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BATTERY

Abstract

Disclosed is a battery capable of improving impact resistance of a terminal and a current collector part. The battery of the present disclosure includes an electrode laminate, a current collector part, and a terminal. The electrode laminate is electrically connected to the terminal via the current collector part. The terminal includes a base and a protrusion. The base has a first surface facing the electrode laminate and a second surface opposite the first surface. The protrusion protrudes from the base toward the electrode laminate. The protrusion includes a first protrusion and a second protrusion. The first protrusion has a third surface facing the second protrusion and a fourth surface opposite the third surface. The second protrusion has a fifth surface facing the first protrusion and a sixth surface opposite the fifth surface. The current collector part is joined to one or both of the third surface and the fifth surface.

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Background/Summary

FIELD
[0001] The present disclosure relates to a battery.
BACKGROUND
[0002] Patent Literature 1 discloses a battery, wherein an electrode laminate and a lid terminal are electrically connected via a current collector part, an exterior body is adhered to an outer periphery of the lid terminal, and the current collector part and the electrode laminate are housed inside the exterior body.
CITATION LIST
Patent Literature
[0003] [PTL 1] Japanese Unexamined Patent Publication No. 2023-084066
SUMMARY
Technical Problem
[0004] Conventional batteries have room for improvement in terms of impact resistance of the terminal and current collector part.
Solution to Problem
[0005] The present disclosure provides, as means for achieving the object described above, the following multiple aspects.
<Aspect 1>
[0006] A battery, comprising an electrode laminate, a current collector part, and a terminal, wherein
[0007] the electrode laminate is electrically connected to the terminal via the current collector part,
[0008] the terminal comprises a base and a protrusion, [0009] the base has a first surface facing the electrode laminate and a second surface opposite the first surface, [0010] the protrusion protrudes from the base toward the electrode laminate, [0011] the protrusion comprises a first protrusion and a second protrusion, [0012] the first protrusion has a third surface facing the second protrusion and a fourth surface opposite the third surface, [0013] the second protrusion has a fifth surface facing the first protrusion and a sixth surface opposite the fifth surface, and [0014] the current collector part is joined to one or both of the third surface and the fifth surface.
<Aspect 2>
[0015] The battery according to Aspect 1, wherein the current collector part is joined to the first surface.
<Aspect 3>
[0016] The battery according to Aspect 1 or 2, wherein the current collector part is joined to both the third surface and the fifth surface.
<Aspect 4>
[0017] The battery according to Aspect 1, wherein the current collector part passes near the third surface and the first surface and is joined to the fifth surface.
<Aspect 5>
[0018] The battery according to any one of Aspects 1 to 4, wherein the base is thicker than the first protrusion and the second protrusion.
<Aspect 6>
[0019] The battery according to any one of Aspects 1 to 5, wherein [0020] the protrusion comprises a third protrusion and a fourth protrusion, [0021] the third protrusion has a seventh surface facing the fourth protrusion and an eighth surface opposite the seventh surface, and [0022] the fourth protrusion has a ninth surface facing the third protrusion and a tenth surface opposite the ninth

surface.
<Aspect 7>
[0023] The battery according to Aspect 6, wherein [0024] the base is thicker than the third protrusion and the fourth protrusion.
<Aspect 8>
[0025] The battery according to Aspect 6 or 7, wherein [0026] a planar shape of the base is a rectangle, [0027] the rectangle comprises a first side and a second side facing each other and a third side and a fourth side facing each other, [0028] the first protrusion protrudes from the first side, [0029] the second protrusion protrudes from the second side, [0030] the third protrusion protrudes from the third side, and [0031] the fourth protrusion protrudes from the fourth side.
<Aspect 9>
[0032] The battery according to Aspect 6 or 7, wherein [0033] the planar shape of the base is an elongated rectangle, [0034] the first protrusion protrudes from one long side of the elongated rectangle, [0035] the second protrusion protrudes from another long side of the elongated rectangle, [0036] the third protrusion protrudes from one short side of the elongated rectangle, and [0037] the fourth protrusion protrudes from another short side of the elongated rectangle.
<Aspect 10>
[0038] The battery according to Aspect 9, wherein [0039] a lamination direction in the electrode laminate is along the short sides, and [0040] a width direction of the electrode laminate is along the long sides.
<Aspect 11>
[0041] The battery according to any one of Aspects 1 to 10, wherein [0042] the protrusion protrudes from an outer edge of the base.
<Aspect 12>
[0043] The battery according to any one of Aspects 1 to 11, wherein [0044] a ratio of a width of the current collector part to an inner width of the base is 0.9 or more.
<Aspect 13>
[0045] The battery according to any one of Aspects 1 to 12, wherein [0046] a thickness of the base is less than a protrusion length of the protrusion.
<Aspect 14>
[0047] The battery according to any one of Aspects 1 to 13, wherein [0048] a thickness of the terminal is less than a thickness of the electrode laminate.
<Aspect 15>
[0049] The battery according to any one of Aspects 1 to 14, wherein [0050] the protrusion has an insulating layer at an end surface on the electrode laminate side.
<Aspect 16>
[0051] The battery according to any one of Aspects 1 to 15, wherein [0052] the electrode laminate and the current collector part are housed in a laminate exterior body, and [0053] the laminate exterior body is adhered to the fourth surface and the sixth surface.
Effects
[0054] The battery of the present disclosure has excellent impact resistance of the terminal and the current collector part. For example, even if an impact is applied to the base of the terminal by some member, the impact is unlikely to be transmitted to the current collector part.

Description

BRIEF DESCRIPTION OF DRAWINGS
[0055] FIG. **1** schematically shows an example of the external configuration of a battery.
[0056] FIG. **2** schematically shows an example of the configuration of the cross section taken along

line II-II of FIG. **1**.
[0057] FIG. **3** schematically shows an example of the configuration of the cross section taken along line III-III of FIG. **1**.
[0058] FIG. **4** schematically shows an example of the configuration of the cross section taken along line IV-IV of FIG. **1**.
[0059] FIG. **5** schematically shows an example of the external shape of a terminal.
[0060] FIG. **6** schematically shows an example of the cross section of a terminal.
[0061] FIG. **7** schematically shows an example of the cross section of a terminal.
[0062] FIG. **8** schematically shows another example of the cross section of a terminal.
[0063] FIG. **9** schematically shows another example of the connection state between a terminal and a current collector part.
[0064] FIG. **10** schematically shows another example of a connection state between a terminal and a current collector part.
[0065] FIG. **11** schematically shows another example of a connection state between a terminal and a current collector part.
[0066] FIG. **12** schematically shows another example of a connection state between a terminal and a current collector part.
[0067] FIG. **13** schematically shows another example of a connection state between a terminal and a current collector part.
[0068] FIG. **14** schematically shows another example of a connection state between a terminal and a current collector part.
[0069] FIG. **15** schematically shows an example of a cross-sectional shape of a terminal when an insulating layer is provided on part of the terminal.
[0070] FIG. **16** schematically shows an example of an adherence state between a terminal and a exterior body. The current collector part and electrode laminate are omitted.

