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(54) **Top loading laundry washing machine**

(57) A laundry washing-machine is described comprising a cabinet (1) inside which a drum (3) turnable around an axis (A) is housed. The drum (3) is provided with an opening (30) for the top loading of the laundry and with a door (4) to close the opening (30). The door (4) comprises at least one wing (5) connected with the drum (3) by means of a hinge (10) which extends along the edge of the opening (30) of the drum (3) in a way parallel to the axis of rotation (A) of the drum (3). The wing (5) is suitable to bear the action of spring means (7) for its arrangement in opening position by rotation around the hinge (10); the spring means (7) have a first end (8) fastened to the drum (3) and a second end (9) fastened to the wing (5) and the hinge (10) comprises

first elements (11) of the wing (5) and second elements (12) of the drum (3) interacting with each other. The laundry washing-machine comprises means (2) that are suitable to lock the wing (5) in opening position and shock absorption means (20) to brake the rotation of the wing (5) around the hinge (10) during the opening of the door (4). The shock absorption means (20) comprise at least one bush (21) fastened to the first end (8) of the spring means (7) and arranged inside the hinge (10) in such a way as to be adjacent to it in order to brake the rotation of the wing (5) around the hinge (10) by friction between its external cylindrical surface (22) and the internal surface (23) of the first elements (11) of the hinge (10).

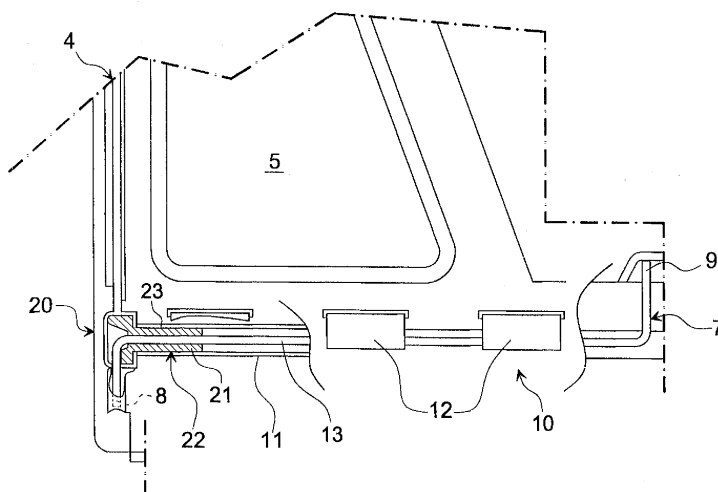


Fig.2

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Description

[0001] The present invention refers to a top loading laundry washing machine.

[0002] Current laundry washing machines with top loading are provided with a drum suitable to contain the laundry to be washed and/or to be dried which is situated in a central position of the washing-machine and has an opening on the top part of the machine. Such drum is revolvingly mounted in a container, called washing tub, destined to contain the washing water and equipped for the anchorage of suspension organs which allow it to remain suspended inside a cabinet containing the laundry washing/drying machine.

[0003] The top opening of the drum is generally closed by a metal door generally with two wings which gets normally locked to each other by coupling means; in such way the door is maintained closed during the operation of the machine.

[0004] The wings of the doors are normally provided with springs or other elastic elements which make their opening easier. In fact said elastic elements, which with the wings locked one to the other are extended, after the manual uncoupling of the wings go back to their rest position thus allowing the opening for the access to the drum.

[0005] Said elastic elements can determine a snap opening of the associated wings and such operation can result unpleasant for the noise caused by the collision of the wings with the mouthpiece structure of the tub and can become unsafe for the user in the case of accidental hitting with hands or arms.

