

Title (en)

Starter having two planetary speed reducers with different speed reduction ratios

Title (de)

Anlasser mit zwei Planetengetriebedrehzahlminderern mit unterschiedlichen Drehzahlminderungsverhältnissen

Title (fr)

Démarreur disposant de deux réducteurs de vitesse planétaire avec des rapports de réduction de vitesse différents

Publication

**EP 2067984 A3 20100519 (EN)**

Application

**EP 08020899 A 20081202**

Priority

JP 2007314786 A 20071205

Abstract (en)

[origin: EP2067984A2] A starter (1) is disclosed which includes a speed reducer assembly and a speed reduction ratio shifter (34, 36, 37). The speed reducer assembly includes first and second planetary speed reducers respectively having first and second speed reduction ratios. The speed reduction ratio shifter shifts the speed reduction ratio of the speed reducer assembly between the first and second speed reduction ratios. The speed reduction ratio shifter includes a gear engaging member (34) and a driver. The driver includes a first spring (36) made of a shape memory alloy and a second spring (37) made of an ordinary spring material, which are respectively disposed on opposite sides of the gear engaging member in the axial direction of an armature shaft (2b). The driver drives the gear engaging member to move in the axial direction by using the difference between restoring forces of the first and second springs.

IPC 8 full level

**F02N 15/06** (2006.01); **F02N 11/00** (2006.01)

CPC (source: EP)

**F02N 15/046** (2013.01); **F02N 11/00** (2013.01); **F02N 15/063** (2013.01)

Citation (search report)

- [A] US 2004093967 A1 20040520 - SHIGA TSUTOMU [JP], et al
- [A] US 6409622 B1 20020625 - BOLZ MARTIN-PETER [DE], et al
- [A] EP 0582429 A1 19940209 - FORD MOTOR CO [US]
- [AD] JP S61282650 A 19861212 - TAKAHASHI TAKASHI

Cited by

EP3604791A1; EP2698269A3; CN113309840A; CN109884764A; FR2969219A1; CN103270290A; DE102013209022A1; DE102013209022B4; US9309856B2; DE102018212995A1; DE102018212995B4; WO2012085424A1

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

Designated extension state (EPC)

AL BA MK RS

DOCDB simple family (publication)

**EP 2067984 A2 20090610; EP 2067984 A3 20100519; EP 2067984 B1 20120530;** JP 2009142035 A 20090625; JP 4957530 B2 20120620

DOCDB simple family (application)

**EP 08020899 A 20081202;** JP 2007314786 A 20071205