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## (54) Laundry washing and/or drying machine

(57) A laundry washing and/or drying machine is described, comprising a drum (2) for containing the laundry (3), which rotates about an axis (20) during at least one operating phase of the machine and which is fitted with elements (21) being shaped and sized in such a way as to drag the laundry (3) contained therein when the drum (2) is rotating; the dragging elements (21) are at least partially arranged radially relative to said axis (20).

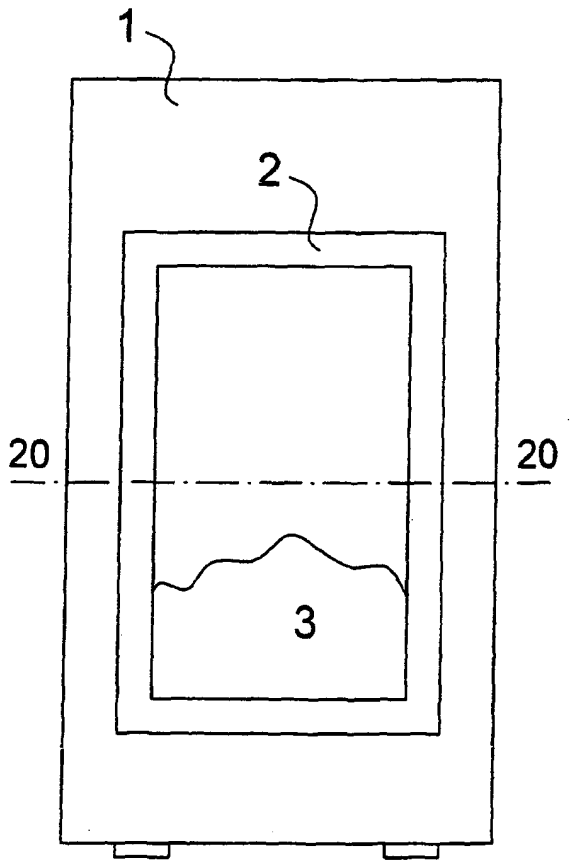


Fig.1B

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## Description

**[0001]** The present invention relates to a laundry washing and/or drying machine according to the preamble of claim 1.

**[0002]** Therefore, the present invention concerns products being commercially called, depending on the functions they perform, "washing machines" or "washing/drying machines" or "clothes dryers".

**[0003]** These machines comprise a drum for containing the laundry, which rotates about an axis during at least one operating phase of the machine; in a washing machine, the drum typically rotates during three operating phases (washing, rinsing and spinning), though in different ways and at different speeds; in a washing/drying machine, the drum typically rotates during four operating phases (washing, rinsing, spinning and drying).

**[0004]** Generally, the drum has a cylindrical outer shape and has a cylindrical cavity in which the laundry is loaded.

**[0005]** The drum cavity is provided with means adapted to drag the laundry when the drum is rotating; this allows, for instance, to lift the laundry, which is thus taken out from the wash water and then immersed again.

**[0006]** Such means generally consist of straight elements being located symmetrically on the cavity wall and arranged in a direction being parallel to the drum axis; usually, three or four ledges are provided. These elements are called "lifters".

**[0007]** As known, the dragging of the laundry has a very important influence on the effectiveness of the functions performed by such machines, in particular on the effectiveness of the laundry washing.

**[0008]** The present invention aims at providing a new solution compared to the state of the art as regards the shape and arrangement of the dragging elements.

**[0009]** This object is achieved by the laundry washing and/or drying machine having the features described in claim 1; advantageous aspects of the present invention are detailed in dependent claims.

**[0010]** The present invention is based on the idea of arranging the dragging elements at least partially in a radial direction relative to the rotation axis of the drum.

**[0011]** By so doing it is possible, among other things, to stir the laundry when the drum is rotating; this is particularly advantageous during the washing phase.

**[0012]** The present invention will become more apparent from the following description and from the annexed drawings, wherein:

Fig. 1 shows schematic and simplified drawings of a laundry washing machine according to a front view (Fig. 1A) and a side view (Fig. 1B),

Fig. 2 shows various schematic and simplified side view embodiment examples of dragging elements being arranged in the drum of a machine according to the present invention,

Fig.3 shows various schematic and simplified front view embodiment examples of dragging elements being arranged in the drum of a machine according to the present invention, and

Fig.4 shows cross-sections of various embodiment examples of dragging elements according to the present invention.

**[0013]** Said description and said drawings are to be considered as non-limiting examples.

**[0014]** Fig. 1 shows a washing machine, indicated as a whole with reference number 1.

**[0015]** Such a machine comprises a drum 2 provided to contain laundry; the drum is the only component of the machine being shown in Fig. 1, in that it is the most important one for the purposes of the present invention.

