
Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-20</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>3, 18</u>
	No: Claims	<u>1, 2, 4-17, 19, 20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-20</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1 US 2016/229289 A1 (FROHNMAYER MARK DOUGLAS [US] ET AL) 11 August 2016 (2016-08-11)
- D2 US 2014/033846 A1 (SUTO JUNICHI [JP] ET AL) 6 February 2014 (2014-02-06)
- D3 US 2012/248850 A1 (HIRANO TAKAHISA [JP]) 4 October 2012 (2012-10-04)
- D4 DE 10 2015 212811 A1 (BAYERISCHE MOTOREN WERKE AG [DE]) 12 January 2017 (2017-01-12)

1.1 **Independent Claim 1 - Inventive Step**

Furthermore, notwithstanding the below-mentioned lack of clarity, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

- 1.1.1 D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document) a drivetrain system comprising:
- an ~~I-shield~~ intermediate housing* (fig.8; 812; [0033]);
 - a first motor (fig.8; 880; [0037]);
 - a second motor (fig.8; 884; [0037]);
 - a first ~~A-shield~~ housing* (fig.8; 814; [0033]) affixed to the first motor ([0020]) and the ~~I-shield~~ intermediate housing (fig.8; [0033]);
 - a second ~~A-shield~~ housing* (fig.8; 816; [0033]) affixed to the second motor ([0020]) and the ~~I-shield~~ intermediate housing (fig.8; [0033]);
 - a first gearset comprising:
 - a first motor shaft (fig.8; 822; [0034]) of the first motor;
 - a first motor gear (fig.8; 823; [0042]) affixed to the first motor shaft;
 - a first intermediate shaft (fig.8; 824; [0042]);
 - a first wheel gear (fig.8; 825; [0042]) affixed to the first intermediate shaft and

engaged with the first motor gear;
a first pinion gear (fig.8; 826; [0042]) affixed to the first intermediate shaft;
a first drive shaft (fig.8; 827; [0042]);
a first drive gear (fig.8; 828; [0042]) affixed to the first drive shaft and engaged with the first pinion gear;
~~three and only three~~ motor bearings (fig.8; 840, 844 of the motor shaft 822; [0047], [0048]) arranged co-linearly and coupled to the first motor shaft (fig.8);
and
two intermediate bearings (fig.8; 840, 844 of the intermediate shaft 822; [0047], [0048]) arranged co-linearly and coupled to the intermediate shaft.

*see chapter clarity

1.1.2 The subject-matter of claim 1 of the present application therefore differs from this known drive train system in that the first gearset comprises three and only three motor bearings.

1.1.3 The technical effect of that feature is a compact powertrain with a reduced number of components arrangement for an electric vehicle.

1.1.4 The objective technical problem to be solved by the present invention may therefore be regarded as *how to provide a compact powertrain arrangement with a reduced number of components for the electric vehicle of D1?*

1.1.5 D1 is rather rather silent how the motors 880 and 884 are fixed to the housing 814 resp. 816.

The skilled person searching for a solution how to rigidly fix the motors 880 and 884 to the respective housing would consider electric drive trains providing electric motors directly attached to gear housings.

The skilled person also would receive the solution proposed by D2. D2 is focused on providing a powertrain for electric vehicles which is made up of a reduced number of parts (see [0009] of D2).

D2 proposes, when attaching the motor to the housing to apply three and only three motor bearings for the motor shaft (see fig.1 of D2).

It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a powertrain according to D1, thereby arriving at a powertrain according to claim 1.

1.1.6 Therefore, the solution proposed in claim 1 of the present application cannot be considered to involve an inventive step.

1.2 Dependent Claims 2, 4-13 - Inventive Step

Furthermore, notwithstanding the below-mentioned lack of clarity, dependent claims 2, 4-13 of the present application, depending on claim 1, do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33 (1), 33 (3) PCT).

1.2.1 Claim 2

Securing bearings in recesses by snap rings is a well known technique to the skilled person (see for example D3: fig.1; [0060]). Depending on the type of the standard used for the snap ring, the shape of the spring clip can also be interpreted as a horseshoe shaped retaining plate.

Consequently, the solution proposed in claim 2 lacks an inventive step.

1.2.2 Claims 4-6

D1: fig.10; [0057].

1.2.3 Claim 7

D1: fig.8; [0034], [0042].

1.2.4 Claim 8

There is no hint or indication why the drivetrain of D1 should not be usable for a front drivetrain system or a rear drivetrain system. Consequently, D1 also discloses this feature.

1.2.5 Claims 9 and 10

depending on the detailed realization of a vehicle drivetrain arrangement, the proposed solution of claim 9 and 10 is merely one of several straightforward possibilities which the skilled person would select, depending on the circumstances, without exercising inventive skill, in order to solve the problem posed.

Consequently, the solutions proposed in claims 9 and 10 lack an inventive step.

