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MINISTRY OF COMMERCE & INDUSTRY

पेटेंट कार्यालय

THE PATENT OFFICE

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TO WHOMSOEVER IT MAY CONCERN

अधोहस्ताक्षरी जो पेटेंट अधिनियम, 1970 की धारा 73(3) के तहत महानियंत्रक एकस्व, वाणिज्य एवं व्यापार चिह्न की ओर से प्रमाणपत्र हस्ताक्षर व जारी करने के लिए प्राधिकृत अधिकारी हूँ, यह प्रमाणित करता/ती हूँ कि निम्नलिखित पेटेंट आवेदन के संबंध में फाइल दस्तावेज़(जों) की प्रतिलिपि इसके साथ संलग्न है:

I, the undersigned, being an officer duly authorized to sign and issue the certificate on behalf of the Controller General of Patents, Designs and Trademarks in accordance with the provisions of Section 73(3) of the Patents Act, 1970, hereby certify that annexed hereto is a true and correct copy of the document(s) as filed in connection with the following Patent Application:

पेटेंट आवेदन संख्या/a) Application Number: 202041030743

फाइल करने की तारीख/b) Date of Filing: 18/07/2020

प्रामाणिक दस्तावेज़(जों) का नाम:

Name of the document(s) requested: Complete Specification

प्रमाणित पेटेंट अधिनियम, 1970 की धारा 147(1) के अधीन मुझमें निहित शक्तियों के तहत जारी किया गया है। This certificate is issued under the powers vested in me U/S 147(1) of The Patents Act, 1970.

16th day of June 2021

नियंत्रक पेटेंट व डिजाइन/Controller of Patents and Designs
(प्राधिकृत हस्ताक्षरी/Authorised Signatory)

FORM 1 THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 APPLICATION FOR GRANT OF PATENT (See section 7, 54 and 135 and sub-rule (1) of rule 20)				(FOR OFFICE USE ONLY)	
				Application No.	
				Filing date:	
				Amount of Fee paid:	
				CBR No:	
				Signature:	
1. APPLICANT'S REFERENCE/ IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)					
2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]					
Ordinary(✓)		Convention(x)		PCT-NP(x)	
Divisional ()	Patent of Addition ()	Divisional ()	Patent of Addition()	Divisional ()	Patent of Addition()
3A. APPLICANT(S)					
Name in Full		Nationality	Country of Residence	Address of the Applicant	
TVS MOTOR COMPANY LIMITED		An Indian Company incorporated under the Companies Act, 1956	India	TVS Motor Company Limited, "Chaitanya", No.12 Khader Nawaz Khan Road, Nungambakkam, Chennai 600 006	
3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]					
Natural Person (x)			Other than Natural Person		
			Small Entity (x)	Startup (x)	Others (✓)
4. INVENTOR(S) [Please tick(✓) at the appropriate category]					
Are all the inventor(s) same as the applicant(s) named above?		Yes ()		No (✓)	
If "No", furnish the details of the inventor(s)					
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RAJENDRAN MAHENDRAN	Indian	India	TVS Motor Company Limited, "Chaitanya", No.12 Khader Nawaz Khan Road, Nungambakkam, Chennai 600 006		
5. TITLE OF THE INVENTION					
FUEL SENDER UNIT ASSEMBLY OF A VEHICLE					
6. AUTHORISED REGISTERED PATENT AGENT(S): NOT APPLICABLE	IN/PA No.				
	Name				
	Mobile No.				
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name		TVS Motor Company Limited		
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	Telephone No.		044 – 28332115		
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	E-mail ID		iprtvs@tvs motor.com		
8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION: NOT APPLICABLE					
Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)
Nil	Nil	Nil	Nil	Nil	Nil
9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY(PCT): NOT APPLICABLE					
International application number			International filing date		

Nil	Nil														
10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION ORIGINAL (FIRST) APPLICATION: NOT APPLICABLE															
Original (first) application No.	Date of filing of original (first) application														
Nil	Nil														
11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT: NOT APPLICABLE															
Main application/patent No.	Date of filing of main application														
Nil	Nil														
12. DECLARATIONS															
(i) Declaration by the inventor(s) (In case the applicant is an assignee: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period). I/We, the above named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative. (a) Date: <table border="0"> <thead> <tr> <th>(b) Signature(s)</th> <th>(c) Name(s)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>NAGARAJAN CHANDRASEKAR</td> </tr> <tr> <td>2.</td> <td>RAJAMANI RAVISANKAR</td> </tr> <tr> <td>3.</td> <td>VAIDHEESWARAN RAMESH</td> </tr> <tr> <td>4.</td> <td>R DHILIP KUMAR</td> </tr> <tr> <td>5.</td> <td>KOILPILLAI CHRISTOPHER TENNISON</td> </tr> <tr> <td>6.</td> <td>RAJENDRAN MAHENDRAN</td> </tr> </tbody> </table>		(b) Signature(s)	(c) Name(s)	1.	NAGARAJAN CHANDRASEKAR	2.	RAJAMANI RAVISANKAR	3.	VAIDHEESWARAN RAMESH	4.	R DHILIP KUMAR	5.	KOILPILLAI CHRISTOPHER TENNISON	6.	RAJENDRAN MAHENDRAN
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4.	R DHILIP KUMAR														
5.	KOILPILLAI CHRISTOPHER TENNISON														
6.	RAJENDRAN MAHENDRAN														
(ii) Declaration by the applicant(s) in the convention country: N/A (In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic															

transmission duly authenticated within the prescribed period)			
I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.			
(a) Date:		(c) Name(s)	
(b) Signature(s)			
(iii) Declaration by the applicant(s) I/We the applicant(s) hereby declare(s) that: - ■ I am/We are in possession of the above-mentioned invention. ■ The provisional/complete specification relating to the invention is filed with this application. ■ ~~The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.~~ ■ There is no lawful ground of objection(s) to the grant of the Patent to me/us. ■ ~~I am/we are the true & first inventor(s).~~ ■ I am/we are the assignee or legal representative of true & first inventor(s). ■ ~~The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).~~ ■ ~~I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/We derive the title.~~ ■ My/our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9. ■ The application is divided out of my/our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section-16 of the Act. ■ The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.			
13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION			
(a) Form 2			
Item	Details	Fee	Remarks
Complete/ Provisional specification) #	No. of pages – 32		
No. of Claim(s)	No. of claims – 20 and No. of pages – 4		
Abstract	No. of pages –1		
No. of Drawing(s)	No. of drawings – 8 and No. of pages – 8		
#In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule-13(4), the number of such pages filed with the provisional specification are required to be mentioned here.			
(b) Complete specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).			
(c) Sequence listing in electronic form			

- (d) Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).
- (e) Priority document(s) or are quest to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.
- (f) Translation of priority document/Specification/International Search Report/International Preliminary Report on Patentability.
- (g) Statement and Undertaking on Form 3
- (h) Declaration of Inventorship on Form 5
- (i) Power of Authority

Total fee ₹ _____/-in Cash/Banker's Cheque/Bank Draft bearing No.....
Date.....on..... Bank.

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters slated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated: 18th July 2020

Signature: [Digitally signed]

Name: Chandan Chavan
Head IP
TVS Motor Company Limited

To,
The Controller of Patents
The Patent Office, at Chennai

FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

&

The Patents Rules, 2003

COMPLETE SPECIFICATION

(See Section 10 and Rule 13)

FUEL SENDER UNIT ASSEMBLY OF A VEHICLE

APPLICANT:TVS MOTOR COMPANY LIMITED, an Indian Company at: "Chaitanya",
No.12 Khader Nawaz Khan Road, Nungambakkam, Chennai 600 006.

The following specification particularly describes the invention and the manner in which it is to be performed.

TECHNICAL FIELD

[0001] The present subject matter described herein generally relates to a vehicle, and particularly but not exclusively relates to a fuel sender unit assembly of a vehicle.

BACKGROUND

10 [0002] A fuel tank is a part of a fuel system of a vehicle which stores fuel. The fuel is then propelled through a fuel pump into an engine of the vehicle. The fuel tank of a vehicle is either made of metal (steel or aluminum) or of plastic such as high-density polyethylene (HDPE).

15 [0003] Generally, the fuel tank of the motorcycle type saddle vehicle is mounted on a frame assembly of the vehicle, while being mostly placed ahead of a seat. As the outer part of the fuel tank is visible, it is designed, considering the style elements to give aesthetic appeal to the rider. The inner part of the fuel tank is usually shaped in a complex manner, mostly to accommodate many essential internal or surrounding parts and in accordance with the volume of the fuel it has to store. Along with it, an evaporative
20 emission control system for accommodating the fuel vapors is placed within the fuel tank inner space, disposed between a frame tube and an inner side wall of the inner part of the fuel tank.

[0004] In most of the vehicles, the fuel tank of a vehicle is designed such that the front portion of the fuel tank is broader and the rear portion of the fuel tank is narrower, when
25 viewed from front of the vehicle when a rider is in riding position. The inner portion of the fuel tank is usually shaped as an inverted U shape, with variable width in longitudinal section.

[0005] With increasing demand for addition of features to reduce vehicular emission, many systems such as fuel injection system, evaporative emission control system, fuel
30 gauge system etc. are also housed within the fuel tank and its surrounding areas. Since, systems such as, the fuel pump and the fuel gauge system are to be fitted on inner part of the fuel tank along with the evaporative emission control system; an efficient and compact design of such parts becomes essential.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The detailed description is described with reference to a saddle type two wheeled scooter along with the accompanying figures. The same numbers are used throughout the drawings to reference like features and components.

[0007] Fig. 1 illustrates a side view of a vehicle in accordance with an embodiment of the present invention.

[0008] Fig. 2 illustrates a perspective view of a fuel tank assembly mounted on a frame assembly of a vehicle in accordance with an embodiment of the present invention.

[0009] Fig. 3 illustrates an exploded sub assembly of a fuel tank assembly mounted on a frame assembly of a vehicle in accordance with an embodiment of the present invention.