**[0016]** The drum 2 has a cylindrical outer shape and has a cylindrical cavity in which the laundry to be washed is placed.

**[0017]** In Fig. 1, the laundry is shown as a single mass 3 on the bottom of the cavity of the drum 2; the illustration therefore refers to an idle condition of the drum 2, which is typical of a switched-off or inactive machine 1.

**[0018]** During some operating phases of the machine 1, more specifically during the washing, rinsing and spinning phases, the drum 2 rotates about an axis 20.

**[0019]** The axis 20 of the drum 2 of Fig. 1 is horizontal. On front-loading machines, recently it has been thought to tilt the drum rotation axis slightly (e.g. with an angle of 10° to 20°) in order to make it easier for the user to access the drum. Machines fitted with a drum having a vertical rotation axis have also been known for many years; machines of this type are not at present widespread on the European market and actually the present invention has not been conceived expressly for such machines.

**[0020]** The teachings of the present invention may be applied, for example, to the machine of Fig. 1.

**[0021]** Figs. 2 are just explanatory, and therefore are schematic and simplified. Figs. A to L refer to drums with a cavity having an exactly cylindrical shape; instead, Fig. 2M refers to a drum with a cavity having a substantially cylindrical shape: both flanks are equal and consist of two conical surfaces (being very flat), while the wall is slightly convex. The illustrations partially show the side profile (being "U" shaped) of the surface of the drum cavity with its axis 20.

**[0022]** Figs. 2 show various embodiment examples of dragging elements, indicated with reference numbers 21 and 22; each of these illustrations shows one (Figs. A to E) or two (Figs. F to H) or three (Figs. L and M) dragging elements, which in these examples are grouped and aligned with one another. Generally, the dragging elements are repeated and arranged evenly according to a sunburst pattern about the drum axis 20 in the drum cavity; the number of repetitions may for instance be two or three or four or five or six or seven or eight or ..., but it is typically three or four.

**[0023]** In Fig. 2A, the dragging element 21 has a "U" shape and is arranged on both cavity flanks as well as

on the cavity wall; the element 21 extends along the cavity flanks to the same extent.

**[0024]** In Fig. 2B, the dragging element 21 has a "U" shape and is arranged on both cavity flanks as well as on the cavity wall; the element 21 extends more on one cavity flank, i.e. it is about three times longer on the right flank.

**[0025]** In Fig. 2C, the dragging element 21 has an "L" shape and is arranged on the wall and on one flank of the cavity, i.e. on the right flank; the element 21 extends along the entire wall width.

**[0026]** In Fig. 2D, the dragging element 21 has an "L" shape and is arranged on the wall and on one flank of the cavity, i.e. on the right flank; the element 21 extends only along a portion of the wall width, i.e. about half the wall width.

**[0027]** In Fig. 2E, the dragging element 21 has an "I" shape, i.e. it is straight, and is arranged on one cavity flank; the element 21 starts approximately from the cavity wall and ends almost at the cavity axis 20.

**[0028]** In Fig. 2F, the dragging element 21 are two identical ones having an "I" shape, i.e. they are straight, and are arranged on the two cavity flanks, respectively; each of the two elements 21 starts approximately from the cavity wall and ends almost at the cavity axis 20.

**[0029]** In Fig. 2G, the dragging elements 21 are two different ones having an "I" shape, i.e. they are straight, and are arranged on the two cavity flanks, respectively; each of the two elements 21 starts approximately from the cavity wall; the first one, i.e. the element on the right, ends almost at the cavity axis 20; the second one is shorter than the first one, i.e. its length is approximately a third of the length of the first one.

**[0030]** In the solution of Fig. 2H there are dragging elements being arranged on the cavity flanks (designated 21), i.e. radially relative to the axis 20, as well as dragging elements being arranged on the cavity wall (designated 22), i.e. being parallel to the axis 20; the illustration shows one element 21 and one element 22; the element 22 extends along the entire wall width; the element 21 starts just above the element 22 and ends almost at the cavity axis 20.

**[0031]** In the solution of Fig. 2L there are dragging elements being arranged on the cavity flanks (designated 21), i.e. radially relative to the axis 20, as well as dragging elements being arranged on the cavity wall (designated 22), i.e. being parallel to the axis 20; the illustration shows two elements 21 and one element 22; the element 22 extends along the entire wall width; each element 21 starts just above the element 22 and ends almost at the cavity axis 20.

