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Reserve power supply with electrode plates clipping with auxiliary conductors

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ABSTRACT

The present invention relates to one or more electrode plates, which are installed with collecting current terminals at two or more sides thereof, clipping with an auxiliary conductor made of the material with conductivity better than that of the electrode plates; in which collecting current terminals are installed at two or more sides of the auxiliary conductor, for linking with the collecting current terminals installed at two or more sides of the electrode plates, and at least one of which are used to be the general collecting current terminal to output current to the external part or to receive the input current from the external part; and there are insulators installed between the auxiliary conductor and the electrode plates to constitute an electrode unit.

20102464461 01 Jun 2016

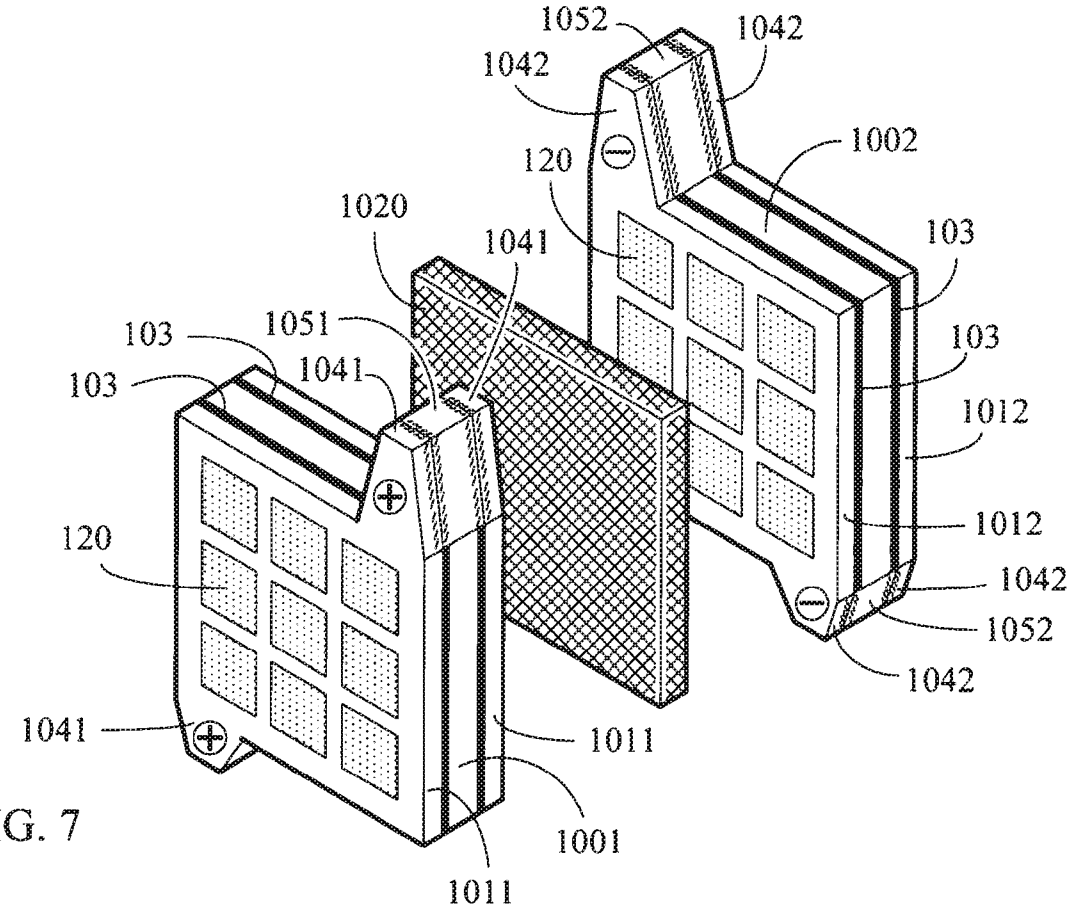


FIG. 7

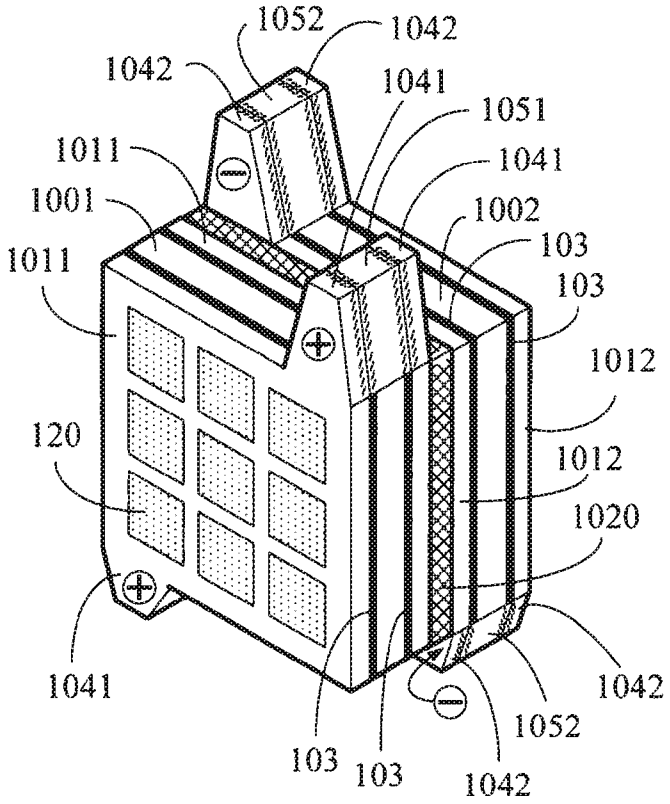


FIG. 8

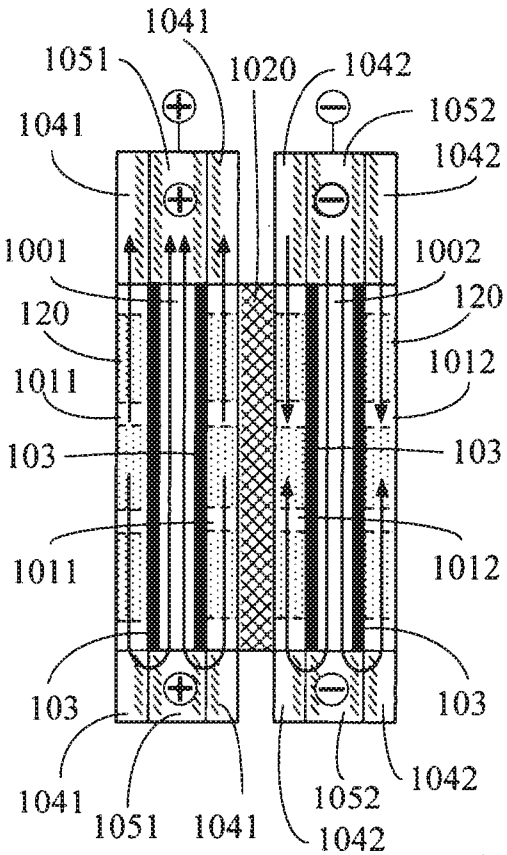


FIG. 9

201024646461 01 Jun 2016

TITLE: RESERVE POWER SUPPLY WITH ELECTRODE PLATES JOINED TO AUXILIARY CONDUCTORS

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a reserve power supply with electrode plates joined to auxiliary conductors, wherein one or more electrode plates, which are installed with current collecting terminals at two or more sides thereof, are joined with an auxiliary conductor having a flat, strip, or mesh structure and made of a material and/or structure with a conductivity that is higher than that of the electrode plates. The current collecting terminals are installed at two or more sides of the auxiliary conductor, so that the auxiliary conductor terminals can be unilaterally or multilaterally parallel connected with current collecting terminals installed at two or more sides of the electrode plates, and which are to be used as general current current collecting terminals to output current to an external part or to receive input current from the external part. Insulators are installed between the auxiliary conductor and the electrode plates to constitute an electrode unit. The number of the above general current collecting terminals for inputting/outputting the collection current is one or more.

(b) Description of the Prior Art

The conventional reserve power supply, which may include a variety of primary batteries, rechargeable batteries, capacitors, or super capacitors, has an electrode plate that is usually installed with one or more current collecting terminals of same polarity on a single side. FIG. 1 is a schematic view showing an embodiment of the conventional electrode plate unilaterally installed with a current collecting terminal, in which each electrode plate (P100) is unilaterally installed with a current collecting terminal (T100) for the electrode plate performing the current

collecting function of inputting/outputting current, or for connecting with another electrode plate in series or parallel; because the electrode plate is only unilaterally installed with a current collecting terminal for inputting/outputting current, the current density on the electrode plate is uneven at the electrode plate region of the neighboring current collecting terminal, another side of the electrode plate, and the electrode plate region more far away from the current collecting terminal (T100) when large currents are input or output. If two or more current collecting terminals are installed at the same side of the electrode plate, which is more progressive, the electrode plate will have two or more pathways for inputting/outputting current, and two or more current collecting terminals with same polarity that are linked in parallel through a conductor, but providing same side terminals only improves the uniformity of the input/output current density on the same side, and is useless with respect to the uneven input/output current density at another side of the electrode plate.

In addition, one or more current collecting terminals, which are individually outwardly extended, are installed at two or more sides of the electrode plate to provide a further improvement. FIG. 2 is a schematic view showing an embodiment, in which the two sides of the electrode plate are individually installed with a current collecting terminals; or one or more sides of the electrode plate (P100) are installed with two or more current collecting terminals (T100) for forming two or more pathways for inputting/outputting current to reduce the resistance. FIG. 3 is a schematic view showing two current collecting terminals installed at each of the opposite sides of the electrode plate. Although the embodiments shown in FIG. 2 and FIG. 3 improve the uniformity of the input/output current density, they are still inconvenient to use with input/output terminals installed at the two sides.

201024646 1 01 Jun 2016

SUMMARY OF THE INVENTION

The present invention relates to a reserve power supply with electrode plates joined to auxiliary conductors to form positive and negative electrodes of reserve power supplies such as primary batteries, rechargeable batteries, capacitors, or super capacitors, or of fuel cells with electrode plates. The above device is installed with anode auxiliary conductors, in which one or more anode electrode plates are installed with at least one current collecting terminal at each of two or more sides thereof and joined to an anode auxiliary conductor having a flat shape, strip, or mesh structure and made of a material and/or structure with conductivity higher than that of the electrode plates. At least one current collecting terminal is installed at each of two or more sides of the anode auxiliary conductor, for unilateral or multilateral parallel linking with the current collecting terminals installed at two or more sides of the anode electrode plates, and which are used provide a general current collecting anode terminal to output current to an external part or to receive input current from the external part. Insulators are installed between the anode auxiliary conductor and the anode electrode plates to constitute a positive electrode unit; and the number of the above anode general current collecting terminals for inputting/outputting the collection current is one or more.

Also, the above device is installed with cathode auxiliary conductors, in which one or more cathode electrode plates are installed with at least one current collecting terminal at each of two or more sides thereof and joined to an cathode auxiliary conductor having a flat shape, strip, or mesh structure and made of a material and/or structure with a conductivity higher than that of the electrode plates; and in which at least one current collecting terminal is installed at each of two or more sides of the cathode auxiliary conductor for unilateral or multilateral parallel linking with the current collecting terminals installed at two or more sides of the cathode

electrode plates, the linked terminals being used as general current collecting cathode terminals to output current to the external part or to receive input current from the external part with insulators being installed between the cathode auxiliary conductor and the cathode electrode plates to constitute a negative electrode unit. The number of the above-described general current collecting cathode terminals for inputting/outputting the collection current may be one or more.

According to one aspect, the present invention provides an electrode unit for a reserve power supply, including: at least two electrode plates having at least one current collecting terminal extending from each of at least two sides of the electrode plate, said electrode plate having an active surface on which is coated an active substance; and at least one auxiliary conductor for installing between two electrode plates, having a conductivity higher than a conductivity of the electrode plate, said auxiliary conductor having at least one current collecting terminal extending from each of at least two sides of the auxiliary conductor; and an insulator sandwiched between each electrode plate and the auxiliary conductor and joined to the electrode plate and two sides of the auxiliary conductor to form said electrode unit, wherein said at least one current collecting terminal extending from each of at least two sides of the electrode plate and said at least one current collecting terminal extending from each of at least two sides of the auxiliary conductor are electrically connected to form at least two common input/output terminals on opposite sides of the electrode unit.

According to another aspect, the present invention provides a reserve power supply, including: an anode unit that includes: at least two anode electrode plates having at least one current collecting anode terminal extending from each of at least two sides of the anode electrode plate , said anode electrode plate having an anode active surface on which is coated an active anode substance; and at least one anode auxiliary conductor for installing between two anode electrode plates, having a conductivity higher than a conductivity of the anode electrode plate, said anode auxiliary conductor having at least one current collecting anode terminal extending from each of at least two sides of the anode auxiliary

conductor; and an anode unit insulator sandwiched between each anode electrode plate and the anode auxiliary conductor and joined to the anode electrode plate and two sides of the anode auxiliary conductor to form the anode unit, wherein said at least one current collecting anode terminal extending from each of at least two sides of the anode electrode plate and said at least one current collecting anode terminal extending from each of at least two sides of the anode auxiliary conductor are electrically connected to form common input/output terminals on the two sides the anode unit; a cathode unit that includes: at least two cathode electrode plates having at least one current collecting cathode terminal extending from each of at least two sides of the cathode electrode plate, said cathode electrode plate having a cathode active surface on which is coated an active cathode substance; and at least one cathode auxiliary conductor for installing between two cathode electrode plates, having a conductivity higher than a conductivity of the cathode electrode plate, said cathode auxiliary conductor having at least one current collecting cathode terminal extending from each of at least two sides of the cathode auxiliary conductor; and a cathode unit insulator sandwiched between each cathode electrode plate and the cathode auxiliary conductor and joined to the cathode electrode plate and two sides of the cathode auxiliary conductor to form the cathode unit, wherein said at least one current collecting cathode terminal extending from each of at least two sides of the cathode electrode plate and said at least one current collecting cathode terminal extending from each of at least two sides of the cathode auxiliary conductor are electrically connected to form at least one common input/output terminals on the two sides of the cathode unit; and a separator sandwiched between and joined to the anode unit and the cathode unit to form an integrated electrode pair, said integrated electrode pair being installed in an electrode tank of said reserve power supply.

According to another aspect, the present invention provides a reserve power supply including winding type electrode unit, including: at least two anode side electrode plates, said at least two anode side electrode plates each having an anode active surface on which is coated an anode active substance; and at least one anode side auxiliary conductor sandwiched between respective anode side insulator layers, said at least

one anode side auxiliary conductor and insulator layers being further sandwiched between said at least two anode side electrode plates and said at least one anode side auxiliary conductor having a conductivity higher than a conductivity of the at least two anode side electrode plates; at least two cathode side electrode plates, said at least two cathode side electrode plates each having a cathode active surface on which is coated a cathode active substance; and at least one cathode side auxiliary conductor sandwiched between respective cathode side insulator layers, said at least one cathode side auxiliary conductor and insulator layers being further sandwiched between the at least two cathode side electrode plates and said at least one cathode side auxiliary conductor having a conductivity higher than a conductivity of the at least two cathode side electrode plates; and a first separator sandwiched between a first one of said at least two anode side electrode plates and a first one of said at least two cathode side electrode plates; and a second separator sandwiched between a second one of said at least two anode side electrode plates and a second one of said at least two cathode side electrode plates, wherein said at least two anodes side electrode plates, at least two cathode side electrode plates, and respective said first and second separators are alternately wound in a spiral configuration to form a winding type electrode unit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view showing an embodiment of a conventional electrode plate unilaterally installed with a current collecting terminal;

FIG. 2 is a schematic view showing an embodiment of a conventional electrode plate installed with a current collecting terminal at each of two sides;

FIG. 3 is a schematic view showing an embodiment of a conventional electrode plate installed with two current collecting terminals at each of the opposite sides;

FIG. 4 is a schematic view showing three-dimensional structure of an electrode unit constituted by an auxiliary conductor, in which at least one current collecting terminal is installed at each of at least two sides thereof,

and joined to two electrode plates with a same polarity, and in which at least one current collecting terminal is installed at each of at least two lateral sides of the auxiliary conductor, and an insulator is sandwiched therein according to the present invention;

FIG. 5 is a front view of FIG. 4;

FIG. 6 is a side view of FIG. 4;

FIG. 7 is a schematic exploded view showing an embodiment, in which an electrode pair of a reserve power supply is constituted by a positive electrode unit composed of two anode electrode plates (1011) joined to an anode auxiliary conductor (1001), a negative electrode unit composed of two cathode electrode plates (1012) joined to a cathode auxiliary conductor (1002), and an separator sandwiched therein.

