



- (51) International Patent Classification:
B60R 16/04 (2006.01)
- (21) International Application Number:
PCT/IB2016/056884
- (22) International Filing Date:
16 November 2016 (16.11.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
201641003334 29 January 2016 (29.01.2016) IN
- (71) Applicant: **ATHER ENERGY PVT. LTD** [IN/IN]; Ather Energy Pvt. Ltd., No.1, Victoria Road Extension, Victoria Layout, 6th Cross, Bengaluru – 560047, Karnataka (IN).
- (72) Inventors: **BISWAS, Bikash Jyoti**; House no. – 23, Kaus-turba Nagar, South Sarania, Ulubari, Guwahati – 781007 (IN). **MODY, Mahek**; A1402, Florentine, Hiranandani Gardens, Powai, Mumbai 400076 (IN). **VINAYAK, Arun**; #164, Embassy heritage, 8th main, Malleshwaram, Bangalore- 560055 (IN).
- (74) Agent: **SAHNEY, Garima**; Saikrishna & Associates, Ad-vocates, B-140, Sector 51, Noida- 201301, Uttar Pradesh (IN).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, 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.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: A VEHICLE WITH AN INTEGRATED BATTERY CASING

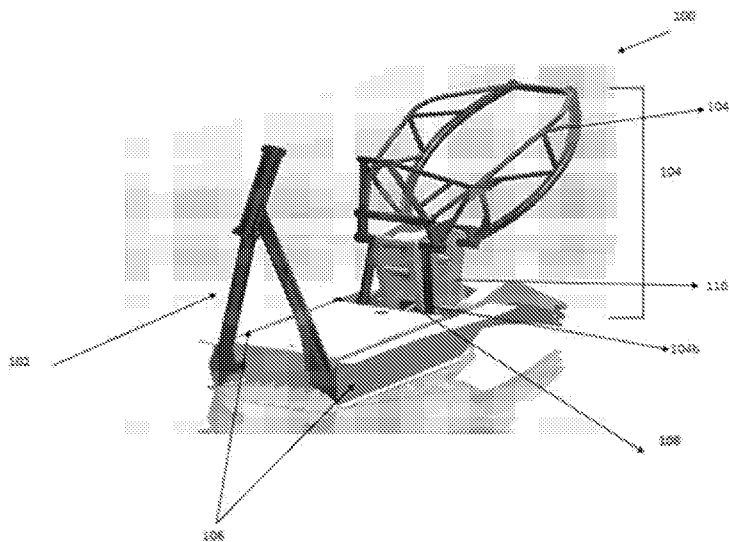


FIGURE 1

(57) Abstract: A vehicle comprising at least one front member, at least one rear member, at least one channel [106] connecting the front member [102] and the rear member [104] and a battery casing [108] mounted on said at least one channel [106] is disclosed herein. The present invention provides an efficient approach for developing an efficient and simple vehicle with enhanced properties such as reduced weight, cost effectiveness, easy installation.

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*

A VEHICLE WITH AN INTEGRATED BATTERY CASING

FIELD OF INVENTION

The present invention generally relates to the field of arrangement of electric
5 and/or mechanical components adapted for vehicles. More particularly, the
present invention is directed towards a battery casing, to be fitted/housed in a
vehicle.

BACKGROUND OF THE INVENTION

The following description of related art is intended to provide background
10 information pertaining to the field of the present disclosure. This section may
include certain aspects of the art that may be related to various aspects of the
present disclosure. However, it should be appreciated that this section be used
only to enhance the understanding of the reader with respect to the present
disclosure, and therefore, unless otherwise indicated, it should not be assumed
15 that any of the approaches described in this section qualify as prior art merely by
virtue of their inclusion in this section.

At present, vehicle manufacturers are increasingly focusing on vehicles having a
hybrid drive or a purely electric drive. One of such alternatives is to use electric
20 vehicles. The electric vehicles are non-polluting and have the necessary
elements/mechanical components to make the road transport system efficient in
terms of cost of travel. The vehicle referred herein may be, but not limited to, a
hybrid vehicle, an electric vehicle or a combination thereof. Also, the vehicle may
be, but not limit to, a two wheeler such as motorcycle or scooter.

25 Further, it may be anticipated that the electric vehicles, for proper
functioning/operation require batteries and thus, the batteries play a crucial role
in operability of said vehicles since these are not only used for providing power
to the vehicle but are also used for the functioning/operation of other electric
components. In the past, various attempts have been made to efficiently

package and position the battery and its components. The problems associated with packaging and positioning of the batteries within the vehicle becomes even more complex when the vehicle design requires maximizing energy storage while minimizing space utilization within the vehicle.