[00010] Fig. 4 illustrates an exploded sub assembly of the fuel tank assembly with essential components of the fuel tank assembly in accordance with an embodiment of the present invention.

[00011] Fig. 5 illustrates a fuel sender unit assembly of a fuel tank assembly with essential components in accordance with an embodiment of the present invention.

[00012] Fig. 6 illustrates a fuel tank inner profile of the fuel tank assembly (shown in Fig 3) with essential components in accordance with an embodiment of the present invention.

[00013] Fig. 7 illustrates a perspective view of the fuel tank inner profile of the fuel tank assembly (shown in Fig 3) with essential components in accordance with an embodiment of the present invention.

[00014] Fig. 8 illustrates a perspective view of the fuel tank inner profile of the fuel tank assembly (shown in Fig 3) in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

[00015] A fuel gauge system is a measuring instrument that determines and indicates the amount of fuel present in the vehicle's fuel tank. Typically, the fuel gauge system is of analog type or digital type. Digital fuel gauge system has many advantages over the analog fuel gauge system. These advantages include giving measure of exact quantity of

5 fuel left in the tank, aiding in exterminating fuel theft cases while refueling, and in some cases also aiding in precise determination of fuel efficiency of the vehicles. Along with these advantages there are certain disadvantages associated with the digital fuel gauge systems which include relatively high cost than the analog fuel gauge systems, requirement of high maintenance, and need of a robust construction. Mainly because of
10 the high cost and maintenance factor associated with the digital fuel gauge systems, analog fuel gauge systems are more popularly used in vehicles, for example, two wheeled vehicles.

[00016] Conventionally in vehicles, an analog fuel gauge system, herein referred as a fuel gauge system, comprises of two parts, such as a fuel sending unit assembly and a fuel
15 indicator unit. The fuel sending unit assembly is placed in the fuel tank of the vehicle. The fuel indicator unit is usually placed in front of the vehicle, on a dashboard or an instrument cluster which is easily visible to a rider while riding the vehicle. The fuel sending unit assembly usually uses a float connected to a fuel sender unit by a float arm. As the level of the fuel in the fuel tank decreases, the float drops and slides a moving
20 contact along a resistor, increasing its resistance. Similarly, the float rises with increase in fuel level of the fuel tank, while decreasing its resistance. The resistance is calibrated to indicate the volume of fuel inside the fuel storage unit.

[00017] The fuel indicator unit measures and displays the amount of electric current flowing through the fuel sending unit. Thus, when the fuel tank is full, resistance values
25 decreases, current value increases and when the fuel tank is empty, resistance values increases and current value decreases. Therefore, when the fuel tank level is high and a maximum current is flowing, the fuel indicator unit indicates a full tank. The full tank on the fuel indicator unit is indicated in many vehicles with help of a needle that points towards a symbol "F" or "1" present on the fuel indicator unit. Likewise, when the fuel
30 tank is empty and a minimum current is flowing, the fuel indicator unit indicates an empty tank with help of the needle pointing towards a symbol "E" or "0" or "R" present on the fuel indicator unit. In few vehicles, a special low fuel light is present which turns on automatically to attract the attention of the rider towards the low level of the fuel.

[00018] Fuel level indication is very critical in vehicles, as it helps the rider in estimating
35 the distance that can be covered with the available fuel and avoid getting stranded.

5 Inaccurate fuel level indications can lead to wrong estimations and cause inconvenience to the rider e.g. getting stranded. Further, such inaccurate fuel level indication tends to have an overall adverse impact in the entire fuel system of the vehicle. For instance, accumulation of fuel at the bottom of the fuel tank over a period of time, which typically happens when the fuel level indication is inaccurate, causes formation of debris like material. Such a formation when drawn in while running the vehicle at low fuel levels, could negatively impact the functioning of fuel system components such as fuel pump and fuel filter. Further, this could also negatively impact the evaporative emission control device. Further, inaccurate indication of fuel level can also cause the vehicle to cease running due to empty fuel. In case of engines with fuel injection systems, which typically uses fuel pumps, such a condition of empty fuel will damage the fuel pump and fuel injector.

10 [00019] Moreover, since the fuel sender unit of the fuel gauge systems of most of the vehicles are primarily variable resistance based; in these fuel gauge systems, resistance changes with the amount of fuel in the fuel tank. In this type of fuel gauge systems, there is always a possibility of inaccurate or inconsistent indication of the fuel level measured because the fuel sending unit of these fuel gauge systems, only measure the height of the fuel level from a reference plane. This problem of inaccurate or inconsistent indication arises when the level of fuel inside the fuel tank is not settled on a particular level owing the phenomenon of frequent slosh of the fuel inside the storage area during the usage of the vehicle especially on uneven roads. Additionally, the non-linear calibration required for the height of the fuel level, to compensate for the complex inner contours of the fuel tank as well as piece to piece variation in production, undermines the accuracy of measurement as the conventional fuel gauge systems are calibrated to only measure the height of the fuel level from a reference plane.

25 [00020] Conventionally in many vehicles, the fuel gauge of the fuel tank has a float present at the top of the fuel pump, and an arm. One end of the arm is pivotally attached to the body of the gauge and the other end of the arm is disposed such that it acts as a free end of the arm which is freely movable in a predefined plane. The free end of the arm has a float pivotally attached to it. The pivot range of the float at the free end of the arm does not reach the bottom of the main chamber, making it impossible to accurately measure

5 the amount of leftover fuel in the fuel tank. Thus, the float of the fuel sender unit of conventional vehicles has limited angular movement and limited access to the lowest and highest level of the fuel volumes present in the fuel tank, which critically compromises with the accuracy of fuel estimation done by the fuel sender unit assembly.

10 [00021] This limitation is also caused because of the space constraint of the location at which the fuel sender unit assembly is usually placed, as the location determines the amount of contact of the float with the maximum and minimum volumes of the fuel present in the fuel tank. Thus, even the location of the fuel sender unit assembly of the fuel gauge system determines the accuracy of the results indicated by the indicator unit. Therefore, the fuel sender unit assembly needs to be placed at an optimum location such
15 that, it should be able to accurately measure the lowest and highest level of fuel volumes present in the fuel tank. Often, known arts end up making a tradeoff on either of the lowest or highest level or both in order to achieve a reasonable accuracy in measurement over predominant range of the capacity of the fuel tank. This implies, the readings towards the full capacity of fuel tank or towards the empty condition can be undesirably
20 poor in accuracy. Achieving a consistent measurement method throughout the range appears counterintuitive.

[00022] Also, for a given quantity of fuel, the fuel level height varies when the fuel tank is tilted. Conventional fuel gauge system neither account for the fuel tank tilt nor the vehicle tilt angle. This consequently produces wrong fuel indications when the vehicle is
25 tilted during riding. When the vehicle is tilted, all the fuel gets accumulated on one side of the tank due to gravity. As a result, the fuel level increases on the side to which, the vehicle is tilted and reduces on the opposite side. The fuel sender unit of the fuel gauge system gives output corresponding to the increased or decreased fuel level when the vehicle is tilted. The fuel indicator unit of the fuel gauge in turn estimates and indicates
30 incorrect fuel level based on the output from the fuel sending unit assembly. Due to this incorrect indication, the rider ends up with incorrect estimation of the coverable distance with the available fuel, which further causes inconvenience to the rider.

[00023] In many vehicles, the float of the sender unit is placed in the front portion or the rear portion of the inner fuel tank of the vehicle. In such vehicles, when the vehicle is in
35 motion, during acceleration, deceleration, braking, speed braking, while encountering

5 with pot holes and road bumps, undesired jerks are experienced. These jerks tend to cause erratic movement of the fuel level present in the fuel tank also termed as fuel sloshing. The fuel sloshing results in producing wrong fuel indication, as conventionally the access of the float to maximum and minimum level of fuel in the fuel tank is limited. Limited access of the float to the fuel volumes results into incorrect fuel estimation, which further
10 causes inconvenience to the rider.

[00024] Hence, there is a need for an improved design of a low cost and low maintenance fuel sender unit assembly of a fuel gauge system, overcoming all the above problems and other problems of known arts. There is a need of a non-compromised solution, which provides instantaneously accurate fuel level measurement, irrespective of the factors like
15 tilting of the vehicle, and high magnitude of the fuel sloshes when the vehicle is in dynamic condition etc.

[00025] The present subject matter has been devised in view of the above circumstances as well as solving other problems of known art.

[00026] In an embodiment of the present subject matter, the present subject matter relates
20 to a fuel sender unit assembly of a fuel tank assembly.

[00027] In an aspect of the present embodiment the fuel tank assembly is disposed such that the uppermost part of the upper surface of the fuel tank assembly is configured at a position higher than the front and the rear part of the fuel tank assembly. The fuel sender unit is mounted on a mounting profile of a fuel tank assembly, such that the float rises
25 and falls in an inclined angular direction tracing a 3-dimensional coupler curve.

[00028] In another aspect of the present embodiment the fuel sender unit assembly includes a fuel sender unit, a float arm, and a float. The float arm is an extended arm like structure which is attached to at least one end of the fuel sending unit, in a direction away
30 from of the fuel sending unit. The float arm is mounted on the fuel sending unit by means of a float arm mounting provision. The float is a small barrel shaped structure which is attached to at least one end of the float arm.

[00029] In another aspect of the present embodiment, the float arm along with the float is capable of an inclined angular rotation substantially orthogonal to the longitudinal direction of the fuel tank from a maximum to a minimum position of the float.

10 [00030] In yet another aspect of the present embodiment the range between the maximum and the minimum position of the float is such that the angle between the float arm when at maximum position to a minimum position, is an angle θ_1 .

[00031] In another aspect of the present embodiment, the placement of the fuel sending unit assembly is such that the mounting plane of the fuel sending unit makes an angle θ_2 with respect to an plane P, wherein the plane P is substantially orthogonal to the direction of gravity force G .

