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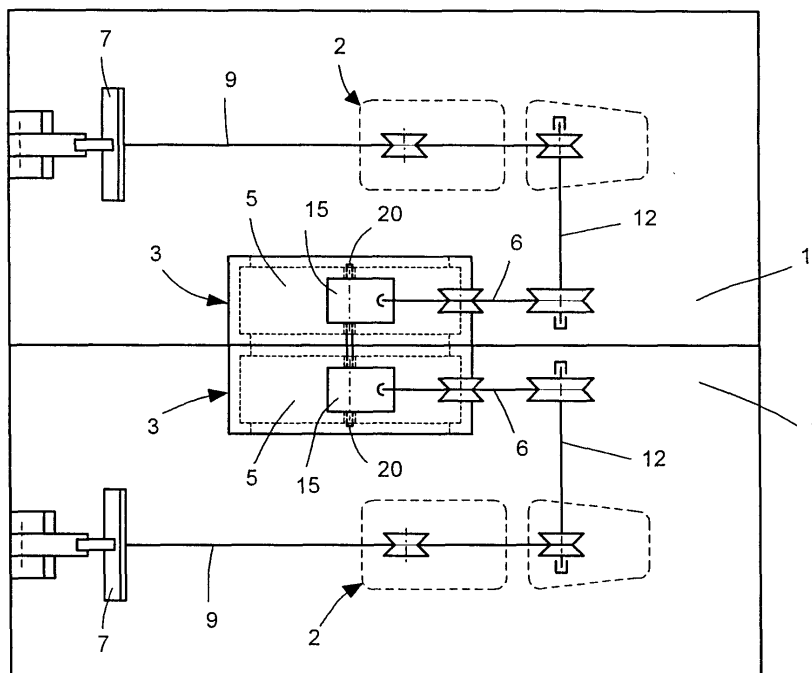
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(54) **Apparatus for performing exercise with two training stations**

(57) An apparatus for performing exercise has two training stations which are fixedly attachable to each other. Each training station has a mounting frame (1) with a seat (2) or rest and a weight stack mechanism (3) with a weight belt (6) and a pulley mechanism adapted for a specific muscle exercising purpose. When the training stations are attached to each other the weight stacks are positioned in parallel and adjacent to each

other and the weights aligned to be selectable as independent weight packs for each training station or as a common weight pack for team training. The pulley mechanism of each training station is equipped with a safety pulley assembly (15). The advantages are the possibility for team training, which is believed to be more motivating, a simple and safe design and easy conversion between single station mode and team station mode.

Fig. 3



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Description

[0001] The invention refers to an apparatus for performing exercise with two training stations, each training station having a mounting frame with a seat (or rest) and a weight stack mechanism with a weight belt and a pulley mechanism mounted on the mounting frame, the pulley mechanism adapted for the purpose of exercising specific muscles or muscle groups, as indicated in claims 1 and 5. Specifically it refers to an apparatus for performing leg press exercise with two training stations.

[0002] Apparatuses for performing exercise in single training stations are widely known and commonly used in the field of exercise and physical rehabilitation equipment.

[0003] Some exercising apparatuses for cooperative exercising are known but have not found widespread use. US-4 634 118 describes a cooperative exercising apparatus with a collapsible frame, a pulley system and two differently equipped positions for two cooperatively exercising people. A first person is exercising via the pulley system with a weight which is being applied and controlled by a second person. The amount of the weight being applied by the second person depends on how much of his body weight he chooses to convey to a seat harness. A motivational aspect is intended but it is mainly based on the assumption that older exercising equipment used to be rather difficult and time-consuming to individually adjust and that therefore the cooperation of a second person would be more convenient.

[0004] A multi-station exercise machine is known from the US-5 518 477. This exercise machine uses a common weight stack for a number of exercise stations. The pulley system applied at the weight stack allows for a fixed-ratio step-wise reduction of required pulling force at subsequently connected stations. The forces applied at the individual exercise stations are decoupled from each other, i.e. none of the forces applied at any one of the available stations has any influence on the forces to be applied at any of the other stations.

