



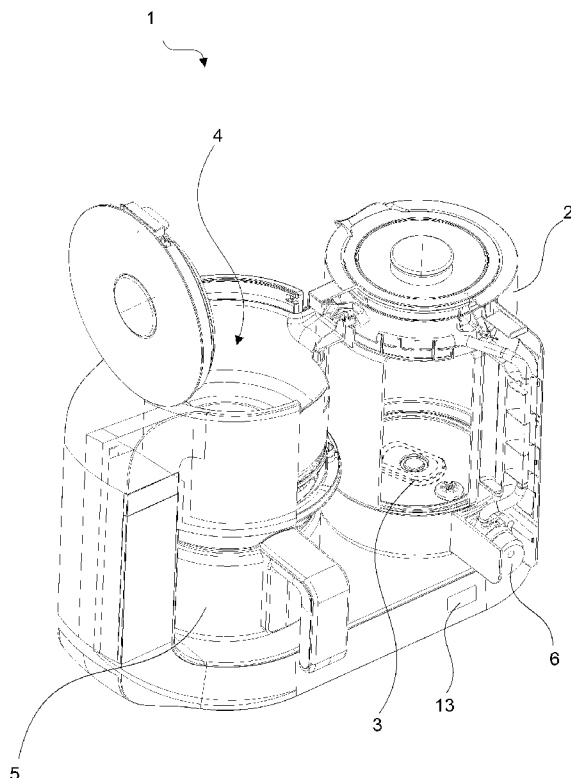
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- (81) **Designated States** (unless otherwise indicated, for every
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[Continued on next page]

(54) **Title:** A HOT BEVERAGE PREPARATION MACHINE

Figure 1



(57) **Abstract:** The present invention relates to a hot beverage preparation machine (1) comprising a water container (2) wherein water is filled; a water heater (3) enabling the water in the water container (2) to be heated; a brewing chamber (4) wherein the raw material of the beverage to be prepared is put and whereto the water heated in the water container (2) is transferred, wherein the brewing process is performed as a result of the interaction between the raw beverage material and water; a pot (5) that is situated under the brewing chamber (4) and wherein the beverage brewed in the brewing chamber (4) is transferred; a pump (6) that enables the water heated in the water container (2) to be transferred to the brewing chamber (4), and a first valve (7) that is situated between the brewing chamber (4) and the pot (5) and that enables the brewed beverage to be transferred into the pot (5).



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Description**A HOT BEVERAGE PREPARATION MACHINE**

[0001] The present invention relates to a hot beverage preparation machine.

[0002] In hot beverage preparation machines, the water filled into the water container is heated by a water heater and is transferred to the brewing chamber containing raw material of the beverage to be prepared. The brewing process is performed in the brewing chamber as a result of the interaction between the raw beverage material and water. The brewed beverage is afterwards transferred into a pot and served. The hot beverage preparation process is composed of steps such as heating the water, transferring the water, brewing and transferring the brew. The amount of water to be transferred from the water container to the brewing chamber for the brewing process is determined according to the brewing setting selected by the user. However, in case of a malfunction in the pump providing the transfer of water from the water container to the brewing chamber, hot water may overflow from the brewing chamber to the outer environment. When the water mixed with the raw beverage material in the brewing chamber overflows, it may cause the malfunction of the hot beverage preparation machine and damage the outer environment the water spills on.

[0003] In the state of the art United States Patent Application No. US8528466, a hot beverage preparation machine disposed onto a liquid container for receiving overflowing liquid is disclosed.

[0004] The aim of the present invention is the realization of a hot beverage preparation machine wherein the liquid overflowing from the brewing chamber is detected to be prevented from spilling to the outer environment.

[0005] The hot beverage preparation machine realized in order to attain the aim of the present invention and explicated in the claims, comprises a water container wherein the brewing water is heated, a brewing chamber wherein the brewing process is performed as a result of the interaction between raw beverage material and water, a pump that enables the water heated in the water container to be transferred to the brewing chamber, a

pot that is situated under the brewing chamber and a first valve that enables the beverage brewed in the brewing chamber to be delivered into the pot.

