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(54) **Scooter type vehicle**

Rollerartiges Fahrzeug

Véhicule de type scooter

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Description

Field of the Invention

[0001] The present invention relates to a scooter type vehicle according to the preamble of claim 1. This vehicle has a unit swing type power unit provided with a water-cooled engine. More particularly, it relates to a scooter type vehicle in which improvement is made to a layout of a plurality of cooling water passages connecting an engine, a water pump for circulating cooling water for the engine, and a radiator for exchanging heat of the cooling water.

Related Art

[0002] A general scooter type vehicle ha a low floor type foot board, on which feet of a rider are put, placed between a handle-bar for steering a front wheel and a seat on which a rider sits. An article storage box is provided below the seat, and below the article storage box, a power unit, in which the engine and a power transmitting unit are integrally provided, is disposed.

[0003] Further, in order to secure a large capacity of the article storage box, a cylinder of the engine is forwardly inclined substantially horizontally on a front surface of a crankcase so that the entire height of the engine is lowered.

[0004] The power transmitting device is provided with its front end connected to one side surface of the crankcase and extends rearward, and a rear wheel is pivotally supported at the rear end of the power transmitting device.

[0005] When the engine is of a water-cooled type, a water pump is provided in the crankcase, while the radiator is disposed in a front head of a vehicle frame, the radiator and the water pump are connected with each other through an inlet pipe. The water pump and the cylinder of the engine are connected with each other through a joint pipe, and the cylinder and the radiator are connected with each other through an outlet pipe. Cooling water is circulated between the radiator, the water pump and the cylinder so as to perform an exchanging operation of the cylinder. A scooter type vehicle with exhaust pipe on the side of the cylinder opposite to the power transmitting unit is known from JP11082050. A scooter type vehicle according to the preamble of claim 1 is known from Japanese Patent Application Laid-open No. 9-13985 and Japanese Patent Application Laid-open No. 2001-10354 (Patent Publication 1 and 2). A water pump is generally disposed on one side surface of the crankcase. An exhaust pipe extending from a cylinder also extends rearward through a side of the crankcase and is connected to an exhaust muffler disposed on a side of a rear wheel. The exhaust muffler and the exhaust pipe are generally disposed on sides opposite to the power transmission unit with the rear wheel being interposed.

[0006] When the water pump is disposed on one side surface of the crankcase, it is difficult to dispose the water pump on the side at which the power transmitting unit is provided in terms of space, and it is absolutely necessary to employ a structure called "internal piping", in which a water passage from the water pump to the cylinder is formed inside the crankcase, for securing the liquid-tightness for a dry type V-belt existing in the power transmitting unit. These factors increase the engine (crankcase) in size and weight and make the structure complicated, which increase a manufacturing cost.

[0007] On the other hand, when the water pump is disposed on one side of the crankcase opposite to the side thereof at which the power transmitting unit is provided (on the side where the exhaust pipe is disposed), there is an adverse possibility that the water pump interferes with the exhaust pipe, and highly heated air generated from the exhaust pipe reaches the water pump, resulting in thermal damage to the water pump and being disadvantageous.

[0008] Since the cooling water cooled by the radiator is circulated through the water pump, if the water pump is heated, the cooling efficiency will deteriorated.

[0009] A swing shaft, a swing bracket and a swing arm for connecting the entire power unit to the vehicle frame to be swingably with respect to the vehicle frame are disposed around the crankcase of the engine, and a bottom of the article storage box is lowered to a low position. These arrangements make it difficult to arrange the water pump and the cooling water pipe.

SUMMARY OF THE INVENTION

[0010] The present invention was conceived in consideration of the circumstances mentioned above and an object of the present invention is to provide a scooter-type vehicle capable of disposing a water pump so as not to interfere with a power transmitting unit and an exhaust unit with excellent space efficiency, preventing heat of the exhaust unit from reaching the water pump and each piping to achieve an improved cooling efficiency, and also preventing a movable portion of the power unit and a cooling unit pipe member from interfering with each other.

[0011] The above and other objects can be achieved according to the present invention by providing a scooter type vehicle in which a power transmitting unit is integrally formed on one side of a crankcase of a water-cooled engine, a rear wheel is pivotally supported at the rear end portion thereof, a cylinder is disposed so as to forwardly incline substantially horizontally on a front surface of the crankcase, a unit swing type power unit is provided so as to vertically turn around a swing shaft disposed below the cylinder and in front of the crankcase, a cooling device for cooling a cooling water for the engine includes: a radiator serving to exchange heat of the cooling water; a water pump provided on one side surface of the crankcase for circulating cooling water; an inlet pipe through which the cooling water flows from the radiator to the

water pump; a joint pipe through which the cooling water flows from the water pump to the cylinder; an output pipe through which the cooling water flows from the cylinder to the radiator, and an exhaust pipe, the scooter-type vehicle being characterized in that the exhaust pipe is disposed on one side of the cylinder so as to oppose to the power transmitting unit in a widthwise direction of the vehicle, the water pump being disposed on a side surface of a lower portion of the crankcase on the side at which the exhaust pipe is disposed and below the exhaust pipe, the radiator is disposed on a front portion of a vehicle body, and the inlet pipe and the outlet pipe are disposed respectively on one and another sides in the vehicle widthwise direction substantially in parallel to each other along a longitudinal direction of the vehicle body in a space below a foot board.

[0012] In the above aspect, the following preferred embodiment may be adopted.

it may be desired that an exhaust port of the cylinder opens toward one side of the cylinder so as to oppose to the power transmitting device in the vehicle widthwise direction, and the exhaust pipe is connected to the exhaust port and curves from the exhaust port toward a rear portion of the vehicle body substantially horizontally.

[0013] The joint pipe may be arranged below the cylinder by passing between a lower surface of the cylinder and the swing shaft in the vehicle widthwise direction.

[0014] The exhaust pipe, the joint pipe and the inlet pipe may be disposed in this order as viewed in a side view on the side at which the water pump is disposed.

[0015] It may be further desired that an exhaust gas sensor is mounted on an upper surface of a substantially horizontal portion of the exhaust pipe located on one side of the cylinder, and an axis of the exhaust gas sensor extends along a side surface of the cylinder.

[0016] The inlet pipe may be disposed so as to be inclined forward and downward.

[0017] It may be further desired that the radiator is disposed in front of a head pipe of the vehicle frame at substantially the same height as the head pipe, sections of the inlet pipe and the outlet pipe from a front end of the foot board to the radiator are disposed along a front portion forming member of the vehicle frame substantially in the vertical direction, and the inlet pipe and the outlet pipe are respectively disposed on one and another sides of the vehicle frame in the widthwise direction of the vehicle.

[0018] According to the scooter type vehicle of the present invention of the characters mentioned above, the exhaust pipe is disposed on one side of the cylinder that is opposite side from the power transmitting device in the widthwise direction of the vehicle, and the water pump is disposed on a lower side surface of the crankcase on the side where the exhaust pipe is disposed and below the exhaust pipe. Accordingly, it is possible to dispose the water pump such a way that the water pump does not interfere with the power transmitting device and the exhaust unit with excellent space efficiency, whereby heat of the exhaust unit can be prevented from reaching the water pump and each piping to enhance the cooling efficiency.

