



- (51) International Patent Classification:
B60F 3/00 (2006.01) *B63B 11/00* (2006.01)
- (21) International Application Number:
PCT/PH2017/000002
- (22) International Filing Date:
16 March 2017 (16.03.2017)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
1-2016-000109 16 March 2016 (16.03.2016) PH
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(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, KH, 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,

[Continued on next page]

(54) Title: AMPHIBIOUS WHEELED VEHICLE

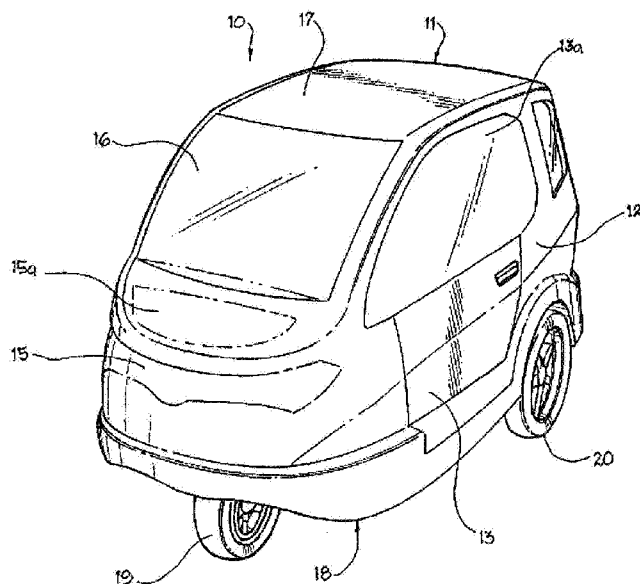


FIG. 1

(57) Abstract: The present invention relates to an amphibious wheeled vehicle comprising a vehicle body being provided with an engine at the inner portion thereof, a transmission means being provided at the inner portion of said vehicle body and operably configured with said engine, a compartmentalized hull secured to the bottom portion of said vehicle body, said hull being provided with a keel on the outer surface thereof a transfer means being operably connected to said transmission means, a propeller or jet propulsion being provided at the rear portion of said hull and operably connected to said transfer means, a front wheel and pair of rear drive wheels being provided on said hull and being connected to said transfer means; and a steering mechanism being operably connected to said propeller and said front wheel.



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).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Declarations under Rule 4.17:

- *of inventorship (Rule 4.17(iv))*

AMPHIBIOUS WHEELED VEHICLE

TECHNICAL FIELD

5 The present invention relates in general to amphibious wheeled vehicles, but more particularly to an amphibious wheeled vehicle with a multi and compartmentalized hull.

BACKGROUND OF THE INVENTION

Existing amphibious vehicles which employ the conventional mono hull or either the
10 V-hull or rounded hull designs have been found to operate inefficiently due to their present constructional features. The present constructional features of these existing amphibious vehicles do not provide stability during operation and use on the road and on the water. They also do not provide proper load distribution, safety and efficient loading and off-loading of passenger while the vehicle is on the water.

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SUMMARY OF THE INVENTION

To solve the aforementioned problems of the existing amphibious vehicles, the present invention aims to provide an amphibious wheeled vehicle having a multi and compartmentalized hull that will allow proper load distribution and stability during
20 water and land operations. The amphibious wheeled vehicle of the present invention includes a vehicle body being provided with an engine at the inner portion thereof, a transmission means being provided at the inner portion of said vehicle body and operably configured with the engine, a compartmentalized hull secured to the bottom portion of the vehicle body, the hull being provided with a keel on the outer surface
25 thereof, a transfer means being operably connected to the transmission means, a propeller or jet propulsion (water jet drive assembly) being provided at the rear portion of the hull and operably connected to the transfer means; and a pair of rear drive wheels being provided on the transfer means; and a steering mechanism being operably connected to the propeller or jet propulsion
30 (water jet drive assembly) and the front wheel.

In one aspect of the invention, the following combination of different components are used to construct the present invention for the amphibious wheeled vehicle according to

the present invention. A small regular motorcycle engine, with 5-speed transmission with reverse, a transfer mean and a 90 degree gear box and a differential with a spider gear. Preferably, the usual size of motorcycle engines used to transport the daily commuters to different destination in both rural and urban areas in our country may be used. The motorcycle gives power to 5-speed gear type transmission with reverse, and distributes forces to a transfer means and into the differential gear box to run either the rear drive wheels or the propeller or jet propulsion (jet drive assembly) by means of a propeller shaft during land or water operations, respectively.

In another aspect of the present invention, the multi and compartmentalized hull is provided on the bottom portion of the vehicle body to serve as floating mechanism when it is converted and used as a watercraft vehicle during flood conditions. It is provided with stiffeners to serve as reinforcement and a minor frame and bulkhead for the purpose of preventing water through other compartments. Each of the compartments is water tight and easily converted into a ballast compartment if more stability is needed. The upper wall of compartments serves as a double bottom plate preventing the water that comes through the engine compartment, passenger cabin and bow compartment, if ever the bottom plate has a leak due to normal use or leaks caused by hitting sharp objects during operation.

Still, in another aspect of the present invention, a double tunnel with a longitudinal sharp keel is provided at central longitudinal portion of the bottom wall of the compartmentalized hull. This feature in combination with the compartments provide efficient aerostatic, hydrostatic and hydrodynamic properties to create a better way to move load on the water.

Still, in another aspect of the present invention, the hull which includes tunnels, skirts and planing surfaces that are designed to adapt with any air and water conditions and automatically provide stability and quality ride at all speeds and sea conditions. The compartmentalized hull utilizes wave energy that passes in between hull compartments which creates a turbulence effect to lift the entire hull and consequently causes a great hydroplaning force. Since the hull is compartmentalized, it effectively provides multiple lifting surfaces in contact with water buoyancy and thereby

promote more efficient and effective vehicle maneuvering capabilities in spite of its small size.