DESCRIPTION OF EMBODIMENTS

[0071] An embodiment of the battery of the present disclosure will be described below, but the battery of the present disclosure is not limited to the following embodiment.
[0072] As shown in FIGS. **1** to **7**, a battery **100** according to an embodiment comprises an electrode laminate **10**, a current collector part **20**, and a terminal **30**. The electrode laminate **10** is electrically connected to the terminal **30** via the current collector part **20**. The terminal **30** comprises a base **31** and a protrusion **32**. The base **31** has a first surface **31***x* facing the electrode laminate **10**, and a second surface **31***y* opposite the first surface **31***x*. The protrusion **32** protrudes from the base **31** toward the electrode laminate **10**. The protrusion **32** comprises a first protrusion **32***a* and a second protrusion **32***b*. The first protrusion **32***a* has a third surface **32***ax* facing the second protrusion **32***b*, and a fourth surface **32***ay* opposite the third surface **32***ax*. The second protrusion **32***b* has a fifth surface **32***bx* facing the first protrusion **32***a* and a sixth surface **32***by* opposite the fifth surface **32***bx*. The current collector part **20** is joined to one or both of the third surface **32***ax* and the fifth surface **32***bx*.

1. Electrode Laminate

[0073] The battery **100** supplies the power generated by the electrode laminate **10** to external devices and the like via the current collector part **20** and the terminal **30**. Specifically, the electrode laminate **10** functions as a power generating element of the battery **100**.
[0074] As shown in FIGS. **2** and **4**, the electrode laminate **10** may be formed by stacking a plurality of electrode bodies. Each electrode body can comprise, for example, a layer composed of a positive electrode current collector, a positive electrode active material layer, an electrolyte layer, a negative electrode active material layer, and a layer composed of a negative electrode current collector. The positive electrode current collector, the positive electrode active material layer, the electrolyte layer, the negative electrode active material layer, and the negative electrode current collector may be publicly known components. The electrode laminate **10** may contain a solid electrolyte, a liquid

electrolyte, or a solid electrolyte and a liquid electrolyte. When the electrode laminate **10** contains at least a solid electrolyte, a battery **100** having excellent mechanical properties, output properties, etc., can easily be obtained. The shape of the lamination surface of the layers constituting the electrode laminate **10** may be, for example, rectangular.

[0075] The number of electrode bodies stacked in the electrode laminate **10** is not particularly limited. In the electrode laminate **10**, the plurality of electrode bodies may be connected to each other in series or in parallel. The electrode laminate **10** may have a bipolar structure. In the electrode laminate **10**, the lamination surfaces of the electrode bodies may be insulated from each other by providing an insulating layer between one electrode body and another electrode body. As shown in FIG. **2**, in the battery **100**, the plurality of electrode bodies can be electrically connected to each other by the current collector part **20**. For example, the plurality of electrode bodies can be electrically connected to each other in parallel by the current collector part **20**.

[0076] As shown in FIGS. **2** to **4**, the electrode laminate **10** may have an end surface **10***x* at one end in the lamination direction of each of the layers, an end surface **10***y* at the other end in the lamination direction of each of the layers, and side surfaces **10***z* each connecting the end surface **10***x* and the end surface **10***y*. Each side surface **10***z* may be formed by the outer edges of the layers constituting the electrode laminate **10**. In the electrode laminate **10**, the lamination areas of the layers may differ so that the side surfaces **10***z* may have concavities and convexities or gaps. Each side surface **10***z* may have a surface along the lamination direction of the layers in the electrode laminate **10**. The current collector part **20**, which is described later, can protrude from the side surface **10***z* of the electrode laminate **10** to the terminal **30**. The electrode laminate **10** may be, for example, in the shape of a plate or a rectangular parallelepiped as a whole.

[0077] As shown in FIGS. **2** and **4**, the electrode laminate **10** can have a thickness T.sub.10 along the lamination direction. The thickness T.sub.10 of the electrode laminate **10** is not particularly limited. The thickness T.sub.10 of the electrode laminate **10** may be, for example, 5 mm or more and 100 mm or less, or 10 mm or more and 50 mm or less.

[0078] As shown in FIGS. **3** and **4**, the electrode laminate **10** can have a width W.sub.10 along the lamination surface at the side surface **10***z* where the current collector part **20** protrudes. The width W.sub.10 of the electrode laminate **10** is not particularly limited. The width W.sub.10 of the electrode laminate **10** may be, for example, 10 mm or more and 500 mm or less, or 50 mm or more and 200 mm or less.

2. Current Collector Part

[0079] The current collector part **20** protrudes from the electrode laminate **10** toward the terminal **30**, and electrically connects the electrode laminate **10** and the terminal **30**. More specifically, as shown in FIGS. **2** and **3**, a part of the current collector part **20** including the tip on the terminal **30** side is joined to one or both of the third surface **32***ax* and the fifth surface **32***bx* of the terminal **30**.

[0080] As shown in FIGS. **2** and **3**, the current collector part **20** may be, for example, a bundle of a plurality of current collectors protruding from the side surface **10***z* of the electrode laminate **10** toward the terminal **30**. The number of current collectors protruding in the same direction from the electrode laminate **10** is not particularly limited, and may be, for example, 10 to 200, or 30 to 100. In the battery **100**, the current collector part **20** may be a bundle of a plurality of positive electrode current collectors, or a bundle of a plurality of negative electrode current collectors. In the battery **100**, the plurality of current collectors protruding from the side surface **10***z* of the electrode laminate **10** toward the terminal **30** may be grouped to form one bundle, or may be grouped to form a plurality of bundles.

[0081] The current collector constituting the current collector part **20** may be, for example, a metal foil or a metal mesh. From the viewpoint of excellent handling, the current collector part **20** may comprise a plurality of metal foils. Examples of the metal constituting the current collector include Cu, Ni, Cr, Au, Pt, Ag, Al, Fe, Ti, Zn, Co, and stainless steel. The current collector may have some type of coating layer on the surface thereof for the purpose of adjusting the resistance, etc.

