Claims

1. A gas phase distribution control apparatus for a dividing wall column, comprising:

a filler layer for removing liquid from a gas phase; and

a distribution layer arranged above the filler layer and provided with at least two gas phase channels that are independent of each other and respectively communicate with the filler layer and the upside of the distribution layer, wherein each gas phase channel has an inlet close to the filler layer and an outlet close to the upside of the distribution layer, and at least two of the inlets are respectively arranged with an opening that is adjustable in size by means of a gas phase distribution mechanism according to a preset gas phase distribution ratio,

wherein the distribution layer is provided with two of the gas phase channels, and the gas phase distribution mechanism comprises:

a hollow circular ring that is fixed above the filler layer and comprises three sections sequentially arranged in circumferential direction, wherein the bottom of one section is provided with two inlets that are spaced apart from each other or communicate with each other in the circumferential direction of the hollow circular ring, and the other two sections are respectively located at two ends of said one section and have respectively an outlet in the top; and

a slider that is adaptively arranged in inner cavity of the hollow circular ring and slidable in said one section in the circumferential direction of the hollow circular ring,

the gas phase distribution mechanism is arranged to adjust the size of the two inlets by changing the position of the slider;

or, wherein the gas phase distribution mechanism comprises:

a hollow circular ring that is fixed above the filler layer and comprises at least four sections arranged sequentially in circumferential direction, wherein the bottoms of at least two of the at least four sections are respectively provided with an inlet, and at least the other two of the at least four sections are respectively provided with an outlet in the tops, and the inlets and the outlets are alternately arranged in the circumferential direction of the hollow circular ring; and

at least two sliders that are adaptively arranged in inner cavity of the hollow circular ring and slidable in the circumferential direction of the hollow circular ring,

the gas phase distribution mechanism is arranged to adjust the size of the at least two inlets by changing the positions of the at least two sliders.

2. The gas phase distribution control apparatus according to claim 1, wherein

the hollow circular ring comprises four sections L1, L2, L3 and L4 that have the same arc length and are arranged sequentially, wherein the bottoms of L1 and L3 are respectively provided with a hollowed inlet part to form the two inlets, and the tops of L2 and L4 are respectively provided with a hollowed outlet part to form the two outlets;

the gas phase distribution mechanism comprises two sliders that are slidably arranged in L1 and L3 respectively.

3. The gas phase distribution control apparatus according to claim 1, wherein

the hollow circular ring comprises four sections L1, L2, L3 and L4 that have the same arc length and are arranged sequentially, wherein the bottoms of L1 and L2 are respectively provided with a hollowed inlet part to form the two inlets, and the tops of L3 and L4 are respectively provided with a hollowed outlet part to form the two outlets;

the gas phase distribution mechanism comprises two sliders that are slidably arranged in L1 and L2 respectively.

4. The gas phase distribution control apparatus according to any of claims 1-3, wherein the slider(s) is/are a magnetic component, and the gas phase distribution mechanism further comprises an electromagnetic distribution control component, which comprises:

an arc-shaped track coaxially arranged outside the hollow circular ring;

an electromagnet that is arranged on the arc-shaped track and movable along the arc-shaped track; and

an electromagnetic controller arranged to drive the electromagnet to move according to the preset gas phase distribution ratio so as to drive the slider to a desired position.

5. The gas phase distribution control apparatus according to claim 4, wherein the inner cavity of the hollow circular ring has a circular cross section, and the slider is a hollow iron ball.

6. The gas phase distribution control apparatus according to any of claims 1-3, comprising a baffle plate arranged between the distribution layer and the filler layer so that the filler layer communicates with the upside of the distribution layer only through the gas phase channel; and/or

a filler grille is provided at the bottom of the filler layer.

7. The gas phase distribution control apparatus according to claim 6, wherein

the baffle plate is hermetically arranged at the inner side of the hollow circular ring and located at a middle position of the hollow circular ring in the axial direction,

and/or

the porosity of the filler grille is 5%~15%.

8. A dividing wall column, comprising the gas phase distribution control apparatus according to any of claims 1-7, wherein a dividing wall of the dividing wall column is located in the middle section of the column body and extends in the axial direction of the column body, and divides the internal space of the column body into a common rectifying section above the dividing wall, a feeding section on the left side of the dividing wall, a discharging section on the right side of the dividing wall, and a common stripping section below the dividing wall, the gas phase distribution control apparatus is arranged below the dividing wall, and said at least two outlets communicate with the two sides of the dividing wall respectively.

9. The dividing wall column according to claim 8, wherein

the gas phase distribution control apparatus comprises two gas rise channels that communicate with said at least two outlets respectively and lead to the two sides of the dividing wall respectively; and/or

the dividing wall has a multi-layer hollow structure, and the hollow part of the dividing wall is filled with an inert gas or heat-insulating material.

10. The dividing wall column according to claim 9, wherein the cross-sectional area of the gas rise channel is 10%~40% of the cross-sectional area of the column body; and/or

the cross section of the gas rise channel is rectangular, square or circular.