

Description

This invention relates to sealing assemblies for valves.

Valves, such as gate valves and chokes, in recent years are expected to operate in a corrosive atmosphere, to retain pressures such as 15,000 psig (103421 KN/m²) and to function at a wide range of temperatures, such as from 250°F to -20°F (121°C to -29°C). One of the difficulties encountered in such valves is the failure of the stem seal.

In some prior valves an elastomer has been used to energize the seal. The elastomers deteriorate with time as a result of the presence of H₂S, corrosion inhibitors, high temperatures, gas decompression, and compression set.

In other prior valve design, a stamped metal spring has been used to energize a polytetrafluoroethylene lip seal. The spring must be thin and weak to provide the desired flexibility. Therefore, the sealing lips must be sufficiently thin so that the spring can energize them properly. Such thin lips have poor wear resistance and at high temperature the polytetrafluoroethylene lips soften and are distorted by the edges of the spring resulting in seal failure.

The following U.S. patents disclose shaft and stem seals which may be pertinent with respect to the present invention: Patent No. 4,410,189 discloses a shaft seal having a tapered load ring to wedge the sealing lip into sealing engagement with the surfaces to be sealed. Patent No. 4,426,093 discloses a stem seal for a valve which is a cylindrical sleeve with spaced external circumferential cuts to enable the sleeve to act as a loose stack of washers in sealing. Patent No. 3,787,060 discloses a stem seal having a wedge sleeve forced into the stem packing to ensure sealing against the stem and the inner wall of the housing bore. Patent No. 4,262,690 discloses wedges used to move rings into position to prevent extrusion of sealing rings in a stack of sealing rings.

GB-A-2122727 describes a sealing assembly for a valve stem which comprises a sealing ring of generally U-shaped cross-section. The ring has internal and external sealing lips and a load ring between the legs of the U to urge the sealing lips into engagement with a sealing surface.

According to one aspect of the present invention there is provided a valve comprising a body having a valve chamber, an inlet into, an outlet from and an opening from said valve chamber extending through said body and a valve seat in said valve chamber, a valve member movably positioned in said valve chamber, a stem connected to said valve and extending through said opening, means coacting with said stem to move said valve member with respect to said valve seat to control flow through said valve, a stem sealing assembly for sealing between said stem and said opening and including a sealing ring having internal and external sealing lip and an

annular end recess passing towards the valve member, and means for retaining said stem sealing assembly between said stem and said opening, characterised in that a load ring is positioned in said end recess and has its external surface tapered toward the axis of said stem and toward said valve member.

According to another aspect of the present invention there is provided a valve stem sealing assembly for sealing between a valve stem and a valve body, said sealing assembly comprising: a sealing ring, having an external sealing lip an internal sealing lip and an end recess on the end of said sealing ring which, in use, faces towards the valve member, characterised in that a load ring is positioned within said end recess, said load ring having preselected dimensions which, in use, provide initial loading of said sealing lips and a base at the closed end of the recess which has a greater external radial dimension than the external radial dimension of the load ring at the open end of said recess.

One embodiment of the invention provides a valve with an improved stem seal. The structure includes a valve body having a valve chamber, an inlet to and an outlet from the valve chamber and a valve seat in the valve chamber surrounding the outlet, a valve member movable in the valve chamber and coacting with the valve seat to control flow through the valve, a valve stem connected to the valve chamber and extending through an opening in said body, means coacting with said stem to move said valve member, a sealing assembly positioned in surrounding relation to said stem and within said body opening to provide stem sealing, and means for retaining said sealing assembly in said body opening, said sealing assembly including a filled polytetrafluoroethylene sealing ring having a plurality of internal grooves to provide internal and external sealing lips therebetween and an annular end recess facing toward said valve member, a soft sealing ring in the inner and outer grooves farthest from the valve member providing improved low temperature sealing, and a load ring positioned in said end recess, said load ring having an external surface which is tapered toward the axis of said stem in the direction toward said valve member whereby said load ring maintains said seal ring lips in sealing position over a wide range of temperatures without causing compression setting of such lips.

The stem seal allows the use of sealing materials which have good wear resistance and corrosion resistance while providing bubble tight sealing under varying temperatures.

