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(54) **Motorcycle exhaust gas sensor assembly**

(57) The invention positions an exhaust gas sensor in such a manner that a protective cover is not required, collisions and water bursts due to flying stones are avoided as much as possible, where maintenance work is straightforward, and where available space is effectively utilized.

To achieve this, an exhaust gas sensor 29 is fitted to an upper side wall of an exhaust pipe 26 at a position forward from a right projection 14a of a crank case 14 and facing out from a right side surface 15a of a cylinder block 15.

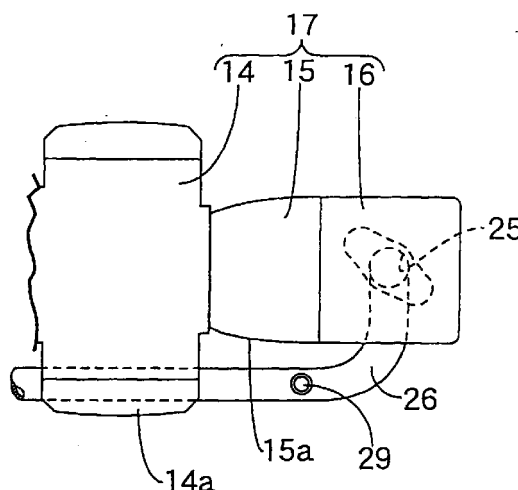


FIG. 3

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Description

[0001] The present invention relates to a superior position for fitting an exhaust gas sensor, for sensing concentration etc. of O₂ discharged from an engine mounted on a motorcycle, to an exhaust pipe.

[0002] Motorbikes installed with exhaust gas sensors at exhaust pipes of engines mounted on a vehicle frame as disclosed in, for example, Japanese Utility Model Publication Laid-open No. 58-82420 etc. are well known.

[0003] The motorcycles disclosed in the above publication are large-type motorcycles with exhaust gas sensors fitted at an exhaust pipe at the bottom of a rear part of an engine body, and maintenance after the exhaust gas sensor is fitted to the exhaust pipe is therefore difficult. Further, it is necessary to provide a protective cover for protecting the exhaust gas sensor from stones and water scattered in accompaniment with the travel of the motorcycle because there is nothing located at the lower part of the exhaust gas sensor.

[0004] Such exhaust gas sensors are not just applied to large-type motorcycles, but are also widely adopted in small-type utility cycles. However, the exhaust gas sensors require substantially the same dedicated space regardless of whether the motorcycle is a large-type motorcycle or a small-type motorcycle. When an exhaust gas sensor is arranged at the same position as for the large-type vehicle of the aforementioned publication, it is difficult to maintain clearance with other parts of the engine body etc. and the degree of freedom in arranging other parts is constricted.

[0005] In order to resolve the aforementioned problems, it is the object of the present invention to provide a motorcycle exhaust gas sensor assembly where an exhaust gas sensor is located in such a manner that collisions and water bursts due to flying stones are avoided to as great an extent as possible without requiring a protective cover, maintenance work is straightforward, and where the available space is effectively utilized.

[0006] In order to achieve the aforementioned object, in the present invention, there is provided a motorcycle exhaust gas sensor assembly wherein, in a motorcycle where an engine equipped with a cylinder block located on an axis of a cylinder within a perpendicular plane running from the front to the rear of a vehicle frame, a crank case coupled to the cylinder block and having a right projection projecting further to the side than a right side surface running in a left to right direction of the cylinder block, and a cylinder head coupled to the cylinder block on the opposite side to the crank case, is mounted on the vehicle frame, and an exhaust pipe extending from front to rear along the lower part of the right projection is connected to an exhaust port provided at the cylinder head, an exhaust gas sensor is fitted at an upper side wall of the exhaust pipe at a position forward from the right projection of the crank case and facing out from the left side surface of

the cylinder block.

[0007] According to this configuration, the exhaust gas sensor is fitted to the exhaust pipe so as to project further to the side than the right side surface of the cylinder block and further forward than a right projection with which the crank case is equipped and to the right side of the cylinder block. The exhaust gas sensor can therefore be positioned so as to use the available space effectively without the engine body and the exhaust gas sensor interfering with each other so that this exhaust gas sensor can be easily adopted for small motorcycles without restrictions being placed on the degree of freedom of arranging other parts. Moreover, maintenance of the exhaust gas sensor can easily be carried out from above because the exhaust gas sensor is fitted to the upper side wall of the exhaust pipe, and stones and water scattered up from below are prevented from colliding with the exhaust gas sensor by the exhaust pipe itself because the exhaust pipe is positioned lower than the exhaust gas sensor. Further, collisions and water bursts due to stones from the inside can be effectively prevented because the cylinder block is arranged inside of the exhaust gas sensor and collisions and water bursts due to flying stones can be prevented as much as possible without a protective cover being necessary.

