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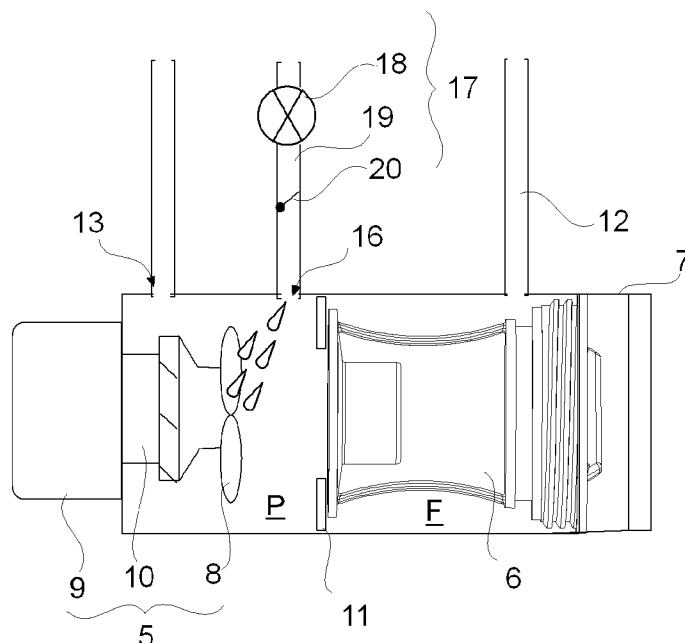
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(54) Title: A WASHING MACHINE COMPRISING A PUMP

Figure 2



(57) Abstract: A washing machine (1) comprising a pump (5) having a propeller (8), a motor (9), and a shaft (10) where the propeller (8) is mounted and which is rotated by means of said motor (9), wherein particles such as fiber and fluff, which accumulate on the propeller (8) and/or on the shaft (10), are cleaned off by means of the water directing mechanism (17) which provides water to be sprayed towards the propeller (8) and/or the shaft (10).

Description**A WASHING MACHINE COMPRISING A PUMP**

- [0001] The present invention relates to a washing machine having a pump, the cleaning of which is easily performed.
- [0002] In washing machines, the wash water used in washing is discharged by means of a pump. A filter, which prolongs the life of the pump by preventing the foreign matters such as button, fluff of fabric, fiber and coin from entering the pump during the discharge of the wash water, is present. However, filters used in machines cannot hold all of the particles such as fiber and fluff. Particles such as fluff of fabric and fiber, which come off from the laundry and mix with the water during the washing and which cannot be held by the filter, can get stuck to the propeller or shaft of the pump. These particles, which get stuck to the pump propeller or to the pump shaft, causes the discharge process not to be performed by hindering the operation of the pump in the course of time. In such a situation, in order to provide the cleaning of the pump, the user should perform the cleaning of the propeller and the shaft by reaching the pump compartment wherein the propeller is situated. This cleaning process is a rather troublesome and difficult process.
- [0003] In the state of the art, holding all of the particles such as fiber and fluff, which come to the propeller or shaft of the pump, for the solution of this problem is provided by filters with tighter pores. However, in this situation, clogging of the filters in a short time is encountered.
- [0004] The aim of the present invention is the realization of a washing machine having a pump, the cleaning of which is easily performed.
- [0005] The washing machine realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises an opening, which opens to the pump chamber, on the pump body, and a water directing mechanism which sprays water onto the propeller and/or shaft of the pump motor through the opening.
- [0006] In an embodiment of the present invention, the openings are positioned on the ceiling of the pump chamber.
- [0007] In an embodiment of the present invention, the openings are positioned

such that they will direct water onto the propeller and/or shaft in a different direction and course.

