



(51) International Patent Classification:

B60K 15/035 (2006.01)

(21) International Application Number:

PCT/IN2020/050162

(22) International Filing Date:

22 February 2020 (22.02.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

201941009782 13 March 2019 (13.03.2019) IN

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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, JO, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- of inventorship (Rule 4.17(iv))

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))

(54) Title: VAPOR TUBE FOR A FUEL TANK ASSEMBLY

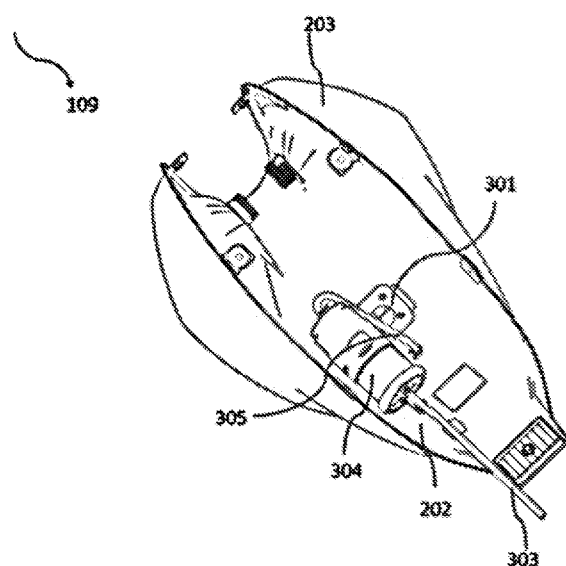


Fig. 3

(57) Abstract: The present invention relates to a saddle type vehicle (100), where said vehicle (100) comprises of a fuel tank assembly (109) mounted on at least a portion of said vehicle (100), includes a canister (304), a hose (305), a fuel level sensor (301), a hose drain canister (303), vapor tube (204), fuel tank inner portion (202), fuel tank outer portion (203), bracket for vapor tube (402) and a vapor chamber assembly (401), where a portion of the vapor tube (204) has two extreme portions being arranged in a zig zag manner inside the fuel tank assembly (109) which helps in eliminating roll over valve & its supporting components.



VAPOR TUBE FOR A FUEL TANK ASSEMBLY

5

TECHNICAL FIELD

[0001] The present subject matter relates to a saddle type vehicle. More particularly, the present subject matter relates to the installation of vapor tube in the fuel tank assembly.

BACKGROUND

10 [0002] In an evaporative emission control system, the fuel vapors generated inside the fuel storage unit or fuel tank assembly is tapped & directed to the carbon canister through a vapor tube. The vapors are adsorbed onto the activated carbon inside the canister.

15 [0003] In present era, when the vehicle roll over condition arises or during accident condition, fuel leakage occurs through the canister and further, sloshing of the fuel takes place. Also the performance of the canister gets significantly affected if liquid fuel enters the canister continuously. To avoid these problems, a very common practice is to use a Roll Over Valve (ROV) placed in the conduit from the fuel tank assembly to the vapor
20 control system. When the vehicle is in roll over condition, this ROV works to close the conduit between the fuel tank assembly and the canister to avoid the leaking of fuel. The main disadvantage of the existing system is that it requires implementation of the (ROV) as an additional component which adds to the cost of the vehicle. For any low cost vehicle this is not a
25 very economical option and it also necessitates extra packaging space in

the fuel tank assembly for the installation of the ROV components. This occupies the valuable space of fuel storage thereby compromising on the usable range of the vehicle.

[0004] In another known art, the ROV is removed but two (or more) identical polymer (floats) are used which works partially as a ROV, i.e. to restrict the fuel leakage when the vehicle is in roll over condition. Thus, basically this solution as well requires more number of new components making it costly. Additionally, number of parts and time required for assembly/dismantling is also high.

15 [0005] Therefore, there is a need to have a simple cost effective solution
for achieving leakage of fuel from the fuel tank assembly in case of roll
over / accidents as well as avoiding any undesirable entry of fuel into the
canister and sloshing while achieving good storage volume for fuel & ease
of assembly cum service of fuel system components.

20 **BRIEF DESCRIPTION OF THE DRAWINGS**

[0006] The detailed description is described with reference to the accompanying figures. The same numbers are used throughout the drawings to reference like features and components.

25 **[0007]** **Fig.1** is a side view of a motorcycle type vehicle as per one
embodiment of the present invention.

- 5 [0008] **Fig.2** is a perspective view of a fuel tank assembly with a vapor tube disposed in a fuel tank assembly as per one embodiment of the present invention
- [0009] **Fig.3** is an inverted view of the fuel tank assembly with a canister as per one embodiment of the present invention of the present invention.
- 10 [00010] **Fig. 3a** is an inverted view of the fuel tank assembly with a bracket for canister as per one embodiment of the present invention.
- [00011] **Fig. 4** is a longitudinal axis view of the fuel tank assembly with a vapor trap assembly as per one embodiment of the present invention.
- [00012] **Fig. 4a** is an exploded view of the vapor chamber assembly as per one embodiment of the present invention.
- 15 [00013] **Fig. 4b** is a front view of the vapor tube as per one embodiment of the present invention.
- [00014] **Fig.5** is a mid-plane axis (XX') view of the fuel tank assembly as per one embodiment of the present invention
- 20 [00015] **Fig.6** is a front view of the vapor trap assembly illustrating the mounting of the vapor tube inside the fuel tank assembly as per one embodiment of the present invention.
- [00016] **Fig. 7** is a method to perform the invention as per one embodiment of the present invention
- 25 [00017] **Fig.7a** is a top view of the fuel tank assembly as per one embodiment of the present invention.

5 [00018] Fig. 7b is a sectional view of the fuel tank assembly illustrating vehicle is in roll over condition in RHS of the mid plane axis.

[00019] Fig. 7c is a sectional view of the fuel tank assembly illustrating vehicle is in roll over condition in LHS of the mid plane axis.