[0005] These types of apparatus are not designed to allow team training in a way that only the joint effort of all team members will yield a desired result, e.g. to lift a weight that one person alone could not.

[0006] It is therefore an object of the invention to provide an apparatus for performing exercise with two training stations that will allow for team training in the aforementioned manner.

[0007] Another object of the invention is to provide an apparatus for performing exercise with two training stations which allows safe operation for the exercising individuals even in case one of the exercising individuals fails in his effort and the preselected total weight would be too much for one person alone to bear.

[0008] Yet another object of the invention is to provide an apparatus for performing exercise with two training stations that can be used in the above described manner, but that can also be used as two conventional sep-

arate training stations where the exercising individuals can set the weight packs separately and independently.

[0009] Independent claims 1 describes the solution for a leg press exercise apparatus according to the invention. Since the invention is not limited to such specific use and can easily be expanded in scope to various other muscle exercising purposes, such as pull down stations, lower pull stations etc., independent claim 5 has been added.

[0010] The solution uses two equally equipped training stations which are attached to each other in such a way that the weight stacks of the two training stations are positioned in parallel and adjacent to each other and the weights are aligned to be selectable as independent weight packs for each training station or as a common weight pack for team training, and that each training station is additionally equipped with a safety pulley assembly. The safety pulley assembly serves to ensure safe operation for the exercising individuals even in case one of the exercising individuals fails in his effort and the preset total weight would be too much for one person alone to bear.

[0011] The idea behind the solution is based on the assumption that two people working together are able to work harder than separate individuals. The increased weight of a common weight pack requires a team effort to complete the exercising movement. The motivational value of such joint effort is believed to be very high. Of course the total weight of the common weight pack is determined by the team capability.

[0012] The main advantage is therefore to be seen in the increased motivation for the exercising individuals.

[0013] Other advantages are the ease with which the apparatus can be converted from single station use to team station use and vice versa, the complete safety for the exercising individuals under all training conditions and the simple mechanical design.

[0014] Furthermore it is possible to utilize existing designs of single station training apparatuses and arrive at apparatuses with team capability by applying only relatively small changes and modifications.

[0015] A example of a preferred design for an apparatus for performing exercise with two training stations, namely for leg press exercise, is shown in the following figures and described below:

Fig. 1 shows a simplified side view of a training station for leg press exercise.

Fig. 2 shows a simplified top view of the training station according to Fig. 1.

Fig. 3 shows a simplified top view of two training stations according to Fig. 1, the two of them interconnected for team operation.

Fig. 4 shows a weight stack detail when set up for single station operation.

Fig. 5 shows a weight stack detail according to Fig. 3 when set up for team operation.

[0016] The Figures refer to an apparatus for leg press exercise, which is just an example of the principle of the idea.

[0017] Fig. 1 shows a simplified side view of a training station for leg press exercise. The illustration has been simplified in that it concentrates on functionally essential parts. Mechanisms and details frequently available at apparatuses of this kind, such as means for adjustment to individual body size, counterbalancing mechanisms, guiding means for cables and belts etc. have therefore been left out.

[0018] The training station has a mounting frame 1. Mounted thereon is a seat 2 and a weight stack mechanism 3. The weight stack mechanism 3 consists of a frame 4 with a stack of vertically movable weight plates 5. A selectable number of weight plates 5 can be lifted by means of a weight belt 6 and an attached pulley mechanism.

[0019] The term pulley mechanism is used in a broad sense to subsume all those parts which used to mechanically transfer the force applied by the exercising individual via levers, ropes, pulleys, axles and belts etc. to the selected number of weight plates 5 which are to be lifted for exercise. The pulley mechanism shown in Fig. 1 serves as a (simplified) example, other types of construction are possible.

[0020] In the example shown in Figs. 1 and 2, the exercising individual applies pressure to a foot plate 7 on a pivotably mounted arm 8. A cable 9 transmits this force via a first auxiliary pulley 10 to a first wheel 11. First wheel 11 is fastened on an axle 12. Cable 9 is fastened on wheel 11. Also fastened on axle 12 is a second wheel 13. Weight belt 6 is fastened on second wheel 13 and transmits the pulling force via a second auxiliary pulley 14 and a safety pulley assembly 15 to the weight plates 5 in the weight stack mechanism 3. The different diameters of the wheels 11 and 13 effect a change of torque.

