



(54) **ROTARY ELECTROADHESIVE CLUTCH**

Publication Classification

(71) Applicant: **ESTAT Actuation, Inc.**, Pittsburgh, PA (US)

(72) Inventors: **Stuart B. Diller**, Pittsburgh, PA (US);
Kirby A. Witte, Pittsburgh, PA (US);
John D. Watkins, Pittsburgh, PA (US);
Carmel Majidi, Pittsburgh, PA (US);
Brock Zekany, Pittsburgh, PA (US)

(73) Assignee: **ESTAT Actuation, Inc.**, Pittsburgh, PA (US)

(51) **Int. Cl.**
H02N 13/00 (2006.01)
F16D 28/00 (2006.01)

(52) **U.S. Cl.**
CPC **H02N 13/00** (2013.01); **F16D 28/00** (2013.01)

(21) Appl. No.: **18/288,960**

(22) PCT Filed: **May 2, 2022**

(86) PCT No.: **PCT/US2022/027355**

§ 371 (c)(1),
(2) Date: **Oct. 30, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/182,681, filed on Apr. 30, 2021.

(57) **ABSTRACT**

An electroadhesive clutch using a ceramic-based dielectric layer separating opposing clutch plates, which function as electrodes. At least one of the clutch plates can be a flexible material, such as a thin film. A voltage applied across the electrodes creates an electrostatic attraction between the electrodes. The ceramic-based dielectric layer can be applied to one or both electrodes or, alternatively, placed between opposing electrodes. The ceramic-based dielectric reduces the voltage required to adhere adjacent plates, while also improving the force of adhesion. A rotary electroadhesive clutch using the ceramic-based dielectric provides improved force of adhesion and can be used to control the amount of torque transferred from an input to an output.