DETAILED DESCRIPTION

10 [0001] In general, a vent line is attached to the fuel tank assembly for directing the fuel vapors to the canister, in order to minimize the evaporative loss of fuel to the atmosphere. Further, the vent lines are vulnerable to the fuel leakage from the fuel tank assembly, when the vehicle is inclined at predetermined angle or more or in a situation when

15 the vehicle turns over. The roll over valve (ROV) which is mounted inside the fuel tank assembly, prevents the fuel leakage to the canister and also, through the roll over valve (ROV), the evaporative gas in fuel tank assembly is collected in the canister. The main disadvantage of the existing system is that, it requires implementation of the roll over valve

20 (ROV) as an additional component which adds to the cost of the vehicle and for the low cost vehicle this is not an economical option. Moreover, it requires extra packaging space in the fuel tank assembly for the installation of ROV components. The main disadvantage with the existing vehicle system is that, that it requires the roll over valve (ROV) which is

25 economically not that feasible for any low cost vehicle and also increases the space constraints in the fuel tank assembly for the installation of new components.

5 **[0002]** Moreover, the installation of components in the fuel tank assembly requires space, hence, it is required to provide a structure in which sufficient space can be formed for easy installation of the vapor tube and also for ease of accessibility and ease of serviceability to the riders. With the known conventional construction of the vehicle body frame & fuel
10 tank assembly, the installation of the vapor tube inside the fuel tank assembly becomes difficult, as in this installation, the presence of ROV or the alike components reduces the installation space in the fuel tank assembly and also may coincide or foul with at least a portion of the vehicle body.

15 **[0003]** To overcome above problems, it becomes essential to modify the mounting of the components of the saddle type vehicle to facilitate the simple and easy installation of vapor tube in the fuel tank assembly. The change is typically with a compromise on the available space for fuel storage which is undesirable. Alternatively, the size of the fuel tank
20 assembly needs to be enlarged which leads to many adverse effects like poor ergonomics, packaging, increase in dimensions of the vehicle, weight & cost increase, etc. The present subject matter provides a solution to the above problems while meeting the requirements of minimum compromise on the vehicle layout, packaging, space, at low cost with ease of
25 manufacturing, serviceability etc.

[0004] With the above objectives in view, the present invention relates to a fuel tank assembly which separates fuel vapors from liquid fuel inside

5 the fuel tank assembly, and more particularly to the installation of the vapor tube with a roll over protection inside the fuel tank assembly by completely removing the ROV & its supporting components, enhancing cost & part count reduction. Due to elimination of ROV & associated parts, more installation space is enabled thus making the structure of the
10 fuel tank assembly & the vehicle simple.

[0005] According to one embodiment of the present invention, this design reduces the number of pipe connections which are potential vapor leak paths in the evaporative emission control system, and hence serves as prevention design control for leakage in the system. This mechanism does
15 not use any external pipe for carrying the vapors from the fuel tank assembly to roll over valve and then to the canister, since the roll over valve is eliminated. Hence, number of parts and time required for assembly is reduced. In the current invention a simple low cost alternative design solution for replacing the roll over valve and its associated parts are
20 described which will need lesser number of parts and will take lesser time for assembly.

[0006] According to one embodiment of the present invention, the fuel supply system for the saddle type vehicle comprises of a canister, hose, fuel level sensor and a hose drain to drain the canister. Further, as per one
25 embodiment of the present invention, the fuel tank assembly include fuel tank outer portion, fuel tank inner portion, vapor tube, brackets for vapor tube and a vapor chamber assembly, where the bracket for vapor tube

5 holds the vapor tube based on the layout of the fuel tank assembly, to avoid the deformation of the vapor trap assembly inside the fuel tank assembly.

[0007] Further, as per one embodiment of the present invention, the vapor tube is installed in a zig zag manner with respect to the mid plane axis of the fuel tank assembly. As per one embodiment of the present invention, a portion of the vapor tube which is installed inside the fuel tank assembly, is originating from the vapor chamber assembly towards top or bottom portion of the fuel tank assembly along the mid plane axis of the fuel tank assembly & is extending away from the mid plane axis towards left hand side of the mid plane axis and right hand side of the mid plane axis. The remaining portion of the vapor tube projects outside the fuel tank assembly which is then connected to the canister by rubber hoses.

[0008] Further, the present invention relates to the installation of the vapor tube in the fuel tank assembly where the bracket for vapor tube, vapor tube and vapor chamber assembly together called as vapor trap assembly. Further, as per one embodiment of the present invention, the vapor chamber assembly has a vapor chamber & caps which cover the vapor chamber at its ends. Furthermore, the vapor chamber has minimum two holes for vapor entry & a hole for vapor tube entry; the bracket for vapor tube holds the vapor tube to avoid deformation of the vapor trap assembly inside the fuel tank assembly. Further as per one embodiment of the present invention, the bracket for vapor tube is placed substantially below

5 the vapor entry holes of the vapor chamber which restrict the entry of fuel into the vapor chamber through vapor entry holes during sloshing. Also, the vapor will flow easily to the vapor chamber as they tend to move up.

[0009] As per one embodiment of the present invention, the saddle type vehicle comprises, the fuel tank assembly being operatively mounted on
10 the vehicle body and the fuel tank assembly is provided with an EVAP (evaporative emission control) system to safely carry away the fuel vapors from the fuel tank assembly to the engine through canister & hoses. The fuel vapors are then purged to the engine from canister with the help of hoses.

15 [00010] Various other features of the invention are described in detail below with reference to an embodiment in the accompanying drawings. In the drawings, like reference numbers generally indicate identical, functionally similar, and/or structurally similar elements. The drawing in which an element first appears is indicated by the leftmost digit(s) in the
20 corresponding reference number. With reference to the accompanying drawings, wherein the same reference numerals will be used to identify the same or similar elements throughout the several views.

[00011] Further “front” and “rear”, and “left” and “right” referred to in the ensuring description of the illustrated embodiment refer to front and rear,
25 and left and right directions as seen in a state of being seated on a seat of the saddle type vehicle. Furthermore, a longitudinal axis refers to a front to rear axis relative to the vehicle, while a lateral axis refers to a side to side,

5 or left to right axis relative to the vehicle. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.

