

CLAIMS

1. A multi-stage vacuum pump comprising:
a stator defining multiple pumping chambers;
5 said stator comprising a plurality of transfer channels each providing a fluid passage from an outlet port of one of said pumping chambers to an inlet port of a subsequent pumping chamber;
at least one of said transfer channels comprises two side channel sections on opposing side of said stator; and
10 at least one of said transfer channels comprises a single side channel section on one side of said stator, said vacuum pump further comprising
a gas ballast inlet channel arranged on an other side of said stator to said one side of said stator.
- 15 2. A multi-stage vacuum pump according to claim 1,
wherein a cross section of at least some of said sections of said transfer channels providing a fluid passage between pumping chambers closer to said vacuum pump inlet have a larger cross section than a cross section of said sections of said transfer channels between pumping chambers closer to said
20 pump outlet.
3. A multi-stage vacuum pump according to any preceding claim,
wherein said transfer channel comprising said single side channel section has a larger cross section than a cross section of an adjacent upstream transfer
25 channel.
4. A multi-stage vacuum pump according to any preceding claim, wherein said stator comprises side walls on opposing sides of said multiple pump chambers and cover portions for covering opposing faces of said multiple
30 pumping chambers, said inlet and outlet ports of said plurality of pumping chambers extending towards said inlet and outlet cover portions respectively,

wherein said cover portions comprise sections of said transfer channels for linking respective inlets and outlets to said side channel sections.

5. A multi-stage vacuum pump according to any preceding claim, wherein
5 said stator comprises a clam-shell stator comprising two clam shell components, said side channel sections and pumping chambers extending into both of said clam shell components, one of said clam shells comprising an inlet clam, comprising an inlet portion of said pumping chambers and one comprising an outlet clam comprising an outlet portion of said pumping chambers.
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6. A multi-stage vacuum pump according to claim 4 or 5,
wherein said channel linking said pumping chamber inlet to said single side channel in said inlet cover portion is angled, said single side channel section being offset with respect to said pumping chamber inlet that said single side
15 channel section is connected to via said linking channel, said side channel being closer to said vacuum pump inlet than said pumping chamber inlet is.
7. A multi-stage vacuum pump according to claim 4 or 5,
wherein said transfer channel adjacent to said channel comprising said
20 single side channel and closer to said vacuum pump inlet , comprises linking portions in said inlet cover portion that are angled, said side channel sections being offset with respect to said pumping chamber inlet that said side channel sections are connected to via said linking channel, said side channel sections being closer to said vacuum pump inlet than said pumping chamber inlet is.
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8. A multi-stage vacuum pump according to any preceding claim, wherein said transfer channel comprising said single side channel section is a channel connecting an antepenultimate pumping chamber to a penultimate pumping chamber, said penultimate pumping chamber being adjacent to an exhaust
30 pumping chamber.

- 17 -

9. A multi-stage vacuum pump according to claim 8,
wherein a portion of said gas ballast inlet channel is located at said other
side of said stator at least partially to one side of said antepenultimate pumping
chamber.

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10. A multi-stage vacuum pump according to any preceding claim, wherein
said gas ballast inlet channel comprises a cavity that contains a non-return valve
for inhibiting flow from said pump to a gas ballast inlet port.

10 11. A multi-stage vacuum pump according to any preceding claim, wherein
said gas ballast inlet channel comprises a control valve for admitting gas ballast
through said gas ballast inlet channel or for sealing said pumping chambers from
said gas ballast.

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