CLAIMS

What is claimed is.

1. A gate valve assembly comprising:

a body having a cavity formed therein;

a neck opening formed through the body and having a conically shaped portion that intersects with the cavity;

a stem that projects into the neck opening in the body and having an end in the cavity that is coupled to an end of a gate;

a profile circumscribing a portion of the stem and having a radius that changes along a length of the stem; and

a ring like backseat member slidingly and pivotingly set over the profile and having an inner surface complementary to an outer surface of the profile and an outer surface with a portion complimentary to the conically shaped portion of the neck opening, so that when the stem is urged in a direction that wedges the backseat member between the profile and the neck portion, a seal is formed between the stem and neck opening.

2. The gate valve assembly of claim 1, further comprising an annular retainer mounted around the stem and positioned adjacent a lower surface of the backseat member to define a resilient sealing interface between the retainer and backseat member, so that when the stem tilts from an aligned position to an unaligned position, the sealing interface is maintained in the unaligned position.

3. The gate valve assembly of claim 2, wherein the retainer comprises a body, a furrow formed in an outer radial surface of the body that defines a spring like flex element that projects radially outward from the body and that biases against the lower surface of the backseat member to form a sealing interface.

4. The gate valve assembly of claim 3, further comprising an o-ring that is provided in a space between an upper end of the body and a lower end of the profile.

5. The gate valve assembly of claim 1, wherein a recess is formed along the inner surface of the backseat member and a flex leg having an elongated cross section depends from an interface between the recess and inner surface and biases against the profile.

6. The gate valve assembly of claim 5, further comprising an annular retainer circumscribing the stem adjacent a lower end of the profile and a soft metal inlay on an upper surface of the retainer that contacts a lower surface of the backseat member that forms a sealing interface.

7. The gate valve assembly of claim 5, wherein the flex leg forms a sealing interface when biased against the profile that is maintained with rotation and tilting of the stem with respect to the backseat member.

8. The gate valve assembly of claim 1, wherein the profile has a spherical type curvature.

9. A gate valve assembly comprising:

a body having a cavity formed therein;

a stem passage in the body having a conically shaped opening that is adjacent the cavity;

an elongated cylindrically shaped stem that extends from within the cavity and into the stem passage;

a profile circumscribing a portion of the stem having a curved outer surface that resembles a portion of a sphere;

an annular backseat member having an inner surface formed complementary to the curved outer surface of the profile and an outer surface that is in selective sealing engagement with the conically shaped opening; and

a spring like member that forms a sealing interface adjacent a surface of the backseat member when the outer surface of the backseat member is in sealing engagement with the conically shaped opening.

10. The gate valve assembly of claim 9, wherein the spring like member comprises a flex leg disposed on the inner surface of the backseat member and that is selectively biased against the profile.

11. The gate valve assembly of claim 10, wherein a recess is formed in the backseat member that extends radially outward a distance from the inner surface and substantially parallel with the inner surface to define the flex leg.

12. The gate valve assembly of claim 10, further comprising an annular retainer circumscribing the stem and having a soft metal inlay on an upper surface that sealingly engages a lower surface of the backseat member.

13. The gate valve assembly of claim 9, wherein the spring like member comprises a flex element that resiliently maintains a sealing interface on a lower surface of the backseat member.

14. The gate valve assembly of claim 13, wherein the flex element is part of an annular retainer that circumscribes the stem adjacent a lower end of the profile and wherein a metal o-ring is disposed in sealing contact between an inner surface of the annular retainer and an outer circumference of the stem.

15. A gate valve assembly comprising:

a body having a cavity formed therein;

a stem passage in the body having a conically shaped opening that is adjacent the cavity;

a stem assembly comprising an elongated cylindrically shaped stem that extends from within the cavity and into the stem passage, a profile circumscribing a portion of the stem having a curved outer surface, and an annular retainer circumscribing the stem adjacent a lower end of the profile;

an annular backseat member circumscribing a portion of the profile that provides a means for providing a seal between the stem and stem passage and that maintains the seal when the stem is tilted into an unaligned position.

16. The gate valve assembly of claim 15, further comprising a spring like member that forms a sealing interface adjacent a surface of the backseat member when the outer surface of the backseat member is in sealing engagement with the conically shaped opening.

17. The gate valve assembly of claim 15, wherein the backseat member has an inner surface formed complementary to the curved outer surface of the profile.

