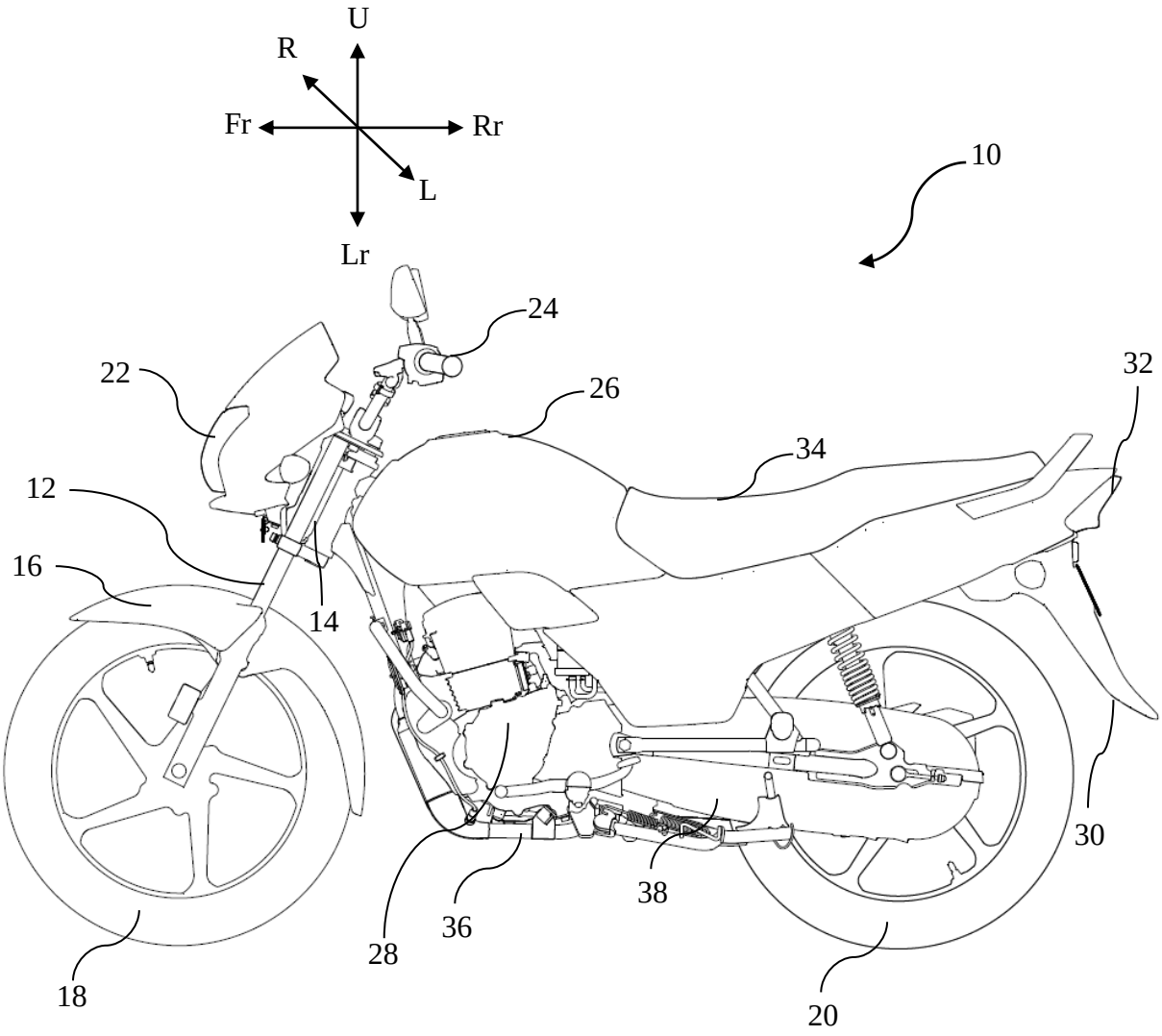


FIGURE 1

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Of Rajeshwari & Associates
Agent for the Applicant