[0006] The hot beverage preparation machine comprises an overflow chamber having an intake line extending to the brewing chamber and an outlet line extending to the first valve. In case the pump sends water to the brewing chamber in an amount more than the volume of the brewing chamber, the excess water flows from the brewing chamber into the intake line and the water is transferred from the intake line to the overflow chamber. The water collected in the overflow chamber is delivered to the first valve through the outlet line. Thus, the water coming from the brewing chamber to the first valve is transferred to the pot together with the water coming from the overflow chamber and thus, the water collected in the overflow chamber is prevented from overflowing from the overflow chamber to the outer environment. Moreover, by transferring the water overflowing from the brewing chamber from the overflow chamber to the pot, the user is not required to empty the overflow chamber, thus increasing the user satisfaction.

[0007] In an embodiment of the present invention, the hot beverage preparation machine comprises a sensor that is disposed in the overflow chamber and that provides the detection of the water flowing from the brewing chamber into the overflow chamber. The overflow in the brewing chamber occurs due to a malfunction in the pump delivering water to the brewing chamber. In case the pump delivers water in an amount more than the amount required for the brewing process and predetermined by the producer, the excess water overflows from the overflow chamber to the outer environment. Thus, when the sensor detects water entry into the overflow chamber, it is decided that water was transferred from the brewing chamber to the overflow chamber due to a malfunction in the pump.

[0008] In another embodiment of the present invention, the control unit provides the interruption of the energy supplied to the pump according to the data received from the sensor. When the control unit interrupts the energy being delivered to the pump, the pump stops and thus water transfer from

the water container to the brewing chamber is ended.

- [0009] In another embodiment of the present invention, the control unit enables the first valve to be controlled according to the data received from the sensor. In the hot beverage preparation machine, the first valve opens after the completion of the brewing time predetermined by the producer and provides the transfer of the water in the brewing chamber to the pot. In this embodiment, when the sensor detects water entry into the overflow chamber, the control unit enables the first valve to open. Thus, the water collected in the overflow chamber is emptied into the pot together with the water in the brewing chamber.
- [0010] In another embodiment of the present invention, the hot beverage preparation machine comprises a second valve disposed on the base of the overflow chamber and the control unit that enables the second valve to be controlled according to the data received from the sensor. The control unit compares the level of the water in the overflow chamber detected by the sensor with the limit water level predetermined by the producer. If the measured water level is below the limit water level, the second valve is kept in the closed position. If the measured water level is above the limit water level, the second valve is brought to the open position and thus the water in the overflow chamber is enabled to pass through the second valve and to be delivered to the pot via the first valve.
- [0011] In another embodiment of the present invention, the overflow chamber has an inclined base surface. By means of the inclined configuration thereof, water remaining on the base of the overflow chamber is prevented and the entire water in the overflow chamber is enabled to be delivered to the pot. Thus, the water remaining in the overflow chamber after the brewing process is prevented from causing mold, fungus and bacteria formation in the course of time.
- [0012] In another embodiment of the present invention, the control unit enables the user to be warned by visual and/or audio warnings according to the data received from the sensor. When water is transferred from the brewing chamber to the overflow chamber, it is detected that the pump has malfunctioned and the user is enabled to be informed about the

malfunction by visual and/or audio warnings.

[0013] In another embodiment of the present invention, the overflow chamber is coated with a hydrophobic material. The hydrophobic material enables the water droplets remaining on the side surfaces and base of the overflow chamber to flow over the surface to be delivered to the outlet line.

[0014] By means of the present invention, a hot beverage preparation machine is realized, comprising an overflow chamber that enables the fluid overflowing from the brewing chamber to be delivered to the pot without requiring the user to empty the same.

[0015] The hot beverage preparation machine realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0016] Figure 1 – is the perspective view of a hot beverage preparation machine.

[0017] Figure 2 – is the schematic view of a hot beverage preparation machine in an embodiment of the present invention.

