CLAIMS

1. A gate valve, comprising:

a throughbore in said gate valve that extends through said gate valve;

a body cavity in said gate valve is oriented transversely to said throughbore;

a gate is axially movable in said body cavity between an open position and a closed position along an axis through said body cavity;

a stem connects to said gate with a stem-gate connection, said stem being on a first side of said throughbore;

said body cavity on said first side of said throughbore comprising a round cross-section portion and a first rectangular cross-section portion;

said body cavity comprising a second rectangular cross-section on a second side of said throughbore opposite to said first side, said second rectangular cross-section of said body cavity receives a rectangular cross-section of said gate;

said gate comprising a gate opening that aligns with said throughbore in said open position and a blank portion that aligns with said throughbore in said closed position, said blank portion comprising two flat sides;

a seat on both sides of said gate, each said seat comprising an opening therethrough and being in surrounding relationship to said throughbore, each said seat comprising a sealing end that engages one of said two flat sides of said gate when said gate valve is closed, each said seat comprising an outer end opposite to said sealing end that fits into a corresponding pocket in said gate valve;

each said seat comprising at least one non-elastomeric U-shaped seal oriented so that an opening of said at least one non-elastomeric U-shaped seal on each said

seat is directed toward said gate and forms a downstream seal whereby when said gate is closed said at least one non-elastomeric U-shaped seal on a downstream side of said gate is positioned to receive fluid pressure into said opening for sealing whereby said gate valve is a bi-directional gate valve with downstream sealing; and

a skirt assembly, said skirt assembly comprising a skirt plate on each side of said gate mounted to allow said gate to slide with respect to said skirt plate.

2. The gate valve of claim 1, wherein each said seat comprises two non-elastomeric U-shaped seals oriented so that openings of said two non-elastomeric U-shaped seals are directed away from each other, each U-shaped seal of said two non-elastomeric U-shaped seals comprising a leg expansion spring to urge legs of said two non-elastomeric U-shaped seals outwardly, whereby said two non-elastomeric U-shaped seals are positioned to form upstream and downstream seals and whereby said gate valve is a bi-directional gate valve with upstream and downstream sealing.

3. The gate valve of claim 2, further comprising an outer spring for each said seat positioned on said outer end to urge each said seat towards said gate, a gate width between said two flat sides of said blank portion of said gate being greater than a seat width between said sealing end and said outer end of each said seat.

4. The gate valve of claim 3, further comprising a metallic flange formed on each said seat between said two non-elastomeric U-shaped seals.

5. The gate valve of claim 4 further comprising two non-elastomeric support rings directly next to said metallic flange comprised of a material to act as non-extrusion rings.

6. The gate valve of claim 5 further comprising two non-elastomeric retainer rings wherein one retainer ring comprises a leg that fits in a slot formed in each said seat adjacent said sealing end of each said seat and one retainer ring is positioned on an opposite end of each said seat adjacent said outer end of each said seat.

7. The gate valve of claim 5 further comprising two metallic lips formed on each said seat that retain said two non-elastomeric support rings and said two non-elastomeric U-shaped seals in place on each said seat, said two metallic lips being on opposite outer ends of each said seat wherein one of said two metallic lips is on said sealing end of each said seat and one of said two metallic lips is on said outer end of each said seat.

8. The gate valve of claim 1, wherein said gate opening is adjacent to said stem-gate connection so that said gate opening is positioned between said blank portion and said stem-gate connection.

9. The gate valve of claim 1, wherein said skirt plate on each side of said gate covers said gate opening when said gate is moved to said closed position.

10. The gate valve of claim 9, wherein each said skirt plate engages a corresponding seat.

11. The gate valve of claim 1 wherein said stem-gate connection comprises a latch without threads.

12. The gate valve of claim 1 comprising a gate width between said two flat sides being greater than a length between said sealing end and said outer end of each said seat.