CLAIMS

1. A battery sealing structure, comprising a battery plate-like member and a pair of frames for holding a peripheral portion of said battery plate-like member therebetween, for sealing a space between said frames,

said pair of frames being pressed from the front and the rear,

said pair of frames being provided with an annular groove between respective surfaces of said frames facing each other in a pressing direction, for accommodating the peripheral portion of said battery plate-like member,

said battery sealing structure comprising an annular packing made of an elastic material, said packing being arranged in said annular groove and press-contacted between said pair of frames and the peripheral portion of said battery plate-like member,

said packing including

a pair of legs for holding the peripheral portion of said battery plate-like member therebetween, and

a base connecting the legs together at an outer edge of said battery plate-like member.

2. The battery sealing structure according to claim 1, wherein

at least one of said legs of said packing includes a projection on one or both of an outer surface facing said frames and an inner surface facing said battery plate-like member.

3. The battery sealing structure according to claim 1, wherein

at least one of said legs of said packing includes a root portion extending linearly from said base, and at least one bent portion formed between this root portion and a tip.

4. The battery sealing structure according to any one of claims 1 to 3, wherein

said base of said packing includes a projection on at least one of front and rear surfaces facing said pair of frames.

5. An electrolyte circulation type battery cell frame, comprising a battery plate-like member and a pair of frames for holding a peripheral portion of said battery plate-like member therebetween,

said battery plate-like member being a bipolar plate,

said electrolyte circulation type battery cell frame comprising the battery sealing structure according to any one of claims 1 to 4.

6. An electrolyte circulation type battery cell stack, comprising a stacked body including a plurality of cells stacked with cell frames interposed therebetween, each cell including a membrane, and a positive electrode and a negative electrode facing each other with the membrane interposed therebetween,

said cell frame being the electrolyte circulation type battery cell frame according to claim 5,

said electrolyte circulation type battery cell stack comprising:

a pair of end plates arranged on opposite ends of said stacked body; and

a clamping mechanism for clamping both of said end plates in a stacking direction of said stacked body.

7. An electrolyte circulation type battery, comprising the electrolyte circulation type battery cell stack according to claim 6.