[0008] According to the present invention described above, an exhaust gas sensor is located in a manner that effectively utilizes available space without an engine body and an exhaust gas sensor interfering with each other. Here, no restrictions are placed on the degree of freedom with which other parts can be arranged and this exhaust gas sensor can easily be adopted in small-type motorcycles. Maintenance of an exhaust gas sensor can therefore easily be carried out from above and collisions and water bursts due to scattered stones can be prevented to as great an extent as possible without it being necessary to provide a protective cover.

[0009] The following is a description of a practical example of the present invention based on an embodiment of the present invention shown in the appended drawings.

FIG. 1 is a right side view of a motorcycle.

FIG. 2 is a side view of an engine vicinity as viewed from the right side; and

FIG. 3 is a simplified plan view of an engine vicinity as viewed from above.

[0010] First, in FIG 1, a backbone-type motorcycle vehicle frame F comprises a steel pipe backbone 5 inclined downwards and to the rear, and steel plate rear frame 6 welded to the rear end of the backbone 5, with a front fork 8 axially supporting a front wheel WF being pivoted in a steerable manner at a head pipe 7 provided at the front end of the backbone 5 and a steering handle 9 being coupled to the upper end of the front fork 8. A rear fork 10 axially supporting a rear wheel WR is then

pivotaly supported at the rear frame 6, with a rear cushion 11 being provided between the rear fork 10 and the rear frame 6. A saddle 12 is fitted at the upper surface of the rear frame 6, with a fuel tank 13 being housed and supported within the rear frame 6 directly below the saddle 12. A crank case 14 of the engine E is then fitted at the lower part of a part coupling with the backbone 5 at the front end of the rear frame 6.

[0011] Referring to FIG 2, the crank case 14 is constituted by the cylinder block 15, cylinder head 16 and engine body 17. The cylinder block 15 is arranged along a direction from the front to the rear of the vehicle frame F within a perpendicular plane so as to be substantially horizontal to the axis of a cylinder 18 so as to project forwards in a substantially horizontal manner from the front surface of the crank case 14. The cylinder head 16 is then coupled at the front surface of the cylinder block 15 on the opposite side to the crank case 14.

[0012] An air cleaner 19 is fitted to the front end of the backbone 5. A downstream end of a horn pipe 20, the upstream end of which penetrates to the inside of an air cleaner 19, and the upstream end of an intake pipe 22, the downstream end of which is connected to an intake port 23 provided at the upper end of a cylinder head 16, are connected via a throttle body 21. A fuel injection valve 24 for injecting fuel into the intake port 23 is fitted at the central part of the intake pipe 22.

[0013] The upstream end of an exhaust pipe 26 is connected to an exhaust port 25 provided at the lower part of the cylinder head 16, and the downstream end of the exhaust pipe 26 is connected to an exhaust pipe 27 positioned at the rear right side of the vehicle frame F.

[0014] The backbone 5, cylinder block 15, cylinder head 16, air cleaner 19, horn pipe 20, throttle body 21 and intake pipe 22 are covered by a leg shield 28 fitted to the vehicle frame F. An opening 28a facing the throttle body 21, intake pipe 22, and part of the fuel injection valve 24 is provided at the leg shield 28.

[0015] Referring to FIG. 3, the crank case 14 has a right projection 14a projecting further to the side than the right side surface 15a in a direction from left to right of the cylinder block 15. The exhaust pipe 26 connected to the exhaust port 25 of the cylinder head 16 then extends downwards and to the right from the exhaust port 25 in a direction from left to right of the motorcycle and then extends to the rear so as to pass through the lower part of the right projection 14a on the outer side from the right side surface 15a.

[0016] In order to control the running of the engine E, an O₂ sensor 29 that is an exhaust gas sensor is fitted at the exhaust pipe 26. This O₂ sensor 29 is fitted to the exhaust pipe 26 in such a manner as to extend upwards from the upper side wall of the exhaust pipe 26 at a position further towards the front than the right projection 14a of the crank case 14 at a position out from the right side surface 15a of the cylinder block 15.

