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(54) **DRAINAGE DEVICE FOR ICE MAKER**

(57) A drainage device (1) for an ice maker (10) is provided, wherein the ice maker (10) comprises an upper portion (11) defining an ice containment enclosure and a lower portion (12) containing at least one power supply unit and a hydraulic apparatus in fluidic through connection with the upper portion (11) and wherein the device (1) is placed in the lower portion (12) and comprises a tank (2) detachably placed in fluidic through connection with the upper portion (11) by means of the hydraulic apparatus and suitable to contain a fluid coming from the upper portion (11), a drainage channel (3) in fluidic through connection with the tank (2) and suitable to allow the fluid to flow towards the outside of the ice maker (10), a drainage pump (4) mechanically connected to said tank (2) and suitable to convey on command the fluid from the tank (2) to the drainage channel (3).

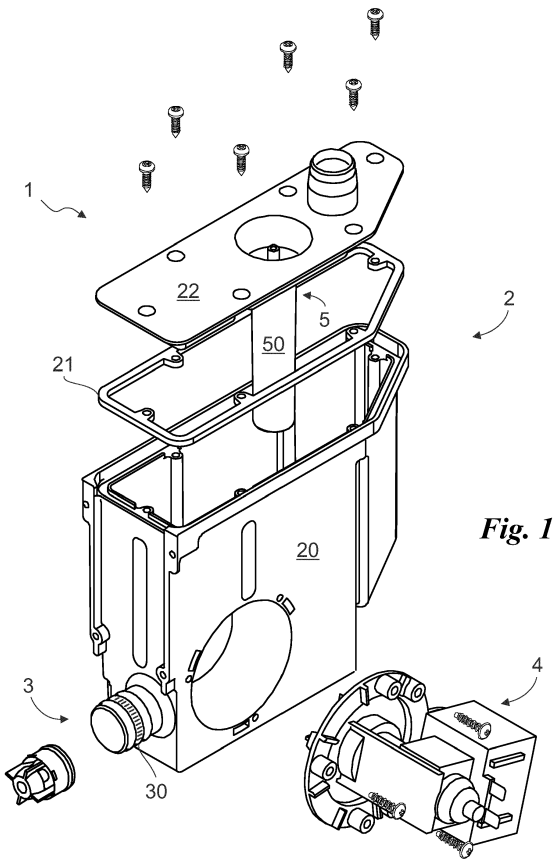

Fig. 1

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Description

DRAINAGE DEVICE FOR ICE MAKER

[0001] The present invention relates to a drainage device for ice maker of the type specified in the preamble of the first claim.

[0002] Similar devices are described in patent applications CN-A-102252477, US-A-2011/284094, US-A-2016/054043, JP-A-HI0288437 and DE-A-112006000552.

[0003] In particular, the invention relates to a drainage device for a professional ice maker, for example of the type occurring in catering facilities.

[0004] As is well known, ice makers consist of a generally parallelepiped structure comprising an upper portion and a lower portion.

[0005] Usually, the upper portion consists of a box structure accessible from the outside and suitable to enclose therein the ice made by the ice maker. The ice can therefore have different shapes and dimensions depending on the means used to make the ice.

[0006] Ice makers, which make ice granules or cubes or the like, are known in the current state of the art.

[0007] On the other hand, the lower portion of the machines described above is generally, though not necessarily, constituted by a set of power supply and drive means, and hydraulic pipes required for the operation of the machine.

[0008] The ice makers known in the current state of the art may comprise drainage devices arranged inside the upper portion and suitable to allow the excess liquid inside the ice maker to be ejected so as to preserve the correct operation of the ice maker.

[0009] These devices generally comprise a liquid containment tank and a pump connected to the tank and suitable to allow the fluid contained therein to flow out of the device. Alternatively, the pump can be directly connected to the ice container defining almost the entire upper portion.

[0010] The described prior art has a few major drawbacks.

[0011] In particular, drainage devices can experience malfunction or operation interruptions that can lead to flooding of the room.