Still, in another aspect of the present invention, the amphibious wheeled vehicle with the compartmentalized hull can travel faster at far distances and carry more payload than conventional high speed craft with great transverse trim and stability at large rotations. The compartmentalized hull makes the vehicle easier to operate and is more reliable to navigate, and provides more dynamic stability and less pitch and roll. The amphibious wheeled vehicle with the compartmentalized hull of the present invention is designed for loading and off-loading of passenger in either side without compromising the stability of the boat in an even load distribution.

Other advantages and features of the amphibious wheeled vehicle with a compartmentalized hull of the present invention include the following:

1. The hull is compartmentalized which ensures continuous operation even when one part is damaged, and the damaged part it is also easy to repair.
2. Sealed Multi-directional Propeller-rudder housing using a combine system of outboard and inboard propulsion system, the propulsion unit can rotate almost 180 degrees for easy maneuvering capability.
3. The Vehicle size is designed to fit in urban small streets. Since its main purpose is to navigate within the compact streets during flood, it is designed with very good maneuverability.
4. The vehicle is able to navigate 360 degrees in the same water spot.
5. The amphibious vehicle's propeller is designed to penetrate waste/ garbage found in the flood waters.
6. The compartmentalized hull e bottom and double chassis for additional safety

Still, another object of the present invention is to provide an amphibious wheeled vehicle that can be manufactured using readily locally available materials and technology.

These and other objects and advantages of the present invention will become more apparent upon a reading of the ensuing detailed description taken in conjunction with the appended drawings.

5 **BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS**

FIG. 1 is a perspective view showing the amphibious vehicle of the present invention;

FIG. 2 is a side view thereof;

FIG. 3 is sectional view thereof;

10 FIG. 4 is a front view thereof;

FIG. 5 is a rear view thereof;

FIG. 6 is a top view thereof;

FIG. 7 is a perspective of the hull which is adapted to be attached to the bottom portion of the amphibious vehicle of the present invention;

15 FIG. 8 is a side view thereof;

FIG. 9 is a top view thereof;

FIG. 10 is a bottom view thereof;

FIG. 11 is a front view thereof;

FIG. 12 is a rear view thereof;

20 FIG. 13 and 13A are perspective views of the transfer means of the present invention; and

FIG. 14 is a perspective view of the steering mechanism of the present invention.

DETAILED DESCRIPTION

25 Before describing the present invention in detail, it is to be understood that the phraseologies and terminologies used herein are for description and should not be regarded as limiting.

Referring now to the different views of the drawings, wherein like reference numerals
30 designate the components or elements throughout the ensuing enabling description, there is shown the present invention for AN AMPHIBIOUS WHEELED VEHICLE designated as 10.

Referring now to FIGS. 1 to 6, the amphibious wheeled vehicle 10 comprises a vehicle body 11 which includes opposed sidewalls 12 provided with doors 13 with corresponding windows 13a, a rear wall 14, a front wall 15 a wind shield 16, and a roof portion 17. The front wall 15 extends from the windshield 16 by an extended front portion 15a and the windshield extends between the extended front portion 15a and the roof portion 17. Preferably, the roof portion 17 extends from the sidewalls 12, rear wall 14 and front wall 15 to form a substantially smoothly curved unitary body having the advantage of maneuverability and ease of operation and maintenance. The vehicle body 11 further includes a multi and compartmentalized hull 18 which is provided at the bottom portion thereof and serves as the vehicles' main flooring and at the same time as a floating mechanism through a propeller or jet propulsion (water jet drive assembly) provided thereon when the amphibious wheeled vehicle 10 of the present invention is converted from a land vehicle function to an amphibian vehicle function. More specifically, a flooring 18a is provided on top of the compartmentalized hull 18 to support the driver and passenger seats "S" inside the amphibious wheeled vehicle 10. The vehicle body 11 further includes a single central front wheel 19 and a pair of rear drive wheels 20 and 21 provided and rotatably secured at the rear portion of the compartmentalized hull 18.

Referring now to FIGS. 7 to 12, there is shown the multi and compartmentalized hull 18 which is secured to the bottom portion of the vehicle body 11. In accordance with the present invention, the compartmentalized hull 18 includes a hull body 22 having a bottom wall 23, opposed side portions 24 extending to curved side portions 24a having a taller dimension than the side portions 24 and terminating to a smooth curved front portion 25 upwardly extending from the bottom wall 23. A front wheel housing 26 is provided and disposed on the bottom wall 23 and adjacent the front portion 25. Front wheel housing 27 and 28 are provided and disposed at the rearward portion of the bottom wall 23, and a rear portion 29 is provided on the bottom wall 23 and extends between the pair of opposed rear wheel housing 27 and 28. The front wheel housing 26 is adapted to rotatably secure the front wheel 19 thereon and the pair of opposed rear wheel housing 27 and 28 are adapted to rotatably secure the corresponding pair of rear drive wheels 20 and 21 thereon. The pair of rear drive wheels 20 and 21 are also rotatably interconnected by a differential axle. The compartmentalized hull 18 further includes a

plurality of adjacent compartments 30 provided within the hull body 22 which are defined by compartment walls 30a. With the provision of the adjacent compartments 30, wave energy that passes in between the adjacent compartments 30 creates turbulence effects to lift the entire hull 18 and cause great hydroplaning force, and since it has a multiple lifting surface (*through the adjacent compartments 30*) in contact with water, buoyancy and its maneuvering capability is vast in spite of the small size of the hull 18. The compartmentalized hull 18 further includes a keel 31 provided on the outer surface thereof. More particularly, the keel 31 is provided substantially along the central longitudinal section of the bottom wall 23. Preferably, the keel 31 is an elongated triangular strut which extends in a tapering manner from an area proximate the rear portion 29 up to proximate the front wheel housing 26 as shown in FIGS. 8 and 10.

