Claims

1. A separator (18) for separating a fluid mixture comprising gas and liquid, a first stage of separation including an inlet device (17) to the separator (18), the separator comprising:

a distribution chamber (2) connected to an inlet opening (31) for distributing the fluid mixture to one or more axial cyclones (3) constituting an integral part of the inlet device (17) and being connected to the distribution chamber (2), the one or more axial cyclones (3) being provided with an outlet opening (9) for a gas rich fluid stream and one or more openings (24) to allow liquid to leave the axial cyclones (3) and to pass into a liquid collection chamber;

a liquid pad (7) located below the inlet device (17), wherein liquid leaving the axial cyclones (3) through the one or more openings (24) is drained to the liquid pad (7), and liquid from liquid-rich fluid drained below the distribution chamber (2) is drained to the liquid pad (7); and

a demisting device (6) below said distribution chamber; and

one or more downcomers for draining fluid from the liquid collection chamber to a location underneath said distribution chamber and below said demisting device;

a liquid drain pipe (4) arranged to drain liquid-rich fluid from the distribution chamber (2) to the liquid pad (7);

wherein said demisting device is configured to further demist fluid drained through the liquid drain pipe (4) and/or the one or more downcomers (5), after which a fluid is allowed to pass upwards outside the distribution chamber (2).

2. A separator as claimed in claim 1, wherein the liquid leaving the one or more axial cyclones (3) through the one or more openings (24) is collected in a liquid collection chamber (8) from which liquid is drained into the liquid pad (7) of the separator (18).

3. A separator as claimed in claim 1, wherein, when a lowermost end of the one or more downcomers (5) or the liquid drain pipe (4) is located above the liquid pad (7) of the separator (18), diffusers (13) are arranged on the lowermost end to reduce gas momentum.

4. A separator as claimed in claim 1, wherein the one or more axial cyclones (3) are arranged in groups, having a common liquid collection chamber for each group.

5. A separator as claimed in claim 1, wherein the distribution chamber (2) is adapted to the separator (18) in which it is to be used so that a horizontal cross-section of the distribution chamber (2) covers between 65% and 90% of a horizontal cross-section of the separator (18).

6. A separator as claimed in claim 1, wherein all upward openings from the distribution chamber (2) are connected to said one or more axial cyclones (3).

7. A separator as claimed in claim 1, wherein the one or more downcomers (5) extend into the liquid pad (7), sealing the one or more downcomers from transporting gas underneath the inlet device (17).

8. A separator as claimed in claim 1, wherein the liquid drain pipe (4) extends into the liquid pad (7), sealing the liquid drainage from transporting gas underneath the inlet device (17).

9. A separator comprising an inlet device being arranged as a first stage of separation in the separator, the inlet device comprising:

a distribution chamber having an inlet opening arranged for receiving a liquid-and-gas mixture;

one or more axial cyclones mounted to the distribution chamber;

a liquid pad located below the distribution chamber and arranged to receive liquid from a liquid-rich stream exiting one or more sidewall openings of the axial cyclones and from liquid-rich fluid drained below the distribution chamber; and

a demisting device (6) below said distribution chamber;

one or more downcomers for draining fluid from a liquid collection chamber to a location below said demisting device;

a liquid drain pipe arranged to drain liquid-rich fluid from the distribution chamber to the liquid pad;

wherein said demisting device is configured to further demist fluid drained through the liquid drain pipe (4) and/or the one or more downcomers (5), after which a fluid is allowed to pass upwards outside the distribution chamber (2).

10. A separator as claimed in claim 9, further comprising the inlet device including a liquid collection chamber arranged to receive liquid leaving the one or more axial cyclones and to drain the liquid into the liquid pad of the separator.

11. A separator as claimed in claim 9, wherein the one or more downcomers or the liquid drain pipe are arranged to extend into the liquid pad of the separator.

12. A separator as claimed in claim 9, wherein the one or more axial cyclones of the inlet device are arranged in groups, having a common liquid collection chamber for each group.

13. A separator as claimed in claim 9, wherein the distribution chamber is adapted to the separator vessel in which it is to be used so that a horizontal cross-section of the

distribution chamber covers between 65% and 90% of a horizontal cross-section of the separator.

14. A separator as claimed in claim 9, wherein all upward openings from the distribution chamber are connected to the one or more axial cyclones of the inlet device.

15. A separator comprising an inlet device being arranged as a first stage of separation in the separator, the separator comprising:

a liquid pad located below an inlet distribution chamber, the distribution chamber including axial cyclones, the liquid pad arranged to receive liquid from a liquid-rich stream exiting one or more sidewall openings of the axial cyclones and from liquid-rich fluid drained below the inlet distribution chamber; and

a liquid drain pipe arranged to drain liquid-rich fluid from the inlet distribution chamber to the liquid pad;

a demisting device (6) below said distribution chamber;

one or more downcomers for draining fluid from a liquid collection chamber to a location below said demisting device;

wherein said demisting device is configured to further demist fluid drained through the liquid drain pipe (4) and/or the one or more downcomers (5), after which a fluid is allowed to pass upwards outside the distribution chamber (2).

16. A vertically elongated gravity separator (18) for separating a fluid mixture comprising gas and liquid, a first stage of separation including an inlet device (17) to the separator (18), the vertically elongated gravity separator comprising:

a vertically oriented vessel;

a distribution chamber (2) connected to an inlet opening (31) in said vertically oriented vessel for distributing the fluid mixture to one or more axial cyclones (3) constituting an integral part of the inlet device (17) and being connected to the distribution chamber (2), said axial cyclones mounted to a top end of the distribution chamber, the one or more axial cyclones (3) being provided with an outlet opening (9) for a gas rich fluid stream and one or more openings (24) to allow liquid to leave the axial cyclones (3) and to pass into a liquid collection chamber;

a liquid pad (7) located below the inlet device (17), wherein liquid leaving the axial cyclones (3) through the one or more openings (24) is drained to the liquid pad (7), and liquid from liquid-rich fluid drained below the distribution chamber (2) is drained to the liquid pad (7).