[0021] The selection of a number of weight plates 5 to be lifted by means of the weight belt 6 is effected in a customary and well known way. Each weight plate 5 has a pin hole 16 to accommodate an insertable pin 17. Each weight plate 5 also has a vertical through hole 18 (see Fig. 4) through which a vertical bar 19 is slidably inserted. Vertical bar 19 has pin holes equivalent to those in the weight plates 5. The weight belt 6 is fastened to the bar 19. Thus any number of weight plates 5 can be selected by simply inserting the pin 17 at the desired position.

[0022] The safety pulley assembly 15 contains a safety clutch for blocking the movement of the weight belt in case the rate of descent of the selected weight pack exceeds a preset limit value. The function and the mechanism of the safety pulley assembly is similar to that of a car seat belt safety mechanism, a technology commonly used and well known and therefore not further

explained in this place. Its function may also be compared to that of a locking fly wheel that engages as soon as the movement of the weight belt exceeds the preset speed value.

[0023] Fig. 3 shows a simplified top view of two training stations according to Figs. 1 and 2, the two of them interconnected for team operation. The mounting frames 1 of the two training stations are fixedly attached to each other. In this position the weight stack mechanisms 3 of the two training stations are positioned in parallel and adjacent to each other. The positioning is such that the pin holes 16 of the weight plates 5 in the two weight stack mechanisms 3 are aligned to each other so that a long pin 20 for use in team station mode is insertable.

[0024] As mentioned earlier, the given illustration of the example of an apparatus for performing leg press exercise with two training stations in team operation mode has been simplified, mainly for reasons of clarity. Some minor components are therefore not shown, e.g.: In team station mode there have to be guiding means for keeping the weight belt 6 or the cable 9 in the pulleys in case of weight belt slack conditions. Weight belt slack conditions may occur if one of the exercising individuals lags behind in completing the leg press movement. Such guiding means may be rods, bars, loops or the like. They are not shown because these or functionally equivalent means are well known.

[0025] Figs. 4 and 5 show a weight stack detail when set up for either single station operation or for team operation. When set up for single station operation (Fig. 4) short pins 17 are used for individual weight pack selection by the two users. When set up for team operation (Fig. 5) one single long pin 20 is used for the weight pack selection by the team.

[0026] During normal operation in single station mode each exercising individual uses his own pin 17 for weight pack selection. Because the weight pack selection is based on each individual's assessment of his own capability, the risk of damage or injury is very low.

[0027] During normal operation in team station mode the team uses the long pin 20 for weight pack selection. The weight pack selection is made according to team capability. However, if team capability is rated very high, it could mean that in case one of the team members were suddenly to fail (for whatever reasons), the selected weight pack could be too heavy to bear for the other team member and the weight pack would come down very fast and cause damage and injury. This is prevented by the safety pulley assembly, which will stop the descent of the weights as soon as the weight belt speed exceeds a preset limit value. Once this happens the blocking can be released by again applying sufficient pulling force. Because of the otherwise increased likelihood for joint injury the safety pulley assembly is an essential component of the apparatus.

[0028] The described apparatus for leg press exercise with two training stations uses a cable mechanism

for transmitting the applied force. Other means for transmitting the applied force may be used, e.g. lever mechanisms or combinations of lever mechanisms and cable mechanisms. It seems obvious that the concept of aligning weight stacks and using them singly or jointly would also work with pure lever mechanisms. However, the use of systems with cable or pulley mechanisms usually results in a more simple and less bulky design and is therefore generally preferred.

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Claims

1. An apparatus for performing exercise with two training stations, each training station having a mounting frame (1) with a seat (2) and a weight stack mechanism (3) with a weight belt (6) and a pulley mechanism mounted on the mounting frame (1), the pulley mechanism adapted for leg press exercising,

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the mounting frames (1) of the two training stations being fixedly attachable to each other, whereby the weight stacks of the two training stations are positioned in parallel and adjacent to each other and the weights aligned to be selectable by selection means as independent weight packs for each training station or as a common weight pack for team training, the pulley mechanism of each training station being equipped with a safety pulley assembly (15).

