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(54) **Air intake system of v-type engine for vehicle**

Lufteinlasssystem eines V-Motors für Fahrzeug

Système d'admission d'air de moteur de type en v pour véhicule

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention relates to an air intake system of a V-type engine for a vehicle, and especially relates to an air intake system of a V-type engine for a vehicle in which: a first throttle body and a second throttle body are placed between first and second banks in a V configuration which are provided to an engine main body mounted on a vehicle, the first throttle body including a first air intake passage and a first throttle valve for opening and closing the first air intake passage, the first throttle body corresponding to the first bank, the second throttle body including a second air intake passage and a second throttle valve for opening and closing the second air intake passage, the second throttle body corresponding to the second bank, the first throttle body and the second throttle body being connected to each other, and turn axis lines of the respective first and second throttle valves extending in a vehicle widthwise direction; and an electric motor which is common between the first and second throttle valves has a rotation axis line in parallel with the turn axis lines of the respective first and second throttle valves, and is interlinked with and connected to the first and second throttle valves.

DESCRIPTION OF THE RELATED ART

[0002] Each of Japanese Patent Application Laid-open No. 2009-85111 and Japanese Patent Application Laid-open No. 2004-132290 has already made known an air intake system of a V-type engine for a vehicle in which throttle bodies corresponding to a pair of banks and provided with their respective fuel injection valves are placed between the two banks.

SUMMARY OF THE INVENTION

[0003] In the air intake system disclosed by Japanese Patent Application Laid-open No. 2009-85111, in a side view, an electric motor for commonly driving throttle valves of throttle bodies corresponding to one of the banks and throttle valves of throttle bodies corresponding to the other one of the banks is placed outside the throttle bodies corresponding to the one of the banks. As a result, the air intake system is large in a direction in which the two banks are arranged. On the other hand, in the air intake system disclosed by Japanese Patent Application Laid-open No. 2004-132290, in a side view, an electric motor for commonly driving throttle valves of a throttle body corresponding to one of the banks and throttle valves of the other throttle body corresponding to the other one of the banks is placed between the two throttle bodies. Although this solves the problem posed by Japanese Patent Application Laid-open No. 2009-85111, the

air intake system is large in size in a direction along the pivoting axes of the respective throttle valves because coil springs for biasing the throttle valves in a closing direction are placed in locations where some of the throttle valves are interposed between the coil springs and a driving force transmission place where driving force is transmitted from the electric motor to the throttle valves.

[0004] EP 1 555 409 A1, which is a family member of JP 2004-132290, discloses an air intake system in accordance with the preamble of claim 1, and discloses further that the second coil is placed at a side of the second throttle body, which is a side opposite from the side on which the electric motor is placed.

[0005] The present invention has been made with the foregoing situation taken into consideration. An object of the present invention is to provide an air intake system of a V-type engine for a vehicle which can be made compact.

[0006] In order to achieve the object, the invention provides an air intake system of a V-type engine in accordance with claim 1.

[0007] According to the invention described in claim 1, the electric motor is placed between the first throttle body including the first air intake passage and the second throttle body including the second air intake passage. For this reason, the air intake system can be made compact in the direction in which the first and second throttle bodies are arranged, compared with an air intake system in which an electric motor is placed outside two throttle bodies. In addition, the electric motor, which is a heavy object, is placed in the center portion of the air intake system in the arrangement direction. For this reason, the vibration of the electric motor can be reduced to a lower level. Furthermore, in the projection view obtained by projection to the horizontal plane, the center axis line of the second air intake passage is offset from the center axis line of the first air intake passage toward the one side in the vehicle widthwise direction; in the projection view, at least the part of the electric motor is placed within the range of offset in the vehicle widthwise direction between the points of intersection on the one side in the vehicle widthwise direction at which the turn axis lines of the first and second throttle valves intersect with the inner surfaces of the first and second air intake passages, respectively; the first coil spring for biasing the first throttle valve in the closing direction is placed at a side of the first throttle body in the vehicle widthwise direction, which is the side on which the electric motor is placed; and the second coil spring for biasing the second throttle valve in the closing direction is placed at a side of the second throttle body, which is the side opposite from the side on which the electric motor is placed, in the vehicle widthwise direction. For these reasons, the air intake system can be made compact in the vehicle widthwise direction, and the layout for placing the air intake system between the first and second banks of the V-type engine can be made easier. Moreover, the first coil spring is placed at a side of the first throttle body in the vehicle widthwise direction,

which is the side on which the electric motor is placed. For this reason, it is possible to reduce distortional deformation which occurs on the valve shaft, which is provided with the first throttle valve, due to force acting on the valve shaft from the first coil spring for biasing the first throttle valve in the closing direction and from the electric motor. What is more, at least the part of the electric motor is placed among the one ends and the opposite ends of the respective first and second throttle bodies in the direction orthogonal to the virtual plane passing through the turn axis lines of the respective first and second throttle valves. For this reason, the air intake system can be made compact in an air intake flow direction of each of the first and second air intake passages. Thereby, also with this configuration, the layout for placing the air intake system between the first and second banks can be made easier.

[0008] Further, according to an invention described in claim 2, in addition to the configuration of claim 1, there is provided the air intake system of a V-type engine for a vehicle, wherein a first fuel injection valve for injecting fuel downstream of the first throttle valve is attached to the first throttle body from the second throttle body side in a way that: in a side view, at least part of the first fuel injection valve overlaps the electric motor or a motor housing portion provided continuously to the first throttle body on the one side in the vehicle widthwise direction and housing the electric motor; and the first fuel injection valve is placed among the one ends and the opposite ends of the respective first and second throttle bodies in a direction orthogonal to the virtual plane, a second fuel injection valve for injecting fuel downstream of the second throttle valve is attached to the second throttle body from the first throttle body side in a way that the second fuel injection valve is placed among the one ends and the opposite ends of the respective first and second throttle bodies in the direction orthogonal to the virtual plane, and in the projection view obtained by projection to the horizontal plane, an opposite end portion of the electric motor in the vehicle widthwise direction or an opposite end wall of the motor housing portion in the vehicle widthwise direction is placed between the first fuel injection valve and the point of intersection on the one side in the vehicle widthwise direction, which is one of the points of intersection between the turn axis line of the first throttle valve and the inner surface of the first air intake passage.

[0009] According to the invention described in claim 2, the first fuel injection valve for injecting the fuel downstream of the first throttle valve and the second fuel injection valve for injecting the fuel downstream of the second throttle valve are placed among the one ends and the opposite ends of the respective first and second throttle bodies in the direction orthogonal to the virtual plane passing through the turn axis lines of the respective first and second throttle valves. Thereby, the air intake system can be made compact in the air intake flow direction of each of the first and second air intake passages. In addition, in the side view, the first fuel injection valve is

placed with the part of the first fuel injection valve overlapping the electric motor or the motor housing portion. For this reason, the second fuel injection valve is placed closer to the electric motor or the motor housing portion in the direction in which the first and second throttle bodies are arranged. Thereby, the air intake system can be made compact in the direction in which the first and second throttle bodies are arranged. Furthermore, in the projection view obtained by projection to the horizontal plane, the opposite end portion of the electric motor in the vehicle widthwise direction or the opposite end wall of the motor housing portion in the vehicle widthwise direction is placed between the first fuel injection valve and the point of intersection on the one side in the vehicle widthwise direction, which is one of the points of intersection between the turn axis line of the first throttle valve and the inner surface of the first air intake passage; and the electric motor or the motor housing portion is placed closer to the first fuel injection valve. By these, the air intake system can be made compact in the vehicle widthwise direction. Moreover, from the second throttle body side, the first fuel injection valve is attached to the first throttle body; and from the first throttle body side, the second fuel injection valve is attached to the second throttle body. For this reason, the air intake system can be made compact in the direction in which the two throttle bodies are arranged, compared with an air intake system in which at least one of the first and second fuel injection valves is attached to at least a corresponding one of the two throttle bodies from a side opposite from the other one.

[0010] Further, according to an invention described in claim 3, in addition to the configuration of claim 2, there is provided the air intake system of a V-type engine for a vehicle, wherein a tubular case main body a part of which forms the motor housing portion is connected to the first throttle body in a way that is open to the one side in the vehicle widthwise direction, the first coil spring is housed in a housing case formed from the case main body and a cover member which is fastened to the case main body in a way that closes an outer end opening portion of the case main body, a case-side fastening portion sticking out beyond the cover member towards the second throttle body is integrally provided to an outer end portion of the part, which forms the motor housing portion, of the case main body, and a connection plate is fastened to: an arm-shaped fastening portion integrally provided to the second throttle body and projecting to the one side in the vehicle widthwise direction; and the case-side fastening portion.

