**DESCRIPTION**

**Invention Title:**

BATTERY LOADING APPARATUS

**Technical Field**

[1] The present disclosure relates to a battery loading apparatus, and more specifically, relates to a battery loading apparatus that may increase transport efficiency through a plurality of side covers capable of inner or outer folding.

[2]

**Background Art**

[3] Recently, together with rising interest in the environment, electrified vehicles equipped with an electric motor as a power source are increasingly in trend.

[4] Accordingly, a battery is required for driving of the electrified vehicle, and upon overseas transport of the battery, a method using a battery loading apparatus is essential in order to load a plurality of batteries in a vertical direction.

[5] In general, in a case of configuring a battery pack by connecting a plurality of battery cells in series/parallel, a battery module consisting of a plurality of battery cells is first configured, and, by using the battery module, other components are added such that the battery pack is configured. At this time, the battery pack is, in accordance with various voltage and capacity requirements, used for household use or configured as a battery loading apparatus in which a plurality of battery packs are loaded for industrial use.

[6] Conventionally, in a case of using a battery loading apparatus of a method that fixes a battery through

welding, there is a problem in that the battery loading apparatus is disposed of after a single use such that an environmental issue occurs, or transport efficiency is reduced. In addition, even in a case of a battery loading apparatus capable of only inner folding, there is a problem in that a clearance of a predetermined gap occurs in a Z-axis direction such that transport efficiency is reduced.

[7] Accordingly, a solution that may increase transport efficiency through a plurality of side covers capable of inner or outer folding is needed.

[8] In addition, as prior art related thereto, there is KR 10-2023-0103431 A.

[9]

[10] The matters described as the above background art are merely for the purpose of enhancing understanding of the background of the present disclosure, and should not be taken as an admission that they correspond to prior art already known to those of ordinary skill in the art to which this disclosure pertains.

[11]

**Disclosure**

**Technical Problem**

[12] The present disclosure is intended to provide a battery loading apparatus that may increase transport efficiency through a plurality of side covers capable of inner or outer folding.

[13]

[14] The technical problems to be achieved in the present disclosure are not limited to the technical problems mentioned above, and other technical problems not mentioned may be clearly understood from the following

description by those of ordinary skill in the art to which the present disclosure pertains.

[15]

**Technical Solution**

[16] As a means for solving the above technical problem, the present disclosure configures a battery loading apparatus comprising: a loading base that supports a lower portion of a battery and regulates a lateral position of the battery; a base bracket extending upward from each corner of the loading base and having a fixing groove formed on an upper surface thereof; and a plurality of side covers provided at an outer lateral side of the loading base, connected to both sides of the base bracket so as to be formed to enable inner or outer folding, and, upon being fastened to the fixing groove, fixed to the base bracket so as to cause a lateral side of the battery to be covered.

[17] For example, a plurality of seating portions may be formed on the upper surface of the loading base, and the lateral position of the battery may be regulated by an edge of the battery being supported by the seating portions.

[18] For example, the apparatus may further comprise a plurality of stoppers provided on an inner surface of the side cover and regulating a vertical position of the battery in a state where the battery is loaded.

[19] For example, a plurality of indented portions may be formed in the loading base by being indented downward at a point where the side cover is folded inward to face the loading base, and the stoppers may be folded together upon inner folding of the side cover and seated in the indented portions.

[20] For example, a through hole penetrating in a vertical direction may be formed at both sides of the base bracket, and the side cover may be connected to both sides of the base bracket by a side pin protrudingly formed toward both lateral sides of the side cover being inserted into the through hole.

[21] For example, the through hole may be formed in a vertically long shape at both sides of the base bracket, and the side pin may be inserted into the through hole to move in the vertical direction together with vertical movement of the side cover, and the side cover may be formed to enable inner or outer folding in a state where the side pin is moved upward.

[22] For example, the side cover may be parallel to the loading base based on being folded inward, and may be orthogonal to the loading base based on being fastened to the fixing groove and fixed to the base bracket.

