



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 591 617 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.11.2005 Bulletin 2005/44

(51) Int Cl.7: **E06B 9/60**

(21) Application number: **04425290.6**

(22) Date of filing: **28.04.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(72) Inventor: **Gnaccarini, Mario**
10098 Rivoli (TO) (IT)

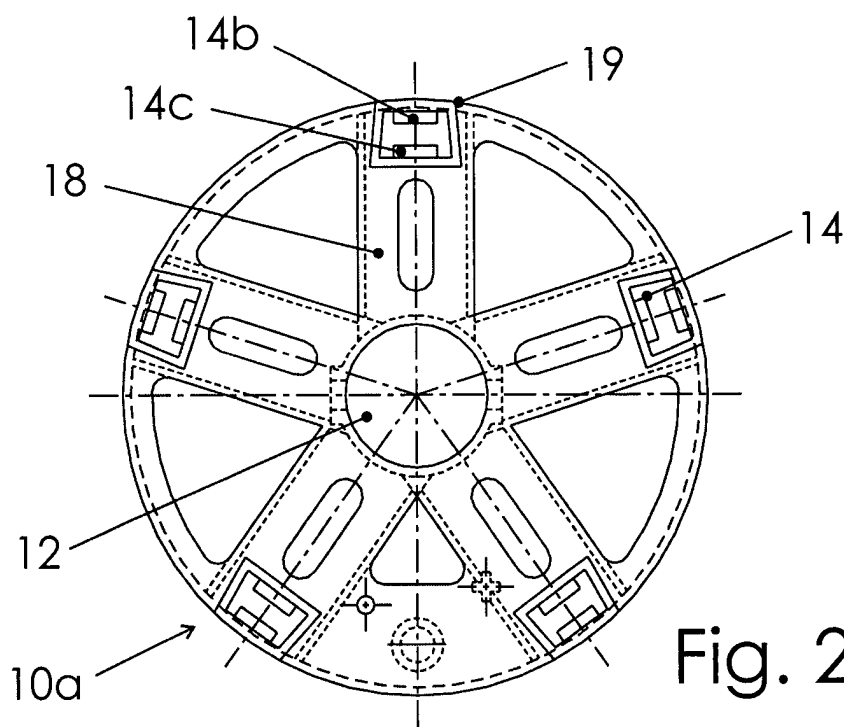
(74) Representative: **Garavelli, Paolo**
A.BRE.MAR. S.R.L.,
Via Servais 27
10146 Torino (IT)

(71) Applicant: **Gnaccarini, Mario**
10098 Rivoli (TO) (IT)

(54) **Spring-holder device for roller shutters and gates**

(57) A spring-holder device (1) is disclosed for roller shutters and gates which has parts that can be mutually composed and is made of lightweight and self-lubricating material. It preferably comprises at least two mutually equal supporting disks (10a,10b) for a shutter or gate which are equipped with a central through-hole (12)

adapted to allow the passage of a fixed winding shaft of the shutter and with quick-connection securing means consisting of a plurality of spacers (16) adapted to equally connect and to suitably mutually space the two disks (10a,10b) which are adapted to rotate around the winding shaft.



EP 1 591 617 A1

Description

[0001] The present invention refers to a spring-holder device for roller shutters and gates.

[0002] As known, roller shutters and gates (hereinbelow briefly called globally "gates") can be enlived with winding systems composed of a fixed or rotating winding shaft; the winding system with fixed winding shaft is equipped with two or more, substantially cylindrical spring-holder boxes that are coaxial to the winding shaft and rotating thereon; function of these spring-holder boxes, on which a gate side is secured, is supporting and allowing to roll-up the gate around the winding shaft and containing the compensating spring of the spiral type, this latter one operating for counterbalancing, at least partially, the gate weight, returning, during the opening phase, the energy stored as torque during the closing phase, making thereby easier for an operator to move the gate.