8. The electrolyte circulation type battery according to claim 7, being a redox flow battery.

Dated this 13th day of August 2013

Of Anand and Anand Advocates
Agent for the Applicant

SUMITOMO ELECTRIC INDUSTRIES, LTD.
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ORIGINAL

8 Sheets
Sheet 1

FIG.1

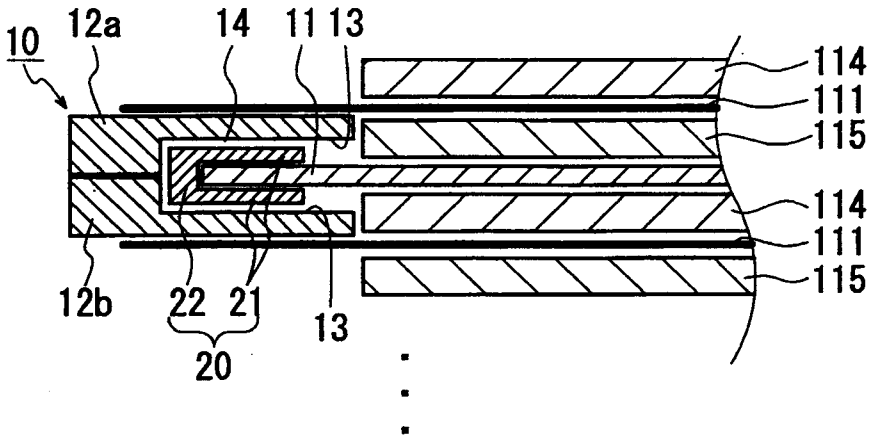

FIG.2

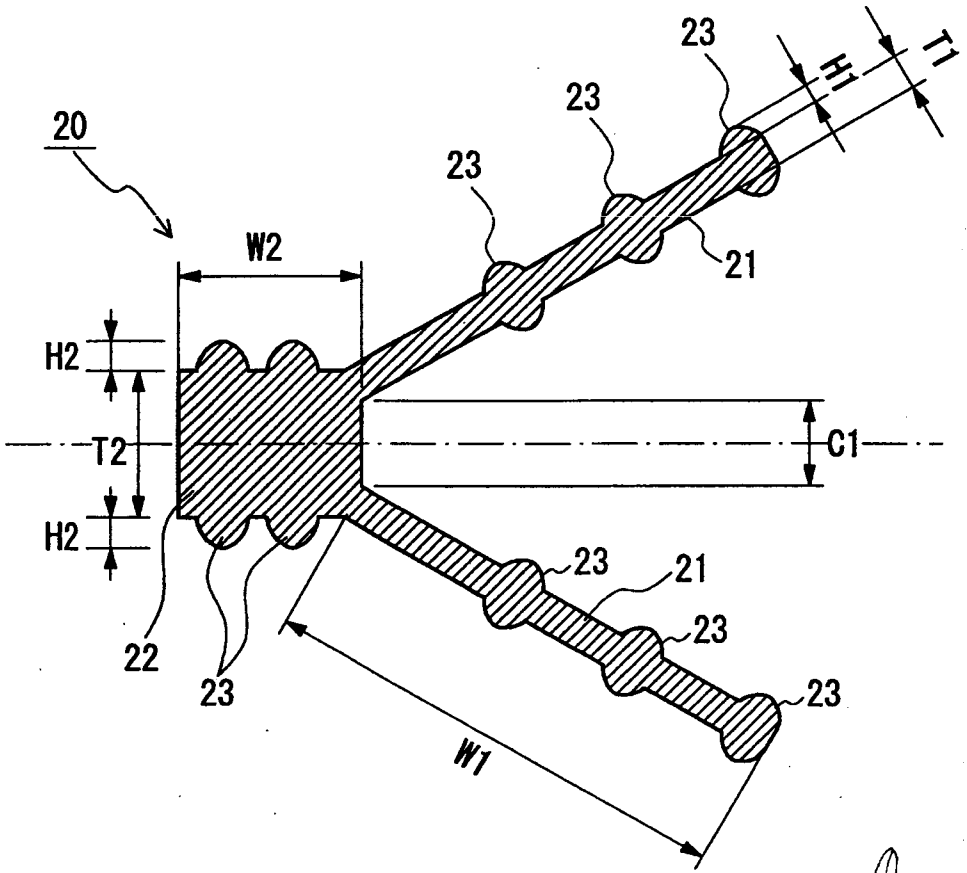

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FIG.3

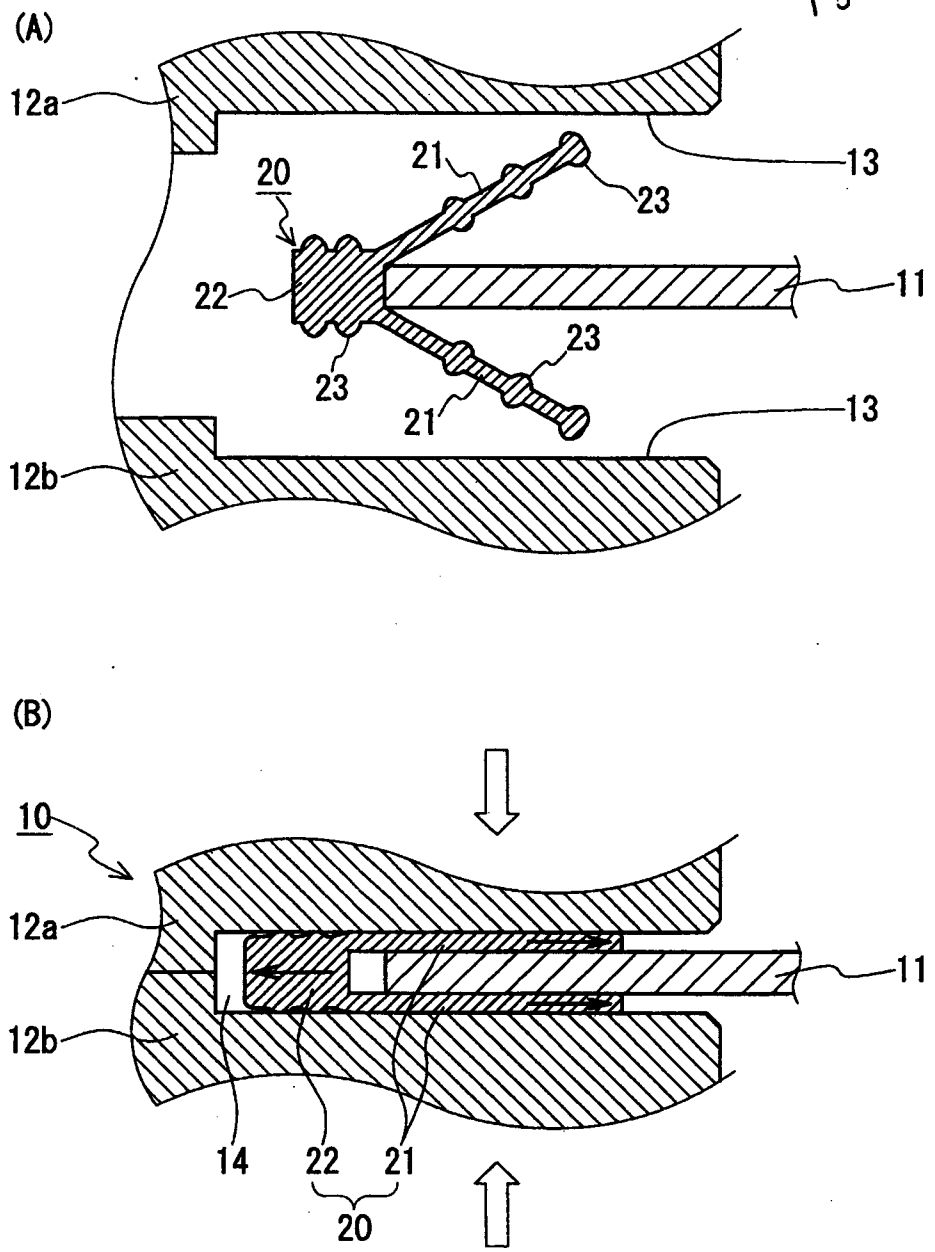

