



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.08.2012 Bulletin 2012/35

(51) Int Cl.:
B24B 7/18 (2006.01) B24B 41/02 (2006.01)

(21) Application number: **11155908.4**

(22) Date of filing: **24.02.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Surface treating apparatus with at least one hinge for the flexible mounting of the motor and tool unit and/or to facilitate the processing close to walls**

(57) A surface treatment apparatus particularly for treating concrete or wooden floors comprising
a frame (1),
a motor (4),
a utility tool (5) for treating the surface, the utility tool (5) being driven by said motor (4) and
at least one supporting wheel (3), roll and/or track where-in,
said frame (1) comprises at least two members (6,7,8) connected to each other by a hinge, a first member (6)

whereon said wheel (3), roll and/or track is rotatably connected and a second member (7) whereon said motor (4) and utility tool (5) are mounted.

In one embodiment, the first member (6) is connected to a third member (8) via a hinge extending perpendicular to the drive shaft of the utility tool (5) to enable adaptation to the floor.

The second member (7) is connected to the third member (8) via a second hinge extending parallel to the drive shaft of the utility tool (5) to enable processing close to walls.

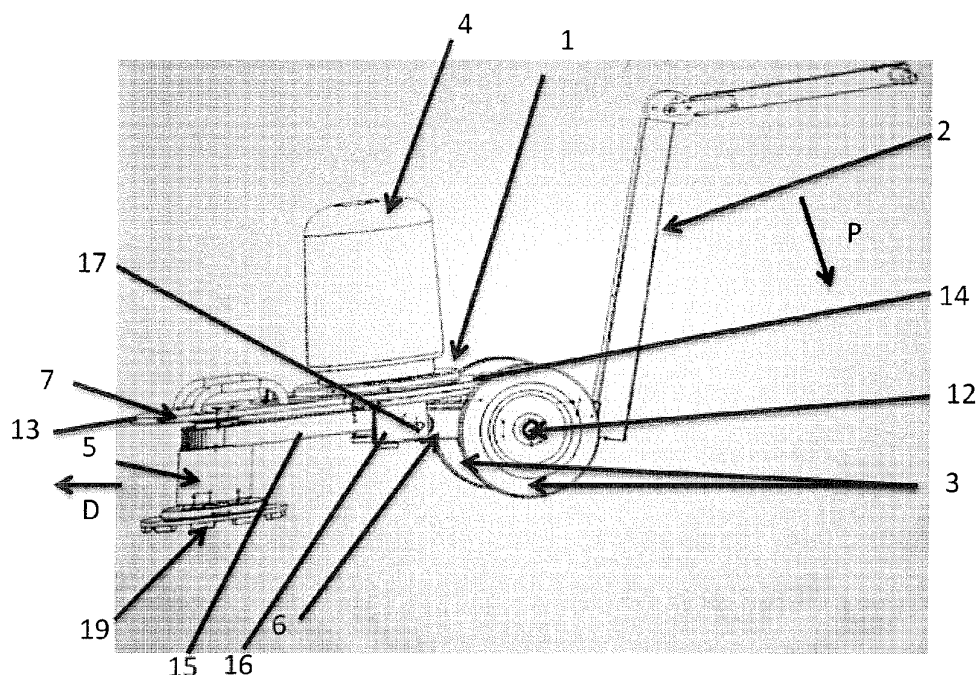


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The invention relates generally to surface treatment apparatuses, more particularly to apparatuses used for polishing, grinding, sanding or otherwise treating surfaces such as concrete or wooden floors.

BACKGROUND OF THE INVENTION

[0002] With increasing renovation of old buildings and houses, there is an increased interest from so-called do-it-yourself handyman for renting floor treatment apparatuses. Handling floor treatment apparatuses however is known to be difficult, especially for people lacking experience in handling such apparatuses. Non-seldom a floor treated by a do-it-yourselfer is severely damaged by incisions or by grinding to a too high extend. Most of the problems occurring during floor treatment by inexperienced persons are due to a poor alignment of the grinding or sanding tool in view of the floor, resulting in only part of the utility tool (usually a rotating disk, the lower surface of which forms the working surface) contacting the floor or even worse, a side edge of the disk grinding into the floor. Experienced craftsmen can alleviate the problem of poor alignment by slightly lifting the apparatus or by adapting the treatment pace, however clearly this is a non-ideal solution.

