VEHICLE BODY ASSEMBLY AND VEHICLE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to Chinese Patent Applications No. 202410378340.1, filed on March 29, 2024, the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to, but is not limited to, the technical field of vehicles, and in particular, to a vehicle body assembly of a vehicle and a vehicle having the same.

BACKGROUND

[0003] In the related art, with the rapid development of new energy vehicles, an integration degree between a battery pack and a vehicle body has become increasingly higher. Therefore, a higher requirement is imposed on safety performance of the battery pack, thereby raising a higher requirement for energy absorption of an anti-collision beam. However, an existing anti-collision beam of a vehicle has a poor structural strength and an unsatisfactory energy absorption effect, resulting in a poor protection effect on the battery pack by the existing anti-collision beam. Moreover, the existing anti-collision beam of the vehicle mainly has functions of energy absorption and force transmission. In the event of a vehicle collision, the anti-collision beam provides no protection for a pedestrian, and an overall vehicle maintenance cost is relatively high, which further leads to a high vehicle operation cost.

SUMMARY

[0004] The following description is a summary of the subject matter described in detail herein. This summary is not intended to limit the scope of the claims.

[0005] An objective of the present disclosure is to provide a vehicle body assembly of a vehicle, which can reduce a probability of damage to a battery pack in an event of a collision of the vehicle, protect a pedestrian in the event of a collision of the vehicle, and ensure maintenance economy of the entire vehicle, thereby reducing a vehicle operation cost.

[0006] The present disclosure further provides a vehicle having the above vehicle body assembly.

[0007] The vehicle body assembly according to the embodiments of the present disclosure includes: a longitudinal beam, an anti-collision cross beam, and an energy absorption box, in which the energy absorption box is located between the longitudinal beam and the anti-collision cross beam, and in which the energy absorption box is fixedly connected to the longitudinal beam and the anti-collision cross beam; and a support member located at a side of the anti-collision cross beam away from the energy absorption box. The support member is fixedly connected to the anti-collision cross beam.

[0008] For the vehicle body assembly according to the embodiments of the present disclosure, by fixedly connecting the energy absorption box to the longitudinal beam and the anti-collision cross beam, the anti-collision cross beam and the energy absorption box can sufficiently absorb collision energy in the event of a collision of the vehicle, reducing the probability of damage to the battery pack during the collision and further improving safety performance of the entire vehicle. The support member is located at the side of the anti-collision cross beam away from the energy absorption box and is fixedly connected to the anti-collision cross beam. When the vehicle collides with the pedestrian, the support member can support and protect a leg of the pedestrian, and the energy absorption box collapses to absorb a large amount of collision energy, which reduces a risk of deformation of the longitudinal beam, thereby ensuring the maintenance economy of the entire vehicle and lowering the vehicle operation cost.

[0009] The vehicle according to the embodiments of the present disclosure includes the

vehicle body assembly of the vehicle according to the above embodiments.

[0010] The vehicle according to the embodiments of the present disclosure can protect the battery pack from damage during a collision, thereby improving the safety performance of the entire vehicle, and can also ensure the maintenance economy of the entire vehicle, thus reducing the vehicle operation cost.

[0011] Additional aspects and advantages of the present disclosure will be provided in part in the following description, or will become apparent in part from the following description, or can be learned from practicing of the present disclosure.

[0012] Other aspects may be apparent upon reading and understanding the drawings and detailed descriptions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a schematic structural view of a vehicle body assembly according to an embodiment of the present disclosure.

[0014] FIG. 2 is a side view of a vehicle body assembly according to an embodiment of the present disclosure.

[0015] FIG. 3 is a schematic structural view of a structural reinforcement member according to an embodiment of the present disclosure.

[0016] FIG. 4 is a schematic structural view of an energy absorption box according to an embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0017] Embodiments of the present disclosure will be described in detail below with reference to examples thereof as illustrated in the accompanying drawings, throughout which same or similar elements, or elements having same or similar functions, are denoted by same or similar reference numerals. The embodiments described below with reference to the drawings are illustrative only, and are intended to explain, rather than limiting, the present disclosure.

[0018] A vehicle body assembly 100 of a vehicle according to the embodiments of the

present disclosure is described below with reference to FIG. 1 to FIG. 4. The vehicle body assembly 100 includes: a longitudinal beam 82, an anti-collision cross beam 20, an energy absorption box 30, and a support member 35. The energy absorption box 30 is located between the longitudinal beam 82 and the anti-collision cross beam 20, and the energy absorption box 30 is fixedly connected to the longitudinal beam 82 and the anti-collision cross beam 20. The support member 35 is located at a side of the anti-collision cross beam 20 away from the energy absorption box 30. The support member 35 is fixedly connected to the anti-collision cross beam 20.