[0019] Furthermore, the radiator is disposed in the front portion of the vehicle, the inlet pipe and the outlet pipe are disposed on one side and the other side respectively in the widthwise direction of the vehicle substantially in parallel to each other along the longitudinal direction of the vehicle body in spaces below the foot board on which feet of a rider are put. Accordingly, it is possible to dispose cooling unit parts with excellent space efficiency, and to prevent the power unit movable portion and the cooling unit pipe member from interfering with each other.

[0020] 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.

BRIEF DESCRIPTION OF DRAWINGS

[0021] In the accompanying drawings:

Fig. 1 is a right side view showing a basic framework of a vehicle frame and a power unit of a scooter type vehicle according to the present invention;
Fig. 2 is a left side view of the basic framework of Fig. 1;
Fig. 3 is a right side view showing essential portions of the present invention;
Fig. 4 is a left side view showing essential portions of the invention; and
Fig. 5 is a plan view taken in a direction of an arrow V in Fig. 4 for showing one embodiment of the present invention.

DESCRIPTION OF SPECIFIC EMBODIMENT

[0022] An embodiment of the present invention will be explained hereunder with reference to the accompanying drawings. Further, it is to be noted that terms "right", "left", "upper", "lower" and lime terms are used herein with reference to the illustration of the accompanying drawings or an actual installation state of a vehicle body frame.

[0023] With reference to Figs. 1 to 5, the vehicle frame 2 of the scooter type vehicle 1 has a basic structure in which one front pipe 4 extends rearward and downward at an abrupt angle from a head pipe 3 of a front head. A pair of left and right down pipes 5 extend downward from a lower end area of the front pipe 4, curve rearward and are then connected to a center pipe 6 which extends in the widthwise direction of the vehicle. Further, a pair of left and right rear pipes 7 extend rearward and diagonally upward from the center pipe 6. An engine bracket 8, which functions as a reinforcing member, is provided at a junction between the center pipe 6 and the rear pipes 7.

[0024] As schematically illustrated, a handle-bar, not shown, and a front fork 12, which supports a front wheel 11, are pivotally supported by the head pipe 3. A power

unit 14 is connected to an engine bracket 8 through a swing bracket 32, mentioned hereinlater. A bottomed article storage box 16, which opens upward, and a fuel tank 17 are disposed at front and back portions above the rear pipes 7.

[0025] A seat 18 is disposed to cover the upper portions of the article storage box 16 and the fuel tank 17. The accessing to the article storage box 16 and the supplying of the fuel to the fuel tank 17 are performed by opening the seat 18 upward.

[0026] A foot board member 21 is placed on a horizontal portion of the down pipe 5 of the vehicle frame 2, and a foot board, not shown, on which feet of a rider are put, is disposed on the foot board member 21. The entire vehicle frame 2 is covered with a frame cover made of synthetic resin so as to improve an outer appearance of the scooter type vehicle 1 and to protect internal equipment.

[0027] A water-cooled engine 24 and a power transmitting unit 25 are formed integrally to constitute the power unit 14. The engine 24 is provided so that a cylinder 27 thereof is inclined forward substantially horizontally and provided on the front surface of the crankcase 26 so as to reduce the entire height of the engine 24, and to secure the capacity of the article storage box 16.

[0028] A front portion of the power transmitting unit 25 (belt case) is integrally provided on one side, e.g., left side of the crankcase 26, the power transmitting unit 25 extends rearward, and a rear wheel 30 is pivotally supported at the right side surface of rear end of the power transmitting unit 25. A magneto cover 28 for covering an electric generator is applied on a right side surface of the crankcase 26, and a cam chain tensioner 29 is provided on an upper surface of a base portion of the cylinder 27.

[0029] A pair of left and right swing arms 31 are provided on a front surface of the crankcase 26 and below the cylinder 27. A pair of left and right swing brackets 32 extending rearward are provided on the engine bracket 8 of the vehicle frame 2.

[0030] Tip ends of the swing arms 31 are pivotally supported by the swing shaft 33 provided between rear ends of the swing brackets 32 to be rotatable around the shaft. Thus, the entire power unit 14 vertically turns around the swing shaft 33 together with the rear wheel 30, and the power unit 14 functions as a suspension arm of the rear wheel 30.

[0031] A rear cushion unit 34 is connected between a rear portion of the power transmitting unit 25 and a rear portion of the vehicle frame 2 (rear pipe 7) so as to absorb and restore the vertical swing motion of the power unit 14.

[0032] A throttle body 35 is disposed on the upper portion of the cylinder 27, and the throttle body 35 and an intake port 36 of the cylinder 27 are connected to each other through a curved inlet manifold 37. The intake port 36 opens on the side of the power transmitting unit 25 of the cylinder 27, i.e., on an upper portion of a left side surface of the cylinder 27 in the illustrated embodiment. A fuel injector 38 is disposed on the curved portion of the inlet manifold 37, and a fuel injecting direction is oriented inward of the intake port 36. One end of a fuel delivery pipe 39 is connected to the fuel injector 38, and the other end thereof is connected to the fuel tank 17.

[0033] An air cleaner 40 is disposed on an upper portion of the power transmitting device 25, and an intake pipe 41 extending from a front portion of the air cleaner 40 is connected to the throttle body 35. The air cleaner 40 vertically swings in unison with the power transmitting unit 25. A breather hose 42, extending from a top of the cylinder 27 at one end, is connected to the air cleaner 40 at the other end thereof.

[0034] An exhaust port 43 of the cylinder 27 opens toward the opposite side in the widthwise direction of the vehicle body with respect to the power transmitting unit 25, i.e., toward the right side in the embodiment.

[0035] An exhaust pipe 44 connected to the exhaust port 43 extends shortly therefrom and immediately curves rearward of the vehicle. Then, the exhaust pipe 44 extends substantially horizontally rearward along the right side of the cylinder 27 and is connected to an exhaust muffler 45 provided on a right side of the rear wheel 30.

[0036] When the connection of the connecting portion 46 provided on an intermediate portion of the exhaust pipe 44 is released, a rear half of the exhaust pipe 44 and the exhaust muffler 45 will be removed from the vehicle body. Therefore, maintenance around a water pump 52, mentioned hereinlater, can be performed excellently.

[0037] An exhaust gas sensor 48 (O_2 sensor or the like) is provided near the most upstream portion of the exhaust pipe 44, i.e., an upper surface of the exhaust pipe 44 in a substantially horizontal section located on the right side of the cylinder 27. The exhaust gas sensor 48 is mounted such that an axis 48a thereof stands substantially upright on an upper surface of the exhaust pipe 44 along the side surface of the cylinder 27.

[0038] A cooling device 50 for cooling the cooling water for the engine 24 includes: a radiator 51 for exchanging heat of the cooling water; the water pump 52 for circulating the cooling water; an inlet pipe 53 through which cooling water flows to the water pump 52 from the radiator 51; a joint pipe 54 through which cooling water flows to the cylinder 27 from the water pump 52; and an outlet pipe 55 through which cooling water flows to the radiator 51 from the cylinder 27.

[0039] The radiator 51 is disposed in front of the head pipe 3 on the front portion of the vehicle body and at substantially the same height as the head pipe 3. The water pump 52 is mounted on a side surface of a lower portion of the crankcase 26 on the opposite side from the power transmitting unit 25 in the widthwise direction of the vehicle body, i.e., on the right side surface of the crankcase 26 which is the side at which the exhaust pipe 44 is disposed. The water pump 52 is disposed at a location lower than the exhaust pipe 44.