[0012] In addition, drainage devices are frequently integrated inside the machine and therefore are difficult to replace in the event of malfunction or failure.

[0013] In this context, the technical task underlying the present invention is to devise a drainage device for an ice maker, which is capable of substantially obviating at least some of the above-mentioned drawbacks.

[0014] Within the scope of said technical task, a major object of the invention is to obtain a drainage device, which allows the space occupied inside the ice maker to be considerably reduced.

[0015] Another major object of the invention is to provide a drainage device, which is easily replaceable or accessible so as to allow proper maintenance.

[0016] The technical task and the specified objects are achieved by means of a drainage device for an ice maker as claimed in the appended claim 1. Preferred embodiments are described in the dependent claims.

[0017] The features and advantages of the invention will be apparent from the detailed description of preferred embodiments of the invention, with reference to the accompanying drawings, in which:

Fig. 1 is an exploded view of the drainage device according to the invention;

Fig. 2a shows an ice maker including the drainage device according to the invention in a first configuration;

Fig. 2b shows an ice maker including the drainage device according to the invention in an alternative configuration; and

Fig. 3 shows the drainage device according to the invention in axonometric projection.

[0018] In the present document, the measures, values, shapes and geometric references (such as perpendicularity and parallelism), when associated with terms like "about" or other similar terms such as "almost" or "substantially", are to be understood as unless measurement errors or inaccuracies due to production and/or manufacturing defects and, especially, unless a slight difference from the value, measure, shape, or geometric reference with which it is associated. For example, these terms, if associated with a value, preferably indicate a difference not exceeding 10% of the value itself.

[0019] Furthermore, when used, terms such as "first", "second", "higher", "lower", "main" and "secondary" do not necessarily identify an order, a priority relationship or a relative position, but can simply be used to distinguish more clearly the different components from each other.

[0020] The measurements and the data reported in this text are to be considered, unless otherwise indicated, as carried out in the International Standard Atmosphere ICAO (ISO 2533).

[0021] With reference to the Figures, the drainage device for an ice maker according to the invention is indicated as a whole by the numeral **1.**

[0022] The drainage device 1 is preferably suitable to be installed on an ice maker **10** of a known type.

[0023] In fact, such an ice maker 10 is, for example, a professional machine for making granular or cubed ice components or the like.

[0024] Therefore, the ice maker 10 preferably comprises an upper portion **11** and a lower portion **12.**

[0025] The upper portion 11 preferably comprises an ice containment enclosure. The latter can be substantially defined, for example, by a container accessible through a door, and is suitable to make and store therein ice cubes or the like.

[0026] The second portion 12 is preferably suitable to

contain at least one power supply unit and a hydraulic apparatus.

[0027] The power supply unit is constituted, for example, by an electric motor or other means suitable to supply energy to the first portion for making ice according to known techniques.

[0028] The hydraulic apparatus is preferably in fluidic through connection with the upper portion 11.

[0029] In particular, the hydraulic apparatus may comprise tubular elements suitable to allow a fluid to pass therein.

[0030] Preferably, the hydraulic apparatus comprises at least one drainage channel suitable to channel therein the fluid coming from the upper portion 11, i.e. from the ice container.

[0031] The ice maker 10 and the portions 11, 12 may therefore have variable shapes and dimensions depending on the ice maker model used.

[0032] Generally, these machines have square parallelepiped shapes with a rectangular base and define walls and angles.

[0033] The device 1 preferably comprises a tank **2,** a drainage channel **3** and a drainage pump **4.**

[0034] The tank 2 is preferably placed in fluidic through connection with the upper portion 11 by means of the hydraulic apparatus and is suitable to contain the fluid coming from the upper portion 11.

[0035] Thus, the tank 2 is preferably in fluidic through connection with the drainage channel mentioned above.

[0036] In detail, the tank 2 comprises a primary container **20,** an air-tight element **21** and a lid **22.**

[0037] The primary container 20 preferably defines an open box suitable to be closed by means of the lid 22.

