Claims

[Claim 1]

A ground thermal energy system comprising:

a well;

piping including an end portion on a side extending toward the well; and

a heat exchanger provided to the piping, wherein

the piping includes, at the end portion, a pump pipe connected to a pump configured to pump groundwater in the well, and

a plurality of water injection pipes each including a flow control valve and each extending to the well, and pipe diameters of the plurality of water injection pipes being different from each other.

[Claim 2]

The ground thermal energy system according to claim 1, wherein

the well comprises a pair of wells,

the piping includes, at the end portion on a side extending toward each of the pair of wells, the pump pipe and the plurality of water injection pipes.

[Claim 3]

The ground thermal energy system according to claim 1 or 2, wherein

the flow control valve is capable of maintaining a pressure in the piping in a pressurized state.

[Claim 4]

The ground thermal energy system according to any one of claims 1 to 3, further comprising a valve opening control section configured to adjust a degree of opening of the flow control valve in accordance with a water injection flow rate toward the well.

[Claim 5]

The ground thermal energy system according to claim 4, wherein

the valve opening control section opens only the flow control valve provided in some of the plurality of water injection pipes when a flow rate of the groundwater made to flow into the well is smaller than a flow rate setting reference value.

[Claim 6]

The ground thermal energy system according to any one of claims 1 to 5, wherein

each of water injection pipes is immersed in the groundwater in the well.

[Claim 7]

A control device comprising:

a pump operation control unit configured to operate a pump provided in a pump pipe provided in one well of a pair of wells to pump up groundwater from the pump pipe; and

a valve opening control section configured to adjust a degree of opening of a flow control valve provided in each of a plurality of water injection pipes such that the groundwater pumped up from the pump pipe passes through a heat exchanger and is made to flow into the other of the pair of wells at a predetermined flow rate through the plurality of water injection pipes provided in the other of the pair of wells, wherein

the plurality of water injection pipes each extends to the other of the pair of wells, and pipe diameters of the plurality of water injection pipes are different from each other.

[Claim 8]

A control method comprising:

operating a pump provided in a pump pipe provided in one well of a pair of wells to pump up groundwater from the pump pipe; and

adjusting a degree of opening of a flow control valve provided in each of a plurality of water injection pipes such that the groundwater pumped up from the pump pipe passes through a heat exchanger and is made to flow into the other of the pair of wells at a predetermined flow rate through the plurality of

water injection pipes provided in the other of the pair of wells, wherein

the plurality of water injection pipes each extends to the other of the pair of wells, and pipe diameters of the plurality of water injection pipes are different from each other.

[Claim 9]

A program for causing a computer to execute a method of:

operating a pump provided in a pump pipe provided in one well of a pair of wells to pump up groundwater from the pump pipe; and

adjusting a degree of opening of a flow control valve provided in each of a plurality of water injection pipes such that the groundwater pumped up from the pump pipe passes through a heat exchanger and is made to flow into the other of the pair of wells at a predetermined flow rate through the plurality of water injection pipes provided in the other of the pair of wells, wherein

the plurality of water injection pipes each extends to the other of the pair of wells, and pipe diameters of the plurality of water injection pipes are different from each other.