US Patent & Trademark Office
Patent Public Search | Text View

United States Patent	12391328
Kind Code	B2
Date of Patent	August 19, 2025
Inventor(s)	Dong; Zhen et al.

Vehicle

Abstract

A vehicle is provided. The vehicle includes: a frame; a seat arranged on the frame; a powertrain arranged on the frame; a steering system arranged on the frame, and including a steering shaft, the steering shaft being located in front of the powertrain; and a fuel tank located behind the steering shaft and in front of the powertrain.

Inventors: **Dong; Zhen (Changzhou, CN), Yan; Shuting (Changzhou, CN)**

Applicant: **SEGWAY TECHNOLOGY CO., LTD.** (Changzhou, CN)

Family ID: **1000008766702**

Assignee: **SEGWAY TECHNOLOGY CO., LTD. (Changzhou, CN)**

Appl. No.: **17/474135**

Filed: **September 14, 2021**

Prior Publication Data

Document Identifier	Publication Date
US 20220089243 A1	Mar. 24, 2022

Foreign Application Priority Data

CN	202022087621.1	Sep. 21, 2020

Publication Classification

Int. Cl.: **B62K5/01** (20130101); **B62J35/00** (20060101); **B62J37/00** (20060101)

U.S. Cl.:

CPC **B62K5/01** (20130101); **B62J35/00** (20130101); **B62J37/00** (20130101);

Field of Classification Search

CPC: B62J (35/00); B62K (5/01); B60Y (2200/124); B60K (2015/0637)

USPC: 280/834; 280/835

References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
6523634	12/2002	Gagnon	180/908	B60K 17/06
6626260	12/2002	Gagnon	180/908	B60K 15/01
6920949	12/2004	Matsuura	180/908	B60T 5/00
9873316	12/2017	Lovold et al.	N/A	N/A
10569819	12/2019	Lovold et al.	N/A	N/A
2006/0278451	12/2005	Takahashi	180/68.1	B60K 11/04
2008/0236918	12/2007	Hanafusa	180/68.4	B60K 15/063
2011/0226538	12/2010	Brady	180/54.1	B62K 5/01
2019/0248405	12/2018	Bennett	N/A	B62K 5/01
2020/0072164	12/2019	Higashiyama	N/A	B62J 37/00

FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
1553331	12/2006	EP	F16H 57/0415
WO 2006/072077	12/2005	WO	N/A

OTHER PUBLICATIONS

Extended European Search Report dated Jan. 17, 2022 for Application No. 21196325.1, 7 pages. cited by applicant

---

Primary Examiner: Wehrly; Christopher B

Attorney, Agent or Firm: Frost Brown Todd LLP

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

(1) This application claims the benefit of priority to Chinese patent Application No. 202022087621.1, filed on Sep. 21, 2020, the content of winch is incorporated herein by reference in its entirety.

FIELD

(2) The present disclosure relates to a field of vehicle technologies, and more particularly, to a vehicle.

BACKGROUND

(3) In the related art, a fuel tank of an all-terrain vehicle is usually arranged in front of a driving seat and behind a steering handle. However, by arranging the fuel tank in this way, a volume of the fuel tank is generally limited, and a center of gravity of the whole all-terrain vehicle is relatively high, thus affecting the stableness of the all-terrain vehicle during driving.

SUMMARY

(4) Embodiments of the present disclosure provide a vehicle. The vehicle includes: a frame; a seat arranged on the frame; a powertrain arranged on the frame; a steering system arranged on the frame and including a steering shaft, and the steering shaft being located in front of the powertrain; and a fuel tank arranged on the frame, and located behind the steering shaft and in front of the powertrain.

(5) Additional aspects and advantages of the present disclosure will be given in part in the following description, become apparent in part from the following description, or be learned from the practice of the present disclosure.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The above and/or additional aspects and advantages of the present disclosure will become apparent and easy to understand from the following description of the embodiment in combination with the accompanying drawings.

(2) FIG. **1** is a perspective view of a vehicle according to an embodiment of the present disclosure.

(3) FIG. **2** is a top view of a vehicle according to an embodiment of the present disclosure.

(4) FIG. **3** is an assembly view of a fuel tank, a gear lever, a frame and a steering system of the vehicle shown in FIG. **2**.

(5) FIG. **4** is an assembly side view of a fuel tank, a gear lever, a frame and a steering system of the vehicle shown in FIG. **2**.

(6) FIG. **5** is a schematic view of a fuel tank and a frame of the vehicle shown in FIG. **2**.