[0018] The elements illustrated in the figures are numbered as follows:

1. Hot beverage preparation machine
2. Water container
3. Water heater
4. Brewing chamber
5. Pot
6. Pump
7. First valve
8. Intake line
9. Outlet line
10. Overflow chamber
11. Sensor
12. Second valve
13. Control unit

[0019] The hot beverage preparation machine (1) comprises a water container (2) wherein water is filled; a water heater (3) enabling the water in the water container (2) to be heated; a brewing chamber (4) wherein the raw material of the beverage to be prepared is put and whereto the water heated in the water container (2) is transferred, wherein the brewing

process is performed as a result of the interaction between the raw beverage material and water; a pot (5) that is situated under the brewing chamber (4) and wherein the beverage brewed in the brewing chamber (4) is transferred; a pump (6) that enables the water heated in the water container (2) to be transferred to the brewing chamber (4); and a first valve (7) that is situated between the brewing chamber (4) and the pot (5) and that enables the brewed beverage to be transferred into the pot (5) (Figure 1 and Figure 2).

[0020] The hot beverage preparation machine (1) comprises an overflow chamber (10) having an intake line (8) extending to the brewing chamber (4) and an outlet line (9) extending to the first valve (7). In case the water transferred from the water container (2) to the brewing chamber (4) overflows from the brewing chamber (4), the overflowed water passes through the intake line (8) to be collected in the overflow chamber (10). The water collected in the overflow chamber (10) passes through the outlet line (9) to be delivered to the first valve (7) from the overflow chamber (10) and then passes through the first valve (7) to be transferred to the pot (5). Thus, the water overflowing from the brewing chamber (4) is prevented from flowing out of the hot beverage preparation machine (1) and damaging the outer environment. Moreover, the water collected in the overflow chamber (10) is transferred to the pot (5) by means of the outlet line (9) without requiring the user to empty the same, thus increasing user satisfaction.

[0021] In an embodiment of the present invention, the hot beverage preparation machine (1) comprises a sensor (11) that is disposed in the overflow chamber (10) and that provides the detection of the water flowing from the brewing chamber (4) into the overflow chamber (10). By means of the sensor (11), the water transfer from the brewing chamber (4) to the overflow chamber (10) is detected. Thus, by deciding that the pump (6) has delivered water from the water container (2) to the brewing chamber (4) in an amount greater than the predetermined amount, it is determined that the pump (6) has malfunctioned.

[0022] In another embodiment of the present invention, the control unit (13)

provides the interruption of the energy supplied to the pump (6) according to the data received from the sensor (11). When the sensor (11) detects water entry into the overflow chamber (10), the control unit (13) closes the pump (6) and ends the water transfer from the water container (2) to the brewing chamber (4), thus preventing the overflow from the brewing chamber (4).

[0023] In another embodiment of the present invention, the control unit (13) enables the first valve (7) to be controlled according to the data received from the sensor (11). When the sensor (11) detects water entry into the overflow chamber (10), the control unit (13) enables the first valve (7) to open. Thus, by preventing the pump (6) from continuing to operate during the adjusted brewing time, the brewing chamber (4) is enabled to be emptied before the completion of the brewing time.

[0024] In another embodiment of the present invention, the hot beverage preparation machine (1) comprises a second valve (12) disposed on the base of the overflow chamber (10) and the control unit (13) that enables the second valve (12) to be controlled according to the data received from the sensor (11). In this embodiment, the sensor (11) detects the level of the water in the overflow chamber (10), thus determining the amount of water overflowed from the brewing chamber (4) to the overflow chamber (10). The control unit (13) compares the water level detected by the sensor (11) with the limit water level predetermined by the producer. When the detected water level exceeds the limit water level, the control unit (13) opens the second valve (12) and enables the water collected in the overflow chamber (10) to be emptied. When the second valve (12) is opened, the water collected in the overflow chamber (10) is delivered to the first valve (7) by means of the outlet line (9). When the second valve (12) is in the closed position, the water overflowed from the brewing chamber (4) is collected in the overflow chamber (10).

[0025] In another embodiment of the present invention, the overflow chamber (10) has an inclined base surface. The outlet line (9) is connected to the lowermost point of the inclined base in the vertical direction. Thus, when the water collected in the overflow chamber (10) is emptied, the entire

water flows over the inclined surface to be directed to the outlet line (9).