Furthermore, when the current collector part **20** is composed of a plurality of metal foils, some type of layer may be present between the plurality of metal foils. The thickness of each current collector is not particularly limited. For example, it may be 0.1 μm or more, it may be 1 μm or more, it may be 1 mm or less, and it may be 100 μm or less.

[0082] As shown in FIG. **3**, the current collector part **20** can have a width W.sub.20 in a direction perpendicular to the protrusion direction of the current collector part **20** from the electrode laminate **10** and along the lamination surface of the electrode laminate **10**. The width W.sub.20 of the current collector part **20** is not particularly limited. The width W.sub.20 of the current collector part may be, for example, 5 mm or more and 450 mm or less, or 20 mm or more and 190 mm or less.

3. Terminal

[0083] As shown in FIGS. **2**, **3**, and **5** to **7**, the terminal **30** has a base **31**, a first protrusion **32***a*, and a second protrusion **32***b*. As shown in FIGS. **2** and **3**, the first surface **31***x* on the electrode laminate **10** side of the base **31** may face the inside of the battery, and the second surface **31***y* on the side opposite the electrode laminate **10** may face the outside of the battery **100**. Further, as shown in FIG. **6**, the third surface **32***ax* facing the second protrusion **32***b* side of the first protrusion **32***a* may face the inside of the battery, and the fourth surface **32***ay* on the side opposite the third surface **32***ax* may be adhered to the exterior body **40**. As shown in FIG. **6**, the fifth surface **32***bx* of the second protrusion **32***b* facing the first protrusion **32***a* may face the inside of the battery, and the sixth surface **32***by* on the side opposite the fifth surface **32***bx* may be adhered to the exterior body **40**.

3.1 Base

[0084] As shown in FIGS. **2**, **3**, and **5** to **7**, the base **31** can have a first surface **31***x* facing the electrode laminate **10** and a second surface **31***y* facing the side opposite the electrode laminate **10**. The base **31** may correspond to, for example, the bottom of a vessel-shaped terminal **30**. As shown in FIGS. **2** and **3**, the first surface **31***x* may not be in contact with the current collector part **20** or may be in contact with the current collector part **20**, as will be described later, and may have a joint **25** with the current collector part **20**. The second surface **31***y* may face the outside of the battery **100**. The first surface **31***x* and the second surface **31***y* of the base **31** may be, for example, flat surfaces as shown in the drawings, or may have concavities and convexities. The planar shapes of the first surface **31***x* and the second surface **31***y* (referring to the planar shape when the first surface and the second surface are projected) is not particularly limited. Though the planar shapes of the illustrated first surface **31***x* and second surface **31***y* are elongated rectangles, the planar shapes may be square, quadrangles other than rectangles (elongated rectangles and squares), other polygonal shapes, circles, ellipses, or other shapes. In particular, when the first surface **31***x* and second surface **31***y* are rectangular, and especially when they are elongated rectangles, ease of handling and mechanical strength are likely to be improved. Note that the terms “polygon”, “quadrangle”, “rectangle”, and “elongated rectangle” in the present description each include concepts including shapes with chamfered corners and shapes with rounded corners.

[0085] As shown in FIGS. **6** and **7**, the base **31** can have a thickness T.sub.31 (thickness from the first surface **31***x* to the second surface **31***y*). The thickness T.sub.31 of the base **31** is not particularly limited. In particular, when the thickness T.sub.31 of the base **31** is 0.1 mm or more and 10 mm or less or 0.2 mm or more and 3 mm or less, the structural efficiency around the terminal **30** and the strength of the terminal **30** tend to be well balanced.

[0086] As shown in FIG. **6**, the base **31** can have a length (height) L.sub.31x along the lamination direction in the electrode laminate **10** in the inner dimension of the first surface **31***x* (from the inner surface of the first protrusion **32***a* to the inner surface of the second protrusion **32***b*). As shown in FIG. **6**, the length L.sub.31x in the inner dimension of the first surface **31***x* of the base **31** may be the same as the height H.sub.33 of the opening **33** of the terminal **30**, which will be described later. Alternatively, the length L.sub.31x in the inner dimension of the first surface **31***x* of the base **31** may be smaller or larger than the height H.sub.33. The length L.sub.31x in the inner dimension of the first surface **31***x* of the base **31** is not particularly limited, and may be 4.8 mm or more and 99.8

mm or less or 9.8 mm or more and 49.8 mm or less.
[0087] As shown in FIG. **6**, the base **31** can have a length (height) L.sub.31y at the second surface **31***y* along the lamination direction in the electrode laminate **10**. As shown in FIG. **6**, the length L.sub.31y at the second surface **31***y* of the base **31** may be the same as the thickness T.sub.30 of the terminal **30** (the length from the fourth surface **32***ay* of the first protrusion **32***a* to the sixth surface **32***by* of the second protrusion **32***b*). Alternatively, the length L.sub.31y at the second surface **31***y* of the base **31** may be greater than the thickness T.sub.30 of the terminal **30**. Specifically, as shown in FIG. **8**, the first protrusion **32***a* and the second protrusion **32***b* may protrude from inside the outer edge of the first surface **31***x* of the base **31** toward the electrode laminate **10**. The length L.sub.31y may be greater than the above-mentioned length L.sub.31x and may be smaller than the above-mentioned thickness T.sub.10. The length L.sub.31y of the second surface **31***y* of the base **31** is not particularly limited, and may be 4.9 mm or more and 99.9 mm or less or 9.9 mm or more and 49.9 mm or less.
[0088] As shown in FIG. **7**, the base **31** can have a width W.sub.31x along the lamination surface of the electrode laminate **10** in the inner dimension of the first surface **31***x*. As shown in FIG. **7**, the width W.sub.31x in the inner dimension of the first surface **31***x* of the base **31** may be the same as the width W.sub.33 of the opening **33** of the terminal **30**, which will be described later. The width W.sub.31x may be larger than the width W.sub.20 described above. The width W.sub.31x may be smaller than the width W.sub.31y, which will be described later. Alternatively, the width W.sub.31x in the inner dimension of the first surface **31***x* of the base **31** may be smaller than the width W.sub.33. The width W.sub.31x in the inner dimension of the first surface **31***x* of the base **31** is not particularly limited, and may be 7.5 mm or more and 475 mm or less or 30 mm or more and 195 mm or less.
[0089] As shown in FIG. **7**, the base **31** can have a width W.sub.31y at the second surface **31***y* along the lamination surface of the electrode laminate **10**. As shown in FIG. **7**, the width W.sub.31y of the second surface **31***y* of the base **31** may be the same as the sum of the width W.sub.33 of the opening **33**, the thickness T.sub.32c of the third protrusion **32***c*, and the thickness T.sub.32d of the fourth protrusion **32***d*, of the terminal **30**, which will be described later. Alternatively, the width W.sub.31y of the second surface **31***y* of the base **31** may be larger than the sum of the width W.sub.33, the thickness T.sub.32c, and the thickness T.sub.32d. Furthermore, the width W.sub.31y may be larger than the width W.sub.31x or the width W.sub.33. The width W.sub.31y may be smaller than the width W.sub.10. The width W.sub.31y of the second surface **31***y* of the base **31** is not particularly limited, and may be 8.1 mm or more and 475.1 mm or less or 30.1 mm or more and 195.1 mm or less.
[0090] The ratio L.sub.31x/W.sub.31x of the length (height) L.sub.31x to the width W.sub.31x of the first surface **31***x* of the base **31** is not particularly limited. In particular, when the ratio L.sub.31x/W.sub.31x is 0.01 or more and 13.3 or less or 0.05 or more and 1.66 or less, the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal are easily secured.
[0091] The ratio L.sub.31y/W.sub.31y of the length (height) L.sub.31y to the width W.sub.31y of the second surface **31***y* of the base **31** is not particularly limited. In particular, when the ratio L.sub.31y/W.sub.31y is 0.01 or more and 13.3 or less or 0.05 or more and 1.66 or less, the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal are easily secured.
3.2 Protrusion
[0092] The protrusion **32** protrudes from the base **31** toward the electrode laminate **10**. As shown in FIGS. **2**, **3**, and **5** to **7**, the protrusion **32** may protrude linearly from the base **31** toward the electrode laminate **10** while having a thickness. As shown in FIG. **2**, the protrusion **32** comprises a first protrusion **32***a* and a second protrusion **32***b* in one cross section. The first protrusion **32***a* has a third surface **32***ax* facing the second protrusion **32***b* and a fourth surface **32***ay* opposite the third

