

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To: GALEN J. SUPPES  
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# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

01 JUL 2016

Applicant's or agent's file reference

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US 15/67799

International filing date (day/month/year)

29 December 2015 (29.12.2015)

Priority date (day/month/year)

30 December 2014 (30.12.2014)

International Patent Classification (IPC) or both national classification and IPC:

IPC(8) - B61B 3/00, B61B 3/02, B61B 13/08, B61C 13/04, G05D 1/00 (2016.01)

CPC - B61B 3/00, B61B 3/02, B61B 13/08, B61C 13/04, Y02T 30/30

Applicant SUPPES, GALEN J.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- 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
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-8300

Date of completion of this opinion

20 April 2016

Authorized officer:

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## Box No. I Basis of this 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 43*bis*.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 13*ter*.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 13*ter*.1(a)).
    - on paper or in the form of an image file (Rule 13*ter*.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:

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**Box No. IV Lack of unity of invention**

1.  In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
- paid additional fees.
- paid additional fees under protest and, where applicable, the protest fee.
- paid additional fees under protest but the applicable protest fee was not paid.
- not paid additional fees.
2.  This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

- complied with.
- not complied with for the following reasons.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general 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: Claims 1-7, directed to a transportation system.

Group II: Claim 8-11 directed to a linear motor having an open sided-coil.

Group III: Claim 12-14 directed to a linear motor having a horseshoe electromagnet.

The inventions listed as Groups I-III do not relate to a single general 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:

**SPECIAL TECHNICAL FEATURES**

The invention of Group I includes the special technical feature of a transportation system, a route, a tensile force, an acceleration, a vehicle, aerodynamic vehicle body surfaces, aerodynamic lift, not required by the claims of Group II and III.

The invention of Group II includes the special technical feature of an open sided-coil, an inner partial coil, an open cavity, an inner surface, an outer surface, surroundings, a cavity first end, a cavity second end, a slot, an insert, electromagnetic interactions, a past, connections, an object, not required by the claims of Group I and III.

The invention of Group III includes the special technical feature of a horseshoe electromagnet, the ends, a plain, not required by the claims of Group I and II.

**COMMON TECHNICAL FEATURES**

Groups I-III share the common technical features of a propulsion carriage. However, this shared technical feature does not represent a contribution over prior art as being anticipated by US 4,841,871 A to Leibowitz, which discloses a propulsion carriage (collective unit of spaced apart sets of dual pneumatic tired guide wheels 60 and 62, traction drive wheels 90, and motor 88, Fig. 5).

Groups I and III share the common technical features of a propulsion line. However, this shared technical feature does not represent a contribution over prior art as being by US 4,841,871 A to Leibowitz, which discloses a propulsion line (opposed parallel trackways, 16 and 18, Fig. 1).

Groups II and III share the common technical features of a linear motor. However, this shared technical feature does not represent a contribution over prior art as being anticipated by 4,841,871 A to Leibowitz, which discloses a linear motor (motor, 88, Fig. 5).

As the common technical features were known in the art at the time of the invention, these cannot be considered special technical feature that would otherwise unify the groups.

Therefore, Groups I-III lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- all parts.
- the parts relating to claims Nos. 1-7

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**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)	Claims	<u>3-7</u>	YES
	Claims	<u>1, 2</u>	NO
Inventive step (IS)	Claims	<u>6</u>	YES
	Claims	<u>1-5, 7</u>	NO
Industrial applicability (IA)	Claims	<u>1-7</u>	YES
	Claims	<u>None</u>	NO

2. Citations and explanations:

Claims 1, 2 lack novelty under PCT Article 33(2) as being anticipated by US 4,841,871 A to Leibowitz.

