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(54) **Balanced motion system provided with lateral actuator, particularly for lifting planes and like**

(57) The present invention relates to a balanced motion system provided with lateral actuator, particularly for lifting planes and like (2), comprising motion means (3) applied to said plane and like (2), characterised in that it provides a movable frame (6), said movable frame (6) comprising at least two axes (61, 62) parallel each other and coupled, preferably at the bottom, by a bar (63), and said movable frame (6) being coupled with said plane and like (2) and said two parallel axes (61, 62) sliding along fixed sliding means (5, 5'), in that said motion means (3) are applied close to one end of said plane and like (2) to be moved, and in that motion transmission means (8) are further provided for transmitting the motion from said motion means (3) to said frame (6),

said transmission means (8) being applied to one end close to the same end of said plane and like (2) on which said motion means (3) are applied, and on the other end to said bar (63) of said frame (6), in correspondence of the end of said plane and like (2) opposed to the one on which said motion means (3) are applied, and guide means (7, 7') for said motion transmission means, suitable to allow a vertical coupling of said transmission means (8) with said plane and like (2) and with said movable frame, all the above in such a way that when said motion means lift said plane and like (2), said movable frame slides along said sliding means, dragging said plane and like (2) in a balanced way with even distribution of efforts also in case the load is applied misaligned on said plane and like (2).

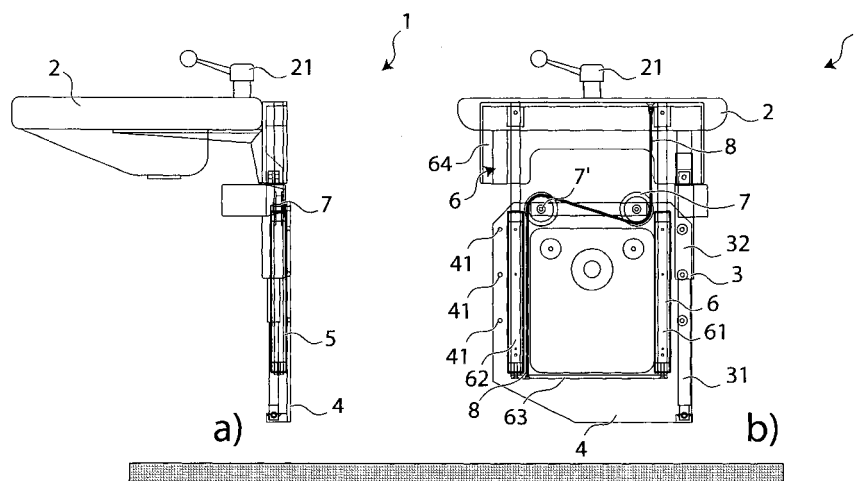


Fig. 2

Description

[0001] The present invention relates to a balanced motion system provided with lateral actuator, particularly for lifting planes and like.

[0002] More specifically, the invention concerns a balanced motion system studied and realised particularly for maintaining at the same level a plane, for example a hygienic - sanitary system, but that can be used for any other kind of plane or like, that must be balanced in case it is subjected to asymmetric loads.

[0003] In the following the specification will be addressed to the motion and balancing of hygienic - sanitary planes, but it is well evident that the same must not be considered limited to this specific use, being the same solution usable for any other kind of application.

[0004] During the day life, often handicapped persons need means allowing them to carry out also simple activities.

[0005] In this picture, it is possible including systems for maintaining along a horizontal position liftable planes, such as planes for sanitary services, such as washbasins, support planes, ecc.

[0006] At present, in order to solve the problem of balancing the level of said planes, a piston - cylinder device is used, that can be of the pneumatic, electric or hydraulic kind, substantially inserted on the vertical axis perpendicular to the plane.

[0007] This solution presents the drawback that it is not able to balance large loadings such as, as in the case described, the whole weight of a person.

[0008] Furthermore, the solution has a central dimension under the plane that in many cases is not compatible with what is present under the same (for example fixed and flexible tubes and joint of the same in case of a wash basin).

[0009] A more evolved system provides the use of two piston - cylinder devices, provided laterally with respect to the liftable plane that must be kept horizontal. In case a weight is put on one end of the plane, a sensor system reveals the unbalancing, controlling the piston - cylinder device provided on the end opposite to the end on which the weight has been placed. Level is balanced by a contraction or an extension of said device.