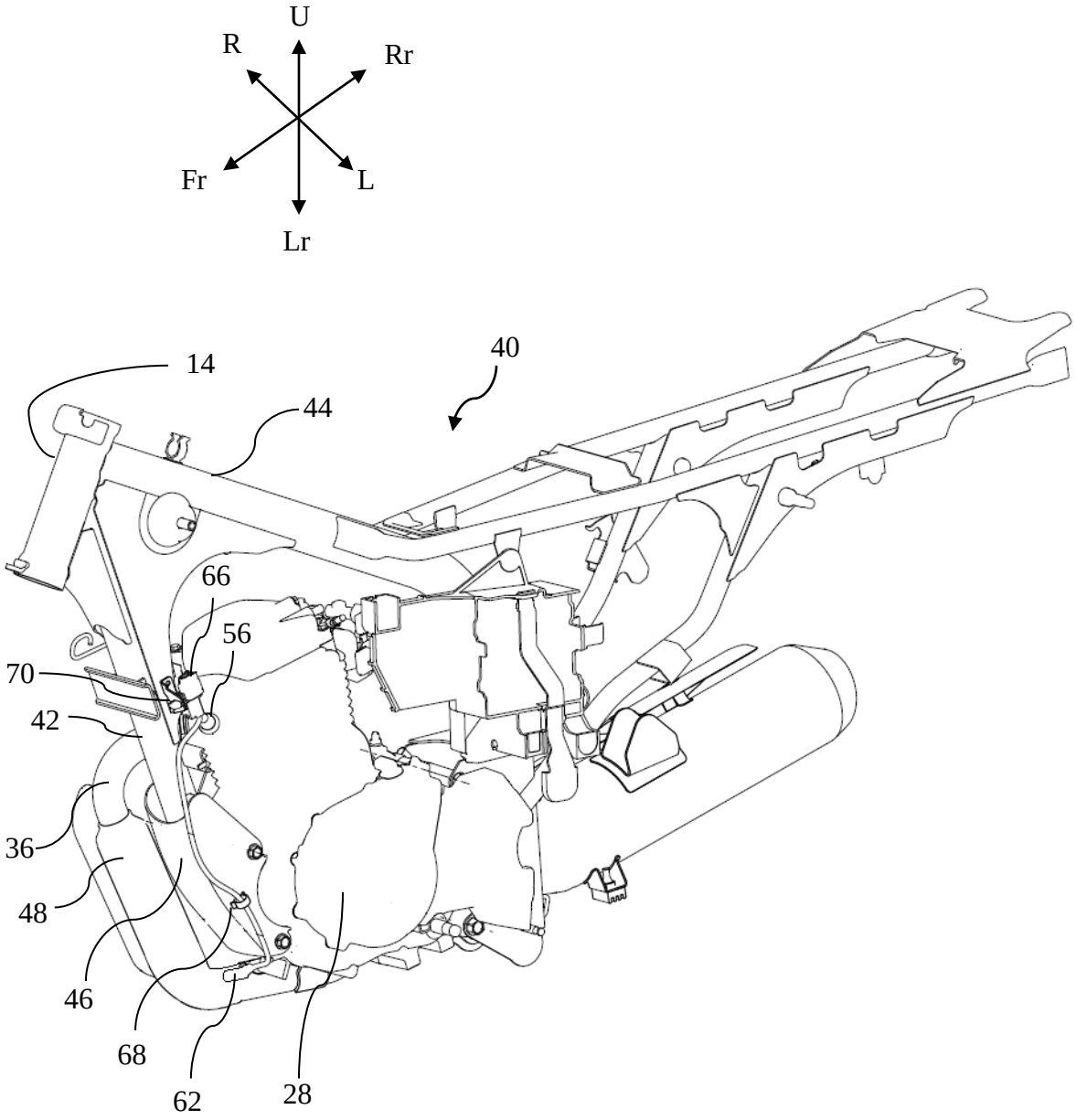


FIGURE 2

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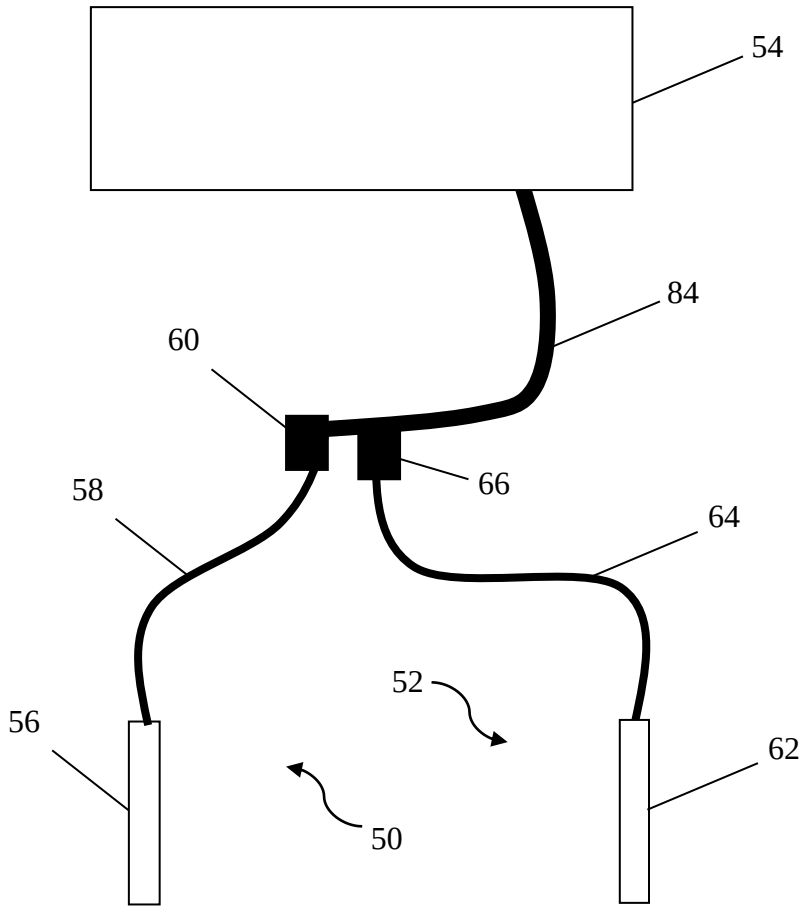


FIGURE 3

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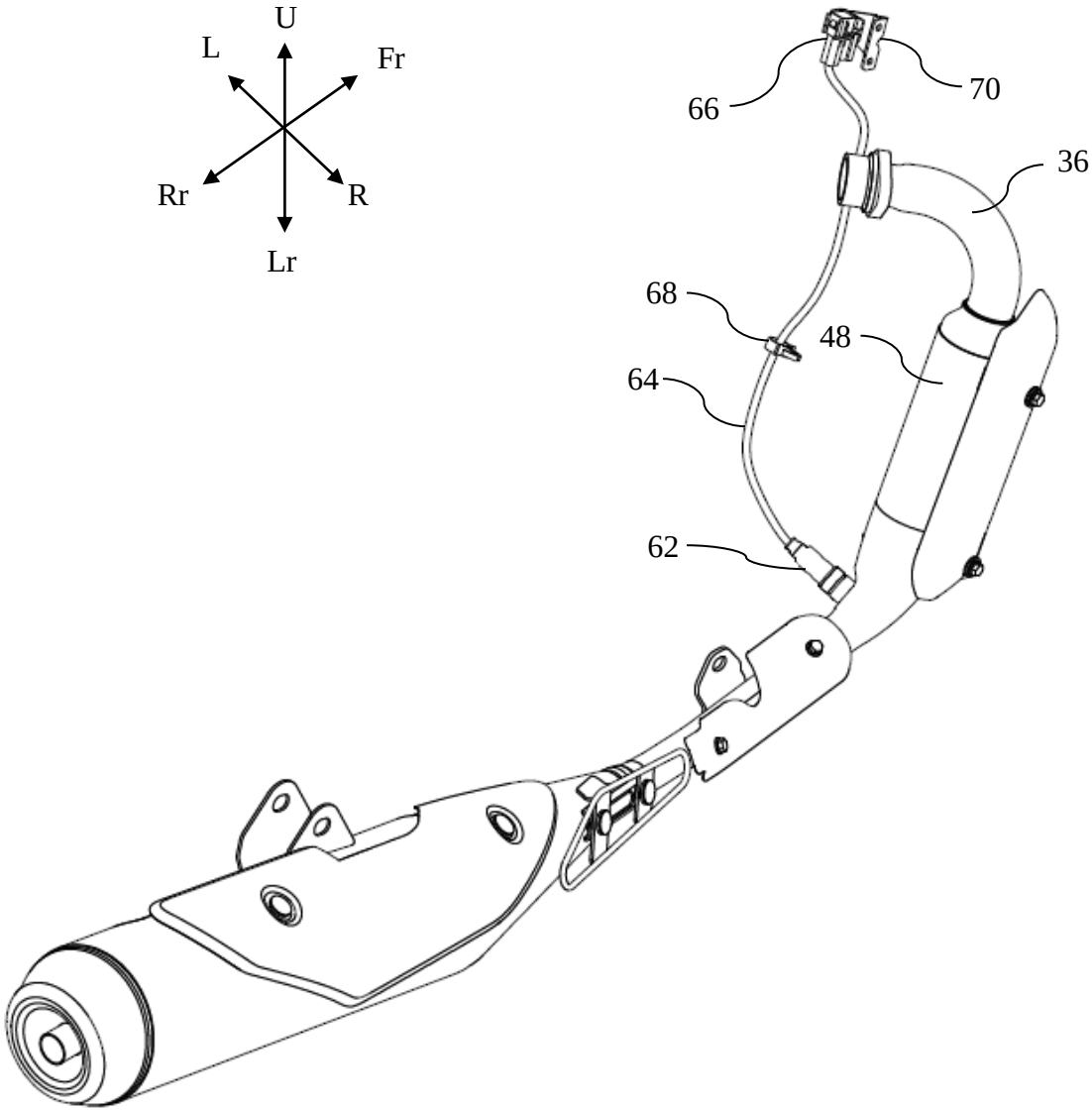


