(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 025 791 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.02.2009 Bulletin 2009/08

(51) Int Cl.:
D06B 5/24 *(2006.01)* ***D06B 5/26*** *(2006.01)*
D06F 23/00 *(2006.01)* ***D06B 23/00*** *(2006.01)*

(21) Application number: **08013079.2**

(22) Date of filing: **21.07.2008**

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

(30) Priority: **09.08.2007 IT TV20070137**

(71) Applicant: **Avantec Costruzioni Meccaniche Srl**
36064 Villaraspa di Mason (IV) (IT)

(72) Inventor: **Dalla Valle, Vittorio**
36030 Lugo di Vicenza (VI) (IT)

(74) Representative: **Massa, Patrizia**
D'Agostini Group S.r.l.
Viale Mazzini 142
00195 Roma (IT)

(54) Apparatus for dyeing and/or washing delicate garments with double basket

(57) Apparatus for dyeing and/or washing delicate garments including a body (2) equipped with a dyeing bath containment basin (3) within the dyeing basin there being a drum (4) hinged to a rotational hollow shaft (43) provided with a lot of bath movement paddles (44), where internally to the drum (4) there is a basket (7) whose rotational axis is housed inside the hollow shaft (43) of the drum (4) where a pulley is keyed to the rotational hollow shaft (43) of the drum (4) and a pulley is keyed to the rotational axis of the basket (7), each pulley being conventionally moved by means of belts by independent electric motors in such a way that the movement of the drum (4) and the movement of the basket (7) are independent.

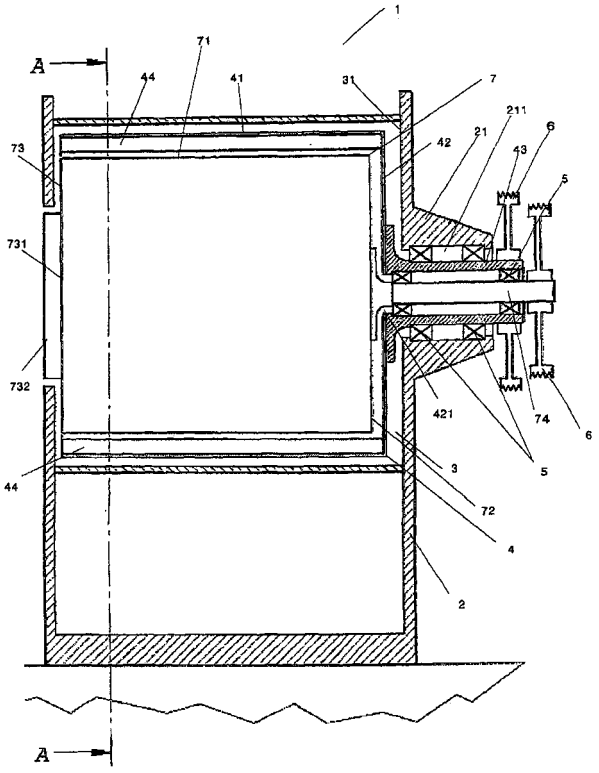

Fig. 1

EP 2 025 791 A1

Description

Domain

[0001] This invention has as object an apparatus for dyeing and/or washing delicate garments.

[0002] The invention, finds particular but not exclusive application in the field of the production of devices for dyeing and/or washing fabric, particularly fabric and garments made with delicate fabric.