[0010] This system is rather expensive, since it requires two piston - cylinder devices. Furthermore, it is necessary providing at least one electronic system for controlling a level sensor. All the above remarkably complicates the technical realisation of the device, increasing its costs

[0011] In view of the above, it is well evident the need of having a system allowing to automatically levelling unbalanced planes, such as the one suggested by the present invention, allowing a better convenience under the economical point of view.

[0012] In this situation it is included the solution according to the present invention.

[0013] The object of the present invention is therefore

that of realising a motion system allowing an automatic levelling of the plane.

[0014] Another object of the present invention is that of being easily applied without requiring particular systems.

[0015] It is therefore specific object of the present invention a balanced motion system provided with lateral actuator, particularly for lifting planes and like, comprising motion means applied to said plane and like, characterised in that it provides a movable frame, said movable frame comprising at least two axes parallel each other and coupled, preferably at the bottom, by a bar, and said movable frame being coupled with said plane and like and said two parallel axes sliding along fixed sliding means, in that said motion means are applied close to one end of said plane and like to be moved, and in that motion transmission means are further provided for transmitting the motion from said motion means to said frame, said transmission means being applied to one end close to the same end of said plane and like on which said motion means are applied, and on the other end to said bar of said frame, in correspondence of the end of said plane and like opposed to the one on which said motion means are applied, and guide means for said motion transmission means, suitable to allow a vertical coupling of said transmission means with said plane and like and with said movable frame, all the above in such a way that when said motion means lift said plane and like, said movable frame slides along said sliding means, dragging said plane and like in a balanced way with even distribution of efforts also in case the load is applied misaligned on said plane and like.

[0016] According to the invention, said movable frame further comprises an upper horizontal support.

[0017] Still according to the invention, said guide means are comprised of two pulleys, parallel each other.

[0018] Always according to the invention, said motion system can comprise means for tensioning said motion transmission means, such as a chain tightener.

[0019] Preferably, according to the invention, said motion transmission means can be comprised of a chain, or of a belt, or of a toothed belt, or of a cord, or of a steel rope.

[0020] Preferably, according to the invention, said lifting means can comprise a piston - cylinder assembly.

[0021] Still according to the invention, said motion system can comprise a plate that can be applied on a wall for supporting the same system.

[0022] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

Figure 1 a shows a lateral view of an embodiment of a balanced motion system with lateral actuator provided on a washbasin;

Figure 1 b shows a front view of the balanced motion system according to figure 1b;

Figure 2a shows a lateral view of the balanced motion system according to figure 1a in the lifted position;

Figure 2b shows a front view of the balanced motion system according to figure 2b;

Figure 3a shows a lateral view of an outer cover of said balanced motion system according to figure 1a; and

Figure 3b shows a front view of the outer cover according to figure 3b.

[0023] Making reference to figures 1a and 1b, it is possible observing the balanced motion system 1 provided on a washbasin 2, on which a tap 21 is applied.

[0024] Said balanced motion system 1 provides a piston - cylinder assembly 3, comprising a piston 31 and a cylinder 32. Piston - cylinder assembly 3 is provided under and laterally with respect to one side of the plane to be lifted, i.e. the washbasin 2.

[0025] Piston 31 is integrally fixed to a plate 4. On the surface of said plate 4, holes 41 are provided for fixing the same to a wall. In the figure it is possible also observing the two vertical parallel sliding sleeves 5, 5', integrally coupled to the plate 4, along which two vertical and parallel axes 61, 62 of a movable frame 6 can slide. The two axes 61, 62 are coupled by a horizontal bar 63, and above are coupled by a horizontal support 64. By said horizontal support 64, movable frame 6 is coupled to the plane to be lifted, in this case the washbasin 2.

[0026] Balanced motion system 1 further comprises two pulleys 7, 7', allowing the sliding of a flexible transmission system 8. The latter has one end coupled under the washbasin 2, on the side on which the piston - cylinder assembly 3 is provided. The other end is instead coupled with the movable frame 6, particularly with bar 63, on the opposite side with respect to where the piston - cylinder assembly 3 is provided.

[0027] Observing figures 2a and 2b, when piston - cylinder assembly 3 is activated, e.g. by an electric motor, it extends, lifting the washbasin 2 plane. At the same time, flexible transmission means 8, fixed to one end of the wash basin 2 plane, sliding along the two pulleys 7, 7', lifts the movable frame 6 parallel to itself, by the sliding of the two vertical sliding sleeves 5 and 5'.

