

STRUCTURE FOR CHANGING BODIES OF MOTORCYCLES

Technical Field

The present invention relates generally to the field of motorcycle structure for body switching.

Background Art

5 Up to now in Thailand, transportation by motorcycles has been an important alternative because motorcycles are not expensive and allow riders to travel in and out of various areas quickly. At present electric motorcycles are gaining popularity, decreasing travel expenses and helping protect the environment.

10 In addition, the domestic moto cycle market has grown steadily over the years. The number of motorcycles per capita in Thailand is about 1/4. This is a rapid increase from the ratio of 1/8 about 10 years ago. (Kasikorn Research Center: 2010)

In all structural designs of conventional moto cycles at present, the body frame is always firmly fixed to the motorcycle's body. It follows that a change in the body of the motorcycle for any reason would necessitate a replacement in the body frame as well, thus creating substantial industrial waste. Furthermore, in case either the motorcycle body or the body frame suffers
15 irreparable damage, removal and replacing just the damaged part would be unduly difficult.

The inventors have been inspired to conceptualize solutions to these problems by automobiles with separate car frames and body assembly such that both parts are replaceable. After much experimentation with motorcycles, the inventors finally came up with practical solutions on the design of motorcycle body frame that would allow easy swapping out the motorcycle body. In
20 case a new body design is introduced, it would save both time and cost to the manufacturer, and to the consumer as well, since one can simply replace the old body on the existing frame.

Summary of the Invention

25 It is an objective of the present invention to provide a structural design that allows a lay person to change the body of a motorcycle in a short time without the help of an expert technician.

One aspect of the disclosed invention is directed towards a structure of the frame and body of a motorcycle that allows removing or switching the body from the frame of the motorcycle. This structure comprises three groups of mounting points between the moto cycle's frame and body. One group of mounting points is located substantially on the sagittal plane (110), which passes
30 the axial length (passing the centers of the two wheels) of the motorcycle. Another group of mounting points (111) is located substantially on the plane perpendicular to the axial length of the motorcycle and preferentially above the center of the front wheel. Another group of mounting

points (112) is located substantially on the plane perpendicular to the axial length of the motorcycle and preferentially above or in front and above the center of the rear wheel.

Examples of mounting points that are located substantially on the sagittal plane (110), which passes the axial length (passing the centers of the two wheels) of the motorcycle comprises mounting point one (200), mounting point two (201), mounting point three (202), mounting point four (203), and mounting point eleven (210).

Examples of mounting points that are located substantially on the plane perpendicular to the axial length of the motorcycle and preferentially above the center of the front wheel (111) comprises mounting point five (204) and mounting point six (205).

Examples of mounting points that are located substantially on the plane perpendicular to the axial length of the motorcycle and preferentially above or in front and above the center of the rear wheel. (112) comprises mounting point seven (206), mounting point eight (207), mounting point nine (208), and mounting point ten (209).

There must be at least one mounting point between the motorcycle's frame and the motorcycle's body in each of the three groups of mounting points mentioned above.

Each mounting point in the above examples is the point where the motorcycle body is fastened to the frame structure. If the body is bolted to the frame, the bolt size must be between 5 mm to 12 mm or 1/2 to 1 inch. In case the 5 mm mounting bolt are used, they must have a minimum proof load of less than or equal to 225x106 Pascal and must withstand a minimum tensile strength of at least 400x106 Pascal. The bolt size can be larger than 5 mm, with corresponding changes in the minimum proof load and the minimum tensile strength. Alternatively, the motorcycle body can be fastened to the structural frame at each mounting point by any secure means other than bolts. The disclosed invention is applicable to ordinary motorcycles (with internal combustion engines) as well as electric and hybrid motorcycles.

The use of the word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one," but it is also consistent with the meaning of "one or more," "at least one," and "one or more than one."

The various purposes and characteristics of these and other aspects of this invention will be more apparent when considered together with the attached drawings and the details of the invention in the best form which will be further described.

Brief Description of Drawings

The following drawings form part of the present specification and are included to further demonstrate certain aspects of the present invention. The present invention may be better

understood by reference to one or more of these drawings in combination with the detailed description of specific embodiments presented herein.

Figure 1 shows the structure of the motorcycle.

Figure 2 shows the mounting points divided on each part of the motorcycle.

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Detailed Description of the Invention

The description of this invention is made by giving an example of invention and referenced by using drawings as examples that help describe the invention more clearly. The same parts in these drawings are represented by the same reference number. Without limitation in any way, the scope of this invention will be in accordance with the claims.