[0003] Dyeing techniques for fabric and yarns have been known and diffused for some time. In extreme synthesis the dyeing process provides the bestow of a colour different from the one that would be the natural colour of the yarn or fabric transferring the colouring from the dye bath to the fibre, so as to distribute it uniformly and steadily fix it. The state of the art provides different dyeing possibilities according to the fact that the dyeing is respectively performed: on patch, on fibre, on paste, on yarn or on garment. Substantially, the dyeing process "on patch" consists in dyeing the fabric once its weaving phase is completed, as for the dyeing process "on fibre", the painting is carried out on tapes of fibres later coupled, ironed and submitted to spinning. The dyeing process "on paste", that occurs on chemical fibres, sees that the dyeing is carried out adding some coloured pigments to the paste to be extruded in such a way that after the extrusion coloured yarns are obtained. In the dyeing process "on yarn", the yarn itself, wound in reel or in skein, is provided for submission to the dyeing operation so as to obtain the homogenous colouring of the yarn itself. Finally, the dyeing process "on garment", at present obtaining results with scarce value, provides immerging off-the-pegs in a dye bath. Referring to the off-the-peg dyeing, particularly of items in wool such as sweater or outerwear, the results of current dyeing processes revealed to be little appreciable because of the noteworthy difficulties encountered for obtaining a quality finished product. In the present state of the art, with reference to knitted garments, the dyeing methods substantially are of three kinds. A first method provides the dyeing of the finished garment by means of the use of machines conventionally defined of the "Dutch" type. Substantially such machines consist in oval shaped baths inside of which the dyeing bath is circulated through a predisposed paddle moving mechanism which allows the garments immersed in the dyeing bath to follow the impressed circulation movement. The dyeing process "on yarn" substantially provides for the use of two technologies of a different kind, according to which the dyeing of the yarn occurs when the same is wound in reel or in skeins. If the dyeing of the yarn occurs when the same is wound in reels, the arrangement of the reels to be dyed are in suitable pressurized autoclaves where the dyeing bath is moved and forcedly circulated between the reels to be dyed. The dyeing method providing for the use of skeins is particularly employed in the tinting of wool yarns of the thin and delicate type. Substantially, the yarn skeins, aligned in rows, are set inside suitable cabinets being sustained by suitable rods, where the dyeing bath is forcedly circulated between the arranged skeins. Another used process is that providing for the dyeing of the woollen fabric in opened or tubular fabric. To carry out such a type of working an autoclave is used, inside of which the material to be dyed in the form of contiguously seamed "patches" forming a sort of rope seamed at the ends is placed circulating in the dyeing bath as well as the material to be dyed. Substantially, the fabric in the form of head-tail seamed rope is closed on the outside of a reel and, by means of the rotational motion of the reel, the rope of fabric is moved in the area of the autoclave following a forced circuit. The reel is placed on the upper part of said forced circuit and just before the injection point of the dyeing bath is located in such a way that the fabric is coloured passing through such point. The dyeing bath is provided for placed in the underside of the autoclave and part of it circulates together with the fabric. The injection of the bath in the dyeing point usually occurs by means of circulation pumps or systems conventionally defined "jet".

Prior art

[0004] In the known present state of the art, there are multiple traceable solutions in patent literature about machines or improvements to machines for dyeing yarns and/or fabrics with particular reference to the solutions with a basket for the positioning of the material to be treated. Merely as an example, a first solution can be found in EP1295689 (Steiner) in which an apparatus for colouring woolen fabric is described. Synthetically the wool fabric colouring device is expected to be provided with a device for the entry of the wool, a device for the entry of the dye and a water output device. Furthermore, the apparatus is expected to be equipped with a drum with an entry and an exit at opposite ends of the cylindrical body of the drum. Moreover the cylindrical wall of the drum is expected to be internally provided with a spiral which provides for the movement of the wool from the entry end to the exit end of the drum.

[0005] A second solution is described in US2002/0017118 (Held et al.) in which a type of drum for a fabric dyeing machine is illustrated. In short, the solution provides a drum subdivided in sections according to a radial partition. The provided partitions are connected to the walls of the drum through narrow perforated walls through which the dyeing liquid is discharged. The wall of the drum and the provided partitions on the contrary have no perforations. Said partitions are connected to a perforated pipe placed at the centre of the drum through which the introduction of the dyeing liquid is provided.

[0006] A third proposed solution can be found in WO2004/044300 (Arizzi) in which a machine for treating fabric immersed in a bath is described, particularly for the dyeing of clothes. Briefly put, the machine includes

a rotating drum defining a charging compartment in which the clothes to be treated are placed, where further a sealing closed outer wall is present in order to avoid letting the dyeing bath exit.

