Claims

[Claim 1] Dry vacuum pump (1) comprising:

- a stator (2) comprising at least one first and one second complementary half-shells (7, 8) and one first end piece and one second end piece (9, 10), the half-shells (7, 8) and the end pieces (9, 10) being joined together by axial assembly to form at least one pumping chamber of a pumping stage (3a-3f),
- two rotor shafts (6) configured to turn synchronously in reverse directions in the at least one pumping stage,

characterized in that the vacuum pump (1) further comprises:

- an elastic outer seal (16) and at least one elastic inner seal (17) respectively comprising:
  - one first and one second end annular parts (161, 171, 162, 172) parallel to one another and inserted between a respective end piece (9, 10) and the half-shells (7, 8), and
  - two side rails (163, 173) connecting the end annular parts (161, 171, 162, 172) and which are at right angles thereto, the side rails (163, 173) being inserted between the half-shells (7, 8), the at least one inner seal (17) being arranged inside the outer seal (16) so that the at least one inner seal (17) and the outer seal (16) form at least two successive sealing barriers for the gases, wherein the at least one inner seal (17) is formed from a material that is more resistant to corrosion, to abrasion and/or to high temperatures than the material of the outer seal (16).

[Claim 2] Vacuum pump (1) according to the preceding claim, characterized in that the outer seal (16) is in one piece.

[Claim 3] Vacuum pump (1) according to one of the preceding claims, characterized in that the at least one inner seal (17) is in one piece.

[Claim 4] Vacuum pump (1) according to one of the preceding claims, characterized in that the outer seal (16) is made of a fluorinated elastomer material and the at least one inner seal (17) is made of a perfluoroelastomer material.

[Claim 5] Vacuum pump (1) according to one of the preceding claims, characterized in that the half-shells (7, 8) and the end pieces (9, 10) are joined to one another by axial assembly of a first and second axial nose (12) and a first and second axial void (13) that are complementary, one being borne by the half-shells (7, 8), the others by the end pieces (9, 10), the first and second end annular parts (161, 171, 162, 172) being inserted between a respective complementary axial nose (12) and axial void (13).

[Claim 6] Vacuum pump (1) according to the preceding claim, characterized in that:

- a first and at least one second peripheral annular grooves (18a, 18b) are formed in at least one axial nose (12) and/or in at least axial void (13) to receive the first and second end annular parts (161, 171, 162, 172) of the outer seal (16) and of the at least one inner seal (17),

- at least two longitudinal grooves (19a, 19b) are formed in one and/or the other of the half-shells (7, 8) in a joining surface (11) on either side of the pumping chambers, to receive the side rails (163, 173) of the outer seal (16) and of the inner seal (17).

[Claim 7] Vacuum pump (1) according to one of the preceding claims, characterized in that at least one injection duct (20) is formed in a half-shell (7, 8) of the stator (2) and emerges through at least one injection orifice (21) in an interstitial space (22) situated between the at least one inner seal (17) and the outer seal (16), the vacuum pump (1) comprising a gas feed device (23) configured to inject a neutral gas into the injection duct (20).

[Claim 8] Vacuum pump (1) according to the preceding claim, characterized in that the injection duct (20) emerges in the zone of the interstitial space (22) situated in a joining surface (11) of the half-shells (7, 8), between two side rails (163, 173).

[Claim 9] Vacuum pump (1) according to one of Claims 7 and 8, characterized in that the gas feed device (23) is configured to heat the neutral gas.

[Claim 10] Vacuum pump (1) according to one of Claims 7 to 9, characterized in that the gas feed device (23) is configured to inject the neutral gas with overpressure.

[Claim 11] Vacuum pump (1) according to one of Claims 1 to 9, characterized in that at least one suction duct is formed in a half-shell (7, 8) of the stator (2) and emerges in an interstitial space (22) situated between the at least one inner seal (17) and the outer seal (16), through at least one suction orifice (24), the suction duct (24) connecting the interstitial space (22) with a pumping chamber or an interstage channel of the vacuum pump (1).

[Claim 12] Vacuum pump (1) according to the preceding claim, characterized in that the suction duct (24) emerges in the zone of the interstitial space (22) situated in a joining surface (11) of the half-shells (7, 8), between two side rails (163, 173).

[Claim 13] Vacuum pump (1) according to one of the preceding claims, characterized in that it comprises a pressure sensor (25) configured to measure the pressure in an interstitial space (22) situated between the at least one inner seal (17) and the outer seal (16).

[Claim 14] Vacuum pump (1) according to one of the preceding claims, characterized in that it comprises a gas sensor (27) configured to determine the presence of at least

one corrosive gaseous species in an interstitial space (22) situated between the at least one inner seal (17) and the outer seal (16).

[Claim 15] Vacuum pump (1) according to one of the preceding claims, characterized in that the half-shells (7, 8) of the stator (2) form at least two pumping stages (3a-3f) mounted in series between a suction (4) and a discharge (5) of the vacuum pump (1).

[Claim 16] Vacuum pump (1) according to one of the preceding claims, characterized in that the stator (2) comprises at least two pairs of complementary half-shells (7, 8, 70, 80, 700, 800), the elastic outer (16) and inner (17) seals respectively comprising at least one interposed annular part (164, 165, 174, 175) inserted between two pairs of half-shells (7, 8, 70, 80, 700, 800).

[Claim 17] Vacuum pump (1) according to one of the preceding claims, characterized in that the stator (2) further comprises at least one one-piece pumping stage mounted in series of the at least one pumping stage (3a-3f) formed in the at least first and second half-shells (7, 8).