[0011] According to the invention described in claim 3, the tubular case main body is connected to the first throttle body in a way that the part of the tubular case main body forms the motor housing portion; the cover member which, together with the case main body, forms the housing case in which to house the first coil spring is fastened to the case main body in the way that closes the outer end opening portion of the case main body; the case-

side fastening portion sticking out beyond the cover member towards the second throttle body is integrally provided to the outer end portion of the part, which forms the motor housing portion, of the case main body; and the connection plate is fastened to the arm-shaped fastening portions integrally provided to the second throttle body and projecting to the one side in the vehicle widthwise direction, and to the case-side fastening portion. For these reasons, by use of the simple structure which needs no specialized arm-shaped fastening portion for fastening the connection plate to be projectingly provided to the first throttle body, in the projection view obtained by projection to the horizontal plane, the end portion of the second throttle body on the one side in the vehicle widthwise direction can be accommodated within a range in the vehicle widthwise direction which reaches an outer end of the cover member. Moreover, since the distance from the second throttle body to the case-side fastening portion is short, and since the motor housing portion in which to house the electric motor is placed in the vicinity of the case-side fastening portion, the second throttle body is capable of effectively reducing the amplitude of vibration of the electric motor and the motor housing portion which occurs due to the vibration of the vehicle body; and the connection plate can be made smaller.

[0012] Here, a first connection plate 11 of an embodiment corresponds to the connection plate of the present invention.

[0013] The above and other objects, characteristics and advantages of the present invention will be clear from detailed descriptions of the preferred embodiment which will be provided below while referring to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a side view of an intake system and an essential part of an engine main body; FIG. 2 is a view seen from a direction of an arrow 2 in FIG. 1 in a state where a part of the intake system is cut out; FIG. 3 is a sectional view taken along a line 3-3 in FIG. 2; and FIG. 4 is a sectional view taken along a line 4-4 in FIG. 2.

DESCRIPTION OF PREFERRED EMBODIMENT

[0015] Descriptions will be hereinbelow provided for an embodiment of the present invention while referring to the attached FIGS. 1 to 4.

[0016] First of all, in FIG. 1, an engine main body 6 built in a V-type twin-cylinder configuration is mounted on a two-wheeled motor vehicle which is a type of vehicle. This engine main body 6 includes a first bank BA and a second bank BB which form a V shape by separating from each other in a front-rear direction of the two-wheeled motor vehicle, and is accordingly built in the V type.

[0017] An air intake system 8 is arranged in a space between the first and second banks BA, BB of the engine

main body 6. The air intake system 8 includes: a first throttle body 9A on the first bank BA side, whose downstream end is connected to a cylinder head 7A of the first bank BA; a second throttle body 9B on the second bank BB side, whose downstream end is connected to a cylinder head 7B of the second bank BB; and an air cleaner 10 to which upstream ends of the respective first and second throttle bodies 9A, 9B are commonly connected.

[0018] The first and second throttle bodies 9A, 9B are connected to each other. The first and second throttle bodies 9A, 9B are connected to each other by means of a first connection plate 11 on one side (in this embodiment, on an upper side in FIG. 2) in a vehicle widthwise direction, while the first and second throttle bodies 9A, 9B are connected to each other by means of a second connection plate 12 on another side (in this embodiment, on a lower side in FIG. 2) in the vehicle widthwise direction.

[0019] Referring to FIG. 2 to FIG. 4 together, the opening degree of a first air intake passage 13A included in the first throttle body 9A is controlled by a first throttle valve 14A, and the first throttle valve 14A is fixedly attached to a first valve shaft 15A which is turnably supported by the first throttle body 9A in a way that the first valve shaft 15A traverses the first air intake passage 13A. In addition, the opening degree of a second air intake passage 13B included in the second throttle body 9B is controlled by a second throttle valve 14B, and the second throttle valve 14B is fixedly attached to a second valve shaft 15B which is turnably supported by the second throttle body 9B in a way that the second valve shaft 15B traverses the second air intake passage 13B. The first and second throttle bodies 9A, 9B connected together are arranged between the first and second banks BA, BB in a way that: turn axis lines T1, T2 of the first and second throttle valves 14A, 14B, namely center axis lines of the first and second valve shafts 15A, 15B, extend in the vehicle widthwise direction; and the first and second air intake passages 13A, 13B extend in a top-bottom direction.

[0020] Furthermore, as clearly shown in FIG. 2, the first and second throttle bodies 9A, 9B are arranged by offsetting a center axis line C2 of the second air intake passage 13B from a center axis line C1 of the first air intake passage 13A towards one side in the vehicle widthwise direction in a projection view obtained by projection to a horizontal plane.

[0021] The first and second throttle valves 14A, 14B are driven by an electric motor 16 which is common for the valves 14, 14B. This electric motor 16 is arranged between the first and second throttle bodies 9A, 9B, and has a rotation axis line MC which is in parallel with the turn axis lines T1, T2 of the respective first and second throttle valves 14A, 14B, as well as is interlinked with and connected to the first and second throttle valves 14A, 14B.

[0022] Moreover, at least a part of the electric motor 16 (in this embodiment, all of the electric motor 16) is

placed among one ends and opposite ends of the respective first and second throttle bodies 9A, 9B in a direction orthogonal to a first virtual plane PL1 (see FIG. 3) passing through the turn axis lines T1, T2 of the first and second throttle valves 14A, 14B. In this embodiment, at least a part of the electric motor 16 (in this embodiment, all of the electric motor 16) is placed among upper and lower ends of the respective first and second throttle bodies 9A, 9B, that is to say, between a first horizontal line HL1 passing through the upper ends of the respective first and second throttle bodies 9A, 9B and a second horizontal line HL2 passing through the lower ends of the respective first and second throttle bodies 9A, 9B.

[0023] Besides, in the projection view obtained by projection to the horizontal plane, at least a part of the electric motor 16 (in this embodiment, a part of the electric motor 16) is placed within an offset range W1 in the vehicle widthwise direction between a point of intersection P1 on the one side in the vehicle widthwise direction, which is one of the points of intersection P1, P2 between the turn axis line T1 of the first throttle valve 14A and an inner surface of the first air intake passage 13A, and a point of intersection P3 on the one side in the vehicle widthwise direction, which is one of the points of intersection P3, P4 between the turn axis line T2 of the second throttle valve 14B and an inner surface of the second intake passage 13B.

[0024] The electric motor 16 is housed in a motor housing portion 17a which is provided continuously to the first throttle body 9A on the one side in the vehicle widthwise direction and which sticks out beyond the second throttle body 9B to the one side in the vehicle widthwise direction in the projection view obtained by projection to the horizontal plane.

[0025] A tubular case main body 17 a part of which forms the motor housing portion 17a is connected to the first throttle body 9A, for example by fastening or the like, in a way that the case main body 17 sticks out beyond the first throttle body 9A to the one side in the vehicle widthwise direction. A housing case 20 is formed from: the case main body 17; and a cover member 18 fastened to the case main body 17 by means of multiple screw members 19, 19, ... in a way that closes an outer end opening portion of the case main body 17.

[0026] One end portion of the first valve shaft 15A on the one side in the vehicle widthwise direction is protruded into the inside of the housing case 20. A speed reducing gear mechanism 22 is provided between the electric motor 16 housed in the motor housing portion 17a and the first valve shaft 15A. The speed reducing gear mechanism 22 is housed in the inside of the housing case 20 as well.

[0027] As shown in FIG. 4, the speed reducing gear mechanism 22 is formed from: a driving gear 24 fixed to a motor shaft 23 of the electric motor 16; a first idle gear 25 in mesh with the driving gear 24; a second idle gear 26 rotating integrally with the first idle gear 25; and a sector gear 27 fixed to one end portion of the first valve

shaft 15A in a way that the sector gear 27 is in mesh with the second idle gear 26. The first and second idle gears 25, 26 are rotatably supported by an idle shaft 28 which is provided between the case main body 17 and the cover member 18.

[0028] Furthermore, the first throttle valve 14A is biased in a closing direction by a first coil spring 29 which is a torsion spring. The first coil spring 29 provided between the housing case 20 and the sector gear 27 is housed in the inside of the housing case 20 in a way that surrounds the first valve shaft 15A. In other words, the first coil spring 29 is placed at one side of the first throttle body 9A in the vehicle widthwise direction.

[0029] Turning attention to FIG. 4, a first straight line L1, which joins the turn axis line T1 of the first throttle valve 14A and the rotation axis line MC of the electric motor 16 in a side view, obliquely intersects with a second virtual plane PL2, which is orthogonal to the center axis line C1 of the first air intake passage 13A and passes through the turn axis line T1 of the first throttle valve 14A in the side view, at an angle α to the cylinder head 7A side of the first bank BA (in this embodiment, to the lower side). The rotation axis line MC of the electric motor 16 is placed closer to the cylinder head 7A of the first bank BA (in this embodiment, in a lower side) than the second virtual plane PL2.