[0007] Another solution is present in JP2004060107 (Takigawa) in which a rotating drum type apparatus for treating textile fibres is described. The declared aim of the invention aims to realize a delicate dyeing bath without the use of a pump for the movement of the dyeing bath itself. In a few words, the claimed apparatus provides for the charging of the apparatus itself with the textile fibres to be treated with the dyeing within a first drum similar to an internal cylinder rotationally installed relatively to a horizontal shaft in an external drum. The solution provides a lot of paddles for the liquid collection interposed between the internal drum and the external drum in a block at the rear end of the internal drum. Furthermore, there are a number of accumulation projections, by means of a special opening, being in communication with said liquid collection paddles and extending for almost the whole length of the inside wall of the drum and there are also accumulation elements, said accumulation elements being provided with a lot of openings placed at the upside of the accumulation elements, where the same are actuated in order to allow the release of the accumulated liquid with the rotational motion of the drum in order to constitute a cascade fall mechanism of the liquid.

[0008] All these things considered it is therefore reasonable to consider known:

- fabric dyeing apparatuses provided with a perforated moving basket in a dyeing bath;
- fabric dyeing apparatuses provided with an internal moving basket and an external basket;
- fabric dyeing apparatuses provided with devices in order to obtain a cascade effect.

Drawbacks

[0009] All said solutions have, though in different measures, drawbacks and/or limitations.

[0010] A first characteristic limitation of all of the known solutions for fabric dying apparatuses consists in the present impossibility to proceed to a quality dyeing of the outerwear and in particular of the finished garment made with delicate fabric such as, for example, wool.

[0011] A second limitation, also involving all of the known solutions for fabric dying apparatuses, in the opinion of the applicant, consists in the verified difficulty of dyeing finished garments, particularly if they are made using delicate fabric. In fact it has been noticed that at present it is impossible to eliminate the disadvantage given by the mechanical action exercised by the movement of the fabric against the walls of the basket with consequent abrasion problems, anomalous tensioning of yarns, matting, permanent creases formation and possible formation of "striations".

[0012] Another limitation consists in the fact that the known current solutions for fabric dying apparatuses not obtaining noteworthy results on finished garments determine a considerable lengthening of the confection time of the garment often creating problems related to the stock remnants of dyed yarns or fabrics with negative consequent repercussions regarding the overall costs of the product.

[0013] It is therefore necessary for the enterprises of the field to find optimal solutions to obtain the following set aims.

Summary of the invention

[0014] These and other aims are reached by this invention according to the characteristics as for the included claims, solving the abovementioned problems by means of an apparatus for dyeing and/or washing delicate garments including a body equipped with a dyeing bath containment basin within which there is a drum hinged to a rotational hollow shaft and provided with a lot of bath movement paddles, where internally to the drum there is a basket whose rotational axis is housed inside the hollow shaft of the drum where a pulley is keyed to the rotational hollow shaft of the drum as well as a pulley is keyed to the rotational axis of the basket each pulley of which is conventionally moved by means of belts by independent electric motors in such a way that the movement of the drum and the movement of the basket are independent.

Aims

[0015] By means of the considerable creative contribution whose effect constitutes an immediate technical progress different aims and advantages are achieved.

[0016] A first advantageous aim consists in the realization of an apparatus for dyeing and/or washing delicate garments thanks to the innovative structuring of which a finished garment optimal dyeing can be realized also and particularly in the case in which the confection of the same has been made using delicate fabric.

[0017] A second advantageous aim consists in the realization of an apparatus for dyeing and/or washing delicate garments with the innovative structuring which allows for the solving of the current models' problems regarding the dyeing and/or washing of delicate garments, particularly preventing their characteristic drawbacks allowing for the avoidance of the mechanical rubbing of the garment and the consequent arising damages, as well as avoiding the dyeing or washing process's causing damages to the garment made with delicate fibres due to the occurring of an anomalous tensioning of yarns rather than to problems concerning matting, forming of permanent creases or due to the formation of striations of anomalous colouring.

[0018] A third advantageous aim consists in the realization of an apparatus for dyeing and/or washing delicate

garments with the innovative structuring which obtains an optimal dyeing of woolen garments or garments made with other delicate fibres, as well as of those made knitted and items in fabric.

[0019] One more advantageous aim consists in the realization of an apparatus for dyeing and/or washing delicate garments whose innovative structuring, allowing for the dyeing directly on the finished garment, allows the finishing treatments to be carried out directly on the raw fabric.