[0028] Always observing figure 2b, it can also be understood the operation of the balanced motion system 1. Particularly, if one end of the washbasin 2 plane is subjected to a load, movable frame 6 is obliged to slide along the vertical sliding sleeves 5, 5'. Therefore, it implies the transmission of a force having the intensity of the load induced force to the flexible transmission means 8, with the consequent alignment of the washbasin 2 plane. Substantially, a load compensation mechanism is created by the flexible transmission means 8. The above compensation, transmitted from one side to the other one of the plane, is permitted by the flexible transmission means 8.

[0029] Figures 3a and 3b show an outer cover 9 of the

whole lifting and self - balancing system, in this case provided under the washbasin 2.

[0030] On the basis of the previous specification, it can be noted that the basic feature of the present invention is that of obtaining a balanced motion system with a single lateral actuator, such as a pneumatic piston.

[0031] Among the main advantages of the present invention is that it can be easily implemented. In fact, in the above described realisation, it is sufficient a fixing of the plate against a wall.

[0032] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Balanced motion system provided with lateral actuator, particularly for lifting planes and like, comprising motion means applied to said plane and like, **characterised in that** it provides a movable frame, said movable frame comprising at least two axes parallel each other and coupled, preferably at the bottom, by a bar, and said movable frame being coupled with said plane and like and said two parallel axes sliding along fixed sliding means, **in that** said motion means are applied close to one end of said plane and like to be moved, and **in that** motion transmission means are further provided for transmitting the motion from said motion means to said frame, said transmission means being applied to one end close to the same end of said plane and like on which said motion means are applied, and on the other end to said bar of said frame, in correspondence of the end of said plane and like opposed to the one on which said motion means are applied, and guide means for said motion transmission means, suitable to allow a vertical coupling of said transmission means with said plane and like and with said movable frame, all the above in such a way that when said motion means lift said plane and like, said movable frame slides along said sliding means, dragging said plane and like in a balanced way with even distribution of efforts also in case the load is applied misaligned on said plane and like.
2. Balanced motion system according to claim 1, **characterised in that** said movable frame further comprises an upper horizontal support.
3. Balanced motion system according to claim 2, **characterised in that** said guide means are comprised of two pulleys, parallel each other.

4. Balanced motion system according to one of the preceding claims, **characterised in that** said motion system comprises means for tensioning said motion transmission means. 5
5. Balanced motion system according to one of the preceding claims, **characterised in that** said motion transmission means are comprised of a chain, or of a belt, or of a toothed belt, or of a cord, or of a steel rope. 10
6. Balanced motion system according to claim 5, **characterised in that** said tensioning means comprise a chain tightener. 15
7. Balanced motion system according to one of the preceding claims, **characterised in that** said lifting means comprises a piston - cylinder assembly.
8. Balanced motion system according to one of the preceding claims, **characterised in that** it comprises a plate that can be applied on a wall for supporting the same system. 20
9. Balanced motion system according to each one of the preceding claims, substantially as illustrated and described. 25