[0003] Another problem that arises with a known floor treatment apparatus typically offered for rent in the do-it-yourself market is that the apparatus comprises a frame having supporting wheels and a motor and utility tool assembled on the frame, wherein the wheel basis is as broad as or even broader than the diameter of the utility tool. Although this design allows for a good stability and steering of the apparatus, it makes it impossible to treat the edges of a floor along a wall part. Indeed, there is no possibility to drive the apparatus along a wall and closer to the wall than the wheel basis allows for. Typically parts of the floor left untreated by the above-described apparatuses are to be treated by handhelds such as described in for example US 5,788,561. Clearly, grinding or sanding surfaces with a handheld apparatus is, to a same extent as with a heavier and larger treatment apparatus as described above, very difficult, more expensive and time consuming even for experienced craftsmen.

[0004] It should, therefore, be appreciated that there remains a need for a surface treatment apparatus addressing the above problems. It is an object of the present invention to provide surface treatment apparatuses, in particular apparatuses used for polishing, grinding, sanding or otherwise treating surfaces such as concrete or wooden floors which address one or more of the identified problems described above.

DESCRIPTION OF THE INVENTION

[0005] The present invention concerns a surface treatment apparatus, in particular an apparatus for polishing, grinding and/or sanding floors, the apparatus comprising:

- (a) a frame
- (b) a motor
- (c) a utility tool for treating a surface, the utility being driven by said motor
- (d) at least one supporting wheel, roll and/or track

characterized in that said frame comprises at least two members connected to each other by a hinge, a first member whereon said wheel, roll and/or track is rotatably connected and a second member whereon said motor and utility tool are mounted.

[0006] Preferably, the at least two members are connected by a hinge extending perpendicular in view of a drive shaft of the utility tool (so as to allow rotation of the longitudinal axis of a drive shaft of the utility tool versus the surface to be treated).

[0007] Preferably, the at least two members are connected by a hinge extending parallel in view of a drive shaft of the utility tool.

[0008] More preferably the frame comprises at least a third member that is connected to the first member by a hinge extending perpendicular in view of a drive shaft of the utility tool and that is connected to the second member by a hinge extending parallel in view of a drive shaft of the utility tool or vice versa.

[0009] In a preferred embodiment, the second frame member has a front and a back end, the back end being connected to said hinge and the utility tool being mounted near or at the front end of this second member. In this embodiment, the motor is preferably mounted near or at the back end of the second member.

[0010] The second member further preferably comprises means for adjusting the downward pressure on the front end of the second member. Such means can for example comprise a slot or shaft provided on the second member and configured for releasably providing weight elements thereon.

[0011] In a preferred embodiment damping means are provided between the first and second members. The damping means can for example comprise damped bushings for said hinge.

[0012] The apparatus may further comprise an actuating lever, said lever being fixed to the frame.

[0013] According to a preferred embodiment, the first frame member has a back end and a front end, whereby the hinge between the first and second member is provided at a distance of the front end of the first member and wherein, at a position towards the front end in view of the hinge, an abutment surface is provided on the first member, said abutment engaging the second frame member when hinging the first and second member in a predetermined direction over a predetermined angle

such as to limit the hinging of the first and second member in the predetermined direction of rotation.

[0014] According to the most preferred embodiment, the apparatus comprises exactly one utility tool, the tool preferably having a diameter ranging from 5 to 70 cm measured perpendicularly in view of the driving shaft of said tool.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 represents a side view of an apparatus according to the present invention;

Fig. 2 represents a partially exploded view of the apparatus according to the present invention;

Fig 3 represents a perspective view of an apparatus of the present invention with exception of some parts.

DESCRIPTION OF THE INVENTION

[0016] Figure 1 represents an apparatus according to the present invention, said apparatus comprising a frame 1 with an actuating lever 2, two wheels 3, a motor 4 and a utility tool 5.

[0017] The frame comprises at least two and in this particular case three members 6, 7 and 8. In the present embodiment, and as represented in Figure 3, the first frame member 6 comprises a U-shaped rigid profile with a lateral beam 9 and two side beams 10 provided thereon. As represented in figure 2, each of said beams is in this case provided with a hole 11 at a distance of its front end.