**[0032]** In the solution of Fig. 2M there are dragging elements being arranged on the cavity flanks (designated 21), i.e. radially relative to the axis 20, as well as dragging elements being arranged on the cavity wall (designated 22), i.e. being parallel to the axis 20. The arrangement of the dragging elements in the solution of Fig. 2M is similar to that of Fig. 2L, with some differences due to the different shape of the cavity.

**[0033]** Figs. 3 are just explanatory, and therefore are schematic and simplified. All illustrations refer to drums having cylindrical cavities. The illustrations partially show the (circular) front profile of the surface of the drum cavity with its axis 20.

**[0034]** Figs. 3 show various embodiment examples of dragging elements being arranged on one flank of the drum cavity (and not on the cavity wall), indicated with reference numbers 21; every illustration only shows one dragging element; in the illustrations there is also a dashed line representing a radial direction relative to the axis 20. Generally, the dragging elements are repeated in the drum cavity according to a typically even sunburst pattern about the drum axis 20; the number of repetitions may for instance be two or three or four or five or six or seven or eight or ..., but it is typically three or four.

**[0035]** In Fig. 3A, the element 21 is a ledge having a triangular cross-section; said element is straight and its axis follows a radial direction.

**[0036]** In Fig. 3B, the element 21 is a ledge having a triangular cross-section; said element comprises two straight segments.

**[0037]** In Fig. 3C, the element 21 is a ledge having a triangular cross-section; said element is straight and its axis is tilted with respect to a radial direction.

**[0038]** In Fig. 3D, the element 21 is a ledge having a triangular cross-section; said element is curved.

**[0039]** Figs. 4 show cross-sections of various embodiment examples of ledge-shaped dragging elements according to the present invention. All illustrations refer to dragging elements 21 being arranged on the flank of the drum cavity; in the drawings, the flank of the drum is under the element 21.

**[0040]** In Fig. 4A, the cross-section is rectangular in shape and therefore is symmetrical with respect to a radial direction (not shown).

**[0041]** In Fig. 4B, the cross-section has the shape of an isosceles triangle and therefore is symmetrical with respect to a radial direction (not shown).

**[0042]** In Fig. 4C, the cross-section has the shape of an isosceles trapezium and therefore is symmetrical with respect to a radial direction (not shown).

**[0043]** In Fig. 4D, the cross-section has the shape of a rectangular triangle and therefore is not symmetrical with respect to a radial direction (not shown).

**[0044]** It is worth noting that the cross-section of the ledges may vary along their length in terms of both size and shape.

**[0045]** In Figs. 4, the cross-sections of the elements have sharp corners because these illustrations are purely schematic and simplified; the actual corners of the dragging element will have to be made in such a way as to provide their dragging effect without damaging the laundry.

**[0046]** The examples shown in the drawings may be modified in many ways. For instance, the protrusion of the dragging elements 21 of Fig. 2 from the surface of

the drum cavity may change depending on the distance from the axis 20, so as to reduce the dimensions of the elements 21 in the central area of the drum cavity, where they are least useful; if the elements consist of ledges, this effect may be achieved by varying the cross-section of the ledge.

**[0047]** The machine according to the present invention is intended for washing and/or drying laundry, and comprises a drum for containing the laundry, which can rotate about a axis during at least one operating phase of the machine and which is fitted with elements being shaped and sized in such a way as to drag the laundry contained therein when the drum is rotating; the dragging elements are at least partially arranged radially relative to the drum axis.

**[0048]** The above definition comprises, for example, all elements 21 of Fig. 2, Fig. 3 and Fig. 4, as well as elements being shaped, sized and arranged in very different manners, as will become more apparent from the following; it is worth noting, for example, that the element 21 of Fig. 2C is arranged partly in the radial direction (vertical segment) and partly in the axial direction (horizontal segment); it is also worth noting, for example, that the element 21 of Fig. 2M is arranged for the most part in the radial direction and for the least part in the axial direction, in that it lies on a plane being slightly tilted with respect to the plane being perpendicular to the axis 20.

**[0049]** The arrangement according to the present invention, i.e. the radial arrangement, also allows, among other things, to stir the laundry while the drum is rotating. For instance, with reference to Fig. 1B, if in the cavity of the drum 2 there are elements being arranged radially near the right flank of the drum cavity, the items of the laundry 3 being on the right of the cavity will tend to be dragged, whereas the items of the laundry 3 being at the center of the cavity will not tend to be dragged; the laundry 3 will thus be stirred during the rotation of the drum 2; such stirring action is particularly advantageous during the wash phase.

**[0050]** Using the laundry stirring effect does not necessarily prevent from using in the drum the laundry lifting effect as well, which is typical of dragging elements being arranged axially; the combined use of both effects is provided in the examples of Fig. 2A, Fig. 2B, Fig. 2C,

**[0051]** Fig. 2D, Fig. 2H, Fig. 2L, and Fig. 2M; besides, dragging elements being arranged in the radial direction only may provide both a stirring effect and a lifting effect, if appropriately shaped.

