(57) Abrégé/Abstract:
To provide a saddle-ride type vehicle capable of attempting to improve the degree of freedom in the design around an engine by making it possible to facilitate the layout of a fuel feed pipe that connects a fuel pump to a fuel intake at the front and rear of the engine under a situation where the fuel feed pipe is hardly affected by the heat of the engine. In a saddle-ride type vehicle provided with an air cleaner on the rear side of an engine and a fuel tank on the upper side of the engine, a heat shield panel is disposed between the fuel tank and the engine. A fuel feed pipe one end of which is connected to a fuel pump on the front side of the engine is extracted toward the upper part of the heat shield panel; and routed on the upper side of the heat shield panel and connected to an injector which is a fuel intake.
ABSTRACT OF THE DISCLOSURE

To provide a saddle-ride type vehicle capable of attempting to improve the degree of freedom in the design around an engine by making it possible to facilitate the layout of a fuel feed pipe that connects a fuel pump to a fuel intake at the front and rear of the engine under a situation where the fuel feed pipe is hardly affected by the heat of the engine. In a saddle-ride type vehicle provided with an air cleaner on the rear side of an engine and a fuel tank on the upper side of the engine, a heat shield panel is disposed between the fuel tank and the engine. A fuel feed pipe one end of which is connected to a fuel pump on the front side of the engine is extracted toward the upper part of the heat shield panel; and routed on the upper side of the heat shield panel and connected to an injector which is a fuel intake.
SADDLE-RIDE TYPE VEHICLE

FIELD OF THE INVENTION
5 The present invention relates to a saddle-ride type vehicle such as an ATV (All Terrain Vehicle), in particular to a saddle-ride type vehicle provided with: an air cleaner on the rear side of an engine attached to a vehicle body frame; and a fuel tank on the upper side of the engine.

10 BACKGROUND OF THE INVENTION
A saddle-ride type vehicle such as an ATV is generally provided with: an engine nearly at the center of a vehicle body frame; a fuel tank on the upper side of the engine; and also a seat for a rider at the rear part of the fuel tank. Then such kind of a vehicle is mostly provided with an air cleaner of the inlet system of the engine on the lower side of the seat and the ambient air having passed through the air cleaner is inhaled into the engine through a throttle body. Further, in the case of a vehicle provided with a fuel pump on the vehicle body front side of the engine, a fuel feed pipe one end of which is connected to the fuel pump is routed on the upper side of the engine and connected to a fuel intake in the throttle body.

Further, in recent years, as such kind of a saddle-ride type vehicle, a vehicle provided with a heat shield panel between an engine and a fuel tank on the upper side thereof so as to prevent the heat of the engine from transferring to the side of the fuel tank has been developed (for example refer to JP-A No. 72640/2003

However, in such a conventional saddle-ride type vehicle, since a heat shield panel is disposed between an engine and a fuel tank on the upper side
thereof, it is difficult to secure a space for piping and others on the upper side of the engine. Thereby the space for installing a fuel feed pipe disposed astraddle the upper part of the engine in the anteroposterior direction of the vehicle body is largely restricted and a great amount of labor is required for the layout around the engine.

In addition, in a conventional saddle-ride type vehicle, when a fuel feed pipe is routed around an engine, some sort of a measure has to be taken in order to avoid the high heat of the engine and this also makes the design of the vehicle difficult.

In view of the above problems, the object of the present invention is to provide a saddle-ride type vehicle capable of attempting to improve the degree of freedom in the design around an engine by making it possible to facilitate the layout of a fuel feed pipe that connects a fuel pump to a fuel intake at the front and rear of the engine under a situation where the fuel feed pipe is hardly affected by the heat of the engine.

**SUMMARY OF THE INVENTION**

The present invention is, in a saddle-ride type vehicle: provided with an air cleaner on the rear side of an engine attached to a vehicle body frame, a fuel tank on the upper side of the engine, and a heat shield panel between the engine and the fuel tank; and configured so as to inhale fuel in the fuel tank with a fuel pump disposed on the side of the engine and supply the fuel to a fuel intake on the side of the engine, configured so as to: extract a fuel feed pipe one end of which is connected to the fuel pump toward the fuel tank side of the heat shield panel; and route the fuel feed pipe on the fuel tank side of the heat shield panel and connect the fuel feed pipe to the fuel intake.

