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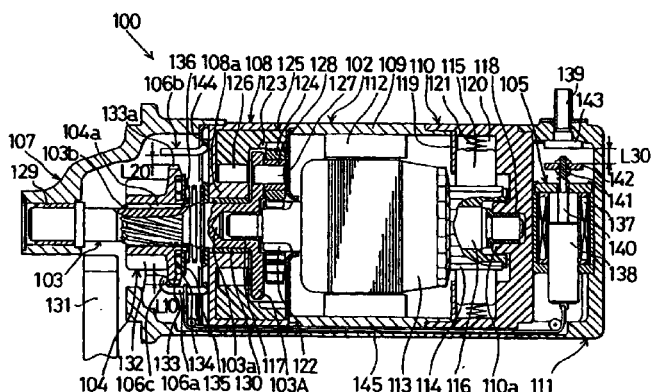
(54) **Starter having a pinion movement control structure**

(57) A starter (1) has a motor (2), output shaft (3) driven by the motor, a pinion moving body (4) mounted on the output shaft and engageable with a ring gear (29), an electromagnet switch (5), and a rotation restricting member (6) driven by the electromagnet switch to engage and restrict rotation of the pinion moving body until engagement of a pinion gear (30) with the

ring gear.

Further, to protect the pinion moving body, the pinion moving body is advanced closely to the ring gear and thereafter the motor is allowed to rotate so that the pinion engages the ring gear at low rotation speeds.

FIG. 1



EP 1 052 402 A3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 11 6717

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
A	US 3 875 805 A (TOULIER PIERRE) 8 April 1975 (1975-04-08)	1-3,5-11	F02N15/06
A	* column 1, line 46 - column 3, line 18; figure *		
X	GB 968 157 A (LUCAS) 26 August 1964 (1964-08-26)	6	
A	* page 1, line 45 - page 2, line 39; figure 1 *	1,11	
D,A	JP 08 093607 A (NIPPONDENSO CO LTD) 9 April 1996 (1996-04-09)		
A	US 3 465 353 A (BUXTON JAMES E ET AL) 2 September 1969 (1969-09-02)		
A	US 3 599 496 A (TOULIER PIERRE) 17 August 1971 (1971-08-17)		
A	US 1 870 367 A (KEARNEY) 9 August 1932 (1932-08-09)		TECHNICAL FIELDS SEARCHED (Int.CI.7)
			F02N
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 February 2001	Examiner Bijn, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document</p> <p>T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document</p>			

EPO FORM 1503 03 82 (P04C01)



European Patent
Office

Application Number

EP 00 11 6717

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 00 11 6717

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1 - 5

Starter motor with movement restricting means to restrict normally movement of the pinion body toward the ring gear.

2. Claims: 6 - 10

Starter motor with output shaft, a pinion moving body, pinion moving means and electromagnetic switch.

3. Claim : 11

Starter motor with electromagnetic switch and rotation restricting means of the pinion enabling rotation of the starter motor only after engagement of the pinion moving body toward the ring gear.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 11 6717

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82