Referring now to FIGS. 13, 13a and 14, and in relation with FIG. 3, an engine "E" is provided at the rear inner portion of the vehicle body 11 and is supported on the flooring 18a thereof. A transmission means "T" is also provided at the inner portion of said vehicle body and operably configured with the engine "E". Any type of engine "E" adapted to operate with a manual or automatic transmission means may be used for the amphibious wheeled vehicle 10 of present invention. More particularly, "a manual 5-speed gear type transmission with reverse" or "an automatic 5-speed gear type transmission with reverse" may be used for the purpose of the present invention. To inter-shift the engine drive to the propeller drive or a propeller drive to an engine drive for a flood or dry land function, a transfer means 32 is provided at the rearward inner portion of the vehicle body 11 and is operably connected to the transmission means "T". The transfer means 32, more specifically, includes a transfer switch 33 having adjustable settings "W" and is operably connected and engageably connected to the hull 18 and is operably connected and engageably connected to the transmission means "T" by a main drive shaft 34. The transfer means 32 further includes a differential gear box 35 operably connected to the transfer switch 33 and to the pair of rear drive wheels 20 and 21 by a differential shaft 36, and a propeller shaft 37 connected to the transfer switch 33 and a propeller "P", through receiving portion "R". In another embodiment as shown in FIG. 13A, a water jet drive assembly "J" may also be used in lieu of the propeller "P". The transfer means 32 further includes a means to actuate and operate the transfer switch 33, which preferably includes a plurality of levers 38 and corresponding

conventional cables (not shown) connected to the transfer means 32. The levers 38 are supported on the steering mechanism 39 which is provided and disposed in front of the driver's seat "S" in order to facilitate the navigation of the amphibious wheeled vehicle 10 of the present invention. The levers 38 are operationally connected to the transfer switch 33 by means of cable shifters. The steering mechanism 39 includes a base 39a, a steering rod 39b directly connected to the front wheel 19 and handle bars 39c to facilitate navigation the amphibious wheeled vehicle 10 in both land and water. Preferably, the levers 38 which are specifically supported on the base 39a are of the shift lever-type in order to facilitate gear shifting in case a manual engine is used, or for the transfer of motion for the rear drive wheels 20 and 21 through the differential shaft 36 or the transfer of motion for propeller "P" through the propeller shaft 37, or for directional purposes using the transmission means "T" (*forward direction, neutral and reverse direction, etc.*). The transfer switch 33 is provided and adapted to inter-shift the engine drive to the propeller drive and propeller drive to the engine drive by controlling the motion of the rear drive wheels 20 and 21 through the differential shaft 36 and the propeller "P" through the propeller shaft 37. The transfer switch 33 is provided with knobs "W" for adjustment purposes, more particularly, adjustment knobs 33a for land and adjustment knobs 33b for water.

As further shown in FIG. 9, the amphibious wheeled vehicle 10 includes a passive secondary cooling means 40 provided inside a chamber at lower right portion of the hull body 22 for the purpose of cooling the engine "E" when the vehicle body 11 is submerged in water. When the amphibious wheeled vehicle 10 is on water or flood, water will pass thru the chamber and cool the engine via the radiator or copper or aluminum coils or cooling fins provided therein. Preferably, the passive secondary cooling means is a heat exchanger 4

In operation, the amphibious wheeled vehicle 10 is easily operated as a small land vehicle to carry passengers. In case of strong rains and typhoons, amphibious wheeled vehicle 10 can be easily converted to function as an amphibian vehicle (water function mode) by simply deactivating the main drive shaft 34 and activating the propeller shaft to and consequently put the propeller assembly "P" or jet drive assembly "J" in motion. This easily attained through the levers 38 which are directly and functionally connected to the transfer switch 33 by means of cable shifters. When the amphibious wheeled

vehicle **10** is used as an amphibian vehicle, the steering mechanism **39** is also used to direct the movement and motion of the vehicle in the same manner as when the vehicle is used in the land function mode.

5 Additional advantages and modifications of the present invention will readily occur to those skilled in the art in view of these teachings. The present invention in its broader aspects is not limited to the specific details, representative contrivances, and illustrative examples shown and described herein. Accordingly, various modifications may be made without departing from the spirit and scope of the general concept as defined in the
10 appended claims and their equivalents.

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CLAIMS:

1. An amphibious wheeled vehicle comprising:
a vehicle body being provided with an engine at the inner portion thereof;
a transmission means being provided at the inner portion of said vehicle body and
5 operably configured with said engine;
a compartmentalized hull secured to the bottom portion of said vehicle body, said hull
being provided with a keel on the outer surface thereof;
a transfer means being operably connected to said transmission means;
a propeller being provided at the rear portion of said hull and operably connected to
10 said transfer means;
a front wheel and pair of rear drive wheels being provided on said hull and being
connected to said transfer means; and
a steering mechanism being operably connected to said propeller and said front
wheel.
- 15
2. An amphibious vehicle according to claim 1, wherein said multi and
compartmentalized hull includes a hull body having a bottom wall, opposed side
portions and a front portion upwardly extending from said bottom wall, a front wheel
housing disposed centrally at the forward portion of said bottom wall, a pair of opposed
20 rear wheel housing disposed at the rearward portion of said bottom wall, a rear portion
extending between said pair of opposed rear wheel housing, and a plurality of adjacent
compartments being provided within said hull body.
3. An amphibious vehicle according to claims 1 or 2, wherein said transfer means
25 includes a transfer switch being provided at the rearward portion of said hull and
connected to said transmission means, a differential gear box being operably connected
to said transfer switch and said pair of rear drive wheels, a propeller shaft being
connected to said transfer switch and said propeller, and a means to actuate said transfer
switch, said transfer switch being adapted to inter-shift the engine drive to the propeller
30 drive by controlling the motion of said rear wheels and said propeller.
4. An amphibious vehicle according to claim 1, wherein said means to actuate said
transfer switch includes a plurality of levers and corresponding cables being
interconnected to said transfer switch.