[0040] The water pump 52 is mounted below the magneto cover 28 which is put on the right side surface of

the crankcase 26. As shown in Fig. 5, the right side surface of the water pump 52 is located inward from the right side surface of the magneto cover 28 in the widthwise direction of the vehicle body. This arrangement secures a large bank angle when the scooter type vehicle 1 turns rightward.

[0041] The inlet pipe 53 and the outlet pipe 55 are provided on one side and the other side respectively in the widthwise direction of the vehicle body substantially in parallel to each other along the longitudinal direction of the vehicle body in a space below the foot board (foot board member 21). For example, the inlet pipe 53 may be disposed on the right side and the outlet pipe 55 may be disposed on the left side as viewed in the traveling direction.

[0042] A section of the inlet pipe 53 and the outlet pipe 55 from a front end region of the foot board to the radiator 51 is disposed substantially in the vertical direction along the front pipe 4, which is a front portion constituting member of the vehicle frame 2, and the inlet pipe 53 and the outlet pipe 55 are disposed on both sides of the front pipe 4 in the widthwise direction of the vehicle body, respectively. The inlet pipe 53 and the outlet pipe 55 are inclined forward and downward in the space below the foot board.

[0043] As shown Fig. 3, the inlet pipe 53 includes: an inlet hose 58 in shape of rubber hose, for example, and connected to an outlet-side union 57 provided on a right side of a rear surface of the radiator 51; an inlet pipe 59 in shape of metal pipe, for example, and connected to a rear end of the inlet hose 58; and an inlet hose 60 connected to a rear end of the inlet pipe 59.

[0044] A rear end of the inlet hose 60 is connected to a cooling water suction portion 61 provided at a central portion of a side surface of the water pump 52. The section extending along the front pipe 4 of the vehicle frame 2 and disposed in the space below the foot board is mainly the part of inlet pipe 59.

[0045] As shown in Fig. 4, the outlet pipe 55 includes: an outlet hose 64 in shape of rubber hose, for example, and connected to an inlet-side union 63 provided on a left side of a rear surface of the radiator 51; an outlet pipe 65 in shape of metal pipe, for example, and connected to a lower end of the outlet hose 64; and an outlet hose 66 connected to a rear end of the outlet pipe 65.

[0046] A rear end of the outlet hose 66 is connected to a cooling water discharge portion 67 (see Figs. 3 and 5) provided on an upper surface of the cylinder 27. A thermostat valve, not shown, is incorporated in the cooling water discharge portion 67 to control a flow rate of cooling water in accordance with the temperature of the cooling water in the cylinder 27. The section extending along the front pipe 4 of the vehicle frame 2 and disposed in the space below the foot board is mainly of the outlet hose 64 and the outlet pipe 65.

[0047] The joint pipe 54 is a pipe such as a rubber hose pipe. One end of the joint pipe 54 is connected to a cooling water discharge portion 69 of the water pump 52 (see Fig. 3), and the other end is connected to a cooling water introducing opening 70 provided near a base portion of a lower surface of the cylinder 27 (see Fig. 4). The cooling water introducing opening 70 is connected to a water jacket formed in the cylinder 27.

[0048] As shown in Fig. 3, the joint pipe 54 is disposed below the cylinder 27 and passing between the lower surface of the cylinder 27 and the swing shaft 33 so as to extend in the widthwise direction of the vehicle. The exhaust pipe 44, the joint pipe 54 and the inlet pipe 53 (inlet hose 60) are disposed in this order in the side view from right side at which the water pump 52 is provided as shown in Fig. 3.

[0049] When the engine 24 of the power unit 14 starts, the water pump 52 is operated to circulate the cooling water through the water pump 52 (cooling water discharge portion 69) → the joint pipe 54 → the cooling water introducing opening 70 → the cylinder 27 (water jacket) → the cooling water discharging portion 67 → the outlet pipes 55 (64, 65 and 66) → the radiator 51 → the inlet pipes 53 (58, 59 and 60) → the water pump 52 (cooling water suction portion 61) in this order. With this circulation, the heat of the cylinder 27 is cooled and this heat is exchanged by the radiator 51.

[0050] As described above, according to the scooter type vehicle 1, the exhaust pipe 44 is disposed on one side of the cylinder 27 that is opposite from the power transmitting device 25 of the power unit 14 in the widthwise direction of the vehicle, the exhaust port 43 to which the exhaust pipe 44 is connected opens toward one side of the cylinder 27 that is opposite from the power transmitting device 25 in the widthwise direction of the vehicle, and the exhaust pipe 44 curves substantially horizontally rearward of the vehicle body from the exhaust port 43.

[0051] The water pump 52 is disposed on the side surface of the lower portion of the crankcase 26 on the side at which the exhaust pipe 44 is disposed and below the exhaust pipe 44, and the exhaust pipe 44, the joint pipe 54 and the inlet pipe 53 are disposed in this order from above as viewed from side. Therefore, the water pump 52 can be disposed with excellent space efficiency without interfering with the power transmitting unit 25 and the exhaust pipe 44.

[0052] Further, since the heat diffused from the exhaust pipe 44 is convected upward, it is possible to effectively prevent the water pump 52, the joint pipe 54 and the inlet pipe 53 (inlet hose 60) located below the exhaust pipe 44 from being thermally damaged and also possible to enhance cooling efficiency of the cooling device 50. In addition, since the exhaust pipe 44 is disposed above the water pump 52, it is possible to secure the sufficient bank angle of the vehicle body at the time of cornering of the scooter type vehicle 1.

[0053] The joint pipe 54 through which cooling water flows from the water pump 52 to the cylinder 27 is provided as an external pipe. With this arrangement, it is possible to secure the more excellent liquid-tightness and maintenance easiness as compared with the case where the joint pipe 54 is formed in the crankcase 26. Further,

the engine 24 (crankcase 26) can be reduced in size and weight, and the producing cost thereof can also be reduced.

[0054] Furthermore, since the joint pipe 54 is disposed below the cylinder 27 passing between the lower surface of the cylinder 27 and the swing shaft 33 in the widthwise direction of the vehicle, the joint pipe 54 can be disposed with excellent space efficiency, and it is possible to prevent the joint pipe 54 from interfering with moving parts of the power unit 14 such as the swing arms 31, the swing bracket 32 and the swing shaft 33. Especially, since the joint pipe 54 is connected to the cooling water introducing opening 70 formed on the lower surface of the rear portion of the cylinder 27, the joint pipe 54 can be disposed at a location separated away from the exhaust port 43 and the exhaust pipe 44, the angle sandwiched between the cylinder 27 and the swing arms 31 can be reduced. Thus, it is possible to incline the cylinder 27 substantially horizontally, and the swing shaft 33 can be disposed at a high position whereby the minimum height from the ground can be increased.

[0055] According to the scooter type vehicle 1 of the present invention, the radiator 51 is disposed in front of the head pipe 3 of the vehicle frame 2 and substantially at the same height level as that of the head pipe 3, the inlet pipe 53 and the outlet pipe 55 are respectively disposed on one side and the other side in the widthwise direction of the vehicle substantially in parallel to each other along the longitudinal direction of the vehicle body in the space below the foot board on which feet of a rider are put. Therefore, the inlet pipe 53 and the outlet pipe 55 can be made short, and piping thereof can be simplified.