[0020] A last advantageous aim consists in the realization of an apparatus for dyeing and/or washing delicate garments whose innovative structuring remarkably reduces the processing times of the confectioned garment avoiding the drawbacks deriving from the necessary waste of coloured material following the confectioning and, furthermore, allowing for the product cost contain.

[0021] These and other advantages will appear from the following detailed description of some preferred embodiments with the aid of enclosed schematic drawings whose embodiment details are not to be considered limitative but only illustrative.

Content of drawings

[0022]

Figure 1, is a sectional view of the apparatus for the dyeing and/or washing of delicate garments regarding the invention object of this invention;

Figure 2, is a sectional view along the axis A-A of the apparatus for the dyeing and/or washing of delicate garments of figure 1.

Practical embodiment of the invention

[0023] With reference to the figures one can observe an apparatus **1** for the dyeing and/or washing of delicate garments the base solution of which as described in the disclosed example (fig. 1 and fig. 2) includes a weight-bearing body **2** conventionally realised in such a way as to encompass and be suitable for the allocation of the functional components of the apparatus and of the devices and controls that conventionally integrate the functioning. More in detail, the body **2** is provided to comprise a basin **3** for the dyeing and/or washing bath containing, the basin **3** conventionally provided with an opening **31** suitable for allowing the loading of the apparatus **1** with the garments to be dyed and/or washed.

[0024] Inside the provided basin **3** the apparatus **1** there is a cylindrical drum **4** including a perforated cylindrical perimetrical wall **41** being provided with a lot of through-holes on the whole surface, conventionally but not necessarily equidistantly located one with respect to the other usually, but not necessarily, being placed in parallel rows. Conventionally, the cylindrical perimetrical wall **41** is orthogonally connected and sustained by a circular bottom wall **42.** The bottom wall **42** of the drum **4**, at the centre, has a through-hole **421**.

Furthermore, the bottom wall **42** of the drum **4**, in order to make rotational motion of the same possible, keys a rotational hollow shaft **43**.

[0025] The hollow shaft **43,** in the drum **4,** is to be placed at a shaft-carrying body **21** which is in the body **2** of the apparatus **1**. The provided shaft-carrying body **21** realizes a passing-through housing **211**, conventionally realized in such a way that it is able to allow the axial holding of the hollow shaft **43** regarding the drum **4**, where the holding of the hollow shaft **43** to the shaft-carrying body **21** occurs by means of the interposition of friction reduction devices conventionally such as antifriction bearings **5.** The obtained housing **21 1** of the shaft-carrying body **21** of the body **2** is such that it is centrally positioned relatively to the back wall **31** of the basin **3,** in such a way that the drum **4** is centred relatively to the basin **3** itself, the basin **3,** in the example, being shaped in such a way as to be cylindrical.

[0026] In order to be able to give the drum **4** a rotational movement, that can be in clockwise as can be anti-clockwise, there is a pulley **6,** keyed at the rear end of the hollow shaft **43,** opposite the end connected to the bottom wall **42,** conventionally keyed to the hollow shaft **43.** Indifferently the rotational motion of the drum can be carried out also by means of different, conventional, systems for the transmission of the motion to the hollow shaft **43** such as, for example, gears. The cylindrical perimetrical wall **41** of the drum **4** has further, at the internal surface, a series of paddles **44** which, in the example described as preferred embodiment, are identically shaped, radially arranged and each of them extending for the entire length of the cylindrical perimetrical wall **41** itself.

[0027] More in detail, each paddle **44** is shaped in such a way as to be shaped as a rectangular plate, where each paddle **44** is to be positioned parallel with respect to the contiguous paddle **44**. However, there is also the possibility for each paddle **44** profile to be shaped differently with respect to the rectangular shape provided in the basic solution, likewise the reciprocal positioning of each paddle **44** may also not be parallel. Moreover, there is the possibility for the provided paddles **44** to also be arranged so that not all of them are on the same plane being positioned in a scalar way and/or alternative scalar way.

[0028] Internally to the drum **4**, axially to the same, there is a cylindrical basket **7**, able to contain the garments to be treated, shaped in such a way as to comprise a cylindrical wall **71** conventionally perforated in order to allow the passage of the dyeing and/or washing liquid, at the external edge of which there is an orthogonal closed circular bottom **72**, oppositely to this circular bottom **72** conventionally there is a front wall **73**, with a central opening **731** the latter, near the edge, having a protruding reinforcing edge **732** in such a way that through the provided central opening **731** the loading of the basket **7** with the garments to be treated is conventionally allowed.