FIG. 8 is a schematic view showing an embodiment including a combination of the electrode pairs constituting the reserve power supply shown in FIG. 7;

FIG. 9 is a schematic view showing the reserve power supply constituted by the electrode pairs shown in FIG. 8 and the current paths thereof;

FIG. 10 is a schematic view showing an embodiment including a combination of two negative electrode units joined to a positive electrode unit at two sides thereof, according to the present invention;

FIG. 11 is a schematic view showing an embodiment including a combination of two positive electrode units joined to a negative electrode unit at two sides thereof, according to the present invention;

FIG. 12 is a schematic view showing a second embodiment including a combination of two negative electrode units joined to a positive electrode unit at two sides thereof, according to the present invention;

FIG. 13 is a schematic view showing the second embodiment including a combination of two positive electrode units joined to a negative electrode unit at two sides thereof, according to the present

invention;

FIG. 14 is a schematic view showing an embodiment including a further combination of at least two negative electrode units and at least two positive electrode units placed in a staggered arrangement for unilaterally or bilaterally parallel connecting same polarity units in an electrode tank, in which an anode input/output general current collecting terminal 1051 of the positive electrode unit and a cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current, according to the present invention;

FIG. 15 is a schematic view showing a second embodiment including a combination of electrode units with same polarity for unilateral or bilateral parallel connection in an electrode tank, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for inputting/outputting current, according to the present invention;

FIG. 16 is a schematic view showing a third embodiment including a combination of at least two negative electrode units and at least two positive electrode units placed in a staggered arrangement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portions, are used as general current collecting terminals for inputting/outputting current, according to the present invention;

FIG. 17 is a three-dimensional schematic view showing the exploded structure of FIG. 16;

FIG. 18 is a three-dimensional schematic view showing the

composition of FIG. 16;

FIG. 19 is a schematic view showing an embodiment including a combination of electrode pairs constituted by positive and negative electrodes for staggered parallel superposition, in which the positive-negative electrode pairs are joined according to the present invention;

FIG. 20 is a schematic view showing a second embodiment that includes a combination of negative electrode units and positive electrode units for staggered placement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for inputting/outputting current;

FIG. 21 is a schematic view showing a third embodiment including a combination of negative electrode units and positive electrode units for staggered placement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current;

FIG. 22 is a schematic view showing a combination of electrode pairs constituted by at least one positive electrode unit and at least one negative electrode unit, and in which a monolithic positive polarity electrode plate, and a monolithic negative polarity electrode plate, are in staggered superposition, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portion, are used as general current collecting terminals for inputting/outputting current;

FIG. 23 is a schematic view showing an embodiment in which a

number of electrode pairs constituted by positive-negative electrode units are placed in individual electrode tanks or cells 1030 and unilaterally or multilaterally connected in series by different polarities;

FIG. 24 is a schematic view showing a second embodiment of the combination shown in FIG. 23, in which the anode input/output general current collecting terminal and the cathode input/output general current collecting terminal, which are used to input/output current, are exposed to the outside of the tank shell of the electrode tank 1030, and in which the other current collecting terminals are hidden within the electrode tank 1030;

FIG. 25 is a schematic view showing an embodiment in which a number of electrode pairs constituted by positive-negative electrode units are placed in individual electrode tanks or cells 1030 and unilateral or multilateral connected in series by different polarities;

FIG. 26 is a schematic view showing a second embodiment of the combination shown in FIG. 25, in which current terminals used to input/output current are exposed to the outside of the tank shell, and the other current collecting terminals are hidden within the electrode tank 1030;

FIG. 27 is a three-dimensional structural schematic view showing an electrode unit constituted by an auxiliary conductor, in which two input/output current collecting terminals are installed at each of two sides thereof, and which is joined to electrode plate(s) with a same polarity, in which two current collecting terminals are installed at each of two sides thereof according to the present invention;

FIG. 28 is a front view of FIG. 27;

FIG. 29 is a side view of FIG. 27;

FIG. 30 is a three-dimensional structural schematic view showing an electrode unit constituted by an auxiliary conductor, in which a current collecting terminal is installed at each of four sides thereof, the auxiliary

conductor joined to electrode plate(s) with a same polarity, in which a current collecting terminal is also installed at each of four sides thereof according to the present invention;

FIG. 31 is a front view of FIG. 30;

FIG. 32 is a side view of FIG. 30;

FIG. 33 is a three-dimensional structural schematic view showing an electrode unit constituted by an auxiliary conductor, in which two current collecting terminals are installed at each of four sides thereof, the auxiliary conductor joined to electrode plate(s) with a same polarity, in which two current collecting terminals are installed at each of four sides thereof according to the present invention;

FIG. 34 is a front view of FIG. 33;

FIG. 35 is a side view of FIG. 33;

FIG. 36 is a schematic structural view showing an embodiment in which the conductor is radial and the electrode unit has a grid layout, according to the present invention;

FIG. 37 is a front view of FIG. 36;

FIG. 38 is a side view of FIG. 36;

FIG. 39 is a schematic structural view showing an embodiment in which the electrode unit is plate type, according to the present invention;

FIG. 40 is a front view of FIG. 39;

FIG. 41 is a side view of FIG. 39;

FIG. 42 is a schematic view showing an embodiment in which the electrode unit is used in a winding type reserve power supply, according to the present invention;

FIG. 43 is a top view of FIG. 42; and

FIG. 44 is a side view of FIG. 42.

DESCRIPTION OF MAIN COMPONENT SYMBOLS

P100: Electrode plate

201024646l 01 Jun 2016

T100: Current collecting terminal

100: Auxiliary conductor

101: Side electrode plate

103: Insulator

104: Current collecting terminal

105: Input/output general current collecting terminal

120: Active substance

601: Current collecting terminal of the monolithic anode electrode plate 1031

602: Current collecting terminal of the monolithic cathode electrode plate 1032

1001: Anode auxiliary conductor

1002: Cathode auxiliary conductor

1011: Anode side electrode plate

1012: Cathode side electrode plate

1020: separator

1030: Electrode tank

1031: Monolithic anode electrode plate

1032: Monolithic cathode electrode plate

1041: Anode current collecting terminal

1042: Cathode current collecting terminal

1051: Anode input/output general current collecting terminal

1052: Cathode input/output general current collecting terminal

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A conventional reserve power supply, which may include a variety of primary batteries, rechargeable batteries, capacitors, or super capacitors, includes an electrode plate usually installed with one or more current collecting terminals having a same polarity at a single side. FIG. 1 is a schematic view showing an embodiment of a conventional electrode plate

unilaterally installed with a current collecting terminal, in which each electrode plate (P100) is unilaterally installed with a current collecting terminal (T100) to perform a current collecting function of inputting/outputting current, or for connecting with another electrode plate in series or parallel. Because the electrode plate is only unilaterally installed with a current collecting terminal for inputting/outputting current, the current density on the electrode plate is uneven at the electrode plate region of the neighboring current collecting terminal and the electrode plate region farther away from the current collecting terminal (T100) when large currents are input or output. If two or more current collecting terminals are installed at same side of the electrode plate, which is more progressive, the electrode plate will have two or more pathways for inputting/outputting current, and two or more current collecting terminals with same polarity linked in parallel through a conductor; but this two terminal, same side arrangement only improve the uniformity of the input/output current density on one side, and is useless with respect to the uneven input/output current density at the other side of the electrode plate.

To provide improved uniformity, one or more current collecting terminals, which are individually outward extended, may be installed at two or more sides of the electrode plate. FIG. 2 is a schematic view showing an embodiment in which the two sides of the electrode plate are individually installed with a current collecting terminals; or one or more sides of the electrode plate (P100) are installed with two or more current collecting terminals (T100) for forming two or more pathways for inputting/outputting current to reduce the resistance, and FIG. 3 is a schematic view showing two current collecting terminals installed at each of the opposite sides of the electrode plate. Although the arrangements shown in FIG. 2 and FIG. 3 improve the uniformity of the input/output current density, the arrangements are still inconvenient to use with input/output terminals installed at the two sides.

The present invention relates to a reserve power supply with electrode plates joined to auxiliary conductors, wherein one or more electrode plates are installed with at least one current collecting terminal at each of two or more sides thereof, and which are joined to an auxiliary conductor having a flat shape, strip, or mesh structure, the auxiliary conductor being made of a material and/or structure with higher conductivity than that of the electrode plates; and in which at least one current collecting terminal is installed at each of two or more sides of the auxiliary conductor, for unilateral or multilateral parallel linking with the current collecting terminals installed at two or more sides of the electrode plates, the linked terminals being used as general current collecting terminals to output current to an external part or to receive the input current from the external part. Furthermore, according to the invention, insulators installed between the auxiliary conductor and the electrode plates to constitute an electrode unit, and the number of the above general current collecting terminals for inputting/outputting the collection current is one or more.

FIG. 4 is a schematic view showing a three-dimensional structure of a electrode unit constituted by an auxiliary conductor, in which at least one current collecting terminal is installed at each of at least two sides thereof, and joined to two electrode plates with same polarity, in which at least one current collecting terminal is installed at each of at least two sides thereof and on two sides of the auxiliary conductor, with an insulator sandwiched therein, respectively, according to the present invention.

FIG. 5 is a front view of FIG. 4.

FIG. 6 is a side view of FIG. 4.

As shown in FIG. 4, FIG. 5, and FIG. 6, the mainly structural figure is installed with an auxiliary conductor 100, wherein one or more side electrode plates 101 are installed with at least one current collecting terminal 104 at two or more sides thereof, and coated with active

substance 120 on the surface of the electrode plate, the electrode plates 101 being joined to the auxiliary conductor 100 which has a flat shape, strip, or mesh structure, and is made of the material and/or structure with a conductivity higher than that of the electrode plates. At least one input/output general current collecting terminal 105 is installed at each of two or more sides of the auxiliary conductor 100, for unilateral or multilateral parallel linking with the current collecting terminals installed at two or more sides of the side electrode plates, and which are used as general current collecting terminals to output current to an external part or to receive input current from the external part. An insulator 103 is installed between the auxiliary conductor 100 and the side electrode plate 101 to constitute an electrode unit and the number of the general current collecting terminals 105 for inputting/outputting the collection current is one or more.

The reserve power supply with electrode plates joined to auxiliary conductors may be applied to primary batteries, rechargeable batteries, capacitors, or super capacitors, or to a positive-negative electrode pair required for the fuel cell with electrode plate(s).

FIG. 7 is a schematic exploded view showing an embodiment, in which an electrode pair of a reserve power supply is constituted by two anode electrode plates (1011) joined to an anode auxiliary conductor (1001), two cathode electrode plates (1012) joined to a cathode auxiliary conductor (1002), and an separator sandwiched therein.

FIG. 8 is a schematic view showing an embodiment that includes an electrode pair constituting the reserve power supply shown in FIG. 7.

FIG. 9 is a schematic view showing the reserve power supply constituted by the electrode pair shown in FIG. 8 and the current paths thereof.

As shown in FIG. 7, FIG. 8, and FIG. 9, an anode auxiliary conductor 1001 has one or more anode side electrode plates 1011, which are

installed with at least one anode current collecting terminal 1041 at two or more sides thereof, and coated with an active substance 120 on the surface of the electrode plate, the electrode plates 1011 being joined to the anode auxiliary conductor 1001, which has a flat shape, strip, or mesh structure and is made of a material and/or structure with conductivity higher than that of the electrode plates. In this embodiment, at least one anode input/output general current collecting terminal 1051 is installed at each of two or more sides of the anode auxiliary conductor 1001, for unilateral or multilateral parallel linking with the anode current collecting terminals installed at two or more sides of the anode side electrode plates, and which are used as anode general current collecting terminals to output current to the external part or to receive input current from the external part An insulator 103 is installed between the anode auxiliary conductor 1001 and the anode side electrode plate 1011 to constitute a positive electrode unit; and the number of the anode input/output general current collecting terminal 1051 for inputting/outputting the collection current is one or more.

Also, one or more cathode side electrode plates 1012 are installed with at least one cathode current collecting terminal 1042 at two or more sides thereof, and coated with the active substance 120 on the surface of the electrode plate, the cathode electrode plates being joined to the cathode auxiliary conductor 1002, which has a flat shape, strip, or mesh structure, and is made of a material and/or structure having a conductivity higher than that of the electrode plates. At least one cathode input/output general current collecting terminal 1052 is installed at each of two or more sides of the cathode auxiliary conductor 1002, for unilateral or multilateral parallel linking with the cathode current collecting terminals installed at two or more sides of the cathode side electrode plates, and which are used as cathode general current collecting terminals to output current to the external part or to receive the input current from the external

part. An insulator 103 is installed between the cathode auxiliary conductor 1002 and the cathode side electrode plate 1012 to constitute a negative electrode unit; and the number of the cathode input/output general current collecting terminal 1052 for inputting/outputting the collection current is one or more.

The positive electrode unit integrated with the negative electrode unit is installed in an electrode tank for constituting the electrode pair.

FIG. 10 is a schematic view showing an embodiment including two negative electrode units joined to a positive electrode unit at two sides thereof, according to the present invention; in which:

the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit; and

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminal 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; the cathode input/output general current collecting terminals 1052 of

the two negative electrode units are installed at two sides of the positive electrode unit for unilateral or multilateral parallel connection; and isolation bodies 1020 are installed between the two sides of the positive electrode unit and the two negative electrode units, respectively.

The positive electrode unit integrated with the negative electrode unit is installed in an electrode tank for constituting the electrode pair.

FIG. 11 is a schematic view showing an embodiment of combination of two positive electrode units joined to a negative electrode unit at two sides thereof, according to the present invention; in which:

the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminal 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the anode input/output general current collecting terminals 1051 of

the two positive electrode units are installed at two sides of the negative electrode unit for unilateral or multilateral parallel connection; and isolation bodies 1020 are installed between the two sides of the negative electrode unit and the two positive electrode units, respectively.

The positive electrode unit integrated with the negative electrode unit is installed in an electrode tank for constituting the electrode pair.

FIG. 12 is a schematic view showing the second embodiment of combination of two negative electrode units joined to a positive electrode unit at two sides thereof, according to the present invention; in which:

the negative electrode unit is constituted by the cathode side electrode plate 1012 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at the lateral thereof; the cathode current collecting terminals 1042 placed at two sides of the cathode side electrode plate 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminal 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the cathode input/output general current collecting terminals 1052 of

the two negative electrode units are installed at two sides of the positive electrode unit for unilateral or multilateral parallel connection; and isolating bodies 1020 are installed between the two sides of the positive electrode unit and the two negative electrode units, respectively, with the thus integrated positive and negative electrode units being installed in an electrode tank.

FIG. 13 is a schematic view showing a second embodiment including a combination of two positive electrode units joined to a negative electrode unit at two sides thereof, according to the present invention; in which the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with an active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by the anode side electrode plate 1011 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at the lateral thereof; the anode current collecting terminal 1041 placed at two sides of the anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the anode input/output general current collecting terminals 1051 of

the two positive electrode units are installed at two sides of the negative electrode unit for unilateral or multilateral parallel connection; and isolating bodies 1020 are installed between the two sides of the negative electrode unit and the two positive electrode units, respectively.

The positive electrode unit integrated with the negative electrode unit is installed in an electrode tank for constituting the electrode pair.

FIG. 14 is a schematic view showing an embodiment that includes at least two negative electrode units and at least two positive electrode units placed in a staggered arrangement for unilateral or bilateral parallel connecting same polarity units in an electrode tank, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portion, are used as general current collecting terminals for inputting/outputting current, according to the present invention; in which

the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plates, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two

sides thereof; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

at least two negative electrode units and at least two positive electrode units are placed in staggered fashion in an electrode tank 1030, in which: the anode input/output general current collecting terminals 1051 of the positive electrode units are used for unilateral or bilateral parallel connecting same polarity anode units, the cathode input/output general current collecting terminals 1052 of the negative electrode units are used for unilateral or bilateral parallel connecting same polarity ones of the cathode units, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portion, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

FIG. 15 is a schematic view showing a second embodiment that includes a combination of electrode units with same polarity for unilateral or bilateral parallel connection in an electrode tank, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for inputting/outputting current, according to the present invention; in which: at least two negative electrode units and at least two positive electrode units are placed in a staggered arrangement;

the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the

intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plates, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

at least two negative electrode units and at least two positive electrode units are staggered placed in the electrode tank 1030, in which: the anode input/output general current collecting terminals 1051 of the positive electrode units are used for unilateral or bilateral parallel connecting same polarity positive electrode units, the cathode input/output general current collecting terminals 1052 of the negative electrode units are used for unilateral or bilateral parallel connecting the same polarity negative electrode units, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

FIG. 16 is a schematic view showing a third embodiment that

includes a combination of at least two negative electrode units and at least two positive electrode units placed in a staggered arrangement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current, according to the present invention; in which:

the negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

the positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plates, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

at least two negative electrode units and at least two positive electrode units are placed in staggered fashion in the electrode tank 1030, in which: the anode input/output general current collecting terminals 1051

of the positive electrode units are used for unilateral or bilateral parallel connecting the corresponding same polarity units, the cathode input/output general current collecting terminals 1052 of the negative electrode units are used for unilateral or bilateral parallel connecting the corresponding same polarity units, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

FIG. 17 is a three-dimensional schematic view showing the exploded structure of FIG. 16.

FIG. 18 is a three-dimensional schematic view showing the composition of FIG. 16.

Another structural mode of the present invention is shown as FIG. 19, which is a schematic view showing an embodiment that includes a combination of electrode pairs constituted by positive and negative electrodes for staggered parallel superposition, in which the positive-negative electrode pair with input/output general current collecting terminals is joined therein, according to the present invention; in which, the positive electrode unit on one side is constituted by the auxiliary conductor 1001 joined to the anode side electrode plate 1011 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the anode side electrode plate 1011; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit;

the negative electrode unit placed at another side is constituted by the

cathode auxiliary conductor 1002 joined to the cathode side electrode plate 1012 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the cathode side electrode plate 1012; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two cathode side electrode plates 1012 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof, and the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two anode side electrode plates 1011 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof, and the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the above negative electrode units and positive electrode units are placed in staggered arrangement to form electrode pairs in which a negative electrode unit and a positive electrode unit, placed at two sides,

are placed in the electrode tank 1030, and the separator 1020 is installed between the positive and negative electrode units in a staggered placement, in which: the anode input/output general current collecting terminal 1051 of each positive electrode unit is unilateral or multilateral connected with same polarity, the cathode input/output general current collecting terminal 1052 of each negative electrode unit is unilateral or multilateral connected with a same polarity, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current.

