

CLAIMS

1. An intravascular blood pump, comprising a pumping device (11) with
- 5 - a pump casing (2) having a primary blood flow inlet (211) and a primary blood flow outlet (22) which are hydraulically connected by a primary blood flow passage (30),
- a primary impeller (31) having an upstream end and a downstream end and being configured to convey a primary blood flow (1BF) from the primary blood flow inlet (211) to the primary blood flow outlet (22) along the primary blood flow passage (30),
10 - a drive unit (4) configured to rotate the primary impeller (31) about an axis of rotation (10),
- an impeller bearing (37) supporting the upstream end of the primary impeller (31),
- a central opening (262) axially extending through the impeller bearing (37),
- at least one secondary blood flow passage (321) in the primary impeller (31), the at
15 least one secondary blood flow passage (321) having a secondary blood flow inlet (212) in axial alignment with the central opening (262) of the impeller bearing (37) and each of the at least one secondary blood flow passage (321) having a secondary blood flow outlet (213), wherein the at least one secondary blood flow passage (321) is configured to convey a secondary blood flow (2BF) from the secondary blood flow inlet (212) to
20 the secondary blood flow outlet (213), and
wherein the secondary blood flow outlet (213) connects the at least one secondary blood flow passage (321) to the primary blood flow passage (30) at a location axially between the upstream and downstream ends of the primary impeller (31).
- 25 2. The intravascular blood pump according to claim 1, wherein the central opening (262) defines an outer impeller bearing surface (277) of the impeller bearing (37), by which the primary impeller (31) is rotatably supported.
3. The intravascular blood pump according to claim 1 or 2, wherein the primary blood
30 flow inlet (211) is separated from the secondary blood flow inlet (212) by a non-rotating inflow separator (26), the inflow separator (26) forming the outer impeller bearing surface (277) of the impeller bearing (37).

4. The intravascular blood pump according to claim 3, wherein the inflow separator (26) comprises an impeller bearing ring (27) as a separate component forming the outer impeller bearing surface (277) of the impeller bearing (37).
- 5 5. The intravascular blood pump according to claim 3 or 4, wherein the inflow separator (26) is supported by at least one and preferably three struts (28) extending across the primary blood flow inlet (211).
6. The intravascular blood pump according to claim 5, wherein the at least one strut (28)
10 connects the inflow separator (26) to the pump casing (2).
7. The intravascular blood pump according to any one of claims 3 to 6, wherein the inflow separator (26) comprises at least one cut-out (261) at a downstream end of the inflow separator (26).
- 15 8. The intravascular blood pump according to any one of claims 3 to 7, wherein the inflow separator (26) has at least one cut-out (261) in the outer impeller bearing surface (277).
- 20 9. The intravascular blood pump according to any one of claims 2 to 8, wherein one or more of the at least one secondary blood flow passage (321) defines an edge (325) moving over the outer impeller bearing surface (277) upon rotation of the primary impeller (31) so as to clean the outer impeller bearing surface (277).
- 25 10. The intravascular blood pump according to any one of the preceding claims, wherein the impeller bearing (37) is a sliding bearing.
11. The intravascular blood pump according to claim 10, wherein the impeller bearing (37) is a blood purged sliding bearing.
- 30 12. The intravascular blood pump according to any one of the preceding claims, wherein a center of area of the primary blood flow inlet (211) is arranged in the separated secondary blood flow inlet (212).

13. The intravascular blood pump according to any one of the preceding claims, wherein one secondary blood flow inlet (212) of the at least one secondary blood flow passage (321) is arranged at a position of the axis of rotation (10).

5 14. The intravascular blood pump according to any one of the preceding claims, wherein a secondary channel intake (324) forming part of the at least one secondary blood flow passage (321) is arranged upstream of a primary channel intake (314) forming part of a primary impeller channel (311) in the primary blood flow passage (30).

10

15. The intravascular blood pump according to any one of the preceding claims, wherein the primary impeller (31) comprises at least one blade (313) which has a primary pitch at the upstream end of the primary impeller (31) and wherein the at least one secondary blood flow passage (321) has a secondary pitch, the secondary pitch
15 being approximately or exactly the same as the primary pitch.

16. The intravascular blood pump according to any one of the preceding claims, wherein an exactly one of the at least one secondary blood flow passage (321) has an upstream end arranged at a position of the axis of rotation (10).

20

17. The intravascular blood pump according to any one of the preceding claims, wherein at least two of the at least one secondary blood flow passage (321) are arranged asymmetrically in regard to the axis of rotation (10).

25 18. The intravascular blood pump according to any one of the preceding claims, wherein two of the at least one secondary blood flow passage (321) are arranged opposite to each other in regard to the axis of rotation (10).

19. The intravascular blood pump according to any one of the preceding claims,
30 comprising exactly two of the at least one secondary blood flow passage (321).

20. The intravascular blood pump according to any one of the preceding claims, wherein the primary impeller (31) comprises an inlay in which the at least one secondary blood flow passage (321) is formed.