[0003] The known spring-holder boxes are generally composed of a containing case comprising two supporting disks, mutually spaced by a set of metallic tabs constrained thereto, each one equipped in its central position with a hole adapted to allow the shaft to pass; next to such hole, moreover, cages are secured for containing rolling rollers, similar to roller bearings but with a rather lower mechanical accuracy, adapted to decrease the rolling friction between shaft and spring-holder box when actuating the roller gate.

[0004] All above-mentioned spring-holder box components are further universally manufactured with metallic material, typically a sheet, through a series of mechanical workings aimed to shear, drill and press it in order to finally come, after assembling, to the manufacture of the finished spring-holder box.

[0005] As previously described, the known spring-holder boxes however have the following, several disadvantages:

- the metallic rolling rollers, after a first step of gate use in which they efficiently reduce the friction, due to the deposit of dust, residuals, fouling and/or mechanical distortion, physiologically tend to reduce their efficiency, till they are blocked, damaging the external shaft surface and making extremely fatiguing, if not impossible, to actuate the roller gate; moreover, due to the presence of rollers, it is necessary to provide for the manufacture of different boxes with different hole and roller-holder case sizes depending on the different shaft diameters on which they must be installed;
- in case of box malfunction due to the breakage of the spring contained therein, or, as previously mentioned, to the roller wear, it is necessary to provide for the replacement of the box itself: in this situation it is mandatory to remove the shaft from its own seat in order to free one end thereof and thereby allow withdrawing the faulty box and inserting a new box,

with obvious waste of time and resources;

- the use of metallic material for their manufacture, particularly sheet, requires a high number of mechanical workings that negatively affect the finished product cost;
- the spring-holder box is typically marketed as assembled, that is, due to the actual extremely high occupied volume as compared with the real volume of the single parts composing it, implies a relevant waste of space, and consequently resources, as regards packaging, carriage and storage.

[0006] Object of the present invention is solving the above prior art problems by providing a spring-holder device for roller shutters and gates made of self-lubricating material that does not require the mechanical workings and the sliding rollers of the known spring-holder boxes.

[0007] Another object of the present invention is providing a spring-holder device for roller shutters and gates composed of elements that can be composed and assembled upon installation, making their packaging, transport and storage extremely more convenient, efficient and easy.

[0008] Moreover, an object of the present invention is providing a spring-holder device for rolling shutters and gates that can be installed, removed or replaced without necessarily having to remove the winding shaft from its housings.

[0009] A further object of the present invention is providing a spring-holder device for rolling shutters and gates that can, without specific modifications or variations when manufacturing it, be easily customised to its laying on shafts with different diameters.

[0010] The above and other object and advantages of the invention, as will appear from the following description, are obtained by a spring-holder device for rolling shutters and gates as claimed in claim 1. Preferred embodiments and non-trivial variations of the present invention are the subject of the dependent claims.

[0011] The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which:

- FIG. 1 shows a sectional view of a supporting disk of an embodiment of the spring-holder device for rolling shutters and gates according to the present invention;
- FIG. 2 shows a side view of the spring-holder device disk of FIG. 1;
- FIG. 3 shows the three main views of one of the spacers of the spring-holder device according to the present invention;
- FIG. 4 shows a sectional view of the spring-holder device according to the present invention as assembled;
- FIG. 5 shows a side view of the spring-holder device

of FIG. 4;

- FIG. 6 shows a sectional view and a front view of an adapter of the spring-holder device according to the present invention;
- FIG. 7 shows a side view of another embodiment of the spring-holder device according to the present invention; and
- FIG. 8 shows a sectional view of the spring-holder device of FIG. 7.