Another structural mode of the present invention is shown as FIG. 20, which is a schematic view showing a second embodiment including a combination of negative electrode units and positive electrode units for staggered placement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for inputting/outputting current; in which, the positive electrode unit placed at one side is constituted by the auxiliary conductor 1001, which is joined to the anode side electrode plate 1011 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the anode side electrode plate 1011; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit;

the negative electrode unit placed at another lateral is constituted by the cathode auxiliary conductor 1002 placed at lateral joined to the

cathode side electrode plate 1012 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the cathode side electrode plate 1012; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two cathode side electrode plates 1012 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and clip with the cathode auxiliary conductor 1002 at two sides thereof, and the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two anode side electrode plates 1011 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof, and the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the above negative electrode units and positive electrode units are placed in a staggered arrangement for constituting the electrode pairs, the negative electrode unit and the positive electrode unit, placed at two sides, being placed in the electrode tank 1030, and the separator 1020 being

installed between the positive and negative electrode units, which are also in staggered placement, in which: the anode input/output general current collecting terminals 1051 placed at two sides of each positive electrode unit coated with the active substance 120 on the electrode plate are unilateral or multilateral connected with same polarity, the cathode input/output general current collecting terminals 1052 placed at two sides of each negative electrode unit are unilateral or multilateral connected with same polarity, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at two sides, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

Another structural mode of the present invention is shown as FIG. 21, which is a schematic view showing a third embodiment that includes a combination of negative electrode units and positive electrode units for staggered placement, in which the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current; in which, the positive electrode unit placed at one side is constituted by the auxiliary conductor 1001 joined to the anode side electrode plate 1011 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the anode side electrode plate 1011; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit;

the negative electrode unit placed at another side is constituted by the

cathode auxiliary conductor 1002 joined to the cathode side electrode plate 1012 coated with the active substance 120 on the surface of the electrode plate, wherein the insulator 103 is installed between the intermediate section of the auxiliary conductor and the cathode side electrode plate 1012; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two cathode side electrode plates 1012 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and clip with the cathode auxiliary conductor 1002 at two sides thereof, and the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

two anode side electrode plates 1011 are coated with the active substance 120 on each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof, and the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plate1 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the above negative electrode units and positive electrode units are in a staggered placement for constituting the electrode pairs, the negative electrode unit and the positive electrode unit, placed at two sides, are

placed in the electrode tank 1030, and the separator 1020 is installed between the positive and negative electrode units, which are also in staggered placement, in which: the anode input/output general current collecting terminal 1051 of each positive electrode unit coated with the active substance 120 on the electrode plate is unilateral or multilateral connected with same polarity, the cathode input/output general current collecting terminal 1052 of each negative electrode unit is unilateral or multilateral connected with same polarity, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portion, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

The present invention is further shown as FIG. 22, which is a schematic view showing a combination constituted by at least one positive electrode unit and at least one negative electrode unit, in which a monolithic positive polarity electrode plate and a monolithic negative polarity electrode plate are in staggered superposition, and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at an intermediate portion, are used as general current collecting terminals for inputting/outputting current; in which:

at least one negative electrode unit is constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the

cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

at least one positive electrode unit is constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plates, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

the negative electrode unit and the positive electrode unit are respectively staggered with one or more monolithic electrode plate units and placed in the electrode tank 1030, in which, the monolithic anode electrode plate 1031 and the monolithic cathode electrode plate 1032 are coated with the active substance 120 on the electrode plates, and are placed in a staggered arrangement at two sides of the positive electrode unit and the negative electrode unit by polarity; the isolating bodies 1020 are installed between the positive electrode unit, the negative electrode unit, the monolithic anode electrode plate 1031, and the monolithic cathode electrode plate 1032, respectively; the anode input/output general current collecting terminals 1051 of the positive electrode units, and the current collecting terminals 601 of the monolithic anode electrode plate 1031 are used for unilateral or multilateral parallel connecting same polarity ones of the corresponding plates; the cathode input/output general current collecting terminals 1052 of the negative electrode units, and the current collecting terminal 602 of the monolithic cathode electrode plate 1032 are used for unilateral or multilateral parallel connecting same

polarity ones of the corresponding plates; and the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, placed at intermediate portion, are used as general current collecting terminals for the anodes and cathodes inputting/outputting current.

The present invention is further shown as FIG. 23, which is a schematic view showing an embodiment of combination, in which a number of electrode pairs constituted by positive-negative electrode units placed in individual electrode tanks or cells 1030 are unilateral or multilateral connected in series by different polarities; in which:

at least two negative electrode units are constituted by two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

at least two positive electrode units are constituted by two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plates, wherein the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit; and

at least one or more negative electrode units and at least one or more positive electrode units are staggered placed for constituting the electrode pairs, and the isolating bodies 1020 are installed between each electrode unit for being placed in the same electrode tank or cell 1030; wherein if there are more than one electrode units with same polarity placed in the same electrode tank or 1030, the current collecting terminals of the electrode units with same polarity are mutually unilateral or multilateral parallel connected; and in which, the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, which constitute the electrode pair in each electrode tank or cell 1030, are exposed to the outside of the tank shell of the electrode tank or cell 1030, for unilateral or multilateral connection in series with the electrode pair in a different electrode tank 1030 by different polarity; and wherein in different electrode tanks or cells 1030, the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit in the electrode pair after being connected in series are used as anode and cathode general current collecting terminals for inputting/outputting current after the connected in series.

FIG. 24 is a schematic view showing the second embodiment of combination shown in FIG. 23, in which except for the anode input/output general current collecting terminal and the cathode input/output general current collecting terminal, which are used to input/output current, are exposed to the outside of the tank shell of the electrode tank 1030, the other current collecting terminals are hidden within the electrode tank 1030.

As shown in FIG. 24, in which the anode input/output general current collecting terminal and the cathode input/output general current collecting terminal used to input/output current are exposed to the outside of the tank

shell of the electrode tank 1030, and the other current collecting terminals are hidden within the electrode tank 1030, and the other compositions are same as that of FIG. 23.

FIG. 25 is a schematic view showing an embodiment that includes a combination, in which a number of electrode pairs constituted by positive-negative electrode units placed at individual electrode tank 1030 are unilateral or multilateral connected in series by different polarity.

As shown in FIG. 25, the positive electrode unit in the electrode tank 1030 for inputting/outing the anode current after being connected in series is constituted by the anode auxiliary conductor 1001 placed at one side, in which the insulator 103 is installed between the intermediate section of the auxiliary conductor and the anode side electrode plate 1011, and joined to the anode side electrode plate 1011; the anode current collecting terminals 1041 placed at two sides of the anode side electrode plate 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit;

two cathode side electrode plates 1012 coated with the active substance 120 on the surface of each electrode plate, in which the insulator 103 is installed between the intermediate section of the electrode plate and the cathode auxiliary conductor 1002, and joined to the cathode auxiliary conductor 1002 at two sides thereof; the cathode current collecting terminals 1042 placed at two sides of each of two cathode side electrode plates 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit;

if there are more than one electrode units with same polarity placed in the electrode tank 1030, the current collecting terminals of the electrode units with same polarity are mutually unilateral or multilateral parallel connected;

also, the negative electrode unit in another electrode tank 1030 for inputting/outing the cathode current after connected in series is constituted by the cathode auxiliary conductor 1002 placed at the lateral, in which the insulator 103 is installed between the intermediate section of the auxiliary conductor and the cathode side electrode plate 1012, and joined to the cathode side electrode plate 1012 coated with the active substance 120 on the surface of the electrode plate; the cathode current collecting terminal 1042 placed at two sides of the cathode side electrode plate 1012 link with the cathode input/output general current collecting terminals 1052 placed at two sides of the cathode auxiliary conductor 1002 to constitute the negative electrode unit placed at lateral;

two anode side electrode plates 1011 coated with the active substance 120 on the surface of each electrode plate, in which the insulator 103 is installed between the intermediate section of the electrode plate and the anode auxiliary conductor 1001, and joined to the anode auxiliary conductor 1001 at two sides thereof; the anode current collecting terminals 1041 placed at two sides of each of two anode side electrode plates 1011 link with the anode input/output general current collecting terminals 1051 placed at two sides of the anode auxiliary conductor 1001 to constitute the positive electrode unit;

if there are more than one electrode units with same polarity placed in the electrode tank 1030, the current collecting terminals of the electrode units with same polarity are mutually unilateral or multilateral parallel connected;

at least one or more negative electrode units and at least one or more positive electrode units are staggered placed for constituting the electrode pairs placed in the individual electrode tank 1030 connected in series, and the isolating bodies 1020 are installed between each electrode unit for being placed in the same electrode tank 1030; if there are more than one electrode units with same polarity placed in the same electrode tank 1030,

the current collecting terminals of the electrode units with same polarity are mutually unilateral or multilateral parallel connected; in which:

the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit, which constitute the electrode pair in each electrode tank 1030 connected in series, are unilateral or multilateral connected in series with the electrode pair in different electrode tank 1030 by different polarity; in different electrode tanks, the anode input/output general current collecting terminal 1051 of the positive electrode unit and the cathode input/output general current collecting terminal 1052 of the negative electrode unit in the electrode pair 1030 after being connected in series are used as anode and cathode general current collecting terminals for inputting/outputting current after being connected in series.

FIG. 26 is a schematic view showing a second embodiment of the combination shown in FIG. 25, in which the current terminals used to input/output current are exposed to the outside of the tank shell, and the other current collecting terminals are hidden within the electrode tank 1030.

As shown in FIG. 26, the anode input/output general current collecting terminal and the cathode input/output general current collecting terminal for inputting/outputting current are exposed to the outside of the tank shell, and the other current collecting terminals are hidden within the electrode tank 1030, the other compositions being the same as that of FIG. 25.

For the reserve power supply with electrode plates joined to auxiliary conductors, in practical application, two or more sides of the auxiliary conductor are individually placed with one or more current collecting terminals, and unilaterally or bilaterally joined to the electrode plate with same polarity, which is installed with one or more current collecting

terminals at two or more sides; the one or more current collecting terminals placed at each of the two or more sides are unilaterally or multilaterally parallel connected, and the insulators are installed between the both for constituting the electrode unit with a variety of geometric shapes; as follows:

FIG. 27 is a three-dimensional structural schematic view showing an electrode unit constituted by the auxiliary conductor, in which two input/output current collecting terminals installed at each of two sides thereof, and joined to electrode plate(s) with same polarity, in which two current collecting terminals are installed at each of two sides thereof, at one of two or more outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively, according to the present invention.

FIG. 28 is a front view of FIG. 27.

FIG. 29 is a side view of FIG. 27.

As shown in FIGS. 27, 28, and 29, an electrode unit is constituted by an auxiliary conductor, in which two input/output current collecting terminals are installed at each of two sides thereof and joined to electrode plate(s) with same polarity, in which two current collecting terminals are installed at each of two sides thereof, at one of two or more outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively, according to the present invention.

FIG. 30 is a three-dimensional structural schematic view showing the electrode unit constituted by the auxiliary conductor, in which a current collecting terminal is installed at each of four sides thereof and joined to the electrode plate(s) with same polarity, in which a current collecting terminal is installed at each of four sides thereof, at one of two or more outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively, according to the present invention.

FIG. 31 is a front view of FIG. 30.

FIG. 32 is a side view of FIG. 30.

As shown in FIGS. 30, 31, and 32, the electrode unit is constituted by an auxiliary conductor having current collecting terminals installed at each of four sides thereof, and joined to electrode plate(s) with same polarity, in which a current collecting terminal is installed at each of four sides thereof, at one of two or two outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively.

FIG. 33 is a three-dimensional structural schematic view showing the electrode unit constituted by the auxiliary conductor, in which two current collecting terminals are installed at each of four sides thereof and joined to the electrode plate(s) with same polarity, and in which two current collecting terminals are installed at each of four sides thereof, at one of two or more outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively, according to the present invention.

FIG. 34 is a front view of FIG. 33.

FIG. 35 is a side view of FIG. 33.

As shown in FIGS. 33, 34, and 35, the electrode unit is constituted by the auxiliary conductor, in which two current collecting terminals are installed at each of four sides thereof and joined to the electrode plate(s) with same polarity, and in which two current collecting terminals are installed at each of four sides thereof, at one of two or two outer sides of the auxiliary conductor, and an insulator is sandwiched therein, respectively.

FIG. 36 is a schematic structural view showing an embodiment of application, in which the conductor is radial and the electrode unit has a grid layout, according to the present invention.

FIG. 37 is a front view of FIG. 36.

FIG. 38 is a side view of FIG. 36.

As shown in FIGS. 36, 37, and 38, the structure of the reserve power supply with electrode plates joined to auxiliary conductors is constituted by a radial conductor and a grid layout electrode unit.

FIG. 39 is a schematic structural view showing an embodiment of application, in which the electrode unit is a plate type electrode unit, according to the present invention.

FIG. 40 is a front view of FIG. 39.

FIG. 41 is a side view of FIG. 39.

As shown in FIGS. 39, 40, and 41, the structure of the reserve power supply with electrode plates joined to auxiliary conductors is constituted by a plate type electrode unit.

FIG. 42 is a schematic view showing an embodiment of application, in which the electrode unit is used to be a winding type reserve power supply, according to the present invention.

FIG. 43 is a top view of FIG. 42.

FIG. 44 is a side view of FIG. 42.

As shown in FIGS. 42, 43, and 44, the structure of the reserve power supply with electrode plates joined to auxiliary conductors is constituted by a winding type electrode unit.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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The claims defining the invention are as follows:

1. An electrode unit for a reserve power supply, including:

at least two electrode plates having at least one current collecting terminal extending from each of at least two sides of the electrode plate, said electrode plate having an active surface on which is coated an active substance; and

at least one auxiliary conductor for installing between two electrode plates, having a conductivity higher than a conductivity of the electrode plate, said auxiliary conductor having at least one current collecting terminal extending from each of at least two sides of the auxiliary conductor; and

an insulator sandwiched between each electrode plate and the auxiliary conductor and joined to the electrode plate and two sides of the auxiliary conductor to form said electrode unit,

wherein said at least one current collecting terminal extending from each of at least two sides of the electrode plate and said at least one current collecting terminal extending from each of at least two sides of the auxiliary conductor are electrically connected to form at least two common input/output terminals on opposite sides of the electrode unit.

2. An electrode unit for a reserve power supply as claimed in claim 1, wherein said at least one auxiliary conductor is one of a planar structure, a strip structure, and a mesh structure.

3. An electrode unit for a reserve power supply as claimed in claim 1, wherein said reserve power supply is one of a primary battery, rechargeable battery, capacitor, and super capacitor.

4. An electrode unit for a reserve power supply as claimed in claim 1, wherein said input/output terminals have a same polarity.

5. An electrode unit for a reserve power supply as claimed in claim 1, wherein one said current collecting terminal and one said current collecting terminal extend from each of four sides of the respective electrode plate and auxiliary conductor to form input/out terminals on each of four sides of said electrode unit.

6. A reserve power supply, including:

an anode unit that includes:

at least two anode electrode plates having at least one current collecting anode terminal extending from each of at least two sides of the anode electrode plate , said anode electrode plate having an anode active surface on which is coated an active anode substance; and

at least one anode auxiliary conductor for installing between two anode electrode plates, having a conductivity higher than a conductivity of the anode electrode plate, said anode auxiliary conductor having at least one current collecting anode terminal extending from each of at least two sides of the anode auxiliary conductor; and

an anode unit insulator sandwiched between each anode electrode plate and the anode auxiliary conductor and joined to the anode electrode plate and two sides of the anode auxiliary conductor to form the anode unit,

wherein said at least one current collecting anode terminal extending from each of at least two sides of the anode electrode plate and said at least one current collecting anode terminal extending from each of at least two sides of the anode auxiliary conductor are electrically connected to form common input/output terminals on the two sides the anode unit;

a cathode unit that includes:

at least two cathode electrode plates having at least one current collecting cathode terminal extending from each of at least two sides of the cathode electrode plate, said cathode electrode plate having a cathode active surface on which is coated an active cathode substance;

201024646l 01 Jun 2016

and

at least one cathode auxiliary conductor for installing between two cathode electrode plates, having a conductivity higher than a conductivity of the cathode electrode plate, said cathode auxiliary conductor having at least one current collecting cathode terminal extending from each of at least two sides of the cathode auxiliary conductor; and

a cathode unit insulator sandwiched between each cathode electrode plate and the cathode auxiliary conductor and joined to the cathode electrode plate and two sides of the cathode auxiliary conductor to form the cathode unit,

wherein said at least one current collecting cathode terminal extending from each of at least two sides of the cathode electrode plate and said at least one current collecting cathode terminal extending from each of at least two sides of the cathode auxiliary conductor are electrically connected to form at least one common input/output terminals on the two sides of the cathode unit; and

a separator sandwiched between and joined to the anode unit and the cathode unit to form an integrated electrode pair, said integrated electrode pair being installed in an electrode tank of said reserve power supply.

7. A reserve power supply as claimed in claim 6, including two of said cathode units joined by respective said separators to opposite lateral surfaces of said anode unit,

wherein each said cathode unit include two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein said anode units include two said anode electrode plates coated with said active anode substance and joined to said anode auxiliary conductor by respective said anode unit insulators, said anode unit insulators being respectively installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plates and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals, and

wherein said common cathode input/output terminals of said two cathode units are further electrically connected to each other.

8. A reserve power supply as claimed in claim 6, including two of said anode units joined by respective said separators to opposite lateral surfaces of said cathode unit,

wherein each said anode unit include two said anode electrode plates coated with said active anode substance and joined to said anode auxiliary conductor by respective said anode unit insulators, said anode unit insulators being respectively installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor , and said current collecting anode terminals of said anode electrode plates and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals,

wherein said cathode unit includes two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals, and

wherein said common anode input/output terminals of said two anode units are further electrically connected to each other.

9. A reserve power supply as claimed in claim 6, including two of said cathode units joined by respective said separators to opposite lateral surfaces of said anode unit,

wherein each said cathode unit include one said cathode electrode plate coated with said active cathode substance and joined to said cathode auxiliary conductor by said cathode unit insulator, said cathode unit insulator being installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plate and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein said anode unit includes two said anode electrode plates coated with said active anode substance and joined to said anode auxiliary conductor by respective said anode unit insulators, said anode unit insulators being respectively installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plates and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals, and

wherein said common cathode input/output terminals of said two cathode units are further electrically connected to each other.

10. A reserve power supply as claimed in claim 6, including two of said anode units joined by respective said separators to opposite lateral surfaces of said cathode unit,

wherein each said anode unit include one said anode electrode plate coated with said active anode substance and joined to said anode auxiliary conductor by said anode unit insulator, said anode unit insulator being

201024646l 01 Jun 2016

installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plate and said current collecting anode terminal of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals,

wherein said cathode unit includes two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals, and

wherein said common anode input/output terminals of said two anode units are further electrically connected to each other.

