



(11)

EP 3 415 825 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.12.2018 Bulletin 2018/51

(51) Int Cl.:
F24D 3/10 (2006.01)

(21) Application number: **17175920.2**

(22) Date of filing: **14.06.2017**

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

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(54) **HEAT CIRCUIT REFILLING DEVICE**

(57) Heat circuit refilling device (10) comprising a water tank unit (11), the water tank unit (11) having a water tank (12), an inlet (13) through which water tank unit (11) is connectable to a water supply system, a free overflow outlet (14), a floating valve (15) having a float (16) monitoring the filling level within the water tank (12) and having a valve (17) within the inlet (13), wherein the valve (17) opens and closes as a function of the filling level

monitored by the float (16). The eat circuit refilling device (10) further comprising a booster unit (18), the booster unit (18) having an inlet (19) being in communication with the water tank (12), an outlet (20) being connectable to a heat circuit, a pump (21) being connected between the inlet (19) of the booster unit (18) and the outlet (20) of the booster unit (18).

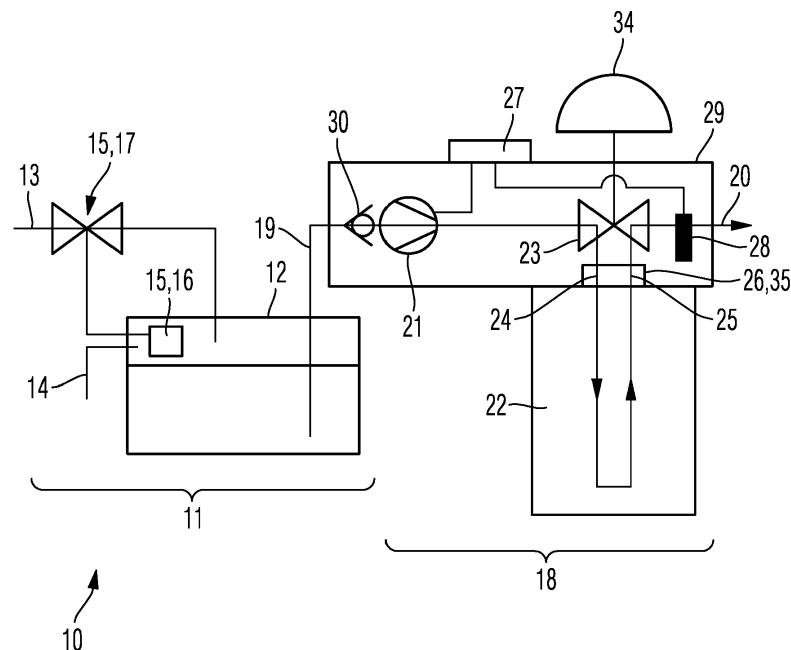


Fig. 2

Description

[0001] The present patent application relates to a heat circuit refilling device.

[0002] Heat circuits are filled with water. When the water pressure within the heat circuit drops below a threshold, it becomes necessary to refill the heat circuit with water. The refilling of a heat circuit with water is usually done by connecting the heat circuit to a potable water supply system.

[0003] When refilling a heat circuit, it is necessary to avoid a backflow of the water within the heat circuit into the potable water system. A heat circuit refilling device is used to refill water provided by a potable water system into to heat circuit while preventing backflow of the water within the heat circuit into the potable water system.

[0004] Heat circuit refilling devices known from the prior art are provided by a backflow preventer also often called system separator or system disconnect. A backflow preventer comprises two check valves and a discharge valve. A backflow preventer known from the prior art is disclosed EP 0 555 837 B1.

[0005] Such backflow preventers need to be professionally maintained once a year. This causes costs for the customer. Therefore, maintenance is done rarely causing a risk of pollution for the potable water system.

[0006] Against this background a novel heat circuit refilling device according to the claim 1 is provided.

[0007] The heat circuit refilling device comprises a water tank unit and a booster unit.

[0008] The water tank unit of the novel heat circuit refilling device comprises a water tank, an inlet through which water tank unit is connectable to a water supply system, a free overflow outlet and a floating valve. The floating valve has a float monitoring the filling level within the water tank and having a valve within the inlet of the water tank unit, wherein the valve opens and closes as a function of the filling level monitored by the float.