[0012] With reference to the Figures, it is possible to note that the spring-holder device 1 for rolling shutters and gates is composed of at least two gate-supporting disks 10a, 10b, that are substantially equal one another, each one equipped at its center with a through-hole 12 adapted to allow the passage of a winding shaft (not shown) and quick-connection securing means 14 of a plurality of spacers 16 adapted to equally connect and to suitably space the two disks 10a, 10b one from the other, in order to create between them an adequate space to house a compensating spring; this particular arrangement allows the spring-holder device 1 according to the present invention to be able to be decomposed, and to be easily assembled when installing it.

[0013] Each disk 10a, 10b is further preferably equipped with at least three spokes 18 that are suitable mutually spaced and separated by hollow spaces, each one of the spokes 18 being adapted to connect the external perimeter edge of its own disk with the external circumferential wall of the hole 12, in order to stiffen the structure of the spring-holder device 1 and to discharge the forces induced by weight and actuation of the roller gate connected therewith; in the embodiment of the present invention shown in the Figures, it is possible to note that the spokes 18 are preferably five. Moreover, the above securing means 14 are preferably arranged in a portion of each spoke 18 next to the external circumference of its own disk 10a, 10b.

[0014] As it is possible to note in particular from FIG. 3, each spacer 16 is preferably equipped, on each of its two opposite ends, with restraining means adapted to engage the respective securing means 14 of the disks 10a, 10b. Preferably, each restraining means is composed of a supporting portion 16d, substantially orthogonal to the main development plane of the spacer 16, equipped with a supporting tooth 16b and with a securing tooth 16c, each one aimed to engage a respective slit 14b, 14c with which each securing means 14 of the disks 10a, 10b is equipped. In particular, between each pair of slits 14b, 14c a substantially "T"-shaped projection 17 is preferably arranged and is adapted to reinforce the coupling between each slit 14c and its respective securing tooth 16c. Moreover, in order to make the securing between the securing means 14 of the disks 10a, 10b and the restraining means of the spacers 16 further more stiff and reliable, it is preferable to provide each supporting portion 16d of these latter ones with an external perimeter with a trapezoidal shape, adapted to be

inserted into a housing 19 whose edge has a similar shape that is complementary thereto and that surrounds each securing means 14. In order to further stiffen the spacer 16, it is possible to provide it with a longitudinal rib 16e that preferably joins together the two opposite supporting portions 16d.

[0015] Moreover, one of the spacers 16 is adapted to allow securing one end of a compensating spring, whose other end is traditionally secured to the winding shaft.

[0016] As previously mentioned, the spring-holder device 1 according to the present invention is preferably made of a self-lubricating material, above all on the surface of the hole 12 in contact with the winding shaft, that, reducing the friction, allows avoiding the use of traditional sliding rollers, and of a lightweight material, still more preferably a plastic material that has the above characteristics and guarantees the due sturdiness and fatigue resistance. For such purpose, it has been preferable, and complying with all desired requirements aimed to simultaneously obtain the necessary reliability and competitive final costs, to use a material called Derlin 100 manufactured by company DuPont of Nemours (France), even if obviously other functionally equivalent materials can and will be able to be used.

[0017] It is further possible to provide for the adoption of an adapter 70, like the one shown in particular in FIG. 6, that allows using the same device 1 universally on shafts having different diameters: in fact, the adapter 70 is a bush characterised by an external circumference that is substantially equal to the one of the hole 12 and by an internal circumference that is substantially equal to the one of the winding shaft and is adapted to be concentrically inserted on the winding shaft and in the hole 12 and to be secured to this latter one through hooking means, preferably composed of at least one tab 72 that is inserted into at least one respective slit (not shown) obtained inside the hole 12 itself, thereby allowing to install the device 1 on a winding shaft whose diameter is less than the diameter of the hole 12, without necessarily having to manufacture the device 1 suitably for each winding shaft diameter.

[0018] In an alternative embodiment of the spring-holder device 1 according to the present invention shown by FIGs. 7 and 8, notwithstanding everything that has been previously disclosed, each disk 10a, 10b is composed of two half-disks respectively 101a, 102a and 101b, 102b being kept mutually joined through securing means 80 such as at least one screw, one bolt or one pin: in such arrangement, it is obvious that it is possible to apply or remove the device 1 from a winding shaft without the need of having to free at least one end of the shaft.

