characterised in that** it uses a metal bearing structure composed of a parallel pair of uprights (1) connected with cross-pieces (1 a, 1b, 1 c) provided on top with protruding horizontal arms (3a, 3b) from which a barbell (13) hangs by means of suitable cables (12a, 12b); it being provided that, thanks to the presence of a series of grooved guide and transmission wheels with horizontal axis (4a, 4b / 40a, 40b / 400b), the cables (12a, 12b) are hooked onto one (11b) of the grooves of a large grooved wheel (11) with double groove that idles around an horizontal axis with parallel orientation with respect to the arms (3), with a cable (10) fixed on the opposite groove (11 a), preferably by means of a joint (9) with adjustable height and used to actuate the resisting apparatus (AR).

6. Apparatus as defined in one or more of the preceding claims, **characterised in that** the resisting apparatus (AR) is housed inside a case (C) suitably fixed to the bearing structure (S).

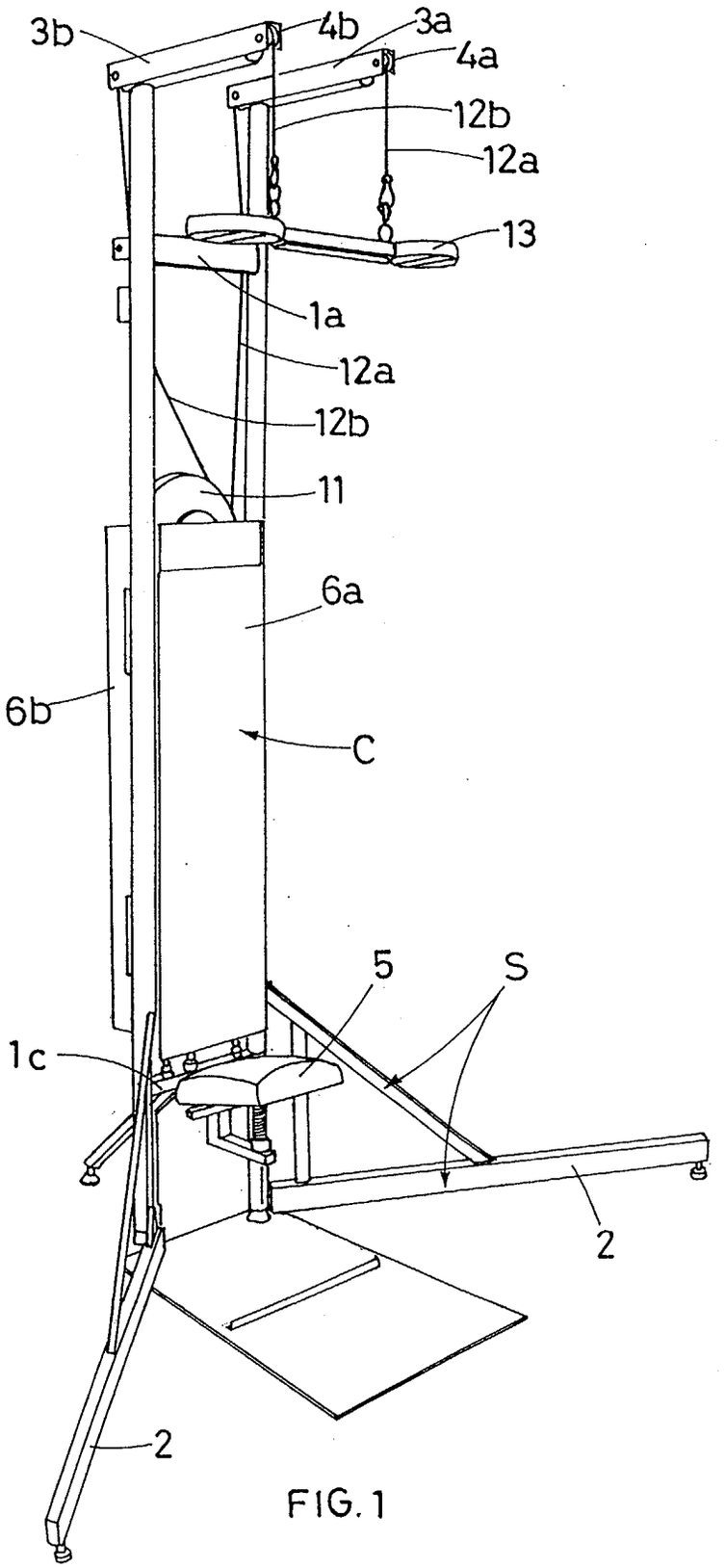

FIG. 1

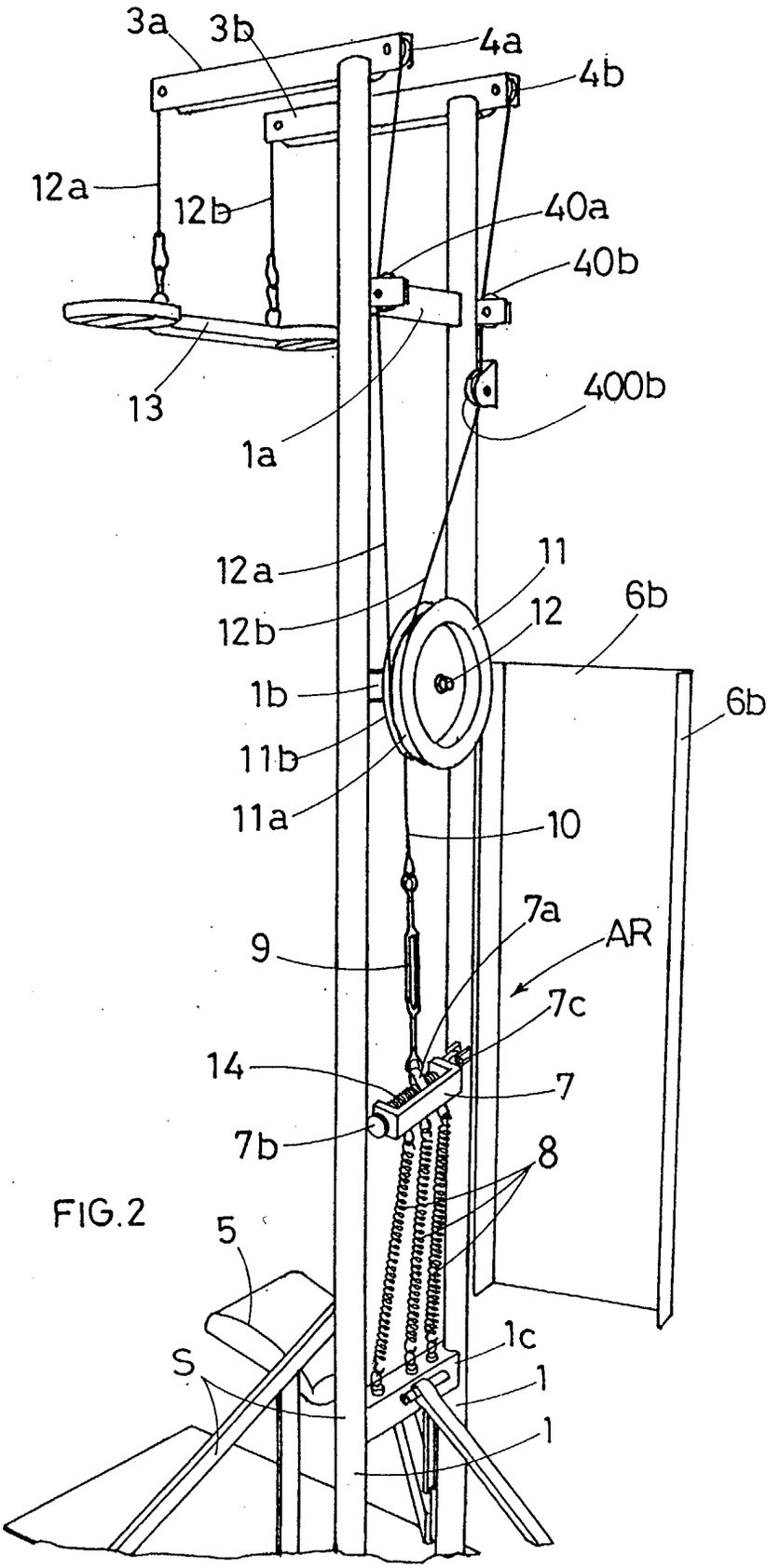
3a
3b
4a
4b
12a
12b
40a
40b
400b
13
1a
12a
12b
11
12
6b
1b
6b
11b
11a
10
7a
AR
9
7c
14
7
7b
8
5
S
1c
1
1

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5508

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 26 56 534 A (KUELKENS FRANZ) 15 June 1978 (1978-06-15) * the whole document *	1-6	A63B21/055 A63B21/04 A63B23/12
A	DE 299 19 472 U (HSU HANK) 17 February 2000 (2000-02-17) * figure 1 *	1	
A	DE 35 41 980 A (RK SPORTGERAETE VERTRIEBS GMBH) 4 June 1987 (1987-06-04) * figures *	3	
A	US 2002/094918 A1 (SAN-PING LEE ET AL) 18 July 2002 (2002-07-18) * figure 1 *	5	
A	US 5 586 962 A (HALLMARK TIMOTHY M) 24 December 1996 (1996-12-24) * figure 1 *	6	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A63B
A53B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 November 2003	Knoflacher, N

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 42 5508

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on 07-11-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2656534 A	15-06-1978	DE 2656534 A1	15-06-1978
DE 29919472 U	17-02-2000	DE 29919472 U1	17-02-2000
DE 3541980 A	04-06-1987	DE 3541980 A1	04-06-1987
		DE 8533440 U1	16-01-1986
US 2002094918 A1	18-07-2002	TW 453207 Y	01-09-2001
US 5586962 A	24-12-1996	NONE	

EPO FORM P0459

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