**[0052]** The dragging elements may be shaped as simple hollow or solid ledges.

**[0053]** Typically, the drum axis is substantially horizontal; the radial elements are equally effective with either perfectly horizontal drums or slightly tilted drums.

**[0054]** The present invention particularly applies to drums having a substantially cylindrical outer shape and, above all, being provided with a cavity having a substantially cylindrical inner shape; this is the case of all the examples shown in the drawings.

**[0055]** If the radial dragging elements consist of protrusions projecting from the cavity surface, they will take up very little space and the various points of the cavity will be easily accessible, as is the case of all dragging elements shown in the drawings; preferably, said elements project from the cavity surface in the axial direction, as is particularly apparent for the elements 21 of Figs. 2E to 2M.

**[0056]** The dragging elements may be integrated with the surface of the cavity; for example, they may be obtained by appropriately shaping the drum flanks; in such a case, said elements are usually made of metal.

**[0057]** As an alternative, the dragging elements may be applied onto the cavity surface; in this way it is easier to shape and size the elements as appropriate; in such a case, said elements are usually made of a plastic material or partly of a plastic material and partly metal.

**[0058]** In the presence of elements being applied onto the cavity surface, it is advantageous from both the machine production and maintenance viewpoints that said elements be made in such a way as to be easy to assemble and remove from the surface; moreover, the user may thus decide whether to use the machine with or without the radial dragging elements.

**[0059]** The radial dragging elements may be arranged at least partially on just one flank of the cylindrical cavity, as in the examples of Fig. 2C, Fig. 2D, Fig. 2E, Fig. 2H. Such a choice is typically made for front-loading machines; as a matter of fact, in these machines there is little room available for mounting dragging elements beside the glass door bowl. Nonetheless, this choice is simple and very effective for any machine; in fact, the laundry stirring effect is obtained because the dragging effect is highest on one flank (the right one in Figs. 2) and lowest on the other one (the left flank in Figs. 2).

**[0060]** Alternatively, the radial dragging elements may be arranged at least partially on both flanks of the cylindrical cavity, as in the example of Fig. 2A, Fig. 2B, Fig. 2F, Fig. 2G,

**[0061]** Fig. 2L, Fig. 2M; it is worth noting that the solutions of Fig. 2B and Fig. 2G may also be applied to front-loading machines, because the elements (on the left) do not extend to the area of the glass door bowl.

**[0062]** A terminological distinction should be made: in top-loading machines, the "flanks" of the drum are generally called "flanges"; in front-loading machines, the "flank" of the drum is generally called "drum bottom".

**[0063]** By shaping and/or sizing and/or arranging the radial dragging elements on a first flank differently from the radial dragging elements on a second flank, it is possible to achieve a differentiated dragging action on the two flanks and thus a stirring effect; in the examples of Fig. 2B and Fig. 2G, the elements are sized differently; a stirring effect is however obtained also if the elements on one flank are equal to but not aligned with the elements on the other flank, i.e. different from those shown in Figs. 2, in particular Fig. 2F, Fig. 2G, Fig. 2L and Fig. 2M.

**[0064]** The dragging elements according to the

present invention may be simple straight ones and still be effective, as is the case of the elements 21 of Fig. 3A and Fig. 3C.

**[0065]** Alternatively, the dragging elements according to the present invention may be curved, as is the case of the element 21 of Fig. 3D.

**[0066]** As a further alternative, the dragging elements according to the present invention may consist of two segments, each being either straight or curved; the element 21 of Fig. 3B consists of two equal, straight segments.

**[0067]** As shown in Figs. 3, all these dragging elements are arranged radially, but the axis of one such element only, i.e. the one of Fig. 3A, coincides with a radial direction.

**[0068]** The dragging elements according to the present invention may be advantageously asymmetrical relative to a radial direction; this is the case of the elements 21 of Fig. 3B, Fig. 3C and Fig. 3D as far as their shape is concerned.

**[0069]** The asymmetry may however be given by the cross-section of the element rather than by its shape, as is the case of the element 21 of Fig. 4D.

**[0070]** In order to obtain a very effective action from the dragging elements, the latter may be shaped and arranged in such a way that when the drum is rotating in a first direction they perform a high dragging action on the laundry, whereas when the drum is rotating in a second direction they perform a low dragging action or, at the theoretical limit, no dragging action at all on the laundry. This effect is efficacious during both the washing and rinsing phases, but mostly during the washing phase; as known, during these two phases the drum is turned first in a direction and then in the opposite direction. This effect may be achieved by using dragging elements being asymmetrical relative to a radial direction.