[0009] The booster unit of the novel heat circuit refilling device comprises an inlet being in communication with the water tank, an outlet being connectable to a heat circuit, and a pump being connected between the inlet of the booster unit and the outlet of the booster unit.

[0010] Such a heat circuit refilling device allows a refilling of the heat circuit with water avoiding backflow of water of the heat circuit into the water supply system without requiring professional maintenance once a year.

[0011] According to a preferred embodiment, the booster unit comprises a water preparation cartridge. The water preparation cartridge is preferably connected between the pump of the booster unit and the outlet of the booster unit. The water preparation cartridge provides the possibility of a water treatment for the water to be refilled into the heat circuit. The water preparation cartridge can provide ion exchange and salt removal from the water. There is no risk of backflow of the treated water into the potable water supply system.

[0012] According to a preferred embodiment, the

booster unit comprises a user interface having a switch through which the pump of the booster unit is activatable. An operator can manually activate and deactivate the pump by operating the switch.

[0013] Preferred developments of the invention are provided by the dependent claims and the description which follows. Exemplary embodiments are explained in more detail on the basis of the drawing, in which:

Figure 1 shows a perspective view of a heat circuit refilling device according to the present application;

Figure 2 shows a schematic block diagram for the heat circuit refilling device of Fig. 1.

[0014] The present patent application relates to a heat circuit refilling device 10.

[0015] The heat circuit refilling device 10 according to the present patent application comprises a water tank unit 11. The water tank unit 11 has a water tank 12, an inlet 13 through which water tank unit 11 is permanently connectable to a potable water supply system, a free overflow outlet 14, and a floating valve 15.

[0016] The floating valve 15 comprises a float 16 monitoring the filling level within the water tank 12. The floating valve 15 comprises further a valve 17 within the inlet 13 of the water tank unit 11, wherein the valve 17 opens and closes automatically as a function of the filling level monitored by the float 16.

[0017] In case the filling level is below a first threshold, the valve 17 opens automatically such that potable water flows from the potable water supply system through the inlet 13 of the water tank unit 11 into the water tank 12. In case the filling level is above the first threshold, the valve 17 closes automatically.

[0018] In case the filling level is above the second threshold being greater than the first threshold, the water flows out of the water tank 12 through the free overflow outlet 14.

[0019] The heat circuit refilling device 10 according to the present patent application comprises further a booster unit 18. The booster unit 18 has an inlet 19 being in permanent communication with the water tank 12 of the water tank unit 11, an outlet 20 being permanently connectable to a heat circuit, a pump 21 being connected between the inlet 19 of the booster unit 18 and the outlet 20 of the booster unit 18.

[0020] When water has to be refilled into the heat circuit, the pump 21 of the booster unit 18 becomes activated. The pump 21 can boost water provided with the water tank 12 of the water tank unit 11 towards the outlet 20 of the booster unit 18 for refilling the heat circuit with water and avoids dry-running of the pump.

[0021] The booster unit 18 comprises a non-return valve 30 connected between the inlet 19 of the booster unit 18 and the pump 21 of the booster unit 18. The non-return valve prevents water to flow back from the booster unit 18 into the water tank 12 of the water tank unit 11.

[0022] The booster unit 18 comprises further a shut-off valve 23 connected between the outlet 20 of the booster unit 18 and the pump 21 of the booster unit 18. The shut-off valve 23 can be operated, namely opened and closed, through an operator by a shut-off handle 34.

[0023] The booster unit 18 preferably comprises a water preparation cartridge 22. The water preparation cartridge 22 is connected between the outlet 20 of the booster unit 18 and the pump 21 of the booster unit 18. The shut-off valve 23 is connected between an inlet 24 of the water preparation cartridge 22 and an outlet 25 of the water preparation cartridge 22. The water preparation cartridge 22 provides the possibility of a water treatment for the water to be refilled into the heat circuit. The water preparation cartridge 22 can provide ion exchange and salt removal from the water.