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FIG.4

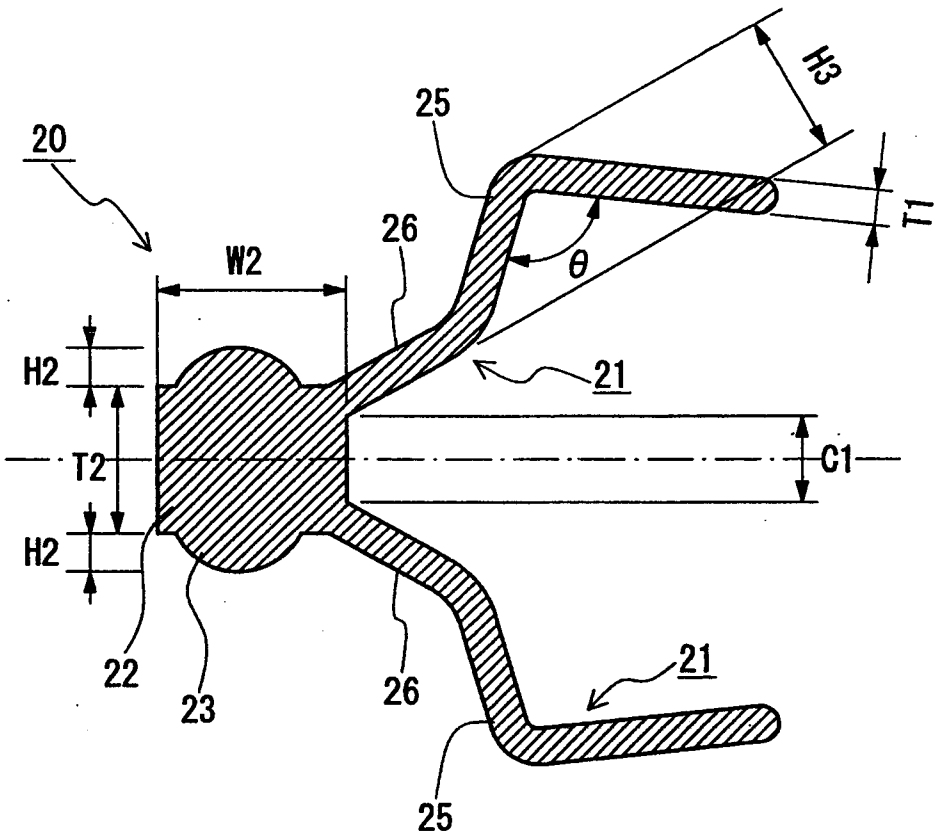

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FIG.5

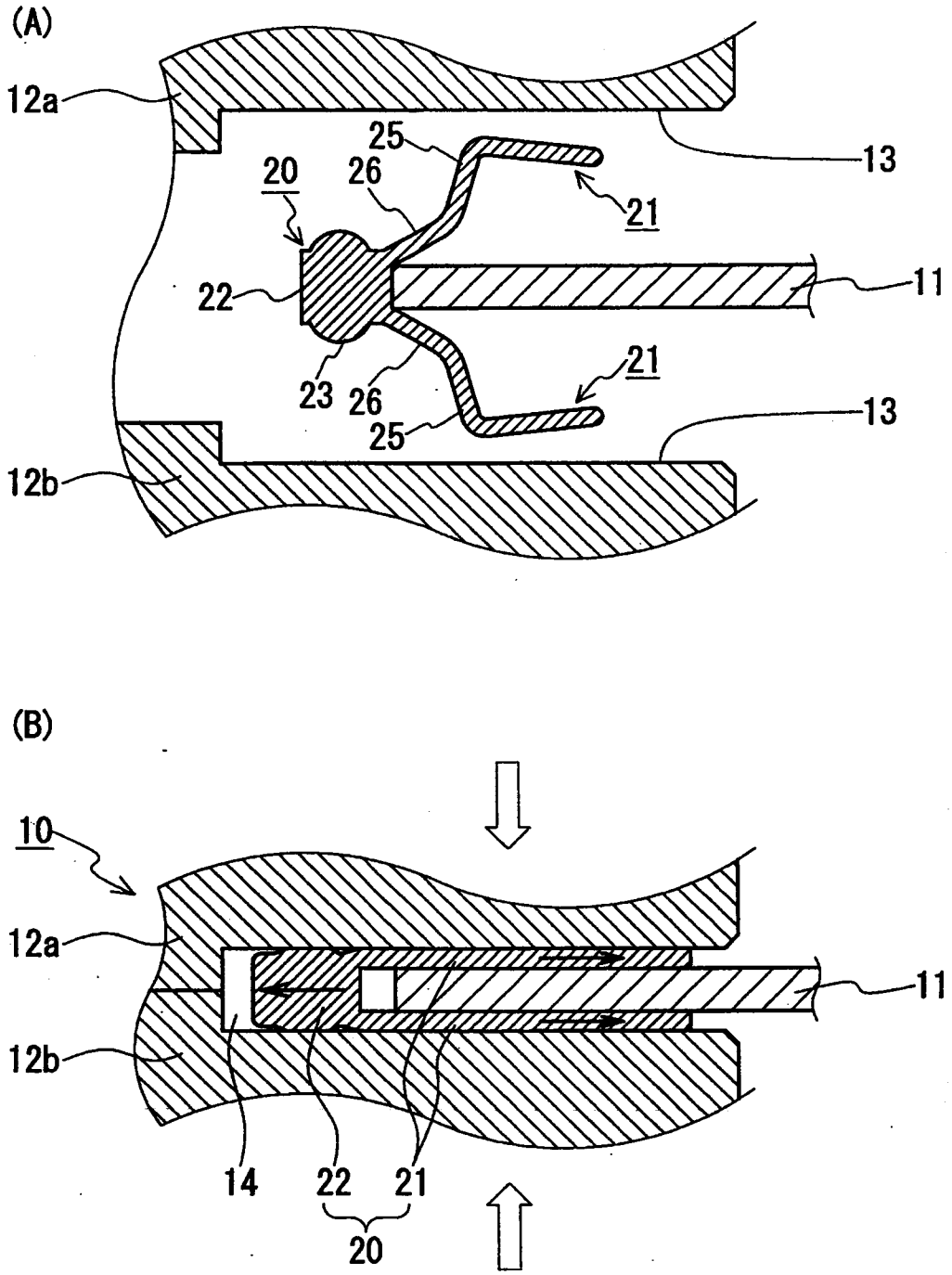

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FIG.6

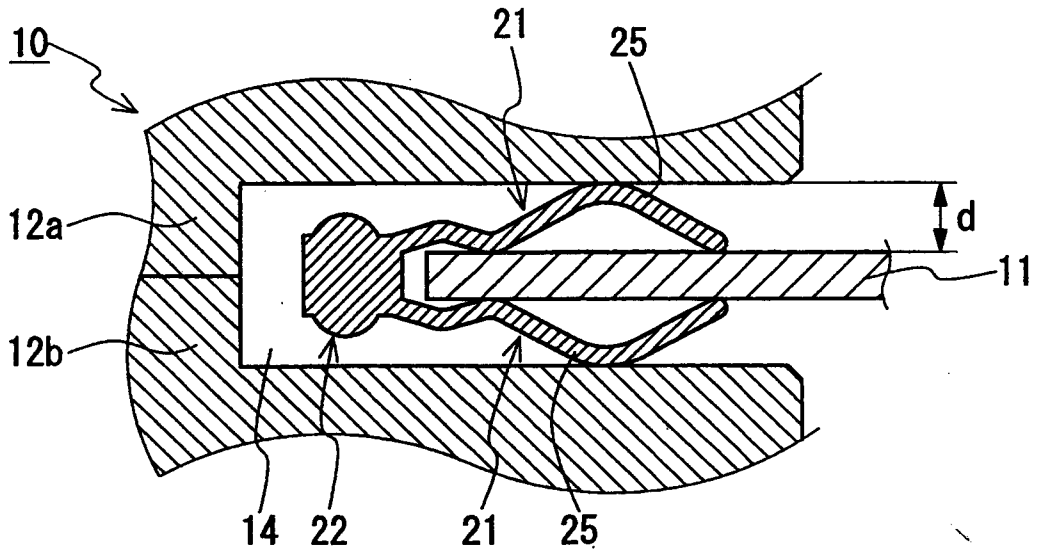

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FIG.7

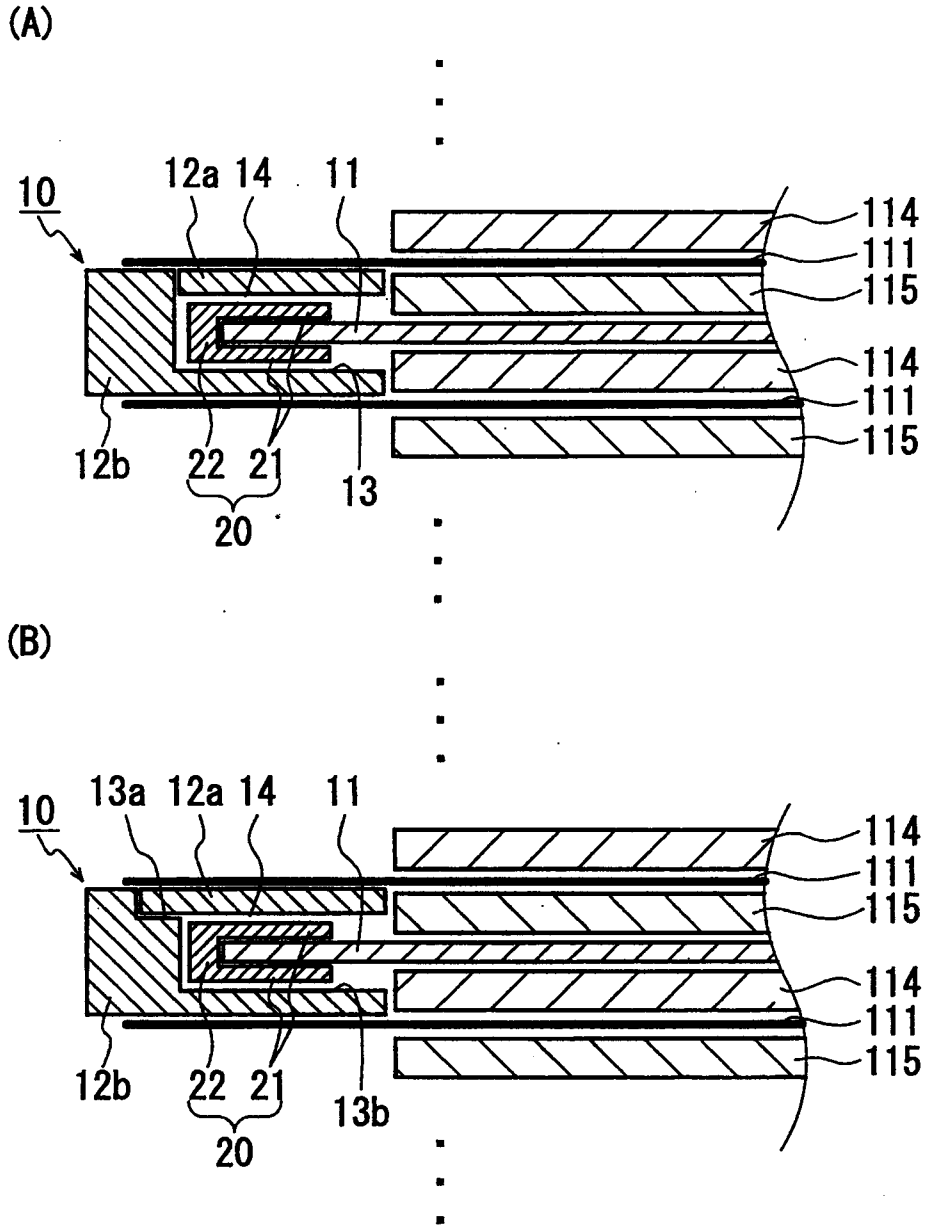

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FIG.8

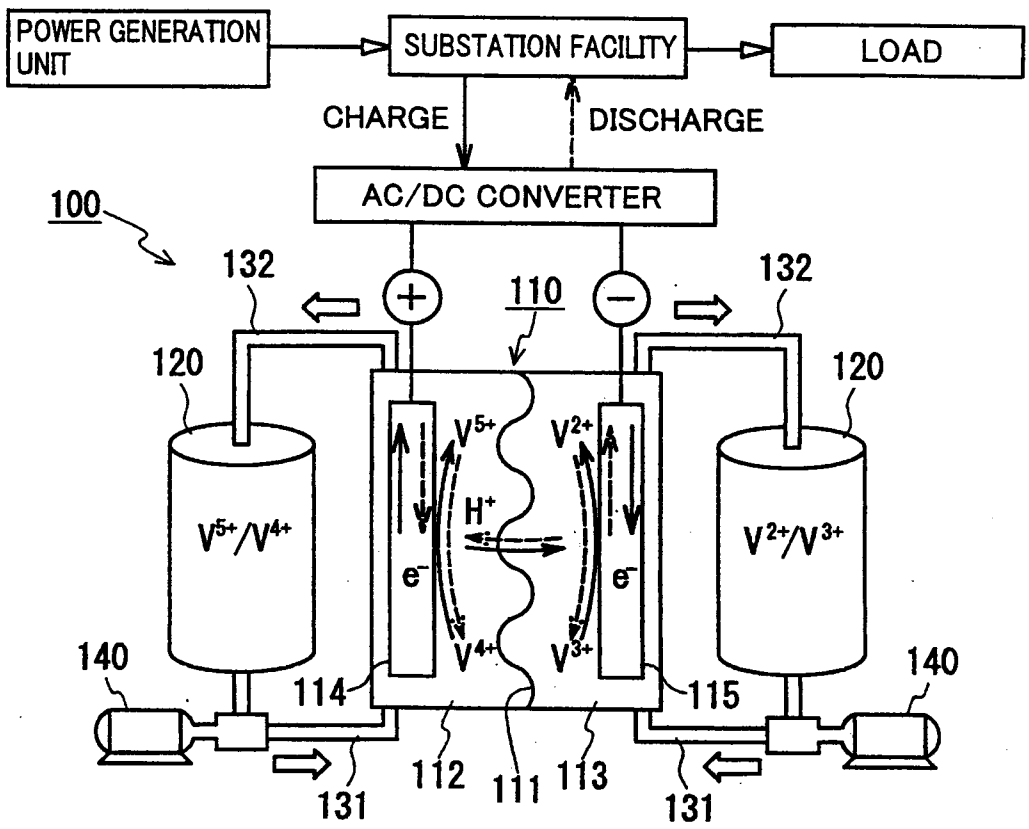

