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(54) **SIDE-CHANNEL PUMP**

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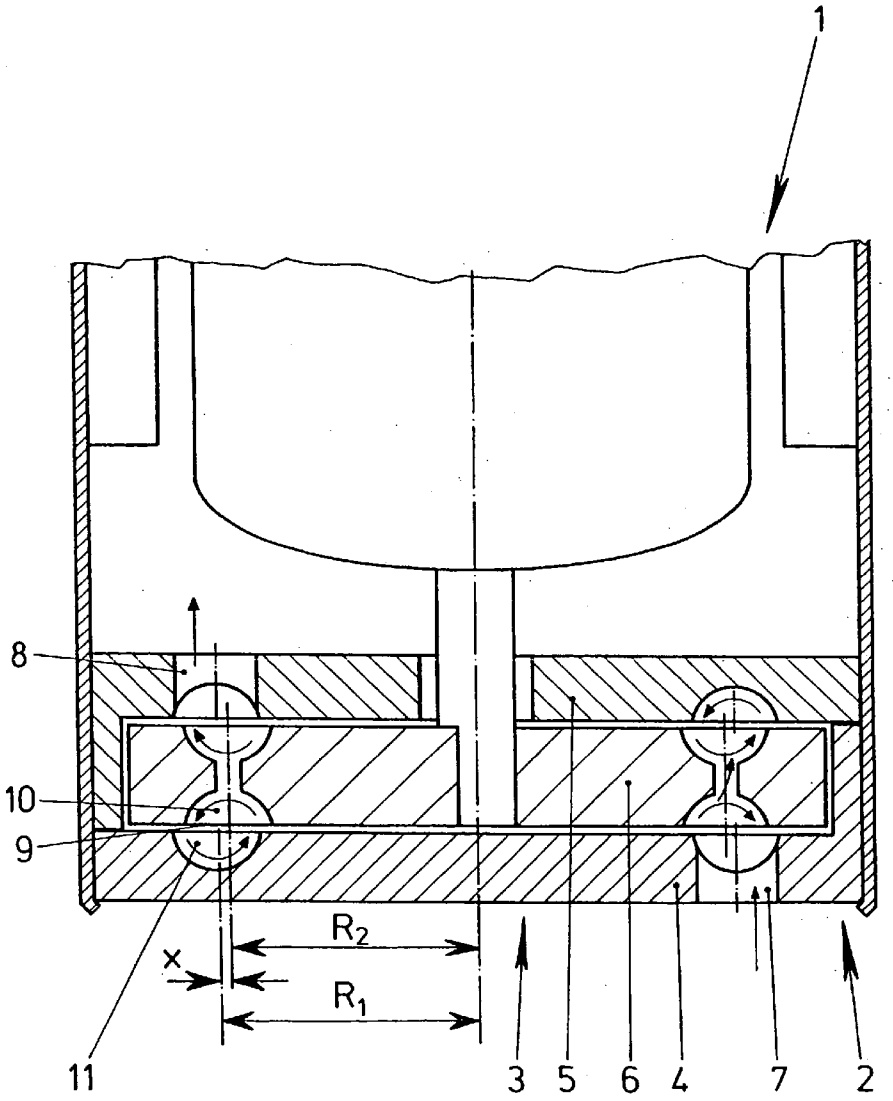
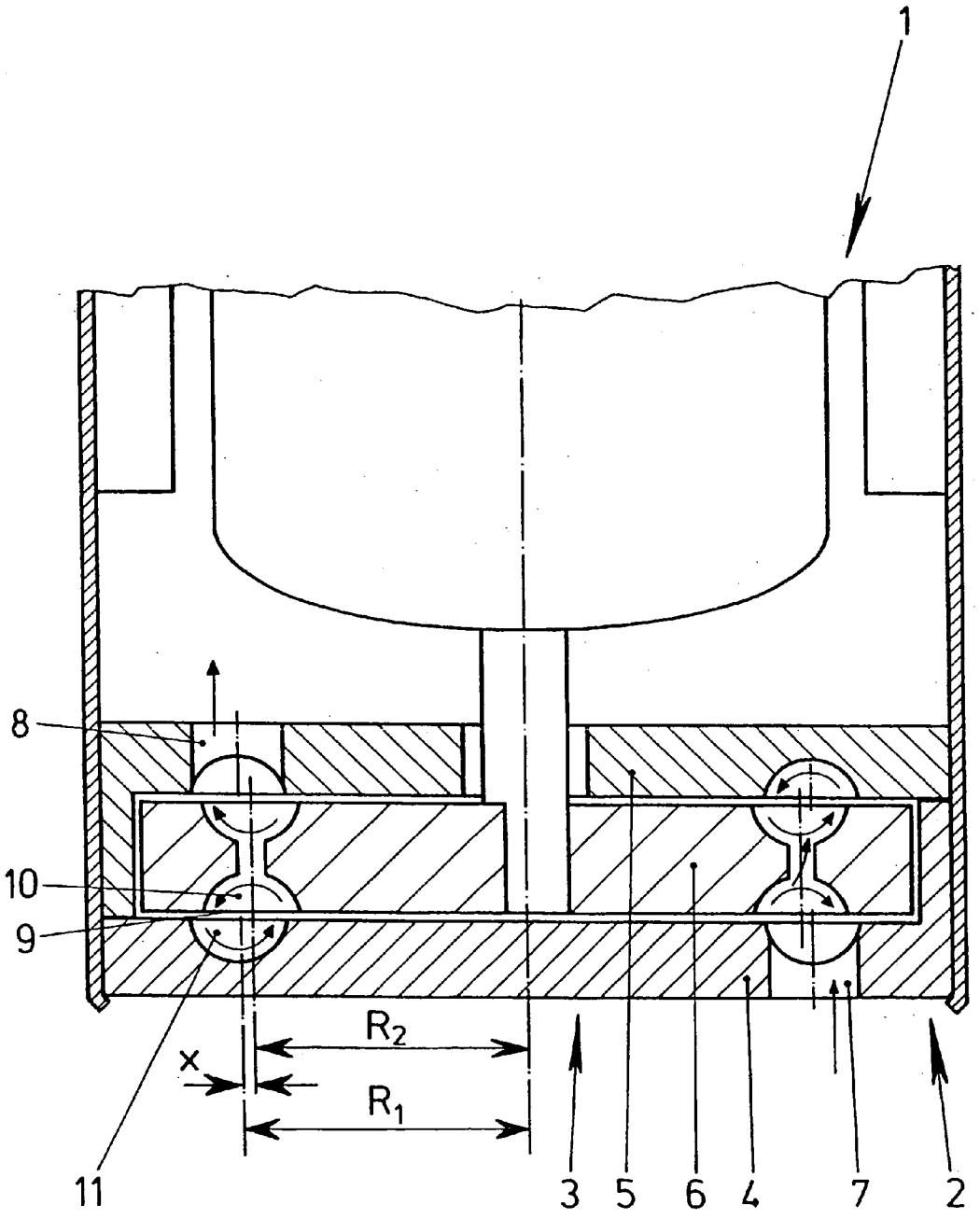
(57) **ABSTRACT**