In the case of the invention, the fuel feed pipe becomes to be: routed around the upper side part, which is shielded from the heat of the engine, of the heat shield panel; and connected to the fuel intake nearer to the rear part of the vehicle body in relation to the engine.
An aspect of the invention is, in addition to the above, configured so as to connect the fuel pump to an injector of the fuel intake through the fuel feed pipe.

In this case, the fuel becomes to be supplied to the injector through the fuel feed pipe without undergoing the heat of the engine and hence it becomes possible to realize high-accuracy fuel injection with the injector.

Another aspect of the invention is, in addition to the above, configured so as to dispose a positioning fixture to lock the fuel feed pipe on the upper face side of the heat shield panel.

In this case, the fuel feed pipe is locked at a setting position on the upper face side of the heat shield panel with the positioning fixture and hence it becomes possible to easily connect the fuel feed pipe to the injector and also prevent unnecessary external force due to distortion of the fuel feed pipe or the like from affecting the injector.

A further aspect of the invention is, in addition to the above, configured so as to: extend the heat shield panel toward the rear side of the fuel tank; and, at the trailing edge thereof, support a snorkel on the upstream side of the air cleaner.

In this case, it becomes possible to support the snorkel with the heat shield panel without fail.

The present invention: is configured so as to route the fuel feed pipe extracted from the fuel tank on the upper side of the heat shield panel to partition the fuel feed pipe from the engine and shield the heat of the engine; and hence
makes it possible to surely improve the degree of freedom in the design around the engine without incurring the drawback of the adverse effect of the heat of the engine on the fuel feed pipe.

5 BRIEF DESCRIPTION OF THE DRAWINGS
Preferred embodiments of the invention are shown in the drawings, wherein:

Fig. 1 is a side view centered on the skeleton section of a saddle-ride type vehicle of an embodiment according to the present invention.

Fig. 2 is a plan view centered on the skeleton section of the saddle-ride type vehicle of the same embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
An embodiment of the present invention is hereunder explained in reference to the drawings. Here, in the explanations below, it is assumed that the directions of front, rear, right and left are identical to the directions in relation to the traveling direction of a vehicle unless otherwise specified. Further, the arrow FR in the figures shows the front direction of the vehicle, the arrow LH the left direction thereof, and the arrow UP the upper direction thereof, respectively.

A saddle-ride type vehicle 1 according to the present embodiment is a so-called ATV that is equipped with low pressure balloon tires of a large diameter as front and rear wheels 2 and 3; secures a large minimum ground clearance; and thus has improved the running through performance mainly on a rough terrain.

An engine 5 is attached nearly to the center section of a vehicle body frame 4 on a longitudinal layout and configured so that power is output to propeller shafts 8 and 9 for the front and rear wheels respectively through transmissions not shown in the figures. The propeller shafts 8 and 9 transfer the power to the front and rear wheels 2 and 3 through power distribution mechanisms 11 and 12, respectively. Here, in the case of the present embodiment, a crank case 6 that composes the lower part of the engine 5 has also the function as a transmission case that contains the transmissions.
The vehicle body frame 4 is formed nearly into a box structure by: disposing a pair of an upper pipe 41 and a lower pipe 42, extending nearly in the anteroposterior directions of the vehicle body, on each of the right and left sides of the vehicle body; and connecting the pipe combinations, each of which is formed by connecting the pair of the pipes 41 and 42 to each other, on the right and left sides of the vehicle body to each other with plural cross pipes (no shown by reference numerals).