1.2.6 Claims 11 and 12

Providing power electronics for electric motors of drivetrains attached to the motor/geartrain-housing is well known to the skilled person (see for example D4: fig.1; [0034]).

Consequently, the solutions proposed in claims 11 and 12 seem to lack an inventive step.

1.2.7 Claim 13

The proposed slight modification of the bearing positions seems - depending on the circumstances - not to be based on an inventive step, when starting from D1.

1.3 **Independent Claim 14 - Inventive Step**

Furthermore, notwithstanding the below-mentioned lack of clarity, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 14 does not involve an inventive step in the sense of Article 33(3) PCT.

D1 is regarded as being the prior art closest to the subject-matter of claim 14, and discloses (the references in parentheses applying to this document) an electric vehicle comprising a first and a second drive train system (fig.8; abstract).

For the feature analysis as well as for the detailed problem-solution-approach showing the lack of an inventive step see chapter 1.1.1-1.1.5 and 1.2.3 of this written opinion.

1.4 **Dependent Claims 15-17, 19 and 20 - Inventive Step**

Furthermore, notwithstanding the below-mentioned lack of clarity, dependent claims 15-17, 19 and 20 of the present application, depending on claim 14, do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33 (1), 33 (3) PCT).

1.4.1 Claims 15-17

When applying two of the drivetrains of D1 as shown in fig.8, to a four-wheeled vehicle, the proposed arrangement of claims 15-17 would fall within the scope of customary practice of a skilled person.

Consequently, the solutions proposed in claims 15-17 lack an inventive step.

1.4.2 Claims 19 and 20

See chapter 1.2.6 of this written opinion.

1.5 Dependent Claims 3 and 18 - Inventive Step

As argued in chapter 1.2.1 a respective horseshoe shaped bearing retention plate would be a snap ring securing the bearing. Such a concept would not allow to position the mid-bearing in an opening of the snap ring.

Thus, the subject-matters of claims 3 and 18 of the present application - assuming the clarity objections can be resolved - seem to be neither known from, nor rendered obvious by the cited documents (Article 33 (1), 33 (2) and 33 (3) PCT).

2 Re Item VII

Certain defects in the international application

2.1 Claim 1

Independent claims 1 and 14 are not in the two-part form in accordance with Rule 6.3(b) PCT.

2.2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 is not mentioned in the description, nor is this document identified therein.

2.3 Claims 1-20

The features of claims 1-20 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3 Re Item VIII

Certain observations on the international application

3.1 Lack of conciseness

Although claims 1 and 14 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

3.2 Clarity - Claims 1-6, 9, 10, 12, 14 and 18

The application does not meet the requirements of Article 6 PCT, because claims 1-6, 9, 10, 12, 14 and 18 are not clear.

3.2.1 Claims 1, 2, 14 and 18

The terms "I-shield" and "A-shield" are vague and unclear and leave the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definitions of the subject-matters of said claims unclear.

For the reasoned statement with regard to novelty, inventive step or industrial applicability the term "I-shield" has been interpreted in the light of the description [0024] as "intermediate housing" and the term "A-shield" has been interpreted in the light of the description [0026] as "housing".

3.2.2 Claim 3

Claim 3 refers to claim 2 which refers to claim 1. Claim 1 defines a first wheel gear. Claim 3 also defines a first gear gear. It is not clear whether there are two first wheel gears or only one. This renders the definition of the subject-matter of claim 3 unclear.

For the reasoned statement with regard to novelty, inventive step or industrial applicability the claim is read as: "The drivetrain system of claim 2, wherein **the** first wheel gear is positioned axially adjacent to the mid-bearing and in an opening of the first horseshoe-shaped bearing retention plate."

3.2.3 Claims 4-6

The claims 4-6 use the term shaft angle and it is stated that the "the motor axis, intermediate axis, and drive axis define a shaft angle". It is not clear how the axis define the angle (for example by intersecting of the like?), thereby, rendering the definitions of the subject-matters of said claims unclear.

For the reasoned statement with regard to novelty, inventive step or industrial applicability the claim is interpreted in the sense of Fig.6 of the present application.

3.2.4 Claims 9 and 10

Claims 9 and 10, claiming a physical entity (drivetrain), seek to define the invention by reference to features relating to the entity's use (e.g. 'as the front drivetrain'). This results in a lack of clarity of the claims in the meaning of Article 6 PCT (see PCT Guidelines II - 5, 5.37).

3.2.5 Claim 12

Claim 12, which is depending to claim 1, refers to "the lid". A "lid" is, however, mentioned for the first time in claim 11. Thus, the dependency of claim 12 does not clearly define the subject-matter for which the protection is sought as required.

For the reasoned statement with regard to novelty, inventive step or industrial applicability the claim is read as: "The drivetrain system of claim 11, wherein the lid ...".