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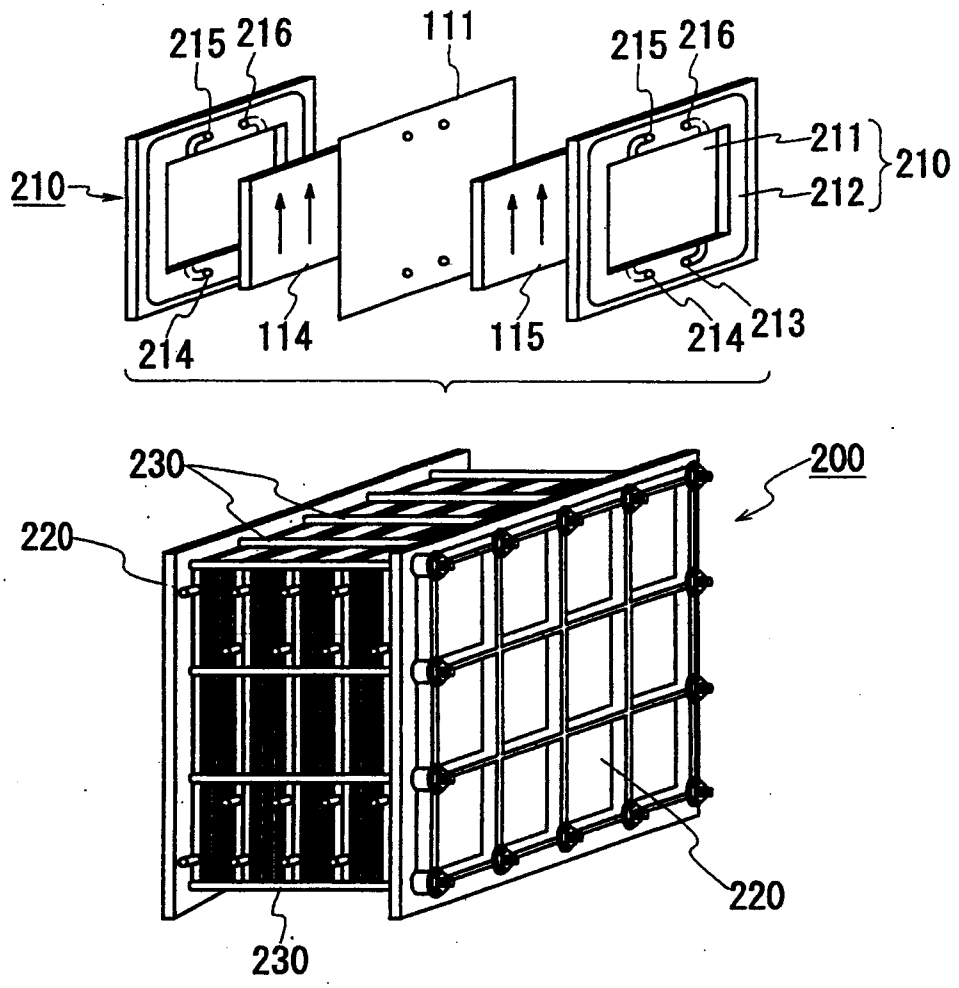
FIG.9



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DESCRIPTION

TITLE OF INVENTION

Battery Sealing Structure, Electrolyte Circulation Type Battery Cell Frame, Electrolyte Circulation Type Battery Cell Stack, and Electrolyte Circulation Type Battery

TECHNICAL FIELD

The present invention relates to an easy-to-assemble battery sealing structure, and an electrolyte circulation type battery cell frame, an electrolyte