

What is claimed is:

1. A slide gate valve for controlling the flow of gas, liquid and catalyst material in a fluid catalytic cracking process comprising:
 - a valve body having an internal chamber and formed to include an inlet, and an outlet;
 - an orifice plate positioned within the chamber, the orifice plate formed to include an orifice;
 - first and second disc guides that are located on opposite sides of the orifice, the disc guides each include a guide channel and a wedge having a wedge surface;
 - a valve disc positioned between the first and second disc guides and configured to slide along the disc guides from a fully opened position in which gases, liquids and catalyst materials can pass through the orifice to a fully closed position in which the orifice is blocked, preventing the flow of gases, liquids or catalyst materials through the orifice, the valve disc including a pair of wedges each having a wedge surface;
 - wherein movement of the valve disc from the fully opened position toward the fully closed position causes the valve disc to slide linearly along the first and second disc guides until a point in the travel of the valve disc where the wedges of the valve disc engage the wedges of the first and second disc guides to cause translational movement of the valve disc toward the orifice plate to seal the valve disc against the orifice plate to block flow through the orifice.
2. The slide gate valve of claim 1, wherein the orifice plate includes refractory material positioned radially outward from the orifice.
3. The slide gate valve of claim 2, wherein the orifice plate includes a sealing surface positioned radially outward from the refractory material.
4. The slide gate valve of claim 3, wherein the sealing surface includes a layer of a stellite alloy.
5. The slide gate valve of claim 1, wherein the first and second disc guides each include a first end and a second end and the wedges are located closer to the second end than the first end.
6. The slide gate valve of claim 5, wherein the wedges are unitary with the first and second disc guides.
7. The slide gate valve of claim 5, wherein the first and second disc guides each include a guide channel and a planar interior wall, wherein the wedge extend outward from the interior wall.

8. The slide gate valve of claim 3, wherein the valve disc includes a top surface having a center region having a refractory material.
9. The slide gate valve of claim 8, wherein the valve disc includes a seat ring member positioned radially outwardly from the center region, the seat ring member adapted to seal against the sealing surface of the orifice plate when the valve disc is in the fully closed position.
10. The slide gate valve of claim 9, wherein the valve disc includes a nose and refractory material that wraps around the nose of the valve disc.
11. The slide gate valve of claim 1, wherein the wedges of the valve disc are unitary with the valve disc.
12. The slide gate valve of claim 1, wherein the valve disc is formed to include a slot configured to accept an end of an actuator stem, wherein the connection of the actuator stem to the valve disc permits movement of the valve disc with respect to the actuator stem when the valve disc is moved from the fully opened position to the fully closed position.
13. A slide gate valve for controlling the flow of gas, liquid and catalyst material in a fluid catalytic cracking process comprising:
 - a valve body having an internal chamber and formed to include an inlet, and an outlet;
 - an orifice plate positioned within the chamber, the orifice plate formed to include an orifice;
 - first and second disc guides that are located on opposite sides of the orifice, the disc guides each include a guide channel and a wedge having a wedge surface;
 - a valve disc positioned between the first and second disc guides and configured to slide along the disc guides from a fully opened position in which gases, liquids and catalyst materials can pass through the orifice to a fully closed position in which the orifice is blocked, preventing the flow of gases, liquids or catalyst materials through the orifice, the valve disc including a pair of wedges each having a wedge surface;
 - an actuator stem having a first end coupled to the valve disc;
 - an actuator coupled to a second end of the actuator stem, wherein the actuator and the actuator stem are adapted to move the valve disc from the fully opened position to the fully closed position;
 - wherein movement of the valve disc from the fully opened position toward the fully closed position causes the valve disc to slide linearly along the first and second disc guides until a point in the travel of the valve disc where the wedges of the valve disc engage the wedges of the first and second disc guides to cause translational movement of the valve disc

toward the orifice plate to seal the valve disc against the orifice plate to block flow through the orifice.

14. The slide gate valve of claim 13, wherein the actuator periodically partially retracts the actuating stem and the valve disc along a linear axis to a partially-retracted non-tight position so that the valve disc is not in sealing engagement with the orifice plate and is spaced apart a short distance from orifice plate creating an air gap and then moves the valve disc back to the fully closed position.

15. The slide gate valve of claim 13, wherein the valve disc is formed to include a slot configured to accept an end of the actuator stem, wherein the connection of the actuator stem to the valve disc permits movement of the valve disc with respect to the actuator stem when the valve disc is moved from the fully opened position to the fully closed position.

16. The slide gate valve of claim 13, wherein the orifice plate includes refractory material positioned radially outward from the orifice.

17. The slide gate valve of claim 16, wherein the orifice plate includes a sealing surface positioned radially outward from the refractory material.

18. The slide gate valve of claim 13, wherein the valve disc includes a top surface having a center region having a refractory material.

19. The slide gate valve of claim 18, wherein the valve disc includes a seat ring member positioned radially outwardly from the center region, the seat ring member adapted to seal against the sealing surface of the orifice plate when the valve disc is in the fully closed position.

20. A slide gate valve for controlling the flow of gas, liquid and catalyst material in a fluid catalytic cracking process comprising:

- a valve body having an internal chamber and formed to include an inlet, and an outlet;
- an orifice plate positioned within the chamber, the orifice plate formed to include an

orifice;

- a disc guide positioned proximate the orifice and having a guide channel;

- a valve disc configured to slide along the guide channel of the disc guide from a fully opened position in which gases, liquids and catalyst materials can pass through the orifice to a fully closed position in which the orifice is blocked, preventing the flow of gases, liquids or catalyst materials through the orifice;

- a cam located in the internal chamber of the valve body;

- wherein movement of the valve disc from the fully opened position toward the fully closed position causes the valve disc to slide linearly along the guide channel of disc guide

until a point in the travel of the valve disc where the cam causes translational movement of the valve disc toward the orifice plate to seal the valve disc against the orifice plate to block flow through the orifice.