15 [00032] In another aspect of the present embodiment, a distance between the float upper limit position and the float lower limit position is a distance D1 when projected in a plane S which is orthogonal to the direction of gravity force G.

20 [00033] In another aspect of the present embodiment, an angular distance between the float upper limit position and the float lower limit position is a distance D2 when projected on the plane P.

[00034] In another aspect of the present embodiment, a distance between the float upper limit position and the float lower limit position is a distance D3 when projected in a plane orthogonal to the plane S and parallel to length direction L.

25 [00035] In another embodiment of the present subject matter, a fuel sender unit assembly is placed near a vapor trap unit.

[00036] In yet another embodiment of the present subject matter, a fuel sender unit assembly is placed near a fuel pump module.

30 [00037] In an efficacy of the present subject matter, the fuel sender unit assembly described in the present subject matter ensures a low cost fuel sender unit assembly.

[00038] In another efficacy of the present subject matter, the fuel sender unit assembly described in the present subject matter ensures a low maintenance fuel sender unit assembly.

5 [00039] Exemplary embodiments detailing features regarding the aforesaid and other advantages of the present subject matter will be described hereunder with reference an embodiment in a two wheeled motorcycle type saddle vehicle along with the accompanying drawings. Various aspects of different embodiments of the present invention will become discernible from the following description set out hereunder. 10 Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. It should be noted that the description and figures merely illustrate principles of the present subject matter. Various arrangements may be devised that, although not explicitly described or shown herein, encompass the principles of the present subject matter. Moreover, all statements herein reciting principles, aspects, and examples of the present subject matter, as well as specific examples thereof, are intended to encompass equivalents thereof. Further, it is to be noted that terms "upper", "down", "right", "left", "front", "forward", "rearward", "downward", "upward", "top", "bottom", "exterior", "interior" and like terms are used herein based on the illustrated state or in a standing state of the two wheeled vehicle with a driver riding thereon. Furthermore, arrows wherever provided in the top right corner of figure(s) in the drawings depicts direction with respect to the vehicle, wherein an arrow F denotes front direction, an arrow R indicates rear direction, an arrow Up denotes upward direction, an arrow Dw denotes downward direction, an arrow R denotes rear side, and an arrow F denotes front side. Also, it is to be understood that the phraseology and terminology used 25 herein is for the purpose of description and should not be regarded as limiting.

[00040] The nature and further characteristic features of the present invention will be made clearer from the following descriptions made with reference to the accompanying drawings.

30 [00041] Fig. 1 illustrates a side view of a vehicle 100 in accordance with an embodiment of the present invention. The vehicle 100 includes a frame assembly 200 (shown in Fig. 2) to support different parts of the vehicle 100. In an upper portion of the frame assembly 200 (shown in Fig. 3), a handlebar assembly 115 is rotatably integrally connected to the steering shaft (not shown). The handlebar assembly 115 is used to steer the vehicle 100 and is connected to a front wheel 185 through the steering shaft (not shown) and a front fork assembly (not shown). An upper portion of the front wheel 185 is covered by a front 35

5 fender 190 which prevents mud and water from getting deflected towards the steering shaft (not shown). Further, the front fork assembly (not labelled) is supported on the front fender 190 by means of a brace fender (not shown).

10 [00042] In a front portion of the frame assembly 200 (shown in Fig. 2) a fuel tank assembly 120 is arranged immediately behind the handlebar assembly 115 and is disposed over a first power source, for example an engine assembly 180. A seat assembly 125 is placed behind the fuel tank assembly 120. The seat assembly 125 includes a front rider seating portion and a pillion rider seating portion. The pillion rider seating portion is placed on the rear part of the frame assembly 200 (shown in Fig. 2), where the rear part of the frame assembly 200 (shown in Fig. 2) is covered by the tail cover assembly (not labelled).

15 [00043] For the safety of the rider and in conformance with the traffic rules, a headlamp assembly 105 that includes a headlamp 110 and front indicator lights 140a are provided in the front portion of the vehicle 100. On the rear portion of the two wheeled vehicle 100 a tail lamp (not labelled) and rear indicator light 140b are provided on the rear portion of the tail cover assembly (not shown). Above the tail cover assembly 130 and behind the seat assembly 125 a pillion handle 135 is provided for the pillion rider to grab.

20 [00044] Suspension systems are provided for comfortable steering of the two wheeled vehicle 100 on the road. A front suspension assembly 195 serves as rigidity component for the front portion of the vehicle 100 just like the frame assembly 200. The front suspension assembly 195 clamped to the head tube (not shown) through an upper bracket (not shown) and a lower bracket (not shown) is capable of being moved to the left and right. Further, a rear suspension system 160, which is a hydraulic damped arrangement, is connected to the frame assembly 200 (shown in Fig. 2). The rear suspension system 160 comprises of at least one rear suspension 160 preferably disposed centrally in the longitudinal mid plane of the vehicle 100. However, in a vehicle 100 with two rear suspensions, the same may be disposed on the left side and the right side respectively of the vehicle 100.

25 [00045] The first power source, for example the engine assembly 180 is mounted to a front lower portion of the frame assembly 200 (shown in Fig. 2) by means of an engine mounting bracket (not shown). The engine assembly 180 is partially covered on the lower

5 side of the engine assembly 180 by an engine cover 175. The engine assembly 180 is equipped with an exhaust system that includes an exhaust pipe (not labelled) connected to the engine assembly 180 and a muffler assembly 155 connected to the exhaust pipe. The muffler assembly 155 extends rearwards along the right side of the rear wheel 150.

10 [00046] Further, a swing arm (not shown) extending rearwards is swingably connected to a lower rear portion of the vehicle 100. The rear wheel 150 is rotatably supported at a rear end of the swing arm (not labelled). Power from the engine assembly 180 is transmitted to the rear wheel 150 through a power drive mechanism, such as a drive chain, so as to drive and rotate the rear wheel 150. A center stand 165 is provided in between the front wheel 185 and the rear wheel 150 for parking the vehicle 100.

15 [00047] A rear fender 145 for covering an upper side of the rear wheel 150 is mounted to a rear portion of the vehicle 100 to prevent mud and water splashed by the rotating rear wheel 150 from entering the muffler assembly 155, the engine assembly 180 and other parts disposed close by. To enhance the overall aesthetics of the vehicle 100 and to prevent undesired foreign particles from entering parts of the vehicle 100, a plurality of rear covers (not labelled) is attached to a rear portion of the frame assembly 200 (shown in Fig. 2).

[00048] Area below the seat assembly 125 and the fuel tank assembly 120 of the vehicle 100 is covered on both sides by a cover frame assembly 170. The cover frame assembly 170 includes the one or more side covers.

25 [00049] Fig. 2 illustrates a perspective view of a fuel tank assembly 120 mounted on a frame assembly 200 of a vehicle 100 in accordance with an embodiment of the present invention. A downward portion (120a) of the fuel tank assembly 120 is mounted on the front portion of the frame assembly 200. The rear portion (120d) of the fuel tank assembly 120 is fastened to the frame assembly 200 with help of a plurality of visible fasteners 205, herein called as fastener fuel tank rear mounting 205. The said front portion (120c) of the fuel tank assembly 120 is disposed just behind a head tube 300 (shown in Fig. 3), on a main tube 305 (shown in Fig. 3) of the frame assembly 200. The upper portion (120b) of the fuel tank assembly 120 has an opening which acts as an inlet for inserting the fuel dispenser for filling the fuel tank assembly 120 with fuel. The opening is covered by a cap herein called as a fuel cap assembly 210. The fuel cap

assembly 210 is so designed that it can be locked by a locking mechanism to avoid theft of fuel or fuel spillage when the vehicle is titled.

[00050] Fig. 3 illustrates an exploded perspective sub assembly of a fuel tank assembly 120 mounted on a frame assembly 200 of a vehicle 100 in accordance with an embodiment of the present invention. The frame assembly 200 of the vehicle 100 includes the head tube 300, the main tube 305, a pair of mid tubes 310 extending in a rear portion of the vehicle 100 as a pair of rear tubes 315. The main tube 305 extends rearwardly downward from the head tube 300. The pair of mid tubes 310 extends rearward, along a longitudinal axis of the vehicle 100, from a rear portion of the main tube 305. The pair of rear tubes 315 extends inclinedly rearward towards a rear portion of the vehicle 100 from the pair of the mid tube 310.

[00051] The fuel tank assembly 120 of the vehicle 100 is mounted on the frame assembly 200 such that said front portion 120c (shown in Fig. 2) of the fuel tank assembly 120 is mounted on the main tube 305 just behind the head tube 300 of the frame assembly 200. The said rear portion 120d (shown in Fig. 2) of the fuel tank assembly 120 is fastened to a front portion of the pair of the mid tubes 310 of the frame assembly 200 with help of a plurality of visible fasteners 205, herein called as fastener fuel tank rear mounting 205. The upper portion of the fuel tank assembly 120 has an opening covered by a fuel cap assembly 210 which acts as an inlet for inserting the fuel dispenser for filling the fuel tank assembly 120 with fuel.

[00052] Fig. 4 illustrates an exploded sub assembly of the fuel tank assembly 200 with essential components of the fuel tank assembly 120 in accordance with an embodiment of the present invention. The fuel tank assembly 120 can be broadly sub divided into an outer unit 440 herein called as, a fuel tank outer portion 440 and an inner unit 445 herein called as, a fuel inner portion 445. The fuel tank outer portion 440 covers the fuel tank inner portion 445 from outside.

[00053] The fuel tank outer profile portion 440 includes a fuel tank outer cover 410, which acts as an outer covering for the entire fuel tank assembly 120 and protects the internal systems from contaminants and damage due to external factors. The upper portion of the fuel tank outer cover 410 has a fuel cap provision 405, on which a fuel cap assembly 210

5 is attached. The fuel cap assembly 210 is fastened to the fuel cap provision 405 by means of a plurality of fasteners, herein called as a fuel cap fastener 400.