[0019] The longitudinal beam 82, the anti-collision cross beam 20, and the energy absorption box 30 may each be made of a steel material, thereby reducing the cost of vehicle development and vehicle operation. The anti-collision cross beam 20 may have a plurality of cavities 21. As an example, the anti-collision cross beam 20 may have two, three, or four cavities 21. However, the present disclosure is not limited thereto. The anti-collision cross beam 20 may have other numbers of cavities 21, as long as the anti-collision cross beam 20 has the plurality of cavities 21. The present disclosure is described by taking the anti-collision cross beam 20 with two cavities 21 as an example. The plurality of cavities 21 may be arranged sequentially in a height direction of the vehicle, such that a cross-sectional shape of the anti-collision cross beam 20 may be in a zigzag shape or a zigzag-like shape. Moreover, in a width direction of the vehicle, the anti-collision cross beam 20 may be provided with a second recessed portion 22 extending in the width direction of the vehicle. The energy absorption box 30 may also have an energy absorption box cavity, and a dimension of the energy absorption box cavity may be reasonably designed as desired. As an example, a cross-section of the energy absorption box cavity may be a rectangle of 174mm*71mm or a rectangular-like structure. With such an arrangement, in a case where performance of the anti-collision cross beam 20 and the energy absorption box 30 can be ensured to meet the requirements, weights of the anti-collision cross beam 20 and the energy absorption box 30 can be made minimum, thereby reducing manufacturing costs of the anti-collision cross beam 20 and the energy absorption box 30, and further reducing the cost of vehicle development and vehicle operation.

[0020] The energy absorption box 30 is located between the longitudinal beam 82 and the

anti-collision cross beam 20, and is fixedly connected to the longitudinal beam 82 and the anti-collision cross beam 20. As an example, the energy absorption box 30 may be fixedly connected to the longitudinal beam 82 and the anti-collision cross beam 20 by welding or through bolts. However, the present disclosure is not limited thereto. The energy absorption box 30 may be fixedly connected to the longitudinal beam 82 and the anti-collision cross beam 20 by other means, as long as the fixed connection of the energy absorption box 30 with the longitudinal beam 82 and the anti-collision cross beam 20 can be achieved. The present disclosure is described by taking the fixed connection between the energy absorption box 30 and the anti-collision cross beam 20 through welding as an example. Since the welding connection has a high connection strength and rigidity, it can be ensured that the connection between the energy absorption box 30 and the anti-collision cross beam 20 does not fail in an event of a high-speed collision of the vehicle, thereby improving safety and reliability of the entire vehicle. Moreover, the welding connection is easy to process, saves steel materials, and can reduce the manufacturing cost of the vehicle.

[0021] By disposing the energy absorption box 30 between the longitudinal beam 82 and the anti-collision cross beam 20 and fixedly connecting the energy absorption box 30 to the longitudinal beam 82 and the anti-collision cross beam 20, when the vehicle is in a collision, the anti-collision cross beam 20 and the energy absorption box 30 can fully absorb collision energy to reduce a probability of damage to the battery pack during the collision, thereby improving safety performance of the entire vehicle.

[0022] The support member 35 is located at the side of the anti-collision cross beam 20 away from the energy absorption box 30, and is fixedly connected to the anti-collision cross beam 20. As an example, the support member 35 may be fixedly connected to the anti-collision cross beam 20 by welding or through bolts. However, the present disclosure is not limited thereto. The support member 35 may be fixedly connected to the anti-collision cross beam 20 by other means, as long as the fixed connection between the support member 35 and the anti-collision cross beam 20 can be achieved. When the vehicle collides with a pedestrian, the support member 35 can support and protect a pedestrian’s leg, reducing harm to the pedestrian. Moreover, the energy absorption box 30 collapses to absorb a large amount of collision energy to reduce a deformation amount of the longitudinal beam 82, which can

ensure maintenance economy of the entire vehicle, thereby reducing the cost of vehicle operation.

[0023] For the vehicle body assembly 100 according to the embodiments of the present disclosure, by fixedly connecting the energy absorption box 30 to the longitudinal beam 82 and the anti-collision cross beam 20, when the vehicle is in a collision, the anti-collision cross beam 20 and the energy absorption box 30 can fully absorb the collision energy to reduce the probability of damage to the battery pack during the collision, thereby improving the safety performance of the entire vehicle. The support member 35 is located at the side of the anti-collision cross beam 20 away from the energy absorption box 30, and is fixedly connected to the anti-collision cross beam 20. When the vehicle collides with the pedestrian, the support member 35 can support and protect the pedestrian's leg, reducing the harm to the pedestrian. Moreover, the energy absorption box 30 collapses to absorb a large amount of collision energy to reduce the deformation amount of the longitudinal beam 82, which can ensure the maintenance economy of the entire vehicle, thereby reducing the cost of vehicle operation.