11. A reserve power supply as claimed in claim 6, including at least two of said cathode units and at least two of said anode units alternately joined to each other by respective said separators,

wherein each said cathode unit include two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein each said anode unit includes two said anode electrode plates coated with said active anode substance and joined to said anode auxiliary conductor by respective said anode unit insulators, said anode unit insulators being respectively installed between an intermediate section of

said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plates and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals, and

wherein said common cathode input/output terminals of said at least two cathode units are electrically connected to each other and said common anode input/output terminals of said at least two anode units are also electrically connected to each other.

12. A reserve power supply as claimed in claim 11, wherein one of said common cathode input/output terminals at an intermediate position in said series of said alternating cathode and anode units, and one of said common anode input/output terminals at an intermediate position in said series of alternating cathode and anode units, serve as respective general collecting current terminals for input and output of current between said reserve power supply and an external device.

13. A reserve power supply as claimed in claim 12, wherein said general collecting current terminals are exposed to an outside of said tank and remaining said common anode input/output terminals and common cathode input/output terminals are hidden within said tank.

14. A reserve power supply as claimed in claim 11, wherein a respective said common anode input/output terminals of said end cathode and anode units serve as respective general collecting current terminals for input and output of current between said reserve power supply and an external device.

15. A reserve power supply as claimed in claim 14, wherein said general collecting current terminals are exposed to an outside of said tank and remaining said common anode input/output terminals and common cathode input/output terminals are hidden within said tank.

2010246461 08 Jul 2016

16. A reserve power supply as claimed in claim 6, including at least two of said cathode units and at least two of said anode units alternately joined to each other by respective said separators,

wherein one of said cathode units at an end of a series of said alternating anode and cathode units includes one said cathode electrode plate coated with said active cathode substance and joined to said cathode auxiliary conductor by said cathode unit insulator, said cathode unit insulator being installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plate and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein each of said cathode units except said end cathode unit includes two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein one of said anode units at an opposite end of said series of alternating anode and cathode units include one said anode electrode plate coated with said active anode substance and joined to said anode auxiliary conductor by said anode unit insulator, said anode unit insulator being installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plate and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals,

wherein each said anode unit except said end anode unit includes two

said anode electrode plates coated with said active anode substance and joined to said anode auxiliary conductor by respective said anode unit insulators, said anode unit insulators being respectively installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminals of said anode electrode plates and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals, and

wherein said common cathode input/output terminals of said at least two cathode units are electrically connected to each other and said common anode input/output terminals of said at least two anode units are also electrically connected to each other.

17. A reserve power supply as claimed in claim 16, wherein one of said common cathode input/output terminals at an intermediate position in said series of said alternating cathode and anode units, and one of said common anode input/output terminals at an intermediate position in said series of alternating cathode and anode units, serve as respective general collecting current terminals for input and output of current between said reserve power supply and an external device.

18. A reserve power supply as claimed in claim 17, wherein said general collecting current terminals are exposed to an outside of said tank and remaining said common anode input/output terminals and common cathode input/output terminals are hidden within said tank.

19. A reserve power supply as claimed in claim 16, wherein a respective said common anode input/output terminals of said end cathode and anode units serve as respective general collecting current terminals for input and output of current between said reserve power supply and an external device.

20. A reserve power supply as claimed in claim 19, wherein said general collecting current terminals are exposed to an outside of said tank and

201024646l 08 Jul 2016

remaining said common anode input/output terminals and common cathode input/output terminals are hidden within said tank.

21. A reserve power supply as claimed in claim 6, including one said cathode unit and one said anode unit joined to each other by one said separators,

wherein said cathode unit include two said cathode electrode plates coated with said active cathode substance and joined to said cathode auxiliary conductor by respective said cathode unit insulators, said cathode unit insulators being respectively installed between an intermediate section of said cathode electrode plate and an intermediate section of the cathode auxiliary conductor, and said current collecting cathode terminals of said cathode electrode plates and said current collecting cathode terminals of said cathode auxiliary conductor are electrically connected to form said common cathode input/output terminals,

wherein said anode unit include one said anode electrode plate coated with said active anode substance and joined to said anode auxiliary conductor by said anode unit insulator, said anode unit insulator being installed between an intermediate section of said anode electrode plate and an intermediate section of the anode auxiliary conductor, and said current collecting anode terminal of said anode electrode plate and said current collecting anode terminals of said anode auxiliary conductor are electrically connected to form said common anode input/output terminals.

22. A reserve power supply at claimed in claim 21, further including at least one monolithic anode plate having a positive terminal and joined to the cathode unit by a second said separator, and at least one monolithic cathode plate having a negative terminal and joined to said anode unit by a third said separator, said positive terminal being electrically connected to the common input/output terminal of the anode unit and said negative terminal being electrically connected to the common input/output terminal of the cathode unit.

23. A reserve power supply at claimed in claim 21, further including additional

said monolithic anode plates and monolithic cathode plates stacked in alternating fashion on each side of said joined-together anode unit and cathode unit.

24. A reserve power supply as claimed in claim 6, wherein said tank is divided into multiple cells, each containing one cathode unit and one anode unit.

25. A reserve power supply including winding type electrode unit, including:

at least two anode side electrode plates, said at least two anode side electrode plates each having an anode active surface on which is coated an anode active substance; and

at least one anode side auxiliary conductor sandwiched between respective anode side insulator layers, said at least one anode side auxiliary conductor and insulator layers being further sandwiched between said at least two anode side electrode plates and said at least one anode side auxiliary conductor having a conductivity higher than a conductivity of the at least two anode side electrode plates;

at least two cathode side electrode plates, said at least two cathode side electrode plates each having a cathode active surface on which is coated a cathode active substance; and

at least one cathode side auxiliary conductor sandwiched between respective cathode side insulator layers, said at least one cathode side auxiliary conductor and insulator layers being further sandwiched between the at least two cathode side electrode plates and said at least one cathode side auxiliary conductor having a conductivity higher than a conductivity of the at least two cathode side electrode plates; and

a first separator sandwiched between a first one of said at least two anode side electrode plates and a first one of said at least two cathode side electrode plates; and

a second separator sandwiched between a second one of said at least two anode side electrode plates and a second one of said at least two cathode side electrode plates,

wherein said at least two anodes side electrode plates, at least two

cathode side electrode plates, and respective said first and second separators are alternately wound in a spiral configuration to form a winding type electrode unit.

26. An electrode unit for a reserve power supply as claimed in claim 25, wherein said reserve power supply is one of a primary battery, rechargeable battery, capacitor, and super capacitor.

20102464461 01 Jun 2016

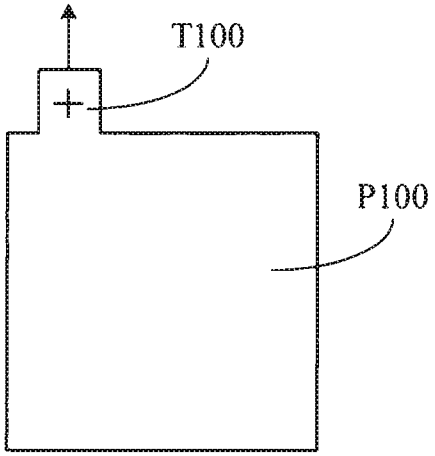


FIG. 1 (Prior Art)

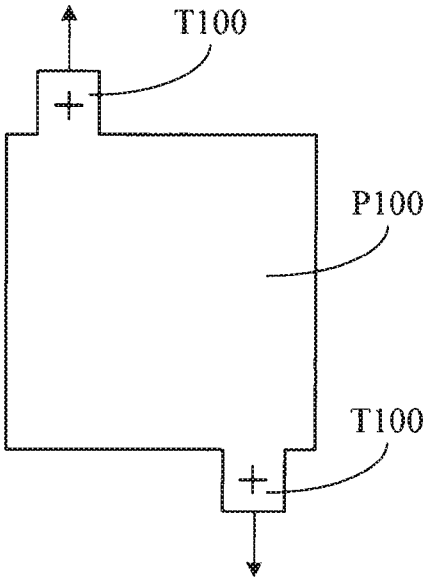


FIG. 2 (Prior Art)

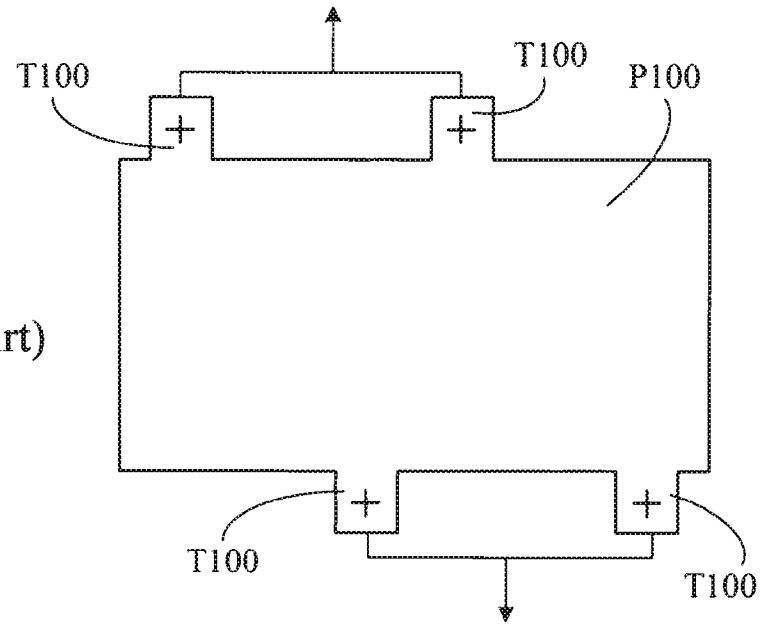


FIG. 3 (Prior Art)