[0056] According to this arrangement, it becomes unnecessary to dispose the inlet pipe 53 (58, 59 and 60) and the outlet pipe 55 (64, 65 and 66) across in the widthwise direction of the vehicle near the engine. Therefore, the piping layout around there can be simplified to make it possible to effectively prevent the joint pipe 54 from interfering with other members (such as swing arms 31, the exhaust port 43 and the exhaust pipe 44).

[0057] Furthermore, since it becomes unnecessary to extend the inlet pipe 53 and the outlet pipe 55 in the space below the foot board from one side to the other side in the widthwise direction of the vehicle body, the lower surface of the foot board and the down pipe 5 can be disposed close to each other, and therefore, a space through which feet can be put (space above the foot board and between a leg shield, not shown, and a vehicle body cover, not shown, covering the article storage box 16) can be largely secured.

[0058] Still Furthermore, since the inlet pipe 53 is inclined forward and downward in the space below the foot board, it is possible to prevent air from staying in the inlet pipe 53, thus reducing the pump loss of the water pump 52.

[0059] Sections of the inlet pipe 53 and the outlet pipe 55 from the front end area of the foot board to the radiator 51 are disposed along the front pipe 4, forming the front portion of the vehicle frame 2, substantially in the vertical direction, and the inlet pipe 53 and the outlet pipe 55 are respectively disposed on one side and the other side of the front pipe 4 in the widthwise direction of the vehicle. Therefore, a leg shield which is formed in such a way to cover the front pipe 4 so as to cover front portions of knees of a rider, can be prevented from protruding outward in the widthwise direction of the vehicle, and it is possible to protect the inlet pipe 53 and the outlet pipe 55.

[0060] According to the scooter type vehicle 1 of the present invention, the exhaust gas sensor 48 is mounted on an upper surface of a substantially horizontal portion of the exhaust pipe 44 located on the right side of the cylinder 27, and the axis 48a of the exhaust gas sensor 48 extends along the side surface (right side surface) of the cylinder 27. Therefore, it is possible to prevent the exhaust gas sensor 48 from interfering with the cooling water pipes (e.g., the inlet hose 60 and the joint pipe 54).

[0061] Since a gas detector of the exhaust gas sensor 48 is located above the bottom surface (lower side) of the exhaust pipe 44 in the exhaust pipe 44, the gas detector is prevented from coming into contact with water drop included in the exhaust gas, and thus, the detection precision can be enhanced.

[0062] Since the joint pipe 54 is disposed below the cylinder 27 in the widthwise direction of the vehicle, the joint pipe 54 is prevented from interfering with the cam chain tensioner 29 and the breather hose 42 disposed above the cylinder 27. Further, the cam chain, not shown, is disposed on the right side of the cylinder 27 opposite to the side at which the intake unit parts (such as the air cleaner 40, the intake pipe 41, the throttle body 35, the fuel injector 38, the fuel delivery pipe 39, the inlet manifold 37 and the intake port 36) are disposed. Therefore, the intake unit parts can be disposed at lower positions, and the capacity of the article storage box 16 can be secured.

[0063] Still furthermore, since the exhaust pipe 44 is formed to be dividable in the longitudinal direction, and the water pump 52 is disposed behind the connecting portion 46, the inlet hose 60 and the joint pipe 54 can be easily maintained by removing the rear half of the exhaust pipe 44 and the exhaust muffler 45.

[0064] It is to be further noted that the present invention is not limited to the described embodiment and many other changes and modifications may be made without departing from the scopes of the appended claims.

Claims

1. A scooter type vehicle (1) in which a power transmitting unit (25) is integrally formed on one side of a crankcase (26) of a water-cooled engine (24), a rear wheel (30) is pivotally supported at the rear end portion thereof, a cylinder (27) is disposed so as to forwardly incline substantially horizontally on a front surface of the crankcase (26), a unit swing type pow-

er unit (14) is provided so as to vertically turn around a swing shaft (33) disposed below the cylinder (27) and in front of the crankcase (26), a cooling device (50) for cooling a cooling water for the engine (24) includes: a radiator (51) serving to exchange heat of the cooling water; a water pump (52) provided on one side surface of the crankcase (26) for circulating cooling water; an inlet pipe (53) through which the cooling water flows from the radiator (51) to the water pump (52); a joint pipe (54) through which the cooling water flows from the water pump (52) to the cylinder (27); an output pipe (55) through which the cooling water flows from the cylinder (27) to the radiator (51); and an exhaust pipe (44), wherein the exhaust pipe (44) is disposed on one side of the cylinder (27) so as to oppose to the power transmitting unit (25) in a widthwise direction of the vehicle (1), **characterized in that** the water pump (52) being disposed on a side surface of a lower portion of the crankcase (26) on the side at which the exhaust pipe (44) is disposed and below the exhaust pipe (44), the radiator (51) is disposed on a front portion of a vehicle body, and the inlet pipe (53) and the outlet pipe (55) are disposed respectively on one and another sides in the vehicle widthwise direction substantially in parallel to each other along a longitudinal direction of the vehicle body in a space below a foot board.

2. The scooter typ vehicle (1) according to claim 1, wherein an exhaust port (43) of the cylinder (27) opens toward one side of the cylinder (27) so as to oppose to the power transmitting device (25) in the vehicle widthwise direction, and the exhaust pipe (44) is connected to the exhaust port (43) and curves from the exhaust port (43) toward a rear portion of the vehicle body substantially horizontally.

3. The scooter type vehicle (1) according to claim 1 or 2, wherein the joint pipe (54) is arranged below the cylinder (27) by passing between a lower surface of the cylinder (27) and the swing shaft (33) in the vehicle widthwise direction.

4. The scooter type vehicle (1) according to any one of claims 1 to 3, wherein the exhaust pipe (44), the joint pipe (54) and the inlet pipe (53) are disposed in this order as viewed in a side view on the side at which the water pump (52) is disposed.

5. The scooter type vehicle (1) according to any one of claims 1 to 4, wherein an exhaust gas sensor (48) is mounted on an upper surface of a substantially horizontal portion of the exhaust pipe (44) located on one side of the cylinder (27), and an axis of the exhaust gas sensor (48) extends along a side surface of the cylinder (27).

6. The scooter type vehicle (1) according to any one of claims 1 to 5, wherein the inlet pipe (53) is disposed so as to be inclined forward and downward.

7. The scooter type vehicle (1) according to any one of claims 1 to 6, wherein the radiator (51) is disposed in front of a head pipe (3) of the vehicle frame (2) at substantially the same height as the head pipe (3); sections of the inlet pipe (53) and the outlet pipe (55) from a front end of the foot board to the radiator (51) are disposed along a front portion forming member of the vehicle frame (2) substantially in the vertical direction, and the inlet pipe (53) and the outlet pipe (55) are respectively disposed on one and another sides of the vehicle frame (2) in the widthwise direction of the vehicle (1).

