



- (51) International Patent Classification:
F03B 5/00 (2006.01)
- (21) International Application Number:
PCT/CZ2014/000093
- (22) International Filing Date:
29 August 2014 (29.08.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
PV 2013-681 5 September 2013 (05.09.2013) CZ
- (71) Applicant: VALTA Milan [CZ/CZ]; Na Slunecne 120,
Brtnice - Velke Popovice, 25169 Praha-vychod (CZ).
- (72) Inventors: SEDLACEK, Miroslav; Pruchova 58, 15006
Praha 5 (CZ). HOSTIN, Stanislav; 919 08 Boleraz 144
(CZ). JANIK, Igor; Csl. Armady 2276/10, 434 01 Most
(CZ).
- (74) Agents: ANDERA, Jiri et al.; Rott, Ruzicka & Guttman,
Vinohradska 37, 120 00 Praha 2 (CZ).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the applicant's entitlement to claim the priority of the
earlier application (Rule 4.17(iii))

[Continued on next page]

- (54) Title: PRECESSION FLUID TURBINE

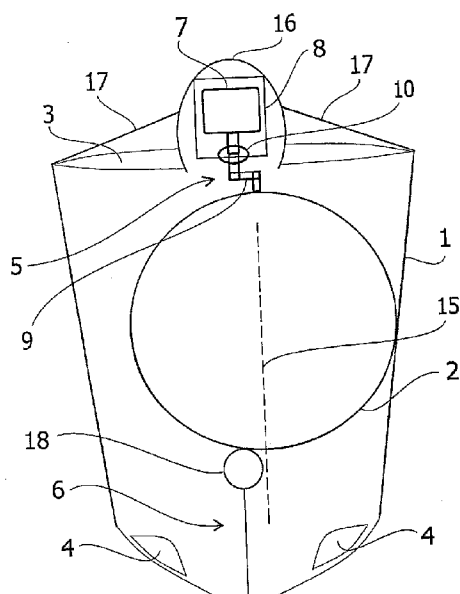


Fig. 1

- (57) Abstract: A precession fluid turbine, comprising a stator (1) with an intake (3) for fluid and with an outlet (4) for fluid and in the stator (1) a bladeless rolling rotor (2) is set on holding equipment (6). The rotor (2) is formed by a body of rotational shape. The holding equipment (6) is adapted to allow the rolling of the rotor (2) along the interior side of the stator (1). The rolling rotor (2) is connected by a mechanism (5) to an electric current generator (7) placed in a watertight case (8). The mechanism (5) comprises a crankshaft (9) placed between the rolling rotor (2) and the electric current generator (7) and the crankshaft (9) is provided with a magnetic clutch (10).



Published:

— *with international search report (Art. 21(3))*

Precession fluid turbine

Technical Field

The invention relates to a precession fluid turbine comprising a stator with an intake for fluid and with an outlet for fluid and in the stator a bladeless rolling rotor is set on holding equipment. The rotor is formed by a body of rotational shape. The holding equipment is adapted to allow the rolling of the rotor along the interior side of the stator. The rolling rotor is connected by a mechanism to an electric current generator placed in a watertight case.

Prior Art

Fluid machines already exist that have a stator with a liquid intake and a liquid outlet, and with a bladeless rolling rotor placed on holding equipment, comprising of a body with a rotational shape. The holding equipment is adapted to allow rolling of the rolling rotor along the interior wall of the stator. After liquid is led into the stator, the flow of liquid causes the rotor to touch the interior wall of the stator and it starts to roll along the interior wall of the stator. At least part of the shaft of the rotor precesses. Such machines are sometimes called precession machines.

Czech patent no. 284483 and European patent EP 1015760 B1 discloses a rolling fluid machine comprising a fluid storage tank, provided with an inlet and at least with one outlet nozzle, and in the area of the outlet nozzle there is mounted, on a holding device, at least one rolling rotor represented by a body of a rotary shape. The rolling rotor is set so that it can roll along the interior wall of the outlet nozzle.

Working on the same principle are fluid machines disclosed in European patent EP 1082538 B1, Czech patent no. 294708 and no. 3023261 and Czech utility model no. 7606, no. 17908, and no. 18890.