[00054] The fuel tank inner portion 445 includes a fuel tank inner 420 which further includes essential components of the fuel tank assembly 200, for example a fuel pump module 415 and a fuel sender unit assembly 425 herein called as a FSA assembly 425.
10 The fuel pump module 415 aids in supplying fuel from fuel tank to the engine assembly 180 (shown in Fig. 1) by creating a positive pressure. The fuel pump module 415 is placed downwardly towards a front portion of the fuel tank inner 420. The FSA assembly 425 aids in estimating the fuel level available in the fuel tank assembly 120. The FSA assembly 25 is disposed at an upper rear portion of the fuel tank inner 420 of the fuel tank assembly 120. The fuel tank inner 420 has a profile which in a length direction L (shown in Fig 6) forms a substantially inverted U-shaped cross section (shown in Fig 6) in the lateral mid region of the fuel tank inner 420. The rear portion of the fuel tank inner 420 comprises of a downward sloping profile in a plane P (shown in Fig 6) followed by a substantially horizontal profile in a plane S (shown in Fig 6) which is orthogonal to the gravity force G (shown in Fig 6) as well as orthogonal to the length direction L (shown in Fig 6) of the fuel tank inner 420. An FSA mounting portion 430 is disposed in said plane P. The FSA assembly 425 is mounted on the fuel tank inner 420 on a FSA mounting portion 430 of the fuel tank inner portion 445.
20

[00055] The fuel tank outer profile portion 440 is coupled to the fuel tank inner profile portion 445 by means of a suitable attachment means like welding etc. and the fuel tanks assembly 120 is attached to the frame of the vehicle with suitable attachment means e.g. plurality of fasteners at a fuel tank rear mounting 205. As per an embodiment, the fasteners are inserted on dedicated provisions herein called as a provision rear mounting 435, present on the rear end of the fuel tank inner profile portion 445.
25

[00056] Fig. 5 illustrates a fuel sender unit assembly 425 of a fuel tank assembly 120 with essential components in accordance with an embodiment of the present invention. The fuel sender unit assembly 425 of the fuel tank assembly 120 (shown in Fig 3), herein called as the FSA assembly 425, includes a fuel sender unit 500, a float arm 510, and a float 505. The fuel sender unit, herein called as the FSU 500 is mounted on a FSA
30

5 mounting portion 430. An extended arm like structure herein called as a float arm 510, is attached to at least one end of the FSU 500, extending away from the FSU 500.

10 [00057] A small barrel shaped structure herein called as a float 505 is attached to at least one end of the float arm 510 in a direction away from the FSU 500. The float arm 510 is mounted on the FSU 500 by means of a float arm mounting provision 515 having axis C orthogonal to the mounting provision 515. Further the FSU 500 is mounted on the FSA mounting portion 430. The float arm 510 along with the float 505, as per the present configuration and layout, is capable of an inclined angular rotation to trace a 3-dimensional coupler curve path. The swivel arc movement of the float arm is about axis C, and follows a 3-dimensional contour CC (shown in Fig 6 and Fig. 7) from a maximum upward position 520 to a minimum downward position 525.

15 [00058] The angle between the maximum position 520 to a minimum position 525 is a predetermined angle θ_1 . The θ_1 herein called as a 3-dimensional sweep angle θ_1 . The position of the float 505 present at a maximum position herein is called as a float upper limit position 520. The position of the float present at a minimum position herein is called as a float lower limit position 525.

20 [00059] As the level of the fuel in the fuel tank assembly 120 decreases, the float 505 moves in an inclined downward direction. As a result, the float 505 slides a moving electric contact away from the FSU 500 along a resistor (not shown) present on the float arm 510, thus increasing its resistance. Similarly, the float 505 moves in an inclined upward direction with the increase in the fuel level of the fuel tank assembly 120. As a result, the float 505 slides a moving electrical contact towards the FSU 500 along a resistor (not shown) present on the float arm 510, thus decreasing its resistance.

25 [00060] Therefore, when the fuel in the fuel tank assembly 120 is at its maximum level, the resistance decreases, and the current flow increases. When the fuel in the fuel tank assembly 120 is at its minimum level or the fuel tank assembly 120 is empty, the resistance increases and the current decreases.

30 [00061] The fuel level information is processed and indicated to the user through a fuel indicator unit (not shown) which is calibrated to display the fuel amount based on the magnitude of electric current flowing through the FSU assembly 425. Therefore, when the fuel level is high and the float 505 is at the float upper limit position 520, the fuel

indicator unit (not shown) indicates a full tank. When the fuel level is low and the float 505 is at the float lower limit position 520, the fuel indicator unit (not shown) indicates an empty tank.

[00062] In the present embodiment, the sweep angle θ_1 between the maximum position 520 and minimum position 525 of the float 505 denotes the maximum inclined angular rotation of the float 505. This configuration of the float to perform a 3-dimensional couple curve enables increasing the overall range of rotation of the float within a compact space. Thus, by increasing the range i.e. sweep angle θ_1 the sensitivity and accuracy of measurement of the float is significantly enhanced. Maximum possible sweep angle θ_1 ensures maximum possible contact of the float 505 with the upper and lower limit of the fuel in the fuel tank assembly 120. The maximum sweep angle θ_1 for the present embodiment for example, is up to 80°. The maximum access to the lowest and highest level of the fuel volumes present in the fuel tank assembly 120 within the compact vertical as well as lateral dimension of the fuel tank helps in measurement of the lowest and highest level of fuel volumes more accurately by the FSU assembly 425. In situations, particularly when the vehicle is tilted or when fuel sloshing occurs, the maximum possible sweep angle θ_1 helps in maximum surface contact of the float 505 with the fuel present in the tank. Thus the FSU assembly 425 achieves an accurate estimation of the fuel present in the fuel tank within a compact fuel tank and a compact vehicle layout.

[00063] Fig. 6 illustrates a perspective view of the fuel tank inner profile portion 445 of the fuel tank assembly 120 (shown in Fig 3) with essential components in accordance with an embodiment of the present invention. The fuel tank inner profile portion 445 includes a fuel tank inner 420 which further includes some essential components of the fuel tank assembly 120, for example a fuel pump module 415, a vapor trap unit 600, and a FSU 500. The fuel pump module 415 which is disposed downwardly laterally at a front portion of the fuel tank inner 420 at either of the left or right-side vertical walls of the inverted U-shaped profile. As per an embodiment, a vapor trap unit 600 is disposed at an upper portion of the fuel tank inner 420 on the bridge wall of the inverted U profile. The fuel sender unit assembly 425 is disposed at an upper rear portion of the fuel tank inner 420 below and rearward of the vapor trap unit 600. The FSU 500 of the fuel sender unit

5 assembly 425 is mounted on the fuel tank inner 420 on a FSA mounting portion 430 of the fuel tank inner profile portion 445 such that the FSA mounting portion is disposed in said plane P.

10 [00064] The float 505 attached to the FSA 425 by means of a float arm 510, which is capable of an inclined angular rotation from its minimum position 525 to a maximum position 520. The minimum position 525 of the float 505 is a float lower limit position 525 and the maximum position 520 of the float 505 is a float upper limit position 520. The float upper limit position 520 ensures maximum surface contact with the upper limit of the fuel present in the fuel tank assembly 120. The float lower limit position 525 ensures maximum surface contact with the lower limit of the fuel present in the fuel tank assembly 120 thereby enhancing the buoyancy forces acting on the float which thereby enhances the accuracy of measurement.

15 [00065] Fig. 7 illustrates a side view of the fuel tank inner profile portion 445 of the fuel tank assembly 120 (shown in Fig 3) with essential components in accordance with an embodiment of the present invention. The FSA assembly 425 of the vehicle 100 extends in a inclined rearwardly manner from a front side to a rear side along a central longitudinal axis Y-Y' disposed in plane P (shown in Fig 6). The FSA assembly 425 is upwardly placed on a rear portion of the sloping region of the fuel tank inner 420 just below a vapor trap unit 600 and in proximity to a fuel pump module 415. The placement of the FSA assembly 425 is such that it makes an angle θ_2 , herein called as a second angle θ_2 with respect to a horizontal axis X-X' which is disposed in said plane P (shown in Fig 6). The second angle θ_2 for example, is in range of 0° to 130°. The second angle θ_2 also enables more accurate fuel indication even when the vehicle is tilted or when vehicle 100 encounters fuel sloshing during acceleration, deceleration, braking, speed braking, encountering with pot holes and road bumps.

20 [00066] Fig. 8 illustrates a side view of the fuel tank assembly 120 (shown in Fig 3) in accordance with an embodiment of the present invention. The fuel tank inner profile portion 445 includes a float 505 of the fuel sender unit assembly (not shown). The illustrated figure in the present embodiment shows the distance covered by the float 505 from its maximum position to the minimum position in the fuel tank inner profile 445 of the fuel tank assembly 120 (shown in Fig 3).

5 [00067] The placement of the FSA assembly 425 is such that it makes a second angle θ_2 with respect to a horizontal axis X-X'. The distance between the float upper limit position 520 and the float lower limit position 525 is D1 when projected in said plane S. The distance D1 as per an embodiment is in the range of 50 mm to 150 mm. The angular distance between the float upper limit position 520 and the float lower limit position 525 is D2 when projected in plane P. The distance D2 for example, as per an embodiment is in the range of 150 mm to 200 mm. The distance between the float upper limit position 520 and the float lower limit position 525 is D3 when project in a plane orthogonal to said plane S. The distance D3 as per an embodiment is in the range of 100 to 170 mm.

10 [00068] The sweep angle θ_1 , the second angle θ_2 and the distances D1, D2 and D3 between the float upper limit position 520 and the float lower limit position 525 enables to achieve higher precision and accuracy in fuel level estimation by the fuel sender unit. As per an alternate embodiment, the sweep movement of the float may be configured to be a 2-dimensional curve to enhance the range and accuracy of fuel level measurement.

15 [00069] Many modifications and variations of the present subject matter are possible in the light of above disclosure. Therefore, within the scope of claims of the present subject matter, the present disclosure may be practiced other than as specifically described.