[0030] The opposite end portion of the first valve shaft 15A projects from the first throttle body 9A on the opposite side in the vehicle widthwise direction, and a first lever 31 is fixed to the opposite end portion of the first valve shaft 15A. In addition, an end portion of the second valve shaft 15B projects from the second throttle body 9B on the opposite side in the vehicle widthwise direction, and a second lever 32 is fixed to the end portion of the second valve shaft 15B which projects from the second throttle body 9B. Moreover, the second throttle valve 14B is biased in the closing direction by a second coil spring 30 which is a torsion spring. The second coil spring 30 to be provided between the second lever 32 and the second throttle body 9B is placed between the second lever 32 and the second throttle body 9B while surrounding the second valve shaft 15B. In other words, the second coil spring 30 is placed at the side of the second throttle body 9B in the vehicle widthwise direction, which is a side opposite from a side on which the electric motor 16 is placed.

[0031] One end portion of a link 33 is connected to the first lever 31 at a position offset from the center axis line of the first valve shaft 15A, and a link-movement mechanism 34 for turning the second lever 32 and the second valve shaft 15B in response to a longitudinal movement of the link 33 which takes place in connection with the turn of the first valve shaft 15A and the first lever 31 is provided between the opposite end portion of the link 33 and the second lever 32.

[0032] A case-side fastening portion 35 sticking out beyond the cover member 18 towards the second throttle body 9B is integrally provided to an outer end part, of a

portion forming the motor housing portion 17a, of the case main body 17 connected to the first throttle body 9A. The second throttle body 9B is integrally provided with, for example, two arm-shaped fastening portions 36, 37 which project toward the one side in the vehicle widthwise direction. The first connection plate 11 is fastened to the arm-shaped fastening portions 36, 37 and the case-side fastening portion 35 by means of bolts 38, 38,

[0033] The second connection plate 12 is placed in a way that covers the first lever 31, the second lever 32, the link 33 and the link-movement mechanism 34 from the lateral side. The second connection plate 12 is connected by means of bolts 43, 43, ... to: paired arm-shaped fastening portions 39, 40 integrally provided to the first throttle body 9A and projecting to the opposite side in the vehicle widthwise direction; and paired arm-shaped fastening portions 41, 42 integrally provided to the second throttle body 9B and projecting to the opposite side in the vehicle widthwise direction.

[0034] From the second throttle body 9B side, a first fuel injection valve 44A is attached to the first throttle body 9A. From the first throttle body 9A side, a second fuel injection valve 44B is attached to the second throttle body 9B. The first fuel injection valve 44A is attached to the first throttle body 9A while, in the projection view obtained by projection to the horizontal plane, being orthogonal to the turn axis line T1 of the first throttle valve 14A and having a center axis line F1 passing through the center axis line C1 of the first air intake passage 13A, and in a way that the first fuel injection valve 44A injects fuel downstream of the first throttle valve 14A. The second fuel injection valve 44B is attached to the second throttle body 9B while, in the projection view, being orthogonal to the turn axis line T2 of the second throttle valve 14B and having a center axis line F2 passing through the center axis line C2 of the second air intake passage 13B, and in a way that the second fuel injection valve 44B injects fuel downstream of the second throttle valve 14B.

[0035] In addition, the first fuel injection valve 44A is placed between the one ends and the opposite ends of the respective first and second throttle bodies 9A, 9B, that is to say, between the first and second horizontal lines HL1, HL2, in the direction orthogonal to the first virtual plane PL1 passing through the turn axis lines T1, T2 of the respective first and second throttle valves 14A, 14B, with at least part of the first fuel injection valve 44A overlapping the electric motor 16 or the motor housing portion 17a (in this embodiment, only the motor housing portion 17a) in a side view in the vehicle widthwise direction. The second fuel injection valve 44B is also placed between the one ends and the opposite ends of the respective first and second throttle bodies 9A, 9B, that is to say, between the first and second horizontal lines HL1, HL2, in the direction orthogonal to the first virtual plane PL1.

[0036] Furthermore, as shown in FIG. 2, in the projection view obtained by projection to the horizontal plane, either an opposite end portion of the electric motor 16 in

the vehicle widthwise direction or an opposite end wall 17aa of the motor housing portion 17a in the vehicle widthwise direction, particularly the opposite end wall 17aa of the motor housing portion 17a in this embodiment is placed within a range W2 between the first fuel injection valve 44A and the point of intersection P1 on the one side in the vehicle widthwise direction, which is one of the points of intersection P1, P2 between the turn axis line T1 of the first throttle valve 14A and the inner surface of the first air intake passage 13A.

[0037] The second fuel injection valve 44B is placed in a location offset from the first fuel injection valve 44A towards the one side in the vehicle widthwise direction by a distance corresponding to the amount of offset between the center axis lines C1, C2 of the respective first and second air intake passages 13A, 13B in the vehicle widthwise direction. A joint 45 having a fuel supply connecting pipe 46, which is common between the first and second fuel injection valves 44A, 44B, is attached to the first and second fuel injection valves 44A, 44B.

[0038] A fuel supply pipe 47 for supplying fuel from a fuel tank, which is not illustrated, to the first and second fuel injection valves 44A, 44B is connected to the fuel supply connecting pipe 46.

[0039] Meanwhile, in the side view, as indicated with a chain line in FIG. 1, a vacant space S is formed among mutually-adjacent upper end portions of the respective first and second throttle bodies 9A, 9B, an upper end of the first connection plate 11 and an upper end of the housing case 20, on the basis of the design in which the first straight line L1 joining, in the side view, the rotation axis line MC of the electric motor 16, which is placed under the second virtual plane PL2, and the turn axis line T1 of the first throttle valve 14A obliquely intersects, at the angle α , with the second virtual plane PL2 which is orthogonal to the center axis line C1 of the first air intake passage 13A and passing through the turn axis line T1 of the first throttle valve 14A in the side view. The fuel supply pipe 47 is laid in a way that passes the vacant space S.

[0040] Next, descriptions will be provided for operations of this embodiment. The electric motor 16 is placed between the first throttle body 9A including the first air intake passage 13A and the second throttle body 9B including the second air intake passage 13B. For this reason, the air intake system 8 can be made compact in a direction in which the first and second throttle bodies 9A, 9B are arranged (hereinafter referred to as an "arrangement direction"), compared with an air intake system having the electric motor 16 outside the two throttle bodies 9A, 9B. In addition, the placement of the electric motor 16, which is a heavy object, in the center portion of the air intake system 8 in the arrangement direction makes it possible to reduce the vibration of the air intake system 8 to a lower level.

[0041] Furthermore, in the projection view obtained by projection to the horizontal plane, the center axis line C2 of the second air intake passage 13B is offset from the

center axis line C1 of the first air intake passage 13A towards the one side in the vehicle widthwise direction; at least the part (in this embodiment, only the part) of the electric motor 16 is placed within the range W1 of the offset in the vehicle widthwise direction between the point of intersection P1 on the one side in the vehicle widthwise direction, which is one of the points of intersection P1, P2 between the turn axis line T1 of the first throttle valve 14A and the inner surface of the first air intake passage 13A, and the point of intersection P3 on the one side in the vehicle widthwise direction, which is one of the points of intersection P3, P4 between the turn axis line T2 of the second throttle valve 14B and the inner surface of the second air intake passage 13B; the first coil spring 29 for biasing the first throttle valve 14A in the closing direction is placed at the side of the first throttle body 9A in the vehicle widthwise direction, which is the side on which the electric motor 16 is placed; and the second coil spring 30 for biasing the second throttle valve 14B in the closing direction is placed at the side of the second throttle body 9B in the vehicle widthwise direction, which is the side opposite from the side on which the electric motor 16 is placed. For these reasons, the air intake system 8 can be made compact in the vehicle widthwise direction, and the layout for placing the air intake system 8 between the first and second banks BA, BB of the V-type engine can be made easier. Moreover, since the first coil spring 29 is placed at the side of the first throttle body 9A in the vehicle widthwise direction, which is the side on which the electric motor 16 is placed, it is possible to reduce or eliminate distortional deformation of the first valve shaft 15A, which is provided with the first throttle valve 14A, due to a force acting on the first valve shaft 15A from the first coil spring 29 for biasing the first throttle valve 14A in the closing direction and from the electric motor 16.