[00012] Fig. 1 is a left side of the motorcycle type vehicle (100) (hereinafter 'the vehicle') illustrating the fuel tank assembly (109).
10 According to one embodiment of the present invention, the vehicle (100) includes the body frame (not shown) schematically configured to mount the fuel tank assembly (109) for disposing vapor tube in fuel tank assembly (109). In a front portion (F) of the vehicle (100), a steering shaft (not shown) is supported rotatable in a certain range. Further a handlebar
15 (105) is rotatable integrally connected to the steering shaft for steering the vehicle (100) and is connected to a front wheel (108) through the steering shaft. A steering handle (118) is rotatable supported, independently of a front fork assembly (106), on a steering stem provided on the head tube (not shown) an upper portion of the front wheel is covered by a front
20 fender (107) which prevents mud and water from getting deflected towards the steering shaft. The front wheel (108) is rotatably mounted on the front portion (F) thereof and a rear wheel (117) is rotatable mounted on a rear portion (R) thereof. Further, the front fork assembly (106) is mounted over the front fender (107). In a portion lying ahead of the front fork assembly
25 (106), a lighting device for example as a headlamp (103), a pair of signaling devices like as turn signal lamps (not shown), a display device like as a speedometer (not shown) are housed by a holding structure (not

5 shown) mounted thereto. The portion, lying at the backside of the vehicle (100), includes the tail lamp (115), a rear fender (116) which prevents the entry of mud and water from getting deflected. An adjustable windscreen (102) is mounted to the front of the vehicle (100). A pair of rear view mirror (104) comprises a casing, the casing having a front mirror for
10 reflecting the image of traffic approaching from behind. At least one of a right & left side shock absorber (112) is placed which gives better ride experience to the rider. A two legged stand (not shown) is used to support and hold the vehicle (100). The stand (not shown) moves on a pivot (not shown) to take up two positions, one folded up and the other on the
15 ground.

[00013] Further in Fig.1, in the front portion (F) of the vehicle (100), the fuel tank assembly (109) is arranged immediately behind the head tube (not shown) and is disposed over an internal combustion engine (114). A seat assembly (111) is disposed immediately behind the fuel tank assembly
20 (109). A pillion (113) is disposed rearward of the seat assembly. Suspension systems are provided for comfortable steering of the vehicle on the road. The front fork assembly (106) forms the front suspension system and serves as a rigidity component. An internal combustion engine (114) is mounted to a front lower portion of the vehicle body frame by
25 means of an engine mounting bracket (not shown). An internal combustion engine (114) is equipped with an exhaust system that includes an exhaust

5 pipe (not shown) connected to the engine and a muffler (not shown) connected to the exhaust pipe.

[00014] Fig.2 is a perspective view of the fuel tank assembly (109), as per one embodiment of the present invention, the opening (201) on the fuel tank assembly (109) is shown and further fuel tank assembly is divided
10 into two parts viz. fuel tank inner portion (202) and fuel tank outer portion (203) in which the vapor tube (204) is routed inside the fuel tank assembly (109).

[00015] Fig. 3 is the inverted view of the fuel tank assembly (109), as per one embodiment of the present invention, the fuel tank assembly (109)
15 includes a canister (304), hose (305), and a hose drain to drain the canister (303), where the canister (304) is mounted to the fuel tank assembly (109) by means of rubber boot and a bracket for canister (307) (fig 3a). Further, as per one embodiment of the present invention, the mounting position of the canister (304) enables in reducing the length of the fuel hoses as the
20 other end of the vapor tube (204) is connected to canister (304) through the hose (305). Hence, when the vehicle (100) is in roll over condition, the minimum amount of fuel is left over in vapor tube (204) and further, when the vehicle (100) comes in actual position after roll over condition, the left over fuel in the vapor tube (204) is channelized to the canister (304)
25 through the hose (305) , where the canister (304) absorbs the left over fuel, which ultimately results in the decreasing the fuel leakage in the system and also, avoid the interference with the surrounding components.

5 **[00016]** **Fig. 4.** is the longitudinal axis view of the fuel tank assembly, as
per one embodiment of the present invention, the fuel tank assembly (109)
includes vapor tube (204), vapor chamber assembly (401), bracket for
vapor tube (402), fuel tank inner portion (202) and fuel tank outer portion
(203) where the vapor tube (204) routed inside the fuel tank assembly
10 (109), ensures enough space for installation of the components e.g. fuel
pump, float assembly etc. Further, as per one embodiment of the present
invention, the vapor tube (204) is routed, ensuring that the fuel level
sensor (301) is having enough space for insertion / assembly and function
inside the fuel tank assembly (109). Further, as per one embodiment of the
15 present invention, the vapor tube (204), the vapor chamber assembly
(401), and bracket for vapor tube (402) are together called as vapor trap
assembly (403).

[00017] **Fig. 4a.** is an exploded view of vapor chamber assembly (401), as
per one embodiment of the present invention, the vapor chamber assembly
20 (401) includes vapor chamber (401a), vapor entry holes (401b), cap (401c)
and a vapor tube entry hole (401d), where the vapor generated inside the
fuel tank assembly (109) will flow through the at least vapor entry holes
(401b) and then reach vapor chamber (401a).

[00018] **Fig. 4b** is the front view of vapor tube (204), as per one
25 embodiment of the present invention, the vapor tube (204) has a slanted
cut open portion (404) at its one end where it is connected to vapor
chamber (401a) (Fig.4a) to ensure the tightness and rigidity in the

5 structure. Further, as per one embodiment of the present invention, the vapor generated inside the fuel tank assembly (109) will flow through at least one of the vapor entry holes (401b), reaches to vapor chamber (401a) and from vapor chamber (401a), the vapor reaches vapor tube (204) through the slanted cut open portion (404) of the vapor tube (204), ensures
10 the shortening of fuel hose and maintaining the fuel level and increases the ease of serviceability to the riders. Further, as per one embodiment of the present invention, the bracket for vapor tube (401) is mounted to the fuel tank outer portion (203), which eliminates any overhang in the bracket for vapor tube in the embodiment.