Patentansprüche

1. Rollerartiges Fahrzeug (1), in welchem eine Kraftübertragungseinheit (25) an einer Seite eines Kurbelgehäuses (26) eines wassergekühlten Motors (24) integral ausgebildet ist, an dem hinteren Endabschnitt der Einheit ein Hinterrad (30) drehbar gelagert ist, ein Zylinder (27) derart angeordnet ist, dass er an einer Frontseite des Kurbelgehäuses (26) im Wesentlichen horizontal nach vorn geneigt ist, eine Einheitsschwingen-Leistungseinheit (14) derart vorgesehen ist, dass sie schwenkbar um eine unterhalb des Zylinders (27) und vor dem Kurbelgehäuse (26) angeordnete Schwenkwelle (33) vertikal schwenkbar ist, eine Kühleinrichtung (50) zum Kühlen von Kühlwasser für den Motor (24) aufweist: ein Gebläse (15), welches zum Austausch von Wärme des Kühlwassers dient; eine Wasserpumpe (52), die an einer Seitenfläche des Kurbelgehäuses (26) vorgesehen ist, um Kühlwasser umzuwälzen; eine Einlassleitung (52), durch die das Kühlwasser von dem Gebläse (51) zu der Wasserpumpe (52) strömt; und eine Verbindungsleitung (54), durch die das Kühlwasser von der Wasserpumpe (52) zu dem Zylinder (27) strömt; eine Ausgangsleitung (55), durch die das Kühlwasser von dem Zylinder (27) zu dem Gebläse (51) strömt, und eine Auspuffleitung (44),
wobei die Auspuffleitung (44) auf einer Seite des Zylinders (27) in Breitenrichtung des Fahrzeugs (1) abgewandt von der Kraftübertragungseinheit (25) angeordnet ist, **dadurch gekennzeichnet, dass**
die Wasserpumpe (52) an einer Seitenfläche eines unteren Teils des Kurbelgehäuses (26) auf der Seite, auf der sich die Auspuffleitung (44) befindet, und unterhalb der Auspuffleitung (44) angeordnet ist, das Gebläse (51) sich in einem Frontbereich einer Fahrzeugkarosserie befindet, und die Einlassleitung (53) sowie die Auslassleitung (55) auf der einen beziehungsweise der anderen Seite in Fahrzeug-Breitenrichtung etwa parallel zueinander entlang einer Längsrichtung der Fahrzeugkarosserie in einem

Raum unterhalb einer Fußrastplatte angeordnet sind.

2. Fahrzeug (1) nach Anspruch 1, bei dem eine Auspufföffnung (43) des Zylinders (27) sich zu einer Seite des Zylinders (27) hin öffnet, sodass sie gegenüber der Kraftübertragungseinheit (25) in Fahrzeug-Breitenrichtung liegt, und die Auspuffleitung (44) an die Auspufföffnung (23) angeschlossen ist und sich ausgehend von der Auspufföffnung (43) im Wesentlichen horizontal zu einem hinteren Bereich der Fahrzeugkarosserie krümmt.

3. Fahrzeug (1) nach Anspruch 1 oder 2, bei dem die Verbindungsleitung (54) unterhalb des Zylinders (27) angeordnet ist, wobei sie zwischen einer Unterseite des Zylinders (27) und der Schwenkwelle (33) in Fahrzeug-Breitenrichtung verläuft.

4. Fahrzeug (1) nach einem der Ansprüche 1 bis 3, bei dem die Auspuffleitung (44), die Verbindungsleitung (54) und die Einlassleitung (53) in dieser Reihenfolge bei Betrachtung von der Seite, auf der sich die Wasserpumpe (52) befindet, angeordnet sind.

5. Fahrzeug (1) nach einem der Ansprüche 1 bis 4, bei dem ein Auspuffgassensor (48) an einer Oberseite eines im Wesentlichen horizontalen Abschnitts der Auspuffleitung (44) auf einer Seite des Zylinders (27) angebracht ist, und eine Achse des Auspuffgassensors (48) sich entlang einer Seitenfläche des Zylinders (27) erstreckt.

6. Fahrzeug (1) nach einem der Ansprüche 1 bis 5, bei dem die Einlassleitung (53) derart angeordnet ist, dass sie nach vorn und nach unten geneigt ist.

7. Fahrzeug (1) nach einem der Ansprüche 1 bis 6, bei dem das Gebläse (51) vor einem Lenkkopfrohr (3) des Fahrzeugrahmens (2) in etwa der gleichen Höhe wie das Lenkkopfrohr (3) angeordnet ist, Abschnitte der Einlassleitung (53) und der Auslassleitung (55) von einem vorderen Ende der Fußrastplatte zu dem Gebläse (51) entlang eines einen Frontabschnitt bildenden Elements des Fahrzeugrahmens (2) etwa in vertikaler Richtung angeordnet sind, und die Einlassleitung sowie die Auslassleitung (55) auf der einen beziehungsweise der anderen Seite des Fahrzeugrahmens in Breitenrichtung des Fahrzeugs (1) angeordnet sind.

Revendications

1. Véhicule de type scooter (1), dans lequel une unité de transmission de puissance (25) est formée d'un seul tenant sur un côté d'un carter de vilebrequin (26) d'un moteur refroidi à l'eau (24), une roue arrière (30) est supportée de manière à pivoter sur la portion d'extrémité arrière de celui-ci, un cylindre (27) est disposé de manière à s'incliner vers l'avant de manière en grande partie horizontale sur une surface avant du carter de vilebrequin (26), un groupe moteur de type à unité oscillante (14) est prévu de manière à tourner verticalement autour d'un arbre oscillant (33) disposé au-dessous du cylindre (27) et devant le carter de vilebrequin (26), un dispositif de refroidissement (50) destiné à refroidir une eau de refroidissement pour le moteur (24) inclut : un radiateur (51) servant à échanger la chaleur de l'eau de refroidissement ; une pompe à eau (52) prévue sur une surface latérale du carter de vilebrequin (26) pour la circulation de l'eau de refroidissement ; un tuyau d'admission (53) à travers lequel l'eau de refroidissement circule du radiateur (51) vers la pompe à eau (52) ; un tuyau de jonction (54) à travers lequel l'eau de refroidissement circule de la pompe à eau (52) au cylindre (27) ; un tuyau de sortie (55) à travers lequel l'eau de refroidissement circule du cylindre (27) au radiateur (51), et un tuyau d'échappement (44),
dans lequel le tuyau d'échappement (44) est disposé sur un côté du cylindre (27) de manière à être face à l'unité de transmission de puissance (25) dans une direction de largeur du véhicule (1), **caractérisé en ce que** la pompe à eau (52) est disposée sur une surface latérale d'une portion inférieure du carter de vilebrequin (26) sur le côté sur lequel le tuyau d'échappement (44) est disposé et au-dessous du tuyau d'échappement (44), le radiateur (51) est disposé sur une portion avant d'une carrosserie de véhicule, et le tuyau d'admission (53) et le tuyau de sortie (55) sont respectivement disposés sur l'un et l'autre côtés dans la direction de largeur de véhicule en grande partie parallèlement l'un à l'autre le long d'une direction longitudinale de la carrosserie de véhicule dans un espace au-dessous d'une tôle de plancher.

2. Véhicule de type scooter (1) selon la revendication 1, dans lequel un orifice d'échappement (43) du cylindre (27) s'ouvre vers un côté du cylindre (27) de manière à faire face au dispositif de transmission de puissance (25) dans la direction de largeur de véhicule, et le tuyau d'échappement (44) est connecté à l'orifice d'échappement (43) et présente une courbe de l'orifice d'échappement (43) vers une portion arrière de la carrosserie de véhicule en grande partie horizontalement.