- [0008] In an embodiment of the present invention, the openings located on the pump body are arranged all around along the pump chamber inner surface of the pump body. The water sprayed through these openings, arranged all around on the pump chamber, by the water directing mechanism comes onto the propeller and the shaft in a different direction and course. Thus, with the water coming onto the propeller in different directions and courses simultaneously, the particles hindering the operation of the propeller are easily removed from the point they cling to.
- [0009] In an embodiment of the present invention, the opening, which opens onto the propeller, is located behind the pump propeller. Thus, the pressurized water, which is sprayed by the water directing mechanism, is provided to be sprayed directly onto the propeller and the shaft.
- [0010] In an embodiment of the present invention, the water directing mechanism comprises a valve and a cleaning conduit. The mains water first reaches the valve and the valve controls the flow of the mains water towards the pump chamber (P). By the opening of the valve, the mains water coming to the valve is carried to the pump chamber (P) and is sprayed onto the propeller through the opening.
- [0011] In a variation of this embodiment of the present invention, the water directing mechanism, furthermore, comprises a one-way valve, which will prevent the flow in the opposite direction, on the cleaning conduit between the opening and the valve. Thus, by the pressure occurring during the operation of the pump, the water inside the pump body is prevented from getting to the mains water or to the valve.
- [0012] In another embodiment of the present invention, the washing machine comprises a sensor detecting that the pump is constrained to perform the discharge process in the situation that the particles, which cannot be held by the filter, hinder the operation of the pump by getting stuck to the propeller or shaft of the pump. The sensor instantly detects the signal coming through the pump and transmits the signal to the control unit. The control unit evaluates the signals received from the sensor and triggers the

water directing mechanism.

- [0013] In another embodiment of the present invention, the control unit activates the water directing mechanism at the end of each washing program. Thus, without requiring any intervention of the user, the cleaning of the pump is provided to be performed at the end of every washing process.
- [0014] In another embodiment of the present invention, the control unit activates the water directing mechanism after the completion of the operation of a certain number of washing programs saved in the memory of the control unit by the producer.
- [0015] In another embodiment of the present invention, the washing machine comprises a push button which provides the water directing mechanism to be activated by the user. By the push button being triggered by the user, the water directing mechanism is provided to be operated only when the user desires.
- [0016] In the washing machine of the present invention, ease of use is provided by the propeller and/or shaft of the pump motor being cleaned by the water jet that is directed from the water directing mechanism.
- [0017] A washing machine realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0018] Figure 1 – is the schematic view of a washing machine.
- [0019] Figure 2 – is the schematic view of detail A in Figure 1.
- [0020] Figure 3 – is the schematic view of detail A in Figure 1 in another embodiment of the present invention.
- [0021] The elements illustrated in the figures are numbered as follows:
- [0022] 1 - Washing machine
- [0023] 2 - Tub
- [0024] 3 - Drum
- [0025] 4 – Discharge conduit
- [0026] 5 - Pump
- [0027] 6 - Filter
- [0028] 7 – Pump body
- [0029] 8 - Propeller
- [0030] 9 - Motor

- [0031] 10 - Shaft
- [0032] 11 – Separator
- [0033] 12 - Water inlet
- [0034] 13 - Water outlet
- [0035] 14 - Sensor
- [0036] 15 - Control unit
- [0037] 16 – Opening
- [0038] 17 - Water directing mechanism
- [0039] 18 – Valve
- [0040] 19 – Cleaning conduit
- [0041] 20 – One-way valve
- [0042] 21 - Push button
- [0043] The washing machine (1) comprises a tub (2) wherein the wash water is collected and a drum (3) which is located inside the tub (2) and wherein the laundry to be washed is placed.
- [0044] The washing machine (1), furthermore, comprises a discharge conduit (4), through which the water is discharged, a pump (5) which is located on the discharge conduit (4), a filter (6) which is located before the pump (5) and which provides the particles in the water to be held, a pump body (7) whereon the pump (5) is mounted and wherein the filter (6) is disposed, and a control unit (15).
- [0045] The pump (5) comprises a propeller (8), a motor (9), and a shaft (10) whereto the propeller (8) is mounted and which is rotated by means of the motor (9). The propeller (8) rotates the liquid entering through the center portion in the axial direction and transfers it to the discharge conduit (4) under the influence of centrifugal forces.
- [0046] The pump body (7) comprises a separator (11) which, by extending from its wall to its center, separates its inner volume into two parts, being a pump chamber (P) wherein the propeller (8) rotates and a filter chamber (F) wherein the filter (6) is located, and wherein a hole, through which the water coming from the filter chamber (F) can flow to the pump chamber (P), is located in its center; and a water inlet (12) which opens to the filter chamber (F) and wherein the water enters, and a water outlet (13) which

opens to the pump chamber (P) and through which the water sucked by the pump (5) flows to the discharge conduit (4). The pump body (7) is configured as a hollow shell, through which the water flows by passing over the filter (6).