The disadvantage common to all known rolling or precession machines/turbines is that they do not allow for the efficient transfer of torque generated by the rolling of the rotor along the inner wall of the stator to an electric current generator.

5 Disclosure of the Invention

The problem in question is solved by a precession fluid turbine comprising a stator with an intake for fluid and with an outlet for fluid and in the stator a bladeless rolling rotor is set on a holding equipment. The rotor is formed by a body of rotational shape. The holding equipment is adapted to allow the rolling of the rotor along the interior
10 side of the stator. The rolling rotor is connected by a mechanism to an electric current generator placed in a watertight case. The mechanism comprises a crankshaft placed between the rolling rotor and the electric current generator and the crankshaft is provided with a magnetic clutch,

15 In this case, a "magnetic clutch" means equipment that can transfer not only torque, but also translational power, and the actual transfer is not done by the mechanical connection of two parts, but by the effect of the magnetic force between the two parts. Such equipment comprises both the existing, usual magnetic clutches for the transfer of torque and various arrangements of magnets for translational transfer of power,
20 comprising magnetic multipliers.

The invention allows efficient transfer of torque created by rolling of the rotor along the interior wall of the stator to the electric current generator.

25 According to an advantageous embodiment the magnetic clutch is set on the crankshaft in a way that one half of the magnetic clutch is placed inside the watertight case and the other half of the magnetic clutch is placed outside of the watertight case.

According to another advantageous embodiment the holding equipment comprises a support firmly attached to the stator and provided with an at least partially round surface on the part turned towards the rotor.

- 5 According to another advantageous embodiment the rotor is in a place where it sits on a support provided with a recess the shape of which corresponds to the round surface of the end of the support.

- 10 According to another advantageous embodiment the crankshaft is on the side of the rolling rotor pivoted in an opening provided on the axis of the rolling rotor.

- According to another advantageous embodiment the crankshaft has a first permanent magnet attached on the end turned towards the rolling rotor, while the first permanent magnet is set above a second permanent magnet and the second permanent magnet
15 is attached to the surface of the rolling rotor at a place on its lateral axis.

- According to another advantageous embodiment one half of the magnetic clutch is set on the end of the crankshaft inside a watertight case and the second half of the magnetic clutch is set outside of the watertight case on the surface of the rolling rotor
20 at a place of its lateral axis.

Brief Description of Drawings

- On figures 1 and 2 are schematic drawings of two versions of the precession fluid turbine in accordance with the invention. On figures 3, 4, and 5 are various versions
25 of the connection of an electric current generator to a rolling rotor.

Description of preferred embodiments

- The precession fluid turbine according to fig. 1 and fig. 2 has a stator 1 with a fluid intake³ on the upper edge of the stator 1 and with four liquid outlets 4 on the bottom
30 part of the stator 1. In the stator 1 a bladeless rolling rotor 2 is set on holding

equipment 6. The rotor 2 is formed by a body of rotational shape. The holding equipment 6 is adapted to allow rolling of the rolling rotor 2 along the interior wall of the stator 1. The rolling rotor 2 may have any rotational shape. The holding equipment 6 may be made by any known mechanism that permits rolling of the rolling rotor 2 along the interior wall of the stator 1.

For the embodiment in fig. 1 and fig. 2, the holding equipment 6 is formed by a bar-like support 18 that is firmly attached to the bottom of the stator 1 and juts upwards towards the rotor 2. On the end of the support 18 facing the rotor 2 is a ball that supports the rotor 2. Of course, instead of a ball, an at least partly round surface facing the rotor can be used on the end of the support 18.

For the advantageous embodiment according to fig. 2, the rotor 2 is at a place where it sits on the support 18, provided with a recess 12, the shape of which corresponds to the rounded surface of the end of the support 18.

The rolling rotor 2 is connected by a mechanism 5 to an electric current generator 7, placed in a watertight case 8. The watertight case 8 is fixed to the chamber 16 that is set with the help of holders 17 on the stator 1.