(7) FIG. **6** is a top view of a vehicle according to another embodiment of the present disclosure.

(8) FIG. **7** is an assembly view of a fuel tank, a gear lever, a frame and a steering system of the vehicle shown in FIG. **6**.

(9) FIG. **8** is a schematic view of a frame of a vehicle according to an embodiment of the present disclosure.

(10) FIG. **9** is a schematic view of a fuel tank of a vehicle according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

(11) Embodiments of the present disclosure are described in detail below. The embodiments described with reference to accompanying drawings are exemplary.

(12) A vehicle **100** according to embodiments of the present disclosure is described below with reference to FIGS. **1**-**9**. The vehicle **100** may be an all-terrain vehicle, such as a straddle all-terrain vehicle. In the following description of the present application, the description is made by an example in which the vehicle **100** is the all-terrain vehicle, such as the straddle all-terrain vehicle. Of course, those skilled in the art can understand that the vehicle **100** can further be other types of vehicles, not limited to the all-terrain vehicle, such as the straddle all-terrain vehicle.

(13) As shown in FIGS. **1**-**9**, the vehicle **100** according to the embodiments of the present disclosure includes a frame **1**, a seat **8**, a powertrain **2**, a steering system **3** and a fuel tank **4**.

(14) Specifically, the frame **1** can provide a mounting carrier for mounting various components

(such as the powertrain **2** and the steering system **3**) of the vehicle **100**, so as to ensure the mounting stability of the various components. The seat **8**, the powertrain **2** and the steering system **3** are all arranged on the frame **1**. The steering system **3** includes a steering shaft **31** located in front of the powertrain **2**. The fuel tank **4** is arranged on the frame **1**, and located behind the steering shaft **31** and in front of the powertrain **2**. Here, it should be noted that a forward direction of the vehicle **100** during driving is a "front" direction. On the contrary, a backward direction of the vehicle **100** during driving is a "rear" direction.

(15) For example, in the examples of FIGS. **1**-**7**, the vehicle **100** further includes wheels **20** and a suspension system. The suspension system is connected to the wheels **20** and the frame **1**, and supports the frame **1** on the ground, so as to ensure the stability of the frame **1**. The powertrain **2** may be mounted in the middle of the frame **1** to provide a driving force for the driving of the vehicle **100**. The seat **8** is mounted above the powertrain **2**, and an upper surface of the seat **8** includes a horizontal seat surface, so that a driver can sit on the seat surface and drive the vehicle **100**, thus ensuring the comfort of the driver during the driving of the vehicle **100**. The steering system **3** may be arranged adjacent to the powertrain **2**, and is connected to front wheels of the vehicle **100** to control a driving direction of the vehicle **100**. The fuel tank **4** can be mounted on the frame **1**. The fuel tank **4** can include a fuel pump, and can supply fuel to the powertrain **2** through the fuel pump and a fuel pipe. The fuel tank **4** is arranged between the steering shaft **31** and the powertrain **2**, and is located behind the steering shaft **31** and in front of the powertrain **2**. Compared with a traditional manner in which the fuel tank is arranged in front of a driving seat and behind a steering handle, an arrangement manner of the fuel tank **4** of the present disclosure allows the fuel tank **4** to be closer to the ground, which thus facilitates to lower a center of gravity of the vehicle **100**, thereby effectively ensuring the stability of the vehicle **100** during driving. Moreover, since a space between the steering shaft **31** and the powertrain **2** is relatively larger, a volume of the fuel tank **4** can be made larger.

(16) In the vehicle **100** according to the embodiments of the present disclosure, since the fuel tank **4** is arranged behind the steering shaft **31** and located in front of the powertrain **2**, the center of gravity of the vehicle **100** is lowered, so as to effectively ensure the stability of the vehicle **100** during driving. In addition, the volume of the fuel tank **4** can be made relatively larger.

(17) According to some specific embodiments of the present disclosure, referring to FIGS. **3**-**8**, the fuel tank **4** includes a tank body **42**. The frame **1** includes two first main beams **11**, two second main beams **12**, two first support members **13** and two second support members **14**. Specifically, the two first main beams **11** are spaced apart in a left-right direction, the two second main beams **12** are spaced apart in the left-right direction, and the two second main beams **12** are located below the two first main beams **11**, respectively. The two first support members **13** are spaced apart in the left-right direction, and two ends of each first support member **13** are connected to the first main beam **11** and the second main beam **12** on the same side, respectively. The two second support members **14** are spaced apart in the left-right direction, and two ends of each second support member **14** are connected to the first main beam **11** and the first support member **13** on the same side, respectively. The two first main beams **11**, the two first support members **13** and the two second support members **14** define an accommodating space **15** therebetween together, and the tank body **42** is arranged in the accommodating space **15**.