LIST OF REFERENCE NUMERALS

100- Vehicle	175- Engine cover
105- Head lamp assembly	180- Engine assembly
110- Head lamp	185- Front wheel
115- Handle bar assembly	190- Front fender
10 120- Fuel tank assembly	30 195- Front suspension assembly
120a: Down portion of fuel tank assembly	200- Frame assembly
120b: Upper portion of fuel tank assembly	205- Fastener fuel tank rear mounting
120c: Front portion of fuel tank assembly	210- Fuel cap assembly
120d: Rear portion of fuel tank assembly	300-Head tube
15 125- Seat assembly	35 305- Main tube
130- Tail cover assembly	310- Down tube
135- Pillion handle	315- Rear tube
140a- Front indicator light	400- Fuel cap fastener
140b- Rear Indicator light	405- Fuel cap provision
20 145- Rear fender	40 410- Fuel tank outer cover
150- Rear wheel	415- Fuel pump module
155- Muffler assembly	420- Fuel tank inner
160- Rear suspension system	425- Fuel sender unit assembly
165- Center stand	430- FSU mounting profile
25 170- Cover frame assembly	45 435- Provision rear mounting

- | | | |
|----|-----------------------------------|---------------------------------|
| 5 | 440- Fuel tank outer | 525- Float lower limit position |
| | 445- Fuel tank inner | 600- Vapor trap unit |
| | 500- Fuel sender unit | θ_1 - Sweep angle |
| | 505- Float | 15 θ_2 - Second angle |
| | 510- Float arm | D1- Horizontal distance |
| 10 | 515- Float arm mounting provision | D2- Angular distance |
| | 520- Float upper limit position | D3- Vertical distance |

I/We Claim:

1. A fuel sender unit assembly (425) of a vehicle (100) extending from a front side to a rear side along a central longitudinal axis (Y-Y'), said fuel sender unit assembly (425) comprising:

10

a fuel sender unit (500);

a float arm (510) attached to said fuel sender unit (500) to at least one end;

a float (505) attached to said float arm (510) to at least one end;

wherein,

15

said float (505) along with said float arm (510) is configured to move inclinedly with respect to said central longitudinal axis (Y-Y') of said vehicle (100) between a maximum position (520) and a minimum position (525) of said float arm (510).

2. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 2, wherein said float arm (510) sweeps between said maximum position (520) and said minimum position (525) of said float (505) to make a sweep angle (θ_1).

20

3. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said fuel sender unit (500) is mounted on a mounting portion (430), wherein said mounting portion (430) is a rearwardly downward sloping region of a fuel tank assembly (120) disposed towards an end of a inverted (U) shaped tunnel, wherein said (U) shaped tunnel is formed at the mid portion of said fuel tank inner (445) of said fuel tank assembly (120).

25

4. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said float arm (510) extends away from of said fuel sending unit (500).

5. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said float (505) is a small barrel shaped structure attached to at least one end of said float arm (510) and configured to swivel in a direction away from said fuel sending unit (500) thereby tracing one of a 2-dimensional or a 3-dimensional curve.

30

- 5 6. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said float arm (510) is mounted on said fuel sending unit (500) by means of a float arm mounting provision (515) with a swivel axis (C) formed at the mounting end region.
7. A fuel sender unit assembly (425) of a fuel tank assembly (120),
wherein,
10 said fuel tank assembly (120) comprises of an outer portion (440) and an inner portion (445); said inner portion (445) of said fuel tank assembly (120) is configured with a rearwardly downward sloping portion (430) constituting a plane P,
wherein,
said sloping portion (430) is disposed substantially along a
15 lateral mid-plane of said fuel tank assembly (120) and said sloping portion (430) so formed enables mounting of said fuel sender unit assembly (425);
wherein,
a float arm (510) of said fuel sender unit assembly
(425) is configured to trace at least one of a 2-dimensional or a 3-dimensional curve from
20 a fuel empty condition to a fuel full condition of the said fuel tank assembly (120).
8. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said fuel sending unit assembly (425) makes a second angle (θ_2) with respect to a horizontal axis (X-X'), wherein said axis (X-X') is disposed in a plane S which is substantially orthogonal to a direction of gravity force (G) and parallel to a length
25 direction (L) of said fuel tank assembly (120).
9. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein the distance between said maximum position (520) and said minimum position (525) when projected on a plane (S), is a predetermined distance (D1).
10. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 9, wherein
30 said predetermined distance (D1) is in a range of 50 mm to 150 mm.
11. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein the angular distance between said maximum position (520) and said minimum position (525), when projected in a plane P, is a predetermined distance (D2).
12. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 11, wherein
35 said predetermined distance (D2) is in range of 150 mm to 200 mm.

- 5 13. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein the vertical distance between said maximum position (520) and said minimum position (525) when projected on an imaginary plane which is substantially parallel to a direction of gravity force (G), is a predetermined distance (D3).
- 10 14. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 13, wherein said predetermined distance (D3) is in a range of 100 to 170 mm.
- 15 15. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said fuel sender unit assembly (425) is placed in close proximity of a vapor trap unit (600), and said fuel sender unit assembly (425) is disposed towards a rear side of said fuel tank assembly (120) to achieve a compact fuel tank assembly (120) layout.
- 16 16. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 11, wherein said fuel sender unit assembly (425) is placed in close proximity of a fuel pump module (415), and wherein said fuel pump module (415) is disposed on said plane (P) to achieve a compact fuel tank assembly (120) layout.
- 20 17. The fuel sender unit assembly (425) of a vehicle (100) as claimed in claim 1, wherein said fuel sender unit assembly (425) is upwardly placed on a rear portion of a sloping region a fuel tank inner (420) just below a vapor trap unit (600) and in proximity to a fuel pump module (415).
- 25 18. A vehicle (100) comprising:
a fuel tank assembly (120), said fuel tank assembly (120) is mounted on a frame assembly (200) of said vehicle (100), said fuel tank assembly (120) includes a fuel tank outer portion (440); and a fuel inner profile portion (445), said fuel tank inner portion (445) includes a fuel sender unit assembly (425), said fuel sender unit assembly (425) of said vehicle (100) extends from a front side to a rear side along a central longitudinal axis (Y-Y'), said fuel sender unit assembly (425) comprising:
30 a fuel sender unit (500);
a float arm (510) attached to said fuel sender unit (500) to at least one end;
a float (505) attached to said float arm (510) to at least one end;
wherein,

ABSTRACT

FUEL SENDER UNIT ASSEMBLY OF A VEHICLE

5 The present subject matter relates to a fuel sender unit assembly (425) of a vehicle (100)
that is low cost and low maintenance, located at an optimum position, which provides
instantaneous accurate results, irrespective of tilting of the vehicle (100) or fuel sloshing
when the vehicle (100) is in motion. The fuel sender unit assembly (425) includes a fuel
sender unit (500), a float arm (510), and a float (505). The float (505) of the fuel sender
10 unit (500) is capable of an inclined angular rotation, between a maximum position (520)
to a minimum position (525) of the float (505).

< To be published with FIG. 6 >

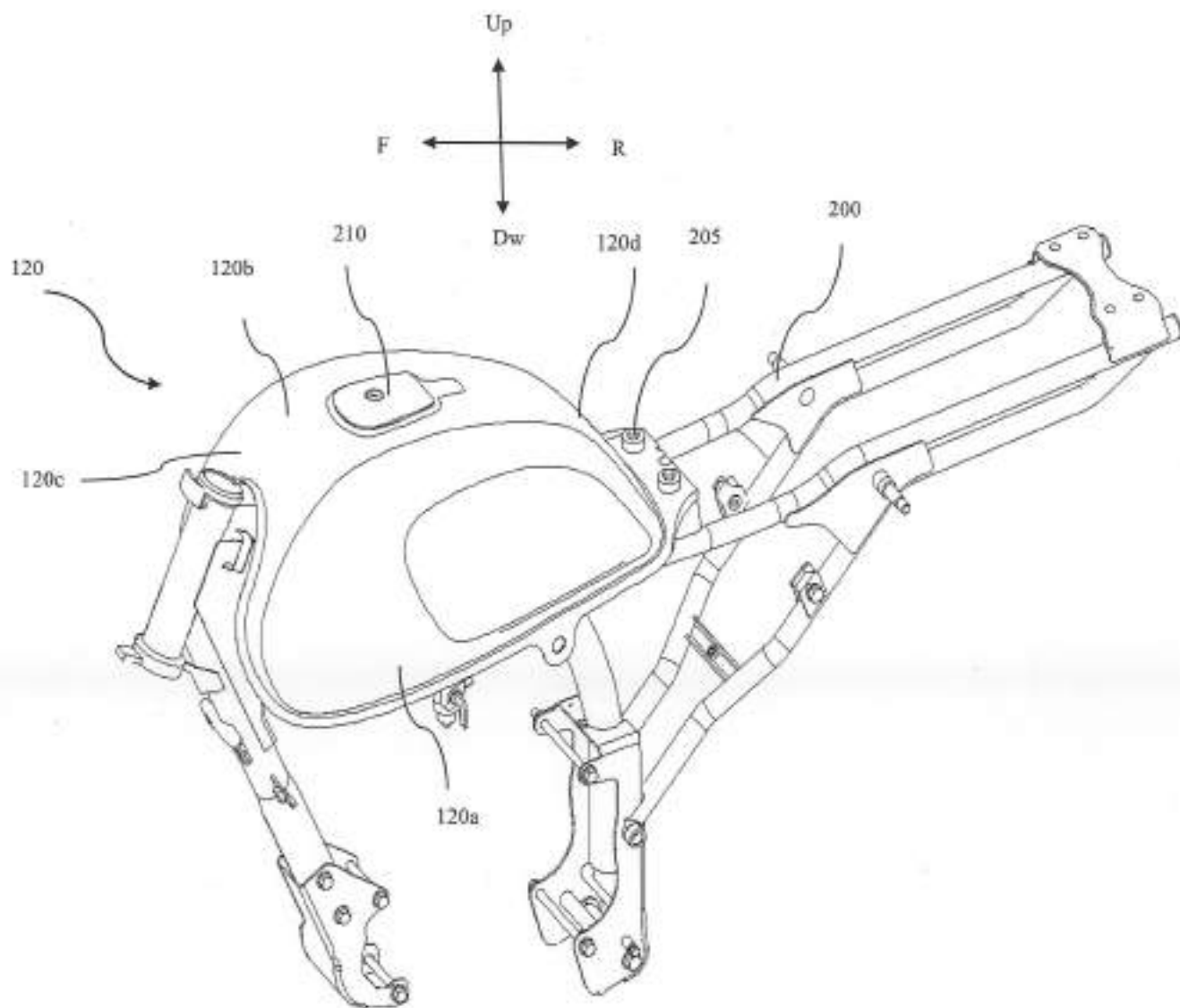


FIG 2

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Head IP
TVS Motor Company Limited