FIGURE 4

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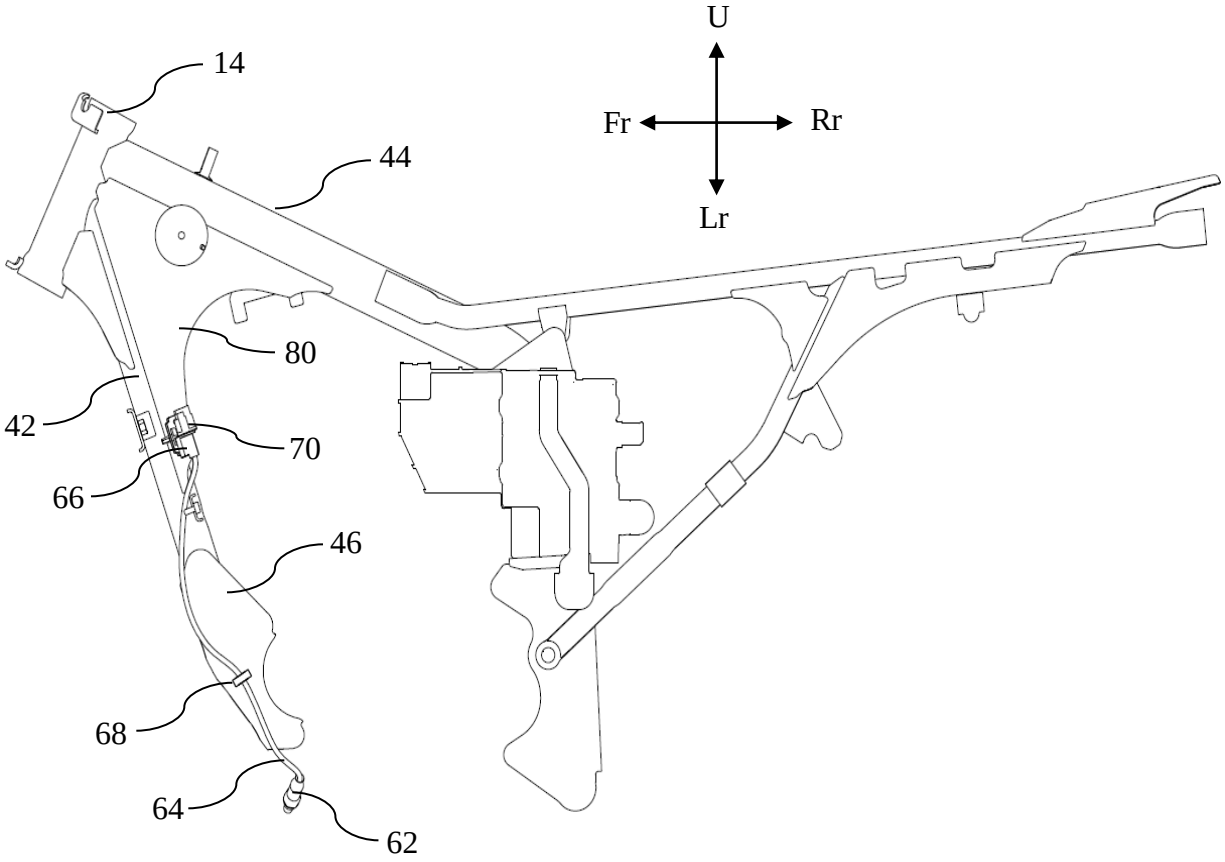


FIGURE 5

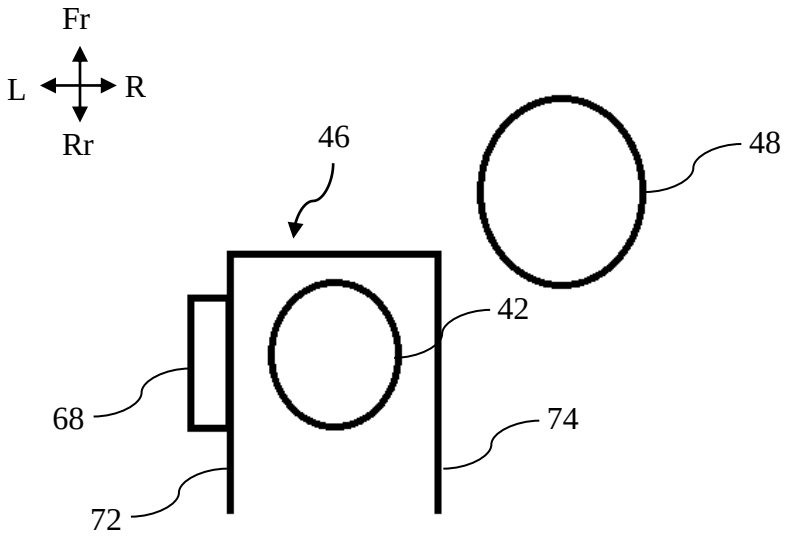


FIGURE 6

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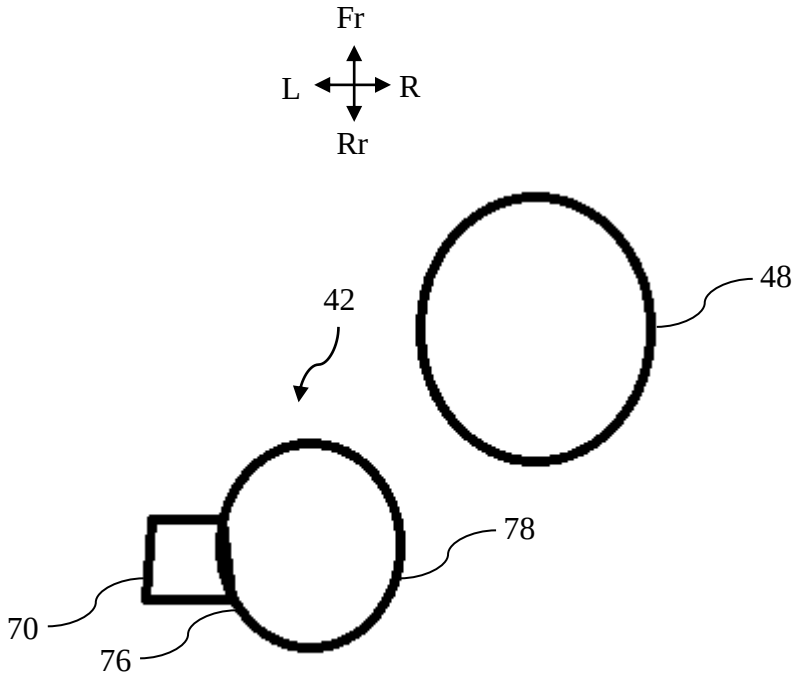