The loading of the seal ring can be maintained under temperature variations without damaging the sealing elements of the seal ring.

The invention will be described now, by way of example only, with particular reference to the accompanying drawings. In the drawings:-

FIGURE 1 is an elevation view, partly in section, of the improved valve of the present invention having the improved stem seal of the

present invention installed therein to seal between the stem and the interior of the bonnet.

FIGURE 2 is a partial sectional view of the preferred form of the improved stem seal of the present invention in relaxed position.

FIGURE 3 is a partial sectional view of a modified form of improved stem seal of the present invention.

FIGURE 4 is a partial sectional view of the valve shown in FIGURE 1 to illustrate the improved stem seal installed to seal between the exterior of the stem and the interior of the bore through the bonnet.

Valve 10, shown in FIGURE 1, is a gate valve and has body 12 having a valve chamber 14 with inlet 16 and outlet 18 connecting through body 12 into chamber 14, valve member 20 movably positioned in valve chamber 14 with stem 22 connected to valve member 20 and extending through the opening provided by bore 24 through bonnet 26 which is secured to body 12 by studs 28 and nuts 30. Suitable means coaxing with stem 22, such as handwheel 32 and the threaded connection 34 of stem 22 into valve member 20, are provided for moving valve member 20 in valve chamber 14 into position with relation to valve seat 36 which surrounds the opening of outlet 18 into valve chamber 14. In one position of valve member 20, it effectively closes the opening into outlet 18 and in its other position its port 38 is aligned with inlet 16 and outlet 18 to allow flow through outlet 18.

Seal assembly 40, shown in FIGURE 2, includes sealing ring 42, load ring 44, soft inner and outer seal rings 46 and 48, and anti-extrusion ring 50. The neck 52 of loading nut 54 is also included in FIGURE 2 to illustrate that it engages ring 50. Sealing ring 42 is a ring formed from moderately filled polytetrafluoroethylene with the filling being a carbon material and being approximately eleven percent of the volume of the completed ring. Preferably the carbon filling material is a carbon powder with approximately ten percent of the powder being powdered graphite so that the composition of sealing ring 42 is approximately 89 percent polytetrafluoroethylene, ten percent powdered carbon and one percent powdered graphite. Sealing ring 42 is formed to have inner grooves 56, outer grooves 58 and end recess 60 into which load ring 44 is positioned. Inner and outer sealing lips 62 and 64 are defined between grooves 56 and 58. Inner and outer soft seal rings 46 and 48 are positioned in the closest of inner and outer grooves 56 and 58, respectively, to the closed end of sealing ring 42 or farthest from valve member 20. Seal rings 46 and 48 each have a cross-sectional area greater than the cross-sectional area of the groove in which they are positioned to ensure that they are held in sealing engagement with the surface against which they are intended to seal. Soft seal rings 46 and 48 are virgin or soft polytetrafluoroethylene to improve low temperature sealing of the seal assembly 40 while such lower temperature following a hot thermal cycle can cause the lips 62 and 64 to relax

their preload. In such case soft seal rings 46 and 48 ensure a bubble tight seal during the time that the temperature is sufficiently low to cause a relaxing of the preload on the sealing lips of sealing ring 42.

Of particular importance in seal assembly 40 is the shape of the exterior surface 66 of load ring 44 which tapers outwardly (thicker) in a direction toward anti-extrusion ring 50. This taper is also toward the axis of stem 22 in the direction toward valve member 20. Inner surface 69 on load ring 44 is substantially parallel to the axis of stem 22. Load ring 44 is preferably metal so that it maintains a rigid position within recess 60 and allows a differential expansion of sealing ring 42. The mating surface 68 on the interior of sealing ring is similarly tapered. Also, load ring 44 includes passages 70 to ensure that there is a pressure equalization across load ring 44 between the mouth of recess 60 and the inner end thereof.