(18) For example, in combination with FIGS. **3**-**8**, the two first main beams **11** can be substantially located in a same horizontal plane, and are spaced apart from each other in the left-right direction. The two second main beams **12** can be substantially located in a same horizontal plane, and are arranged under the two first main beams **11** while being spaced apart from each other in the left-right direction. An upper end of each first support member **13** is connected to one of the two first main beams **11**, and a lower end of each first support member **13** is connected to one of the two second main beams **12** on the same side as the one of the two first main beams **11**. An upper end of each second support member **14** is connected to one of the two first main beams **11**, and a lower

end of each second support member **14** is connected to one of the two first support members **13** on the same side as the one of the two first main beams **11**. Thus, the two first main beams **11**, the two first support members **13** and the two second support members **14** together define the accommodating space **15** for accommodating the fuel tank **4**. The two first main beams **11**, the two first support members **13** and the two second support members **14** can effectively wrap the tank **42** and hence improve the safety factor of the fuel tank **4**. It can be understood that a size of the accommodating space **15** can be set specifically according to the actual needs so as to better adapt to the fuel tanks **4** of different sizes, thus better satisfying the practical applications.

(19) Further, a distance between the first support member **13** and the second support member **14** on the same side gradually decreases from top to bottom, the tank body **42** matches with the accommodating space **15** in shape, and a sectional area of the tank body **42** gradually decreases from top to bottom. For example, referring to FIG. **7** and FIG. **8** in combination with FIG. **9**, a projection of the accommodating space **15** on a longitudinal central plane of the vehicle **100** has a shape of a triangular prism. In this way, a fuel suction nozzle of the fuel pump of the fuel tank **4** can always be at a lowest position of the fuel tank **4** when the vehicle **100** is at various angles (such as upward and downward steep slopes) during driving. Even if there is less remaining fuel in the fuel tank **4**, the fuel pump can still stably supply fuel to the powertrain **2** due to a small sectional area of a lower part of the fuel tank **4**, so as to ensure the normal driving of the vehicle **100**. Of course, the present disclosure is not limited to this, and the projection of the accommodating space **15** on the longitudinal central plane of the vehicle **100** can also have a shape of an inverted trapezoid.

(20) In some embodiments, as shown in FIG. **7** and FIG. **8**, each first support member **13** extends obliquely backward from top to bottom, and each second support member **14** extends obliquely forward from top to bottom. In this way, the vehicle **100** under various driving postures can ensure that the fuel pump can supply fuel stably, and also, a structure of the whole frame **1** is more stable. Furthermore, more space can be reserved in front of the first support member **13** arranged obliquely to arrange the steering system **3**, and more space can be reserved behind the lower end of the second support member **14** to arrange the powertrain **2**, so that a structure of the whole vehicle **100** can be more compact.

(21) According to some specific embodiments of the present disclosure, in combination with FIG. **4** and FIG. **5**, a highest point of the tank body **42** is located below the two first main beams **11**. Thus, a distance between the fuel tank **4** and the ground can be further reduced, so that a center of gravity of the fuel tank **4** can be further lowered, so as to further lower the center of gravity of the vehicle **100** and ensure the stability of the vehicle **100** during driving.

(22) According to some embodiments of the present disclosure, the steering system **3** further includes an electronic power steering device **33**, and projections of the fuel tank **4** and the electronic power steering device **33** on a vertical central plane of the vehicle **100** perpendicular to the longitudinal central plane of the vehicle **100** at least partially overlap with each other. Therefore, since a mounting point of the electronic power steering device **33** on the vehicle **100** is low, and the projections of the fuel tank **4** and the electronic power steering device **33** on the vertical central plane of the vehicle **100** at least partially overlap with each other, the center of gravity of the fuel tank **4** can be effectively lowered, so as to further lower the center of gravity of the vehicle **100**.