[0042] In addition, at least a part (in this embodiment, all) of the electric motor 16 is placed among the one ends and the opposite ends of the respective first and second throttle bodies 9A, 9B in the direction orthogonal to the first virtual plane PL1 passing through the turn axis lines T1, T2 of the respective first and second throttle valves 14A, 14B, that is to say, between the first horizontal line HL1 passing through the upper ends of the respective first and second throttle bodies 9A, 9B and the second horizontal line HL2 passing through the lower ends of the respective first and second throttle bodies 9A, 9B in this embodiment. For this reason, the air intake system 8 can be made compact in an air intake flow direction of each of the first and second air intake passages 13A, 13B. Thereby, also with this configuration, the layout for placing the air intake system 8 between the first and second banks BA, BB can be made easier.

[0043] What is more, the first fuel injection valve 44A injects fuel downstream of the first throttle valve 14A while, in the projection view obtained by projection to the horizontal plane, being orthogonal to the turn axis line T1 of the first throttle valve 14A and having the center axis line F1 passing through the center axis line C1 of

the first air intake passage 13A. The second fuel injection valve 44B injects fuel downstream of the second throttle valve 14B while, in the projection view, being orthogonal to the turn axis line T2 of the second throttle valve 14B and having the center axis line F2 passing through the center axis line C2 of the second air intake passage 13B. By these, the performance of the engine, which depends on the fuel injection by the first and second fuel injection valves 44A, 44B, can be maintained. In addition, the first and second fuel injection valves 44A, 44B are placed among the one ends and the opposite ends of the respective first and second throttle bodies 9A, 9B in the direction orthogonal to the first virtual plane PL1 passing through the turn axis lines T1, T2 of the respective first and second throttle valves 14A, 14B. By this, the air intake system 8 can be made compact in the air intake flow direction of each of the first and second air intake passages 13A, 13B.

[0044] Furthermore, the first fuel injection valve 44A is placed with at least a part of the first fuel injection valve 44A overlapping the electric motor 16 or the motor housing portion 17a in the side view in the vehicle widthwise direction. For this reason, the placement of the second fuel injection valve 44B closer to the electric motor 16 or the motor housing portion 17a in the direction in which the first and second throttle bodies 9A, 9B are arranged makes it possible to make the air intake system 8 compact in the direction in which the first and second throttle bodies 9A, 9B are arranged.

[0045] In the projection view obtained by projection to the horizontal plane, either the opposite end portion of the electric motor 16 in the vehicle widthwise direction or the opposite end wall 17aa of the motor housing portion 17a in the vehicle widthwise direction (in this embodiment, the opposite end wall 17aa of the motor housing portion 17a) is placed between the first fuel injection valve 44A and the point of intersection P1 on the one side in the vehicle widthwise direction, which is one of the points of intersection P1, P2 between the turn axis line T1 of the first throttle valve 14A and the inner surface of the first air intake passage 13A. Either the electric motor 16 or the motor housing portion 17a (in this embodiment, the motor housing portion 17a) is placed closer to the first fuel injection valve 44A. By these, the air intake system 8 can be made compact in the vehicle widthwise direction. Moreover, from the second throttle body 9B side, the first fuel injection valve 44A is attached to the first throttle body 9A, and from the first throttle body 9A side, the second fuel injection valve 44B is attached to the second throttle body 9B. For this reason, the air intake system 8 can be made compact in the direction in which the two throttle bodies 9A, 9B are arranged, compared with an air intake system in which at least one of the first and second fuel injection valves 44A, 44B is attached to at least a corresponding one of the two throttle bodies 9A, 9B from an opposite side of the corresponding one from the other one.

[0046] Additionally, the first straight line L1, which joins

the turn axis line T1 of the first throttle valve 14A and the rotation axis line MC of the electric motor 16 in the side view in the vehicle widthwise direction, obliquely intersects with the second virtual plane PL2, which is orthogonal to the center axis line C1 of the first air intake passage 13A and passes through the turn axis line T1 of the first throttle valve 14A in the side view, at the angle α to the cylinder head 7A side of the first bank BA (in this embodiment, to the lower side). For this reason, the second fuel injection valve 44B can be placed closer to the motor housing portion 17a by using the space which is created on an opposite side of the second virtual plane PL2 from the first straight line L1, and the air intake system 8 can be made compact in the direction in which the first and second throttle bodies 9A, 9B are arranged.

[0047] What is more, the tubular case main body 17 is connected to the first throttle body 9A in the way that a part of the case main body 17 forms the motor housing portion 17a; the cover member 18 which, together with the case main body 17, forms the housing case 20 for housing the first coil spring 29, is fastened to the case main body 17 in the way that closes the outer end opening portion of the case main body 17; the case-side fastening portion 35 sticking out beyond the cover member 18 towards the second throttle body 9B is integrally provided in the outer end part of the portion, of the case main body 17, forming the motor housing portion 17a; and the first connection plate 11 is fastened to, for example, the case-side fastening portion 35 and the paired arm-shaped fastening portions 36, 37 which are integrally provided to the second throttle body 9B and stick out towards the one side in the vehicle widthwise direction. For these reasons, by use of the simple structure which needs no specialized arm-shaped fastening portion for fastening the first connection plate 11 to be projectingly provided to the first throttle body 9A, in the projection view obtained by projection to the horizontal plane, the end portion of the second throttle body 9B on the one side in the vehicle widthwise direction can be accommodated within a range in the vehicle widthwise direction which reaches an outer end of the cover member 18, that is to say, inside the second straight line L2 extending in the front-rear direction while passing through the outer end of the cover member 18. Moreover, since the distance from the second throttle body 9B to the case-side fastening portion 35 is short, and since the motor housing portion 17a in which to house the electric motor 16 is placed in the vicinity of the case-side fastening portion 35, the second throttle body 9B is capable of effectively reducing the amplitude of vibration of the electric motor 16 and the motor housing portion 17b which occurs due to the vibration of the vehicle body; and the first connection plate 11 can be made smaller.

[0048] In addition, in the side view, the fuel supply pipe 47 for supplying the fuel to the first and second fuel injection valves 44A, 44B passes through the vacant space S which is created among the mutually-adjacent upper end portions of the respective first and second throttle

bodies 9A, 9B, the upper end of the first connection plate 11 and the upper end of the housing case 20. For this reason, the fuel supply pipe 47 can be laid out with better space efficiency.

5 [0049] Although the foregoing descriptions have been provided for an embodiment of the present invention, the present invention is not limited to the above-described embodiment. Various design modifications may be made without departing from the present invention recited in claims.

10 [0050] For example, although the foregoing descriptions have been provided for the embodiment in which the engine main body 6 in the V-type twin-cylinder configuration is mounted on the vehicle while including the first and second banks BA, BB which separate from each other in the front-rear direction, the present invention imposes no restriction on the orientation in which the engine main body is mounted on the vehicle as long as the turn axis lines of the respective first and second throttle valves 14A, 14B extend in the vehicle widthwise direction.

15 [0051] In an air intake system of a V-type engine for a vehicle, a pair of throttle bodies connected to each other and placed between a pair of banks includes throttle valves, respectively, and an electric motor is interlinked with and connected to the throttle valves. At least part of an electric motor (16) placed between first and second throttle bodies (9A, 9B) is placed within a range (W1) of offset in a vehicle widthwise direction between points of intersection (P1, P3) on the one side in the vehicle widthwise direction, which are points of intersection between turn axis lines (T1, T2) of first and second throttle valves (14A, 14B) and inner surfaces of first and second air intake passages (13A, 13B), respectively, and is also placed among one ends and opposite ends of the respective first and second throttle bodies (9A, 9B) in a direction orthogonal to a virtual plane passing through the turn axis lines (T1, T2). A first coil spring (29) is placed at one side of the first throttle body (9A) in the vehicle widthwise direction, and a second coil spring (30) is placed at a side of the second throttle body (9B), which is a side opposite from the side on which the electric motor (16) is placed. Accordingly, the air intake system can be made compact.