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A structure of the frame and body of a motorcycle that allows removing or switching the body from the frame consists of the front motorcycle structure (100), the mid motorcycle structure (101), and the rear motorcycle structure (102), and has a total of 11 mounting points, formed by the arrangement of the mounting points along the motorcycle's structure.

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The first mounting point, the lower front neck body mount, (200) is design to secure the front hull at the center of the hull (the front part of the body) to prevent the hull from moving out of the specified area. It can also be used on the front rack to mount the headlights and the horns. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, or M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, or 100Nm.

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The second mounting point, the upper front neck body mount, (201) is designed to secure the front body mount at the center of the hull to prevent the hull from moving out of the specified area. It can also be used with the front rack to mount the headlights and the horns. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, or M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, or 100Nm.

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The third mounting point, the lower rear neck body mount, (202) is designed to hold the front body in the center of the hull to prevent the hull from moving out of the specified area. It can also be used on the front rack to mount the hook and the horn. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, or M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, or 100Nm.

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The fourth mounting point, the upper rear neck body mount, (203) is designed to hold the front body in the center of the hull to prevent the hull from moving out of the specified area. It can also be used on the front rack to mount the hook or the horn. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The fifth mounting point, the left front wheel cover mount, (204) is designed to hold the front body in the center of the hull to prevent the hull from moving out of the specified area and to hold the chassis that acts as a splash guard of the front wheel. It can also be used as the motorcycle radiator mounting point. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The sixth mounting point, the right front wheel cover mount, (205) is designed to hold the front body in the center of the hull to prevent the hull from moving out of the specified area and to hold the chassis that acts as a splash guard of the front wheel. It can also be used to mount the motorcycle radiator. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The seventh mounting point, the right U-box mount, (206) is designed to hold the body from moving out of the specified area and to hold the seat mounting or the U-BOX mounting point. It can also be used to mount the motorcycle radiator. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The eighth mounting point, the left U-BOX mount, (207) is designed to hold the body from moving out of the specified area and to hold the seat mounting or U-BOX mounting point. It can also be used to mount the motorcycle radiator. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The ninth mounting point, the right footrest mount, (208) is designed to hold the body from moving out of the specified area and to hold the seat mounting or U-BOX mounting point. It can also be used to mount the motorcycle radiator. The nut and bolt sizes for this mounting point can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The tenth mounting point, the left footrest / body mount, (209) is designed to keep the body from moving out of the specified area. In addition, it can be used with the rear passenger footrest mounting points. The nut and bolt sizes can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

The eleventh mounting point, the Middle U-box mount, (210) is designed to hold the rear hull instead of the center of the hull to hold the hull from moving out of the specified area. In addition,

it can be used as mounting point for seat support or for accessories such as a luggage box or a rack. The nut and bolt sizes can be M5, M6, M8, M10, M12 and the torque required to tighten the nuts to the bolts can be 7Nm, 12Nm, 30Nm, 55Nm, 100Nm.

At every mounting point, a rubber grommet ring must be placed to prevent depressions or cracks or cracks on the body surface and to reduce vibration and noise.

Assembly of the motorcycle's body and frame is made by first inserting the rubber grommets, either on the frame or on the body, at the 11 connection points, keeping the holes of each rubber ring in alignment with the holes of the corresponding connection point. Then the motorcycle body is held above the frame so that the holes of the connection points on the frame match the corresponding holes in the body.

Then start tightening the bolt at the first mounting point (200), the second mounting point (201) and the eleventh mounting point (210), which are arranged substantially in a straight line.

Next, start tightening the remaining bolts at other mounting points, starting from the motorcycle front area (100) to the motorcycle mid area (101). Tighten all the mounting points again with a specific torque value according to the bolt size in all mounting points by using a torque wrench.

By following the steps above when assembling the frame and the body, the life and the safety of use will be maximized. These assembly steps, however, can be performed differently from the steps disclosed above but the service life and safety will be reduced.

The process for removing the motorcycle body out of the frame starts by unscrewing the bolts from the first mounting point (200), the second mounting point (201) and the eleventh mounting point (210), which are substantially aligned. Then proceed to the mounting points in the mid area (101) and to the front area (100).

By following the steps above when removing the body from the frame, the life and the safety of use will be maximized. These disassembly steps, however, can be performed differently from the steps disclosed above but the service life and safety will be reduced.

Best Mode for Carrying Out the Invention

The best mode for carrying out the invention is as mentioned in the Detailed Description of the Invention.