- [0047] The washing machine (1), furthermore, comprises an opening (16), which opens to the pump chamber (P), on the pump body (7), and a water directing mechanism (17) which sprays water onto the propeller (8) and/or the shaft (10) through the opening (16) (Figure 2 and Figure 3).
- [0048] At the end of the washing process, the water in the tub (2) leaves the tub (2) and enters the filter chamber (F) through the water inlet (12) on the pump body (7). The water that has entered into the filter chamber (F) flows through the filter (6) and meanwhile, heavy and big particles therein are held by the filter (6). After flowing through the filter (6), the water flows into the pump chamber (P). The water that has passed into the pump chamber (P) is sent to the water outlet (13) by means of the pump (5). The water that has passed to the discharge conduit (4) from the water outlet (13) is drained out of the washing machine (1).
- [0049] At the end of the washing process, during the transfer of the water inside the tub (2) to the discharge conduit (4), particles such as fiber and fluff, which come off from the laundry inside the drum (3) during the washing and mix with the wash water, pass through the filter (6). Meanwhile, some of these particles, which mix with the wash water, are held by the filter (6). However, many particles, which cannot be held by the filter (6), pass to the pump chamber (P) and get stuck to the propeller (8) and shaft (10) of the pump (5).
- [0050] When the pump (5) is in the stop position, the control unit (15) activates the water directing mechanism (17) and thus, pressurized water is sprayed onto the propeller (8) through the opening (16) that opens to the pump chamber (P). During the spraying of the water onto the propeller (8), the pump (5) is driven again and while the pump (5) is in motion, pressurized water is continued to be sprayed onto the propeller (8). Both by the pressure force of the sprayed water and by means of the rotational movement created by the operation of the pump (5), the particles that get

stuck on the propeller (8) and on the shaft (10) are provided to be removed from the point to which they are stuck. The particles, which are removed by means of the water sprayed by the water directing mechanism (17), are then directed to the water outlet (13) with the water. These particles finally pass to the discharge conduit (4) from the water outlet (13) and are drained out of the washing machine (1) together with the water.

- [0051] In an embodiment of the present invention, the openings (16) are positioned on the ceiling of the pump chamber (P) (Figure 2).
- [0052] In an embodiment of the present invention, the washing machine (1) comprises at least two openings (16) which open onto the propeller (8) and/or the shaft (10) in a different direction and course.
- [0053] In an embodiment of the present invention, the openings (16) are located on the pump body (7), all around on the pump chamber (P) inner surface. Each opening (16) opens onto the propeller (8) and the shaft (10) in different directions and courses. Thus, since water is sprayed onto the particles such as fiber and fluff, which accumulate on the propeller (8) and/or on the shaft (10), in different directions and courses simultaneously by means of the water directing mechanism (17), a more effective cleaning is provided.
- [0054] In another embodiment of the present invention, at least one opening (16), which opens onto the propeller (8) from behind the propeller (8), is located. The opening (16) sprays the water, brought by the water directing mechanism (17), onto the propeller (8) and the shaft (10) from behind the propeller (8). Thus, particles such as fiber and fluff, which accumulate on the propeller (8) and shaft (10) of the pump (5), are removed therefrom more effectively (Figure 3).
- [0055] In another embodiment of the present invention, the water directing mechanism (17) comprises a valve (18) and a cleaning conduit (19). The valve (18) controls the flow of the mains water, coming to the washing machine (1), towards the pump chamber (P). The cleaning conduit (19) is located between the opening (16), which opens to the pump chamber (P), and the valve (18), and carries the mains water, which is directed by means of the valve (18), to the pump chamber (P). The mains water first

comes to the valve (18) by means of the inlet conduit, and moves towards the pump chamber (P) by the valve (18) being triggered. The mains water, coming to the valve (18) by means of the cleaning conduit (19), is carried to the pump chamber (P) and is sprayed onto the propeller (8) through the opening (16).