Claims

1. An air intake system of a V-type engine for a vehicle in which: a first throttle body (9A) and a second throttle body (9B) are to be placed between first and second banks (BA, BB) in a V configuration which are provided to an engine main body (6) mounted on a vehicle, the first throttle body (9A) including a first air intake passage (13A) and a first throttle valve (14A) for opening and closing the first air intake passage (13A), the first throttle body (9A) corresponding to the first bank (BA), the second throttle body (9B) including a second air intake passage (13B) and a sec-

ond throttle valve (14B) for opening and closing the second air intake passage (13B), the second throttle body (9B) corresponding to the second bank (BB), the first throttle body (9A) and the second throttle body (9B) being connected to each other, and turn axis lines (T1, T2) of the respective first and second throttle valves (14A, 14B) extending in a mounted state in a vehicle widthwise direction; and an electric motor (16) which is common between the first and second throttle valves (14A, 14B) has a rotation axis line (MC) in parallel with the turn axis lines (T1, T2) of the respective first and second throttle valves (14A, 14B), and is interlinked with and connected to the first and second throttle valves (14A, 14B), wherein

in a projection view obtained by projection to a horizontal plane, the first and second throttle bodies (9A, 9B) are placed, in the mounted state, with a center axis line (C2) of the second air intake passage (13B) offset from a center axis line (C1) of the first air intake passage (13A) toward one side in the vehicle widthwise direction,

in the projection view, at least part of the electric motor (16) placed between the first and second throttle bodies (9A, 9B) is placed, in the mounted state, within a range (W1) of offset in the vehicle widthwise direction between a first point of intersection (P1) on the one side in the vehicle widthwise direction and a second point of intersection (P3) on the one side in the vehicle widthwise direction, the first point of intersection (P1) being one of points of intersection (P1, P2) between the turn axis line (T1) of the first throttle valve (14A) and an inner surface of the first air intake passage (13A), and the second point of intersection (P3) being one of points of intersection (P3, P4) between the turn axis line (T2) of the second throttle valve (14B) and an inner surface of the second air intake passage (13B),

at least the part of the electric motor (16) is placed among one ends and opposite ends of the respective first and second throttle bodies (9A, 9B) in a direction orthogonal to a virtual plane (PL1) passing through the turn axis lines (T1, T2) of the respective first and second throttle valves (14A, 14B),

a first coil spring (29) for biasing the first throttle valve (14A) in a closing direction is placed at one side of the first throttle body (9A) in the vehicle widthwise direction, and

a second coil spring (30) for biasing the second throttle valve (14B) in a closing direction is placed at a side of the second throttle body (9B), which is a side opposite from the side on which the electric motor (16) is placed, in the vehicle widthwise direction,

characterized in that the first coil spring (29) is placed on the side of the first throttle body (9A) on which the electric motor (16) is placed.

2. The air intake system of a V-type engine for a vehicle

according to claim 1, wherein

a first fuel injection valve (44A) for injecting fuel downstream of the first throttle valve (14A) is attached to the first throttle body (9A) from the second throttle body (9B) side in a way that: in a side view, at least part of the first fuel injection valve (44A) overlaps the electric motor (16) or a motor housing portion (17a) provided continuously to the first throttle body (9A) on the one side in the vehicle widthwise direction and housing the electric motor (16); and the first fuel injection valve (44A) is placed among the one ends and the opposite ends of the respective first and second throttle bodies (9A, 9B) in a direction orthogonal to the virtual plane (PL1),

a second fuel injection valve (44B) for injecting fuel downstream of the second throttle valve (14B) is attached to the second throttle body (9B) from the first throttle body (9A) side in a way that the second fuel injection valve (44B) is placed among the one ends and the opposite ends of the respective first and second throttle bodies (9A, 9B) in the direction orthogonal to the virtual plane (PL1), and

in the projection view obtained by projection to the horizontal plane, an opposite end portion of the electric motor (16) in the vehicle widthwise direction or an opposite end wall (17aa) of the motor housing portion (17a) in the vehicle widthwise direction is placed between the first fuel injection valve (44A) and the first point of intersection (P1) on the one side in the vehicle widthwise direction, which is one of the points of intersection (P1, P2) between the turn axis line (T1) of the first throttle valve (14A) and the inner surface of the first air intake passage (13A).

3. The air intake system of a V-type engine for a vehicle according to claim 2, wherein

a tubular case main body (17) a part of which forms the motor housing portion (17a) is connected to the first throttle body (9A) in a way that is open to the one side in the vehicle widthwise direction, the first coil spring (29) is housed in a housing case (20) formed from the case main body (17) and a cover member (18) which is fastened to the case main body (17) in a way that closes an outer end opening portion of the case main body (17),

a case-side fastening portion (35) sticking out beyond the cover member (18) towards the second throttle body (9B) is integrally provided to an outer end portion of the part, which forms the motor housing portion (17a), of the case main body (17), and a connection plate (11) is fastened to: an arm-shaped fastening portion (36, 37) integrally provided to the second throttle body (9B) and projecting to the one side in the vehicle widthwise direction; and the case-side fastening portion (35).

Patentansprüche

1. Lufteinlasssystem eines V-Motors für ein Fahrzeug, wobei: ein erster Drosselkörper (9A) und ein zweiter Drosselkörper (9B) zwischen ersten und zweiten Bänken (BA, BB) in einer V-Konfiguration anzuordnen sind, die an einem an einem Fahrzeug angebrachten Motorhauptkörper (6) vorgesehen sind, wobei der erste Drosselkörper (9A) einen ersten Lufteinlasskanal (13A) und eine erste Drosselklappe (14A) zum Öffnen und Schließen des ersten Lufteinlasskanals (13A) enthält, wobei der erste Drosselkörper (9A) der ersten Bank (BA) entspricht, wobei der zweite Drosselkörper (9B) einen zweiten Lufteinlasskanal (13B) und eine zweite Drosselklappe (14B) zum Öffnen und Schließen des zweiten Lufteinlasskanals (13B) enthält, wobei der zweite Drosselkörper (9B) der zweiten Bank (BB) entspricht, wobei der erste Drosselkörper (9A) und der zweite Drosselkörper (9B) miteinander verbunden sind, und Schwenkachslinien (T1, T2) der jeweiligen ersten und zweiten Drosselklappen (14A, 14B) sich im montierten Zustand in Fahrzeugbreitenrichtung erstrecken; und ein Elektromotor (16), der den ersten und zweiten Drosselklappen (14A, 14B) gemeinsam ist, eine Drehachslinie (MC) aufweist, die parallel zu den Schwenkachslinien (T1, T2) der jeweiligen ersten und zweiten Drosselklappen (14A, 14B) ist, und mit den ersten und zweiten Drosselklappen (14A, 14B) gekoppelt und verbunden ist, wobei in Projektionsansicht, die man durch Projektion auf eine horizontale Ebene erhält, die ersten und zweiten Drosselkörper (9A, 9B) im montierten Zustand so angeordnet sind, dass eine Mittelachslinie (C2) des zweiten Lufteinlasskanals (13B) von einer Mittelachselinie (C1) des ersten Lufteinlasskanals (13A), in der Fahrzeugbreitenrichtung, zur einen Seite hin versetzt ist, wobei in der Projektionsansicht zumindest ein Teil des Elektromotors (16), das zwischen den ersten und zweiten Drosselkörpern (9A, 9B) angeordnet ist, im montierten Zustand innerhalb eines Versatzbereichs (W1) in der Fahrzeugbreitenrichtung zwischen einem ersten Schnittpunkt (P1) an der einen Seite in der Fahrzeugbreitenrichtung und einem zweiten Schnittpunkt (P3) an der einen Seite in der Fahrzeugbreitenrichtung angeordnet ist, wobei der erste Schnittpunkt (P1) einer von Schnittpunkten (P1, P2) zwischen der Schwenkachslinie (T1) der ersten Drosselklappe (14A) und einer Innenoberfläche des ersten Lufteinlasskanals (13A) ist, und der zweite Schnittpunkt (P3) einer von Schnittpunkten (P3, P4) zwischen der Schwenkachslinie (T2) der zweiten Drosselklappe (14B) und einer Innenoberfläche des zweiten Lufteinlasskanals (13B) ist, wobei zumindest das Teil des Elektromotors (16) unter einen Enden und entgegengesetzten Enden der jeweiligen ersten und zweiten Drosselkörper (9A, 9B) in Richtung orthogonal zu einer virtuellen Ebene (PL1) angeordnet ist, die durch die Schwenkachslinien (T1, T2) der jeweiligen ersten und zweiten Drosselklappen (14A, 14B) hindurchgeht, eine erste Schraubenfeder (29) zum Vorspannen der ersten Drosselklappe (14A) in Schließrichtung an einer Seite des ersten Drosselkörpers (9A) in der Fahrzeugbreitenrichtung angeordnet ist, und eine zweite Schraubenfeder (30) zum Vorspannen der zweiten Drosselklappe (14B) in Schließrichtung an einer Seite des zweiten Drosselkörpers (9B) angeordnet ist, die eine Seite ist, die, in der Fahrzeugbreitenrichtung, entgegengesetzt von einer Seite ist, an der der Elektromotor (16) angeordnet ist, **dadurch gekennzeichnet, dass** die erste Schraubenfeder (29) an der Seite des ersten Drosselkörpers (9A) angeordnet ist, an der der Elektromotor (16) angeordnet ist.
2. Das Lufteinlasssystem eines V-Motors für ein Fahrzeug nach Anspruch 1, wobei ein erstes Kraftstoffeinspritzventil (44A) zum Einspritzen von Kraftstoff stromab der ersten Drosselklappe (14A) an dem ersten Drosselkörper (9A) an der Seite des zweiten Drosselkörpers (9B) derart angebracht ist, dass: in Seitenansicht, zumindest ein Teil des ersten Kraftstoffeinspritzventils (44A) den Elektromotor (16) oder einen Motorgehäuseabschnitt (17a) überlappt, der kontinuierlich zum ersten Drosselkörper (9A) auf der in der Fahrzeugbreitenrichtung einen Seite vorgesehen ist und den Elektromotor (16) aufnimmt; und das erste Kraftstoffeinspritzventil (44A) unter den einen Enden und den entgegengesetzten Enden der jeweiligen ersten und zweiten Drosselkörper (9A, 9B) in Richtung orthogonal zu der virtuellen Ebene (PL1) angeordnet ist, ein zweites Kraftstoffeinspritzventil (44B) zum Einspritzen von Kraftstoff stromab der zweiten Drosselklappe (14B) an dem zweiten Drosselkörper (9B) von der Seite des zweiten Drosselkörpers (9A) derart angebracht ist, dass das zweite Kraftstoffeinspritzventil (44B) unter den einen Enden und den entgegengesetzten Enden der jeweiligen ersten und zweiten Drosselkörper (9A, 9B) in der Richtung orthogonal zu der virtuellen Ebene (PL1) angeordnet ist, und in Projektionsansicht, die man durch Projektion auf die horizontale Ebene erhält, ein entgegengesetzter Endabschnitt des Elektromotors (16) in der Fahrzeugbreitenrichtung oder eine entgegengesetzte Endwand (17aa) des Motorgehäuseabschnitts (17a) in der Fahrzeugbreitenrichtung zwischen dem ersten Kraftstoffeinspritzventil (44A) und dem ersten Schnittpunkt (P1) an der einen Seite in der Fahrzeugbreitenrichtung angeordnet ist, welcher einer der Schnittpunkte (P1, P2) zwischen der Schwenkachslinie (T1) der ersten Drosselklappe (14A) und der Innenoberfläche des ersten Lufteinlasskanals (13A) ist.