The mechanism 5 comprises a crankshaft 9 set between the rolling rotor 2 and the electric current generator 7. The crankshaft 9 is provided with a magnetic clutch 10. In this case, 'magnetic clutch' means equipment that can transfer not only torque but also translational force, and the actual transfer is done not by the mechanical connection of two parts, but instead by the effect of the magnetic force between those two parts. Such equipment comprises both existing, usual magnetic clutches for transfer of torque and various arrangements of magnets for translational transfer of power, comprising magnetic multipliers.

The magnetic clutch 10 is set on the crankshaft 9 so that one half of the magnetic clutch 10 is placed inside the watertight case 8, and the other half of the magnetic

clutch 10 is set outside of the watertight case 8. The 'halves' of the magnetic clutch 10 mean those parts of the magnetic clutch 10 between which the magnetic force is working.

- 5 The crankshaft 9 can be connected to the rolling rotor 2 by any known means. Several advantageous embodiments are shown in fig. 3, fig. 4, and fig. 5.

In the embodiment in fig. 3, the crankshaft 9 forms a crank that is on the side of the rolling rotor 2 pivoted in an opening 11 provided on the axis 15 of the rolling rotor 2.

10

In the embodiment in fig. 4, the crankshaft 9 forms a crank that has a first permanent magnet 13 fixed to the end turned towards the rolling rotor 2. That first permanent 13 magnet is set above a second permanent magnet 14. The second permanent magnet 14 is fixed to the surface of the rolling rotor 2 on a place on its lateral axis 15.

15

For the embodiment according to fig. 5, half of the magnetic clutch 10 is set on the end of the crankshaft 9 inside a watertight case 8 and the other half of the magnetic clutch 10 is set outside of the watertight case 8 on the surface of the rolling rotor 2 at a place on its lateral axis 15.

20

All of the embodiments of the precession turbine, described above, work the same way. Through the intake 3, liquid is released into the stator 1, then the liquid flows out of the stator 1 through the outlets 4. When liquid flows through the stator 1, the rotor 2 begins to roll along the interior wall of the stator 1. The axis 15 of the rotor 2 then makes precession movement.

25

The torque generated by the rolling of the rotor 2 along the interior wall of the stator 1 is transferred to the electric current generator 7 by the crankshaft 9 and the magnetic clutch 10. The electric current generated is carried away by watertight electrical wiring that is not depicted.