[0024] In some embodiments of the present disclosure, as shown in FIG. 1, the support member 35 may include a first plate body 41, a second plate body 42, and a third plate body 44. The second plate body 42 is connected between the first plate body 41 and the third plate body 44, and is located at the side of the anti-collision cross beam 20 away from the energy absorption box 30 and spaced apart from the anti-collision cross beam 20. Both the first plate body 41 and the third plate body 44 are fixedly connected to the anti-collision cross beam 20.

[0025] The second plate body 42 is connected between the first plate body 41 and the third plate body 44. As an example, the second plate body 42, the first plate body 41, and the third plate body 44 may be integrally formed. Alternatively, the second plate body 42 may be connected to the first plate body 41 and the third plate body 44 by welding. However, the present disclosure is not limited thereto. The second plate body 42 may be connected to the first plate body 41 and the third plate body 44 by other means, as long as the second plate body 42 is connected between the first plate body 41 and the third plate body 44. The second plate body 42 is located at the side of the anti-collision cross beam 20 away from the energy absorption box 30 and spaced apart from the anti-collision cross beam 20, such that a collapse

space is formed between the support member 35 and the anti-collision cross beam 20. When a collision occurs between the vehicle and the pedestrian, upon contact between the support member 35 and the pedestrian, the collapse space can absorb the collision energy and reduce the harm to the pedestrian, thereby reducing damage to the anti-collision cross beam 20 and further improving the maintenance economy of the entire vehicle.

[0026] Both the first plate body 41 and the third plate body 44 are fixedly connected to the anti-collision cross beam 20. As an example, the anti-collision cross beam 20 may be fixedly connected to the first plate body 41 and the third plate body 44 by welding or through bolts. However, the present disclosure is not limited thereto. The anti-collision cross beam 20 may be fixedly connected to the first plate body 41 and the third plate body 44 by other means, as long as the first plate body 41 and the third plate body 44 are fixedly connected to the anti-collision cross beam 20. The fixed connection between each of the first plate body 41 and the third plate body 44 and the anti-collision cross beam 20 can ensure a firmer connection between the support member 35 and the anti-collision cross beam 20, thereby improving stability and reliability of the entire vehicle.

[0027] In some embodiments of the present disclosure, as shown in FIG. 1, the second plate body 42 may have a lightening hole 38, to reduce a weight of the support member 35 on a premise that the support member 35 meets strength and rigidity requirements, which is beneficial to a lightweight design of the vehicle and can also reduce the manufacturing cost of the entire vehicle. It should be noted that a lightening holes 38 may be formed. As an example, one, two, three, or four lightening holes 38 may be formed. However, the present disclosure is not limited thereto, other numbers of lightening holes 38 may be formed, as long as the second plate body 42 has the lightening hole 38.

[0028] In some embodiments of the present disclosure, a length dimension of the support member 35 may be L1, and a length dimension of the anti-collision cross beam 20 may be L2, where $0.5L2 \leq L1 \leq L2$. That is, the length dimension L1 of the support member 35 may be 0.5L2, L2, or any value ranging from 0.5L2 to L2. As an example, the length dimension L1 of the support member 35 may be 0.5L2, 0.6L2, 0.7L2, 0.9L2, L2, or the like. However, the present disclosure is not limited thereto. The length dimension L1 of the support member 35 may also be other values ranging from 0.5L2 to L2, as long as the length dimension L1 of the

support member 35 may be 0.5L2, L2, or any value ranging from 0.5L2 to L2. Therefore, with the length dimension L1 of the support member 35, where $0.5L2 \leq L1 \leq L2$, when the vehicle collides with the pedestrian, the support member 35 with sufficient length can enhance its supporting and protective effect on the pedestrian, which facilitates the support provided by the support member 35 to the pedestrian during the collision.

[0029] In some embodiments of the present disclosure, as shown in FIG. 1, an end of the energy absorption box 30 away from the anti-collision cross beam 20 is connected to a first connection plate 31, and an end of the longitudinal beam 82 facing the energy absorption box 30 is connected to a second connection plate 11. The first connection plate 31 and the second connection plate 11 are cooperatively assembled to fix the energy absorption box 30 and the longitudinal beam 82.