5 Furthermore, in order to make vehicles more robust, more strength is provided in the structural body, however this increases overall weight of the vehicle thereby reducing the overall efficiency of the vehicle. The main challenge in the area of vehicles relates to the weight of the battery modules since the battery along with its casing contributes significantly to the weight of the vehicle. The
10 weight further adds up due to the structural member/s like chassis, thereby, making the overall vehicle bulky and hence less efficient.

Certain prior arts provide a light weight vehicle by providing a vehicle comprising, front wheel, a rear wheel along with electrical storage devices that are accommodated in a storage housing, wherein said housing forms a load-
15 bearing component of the vehicle's body and is not merely inserted into the body/frame. Although this system is efficient in terms of weight, space and cost, but the method for mounting said storage device onto the frame/body is not advantageous.

Hence, in light of the above and other limitations of the existing vehicle and
20 chassis, it is objectively desired to decrease the weight of the vehicle without compromising on robustness and efficiency of the vehicle. More specifically, there exists a need for developing a more efficient and simple vehicle with enhanced properties such as reduced weight, cost effectiveness, easy to install, etc.

25 **OBJECTS OF THE INVENTION**

This section is provided to introduce certain objects and aspects of the disclosed methods and systems in a simplified form that are further described below in the detailed description.

An object of the present invention is to make a light weight structure with enhanced reliability and robustness.

Primary object of the present invention is to provide an integrated battery casing that is adapted to act as a structural member of the vehicle without any need of
5 conventional chassis thereby providing the desired strength to the overall structure.

Yet another object of the present invention is to provide ease in manufacturing and assembling of the battery and its case in a vehicle.

Another object of the present invention is to reduce the cost of a vehicle by
10 utilizing the space more efficiently in a vehicle.

SUMMARY OF INVENTION

This summary is not intended to identify the key features or the scope of the claimed subject matter.

In view of the shortcomings of existing methods and systems, as discussed in the
15 background section, and objectives of the present invention, the present invention relates to a vehicle, more particularly a light weight vehicle.

Further, said vehicle comprises at least one front member for mounting at least one front vehicle component; at least one rear member for mounting at least one rear vehicle component; at least one channel connecting the at least one
20 front member and the at least one rear member, wherein the at least one front member and the at least one rear member are aligned to said at least one channel and a battery casing mounted on said at least one channel.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated herein, and constitute a
25 part of this invention, illustrate exemplary embodiments of the disclosed methods and systems in which like reference numerals refer to the same parts throughout the different drawings. Components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the

principles of the present invention. Also, the embodiments shown in the figures are not to be construed as limiting the invention, but the possible variants of the method and system according to the invention are illustrated herein to highlight the advantages of the invention.

5 Figure 1 illustrates a skeleton view of a vehicle in accordance with the present invention.

Figure 2 illustrates a skeleton top view of a vehicle in accordance with the present invention.

Figure 3 illustrates a lower member of the rear member along with a vehicle
10 motor casing.

It may be evident to skilled artisans that mechanical components in the figures are only illustrative, for simplicity and clarity, and have not necessarily been drawn to scale. For example, the dimensions of some of the mechanical components in the figures may be exaggerated relative to other components to
15 help to improve understanding of embodiments of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

In the following description, for the purposes of explanation, various specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, that the disclosed
20 embodiments may be practiced without these specific details. Several features described hereafter can each be used independently of one another or with any combination of other features. However, any individual feature may not address any of the problems discussed above or might address only some of the problems discussed above. Some of the problems discussed above might not be
25 fully addressed by any of the features described herein.

As used herein, “connect”, “configure”, “attach” and its cognate terms, such as “connects”, “connected”, “configured” and “attached” refer a physical

connection or any other suitable connection as may be obvious to a skilled person.

Techniques are encompassed for providing a vehicle, comprising a structural body interconnecting front and rear wheels of said vehicle along with an integrated battery casing, wherein said vehicle may be a two wheeler such as a motorcycle or a scooter and wherein said vehicle may be, but not limited, to electric vehicle or hybrid vehicle or conventional vehicle.