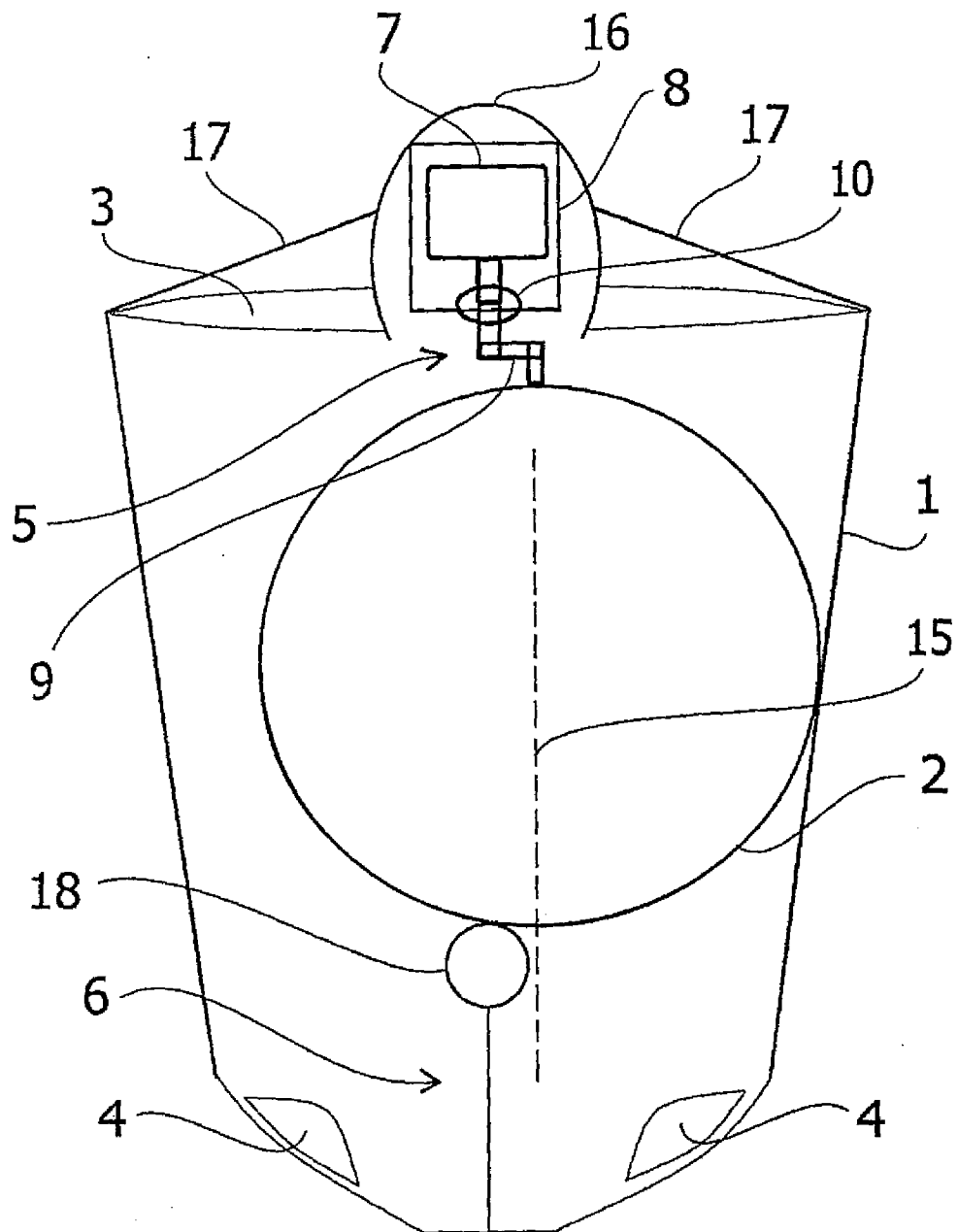
30

CLAIMS

1. A precession fluid turbine, comprising a stator (1) with an intake (3) for fluid and with an outlet (4) for fluid and in the stator (1) a bladeless rolling rotor (2) is set on a holding equipment (6), the rotor (2) is formed by a body of rotational shape, and the
5 holding equipment (6) is adapted to allow the rolling of the rotor (2) along the interior side of the stator (1), while the rolling rotor (2) is connected by a mechanism (5) to an electric current generator (7) placed in a watertight case (8), **characterised in that** the mechanism (5) comprises a crankshaft (9) placed between the rolling rotor (2) and the electric current generator (7) and the crankshaft (9) is provided with a
10 magnetic clutch (10).
2. The precession fluid turbine according to claim 1, **characterised in that** the magnetic clutch (10) being set on the crankshaft (9) so that one half of the magnetic clutch (10) is placed inside the watertight case (8) and the other half of the magnetic
15 clutch (10) is placed outside of the watertight case (8).
3. The precession fluid turbine according to claim 1 or 2, **characterised in that** the holding equipment (6) comprises a support (18) firmly attached to the stator (1) and provided with an at least partially round surface on the part turned towards the rotor
20 (2).
4. The precession fluid turbine according to claim 3, **characterised in that** the rotor (2) is in a place where it sits on a support (18) provided with a recess (12), the shape of which corresponds to the round surface of the end of the support (18).
25
5. The precession fluid turbine according to any of claims 1 through 4, **characterised in that** the crankshaft (9) is on the side of the rolling rotor (2) pivoted in an opening (11) provided on the axis (15) of the rolling rotor (2).
- 30 6. The precession fluid turbine according to any of claims 1 through 4, **characterised in that** the crankshaft (9) has a first permanent magnet (13) attached on the end

turned towards the rolling rotor (2), while the first permanent magnet (13) is set above a second permanent magnet (14) and the second permanent magnet (14) is attached to the surface of the rolling rotor (2) at a place on its lateral axis (15).