15 [00019] Fig. 5 is the mid plane axis view (XX') of the fuel tank assembly (109), as per one embodiment of the present invention, the vapor tube (204) is mounted in a zig zag manner and routed inside the fuel tank assembly (109) away from the mid plane axis (XX') and normal to the mid plane axis (XX') towards LHS (501) and RHS (502) of the mid plane axis
20 (XX'). Also, the vapor tube (204) is routed inside the fuel tank assembly (109) at the RHS (502) and LHS (501), ensuring that the fuel level inside the fuel tank assembly (109) will not reach the vapor tube (204) during vehicle roll over /fall off condition. Further, at least one curling of the vapor tube (204) is disposed in the headspace of the fuel tank assembly
25 (109). Moreover, this embodiment ensures the reduction of fuel leakage as the fuel does not pass through the curling of vapor tube, eliminate the requirement of the new components to channelize the vapor and reduces

5 fuel leakage, which ultimately reduce the weight of the vehicle, reduce cost, and provides enough space for the installation of new components.

[00020] Fig. 6 is the front view of the vapor trap assembly (403) of the fuel tank assembly (109). Further, as per one embodiment of the present invention, the bracket for vapor tube (402) is positioned substantially
10 below the vapor entry holes (401b) of the vapor chamber (401a), which prevents the entry of fuel inside the vapor chamber (401a) during sloshing. Moreover, the bracket for vapor tube (402) holds the vapor tube (204) to avoid deformation of the vapor trap assembly (403).

[00021] Fig. 7 is the method to be performed as per one embodiment of the
15 present invention. Further, as per method to perform the present invention, the vapor tube is provided in a zig zag manner (701) having two extreme portion left hand portion and left hand portion with respect to the mid plane axis, originating from the vapor chamber and installed in a fuel tank. Further, the orientation of the vehicle in roll over state is checked with
20 reference to the left hand side and right hand sides of the mid plane axis (702). Further, when the vehicle is in roll over state, the fuel is restricted to flow through atleast a portion of the vapor tube (703), ensuring the reduction of fuel leakage in the vehicle.

[00022] Fig. 7a is the top view of the fuel tank assembly, as per one
25 embodiment of the present invention, the vapor tube (204) is routed inside the fuel tank assembly (109). Further, as per one embodiment of the present invention, the vapor tube (204) has two extreme portions i.e. right

5 extreme portion (705) on the RHS (502) of the mid plane axis (XX') and
left extreme portion (704) on the LHS (501) of the mid plane axis (XX').
Further, as per one embodiment of the present invention, when the vehicle
(100) is in roll over condition in RHS (502) of the mid plane axis (XX')
(Fig. 7b), the fuel level (BB') will be below the left extreme portion (704)
10 of the vapor tube (204) and hence the liquid fuel inside the fuel tank
assembly (109) will not reach the vapor tube (204) if the fuel tank
assembly (109) is fully filled up to the inlet bottom (AA') of the fuel tank
assembly (109).

[00023] Further, as per one embodiment of the present invention (fig 7c),
15 when the vehicle (100) is in roll over condition in LHS (501) of the mid
plane axis (XX'), the fuel level (BB') will be below the right extreme
portion (705) of the vapor tube (204) and hence the liquid fuel inside the
fuel tank assembly will not reach the vapor tube (204) even if the fuel tank
assembly is completely filled up to the inlet bottom (AA') of the fuel tank
20 assembly (109). Moreover, the routing is done ensuring that the liquid fuel
crosses the right extreme portion (705) and left extreme portion (704) of
the vapor tube only beyond ratio Z where the ratio Z is in the range of
1.25 to 1.30 (distance with respect to the vapor volume (YY'), where
distance to be calculated from the mid plane axis (XX') of the fuel tank
25 assembly (109). Hence, the fuel leakage is restricted as during roll over
condition.

5 **[00024]** The embodiments explained in Fig. 5, Fig. 7b, Fig. 7c of the present invention help in overcoming the problem of space constraints, minimizing the use of new components, maintaining the fuel level as present in the fuel tank assembly (109), reducing the overall weight of the vehicle and make it cost effective.

10 **[00025]** Advantageously, the embodiments of the present invention, describes the potential modifications in the mounting of vapor tube in a zig zag manner with respect to the mid plane axis of the fuel tank assembly of the saddle type vehicle. This facilitates the simple and easy mounting of the vapor tube which can efficiently restrict the fuel leakage from the tank.

15 **[00026]** Many other improvements and modifications may be incorporated herein without deviating from the scope of the invention.

20

25

5 **List of reference symbol:**

Fig. 1:

- 100: Vehicle
- 102: Windscreen
- 103: Headlamp
- 10 104: Rear View Mirror
- 105: Handlebar
- 106: Front Fork Assembly
- 107: Front Fender
- 108: Front Wheel
- 15 109: Fuel tank assembly
- 111: Seat Assembly
- 112: Shock Absorber
- 113: Pillion
- 114: Internal Combustion Engine
- 20 115: Tail Lamp
- 116: Rear Fender
- 117: Rear Wheel
- 118: Steering Handle

5 F: Front Portion

R: Rear Portion

Fig. 2:

201: Opening

202: Fuel tank inner portion

10 203: Fuel tank outer portion

204: Vapor Tube

Fig. 3:

301: Fuel Level Sensor

303: Hose Drain

15 304: Canister

305: Hose

307: Bracket for Canister

Fig. 4:

401: Vapor Chamber Assembly

20 402: Bracket for Vapor Tube

403: Vapor Trap Assembly

Fig. 4a:

401a: Vapor chamber

5 401b: Vapor entry holes

401c: Cap

401d: Vapor tube entry hole

Fig. 4b:

404: Slanted Cut Open Portion.

10 **Fig. 5:**

XX' - Mid Plane Axis

501: LHS of mid plane axis

502: RHS of mid plane axis

Fig. 7a:

15 704: Left Extreme Portion of the Vapor Tube.

705: Right Extreme Portion of the Vapor Tube.

Fig. 7b:

BB' - Fuel Level.

AA' - Inlet Bottom inlet bottom

20 **Fig. 7c:**

Z- Distance with respect to the vapor volume, where distance to be calculated from the mid plane axis of the fuel tank assembly.

YY'- vapor volume.