[23] For example, a first fixing device that causes the side cover to be fixed to the loading base may be formed on a lower end of an outer surface of the side cover, and the side cover may be fixed to the loading base through the first fixing device in a state where the side cover is fixed to the base bracket.

[24] For example, the apparatus may further comprise an upper cover provided so as to face the loading base and covering an upper portion of the battery in a state where the battery is loaded.

[25] For example, the side cover may have, on an upper end of an outer surface thereof, a second fixing device that causes the upper cover to be fixed thereto, and the upper cover may be fixed to the side cover through the second fixing device in a state where the upper cover is mounted on upper ends of the plurality of side covers.

[26] For example, protrusions protruding outward toward the base bracket may be formed at both end portions of the plurality of side covers, the fixing grooves may be formed in a pair in different directions with reference to the corner of the loading base, and the protrusion may be inserted into the fixing groove to cause the side cover to cover the lateral side of the battery.

[27] For example, in a state where the protrusion formed on the side cover is inserted into the fixing groove, both end portions of the plurality of side covers may be in contact with end portions of different side covers, a third fixing device may be formed at an end portion of at least one of the side covers, and adjacent side covers may be fixed to each other through the third fixing device.

[28] For example, the loading base, the base bracket, the plurality of side covers, and the upper cover may be made of a flame-retardant material.

[29]

**Advantageous Effects**

[30] According to the battery loading apparatus of the present disclosure, a weight of the battery loading apparatus itself is reduced through a plurality of side covers capable of inner or outer folding, and thereby transport efficiency may be increased.

[31] In addition, because separate welding is unnecessary for the battery loading apparatus due to the side cover configuration, reuse of the battery loading apparatus is enabled, and upon fire occurrence outside, fire spread to the battery loaded inside the loading apparatus may be prevented.

[32]

[33] The effects obtainable from the present disclosure are not limited to the effects mentioned above, and other effects not mentioned may be clearly understood from the following description by those of ordinary skill in the art to which the present disclosure pertains.

[34]

**Description of Drawings**

[35] FIG. 1 is a view showing a battery loading apparatus according to an embodiment of the present disclosure.

[36] FIG. 2 is a view showing a state where a side cover is folded outward according to an embodiment of the present disclosure.

[37] FIG. 3 is a view showing a state where the side cover is folded inward according to an embodiment of the present disclosure.

[38] FIG. 4 is a view showing an upper cover covering an upper portion of a battery in accordance with an embodiment of the present disclosure.

[39] FIG. 5 is a view showing a stopper regulating a vertical position of the battery according to an embodiment of the present disclosure.

[40] FIG. 6 is a view showing the battery loading apparatus viewed from a lateral side according to an embodiment of the present disclosure.

[41] FIG. 7 is a view showing a connection structure between a base bracket and the side cover according to an embodiment of the present disclosure.

[42] FIG. 8 is a view showing a connection structure between a loading base and the side cover according to an embodiment of the present disclosure.

[43] FIG. 9 is a view showing a state where end portions of adjacent side covers are in contact with each other.

[44] FIG. 10 is a view showing a state where a side pin is inserted into a through hole such that the side cover is capable of inner or outer folding according to an embodiment of the present disclosure.

[45] FIG. 11 is a view showing an indented portion indented downward in the loading base according to an embodiment of the present disclosure.

[46]

**MODE FOR DISCLOSURE**

[47] Hereinafter, the embodiments disclosed in the present specification will be described in detail with reference to the accompanying drawings, regardless of drawing reference numerals, the same or similar components are assigned the same reference numerals, and redundant descriptions thereof will be omitted.

[48] The suffixes “module” and “unit” for the components used in the following description are assigned or used interchangeably merely by consideration of ease of specification writing, and, by themselves, do not have meanings or roles distinguished from each other.