3. Das Lufteinlasssystem eines V-Motors für ein Fahrzeug nach Anspruch 2, wobei ein rohrförmiger Gehäusehaupteckkörper (17), von dem ein Teil den Motorgehäuseabschnitt (17a) bildet, mit dem ersten Drosselkörper (9A) derart verbunden ist, dass er sich zu der einen Seite in der Fahrzeugbreitenrichtung hin öffnet, die erste Schraubenfeder (29) in einem Gehäuse (20) aufgenommen ist, das aus dem Gehäusehaupteckkörper (17) und einem am Gehäusehaupteckkörper (17) befestigten Deckelelement (18) gebildet ist, derart, dass es einen äußeren Endöffnungsabschnitt des Gehäusehaupteckkörpers (17) verschließt, ein gehäuseseitiger Befestigungsabschnitt (35), der über das Deckelelement (18) zu dem zweiten Drosselkörper (9B) hinaus vorsteht, integriert an einem äußeren Endabschnitt des Teils des Gehäusehaupteckkörpers (17), das den Motorgehäuseabschnitt (17a) bildet, vorgesehen ist, und eine Verbindungsplatte (11) an einem Arm-förmigen Befestigungsabschnitt (36, 37), der integriert an dem dem zweiten Drosselkörper (9B) vorgesehen ist und zu der einen Seite in der Fahrzeugbreitenrichtung hin vorsteht, und an dem gehäuseseitigen Befestigungsabschnitt (35) befestigt ist.

Revendications

1. Système d'admission d'air d'un moteur de type en V pour un véhicule dans lequel : un premier corps de papillon (9A) et un second corps de papillon (9B) doivent être placés entre des première et secondes rangées (BA, BB) dans une configuration en V qui sont prévues sur un corps principal de moteur (6) monté sur un véhicule, le premier corps de papillon (9A) comprenant un premier passage d'admission d'air (13A) et un premier papillon des gaz (14A) pour ouvrir et fermer le premier passage d'admission d'air (13A), le premier corps de papillon (9A) correspondant à la première rangée (BA), le second corps de papillon (9B) comprenant un second passage d'admission d'air (13B) et un second papillon des gaz (14B) pour ouvrir et fermer le second passage d'air d'admission (13B), le second corps de papillon (9B) correspondant à la seconde rangée (BB), le premier corps de papillon (9A) et le second corps de papillon (9B) étant raccordés entre eux, et des lignes d'axe de rotation (T1, T2) des premier et second papillons des gaz (14A, 14B) respectifs s'étendant, dans un état monté dans le sens de la largeur du véhicule ; et un moteur électrique (16) qui est commun entre les premier et second papillons de gaz (14A, 14B) a une ligne d'axe de rotation (MC) en parallèle par rapport aux lignes d'axe de rotation (T1, T2) des premier et second papillons des gaz (14A, 14B) respectifs, et est lié avec et raccordé aux premier et second papillons des gaz (14A, 14B), dans lequel :

sur une vue en projection obtenue par la projection sur un plan horizontal, les premier et second corps de papillon (9A, 9B) sont placés, à l'état monté, avec une ligne d'axe central (C2) du second passage d'admission d'air (13B) décalée d'une ligne d'axe central (C1) du premier passage d'admission d'air (13A) vers un côté dans le sens de la largeur du véhicule,

sur la vue en projection, au moins une partie du moteur électrique (16) placée entre les premier et second corps de papillon (9A, 9B) est placée, à l'état monté, dans une plage (W1) de décalage dans le sens de la largeur du véhicule entre un premier point d'intersection (P1) sur le premier côté dans le sens de la largeur du véhicule et un second point d'intersection (P3) sur le premier côté dans le sens de la largeur du véhicule, le premier point d'intersection (P1) étant l'un des points d'intersection (P1, P2) entre la ligne d'axe de rotation (T1) du premier papillon des gaz (14A) et une surface interne du premier passage d'admission d'air (13A), et le second point d'intersection (P3) étant l'un des points d'intersection (P3, P4) entre la ligne d'axe de rotation (T2) du second papillon des gaz (14B) et une surface interne du second passage d'admission d'air (13B),

au moins la partie du moteur électrique (16) est placée parmi les extrémités et les extrémités opposées des premier et second corps de papillon (9A, 9B) respectifs dans une direction orthogonale à un plan virtuel (PL1) passant par les lignes d'axe de rotation (T1, T2) des premier et second papillons des gaz (14A, 14B) respectifs, un premier ressort hélicoïdal (29) pour solliciter le premier papillon des gaz (14A) dans une direction de fermeture, est placé au niveau d'un côté du premier corps de papillon (9A) dans le sens de la largeur du véhicule, et un second ressort hélicoïdal (30) pour solliciter le second papillon des gaz (14B) dans une direction de fermeture, est placé au niveau d'un côté du second corps de papillon (9B) qui est un côté opposé au côté sur lequel le moteur électrique (16) est placé, dans le sens de la largeur du véhicule,

caractérisé en ce que le premier ressort hélicoïdal (29) est placé sur le côté du premier corps de papillon (9A) sur lequel le moteur électrique (16) est placé.

2. Système d'admission d'air d'un moteur de type en V pour un véhicule selon la revendication 1, dans lequel :

une première soupape d'injection de carburant (44A) pour injecter du carburant en aval du premier papillon des gaz (14A) est fixée sur le pre-

mier corps de papillon (9A) à partir du côté du second corps de papillon (9B) de sorte que : sur une vue latérale, au moins une partie de la première soupape d'injection de carburant (44A) chevauche sur le moteur électrique (16) ou une 5 partie de logement de moteur (17a) prévue en continu vers le premier corps de papillon (9A) sur le côté dans le sens de la largeur du véhicule et logeant le moteur électrique (16) ; et la première soupape d'injection de carburant (44A) 10 est placée parmi les extrémités et les extrémités opposées des premier et second corps de papillon (9A, 9B) respectifs dans une direction orthogonale au plan virtuel (PL1), une seconde soupape d'injection de carburant 15 (44B) pour injecter le carburant en aval du second papillon des gaz (14B) est fixée au second corps de papillon (9B) à partir du côté du premier corps de papillon (9A) de sorte que la seconde soupape d'injection de carburant (44B) est placée 20 parmi les extrémités et les extrémités opposées des premier et second corps de papillon (9A, 9B) respectifs dans la direction orthogonale par rapport au plan virtuel (PL1), et sur la vue en projection obtenue par la projection 25 sur le plan horizontal, une partie d'extrémité opposée du moteur électrique (16) dans le sens de la largeur du véhicule ou une paroi d'extrémité opposée (17aa) de la partie de logement de moteur (17a) dans le sens de la largeur du 30 véhicule est placée entre la première soupape d'injection de carburant (44A) et le premier point d'intersection (P1) du premier côté dans le sens de la largeur du véhicule, qui est l'un des points d'intersection (P1, P2) entre la ligne d'axe de 35 rotation (T1) du premier papillon des gaz (14A) et la surface interne du premier passage d'admission d'air (13A).