[0029] Centrally joined to the circular bottom **72** of the basket **7**, there is a rotational axis **74** for the support and the movement of the basket **7**. More in detail, the axis **74** of the basket **7**, by means of the interposition of friction reduction devices conventionally such as some antifriction bearings **5,** is placed internally to the hollow shaft **43** of the drum **4**, the axis **74** of the basket **7** being provided to be centred relatively to the inside of the hollow shaft **43** in such a way that, on its part, the basket **7** is centred relatively to the drum **4**. Furthermore, the axis **74** of the basket **7** has a length which is relatively greater than the length of the hollow shaft **43** in such a way that the rear end of the axis **74** itself on the side protrudes from the hollow shaft **43** of the drum **4.** In order to be able to give the basket **7** a rotational motion, which is established to be possibly both in clockwise as anti-clockwise, a pulley **6,** conventionally keyed to the axis **74,** is provided to be keyed at the end of the axis **74** exiting from the hollow shaft **43** of the drum **4.** In the same way as provided for the drum **4,** indifferently the rotational motion of the basket **7** is provided to be able to be made also by means of different, conventional systems for the transmission of the motion such as, for example, gears. As the rotational motion of the drum **4** as the rotational motion of the basket **7** are allowed by means of independent electric motors, each of them being connected to the related pulley **6,** in the embodiment example described, conventionally by means of driving-belts.

[0030] Furthermore, the cylindrical wall **71** of the basket **7** internally has protrusive walls **75** radially arranged conventionally being shaped in such a way that the orthogonal section of the same is shaped as a trapezium and that they are equidistantly placed the one from the other whether or not being perforated. In the preferred solution that will be described, the distance intercurring between the cylindrical perimetrical wall **41** of the drum **4** and the cylindrical wall **71** of the basket **7** is provided to preferably be contained between **5** and **10** centimetres, while the distance intercurring between the cylindrical perimetrical wall **41** of the drum **4** and the circular wall of the basin **3** is provided to preferably be **3** centimetres.

[0031] Furthermore the apparatus **1** is provided to have, mounted externally to the machine body, a heat exchanger consisting of a plate provided with a series of pipes inside of which a fluid at a controlled temperature is circulated, whose provided heat exchanger is placed outside at the underside of a wall of the body **2** in order to be able, by means of thermal conduction, to heat or cool the dyeing bath.

[0032] Operatively, the basin **3** contains the dyeing bath whose level is such as to reach at least the lower end of the basket **7**. The dyeing bath circulation is ensured by means of the rotation of the drum **4** that, preferably rotating at a rotational speed between **1 50** and **200** revolutions per minute, allows, thanks to the action of the paddles **44** with which the drum **4** itself is provided, to generate a bath vortex in such a way that the dyeing liquid is pushed by the drum **4** itself towards the walls of the basin **3** the latter generating a counter-pressure effect of the dyeing liquid in such a way that the same will be repelled inwardly being forced toward the drum **4** and the basket **7.** In consequence of the effect generated by the rotation of the drum **4,** the dyeing bath will be forced to go beyond both the cylindrical perimetrical wall **41** of the drum **4**, as the cylindrical wall **71** of the basket **7** so as to create a shower effect able to penetrate the fibres of the contained garments in the basket **7** itself, though the item remaining substantially still. However, in order to allow for the minimum movement of the garments, the possibility for the basket **7** to be allowed a slow rotational motion is provided, directed in the same or in the opposite direction with respect to the rotational motion in the drum **4.**

Reference:

[0033]

1 apparatus;
2 body; **21** shaft-carrying body; **21 1** housing;
3 basin; **31** opening;
4 drum; **41** cylindrical perimetrical wall; **42** bottom wall; **421** through-hole; **43** hollow shaft; **44** paddle;
5 bearing;
6 pulley;
7 basket; **71** cylindrical wall; **72** circular bottom; **73** front wall; **731** central opening; **732** protruding border; **74** axis; **75** protrusive walls.