[49] In describing the embodiments disclosed in the present specification, in a case where it is determined that a specific description of the related publicly known technology may obscure the gist of the embodiments disclosed in the present specification, the detailed description thereof is omitted. In addition, the accompanying drawings are merely for easily understanding the embodiments disclosed in the present specification, the technical spirit disclosed in the present specification is not limited by the accompanying drawings, and it should be understood to include all modifications, equivalents, and substitutes included in the spirit and technical scope of the present disclosure. Terms including ordinals such as first, second, and the like

may be used to describe various components, but the components are not limited by the terms. The terms are used only for the purpose of distinguishing one component from another component.

[50] Upon mentioning that a certain component is “connected to” or “coupled to” another component, it should be understood that the component may be directly connected to or coupled to the another component, but another component may also exist in between. On the other hand, upon mentioning that a certain component is “directly connected to” or “directly coupled to” another component, it should be understood that another component does not exist in between.

[51] Singular expressions include plural expressions unless the context clearly indicates otherwise.

[52] In the present specification, terms such as “comprise” or “have” are intended to designate the existence of features, numbers, steps, operations, components, parts, or combinations thereof described in the specification, and should be understood as not precluding in advance the existence or possibility of addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[53] According to an embodiment of the present disclosure, it is proposed to reduce a weight of a battery loading apparatus itself and increase transport efficiency through a plurality of side covers capable of inner or outer folding.

[54] FIG. 1 is a view showing a battery loading apparatus according to an embodiment of the present disclosure. FIG. 1 shows mainly components related to the present embodiment, and it goes without saying that, in actual implementation of the battery loading apparatus, fewer or more components than these may be included.

[55]

[56] Referring to FIG. 1, the battery loading apparatus 100 according to an embodiment may comprise a loading base 101, a base bracket 111, and a side cover 110. The battery loading apparatus 100 is provided above a side rack 200 having a wheel 300 provided on a lower surface thereof, whereby outer folding of the side cover 110 may be performed. This is described below.

[57] The loading base 101 supports a lower portion of a battery 10 and regulates a lateral position of the battery 10. More specifically, a cushion portion 131 provided on an upper surface of the loading base 101 supports the loaded battery 10 from a lower side, and a seating portion 130 provided on the upper surface may support the battery 10 from a lateral side. A plurality of the seating portions 130 are provided to support an edge of the battery 10 along a shape of the battery 10, whereby an X-axis and Y-axis direction, that is, the lateral position of the battery 10 is regulated. The seating portion 130 is formed of an elastic material such as a urethane material, and may absorb impact transmitted to the battery 10 even in a case where impact is applied from outside in a state where the battery 10 is loaded.

[58] In addition, the base bracket 111 extends upward from each corner of the loading base 101, and fixing grooves 111a, 111b are formed on an upper surface thereof. The fixing grooves 111a, 111b are connected to the side cover 110 as will be described below, and may prevent the side cover 110 from being folded together with a stopper 120 in a state where the battery 10 is loaded.

[59] A plurality of the side covers 110 are provided at an outer lateral side of the loading base 101, are connected to both sides of the base bracket 111, and are formed to enable inner or outer folding. In addition, the side

cover 110 is, upon being fastened to the fixing groove, fixed to the base bracket 111 so as to cause a lateral side of the battery 10 to be covered. This is described with reference to FIG. 2 and FIG. 3.

[60] In the battery loading apparatus 100, the outer folding of the side cover 110 is a structure for loading or unloading operation of the battery 10, and the inner folding of the side cover 110 is performed to reduce overall volume upon recovery operation of the battery loading apparatus 100 after unloading of the battery 10. To describe in more detail,

[61] FIG. 2 and FIG. 3 are respectively views showing a state where the side cover 110 is folded outward and inward in accordance with an embodiment of the present disclosure.

[62] Referring to FIG. 2 and FIG. 3, in a case where the plurality of side covers 110 are folded outward or inward, the base bracket 111 may be maintained in a state fixed at each corner of the loading base 101. At this time, upon outer folding of the side cover 110, the side cover 110 may form an angle of 270 degrees with reference to a state folded inward.