- [0056] In a variation of this embodiment of the present invention, the water directing mechanism (17), furthermore, comprises a one-way valve (20) which is located on the cleaning conduit (19) between the opening (16) and the valve (18). The one-way valve (20) hinders the opposite-directional flow that might occur from the pump chamber (P) towards the valve (18). Thus, by the pressure occurring during the operation of the pump (5), the opposite-directional flow that might occur from the opening (16) towards the valve (18) is hindered and hence, the water inside the pump body (7) is prevented from getting to the mains water or to the valve (18).
- [0057] In another embodiment of the present invention, the washing machine (1) comprises a sensor (14) detecting that the pump (5) is constrained to perform the discharge process in the situation that the particles, which cannot be held by the filter (6), hinder the operation of the pump (5) by getting stuck to the propeller (8) or shaft (10) of the pump (5). The sensor (14) instantly detects the signal coming through the pump (5) and transmits the signal to the control unit (15). The control unit (15) evaluates the signals received from the sensor (14).
- [0058] In another embodiment of the present invention, the control unit (15) activates the water directing mechanism (17) at the end of each washing program. Thus, without requiring any intervention of the user, the cleaning of the propeller (8) and the shaft (10) is provided to be performed at the end of every washing process.
- [0059] In another embodiment of the present invention, the control unit (15) activates the water directing mechanism (17) after the completion of the operation of a certain number of washing programs saved in the memory of the control unit (15) by the producer.
- [0060] In another embodiment of the present invention, the washing machine (1)

comprises a push button (21) which provides the water directing mechanism (17) to be activated by the user. By the push button (21) being triggered by the user, the water directing mechanism (17) is provided to be operated only when the user desires.

[0061] In the washing machine (1) of the present invention, the particles such as fiber and fluff, which accumulate on the propeller (8) and/or on the shaft (10), are cleaned off by means of the water directing mechanism (17) which provides water to be sprayed towards the propeller (8) and/or the shaft (10).

[0062] It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A washing machine (1) **comprising** a tub (2) wherein the wash water is collected and a drum (3) which is located inside the tub (2) and wherein the laundry to be washed is placed, a discharge conduit (4), through which the water is discharged; a pump (5) that has a propeller (8), a motor (9), and a shaft (10) whereto the propeller (8) is mounted and which is rotated by means of the motor (9); a filter (6) which provides the particles in the water to be held, a control unit (15), and a pump body (7) that has a separator (11) which, by extending from its wall to its center, separates its inner volume into two parts, being a pump chamber (P) wherein the propeller (8) rotates and a filter chamber (F) wherein the filter (6) is located, and wherein a hole, through which the water coming from the filter chamber (F) can flow to the pump chamber (P), is located in its center; and a water inlet (12) which opens to the filter chamber (F), and a water outlet (13) which opens to the pump chamber (P) and through which the water sucked by the pump (5) flows to the discharge conduit (4),
characterized by at least one opening (16), which opens to the pump chamber (P), on the pump body (7), and a water directing mechanism (17) which sprays water towards the propeller (8) and/or the shaft (10) through this opening (16).
2. A washing machine (1) as in Claim 1, **characterized by** the openings (16) which are located on the pump body (7), all around on the pump chamber (P) inner surface.
3. A washing machine (1) as in Claim 1 or 2, **characterized by** the openings (16) which are positioned on the ceiling of the pump chamber (P).
4. A washing machine (1) as in any one of the above Claims, **characterized by** at least two openings (16) which open onto the propeller (8) and the shaft (10) in a different direction and course.
5. A washing machine (1) as in any one of the above Claims, **characterized by** the opening (16) which opens onto the propeller (8) from behind the propeller (8).
6. A washing machine (1) as in any one of the above Claims, **characterized by** the water directing mechanism (17) which comprises a cleaning conduit (19) and a valve (18).