[0019] Taking into account the reference market requests, but only merely as a non-limiting example, the spring-holder device 1 according to the present invention is characterised by disks 10a, 10b having their respective diameters preferably included between 100

mm and 300 mm, still more preferably between 130 mm and 280 mm.

[0020] As already previously stated, it is easy to understand that the device 1 has all the following properties:

- it can be easily and economically manufactured since it does not require numerous and different mechanical workings as occurs for traditional spring-holder boxes;
- it can be simply and economically realised since it does not require the application of sliding rollers;
- it allows an extreme rationalisation of volumes both for packaging and for transport, since it can be decomposed into its main elements, which does not imply useless wastes of space, and can be easily composed when installing it; substantially, for assembling the spring-holder device 1 according to the present invention, it is enough to insert the spacers 16 into their respective securing means of the disks 10a, 10b, that in this way are suitably joined one to the other, and arrange the device along the winding shaft in its suitable position, possibly, if necessary, by interposing the adapter 70;
- due to the use of adapters 70 with different diameters, it is possible to use the same device 1 with different shaft diameters, thereby avoiding to have to manufacture disks with different holes 12, and the consequent risk of having useless stocks of the device 1 which is less demanded, and further enjoying the benefits and advantages of mass-production economies.

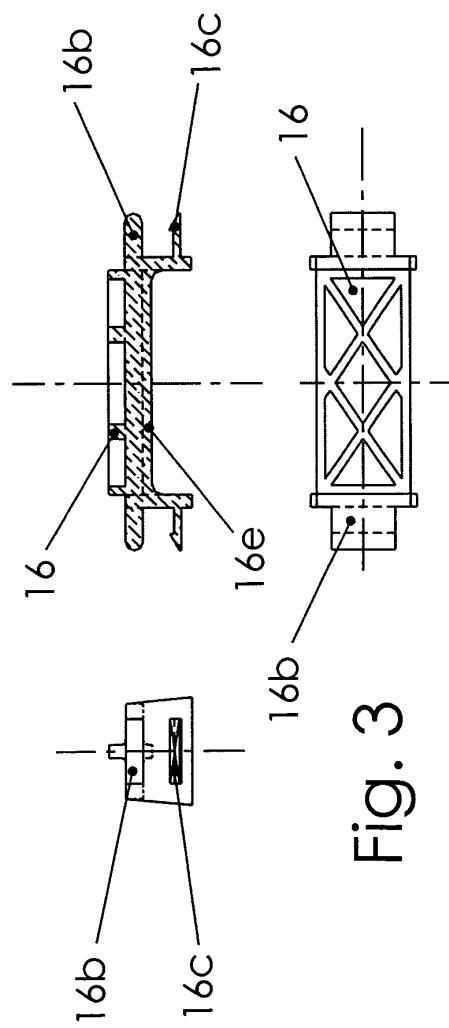
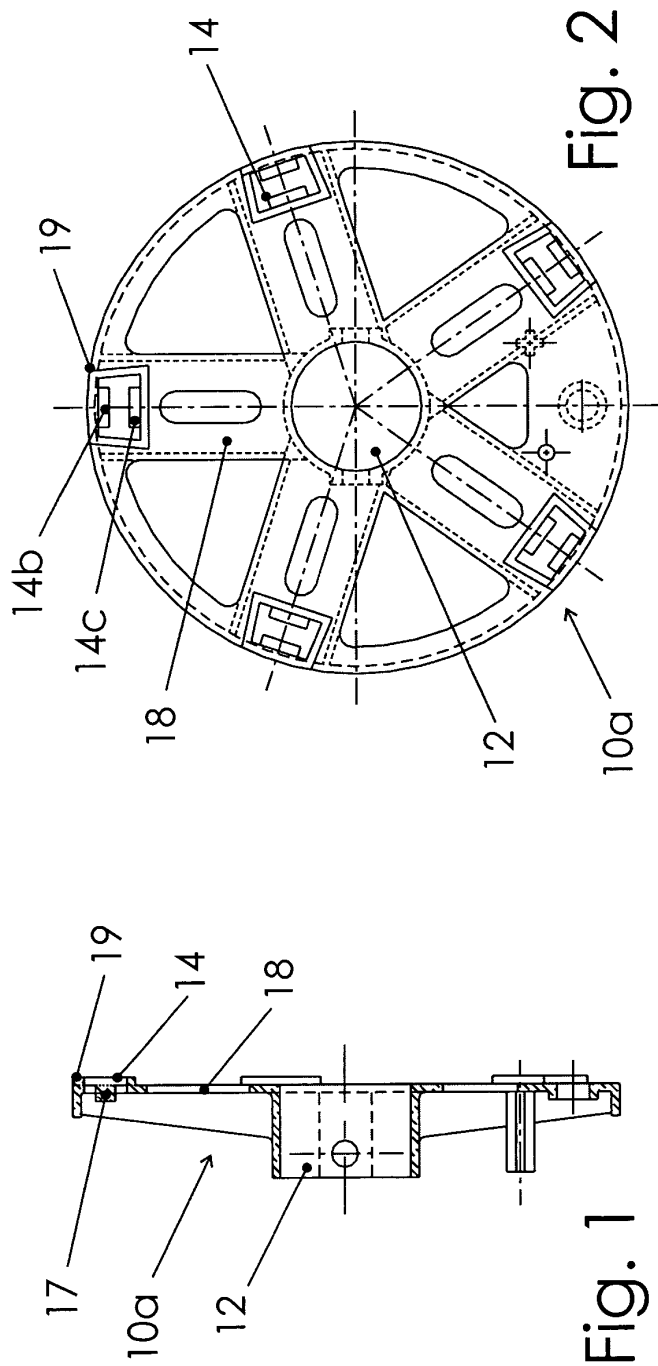
Claims