circulation type battery cell stack and an electrolyte circulation type battery including this battery sealing structure.

BACKGROUND ART

An electrolyte circulation type battery such as a redox flow battery is one of large-capacity storage batteries. In a redox flow battery, a positive electrolyte and a negative electrolyte are supplied to a cell having a membrane and a positive electrode and a negative electrode facing each other with the membrane interposed therebetween, to charge and discharge the battery. For the electrolytes, an aqueous solution containing a metal ion whose valence varies by oxidation-reduction is commonly used. As the redox flow batteries, for example, an iron-chromium-based redox flow battery using an iron ion aqueous solution for the positive electrolyte and a chromium ion aqueous solution for the negative electrolyte, and a vanadium-based redox flow battery using a vanadium ion aqueous solution for the positive and negative electrolytes are well-known (see e.g., Patent Documents 1 to 3).

Fig. 8 is a schematic diagram for illustrating an electrolyte circulation type battery (redox flow battery). A redox flow battery 100 includes a cell 110. Cell 110 is partitioned into a positive electrode cell 112 and a negative electrode cell 113 by a membrane 111 through which ions can pass. Positive electrode cell 112 contains a positive electrode 114, and negative electrode cell 113 contains a negative electrode 115. Redox flow battery 100 further includes, for each of the positive electrode and