The invention relates to a side-channel pump for transporting fuel in a motor vehicle. Said pump comprises a partial annular channel (**11**) located in housing sections (**4, 5**), said channel having a greater radius than a crown of vane chambers (**10**) that are located in the impeller (**6**). The vane chambers (**10**) and the partial annular channel (**11**) respectively have the same width. This prevents wear and tear to the sealing surfaces.




1
8
10
9
R_2
x
R_1
11
3
5
6
4
7
2

SIDE-CHANNEL PUMP

BACKGROUND OF THE INVENTION

[0001] The invention relates to a side-channel pump which is provided, in particular, for the conveyance of fuel in a motor vehicle, with a rotor rotating in a pump casing, with a ring of blade chambers which is arranged in one end face of the rotor, and with a part-annular channel arranged opposite the ring in the casing and extending from an inlet to an outlet.

[0002] Such side-channel pumps are often used in fuel tanks of present-day motor vehicles and are known from practice. The part-annular channel and the blade chambers form a conveying chamber through which fuel is conveyed. When the rotor rotates, this gives rise, in a conveying chamber, to circulation flows radially outward from the radially inner region of the blade chamber, as seen from the axis of rotation of the rotor.

[0003] The known side-channel pump has the disadvantage that, as seen from the axis of rotation of the rotor, the flow can penetrate between the rotor and the casing in the radially outer region. The residual dirt contained in the medium leads to a wear of the axial sealing surfaces lying radially outside the conveying chamber and therefore to a reduction in efficiency. This effect is additionally reinforced, in particular, by heavily contaminated medium to be conveyed.