3. Véhicule de type scooter (1) selon la revendication 1 ou 2, dans lequel le tuyau de jonction (54) est agencé au-dessous du cylindre (27) en passant entre une surface inférieure du cylindre (27) et l'arbre oscillant (33) dans la direction de largeur du véhicule.

4. Véhicule de type scooter (1) selon l'une quelconque des revendications 1 à 3, dans lequel le tuyau d'échappement (44), le tuyau de jonction (54) et le tuyau d'admission (53) sont disposés dans cet ordre comme vu dans une vue latérale sur le côté sur lequel la pompe à eau (52) est disposée.

5. Véhicule de type scooter (1) selon l'une quelconque des revendications 1 à 4, dans lequel un capteur de gaz d'échappement (48) est monté sur une surface supérieure d'une portion en grande partie horizontale du tuyau d'échappement (44) situé sur un côté du cylindre (27), et un axe du capteur de gaz d'échappement (48) s'étend le long d'une surface latérale du cylindre (27).

6. Véhicule de type scooter (1) selon l'une quelconque des revendications 1 à 5, dans lequel le tuyau d'admission (53) est disposé de manière à être incliné vers l'avant et vers le bas.

7. Véhicule de type scooter (1) selon l'une quelconque des revendications 1 à 6, dans lequel le radiateur (51) est disposé devant un tuyau de refoulement (3) du châssis de véhicule (2) à pratiquement la même hauteur que le tuyau de refoulement (3) ; des sections du tuyau d'admission (53) et du tuyau de sortie (55) allant d'une extrémité avant de la tôle de plancher au radiateur (51) sont disposées le long d'un élément formant une portion avant du châssis de véhicule (2) en grande partie dans la direction verticale, et le tuyau d'admission (53) et le tuyau de sortie (55) sont disposés respectivement sur l'un et l'autre côtés du châssis de véhicule (2) dans la direction de largeur du véhicule (1).

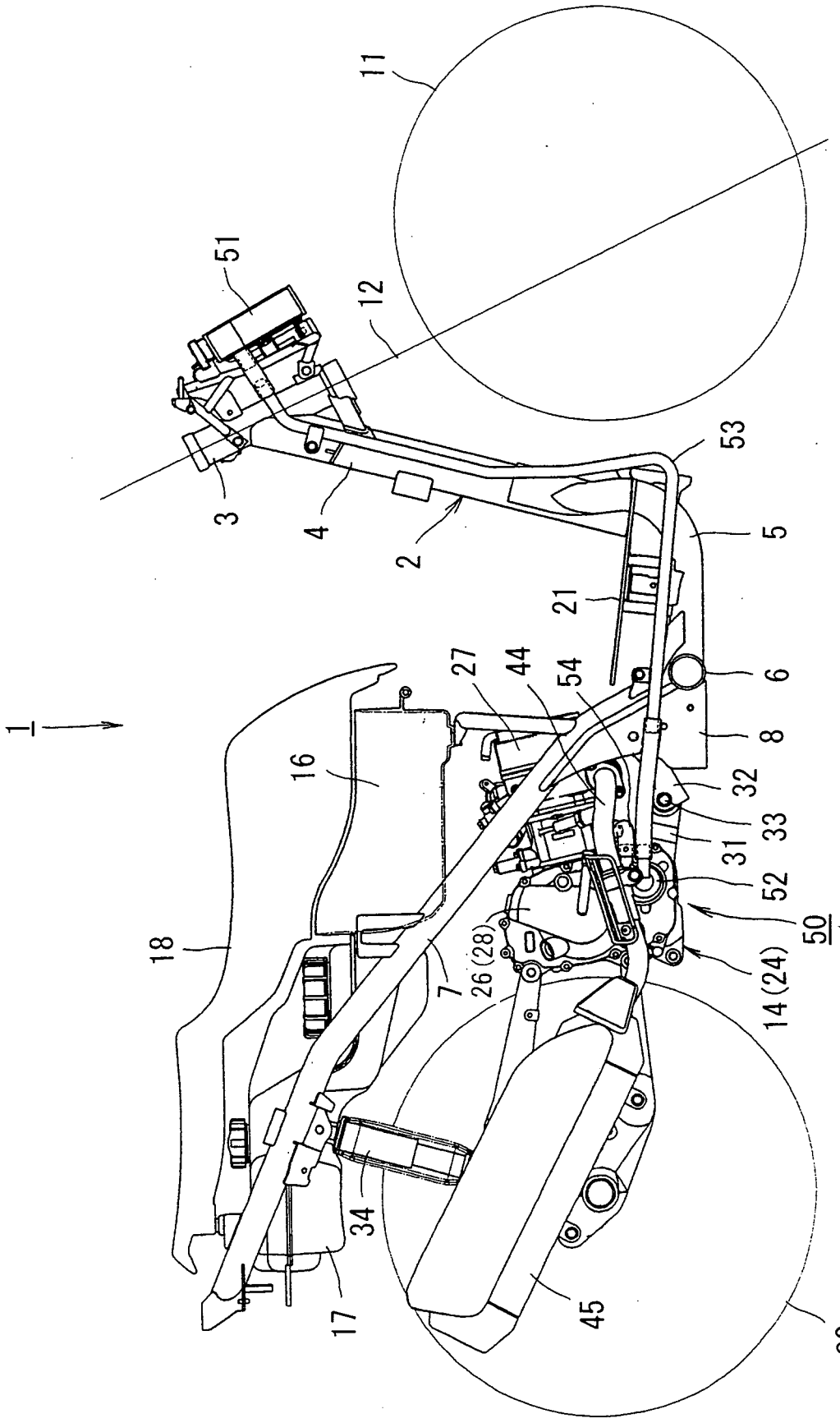

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8
11
12
14 (24)
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18
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26 (28)
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32
33
34
44
45
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51
52
53
54