(23) According, to some embodiments of the present disclosure, the steering system **3** further includes a steering linkage **32** hinged with the steering shaft **31**. When the steering shaft **31** rotates, the steering shaft **31** drives the steering linkage **32** to move. Since the steering linkage **32** is connected to the wheels **20**, it drives the wheels **20** to rotate to allow the vehicle **100** to steer. A projection of a hinge point of the steering linkage **32** and the steering shaft **31** on the vertical central plane perpendicular to the longitudinal central plane of the vehicle **100** is located in a region of the projection of the fuel tank **4** on the above vertical central plane of the vehicle **100**. Since the

hinge point of the steering linkage **32** and the steering shaft **31** is relatively close to the ground, by arranging the fuel tank **4** in the above manner, the distance between the fuel tank **4** and the ground is reduced, thereby lowering the center of gravity of the fuel tank **4**.

(24) According to some embodiments of the present disclosure, the powertrain **2** includes a crankcase **21**. A projection of the crankcase **21** on the vertical central plane of the vehicle **100** perpendicular to the longitudinal central plane of the vehicle **100** at least partially overlaps with the projection of the fuel tank **4** on the above vertical central plane of the vehicle **100**. Referring to FIG. **4**, the crankcase **21** of the powertrain **2** is mounted on the second main beams **12** so that the crankcase **21** is close to the ground. Since the projections of the crankcase **21** and the fuel tank **4** on the vertical central plane of the vehicle **100** perpendicular to the longitudinal central plane of the vehicle **100** at least partially overlap with each other, the distance between the fuel tank **4** and the ground can also be reduced, so as to effectively lower the center of gravity of the fuel tank **4**.

(25) According to a further embodiment of the present disclosure, a bracket **16** which is arranged horizontally is provided between the two first support members **13** and the two second support members **14**, and the fuel tank **4** is placed on the bracket **16**. Referring to FIG. **5** and FIG. **8**, a left end of the bracket **16** is connected to the first support member **13** and the second support member **14** on the left, and a right end of the bracket **16** is connected to the first support member **13** and the second support member **14** on the right. When being mounted, the fuel tank **4** can be placed on the bracket **16**. At this time, the bracket **16** supports the fuel tank **4** and can effectively ensure the stability of the fuel tank **4**. The accommodating space **15** is defined by the two first main beams **11**, the two first support members **13**, the two second support members **14** and the bracket **16** together. A shape of a side surface of the accommodating space **15** is generally an inverted trapezoid, and a shape of the projection of the fuel tank **4** on the longitudinal central plane of the vehicle **100** is also substantially an inverted trapezoid. The two first main beams **11**, the two first support members **13**, the two second support members **14** and the bracket **16** can wrap the fuel tank **4** together, thus making the fuel tank **4** safer.

(26) In some embodiments, the two first support members **13** and the two second support members **14** may each be a support tube, but are not limited to this.

(27) In some embodiments, a backing plate **18** is arranged on the bracket **16**. When the vehicle **100** is driving in poor road conditions, the backing plate **18** can absorb a certain degree of vibration and have a damping effect on the fuel tank **4**, so as to ensue the stability of the fuel tank **4** during the driving of the vehicle **100**, and further improve the safety of the fuel tank **4**.

(28) In some embodiments, the backing plate **18** is a flexible rubber pad. The flexible rubber pad can have a base material of EVA (Ethylene Vinyl Acetate Copolymer) foam, coated with a high-performance pressure-sensitive adhesive on one or both sides, and formed by die-cutting and stamping composite single silicon or double silicon release materials. The flexible rubber pad has excellent weather resistance performance, chemical resistance performance, cushioning performance, sound absorption performance and adhesion performance. The flexible rubber pad has a soft texture and can effectively ensure the stableness of the fuel tank **4** during the driving of the vehicle **100**, while ensuring a good supporting effect on the fuel tank **4**. However, the present disclosure is not limited to this.

(29) According to some embodiments of the present disclosure, the frame **1** is provided with a connecting plate **17**, the steering shaft **31** is connected to the connecting plate **17**, and the highest point of the tank body **42** is located below the connecting plate **17**. As shown in FIGS. **3-5**, the connecting plate **17** is mounted above the first main beams **11**. The connecting plate **17** can be used as a carrier for mounting the steering shaft **31** to ensure the mounting stability of the steering shaft **31**. Therefore, since the highest point of the tank body **42** is arranged below the connecting plate **17**, it can be effectively ensured that the fuel tank **4** is located between the steering shaft **31** and the powertrain **2**, so as to effectively lower the center of gravity of the fuel tank **4**.

(30) According to some embodiments of the present disclosure, the vehicle **100** further includes a

gearbox **30**, and an intake pipe of the gearbox **30** is located on a left or right side of the fuel tank **4**. In this way, a compact structure of the vehicle **100** can be effectively ensured and the assembly of the vehicle **100** is also facilitated.