- [0026] In another embodiment of the present invention, the overflow chamber (10) is coated with a hydrophobic material. The water droplets, that cannot take hold onto the overflow chamber (10) surface due to the hydrophobic material, flow towards the outlet line (9) to be evacuated from the overflow chamber (10). Thus, water remaining on the overflow chamber (10) surfaces is prevented.
- [0027] In another embodiment of the present invention, the sensor (11) is a magnetic sensor. In this embodiment, a magnet is disposed in the overflow chamber (10). The magnet, that is on the surface of the base when the overflow chamber (10) is empty, rises in the overflow chamber (10) with the water filling into the overflow chamber (10). The movement of the magnet is detected by the magnetic sensor (11) and thus the water overflow from the brewing chamber (4) to the overflow chamber (10) is detected.
- [0028] In another embodiment of the present invention, the sensor (11) is a capacitive sensor. The capacitive sensor (11) detects the water level in the overflow chamber (10). The control unit (13) compares the level data received from the capacitive sensor (11) with the limit level value predetermined by the producer and determines the fullness of the overflow chamber (10). By means of the capacitive sensor (11), the level of the water collected in the overflow chamber (10) is detected without contacting the water. Thus, the hygiene of the water collected in the overflow chamber (10) is not deteriorated and the water transferred to the pot (5) is enabled to be used by the user.
- [0029] In another embodiment of the present invention, the control unit (13) enables the user to be warned by visual and/or audio warnings according to the data received from the sensor (11). Thus, the user is informed about the overflow from the brewing chamber (4) and is warned.
- [0030] In the hot beverage preparation machine (1) of the present invention, the water overflowing from the brewing chamber (4) is collected in the overflow chamber (10), thus prevented from flowing out of the hot beverage preparation machine (1), and the hot beverage preparation

machine (1) is enabled to be used in a clean and safe manner.

Claims

1. A hot beverage preparation machine (1) **comprising**
 - a water container (2) wherein water is filled,
 - a water heater (3) that enables the water in the water container (2) to be heated,
 - a brewing chamber (4) wherein the raw material of the beverage to be prepared is put and whereto the water heated in the water container (2) is transferred, wherein the brewing process is performed as a result of the interaction between the raw beverage material and water,
 - a pump (6) that enables the water heated in the water container (2) to be transferred to the brewing chamber (4),
 - a pot (5) that is situated under the brewing chamber (4) and wherein the beverage brewed in the brewing chamber (4) is transferred,
 - a first valve (7) that is situated on the base of the brewing chamber (4) so as to be between the brewing chamber (4) and the pot (5) and that enables the brewed beverage to be transferred into the pot (5),**characterized by** an overflow chamber (10) having
 - an intake line (8) extending to the brewing chamber (4), and
 - an outlet line (9) extending to the first valve (7).
2. A hot beverage preparation machine (1) as in Claim 1, **characterized by** a sensor (11) that is disposed in the overflow chamber (10) and that provides the detection of the water flowing from the brewing chamber (4) into the overflow chamber (10).
3. A hot beverage preparation machine (1) as in Claim 2, **characterized by** a control unit (13) that provides the interruption of the energy supplied to the pump (6) according to the data received from the sensor (11).
4. A hot beverage preparation machine (1) as in Claim 2, **characterized by** the control unit (13) that enables the first valve (7) to be controlled according to the data received from the sensor (11).
5. A hot beverage preparation machine (1) according to any one of claims 2 to 4, **characterized by** a second valve (12) disposed on the base of the overflow chamber (10) and the control unit (13) that enables the second valve (12) to be controlled according to the data received from the sensor (11).

6. A hot beverage preparation machine (1) as in Claim 1, **characterized by** the overflow chamber (10) that has an inclined base surface.
7. A hot beverage preparation machine (1) as in any one of the above claims, **characterized by** the control unit (13) that enables the user to be warned by audio and/or visual warnings according to the data received from the sensor (11).
8. A hot beverage preparation machine (1) as in any one of the above claims, **characterized by** the overflow chamber (10) that is coated with a hydrophobic material.

