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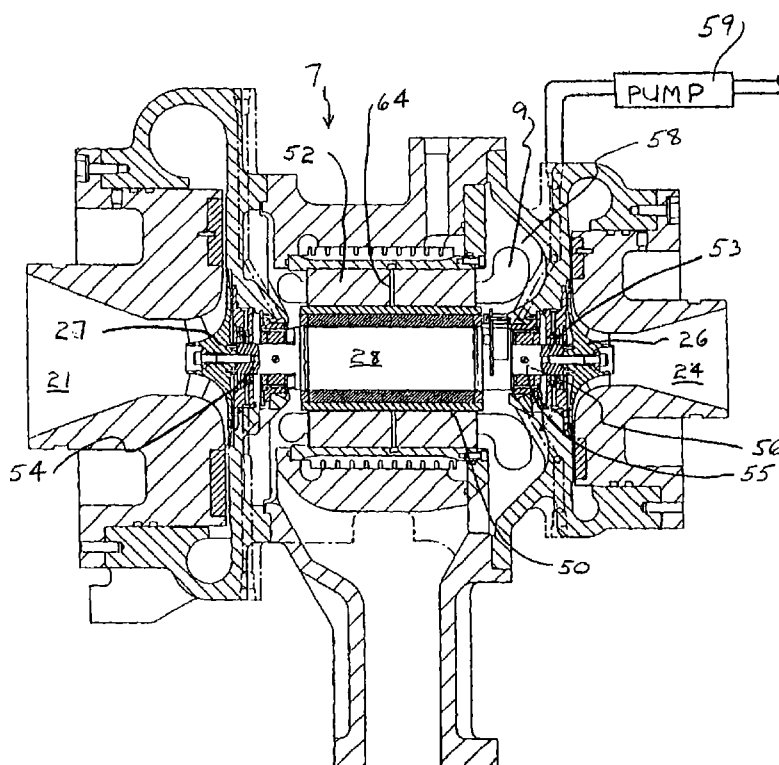
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- (71) Applicant (for all designated States except US): **ELLIOTT TURBOMACHINERY CO., INC.** [US/US]; 901 North Fourth Street, Jeannette, PA 15644 (US).
- (74) Agents: **BYRNE, Richard, L.** et al.; Webb Ziesenheim Logsdon Orkin & Hanson, P.C., 700 Koppers Building, 436 Seventh Avenue, Pittsburgh, PA 15219-1818 (US).
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(54) Title: MULTI-STAGE CENTRIFUGAL COMPRESSOR DRIVEN BY INTEGRAL HIGH SPEED MOTOR



(57) Abstract: A multi-stage centrifugal compressor multi-stage centrifugal compressor with an integral high-speed motor for compressing air has a variable speed permanent magnet motor having electronically commutated stator coils surrounding a rotor carrying permanent magnets, wherein there is a gap between the coils and the rotor. The rotor has a magnetic steel rotor shaft rotatably supported at each end by pressurized oil lubricated hydrodynamic bearings. The stator coils have a plurality of stator wires extending longitudinally along the stator and continuing around the ends of the stator to define end turns. The compressor also has a plurality of compressor impellers mounted to turn with the rotor shaft and cooler for cooling the bearings, rotor and stator coils comprising a pump for introducing cooled oil into the bearings, said bearing configured so that oil exiting from the bearings splashes over the supported ends of the shaft and splashes over the end turns of the stator coils. There is a passageway through the stator for introducing pressurized air within a gap between the stator and the

rotor during start up to maintain a positive pressure within the gap thereby displacing oil from the gap.



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