5. An amphibious vehicle according to claim 1, wherein said transmission means is a manual 5-speed gear type transmission with reverse.

5 6. An amphibious vehicle according to claim 1, wherein said transmission means is an automatic 5-speed gear type transmission with reverse.

7. An amphibious vehicle according to claim 3, wherein said vehicle body includes sidewalls provided with doors, a rear wall, an extended front wall and a wind shield
10 extending to a roof portion.

8. An amphibious wheeled vehicle according to claims 3, wherein said keel is provided substantially along the central longitudinal section of said bottom wall.

15 9. An amphibious wheeled vehicle according to claim 8, wherein said keel is an elongated strut.

10. An amphibious wheeled vehicle according to claim 1, wherein a passive secondary cooling means is provided inside said hull to cool the engine when said
20 vehicle body is submerged in water.

11. An amphibious wheeled vehicle according to claim 10, wherein said passive secondary cooling means is a heat exchanger.

25 12. An amphibious wheeled vehicle according to claim 10, wherein propeller is a water jet drive assembly.

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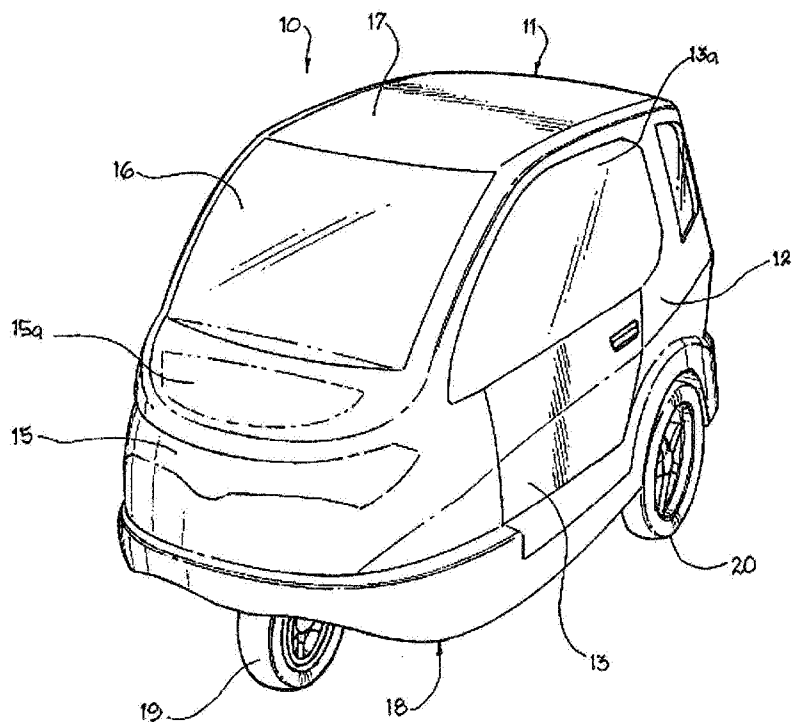