1. Spring-holder device (1) for roller shutters and gates **characterised in that** it is divided into parts that can be mutually composed and it is made of lightweight and self-lubricating material.
2. Spring-holder device (1) according to claim 1, **characterised in that** it comprises at least two, substantially equal, supporting disks (10a, 10b) for a shutter or gate, each one of said disks (10a, 10b) being equipped in its own central portion with a through-hole (12) adapted to allow a passage of a fixed winding shaft of said shutter or gate and with quick-connection securing means of a plurality of spacers (16) adapted to equally connect and to suitable space said two disks (10a, 10b) one from another, said disks (10a, 10b) being adapted to rotate around said winding shaft.
3. Spring-holder device (1) according to claim 1, **characterised in that** each one of said disks (10a, 10b) is equipped with a plurality of stokes (18), each one adapted to connect an external perimetral edge of

its own disk (10a, 10b) to an external circumferential wall of said hole (12).

4. Spring-holder device (1) according to claim 3, **characterised in that** said stokes (18) are three and are arranged at the same distance one from another perpendicular to the circumference of the disks (10a, 10b).
5. Spring-holder device (1) according to claim 3, **characterised in that** said securing means (14) are arranged in a portion of each stoke (18) next to an external circumference of each disk (10a, 10b).
6. Spring-holder device (1) according to claim 1, **characterised in that** each one of said spacers (16) is equipped on each of its two opposite ends with restraining means adapted to engage said respective securing means (14) of said disks (10a, 10b).
7. Spring-holder device (1) according to claim 6, **characterised in that** said restraining means are composed of a supporting portion (16d), that is substantially orthogonal to a main development plan of said spacer (16) and is equipped with a supporting tooth (16b) and with a securing tooth (16c) aimed to respectively engage one of a pair of slits (14b, 14c) with which each one of said securing means (14) of said disks (10a, 10b) is equipped.
8. Spring-holder device (1) according to claim 7, **characterised in that** between each pair of said slits (14b, 14c) a substantially "T"-spaced projection (17) is arranged and is adapted to reinforce a coupling between each one of said slits (14c) and a respective one of said securing teeth (16c).
9. Spring-holder device (1) according to claim 7, **characterised in that** said supporting portion (16d) is equipped with an external perimeter with a substantially trapezoidal shape, that is adapted to be inserted in an housing (19) having an edge with a substantially trapezoidal shape surrounding each securing means (14) and complementary with said perimeter of said supporting portion (16d).
10. Spring-holder device (1) according to claim 1, **characterised in that** said spacer (16) is equipped with a longitudinal rib (16e) adapted to join two opposite ones of said supporting portions (16d).
11. Spring-holder device (1) according to claim 1, **characterised in that** said lightweight and self-lubricating material is a plastic material.
12. Spring-holder device (1) according to claim 11, **characterised in that** said plastic material is Derlin 100.

13. Spring-holder device (1) according to claim 1, **characterised in that** it comprises an adapter (70) whose external circumference is substantially equal to the circumference of said hole (12) and an internal circumference that is substantially equal to the circumference of said winding shaft and that is adapted to be concentrically inserted onto said winding shaft and into said hole (12) and to be secured to said hole (12) through hooking means.
14. Spring-holder device (1) according to claim 13, **characterised in that** said hooking means comprise at least one tab (72) arranged on an external circumferential wall of said adapter (70) and at least one respective restraining slit inside said hole (12), said tab (72) and said restraining slit being adapted to mutually engage.
15. Spring-holder device (1) according to claim 1, **characterised in that** each one of said disks (10a, 10b) is composed of two half-disks (101a, 102a; 101b, 102b).
16. Spring-holder device (1) according to claim 1, **characterised in that** said disks (10a, 10b) have a diameter preferably included between 100 mm and 300 mm, still more preferably between 130 mm and 280 mm.