[0024] The water preparation cartridge 22 of the booster unit 18 is replaceable. The inlet 24 of the water preparation cartridge 22 and the outlet 25 of the water preparation cartridge 22 are preferably provided by a common connection socket 26 through which the water preparation cartridge 22 is connectable to a housing 29 of the booster unit 18. Said housing 29 accommodates the pump 21, the non-return valve 30 and the shut-off valve 23. Said housing further provides a connection socket 35 acting together with the connection socket 26 of the water preparation cartridge 22. These connection sockets 26, 35 can be plugged together by a snap-fit connection and can be released through a release handle 33.

[0025] For replacing the water preparation cartridge 22 the connection between the water preparation cartridge 22 and the housing 29 becomes released through a release handle 33 and the shut-off valve 23 connected between the inlet 24 of the water preparation cartridge 22 and an outlet 25 of the water preparation cartridge 22 becomes closed.

[0026] The booster unit 18 preferably comprises a sensor 28 connected between the water preparation cartridge 22 of the booster unit 18 and the outlet 20 of the booster unit 18 measuring the water quality. The sensor 28 is connected to an user interface 27 having an indicator 32 displaying the water quality measured by the sensor 28 thereby indicating if the water preparation cartridge 22 needs to be replaced.

[0027] The user interface 27 has further a switch 31 through which the pump 21 of the booster unit 18 is activatable by an operator.

[0028] The pump 21 is connected to an electrical power supply source (not shown) energizing the pump when switching the same on through the switch 31.

[0029] The heat circuit refilling device 10 according to the present application is maintenance free and has the water tank unit 11 and the booster unit 18. The booster unit 18 provides the refilling of the heat circuit with water from a decoupled water tank 12. The water tank 12 is refilled from the potable water system by the floating valve 17 making use of the free overflow outlet 14.

List of reference signs

[0030]

5	10	heat circuit refilling device
	11	water tank unit
	12	water tank
	13	inlet
	14	free overflow outlet
10	15	floating valve
	16	float
	17	valve
	18	booster unit
	19	inlet
15	20	outlet
	21	pump
	22	water preparation cartridge
	23	shut-off valve
	24	inlet
20	25	outlet
	26	connection socket
	27	user interface
	28	sensor
	29	housing
25	30	non-return valve
	31	switch
	32	indicator
	33	release handle
	34	shut-off handle
30	35	connection socket

Claims

- 35 1. Heat circuit refilling device (10), comprising:
- a water tank unit (11), the water tank unit (11) having
- 40 a water tank (12),
an inlet (13) through which water tank unit (11) is connectable to a water supply system,
a free overflow outlet (14),
a floating valve (15) having a float (16) monitoring the filling level within the water tank (12) and having a valve (17) within the inlet (13), wherein the valve (17) opens and closes as a function of the filling level monitored by the float (16),
- 45 a booster unit (18), the booster unit (18) having
- 50 an inlet (19) being in communication with the water tank (12),
an outlet (20) being connectable to a heat circuit,
a pump (21) being connected between the
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inlet (19) of the booster unit (18) and the outlet (20) of the booster unit (18).

2. Heat circuit refilling device as claimed in claim 1, **characterized in that** the booster unit (18) comprises a water preparation cartridge (22). 5
3. Heat circuit refilling device as claimed in claim 2, **characterized in that** the water preparation cartridge (22) is connected between the outlet (20) of the booster unit (18) and the pump (21) of the booster unit (18). 10
4. Heat circuit refilling device as claimed in claim 2 or 3, **characterized in that** the water preparation cartridge (22) is replaceable. 15
5. Heat circuit refilling device as claimed in one of claims 1 to 4, **characterized in that** the booster unit (18) comprises a shut-off valve (23) connected between the outlet (20) of the booster unit (18) and the pump (21) of the booster unit (18). 20
6. Heat circuit refilling device as claimed in one of claims 2 to 5, **characterized in that** the booster unit (18) comprises a sensor (28) connected between the water preparation cartridge (22) of the booster unit (18) and the outlet (20) of the booster unit (18) measuring the water quality. 25
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7. Heat circuit refilling device as claimed in one of claims 1 to 6, **characterized in that the characterized in that** the booster unit (18) comprises a non-return valve (30) connected between the inlet (19) of the booster unit (18) and the pump (21) of the booster unit (18). 35
8. Heat circuit refilling device as claimed in one of claims 1 to 7, **characterized in that** the booster unit (18) comprises a user interface (27) having a switch (31) through which the pump (21) of the booster unit (18) is activatable. 40
9. Heat circuit refilling device as claimed in claim 6 and 8, **characterized in that** the user interface (27) has an indicator (32) displaying the water quality measured by the sensor (28) thereby indicating if the water preparation cartridge (22) needs to be replaced. 45