**[0071]** As previously stated, radial dragging elements may advantageously be combined with axial dragging elements; more specifically, according to the present invention the machine may comprise further dragging elements being arranged at least partially in a direction being parallel to said axis. These further elements correspond, in the examples of Fig. 2, to the elements 22 being present in Fig. 2H, Fig. 2L and Fig. 2M.

**[0072]** Axial dragging elements also provide a lifting effect.

**[0073]** Advantageously, said further dragging elements are arranged at least partially on the wall of the cylindrical cavity of the drum, as in Fig. 2H, Fig. 2L and Fig. 2M.

## Claims

1. Laundry washing and/or drying machine (1) comprising a drum (2) for containing the laundry (3), which rotates about an axis (20) during at least one operating phase of the machine and which is fitted with elements (21) being shaped and sized in such a way as to drag the laundry (3) contained therein when the drum (2) is rotating, **characterized in that** said dragging elements (21) are at least partially arranged radially relative to said axis (20).

2. Machine according to claim 1, wherein said dragging elements (21) are ledge-shaped.

3. Machine according to claim 1 or 2, wherein said axis (20) is substantially horizontal.

4. Machine according to claim 1 or 2 or 3, wherein said drum (2) has a substantially cylindrical outer shape.

5. Machine according to claim 1 or 2 or 3 or 4, wherein said drum (2) has a cavity.

6. Machine according to claim 5, wherein said cavity has a substantially cylindrical shape.

7. Machine according to claim 5 or 6, wherein said dragging elements (21) consist of protrusions which project from the surface of said cavity, preferably in the axial direction.

8. Machine according to claim 7, wherein said dragging elements (21) are integrated with the surface of said cavity.

9. Machine according to claim 7, wherein said dragging elements (21) are applied onto the surface of said cavity.

10. Machine according to claim 9, wherein said dragging elements (21) can be easily assembled or removed from the surface of said cavity.

11. Machine according to one of claims 6 to 10, wherein said dragging elements (21) are arranged at least partially on just one of the two flanks of said cylindrical cavity.

12. Machine according to one of claims 6 to 10, wherein said dragging elements (21) are arranged at least partially on both flanks of said cylindrical cavity.

13. Machine according to claim 12, wherein the dragging elements on a first flank are shaped and/or sized and/or arranged differently from the dragging elements on a second flank.

14. Machine according to one of claims 1 to 13, wherein said dragging elements (21) are straight.

15. Machine according to one of claims 1 to 13, wherein said dragging elements (21) are curved.

**16.** Machine according to one of claims 1 to 13, wherein said dragging elements (21) comprise at least two segments.

**17.** Machine according to one of the previous claims, wherein said dragging elements (21) are asymmetrical relative to a radial direction.

**18.** Machine according to claim 17, wherein said dragging elements (21) have an asymmetrical cross-section.

**19.** Machine according to one of the previous claims, wherein said dragging elements (21) are shaped and arranged in such a way that when the drum (2) is rotating in a first direction said elements (21) perform a high dragging action on the laundry (3), when the drum (21) is rotating in a second direction said elements (21) perform a low dragging action on the laundry (3).

**20.** Machine according to one of the previous claims, **characterized in that** it comprises further dragging elements (22) being arranged at least partially in a direction being parallel to said axis (20).

**21.** Machine according to claim 20, wherein said further dragging elements (22) are arranged at least partially on the wall of said cylindrical cavity.

