

Claims

[Claim 1] Vacuum pump (1) comprising:

- at least one pumping stage (1a-1e) within which two rotors are configured to turn synchronously in reverse directions to drive a gas to be pumped,
- 5 - at least one check valve (4) comprising a seat (5) and a mobile closure member (6), the check valve (4) being able to assume a closed position in which the mobile closure member (6) closes a passage (7) of the seat (5) and an open position in which the mobile closure member (6) frees the passage (7), the pressure difference on either side of the mobile closure member (6) being able to open the check valve (4),
- 10 characterized in that the vacuum pump (1) further comprises at least one injection channel (10) emerging through at least one injection orifice (15; 18) configured to inject a purging gas:
 - onto a bearing face of the seat (5) in the open position of the check valve (4) and/or
 - onto the mobile closure member (6) and/or
 - 15 - onto at least one guiding element (13) secured to a stator part (12) of the vacuum pump (1) configured to guide a displacement of the mobile closure member (6) between the positions of opening and of closure of the check valve (4).

[Claim 2] Vacuum pump (1) according to Claim 1, characterized in that the injection channel (10) comprises at least one injection orifice (15) for a purging gas, blocked by
20 the mobile closure member (6) in the closed position and freed in the open position.

[Claim 3] Vacuum pump (1) according to one of the preceding claims, characterized in that it comprises an injection channel (10) comprising a first channel (16) formed in the guiding element (13), the first channel (16) emerging through at least one injection orifice (18) for the injection of a purging gas onto the mobile closure member (6) in
25 the closed position of the check valve (4).

[Claim 4] Vacuum pump (1) according to the preceding claims, characterized in that it comprises an injection channel (10) comprising a first channel (16) formed in the guiding element (13) and at least one second channel (17) formed in the mobile closure member (6) emerging through the at least one injection orifice (15), the at
30 least one injection orifice (15) being disposed facing the seat (5), the first channel and the second channel (16, 17) communicating with one another.

[Claim 5] Vacuum pump (1) according to one of the preceding claims, characterized in that the guiding element (13) comprises a rod cooperating with a guiding envelope (14) of the mobile closure member (6) to guide the translational displacement of the mobile closure member (6).

- 5 [Claim 6] Vacuum pump (1) according to Claims 3, 4 and 5, characterized in that the at least one injection orifice (18) of the first channel (16) of the rod of the guiding element (13) and the guiding envelope (14) of the mobile closure member (6) are positioned relative to one another in such a way that:
- a purging gas can be injected through the at least one injection orifice (18) of the rod
 - 10 in the closed position of the check valve (4), and
 - a purging gas can be injected through the at least one injection orifice (15) emerging from the mobile closure member (6) in the open position of the check valve (4).

[Claim 7] Vacuum pump (1) according to one of Claims 5 and 6, characterized in that it comprises an injection channel (10) emerging through at least one injection orifice (15) configured to inject a purging gas along the rod, the rod and/or the guiding envelope (14) of the mobile closure member (6) having a helical groove (20) communicating with the injection channel (10) for the guiding of the purging gas.

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[Claim 8] Vacuum pump (1) according to one of the preceding claims, characterized in that it comprises an injection channel (10) emerging through at least one injection orifice (15) configured to inject a purging gas in a direction tangential to a plane separating a planar bearing face of the seat (5) and a complementary planar face of the mobile closure member (6) in the open position of the check valve (4).

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[Claim 9] Vacuum pump (1) according to one of Claims 1 to 7, characterized in that the injection channel (10) is configured to inject a purging gas onto a tapered flank (21) of a head (8) of the mobile closure member (6) blocking the passage (7) in the closed position of the check valve (4).

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[Claim 10] Vacuum pump (1) according to one of the preceding claims, characterized in that the at least one injection channel (10) is configured to inject a swirling purging gas.

30 [Claim 11] Vacuum pump (1) according to one of the preceding claims, characterized in that the check valve (4) comprises an elastic return member (11) straining the mobile closure member (6) into the closed position.

[Claim 12] Vacuum pump (1) according to one of the preceding claims, characterized in that it comprises at least two pumping stages (1a-1e), the check valve (4) being a relief check valve (4a) arranged at the output of the first or the second pumping stage (1a, 1b).

5 [Claim 13] Vacuum pump (1) according to one of Claims 1 to 11, characterized in that it comprises at least two pumping stages (1a-1e), the check valve (4) being a discharge check valve (4c) arranged at the output of the last pumping stage (1e).

[Claim 14] Vacuum pump (10) according to one of Claims 1 to 11, characterized in that the check valve (4) is a recirculation check valve (4a) connected between an output
10 and an input of a first pumping stage (1a).

[Claim 15] Method for injecting a purging gas into a vacuum pump (1) according to one of the preceding claims, characterized in that a purging gas is injected onto a bearing face of the seat (5) in the open position of the check valve (4) and/or onto the mobile closure member (6) and/or onto a guiding element (13) secured to a stator part (12) of
15 the vacuum pump (1) configured to guide a displacement of the mobile closure member (6) between the open and closed positions of the check valve (4).