A modified form of the present invention is shown in FIGURE 3. Sealing assembly 72 includes sealing ring 74, load ring 76 (preferably metal), soft inner and outer seal rings 78 and 80 and anti-extrusion ring 82. Neck 52a of a loading nut (not shown) is included in FIGURE 3. Sealing ring 74 is of a material similar to sealing ring 42, previously described. Sealing ring 74 includes inner grooves 84 and outer grooves 86 and end recess 88 in which load ring 76 is positioned. Inner and outer sealing lips 90 and 92 are defined between grooves 84 and 86. Inner and outer soft seal rings 78 and 80 are positioned in the closest of inner and outer grooves 84 and 86, respectively, to anti-extrusion ring 82 or farthest from the valve member. Seal rings 78 and 80 each have a cross-sectional area greater than the cross-sectional area of the groove in which they are positioned to ensure that they are held in sealing engagement with the surface against which they are intended to seal. Soft seal rings 78 and 80 are virgin or soft polytetrafluoroethylene as described with reference to soft seal rings 46 and 48.

Of particular importance in seal assembly 72 is the shape of recess 88 and the inner and outer surfaces 94 and 96 of load ring 76 which taper inwardly and outwardly, respectively, in the direction toward anti-extrusion ring 82. Stated another way inner surface 94 tapers outward in the direction toward the valve member and outer surface 96 tapers inward in the direction toward the valve member. The shape of the interior of recess provides surfaces which mate with surfaces 94 and 96. Also, load ring 76 includes passages 98 to ensure that there is a pressure equalization between the mouth of recess 88 and the inner end thereof.

Seal assembly 40, as shown in FIGURE 4, is installed in position surrounding stem 22, within bore 27 through bonnet 26 and with loading nut tightened to provide an initial loading. A bubble tight seal is provided both by the soft seal rings 46 and 48 and by lips 62 and 64. As the seal assembly 40 is heated, the material of sealing ring 42 becomes softer, loses its memory and its

mechanical properties decrease. In such situations, the position of the sealing lips 62 and 64 are controlled. The heating of the sealing ring 42 causes it to expand in both the axial and radial directions more than load ring 44 expands. The particular configuration of the seal assembly 40 allows the outer lips 64 to expand in the radial direction without becoming overstressed or distorted, because the expansion in the axial direction has an unwedging or relieving effect.

During the cooling of seal assembly 40, the outside diameter of lips 64 are trying to pull away from their sealing against bore 27 because lips 64 try to contract as a ring in the radial direction. Sealing ring 42 is also contracting in the axial direction and this contraction causes ring 42 to draw up against the outer taper on load ring 44 to wedge sealing lips 64 against bore 27.

While wedging principles have been used in seal designs previously, they have been mechanical members which are required to wedge and energize during pressure application. They are free to distort during changes in temperature with no pressure as in the cooling of the seal.

In some applications it may be desirable to utilize seal assembly 72 which is substantially the same as seal assembly 40 except for the inner tapered surface 94 on load ring 76. Such inner tapered surface 94 is used to avoid overstressing inner lips 90. It should also be noted that sealing rings 42 and 72 engage only smooth surfaces of load rings 44 and 76, respectively, and there are no sharp edges or gaps in springs to distort the sealing lips.

After cooling from a hot thermal cycle or on cooling to very low temperatures the preload on the sealing lips may not be as high as when initially installed, because of stress relaxation of the material of the sealing ring. The soft sealing rings shown in both forms of the present invention provide the initial seal since they have a preload of their own, i.e., they extend beyond their adjacent sealing lips, so that they remain in contact with the surface against which they are intended to seal.

The use of the two different materials produces the best advantages of each which includes the good wear resistance, the high temperature stability, the extrusion resistance of the moderately filled polytetrafluoroethylene and the flexibility and low temperature sealing of the soft polytetrafluoroethylene.

Claims

1. A valve comprising a body (12) having a valve chamber (14), an inlet (16) into, an outlet (18) from and an opening from said valve chamber extending through said body and a valve seat (36) in said valve chamber, a valve member (20) movably positioned in said valve chamber, a stem (22) connected to said valve and extending through said opening, means coacting with said stem to move said valve member with respect to said valve seat to control flow through

said valve, a stem sealing assembly (40; 72) for sealing between said stem and said opening and including a sealing ring (42; 72) having internal and external sealing lip (62, 44; 90, 92) and an annular end recess (60, 88) passing towards the valve member, and means for retaining said stem sealing assembly between said stem and said opening, characterised in that a load ring (44; 76) is positioned in said end recess and has its external surface tapered toward the axis of said stem and toward said valve member.