Claims

1. Apparatus **1** for dyeing and/or washing delicate garments of the type including a body **2** and a basin **3** for the dyeing bath **characterised in that** within the basin **3** there is a drum **4** inside of which there is a basket **7** where both the drum **4** and the basket **7** rotate independently from one another.

2. Apparatus **1** for dyeing and/or washing delicate garments according to claim **1 characterised in that** the drum **4** has a perforated cylindrical perimetrical wall **41** equipped with at least one paddle **44** and **in that** the basket **7** is equipped with a perforated cylindrical wall **71**.

3. Apparatus 1 for dyeing and/or washing delicate garments according to the claims **1** and **2 characterised in that** the drum **4** has radially arranged paddles 44 and a bottom wall **42** with a centrally positioned through-hole **421**, where a rotational hollow shaft **43** is keyed to the bottom wall **42** and there is a basket **7** with a circular bottom **72** in the centre of which there is a rotational axis **74** where the axis **74** of the basket **7** centrally finds seat at the hollow shaft **43** of the drum **4** by means of the interposition of friction

reduction devices the hollow shaft **43** of the drum **4** being placed, by means of the interposition of friction reduction devices, at the passing through housing **211** of the shaft-carrying body **21** pertaining to the body **2** of the apparatus **1**.

4. Apparatus **1** for dyeing and/or washing delicate garments according to the previous claims **characterised in that** the drum's **4** paddles **44** are parallel and equidistant from one another.

5. Apparatus **1** for dyeing and/or washing delicate garments according to the previous claims **characterised in that** the distance intercurring between the cylindrical perimetrical wall **41** of the drum **4** and the cylindrical wall **71** of the basket **7** is between 5 +/-10% and 10 +/-10% centimetres, while the distance intercurring between the cylindrical perimetrical wall **41** of the drum **4** and at least one wall of the basin **3** is between 1 +/-10% and 5 +/-10% centimetres.

6. Apparatus **1** for dyeing and/or washing delicate garments according to the previous claims **characterised in that** the apparatus **1** has a heat exchanger consisting of a plate provided with a series of pipes inside of which a fluid at controlled temperature is circulated, provided heat exchanger being placed at a wall of the body **2.**

7. Apparatus **1** for dyeing and/or washing delicate garments according to the previous claims **characterised in that** the basket **7** is centred relatively to the drum **4.**

8. Apparatus **1** for dyeing and/or washing delicate garments according to the previous claims **characterised in that** the friction reduction devices are anti-friction bearings **5**.