surface **32***ax*. The second protrusion **32***b* has a fifth surface **32***bx* facing the first protrusion **32***a* and a sixth surface **32***by* opposite the fifth surface **32***bx*. Furthermore, as shown in FIG. **3**, the protrusion **32** may have a third protrusion **32***c* and a fourth protrusion **32***d* in a cross section perpendicular to the one cross section. In this case, the third protrusion **32***c* may have a seventh surface **32***cx* facing the fourth protrusion **32***d* and an eighth surface **32***cy* opposite the seventh surface **32***cx*. The fourth protrusion **32***d* may have a ninth surface **32***dx* facing the third protrusion **32***c* and a tenth surface **32***dy* opposite the ninth surface **32***dx*.

[0093] In the battery **100**, the thickness T.sub.32 of the protrusion **32** (for example, T.sub.32a to T.sub.32d in FIGS. **6** and **7**) is not particularly limited. In particular, when the thickness T.sub.32 of the protrusion **32** is 0.1 mm or more and 10 mm or less or 0.2 mm or more and 3 mm or less, connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal are easily secured. Note that the "thickness of the protrusion" in the present description is measured at the end surface of the protrusion on the electrode laminate side.

[0094] As shown in FIGS. **6** and **7**, the protrusion **32** can have a protrusion length L.sub.32 from the first surface **31***x* of the base **31** toward the electrode laminate **10**. The protrusion length L.sub.32 of the protrusion **32** is not particularly limited and may be 3 mm or more and 50 mm or less or 5 mm or more and 30 mm or less. The protrusion **32** may have the same protrusion length L.sub.32 as a whole. Specifically, the first protrusion **32***a*, the second protrusion **32***b*, the third protrusion **32***c*, and the fourth protrusion **32***d* may be flush with each other at the end surfaces on the electrode laminate **10** side. Alternatively, the protrusion length of a part of the protrusion **32** may be different from the protrusion length of the other parts of the protrusion **32**.

[0095] As shown in FIGS. **6** and **7**, the thickness T.sub.31 of the base **31** may be smaller than the protrusion length L.sub.32 of the protrusion **32**. By making the thickness T.sub.31 of the base **31** relatively thin, the space for inserting the current collector part **20** is increased. The ratio T.sub.31/L.sub.32 of the thickness T.sub.31 of the base **31** to the protrusion length L.sub.32 of the protrusion **32** may be, for example, more than 0 and less than 1.0, 0.02 or more and 0.5 or less, or 0.05 or more and 0.25 or less.

[0096] As shown in FIGS. **2**, **3**, and **5** to **7**, in the terminal **30**, the protrusion **32** may protrude from the outer edge of the base **31**. Specifically, the planar shape of the second surface **31***y* of the base **31** may coincide with the shape defined by the outer periphery of the protrusion **32**. Alternatively, as shown in FIG. **9**, the protrusion **32** may protrude from inside the outer edge of the first surface **31***x* of the base **31**. Specifically, the planar shape of the second surface **31***y* of the base **31** may be larger than the shape defined by the outer periphery of the protrusion **32**.

[0097] When the protrusion **32** protrudes from the outer edge of the base **31**, the shape defined by the outer periphery of the protrusion **32** corresponds to the planar shape of the second surface **31***y* of the base **31**. For example, when the planar shape of the base **31** (planar shape of the second surface **31***y*) is rectangular and the rectangle has a first side and a second side facing each other and a third side and a fourth side facing each other, the first protrusion **32***a* may protrude from the first side, the second protrusion **32***b* may protrude from the second side, the third protrusion **32***c* may protrude from the third side, and the fourth protrusion **32***d* may protrude from the fourth side. By adopting a configuration in which the protrusion **32** protrudes from the outer edge of the rectangular base **31** in this manner, the structural efficiency around the terminal and the strength of the terminal can easily be secured.

[0098] For example, when the planar shape of the base **31** (planar shape of the second surface **31***y*) is an elongated rectangle, the first protrusion **32***a* may protrude from one long side of the elongated rectangle, the second protrusion **32***b* may protrude from the other long side of the elongated rectangle, the third protrusion **32***c* may protrude from one short side of the elongated rectangle, and the fourth protrusion **32***d* may protrude from the other short side of the elongated rectangle. Since the protrusion **32** protrudes from the outer edge of the elongated rectangular base **31** in this manner, the structural efficiency around the terminal and the strength of the terminal can easily be secured.