[0030] The end of the energy absorption box 30 away from the anti-collision cross beam 20 may be connected to the first connection plate 31. As an example, the energy absorption box 30 may be connected to the first connection plate 31 by welding or through bolts. However, the present disclosure is not limited thereto. The energy absorption box 30 may be connected to the first connection plate 31 by other means, as long as the end of the energy absorption box 30 away from the anti-collision cross beam 20 is connected to the first connection plate 31.

[0031] The end of the longitudinal beam 82 facing the energy absorption box 30 may be connected to the second connection plate 11. As an example, the longitudinal beam 82 may be connected to the second connection plate 11 by welding or through bolts. However, the present disclosure is not limited thereto. The longitudinal beam 82 may be connected to the second connection plate 11 by other means, as long as the end of the longitudinal beam 82 facing the energy absorption box 30 is connected to the second connection plate 11.

[0032] The first connection plate 31 and the second connection plate 11 are cooperatively assembled to fix the energy absorption box 30 and the longitudinal beam 82. As an example, the first connection plate 31 and the second connection plate 11 may be cooperatively assembled through a welding connection or a bolting connection. However, the present disclosure is not limited thereto. The first connection plate 31 and the second connection plate 11 may be cooperatively assembled by other connection means, as long as the energy

absorption box 30 and the longitudinal beam 82 are fixedly connected through the engagement and assembly between the first connection plate 31 and the second connection plate 11.

[0033] Therefore, by engaging and assembling the first connection plate 31 and the second connection plate 11 to fixedly connect the energy absorption box 30 and the longitudinal beam 82, a connection strength and rigidity between the energy absorption box 30 and the longitudinal beam 82 can be improved, thereby reducing connection failure between the energy absorption box 30 and the longitudinal beam 82. Moreover, the second connection plate 11 can ensure a strength of a front part of the longitudinal beam 82, to reduce the deformation amount of the longitudinal beam 82 in an event of a low-speed collision of the vehicle, which can improve the maintenance economy of the entire vehicle, lowering the cost of vehicle operation.

[0034] It can be noted that each of the first connection plate 31 and the second connection plate 11 may be provided with a plurality of mounting flanges 12, which improves a strength and rigidity of the first connection plate 31 and a strength and rigidity of the second connection plate 11. Meanwhile, it is also beneficial to an improvement in impact resistance performance of the first connection plate 31 and impact resistance performance of the second connection plate 11, thereby enhancing the safety and reliability of the entire vehicle.

[0035] In some embodiments of the present disclosure, as shown in FIG. 3, the vehicle body assembly 100 may further include a structural reinforcement member 13 connected between the second connection plate 11 and the longitudinal beam 82. As an example, the structural reinforcement member 13 may be connected to the second connection plate 11 and the longitudinal beam 82 by welding or through bolts. However, the present disclosure is not limited thereto. The structural reinforcement member 13 may be connected to the second connection plate 11 and the longitudinal beam 82 by other means, as long as the structural reinforcement member 13 is connected between the second connection plate 11 and the longitudinal beam 82. Therefore, by connecting the structural reinforcement member 13 between the second connection plate 11 and the longitudinal beam 82, it is possible to further improve the strength of the front part of the longitudinal beam 82, to further reduce a risk of deformation of the longitudinal beam 82 in the event of a low-speed collision of the vehicle,

which can improve the maintenance economy of the entire vehicle, lowering the cost of vehicle operation.

[0036] In some embodiments of the present disclosure, as shown in FIG. 3, the structural reinforcement member 13 may include a first reinforcement member 14 and a second reinforcement member 15. The first reinforcement member 14 is located outside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. Moreover, the first reinforcement member 14 is fixedly connected to the second connection plate 11. The second reinforcement member 15 is located inside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. Moreover, the second reinforcement member 15 is fixedly connected to the second connection plate 11.

[0037] Each of the first reinforcement member 14 and the second reinforcement member 15 may be constructed as an annular reinforcement plate or an arc-shaped reinforcement plate, which can improve a strength and rigidity of the first reinforcement member 14 and a strength and rigidity of the second reinforcement member 15 without increasing their weights, thereby saving material consumption, reducing the weight, and saving the cost.

[0038] The first reinforcement member 14 is located outside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. As an example, the first reinforcement member 14 may be connected to the longitudinal beam 82 by welding or through bolts. However, the present disclosure is not limited thereto. The first reinforcement member 14 may be connected to the longitudinal beam 82 by other means, as long as the first reinforcement member 14 is located outside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. Moreover, the first reinforcement member 14 is fixedly connected to the second connection plate 11. As an example, the first reinforcement member 14 may be connected to the second connection plate 11 by welding or through bolts. However, the present disclosure is not limited thereto. The first reinforcement member 14 may be connected to the second connection plate 11 by other means, as long as the first reinforcement member 14 is fixedly connected to the second connection plate 11.

