claims

1. A dust removal filler (6), comprising:

a plurality of rows of flow channels (61), each flow channel (61) extending obliquely with respect to a vertical direction to form a windward surface (611) and a leeward surface (612), each flow channel (61) is obliquely prismatic-shaped and has a rectangular cross-section, one pair of opposite sides extending obliquely relative to the vertical direction to form the windward surface (611) and the leeward surface (612), and the other pair of opposite sides extending along the vertical direction, each row of flow channels (61) is formed by a rectangular-wave plate (63) and a partition plate (64) to define flow channels therebetween; and

a waveform plate (62), the peak portion of the waveform plate (62) is attached to the leeward surface (612) of the flow channel (61), when the gas flows from top to bottom along the flow channels (61), the gas only flows through area between the waveform plate (62) and the windward surface (611), and does not flow into area between the waveform plate (62) and the leeward surface (612),

during operation:

dust adheres to a concave portion of a lower surface of the waveform plate (62) under the action of Van Der Waals force;

dust accumulates under the action of Coulomb force to form dust aggregates;

when the gravity of the dust aggregates is greater than the adhesion force, the dust aggregates fall onto the windward surface (611) of the flow channels (61); and

the aggregates slide off from the windward surface (611) of the flow channels (61).

2. The dust removal filler (6) according to claim 1, wherein the obliquely prismatic flow channels (61) in two adjacent rows are inclined in opposite directions.

3. The dust removal filler (6) according to claim 2, wherein opening

directions of two adjacent rectangular-wave plates (63) are opposite.

4. The dust removal filler (6) according to claim 1, wherein the inclination angle of the obliquely prismatic flow channel (61) is greater than the angle of repose of the intercepted dust.

5. A gas purification device, comprising:

a body including a housing (5), an upper head (4), and a lower head (7);

a plurality of fouling collection pans (3) arranged in the upper head (4) and the housing (5); and

one or more layers of dust removal fillers (6) according to any one of claims 1 to 4, each layer of dust removal fillers (6) is disposed between two adjacent fouling collection pans (3).

6. A fouling collection pan (3), comprising:

a column tray (31); and

at least one fouling collection device (300) arranged on the column tray (31), each fouling collection device (300) includes a gas collection cartridge (310) and a baffle plate (311) arranged on the outer wall of the gas collection cartridge (310); the baffle plate (311) is formed by multi-layer conical baffles, the conical baffle is composed of a conical plate (3111) and a waveform plate (3112);

during operation:

dust adheres to the concave portion of the lower surface of the waveform plate (3112) under the action of Van Der Waals force;

dust accumulates under the action of Coulomb force to form dust aggregates;

when the gravity of the dust aggregate is greater than the adhesion force, the dust aggregate falls onto the upper surface of the conical plate (3111) below, or directly falls onto the column tray (31); and

the aggregate slide from the upper surface of the conical plate (3111) onto the column tray (31).

7. The fouling collection pan (3) according to claim 6, wherein the gas collection cartridge (310) is a vertical cylindrical structure, the top end of the gas collection cartridge (310) is closed, the lower end thereof is open,

the lower end of the gas collection cartridge (310) passes through the column tray (31) and is connected with the column tray (31), and the outer wall of the gas collection cartridge (310) is provided with a plurality of ventilation holes (3101).

8. The fouling collection pan (3) according to claim 7, wherein the lower end of the gas collection cartridge (310) vertically passes through the column tray (31) and is connected with the column tray (31), and the ventilation hole (3101) is arranged on the cartridge wall between two adjacent layers of conical baffles.

9. The fouling collection pan (3) according to claim 6, wherein the column tray (31) is provided with a plurality of fouling collection devices (300), and the plurality of fouling collection devices (300) are evenly arranged on the column tray (31).

10. A gas purification device, comprising an upper head (4), a lower head (7) and a housing (5), at least one said fouling collection pan (3) according to any one of claims 6 to 9 is arranged inside of the gas purification device.

11. The gas purification device according to claim 10, further comprising one or more layers of the dust removal filler (6) according to any one of claims 1 to 4, the gas purification device is provided with multi-layer fouling collection pans (3), and each layer of dust removal filler (6) is arranged between two adjacent fouling collection pans (3).

12. The gas purification device according to claim 10, further comprising one or more protective agent beds (10), and the protective agent beds (10) are arranged under the fouling collection pan (3).

13. The gas purification device according to claim 12, wherein the protective agent bed (10) is filled with a bird-nest protective agent, and the bird-nest protective agent includes a cartridge and a plurality of ribs, the plurality of ribs intersect each other to form a grid, and form an acute angle at the point of intersections.

14. The gas purification device according to claim 13, wherein when multi-layer dust removal fillers (6) are provided, the wave amplitude and

wavelength of the waveform plates (62) of the multi-layer dust removal fillers (6) gradually decrease along the gas flow direction.

15. A fouling collection pan (3) comprising:

a column tray (31); and

a fouling collection device (300) arranged on the column tray (31), the fouling collection device (300) includes a filter body (305), a baffle separation body (304) and a cover plate (303);

the filter body (305) is a sleeve annular columnar structure defining a fouling collection device axis;

the baffle separation body (304) is a columnar structure of annular folded plates extending around the fouling collection device axis, formed of multi-layer annular folded plates, and the cross section of the annular folded plates is an inverted V shape, thereby forming an inverted V-shaped annular folded plate extending around the fouling collection device axis, the baffle separation body (304) is sleeved outside of the filter body (305);

the cover plate (303) is located above the baffle separation body (304) and the filter body (305) and covers the baffle separation body (304) and the filter body (305), the top end of the baffle separation body (304) is connected with the cover plate (303;

during operation:

dust adheres to the apex of inverted V-shape of the annular folded plate under the action of Van Der Waals force;

dust accumulates under the action of Coulomb force to form dust aggregates;

when the gravity of the dust aggregates is greater than the adhesion force, the dust aggregates falls onto the upper surface of the annular folded plate below, or directly falls onto the column tray (31); and

the aggregates slides off the upper surface of the annular folded plate onto the column tray (31).

16. The fouling collection pan (3) according to claim 15, wherein the lower end of the filter body (305) passes through the column tray (31), and the filter body (305) includes an inner cylinder (307), an outer cylinder (308)

and a fouling collection filling material (306) arranged in an annular space between the inner cylinder (307) and the outer cylinder (308).

17. A gas purification device, comprising an upper head (4), a lower head (7) and a housing (5), at least one said fouling collection pan (3) according to any one of claims 15 to 16 is arranged inside of the gas purification device.

18. The gas purification device according to claim 17, further comprising one or more layers of the dust removal filler (6) according to any one of claims 1 to 4, and each layer of dust removal filler (6) is arranged between two adjacent fouling collection pans (3).

19. The gas purification device according to claim 17, the gas purification device is provided with multi-layer fouling collection pans (3), a protective agent bed (10) or the dust removal filler (6) according to any one of claims 1 to 4 is arranged between the two adjacent layers of fouling collection pans (3), and the dust removal filler (6) is set above the protective agent bed (10), when three layers of fouling collection pans are installed, a first layer of fouling collection pan (3), a dust removal filler (6), a second layer of fouling collection pan (3), a protective agent bed (10) and a third layer of fouling collection pan (3) are in order according a gas flow direction.