FIG. 1

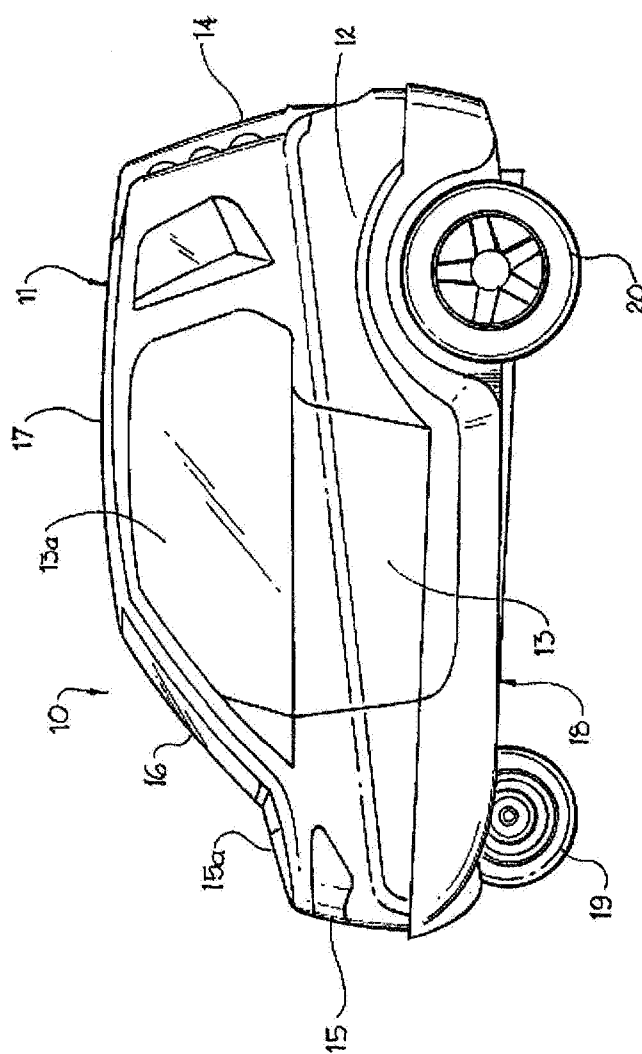


FIG. 2

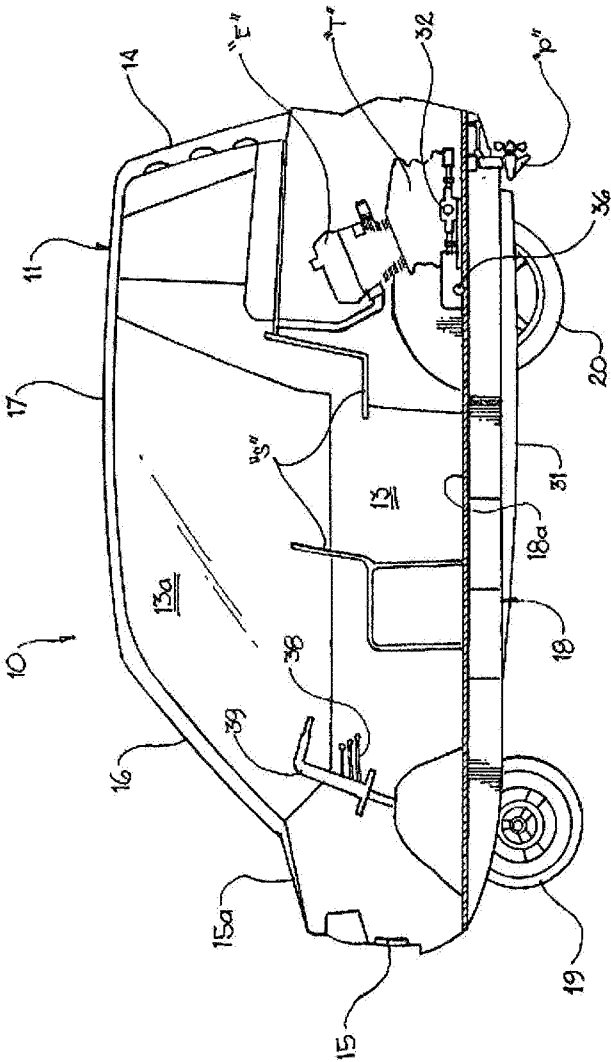


FIG. 3

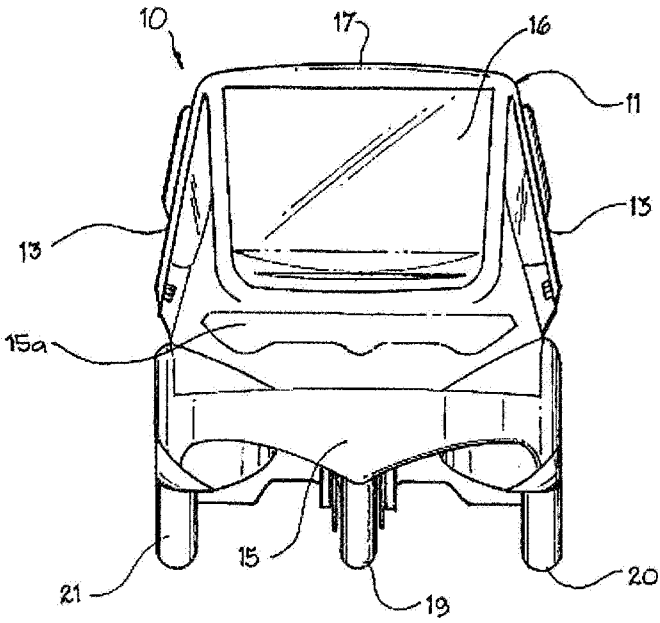


FIG. 4

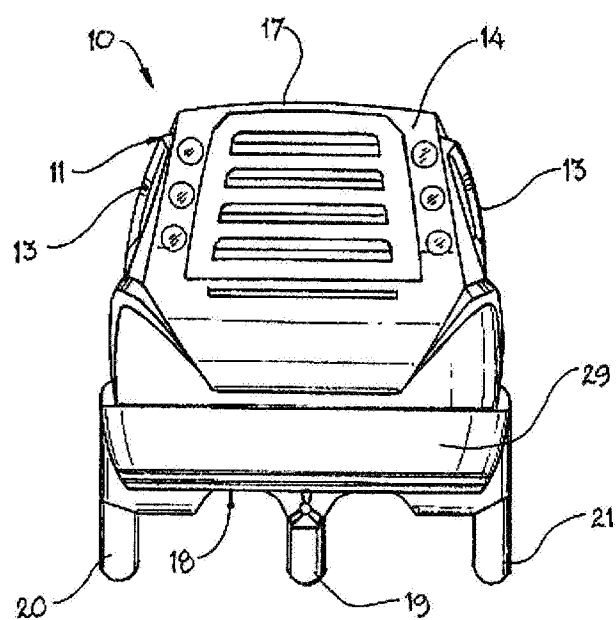


FIG. 5

6 / 15