[0038] The lid 22 also preferably includes a hole or connection means known per se and suitable to ensure the connection between the tank 2 and the drainage channel of the ice maker 10.

[0039] On the other hand, the air-tight element 21 is preferably arranged between the primary container 20 and the lid 22 so as to allow the tank 2 to be hermetically sealed. In particular, the air-tight element 21 preferably consists of a known type of seal.

[0040] Therefore, the tank 2 is accessible for maintenance and can be easily connected to and disconnected from the ice maker 10.

[0041] Moreover, the tank 2 can be arranged inside the lower portion 12 at the angles defined thereby.

[0042] Furthermore, preferably, the tank 2 defines a parallelepiped structure, the base of which is substantially wedge-shaped. More preferably, the base is approximately rectangular with a highly bevelled angle, up to forming a fifth diagonal side and approximating the shape of a wedged rectangle.

[0043] In this manner, the volume occupied by the tank is limited.

[0044] The drainage channel 3 is preferably in fluidic through connection with the tank 2 and suitable to allow the fluid to flow towards the outside of the ice maker 10.

[0045] Preferably, the drainage channel 3 comprises a check valve suitable to allow the fluid to flow in one direction only.

[0046] In addition, the drainage channel 3 preferably comprises connection means **30.**

[0047] The connection means 30 are conveniently suitable to detachably connect the device 1 to an external drainage network.

[0048] This drainage network can therefore be of a known type and provide drainage channels, for example tubular elements, suitable to allow a fluid to flow towards the outside of the device 1, and hence of the ice maker 10.

[0049] In particular, the connection means 30 are composed, for example, of a hose clamp of a known type suitable to trap part of a drainage channel of the drainage network. Also preferably, the drainage channel 3 is suitable to protrude out of the ice maker 10, for example by means of a hole in the wall of the lower portion 12.

[0050] The drainage pump 4 is preferably suitable to convey the fluid from the tank 2 to the drainage channel 3.

[0051] The drainage pump 4 is, for example, a radial positive displacement pump of a type known in the current state of the art.

[0052] In particular, preferably, the drainage pump 4 is not inside the tank 2, but is arranged at least partly outside the tank 2.

[0053] In this way, the drainage pump 4 is accessible from the outside.

[0054] In addition, the drainage pump 4 is powered independently of the power supply unit of the ice maker 10. The independent powering is preferably obtained through a single cable for the connection to the electrical network, which splits upstream of the power supply of the ice maker 10 and upstream of the "on" switch of the latter, so as to ensure the drainage pump 4 to be powered independently of the turning on or off of the ice maker 10.

[0055] In particular, preferably, the drainage pump 4 is powered in parallel with the power supply unit of the ice maker 10 and operates independently of the turning off or on of the ice maker 10.

[0056] However, the global power supply, for example a wall terminal, supplies both the pump 4 and the ice maker 10.

[0057] Alternatively, the drainage pump 4 may comprise a power supply completely independent of the power supply of the ice maker 10, which may involve, for example, a separate wall terminal.

[0058] Preferably, therefore, the drainage pump 4 is operatively connected to secondary power supply means **6.**

[0059] The secondary power supply means 6 are particularly suitable to connect the drainage pump 4 to known electrical connections.

[0060] For example, the secondary power supply means 6 may consist of electrical cables, which are suitable to be connected to wall sockets independently of the ice maker 10, as in the alternative configuration.

[0061] Preferably, in the preferred configuration, the

secondary power supply means 6 consist of cables or electrical connections suitable to interface with at least one multi-connector of a known type suitable to supply the ice maker 10 and the device 1 in parallel.

[0062] In any case, the device 1, and in particular the drainage pump 4 is powered independently of the switching off or on of the ice maker 10.

[0063] The device 1 preferably also comprises sensor means **5.**

[0064] The sensor means 5 are preferably suitable to control the drainage pump 4 so as to activate it when the fluid inside the tank reaches a predetermined threshold level. "Threshold level" is intended to mean the height reached by the fluid inside the tank 2.