Figures 1, 2 and 3 illustrate a structural body [100] of the vehicle, more particularly, a structural body [100] for a two wheeler. As shown in said figures, the vehicle comprises at least one front member [102] for mounting at least one front vehicle component; at least one rear member [104] for mounting at least one rear vehicle component; at least one channel [106] connecting the at least one front member [102] and the at least one rear member [104], wherein the at least one front member [102] and the at least one rear member [104] are aligned to said at least one channel [106] and a battery casing [108] mounted on said at least one channel [106].

The at least one front member [102] is configured to mount at least one front vehicle component, wherein said at least one front vehicle component includes one of a front wheel, fork, bracket, steering column, suspension system, front vehicle component mount, brakes and a combination thereof. Said vehicle components are attached to the vehicle in accordance with the embodiments of the present invention; however, it will be appreciated by person skilled in the art, that the front vehicle components are not limited to the components as discussed above.

Further, the at least one rear member [104] is configured to mount at least one rear vehicle component, wherein said at least one rear vehicle component includes one of a rear wheel, a swing arm, drive train, rear vehicle component mount, brakes or combination thereof. Said vehicle components are attached to the vehicle in accordance with the embodiments of the present invention; however, it will be appreciated by person skilled in the art, that the rear vehicle

components are not limited to the components as discussed above. In an exemplary embodiment of the present invention, the rear wheel is mounted on swing arm such that it supports the vehicle's wheel and further rotates about a pivot axis in the event of loading on the vehicle or uneven nature of the terrain.

5 The present invention encompasses that the at least one rear member [104] comprises of an upper member [104a] and a lower member [104b] that are configured to mount any vehicle component as may be obvious to person skilled in the art, wherein said upper member [104a] is connected to said lower member [104b] by using screws and rivets or any such mechanical fastener as
10 may be obvious to person skilled in the art. In an exemplary embodiment of the present invention, said upper member [104a] is longitudinally connected to said lower member [104b]. Further, a motor housing [110] is connected to said lower member [104b] or upper member [104a] or combination thereof. Figure 3, more particularly, depicts the lower member [104b] illustrating the connection
15 between the lower member [104b] and the vehicle motor housing [110], wherein said motor housing [110] and the lower member [104b] includes a plurality of holes, wherein screws/rivets are inserted/engaged into said holes to fasten the lower member [104b] on the motor casing.

Furthermore, said least one front member [102] and said rear member [104] of
20 the vehicle are connected to each other by at least one channel [106]. In particular, said front member [102] and said rear member [104] are aligned to said channel [106] while keeping the distance between the centres of rotation for the front and rear wheels fixed.

Similarly, said channel [106] is mounted on any one of the upper member [104a],
25 lower member [104b] and combination thereof.

The channel [106] is further configured to mount a battery casing [108] of a vehicle, wherein said battery casing [108] may be lithium batteries, lead acid batteries or any such battery as may be obvious to person skilled in the art. Further, said battery casing [108] comprises at least one of battery cells, cooling
30 fins or combination thereof. Said fins are configured to transfer the heat

dissipated by vehicle components and/or battery. Also, a thermal conducting material (such as epoxy fluid or silicon) present inside the battery casing [108] allows the heat to be transferred to the battery casing walls. Air flows over the fins, located on the battery casing [108], thus cooling the same.

5 In an exemplary embodiment of the present invention, battery casing [108] may be a hollow cuboid with a front side and a rear side such that the front side of the battery casing [108] is mounted on the front member [102] and rear side is mounted on the rear member [104] of the vehicle. The battery casing [108] may be made up of any material, preferably metal or metal alloy, having higher
10 strength and durability such as aluminium, aluminium alloy or any such material as may be obvious to person skilled in the art.

The present invention encompasses detachable battery casing [108] that can be either permanently mounted on the channel [106] or is removable/ detachable. Additionally, various techniques are encompassed by the present invention for
15 mounting said battery casing [108] on channel [106]. For instance, said battery casing [108] may be temporarily connected to said channel [106] by using screws or may be permanently connected by using rivets, welding means or combination thereof. However, it will be appreciated by the person skilled in the art, that the mounting means for mounting the battery casing [108] on the
20 channel [106] is not limited to the means as discussed above. In particular, the battery casing [108] is one of the modules of the chassis; acting as a structural member of the vehicle thereby improving the stiffness of the structure and handling of the vehicle.

Further, an exemplary application of the battery casing [108] is to provide a
25 footboard space for accommodating the feet of the rider. In addition to provide said footboard space, it utilizes the space in the vehicle more efficiently, thereby, providing greater storage space for the battery components and reducing the cost and ease of service on the battery casing [108] and of the vehicle as well.