FIG. 1

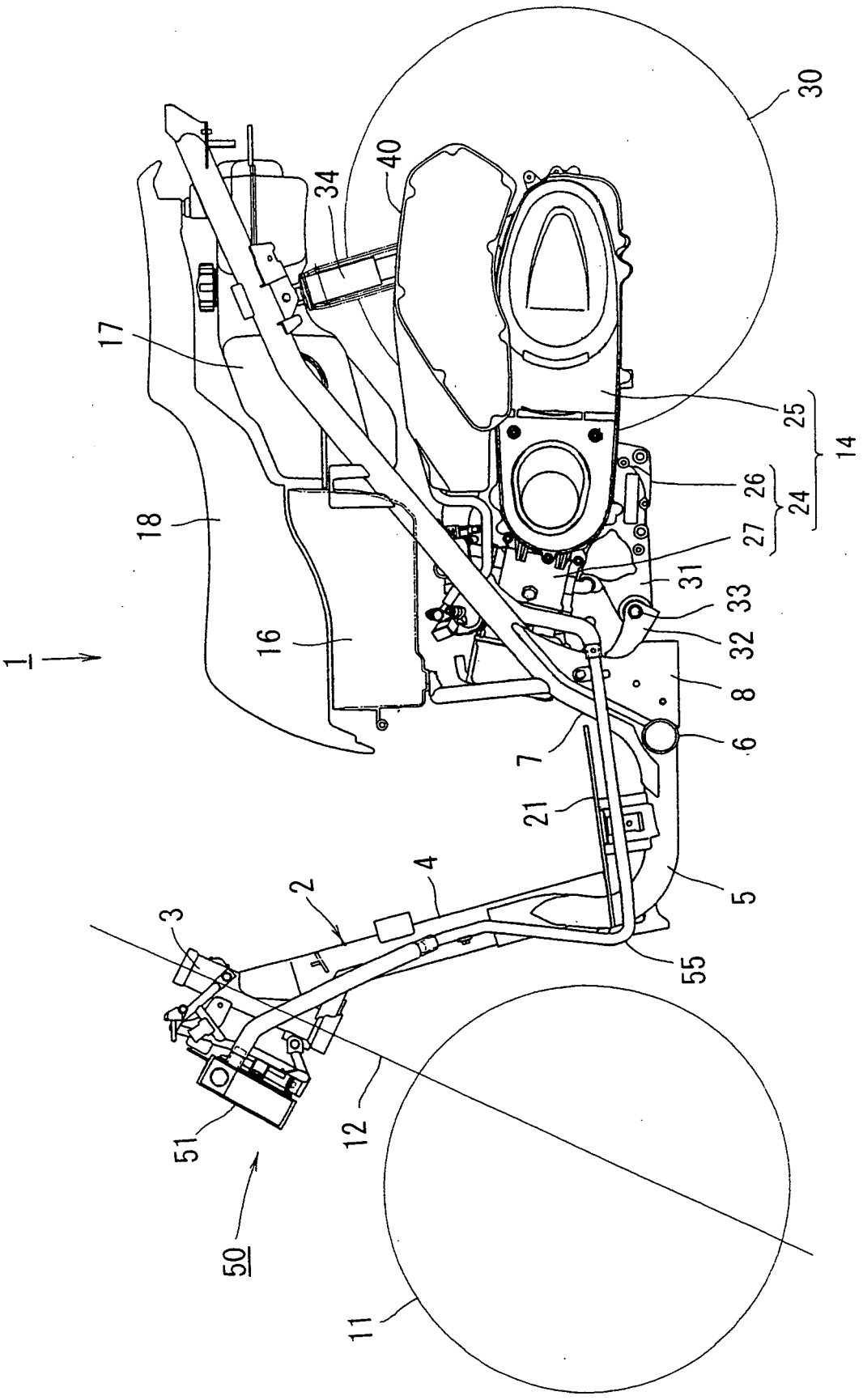


FIG. 2

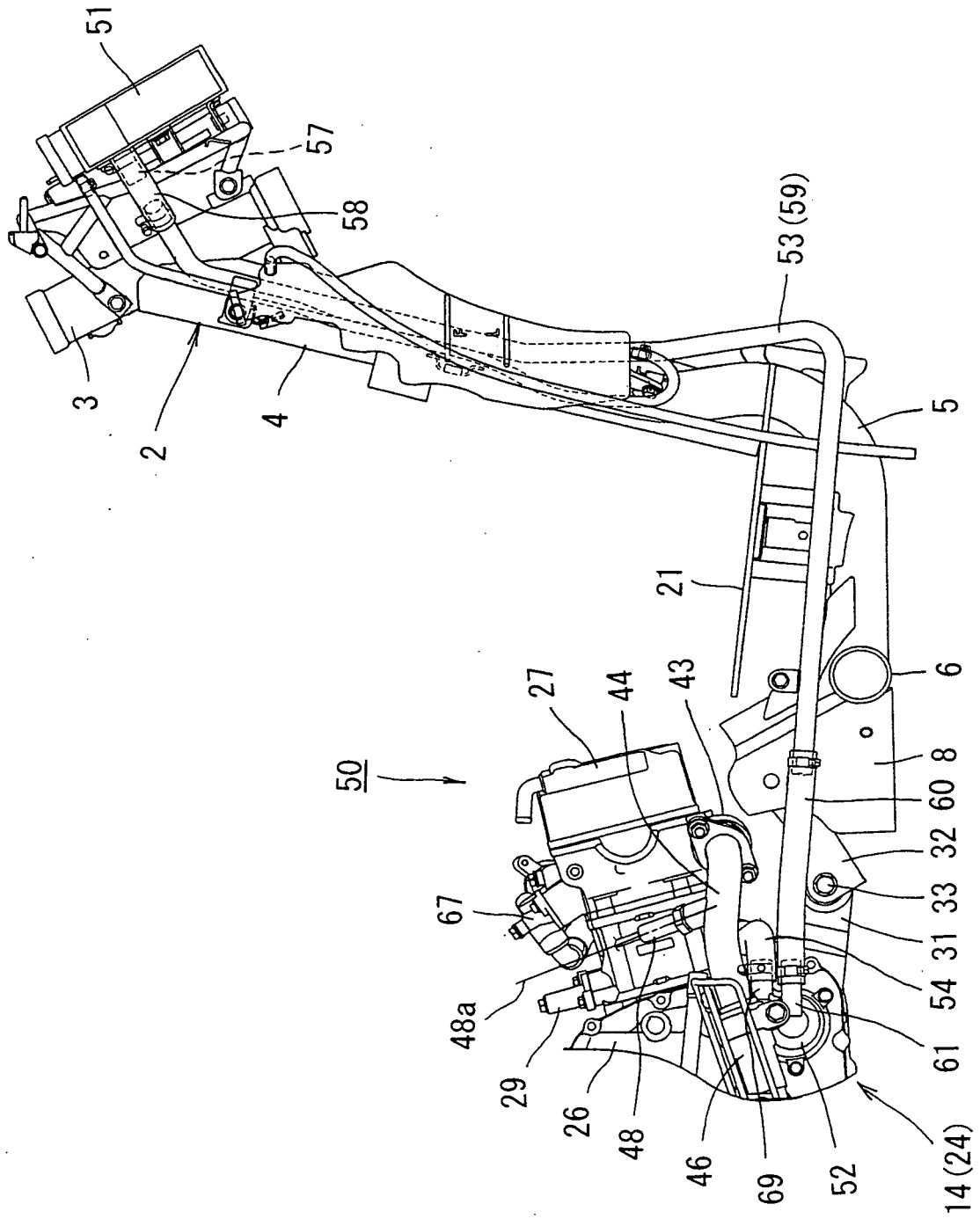

51
57
58
53 (59)
3
2
4
5
21
6
27
44
43
50
8
60
32
33
31
54
61
67
48a
29
26
48
46
69
52
14 (24)