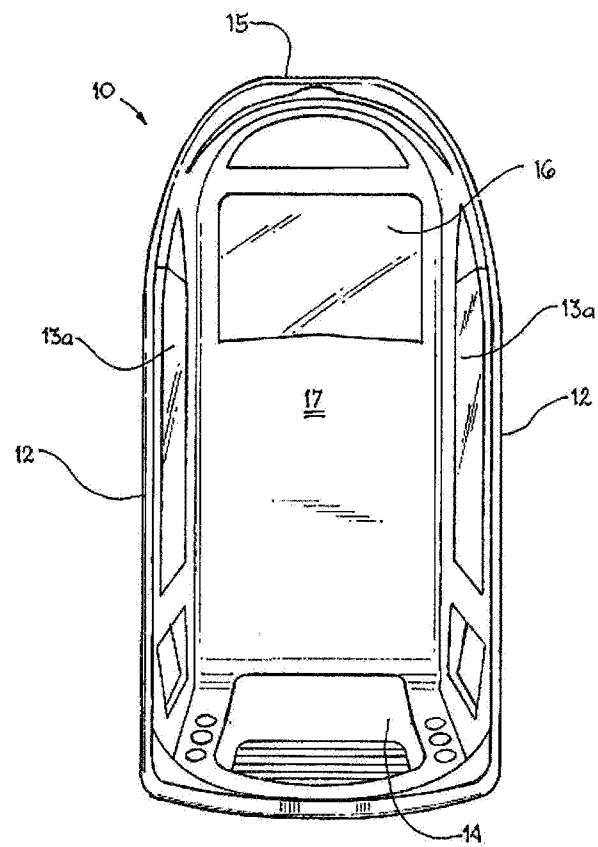


FIG. 6

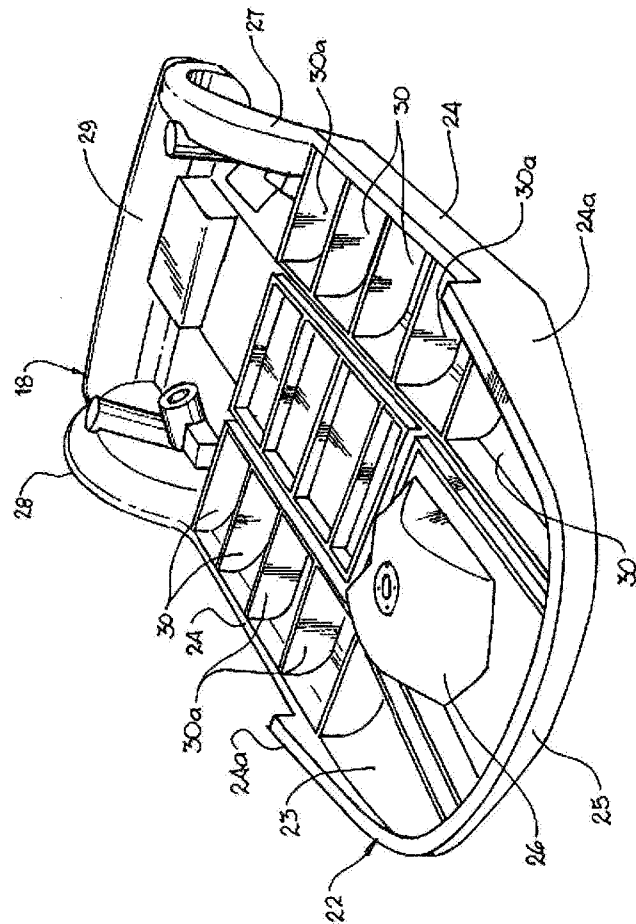


FIG. 7

8 / 15

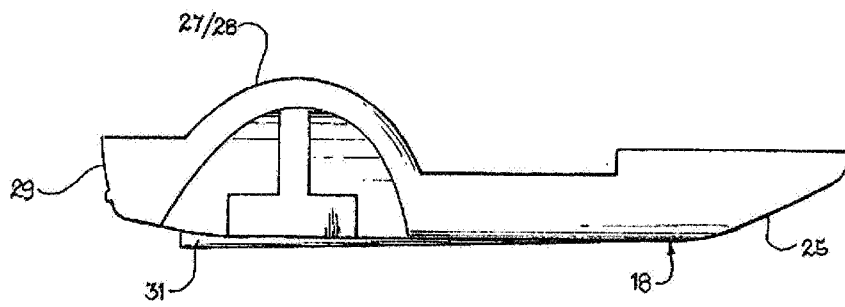


FIG. 8

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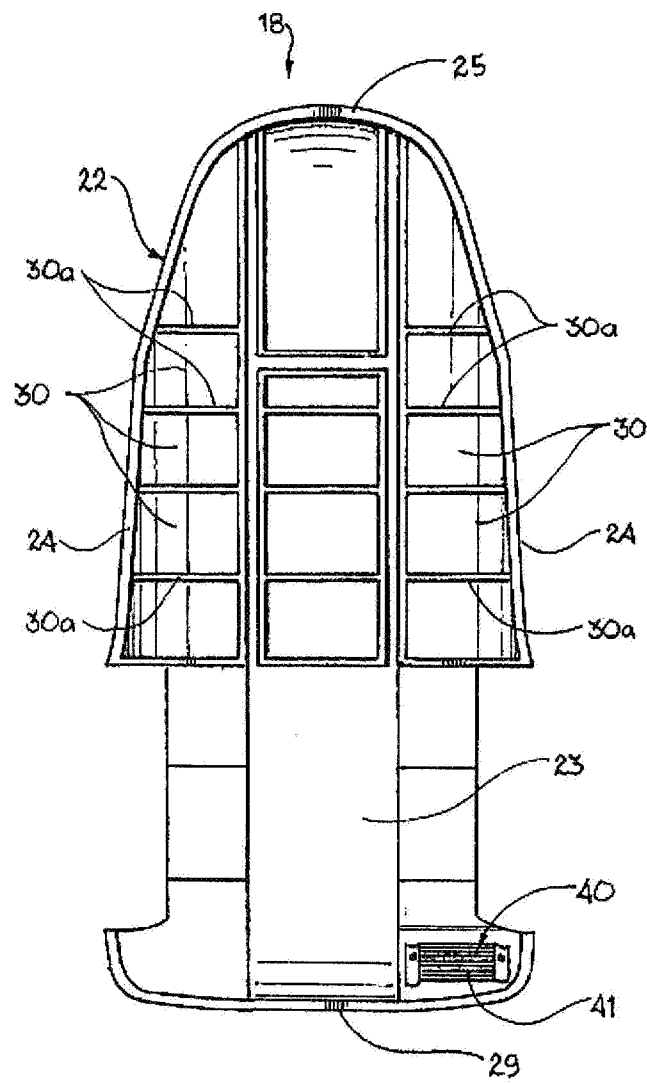