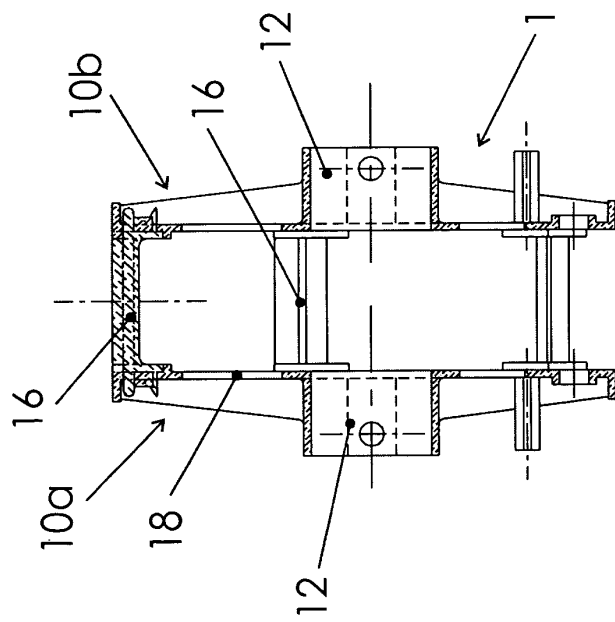


Fig. 4

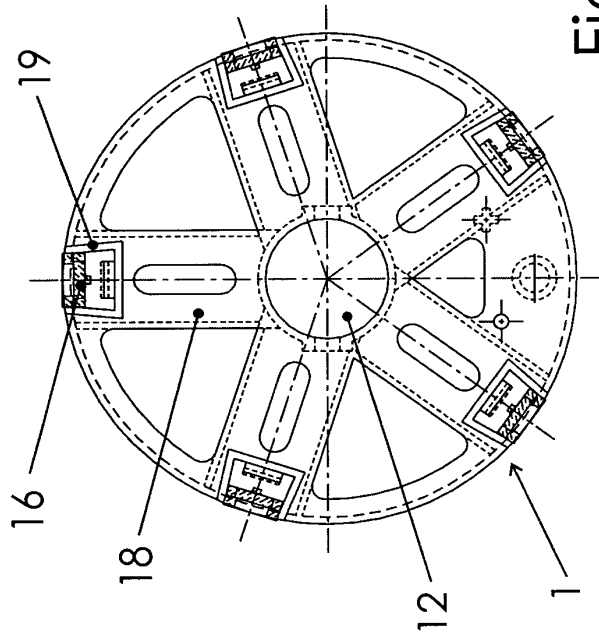


Fig. 5

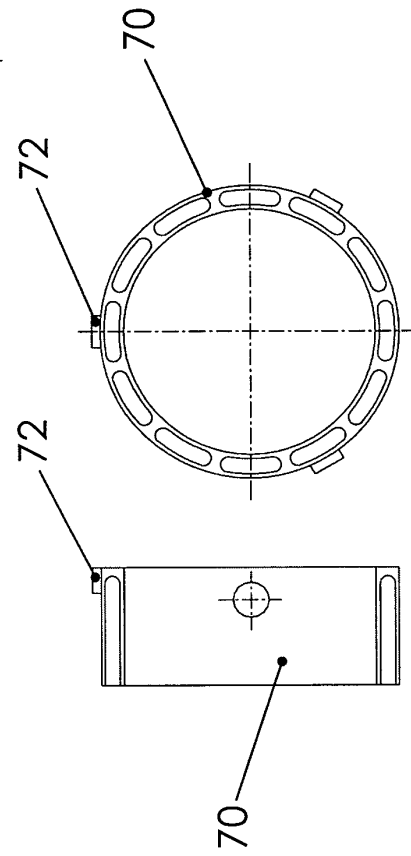


Fig. 6

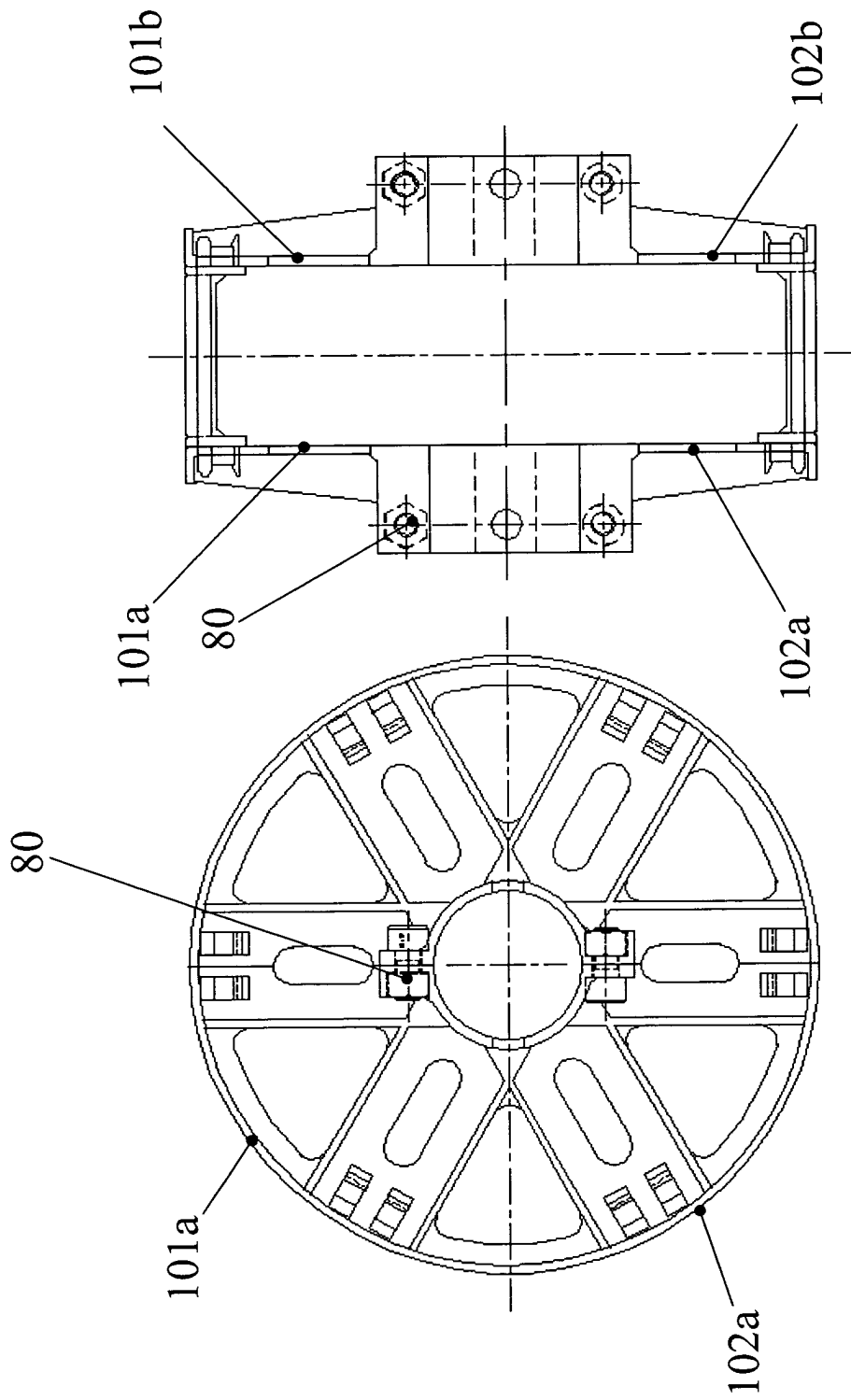


Fig. 8

Fig. 7



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5290

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	FR 2 627 801 A (ZURFLUH FELLER SA ETS) 1 September 1989 (1989-09-01) * claim 1; figures 1,4 *	1-3,11, 12	E06B9/60
Y	US 6 164 428 A (BERMAN JOEL ET AL) 26 December 2000 (2000-12-26) * column 4, line 29 - column 4, line 51 * * column 5, line 11 - column 5, line 20 *	1,2,11, 12	
Y	US 2002/189009 A1 (WALTON ROBERT NIVEN ET AL) 19 December 2002 (2002-12-19) * figure 2 *	3	
A	EP 1 270 866 A (BMJ S A R L) 2 January 2003 (2003-01-02) * the whole document *	1,2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E06B
Place of search		Date of completion of the search	Examiner
Munich		23 September 2004	Knerr, G
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

1
EPO FORM 1503 03/82 (P04C01)

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

EP 04 42 5290

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.

23-09-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2627801	A	01-09-1989	FR 2627801 A1	01-09-1989

US 6164428	A	26-12-2000	AT 273439 T	15-08-2004
			AU 8032900 A	19-03-2001
			CA 2383068 A1	01-03-2001
			CN 1370253 T	18-09-2002
			DE 60012941 D1	16-09-2004
			EP 1206622 A1	22-05-2002
			TW 442612 B	23-06-2001
			WO 0114683 A1	01-03-2001

US 2002189009	A1	19-12-2002	AT 263297 T	15-04-2004
			WO 0144602 A1	21-06-2001
			AU 771075 B2	11-03-2004
			AU 2129701 A	25-06-2001
			DE 60009552 D1	06-05-2004
			EP 1238174 A1	11-09-2002
			ZA 200204772 A	15-09-2003

EP 1270866	A	02-01-2003	FR 2826688 A1	03-01-2003
			EP 1270866 A1	02-01-2003