Regarding claim 1, Leibowitz teaches a transportation system (col 3 lns 19-20, "a modular transportation system") comprising:

a propulsion line (opposed parallel trackways, 16 and 18, Fig. 1) that is connected to earth's surface at multiple locations (Fig. 1, opposed parallel trackways 16 and 18 are connected to the ground via support towers 14) and forms a route (Fig. 1, col 3 ln 21, "monorail network") for travel of the transportation system (Fig. 1),

a propulsion carriage (collective unit of spaced apart sets of dual pneumatic tired guide wheels 60 and 62, traction drive wheels 90, and motor 88, Fig. 5) that produces a tensile force on the propulsion line (Fig. 2, Fig. 3, Fig. 5, since the fore and aft support strut members 56 and 58 are attached to the vehicle 42 and are both attached and located below the 'propulsion carriage' then a tensile force will be produced on the opposed parallel trackways 16 and 18) and an acceleration (col 7 lns 8-9, "The speed of respective vehicles 42"; since the vehicle has a speed then the 'propulsion carriage' will also have a speed due to being attached to the vehicle and therefore both will also have an acceleration in order to arrive at the speed) on the propulsion carriage where the acceleration is in the direction of the route (col 7 lns 8-9, "The speed of respective vehicles 42"; since the vehicle has a speed and the 'propulsion carriage' is connected to the vehicle then the 'propulsion carriage' has an acceleration that would be in the direction of the monorail network, Fig. 1), and

a vehicle (vehicle, 42, Fig. 3) connected to the propulsion carriage where the vehicle has aerodynamic vehicle body surfaces (winglet sections, 52 and 54, Fig. 3) that create an aerodynamic lift (col 4 lns 57-59, "The winglet sections 52 and 54 maybe adjusted to control the amount of lift imparted to the vehicle 42 as it is traversing a trackway") on the vehicle where said lift is greater than half the weight of the vehicle (col 5 lns 60-63, "when aerodynamic lift exceeds the weight of the vehicle the guide wheels 60 and 62, typically leave contact with the track web portions").

Regarding claim 2, Leibowitz teaches the transportation system of claim 1, and further teaches comprising aerodynamic vehicle body surfaces (winglet sections, 52 and 54, Fig. 3) that create aerodynamic lift (col 4 lns 57-59, "The winglet sections 52 and 54 maybe adjusted to control the amount of lift imparted to the vehicle 42 as it is traversing a trackway") on the vehicle where said lift is greater than 99% of the weight of the vehicle (col 5 lns 60-63, "when aerodynamic lift exceeds the weight of the vehicle the guide wheels 60 and 62, typically leave contact with the track web portions").

Claims 1, 5, 7 lack an inventive step under PCT Article 33(3) as being obvious over US 8,371,226 B2 to Timperman.

Regarding claim 1, Timperman teaches a transportation system (mass transit system, 8, Fig. 1) comprising:

a propulsion line (guideway, 12, Fig. 1) that is connected to earth's surface at multiple locations (pillars, 20, Fig. 1) and forms a route (route formed by guideways 12 and pillars 20, Fig. 1) for travel of the transportation system (Fig. 1),

a propulsion carriage (truck system, 14, Fig. 2) that produces a tensile force on the propulsion line (Fig. 1 and Fig. 2, since the truck system 14 is located within the guideway 12 and the streamlined vehicle 10 is suspended below the guideway 12 via the truck system 14 and hangers 18, a tensile force will be produced from the tuck system 14 in the longitudinal direction that the streamlined vehicle 10 is oriented) and an acceleration (acceleration provided by propulsive turbofan engine 28 in order to move the streamlined vehicle 10, Fig. 1) on the propulsion carriage where the acceleration is in the direction of the route (the streamlined vehicle 10 is moved via the propulsive turbofan engine 28 which provides an acceleration to the truck system 14 and the streamlined vehicle 10 in order to arrive at the desired speed in the direction of the route formed by the guideways 12 and pillars 20, Fig. 1), and

