[CLAIMS]

[Claim 1]
A liquid ejection head comprising:
an ejection orifice through which a liquid is ejected;
a first liquid flow path which is in communication with the ejection orifice;
a second liquid flow path which is in communication with the ejection orifice on the opposite side of the first liquid flow path with respect to the ejection orifice;
a first electrode provided in the first liquid flow path; and
a second electrode which is provided in the second liquid flow path and generates an electro-osmotic flow in the liquid supplied to the ejection orifice together with the first electrode, wherein the first electrode is connected to one terminal of an alternating current (AC) power source and the second electrode is connected to the other terminal of the AC power source, and wherein at least one first electrode is each disposed in the first and second liquid flow paths and at least one second electrode is each disposed in the first and second liquid flow paths, and
in each of the first and second liquid flow paths, the first electrode and the second electrode are alternately disposed, and dimensions of the first and second electrodes in directions along the first and second liquid flow paths are different from each other.

[Claim 2]
The liquid ejection head according to claim 1, further comprising:
an energy-generating element which is positioned to face the ejection orifice and generates energy for ejecting the liquid; and
a substrate provided with the energy-generating element,
wherein the first electrode and the second electrode are disposed on the substrate.

[Claim 3]
The liquid ejection head according to claim 1, further comprising an ejection orifice forming member provided with the ejection orifice,
wherein the first electrode and the second electrode are disposed on the ejection orifice forming member.

[Claim 4]
The liquid ejection head according to claim 1, further comprising:
an energy-generating element which is positioned to face the ejection orifice and generates energy for ejecting the liquid;
a substrate provided with the energy-generating element; and
an ejection orifice forming member provided with the ejection orifice,
wherein the first electrode is disposed on the substrate and the second electrode is disposed on the ejection orifice forming member.

[Claim 5]
The liquid ejection head according to claim 1, wherein one first electrode is disposed in the first liquid flow path, one second electrode is disposed in the second liquid flow path, and a dimension of the first electrode in a direction along the first liquid flow path is equal to a dimension of the second electrode in a direction along the second liquid flow path.

[Claim 6]
The liquid ejection head according to claim 2, further comprising:
a pressure chamber including the energy-generating element which generates energy for ejecting the liquid therein; and
third and fourth electrodes disposed in the pressure chamber, the first liquid flow path, or the second liquid flow path while having the ejection orifice interposed therebetween,
wherein the third electrode is connected to one terminal of a second AC power source and the fourth electrode is connected to the other terminal of the second AC power source.

[Claim 7]
The liquid ejection head according to any one of claims 1 to 4, wherein the first electrode is connected to one terminal of a direct current (DC) power source and the second electrode is connected to the other terminal of the DC power source.

[Claim 8]
The liquid ejection head according to claim 2, further comprising a through-orifice penetrating through the substrate provided with the energy-generating element which generates energy for ejecting the liquid, and connected to the first liquid flow path or the second liquid flow path,
wherein the through-orifice is provided for each of the first liquid flow path or the second liquid flow path.

[Claim 9]
The liquid ejection head according to claim 2, further comprising a through-orifice penetrating through the substrate provided with the energy-generating element which generates energy for ejecting the liquid, and connected to the first liquid flow path or the second liquid flow path,
wherein the through-orifice is shared for a plurality of first liquid flow paths and a plurality of second liquid flow paths.

[Claim 10]
The liquid ejection head according to claim 2, further comprising the energy-generating element which generates energy for ejecting the liquid and a pressure chamber including the energy-generating element therein,
wherein the liquid in the pressure chamber is circulated between the pressure chamber and outside of the pressure chamber.