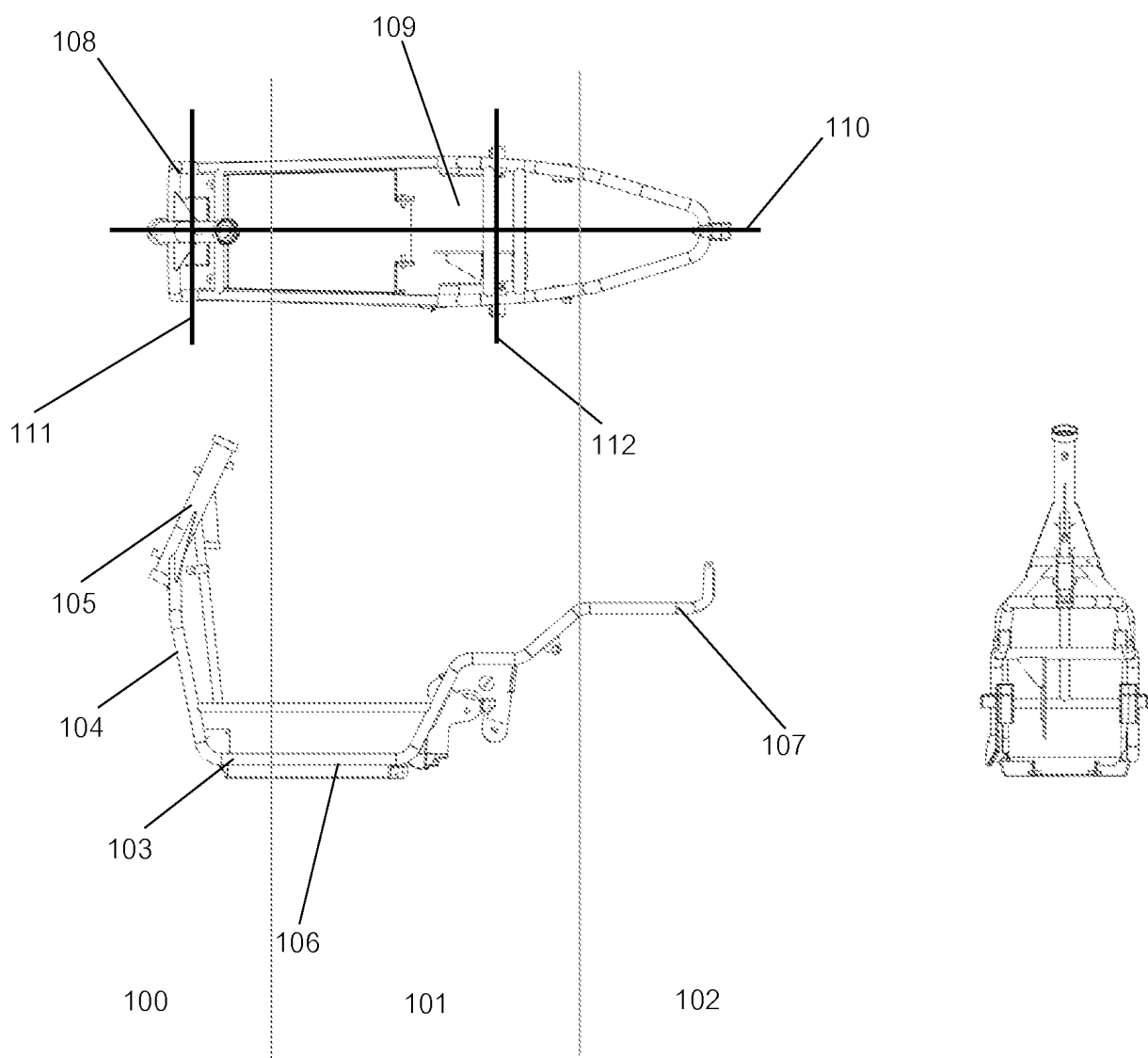


Fig.1

9. The structure according to any one of claims 6 - 7, inclusive, wherein the 5 mm, the smallest size, mounting bolt must have a minimum proof load of less than or equal to 225×10^6 Pascal and must withstand a minimum tensile strength of at least 400×10^6 Pascal.
10. The structure according to claim 9 wherein the bolt size can be larger than 5 mm, with
5 corresponding changes in the minimum proofload and the minimum tensile strength.
11. The structure according to claim 1 wherein the motorcycle comprises ordinary motorcycles (with internal combustion engines), electric motorcycles and hybrid motorcycles.