Patent claims

Pump arrangement

1. A pump arrangement, in particular magnetic clutch pump arrangement, having an interior space formed by a pump casing of the pump arrangement, having a containment can which hermetically seals off a chamber surrounded by said containment can with respect to the interior space formed by the pump casing, having an impeller shaft which can be driven in rotation about an axis of rotation, having an impeller which is arranged on one end of the impeller shaft, having an inner rotor arranged on the other end of the impeller shaft, having an auxiliary impeller arranged in the chamber, and having an outer rotor which interacts with the inner rotor,

characterized in that

the auxiliary impeller (20) is fastened to the inner rotor (17).

2. The pump arrangement as claimed in claim 1, characterized in that the containment can (10) has a main body (27) with an open side and with a side which is situated opposite the open side and which is closed by way of a domed base (28), and the auxiliary impeller (20) has a rear shroud (34), whose outer surface facing toward the base (28) of the containment can (10) has a domed form.

3. The pump arrangement as claimed in claim 2, characterized in that the domed form of the outer surface of the rear shroud (34) substantially corresponds to the domed form of the base (28) of the containment can (10).

4. The pump arrangement as claimed in one of claims 2 to 3, characterized in that a paraboloid-like elevation (35) is provided in the center of the rear shroud (34).

5. The pump arrangement as claimed in one of claims 2 to 4, characterized in that, on the rear shroud (34), at a radial distance from the elevation (35), there are formed multiple raised portions which form vanes (37) and corresponding impeller channels (39) of the auxiliary impeller (20).

6. The pump arrangement as claimed in claim 5, characterized in that the impeller channels (39) have a channel base (41) which is similar in form to a rampant three-center arch.

7. The pump arrangement as claimed in one of claims 2 to 6, characterized in that the upper side, which is averted from the rear shroud (34), of the vanes (37) has a step (42) close to the channel inlet edge (38).

8. The pump arrangement as claimed in one of claims 2 to 7, characterized in that the impeller shaft (13) and the inner rotor (17) form a cover shroud, situated opposite the rear shroud (34), of the auxiliary impeller (20).

9. The pump arrangement as claimed in one of claims 5 to 8, characterized in that, in the raised portions which form the vanes (37), there are formed further impeller channels (56) which extend in a radial direction from the outer lateral surface (40) as far as a point close to the step (42).

10. The pump arrangement as claimed in claim 9, characterized in that the further impeller channels (56) have a channel base (57) which, at least in part, has a domed form which corresponds substantially to the domed form of the outer surface of the rear shroud (34).

11. The pump arrangement as claimed in one of claims 1 to 10, characterized in that the impeller shaft (13) has an axial channel (52) which is connected to the fluid inlet region (36) of the auxiliary impeller (20).

12. The pump arrangement as claimed in one of claims 1 to 11, characterized in that, in the inner rotor (17), there are provided fluid channels (59) which issue into the further impeller channels (56) of the auxiliary impeller (20).

Patent claims

1. A pump arrangement, in particular magnetic clutch pump arrangement, having an interior space formed by a pump casing of the pump arrangement, having a containment can with a base which hermetically seals off a chamber surrounded by said containment can with respect to the interior space formed by the pump casing, having an impeller shaft which can be driven in rotation about an axis of rotation, having an impeller which is arranged on one end of the impeller shaft, having an inner rotor arranged on the other end of the impeller shaft, having an auxiliary impeller arranged in the chamber, and having an outer rotor which interacts with the inner rotor,

characterized in that

the auxiliary impeller (20) which has a semi-open construction is fastened by way of its open side to that face side of the inner rotor (17) which faces toward the base (28) of the containment can (10).

2. The pump arrangement as claimed in claim 1, characterized in that the containment can (10) has a main body (27) with an open side and with a side which is situated opposite the open side and which is closed by way of a domed base (28), and the auxiliary impeller (20) has a rear shroud (34), whose outer surface facing toward the base (28) of the containment can (10) has a domed form.

3. The pump arrangement as claimed in claim 2, characterized in that the domed form of the outer surface of the rear shroud (34) substantially corresponds to the domed form of the base (28) of the containment can (10).

4. The pump arrangement as claimed in one of claims 2 to 3, characterized in that a paraboloid-like elevation (35) is provided in the center of the rear shroud (34).

5. The pump arrangement as claimed in claim 4, characterized in that, on the rear shroud (34), at a radial distance from the elevation (35), there are formed multiple raised portions which form vanes (37) and corresponding impeller channels (39) of the auxiliary impeller (20).

6. The pump arrangement as claimed in claim 5, characterized in that the impeller channels (39) have a channel base (41) which is similar in form to a rampant three-center arch.

7. The pump arrangement as claimed in claim 5, characterized in that the upper side, which is averted from the rear shroud (34), of the vanes (37) has a step (42) close to a channel inlet edge (38).

8. The pump arrangement as claimed in one of claims 2 to 7, characterized in that the impeller shaft (13) and the inner rotor (17) form a cover shroud, situated opposite the rear shroud (34), of the auxiliary impeller (20).

9. The pump arrangement as claimed in claim 5, characterized in that, in the raised portions which form the vanes (37), there are formed further impeller channels (56) which extend in a radial direction from the outer lateral surface (40) as far as a point close to the step (42).

10. The pump arrangement as claimed in claim 9, characterized in that the further impeller

channels (56) have a channel base (57) which, at least in part, has a domed form which corresponds substantially to the domed form of the outer surface of the rear shroud (34).

11. The pump arrangement as claimed in one of claims 1 to 10, characterized in that the impeller shaft (13) has an axial channel (52) which is connected to a fluid inlet region (36) of the auxiliary impeller (20).

12. The pump arrangement as claimed in claim 9, characterized in that, in the inner rotor (17), there are provided fluid channels (59) which issue into the further impeller channels (56) of the auxiliary impeller (20).