[0018] The lateral beam is situated at the back end of the apparatus; it is the back end of the apparatus defined in view of a usual driving direction D during use of the apparatus. Said wheels 3 are movably, in particular rotatably or otherwise pivotably connected to the first member by a wheel shaft 12 or the like supported in the side beams 10. In this case, the actuating lever 2 is also fixed to the first member 6.

[0019] The second member 7, essentially consisting of a rigid plate element with a front end 13 and a back end 14. Both said motor 4 and utility tool 5 are mounted by means of bolts or the like.

[0020] Typically, the motor is mounted on one surface of the plate element, whereas the utility tool extends from the opposite surface of the plate element. In use, the utility tool extends downwards, whereas the motor is mounted on the top surface of the plate. According to a preferred embodiment of the present invention, the motor 4 is mounted near or at the back end 14 of the second member 7, whereas the utility tool 5 is mounted near or at the front end 13 of the second member 7.

[0021] It is known to persons skilled in the art that the motor 4 comprises a motor shaft (not shown) extending perpendicularly through a protrusion in the plate element, whereas the utility tool 5 has a driving shaft (not shown) extending parallel to the motor shaft. Both shaft are con-

nected in rotation by a belt, preferably a toothed belt 15.

[0022] The third member 8 in this case comprises a plate element having two upstanding protrusions 16, wherein a hinge shaft 17 is rotatably lodged, the hinge shaft extending through damped bushings (not shown) lodged in holes 11 provided in the side beams 10 of the first frame member 6. The third frame member further comprises a hole (not shown) where through the motor shaft extends and one or more slits 18 near its circumference.

[0023] In an assembled state of the apparatus, the back end 14 of the second member 7 rests on the third member 8, whereby the interface defined between the second and third member 7, 8 is provided with a lubricant oil or a lubricant coating for allowing rotation or hinging of the second member over the first member in a direction perpendicular to the motor shaft.

[0024] According to the present invention, the utility tool 5 can be a polishing, a grinding, a sanding or other tool that typically comprises a disk defining a working surface 19 for acting on a surface to be treated. Depending on the intended surface treatment, the working surface of the utility tool is defined by a certain roughness and/or abrasive capacity for grinding, sanding, polishing or otherwise treating a given surface. The disk is mounted on the driving shaft of the utility tool and is generally known in the field of treating surfaces such as floors. Preferred disks have a diameter ranging between 5 and 70 cm.

[0025] The apparatus according to the present invention is very user friendly, especially due to the hinge provided between the first and second frame members 6 and 7. Indeed the hinge shaft 17 provided between the first and third frame members allows for an automatic adjustment of the plane formed between the defined by the bottom of the wheels 3 and the working surface 19 of the utility tool in view of a surface to be treated. As said hinge shaft allows rotation of the utility tool 5 and especially of the working surface 19 thereof in view of the first frame member in a direction perpendicular to the surface to be treated an automatic positioning of the working surface of the utility tool in view of the surface to be treated is obtained, thereby ensuring that the working surface 19 of the utility tool is and remains parallel to the surface to be treated during use of the apparatus.

[0026] According to a preferred embodiment, the second frame member 7 further comprises means for adjusting the downward pressure on the front end 13 of the second member. Such means can for example comprise a slot or shaft provided on the second member and configured for releasably providing weight elements thereon. Adjustment of the pressure exerted on the front end of the second member 7 and thus on the utility tool, allows for an increased control of the grinding, sanding and/or polishing by the utility tool. To even further increase adjustment of the (down) pressure exerted on the utility tool, the motor is preferably provided near or at the back end of the second member, proximate to the connection of

the first and second members 6, 7. As such, the weight of the motor 4 is essentially supported by the supporting wheels 3 rather than by the utility tool 5 during use of the apparatus.

[0027] In case the disk of the utility tool needs to be accessed for replacement or control, or in case the working surface has to be lifted from the floor, the apparatus can easily be tilted by pressing down the actuating lever in a direction according to arrow P. In this case, the first and second member will first hinge in view of each other around the hinge shaft 17, until the front end of the side beams of the first member will abut the second or third member thereby preventing further hinging of the second member in view of the first member and lifting the second member when pressing the actuating lever further downwards. The distance between the hole 11 for the hinge shaft 17 and what is defined as the abutment surface 20 of the beams with the second member 7 or third member 8 (both are rigidly fixed to each other in a direction of rotation around the hinge shaft 17) determines the limitation on the angle of rotation between the first and second members 6, 7.