[0006] For such reason elements suitable to brake the rotation of the door during the opening of the same can be provided as the ones present in the laundry washing-machine described in the Italian utility model application No. MI200U000531 of 14 November 2002 by the same applicant. The washing-machine described in the afore-said application comprises a mouthpiece structure for the laundry to be washed and a drum provided with a laundry loading opening closed by a door. The washing-machine is provided with rubber pads arranged in the mouthpiece structure and suitable to absorb the impact of said door with the mouthpiece structure during the opening of the door.

[0007] In view of the state of the art herein described, scope of the present invention is to provide a top loading washing machine provided with elements suitable to brake the rotation of the door of the drum during its opening that are different from the known ones and with simpler make.

[0008] According to the present invention, such scope is attained by means of a washing-machine comprising a cabinet inside which a drum turnable around an axis is housed, said drum being provided with an opening for the top loading of the laundry and with a door to close said opening, said door comprising at least one wing connected with the drum by means of a hinge which ex-

tends along the edge of the opening of the drum parallelly to the axis of rotation of the drum, said wing being suitable to bear the action of spring means for its arrangement in opening position by rotation around said hinge, said spring means having one first end fastened to the drum and a second end fastened to said wing and said hinge comprising first elements of said wing and second elements of said drum interacting with each other, said washing-machine comprising means suitable to lock said at least one wing in said opening position and shock absorption means to brake the rotation of said wing around said hinge during the opening of the door, characterised in that said shock absorption means comprise at least one bush fastened to said first end of said spring means and arranged inside said hinge so as to be adjacent to it in order to brake the rotation of said wing around said hinge by friction between its external cylindrical surface and the internal surface of said first elements of the hinge.

[0009] The characteristics and the advantages of the present invention will become evident from the following detailed description of an embodiment thereof, which is illustrated as a non limiting example in the enclosed drawings, in which:

Figure 1 is a schematic top view of a door coupled to a drum of a top loading laundry washing-machine according to an embodiment of the present invention;

Figure 2 is a similar view, but more in detail, of a detail of the door coupled to the drum of the laundry washing-machine of Figure 1;

Figure 3 is a schematic transversal section view of the door hinged to the drum of the laundry washing-machine of Figure 1;

Figure 4 shows a door hinged to the drum of a laundry washing-machine according to a variation to the embodiment of the present invention.

[0010] With reference to Figures 1-3 a top loading laundry washing-machine according to the present invention is shown. Said laundry washing-machine comprises a cabinet 1 normally closed by a door not visible in the figures and provided with a mouthpiece structure 2 for the loading of the laundry to be washed. The cabinet 1 contains a drum 3 suitable to contain the laundry to be washed, turnable around an axis A inside a washing tub opportunely suspended inside the cabinet 1. The drum 3 has an opening 30 generally closed by a door 4 with two wings 5 which both get hinged to the drum 4 at a first end and get locked one to the other one at the end opposite to the first one by coupling means 6; in this way the door 4 is maintained closed during the operation of the machine.

[0011] Each wing 5 is provided with a pair of springs 7 suitable to facilitate the opening of the door 4. Each spring 7 comprises a first end 8 fastened to the drum 3 and a second end 9 fastened to the wing 5.

[0012] Each wing 5 comprises a hinge 10 which substantially extends along the edge of the opening 30 parallel to the axis of rotation of the drum 3 and is suitable to bear the action of the spring 7 for its arrangement in opening position P by rotation around the hinge 10. The latter comprises first concave parts 11 of the wing 5 and second concave parts 12 of the drum 3 interacting with each other. The spring 7 comprises at least one part 13 arranged inside the hinge 10.

[0013] The mouthpiece structure 2 for the laundry to be washed is suitable to lock the wings 5 in the opening position P and the laundry washing-machine comprises shock absorbtion means 20 suitable to brake the rotation of each wing 5 around the hinge 10.

[0014] The shock absorbtion means 20 comprise a bush 21 fastened to a first end 8 of the spring 7 and arranged inside the hinge 10 so as to be adjacent to the first parts 11 of the wing 5. Said bush 21 is suitable to brake the rotation of the wing 5 around the hinge 10 by friction between the external cylindrical surface 22 of the bush 21 and the internal surface 23 of the first parts 11 of the hinge 10.

