

Title (en)
ELECTROMAGNETIC ADJUSTMENT DEVICE

Title (de)
ELEKTROMAGNETISCHE STELLVORRICHTUNG

Title (fr)
DISPOSITIF DE RÉGLAGE ÉLECTROMAGNÉTIQUE

Publication
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Application
EP 18180013 A 20111020

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Abstract (en)
[origin: WO2012052528A2] The invention relates to an electromagnetic actuating apparatus having an armature unit, which can be moved through a movement distance in an axial direction relative to a stationary core unit and in reaction to an operating current being passed through a coil unit, which armature unit magnetically interacts axially at one end with the core unit over a control range which at least partially overlaps axially along the movement distance, which, as a section of the armature unit, has a first profile section and, as a section of the core unit, has a second profile section, with an air gap formed between them and forms an extent at right angles to the axial direction. The invention provides that a cross section of the first and second profile sections that has a flux effect for a magnetic flux flowing across the air gap where the operating current flows is designed such that, in reaction to a shortening of the air-gap extent which is produced by tilting and/or deflection of the armature unit from the axial direction, a magnetic flux resistance of the first and/or of the second profile section rises in the region of said shortening, in particular being subject to magnetic saturation, and resulting in a force on the armature unit that counteracts the tilting and/or deflection.

IPC 8 full level
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Citation (opposition)
Opponent : Thomas Magnete GmbH
• US 2009051471 A1 20090226 - ZHAO SHEN [JP]
• US 5779220 A 19980714 - NEHL THOMAS WOLFGANG [US], et al
• US 5261637 A 19931116 - CURNOW JOHN W [US]
• US 5722367 A 19980303 - IZYDOREK RANDALL P [US], et al
• DE 19860753 A1 19991014 - BITRON IND ESPANA SA [ES]
• US 2007290581 A1 20071220 - BURNETT KEITH [CA], et al
• US 6076550 A 20000620 - HIRAISHI KAZUO [JP], et al
• DE 3829676 A1 19900315 - OLYMPIA AEG [DE]
• DE 102004028126 A1 20050113 - BORGWARNER INC [US]
• DE 2809975 A1 19790920 - BOSCH GMBH ROBERT
• DE 19848919 A1 20000427 - ELEKTROTEILE GMBH [DE]
• DE 3927150 A1 19910221 - FICHTEL & SACHS AG [DE]
• DE 68915998 T2 19941215 - MITSUBISHI MINING & CEMENT CO [JP]
• DE 202008017033 U1 20100512 - ETO MAGNETIC GMBH [DE]
• DE 102004023905 B4 20130919 - BUERKERT WERKE GMBH [DE]
• DE 29723517 U1 19980924 - KUHNKE GMBH KG H [DE]
• DE 4244444 A1 19940707 - MANNESMANN AG [DE]
• DE 102004012526 B4 20180125 - KELSEY-HAYES CO [US]
• DE 4334031 C2 19980212 - KUHNKE GMBH KG H [DE]
• EBERHARD KALLENBACH, RÜDIGER EICK, PEER QUENDT, TOM STRÖHLA, KARSTEN FEINDT, MATTHIAS KALLENBACH:
"ELEKTROMAGNETE, GRUNDLAGEN, BERECHNUNG UND ANWENDUNGEN, 2. Auflage", December 2003, B. G. TEUBNER VERLAG / GWV FACHVERLAGE GMBH, Wiesbaden, article "3.5 Magnetkraftkennlinien", pages: 71 - 85, XP055737682
• ERICH JASSE: "Grundlagen für die Berechnung des magnetischen Feldes und der darin wirksamen Kräfte, insbesondere an Eisenkörpern", 1930, VERLAG VON JULIUS SPRINGER, Berlin, pages: IV-VI, 1 - 198

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