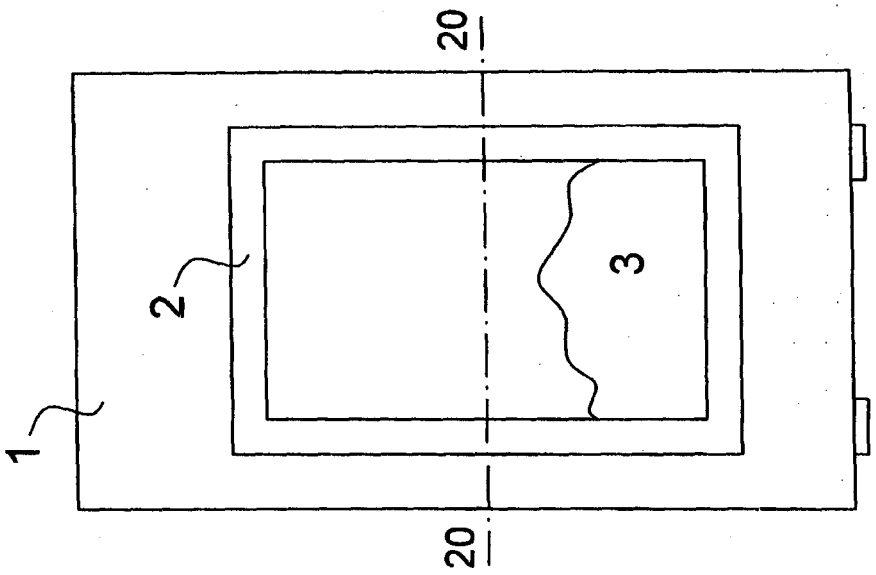



Fig.1B

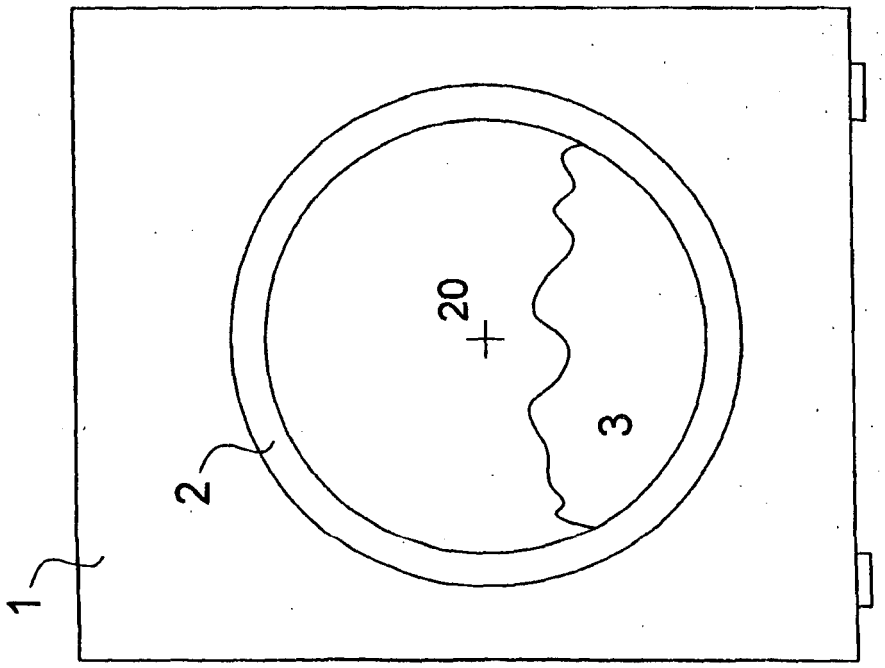



Fig.1A

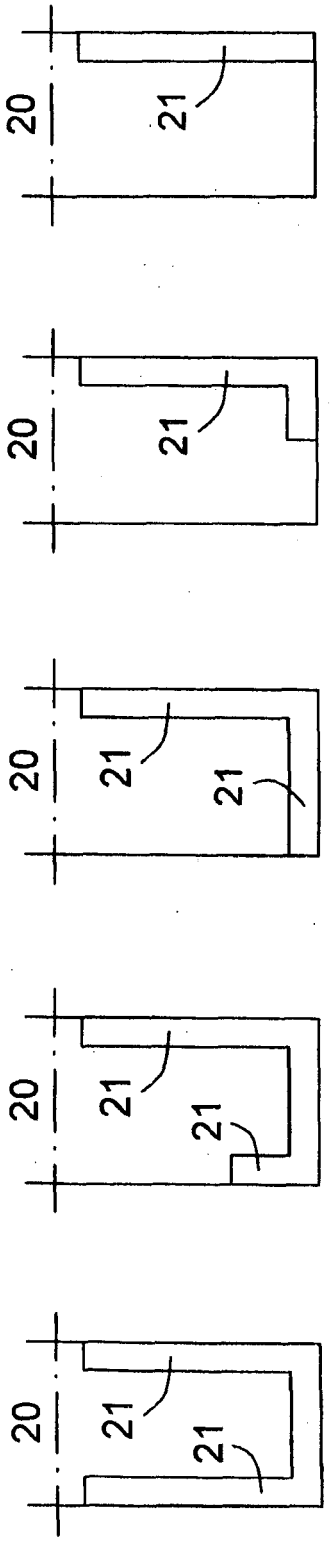



Fig.2A




Fig.2B




Fig.2C




Fig.2D




Fig.2E



Fig.2F

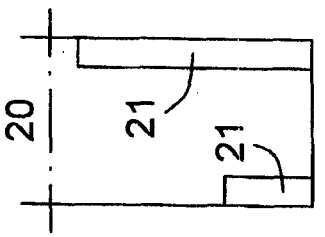



Fig.2G

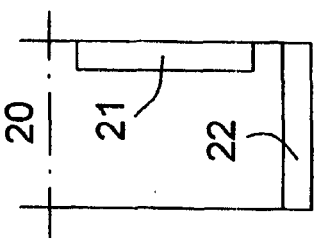