a vehicle (streamlined vehicle embodiment shown in Figs. 25 and 26) connected to the propulsion carriage where the vehicle has aerodynamic vehicle body surfaces (short span wings - not numbered, Fig. 25 and Fig. 26) that create an aerodynamic lift (col 9 lns 55-57, "short span wing(s) can be added to the vehicle at a mostly central location to produce a substantial lifting force without unbalancing the support provided by the truck system 14"; figs. 25-26) on the vehicle but Timperman does not literally teach where said lift is greater than half the weight of the vehicle. However, Timperman does expressly teach that short span wing(s) creates a substantial lift on the streamliined vehicle 10. Therefore, it would have been obvious to one having ordinary skill in the art, practicing ordinary design methodology and routine experimentation, that the transportation system taught by Timperman could have been modified such that the short span wing(s) are configured such that they create an aerodynamic lift within the claimed range, as desired or necessary to meet the requirements of a particular application thereby increasing the efficiency of the tranportation system.

----Continued on Supplemental Page----

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**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:

Claim 1, 2, 3, 4: Regarding claim 1, 2, 3, 4, the term "said lift" lacks clarity and proper antecedent basis. For the purposes of this opinion, "said lift" has been interpreted as "said aerodynamic lift".

Claim 3, 5, 6: Regarding claim 3, 5, 6, the term "the carriage" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the carriage" has been interpreted as "the propulsion carriage".

Claim 6, 12: Regarding claim 6, 12, the term "plain" appears to be a typographical error. For the purposes of this opinion, "plain" has been interpreted as "plane".

Claim 8: Regarding claim 8, the term "the cavity" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the cavity" has been interpreted as "the open cavity".

Claim 8: Regarding claim 8, the term "the slot" lacks proper antecedent basis. For the purposes of this opinion, "the slot" has been interpreted as "a slot".

Claim 8: Regarding claim 8, the term "the coil" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the coil" has been interpreted as "the open sided-coil".

Claim 8: Regarding claim 8, the term "a past of travel" lacks clarity and appears to be a typographical error. For the purposes of this opinion, "a past of travel" has been interpreted as "a passage of travel".

Claim 8: Regarding claim 8, the term "the first end" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the first end" has been interpreted as "the cavity first end".

Claim 8: Regarding claim 8, the term "the second end" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the first end" has been interpreted as "the cavity second end".

Claim 10: Regarding claim 10, the term "said magnet" lacks clarity and proper antecedent basis. For the purposes of this opinion, "said magnet" has been interpreted as "said longitudinally asymmetric electromagnet".

Claim 10: Regarding claim 10, the term "the electromagnet" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the electromagnet" has been interpreted as "the longitudinally asymmetric electromagnet".

Claim 12: Regarding claim 12, the term "the ends" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the ends" has been interpreted as "ends".

Claim 12: Regarding claim 12, the term "the electromagnet" lacks clarity and proper antecedent basis. For the purposes of this opinion, "the electromagnet" has been interpreted as "the horseshoe electromagnet".

Claim 12: Regarding claim 12, the term "ends of the horseshoe electromagnet" lacks clarity. For the purposes of this opinion, "ends of the horseshoe electromagnet" has been interpreted as "the ends of the horseshoe electromagnet".

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## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:  
Box No. V, Part 2: Citations and Explanations

Regarding claim 5, Timperman teaches the transportation system of claim 1, and further teaches comprising:

the vehicle located below the propulsion line (Fig. 1),  
a connector arm (collective unit of upper portion 18A and lower portion 18B, Fig. 1) connecting the propulsion carriage to the vehicle (Fig. 1 and Fig. 2, the truck system 14 is attached to upper portion 18A which is connected to lower portion 18B which is attached to the streamlined vehicle 10) and  
connector arm joints (dynamic joint, 19, Fig. 1) that allow the vehicle to fly at different distances of approach to the carriage (col 5 lns 45-50, "More specifically, as the guideway 12 flexes downward, the dynamic joint 19 will shorten and conversely, as the streamlined vehicle 10 passes over a pier where the guideway 12 will be at or near its high point, the dynamic joint 19 will lengthen hanger 18 to provide a level path for the streamlined vehicle 10").