FIG. 9

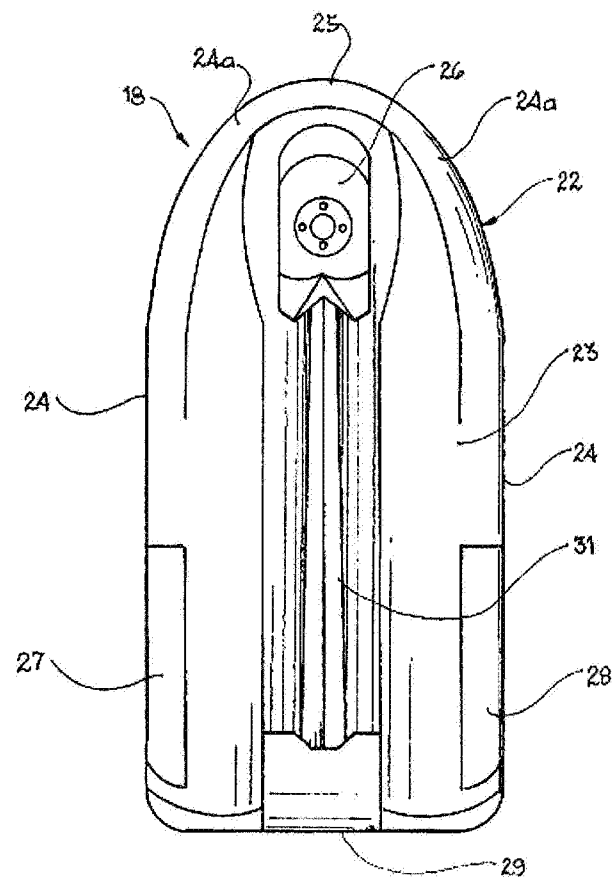


FIG. 10

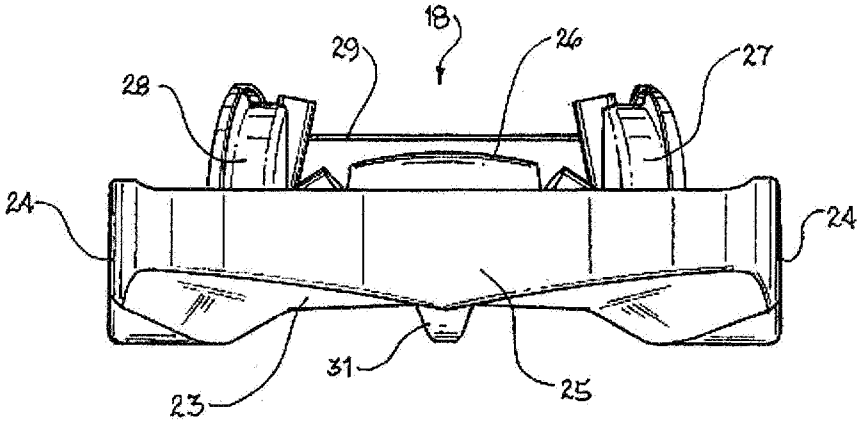


FIG. 11

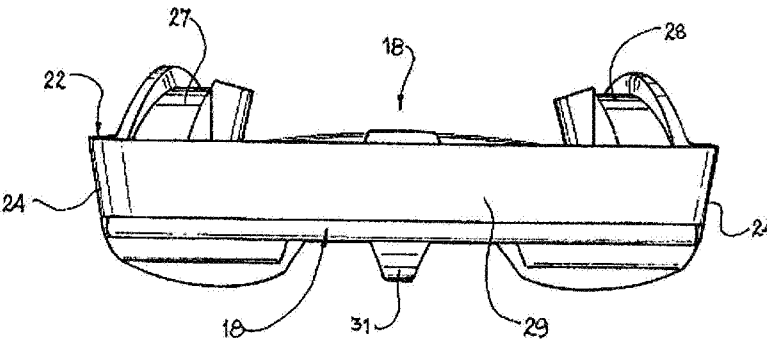


FIG. 12

13 / 15

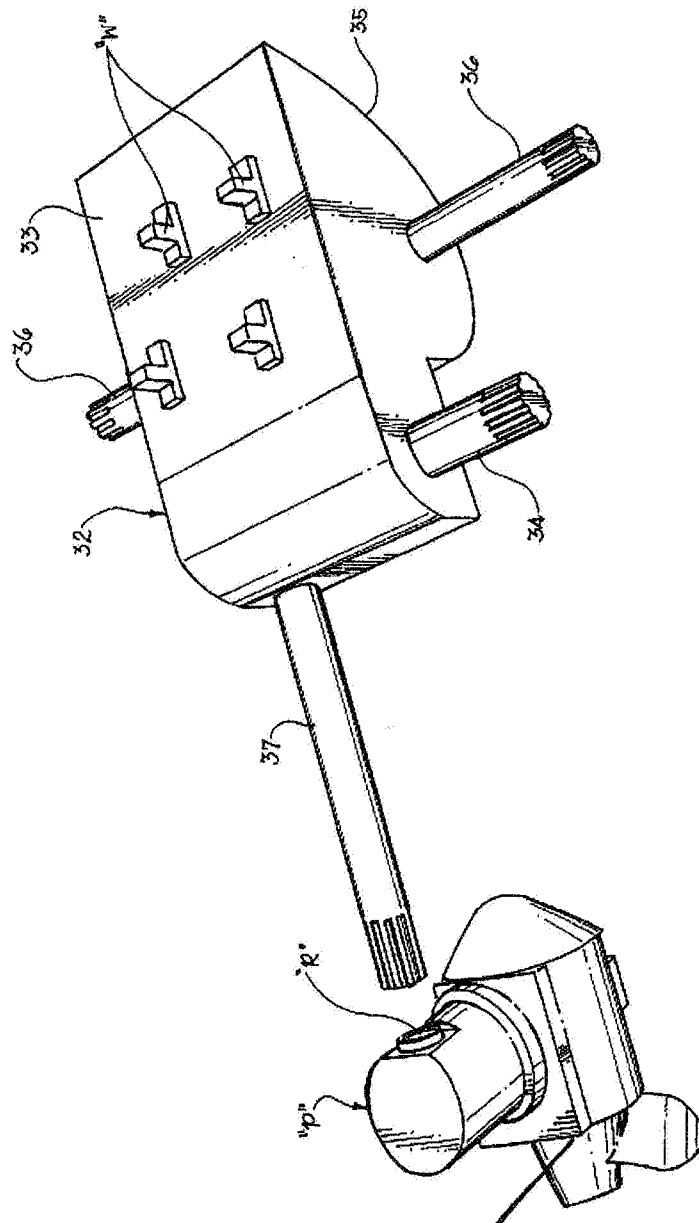


FIG. 13

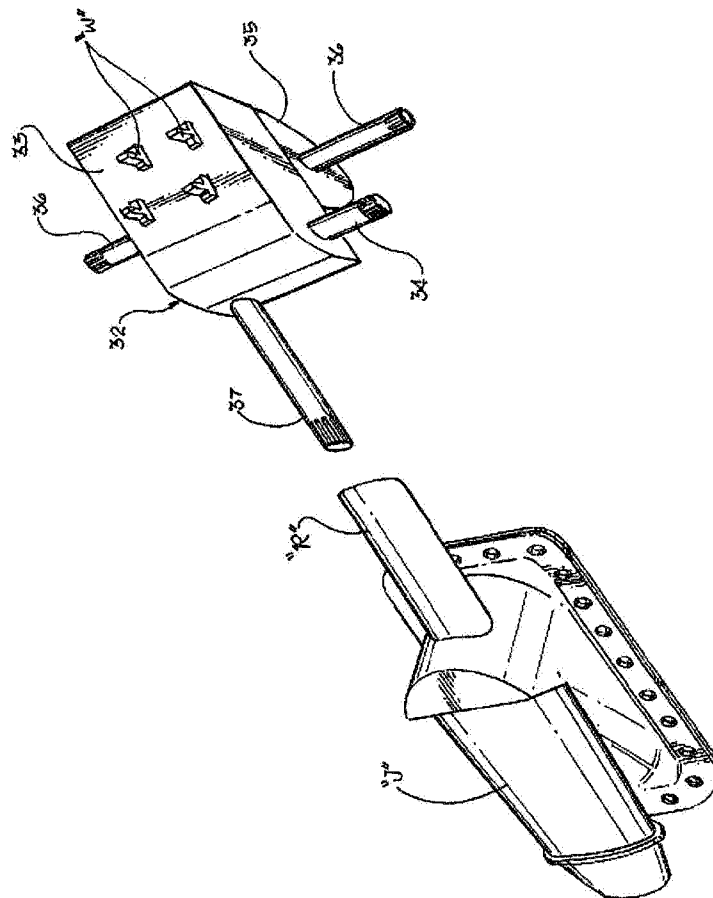


FIG. 13A

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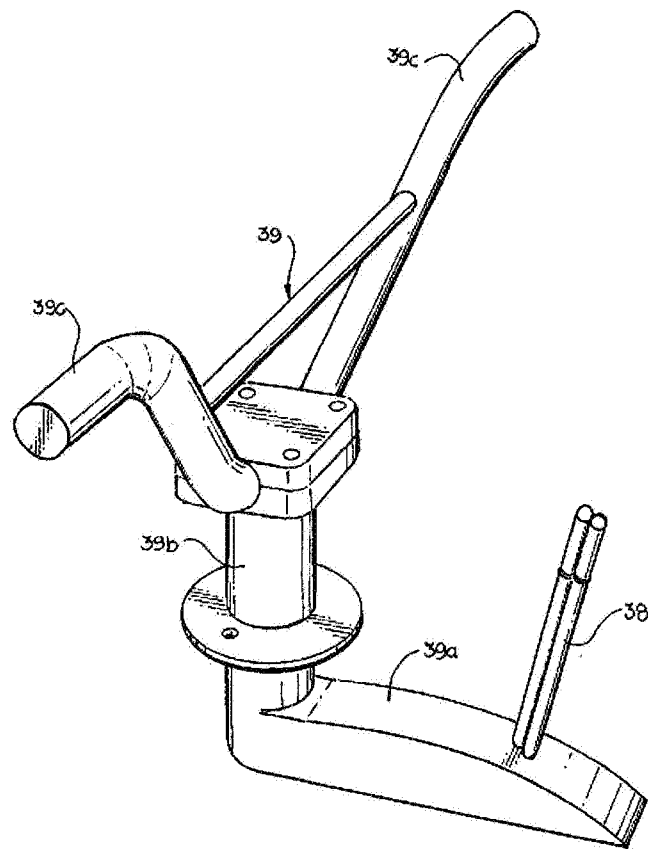


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No

PCT/PH2017/000002

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B60F3/00 B63B11/00
 ADD.

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)
 B60F B63B

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)

EPO-Internal

C. 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	column 2, line 57 - column 3, line 8 -----	9-11
Y	GB 2 420 318 A (EYLES RODNEY [GB]) 24 May 2006 (2006-05-24)	1-8,12
A	abstract; figures -----	9-11
A	US 6 808 430 B1 (MARCH J DAVID [US]) 26 October 2004 (2004-10-26) column 4, line 57 - line 67; figures 19,20,23 -----	1,10,11
A	US 7 934 963 B1 (CARAMBAT DAVID [US]) 3 May 2011 (2011-05-03) column 4, line 4 - line 25 ----- -/-	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"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

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Date of the actual completion of the international search

29 June 2017

Date of mailing of the international search report

07/07/2017

Name and mailing address of the ISA/

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 Fax: (+31-70) 340-3016

Authorized officer

Cauderlier, Frédéric

INTERNATIONAL SEARCH REPORT

International application No
PCT/PH2017/000002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/043775 A1 (GIBBS TECH LTD [GB]; JENKINS NEIL GRAHAM [GB]) 27 May 2004 (2004-05-27) abstract; figures -----	1
A	US 6 482 052 B1 (GILJAM JOHN J [US]) 19 November 2002 (2002-11-19) column 5, line 20 - line 51 -----	1
A	WO 2015/133914 A1 (ARMADA LAMBERTO [PH]) 11 September 2015 (2015-09-11) the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/PH2017/000002

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