CLAIMS

What is claimed is:

1. A valve seat, comprising: a tubular body member for mounting in a valve body, a rearward end, the tubular body member having: a forward end for engagement by a valve element; a rearward end; a passage having a longitudinal axis and extending from forward end through the tubular body member to the rearward end; and a flexible lip formed on the tubular body member at the rearward end, the flexible lip extending rearwardly outwardly from the rearward end of the tubular body member and having a curved rearward sealing surface formed thereon for sealing engagement with the valve body; the flexible lip further extending radially outwardly beyond an outer diameter of the tubular body member and having a radial outward sealing surface formed thereon for sealing engagement with the valve body.

2. The valve seat according to claim 1, wherein the flexible lip extends radially outwardly in a plane inclined relative to the longitudinal axis of the passage in the tubular body member.

3. The valve seat according to claim 1, wherein the flexible lip has a thickness which decreases between an inner end adjacent the tubular body member and the sealing surfaces.

4. The valve seat according to claim 1, wherein the tubular body member is mountable in a cylindrical counterbore having a rear wall and a cylindrical side wall in the valve body and the rearward sealing surface of the flexible lip is engageable with the rear wall of the counterbore.

5. The valve seat according to claim 1, wherein the tubular body member is mountable in a cylindrical counterbore having a rear wall and a cylindrical side wall in the valve body and the

outward sealing surface of the flexible lip is engageable with the cylindrical side wall of the counterbore.

6. The valve seat according to claim 1, wherein the flexible lip has an outer rim surface extending between the rearward and outward sealing surfaces, and the outer rim surface is inclined with respect to the longitudinal axis of the passage in the tubular body member.

7. The valve seat according to claim 1, wherein the tubular body member has a rear cylindrical sleeve portion formed on its rear end and the flexible lip is formed on the rear cylindrical sleeve portion.

8. The valve seat according to claim 7, wherein an arcuate transition surface is formed on a lower base portion of the flexible lip adjacent a rear surface on which the rearward sealing surface is formed.

9. A valve seat mounted in a valve, the valve seat comprising: a tubular body member for mounting in a valve body, a rearward end, the tubular body member having: a forward end for engagement by a valve element; a rearward end; a passage having a longitudinal axis and extending from forward end through the tubular body member to the rearward end; and a flexible lip formed on the tubular body member at the rearward end, the flexible lip extending rearwardly outwardly from the rearward end of the tubular body member and having a curved first sealing surface formed thereon for sealing engagement with the valve body; the flexible lip further extending radially outwardly beyond an outer diameter of the tubular body member and having a radial second sealing surface formed thereon for sealing engagement with the valve body.

10. The valve seat according to claim 9, wherein the flexible lip extends radially outwardly in a plane inclined relative to the longitudinal axis of the passage in the tubular body member.

11. The valve seat according to claim 9, wherein the flexible lip extends radially outwardly in a plane inclined relative to the longitudinal axis of the passage in the tubular body member.

12. The valve seat according to claim 9, wherein the tubular body member is mountable in a cylindrical counterbore having a rear wall and a cylindrical side wall in the valve body and the first sealing surface of the flexible lip is engageable with the rear wall of the counterbore.

13. The valve seat according to claim 9, wherein the tubular body member is mountable in a cylindrical counterbore having a rear wall and a cylindrical side wall in the valve body and the second sealing surface of the flexible lip is engageable with the cylindrical side wall of the counterbore.

14. The valve seat according to claim 9, wherein the flexible lip has an outer rim surface extending between the first and second sealing surfaces, and the outer rim surface is inclined with respect to the longitudinal axis of the passage in the tubular body member.

15. The valve seat according to claim 9, wherein the tubular body member has a rear cylindrical sleeve portion formed on its rear end and the flexible lip is formed on the rear cylindrical sleeve portion.

16. The valve seat according to claim 9, wherein an arcuate transition surface is formed on a lower base portion of the flexible lip adjacent a rear surface on which the first sealing surface is formed.