[0015] Preferably said bush 21 has cylindrical shape and is arranged around the part 13 of the spring 7 inside the hinge 10.

[0016] The bush 21 is made of a single piece from a solid plastic type material, as for example the Hostaform material, and it is of rigid type.

[0017] Both the dimensions of the bush 21, that is diameter and length, and the material of which it is made vary according to the load of the spring in order to assure an acceptable damping. For example, if considering a bush 21 made using the Hostaform material and having a diameter of 6 mm with a tolerance of 0.05 millimeter, a spring load of 100 gs and with a diameter of 1.5 mms of the material used for the spring 7, one obtains a good damping with an angle of opening of the door of approximately 90°.

[0018] Preferably the shock absorbtion means 20 comprise two bushes 21 fastened to the first ends 8 of each spring 7.

[0019] According to a variation of the embodiment of the invention shown in Figure 4, each bush 21 is made up of two cylindrical elements 40, 41 concentric to each other, of which only one, the element 40, is fastened to the first end 8 of the spring 7. In such way, during the rotation of the door 4 for the arrangement in the opening position P, there is a braking action of the bush 21 by mutual friction of the internal surface of the element 11 with the the external cylindrical surface of the element 41 and by mutual friction of the internal cylindrical surface of the element 41 with the external cylindrical surface of the element 40. This improves the shock absorbtion action of the bush 21.

[0020] The elements 40, 41 can be made of plastic and are of rigid type.

Claims

1. Laundry washing-machine comprising a cabinet (1) inside which a drum (3) turnable around an axis (A) is housed, said drum (3) being provided with an opening (30) for the top loading of the laundry and with a door (4) to close said opening (30), said door (4) comprising at least one wing (5) connected with the drum (3) by means of a hinge (10) which extends along the edge of the opening (30) of the drum (3) parallelly to the axis of rotation (A) of the drum (3), said wing (5) being suitable to bear the action of spring means (7) for its arrangement in opening position (P) by rotation around said spring means (7) having a first end (8) fastened to the drum (3) and a second end (9) fastened to said wing (5) and said hinge (10) comprising first elements (11) of said wing (5) and second elements (12) of said drum (3) interacting with each other, said laundry washing-machine comprising means (2) suitable to lock said at least one wing (5) in said opening position (P) and shock absorbtion means (20) to brake the rotation of said wing (5) around said hinge (10) during the opening of the door (4), **characterised in that** said shock absorbtion means (20) comprise at least one bush (21) fastened to said first end (8) of said spring means (7) and arranged inside said hinge (10) in such a way as to be adjacent to it in order to brake the rotation of said wing (5) around said hinge (10) by friction between its external cylindrical surface (22) and the internal surface (23) of said first elements (11) of the hinge (10).
2. Machine according to claim 1, **characterised in that** said spring means (7) comprise at least one part (13) arranged inside said hinge (10), said bush (21) being arranged around said part (13) of said spring means (7).
3. Machine according to claim 1, **characterised in that** said spring means comprise two springs (7) for each hinge (10), each spring (7) having a first end (8) fastened to the drum (3) and a second end (9) fastened to the wing (5), and **in that** it comprises two bushes (21) fastened to each first end (8) of said two springs (7).
4. Machine according to claim 1, **characterised in that** said door (4) comprises two wings (5) hinged to the drum (3).
5. Machine according to claim 1, **characterised in that** said at least one bush (21) comprises two cylindrical elements (40, 41) concentric to each other, only one of said two cylindrical elements (40, 41) being fastened to said first end (8) of said spring means (7).

6. Machine according to claim 1, **characterised in that** said bush (21) is made of a solid material.
7. Machine according to claim 6, **characterised in that** said material which the bush (21) is made of Hostaform material.