5 **We Claim;**

1. A saddle type vehicle (100), said vehicle (100) comprising:

 a fuel tank assembly (109) operatively mounted on at least a portion of
 said vehicle (100), said fuel tank assembly (109) includes vapor tube
 (204), fuel tank outer portion (203), fuel tank inner portion (202), bracket
10 for vapor tube (402), a vapor chamber assembly (401), a canister (304), a
 hose (305), a fuel level sensor (301) and a hose drain (303);

 said vapor chamber assembly (401) includes a vapor chamber (401a),
 vapor entry holes (401b), cap (401c), vapor tube entry hole (401d);

 wherein atleast a portion of said vapor tube (204) have two extreme portions
15 (704, 705) installed in a zig zag manner with respect to the mid plane axis
 (XX') of said fuel tank assembly (109), originating from said vapor chamber
 (401a) along said mid plane axis (XX') inside fuel tank assembly (109).

2. The saddle type vehicle (100) as claimed in claim 1, wherein said vapor tube
is installed providing a space for assembly to the fuel level sensor (301).

20 3. The saddle type vehicle (100) as claimed in claim 1, wherein said vapor tube
 (204) have said two extreme portions as right extreme portion (705) on RHS
 (502) of said mid plane axis (XX') and left extreme portion (704) on LHS
 (501) of said mid plane axis (XX').

4. A method to prevent the fuel leakage from a fuel tank in a Roll Over state of a
25 saddle type vehicle (100), said method comprising steps of:

- 5 providing vapor tube in a zig zag manner having at least two extreme portions where said extreme portions are left hand side and right hand side, said vapor tube originating from the vapor chamber, installed in a fuel tank;
- checking said vehicle's orientation with reference to a mid-plane axis of
- 10 said vehicle where said mid plane axis have left hand side (LHS) and right hand side (RHS); and
- restricting flow of fuel through the vapor tube to the canister by atleast one of the portion of said extreme portions of said vapor tube.
5. The method to prevent the fuel leakage from a fuel tank in a Roll Over state of
- 15 a saddle type vehicle **(100)** as claimed in claim 4, wherein said checking orientation of said vehicle **(100)** in said RHS **(502)** of said mid plane axis **(XX')**, the fuel level **(BB')** is filled till inlet bottom **(AA')** of fuel tank assembly **(109)**, said fuel level **(BB')** is below said left extreme portion **(704)** of said vapor tube **(204)** and in roll over of said vehicle **(100)** in said LHS
- 20 **(501)** of said mid plane axis **(XX')**, said fuel level **(BB')** is filled till inlet bottom **(AA')** of fuel tank assembly **(109)**, said fuel level **(BB')** is below said right extreme portion **(705)** of said vapor tube **(204)**.
6. The saddle type vehicle **(100)** as claimed in claim 1, wherein said bracket for vapor tube **(402)** hold said vapor tube **(204)** configured to avoid deformation
- 25 of said vapor trap assembly **(403)**.

- 5 7. The saddle type vehicle **(100)** as claimed in claim 6, wherein said bracket for vapor tube **(402)** is placed substantially below said at least vapor entry holes **(401b)** of said vapor chamber **(401a)**.
8. The saddle type vehicle **(100)** as claimed in claim 6, wherein said bracket for vapor tube **(402)** is mounted to said fuel tank outer portion **(203)**.
- 10 9. The saddle type vehicle **(100)** as claimed in claim 1, wherein said vapor tube **(204)** has a slanted cut open portion **(404)** at its one end, connected to said vapor chamber **(401a)**.
10. The saddle type vehicle **(100)** as claimed claim 1, wherein said at least vapor entry holes **(401b)** are configured to enable flow of vapor to said vapor chamber **(401a)**.
- 15 11. The saddle type vehicle **(100)** as claimed in claim 1, wherein said vapor chamber **(401a)** is configured to enable flow of vapor to said vapor tube through said slanted cut out portion **(404)** of said vapor tube **(204)**
12. The saddle type vehicle **(100)** as claimed in claim 3, wherein said each extreme portion of said vapor tube **(204)** distance **(Z)** is atleast 1.25 to 1.30 times the vapor volume **(YY')** of said fuel tank assembly **(109)** and said distance **(Z)** is calculated from said mid plane axis of said fuel tank assembly **(109)**.
- 20