Furthermore, by connecting the current collector part **20** to the first protrusion **32***a* or the second protrusion **32***b*, which protrudes from at least the long side of the base **31**, the connectivity of the current collector part **20** to the terminal **30** can easily be improved.

[0099] Furthermore, when the planar shape of the base **31** (planar shape of the second surface **31***y*) is an elongated rectangle, the lamination direction in the electrode laminate **10** may be along the short sides of the elongated rectangle, and the width direction of the electrode laminate **10** may be along the long sides of the elongated rectangle. As a result, a large space for inserting the current collector part **20** can easily be secured, and an excellent balance of structural efficiency and strength around the terminal **30** and the current collector part **20** can easily be achieved.

3.2.1 First Protrusion

[0100] The first protrusion **32***a* has a third surface **32***ax* facing the second protrusion **32***b* and a fourth surface **32***ay* opposite the third surface **32***ax*. As shown in FIG. **2**, the third surface **32***ax* may contact the current collector part **20**. The third surface **32***ax* may have a joint **25** with the current collector part **20**. Conversely, as shown in FIG. **2**, the fourth surface **32***ay* may be an adhesive surface with the exterior body **40**. The third surface **32***ax* and the fourth surface **32***ay* of the first protrusion **32***a* may be flat as shown in the drawing, or may have concavities and convexities. The planar shapes of the third surface **32***ax* and the fourth surface **32***ay* (referring to the planar shapes when the third surface and the fourth surface are projected) are not particularly limited. In particular, when the third surface **32***ax* and the fourth surface **32***ay* have rectangular planar shapes, the structural efficiency around the terminal **30** is likely to be improved, and the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal **30** are likely to be improved.

3.2.2 Second Protrusion

[0101] The second protrusion **32***b* has a fifth surface **32***bx* facing the first protrusion **32***a* and a sixth surface **32***by* opposite the fifth surface **32***bx*. As shown in FIG. **2**, the fifth surface **32***bx* need not contact the current collector part **20**. Alternatively, as will be described later, the fifth surface **32***bx* may contact the current collector part **20**, or may have a joint **25** with the current collector part **20**. Conversely, as shown in FIG. **2**, the sixth surface **32***by* may be an adhesive surface with the exterior body **40**. The fifth surface **32***bx* and the sixth surface **32***by* of the second protrusion **32***b* may be, for example, flat surfaces as shown in the drawing, or may have concavities and convexities. The planar shapes of the fifth surface **32***bx* and the sixth surface **32***by* (referring to the planar shapes when the fifth surface and the sixth surface are projected) are not particularly limited. In particular, when the fifth surface **32***bx* and the sixth surface **32***by* have rectangular planar shapes, the structural efficiency around the terminal **30** is likely to be improved, and the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal **30** are likely to be improved.

3.2.3 Third Protrusion

[0102] The third protrusion **32***c* may have a seventh surface **32***cx* facing the fourth protrusion **32***d* and an eighth surface **32***cy* opposite the seventh surface **32***cx*. As shown in FIG. **3**, the seventh surface **32***cx* need not contact the current collector part **20**. Conversely, as shown in FIG. **3**, the eighth surface **32***cy* may be an adhesive surface with the exterior body **40**. The seventh surface **32***cx* and the eighth surface **32***cy* of the third protrusion **32***c* may be, for example, flat surfaces as shown in the drawing, or may have concavities and convexities. The planar shapes of the seventh surface **32***cx* and the eighth surface **32***cy* (referring to the planar shapes when the seventh surface and the eighth surface are projected) are not particularly limited. In particular, when the seventh surface **32***cx* and the eighth surface **32***cy* have rectangular planar shapes, the structural efficiency around the terminal **30** is likely to be improved, and the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal **30** are likely to be improved.

3.2.4 Fourth Protrusion

[0103] The fourth protrusion **32***d* may have a ninth surface **32***dx* facing the third protrusion **32***c* and

a tenth surface **32***dy* opposite the ninth surface **32***dx*. As shown in FIG. **3**, the ninth surface **32***dx* need not contact the current collector part **20**. Conversely, as shown in FIG. **3**, the tenth surface **32***dy* may be an adhesive surface with the exterior body **40**. The ninth surface **32***dx* and the tenth surface **32***dy* of the fourth protrusion **32***d* may be, for example, a flat surface as shown in the drawing, or may have concavities and convexities. The planar shapes of the ninth surface **32***dx* and the tenth surface **32***dy* (referring to the planar shapes when the seventh surface and the eighth surface are projected) are not particularly limited. In particular, when the ninth surface **32***dx* and the tenth surface **32***dy* have rectangular planar shapes, the structural efficiency around the terminal **30** is likely to be improved, and the connectivity of the current collector part **20** to the terminal **30** and the strength of the terminal **30** are likely to be improved.

3.3 Opening

[0104] As shown in FIGS. **2**, **3**, and **5** to **7**, the terminal **30** may have an opening **33** on the electrode laminate **10** side. In this case, the current collector part **20** can be inserted into the opening **33** and connected to the terminal **30**. The shape of the opening **33** can be defined in accordance with the protrusion **32**. The shape of the opening **33** is not particularly limited. The shape of the opening **33** may be rectangular, circular, or elliptical, or may be another shape.

[0105] When the shape of the opening **33** is rectangular and the rectangle has a first side and a second side facing each other and a third side and a fourth side facing each other, the first protrusion **32***a* of the protrusion **32** may constitute the first side, the second protrusion **32***b* may constitute the second side, the third protrusion **32***c* may constitute the third side, and the fourth protrusion **32***d* may constitute the fourth side. When the shape of the opening **33** defined by the protrusion **32** is rectangular, it becomes easier to ensure the structural efficiency around the terminal and the strength of the terminal.

[0106] When the shape of the opening **33** is an elongated rectangle, the first protrusion **32***a* of the protrusion **32** may constitute one long side of the elongated rectangle, the second protrusion **32***b* may constitute the other long side of the elongated rectangle, the third protrusion **32***c* may constitute one short side of the elongated rectangle, and the fourth protrusion **32***d* may constitute the other short side of the elongated rectangle. In this case as well, the structural efficiency around the terminal and the strength of the terminal are easily secured.

[0107] When the shape of the opening **33** is an elongated rectangle, the lamination direction in the electrode laminate **10** may be along the short sides of the elongated rectangle, and the width direction of the electrode laminate **10** may be along the long sides of the elongated rectangle. As a result, a large space for inserting the current collector part **20** can easily be secured, and an excellent balance of structural efficiency and strength around the terminal **30** and the current collector part **20** can easily be achieved.