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2. An apparatus according to claim 1, **characterized in that** the selection means consist of two short pins (17) in case of independent weight pack selection or of one common long pin (20) in case of team weight pack selection.

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3. An apparatus according to claim 1, **characterized in that** the safety pulley assembly (15) contains a safety clutch for blocking the movement of the weight belt (6) in case the rate of decent of the weight pack exceeds a preset limit value.

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4. An apparatus according to claim 1, **characterized in that** it contains guiding means for keeping the weight belt (6) in the pulleys in case of weight belt slack conditions.

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5. An apparatus for performing exercise with two training stations, each training station having a mounting frame (1) with a seat (2) or rest and a weight stack mechanism (3) with a weight belt (6) and a pulley mechanism mounted on the mounting frame (1), the pulley mechanism adapted for a specific muscle exercising purpose,

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the mounting frames (1) of the two training sta-

tions being fixedly attachable to each other, whereby the weight stacks of the two training stations are positioned in parallel and adjacent to each other and the weights aligned to be selectable as independent weight packs for each training station or as a common weight pack for team training, the pulley mechanism of each training station being equipped with a safety pulley assembly (15).

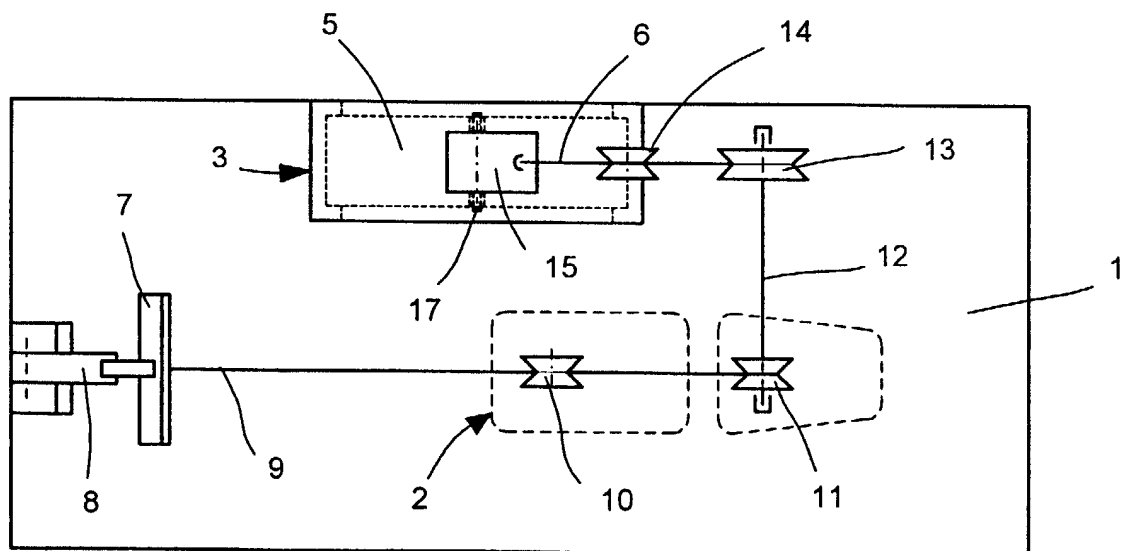
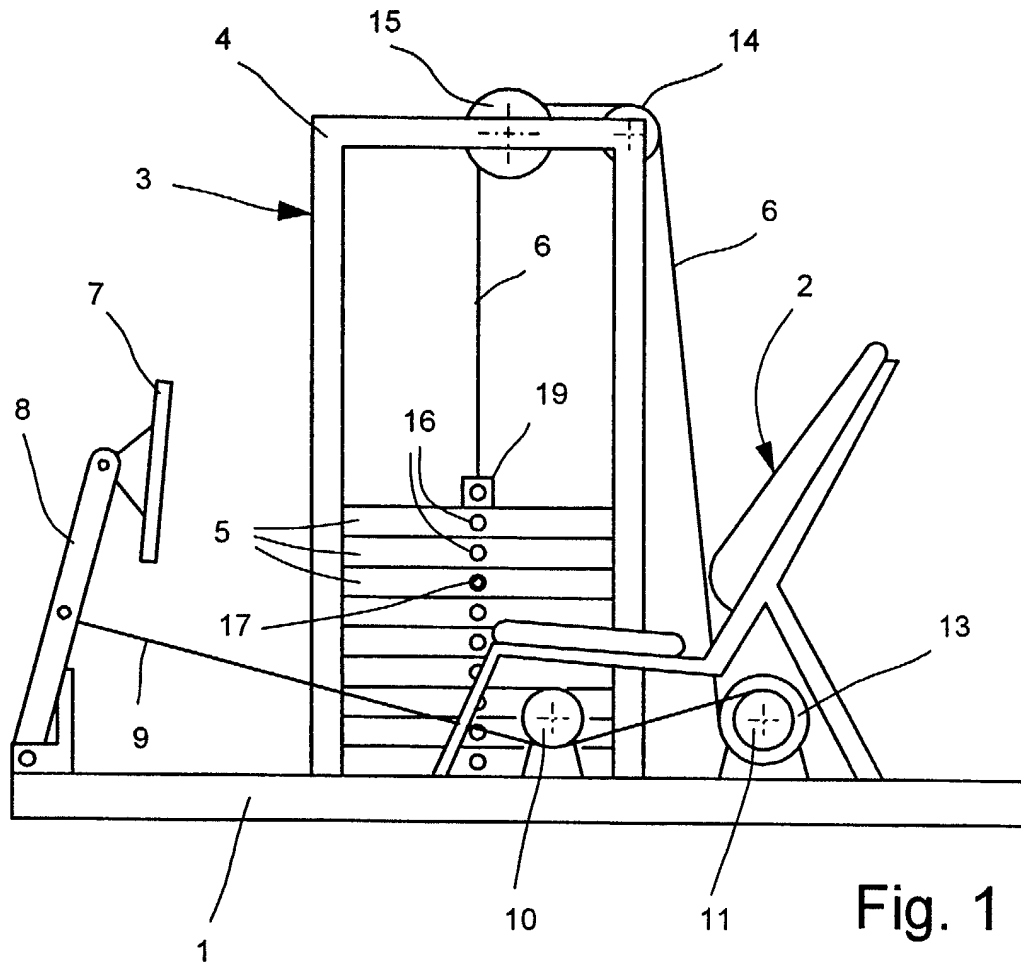