2. A valve according to claim 1, wherein the material of said sealing ring (42; 72) is a polytetrafluoroethylene moderately filled with carbon.

3. A valve according to claim 2, wherein the sealing ring material is filled with approximately eleven percent of carbon material.

4. A valve according to claim 1, including a plurality of sealing lips (62, 64; 90, 92) on the interior and exterior of said sealing ring with a groove (56, 58; 84, 80) between each pair of sealing lips.

5. A valve according to claim 4, including a soft sealing ring (46, 48; 78, 80) in the inner and outer grooves closest to the closed end of said sealing ring.

6. A valve according to claim 5, wherein said soft sealing rings (46, 48; 78, 80) are of soft polytetrafluoroethylene.

7. A valve according to claim 1, including a taper on the inner surface of said load ring (44; 76) tapering inwardly toward said stem in a direction away from said valve.

8. A valve stem sealing assembly for sealing between a valve stem and a valve body, said sealing assembly comprising: a sealing ring (42, 72), having an external sealing lip (64; 92), an internal sealing lip (62, 90) and an end recess (60; 88) on the end of said sealing ring which, in use, faces towards the valve member, characterised in that a load ring (44; 76) is positioned within said end recess, said load ring having preselected dimensions which, in use, provide initial loading of said sealing lips and a base at the closed end of the recess which has a greater external radial dimension than the external radial dimension of the load ring at the open end of said recess.

9. A stem sealing assembly according to claim 8, characterised by including a plurality of sealing lips (62, 64; 90, 92) on the exterior and interior of said sealing ring.

10. A stem sealing assembly according to claim 9, characterised by including a soft seal ring (46, 48; 78, 80) in the inner and outer of said grooves closest to the closed end of said sealing ring.

11. A stem sealing assembly according to claim 10, characterised in that said soft seal rings (46, 48; 78, 80) are soft polytetrafluoroethylene.

12. A stem sealing assembly according to claim 8, characterised in that the exterior surface of said load ring (46; 76) is tapered outwardly away from said recess end of said sealing ring.

13. A stem sealing assembly according to claim 8, characterised in that the interior surface of said load ring (44; 76) is tapered inwardly and away

mechanical properties decrease. In such situations, the position of the sealing lips 62 and 64 are controlled. The heating of the sealing ring 42 causes it to expand in both the axial and radial directions more than load ring 44 expands. The particular configuration of the seal assembly 40 allows the outer lips 64 to expand in the radial direction without becoming overstressed or distorted, because the expansion in the axial direction has an unwedging or relieving effect.

During the cooling of seal assembly 40, the outside diameter of lips 64 are trying to pull away from their sealing against bore 27 because lips 64 try to contract as a ring in the radial direction. Sealing ring 42 is also contracting in the axial direction and this contraction causes ring 42 to draw up against the outer taper on load ring 44 to wedge sealing lips 64 against bore 27.

While wedging principles have been used in seal designs previously, they have been mechanical members which are required to wedge and energize during pressure application. They are free to distort during changes in temperature with no pressure as in the cooling of the seal.

In some applications it may be desirable to utilize seal assembly 72 which is substantially the same as seal assembly 40 except for the inner tapered surface 94 on load ring 76. Such inner tapered surface 94 is used to avoid overstressing inner lips 90. It should also be noted that sealing rings 42 and 72 engage only smooth surfaces of load rings 44 and 76, respectively, and there are no sharp edges or gaps in springs to distort the sealing lips.

After cooling from a hot thermal cycle or on cooling to very low temperatures the preload on the sealing lips may not be as high as when initially installed, because of stress relaxation of the material of the sealing ring. The soft sealing rings shown in both forms of the present invention provide the initial seal since they have a preload of their own, i.e., they extend beyond their adjacent sealing lips, so that they remain in contact with the surface against which they are intended to seal.

The use of the two different materials produces the best advantages of each which includes the good wear resistance, the high temperature stability, the extrusion resistance of the moderately filled polytetrafluoroethylene and the flexibility and low temperature sealing of the soft polytetrafluoroethylene.