[0108] As shown in FIG. **6**, the opening **33** can have a height H.sub.33 along the lamination direction in the electrode laminate **10**. The height H.sub.33 of the opening **33** is not particularly limited. For example, the height H.sub.33 may be the same as the length L.sub.31x. The height H.sub.33 may be smaller than the length L.sub.31y. The height H.sub.33 may be smaller than the thickness T.sub.10. In particular, when the height H.sub.33 of the opening **33** is 4.8 mm or more and 99.8 mm or less, or 9.8 mm or more and 49.8 mm or less, the strength of the terminal **30** is easily secured, and the current collector part **20** can more easily be inserted into the opening **33** and joined to the terminal **30**.

[0109] As shown in FIG. **7**, the opening **33** can have a width W.sub.33 along the lamination surface of the electrode laminate **10**. The width W.sub.33 of the opening **33** is not particularly limited. The width W.sub.33 is greater than the width W.sub.20. The width W.sub.33 may be the same as the width W.sub.31x. The width W.sub.33 may be smaller than the width W.sub.31y. The width W.sub.33 may be smaller than the width W.sub.10. In particular, when the width W.sub.33 of the opening **33** is 7.5 mm or more and 475 mm or less, or 30 mm or more and 195 mm or less, the strength of the terminal **30** is easily secured, and the width W.sub.20 of the current collector part **20**

is easily secured sufficiently.
[0110] The ratio H.sub.33/W.sub.33 of the height H.sub.33 to the width W.sub.33 of the opening **33** is not particularly limited. In particular, when the ratio H.sub.33/W.sub.33 is 0.01 or more and 13.3 or less, or 0.05 or more and 1.66 or less, the joinability of the current collector part **20** and the strength of the terminal **30** are likely to be excellent.
3.4 Other Features Regarding Terminal
[0111] As described above, the base **31** can have a thickness T.sub.31, and the protrusion **32** can have a thickness T.sub.32. The relationship between the thickness T.sub.31 of the base **31** and the thicknesses T.sub.32a and T.sub.32b of the first protrusion **32***a* and second protrusion **32***b* is not particularly limited. In particular, when the base **31** is thicker than the first protrusion **32***a* and second protrusion **32***b*, the structural efficiency around the terminal and the strength of the terminal are likely to be improved.
[0112] The relationship of the thickness T.sub.31 of the base **31** with the thicknesses T.sub.32c and T.sub.32d of the third protrusion **32***c* and fourth protrusion **32***d* is not particularly limited. In particular, when the base **31** is thicker than the third protrusion **32***c* and fourth protrusion **32***d*, the structural efficiency around the terminal and the strength of the terminal are likely to be improved.
[0113] As described above, in the battery **100**, the current collector part **20** is joined to the third surface **32***ax* of the first protrusion **32***a* and/or the fifth surface **32***bx* of the second protrusion **32***b* of the terminal **30**. In the battery **100**, the second surface **31***y* of the base **31** of the terminal **30** can function as, for example, a surface against which a probe for passing a large current through the battery **100** is pressed, or as a surface for connecting the batteries **100** to each other. In this respect, it can be said that the base **31** is a part which is more susceptible to impact from external members than the protrusion **32**. In the battery **100**, the current collector part **20** is joined to the protrusion **32**, which is a part that is less susceptible to impact from external members, and it can be said that this improves the impact resistance of the terminal **30** and the current collector part **20**.
[0114] FIGS. **2** and **3** show an aspect in which the current collector part **20** is connected to the third surface **32***ax* of the first protrusion **32***a* of the terminal **30**, but the configuration of the battery of the present disclosure is not limited to this. For example, as shown in FIG. **9**, the current collector part **20** may be connected to the fifth surface **32***bx* of the second protrusion **32***b* of the terminal **30**. Furthermore, as shown in FIG. **9**, the current collector part **20** may pass near the third surface **32***ax* and the first surface **31***x* and be joined to the fifth surface **32***bx*. "Pass near the third surface and the first surface" means that the current collector part **20** is not "joined" to the third surface **32***ax* and the first surface **31***x*. However, the current collector part **20** may be "in contact" with the third surface **32***ax* and the first surface **31***x*. "Near the third surface" and "near the first surface" refer to within 5 mm from each surface. Even in this case, as described above, it can be said that the impact resistance of the terminal **30** and the current collector part **20** is improved. Furthermore, when the current collector part **20** passes near the third surface **32***ax* and the first surface **31***x* and is joined to the fifth surface **32***bx*, the length of the current collector part **20** from the electrode laminate **10** to the joint **25** becomes longer, whereby tension in the current collector part **20** is suppressed and impact from the terminal **30** is less likely to be transmitted to the current collector part **20** and the electrode laminate **10**.
[0115] As shown in FIGS. **10** and **11**, the current collector part **20** may be joined to the first surface **31***x*. Also, as shown in FIG. **12**, the current collector part **20** may be joined to both the third surface **32***ax* and the fifth surface **32***bx*. Furthermore, as shown in FIG. **13**, the current collector part **20** may be joined to the first surface **31***x*, the third surface **32***ax*, and the fifth surface **32***bx*. It is believed that by joining the current collector part **20** to at least two surfaces of the terminal **30** as shown in FIGS. **10** to **13**, the impact resistance of the terminal **30** and the current collector part **20** is further improved.
[0116] FIGS. **2**, **3**, and **9** to **13** show an aspect in which a plurality of current collectors protruding from the side surface **10***z* of the electrode laminate **10** toward the terminal **30** are grouped to form

one bundle to constitute the current collector part **20**, but the aspect of the current collector part **20** is not limited to this. In the current collector part **20**, the plurality of current collectors protruding from the side surface **10***z* of the electrode laminate **10** toward the terminal **30** may be grouped to form a plurality of bundles. The bundles may be present in the thickness direction of the electrode laminate **10**, or may be present in the width direction of the electrode laminate **10**. The number of the bundles is not particularly limited. For example, as shown in FIG. **14**, the plurality of current collectors protruding from the side surface **10***z* of the electrode laminate **10** toward the terminal **30** may be grouped to form two bundles, one of which may be connected to the third surface **32***ax* of the first protrusion **32***a* of the terminal **30**, and the other of which may be connected to the fifth surface **32***bx* of the second protrusion **32***b* of the terminal **30**. In this manner, the plurality of current collectors protruding from the side **10***z* of the electrode laminate **10** toward the terminal **30** may be grouped to form a plurality of bundles, and the plurality of bundles may be joined to at least two surfaces of the terminal **30**. This configuration is thought to further improve the impact resistance of the terminal **30** and the current collector part **20**.

