

Novel circulatory pump (VAD) for the treatment of heart failure

Novel circulatory pump (VAD / Ventricular Assisted Device) for long-term therapy of cardiac insufficiency, characterized by small overall dimensions and low energy consumption, optimized flow characteristics and less mechanical damage to blood components in addition. In principle, it can be used on various anatomical structures such as the aorta and pulmonary artery, as well as on the heart, of course.

- Combination of an active bearing and drive concept
- Wear-free bearing of the pump
- Low energy consumption, Small overall dimensions
- Optimized pump geometry
- Less mechanical damage to blood components
- Adaptation to changing physiological requirements
- Pulsatile operation
- Better monitoring of the circulatory pump
- Pump can be used in aorta, pulmonary artery or the heart

Fields of application

Cardiac assist device designed for long-term therapy for patients with heart failure

Background

Cardiac insufficiency, more commonly known as heart failure, is the third most common cause of death from cardiovascular disease in Germany. In Europe, the number of affected patients is estimated to be over ten million. Around three percent of the population in Germany suffers from heart failure, and the figure is ten percent for people aged 80+.

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Development Status

TRL 2-3

Patent Situation

EP 4138985 (DE, GB, FR, CH)
granted

Reference ID

18/047TLB

Service

Technologie-Lizenz-Büro GmbH
has been entrusted with exploiting
this technology and assisting
companies in obtaining licenses.

Problem

Replacing the heart's pumping function by a donor organ is only possible to a limited extent. This also applies to the permanent replacement by devices, so-called artificial hearts. There are various cardiac assist devices (CAD). However, these blood pumps require extensive surgery when connecting them to the patient's ventricle. Therefore, the use of these devices is still unsatisfactory.

Solution

A consortium of scientists from Karlsruhe University of Applied Sciences, Essen University Hospital and Heidelberg University Hospital (coordinating role) has developed a functional model for a novel VAD (Ventricular Assisted Device) to expand the range of applications of cardiac assist devices (Fig. 1).

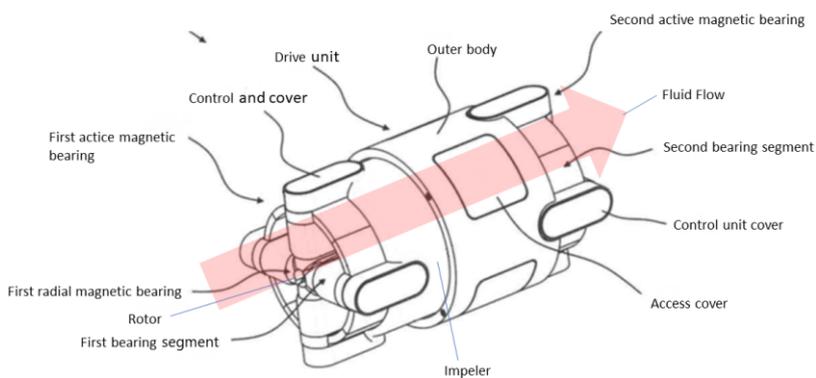


Fig. 1 Ventricular assist device [Fig.: Ramon Estana, Department of Mechanical Engineering, University of Applied Sciences Karlsruhe]

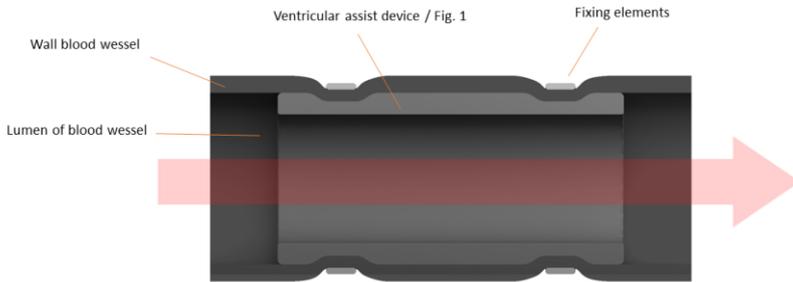


Fig. 2 Implantation into a lumen of blood vessel [Fig.: Ramon Estana, Department of Mechanical Engineering, University of Applied Sciences Karlsruhe]

Advantages

- Combination of an active bearing and drive concept
- Wear-free bearing of the pump
- Low energy consumption
- Small overall dimensions; As a result, surgical intervention is reduced compared to the current surgical procedure
- Optimized pump geometry, good flow properties, optimized flow guidance and optimized impeller
- Less mechanical damage to blood components (reduced risk of blood clots)
- Adaptation to changing physiological requirements (performance control)
- Pulsatile operation (preservation of natural blood movement in the vessel)
- Better monitoring of the circulatory pump during operation
- The novel circulatory pump can be used in various anatomical structures such as the aorta, pulmonary artery or even in the heart (Fig. 2)