[0065] In detail, the sensor means 5 are substantially constituted by a pressure switch and comprise a secondary container **50** and a detector **51.**

[0066] The secondary container 50 is preferably arranged inside the tank 2.

[0067] Most suitably, the secondary container 50 is suitable to be arranged within the primary container 20 so as to communicate with it. In this manner, when the fluid enters the tank 2 and rises in level, it also rises in level inside the secondary container 50 according to the principle of communicating vessels.

[0068] The detector 51 is thus preferably in fluidic through connection with the secondary container 50 and contains a gas, which is suitable to be placed under pressure when the fluid level rises inside the secondary container 50.

[0069] The gas is, for example, air; the detector 51 is therefore suitable to detect the pressure of said gas.

[0070] More in detail, the detector 51 comprises a tubular element connected to the secondary container 50 at one end and comprises a pressure sensor **52** at the opposite end. The pressure sensor is of a known type and is suitable to close the tubular element so as to trap the gas inside said tubular element.

[0071] The sensor means 5 are also operatively connected to the power supply means 6 so as to enable them to send command pulses to the drainage pump 4 when the pressure reaches threshold values at which the fluid reaches, inside the tank, predetermined threshold values.

[0072] Therefore, the secondary power supply means 6 are operatively connected both to the sensor means 5 and to the drainage pump 4 and are suitable to connect them to known electrical connections external to the ice maker 10.

[0073] The operation of the device 1, previously described in structural terms, is as follows. The drainage fluid of the ice maker 10 on which the device 1 is installed settles in the tank 2, and in particular in the primary 20 and secondary 50 containers.

[0074] When the fluid reaches a predetermined threshold level defined by the height of the fluid inside the tank, the gas inside the detector 51 is at a threshold pressure value that activates the pressure switch preferably constituting the sensor means 5.

[0075] Once the threshold value has been reached, the sensor means 5 send a pulse to the drainage pump, thus allowing it to convey the fluid in the tank 2 to the inside of the drainage channel 3.

[0076] In this manner, the excess fluid of the ice maker 10 is drained out of it.

[0077] The drainage device for an ice maker 1 according to the invention achieves important advantages.

[0078] In fact, the secondary power supply means 6 allow the device 1 to operate even when the ice maker 10 is not switched on, in the preferred configuration, or even when the ice maker is not powered or when it fails or malfunctions in the alternative configuration.

[0079] The parallel or independent powering thus allows a continuous control of the drainage of the excess fluid inside the ice maker 10, thus preventing flooding which is detrimental to the electrical components.

[0080] Moreover, the use of the sensor means 5 including the pressure switch prevents using floats inside the tank and therefore allows the electronic means, such as the pressure sensor, to be kept dry and well separated from the fluid inside the tank.

[0081] In conclusion, a further advantage of the device 1 is that it does not substantially encumber the volume of the ice maker thanks to its wedge shape, can be easily installed on any device existing in the market also thanks to its wedge shape that limits the dimensions thereof, and may allow easy maintenance in both configurations.

[0082] The invention is susceptible of variations falling within the scope of the inventive concept as defined by the claims.

[0083] In this context, all details are replaceable by equivalent elements, and the materials, shapes and dimensions may be any materials, shapes and dimensions.

Claims

1. A drainage device (1) for an ice maker (10), said ice maker (10) comprising an upper portion (11) defining an ice containment enclosure and a lower portion (12) containing at least one power supply unit and a hydraulic apparatus in fluidic through connection with said upper portion (11),
said device (1) being placed in said lower portion (12) and being **characterized in that** it comprises:

- a tank (2) detachably placed in fluidic through connection with said upper portion (11) by means of said hydraulic apparatus and suitable to contain a fluid coming from said upper portion (11),
- a drainage channel (3) in fluidic through connection with said tank (2) and suitable to allow said fluid to flow towards the outside of said ice maker (10),
- a drainage pump (4), mechanically connected

to said tank (2), suitable to convey on command said fluid from said tank (2) to said drainage channel (3),
- and **in that** said tank (2) defines a parallelepiped structure, the base of which is substantially wedge-shaped.