Fig.2H

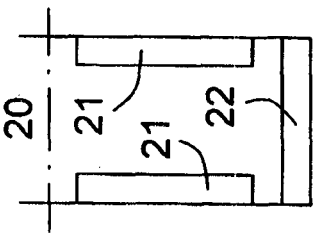



Fig.2L

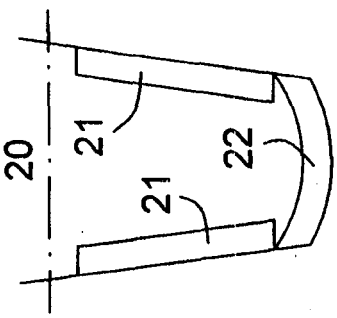



Fig.2M

Fig.3B

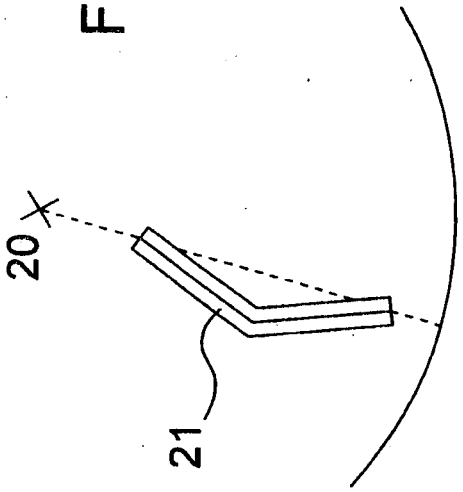



Fig.3D

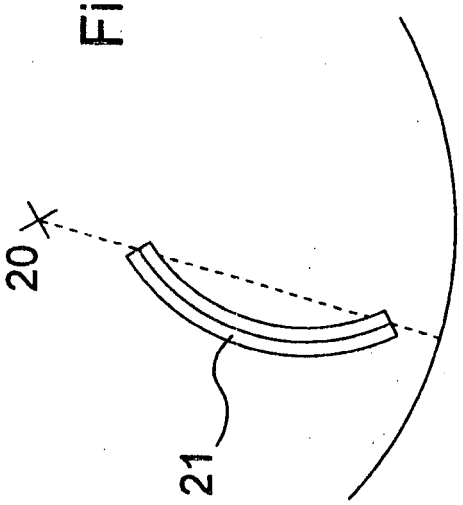



Fig.3A

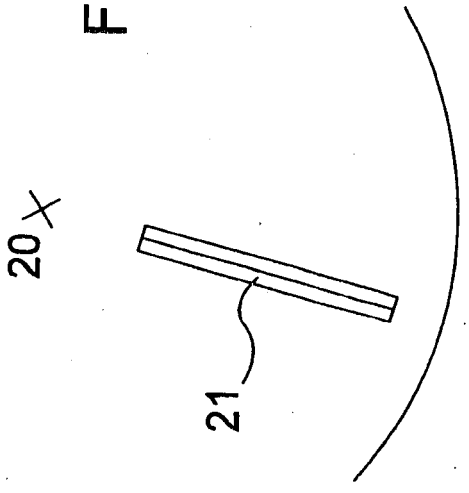
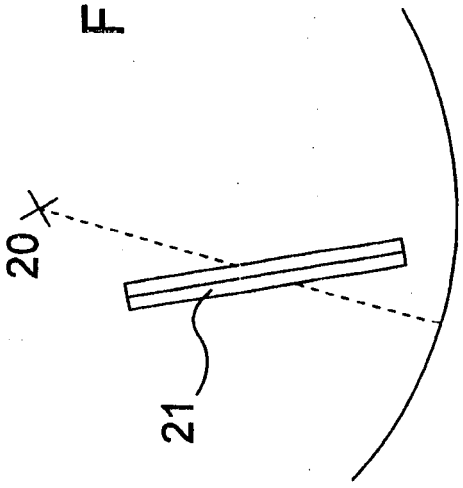