FIG. 3

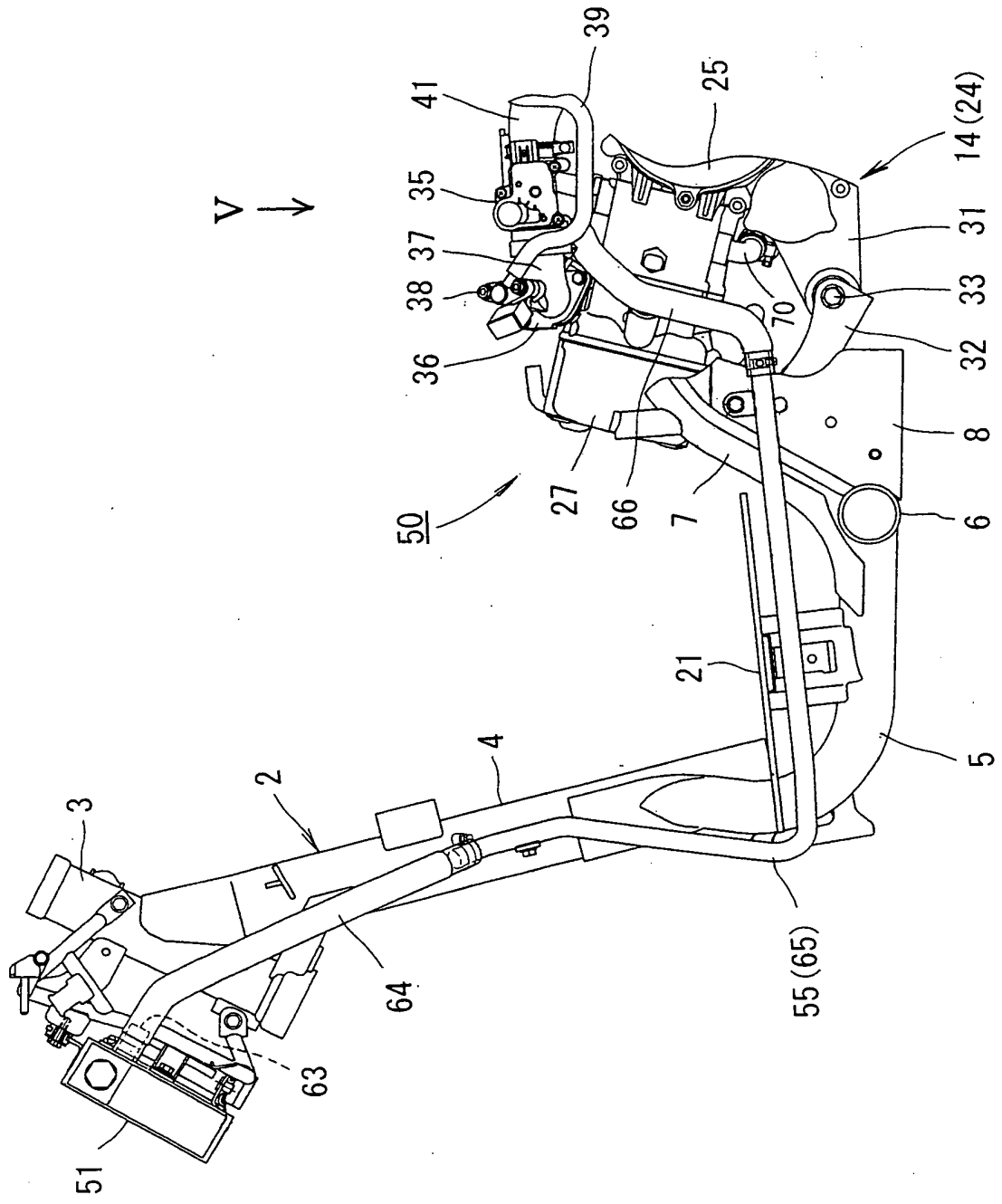

V
39
41
25
14(24)
35
31
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33
38
70
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32
8
27
66
7
6
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21
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4
2
3
64
55(65)
63
51

FIG. 4

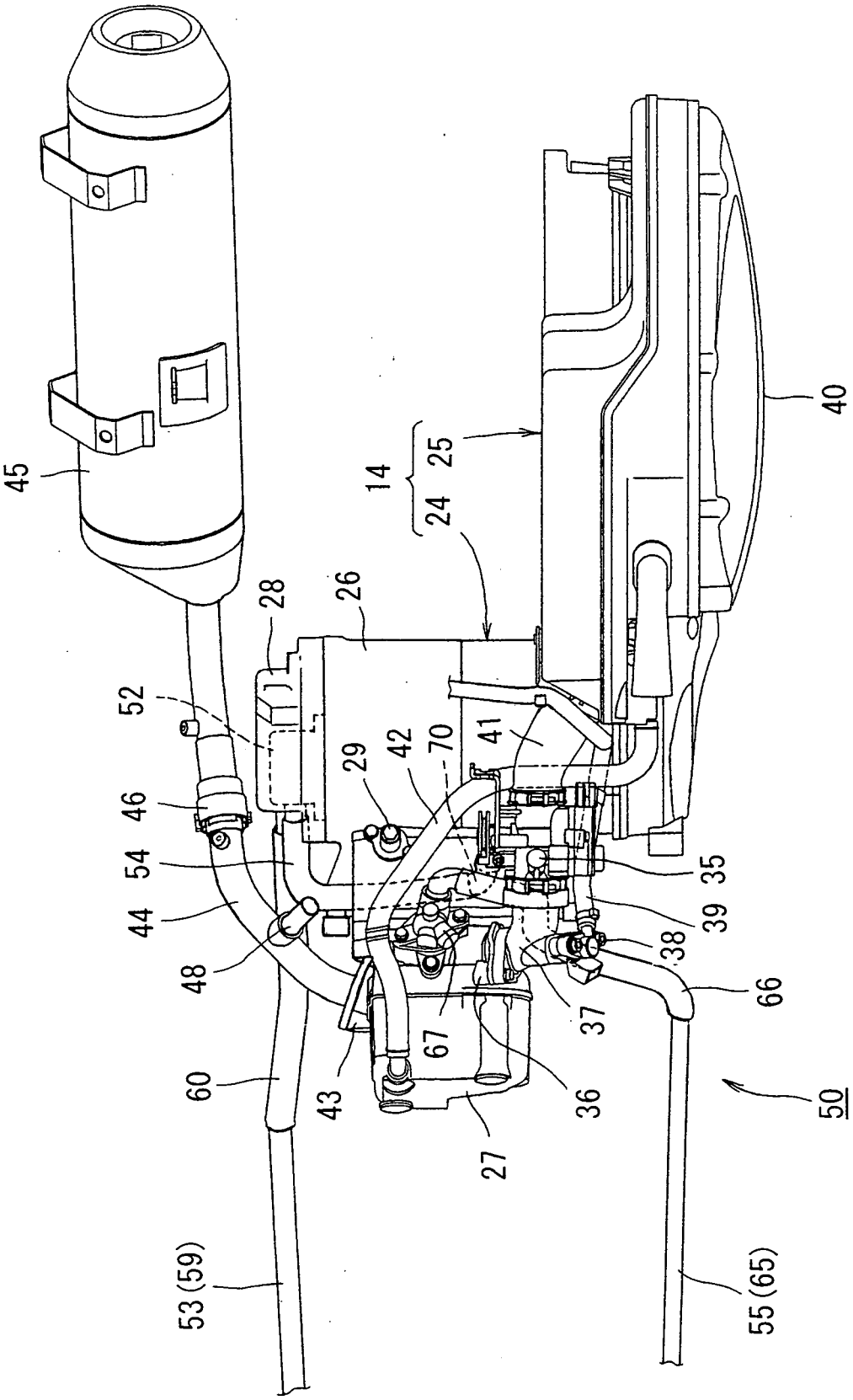

45
14
25
24
40
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26
52
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42
70
41
46
54
35
44
39
38
48
66
37
67
60
43
36
50
27
53 (59)
55 (65)

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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