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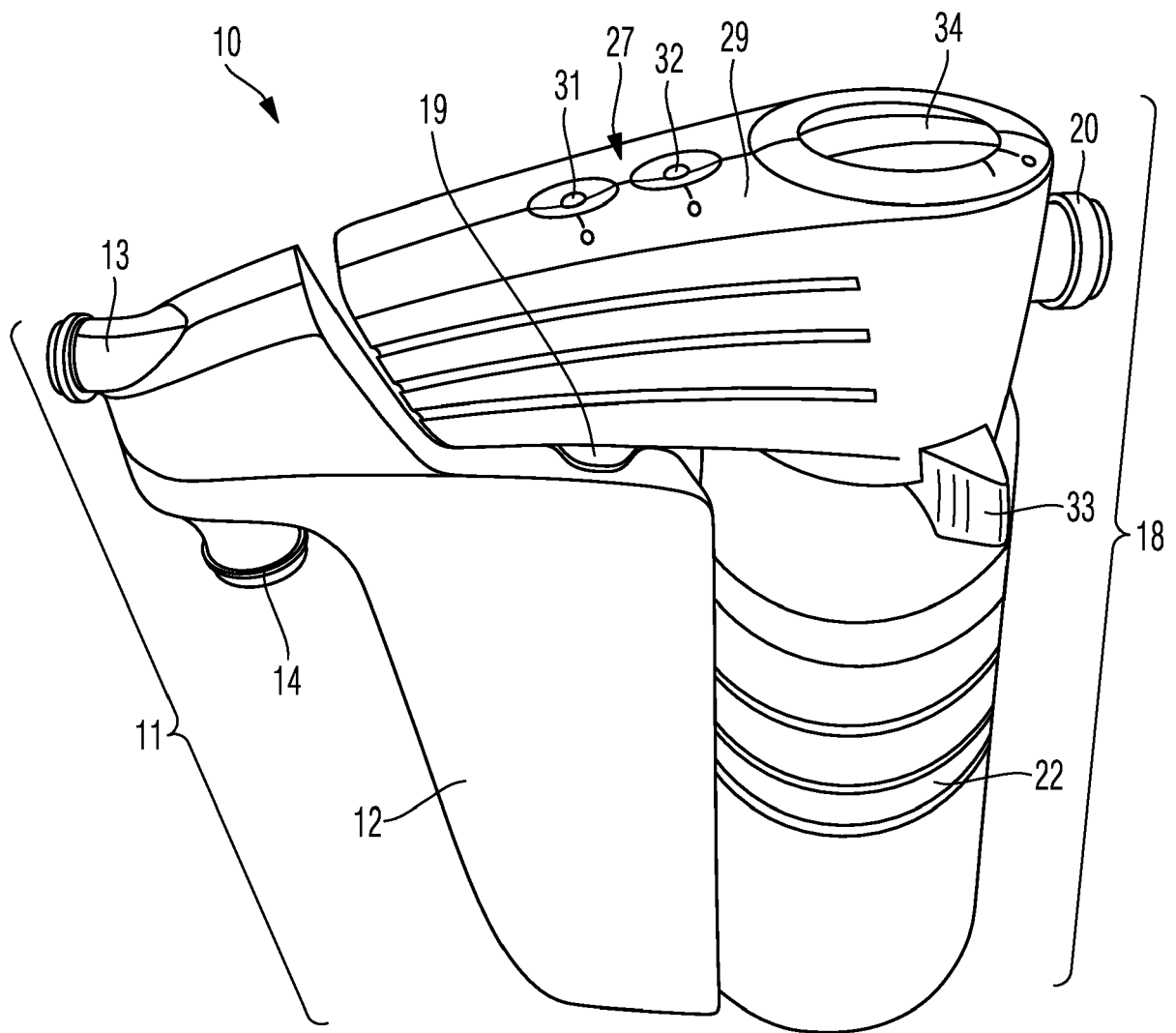