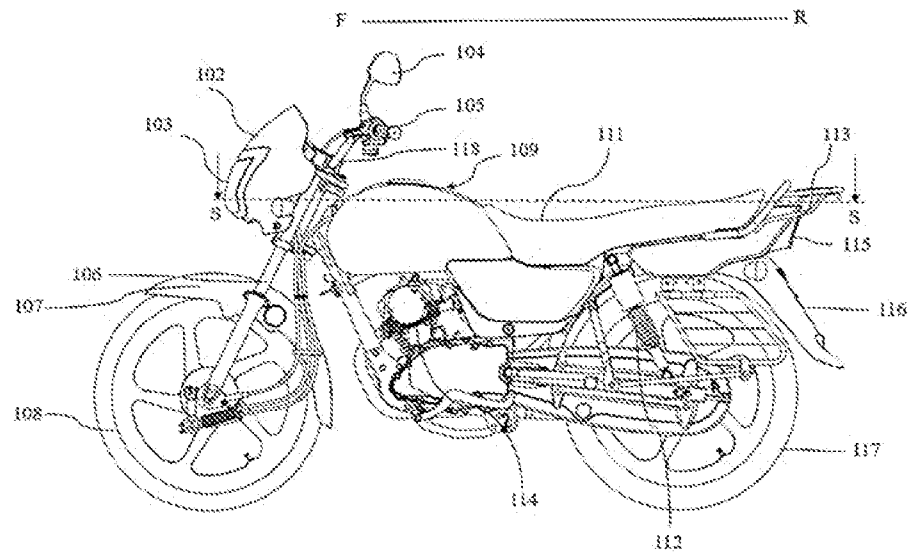


Fig. 1

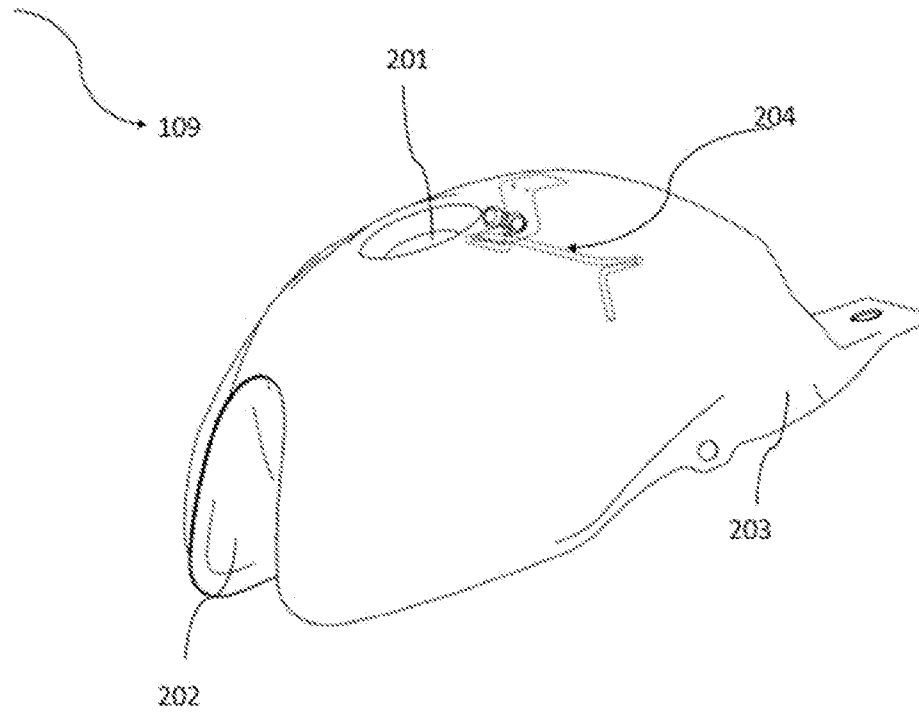


Fig. 2

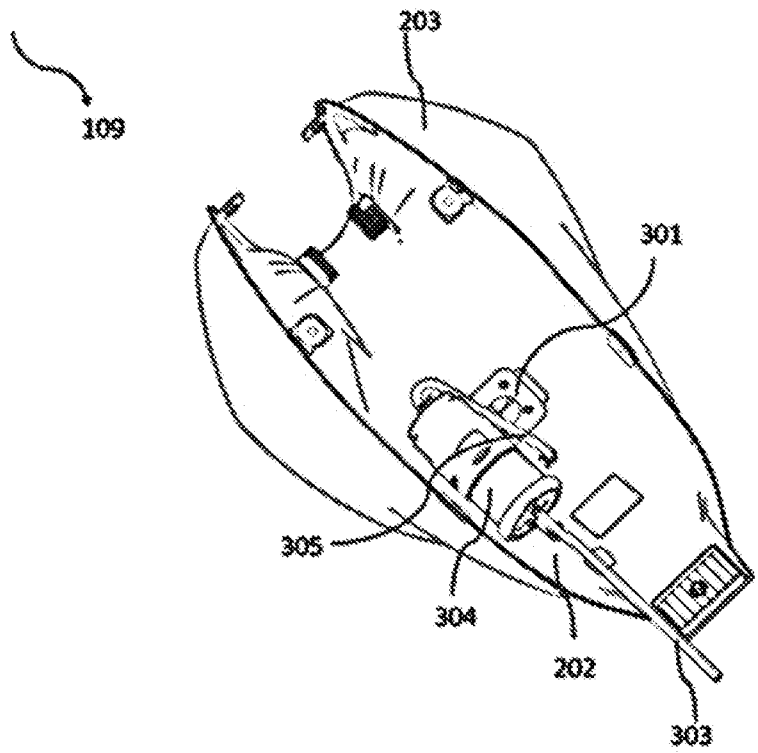


Fig. 3

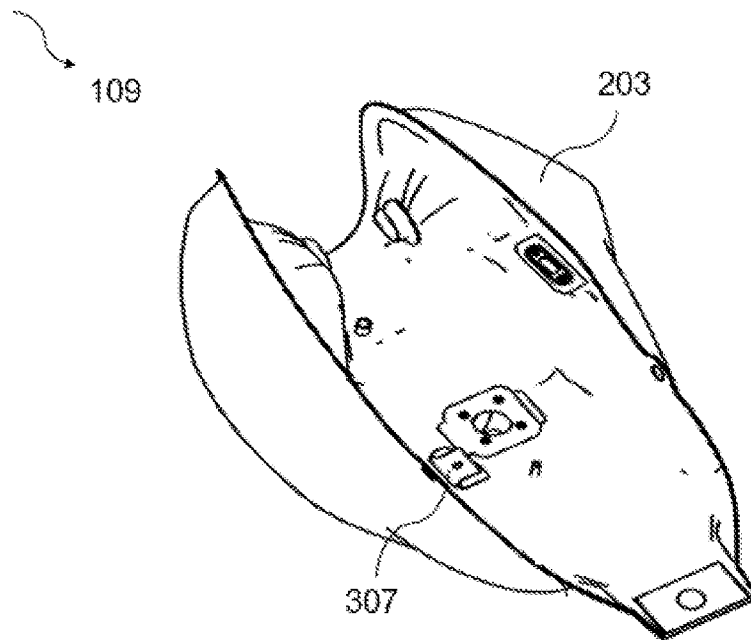


Fig. 3a

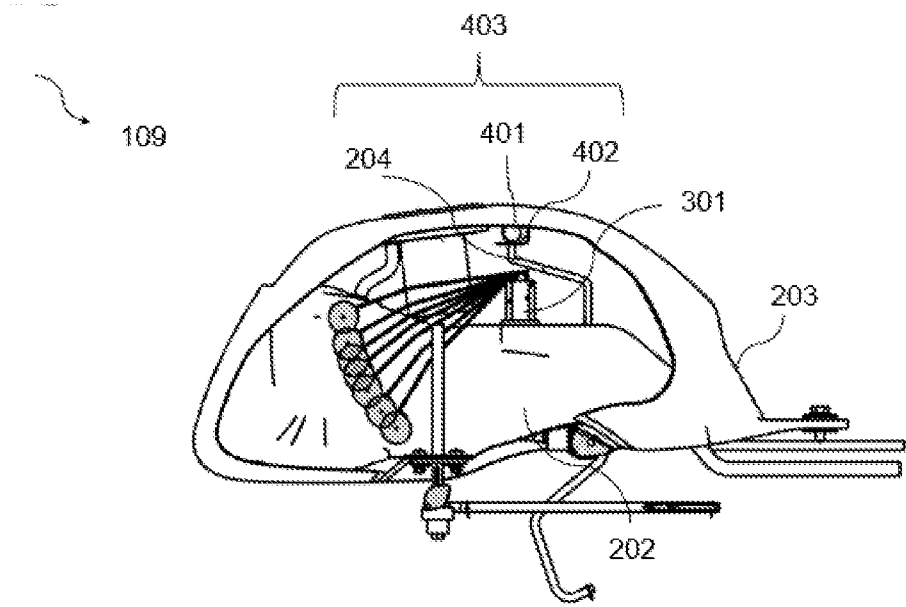


Fig. 4

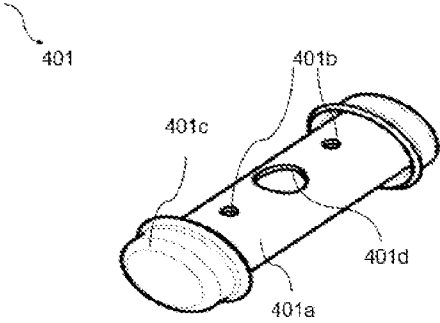


Fig. 4a

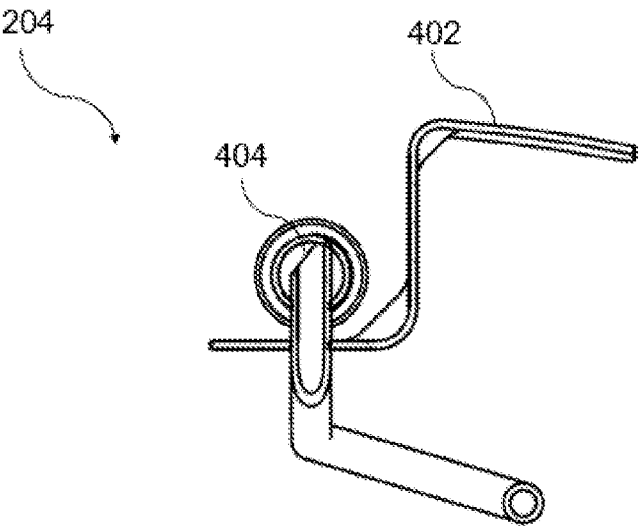


Fig. 4b

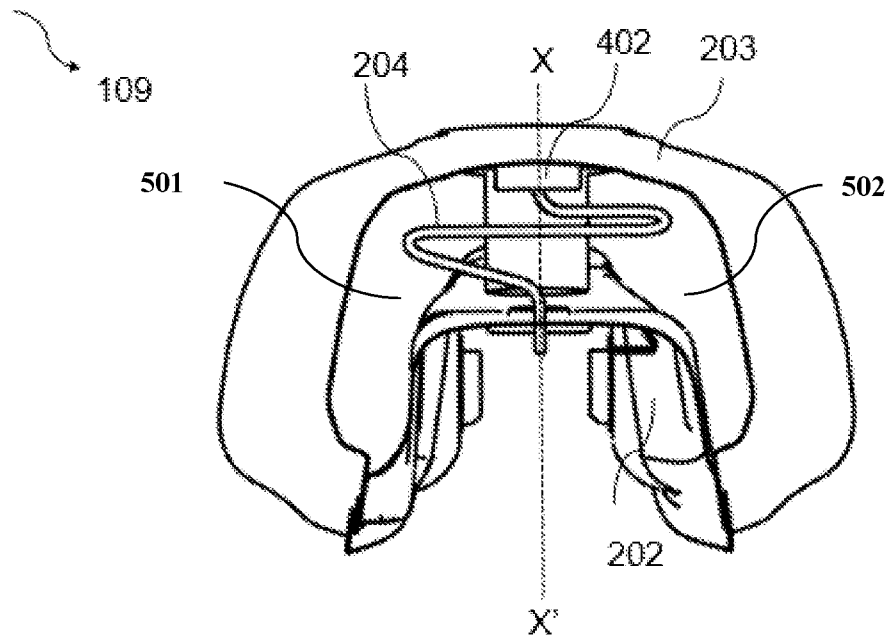


Fig. 5

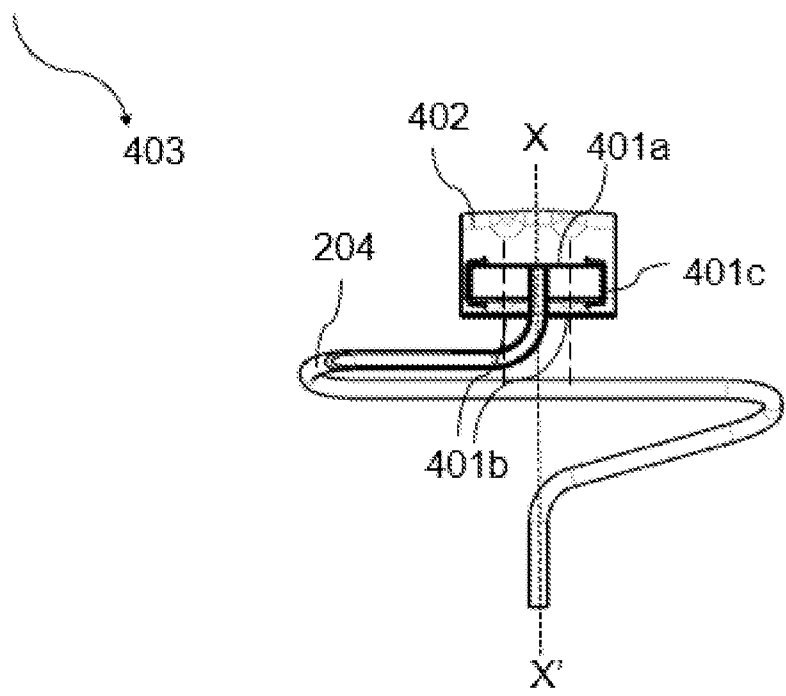


Fig. 6

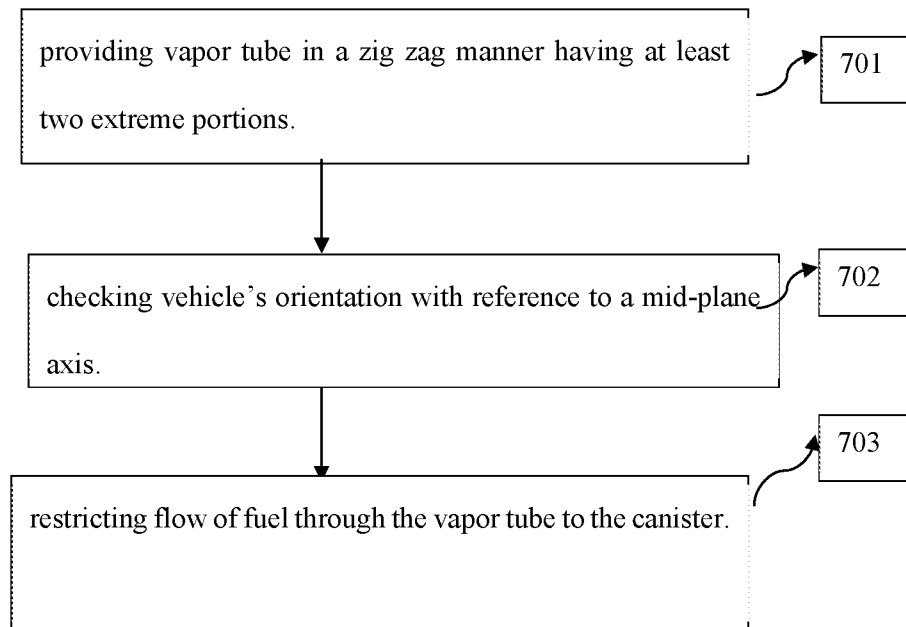


Fig. 7

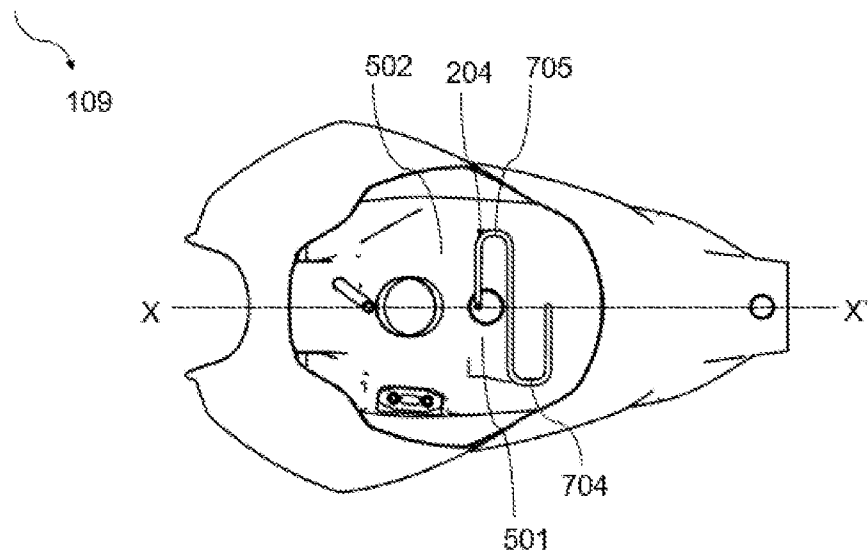


Fig. 7a