20102464461 01 Jun 2016

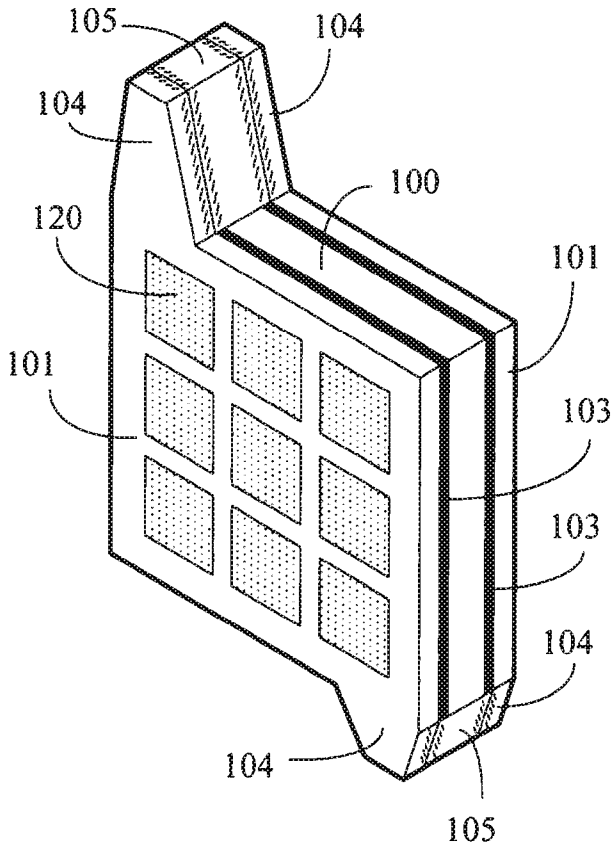


FIG. 4

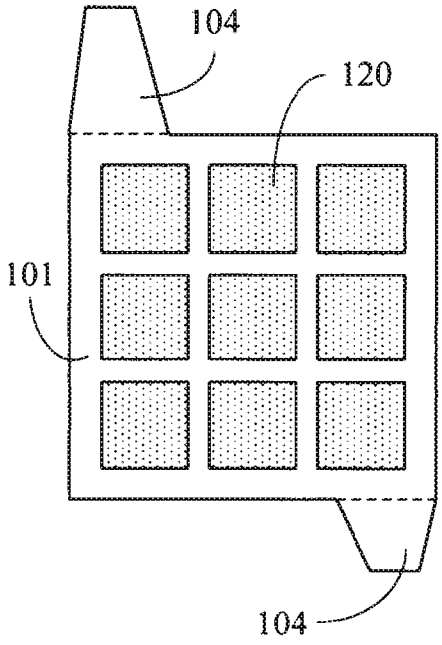


FIG. 5

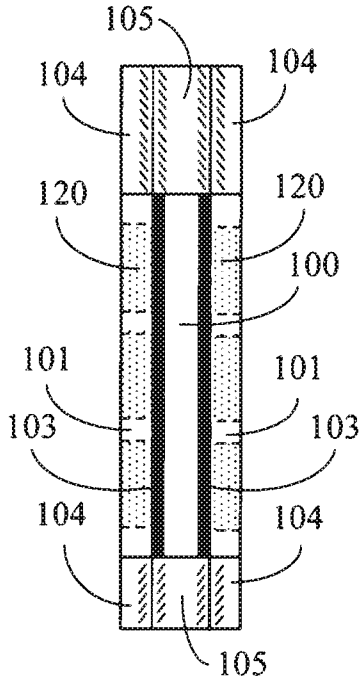


FIG. 6

20102464461 01 Jun 2016

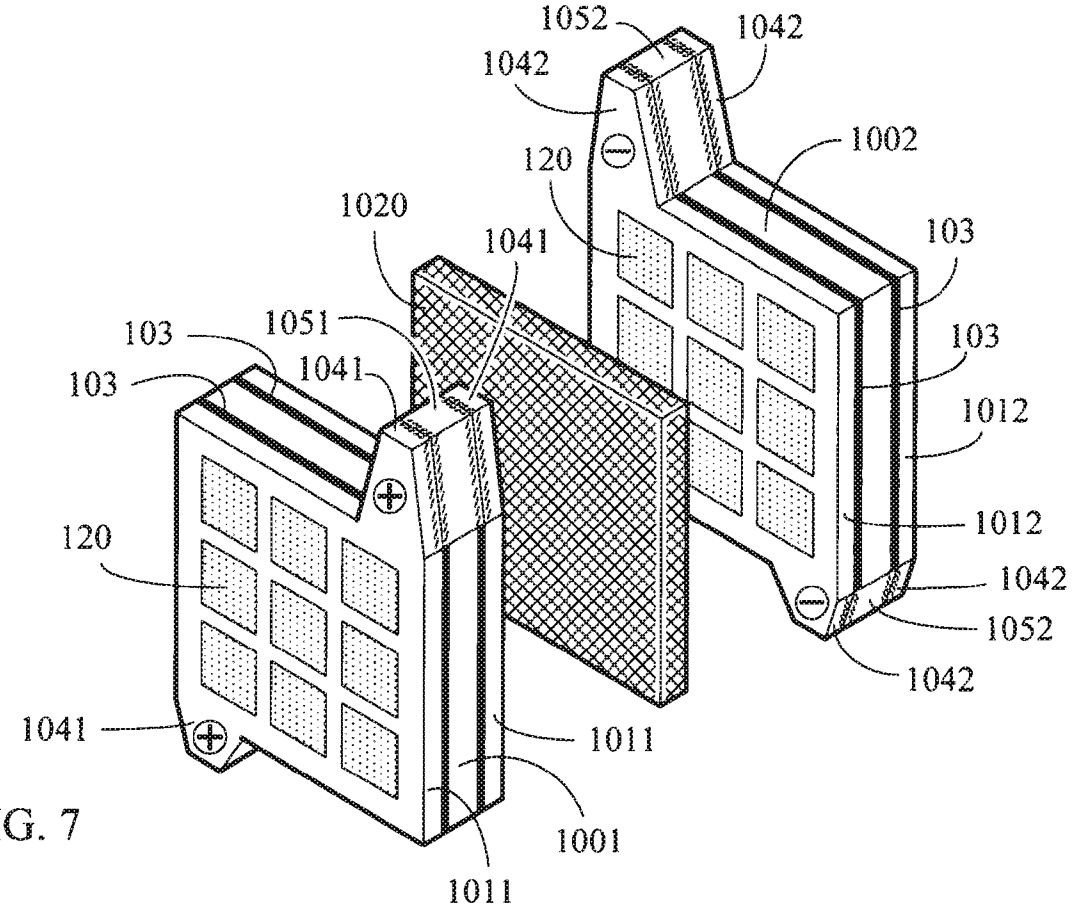


FIG. 7

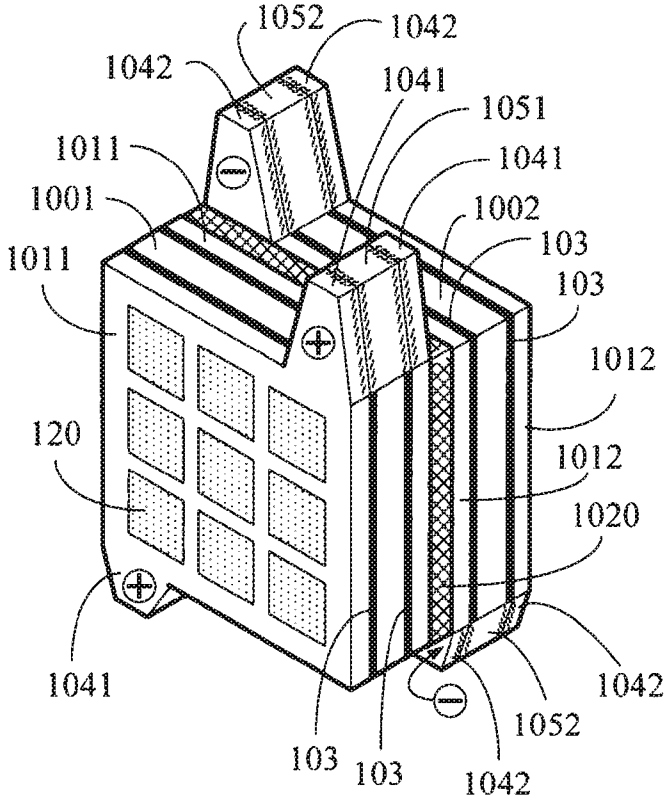


FIG. 8

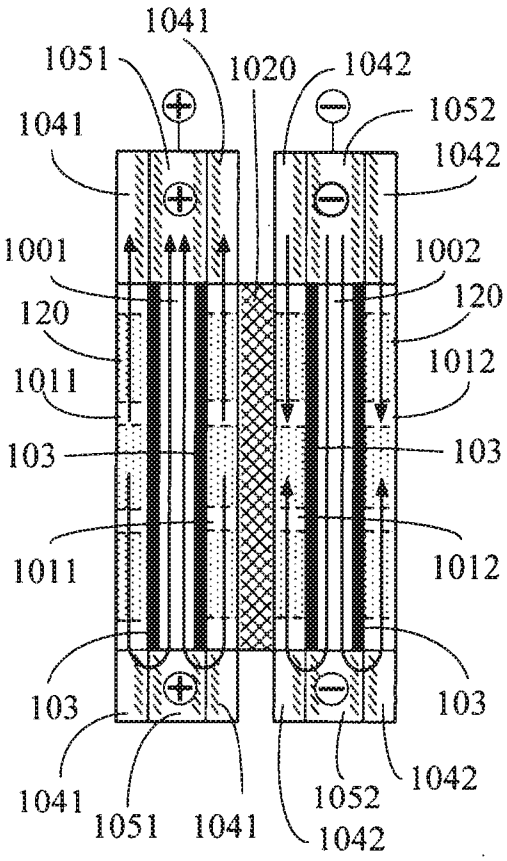


FIG. 9

20102464461 01 Jun 2016

FIG. 10

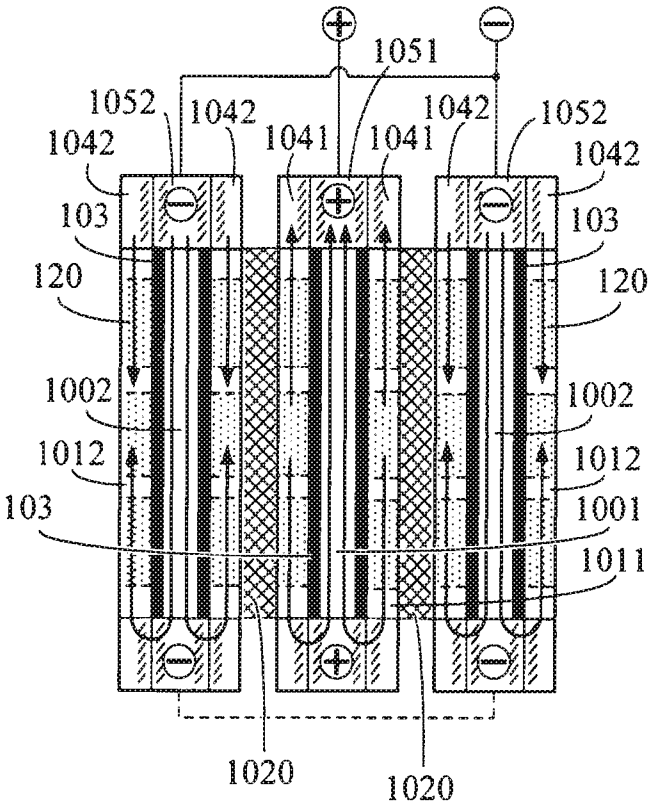
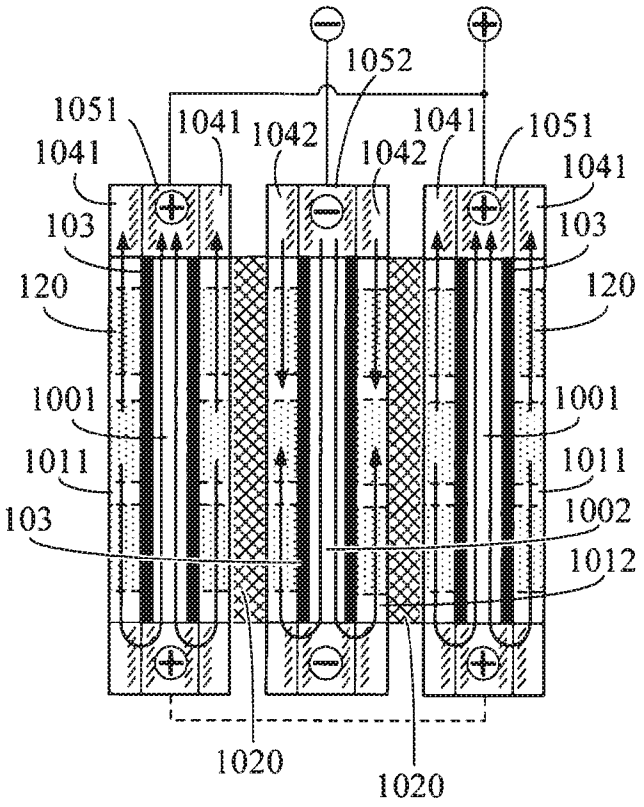


FIG. 11



20102464461 01 Jun 2016

FIG. 12

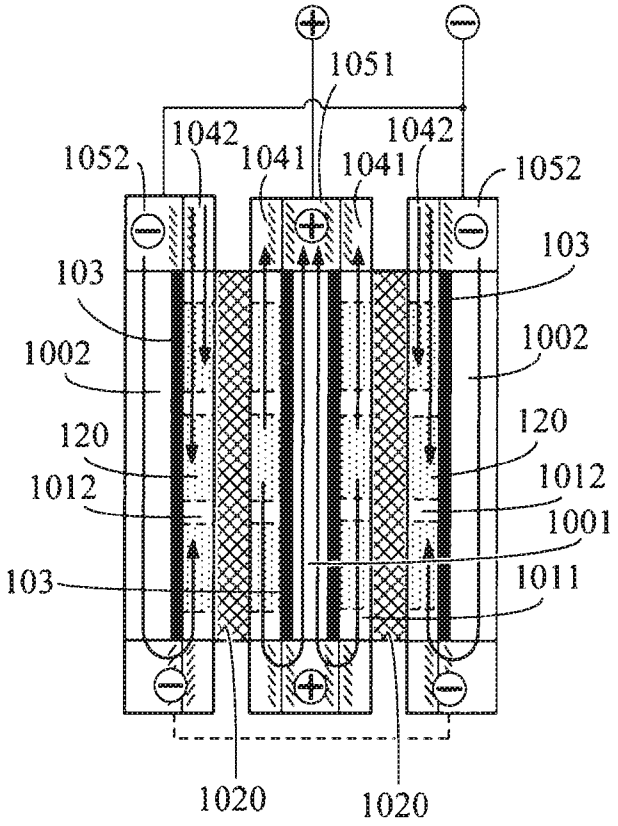
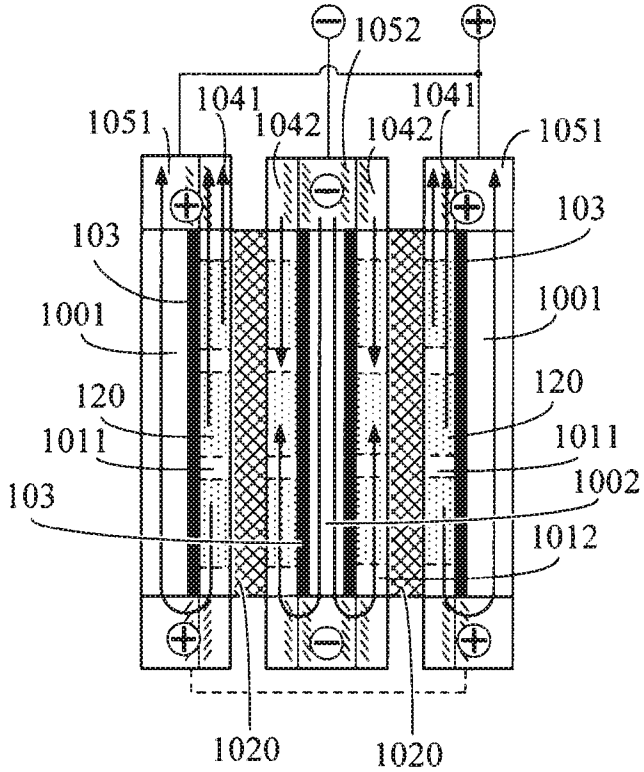


