

THAT WHICH IS CLAIMED IS:

1. A device for filtering and settling entrained particles from a gas feed stream, the device comprising:
 - a cylindrical v-wire filter element to filter the entrained particles, wherein the v-wire filter element comprises a solid metal ring and a body, wherein the solid metal ring is mounted on a top portion of the body to form a hollow internal passageway of the v-wire filter element, wherein the body comprises slits, wherein a first portion of gas stream flows radially through the slits to form a filtered gas stream, and wherein the hollow internal passageway receives the filtered gas stream;
 - a cap located above the v-wire filter element comprising an outer surface, an under surface, and a downward rim attached to a perimeter of the under surface, wherein a bottom edge of the rim is aligned with a bottom edge of the solid metal ring; and
 - an open annulus area located between and in fluid communication with an open top portion of the v-wire filter element and the under surface of the cap, wherein a second portion of gas feed stream flows upward along a length of the v-wire filter element, into the open annulus area and downward into the hollow internal passageway.
2. The device of Claim 1, wherein the v-wire filter element filters entrained particles with a diameter of 100 microns (μm) and above from the first portion of the gas stream.
3. The device of Claim 1, wherein the filtered gas stream flowing through the hollow internal passage comprises a maximum velocity of 1 meter/second (m/s).
4. The device of Claim 1, wherein the gas feed stream is essentially in a gaseous phase.
5. A gas-phase settling (GPS) tray installed within a catalytic reactor, the GPS tray comprising:
 - a plurality of devices for trapping entrained particles from an inlet gas feed stream by particle filtration and settling, wherein each device comprises:
 - a cylindrical v-wire filter element to filter the entrained particles, wherein the v-wire filter element comprises slits and a hollow internal passage, wherein a first portion of gas stream flows radially through the slits to form a filtered gas stream, and wherein the hollow internal passage receives the filtered gas stream;
 - a cap located above the v-wire filter element and comprising an outer surface and an

- under surface; and
- an open annulus area located between and in fluid communication with an opentop portion of the v-wire filter element and the under surface of the cap, wherein a second portion of gas feed stream flows upward along a length of the v-wire filter element, into the open annulus area and downward into the hollow internal passage; and
- a planar surface comprising a plurality of panels, wherein each panel comprises an opening, and wherein the hollow internal passage of each device is located above and aligned with the opening of the panel.
6. The GPS tray of Claim 5, wherein the v-wire filter element filters entrained particles with a diameter of 100 microns (μm) and above from the first portion of the gas stream.
 7. The GPS tray of Claim 5, wherein a total open slit area of the v-wire filter elements is greater than or equal to a total open annulus area.
 8. The GPS tray of Claim 5, wherein the filtered gas stream flowing through the hollow internal passage comprises a maximum velocity of 1 meter/second (m/s).
 9. The GPS tray of Claim 5, wherein the gas feed stream is essentially in a gaseous phase.
 10. The GPS tray of Claim 5, wherein pressure-drop across at least one catalyst bed of the catalytic reactor is less than 0.0145 psi (1 millibar (mbar)) when the GPS tray is installed therein.
 11. The GPS tray of Claim 5, wherein the v-wire filter element filters entrained particles with a diameter of 100 μm and above from the first portion of the gas stream, wherein the entrained particles settle on the planar surface.
 12. The GPS tray of Claim 5, wherein the velocity of the second portion of the gas stream flowing upwards through the open annulus area is lower than the terminal velocity of particles with a diameter of 100 μm .
 13. The GPS tray of Claim 5, wherein the GPS tray is installed above a top catalyst bed of the catalytic reactor.
 14. A method for removing entrained particles from an inlet gas feed stream flowing into a catalytic reactor, the method comprising:

- (a) flowing the inlet gas feed stream into a top inlet of the catalytic reactor; and
- (b) subjecting the inlet gas feed stream to a gas-phase settling (GPS) tray installed within the catalytic reactor, the GPS tray comprising:
 - a plurality of devices for trapping entrained particles from an inlet gas feed stream by particle filtration and settling, wherein each device comprises:
 - a cylindrical v-wire filter element to filter the entrained particles, wherein the v-wire filter element comprises slits and a hollow internal passage, wherein a first portion of gas stream flows radially through the slits to form a filtered gas stream, and wherein the hollow internal passage receives the filtered gas stream;
 - a cap located above the v-wire filter element and comprising an outer surface and an under surface; and
 - an open annulus area located between and in fluid communication with an open top portion of the v-wire filter element and the under surface of the cap, wherein a second portion of gas feed stream flows upward along a length of the v-wire filter element, into the open annulus area and downward into the hollow internal passage; and
 - a planar surface comprising a plurality of panels, wherein each panel comprises an opening, and wherein the hollow internal passage of each device is located above and aligned with an opening of the panel.

15. The method of Claim 14, wherein pressure-drop across at least one catalyst bed of the catalytic reactor is less than 0.0145 psi (1 millibar (mbar)) when the GPS is installed therein.

16. The method of Claim 14, wherein the filtered gas stream flowing through the hollow internal passage comprises a maximum velocity of the 1 meter/second (m/s).