[0039] The second reinforcement member 15 is located inside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. As an example, the second reinforcement member 15 may be connected to the longitudinal beam 82 by welding or through bolts.

However, the present disclosure is not limited thereto. The second reinforcement member 15 may be connected to the longitudinal beam 82 by other means, as long as the second reinforcement member 15 is located inside the longitudinal beam 82 and fixedly disposed at the longitudinal beam 82. Moreover, the second reinforcement member 15 is fixedly connected to the second connection plate 11. As an example, the second reinforcement member 15 may be connected to the second connection plate 11 by welding or through bolts. However, the present disclosure is not limited thereto. The second reinforcement member 15 may be connected to the second connection plate 11 by other means, as long as the second reinforcement member 15 is fixedly connected to the second connection plate 11.

[0040] Therefore, by fixedly disposing the first reinforcement member 14 and the second reinforcement member 15 at the longitudinal beam 82 and fixedly connecting the first reinforcement member 14 and the second reinforcement member 15 to the second connection plate 11, a strength and rigidity of the front part of the longitudinal beam 82 can be further ensured, to reduce the deformation amount of the longitudinal beam 82 in the event of a low-speed collision of the vehicle, which can improve the maintenance economy of the entire vehicle, lowering the cost of vehicle operation.

[0041] In some embodiments of the present disclosure, as shown in FIG. 1 and FIG. 4, the energy absorption box 30 may include a first energy absorption box segment 32 and a second energy absorption box segment 33 connected to the first energy absorption box segment 32. The first energy absorption box segment 32 is fixedly connected to the anti-collision cross beam 20, and the second energy absorption box segment 33 is fixedly connected to the longitudinal beam 82. A cross-sectional dimension of the first energy absorption box segment 32 gradually decreases in a direction from the anti-collision cross beam 20 to the longitudinal beam 82.

[0042] The energy absorption box 30 may include a first energy absorption box segment 32 and a second energy absorption box segment 33 connected to the first energy absorption box segment 32. As an example, the first energy absorption box segment 32 and the second energy absorption box segment 33 may be integrally formed or connected by welding. However, the present disclosure is not limited thereto. The first energy absorption box segment 32 and the second energy absorption box segment 33 may be connected by other

means, as long as they are connected to each other.

[0043] The first energy absorption box segment 32 is fixedly connected to the anti-collision cross beam 20. As an example, the first energy absorption box segment 32 may be fixedly connected to the anti-collision cross beam 20 by welding or through bolts. However, the present disclosure is not limited thereto. The first energy absorption box segment 32 may be fixedly connected to the anti-collision cross beam 20 by other means, as long as the fixed connection between the first energy absorption box segment 32 and the anti-collision cross beam 20 can be achieved. The present disclosure is described by taking the fixed connection between the first energy absorption box segment 32 and the anti-collision cross beam 20 through welding as an example. The welding connection has a high connection strength and rigidity, which can reduce a risk of connection failure between the energy absorption box 30 and the anti-collision cross beam 20 in the event of a high-speed collision of the vehicle, thereby improving the safety and reliability of the entire vehicle. Moreover, the welding connection is easy to process, saves the steel materials, and can reduce the manufacturing cost of the vehicle.

[0044] The second energy absorption box segment 33 is fixedly connected to the longitudinal beam 82. As an example, the second energy absorption box segment 33 may be fixedly connected to the longitudinal beam 82 by welding or through bolts. However, the present disclosure is not limited thereto. The second energy absorption box segment 33 may be fixedly connected to the longitudinal beam 82 by other means, as long as the fixed connection between the second energy absorption box segment 33 and the longitudinal beam 82 can be achieved. Further, the first connection plate 31 is provided at an end of the second energy absorption box segment 33 facing the longitudinal beam 82, and the second energy absorption box segment 33 is fixedly connected to the longitudinal beam 82 through the first connection plate 31. The cross-sectional dimension of the first energy absorption box segment 32 gradually decreases in the direction from the first energy absorption box segment 32 to the longitudinal beam 82, such that a cross-sectional of the energy absorption box 30 is in a flared shape or a flared-like shape. With such an arrangement, the energy absorption box 30 can absorb a large amount of collision energy in the event of a collision of the vehicle, thereby reducing the risk of deformation of the longitudinal beam 82. Moreover, the energy

absorption box 30 can stably collapse without instability or obvious lateral plastic deformation. Moreover, the first energy absorption box segment 32 is in a flared shape or a flared-like shape, which can increase a connection area between the energy absorption box 30 and the anti-collision cross beam 20, thereby improving a connection strength between the energy absorption box 30 and the anti-collision cross beam 20, reducing the risk of the connection failure between the energy absorption box 30 and the anti-collision cross beam 20 in the event of a collision of the vehicle, and thus enhancing the safety performance and stability of the entire vehicle.