[63] FIG. 4 is a view showing an upper cover 140 covering an upper portion of the battery 10 in accordance with an embodiment of the present disclosure.

[64] Referring to FIG. 4, the upper cover 140 is provided so as to face the loading base 101, and may cover the upper portion of the battery 10 in a state where the battery 10 is loaded. At this time, in a state where the upper cover 140 is mounted on upper ends of the plurality of side covers 110, the upper cover 140 may be fixed to the side cover 110 through a second fixing device 113 formed on an upper end of an outer surface of the side cover 110. Because the upper portion of the battery 10 is covered through the upper cover 140, upon fire occurrence outside,

fire spread to the battery 10 loaded inside the loading apparatus may be prevented.

[65] Furthermore, so that fire spread to the battery 10 may be prevented, the loading base 101, the base bracket 111, the plurality of side covers 110, and the upper cover 140 may be made of a flame-retardant material.

[66] FIG. 5 is a view showing the stopper 120 regulating a vertical position of the battery 10 according to an embodiment of the present disclosure. In addition, FIG. 6 is a view showing the battery loading apparatus 100 viewed from a lateral side according to an embodiment of the present disclosure.

[67] Referring to FIG. 5 and FIG. 6, a plurality of the stoppers 120 may be provided on an inner surface of the side cover 110. Through the configuration of the stopper 120, in a state where the battery 10 is loaded, a Z-axis direction, that is, the vertical position of the battery 10 may be regulated. A flange portion 121 is formed at an end portion of the stopper 120, whereby a fastening portion 11 of the battery 10 is pressed downward.

[68] At this time, the side cover 110 is parallel to the loading base 101 based on being folded inward, and may be orthogonal to the loading base 101 based on being fastened to the fixing groove and fixed to the base bracket 111.

[69] FIG. 7 and FIG. 8 are respectively views showing a connection structure between the base bracket 111 and the side cover 110 and a connection structure between the loading base 101 and the side cover 110 according to an embodiment of the present disclosure.

[70] Referring to FIG. 7, a structure in which an upper end portion of the side cover 110 protrudes toward an outer lateral side may be confirmed. In the protruding structure, a pin-shaped protrusion 110b again protrudes

downward and is fastened to a second fixing groove 111b formed on the upper surface of the base bracket 111, whereby the side cover 110 and the base bracket 111 may be connected to each other. Through such a structure, a state where the side cover 110 is not folded inward or outward may be fixed, and the battery 10 loaded in an inner space may be protected from external impact.

[71] Referring to FIG. 8, a first fixing device 112 that causes the side cover 110 to be fixed to the loading base 101 is formed on a lower end of an outer surface of the side cover 110. At this time, the side cover 110 may be fixed to the loading base 101 through the first fixing device 112 in a state where the side cover 110 is fixed to the base bracket 111. The first fixing device 112 is composed of a latch 112a and a handle 112b, and a user, in a state where the user has moved the handle 112b, presses downward so as to cause the latch 112a to descend, whereby the loading base 101 may be fixed to the side cover 110. Through the corresponding manner, welding of each component becomes unnecessary in the battery loading apparatus 100 of the present disclosure, and due to this, reuse of the battery loading apparatus 100 may be performed.

[72] Meanwhile, referring to FIG. 7, a pin-shaped protrusion 110b protrudes downward at the upper end portion of the side cover 110 and is fastened to the second fixing groove 111b formed on the upper surface of the base bracket 111, whereby one side surface of the battery loading apparatus 100 may be covered.

[73] At this time, a pin-shaped protrusion 110a protrudes downward at an upper end portion of another side cover 110 responsible for covering of an adjacent side surface, and is fastened to a first fixing groove 111a formed on the upper surface of the base bracket 111, whereby

another one side surface of the battery loading apparatus 100 may be covered.

[74] In this manner, the fixing grooves 111a, 111b may be formed as fixing grooves formed in different directions with reference to the corner of the loading base 101, and the fixing grooves may comprise the first fixing groove 111a and the second fixing groove 111b.