[0117] The terminal **30** including the base **31** and the protrusion **32** (as well as the opening **33**) can be produced by, for example, press molding a metal. For example, the base **31** and the protrusion **32** (as well as the opening **33**) may be formed by applying pressure to one surface of a metal member having a predetermined shape (for example, a rectangular parallelepiped) to form concavities and convexities.

[0118] The material of the terminal **30** may be appropriately selected taking into consideration sufficient electrical conductivity, appropriate heat capacity, appropriate mechanical strength, etc. For example, the material of the terminal **30** may be aluminum, copper, iron, nickel, or an alloy thereof. The terminal **30** may be a base material plated with any of the above metals or alloys thereof.

[0119] An insulating layer may be provided between the terminal **30** and the electrode laminate **10**. As a result, short circuits in the battery **100** can more easily be suppressed. For example, as shown in FIG. **15**, the protrusion **32** of the terminal **30** may have an insulating layer **36** on the end surface on the electrode laminate **10** side. For example, the insulating layer **36** can be formed on the end surface by applying or transferring an insulating resin material (for example, an ultraviolet-curing resin such as acrylic monomer/oligomer; thermosetting resin such as epoxy resin or imide resin; or thermoplastic resin such as polypropylene or polyethylene) to the end surface of the protrusion **32** of the terminal **30**, or by forming a layer composed of a metal oxide (for example, aluminum oxide) on the end surface by anodization or the like. The thickness of the insulating layer **36** is not particularly limited. When the insulating layer **36** is composed of an insulating resin material, the thickness may be, for example, 0.1 mm or more and 1.0 mm or less. Furthermore, when the insulating layer **36** is composed of a metal oxide formed by anodization or the like, the thickness thereof may be, for example, 0.01 mm or more and less than 0.10 mm.

4. Supplementary Information Regarding Arrangement of Electrode Laminate, Current Collector Part, and Terminal

[0120] In the battery **100**, the arrangement of the electrode laminate **10**, the current collector part **20**, and the terminal **30** is not particularly limited as long as the current collector part **20** protruding from the electrode laminate **10** is joined to a predetermined surface of the terminal **30**. Since a terminal **30** having the specific shape described above is adopted in the battery **100**, space around the terminal **30** and the current collector part **20** can easily be saved, and the connectivity of the current collector part **20** to the terminal **30** can easily be improved. An example of the arrangement of the electrode laminate **10**, the current collector part **20**, and the terminal **30** will be supplemented below.

4.1 Width of Terminal and Width of Current Collector Part

[0121] As described above, the current collector part **20** protruding from the electrode laminate **10** may be inserted into the opening **33** of the terminal **30** and connected to a predetermined surface of

the terminal **30**. When a large current flows through the current collector part **20** and the terminal **30**, heat can be generated in the current collector part **20** and the terminal **30**. According to the knowledge of the present inventors, the heat generation temperature around the terminal **30** and the current collector part **20** varies depending on the width of the current collector part **20** relative to the width of the terminal **30**. As shown in FIG. **3**, for example, when the ratio W.sub.20/W.sub.33 of the width W.sub.20 of the current collector part **20** to the width W.sub.33 of the opening **33** of the terminal **30** is 0.9 or more, the heat generation around the terminal **30** and the current collector part **20** can be suppressed particularly remarkably. Alternatively, when the ratio W.sub.20/W.sub.31x of the width W.sub.20 of the current collector part **20** to the inner width W.sub.31x of the base **31** of the terminal **30** (the width at the inner dimension of the first surface **31***x*) is 0.9 or more, heat generation around the terminal **30** and the current collector part **20** can be suppressed particularly remarkably.

4.2 Thickness of Electrode Laminate and Thickness of Terminal

[0122] The thickness T.sub.30 of the terminal **30** may be thicker than, equal to, or thinner than the thickness T.sub.10 of the electrode laminate **10**. In particular, as shown in FIG. **2**, when the thickness T.sub.30 of the terminal **30** is thinner than the thickness of the electrode laminate **10**, it becomes easier to further improve the adhesion between the exterior body and the terminal **30** by, for example, arranging a resin **35** between the laminate exterior body and the terminal **30**.

4.3 Joint Form Between Current Collector Part and Terminal

[0123] As described above, the current collector part **20** is joined to a specific surface of the terminal **30**. For example, the current collector part **20** may be joined to a specific surface of the terminal **30** to form a joint **25**. In an embodiment, the current collector part **20** may be ultrasonically joined or laser joined to one or both of the third surface **32***ax* and the fifth surface **32***bx*.

5. Other Members

[0124] The battery **100** can have obvious structures as a battery in addition to the above-mentioned electrode laminate **10**, current collector part **20**, and terminal **30**. For example, various members such as those disclosed in Patent Literature 1 (Japanese Unexamined Patent Publication (Kokai) No. 2023-084066) can be adopted as other members. Examples of other members provided in the battery **100** will be described below.

5.1 Exterior Body

[0125] The battery **100** can comprise an exterior body **40** for housing the electrode laminate **10** and the current collector part **20**. The exterior body may be a laminate exterior body composed of a laminate film or may be composed of a metal case. As shown in FIGS. **2** and **3**, the electrode laminate **10** and the current collector part **20** may be housed in a laminate exterior body, and the laminate exterior body may be adhered to a fourth surface **32***ay* of the first protrusion **32***a* and a sixth surface **32***by* of the second protrusion **32***b*.

[0126] The exterior body **40** may be, for example, a cylindrical body having an opening. Specifically, as shown in FIGS. **2** and **3**, the electrode laminate **10** and the current collector part **20** can be housed inside the cylindrical exterior body **40**, and the outer surface of the protrusion **32** of the terminal **30** can be adhered and sealed to the vicinity of the opening of the exterior body **40**. In this case, as shown in FIGS. **2** and **3**, the vicinity of the opening of the exterior body **40** and the protrusion **32** of the terminal **30** can be adhered to each other so as to overlap each other when viewed in the lamination direction in the electrode laminate **10**. This can improve the structural efficiency around the terminal **30** while increasing the sealing performance of the battery **100**.