FIGURE 7

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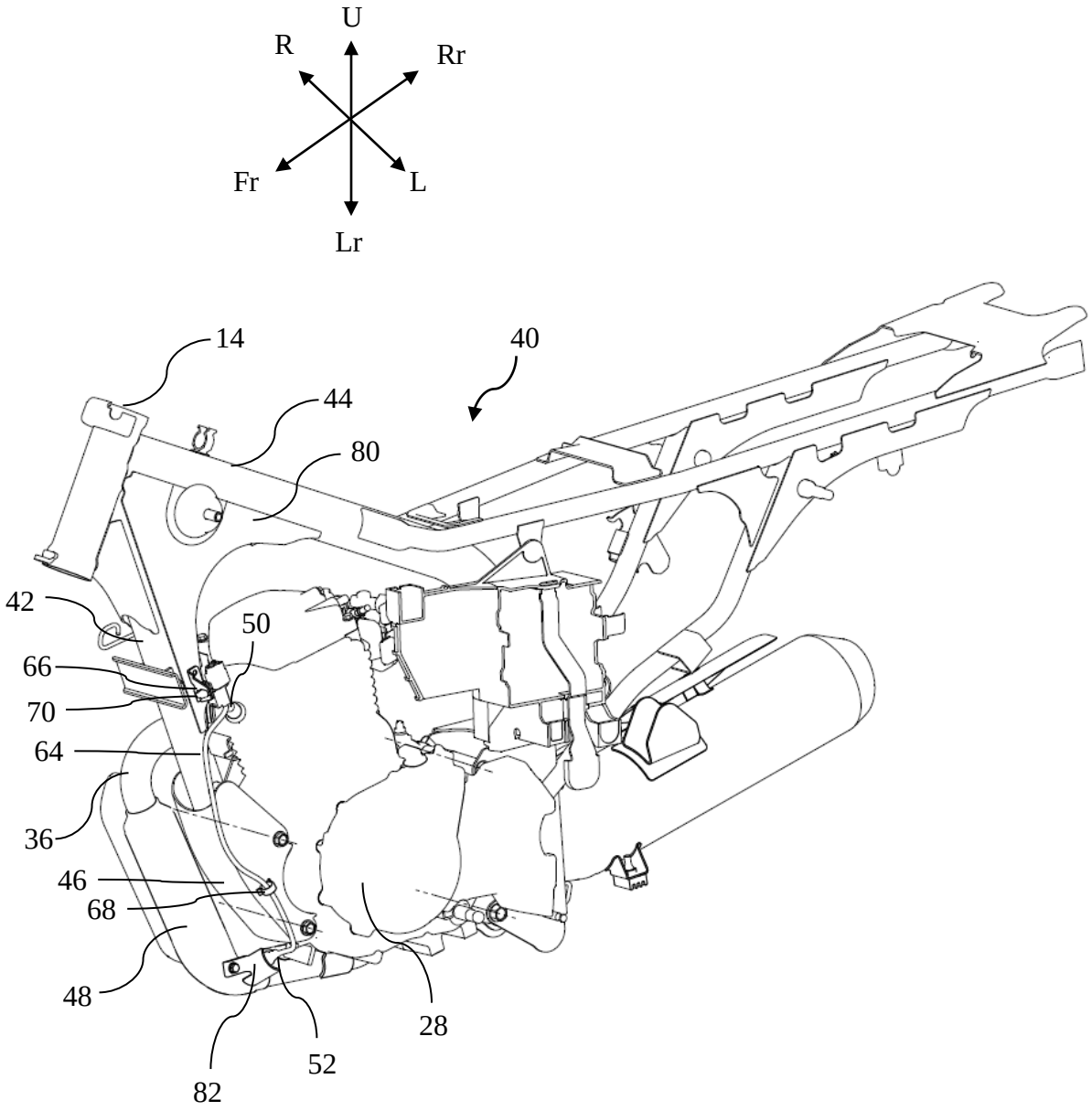


FIGURE 8

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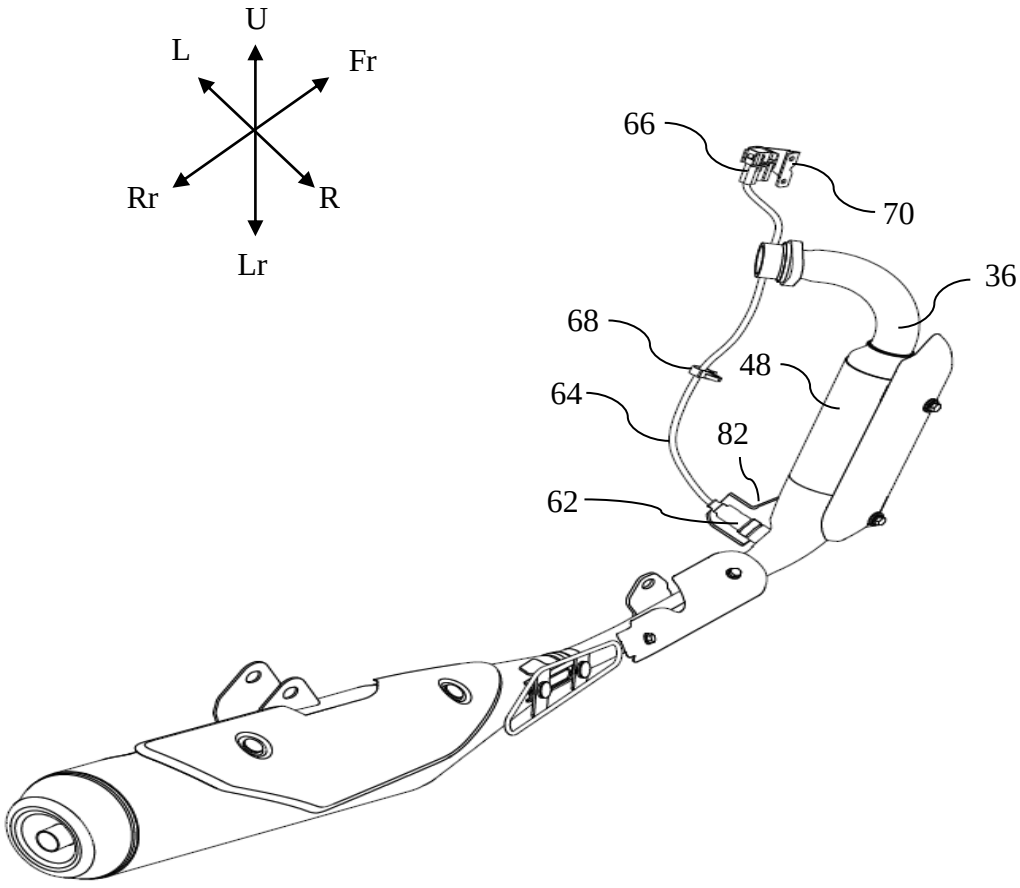