Fig.3C



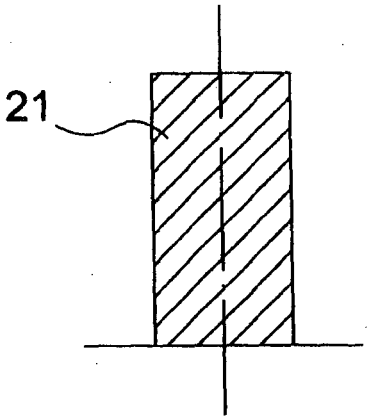



Fig.4A

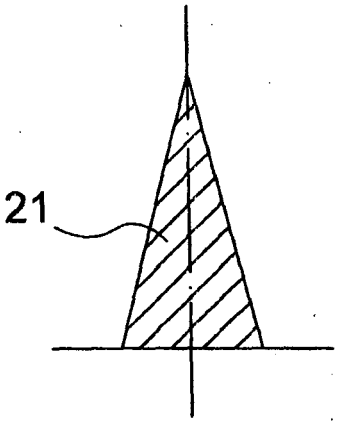



Fig.4B

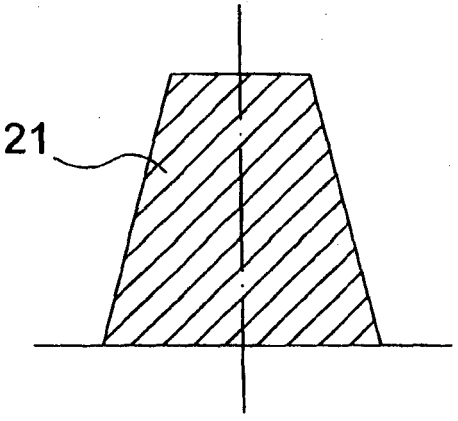



Fig.4C

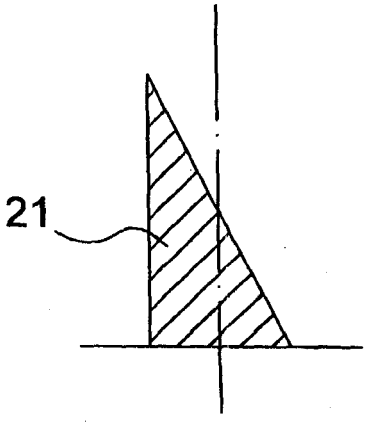



Fig.4D

European Patent Office

# EUROPEAN SEARCH REPORT

Application Number
EP 05 10 9400

## 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<br>Y | US 2 574 985 A (RUSSELL WILLIAM J)<br>13 November 1951 (1951-11-13)<br>* column 4, line 10 - line 44 *<br>* column 6, line 34 - line 63; figures 1,6 *<br>----- | 1-9,<br>11-15<br>19-21 | D06F37/06 |
| X | US 3 736 775 A (SMITH T,US)<br>5 June 1973 (1973-06-05)<br>* column 3, line 15 - column 4, line 7; figures *<br>----- | 1,2,<br>4-11,14,<br>15,19 | |
| Y | US 6 543 074 B1 (WUNDERLICH DANIEL F)<br>8 April 2003 (2003-04-08)<br>* column 2, line 31 - line 58; figures *<br>----- | 19-21 | |
| X | US 4 207 760 A (BOCHAN, JOHN)<br>17 June 1980 (1980-06-17)<br>* column 10, line 55 - line 63; figure 19 *<br>----- | 1,2,4-9,<br>11 | |
| X | US 2 575 691 A (SMITH THOMAS R)<br>20 November 1951 (1951-11-20)<br>* column 4, line 7 - line 59; figure 2 *<br>----- | 1,4-8,<br>11,14,15 | TECHNICAL FIELDS SEARCHED (IPC)<br>D06F |
| X | US 4 920 661 A (FUKUZAWA ET AL)<br>1 May 1990 (1990-05-01)<br>* column 2, line 10 - line 52; figure 2 *<br>----- | 1,2,4-6 | |
| A | DE 906 926 C (LICENTIA PATENT-VERWALTUNGS-G.M.B.H)<br>18 March 1954 (1954-03-18)<br>* the whole document *<br>----- | 1-21 | |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 13 January 2006 | Lodato, A |

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 10 9400

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
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13-01-2006

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2574985 A | 13-11-1951 | NONE | |
| US 3736775 A | 05-06-1973 | CA 989638 A1 | 25-05-1976 |
| US 6543074 B1 | 08-04-2003 | NONE | |
| US 4207760 A | 17-06-1980 | BR 7906315 A | 27-05-1980 |
| | | CA 1112067 A1 | 10-11-1981 |
| | | JP 55063685 A | 13-05-1980 |
| US 2575691 A | 20-11-1951 | NONE | |
| US 4920661 A | 01-05-1990 | AU 597191 B2 | 24-05-1990 |
| | | AU 2349688 A | 13-04-1989 |
| | | CA 1310841 C | 01-12-1992 |
| | | JP 1097499 A | 14-04-1989 |
| DE 906926 C | 18-03-1954 | NONE | |

EPO FORM P0459

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