[0017] A description is now given of the operation of the embodiment. By fitting the O₂ sensor 29 to the

exhaust pipe 26 in such a manner as to project further to the side than the right side surface 15a of the cylinder block 15, be further forward than the right projection 14a with which the crank case 14 is equipped, and be on the right side of the cylinder block 15, the O₂ sensor 29 can be located so as to effectively utilize vacant space without the engine body 17 and the O₂ sensor 29 interfering, no restrictions are placed on the degree of freedom with which other parts can be located, and this O₂ sensor 29 can also be easily adopted for small-type motorcycles.

[0018] Maintenance of the O₂ sensor 29 can easily be carried out from above because the O₂ sensor 29 is fitted at the upper side wall of the exhaust pipe 26.

[0019] The exhaust pipe 26 is positioned down from the O₂ sensor 29 and stones and water scattered from below are therefore prevented from colliding with the O₂ sensor 29 by the exhaust pipe 26 itself. Collisions and water bursts due to stones from the inner side can therefore be effectively prevented because the cylinder block 15 is located inside of the O₂ sensor 29 and can therefore be prevented to as great an extent as possible, without it being necessary to provide a protective cover. In this embodiment, collisions and water bursts of stones with the O₂ sensor 29 from the front side in particular can be effectively prevented because the leg shield 28 is located at the front side of the exhaust pipe 26.

[0020] An embodiment of the present invention is described above, but the present invention is by no means limited to the above embodiment, and various design modifications are possible without deviating from the spirit of the present invention as laid out in the patent claims.

[0021] For example, in the above embodiment, a description is given of an example where the axis of the cylinder 18 of the cylinder block 15 is positioned substantially horizontally within a perpendicular plane running in a direction from the front to the rear of the vehicle frame F. However, the present invention can also be applied to the case where the axis of the cylinder 18 is arranged in a substantially perpendicular manner within a perpendicular plane running in a direction from the front to the rear of the vehicle frame F. The present invention can also be applied to motorcycles employing an LAF sensor as an exhaust gas sensor in place of the O₂ sensor.

[0022] The invention positions an exhaust gas sensor in such a manner that a protective cover is not required, collisions and water bursts due to flying stones are avoided as much as possible, where maintenance work is straightforward, and where available space is effectively utilized.

[0023] To achieve this, an exhaust gas sensor 29 is fitted to an upper side wall of an exhaust pipe 26 at a position forward from a right projection 14a of a crank case 14 and facing out from a right side surface 15a of a cylinder block 15.

Claims

1. A motorcycle exhaust gas sensor assembly wherein, in a motorcycle where an engine (E) equipped with a cylinder block (15) located on an axis of a cylinder (18) within a perpendicular plane running from the front to the rear of a vehicle frame (F), a crank case (14) coupled to the cylinder block (15) and having a right projection (14a) projecting further to the side than a right side surface (15a) running in a left to right direction of the cylinder block (15), and a cylinder head (16) coupled to the cylinder block (15) on the opposite side to the crank case (14), is mounted on the vehicle frame (F), and an exhaust pipe (26) extending from front to rear along the lower part of the right projection (14a) is connected to an exhaust port (25) provided at the cylinder head (16), an exhaust gas sensor (29) is fitted at an upper side wall of the exhaust pipe (26) at a position forward from the right projection (14a) of the crank case (14) and facing out from the right side surface (15a) of the cylinder block (15).