The engine 5 is attached to the vehicle body frame 4 nearly in the center on the bottom side thereof and the part of a cylinder head 7 of the engine 5 is located at a position slightly lower than the upper pipe 41. Then an air cleaner 18 of an engine inlet system is attached to a part of the vehicle body frame 4 on the rear side of the engine 5 in relation to the vehicle body frame 4. The air cleaner 18 is connected to an intake on the rear side of the cylinder head 7 via a throttle body 17. Further, a snorkel 54 extends forward and obliquely upward at a position forming an offset, in the vehicle body width direction, to the throttle body 17 in front of the air cleaner 18 so as to introduce ambient air from the opening of the snorkel 54 at the front end thereof. Furthermore, an injector 17a as a fuel intake is integrally incorporated into the throttle body 17 so as to control the fuel supplied from a fuel pump 51 which will be described later with a controller (not shown in the figures) and eject the fuel into an intake path. Meanwhile, a base end of an exhaust pipe 19 is connected to the front portion of the cylinder head 7 and the exhaust pipe 19 extends forward, then bends rearward, and is connected to a silencer 21 at the rear side of the vehicle body.

Then a fuel tank 22 made of resin is disposed on the upper side of the engine 5 and, at the rear of the fuel tank 22, a saddle-ride type seat 23 is disposed in an openable and closable manner so as to cover the throttle body 17, the snorkel 54, the air cleaner 18 and others from above. A handle stem unit 43 is disposed at the part of the vehicle body frame 4 on the front side of the engine 5 and a steering shaft 25 is supported by the handle stem unit 43. A bar-shaped handle 24 is attached to the top end of the steering shaft 25 and a front wheel steering mechanism not shown in the figures is connected to the bottom end thereof. The front part of the fuel tank 22 curves nearly in a U-shape in the manner of wrapping around the steering shaft 25 from both the sides thereof and thereby a sufficient capacity can be secured.
Then a fuel pump 51 is disposed under the fuel tank 22 so as to be located in front of the engine 5. A connecting pipe 52 extending downward from the fuel tank 22 is connected to the inlet of the fuel pump 51 and, to the exhaust port thereof, a fuel feed pipe 53 to supply the ejected fuel to the injector 17a is connected.

Meanwhile, a heat shield panel 46 is attached at a position immediately under the area extending from about the rear half part of the fuel tank 22 to the front part of the seat 23 in the manner of straddling the right and left upper pipes 41 and 41 of the vehicle body frame 4. The heat shield panel 46 forms a partition between: the engine 5; and the fuel tank 22 and seat 23 above the engine 5, and thereby the propagation of the high heat of the engine 5 to the fuel tank 22 and seat 23 is shielded. The fuel feed pipe 53 one end of which is connected to the fuel pump 51 is extracted from the front end portion of the heat shield panel 46 toward the upper side (the side of the fuel tank 22) and laid along the upper face of the heat shield panel 46. The fuel feed pipe 53 bends on the upper face side of the heat shield panel 46 in the manner of forming a crank-shape on a top view in order to escape from the snorkel 54 extending from the air cleaner 18 toward the upper side of the heat shield panel 46 as shown in Fig. 2. Then the vicinity of the bent part of the fuel feed pipe 53 is locked to a setting position on the heat shield panel 46 with a cramp 55 as a positioning fixture. Here, the fuel pump 51 and the injector 17a as the fuel intake are disposed on the lower side (the side of the engine 5) of the heat shield panel 46 interposing it in between.

A support piece 70 is installed in an extending manner at a position nearly in the center at the rear end part of the heat shield panel 46 and the snorkel 54 is connectedly supported by the support piece 70 with a bolt joint or the like. Further, at a position of the snorkel 54 somewhat closer to the vehicle body rear side than the junction with the support piece 70, a resonator 71 is disposed in a manner of being branched toward the left side of the vehicle body.

Here, in the figures, the reference numeral 31 represents a vehicle body cover made of resin to cover the front part of the vehicle body including the fuel tank, and the reference numerals 32 and 35 represent a front fender and a rear
fender, both made of resin, to cover the front wheels and the rear wheels, respectively. Further, the reference numerals 33 and 34 in Fig. 1 represent a front protector and a front carrier, and the reference numeral 36 represents a rear carrier.