(31) According to some embodiments of the present disclosure, as shown in FIG. **1**, FIG. **2** and FIG. **6**, an air filter **5** and a transmission shaft **6** located below the air filter **5** are arranged to the frame **1**, and the fuel tank **4** is located below the air filter **5** and above the transmission shaft **6**. For example, the air filter **5** can be mounted between the two first main beams **11**, and can be connected to the powertrain **2** through an air pipeline so as to ensure the cleanness of the air inside the powertrain **2**. The transmission shaft **6** is arranged between the two second main beams **12**, and the fuel tank **4** is arranged between the air filter **5** and the transmission shaft **6**. Thus, a height of the fuel tank **4** can be further reduced, so as to lower the center of gravity of the vehicle **100**, and ensure the stability of the vehicle **100** during driving. Moreover, the steering shaft **31**, the powertrain **2**, the air filter **5** and the transmission shaft **6** can wrap the fuel tank **4** together, further improving the safety of the fuel tank **4**. In this way, the fuel tank **4** is arranged in front of the powertrain **2**, behind the steering shaft **31**, below the air filter **5** and above the transmission shaft **6** of the vehicle **100**.

(32) According to some embodiments of the present disclosure, a gear lever **7** is arranged to the frame **1**, the fuel tank **4** has a fuel filler **41**, and the fuel filler **41** and the gear lever **7** are symmetrical about the longitudinal central plane of the vehicle **100** in the left-right direction. For example, as shown in FIGS. **1**-**7**, the vehicle **100** further includes an instrument cover **9**, a body trim cover **10** and a set of wheels **20**. The body trim cover **10** is mounted between the seat **8** and the instrument cover **9**, and the fuel filler **41** and a gear-lever positioning groove **71** are on left and right sides of the body trim cover **10**, respectively, so that the fuel filler **41** and the gear lever **7** are approximately symmetrical about the longitudinal central plane of the vehicle **100** in the left-right direction. The gear lever **7** can be mounted to a side of the frame **1** in a width direction through the gear lever positioning groove **71**, and is arranged adjacent to the first main beams **11**. The gear lever **7** can be connected to the powertrain **2** to change an output ratio and an output direction of the power of the powertrain **2**. The fuel filler **41** is arranged on an upper portion of the fuel tank **4**. Based on the longitudinal central plane defined by the wheels **20** of the vehicle **100**, the fuel filler **41** and the gear lever **7** can be approximately symmetrically arranged on the left and right sides of the whole vehicle. It can be understood that the fuel filler **41** and the gear lever **7** are arranged on the left and right sides of the body trim cover **10** between the seat **8** and the instrument cover **9** of the vehicle **100**. The fuel filler **41** may be arranged on the left side of the longitudinal central plane of the vehicle **100**, and the gear lever **7** may be arranged on the right side of the longitudinal central plane of the vehicle **100** (as shown in FIG. **2** and FIG. **3**); or, the fuel filler **41** may also be arranged on the right side of the longitudinal central plane of the vehicle **100**, and the gear lever **7** may also be arranged on the left side of the longitudinal central plane of the vehicle **100** (as shown in FIG. **6** and FIG. **7**). Thus, a position of the fuel filler **41** is easy to access so as to facilitate refueling, and it is not easy for the fuel filler **41** to collide with other components during the mounting of the fuel tank **4**.

(33) Other configurations and operations of the vehicle **100** according to the embodiments of the present disclosure are known to those skilled in the art and will not be described in detail here.

(34) In the description of the present disclosure, it is to be understood that terms such as “central,” “longitudinal,” “transverse,” “length,” “width,” “thickness,” “upper,” “lower,” “front,” “rear,” “left,” “right,” “vertical,” “horizontal,” “top,” “bottom,” “inner,” “outer,” should be construed to refer to the orientation or position as then described or as shown in the drawings under discussion. These relative terms are for convenience of description of the present disclosure and do not indicate or imply that the device or element referred to must have a particular orientation, or be constructed and operated in a particular orientation. Thus, these terms shall not be construed as limitation on the present disclosure.