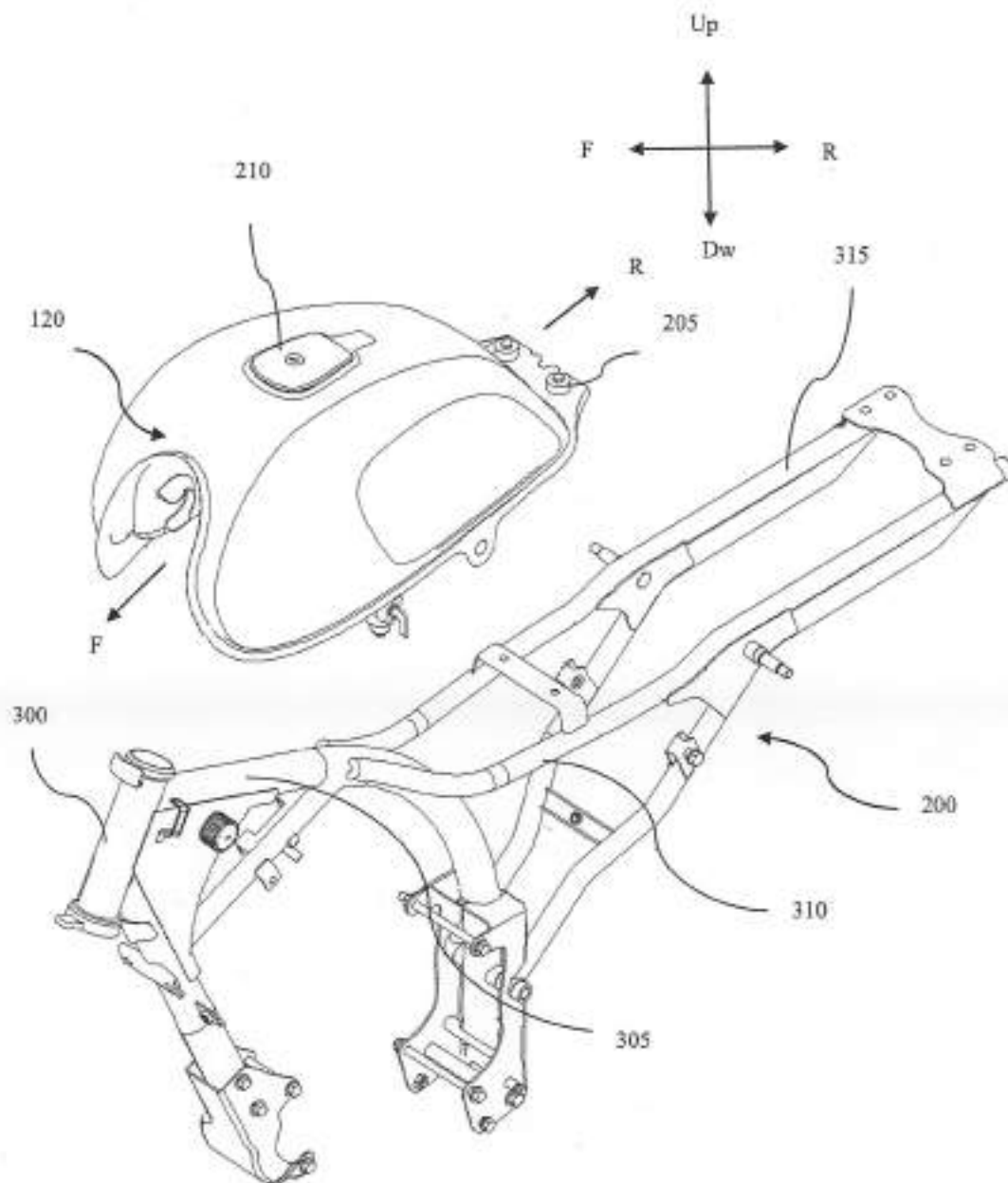
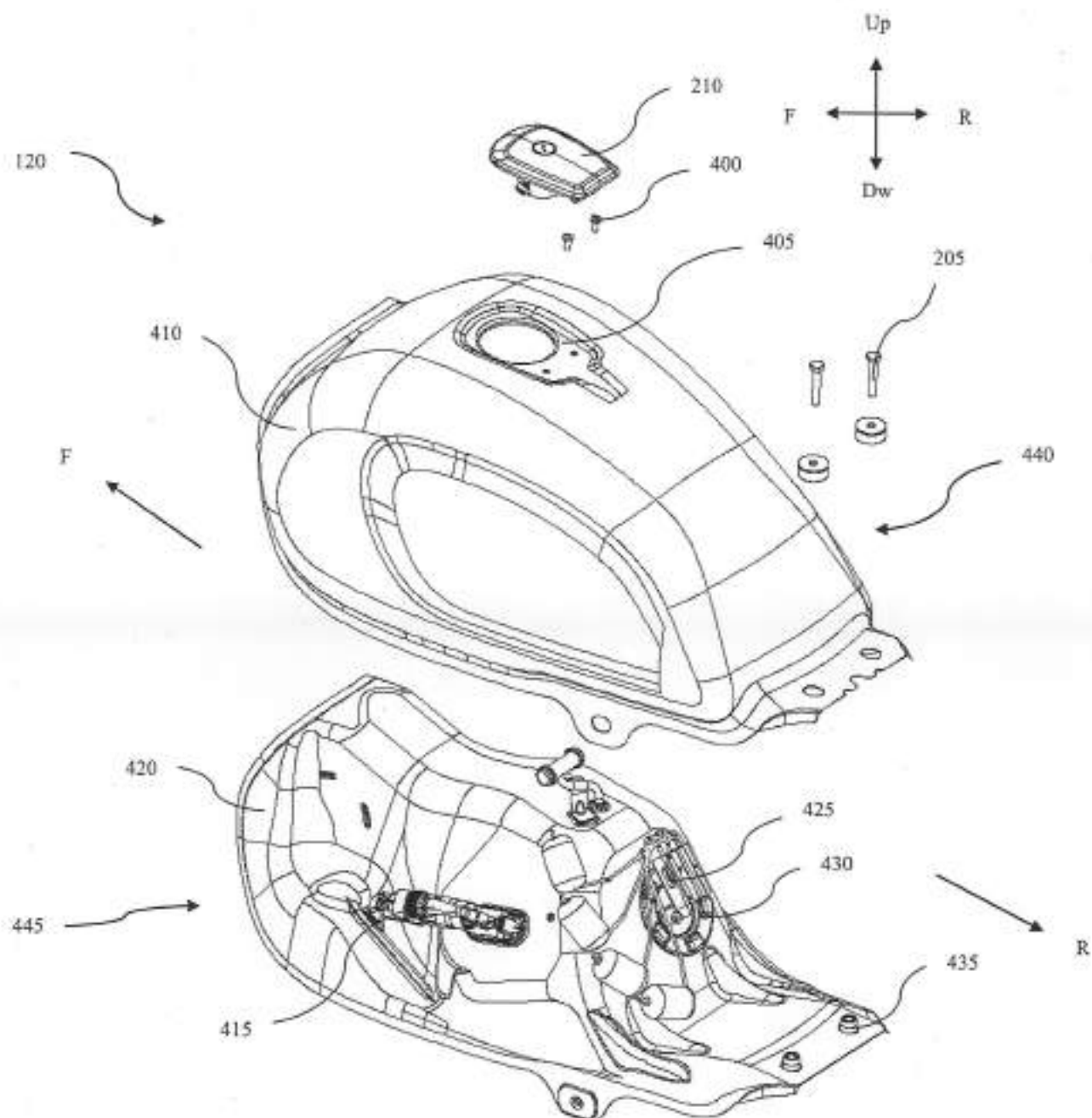