As stated above, in the saddle-ride type vehicle 1, since the fuel feed pipe 53 connecting the fuel pump 51 on the front side of the engine 5 to the injector 17a on the rear side thereof is once extracted toward the upper side of the heat shield panel 46, then laid along the upper face of the heat shield panel 46, and thereafter connected to the injector 17a, not only the heat of the engine 5 is shielded by the heat shield panel 46 and hardly affects the fuel feed pipe 53 but also the fuel feed pipe 53 can easily be laid without caring about the interference of the fuel feed pipe 53 with other engine parts. As a consequence, when such a saddle-ride type vehicle 1 is adopted, the fuel feed pipe 53 can be laid without caring about the influence of the heat of an engine and the interference with engine parts, and hence the degree of freedom in the design around the engine increases without fail.

Meanwhile, though the fuel feed pipe 53 disposed bypassing the upper face side of the heat shield panel 46 is connected to the injector 17a in the case of the present embodiment, this can also be applied likewise to a vehicle that uses a carburetor for the fuel intake of an engine 5. However, in the case of a vehicle that employs an injector 17a at the fuel intake of an engine 5 like the present embodiment, fuel introduced into the injector 17a through a fuel feed pipe 53 is hardly affected by the heat of an engine and hence there is an advantage that more accurate fuel injection control can be realized.

Further, in the present embodiment, since the fuel feed pipe 53 routed along the upper face of the heat shield panel 46 is locked at a setting position on the heat shield panel 46 with a cramp 55, the piping work of the fuel feed pipe 53 is easy to do and moreover there is an advantage that backlash or distortion of the fuel feed pipe 53 can be prevented without fail. Then, if such backlash or distortion of the fuel feed pipe 53 can be prevented with the cramp 55 in this way, it becomes possible to further increase the control accuracy of the injector 17a.
In particular, in the case of fixing the vicinity of the bent part of the fuel feed pipe 53 to the heat shield panel 46 with the cramp 55 like the present embodiment, it is possible to efficiently suppress the backlash or distortion of the fuel feed pipe 53 in the anteroposterior or transverse direction.

Further, in the case of such a vehicle, since the fuel feed pipe 53 is locked to the heat shield panel 46 which is a tabular member with the cramp 55, there is an advantage that the positioning fixture can easily be set at an arbitrary position on the heat shield panel 46 in conformity with the shape of the fuel feed pipe 53.

Furthermore, in the present embodiment, since the support piece 70 is installed at the rear end of the heat shield panel 46 and the snorkel 54 is connected to the support piece 70 with a bolt joint or the like, there is an advantage that the snorkel 54 is surely supported by making use of the heat shield panel 46. In particular, in the case of the present embodiment, since the heat shield panel 46 is attached astride the right and left upper pipes 41 (the vehicle body frame 4) up to the rear end thereof, it is possible to support the snorkel 54 with high support rigidity.

Note that the present invention is not limited to the above embodiment and various modifications of design are acceptable in the range not deviating from the tenor of the present invention. For example, though the fuel feed pipe 53 is locked on the upper face of the heat shield panel 46 with the cramp 55 in the above embodiment, it is also possible to lock the fuel feed pipe 53 to the heat shield panel 46 with a clip capable of holding it in between.

Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.
THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A saddle-ride type vehicle: provided with an air cleaner on the rear side of an engine attached to a vehicle body frame, a fuel tank on the upper side of said engine, and a heat shield panel between said engine and said fuel tank; and configured so as to inhale fuel in said fuel tank with a fuel pump disposed on the side of said engine and supply said fuel to a fuel intake on the side of said engine, characterized by: extracting a fuel feed pipe one end of which is connected to said fuel pump toward the fuel tank side of said heat shield panel; and routing said fuel feed pipe on said fuel tank side of said heat shield panel and connecting said fuel feed pipe to said fuel intake.

2. A saddle-ride type vehicle according to claim 1, characterized by connecting said fuel pump to an injector of said fuel intake through said fuel feed pipe.

3. A saddle-ride type vehicle according to claim 1 or 2, characterized by disposing a positioning fixture to lock said fuel feed pipe on the upper face side of said heat shield panel.

4. A saddle-ride type vehicle according to any one of claims 1 to 3, characterized by: extending said heat shield panel toward the rear side of said fuel tank; and, at the trailing edge thereof, supporting a snorkel on the upstream side of said air cleaner.