However, a person skilled in the art may be cognizant of the fact that for vehicles, be it conventional, hybrid or electric, the arrangement, mounting, connections and positions of the battery casing [108] on the channels [106] may vary with respect to the vehicle for maximum vehicle efficiency.

5 Although the present invention has been described in considerable detail with reference to certain preferred embodiments and examples thereof, other embodiments and equivalents are possible. Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with functional and procedural details, the
10 disclosure is illustrative only, and changes may be made in detail, especially in terms of the procedural steps within the principles of the invention to the full extent indicated by the broad general meaning of the terms. Thus, various modifications are possible of the presently disclosed system and process without deviating from the intended scope and spirit of the present invention. A person
15 having ordinary skill in the art will appreciate that the vehicle and vehicle components, discussed herein above are exemplary and are not limiting in any manner. Further, the components and steps/techniques described herein above may be replaced, reordered or removed to form different embodiments of the present disclosure. Accordingly, in one embodiment, such modifications of the
20 presently disclosed system and method are included in the scope of the present invention.

1. A vehicle comprising:
 - at least one front member [102] for mounting at least one front vehicle component;
 - at least one rear member [104] for mounting at least one rear vehicle component;
 - at least one channel [106] connecting the at least one front member [102] and the at least one rear member, wherein the at least one front member [102] and the at least one rear member [104] are aligned to said at least one channel [106] and
 - a battery casing [108] mounted on said at least one channel [106].
2. The vehicle as claimed in claim 1, wherein the front vehicle component comprises at least one of a front wheel, front vehicle component mount, fork, bracket, steering column, suspension system, brakes or combination thereof.
3. The vehicle as claimed in claim 1, wherein the rear vehicle component comprise at least one of a rear wheel, a swing arm, rear vehicle component mount, mount drive train, brakes or combination thereof.
4. The vehicle as claimed in claim 1, wherein said at least one rear member [104] comprises of an upper member [104a] and a lower member [104b] and wherein said upper member [104a] is connected to said lower member [104b].
5. The vehicle as claimed in claim 1 and 4 wherein said at least one channel [106] is mounted on any one of the upper member [104a], lower member [104b] or combination thereof.

6. The vehicle as claimed in claim 1, wherein the battery casing [108] is adapted to act as a structural member of the vehicle.
7. The vehicle as claimed in claim 1, wherein the battery casing [108] further comprises at least one of battery cells, cooling fins or combination thereof.
8. The vehicle as claimed in claim 1, wherein said battery casing [108] is connected to said at least one channel [106] using at least one of screw, rivets, welding means or combination thereof.
9. The vehicle as claimed in claim 1, wherein said battery casing [108] is removable or permanent.
10. The vehicle as claimed in claim 1 is a two wheeler.
11. The vehicle as claimed in claim 1 wherein the vehicle is an electric vehicle, conventional vehicle or hybrid vehicle.