2. The drainage device (1) according to claim 1, wherein said drainage pump (4) is arranged at least partially outside said tank (2) and is powered independently of the turning off or on of said ice maker (10).

3. The drainage device (1) according to at least one preceding claim, comprising sensor means (5) suitable to control said drainage pump (4) so as to activate said drainage pump (4) when said fluid inside said tank (2) reaches a predetermined threshold level.

4. The drainage device (1) according to at least one preceding claim, wherein said sensor means (5) are constituted by a pressure switch and comprise a secondary container (50) and a detector (51), said secondary container (50) being arranged inside said tank (2) and suitable to receive at least part of said fluid according to the principle of communicating vessels and said detector (51) being in fluidic through connection with said secondary container (50), containing a gas suitable to be placed under pressure when said fluid level rises in said secondary container (50) and being suitable to detect said pressure of said gas.

5. The drainage device (1) according to at least one preceding claim, wherein said detector (51) comprises a tubular element connected to said secondary container (50) at one end and comprising a pressure sensor at the opposite end, said pressure sensor being suitable to close said tubular element so as to trap said gas inside said tubular element.

6. The drainage device (1) according to at least one preceding claim, wherein said tank (2) comprises a primary container (20), an air-tight element (21) and a lid (22), said primary container (20) defining an open box suitable to be closed by means of said lid (22) and said air-tight element (21) being placed between said primary container (20) and said lid (22) and consisting of a known type of seal.

7. The drainage device (1) according to at least one preceding claim, comprising secondary power supply means (6) operatively connected to said sensor means (5) and said drainage pump (4), said secondary power supply means (6) being suitable to connect said sensor means (5) and said drainage pump (4) to known electrical connections external to said ice maker (10).

8. The drainage device (1) according to at least one preceding claim, wherein said drainage channel (3) comprises connection means (30) suitable to detachably connect said device (1) to an external drainage network, said connection means (30) being composed of a hose clamp of a known type suitable to trap part of a drainage channel of said external drainage network.