[0028] The rotation between the second and third members 7, 8 around the motor shaft can be blocked by means of bolts (not shown) or such interacting in the slits 18 in the second frame member 7.

[0029] When releasing said bolts, a rotation of the second member around the motor shaft and in view of the first member is obtained. It will be appreciated that by such rotation, the utility tool can be hinged or rotated in a sideward direction in view of the wheels of the apparatus, thereby allowing the utility tool to be positioned next to the wheels, ie not between the wheels, in view of the driving direction D of the apparatus. Such rotation therefor allows to drive the apparatus over a surface to be treated along a wall, while the utility tool is in very close proximity of the wall, while the wheels remain at a certain distance of the wall, yet rotating parallel to said wall.

[0030] It is clear that instead of providing wheels, a roll or track can also be applied for supporting the apparatus.

NUMERICAL REFERENCES

[0031]

- 1 frame
- 2 actuating lever
- 3 wheels
- 4 motor
- 5 utility tool
- 6 first member (wheel)
- 7 second member (utility tool)
- 8 third member (intermediate)
- 9 lateral beam (first member)
- 10 side beams (first member)
- 11 holes (for hinge bushings)
- 12 wheel shaft

- 13 front end (second member)
- 14 back end (second member)
- 15 toothed belt
- 16 Upstanding protrusions
- 17 Hinge shaft
- 18 Slits
- 19 Working surface
- 20 Abutment surface

Claims

1. A surface treatment apparatus comprising:

- (a) a frame
- (b) a motor
- (c) a utility tool for treating a surface, the utility being driven by said motor
- (d) at least one supporting wheel, roll and/or track

characterized in that said frame comprises at least two members connected to each other by a hinge, a first member whereon said wheel, roll and/or track is connected and a second member whereon said motor and utility tool are mounted.

2. The apparatus according to claim 1, wherein the at least two members are connected by a hinge extending perpendicular in view of a drive shaft of the utility tool.

3. The apparatus according to claim 1, wherein the at least two members are connected by a hinge extending parallel in view of a drive shaft of the utility tool.

4. The apparatus according to claims 2 and 3, wherein the frame comprises at least a third member that is connected to the first member by a hinge extending perpendicular in view of a drive shaft of the utility tool and that is connected to the second member by a hinge extending parallel in view of a drive shaft of the utility tool or vice versa.

5. The apparatus according to claim 1, wherein the second frame member has a front end and a back end, the back end being connected to said hinge and the utility tool being mounted near or at the front end of this second member.

6. The apparatus according to claim 5, wherein the motor is mounted on the back end of the second member.

7. The apparatus according to claim 5, wherein the second member comprises means for adjusting the downward pressure on the front end of the second member.

8. The apparatus according to claim 7, wherein said means comprises a slot or shaft provided on the second member and configured for releasably providing weight elements thereon. 5
9. The apparatus according to claim 1, wherein damping means are provided between the first and second members. 10
10. The apparatus according to claim 9, wherein the damping means comprise damped bushings for said hinge. 15
11. The apparatus according to claim 1, further comprising an actuating lever, said lever being fixed to the frame. 20
12. The apparatus according to claim 2, wherein the first frame member has a back end and a front end, whereby the hinge between the first and second member is provided backwards from the front end of the first member and wherein, at a position towards the front end in view of the hinge, an abutment surface is provided on the first member, said abutment engaging the second frame member when hinging the first and second member in a predetermined direction over a predetermined angle such as to limit the hinging of the first and second member in the predetermined direction of rotation. 25 30
13. The apparatus according to claim 1, comprising exactly one utility tool. 35
14. The apparatus according to claim 1, wherein the utility tool has a diameter ranging from 5 to 70 cm measured perpendicularly in view of the driving shaft of said tool. 40
15. The apparatus according to claim 1, wherein said utility tool is a polishing, grinding and/or sanding tool. 45 50 55