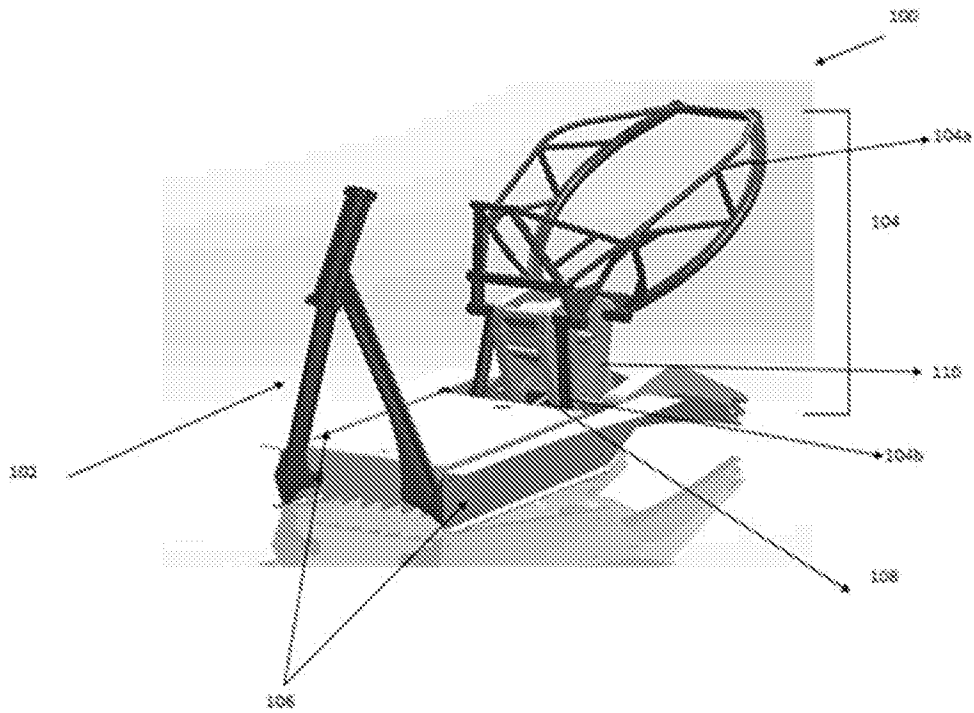


FIGURE 1

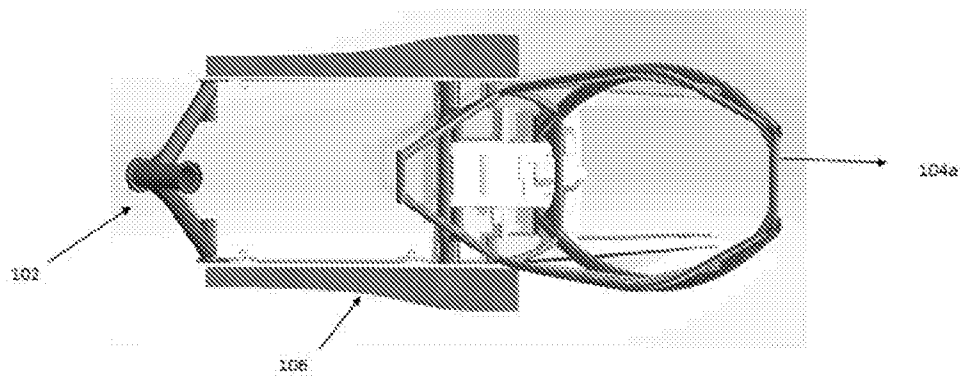


FIGURE 2

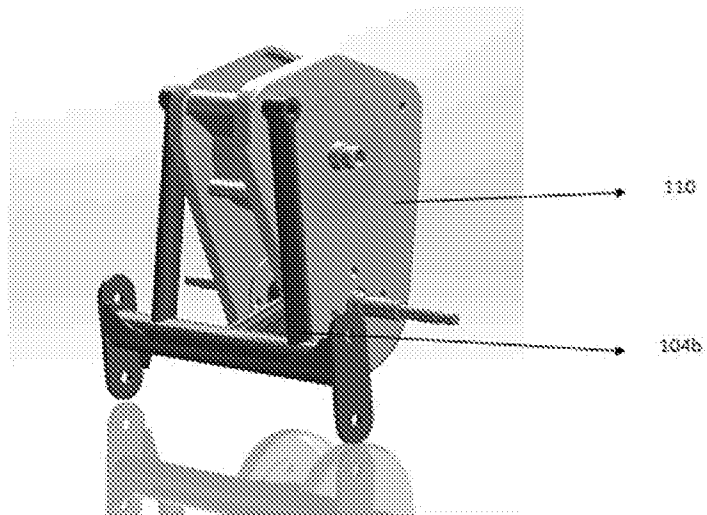


FIGURE 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2016/056884

A. CLASSIFICATION OF SUBJECT MATTER
B60R16/04 Version=2017.01

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)

B60R16/04

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)

Patseer, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 20110240391 A1 (JACQUES BONNEVILLE) 6 October 2011 WHOLE DOCUMENT, ABSTRACT, FIGURES 2-5	1-11
Y	US 8833499 B2 (PETER DORE RAWLINSON) 16 September 2014 WHOLE DOCUMENT, ABSTRACT, FIGURES 1-15	1-11

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 application or patent but 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)	"&" 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 23-02-2017	Date of mailing of the international search report 23-02-2017
---	--

Name and mailing address of the ISA/ Indian Patent Office Plot No.32, Sector 14, Dwarka, New Delhi-110075 Facsimile No.	Authorized officer Rakesh Kumar Singh Telephone No. +91-1125300200
--	--

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2016/056884

Citation	Pub.Date	Family	Pub.Date
US 20110240391 A1	06-10-2011	EP 2371692 A1	05-10-2011
		EP 2371692 B1	12-03-2014
US 8833499 B2	16-09-2014	US 8286743 B2	16-10-2012
		US 8393427 B2	12-03-2013
		US 20120160088 A1	28-06-2012
		US 20120160583 A1	28-06-2012
		US 20120312615 A1	13-12-2012