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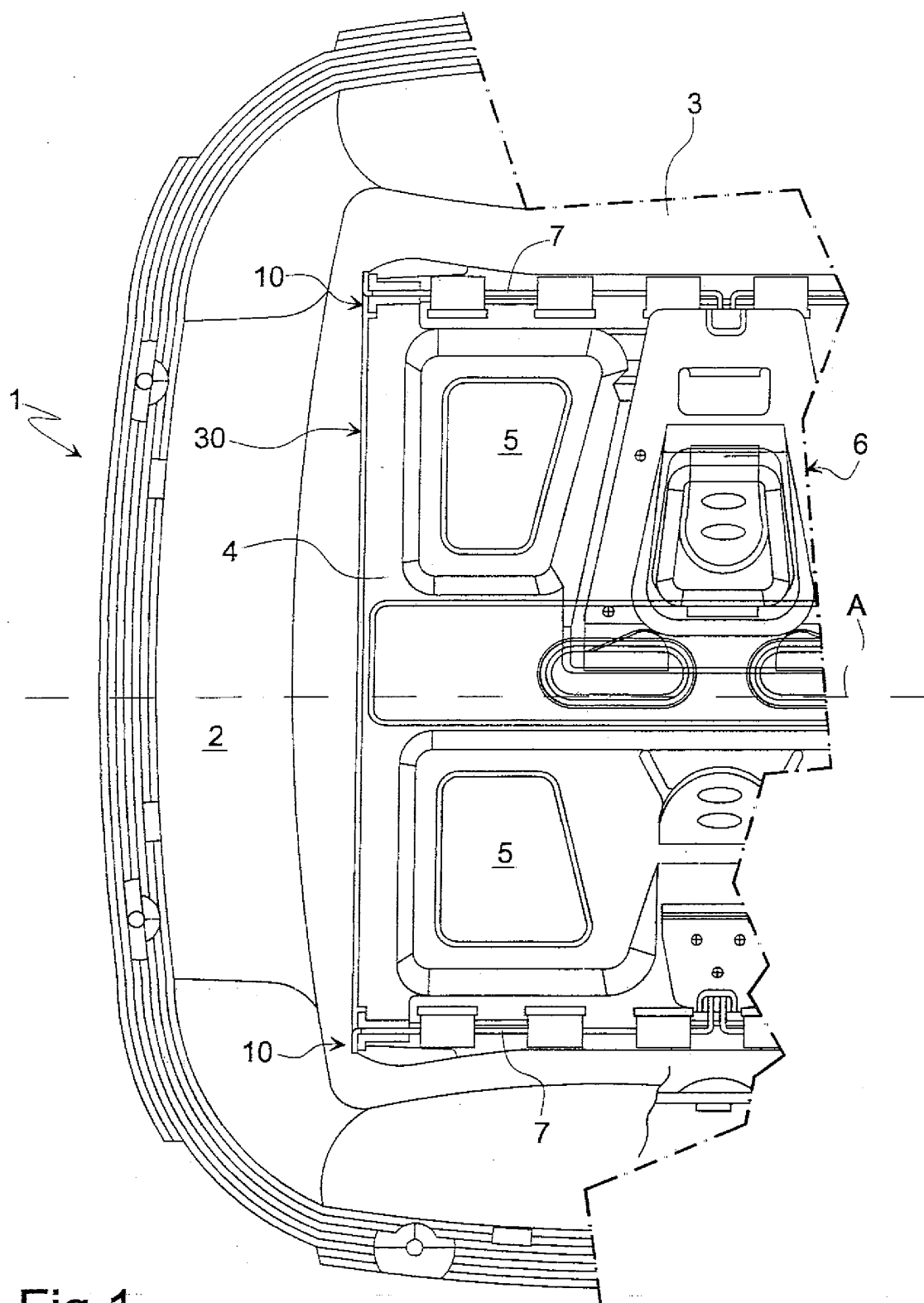