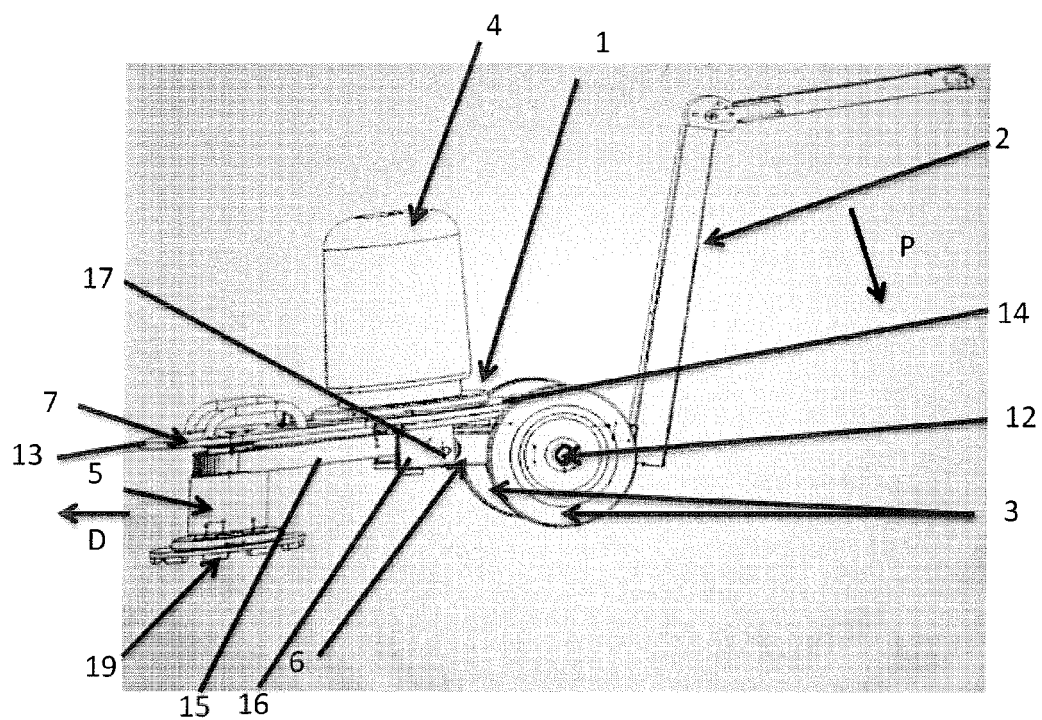


Fig. 1

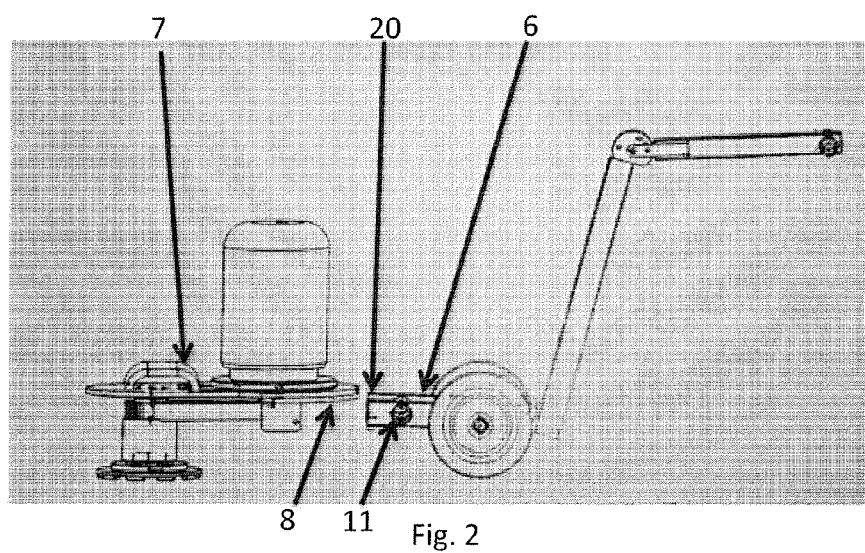


Fig. 2

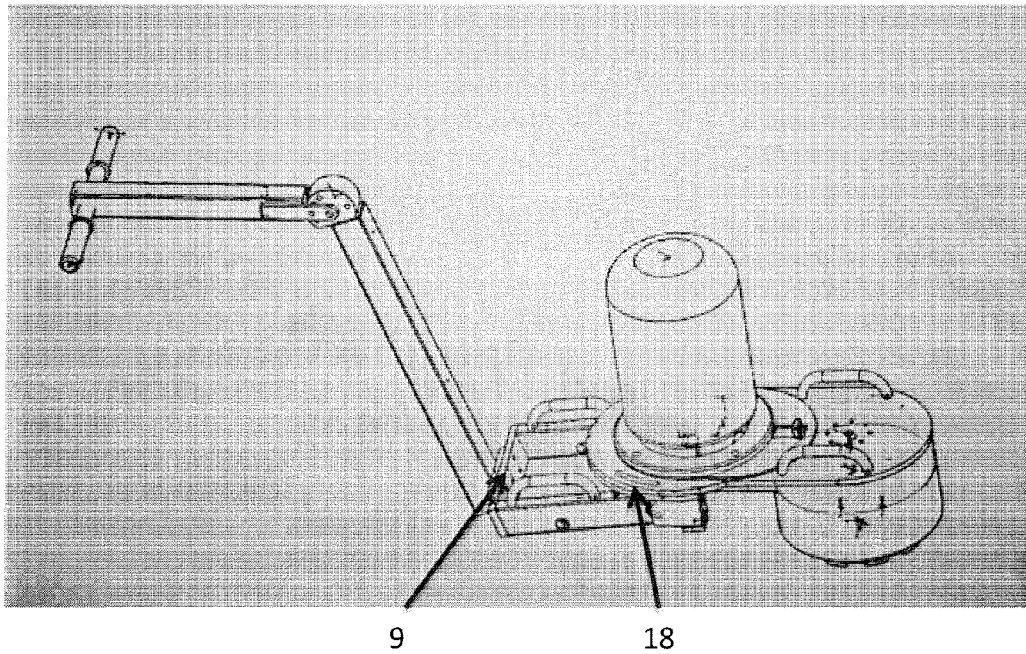


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 5908

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 783 872 A (BURHOE HERBERT G [US]) 15 November 1988 (1988-11-15)	1,3,5-7, 11,13-15	INV. B24B7/18
Y	* figures 1-3 * * column 1, line 6 - line 45 * * column 3, line 15 - line 20 * * column 3, line 56 - column 4, line 3 * * column 4, line 39 - line 41 *	4,8	B24B41/02
X	US 2007/232207 A1 (PALUSHI SIMON [US]) 4 October 2007 (2007-10-04)	1-3, 11-15	
Y	* figures 1,21,22,35,37,38 * * paragraphs [0002], [0109], [0110], [0134] *	4	
X	KR 2009 0110018 A (JEON IN TAEK [KR]) 21 October 2009 (2009-10-21)	1,3,11, 13-15	
	* figures 1,4a,4b * * paragraphs [0015] - [0032] *		
X	DE 299 21 287 U1 (MKS FUNKE GMBH [DE]) 30 March 2000 (2000-03-30)	1,2,11, 14,15	TECHNICAL FIELDS SEARCHED (IPC)
Y	* figures 3,7 * * page 15, line 12 - line 20 *	8	A47L B24B
X	WO 98/21412 A1 (BARTELL IND INC [CA]) 22 May 1998 (1998-05-22)	1,2, 9-11, 13-15	
	* figures 1,2a * * page 6, line 12 - line 18 *		
A	US 2 301 164 A (WILLIAM MALL ARTHUR) 3 November 1942 (1942-11-03)	9,10	
	* figures 7,8 * * page 2, column 2, line 47 - line 50 *		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 August 2011	Examiner Endres, Mirja
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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EPO FORM 1503 03.82 (P04C01)

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

EP 11 15 5908

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11-08-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4783872	A	15-11-1988	NONE
US 2007232207	A1	04-10-2007	NONE
KR 20090110018	A	21-10-2009	NONE
DE 29921287	U1	30-03-2000	NONE
WO 9821412	A1	22-05-1998	AT 219191 T 15-06-2002
		AU 4938597 A 03-06-1998	
		CA 2270968 A1 22-05-1998	
		CN 1237218 A 01-12-1999	
		DE 69713390 D1 18-07-2002	
		EP 0948680 A1 13-10-1999	
		JP 2001503489 A 13-03-2001	
		US 5890772 A 06-04-1999	
US 2301164	A	03-11-1942	NONE

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5788561 A [0003]