[0045] Further, a cross-sectional dimension of the first energy absorption box segment 32 is W1*W2. In an exemplary embodiment of the present disclosure, a height dimension of the first energy absorption box segment 32 in the height direction of the vehicle may be W1, where 90mm≤W1≤115mm. That is, the dimension W1 of the first energy absorption box segment 32 in the height direction of the vehicle may be 90 mm, 115 mm, or any value ranging from 90 mm to 115 mm. A width dimension of the first energy absorption box segment 32 in the width direction of the vehicle may be W2, where 80mm≤W2≤85mm. That is, the dimension W2 of the first energy absorption box segment 32 in the width direction of the vehicle may be 80 mm, 85 mm, or any value ranging from 80 mm to 85 mm. With such an arrangement, it can be ensured to the maximum extent that, when the vehicle is in a collision, an impact received by the anti-collision cross beam 20 is absorbed by the energy absorption box 30 and transmitted to the rear of the vehicle through a linear transmission path. Moreover, the energy absorption box 30 can absorb a large amount of collision energy, thereby further reducing the risk of deformation of the longitudinal beam 82. The energy absorption box 30 can stably collapse without instability or obvious lateral plastic deformation. Moreover, the first energy absorption box segment 32 is in a flared shape or a flared-like shape, which can increase the connection area between the energy absorption box 30 and the anti-collision cross beam 20, thereby improving the connection strength between the energy absorption box 30 and the anti-collision cross beam 20, reducing the risk of the connection failure between the energy absorption box 30 and the anti-collision cross beam 20 in the event of a collision of the vehicle, and thus enhancing the safety performance and stability of the entire vehicle.

[0046] In some embodiments of the present disclosure, as shown in FIG. 1, the second

energy absorption box segment 33 may be formed with a first crushing rib 34 recessed towards an interior of the energy absorption box 30. When the vehicle is in a collision, the first crushing rib 34 can collapse and deform to absorb a large amount of collision energy, thereby reducing a risk of damage to the longitudinal beam 82 behind the energy absorption box 30 caused by the collision energy, and further improving the safety and reliability of the vehicle.

[0047] In some embodiments of the present disclosure, as shown in FIG. 1 and FIG. 4, a plurality of first crushing ribs 34 may be provided, and are arranged sequentially in a direction along which the first energy absorption box segment 32 and the second energy absorption box segment 33 are arranged.

[0048] The plurality of first crushing ribs 34 may be provided. As an example, two, three, or four first crushing ribs 34 may be provided. However, the present disclosure is not limited thereto, other numbers of first crushing ribs 34 may be provided, as long as the plurality of first crushing ribs 34 are provided. The present disclosure is described by taking two first crushing ribs 34 as an example. In an exemplary embodiment of the present disclosure, in the direction from the anti-collision cross beam 20 to the longitudinal beam 82, a distance between one of the two first crushing ribs 34 closest to the anti-collision cross beam 20 and the anti-collision cross beam 20 may be D1, where $28mm \leq D1 \leq 50mm$. That is, the distance D1 between the one of the two first crushing ribs 34 closest to the anti-collision cross beam 20 and the anti-collision cross beam 20 may be 28 mm, 50 mm, or any value ranging from 28 mm to 50 mm. In the direction from the anti-collision cross beam 20 to the longitudinal beam 82, a width of the first crushing rib 34 may be D2, where $17mm \leq D2 \leq 23mm$. That is, the width D2 of the first crushing rib 34 may be 17 mm, 23 mm, or any value ranging from 17 mm to 23 mm. Moreover, the plurality of first crushing ribs 34 are arranged sequentially in the arrangement direction of the first energy absorption box segment 32 and the second energy absorption box segment 33. Therefore, when the vehicle is in a collision, the energy absorption box 30 can absorb a large amount of collision energy, thereby effectively reducing the risk of deformation of the longitudinal beam 82. In the event of a frontal collision of the vehicle, the first crushing rib 34 participates in energy absorption and deformation, enabling the energy absorption box 30 to absorb a large amount of collision energy and further

reducing the risk of deformation of the longitudinal beam 82. Moreover, the energy absorption box 30 can stably collapse without instability, so that no obvious lateral plastic deformation occurs in the energy absorption box 30, which can improve a collision energy absorption effect and collapse stability of the vehicle body assembly 100. Moreover, the connection strength between the energy absorption box 30 and the anti-collision cross beam 20 is high, which can further reduce the risk of the connection failure between the energy absorption box 30 and the anti-collision cross beam 20 in the event of a collision of the vehicle, thereby enhancing the safety performance and stability of the entire vehicle. The maintenance economy of the entire vehicle can also be ensured, thus lowering the cost of vehicle operation.