FIGURE 9

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FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

&

THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

[See section 10, Rule 13]

MOUNTING SYSTEM FOR A WIRE UNIT AND A COUPLER UNIT OF AN OXYGEN SENSOR

HERO MOTOCORP LIMITED, an Indian Company at: The Grand Plaza, Plot No.2, Nelson Mandela Road, Vasant Kunj- Phase -II, New Delhi, India, 110 070

THE FOLLOWING SPECIFICATION PARTICULARLY DESCRIBES THE INVENTION AND THE MANNER IN WHICH IT IS TO BE PERFORMED.

Field of the invention:

[001] The present invention relates to an oxygen sensor in a vehicle. In particular, the invention relates to a mounting system for a wire unit and a coupler unit of an oxygen sensor mounted on a vehicle.

Background of the Invention:

[002] An oxygen sensor is conventionally adopted as a detecting device in a vehicle. The oxygen sensor detects concentration of oxygen in an exhaust gas and based on the detected concentration of oxygen, a control unit of the vehicle controls an air-fuel ratio of an air-fuel mixture to be taken into the engine. By controlling the air-fuel ratio, it is possible to optimize composition ratio of the exhaust gas, thereby allowing best purification of the exhaust gas by a catalyst located in an exhaust pipe coupled to the engine.

[003] An oxygen sensor has three major components namely, a sensor unit, a wire unit and a coupler unit. Typically, the sensor unit is mounted in an exhaust pipe. The wire unit and the coupler unit electrically couples the sensor unit to a wire harness and an electrical power source of the vehicle such as battery and/or alternator. The wire harness is then connected to the control unit and hence, the output of the sensor unit is provided to the control unit.

[004] A vehicle having a single-cylinder engine may be provided with one or more such oxygen sensor(s). In case, a single oxygen sensor is provided, the sensor unit of the oxygen sensor is located up-stream of catalyst in the exhaust pipe in a manner so as not to interfere with the engine body. In a case, two oxygen sensors are provided, the sensor unit of the first oxygen sensor is located up-stream of the catalyst in the exhaust pipe and the sensor unit of the second oxygen sensor is located down-stream of the catalyst in the exhaust pipe in a manner so as not to interfere with the engine body.

[005] Thus, sensor unit and the wire unit has to be located in the exhaust pipe in a manner such that it does not interfere with the engine body. Additionally, the sensor unit has to be located in the exhaust pipe in a manner such that it is not impacted by foreign particles such as stone, water, etc. Also, routing of the wire unit should be such that the wire unit is not bent above a

predetermined angle. Thus, taking into consideration the above factors, mounting of the sensor unit of the second oxygen sensor on the exhaust pipe is restricted and the routing of the wire unit of the second oxygen sensor is restricted. In many cases, the wire unit of the second oxygen sensor is routed along a crankcase of the engine.

[006] The restrictions in the mounting of the sensor unit of the second oxygen sensor and the restrictions in the routing of the wire unit of the second oxygen sensor may lead to various disadvantages that are well known to a person skilled in the art. Some of the disadvantages include difficulty in accessing the sensor unit of the second oxygen sensor, difficulty in assembling the sensor unit of the second oxygen sensor, an increase in a length of the wire unit of the second oxygen sensor, difficulty in accessing the wire unit of the second oxygen sensor, difficulty in assembling the wire unit of the second oxygen sensor, difficulty during servicing of the vehicle, the wire unit of the second oxygen sensor being subjected to higher temperature etc. Additionally, even the mounting and routing of the wiring harness is adversely affected. Thus, there exists a need to address one or more disadvantages as mentioned above.

Summary of the Invention:

[007] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[008] In one aspect of the invention, there is provided a mounting system for a wire unit and a coupler unit of an oxygen sensor. In an embodiment of the invention, the oxygen sensor is located down-stream of a catalyst in an exhaust pipe. In an embodiment of the invention, the wire unit and the coupler unit electrically interconnects a sensor unit forming part of the oxygen sensor to a control unit. In an embodiment of the invention, the mounting system comprises a first holder provided on an engine mount structure and a second holder coupled directly or indirectly coupled to a down tube that extends from a head-pipe.

[009] In an embodiment of the invention, the first holder accommodates the wire unit.

[0010] In another embodiment of the invention, the first holder is provided on the engine mount structure such that the engine mount structure is sandwiched between the first holder and the catalyst.

[0011] In yet another embodiment of the invention, the engine mount structure comprises a first wall and a second wall; the first holder is provided on the first wall of the engine mount structure such that first wall, the second wall and optionally the down tube are sandwiched between the first holder and the catalyst.

[0012] In a further embodiment of the invention, the first holder is provided so as to face a first side of the vehicle and the catalyst is disposed on a second side of the vehicle.

[0013] In a furthermore embodiment of the invention, the second holder accommodates the coupler unit.

[0014] In another embodiment of the invention, the second holder is coupled directly to a first side of the down tube such that a second side of the down tube is sandwiched between the second holder and the catalyst.

[0015] In a further embodiment of the invention, the second holder is coupled to a stay plate, the stay plate being coupled between the down tube and a top tube that extend from the head-pipe.

[0016] In a further embodiment of the invention, the second holder is coupled to a stay plate such that the down tube is sandwiched between the second holder and the catalyst.

[0017] In another embodiment of the invention, the second holder is coupled to a first side of the stay plate and the catalyst is disposed on a second side of the stay plate such that the down tube is sandwiched between the second holder and the catalyst.

[0018] In another aspect of the invention, there is provided a vehicle comprising a head pipe, a down tube extending from the head pipe, a top tube extending from the head pipe; an engine unit supported on the down tube by an engine mount structure, and an exhaust pipe fluidly connected to the engine unit. The exhaust pipe comprises a catalyst for purifying an exhaust gas produced by the engine unit. The vehicle comprises a first oxygen sensor and a second oxygen sensor. The

first oxygen sensor comprising a first sensor unit, a first wire unit, and a first coupler unit. The second oxygen sensor comprising a second sensor unit, a second wire unit, and a second coupler unit. The first wire unit and the first coupler couples the first sensor unit to a wire harness. The second wire unit and the second coupler couples the second sensor unit to the wire harness. The wire harness is coupled to a control unit for transferring the data generated by the first and the second sensor units to the control unit. The first sensor unit is located upstream of the catalyst and the second sensor unit is located downstream of the catalyst. The vehicle comprises a first holder provided on an engine mount structure and a second holder coupled directly or indirectly to the down tube that extends from the head pipe. The first holder accommodates the second wire unit. The second holder accommodates the second coupler unit.