CLAIMS

WHAT IS CLAIMED IS:

1. A gate valve, comprising:

a housing having flow passages with a common flow passage axis intersected by a gate cavity, each of the flow passages having a counterbore formed at an intersection of the gate cavity with each of the flow passages, each of the counterbores having a cylindrical inner wall and a rear wall;

a gate that is movable within the cavity perpendicular to the flow passage axis for opening and closing the flow passages;

a seat ring carried in each of the counterbores, each of the seat rings being axially movable relative to the counterbores between a forward position and a rearward position and comprising:

a forward end for engagement by the gate, which pushes the seat rings from the forward position to the rearward position when the gate is moved into engagement with the seat rings;

a rearward end that is spaced forward of the rear wall of the counterbore while the seat ring is in the forward position and into abutment with the rein wall while the seat ring is in the rearward position;

a passage having a longitudinal axis and extending from forward end through the seat ring to the rearward end;

a flexible lip formed on the seat ring at the rearward end, the flexible lip having a rearward sealing surface formed thereon that elastically deflects into sealing engagement with the rear wall of the counterbore when the gate moves the seat ring to the rearward position; and

the flexible lip further having an outward sealing surface formed thereon that elastically deflects into sealing engagement with the cylindrical inner wall of the counterbore when the gate moves the seat ring to the rearward position.

2. The gate valve according to claim 1, wherein:

the flexible lip extends radially outwardly and rearwardly relative to the flow passage axis; and

a plane containing the rearward sealing surface is perpendicular to the flow passage axis and is spaced rearward from a plane containing the rearward end of the seat ring while the seat ring is in the forward position.

3. The gate valve according to claim 1, wherein the flexible lip has a thickness which decreases between an inner end joining the seat ring and the sealing surfaces.

4. The gate valve seat according to claim 1, wherein the the sealing lip is in an undeflected condition while in the forward position.

5. The gate valve according to claim 1, wherein the seat ring has a constant outer diameter from the forward end to the flexible lip.

6. The gate valve according to claim 1, wherein the flexible lip has an outer rim surface extending between the rearward and outward sealing surfaces, and the outer rim surface is flat and inclined with respect to the flow passage axis.

7. The gate valve according to claim 1, wherein the seat ring has a rear cylindrical sleeve portion formed on its rearward end and the flexible lip has a base that joins en the rear cylindrical sleeve portion.

8. The gate valve according to claim 1, wherein the outward sealing surface of the flexible lip has an outer diameter greater than the outer diameter of the seat ring while the seat ring is in the rearward position.

9. A gate valve comprising:

a housing having flow passages with a common flow passage axis intersected by a gate cavity, each of the flow passages having a counterbore formed at an intersection of the gate cavity with each of the flow passages, each of the counterbores having a cylindrical inner wall and a flat rear wall;

a gate that is movable within the cavity perpendicular to the flow passage axis for opening and closing the flow passages;

a seat ring in each of the counterbores each of the seat rings comprising:

an annular member having a forward end face for sliding and sealing engagement by the gate;

a rearward end face on the annular member;

a bore extending through the annular member from the forward end face to the rearward end face;

an annular flexible lip formed on the annular member and encircling the rearward end face, the flexible lip extending rearwardly from the annular member and having a first sealing surface formed thereon for elastic sealing engagement with the rear wall of the counterbore;

the flexible lip having a second sealing surface formed thereon for elastic sealing engagement with the cylindrical inner wall of the counterbore;

wherein the seat rings move axially in a rearward direction within the counterbores to a rearward position in response to being engaged by the gate, the rearward movement causing the flexible lips to elastically increase in deflection against the rear walls of the counterbores; and

the seat rings move axially in a forward direction from the rearward position in response to the gate being moved from engagement with the seat rings, the forward

movement causing the flexible lips to elastically decrease in deflection against the rear walls of the counterbores.

10. The gate valve according to claim 9, wherein each of the annular members has a cylindrical outer diameter surface that is constant from the forward end face to the sealing lip.

11. The gate valve according to claim 10, wherein the second sealing surface of the flexible lip of each of the annular members has an outer diameter that is greater than the outer diameter surface while each of the seat rings is in the rearward position.

12. The gate valve according to claim 9, wherein while each of the sealing lips is in an undeflected condition, the first sealing surface of each of the flexible lips is rearward from a plane containing the rearward end face of the annular member.

13. The gate valve according to claim 9, wherein a plane containing the first sealing surface of each of the sealing lips is perpendicular to the flow passage axis and spaced rearward from a plane containing the rearward end face prior to contacting the sealing lips with the end walls.

14. The gate valve according to claim 9, wherein the flexible lip has an outer rim surface extending between the first and second sealing surfaces, and the outer rim surface is flat from the first sealing surface to the second sealing surface and inclined with respect to the flow passage axis.

15. The gate valve seat according to claim 9, wherein the annular member has a rear cylindrical sleeve portion that defines the rear end face, and the flexible lip is formed on the rear cylindrical sleeve portion.

16. The gate valve according to claim 9, wherein an arcuate transition surface is formed between the rear end face and an inner base portion of the flexible lip.