

CLAIMS

What is claimed is:

1. A reactor comprising:

a fan arranged on a central rod in a reactor tube, the fan having radial fluid ducts for directing fluid flow through the reactor, the fluid ducts being effective to radially guide the fluid flow to contact the reactor tube;

the fan having a top surface, a bottom surface and an outer diameter face such that the radial fluid ducts terminate along the outer diameter face of the fan to form fluid duct openings facing the reactor tube.

2. The reactor of claim 1, further comprising a core arranged on the central rod.
3. The reactor of claim 1, the fan being a corrugated disk having a center aperture for receiving the central rod.
4. The reactor of claim 1, further comprising a washer being in the shape of a ring having an inner diameter and an outer diameter, the washer being in contact with the top surface or the bottom surface of the fan wherein the outer diameter of the washer extends radially outward from the outer diameter face of the fan
5. The reactor of claim 4, the washer further having spacing tabs extending outward from the outer diameter of the washer.
6. The reactor according to any of claims 4 to 5, the washer or spacing tabs being in contact with the reactor tube and the outer diameter face of the fan not being in contact with the reactor tube.
7. The reactor of claim 1, the central rod having a base plate for supporting the fan arranged on the central rod, the base plate extending radially outward from the central rod.
8. The reactor of claim 1, the central rod having a top end and a bottom end, the central rod having a cylindrical cavity at the top end or bottom end for receiving a portion of another central rod.
9. The reactor of claim 1, the fan being a helix fan.

10. The reactor of claim 9, the helix fan having an incline angle in the range of 5 to 40 degrees.
11. The reactor of claim 9, the helix fan further having a helix washer, the helix washer extending outward from the outer diameter face of the helix fan, a portion of the helix washer being in contact with the reactor tube.
12. The reactor of claim 11, the outer diameter face the helix fan being not in contact with the reactor tube wherein the helix washer creates a gap between the outer diameter face of the helix fan and the reactor tube, the gap being at least 1 mm.
13. The reactor of claim 1, the outer diameter face of the fan having a notch extending around the perimeter of the fan, the notch being an annular channel around the outer diameter face of the fan.
14. The reactor of claim 13, the outer diameter face of the fan further having one or more nose portions, the one of one or more nose portions defining the notch and the one or more nose portions being in contact with the reactor tube.
15. A stackable structural reactor comprising:
 - a reactor component having a top surface, a bottom surface and a circular outer diameter face, the reactor component arranged in a reactor tube;
 - a washer having an inner diameter and an outer diameter, the washer being in contact with the top surface or the bottom surface of the reactor component, the washer extending radially outward beyond the circular outer diameter face of the reactor component;
 - the outer diameter of the washer not being in contact with the reactor tube.

CLAIMS

What is claimed is:

1. A reactor comprising:
a stationary fan arranged on a central rod in a reactor tube,
the fan having radial fluid ducts for directing fluid flow
through the reactor, the fluid ducts being effective to
radially guide the fluid flow to contact the reactor tube
and promote heat transfer along the reactor tube;
the fan having a top surface, a bottom surface and an outer
diameter face such that the radial fluid ducts terminate
along the outer diameter face of the fan to form fluid duct
openings facing the reactor tube.
2. The reactor of claim 1, further comprising a core
arranged on the central rod.
3. The reactor of claim 1, wherein the fan being a corru-
gated disk having a center aperture for receiving the central
rod.
4. The reactor of claim 1, wherein the fan further having a
washer in contact with the top surface or the bottom surface of
the fan.
5. The reactor of claim 4, wherein the washer being in the
shape of a ring having an inner diameter and an outer diam-
eter, the washer being in contact with the top surface or the
bottom surface of the fan wherein the outer diameter of the
washer extends radially outward from the outer diameter face
of the fan.
6. The reactor of claim 5, wherein the washer being flat or
corrugated.
7. The reactor of claim 5, wherein the washer further hav-
ing spacing tabs extending outward from the outer diameter
of the washer.
8. The reactor of claim 5, wherein the washer being in
contact with the reactor tube.
9. The reactor of claim 8, wherein the outer diameter face
of the fan being not in contact with the reactor tube wherein
the washer creates a gap between the outer diameter face of
the fan and the reactor tube of at least 1 mm.
10. The reactor of claim 1, wherein the central rod having
a base plate for supporting the fan arranged on the central rod,
the base plate extending radially outward from the central
rod.

11. The reactor of claim 1, wherein the central rod having a top end and a bottom end, the central rod having a cylindrical cavity at the top end or bottom end for receiving a portion of another central rod.

12. The reactor of claim 1, wherein the fan being a helix fan.

13. The reactor of claim 12, wherein the helix fan having an incline angle in the range of 5 to 40 degrees.

14. The reactor of claim 12, wherein the helix fan further having a helix washer, the helix washer extending outward from the outer diameter face of the helix fan, a portion of the helix washer being in contact with the reactor tube.

15. The reactor of claim 14, wherein the outer diameter face the helix fan being not in contact with the reactor tube wherein the helix washer creates a gap between the outer diameter face of the helix fan and the reactor tube, the gap being at least 1 mm.

16. The reactor of claim 1, wherein the outer diameter face of the fan having a notch extending around the perimeter of the fan.

17. The reactor of claim 16, wherein the notch being an annular channel around the outer diameter face of the fan.

18. The reactor of claim 17, wherein the outer diameter face of the fan further having one or more nose portions, the one of one or more nose portions defining the notch and the one or more nose portions being in contact with the reactor tube.

19. The reactor of claim 17, wherein the fan further having a helix washer in contact with the top surface or the bottom surface.

20. A stackable structural reactor comprising:
a stationary reactor component arranged in a reactor tube,
the reactor component having a top surface, a bottom
surface and a circular outer diameter face, the reactor
component adapted to radially direct fluid flow through
the reactor towards the reactor tube and promote heat
transfer along the reactor tube arranged in a reactor tube;
a washer having an inner diameter and an outer diameter,
the washer being in contact with the top surface or the
bottom surface of the reactor component, the washer
extending radially outward beyond the circular outer
diameter face of the reactor component;
the outer diameter of the washer not being in contact with
the reactor tube.
21. The reactor of claim 1, wherein the heat transfer along
the reactor tube promotes carrying out catalytic reactions.
22. The reactor of claim 1, wherein the heat transfer along
the reactor tube effectively transfers heat from the exterior of
the reactor to the fluid contained in the reactor or from the
fluid contained in the interior of the reactor to the exterior of
the reactor.
23. The reactor of claim 20, wherein the heat transfer along
the reactor tube promotes carrying out catalytic reactions.