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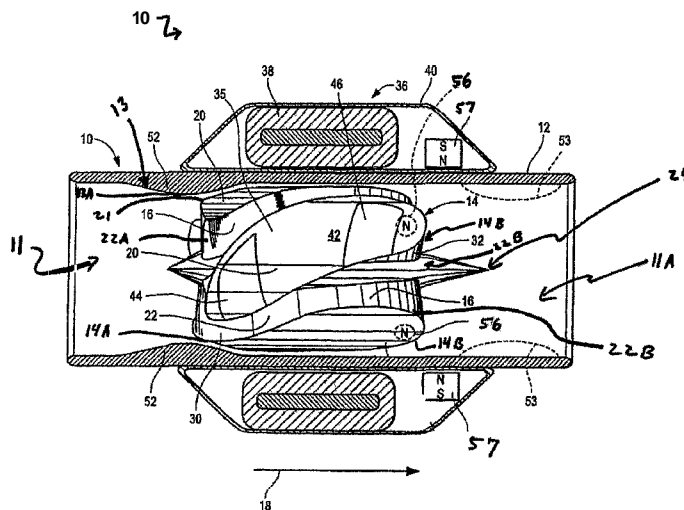
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[Continued on next page]

(54) **Title:** AXIAL FLOW PUMP WITH MULTI-GROOVED ROTOR



(57) **Abstract:** An axial-flow blood pump for pumping blood includes a substantially cylindrical outer enclosure. A tubular housing concentric with and located within the outer enclosure has at one end an inlet and at an opposite end an outlet. A motor stator is concentric with and located between the outer enclosure and the tubular housing. An impeller is concentric with and located within the tubular housing. The impeller is suspended in operation by a combination of passive magnetic forces between magnets within the impeller or magnetized regions of the impeller and the motor stator and hydrodynamic thrust forces generated as blood flows between the tubular housing and a plurality of hydrodynamic thrust bearing surfaces located on the impeller. A volute may be in fluid-tight connection with the outlet of the tubular housing for receiving blood in the axial direction and directing blood in a direction normal to the axial direction. The volute has a flow-improving member extending axially from the volute and into and coaxially with the tubular housing.



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