Claims

1. A valve comprising a body (12) having a valve chamber (14), an inlet (16) into, an outlet (18) from and an opening from said valve chamber extending through said body and a valve seat (36) in said valve chamber, a valve member (20) movably positioned in said valve chamber, a stem (22) connected to said valve and extending through said opening, means coacting with said stem to move said valve member with respect to said valve seat to control flow through

said valve, a stem sealing assembly (40; 72) for sealing between said stem and said opening and including a sealing ring (42; 72) having internal and external sealing lip (62, 44; 90, 92) and an annular end recess (60, 88) passing towards the valve member, and means for retaining said stem sealing assembly between said stem and said opening, characterised in that a load ring (44; 76) is positioned in said end recess and has its external surface tapered toward the axis of said stem and toward said valve member.

2. A valve according to claim 1, wherein the material of said sealing ring (42; 72) is a polytetrafluoroethylene moderately filled with carbon.

3. A valve according to claim 2, wherein the sealing ring material is filled with approximately eleven percent of carbon material.

4. A valve according to claim 1, including a plurality of sealing lips (62, 64; 90, 92) on the interior and exterior of said sealing ring with a groove (56, 58; 84, 80) between each pair of sealing lips.

5. A valve according to claim 4, including a soft sealing ring (46, 48; 78, 80) in the inner and outer grooves closest to the closed end of said sealing ring.

6. A valve according to claim 5, wherein said soft sealing rings (46, 48; 78, 80) are of soft polytetrafluoroethylene.

7. A valve according to claim 1, including a taper on the inner surface of said load ring (44; 76) tapering inwardly toward said stem in a direction away from said valve.

8. A valve stem sealing assembly for sealing between a valve stem and a valve body, said sealing assembly comprising: a sealing ring (42, 72), having an external sealing lip (64; 92), an internal sealing lip (62, 90) and an end recess (60; 88) on the end of said sealing ring which, in use, faces towards the valve member, characterised in that a load ring (44; 76) is positioned within said end recess, said load ring having preselected dimensions which, in use, provide initial loading of said sealing lips and a base at the closed end of the recess which has a greater external radial dimension than the external radial dimension of the load ring at the open end of said recess.

9. A stem sealing assembly according to claim 8, characterised by including a plurality of sealing lips (62, 64; 90, 92) on the exterior and interior of said sealing ring.

10. A stem sealing assembly according to claim 9, characterised by including a soft seal ring (46, 48; 78, 80) in the inner and outer of said grooves closest to the closed end of said sealing ring.

11. A stem sealing assembly according to claim 10, characterised in that said soft seal rings (46, 48; 78, 80) are soft polytetrafluoroethylene.

12. A stem sealing assembly according to claim 8, characterised in that the exterior surface of said load ring (46; 76) is tapered outwardly away from said recess end of said sealing ring.

13. A stem sealing assembly according to claim 8, characterised in that the interior surface of said load ring (44; 76) is tapered inwardly and away



from said recess end of said sealing ring.

14. A stem sealing assembly according to claim 8, characterised in that said sealing ring (42; 72) is formed from a moderately filled polytetrafluoroethylene.

15. A stem sealing assembly according to claim 14, characterised in that said sealing ring material is filled with a carbon material.

16. A stem sealing assembly according to claim 14, characterised in that said sealing ring material is filled with approximately eleven percent by volume of filling material.

17. A stem sealing assembly according to any one of claims 10 to 16, characterised in that the cross-sectional area of each soft seal rings (46, 48; 78, 80) prior to location in a groove is greater than the cross-sectional area of the respective groove.

