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B60K 6/365 (2007.10)

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(71) Applicant: 1E TARAZ HOLDING B.V. [NL/NL];

Vaartweg 94, 3131 HV VLAARDINGEN (NL).

(72) Inventor: DE WERT, Ricardo Mohan; (NL).

(74) Agent: JILDERDA, Anne Ayolt; Lioc Patents & Trade-

marks, Zwaanstraat 31L, 5651 CA Eindhoven (NL).

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KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: HYBRID POWER TRAIN ARRANGEMENT FOR A VEHICLE

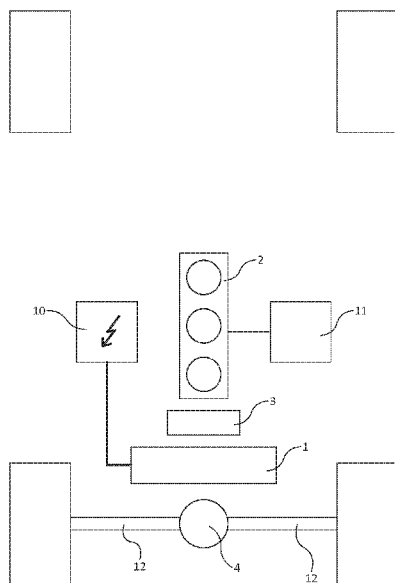


Fig.1

(57) Abstract: A hybrid powertrain arrangement for a vehicle, said powertrain having a primary drive output comprising at least one electric motor (1) coupled to a drive shaft for driving said drive shaft complemented by a combustion engine (2) coupled to said drive shaft for driving said drive shaft, said primary drive output being capable of driving a drive axle (4) of the vehicle, wherein a first gear ratio is located between an output of said combustion engine, wherein an input of said at least one electric motor and said at least one electric motor drives said drive axle (4) over a final gear ratio, wherein said first gear ratio (3) between said combustion engine (2) and said electric motor (1) comprises a star type epicyclic gearing with a reducing gear ratio and wherein a crankshaft of said combustion engine (2) and said input of said electric motor are driven in opposite directions of rotation.



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. B60K6/48 B60K6/448 B60K6/52 B60K6/383 B60K6/365 ADD.																																
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B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B60K																																
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C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>JP 2017 078508 A (EXEDY CORP) 27 April 2017 (2017-04-27)</td> <td>1,2,6,14</td> </tr> <tr> <td>Y</td> <td>paragraph [0009]; figures 1,16 -----</td> <td>3-5,8-13</td> </tr> <tr> <td>X</td> <td>US 2017/282904 A1 (MORITA TOMOHIRO [JP]) 5 October 2017 (2017-10-05)</td> <td>1,2,5,14</td> </tr> <tr> <td>Y</td> <td>paragraphs [0031] - [0050]; figure 1 -----</td> <td>3</td> </tr> <tr> <td>Y</td> <td>US 5 697 466 A (MOROTO SHUZO [JP] ET AL) 16 December 1997 (1997-12-16)</td> <td>3</td> </tr> <tr> <td>A</td> <td>column 3, line 13 - column 4, line 53; figure 1 -----</td> <td>1,2</td> </tr> <tr> <td>Y</td> <td>DE 10 2007 050822 A1 (ZAHNRADFABRIK FRIEDRICHSHAFEN [DE]) 30 April 2009 (2009-04-30)</td> <td>3,5</td> </tr> <tr> <td>A</td> <td>the whole document -----</td> <td>1,2,6</td> </tr> <tr> <td></td> <td>-/--</td> <td></td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	JP 2017 078508 A (EXEDY CORP) 27 April 2017 (2017-04-27)	1,2,6,14	Y	paragraph [0009]; figures 1,16 -----	3-5,8-13	X	US 2017/282904 A1 (MORITA TOMOHIRO [JP]) 5 October 2017 (2017-10-05)	1,2,5,14	Y	paragraphs [0031] - [0050]; figure 1 -----	3	Y	US 5 697 466 A (MOROTO SHUZO [JP] ET AL) 16 December 1997 (1997-12-16)	3	A	column 3, line 13 - column 4, line 53; figure 1 -----	1,2	Y	DE 10 2007 050822 A1 (ZAHNRADFABRIK FRIEDRICHSHAFEN [DE]) 30 April 2009 (2009-04-30)	3,5	A	the whole document -----	1,2,6		-/--	
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Date of the actual completion of the international search		Date of mailing of the international search report																														
8 July 2019		29/08/2019																														
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INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2018/050752

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	paragraph [0003]; figure 1 -----	1-3,5,6
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A	page 2, paragraph 1 - page 8, paragraph 1; figure 1 page 8, paragraph 3 - page 10, paragraph 2; figure 3 -----	13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NL2018/050752

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional 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 fees, this Authority did not invite payment of additional fees.
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.:

1-6, 8-14
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6(completely); 14(partially)

See below

1.1. claims: 1-3(completely); 14(partially)

Hybrid powertrain comprising a planetary gearing between an engine and an electric machine

1.2. claims: 4-6(completely); 14(partially)

Hybrid powertrain comprising a specific connection between an electric machine and a drive axle.

2. claims: 7(completely); 14(partially)

Reversing two-speed planetary gear unit

3. claims: 8-13(completely); 14(partially)

Arrangement of multiple electric machines in a hybrid powertrain.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2018/050752

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