[0019] In an embodiment of the invention, the second sensor unit projects obliquely from the exhaust pipe in a right to left direction of the vehicle.

[0020] In an embodiment of the invention, the exhaust pipe is provided with a protection element located in close proximity of the second sensor unit for protecting the second sensor unit.

[0021] In an embodiment of the invention, the exhaust pipe includes a first portion and a second portion, the first portion projects towards a first side of the vehicle and the second portion projects towards a second side of the vehicle. In an embodiment of the invention, the second portion of the exhaust pipe accommodates the catalyst.

[0022] In an embodiment of the invention, the first holder is provided on the engine mount structure such that the engine mount structure is sandwiched between the first holder and the catalyst.

[0023] In an embodiment of the invention, the engine mount structure includes a first wall and a second wall; the first holder is provided on the first wall of the engine mount structure such that first wall, the second wall and optionally the down tube are sandwiched between the first holder and the catalyst.

[0024] One advantage of the invention includes the wire unit and the coupler unit being protected from high temperature as produced by the engine unit and the catalyst. Another advantage of the invention includes the route of the oxygen sensor wire unit not having a bend which is more than a predetermined value. Yet another advantage of the invention includes a reduction in a length of the oxygen sensor wire unit. Still another advantage of the invention includes an increase in the ease of accessing the oxygen sensor wire unit. A further advantage of the invention includes an increase in the ease of coupling the oxygen sensor wire unit. A furthermore advantage of the invention includes an increase in the ease of accessing the sensor unit. Another advantage of the invention includes an increase in the ease of assembling the sensor unit. A further advantage of the invention includes an increase in the ease of servicing the vehicle. A furthermore advantage of the invention includes an increase in the ease of routing of wiring harness.

[0025] To further clarify the advantages and features of the invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof, which is illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail with the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES:

[0026] In order that the invention may be readily understood and put into practical effect, reference will now be made to exemplary embodiments as illustrated with reference to the accompanying drawings, where like reference numerals refer to identical or functionally similar elements throughout the separate views. The figures together with a detailed description below, are incorporated in and form part of the specification, and serve to further illustrate the embodiments and explain various principles and advantages, in accordance with the present invention where:

[0027] **Figure 1** illustrates a left side view of a vehicle constructed in accordance with an embodiment of the invention;

[0028] **Figure 2** illustrates a perspective left side view of a part of the vehicle constructed in accordance with an embodiment of the invention;

[0029] **Figure 3**, there is illustrated a block diagram showing the connection of the first oxygen sensor and the second oxygen sensor to an air-fuel ratio controller;

[0030] **Figure 4** illustrates a rear perspective view of the exhaust pipe having the oxygen sensor and the oxygen sensor coupler in accordance with an embodiment of the invention;

[0031] **Figure 5** illustrates a left side view of the vehicle frame structure and the oxygen sensor coupler in accordance with an embodiment of the invention;

[0032] **Figure 6** illustrates a perspective left side view of a part of the vehicle in accordance with another embodiment of the invention; and

[0033] **Figure 7** illustrates a rear perspective view of the exhaust pipe shown in Figure 6 in accordance with an embodiment of the invention.

[0034] It may be noted that to the extent possible, like reference numerals have been used to represent like elements in the drawings. Further, skilled artisans will appreciate that elements in the drawings are illustrated for simplicity and may not have been necessarily been drawn to scale. For example, the dimensions of some of the elements in the drawings may be exaggerated relative to other elements to help to improve understanding of aspects of the present invention. Furthermore, one or more elements may have been represented in the drawings by conventional symbols, and the drawings may show only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the drawings with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

Detailed Description of the Invention:

[0035] For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the

scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

[0036] It will be understood by those skilled in the art that the foregoing general description and the following detailed description are explanatory of the invention and are not intended to be restrictive thereof.

[0037] As used in the description herein and throughout the claims that follow, the meaning of “a,” “an,” and “the” includes plural reference unless the context clearly dictates otherwise. Also, as used in the description herein, the meaning of “in” includes “in” and “on” unless the context clearly dictates otherwise.

[0038] Reference throughout this specification to “an aspect”, “another aspect” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrase “in an embodiment”, “in another embodiment”, and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

[0039] The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that one or more devices or sub-systems or elements or structures or components proceeded by "comprises... a" does not, without more constraints, preclude the existence of other devices or other sub-systems or other elements or other structures or other components or additional devices or additional sub-systems or additional elements or additional structures or additional components.

[0040] As used herein, and unless the context dictates otherwise, the terms "coupled to", “connected to”, “operably connected to”, and “operatively connected to” are intended to include both direct connection / coupling (in which two elements that are coupled / connected to each other contact each other) and indirect coupling / connection (in which at least one additional element is located between the two elements). Therefore, the terms "coupled to" and "coupled

with" are used synonymously. Similarly, the terms “connected to” and “connected with” are used synonymously.

[0041] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one ordinary skilled in the art to which this invention belongs. The device, methods, and examples provided herein are illustrative only and not intended to be limiting.

[0042] The use of any and all examples, or exemplary language (e.g. “such as”) provided with respect to certain embodiments herein is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as being essential to the practice of the invention.

[0043] Groupings of alternative elements or embodiments of the invention disclosed herein are not to be construed as limitations. Each group member can be referred to and claimed individually or in any combination with other members of the group or other elements found herein. One or more members of a group can be included in, or deleted from, a group for reasons of convenience and/or patentability. When any such inclusion or deletion occurs, the specification is herein deemed to contain the group as modified thus fulfilling the written description of all Markush groups used in the appended claims.

[0044] Embodiments of the present invention will be described below in detail with reference to the accompanying drawings.

[0045] While the present invention is illustrated in the context of a vehicle, however, cover and aspects and features thereof can be used with other types of vehicles as well. The terms “vehicle”, “two wheeled vehicle” and “motorcycle” have been interchangeably used throughout the description. The term “vehicle” comprises vehicles such as motorcycles, scooters, bicycles, mopeds, scooter type vehicles, All-Terrain Vehicles (ATV) and the like.

[0046] The terms “front / forward”, “rear / rearward / back / backward”, “up / upper / top”, “down / lower / lower ward / downward, bottom”, “left / leftward”, “right / rightward” used

therein represents the directions as seen from a vehicle driver sitting astride and these directions are referred by arrows Fr, Rr, U, Lr, L, R in the Figures.