9. An ice maker (10) comprising a drainage device (1) according to at least one preceding claim.

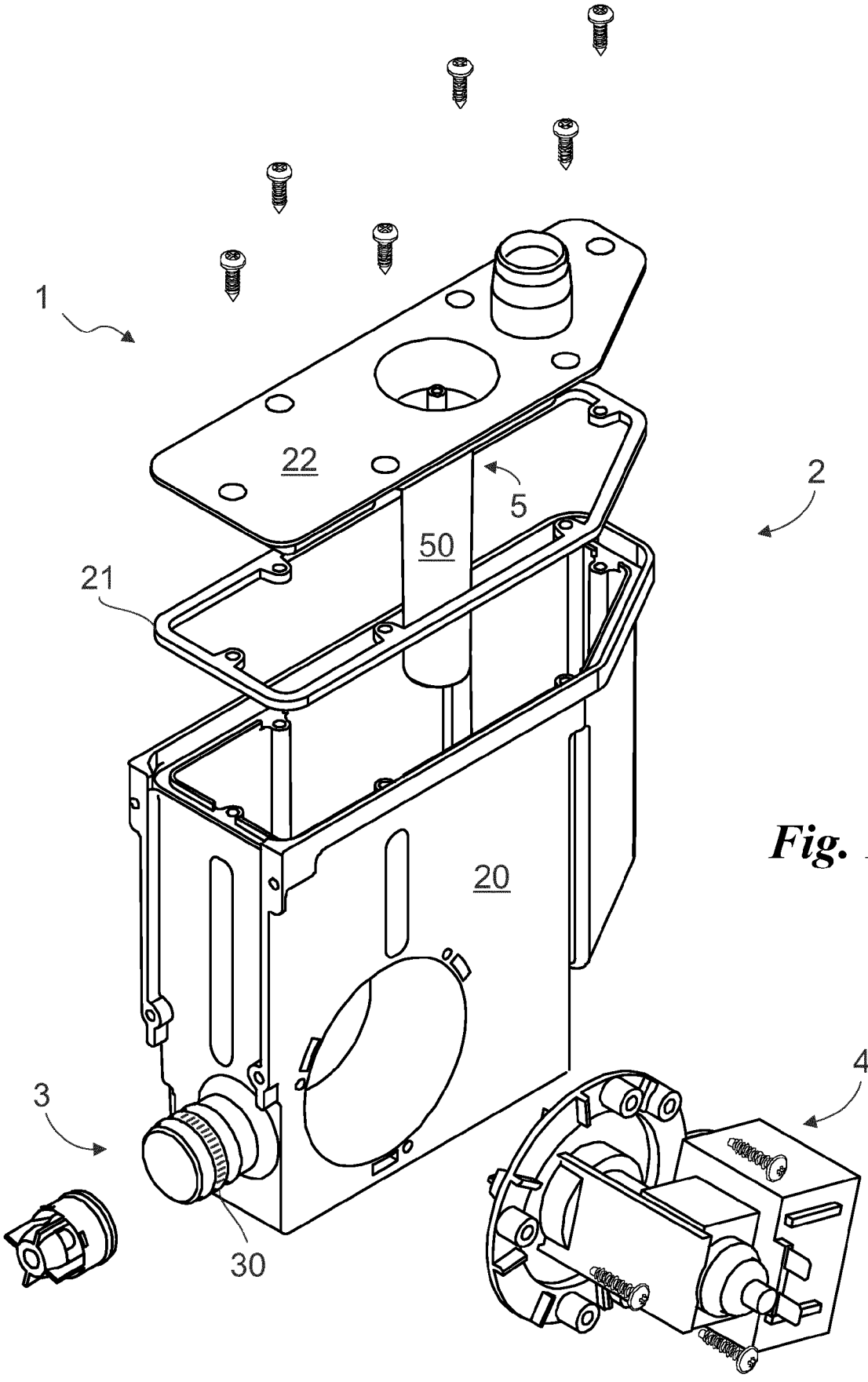


Fig. 1

Fig. 3

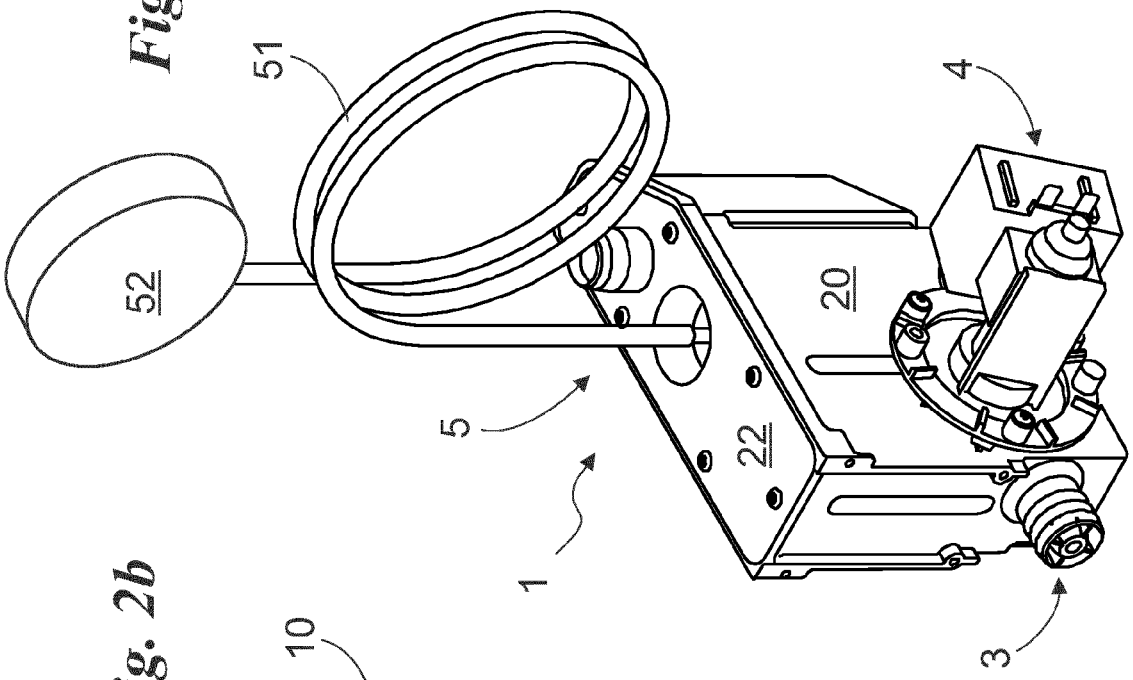


Fig. 2b