Patentansprüche

1. Ventil, umfassend
 - einen Körper (12) mit einer Ventilkammer (14), einem Einlaß (16) in diese und einem Auslaß (18) aus dieser, einer sich durch den Körper von der Ventilkammer erstreckenden Öffnung und einem Ventilsitz (36) in der Ventilkammer,
 - ein Ventilglied (20), das in der Ventilkammer beweglich angeordnet ist,
 - einen Schaft (22), der an das Ventil angeschlossen ist und sich durch die Öffnung erstreckt,
 - mit dem Schaft zusammenwirkende Mittel, um das Ventilglied gegenüber dem Ventilsitz zur Steuerung des Durchflusses durch das Ventil zu bewegen,
 - eine Schaftabdichtungsanordnung (40; 72) für eine Abdichtung zwischen dem Schaft und der Öffnung, mit einem Abdichtring (42; 72) mit inneren und äußeren Abdichtlippen (62, 64; 90, 92) und einer ringförmigen stirnseitigen Vertiefung (60, 88), die zum Ventilglied hin offen ist, und
 - Mittel zum Halten der Schaftabdichtungsanordnung zwischen dem Schaft und der Öffnung, dadurch gekennzeichnet, daß
 - ein Belastungsring (44; 76) in der stirnseitigen Vertiefung angeordnet ist und eine zur Achse des Schaftes hin und zu dem Ventilglied hin abgechrägte äußere Fläche besitzt.
2. Ventil nach Anspruch 1, bei dem
 - das Material des Abdichtrings (42; 72) ein mäßig mit Kohlenstoff versetztes Polytetrafluorethylen ist.
3. Ventil nach Anspruch 2, bei dem
 - das Abdichtringmaterial mit ungefähr 11 % Kohlenstoffmaterial versetzt ist.
4. Ventil nach Anspruch 1, umfassend
 - eine Vielzahl Abdichtlippen (62, 64; 90, 92) auf der Innen- und Außenseite des Abdichtringes, wobei eine Nut (56, 58; 84, 86) zwischen jedem Paar von Abdichtlippen vorgesehen ist.
5. Ventil nach Anspruch 4, umfassend
 - einen weichen Abdichtring (46, 48; 78, 80) in den am nächsten beim geschlossenen Ende des Abdichtrings gelegenen inneren und äußeren Nuten.

6. Ventil nach Anspruch 5, bei dem

- die weichen Abdichtringe (46, 48; 78, 80) aus Weich-Polytetrafluorethylen sind.

7. Ventil nach Anspruch 1, umfassend

- eine Schräge auf der Innenfläche des Belastungsringes (44; 76), die in der vom Ventil wegweisenden Richtung einwärts zum Schaft hin verläuft.

8. Ventilschaftabdichtungsanordnung für eine Abdichtung zwischen einem Ventilschaft und einem Ventilkörper, wobei die Abdichtungsanordnung einen Abdichtring (42, 72) umfaßt, der versehen ist mit einer äußeren Abdichtlippe (64; 92), einer inneren Abdichtlippe (62, 90) und einer stirnseitigen Vertiefung (60; 88) auf jener Stirnseite des Abdichtringes, die bei Gebrauch zum Ventilglied hin weist, dadurch gekennzeichnet, daß

- innerhalb der stirnseitigen Vertiefung ein Belastungsring (44; 76) angeordnet ist und

20 - der Belastungsring vorgewählte Abmessungen besitzt, die bei Gebrauch für eine anfängliche Belastung der Abdichtlippen sowie für eine Basis am geschlossenen Ende der Vertiefung sorgen, die einen größeren Außenradius als der Außenradius des Belastungsringes am offenen Ende der Vertiefung besitzt.

9. Schaftabdichtungsanordnung nach Anspruch 8, gekennzeichnet durch

30 - eine Vielzahl Abdichtlippen (62, 64; 90, 92) auf der Außen- und Innenseite des Abdichtringes.

10. Schaftabdichtungsanordnung nach Anspruch 9, gekennzeichnet durch

35 - einen weichen Abdichtring (46, 48; 78, 80) in den am nächsten beim geschlossenen Ende des Abdichtringes gelegenen inneren und äußeren Nuten.

11. Schaftabdichtungsanordnung nach Anspruch 10, dadurch gekennzeichnet, daß

40 - die weichen Abdichtringe (46, 48; 78, 80) Weich-Polytetrafluorethylen sind.

12. Schaftabdichtungsanordnung nach Anspruch 8, dadurch gekennzeichnet, daß

45 - die Außenfläche des Belastungsringes (44; 76) von dessen Vertiefungsstirnseite aus nach außen geschrägt verläuft.

13. Schaftabdichtungsanordnung nach Anspruch 8, dadurch gekennzeichnet, daß

50 - die Innenfläche des Belastungsringes (44; 76) von dessen Vertiefungsstirnseite aus nach innen geschrägt verläuft.