[0047] Referring to **Figure 1**, there is illustrated a left side view of a vehicle (10) according to an embodiment of the present invention. The vehicle (10) comprises, inter-alia, a front fork (12), a head pipe (14), a front fender (16), a front ground engaging member (18), a rear ground engaging member (20), a headlight (22), a steering handle bar (24), a fuel tank (26), an engine unit (28), a rear fender (30), a tail light (32), a seat (34), and an exhaust pipe (36). The engine unit (28) generates driving power which powers the vehicle (10). The driving power is transmitted to the rear ground engaging member (20) via a transmission system (38). It may be noted that the vehicle (10) is shown to have included above stated parts, however, those skilled in the art would appreciate that the vehicle (10) includes other parts which may not be relevant for explaining the present invention and hence are not shown and described. In an embodiment of the invention, the engine unit (28) may be a four stroke, single-cylinder SOHC internal combustion engine.

[0048] Referring now to **Figure 2**, there is illustrated a perspective left side view of a part of the vehicle (10) constructed in accordance with an embodiment of the invention. The vehicle (10) further comprises a body frame (40) that supports the engine unit (28). In particular, the body frame (40) comprises a down tube (42) and a top tube (44) connected to the head pipe (14). Thus, the down tube (42) and the top tube (44) extend from the head pipe (14). The engine unit (28) is placed between the down tube (42) and the top tube (44) and secured thereto. In particular, the engine unit (28) is supported on the down tube (42) by an engine mount structure (46). The engine unit (28) is fluidly coupled to the exhaust pipe (36) so as to release exhaust gases produced by the engine unit (28) into atmosphere. The exhaust pipe (36) extends in a rear-ward direction of the vehicle (10).

[0049] The exhaust pipe (36) includes a catalyst (48) which functions to purify exhaust gas produced by the engine unit (28). The vehicle (10) includes a first oxygen sensor (50) and a second oxygen sensor (52) in the exhaust pipe (36). The first oxygen sensor (50) is adapted to sense a level of oxygen in the exhaust gas upstream of the catalyst (48) and the second oxygen sensor (52) is adapted to sense a level of oxygen in the exhaust gas downstream of the catalyst (48).

[0050] Now referring to **Figure 3**, there is illustrated a block diagram showing the connection of the first oxygen sensor (50) and the second oxygen sensor (52) to a control unit (54). Although not illustrated, the first oxygen sensor (50) and the second oxygen sensor (52) are also connected to an electrical power source of the vehicle such as battery and/or alternator for receiving energizing power from the electrical power source. The first oxygen sensor (50) comprises a first sensor unit (56), a first wire unit (58), and a first coupler unit (60). The second oxygen sensor (52) comprises a second sensor unit (62), a second wire unit (64), and a second coupler unit (66). The first wire unit (58) and the first coupler unit (60) couples the first sensor unit (56) to a wire harness (84). The second wire unit (64) and the second coupler unit (66) couples the second sensor unit (62) to the wire harness (84). The wire harness (84) is then coupled to the control unit (54). Thus, signal generated by the first sensor unit (56) and signal generated by the second sensor unit (62) is transferred to the control unit (54). On the basis of signals received from the first sensor unit (56) and the second sensor unit (62), the control unit (54) can control an air-fuel ratio of an air-fuel mixture to be taken into the engine unit (28). By controlling the air-fuel ratio, one or more factors including composition ratio of the exhaust gas can be optimized, thereby allowing best purification of the exhaust gas by the catalyst (48) located in the exhaust pipe (36). Since the invention has to do predominantly with the mounting of the second oxygen sensor (50), the description will hereafter describe in detail this aspect. Also, the first wire unit (58) and the second wire unit (64) provide energizing power from the electrical power source to the first sensor unit (56) and the second sensor unit (62), respectively.

[0051] Referring now to **Figure 4**, there is illustrated a rear perspective view of the exhaust pipe (36) in accordance with an embodiment of the invention. As it can be observed, the second sensor unit (62) projects obliquely to a first side and more particularly to a left side of the vehicle (10) from the exhaust pipe (36). In particular, the second sensor unit (62) projects obliquely to a first side of the vehicle (10) and towards the engine unit (28) from the exhaust pipe (36). The second wire unit (64) also projects obliquely to a first side and more particularly to a left side of the vehicle (10) and then turns towards an upward portion of the vehicle (10). Since, the second sensor unit (62) as well as the second wire unit (64) project obliquely to a left side of the vehicle (10), neither the second sensor unit (62) nor the second wire unit (64) is subjected to the heat generated by the engine unit (28) or the catalyst (48). A mounting system helps in mounting and

routing of the second wire unit (64) and the second coupler unit (66). The mounting structure comprises a first holder (68) and a second holder (70).

[0052] Referring now to **Figure 5**, there is illustrated a left side view of the vehicle frame structure in accordance with an embodiment of the invention. In an embodiment of the invention, the first holder (68) accommodates the second wire unit (64). In an embodiment of the invention, the second holder (70) accommodates the second coupler unit (66).

[0053] Referring to **Figure 6**, which is a top sectional view of a first portion of the vehicle in an embodiment of the invention, the first holder (68) is provided on the engine mount structure (46) such that the engine mount structure (46) is sandwiched between the first holder (68) and the catalyst (48). In a non-limiting example, the engine mount structure (46) comprises a first wall (72) and a second wall (74) and the first holder (68) is provided on the first wall (72) of the engine mount structure (46) such that the first wall (72), the second wall (74) and optionally the down tube (42) are sandwiched between the first holder and the catalyst (48). Thus, the first holder (68) is provided so as to face a first side of the vehicle (10) (preferably left side of the vehicle) and the catalyst (48) is disposed on a second side of the vehicle (10) (preferably right side of the vehicle).

[0054] Referring to **Figure 7**, which is a top sectional view of a second portion of the vehicle in an embodiment of the invention, the second holder (70) is provided on the down tube (42). In a non-limiting example, the second holder (70) is coupled directly to a first side (76) of the down tube (42) such that a second side (78) of the down tube (42) is sandwiched between the second holder (70) and the catalyst (48).

[0055] Referring back to **Figure 5**, in an alternative embodiment of the invention, the second holder (70) is coupled to a stay plate (80), the stay plate (80) being coupled between the down tube (42) and the top tube (44) that extend from the head-pipe (14). Referring back to **Figure 2**, in an embodiment of the invention, the second holder (70) is coupled to the stay plate (80) such that the down tube (42) is sandwiched between the second holder (70) and the catalyst (48). In particular, the second holder (70) is coupled to a first side of a stay plate (80) and the catalyst

(48) is disposed on a second side of the stay plate (80) such that the down tube (42) is sandwiched between the second holder (70) and the catalyst (48).

[0056] The mounting system as provided above protects the second wire unit (66) as well as the second coupler unit (68) from the heat generated by the engine unit (28) and the heat generated by the catalyst (28).

