

CLAIMS

1. A water producing system, at least comprising: a semi-permeable membrane treatment apparatus A; a semi-permeable membrane treatment apparatus B; and a semi-permeable membrane treatment apparatus C, wherein

(a) the semi-permeable membrane treatment apparatus A includes

- a semi-permeable membrane treatment device A for subjecting treatment target water A having a low salt concentration to semi-permeable membrane treatment to produce membrane permeate A and concentrate A, and

- a treatment target water A delivery means for delivering the treatment target water A to the semi-permeable membrane treatment device A,

(b) the semi-permeable membrane treatment apparatus B includes

- a treatment target water B branching means for branching treatment target water B having a higher salt concentration which has a higher osmotic pressure than an osmotic pressure of the concentrate A into two or more,

- a semi-permeable membrane treatment device B for subjecting the treatment target water B to the semi-permeable membrane treatment to produce membrane permeate B and concentrate B, and

- a first treatment target water B delivery means for delivering one of the treatment target water B branched by the treatment

target water B branching means to the semi-permeable membrane treatment device B as treatment target water, and

- (c) the semi-permeable membrane treatment apparatus C includes
- a semi-permeable membrane treatment device C for subjecting treatment target water to the semi-permeable membrane treatment to produce membrane permeate C and concentrate C,
 - a first water

mixing means for mixing the other treatment target water B branched by the treatment target water B branching means with at least part of the concentrate A produced in the semi-permeable membrane treatment device A,

- a mixed water delivery means for delivering the mixed water by the first water mixing means to the semi-permeable membrane treatment device C as treatment target water, and

- a second treatment target water B delivery means for delivering the other treatment target water B branched by the treatment target water B branching means to the first water mixing means.

2. The water producing system according to claim 1 wherein the treatment target water A having a low salt concentration is any one of sewage, industrial drainage, river water, or treatment water obtained by subjecting the water described above to the pre-treatment.

3. The water producing system according to claim 1 or 2, wherein the treatment target water B having a higher salt concentration is any one of seawater, salt lake water, and brackish water.

24. The water producing system according to any of claims 1 to 3, wherein

the semi-permeable membrane treatment device B and the semi-permeable membrane treatment device C are respectively provided with

one or more semi-permeable membrane treatment device,

at least one semi-permeable membrane treatment device selected from a group of the semi-permeable membrane treatment devices included in the semi-permeable membrane treatment device B and the semi-permeable membrane treatment device C is a semi-permeable membrane treatment device X for subjecting both the treatment target water B and the mixed water to the semi-permeable membrane treatment, and

the water producing system further comprises a treatment target water switching means for switching the treatment target water to be delivered to the semi-permeable membrane treatment device X in such a manner that both the treatment target water B and the mixed water are deliverable

to the semi-permeable membrane treatment device X.

35. The water producing system according to claim 24, wherein the semi-permeable membrane treatment device X subjects only one of the treatment target water B and the mixed water to the semi-permeable membrane treatment at one time.

46. The water producing system according to claim 24 or 35, wherein the semi-permeable membrane treatment device X communicates with both the delivery means of the first treatment target water B delivery means and the mixed water delivery means.

57. The water producing system according to any of claims 24 to 46, wherein at least one delivery means selected from a group consisting of the first treatment target water B delivery means and the mixed water delivery means is a delivery means Y capable of delivering both the treatment target water B and the mixed water.

68. The water producing system according to claim 57, wherein the delivery means Y delivers one of the treatment target water B and the mixed water at one time.

79. The water producing system according to any of claims 1 to 68, comprising: a second water mixing means for mixing the treatment target water A with the concentrate A or the treatment target water B or the mixed water; and a treatment target water A bypass delivery means for delivering the treatment target water A to the second water mixing means.

810. The water producing system according to claim 79, wherein the first water mixing means and the second water mixing means are the same water mixing means.

911. The water producing system according to any of claims 1 to 810, comprising:

a biological treatment device for subjecting organic component contained water to biological treatment to obtain biological treatment water; and

a membrane treatment device A for subjecting the biological treatment water to treatment with a microfiltration membrane or an ultrafiltration membrane to obtain membrane treatment water A, wherein the membrane treatment water A serves as the treatment target water A.