[0004] The problem on which the invention is based is to design a side-channel pump of the type initially mentioned, in such a way that it avoids a wear of the axial sealing surfaces of the conveying chamber.

BRIEF DESCRIPTION OF THE INVENTION

[0005] This problem is solved, according to the invention, in that the external boundary of the part-annular channel has a larger diameter than the external boundary of the ring of blade chambers.

[0006] By virtue of this design, the main flow emerging from the blade chambers of the rotor cannot come directly up against the edge. Owing to this design, dirt particles present in the medium pass only to a reduced extent into the region of the axial gap between the rotor and the pump chamber. Consequently, in the pump according to the invention, the wear due to contaminated medium is markedly reduced. This ensures a permanently high efficiency of the side-channel pump according to the invention.

[0007] According to another advantageous development of the invention, a wear of the axial sealing surfaces of the blade chambers in the inlet region of the circulation flow can be avoided in a simple way if the internal boundary of the part-annular channel has a larger diameter than the internal boundary of the ring of blade chambers.

[0008] The side-channel pump according to the invention acquires a particularly simple structural configuration when the part-annular channel and the blade chambers have in each case the same width, and when the radius R1 from the axis of rotation of the rotor to the part-annular channel exceeds the radius R2 of the ring of blade chambers by 0.1–1.5 mm. As a result of this configuration, in each case the axial sealing surfaces of the blade chambers and of the part-annular channel are protected against wear.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention permits numerous embodiments. To make its basic principle even clearer, one of these is illustrated in the drawing and is described below. The drawing shows a fuel pump in a single figure.

DETAILED DESCRIPTION OF THE INVENTION

[0010] The fuel pump has a side-channel pump **2** according to the invention, driven by an electric motor **1**. The side-channel pump **2** has a casing **3** with two casing parts **4**, **5**, between which a rotor **6** driven by the electric motor **1** is arranged rotatably. An inlet **7** and an outlet **8** are arranged in the casing **3**. The rotor **6** has on its end faces two rings of blade chambers **10** delimited by guide blades **9**. Blade chambers **10** located opposite one another are connected to one another. Part-annular channels **11** are arranged, opposite the rings of blade chambers **10**, in the casing parts **4**, **5**. The part-annular channels **11** extend from the inlet **7** to the outlet **8** and, together with the blade chambers **10**, form a conveying chamber for the conveyance of fuel. The fuel to be conveyed therefore flows through the side-channel pump **2** axially. When the rotor **6** rotates, this gives rise, in the conveying chamber, to circulation flows which are accelerated away from the axis of rotation of the rotor **6** in the blade chambers **10**. For illustration, the flows of the fuel are marked by arrows in the drawing.

[0011] The radius R1 of the part-annular channels to the axis of rotation of the rotor **6** is greater than the radius R2 of the ring of blade chambers **10** by the amount X=0.1–1.5 mm. This avoids the situation where the circulation flow, when it emerges from the blade chambers **10**, strikes the sealing surfaces of the part-annular channel **11**. When the circulation flow enters the blade chambers **10**, the circulation flow is likewise kept away from the sealing surfaces of the blade chambers **10**, said sealing surfaces facing the casing parts **4**, **5**. A wear of the sealing surfaces is thereby avoided.

1. A side-channel pump which is provided, in particular, for the conveyance of fuel in a motor vehicle, with a rotor rotating in a pump casing, with a ring of blade chambers which is arranged in one end face of the rotor, and with a part-annular channel arranged opposite the ring in the casing and extending from an inlet to an outlet, characterized in that the external boundary of the part-annular channel (**11**) has a larger diameter than the external boundary of the ring of blade chambers (**10**).

2. The side-channel pump as claimed in claim 1, characterized in that the internal boundary of the part-annular channel (**11**) has a larger diameter than the internal boundary of the ring of blade chambers (**10**).

3. The side-channel pump as claimed in claim 1 or **2**, characterized in that the part-annular channel (**11**) and the blade chambers (**10**) have in each case the same width, and in that the radius R1 from the axis of rotation of the rotor (**6**) to the part-annular channel (**11**) exceeds the radius (R2) of the ring of blade chambers (**10**) by 0.1–1.5 mm.

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