[0057] In an embodiment of the invention, the second holder (70) is disposed in an upward direction of the vehicle as compared to the first holder structure (68). In an embodiment of the invention, the second holder structure (70) is disposed such that it is accessible from a left side of the vehicle (10). In a preferred embodiment of the invention, the second holder structure (70) is provided on a left side of the vehicle (10).

[0058] Since the second sensor unit (62) projects obliquely to a left side of the vehicle (10) from the exhaust pipe (36); in an embodiment of the invention there may be provided a protection element (82) located in close proximity of the second sensor unit (62). Referring to **Figure 8** and **Figure 9**, there is illustrated a perspective left side view of a part of the vehicle (10) constructed in accordance with another embodiment of the invention and a rear perspective view of the exhaust pipe (36) shown in Figure 8, respectively.

[0059] It can be seen from Figures 8 and 9, that the protection element (82) is mounted on the exhaust pipe (36). In an embodiment of the invention, the protection element (82) at least partially covers the second sensor unit (62). In particular, the protection element (82) may be in the form curved plate with a provision for mounting on to the exhaust pipe (36).

[0060] One advantage of the invention includes the second sensor unit (62), the second wire unit (64), and the second coupler unit (66) being protected from high temperature as produced by the engine unit (28) and the catalyst (48). Another advantage of the invention includes the route of the second wire unit (64) not having a bend which is more than a predetermined value. The predetermined angle would be generally well below the threshold bending angle as prescribed by a manufacturer of the oxygen sensor.

[0061] Yet another advantage of the invention includes a reduction in a length of the second wire unit (64). In particular, since the wire harness is easily accessible at about a top portion of the bottom tube and the second coupler unit (66) terminates close to the top portion of the bottom tube, the length of the second wire unit (64) is not required to be increased.

[0062] Still another advantage of the invention includes an increase in the ease of accessing the second sensor unit (62), the second wire unit (64), and the second coupler unit (66). In particular, an entire portion of the second oxygen sensor (52) can be accessed from the left side of the vehicle (10). This also makes leads to an increase in the ease of assembling the second oxygen sensor. This furthermore leads to an increase in the ease of servicing the vehicle.

[0063] A furthermore advantage of the invention includes an increase in the ease of routing of wiring harness (84), as the wire harness (84) is not required to be routed to take care of the location of the second coupler unit (66).

[0064] While specific language has been used to describe the disclosure, any limitations arising on account of the same are not intended. As would be apparent to a person in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein.

[0065] The figures and the forgoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, orders of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts necessarily need to be performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples.

WE CLAIM:

1. A mounting system for a wire unit (64) and a coupler unit (66) of an oxygen sensor (52), the oxygen sensor (52) comprising a sensor unit (62) being located down-stream of a catalyst (48) in an exhaust pipe (36), the wire unit (64) and the coupler unit (66) electrically interconnecting the sensor unit (62) forming part of the oxygen sensor (52) to a control unit (54), the mounting system comprises:
   a first holder (68) provided on an engine mount structure (46); and
   a second holder (70) coupled directly or indirectly coupled to a down tube (42) that extends from a head-pipe (14).

2. The mounting system as claimed in claim 1, wherein the first holder (68) accommodates the wire unit (64).

3. The mounting system as claimed in claim 1, wherein the first holder (68) is provided on the engine mount structure (46) such that the engine mount structure (46) is sandwiched between the first holder (68) and the catalyst (48).

4. The mounting system as claimed in claim 1, wherein the engine mount structure (46) comprises a first wall (72) and a second wall (74); the first holder (68) is provided on the first wall (72) of the engine mount structure (46) such that first wall (72), the second wall (74) and optionally the down tube (42) are sandwiched between the first holder (68) and the catalyst (48).

5. The mounting system as claimed in claim 1, wherein the first holder (68) is provided so as to face a first side of the vehicle (10) and the catalyst (48) is disposed on the second side of the vehicle (10).

6. The mounting system as claimed in claim 1, wherein the second holder (70) is operatively coupled to the coupler unit (68).

7. The mounting system as claimed in claim 1, wherein the second holder (70) is coupled directly to a first side (76) of the down tube (42) such that a second side (78) of the down tube (42) is sandwiched between the second holder (70) and the catalyst (48).

8. The mounting system as claimed in claim 1, wherein the second holder (70) is coupled to a stay plate (80), the stay plate (80) being coupled between the down tube (42) and a top tube (44) that extend from the head-pipe (14).

9. The mounting system as claimed in claim 1, wherein the second holder (70) is coupled to a first side of a stay plate (80) and the catalyst (48) is disposed on a second side of the stay plate (80) such that the down tube (42) is sandwiched between the second holder (70) and the catalyst (48).

10. A vehicle comprising:

a head pipe (14);

a down tube (42) extending from the head pipe (14);

a top tube (44) extending from the head pipe (14);

an engine unit (28) supported on the down tube (42) by an engine mount structure (46);

an exhaust pipe (36) fluidly connected to the engine unit (28), the exhaust pipe (36) comprises a catalyst (48) for purifying an exhaust gas produced by the engine unit (28);

a first oxygen sensor (50) for detecting an oxygen content in an exhaust gas produced by the engine unit (28), the first oxygen sensor (50) comprising a first sensor unit (56), a first wire unit (58), and a first coupler unit (60), the first sensor unit (56) being located upstream of the catalyst (48);

a second oxygen sensor (52) for detecting an oxygen content in an exhaust gas produced by the engine unit (28), the second oxygen sensor (52) comprising a second sensor unit (62), a second wire unit (64), and a second coupler unit (66), the second sensor unit (62) being located downstream of the catalyst (48) and projects obliquely from the exhaust pipe (36);

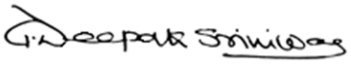
a wire harness (84) electrically connected to the first coupler unit (60) and the second coupler unit (66);

a control unit (54) electrically connected to the wire harness (84);

a first holder (68) provided on an engine mount structure (46), the first holder (68) accommodates the second wire unit (64); and

a second holder (70) coupled directly or indirectly to the down tube (42) that extends from the head pipe (14), the second holder (70) accommodates the second coupler unit (66).

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ABSTRACT

MOUNTING SYSTEM FOR A WIRE UNIT AND A COUPLER UNIT OF AN OXYGEN SENSOR

The present invention relates to a mounting system for a wire unit and a coupler unit of an oxygen sensor provided in a vehicle. The wire unit and the coupler unit electrically interconnect sensor unit located down-stream of a catalyst in an exhaust pipe to a control unit. The mounting system protects the wire unit and a coupler unit from heat generated by the engine unit and the catalyst. The mounting system allows for routing the wire unit such that the wire unit is not bent above a predetermined value and a length of the wire unit is reduced. The mounting system increases an ease of assembling and accessing the wire unit.

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FIGURE 2