Regarding claim 7, Timperman teaches the transportation system of claim 5, and Timperman further teaches comprising:

flaps on the vehicle (tandem wings 106, Fig. 25 and Fig. 26; note: see Applicant's specification at para [0040] describing flaps to be the same structure as the shown tandem wings in Timperman) and  
a control means (col 9 ln 58, "lift changing devices") to control the orientation of the flaps to compensate for disturbances from wind gusts on the flight path of the vehicle (col 9 lns 57-60, "Tandem wings 106 would incorporate known lift changing devices as needed for maintaining the dynamic longitudinal balance of the alternate streamline vehicle 104").

Claims 3, 4 lack an inventive step under PCT Article 33(3) as being obvious over Leibowitz in view of US 5,535,963 A to Lehl et al. (hereinafter 'Lehl').

Regarding claim 3, Leibowitz teaches the transportation system of claim 1 but does not teach comprising aerodynamic carriage body surfaces that create aerodynamic lift on the carriage where said lift is greater than half the weight of the carriage. However, Lehl teaches comprising aerodynamic carriage body surfaces (pair of rear wings, 66, Fig. 2) that create aerodynamic lift on the carriage where said lift is greater than half the weight of the carriage (col 4 lns 47-50, "The rear wings 66 extend laterally in opposite directions from the aircraft and may be provided with controllable forward flaps (not shown) and controlled rearward flaps 70"; since the flaps on the rear wings 66 are controllable then it is obvious that the amount of lift is controllable and could be controlled to be greater than half the weight of the carriage). It would have been obvious to one having ordinary skill in the art to incorporate wings capable of generating aerodynamic lift on the 'propulsion carriage' of Leibowitz in order to lessen the weight and forces produced by the carriage on the propulsion line.

Regarding claim 4, Leibowitz teaches the transportation system of claim 1 but does not teach comprising carriage flaps with a control method capable of controlling aerodynamic lift on the flaps. However, Lehl teaches comprising carriage flaps (pair of rear wings, 66, Fig. 2) with a control method (col 4 lns 47-50, "The rear wings 66 extend laterally in opposite directions from the aircraft and may be provided with controllable forward flaps (not shown) and controlled rearward flaps 70"; since the flaps on the rear wings 66 are controllable then it is inherent that there is a control method) capable of controlling aerodynamic lift on the flaps (col 4 lns 47-50, "The rear wings 66 extend laterally in opposite directions from the aircraft and may be provided with controllable forward flaps (not shown) and controlled rearward flaps 70"). It would have been obvious to one having ordinary skill in the art to incorporate wings capable of generating aerodynamic lift on the 'propulsion carriage' of Leibowitz in order to lessen the weight and forces produced by the carriage and to include a control method to allow for adjustment of the placement of the carriage on the propulsion line and the amount of lift generated.

Claim 6 meets the requirement under PCT Articles 33(2) and 33(3) because, as will be shown, the prior art does not teach, nor does it fairly suggest, the claimed limitations.

The prior art is exemplified by (1) Timperman; and (2) US 8,272,332 B2 to Mobasher.

- (1) Timperman teaches connector arm joints (dynamic joint, 19, Fig. 1).
- (2) Mobasher teaches two vehicle connector arm joints (switcher arms, 22 and 24, Fig. 2).

Regarding claim 6, Timperman teaches the transportation system of claim 5, and Mobasher teaches comprising:

two vehicle connector arm joints (switcher arms, 22 and 24, Fig. 2),  
the vehicle connector arm joints on vertically extending arm connections on the vehicle (Fig. 2, the switcher arms 22 and 24 are located on an unlabeled support bar that extends vertically above the top portion 68 to the hinges 48) and  
during at least one distance of approach the propulsion line located between the two vehicle connector arm joints (Fig. 3, the switcher arms 22 and 24 are located on either side of the I-beam track 12 'propulsion line').  
However, the prior art does not disclose/teach individually nor fairly suggest in combination two carriage connector arm joints on opposite sides of the carriage, during at least one distance of approach the propulsion line located between the two vehicle connector arm joints and in the same geometric plain as the two vehicle connector arm joints.

Claims 1-7 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used by industry.