FIG. 13



20102464461 01 Jun 2016

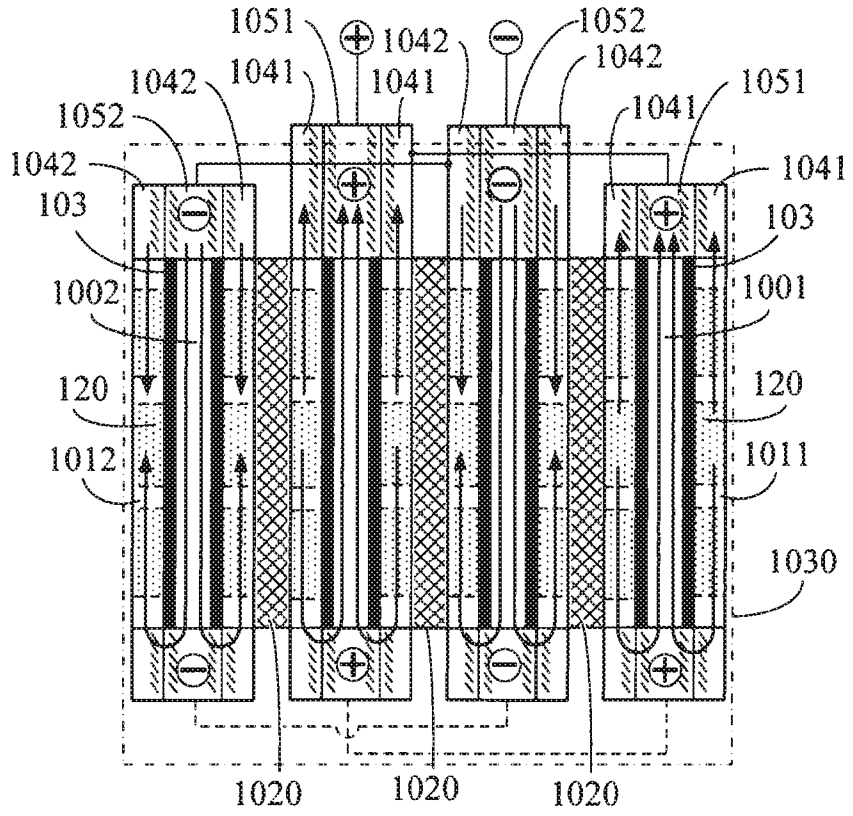


FIG. 14

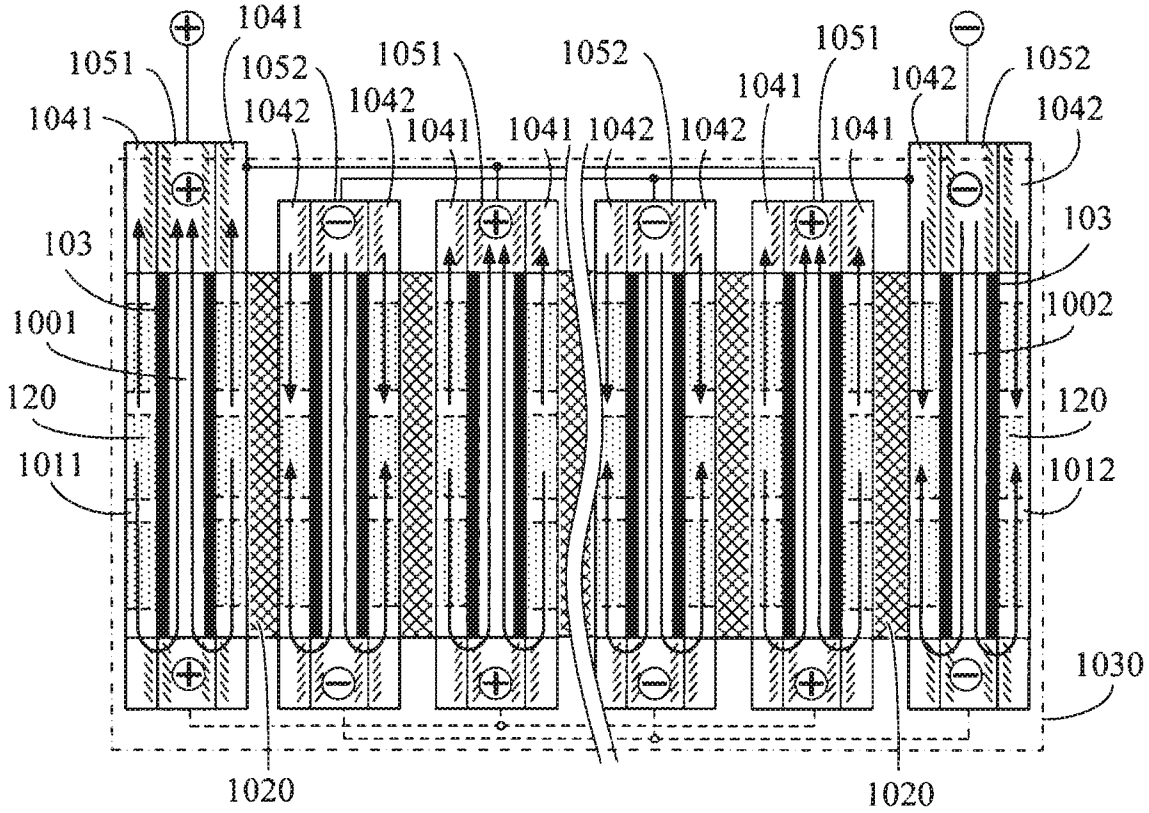


FIG. 15

20102464461 01 Jun 2016

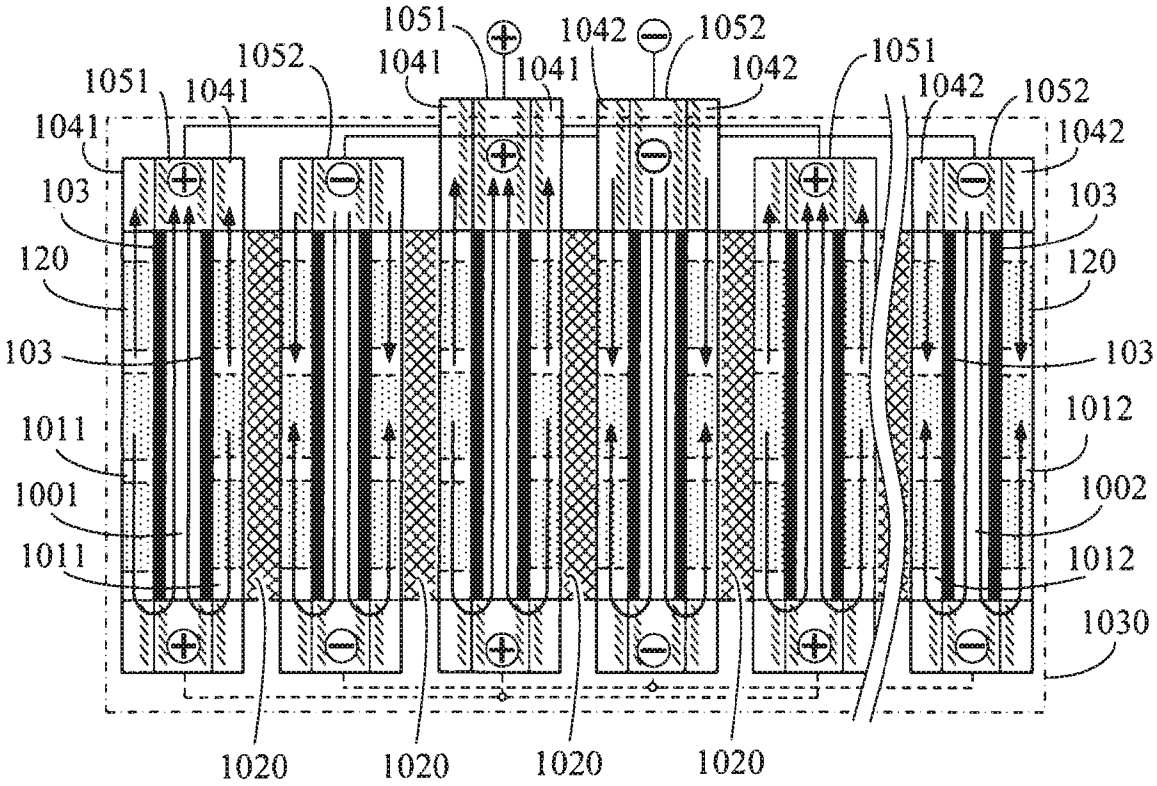


FIG. 16

20102464461 01 Jun 2016

FIG. 17

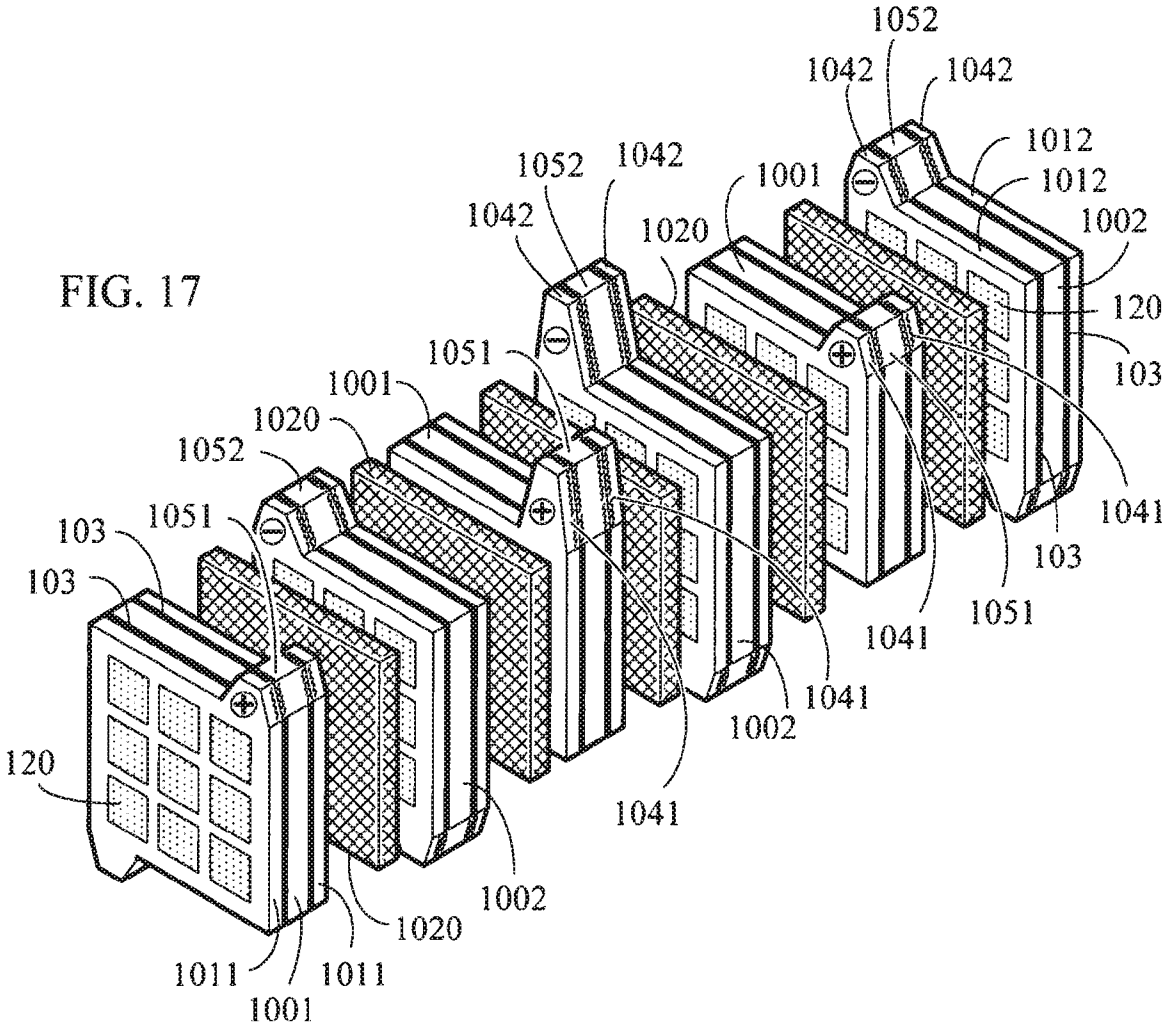
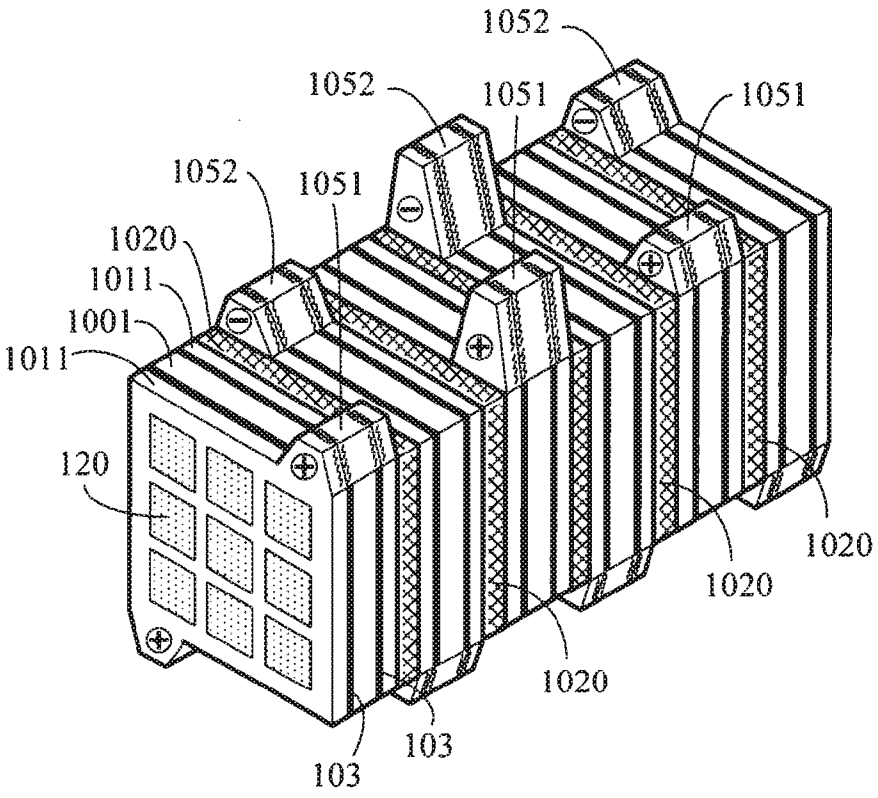