(35) In the description of the present disclosure, it shall be noted that unless specified or limited explicitly otherwise, the terms “mounted,” “interconnected,” “connected” shall be understood broadly, and may be, for example, fixed connections, may also be detachable connections, or integral connections; may be direct connections or indirect connections via intervening medium; may be inner communications of two elements. For those skilled in the art, the specific meaning of the above terms in the present disclosure can be understood according to specific situations.
(36) Reference throughout this specification to “an embodiment,” “some embodiments,” “an exemplary embodiment,” “an example,” “a specific example,” or “some examples,” means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. Thus, the exemplary descriptions of the above terms throughout this specification are not necessarily referring to the same embodiment or example.
(37) Although embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that various changes, modifications, alternatives and variations may be made in the embodiments without departing from principles and purposes of the present disclosure. The scope of the present disclosure is defined by the claims and their equivalents.

Claims

1. A vehicle, comprising: a frame; a seat arranged on the frame; a powertrain arranged on the frame; a steering system arranged on the frame and comprising a steering shaft, and the steering shaft being located in front of the powertrain; and a fuel tank arranged on the frame, and located behind the steering shaft and in front of the powertrain, wherein an air filter and a transmission shaft located below the air filter are arranged to the frame, and the fuel tank is located below the air filter and above the transmission shaft; wherein the fuel tank comprises a tank body; the frame comprises: two first main beams spaced apart in a left-right direction; two second main beams spaced apart in the left-right direction, and located below the two first main beams, respectively; two first support members spaced apart in the left-right direction, and two ends of each first support member being connected to the first main beam and the second main beam on the same side, respectively; and two second support members spaced apart in the left-right direction, and two ends of each second support member being connected to the first main beam and the first support member on the same side, respectively, and a part of each second support member being located behind the fuel tank, an entire end of the fuel tank where a fuel filler is arranged extending beyond the corresponding second support member in a direction facing away from a longitudinal central plane of the vehicle along the left-right direction, wherein the two first main beams, the two first support members and the two second support members define an accommodating space together, the tank body is arranged in the accommodating space, and the two first main beams, the two first support members and the two second support members effectively wrap the tank body, and wherein a bracket is arranged between the two first support members and the two second support members, the bracket is arranged horizontally and the fuel tank is arranged on the bracket.
2. The vehicle according to claim 1, wherein a projection of the accommodating space on the longitudinal central plane of the vehicle has a shape of a triangular prism or an inverted trapezoid.
3. The vehicle according to claim 1, wherein each first support member extends obliquely backward from top to bottom, and each second support member extends obliquely forward from top to bottom.
4. The vehicle according to claim 1, wherein a highest point of the tank body is located below the two first main beams.
5. The vehicle according to claim 1, wherein the steering system further comprises an electronic power steering device, and projections of the fuel tank and the electronic power steering device on

a vertical central plane of the vehicle perpendicular to the longitudinal central plane of the vehicle at least partially overlap with each other.

6. The vehicle according to claim 1, wherein the steering system further comprises a steering linkage hinged with the steering shaft, and a projection of a hinge point of the steering linkage and the steering shaft on a vertical central plane of the vehicle perpendicular to the longitudinal central plane of the vehicle is located in a region of a projection of the fuel tank on the vertical central plane of the vehicle.

7. The vehicle according to claim 1, wherein the powertrain comprises a crankcase, and the crankcase is mounted on the second main beams.

8. The vehicle according to claim 7, wherein a projection of the crankcase on a vertical central plane of the vehicle perpendicular to the longitudinal central plane of the vehicle at least partially overlaps with a projection of the fuel tank on the vertical central plane of the vehicle.

9. The vehicle according to claim 1, wherein the accommodating space is defined by the two first main beams, the two first support members, the two second support members and the bracket.

10. The vehicle according to claim 1, wherein a backing plate is arranged on the bracket.

11. The vehicle according to claim 10, wherein the backing plate is configured as a flexible rubber pad.

12. The vehicle according to claim 1, wherein each of the two first support members and the two second support members is configured as a support tube.

13. The vehicle according to claim 1, wherein the frame is provided a connecting plate, and the steering shaft is connected to the connecting plate; the fuel tank comprises a tank body, and a highest point of the tank body is located below the connecting plate.

14. The vehicle according to claim 1, wherein a gear lever is arranged to the frame, the fuel filler and the gear lever are symmetrical about the longitudinal central plane of the vehicle in the left-right direction.

15. The vehicle according to claim 1, wherein the vehicle is configured to a straddle all-terrain vehicle.

16. The vehicle according to claim 1, wherein a distance between the first support member and the second support member on the same side gradually decreases from top to bottom, the tank body matches with the accommodating space in shape, and a sectional area of a lower part of the tank body gradually decreases from top to bottom.