3. Système d'admission d'air d'un moteur de type en V pour un véhicule selon la revendication 2, dans lequel :

un corps principal de carter tubulaire (17) dont une partie forme la partie de logement de moteur 45 (17a), est raccordé au premier corps de papillon (9A) de sorte qu'il est ouvert vers le premier côté dans le sens de la largeur du véhicule, le premier ressort hélicoïdal (29) est logé dans un carter de logement (20) formé à partir du corps principal de carter (17) et un élément de couvercle 50 (18) qui est fixé au corps principal de carter (17) de sorte qu'il ferme une partie d'ouverture d'extrémité externe du corps principal de carter (17), une partie de fixation du côté du carter (35) étant 55 en saillie au-delà de l'élément de couvercle (18) vers le second corps de papillon (9B) est prévue de manière solidaire sur une partie d'extrémité

externe de la partie, qui forme la partie de logement de moteur (17a), du corps principal de carter (17), et une plaque de raccordement (11) est fixée sur : une partie de fixation en forme de bras (36, 37) prévue de manière solidaire sur le second corps de papillon (9B) et faisant saillie vers le premier côté dans le sens de la largeur du véhicule ; et la partie de fixation du côté du carter (35).

FIG.1

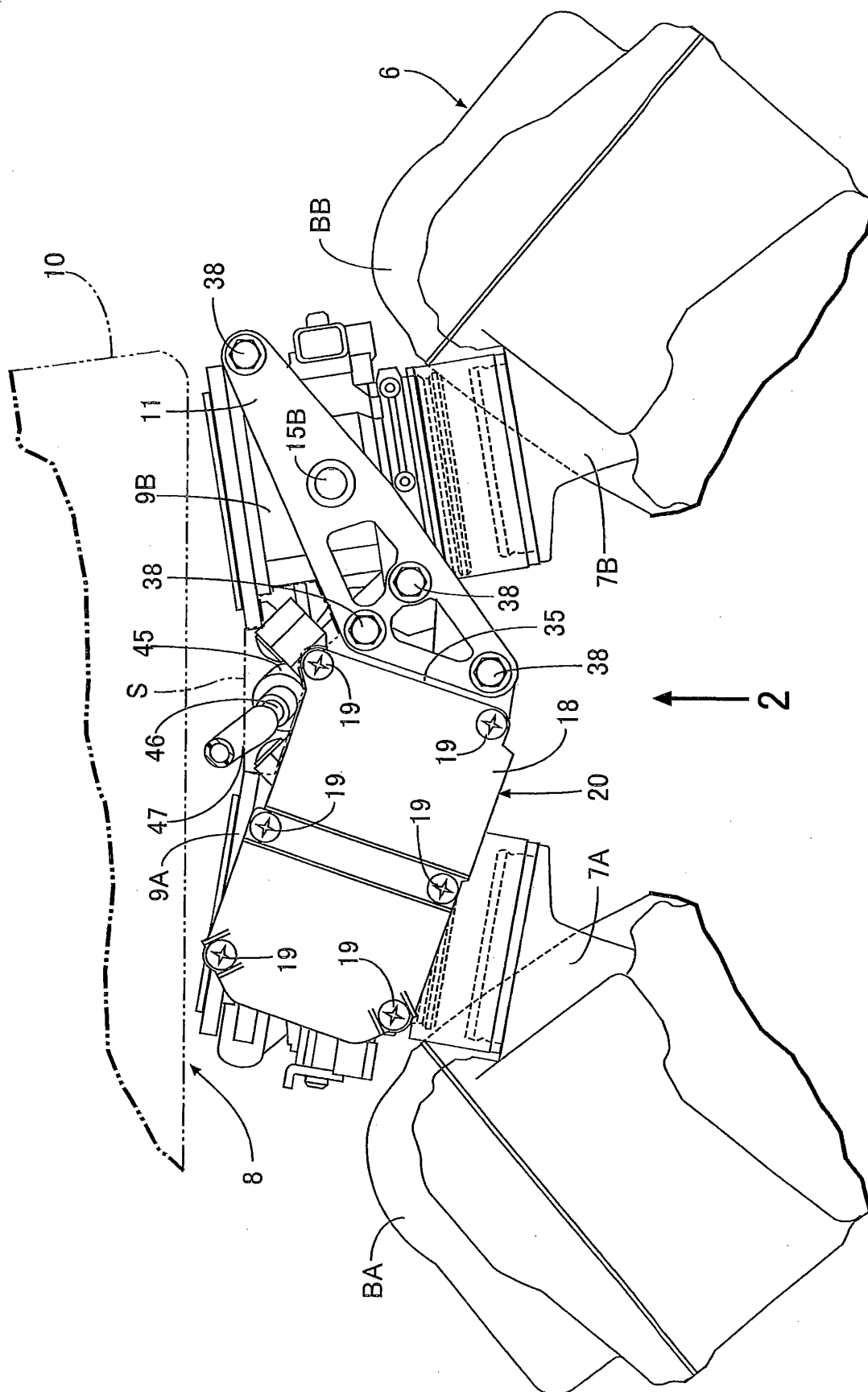


FIG.2

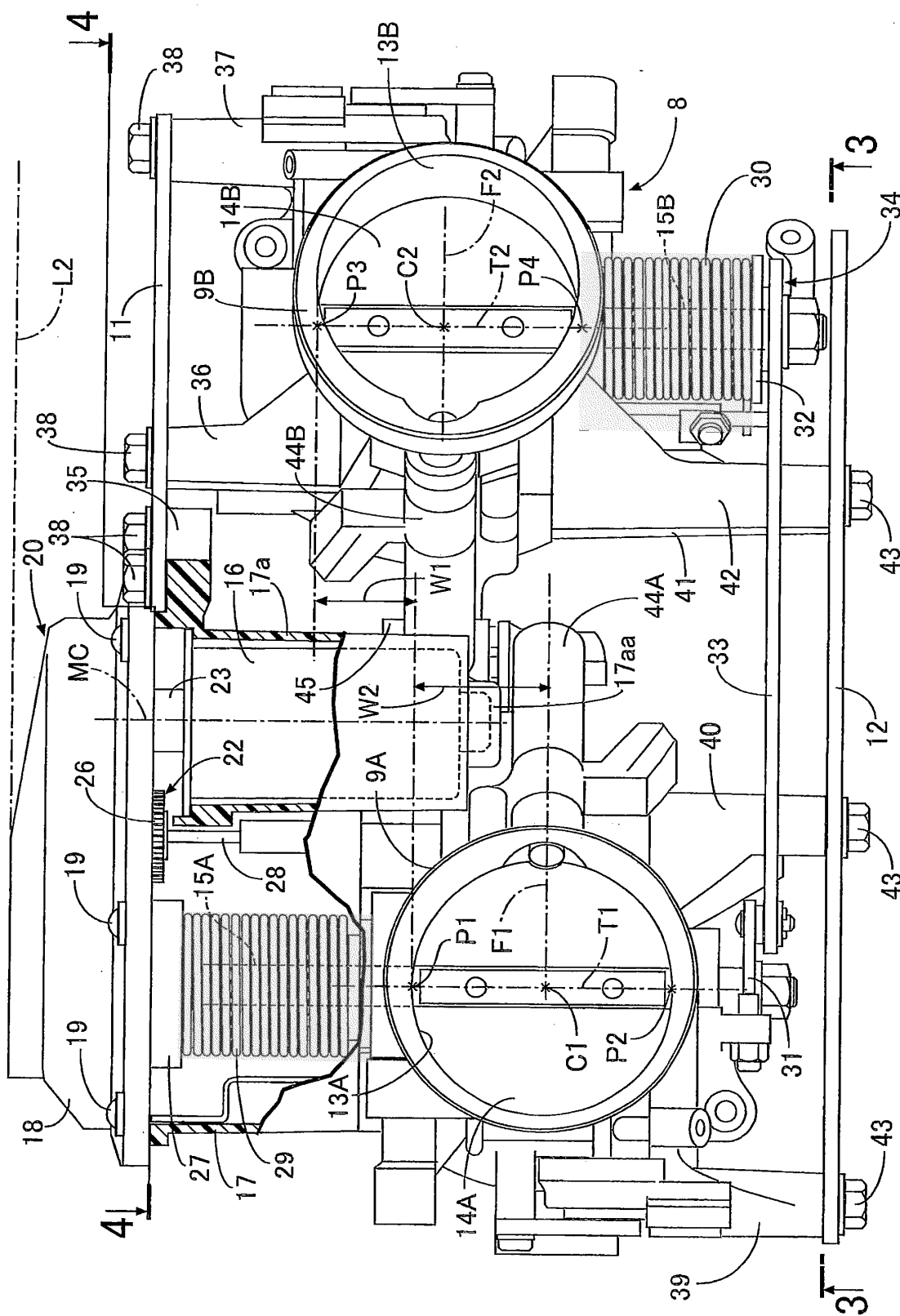


FIG. 3

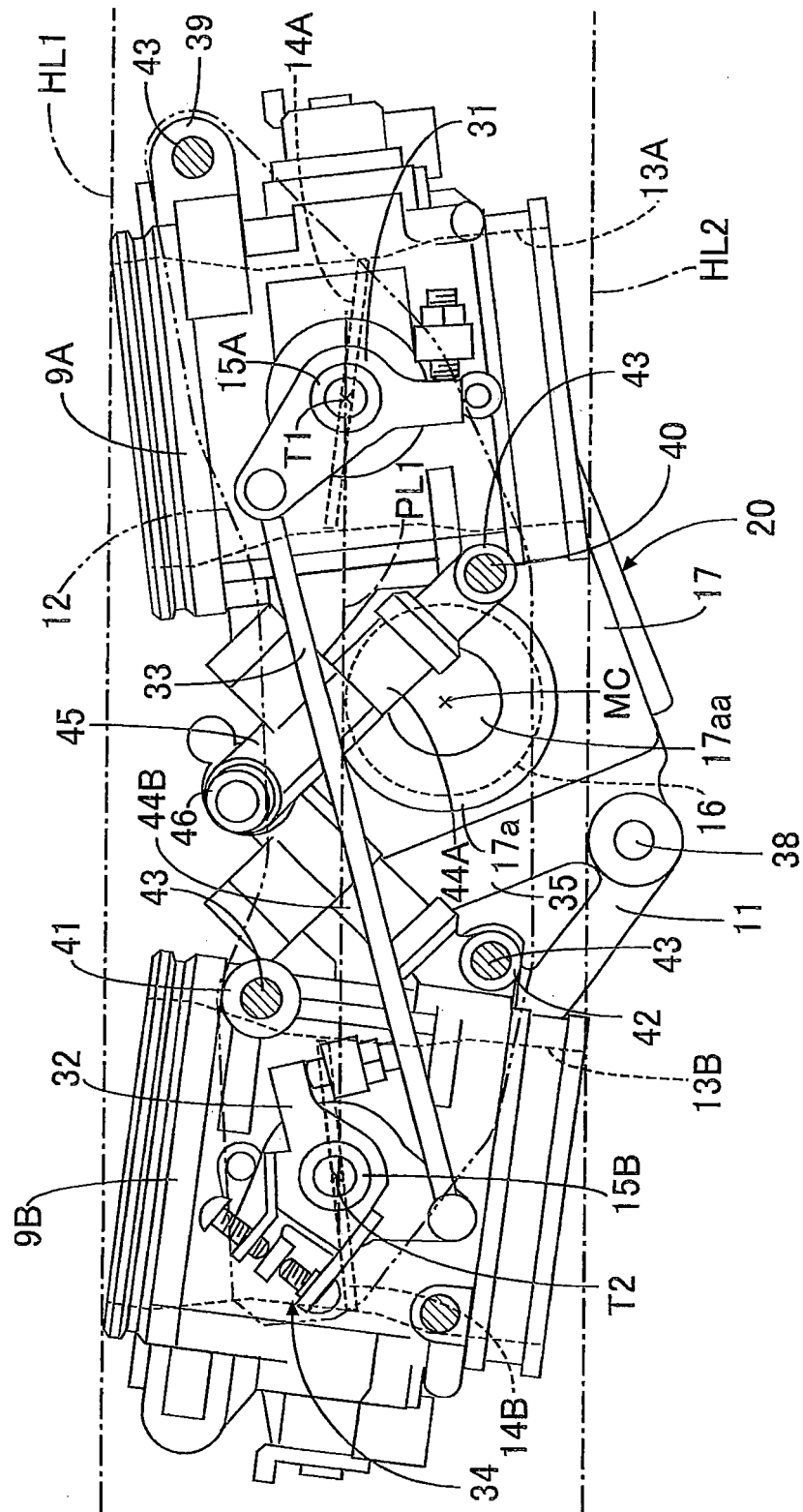
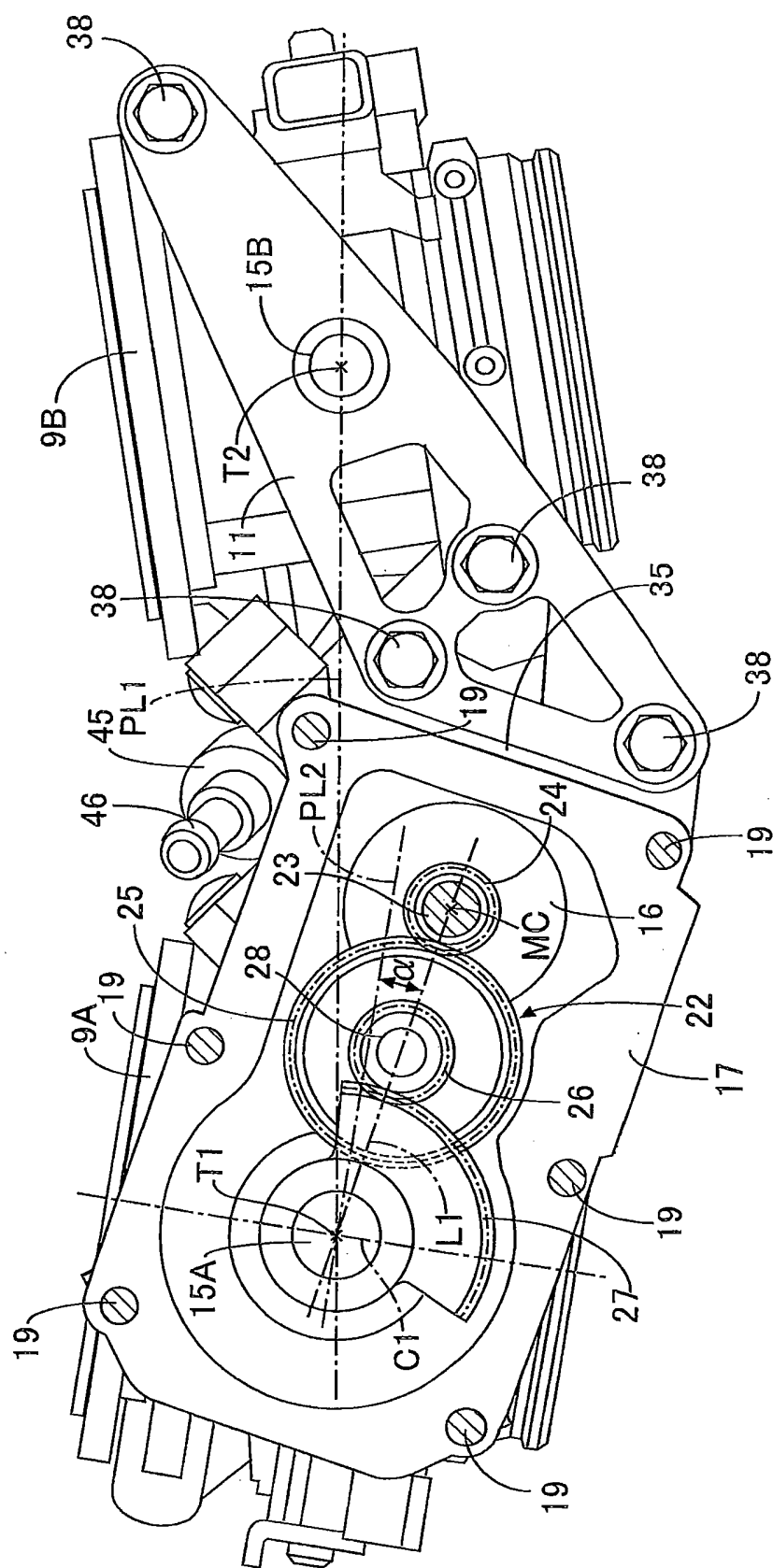


FIG.4



REFERENCES CITED IN THE DESCRIPTION

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