[75] Accordingly, in each of the fixing grooves 111a, 111b, protrusions 110a, 110b protruding outward toward the base bracket 111 at both end portions of the plurality of side covers 110 may be inserted into each of the fixing grooves 111a, 111b, and each of the side covers 110 may cover the battery from different side surfaces.

[76] In this manner, in a state where the protrusions 110a, 110b formed on the side cover 110 are inserted into the fixing grooves 111a, 111b, both end portions of the plurality of side covers 110 are in contact with end portions of different side covers, and what shows this corresponds to FIG. 9.

[77] Referring to FIG. 9, a third fixing device 114 is formed at an end portion of at least one of the side covers 110, and the adjacent side covers 110 may be fixed to each other through the third fixing device 114. The third fixing device 114 is composed of a latch 114a and a handle 114b, and a user, in a state where the user has moved the handle 114b, presses so as to cause the latch 114a to move leftward and rightward, whereby the mutually adjacent side covers 110 may be fixed to each other or the fixing may be released. Through the corresponding manner, welding of each component becomes unnecessary in the battery loading apparatus 100 of the present disclosure, and due to this, reuse of the battery loading apparatus 100 may be performed.

[78]

[79] FIG. 10 is a view showing a state where a side pin 110c is inserted into a through hole 111c such that the side cover 110 is capable of inner or outer folding according to an embodiment of the present disclosure.

[80] Referring to FIG. 10, in order to cause the side cover 110 to be folded inward or outward, a connection structure with the base bracket 111 is very important. Inner or outer folding of the side cover 110 is enabled through the through hole 111c penetratingly formed long in a vertical direction from both sides of the base bracket 111 and the side pin 110c protrudingly formed toward both lateral sides of the side cover 110. More specifically, the side pin 110c protrudingly formed toward both lateral sides of the side cover 110 is inserted into the through hole 111c, whereby the side cover 110 is connected to both sides of the base bracket 111. Here, the through hole 111c is formed in a vertically long shape at both sides of the base bracket 111, the side pin 110c is inserted into the through hole 111c such that the side cover 110 moves in the vertical direction and rotates 270 degrees with reference to the base bracket 111. At this time, the side cover 110 may be folded inward or outward in a state where the side pin 110c is moved upward.

[81] FIG. 11 is a view showing an indented portion 101a indented downward in the loading base 101 according to an embodiment of the present disclosure.

[82] Referring to FIG. 11, a plurality of the indented portions 101a may be formed in the loading base 101 by being indented downward at a point where the side cover 110 is folded inward to face the loading base 101. At this time, the stopper 120 may be folded together upon inner folding of the side cover 110 and may be seated in the indented portion 101a. In this manner, through the indented portion 101a indentedly formed in the Z-axis

direction with reference to the loading base 101, upon inner folding of the side cover 110, a height of the battery loading apparatus 100 is reduced, and due to this, a volume of the battery loading apparatus 100 itself may be minimized, whereby transport efficiency of the battery 10 may be greatly increased.

[83] According to the embodiments of the present disclosure described thus far, a weight of the battery loading apparatus itself is reduced through a plurality of side covers capable of inner or outer folding, and thereby transport efficiency may be increased. In addition, because separate welding is unnecessary for the battery loading apparatus due to the side cover configuration, reuse of the battery loading apparatus is enabled, and upon fire occurrence outside, fire spread to the battery loaded inside the loading apparatus may be prevented.

[84]

[85] Although the present disclosure has been illustrated and described in relation to specific embodiments of the present disclosure, it will be apparent to those of ordinary skill in the art that the present disclosure may be variously improved and modified within a limit that does not depart from the technical spirit of the present disclosure provided by the following claims.