CLAIMS

What is claimed is:

1. A gate valve assembly comprising:
a body having a cavity formed therein;

a neck opening formed through the body and having a conically shaped portion that intersects with the cavity;

a stem that projects into the neck opening in the body and having an end in the cavity that is coupled to an end of a gate;

a profile circumscribing a portion of the stem and having a radius that changes along a length of the stem; and

a ring like backseat member slidingly and pivotingly set over the profile and having an inner surface complementary to an outer surface of the profile and an outer surface with a portion complementary to the conically shaped portion of the neck opening, so that when the stem is urged in a direction that wedges the backseat member between the profile and the conically shaped portion, a seal is formed between the stem and neck opening.

2. The gate valve assembly of claim 1, further comprising an annular retainer mounted around the stem and positioned adjacent a lower surface of the backseat member to define a resilient sealing interface between the retainer and backseat member, so that when the stem tilts from an aligned position to an unaligned position, the sealing interface is maintained in the unaligned position.

3. The gate valve assembly of claim 2, wherein the retainer comprises a retainer body, a furrow formed in an outer radial surface of the retainer body that defines a spring like flex element that projects radially outward from the retainer body and that biases against the lower surface of the backseat member to form a sealing interface.

4. The gate valve assembly of claim 3, further comprising an o-ring that is provided in a space between an upper end of the retainer body and a lower end of the profile.

5. The gate valve assembly of claim 1, wherein a recess is formed along the inner surface of the backseat member and a flex leg having an elongated cross section depends from an interface between the recess and inner surface and biases against the profile.

6. The gate valve assembly of claim 5, further comprising an annular retainer circumscribing the stem adjacent a lower end of the profile and a soft metal inlay on an upper surface of the retainer that contacts a lower surface of the backseat member that forms a sealing interface.

7. The gate valve assembly of claim 5, wherein the flex leg forms a sealing interface when biased against the profile that is maintained with rotation and tilting of the stem with respect to the backseat member.

8. The gate valve assembly of claim 1, wherein the profile has a spherical type curvature.

9. A gate valve assembly comprising:

a body having a cavity formed therein;

a stem passage in the body having a conically shaped opening that is adjacent the cavity;

an elongated cylindrically shaped stem that extends from within the cavity and into the stem passage;

a profile circumscribing a portion of the stem having a curved outer surface that resembles a portion of a sphere;

an annular backseat member having an inner surface formed complementary to the curved outer surface of the profile and an outer surface that is in selective sealing engagement with the conically shaped opening; and

a spring like member that forms a sealing interface adjacent a surface of the backseat member when the outer surface of the backseat member is in sealing engagement with the conically shaped opening.

10. The gate valve assembly of claim 9, wherein the spring like member comprises a flex leg disposed on the inner surface of the backseat member and that is selectively biased against the profile.

11. The gate valve assembly of claim 10, wherein a recess is formed in the backseat member that extends radially outward a distance from the inner surface and substantially parallel with the inner surface to define the flex leg.

12. The gate valve assembly of claim 10, further comprising an annular retainer circumscribing the stem and having a soft metal inlay on an upper surface that sealingly engages a lower surface of the backseat member.

13. The gate valve assembly of claim 9, wherein the spring like member comprises a flex element that resiliently maintains a sealing interface on a lower surface of the backseat member.

14. The gate valve assembly of claim 13, wherein the flex element is part of an annular retainer that circumscribes the stem adjacent a lower end of the profile and wherein a metal o-ring is disposed in sealing contact between an inner surface of the annular retainer and an outer circumference of the stem.

15. A gate valve assembly comprising:

a body having a cavity formed therein;

a stem passage in the body having a conically shaped opening that is adjacent the cavity;

a stem assembly comprising an elongated cylindrically shaped stem that extends from within the cavity and into the stem passage, a profile circumscribing a portion of the stem having a curved outer surface, and an annular retainer circumscribing the stem adjacent a lower end of the profile;

an annular backseat member circumscribing a portion of the profile that provides a means for providing a seal between the stem and stem passage and that maintains the seal when the stem is tilted into an unaligned position.

16. The gate valve assembly of claim 15, further comprising a spring like member that forms a sealing interface adjacent a surface of the backseat member when the outer surface of the backseat member is in sealing engagement with the conically shaped opening.