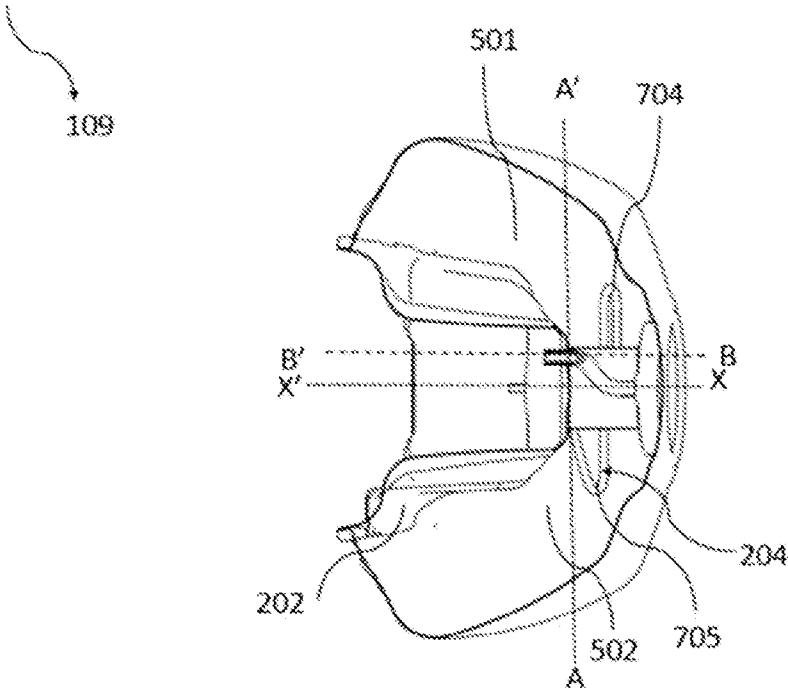


Fig. 7b

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2020/050162

A. CLASSIFICATION OF SUBJECT MATTER
B60K15/035 Version=2020.01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60K

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)

TotalPatent One, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20170226966 A1 (MITSUBISHI MOTOR ENG et. al) 10 August 2017 para 025, 026, 030, 031, 068, 079; fig. 1, 3, 7	1-12
A	US 20170159617 A1 (SUZUKI MOTOR CORP) 08 June 2017 para 104; fig. 2	1-12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

"&" document member of the same patent family

Date of the actual completion of the international search

05-08-2020

Date of mailing of the international search report

05-08-2020

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Authorized officer

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2020/050162

Citation	Pub.Date	Family	Pub.Date
US 20170226966 A1	10-08-2017	US 10174722 B2	08-01-2019
		JP 6638443 B2	29-01-2020
		JP 2017141719 A	17-08-2017
US 20170159617 A1	08-06-2017	US 10502164 B2	10-12-2019
		JP 2017105286 A	15-06-2017