- 5 7. The precession fluid turbine according to any of claims 1 through 4, **characterised in that** one half of the magnetic clutch (10) is set on the end of the crankshaft (9) inside a watertight case (8) and the second half of the magnetic clutch (10) is set outside of the watertight case (8) on the surface of the rolling rotor (2) at a place of its lateral axis (15).

**Fig. 1**

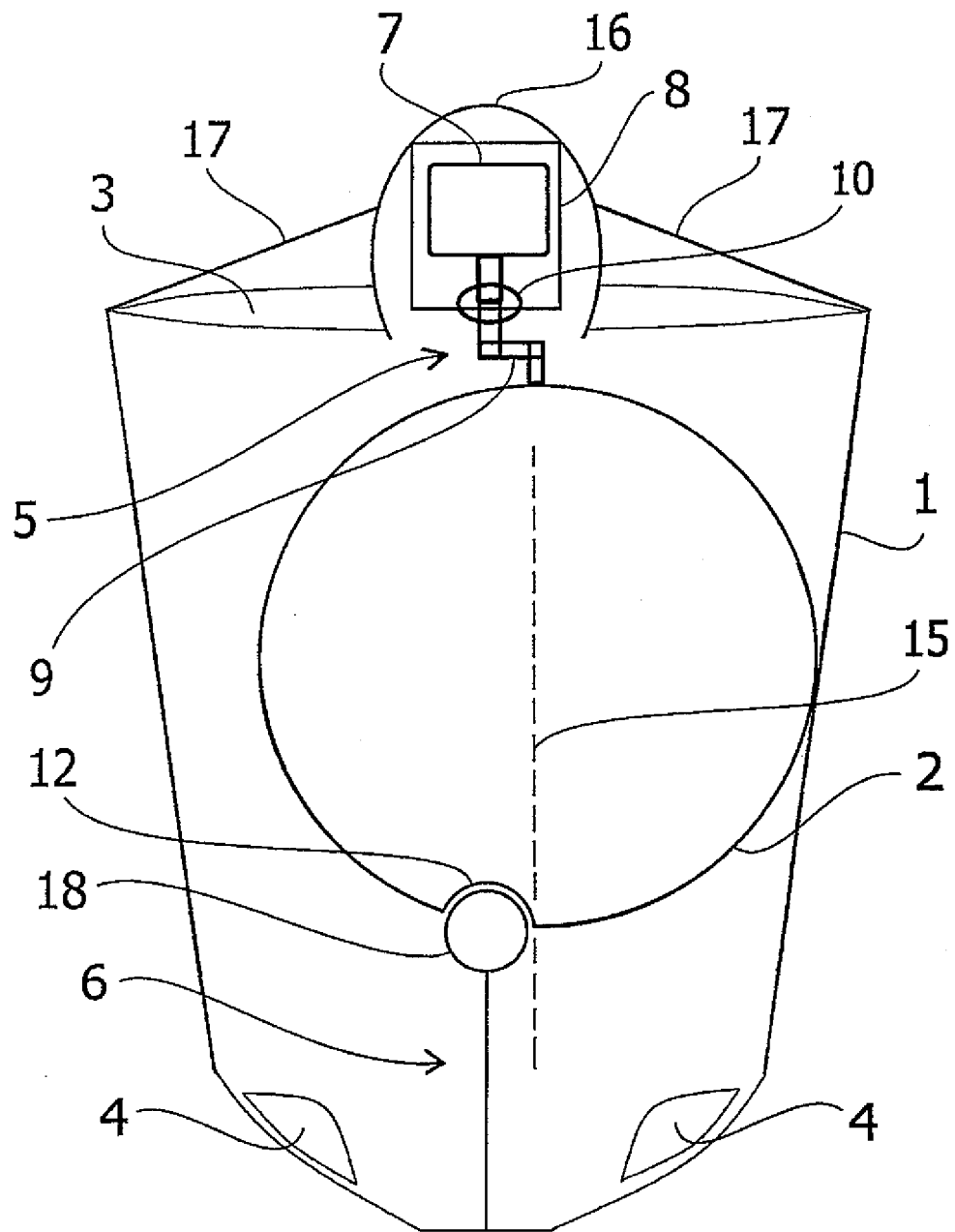
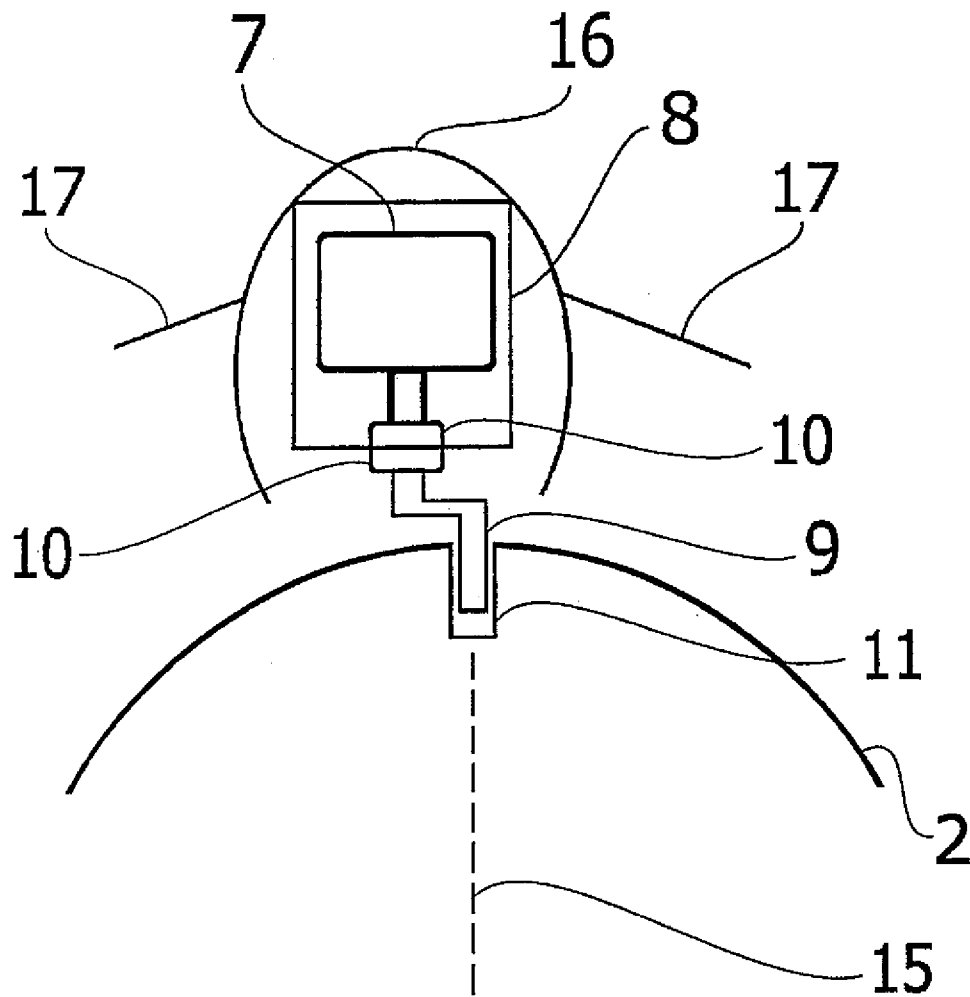
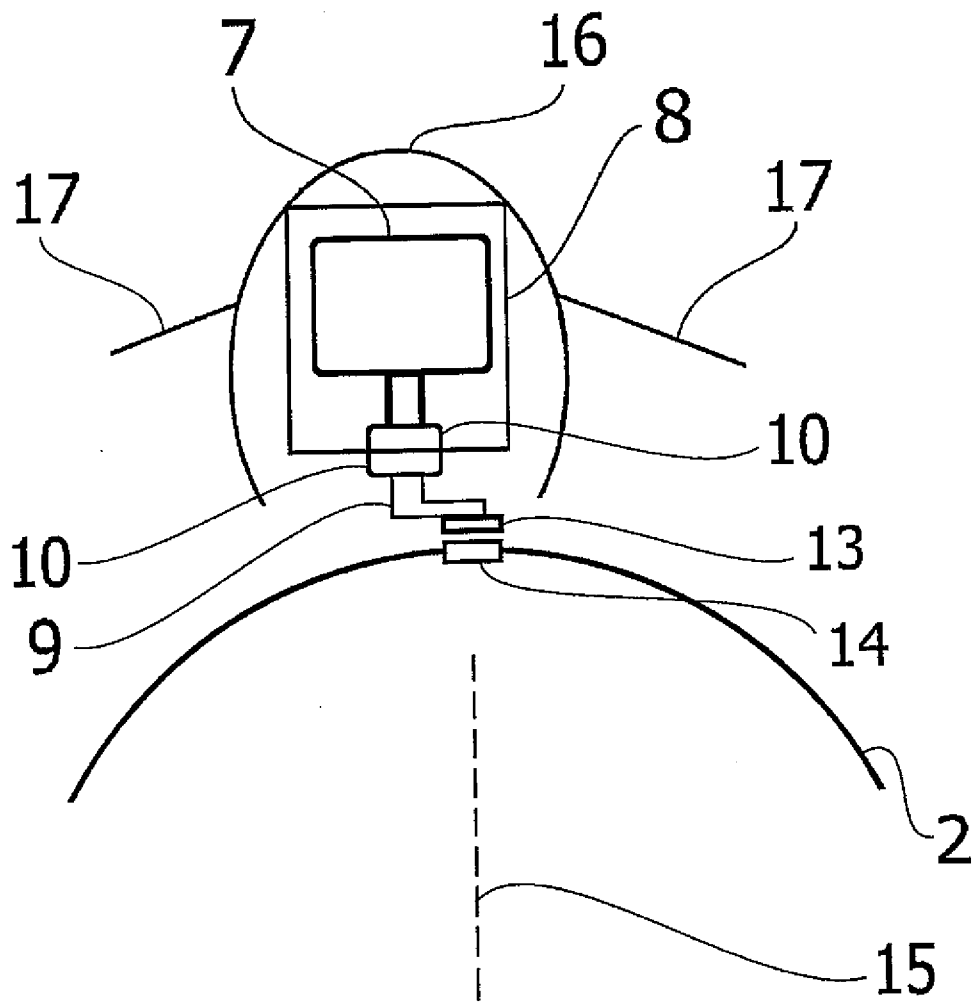