7. A washing machine (1) as in Claim 6, **characterized by** the water directing mechanism (17) which comprises a one-way valve (20) that is located on the cleaning conduit (19) between the opening (16) and the valve (18).
8. A washing machine (1) as in any one of the above Claims, **characterized by** a sensor (14) which detects that the pump (5) is constrained to perform the discharge process.
9. A washing machine (1) as in any one of the above Claims, **characterized by** the control unit (15) which activates the water directing mechanism (17) at the end of each washing program.
10. A washing machine (1) as in any one of the Claims 1 to 8, **characterized by** the control unit (15) which activates the water directing mechanism (17) after the completion of the operation of a certain number of washing programs saved in the memory of the control unit (15) by the producer.
11. A washing machine (1) as in any one of the above Claims, **characterized by** a push button (21) which provides the water directing mechanism (17) to be activated by the user.

Figure 1

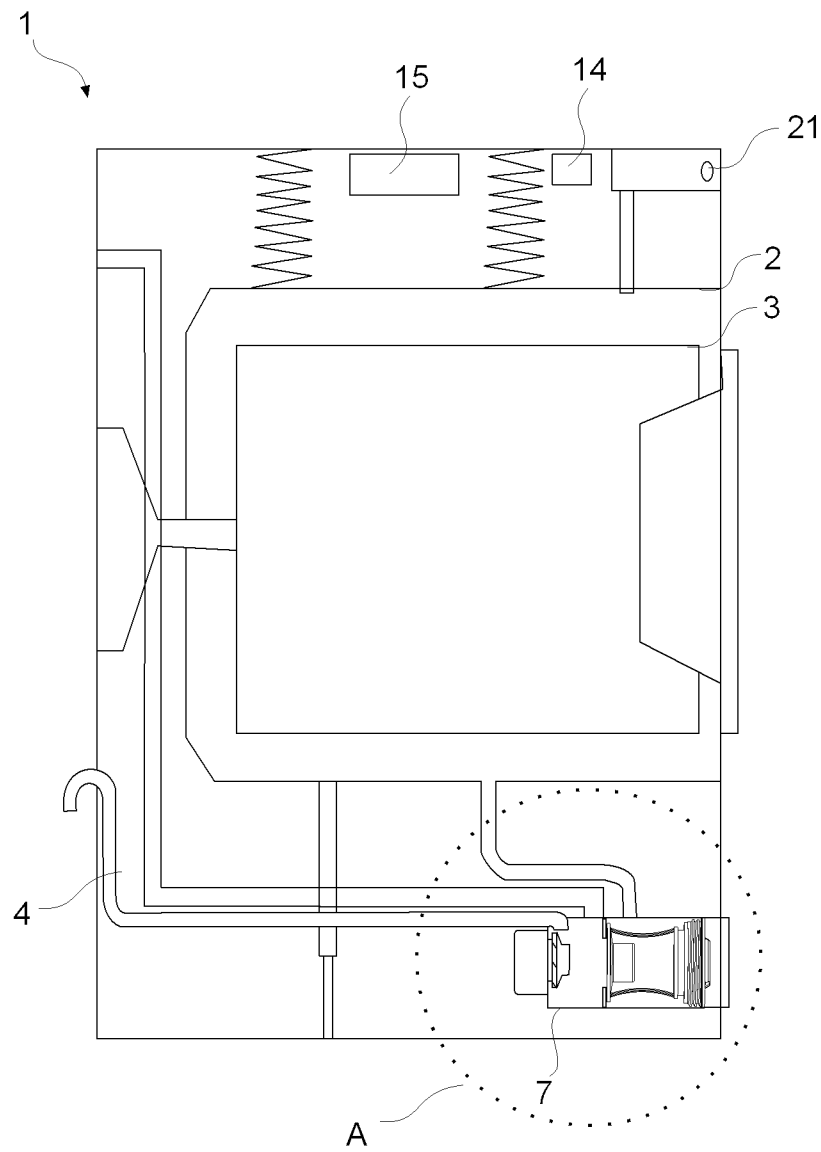


Figure 2

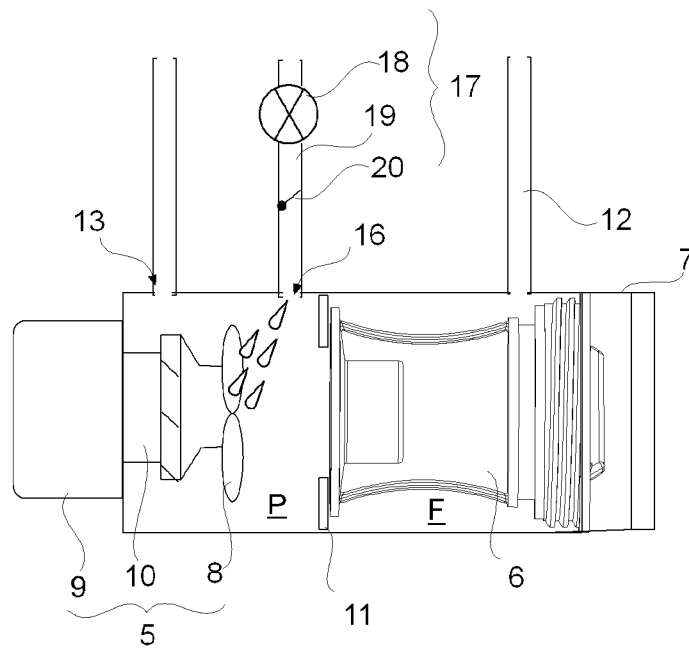
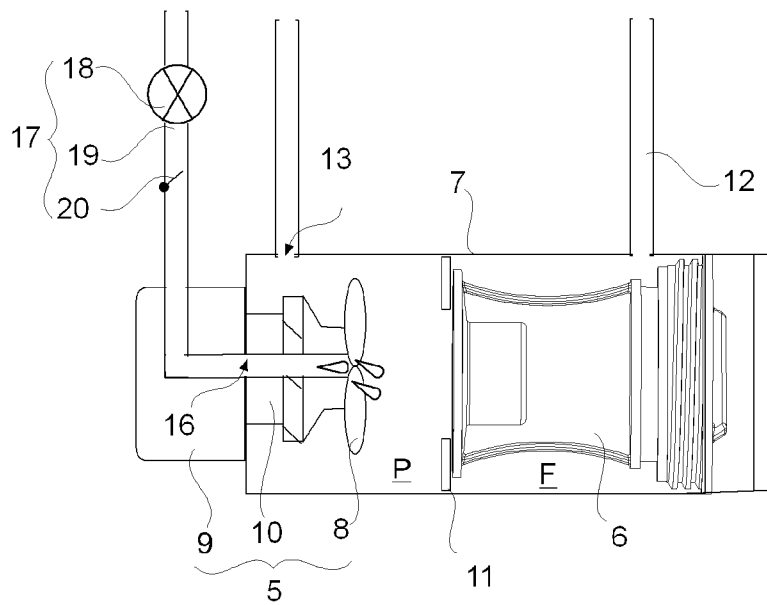


Figure 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/067332

A. CLASSIFICATION OF SUBJECT MATTER
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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)
D06F A47L

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 practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	FR 2 319 034 A1 (PHILIPS NV [NL]) 18 February 1977 (1977-02-18) page 2, line 15 - page 5, line 18; figures -----	1-11
A	US 2004/104158 A1 (KIM KEON [KR] ET AL) 3 June 2004 (2004-06-03) paragraphs [0028] - [0030], [0034] - [0043], [0046] - [0049]; figures -----	1-11
A	DE 10 2004 039436 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 23 February 2006 (2006-02-23) paragraphs [0016], [0017]; figure 1 ----- -/--	1-11

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

International application No

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