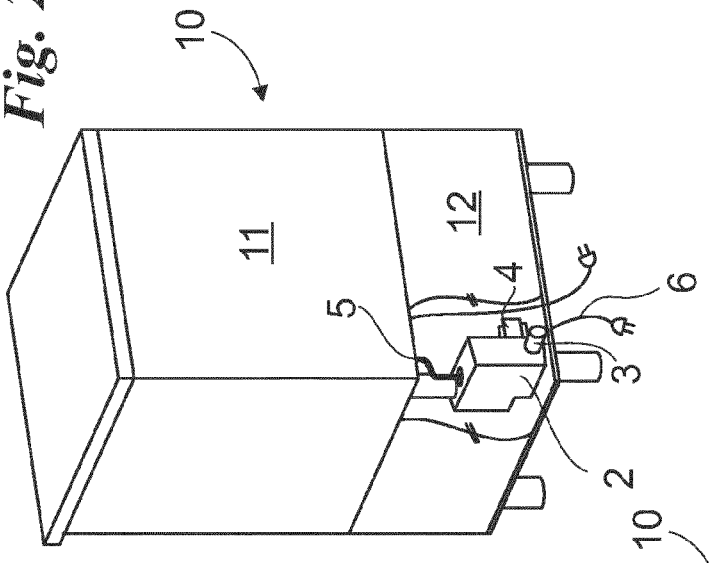
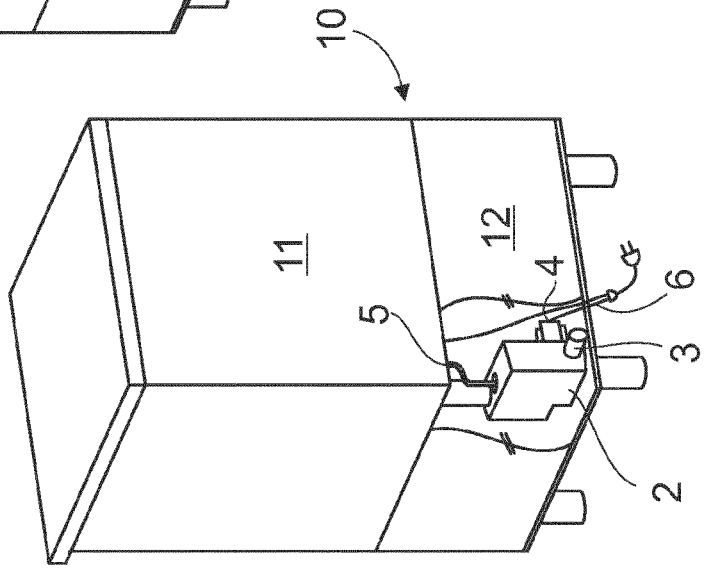


Fig. 2a



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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 6365