FIG 3

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TVS Motor Company Limited

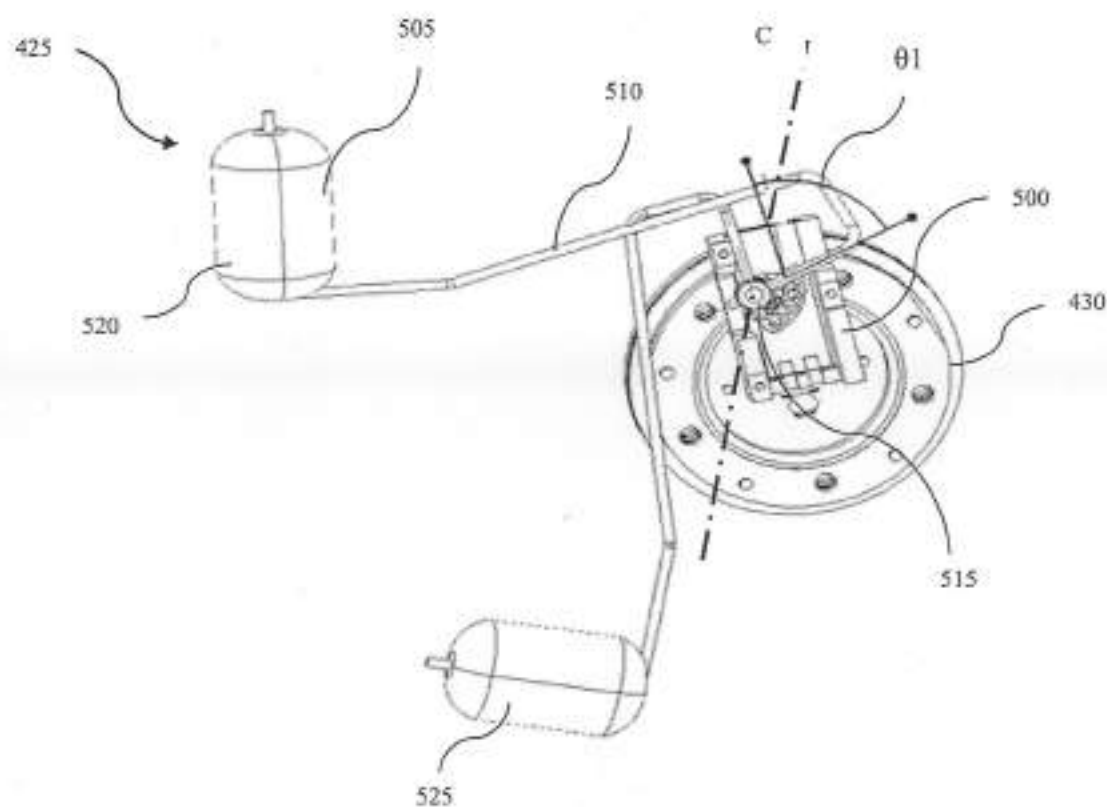


FIG 5

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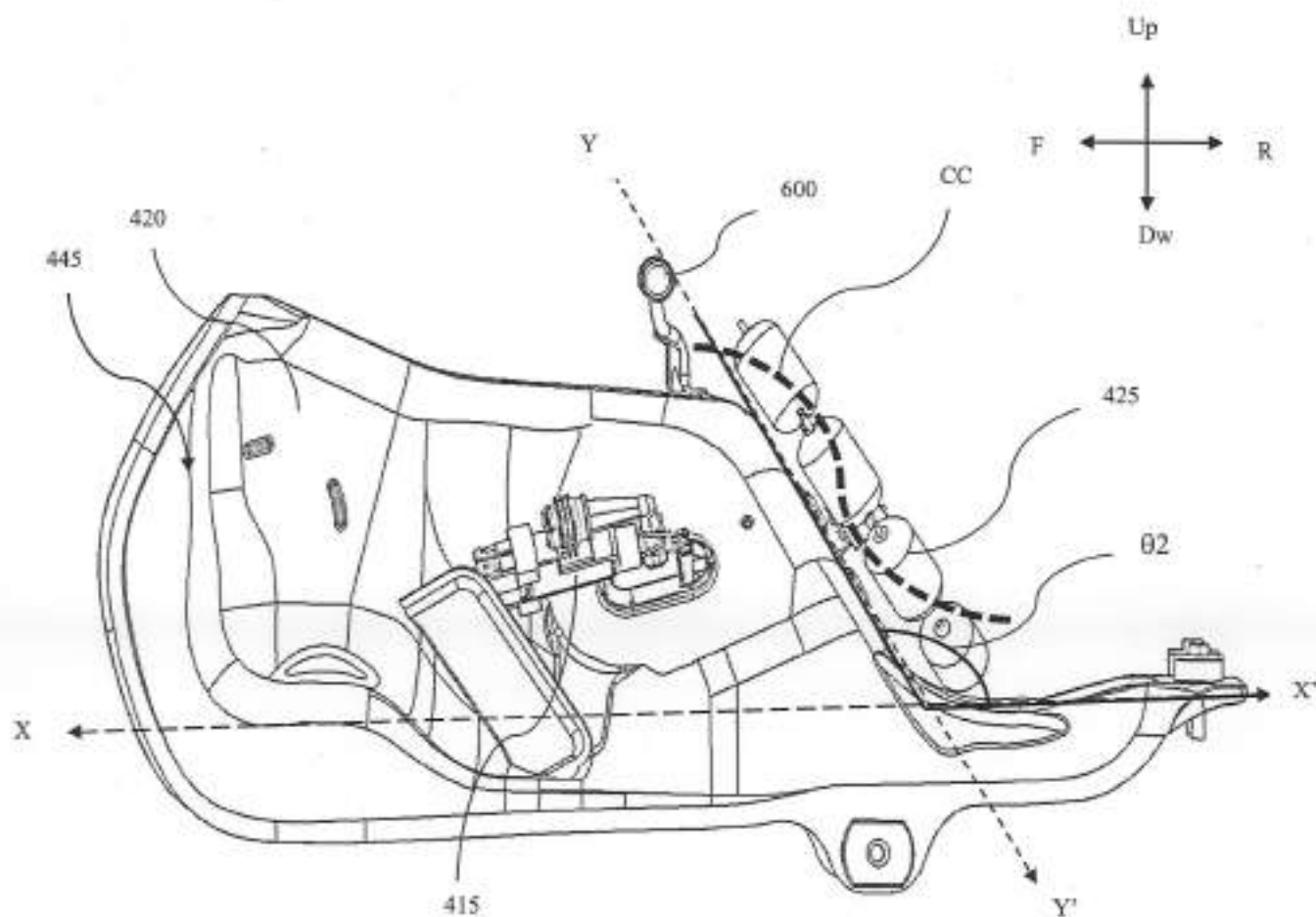


FIG 7

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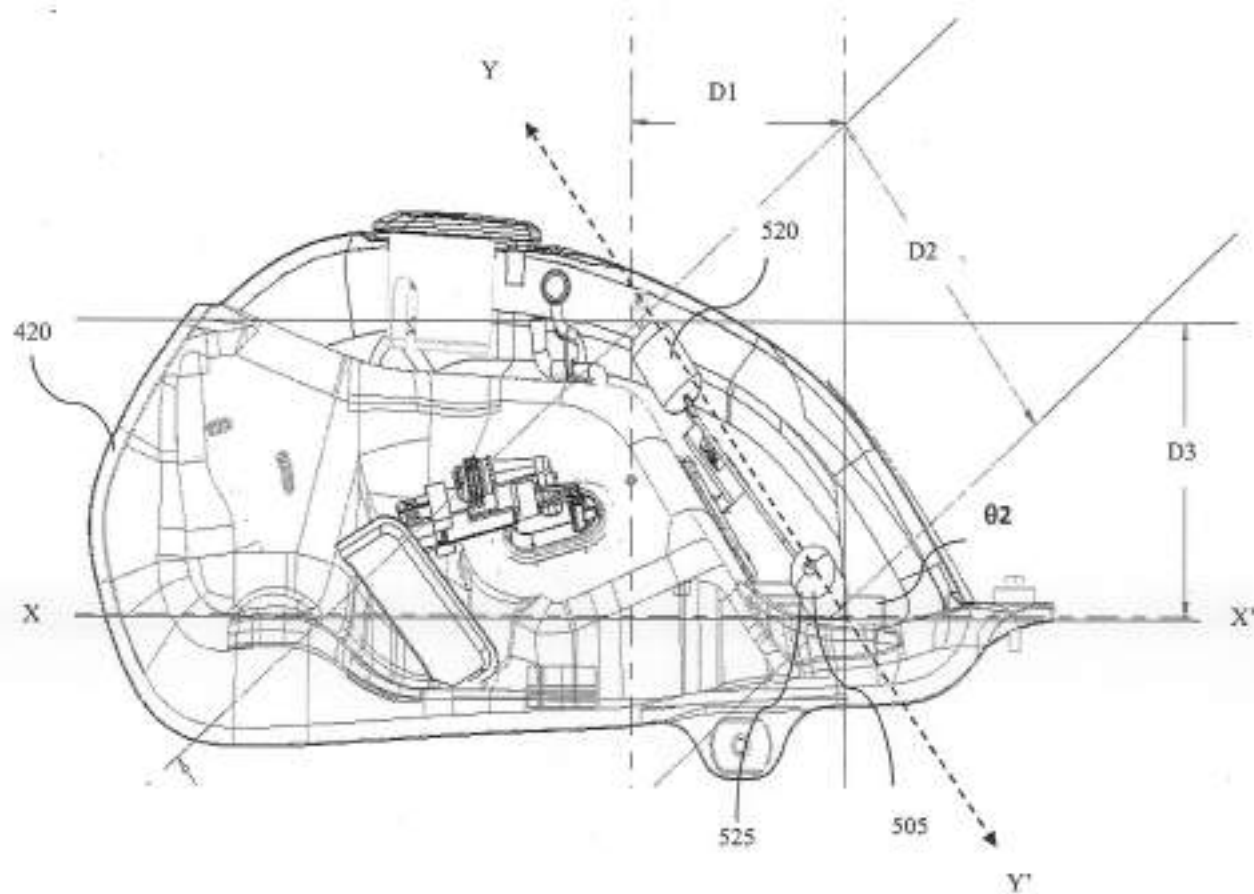


FIG 8

(Digitally signed by)
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MINISTERIO DE COMERCIO E INDUSTRIA
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A QUIEN CORRESPONDA

Yo, el abajo firmante, siendo un funcionario debidamente autorizado para firmar y emitir el certificado en nombre del Contralor General de Patentes, Diseños y Marcas de conformidad con las disposiciones del artículo 73 (3) de la Ley de Patentes de 1970, por la presente certifica que el adjunto aquí presente es una copia fiel del documento o documentos presentados en relación con la siguiente Solicitud de Patente:

Número de solicitud: 202041030743

Fecha de presentación: 18/07/2020

Nombre de los documentos solicitados: Descripción completa

Este certificado se emite bajo las facultades que me confieren U/S 147 (1) de la Ley de Patentes.

