CLAIMS

[Claim 1] A circulation-type water treatment system including a rearing tank in which rearing water containing salt is stored, the circulation-type water treatment system being configured to perform circulation such that the rearing water in the rearing tank is treated outside the rearing tank and then the treated rearing water returns to the rearing tank, the circulation-type water treatment system comprising:

a removal section configured to remove at least solids in a first region in which the rearing water sent from the rearing tank is stored or flows;

an electrolysis section configured to perform electrolysis of the rearing water in a second region in which the rearing water having passed through the first region is stored or flows, thereby generating a chloric acid compound, so that the generated chloric acid compound reacts with ammonia or ammonium ions in the rearing water;

a residual chlorine removing section configured to remove at least residual chlorine in a third region in which the rearing water having passed through the second region is stored or flows;

an ozone generation section configured to generate ozone;

a first residual chlorine sensor configured to detect a concentration of residual chlorine contained in the rearing water until flowing into the third region after having passed through the second region; and

a second residual chlorine sensor configured to detect a concentration of residual chlorine contained in the rearing water in a fourth region in which the rearing water having passed through the third region is stored or flows before returning to the rearing tank, wherein

the removal section includes a bubble separator configured to generate bubbles containing ozone generated by the ozone generation section, so that the solids contained in the rearing water in the first region are adsorbed to the bubbles, and

the residual chlorine removing section removes residual ozone in the third region.

[Claim 2] The circulation-type water treatment system according to claim 1, further comprising a control section configured to control electrolysis in the electrolysis

section on the basis of a measurement result from the first residual chlorine sensor .

[Claim 3] The circulation-type water treatment system according to claim 1, further comprising a coping section configured to, when a predetermined measurement result is obtained from the second residual chlorine sensor , remove residual chlorine from the rearing water in the fourth region or stop returning the rearing water in the fourth region to the rearing tank .

[Claim 4] A circulation-type water treatment system including a rearing tank in which rearing water containing salt is stored, the circulation-type water treatment system being configured to perform circulation such that the rearing water in the rearing tank is treated outside the rearing tank and then the treated rearing water returns to the rearing tank, the circulation-type water treatment system comprising:

a removal section configured to remove at least solids in a first region in which the rearing water sent from the rearing tank is stored or flows;

an electrolysis section configured to perform electrolysis of the rearing water in a second region in which the rearing water having passed through the first region is stored or flows, thereby generating a chloric acid compound, so that the generated chloric acid compound reacts with ammonia or ammonium ions in the rearing water;

a residual chlorine removing section configured to remove at least residual chlorine in a third region in which the rearing water having passed through the second region is stored or flows; and

an ozone generation section configured to generate ozone, wherein

the removal section includes a bubble separator configured to generate bubbles containing ozone generated by the ozone generation section, so that the solids contained in the rearing water in the first region are adsorbed to the bubbles,

the residual chlorine removing section removes residual ozone in the third region, and

the circulation-type water treatment system further comprises an ammonium ion sensor configured to detect ammonium ions contained in the rearing water in a fourth region in which the rearing water having passed through the third region is stored or flows before returning to the rearing tank.

[Claim 5] The circulation-type water treatment system according to claim 1, further comprising an ammonium ion sensor configured to detect ammonium ions contained in the rearing water in the fourth region.

[Claim 6] The circulation-type water treatment system according to any one of claims 1 to 5, wherein

the removal section includes

a reservoir tank in which the rearing water introduced from a region of a process preceding to the removal section is stored,

an introduction section configured to introduce the rearing water stored in the reservoir tank, into the bubble separator,

a lead-out section configured to return the rearing water having passed through the bubble separator, to the reservoir tank, and

a discharge section configured to discharge the rearing water stored in the reservoir tank, to a region of a process subsequent to the removal section.

[Claim 7] The circulation-type water treatment system according to any one of claims 1 to 5, wherein

the removal section is configured such that, after the rearing water supplied from a region of a process preceding to the removal section is introduced into the bubble separator through an introduction path, the rearing water is passed through the bubble separator, and then is led out to a region of a process subsequent to the removal section, which is different from a region of an introduction source where an inlet of the introduction path is located.

[Claim 8] The circulation-type water treatment system according to claim 4 or 5, further comprising a control section configured to control electrolysis in the electrolysis section on the basis of a measurement result from the ammonium ion sensor.

[Claim 9] The circulation-type water treatment system according to claim 8, further comprising a residual chlorine sensor configured to detect residual chlorine

contained in the rearing water in a region in which the rearing water having passed through the second region is stored or flows before returning to the rearing tank, wherein

the control section controls electrolysis in the electrolysis section on the basis of a measurement result from the ammonium ion sensor and a measurement result from the residual chlorine sensor.

[Claim 10] The circulation-type water treatment system according to claim 4 or 5, further comprising a residual chlorine sensor configured to detect residual chlorine contained in the rearing water in a region in which the rearing water having passed through the second region is stored or flows before returning to the rearing tank.

[Claim 11] The circulation-type water treatment system according to claim 4 or 5, further comprising:

a residual chlorine sensor configured to detect residual chlorine contained in the rearing water in the fourth region; and

a coping section configured to, when a predetermined measurement result is obtained from the residual chlorine sensor, remove residual chlorine from the rearing water in the fourth region or stop returning the rearing water in the fourth region to the rearing tank.

[Claim 12] The circulation-type water treatment system according to claim 11, wherein

the coping section includes a neutralizer supply section configured to, when a detected value from the residual chlorine sensor has exceeded a predetermined value, supply a neutralizer for causing a neutralization reaction with residual chlorine, to the rearing water before returning to the rearing tank.

[Claim 13] The circulation-type water treatment system according to claim 4, further comprising:

an electrolysis tank in which the rearing water having passed through the removal section is stored or flows;

a reaction tank in which the rearing water having passed through the electrolysis tank is stored or flows, and in which a reaction period for the chloric acid compound generated in the electrolysis tank and ammonia or ammonium ions contained in the rearing water is ensured;

a residual chlorine removal tank in which the rearing water having passed through the reaction tank is stored or flows;

a standby tank in which the rearing water having passed through the residual chlorine removal tank is stored or flows, and in which a water quality of the rearing water before returning to the rearing tank is examined;

a first residual chlorine sensor configured to detect residual chlorine contained in the rearing water until flowing into the residual chlorine removal tank after having passed through the electrolysis tank;

a second residual chlorine sensor configured to detect residual chlorine contained in the rearing water in the standby tank;

a control section configured to control electrolysis in the electrolysis section on the basis of a measurement result from the ammonium ion sensor and a measurement result from the first residual chlorine sensor; and

a coping section configured to, when a predetermined measurement result is obtained from the second residual chlorine sensor, remove residual chlorine from the rearing water in the fourth region or stop returning the rearing water in the fourth region to the rearing tank, wherein

the second region includes at least an internal region of the electrolysis tank,

the third region includes at least an internal region of the residual chlorine removal tank, and

the fourth region includes at least an internal region of the standby tank.

[Claim 14] The circulation-type water treatment system according to any one of claims 1 to 5, further comprising:

a pH sensor configured to measure a pH of the rearing water in the fourth region; and

a pH adjustment section configured to adjust a pH in the fourth region or a region from the fourth region to the rearing tank, on the basis of a measurement result

from the pH sensor.