FIG. 18



20102464461 01 Jun 2016

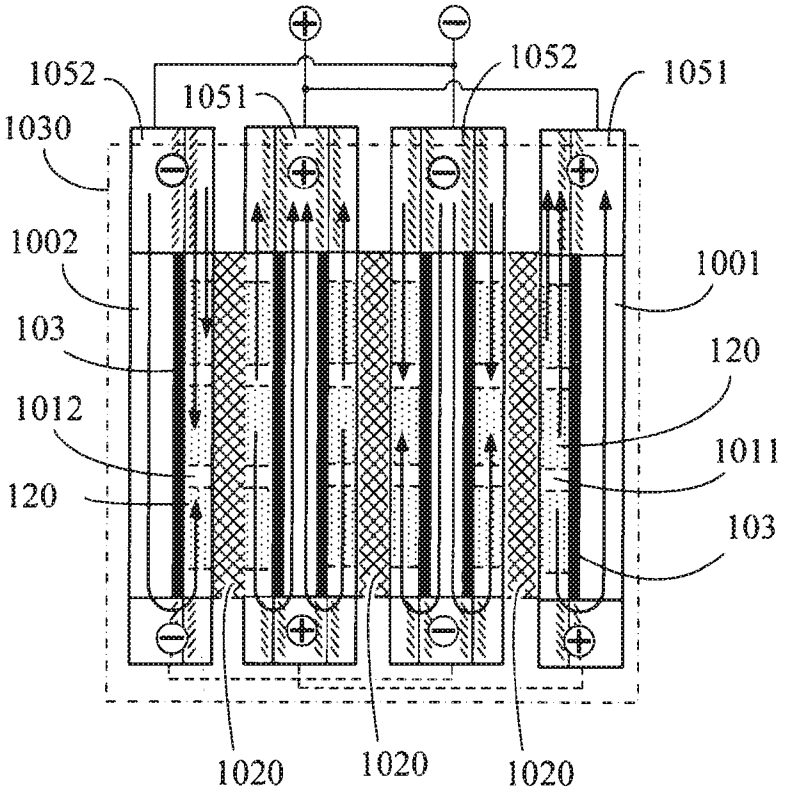


FIG. 19

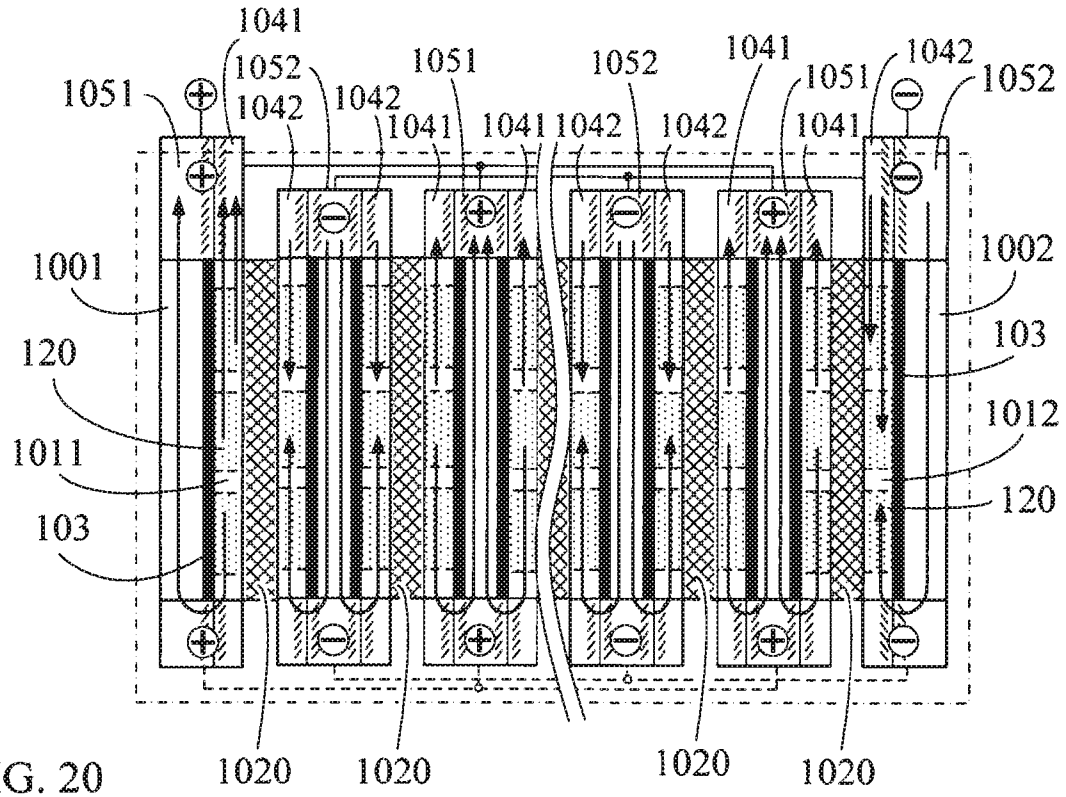


FIG. 20

20102464461 01 Jun 2016

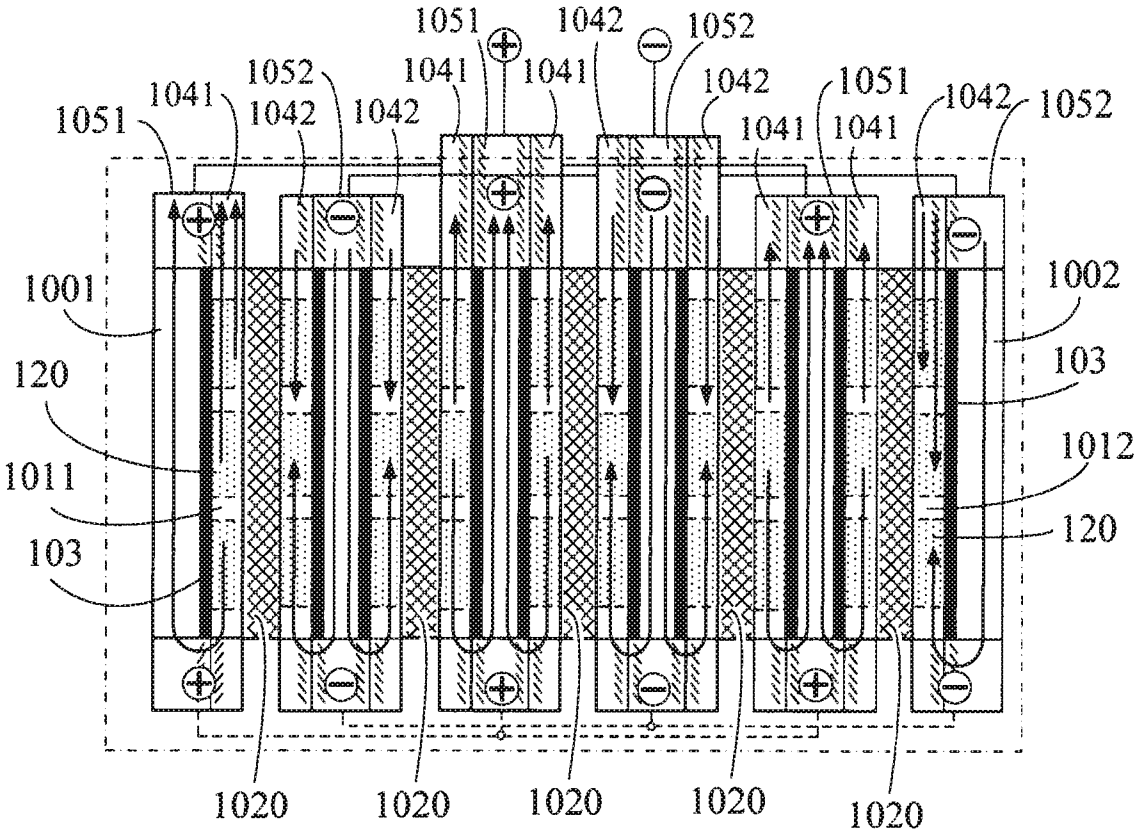


FIG. 21

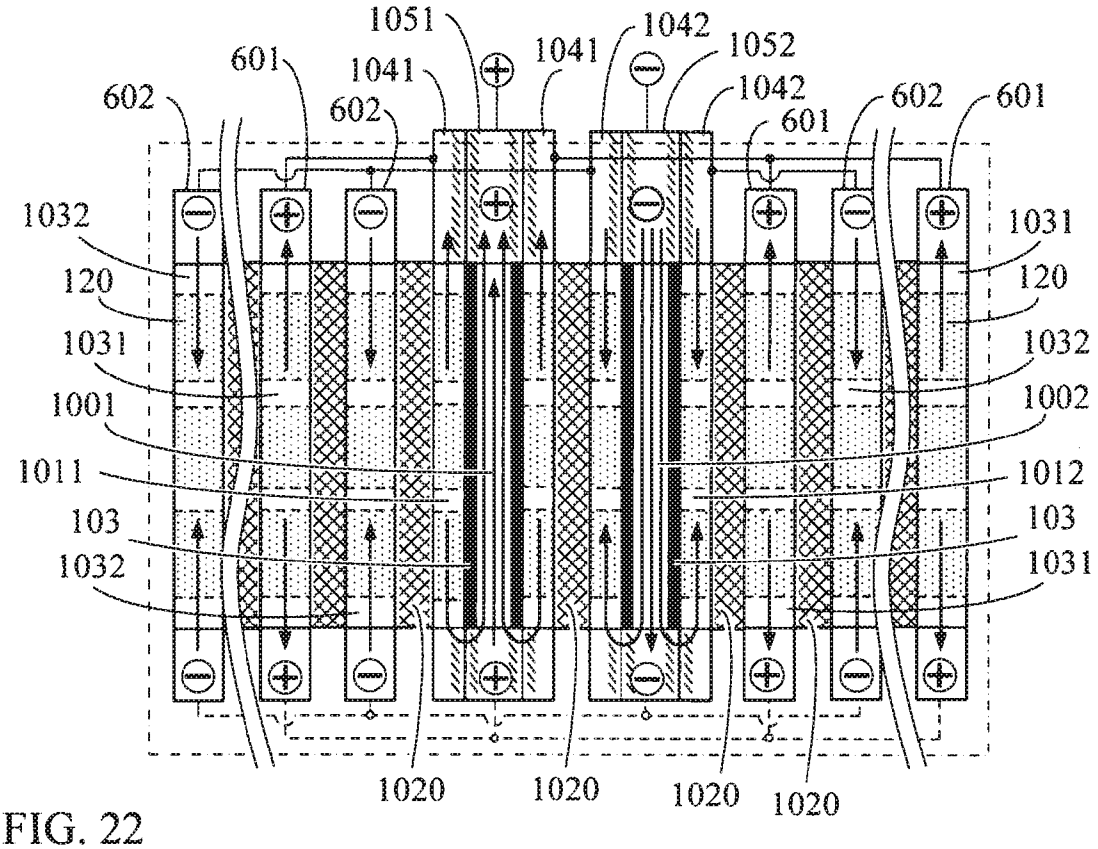


FIG. 22

2010246461 01 Jun 2016

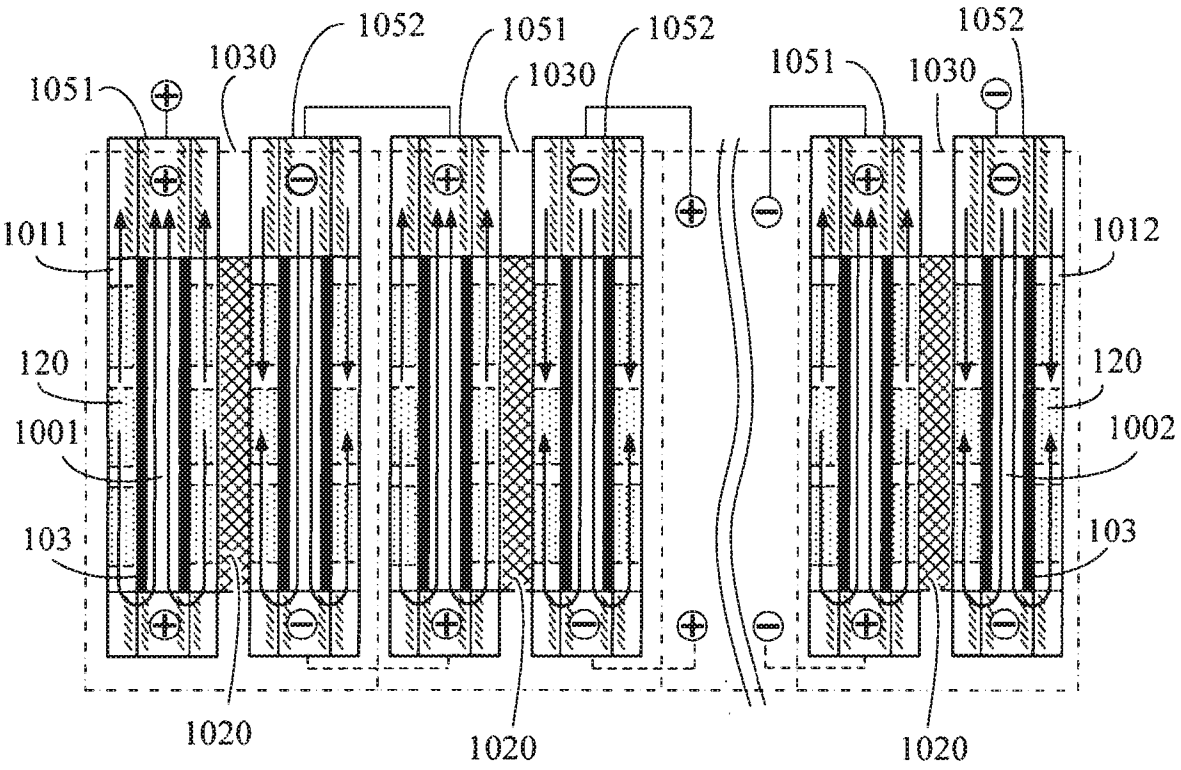


FIG. 23

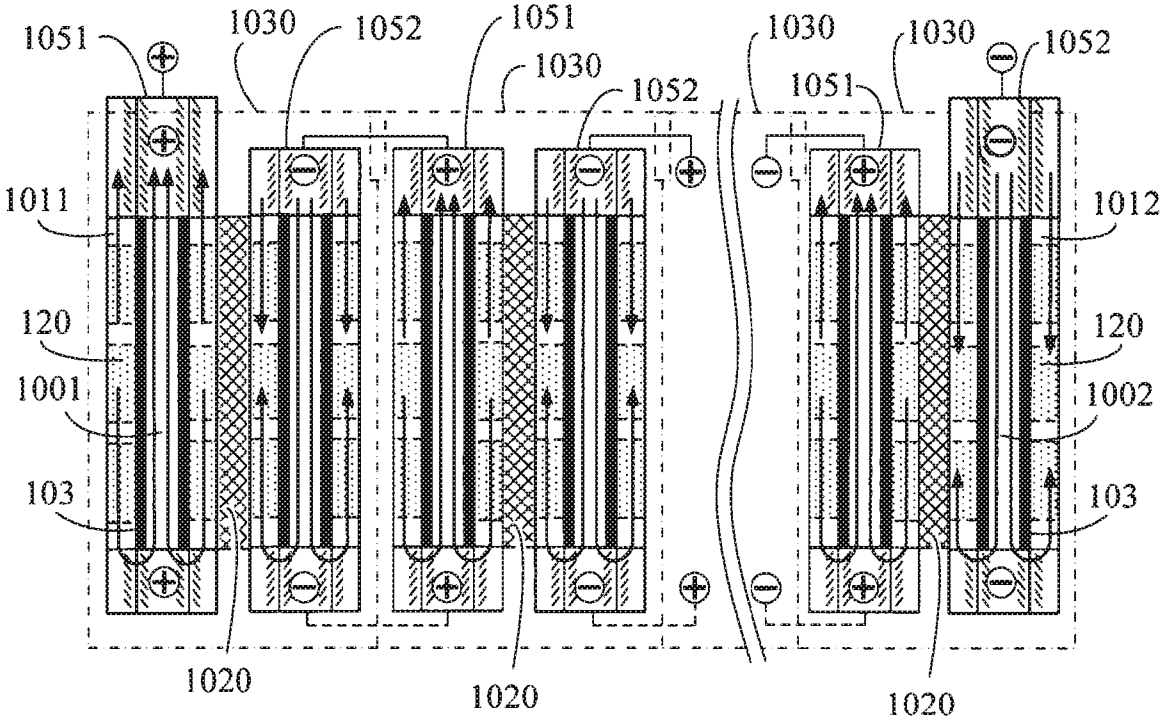


FIG. 24

20102464461 01 Jun 2016

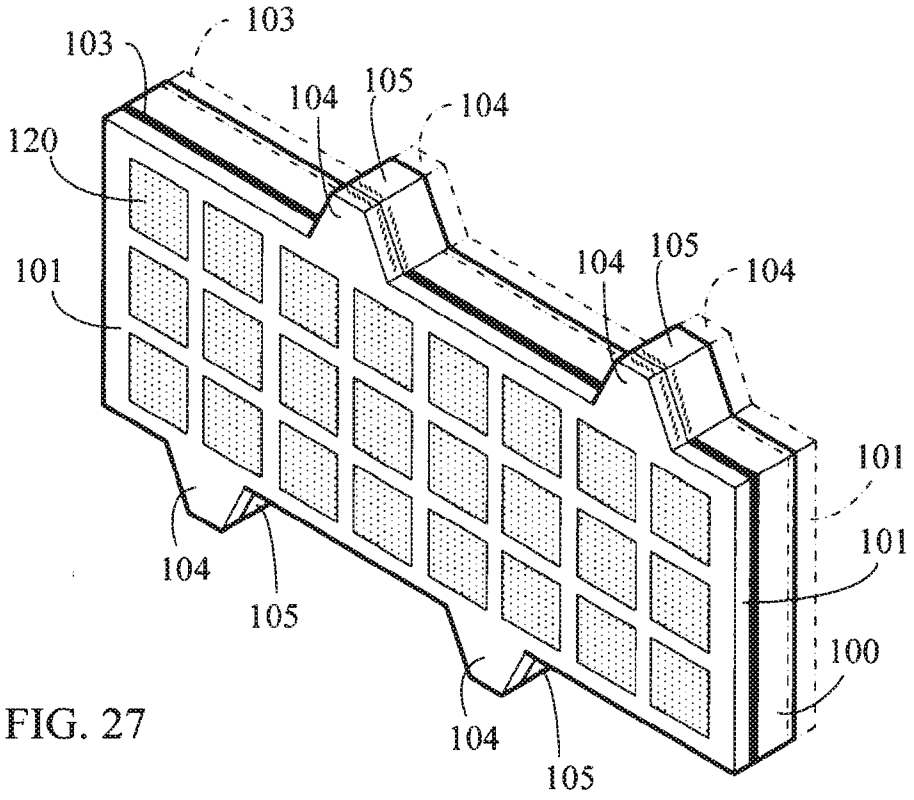


FIG. 27

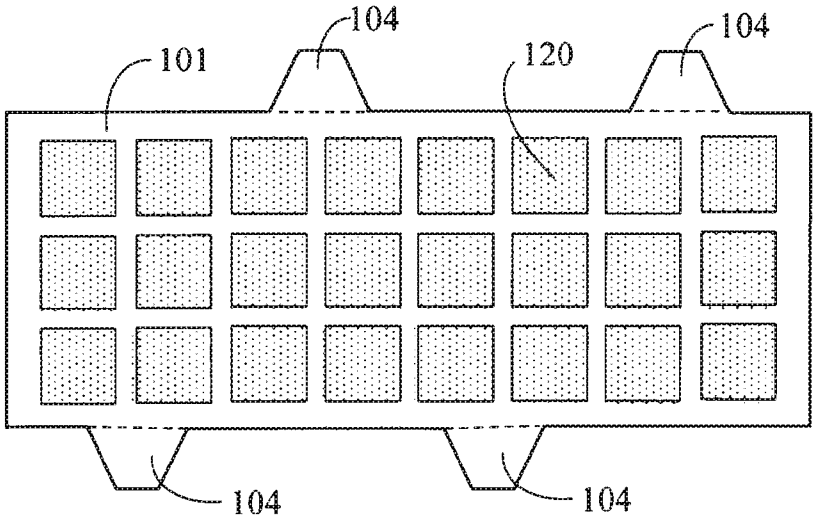


FIG. 28

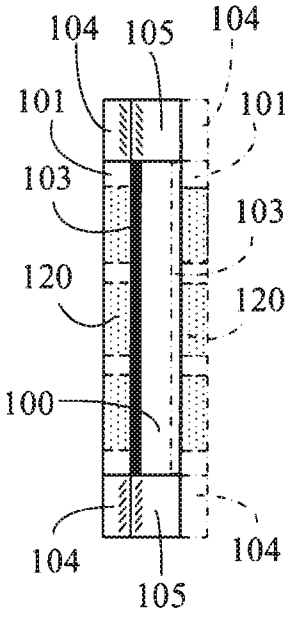


FIG. 29

20102464461 01 Jun 2016

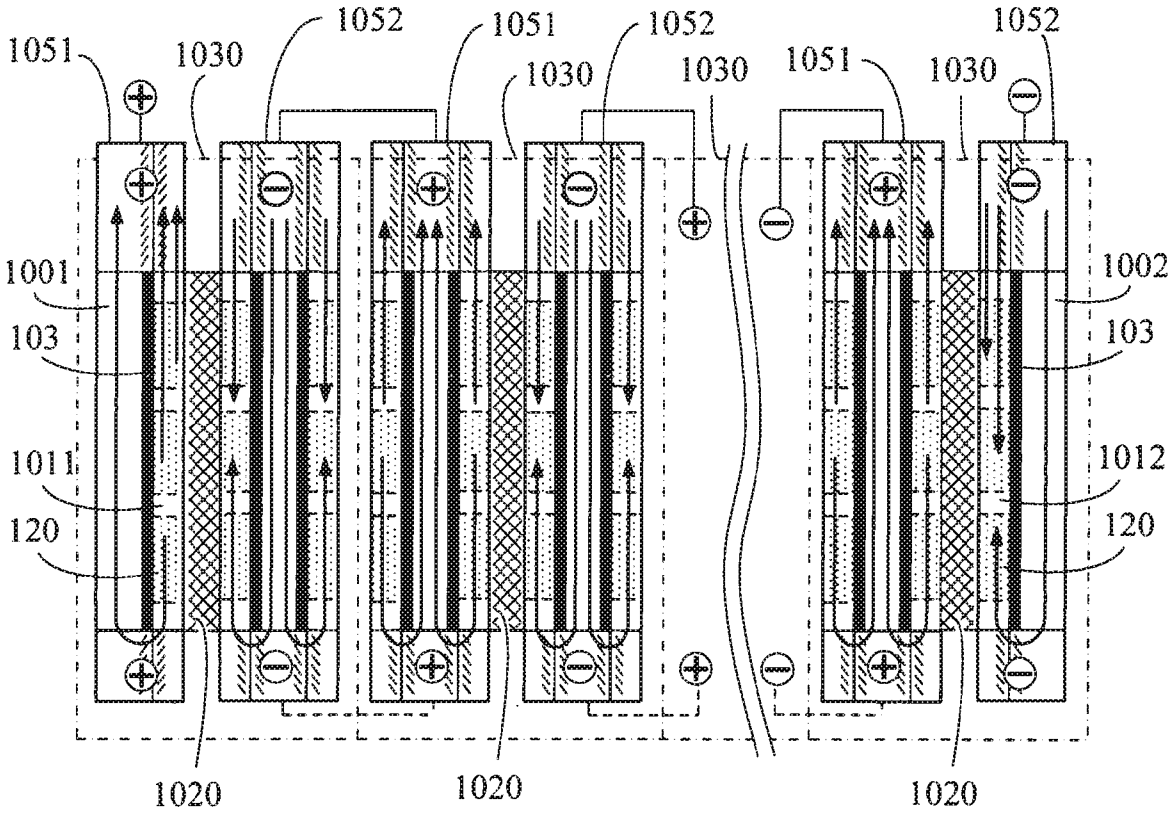


FIG. 25

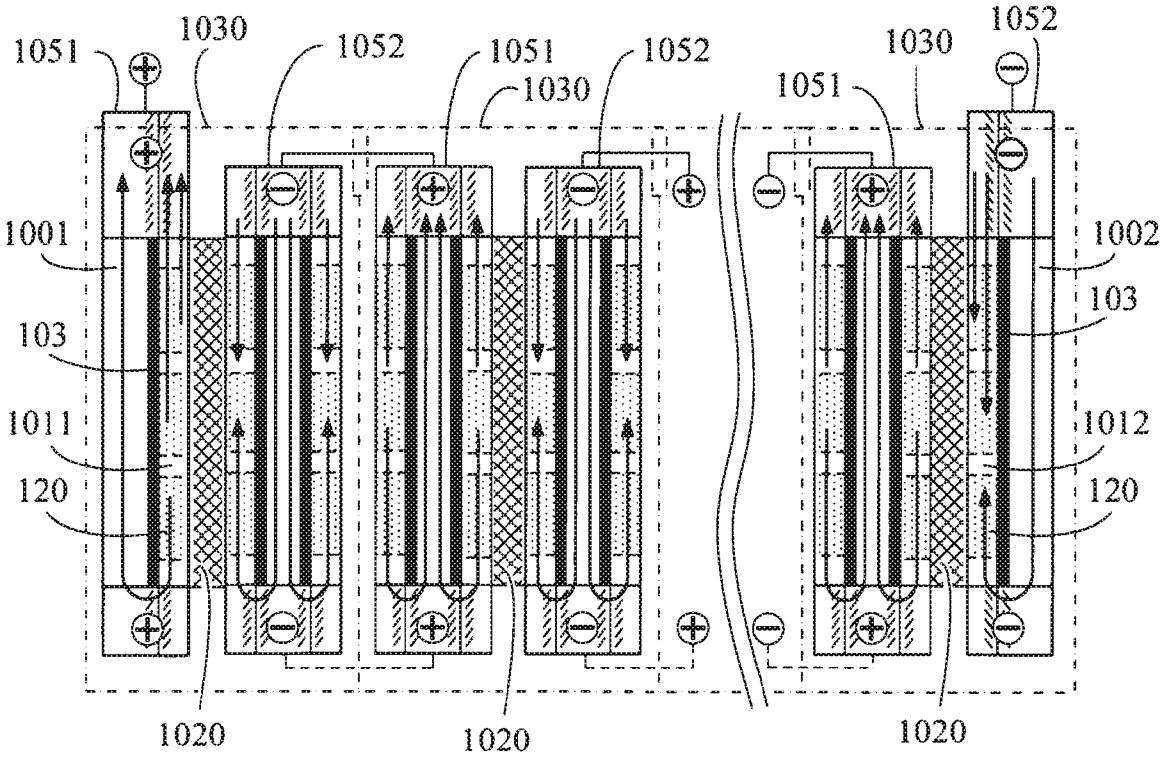


FIG. 26

20102464461 01 Jun 2016

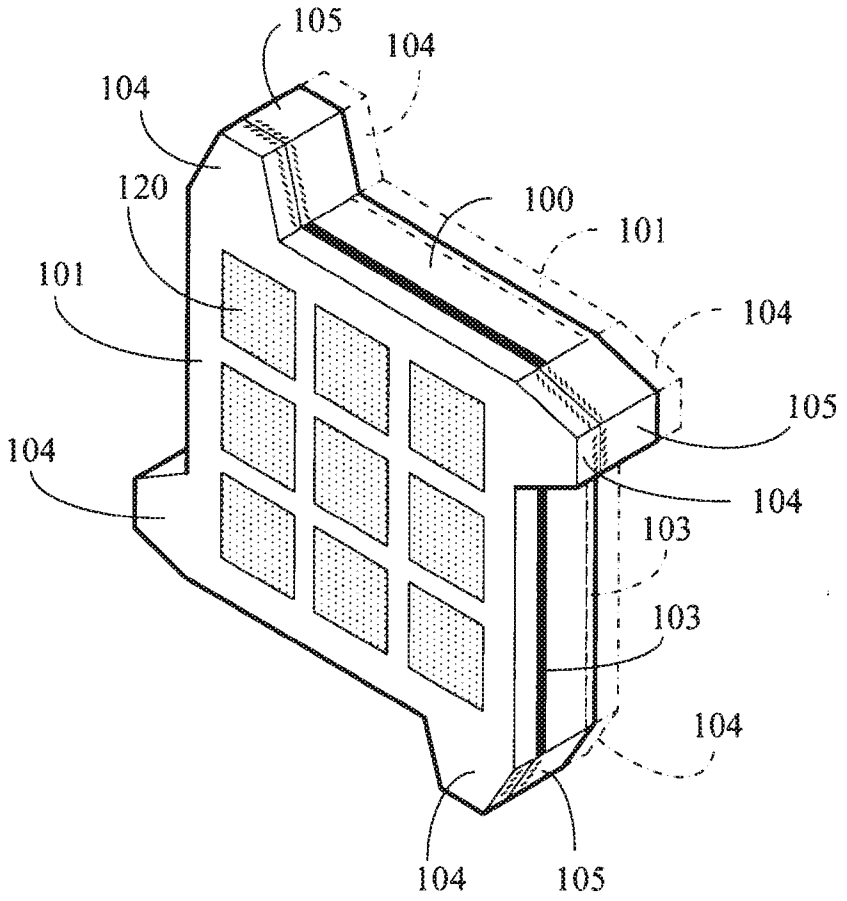


FIG. 30

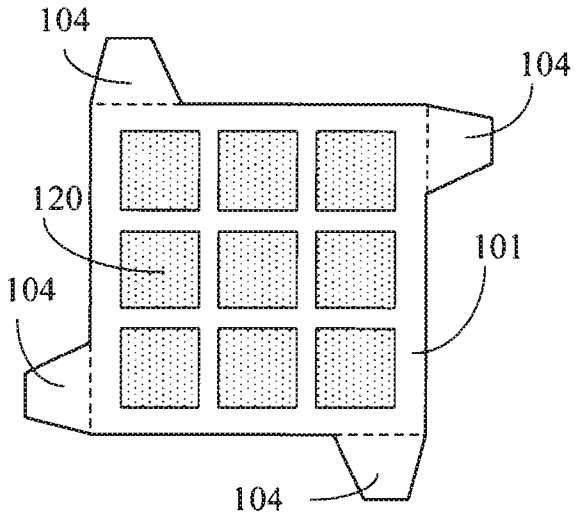