Fig. 1

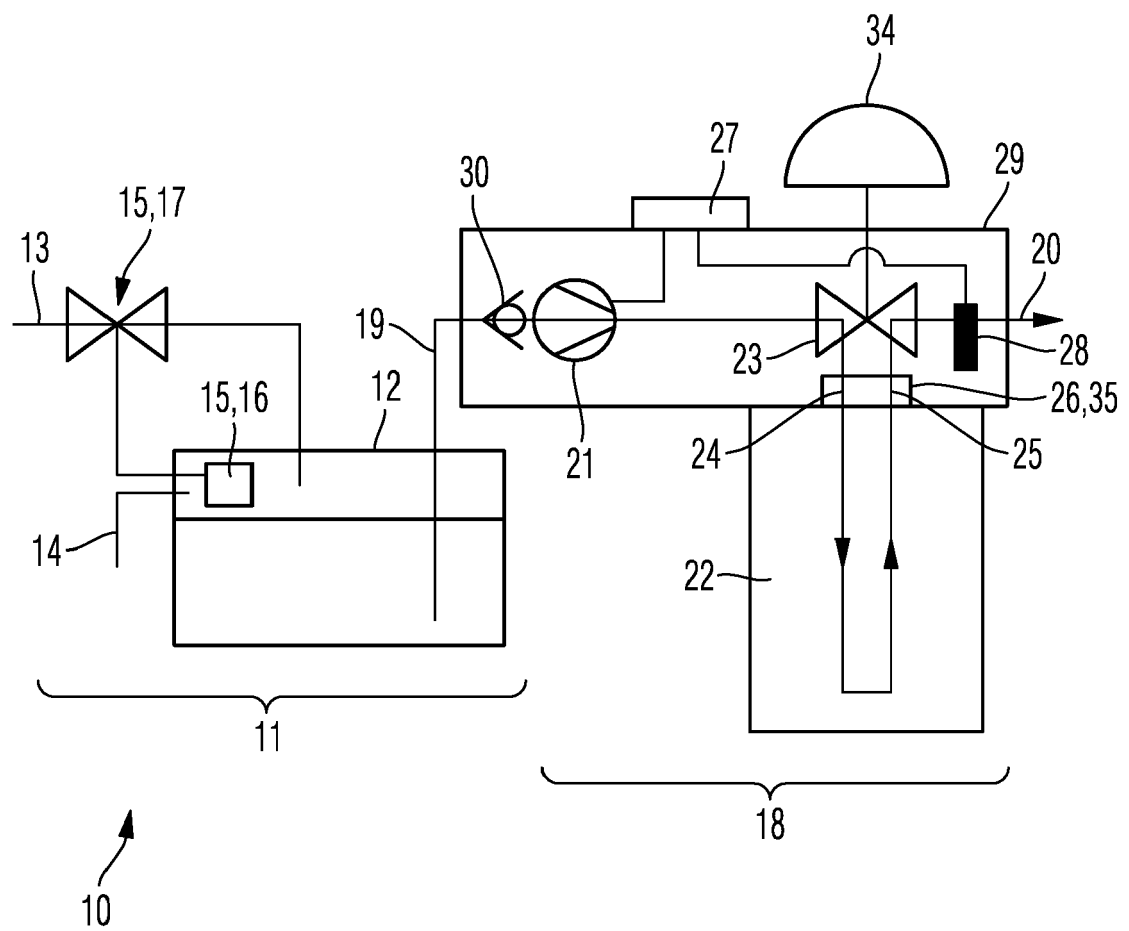


Fig. 2



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Application Number
EP 17 17 5920

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Y	* column 1, line 47 - column 2, line 89; figure 1 *	2-4	
X	DE 21 09 627 A1 (TACO HEIZUNG AG, ZUERICH) 16 September 1971 (1971-09-16)	1,5	
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Y	* paragraph [0012] - paragraph [0047]; figures 1-4 *	2-4,6,8,9	
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Y	* paragraph [0019] - paragraph [0026]; claim 1; figure 1 *	2-4,6,9	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 November 2017	Examiner Ast, Gabor
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EPO FORM 1503 03.82 (P04C01)

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