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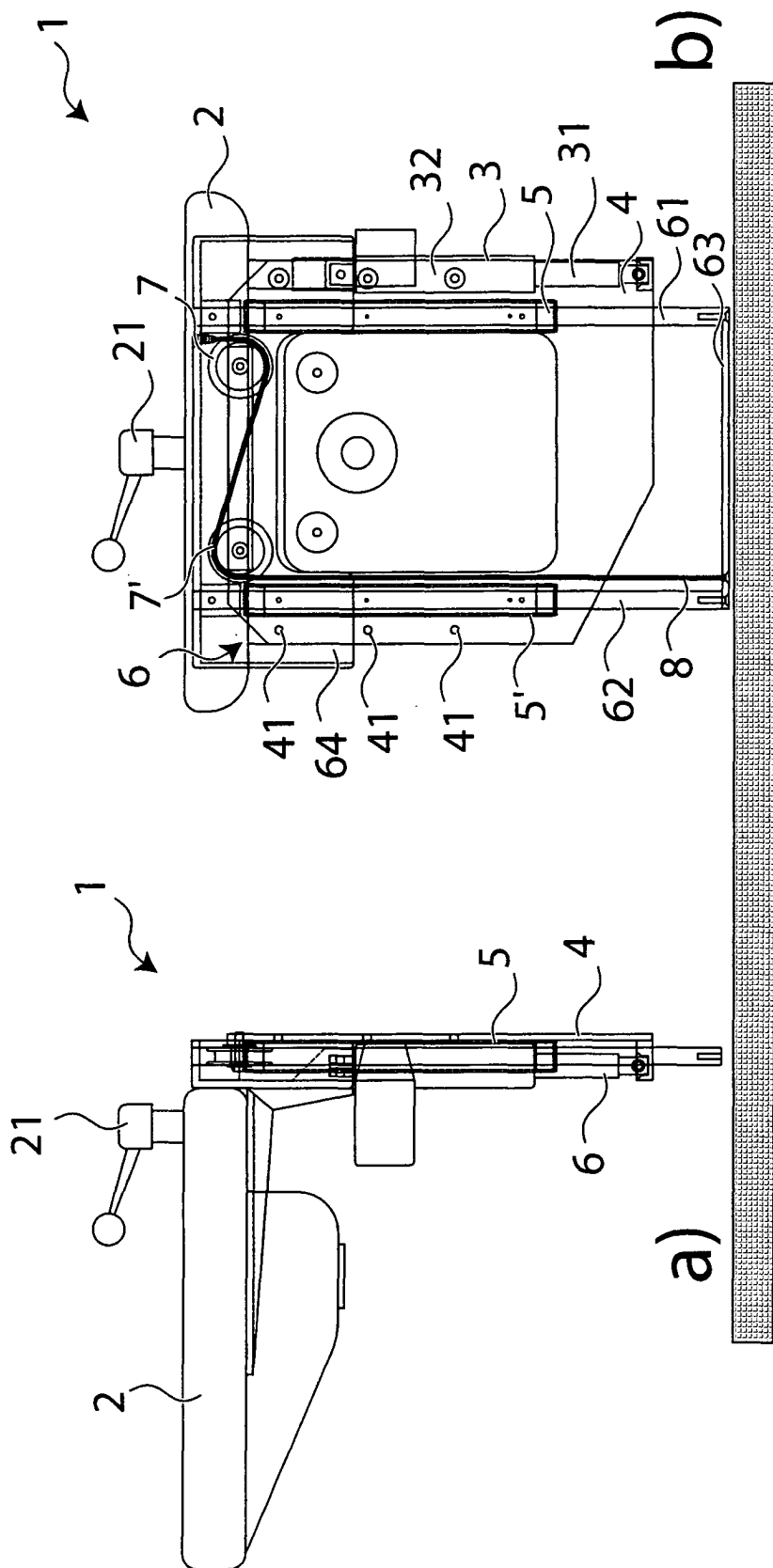