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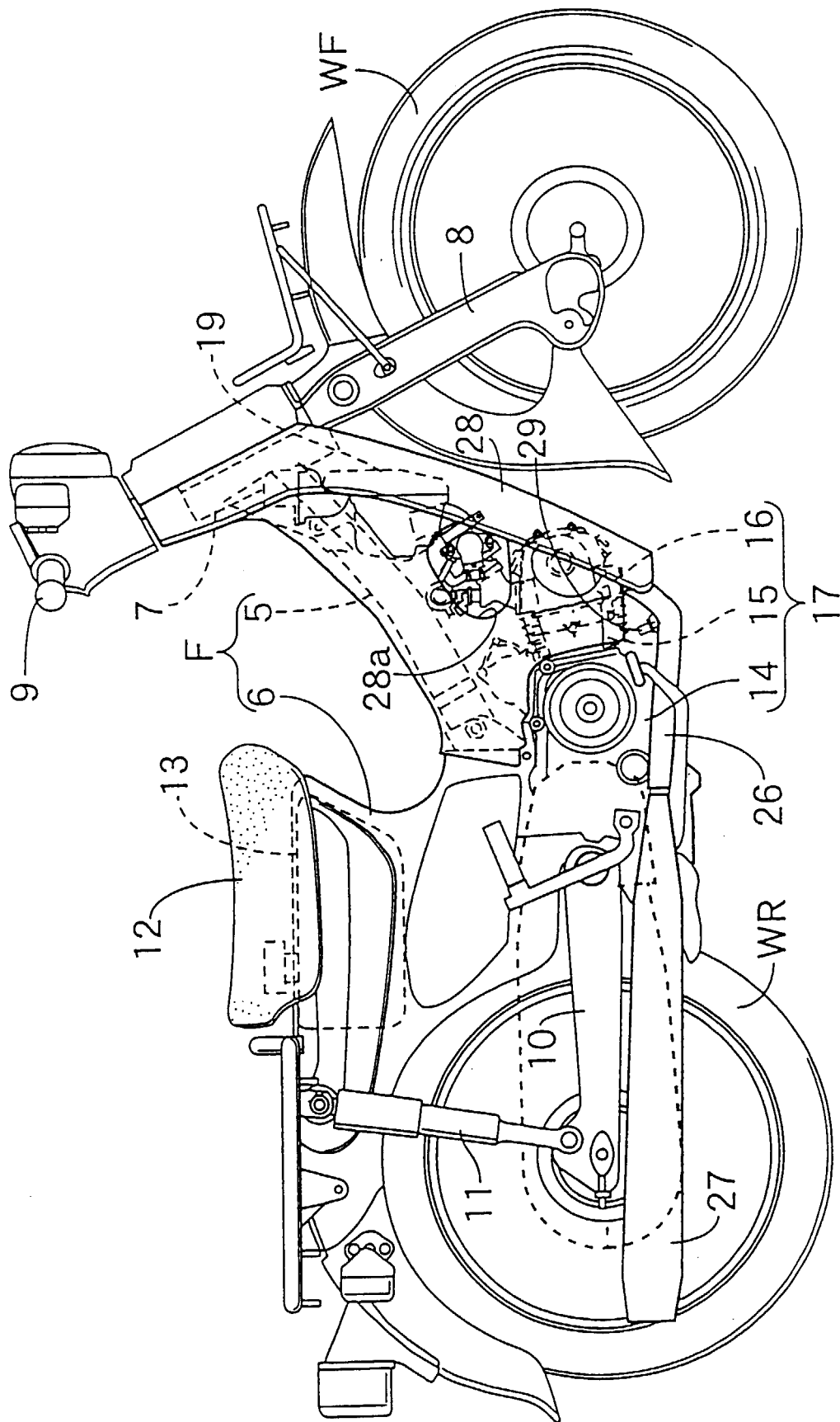


