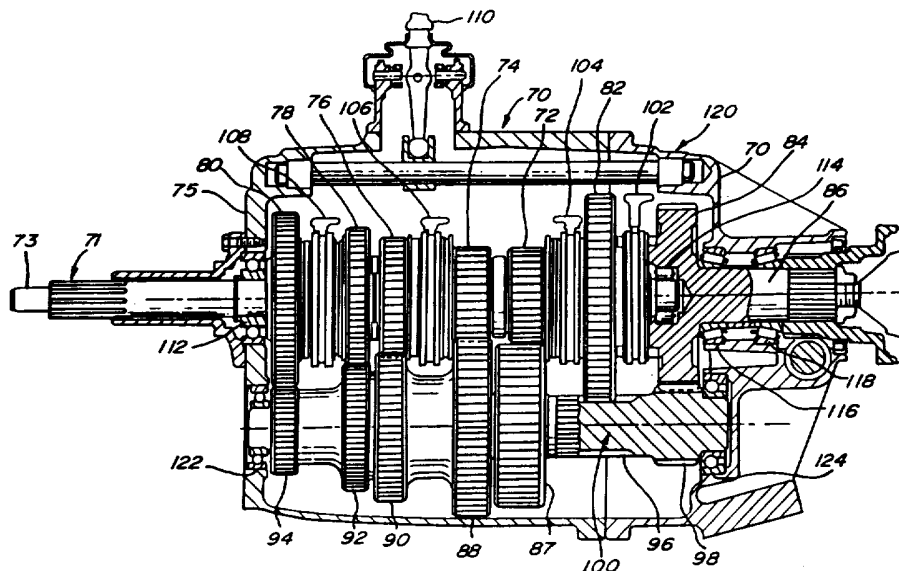




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification⁶ : F16H 57/00, 55/06, 55/14, 57/02, F16H 3/08, 37/00; F16D 11/00; F01M 1/00; F01C 1/00, 21/04</p>	A3	<p>(11) International Publication Number: WO 96/06291</p> <p>(43) International Publication Date: 29 February 1996 (29.02.96)</p>
<p>(21) International Application Number: PCT/US95/10132</p> <p>(22) International Filing Date: 8 August 1995 (08.08.95)</p> <p>(30) Priority Data: 08/287,086 8 August 1994 (08.08.94) US</p> <p>(71) Applicant: GETRAG GEARS OF NORTH AMERICA, INC. [US/US]; 36200 Mound Road, Sterling Heights, MI 48310 (US).</p> <p>(72) Inventors: MASTROIANNI, Cesare, G.; 8111 Bradford Lane, Denver, NC 28037 (US). MICK, Timothy, E.; 2165 Belle Vernon Drive, Rochester Hills, MI 48309 (US).</p> <p>(74) Agent: ANDERSON, Thomas, E.; Gifford, Krass, Groh, Sprinkle, Patmore, Anderson & Citkowski, Suite 400, 280 North Woodward, Birmingham, MI 48009 (US).</p>	<p>(81) Designated States: JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 11 April 1996 (11.04.1996)</p>	

(54) Title: MULTI-SPEED REAR WHEEL DRIVE TRANSMISSION



(57) Abstract

A vehicle transmission (70) is disclosed. The transmission (70) has a mainshaft (171) having rotatable gears (74, 76) with gear rattle prevention means (140, 150). An oil pump (157) is mounted for rotation with main shaft (71). A power takeoff access plate (310) is mounted on one side of the countershaft (320). Another embodiment shows a fixed gear (274) and a rotatable gear (272) on the main shaft (271) with a rotatable gear (288) and a fixed gear (287) on the countershaft (200) meshing with the fixed gear (274) and the rotatable gear (272) respectively.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10132

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :Please See Extra Sheet.
US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 74/11, 15,66, 15.86, 325, 329, 333, 440, 443, 461; 192/30V, 53.34, 53.343; 184/ 6.12, 11.2, 26; 418/88, 171, 177

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS
search term : ((74/11-16/cclst) and (74/606r/ccls) and (cover(1w)plate))

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE, A, 3,137,205 A1 (RENK)14 APRIL 1983, FIGURES 1 AND 2	1,2
Y	DE, A, 1,500,516 (ELLINGER) 10 JULY 1969, FIGURE 1	1,2
X	US, A, 4,483,210 (MAYUZUMI) 20 NOVEMBER 1984, FIGURE 1	1-3,5,6
Y	JP, A, 56-181970 (NISHIKAWA) 20 MAY 1983, FIGURES 1-3	1-3,5
Y	JP, A, 58-109765 (IKEMOTO) 30 JUNE 1983, FIGURE 1	6
X	US, A, 4,834,219 (INAGAKI ET AL) 30 MAY 1989, FIGURES 3 AND 5	7-9

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 11 NOVEMBER 1995	Date of mailing of the international search report 01 FEB 1996
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <i>KHOI Q. TX Mymas</i> Telephone No. (703) 308-2168

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10132

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP, A, 4-148782 (SAKAGUCHI) 07 DECEMBER 1993, FIGURE 5	10-12
X	JP, A, 4-150915 (HONDA) 27 DECEMBER 1993, FIGURES 4 AND 5	13, 14
Y	US, A, 4,610,175 (WEIS ET AL) 09 SEPTEMBER 1986, FIGURES 1 AND 4	13, 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10132

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US95/10132

A. CLASSIFICATION OF SUBJECT MATTER:

IPC (6):

F16H 57/00, 55/06, 55/14, 57/02, 3/08, 37/00; F16D 11/00; F01M 1/00; F01C 1/00, 21/04

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

74/11, 15.66, 15.86, 325, 329, 333, 440, 443, 461; 192/30V, 53.34, 53.343; 184/ 6.12, 11.2, 26; 418/88, 171, 177

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s)1-6, drawn to a gear rattle prevention means.

Group II, claim(s) 7-9, drawn to a transmission lubricating pump.

Group III, claim(s) 10-12, drawn to a gear arrangement in a countershaft transmission.

Group IV, claims 13, 14, drawn to a power take off arrangement with access plate.

The inventions listed as Groups I-IV do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

-the spring washer of Group I is not required for a technical relationship so as to form the inventive concepts of respective Groups II-IV,

-the oil pump mounting arrangement is not required for a technical relationship so as to form the inventive concepts of respective Groups I, III and IV,

-the arrangement of rotatable and fixedly coupled gears is not required for a technical relationship so as to form the inventive concepts of respective Groups I, II and IV,

-the arrangement for a PTO shaft and the access plate in the housing is not required for a technical relationship so as to form the inventive concept of respective Groups I-III.