Fig. 1

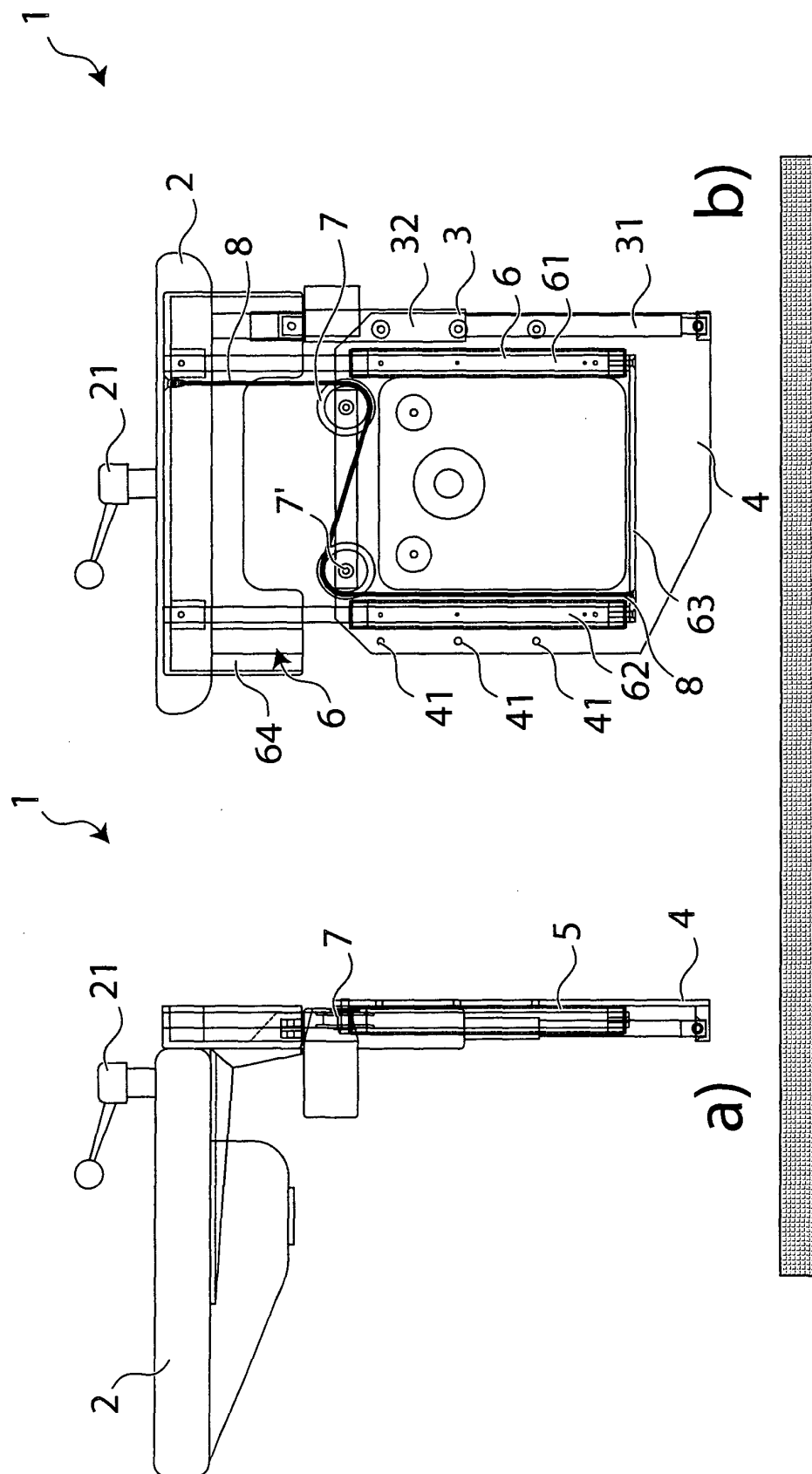


Fig. 2

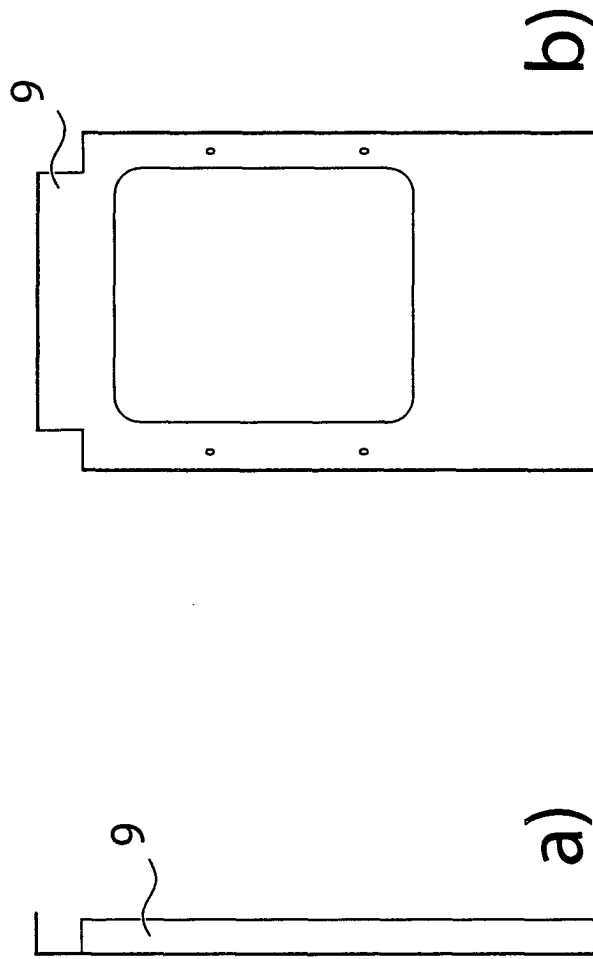


Fig. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5795

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)
Y	US 2002/023801 A1 (RAUCH WINFRIED) 28 February 2002 (2002-02-28) * page 2, paragraph 27 - paragraph 28; figure 3 *	1-9	B66F7/04
Y	US 3 765 648 A (RASMUSSEN R,US ET AL) 16 October 1973 (1973-10-16) * column 2, line 39 - column 3, line 69; figures 1-3 *	1-9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B66F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 31 January 2005	Examiner Ferrien, Y
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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

EP 04 42 5795

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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31-01-2005

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