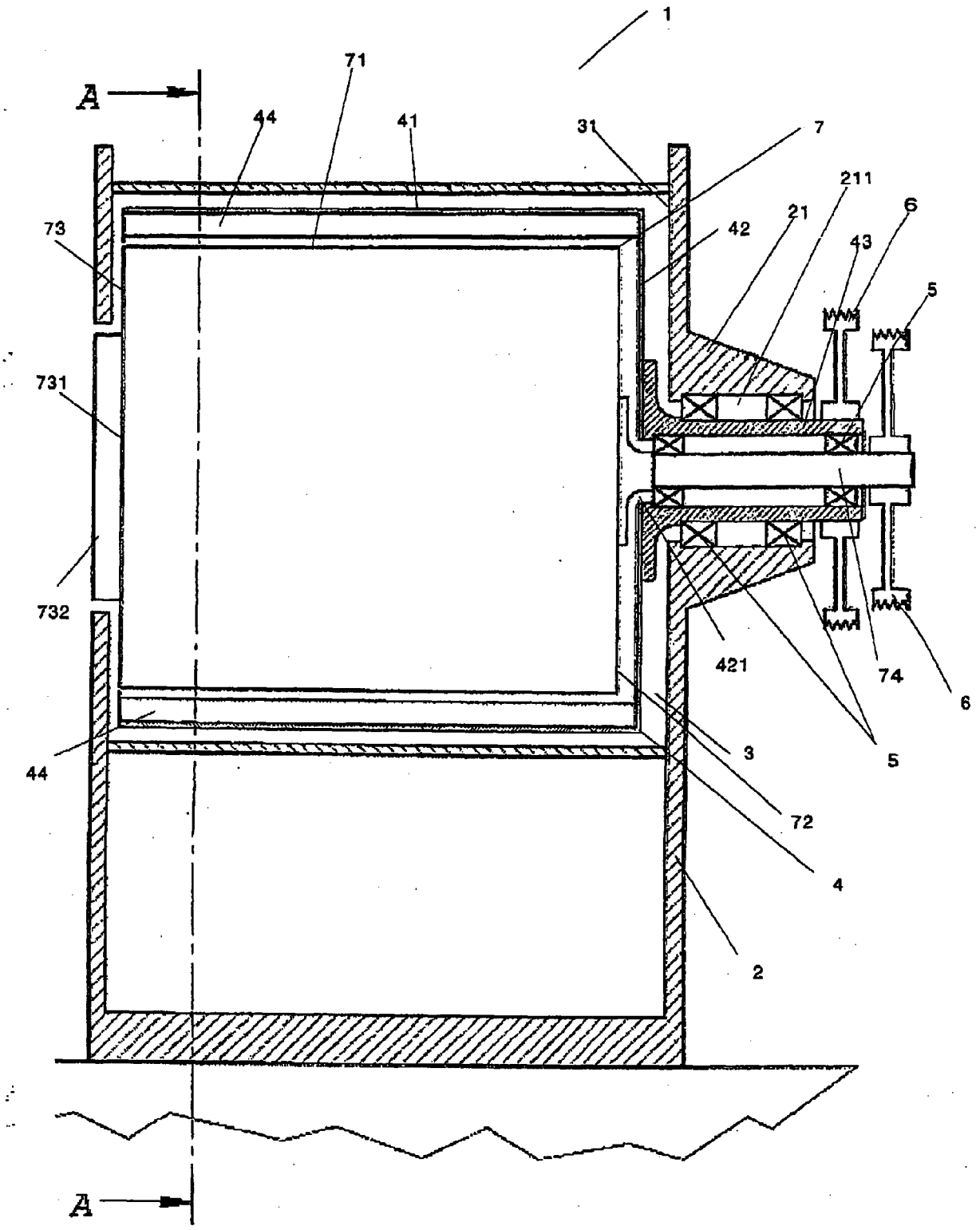

Fig. 1

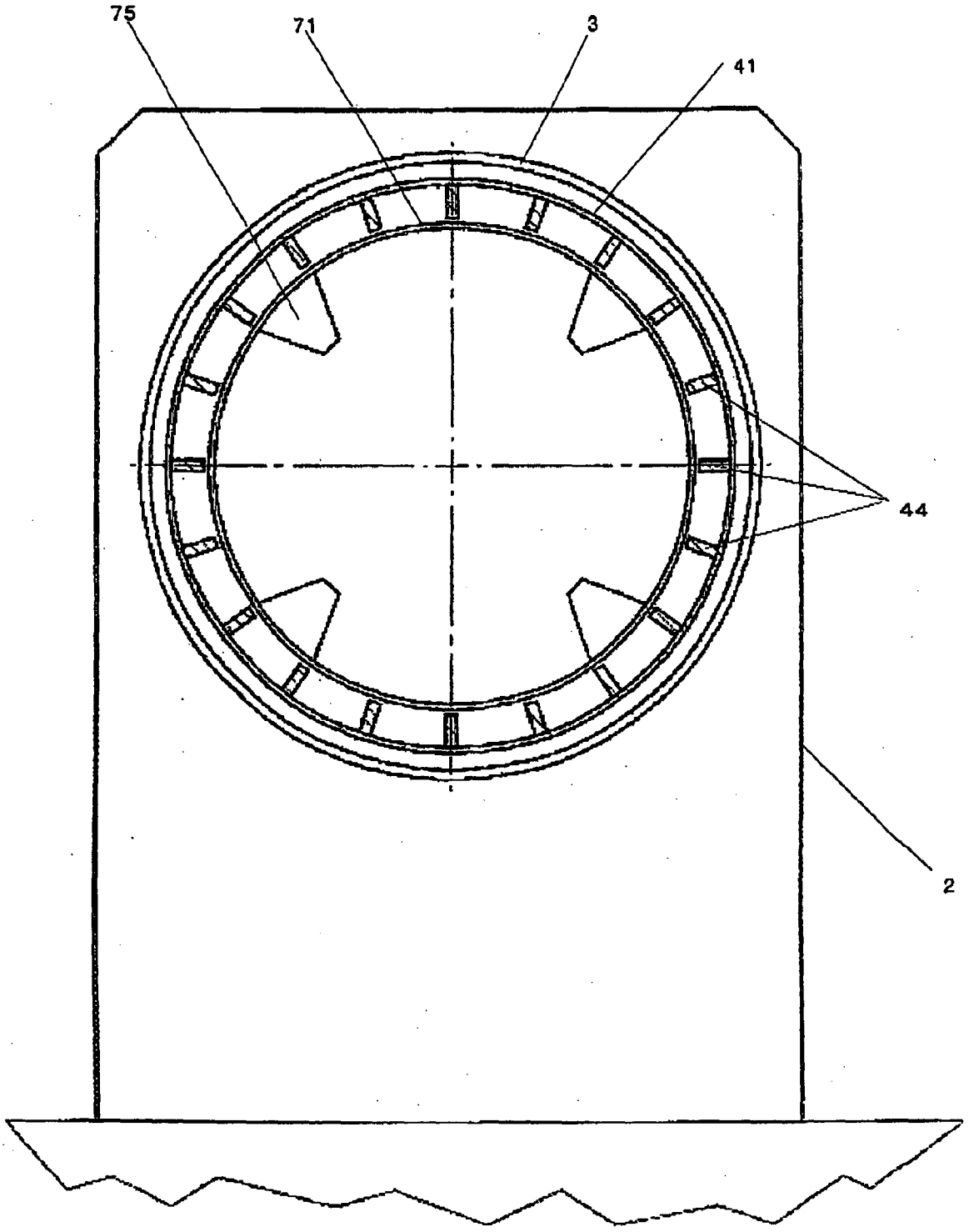

Fig. 2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 08 01 3079

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 4 711 104 A (IKEDA YOSHIO [JP]) 8 December 1987 (1987-12-08) * claim 1 * * abstract * -----	1-8	INV. D06B5/24 D06B5/26 D06F23/00 D06B23/00
X	US 5 950 459 A (TAKAGI SHINYA [JP] ET AL) 14 September 1999 (1999-09-14) * claim 1 * * abstract * -----	1-8	
A	US 2 986 916 A (JOHN BOCHAN) 6 June 1961 (1961-06-06) * the whole document * -----	1-8	
A	DE 37 40 929 C1 (VAHLDIEK JUERGEN) 5 January 1989 (1989-01-05) * the whole document * -----	1-8	
A	WO 02/40762 A (LG ELECTRONICS INC [KR]; CHOI SEUNG BONG [KR]) 23 May 2002 (2002-05-23) * the whole document * -----	1-8	TECHNICAL FIELDS SEARCHED (IPC) D06B D06F
A	DE 27 18 694 A1 (MC GRAW EDISON CO) 3 November 1977 (1977-11-03) * the whole document * -----	1-8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 November 2008	Bichi, Marco

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 01 3079

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-11-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4711104 A	08-12-1987	AU 552421 B2	29-05-1986
		AU 2905684 A	13-12-1984
		CA 1218538 A1	03-03-1987
		GB 2141744 A	03-01-1985
US 5950459 A	14-09-1999	JP 10127972 A	19-05-1998
US 2986916 A	06-06-1961	NONE	
DE 3740929 C1	05-01-1989	NONE	
WO 0240762 A	23-05-2002	AU 2417502 A	27-05-2002
		AU 2002224175 B2	02-09-2004
		CN 1474889 A	11-02-2004
		EP 1334227 A1	13-08-2003
		JP 4112363 B2	02-07-2008
		JP 2004513722 T	13-05-2004
		KR 20020038303 A	23-05-2002
		US 2004031295 A1	19-02-2004
DE 2718694 A1	03-11-1977	FR 2351201 A1	09-12-1977
		IT 1114783 B	27-01-1986
		JP 53019477 A	22-02-1978

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1295689 A, Steiner **[0004]**
- US 20020017118 A, Held **[0005]**
- WO 2004044300 A, Arizzi **[0006]**
- JP 2004060107 B, Takigawa **[0007]**