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 Y	US 2011/284094 A1 (CHILCOAT EDWARD A [US] ET AL) 24 November 2011 (2011-11-24) * abstract; figures 1, 4, 6, 8, 9 * * paragraphs [0034] - [0046] *	1,2,7,9 3-6,8	INV. F25C1/00
Y A	US 2016/054043 A1 (BROADBENT JOHN ALLEN [US]) 25 February 2016 (2016-02-25) * abstract; figures 1, 3 * * paragraphs [0031] - [0034] *	3-5 1	
Y A	JP H10 288437 A (MATSUSHITA REFRIGERATION) 27 October 1998 (1998-10-27) * abstract; figures 1-8 *	6 1	
Y A	DE 11 2006 000552 T5 (ELTEK SPA [IT]) 6 March 2008 (2008-03-06) * abstract; figures 1, 3, 7,15-20 *	8 1	
A	CN 102 252 477 A (ZHONGSHAN XINSHUNXIANG ELECTRICAL APPLIANCE MFG CO LTD) 23 November 2011 (2011-11-23) * abstract; figure 1 * * paragraphs [0013] - [0020] *	1-9	TECHNICAL FIELDS SEARCHED (IPC) F25C F25D
A	JP S62 138664 A (HOSHIZAKI ELECTRIC CO LTD) 22 June 1987 (1987-06-22) * the whole document *	1-9	
A	US 2014/013781 A1 (ANTOINE THOMAS H [US] ET AL) 16 January 2014 (2014-01-16) * the whole document *	1-9	
A	US 4 987 746 A (ROBERTS MARK J [US]) 29 January 1991 (1991-01-29) * the whole document *	1-9	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 October 2018	Bejaoui, Amin

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 6365

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	KR 2010 0085689 A (SE A E & C CO LTD [KR]) 29 July 2010 (2010-07-29) * the whole document *	1-9	
A	US 2008/250820 A1 (CIMETTA SILVANO [IT] ET AL) 16 October 2008 (2008-10-16) * the whole document *	1-9	
A	US 6 536 242 B1 (BOUTIETTE TODD PAUL [US]) 25 March 2003 (2003-03-25) * the whole document *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

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The Hague	30 October 2018	Bejaoui, Amin

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30-10-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011284094 A1	24-11-2011	CA 2799723 A1	24-11-2011
		US 2011284094 A1	24-11-2011
		US 2013206246 A1	15-08-2013
		US 2015238064 A1	27-08-2015
		WO 2011146119 A2	24-11-2011
US 2016054043 A1	25-02-2016	CN 106662387 A	10-05-2017
		EP 3183517 A1	28-06-2017
		JP 2017525921 A	07-09-2017
		KR 20170039177 A	10-04-2017
		US 2016054043 A1	25-02-2016
		WO 2016028846 A1	25-02-2016
JP H10288437 A	27-10-1998	JP 4021001 B2	12-12-2007
		JP H10288437 A	27-10-1998
DE 112006000552 T5	06-03-2008	DE 112006000552 T5	06-03-2008
		US 2008168791 A1	17-07-2008
		WO 2006097838 A2	21-09-2006
CN 102252477 A	23-11-2011	NONE	
JP S62138664 A	22-06-1987	NONE	
US 2014013781 A1	16-01-2014	BR 102013017739 A2	04-08-2015
		CA 2819742 A1	11-01-2014
		CN 103542653 A	29-01-2014
		EP 2685182 A2	15-01-2014
		MX 347069 B	11-04-2017
		TW 201407115 A	16-02-2014
		US 2014013781 A1	16-01-2014
US 4987746 A	29-01-1991	NONE	
KR 20100085689 A	29-07-2010	NONE	
US 2008250820 A1	16-10-2008	BR PI0617223 A2	19-07-2011
		CN 101283138 A	08-10-2008
		CN 102174734 A	07-09-2011
		EP 1775367 A1	18-04-2007
		KR 20080059432 A	27-06-2008
		US 2008250820 A1	16-10-2008
		WO 2007042269 A1	19-04-2007
US 6536242 B1	25-03-2003	NONE	

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

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Patent documents cited in the description

- CN 102252477 A **[0002]**
- US 2011284094 A **[0002]**
- US 2016054043 A **[0002]**
- JP HI0288437 A **[0002]**
- DE 112006000552 A **[0002]**