Claims

[Claim 1]

An electrolytic cell comprising: a cathode main wall component, a cathode plate fixed to an inner surface of the cathode main wall component, an anode main wall component, and an anode plate fixed to an inner surface of the anode main wall component, with using electrolysis at the cathode plate and the anode plate, wherein

the cathode main wall component includes a plurality of the upper flow paths extending respectively from a plurality of the upper openings arranged at intervals in a width direction in the upper end part of the inner surface, and a plurality of the lower flow paths extending respectively from a plurality of the lower openings arranged at intervals in the width direction in the lower end part of the inner surface,

the anode main wall member includes a plurality of the upper flow paths extending respectively from a plurality of the upper openings arranged at intervals in the width direction in the upper end part of the inner surface, and a plurality of the lower flow paths extending respectively from a plurality of the lower openings arranged at intervals in the width direction in the lower end part of the inner surface,

the cathode plate extends continuously from above the upper opening of the cathode main wall component to below the lower opening of the cathode main wall component,

the cathode plate includes a plurality of the upper through openings in its upper end part that are formed in alignment with the plurality of respective upper openings in the cathode main wall component, and a plurality of the lower through openings in its lower end part that are formed in alignment with the plurality of respective lower openings in the cathode main wall component,

the anode plate extends continuously from above the upper opening of the anode main wall component to below the lower opening of the anode main wall component, and

the anode plate includes a plurality of the upper through openings in its upper end part that are formed in alignment with a plurality of respective the upper openings in the anode main wall component, and a plurality of the lower through openings in its lower end part that are formed in alignment with a plurality of respective the lower openings in the anode main wall component.

[Claim 2]

The electrolytic cell according to claim 1, wherein

the upper opening and the lower opening in the cathode main wall component and the upper through opening and the lower through opening in the cathode plate are circular in cross-section, and

the upper opening and the lower opening in the anode main wall component and the upper through opening and the lower through opening in the anode plate are circular in cross-section.

[Claim 3]

The electrolytic cell according to claim 1 or 2, wherein the cathode plate and the anode plate are formed of a rectangular plate.

[Claim 4]

The electrolytic cell according to any one of claims 1 to 3, further comprising:

a gasket interposed between the cathode main wall component and the cathode plate, the gasket including a plurality of the upper communicating opening through which each of the upper opening in the cathode main wall component and each of the upper through opening in the cathode plate

communicate with each other, and a plurality of the lower communicating opening through which each of the lower opening in the cathode main wall component and each of the lower through opening in the cathode plate communicate with each other; and

a gasket interposed between the anode main wall component and the anode plate, the gasket including a plurality of the upper communicating opening through which each of the upper opening in the anode main wall component and each of the upper through opening in the anode plate communicate with each other, and a plurality of the lower communicating opening through which each of the lower opening in the anode main wall component and each of the lower through opening in the anode plate communicate with each other.

[Claim 5]

An electrolytic cell comprising: a cathode main wall component, a cathode plate fixed to an inner surface of the cathode main wall component, an anode main wall component, and an anode plate fixed to an inner surface of the anode main wall member, with using electrolysis at the cathode plate and the anode plate, wherein

the cathode main wall component includes at least one upper flow path extending from an upper opening located in an upper end part of the inner surface and at least one lower flow path extending from a lower opening located in a lower end part of the inner surface,

the anode main wall component includes at least one upper flow path extending from an upper opening located in an upper end part of the inner surface and at least one lower flow path extending from a lower opening located in a lower end part of the inner surface,

the cathode plate extends continuously from above the upper opening of the cathode main wall component to below

the lower opening of the cathode main wall component,

the cathode plate includes at least one upper through opening in its upper end part that is formed in alignment with the upper opening in the cathode main wall component, and at least one lower through opening in its lower end part that is formed in alignment with the lower opening in the cathode main wall component,

the anode plate extends continuously from above the upper opening of the anode main wall component to below the lower opening of the anode main wall component,

the anode plate includes at least one upper through opening in its upper end part that is formed in alignment with the upper opening in the anode main wall component, and at least one lower through opening in its lower end part that is formed in alignment with the lower opening in the anode main wall component,

a gasket is interposed between the cathode main wall component and the cathode plate, the gasket including an upper communicating opening through which the upper opening in the cathode main wall component and the upper through opening in the cathode plate communicate with each other, and a lower communicating opening through which the lower opening in the cathode main wall component and the lower through opening in the cathode plate communicate with each other;

and

a gasket is interposed between the anode main wall component and the anode plate, the gasket including an upper communicating opening through which the upper opening in the anode main wall component and the upper through opening in the anode plate communicate with each other, and a lower communicating opening through which the lower opening in the anode main wall component and the lower through opening in the anode plate communicate with each other.

[Claim 6]

The electrolytic cell according to claim 4 or 5, wherein the upper communicating opening is larger than the upper opening and the upper through opening, and the lower communicating opening is larger than the lower opening and the lower through opening.

[Claim 7]

The electrolytic cell according to claim 6, wherein the upper opening, the upper through opening, the upper communicating opening, the lower opening, the lower through opening, and the lower communicating opening are circular in cross-section.

[Claim 8]

The electrolytic cell according to claim 6 or 7, further comprising a covering member attached to the upper through opening and the lower through opening in each of the cathode plate and the anode plate, the covering member covering an inner peripheral surface of each of the upper through opening and the lower through opening and a region that is adjacent to each of the upper through opening and the lower through opening on a reverse side of each of the cathode plate and the anode plate and is not covered with the gasket.

[Claim 9]

The electrolytic cell according to claim 8, wherein the covering member includes a tube portion to be inserted in each of the upper through opening and the lower through opening and a flange portion that protrudes from a back end of the tube portion.

[Claim 10]

The electrolytic cell according to claim 9, wherein

the tube portion of the covering member is cylindrical in shape, and the upper opening, the upper through opening, the upper communicating opening, the lower opening, the lower through opening, and the lower communicating opening are circular in cross-section,

the upper through opening and the lower through opening have an inner diameter larger than an inner diameter of the upper opening and the lower opening by twice a thickness of the tube portion of the covering member, and the tube portion of the covering member has an inner diameter the same as the inner diameter of the upper opening and the lower opening,

the tube portion has a length the same as an each thickness of the cathode plate and the anode plate,

the flange portion of the covering member is annular in shape and has an outer diameter the same as an inner diameter of the upper communicating opening and the lower communicating opening, and

the flange portion has a thickness the same as a thickness of the gasket.

[Claim 11]

The electrolytic cell according to any one of claims 8 to 10, wherein the covering member is made of a synthetic resin.