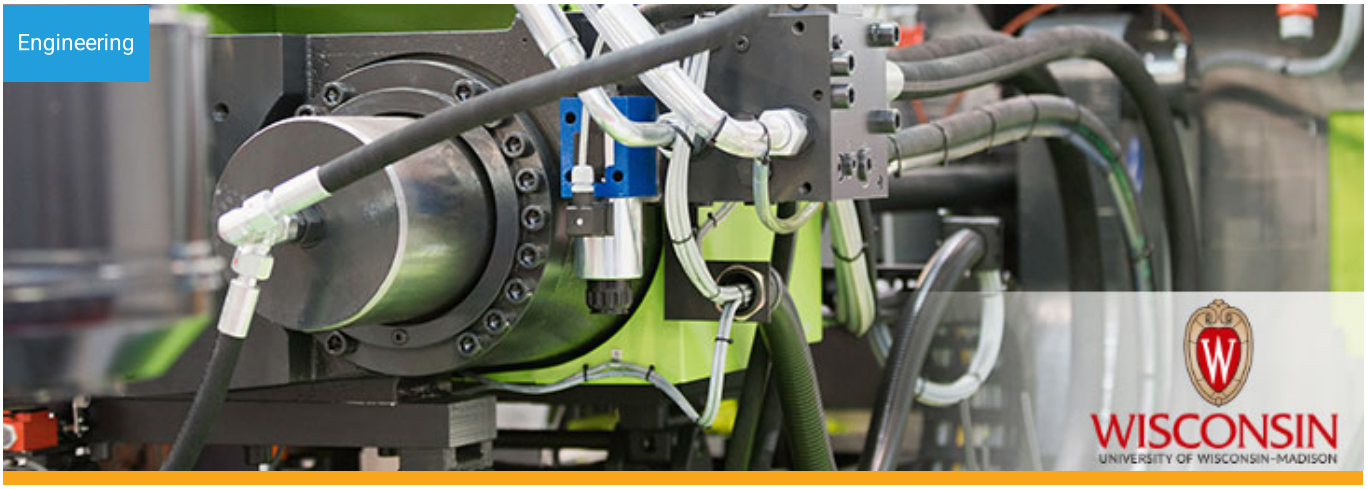
Engineering



Induction-Type Electrostatic Machine Improves Torque Profile, Design Flexibility

View U.S. Patent No. 10,243,485 in PDF format.

WARF: P150323US01

Inventors: Daniel Ludois, Baoyun Ge

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a peg-style electrostatic machine that incorporates conductive support sleeves to improve performance.

Overview

Electrostatic machines are attracting more and more interest because they are lighter and cheaper than conventional electromagnetic designs that rely on semi-precious metals and rare earth materials. They produce torque primarily through variable capacitance as plates come into and out of alignment.

Electrostatic machines work well in small-scale microelectromechanical systems (MEMS), which allow extremely small gaps between rotor and stator elements. Larger scale machines require complex vacuum components that make manufacturing more difficult.

The Invention

UW–Madison researchers have developed a versatile new design for large-scale electrostatic machines. The new design simplifies manufacturing by eliminating plates in favor of interdigitated pegs immersed in dielectric fluid. Concentric conducting ‘sleeves’ fit around/in between the rows of pegs and are used to shape the electrostatic field, reduce drag and improve torque characteristics and mechanical strength. Unlike conventional designs, torque is produced from electrostatic induction.

Applications

- Lower cost alternative to more complex, higher performance fluid bearing-based electrostatic designs
- Industrial/automation machines (where servo electric motors are used)
- Ideal for applications that do not require high precision such as fans and HVAC components

Key Benefits

- Works in macroscale devices
- Eliminates costly vacuum components
- Smooth, consistent torque profile
- Simplifies manufacturing
- Versatile design
- Reduces drag
- Improves peg support
- No complex power electronics – could be plugged directly into a wall outlet

Stage of Development

Simulations and modeling have been performed.

Additional Information

For More Information About the Inventors

- Daniel Ludois

Tech Fields

- Engineering : Electric machines

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867