1012. The water producing system according to any of claims 1 to 911, comprising:

a water intake means for taking in salt contained water; and

a membrane treatment device B for subjecting the salt contained water taken in by the water intake means to the treatment with the microfiltration membrane or the ultrafiltration membrane to obtain membrane treatment water B, wherein the membrane treatment water B serves as the treatment target water B.

1113. The water producing system according to claim 1012, comprising:

a membrane treatment water B storage reservoir that stores the
membrane treatment water B;

a first membrane treatment water B delivery means for

delivering the membrane treatment water B to the membrane treatment water B storage reservoir;

a mixed water storage reservoir that stores the mixed water;

a second membrane treatment water B delivery means for delivering the membrane treatment water B of the membrane treatment water B storage reservoir to the mixed water storage reservoir; and

a concentrate A delivery means for delivering the concentrate A to the mixed water storage reservoir, wherein

the first treatment target water B delivery means is a delivery means for delivering the membrane treatment water B stored in the membrane treatment water B storage reservoir to the semi-permeable membrane treatment device B, and

the mixed water delivery means is a delivery means for delivering the mixed water stored in the mixed water storage reservoir to the semi-permeable membrane treatment device C.

1214. An operation method for a water producing system, wherein in the water producing system according to any of claims 24 to 1113 including a first flow rate measuring means for measuring a flow rate of the treatment target water A or the concentrate A,

the treatment target water of one or more semi-permeable membrane treatment device X is switched by the treatment target

water switching means based on a measured value of the first flow rate measuring means.

~~13~~15. An operation method for a water producing system, wherein in the water producing system according to any of claims ~~24~~ to ~~11~~13, based on a predetermined value of an accumulated membrane permeate quantity or a predetermined value of a treatment time of one or more semi-permeable membrane treatment device X, the treatment target water of the semi-permeable membrane treatment device X is switched.

~~14~~16. An operation method for a water producing system, wherein in the water producing system according to any of claims ~~79~~ to ~~11~~13 including

- a second flow rate measuring means for measuring a flow rate of the treatment target water A delivered by the treatment target water A bypass delivery means, the treatment target water of one or more semi-permeable membrane treatment device X is switched by the treatment target water switching means based on a measured value of the second flow rate measuring means.

~~15~~17. A water producing system, comprising: a semi-permeable membrane treatment device for subjecting a plurality of different kinds of treatment target water to semi-permeable membrane treatment; and a treatment target water switching means for delivering the treatment target water to the semi-permeable membrane treatment device, wherein

the semi-permeable membrane treatment device is formed by a plurality of semi-permeable membrane treatment devices arranged side by side, and

the water producing system comprises a treatment target water switching means for switching the treatment target water to be delivered to a semi-permeable membrane treatment device X in such a manner that one or more semi-permeable membrane treatment device selected from the plurality of semi-permeable membrane treatment devices serves as the semi-permeable membrane treatment device X for subjecting two or more kinds of treatment target water selected from the plurality of different kinds of treatment target water to the semi-permeable membrane treatment.

1618. The water producing system according to claim 1517, wherein the semi-permeable membrane treatment device X subjects only one kind of treatment target water selected from the plurality of different kinds of treatment target water to the semi-permeable membrane treatment at one time.

1719. The water producing system according to claim 1517 or 1618, wherein the semi-permeable membrane treatment device X communicates with a plurality of treatment target water delivery means.

1820. The water producing system according to any of claims 1517 to 1719, wherein one or more treatment target water delivery means serves as a treatment target water delivery means for delivering plural kinds of treatment target water to the semi-permeable membrane treatment device X by switching the kind of the treatment target water to be delivered by the treatment target

water switching means.

1921. An operation method for a water producing system, wherein in the water producing system according to any of claims 1517 to 1820 including a flow rate measuring means for measuring a flow rate of one kind of treatment target water selected from the plurality of different kinds of treatment target water,

the kind of the treatment target water to be delivered to one or more system of the semi-permeable membrane treatment device X is switched based on a measured value of the flow rate measuring means.

2022. An operation method for a water producing system, wherein in the water producing system according to any of claims 1517 to 1921, based on a predetermined value of an accumulated membrane permeate quantity or a predetermined value of a treatment time of one or more system of the semi-permeable membrane treatment device X, the kind of the treatment target water to be delivered to the semi-permeable membrane treatment device X is switched by the treatment target water delivery means.