[86]

[87] [Description of Reference Numerals]

[88] 10 : battery 11 : fastening portion

[89] 100 : battery loading apparatus 101 : loading base

[90] 101a : indented portion 110 : side cover

[91] 110b : protrusion 110c : side pin

[92] 111 : base bracket 111a : first fixing groove

[93] 111b : second fixing groove 111c : through hole

[94] 112 : first fixing device 113 : second fixing device

[95] 120 : stopper 121 : flange portion

[96] 130 : seating portion 131 : cushion portion

[97] 140 : upper cover 200 : side rack

[98] 300 : wheel

**CLAIMS**

[Claim 1] A battery loading apparatus comprising:

a loading base that supports a lower portion of a battery and regulates a lateral position of the battery;

a base bracket extending upward from each corner of the loading base and having a fixing groove formed on an upper surface thereof; and

a plurality of side covers provided at an outer lateral side of the loading base, connected to both sides of the base bracket so as to be formed to enable inner or outer folding, and, upon being fastened to the fixing groove, fixed to the base bracket so as to cause a lateral side of the battery to be covered.

[Claim 2] The battery loading apparatus of claim 1, wherein a plurality of seating portions are formed on the upper surface of the loading base, and an edge of the battery is supported by the seating portions, whereby the lateral position of the battery is regulated.

[Claim 3] The battery loading apparatus of claim 1, further comprising a plurality of stoppers provided on an inner surface of the side cover and regulating a vertical position of the battery in a state where the battery is loaded.

[Claim 4] The battery loading apparatus of claim 3, wherein a plurality of indented portions are formed in the loading base by being indented downward at a point where the side cover is folded inward to face the loading base, and

the stoppers are folded together upon inner folding of the side cover and are seated in the indented portions.

[Claim 5] The battery loading apparatus of claim 1, wherein a through hole penetrating in a vertical direction is formed at both sides of the base bracket, and

a side pin protrudingly formed toward both lateral sides of the side cover is inserted into the through hole, whereby the side cover is connected to both sides of the base bracket.

[Claim 6] The battery loading apparatus of claim 5, wherein the through hole is formed in a vertically long shape at both sides of the base bracket, and

the side pin is inserted into the through hole and moves in the vertical direction together with vertical movement of the side cover, and the side cover is formed to enable inner or outer folding in a state where the side pin is moved upward.

[Claim 7] The battery loading apparatus of claim 6, wherein the side cover is parallel to the loading base based on being folded inward, and is orthogonal to the loading base based on being fastened to the fixing groove and fixed to the base bracket.

[Claim 8] The battery loading apparatus of claim 1, wherein a first fixing device that causes the side cover to be fixed to the loading base is formed on a lower end of an outer surface of the side cover, and the side cover is fixed to the loading base through the first fixing device in a state where the side cover is fixed to the base bracket.

[Claim 9] The battery loading apparatus of claim 1, further comprising an upper cover provided so as to face the loading base and covering an upper portion of the battery in a state where the battery is loaded.

[Claim 10] The battery loading apparatus of claim 9, wherein the side cover has, on an upper end of an outer surface

thereof, a second fixing device that causes the upper cover to be fixed thereto, and the upper cover is fixed to the side cover through the second fixing device in a state where the upper cover is mounted on upper ends of the plurality of side covers.

[Claim 11] The battery loading apparatus of claim 1, wherein protrusions protruding outward toward the base bracket are formed at both end portions of the plurality of side covers,

the fixing grooves are formed in a pair in different directions with reference to the corner of the loading base, and

the protrusion is inserted into the fixing groove so as to cause the side cover to cover the lateral side of the battery.

[Claim 12] The battery loading apparatus of claim 11, wherein in a state where the protrusion formed on the side cover is inserted into the fixing groove,

both end portions of the plurality of side covers are in contact with end portions of different side covers, a third fixing device is formed at an end portion of at least one of the side covers, and adjacent side covers are fixed to each other through the third fixing device.

[Claim 13] The battery loading apparatus of claim 1, wherein the loading base, the base bracket, the plurality of side covers, and the upper cover are made of a flame-retardant material.