[0127] As shown in FIG. **16**, the length L.sub.41 between the end surface (or opening **33**) of the protrusion **32** of the terminal **30** and the opening **41** of the exterior body **40** is not particularly limited. In particular, when the length L.sub.41 is 1.0 mm or more and 20 mm or less, or 3.0 mm or more and 15 mm or less, the balance between the sealing performance and the structural efficiency is likely to be suitable. Furthermore, the ratio L.sub.41/L.sub.32 of the length L.sub.41 to the

protrusion length L.sub.32 of the protrusion **32** is not particularly limited. In particular, when the ratio L.sub.41/L.sub.32 is 0.1 or more and 1.0 or less, or 0.5 or more and 1.0 or less, the balance between the sealing performance and the structural efficiency is likely to be suitable. When the exterior body **40** is a laminate exterior body, the laminate exterior body may be adhered to the outer surface of the protrusion **32** by heat sealing or the like, for example. Furthermore, when the exterior body **40** is a metal case, the metal case can be adhered to the outer circumferential surface of the protrusion **32** by, for example, welding or using an adhesive. As described above, the resin **35** may be arranged between the outer surface of the protrusion **32** and the exterior body **40**.

5.2 Busbar

[0128] The battery **100** may comprise a conductive member for connecting one battery to another. For example, in the battery **100**, a busbar may be connected to the terminal **30**. A plurality of batteries **100** may be combined to form a battery assembly.

6. Battery Production Method

[0129] The electrode laminate **10** and the current collector part **20** can be produced by known methods. The method of producing the terminal **30** and the method of joining the current collector part **20** to the terminal **30** are as described above. The method of housing and sealing the electrode laminate **10** and the like in the exterior body **40** is not particularly limited. As described above, known methods such as heat sealing the laminate exterior body can be adopted.

7. Applications

[0130] There are many applications for the battery **100**. For example, the battery **100** can be suitably used in at least one type of vehicle selected from a hybrid electric vehicle (HEV), a plug-in hybrid electric vehicle (PHEV), and a battery electric vehicle (BEV). Specifically, an aspect of the technology of the present disclosure relates to a vehicle having a battery **100**, the battery **100** having an electrode laminate **10**, a current collector part **20**, and a terminal **30**, the electrode laminate **10** being electrically connected to the terminal **30** via the current collector part **20**, the terminal **30** having a base **31** and a protrusion **32**, the base **31** having a first surface **31***x* facing the electrode laminate **10** and a second surface **31***y* opposite the first surface **31***x*, the protrusion **32** protruding from the base **31** toward the electrode laminate **10**, the protrusion **32** having a first protrusion **32***a* and a second protrusion **32***b*, the first protrusion **32***a* having a third surface **32***ax* facing the second protrusion **32***b* and a fourth surface **32***ay* opposite the third surface **32***ax*, the second protrusion **32***b* having a fifth surface **32***bx* facing the first protrusion **32***a* and a sixth surface **32***by* opposite the fifth surface **32***bx*, the current collector part **20** being joined to one or both of the third surface **32***ax* and the fifth surface **32***bx*.

DESCRIPTION OF REFERENCE SIGNS

[0131] **100** battery [0132] **10** electrode laminate [0133] **20** current collector part [0134] **25** joint [0135] **30** terminal [0136] **31** base [0137] **31***x* first surface [0138] **31***y* second surface [0139] **32** protrusion [0140] **32***a* first protrusion [0141] **32***ax* third surface [0142] **32***ay* fourth surface [0143] **32***b* second protrusion [0144] **32***bx* fifth surface [0145] **32***by* sixth surface [0146] **32***c* third protrusion [0147] **32***cx* seventh surface [0148] **32***cy* eighth surface [0149] **32***d* fourth protrusion [0150] **32***dx* ninth surface [0151] **32***dy* tenth surface [0152] **33** opening [0153] **35** resin [0154] **36** insulating layer [0155] **40** exterior body [0156] **41** opening

Claims

1. A battery, comprising an electrode laminate, a current collector part, and a terminal, wherein the electrode laminate is electrically connected to the terminal via the current collector part, the terminal comprises a base and a protrusion, the base has a first surface facing the electrode laminate and a second surface opposite the first surface, the protrusion protrudes from the base toward the electrode laminate, the protrusion comprises a first protrusion and a second protrusion, the first protrusion has a third surface facing the second protrusion and a fourth surface opposite the

third surface, the second protrusion has a fifth surface facing the first protrusion and a sixth surface opposite the fifth surface, and the current collector part is joined to one or both of the third surface and the fifth surface.

2. The battery according to claim 1, wherein the current collector part is joined to the first surface.

3. The battery according to claim 1, wherein the current collector part is joined to both the third surface and the fifth surface.

4. The battery according to claim 1, wherein the current collector part passes near the third surface and the first surface and is joined to the fifth surface.

5. The battery according to claim 1, wherein the base is thicker than the first protrusion and the second protrusion.

6. The battery according to claim 1, wherein the protrusion comprises a third protrusion and a fourth protrusion, the third protrusion has a seventh surface facing the fourth protrusion and an eighth surface opposite the seventh surface, and the fourth protrusion has a ninth surface facing the third protrusion and a tenth surface opposite the ninth surface.

7. The battery according to claim 6, wherein the base is thicker than the third protrusion and the fourth protrusion.

8. The battery according to claim 6, wherein a planar shape of the base is a rectangle, the rectangle comprises a first side and a second side facing each other and a third side and a fourth side facing each other, the first protrusion protrudes from the first side, the second protrusion protrudes from the second side, the third protrusion protrudes from the third side, and the fourth protrusion protrudes from the fourth side.

9. The battery according to claim 6, wherein the planar shape of the base is an elongated rectangle, the first protrusion protrudes from one long side of the elongated rectangle, the second protrusion protrudes from another long side of the elongated rectangle, the third protrusion protrudes from one short side of the elongated rectangle, and the fourth protrusion protrudes from another short side of the elongated rectangle.

10. The battery according to claim 9, wherein a lamination direction in the electrode laminate is along the short sides, and a width direction of the electrode laminate is along the long sides.

11. The battery according to claim 1, wherein the protrusion protrudes from an outer edge of the base.

12. The battery according to claim 1, wherein a ratio of a width of the current collector part to an inner width of the base is 0.9 or more.

13. The battery according to claim 1, wherein a thickness of the base is less than a protrusion length of the protrusion.

14. The battery according to claim 1, wherein a thickness of the terminal is less than a thickness of the electrode laminate.

15. The battery according to claim 1, wherein the protrusion has an insulating layer at an end surface on the electrode laminate side.

16. The battery according to claim 1, wherein the electrode laminate and the current collector part are housed in a laminate exterior body, and the laminate exterior body is adhered to the fourth surface and the sixth surface.