Fig. 2

**Fig. 3**

**Fig. 4**

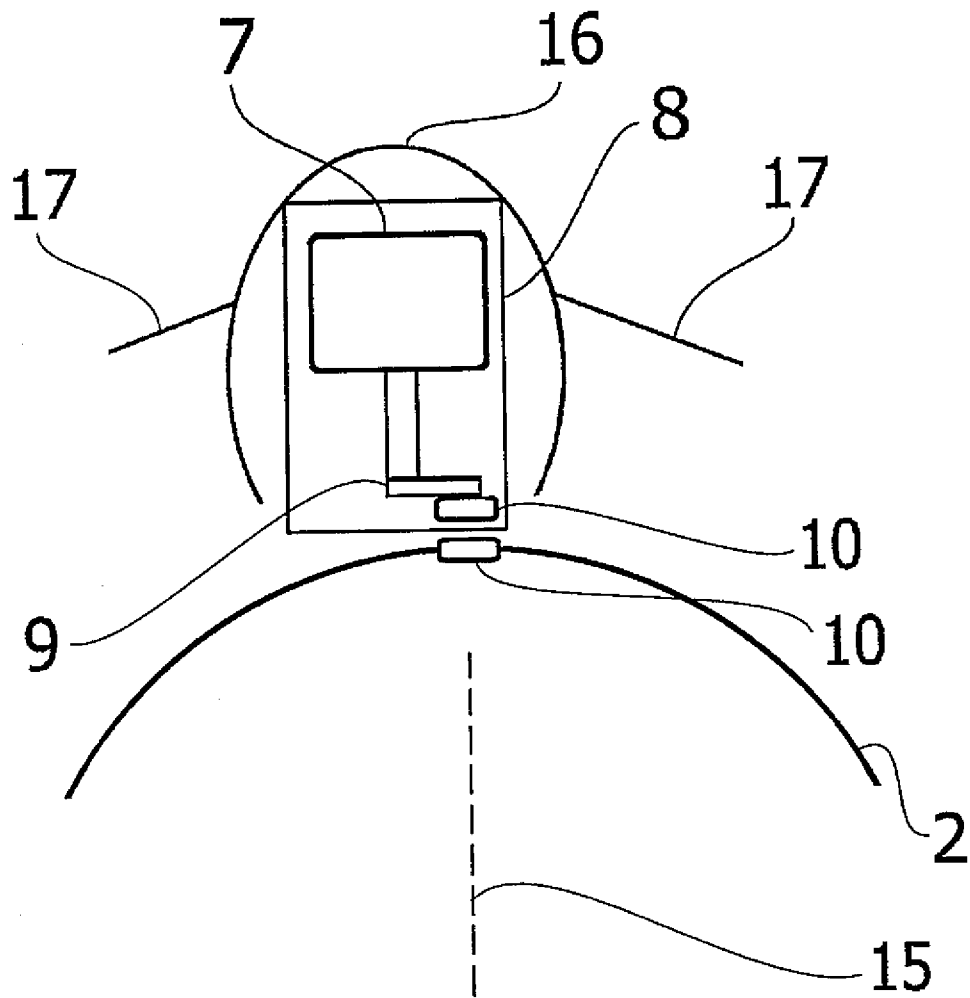


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2014/000093

A. CLASSIFICATION OF SUBJECT MATTER
INV. F03B5/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F03B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 015 760 B1 (SEDLACEK MIROSLAV [CZ]; HOSTIN STANISLAV [SK]) 5 June 2002 (2002-06-05) cited in the application paragraph [0019] - paragraph [0034]; figures	1-7
A	----- CZ 24 162 U1 (MORAVSKA VYSOKA SKOLA OLOMOUC [CZ]) 15 August 2012 (2012-08-15) figures	1-7
A	----- CZ 302 361 B6 (ASTAV TERMOMECHANIKY AV CR [CZ]) 6 April 2011 (2011-04-06) cited in the application figures	1-7
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 November 2014

Date of mailing of the international search report

20/11/2014

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Di Renzo, Raffaele

INTERNATIONAL SEARCH REPORT

International application No

PCT/CZ2014/000093

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CZ 24 439 U1 (CESKU VYSOKU UCENI TECHNICKU V PRAZE FAKULTA STAVEBNI [CZ]) 24 October 2012 (2012-10-24) figures -----	1-7
A	GB 829 607 A (SULZER AG) 2 March 1960 (1960-03-02) page 1, line 70 - line 78; figures -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/CZ2014/000093

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1015760	B1	05-06-2002	AT 218674 T 15-06-2002
		AU 722378 B2	03-08-2000
		AU 4374797 A	15-05-1998
		BR 9711946 A	18-01-2000
		CA 2268793 A1	30-04-1998
		CN 1233315 A	27-10-1999
		DE 69713168 D1	11-07-2002
		DE 69713168 T2	09-01-2003
		DK 1015760 T3	16-09-2002
		EP 1015760 A1	05-07-2000
		ES 2178001 T3	16-12-2002
		HU 0000098 A2	28-05-2000
		JP 4124274 B2	23-07-2008
		JP 2001507423 A	05-06-2001
		NO 991755 A	16-06-1999
		NZ 334927 A	28-01-2000
		PL 332826 A1	11-10-1999
		PT 1015760 E	31-10-2002
		RU 2185525 C2	20-07-2002
		SI 9720064 A	31-08-1999
		SK 38299 A3	10-09-1999
		TR 9900830 T2	21-07-1999
		US 6139267 A	31-10-2000
		WO 9817910 A1	30-04-1998
CZ 24162	U1	15-08-2012	NONE
CZ 302361	B6	06-04-2011	NONE
CZ 24439	U1	24-10-2012	NONE
GB 829607	A	02-03-1960	NONE