[0049] In some embodiments of the present disclosure, as shown in FIG. 1, the longitudinal beam 82 may be formed with a second crushing rib 16 recessed towards an interior of the longitudinal beam 82. When the vehicle is in a collision, after the anti-collision cross beam 20 and the energy absorption box 30 collapse to absorb the collision energy, the second crushing rib 16 can further collapse to absorb the residual collision energy, thereby further reducing the probability of damage to the battery pack of the vehicle, and further improving the safety performance and reliability of the vehicle.

[0050] Further, a mounting box 17 may be provided below the longitudinal beam 82 in the height direction of the vehicle. Moreover, in the width direction of the vehicle, a lower end of a side wall of the mounting box 17 facing the outer side of the vehicle is located at the lowest position, such that the mounting box 17 is used for centralized mounting of other components, thereby improving a space utilization rate inside the vehicle.

[0051] In some embodiments of the present disclosure, the anti-collision cross beam 20 has a width dimension of G1, a length dimension of G2, and a height dimension of G3, where $35mm \leq G1 \leq 45mm$, $1015mm \leq G2 \leq 1215mm$, and $102mm \leq G3 \leq 122mm$.

[0052] The anti-collision cross beam 20 may have the width dimension of G1, the length dimension of G2, and the height dimension of G3, where $35mm \leq G1 \leq 45mm$, $1015mm \leq G2 \leq 1215mm$, and $102mm \leq G3 \leq 122mm$. That is, the width dimension G1 of the anti-collision cross beam 20 may be 35 mm, 45 mm, or any value ranging from 35 mm to 45 mm. As an example, the width dimension G1 of the anti-collision cross beam 20 may be 35

mm, 36 mm, 37 mm, 40 mm, 44 mm, 45 mm, or the like. However, the present disclosure is not limited thereto. The width dimension G1 of the anti-collision cross beam 20 may also be other values ranging from 35 mm to 45 mm, as long as the width dimension G1 of the anti-collision cross beam 20 is 35 mm, 45 mm, or any value ranging from 35 mm to 45 mm.

[0053] The length dimension G2 of the anti-collision cross beam 20 may be 1015 mm, 1215 mm, or any value ranging from 1015 mm to 1215 mm. As an example, the length dimension G2 of the anti-collision cross beam 20 may be 1015 mm, 1016 mm, 1020 mm, 1200 mm, 1211 mm, 1215 mm, or the like. However, the present disclosure is not limited thereto. The length dimension G2 of the anti-collision cross beam 20 may also be other values ranging from 1015 mm to 1215 mm, as long as the length dimension G2 of the anti-collision cross beam 20 is 1015 mm, 1215 mm, or any value ranging from 1015 mm to 1215 mm.

[0054] The height dimension G3 of the anti-collision cross beam 20 may be 102 mm, 122 mm, or any value ranging from 102 mm to 122 mm. As an example, the height dimension G3 of the anti-collision cross beam 20 may be 102 mm, 103 mm, 105 mm, 108 mm, 115 mm, 122 mm, or the like. However, the present disclosure is not limited thereto. The height dimension G3 of the anti-collision cross beam 20 may also be other values ranging from 102 mm to 122 mm, as long as the height dimension G3 of the anti-collision cross beam 20 is 102 mm, 122 mm, or any value ranging from 102 mm to 122 mm.

[0055] In an exemplary embodiment of the present disclosure, specific values of the width dimension G1, the length dimension G2, and the height dimension G3 of the anti-collision cross beam 20 can be reasonably set as desired, as long as they satisfy: $35mm \leq G1 \leq 45mm$, $1015mm \leq G2 \leq 1215mm$, and $102mm \leq G3 \leq 122mm$. With such an arrangement, in a case of ensuring a strength and rigidity of the anti-collision cross beam 20, a weight of the anti-collision cross beam 20 can be reduced, thereby reducing the manufacturing cost of the anti-collision cross beam 20 and also facilitating the lightweight design of the vehicle.