Figure 1

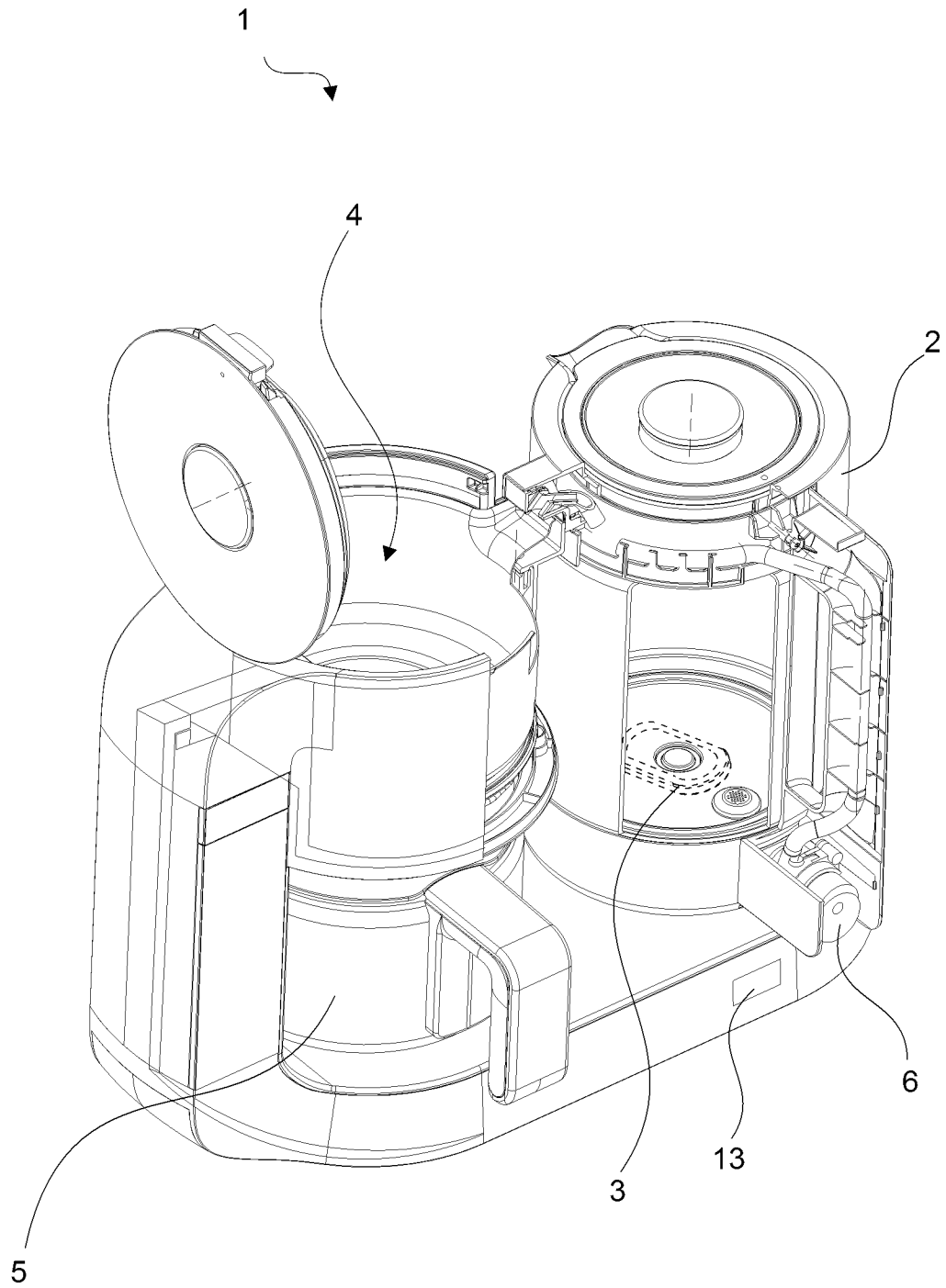
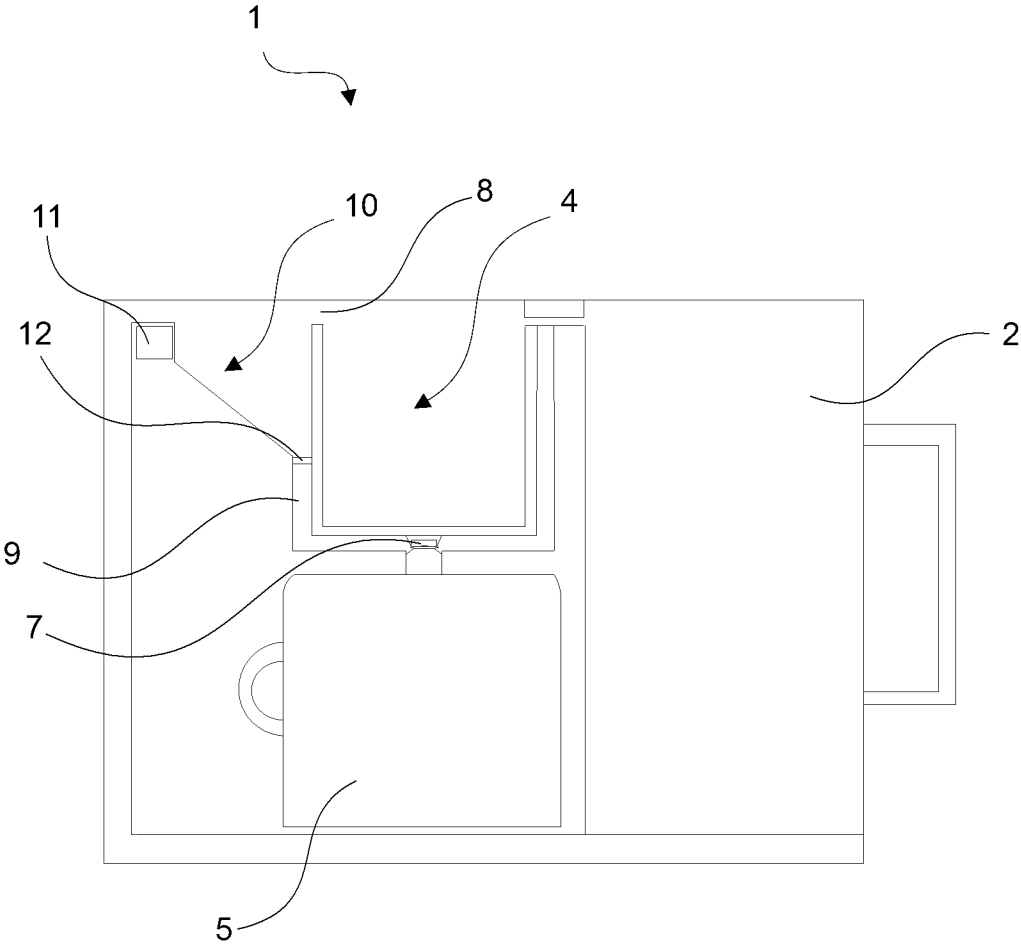


Figure 2



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/064902

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J31/057 A47J31/06
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)
A47J

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.
X	US 6 571 686 B1 (RILEY DARREN ET AL) 3 June 2003 (2003-06-03) column 7, lines 33-64; figures 4-7 -----	1,6
X	US 5 168 794 A (GLUCKSMAN DOV Z) 8 December 1992 (1992-12-08) column 7, lines 34-38; figures 1,4 -----	1,6
A	US 2009/178569 A1 (TUCKER GEORGE H ET AL) 16 July 2009 (2009-07-16) paragraph [0038]; figures 6,7 -----	2,4,7
A	WO 2015/020618 A2 (ARCELIK AS) 12 February 2015 (2015-02-12) figure 1 -----	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

2 September 2016

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/064902

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6571686	B1	03-06-2003	NONE	
US 5168794	A	08-12-1992	NONE	
US 2009178569	A1	16-07-2009	NONE	
WO 2015020618	A2	12-02-2015	NONE	