Fig. 3

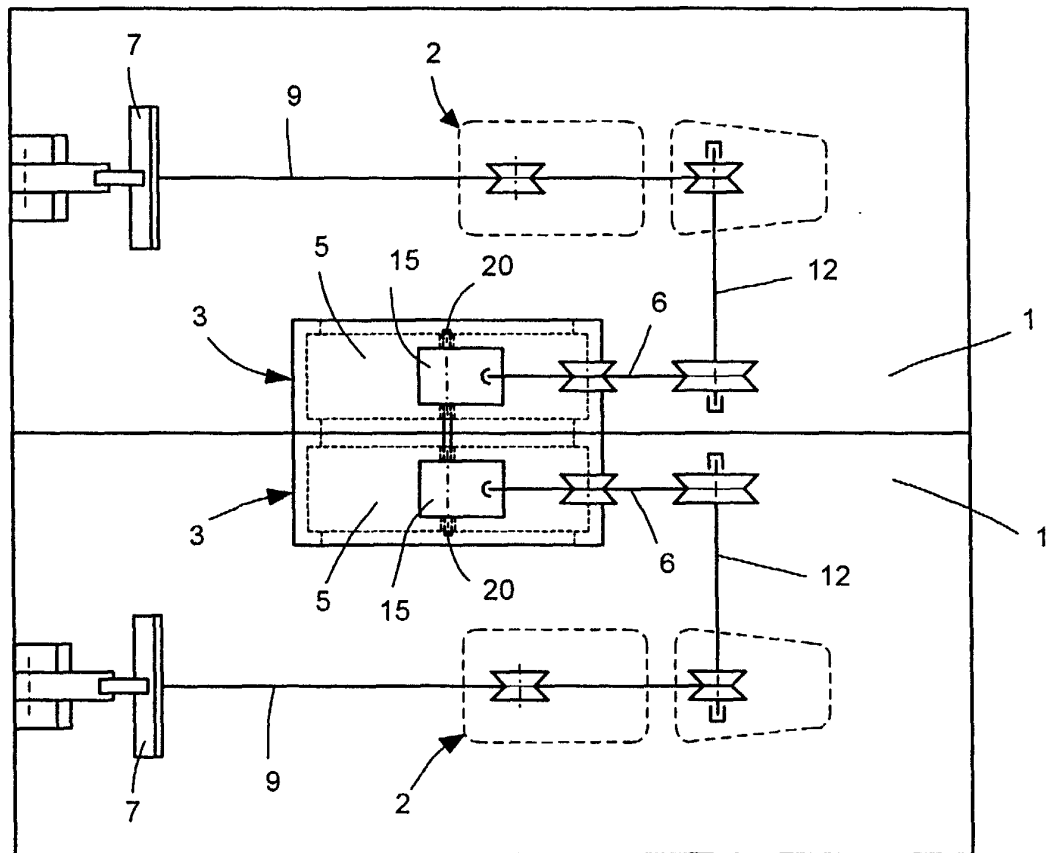


Fig. 4

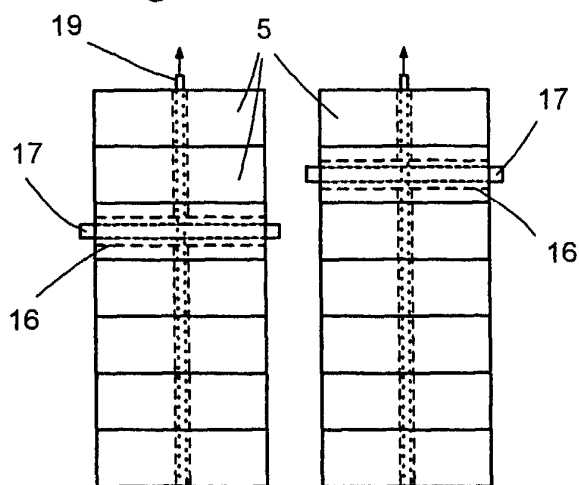
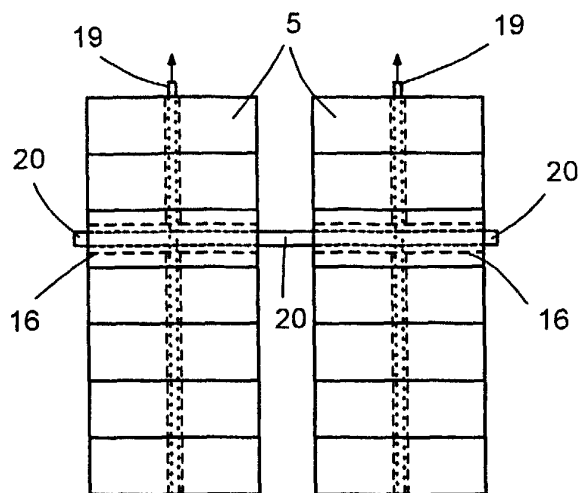


Fig. 5





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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 3400

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION
A	DE 29 21 953 A (KLOTZKI ULRICH) 4 December 1980 (1980-12-04) * page 4, line 8 - page 5, line 36; claims 1-5; figures 1-3 *	1,5	A63B21/062
A	US 4 775 146 A (STANKOVIC) 4 October 1988 (1988-10-04) * column 2, line 55 - column 5, line 35; figures 1-3 *	1,5	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED A63B
Place of search THE HAGUE		Date of completion of the search 21 July 1999	Examiner Levert, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 10 3400

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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21-07-1999

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82