[0056] The vehicle according to the embodiments of the present disclosure includes the vehicle body assembly 100 of the vehicle according to the above embodiments, which can protect the battery pack from damage during a collision, thereby improving the safety performance of the entire vehicle, and can also ensure the maintenance economy of the entire vehicle, thus lowering the cost of vehicle operation.

[0057] Throughout this specification, description with reference to “an embodiment”, “some embodiments”, “an illustrative embodiment”, “an example”, “a specific example”, “some examples”, or the like means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. The appearances of the above phrases in various places throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Further, the particular features, structures, materials, or characteristics described here may be combined in any suitable manner in one or more embodiments or examples.

[0058] Although embodiments of the present disclosure have been illustrated and described, it is conceivable for those of ordinary skill in the art that various changes, modifications, replacements, and variations can be made to these embodiments without departing from the principles and spirit of the present disclosure. The scope of the present disclosure shall be defined by the claims as appended and their equivalents.

CLAIMS

What is claimed is:

1. A vehicle body assembly of a vehicle, comprising:

a longitudinal beam, an anti-collision cross beam, an energy absorption box, and a support member, wherein:

the energy absorption box is located between the longitudinal beam and the anti-collision cross beam, and is fixedly connected to the longitudinal beam and the anti-collision cross beam; and

the support member located at a side of the anti-collision cross beam facing away from the energy absorption box, the support member being fixedly connected to the anti-collision cross beam.

2. The vehicle body assembly of the vehicle according to claim 1, wherein the support member comprises:

a first plate body;

a second plate body located at the side of the anti-collision cross beam facing away from the energy absorption box, the second plate body being spaced apart from the anti-collision cross beam; and

a third plate body, wherein the second plate body is connected between the first plate body and the third plate body, and wherein the first plate body and the third plate body are both fixedly connected to the anti-collision cross beam.

3. The vehicle body assembly of the vehicle according to claim 2, wherein the second plate body has a lightening hole.

4. The vehicle body assembly of the vehicle according to any one of claims 1 to 3, wherein a length dimension of the support member is L1, and a length dimension of the anti-collision cross beam is L2, where $0.5L2 \leq L1 \leq L2$.

5. The vehicle body assembly of the vehicle according to any one of claims 1 to 4, wherein:

an end portion of the energy absorption box facing away from the anti-collision cross

beam is connected to a first connection plate;

an end portion of the longitudinal beam facing the energy absorption box is connected to a second connection plate; and

the first connection plate and the second connection plate are cooperatively assembled to fix the energy absorption box and the longitudinal beam.

6. The vehicle body assembly of the vehicle according to claim 5, further comprising a structural reinforcement member connected between the second connection plate and the longitudinal beam.

7. The vehicle body assembly of the vehicle according to claim 6, wherein the structural reinforcement member comprises:

a first reinforcement member located outside the longitudinal beam and fixedly disposed at the longitudinal beam; and

a second reinforcement member fixedly connected to the first reinforcement member, wherein the second reinforcement member is located inside the longitudinal beam and fixedly disposed at the longitudinal beam, and wherein the second reinforcement member is fixedly connected to the second connection plate.

8. The vehicle body assembly of the vehicle according to any one of claims 1 to 7, wherein the energy absorption box comprises a first energy absorption box segment and a second energy absorption box segment connected to the first energy absorption box segment, wherein:

the first energy absorption box segment is fixedly connected to the anti-collision cross beam;

the second energy absorption box segment is fixedly connected to the longitudinal beam; and

a cross-sectional dimension of the first energy absorption box segment gradually decreases in a direction from the anti-collision cross beam to the longitudinal beam.

9. The vehicle body assembly of the vehicle according to claim 8, wherein a first crushing rib is formed at the second energy absorption box segment and is recessed towards an interior of the energy absorption box.

10. The vehicle body assembly of the vehicle according to claim 9, wherein a plurality of

first crushing ribs are provided and are arranged sequentially in a direction along which the first energy absorption box segment and the second energy absorption box segment are arranged.

11. The vehicle body assembly of the vehicle according to any one of claims 1 to 10, wherein a second crushing rib is formed at the longitudinal beam and is formed with recessed towards an interior of the longitudinal beam.

12. The vehicle body assembly of the vehicle according to any one of claims 1 to 11, wherein the anti-collision cross beam has a width dimension of G1, a length dimension of G2, and a height dimension of G3, where 35 mm≤G1≤45 mm, 1015 mm≤G2≤1215 mm, and 102 mm≤G3≤122 mm.

13. A vehicle, comprising:

the vehicle body assembly of the vehicle according to any one of claims 1 to 12.