FIG. 1

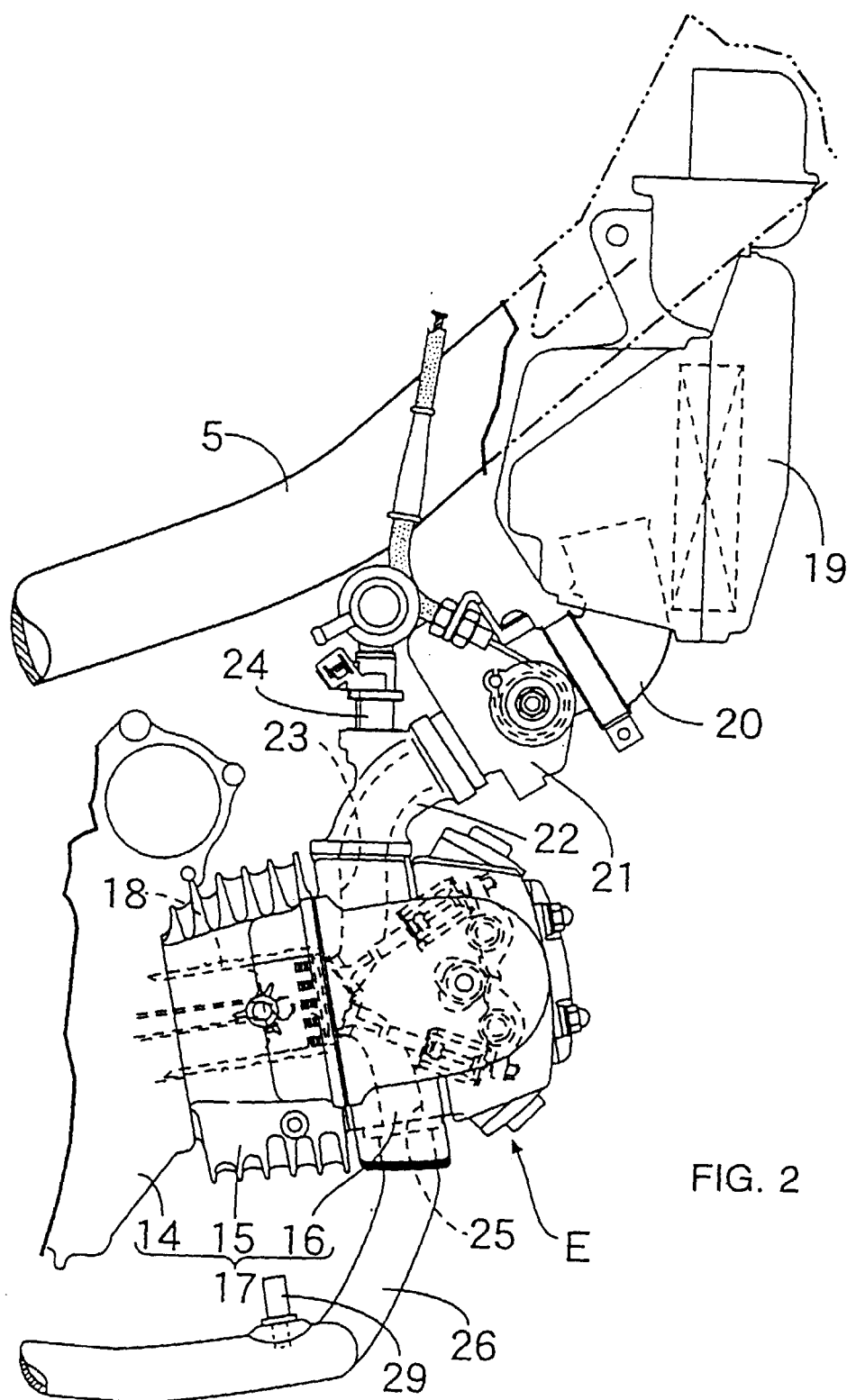


FIG. 2

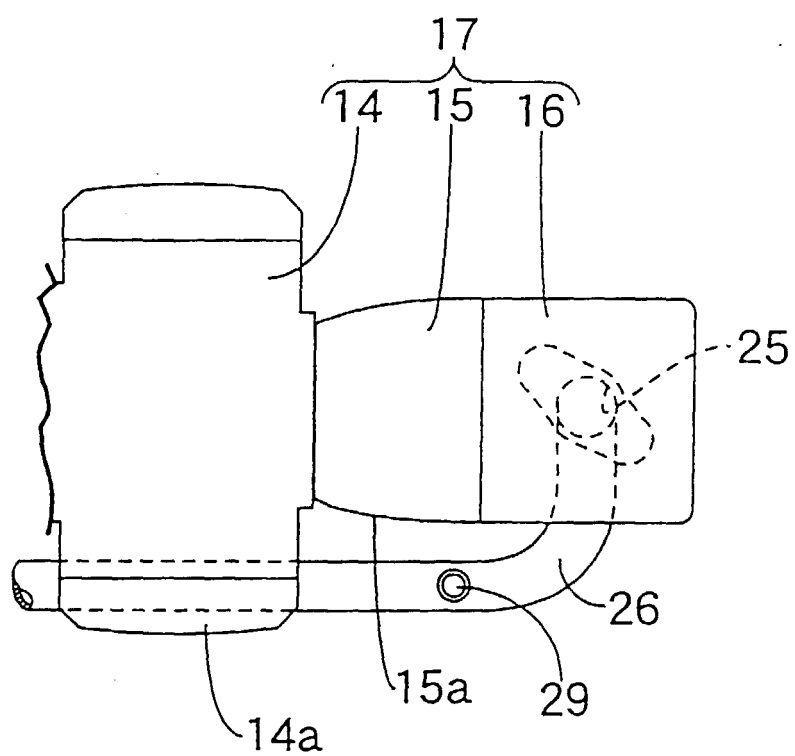


FIG. 3