este día 16 de junio de 2021

Controlador de Patentes y Diseños
Signatario autorizado

FORMA 1 LA LEY DE PATENTES DE 1970 (39 DE 1970) y EL REGLAMENTO DE PATENTES, 2003 SOLICITUD DE CONCESIÓN DE PATENTE (Ver sección 7, 54 y 135 y la subregla (1) de las reglas 20)		(PARA USO DE OFICINA SOLAMENTE)	
		Solicitud No.	
		Fecha de Presentación:	
		Cantidad de Tasa Pagada:	
		CBR No.:	
		Firma:	
1. REFERENCIA / IDENTIFICACIÓN DEL SOLICITANTE NO. (SEGÚN LO ASIGNADO POR LA OFICINA)			
2. TIPO DE SOLICITUD [Marque (X) en la categoría correspondiente]			
Ordinaria ☒		Convención ☒	
PCT-NP ☒			
Divisional ☐	Patente de adición ☐	Divisional ☐	Patente de adición ☐
3A. SOLICITANTE (S)			
Nombre Completo	Nacionalidad	País de Residencia	Dirección del solicitante
TVS MOTOR COMPANY LIMITED	Una empresa india constituida bajo la Ley de Sociedades de 1956	India	TVS Motor Company Limited "Chaitanya" No. 12 Khader, Nawaz Khan Road, Nungambakkam, Chennai- 600 006
3B. CATEGORÍA DE SOLICITANTE [Marque (X) en la categoría correspondiente]			
Persona Natural ☒		Otra que persona natural	
		Pequeña entidad ☒	Iniciante ☒ Otro ☒
4. INVENTOR(ES) [Marque (X) en la categoría correspondiente]			
¿Son todos los inventores los mismos que los solicitantes mencionados anteriormente?		Sí ☐	No ☒
Si la respuesta es "No", proporcione los detalles del (los) inventor (es)			

Nombre completo	Nacionalidad	País de residencia	Dirección del inventor	
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R DHILIP KUMAR	India	India	TVS Motor Company Limited "Chaitanya" No. 12 Khader, Nawaz Khan Road, Nungambakkam, Chennai-600 006	
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RAJENDRAN MAHENDRAN	India	India	TVS Motor Company Limited "Chaitanya" No. 12 Khader, Nawaz Khan Road, Nungambakkam, Chennai-600 006	
5. TÍTULO DE LA INVENCION				
ENSAMBLAJE DE LA UNIDAD DE ENVÍO DE COMBUSTIBLE DE UN VEHÍCULO				
6. AGENTE (S) AUTORIZADO (S) DE PATENTES REGISTRADOS	IN/PA NO.			
	Nombre			
	No. de móvil			
7. DIRECCIÓN DE SERVICIO DEL SOLICITANTE EN LA INDIA	Nombre		TVS Motor Company Limited	

			Dirección Postal	TVS Motor Company Limited "Chaitanya" No. 12 Khader, Nawaz Khan Road, Nungambakkam, Chennai-600 006	
			No. de Teléfono	044-28332115	
			No. móvil	8870005022	
			No. Fax	044-2833213	
			e-mail	iprtvs@tvsmotor.com	
8. EN CASO DE SOLICITUD QUE RECLAME LA PRIORIDAD DE LA SOLICITUD PRESENTADA EN EL PAÍS DE LA CONVENCIÓN, DATOS DE LA SOLICITUD DE LA CONVENCIÓN					
País	Numero de solicitud	Fecha de presentación	Nombre del solicitante	Título de la invención	IPC (según la clasificación del país de la convención)
Nulo	Nulo	Nulo	Nulo	Nulo	Nulo
9. EN CASO DE SOLICITUD PCT, DATOS DE LA SOLICITUD INTERNACIONAL PRESENTADA BAJO EL TRATADO DE COOPERACIÓN DE PATENTES (PCT): NO APLICABLE					
Numero de solicitud internacional			Fecha de presentación internacional		
Nulo			Nulo		
10. EN CASO DE UNA SOLICITUD DIVISIONAL PRESENTADA BAJO LA SECCIÓN 16, DATOS DE LA SOLICITUD ORIGINAL (PRIMERA) SOLICITUD ORIGINAL (PRIMERA): NO APLICABLE					
No. de solicitud original (primera)			Fecha de presentación de solicitud original (primera)		
Nulo			Nulo		
11. EN CASO DE PATENTE ADICIONAL PRESENTADA DE CONFORMIDAD CON LA SECCIÓN 54, DATOS DE LA PRINCIPAL SOLICITUD O PATENTE: NO APLICABLE					
No. de patente/solicitud principal			Fecha de presentación de solicitud principal		
Nulo			Nulo		
12. DECLARACIONES					
(i) Declaración del inventor (es)					

(En caso de que el solicitante sea un cesionario: el inventor(es) puede firmar el presente a continuación o el solicitante puede cargar la cesión o adjuntar la cesión a esta solicitud de patente o enviar la cesión por correo postal/transmisión electrónica debidamente autenticada dentro del período prescrito).

Yo / nosotros, los inventores arriba mencionados, somos los verdaderos y primeros inventores de esta Invención y declaramos que los solicitantes en este documento son cesionarios o representantes legales.

(a) Fecha:

(b) Firma (s)

(c) Nombre (s)

- | | |
|----|---------------------------------|
| 1. | NAGARAJAN CHANDRASEKAR |
| 2. | RAJAMANI RAVISANKAR |
| 3. | VAIDHEESWARAN RAMESH |
| 4. | R DHILIP KUMAR |
| 5. | KOILPILLAI CHRISTOPHER TENNISON |
| 6. | RAJENDRAN MAHENDRAN |

(ii) Declaración del solicitante(s) en el país de convención: N/A

(En caso de que el solicitante en India es diferente al solicitante en el país de convención: el inventor en el país de convención puede firmar el presente a continuación o el solicitante en India puede cargar la cesión del solicitante en el país de convención o adjuntar dicha cesión con esta solicitud o enviar la cesión por correo postal/transmisión electrónica debidamente autenticada dentro del período prescrito).

Yo / nosotros, los solicitantes en el país de convención declaramos que el solicitante en este documento es/es mi/nuestro cesionario o representante legal

(a) Fecha:

(b) Firma (s)

(c) Nombre (s)

(iii) Declaración del solicitante (s)

Yo / nosotros, el (los) solicitante (s) por la presente declaramos que:

- Estoy / Estamos en posesión de la invención mencionada anteriormente.
- La descripción ~~provisional~~ / completa relacionada con la invención se presenta con esta solicitud.
- ~~La invención, tal como se describe en la descripción, utiliza material biológico de la India y yo o nosotros presentaremos el permiso necesario de la autoridad competente antes de otorgarnos la patente.~~
- No hay motivo legal de objeción (es) a la concesión de la Patente para mí / nosotros.
- ~~Yo soy / somos los verdaderos y primeros inventores.~~
- Yo soy / somos el cesionario o representante legal de los verdaderos y primeros inventores.

- ~~La solicitud o cada una de las solicitudes, cuyos detalles se dan en el párrafo 8, fue la primera solicitud en el país o países de la convención con respecto a mi / nuestra invención (es).~~
- ~~Reclamo / reclamamos la prioridad de las solicitudes mencionadas anteriormente presentadas en el país / países de la convención y declaramos que no se ha presentado ninguna solicitud de protección con respecto a la invención en un país de la convención antes de esa fecha por mí / nosotros o por cualquier persona de donde yo / nosotros derivamos el título.~~
- ~~Mi / nuestra solicitud en la India se basa en una solicitud internacional en virtud del Tratado de Cooperación en materia de Patentes (PCT), como se menciona en el párrafo 9.~~
- ~~La solicitud está separada de mi / nuestra solicitud, cuyos detalles se dan en el Párrafo 10 y además, esta solicitud puede ser tratada como si se considerara presentada el DD / MM / YYY bajo la sección 16 de la Ley.~~
- ~~Dicha invención es una mejora o modificación de los detalles de la invención que se dan en el párrafo 11.~~

13. LOS SIGUIENTES SON LOS ADJUNTOS CON LA SOLICITUD

(a) Forma 2

Item	Detalles	Tasa	Anotaciones
# Descripción Completa/ ~~provisional~~	No. de páginas - 32		
No. de Reivindicaciones	No. de reivindicaciones - 20 y No. de páginas - 4		
Resumen	No. de páginas - 1		
No. de figuras	No. de figuras - 8 y No. de páginas - 8		

~~En caso de una descripción completa, si el solicitante desea adoptar los dibujos llenos con su descripción provisional como dibujos o parte de los dibujos para la descripción completa bajo la regla 13 (4), se requiere el número de dichas páginas llenas con la descripción provisional. ser mencionado aquí.~~

~~(b) una descripción completa en confirmación con la solicitud internacional enmendada antes de que la Autoridad de examen preliminar internacional (IPEA) sea aplicable (2 copias).~~

~~(c) listado de secuencias en formato electrónico~~

~~(d) dibujos en confirmación con la solicitud internacional enmendada ante la autoridad de examen preliminar internacional (IPEA) según corresponda (2 copias)~~

~~(e) Los documentos de prioridad se solicitan para recuperar los documentos de prioridad del DAS (Servicio de acceso digital) si el solicitante ya había solicitado a la oficina de primera presentación que los documentos de prioridad estén disponibles para el DAS.~~

~~(f) Traducción de documento de prioridad / especificación / Informe de búsqueda internacional / Informe preliminar internacional sobre patentabilidad~~

(g) Declaración y cumplimiento en el formulario 3

~~(h) Declaración de inventor en el formulario 5~~

~~(i) Poder de autoridad~~

Tarifa total / en efectivo / ~~cheque bancario / giro bancario con No~~

Fecha en.....banco

Por la presente declaro / declaramos que, a mi / nuestro leal saber y entender, información y creencia, el hecho y los asuntos aquí descritos son correctos y solicito / solicitamos que se nos conceda una patente para dicha invención.

Fecha 18 de julio de 2020

Firma: (Firmado digitalmente por)

Nombre: Chandan Chavan

Jefe de PI

TVS Motor Company Limited

A,

El controlador de patentes

La oficina de patentes de Chennai