Fig.1

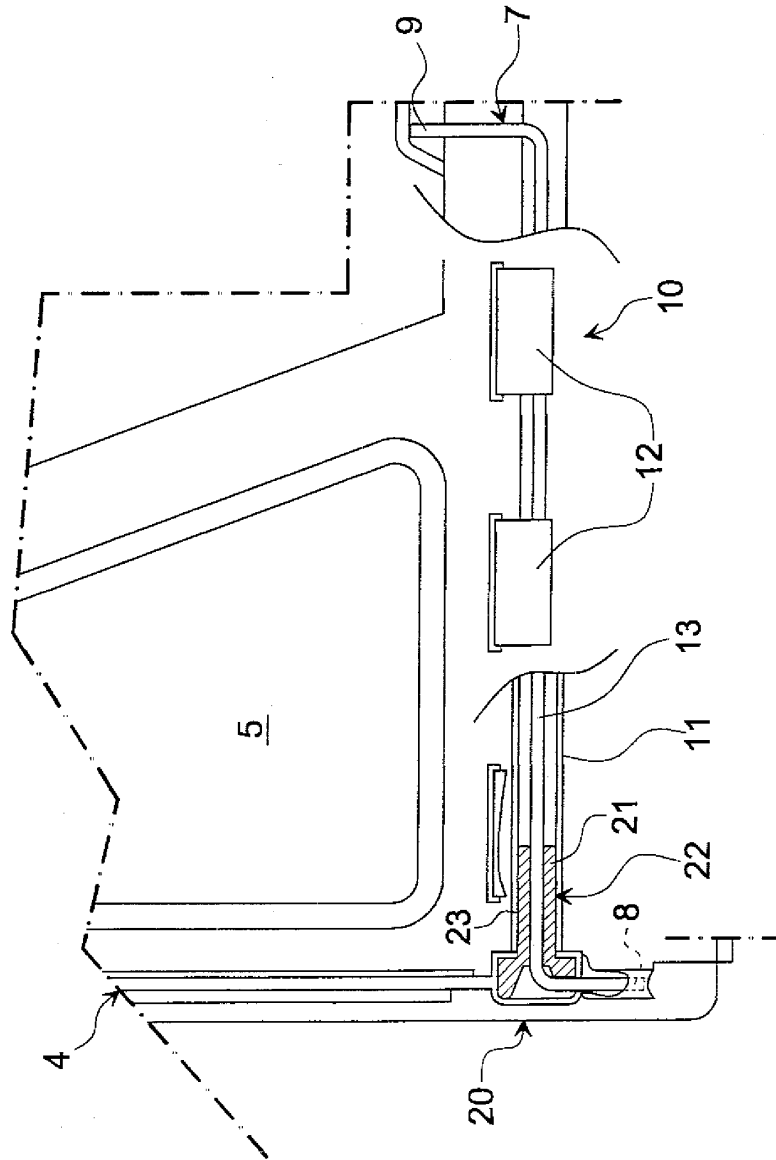


Fig. 2

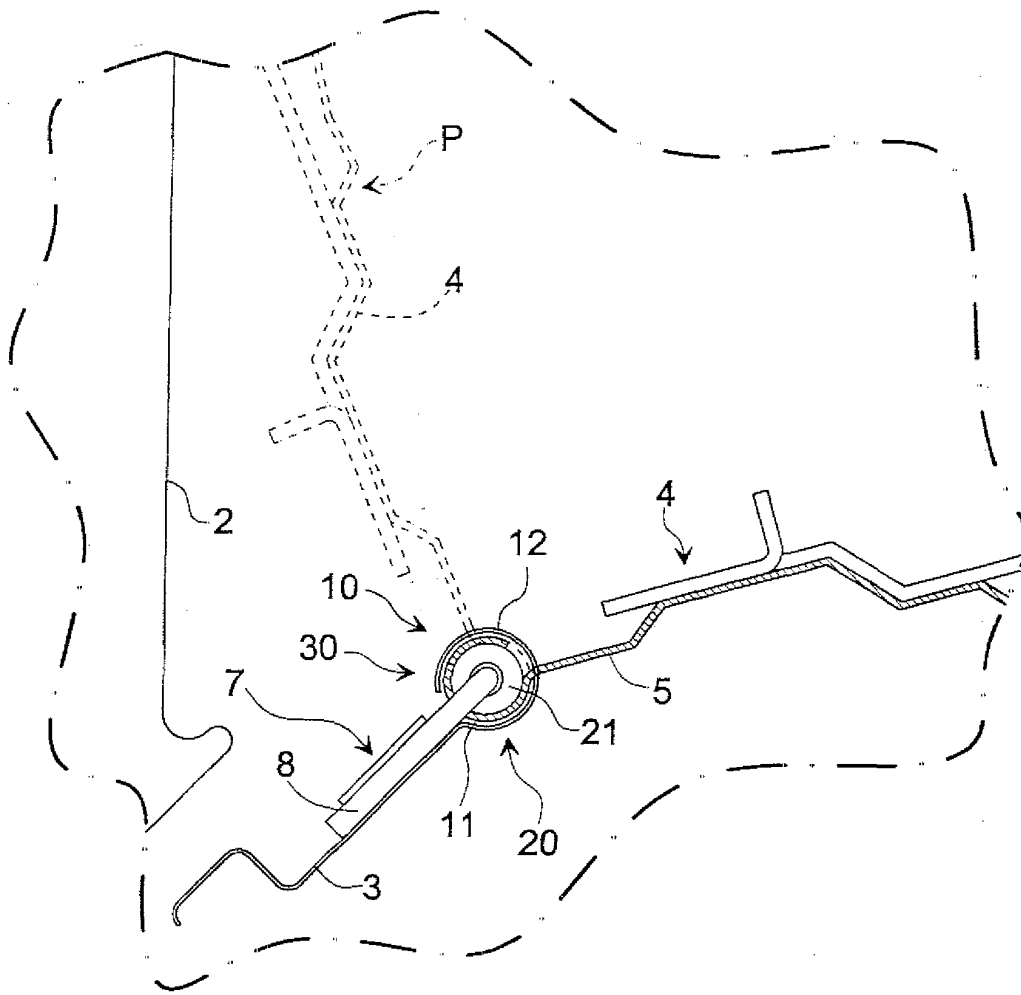


Fig.3

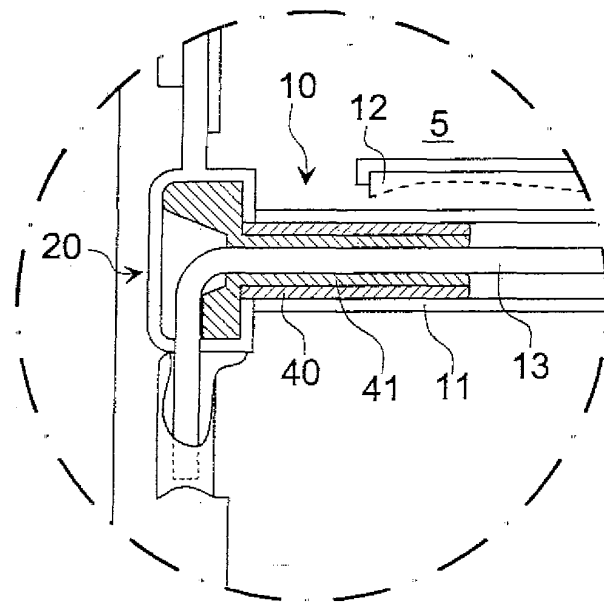


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
EP 05 10 2443

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 July 2005	Examiner Weinberg, E
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
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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