FIG. 31

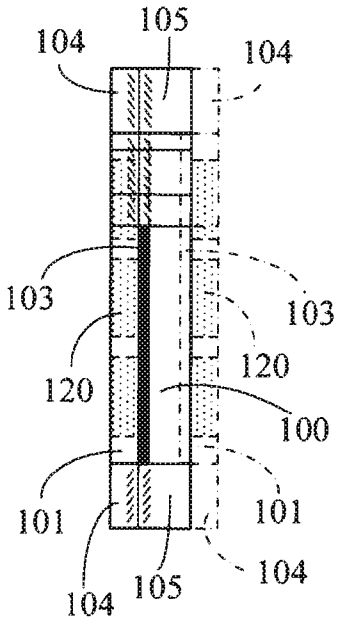


FIG. 32

20102464461 01 Jun 2016

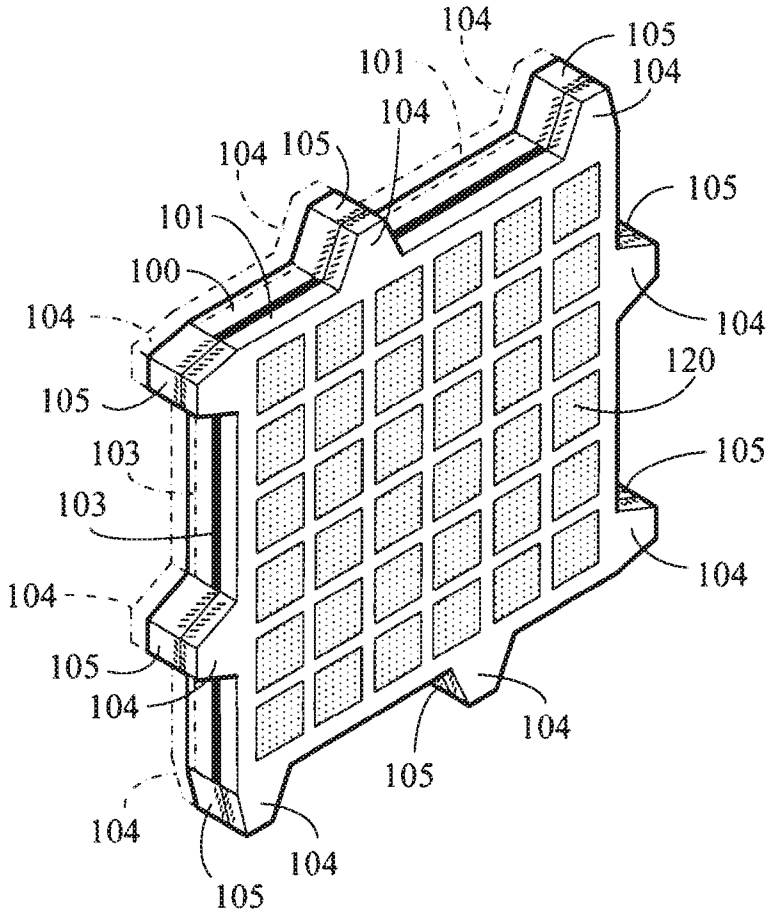


FIG. 33

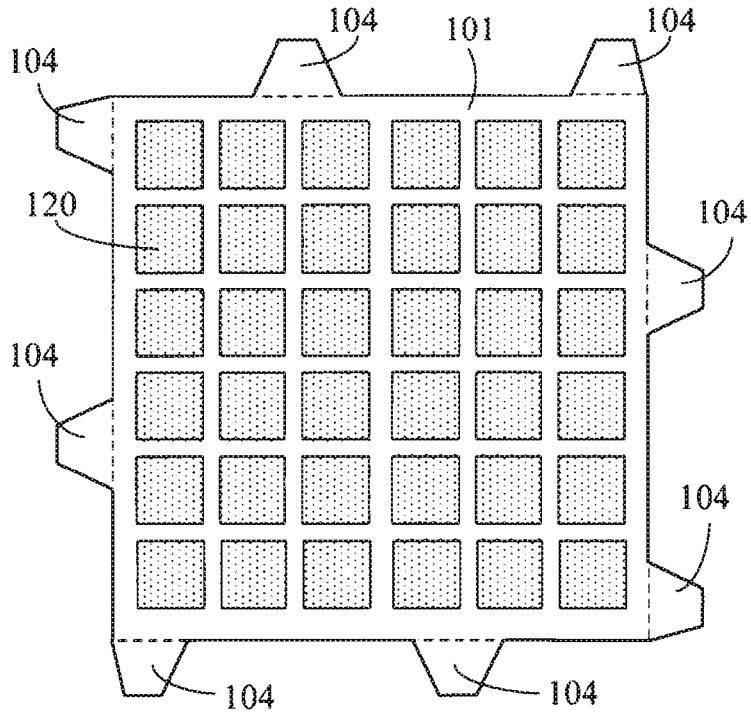


FIG. 34

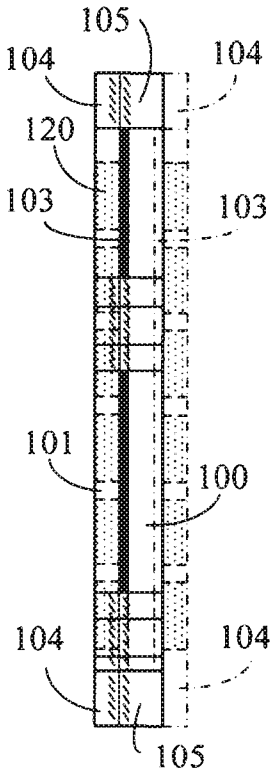


FIG. 35

20102464461 01 Jun 2016

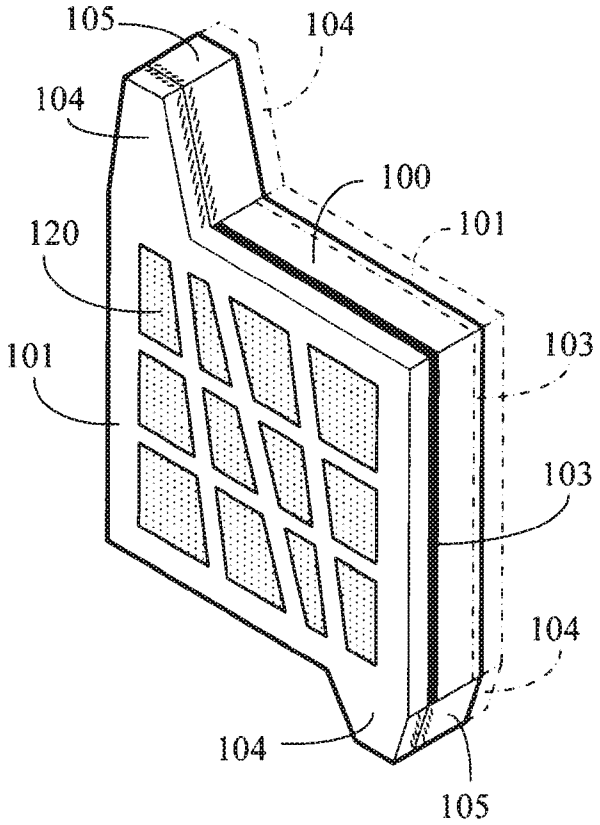


FIG. 36

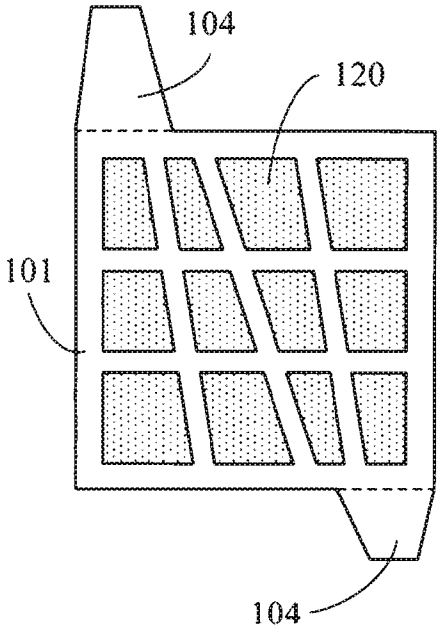


FIG. 37

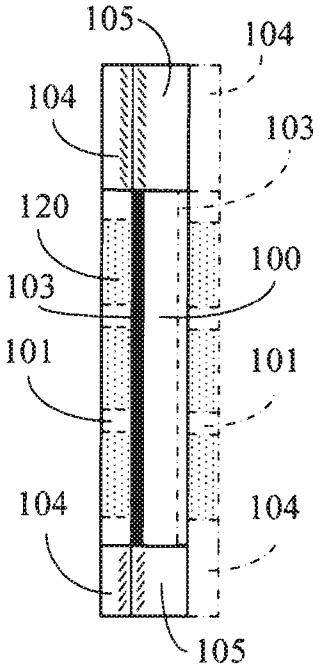


FIG. 38

20102464461 01 Jun 2016

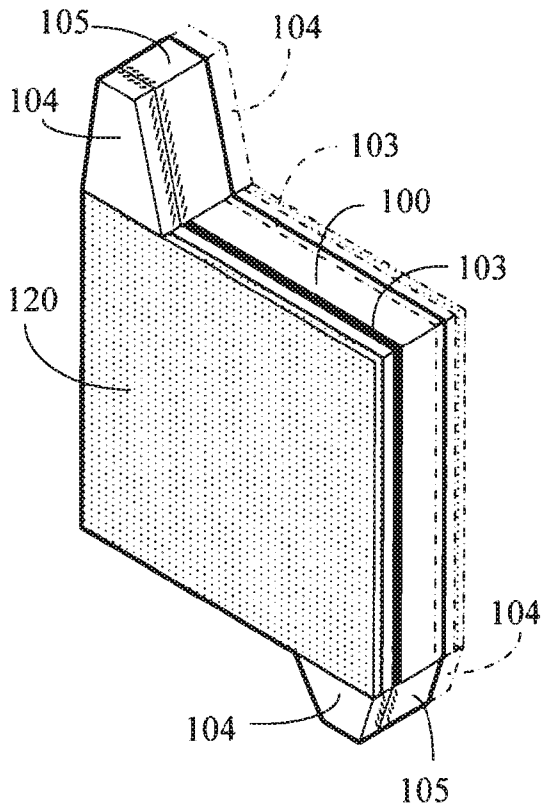


FIG. 39

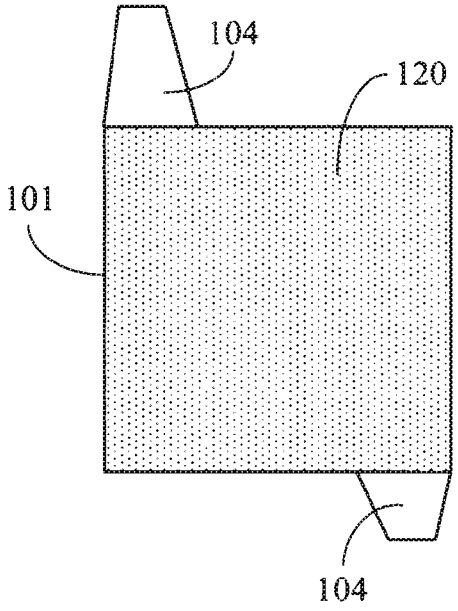


FIG. 40

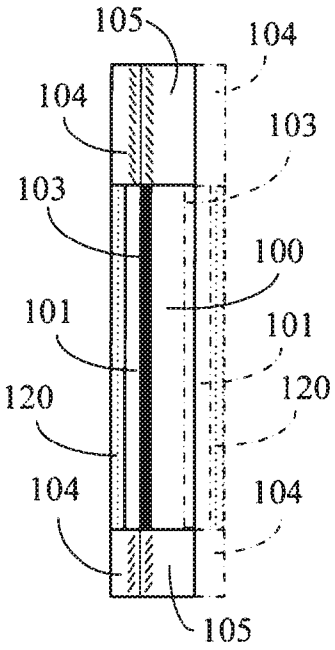


FIG. 41

2010246461 01 Jun 2016

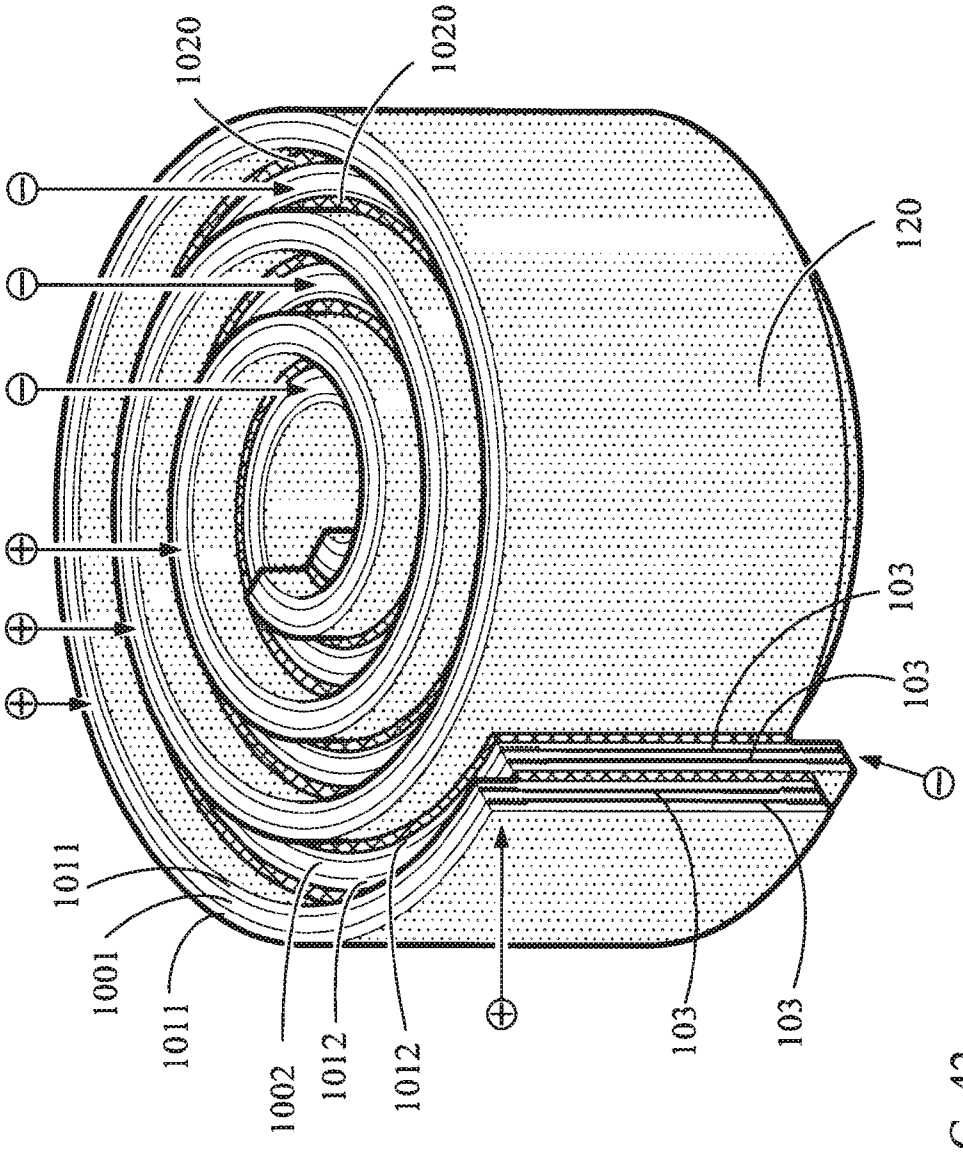


FIG. 42

20102464461 01 Jun 2016

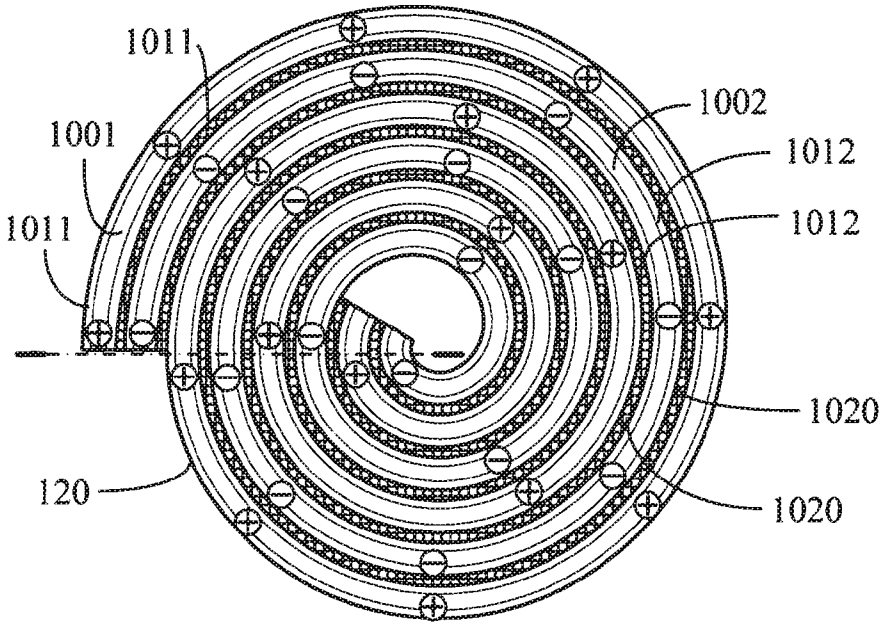


FIG. 43

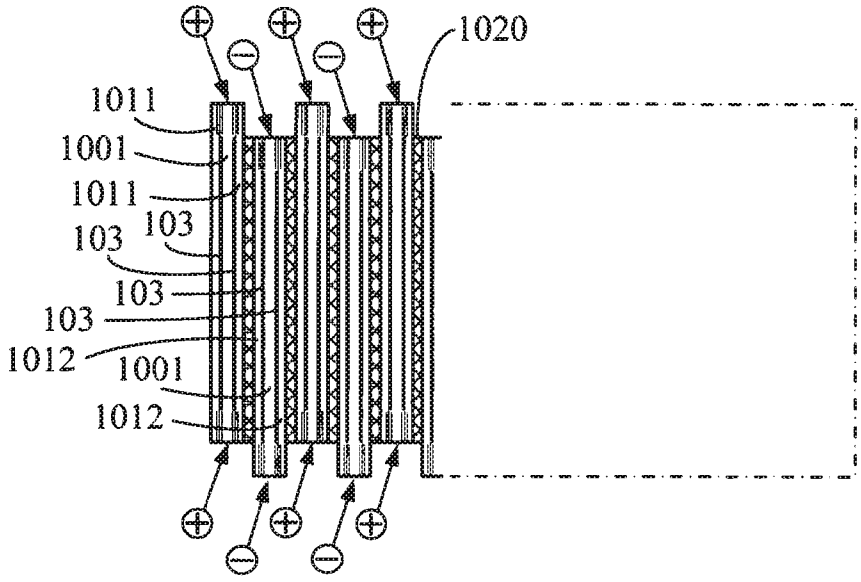


FIG. 44