14. Schaftabdichtungsanordnung nach Anspruch 8, dadurch gekennzeichnet, daß

55 - der Abdichtring (42; 72) aus einem mäßig versetzten Polytetrafluorethylen hergestellt ist.

15. Schaftabdichtungsanordnung nach Anspruch 14, dadurch gekennzeichnet, daß

60 - das Abdichtungsringmaterial mit Kohlenstoff versetzt ist.

16. Schaftabdichtungsanordnung nach Anspruch 14, dadurch gekennzeichnet, daß

65 - das Abdichtringmaterial mit etwa 11 Vol.-% Füllmaterial versetzt ist.

17. Schaftabdichtungsanordnung nach einem der Ansprüche 10 bis 16, dadurch gekennzeichnet, daß



- das Querschnittsgebiet jedes weichen Abdichtrings (46, 48; 78, 80) vor der Anordnung in einer Nut größer ist als das Querschnittsgebiet der betroffenen Nut.

Revendications

1. Vanne comprenant un corps (12) comportant une chambre de vanne (14), une entrée (16), une sortie (18) ainsi qu'une ouverture partant de la chambre de vanne s'étendant dans le corps et un siège de vanne (36) dans la chambre de vanne, un organe de vanne (20) positionné de façon mobile dans la chambre de vanne, une tige (22) reliée à la vanne et s'étendant dans l'ouverture précitée, des moyens agissant conjointement avec la tige précitée pour déplacer l'organe de vanne par rapport au siège de vanne de manière à commander l'écoulement dans la vanne, un assemblage de scellage de tige (40; 72) pour le scellage entre la tige et l'ouverture précitées et comprenant un anneau de scellage (42; 72) comportant des lèvres de scellage intérieure et extérieure (62, 44; 90, 92) ainsi qu'un évidement d'extrémité annulaire (60, 88) passant vers l'organe de vanne, ainsi que des moyens pour retenir l'assemblage de scellage de tige entre la tige et l'ouverture précitées, caractérisée en ce qu'un anneau de chargement (44; 76) est positionné dans l'évidement d'extrémité précité et a sa surface extérieure conique dirigée vers l'axe de la tige et vers l'organe de vanne.

2. Vanne suivant la revendication 1, caractérisée en ce que la matière de l'anneau de scellage (42; 72) est un polytétrafluoréthylène modérément chargé de carbone.

3. Vanne suivant la revendication 2, caractérisée en ce que la matière de l'anneau de scellage est chargée d'approximativement 11 % de matière de carbone.

4. Vanne suivant la revendication 1, caractérisée en ce qu'elle comprend une série de lèvres de scellage (62, 64; 90, 92) sur l'intérieur et l'extérieur de l'anneau de scellage précité, une rainure (56, 58; 84, 80) étant prévue entre chaque paire de lèvres de scellage.

5. Vanne suivant la revendication 4, caractérisée en ce qu'elle comprend un anneau de scellage souple (46, 48; 78, 80) dans les rainures intérieure et extérieure les plus proches de l'extrémité fermée de cet anneau de scellage.

6. Vanne suivant la revendication 5, caractérisée en ce que les anneaux de scellage souples (46, 48; 78, 80) sont en polytétrafluoréthylène souple.

7. Vanne suivant la revendication 1, caractérisée en ce qu'elle comprend une conicité sur la surface intérieure de l'anneau de chargement (44; 76) allant en s'amincissant vers l'intérieur vers la tige précitée dans une direction éloignée de la vanne.

8. Assemblage de scellage de tige de vanne

pour le scellage entre une tige de vanne et un corps de vanne, cet assemblage de scellage comprenant: un anneau de scellage (42; 72) comportant une lèvre de scellage extérieure (64; 92), une lèvre de scellage intérieure (62; 90) ainsi qu'un évidement d'extrémité (60; 88) à l'extrémité de l'anneau de scellage qui, en cours d'utilisation, est orienté vers l'organe de vanne, caractérisé en ce qu'un anneau de chargement (44; 76) est positionné à l'intérieur de l'évidement d'extrémité précité, l'anneau de chargement ayant des dimensions choisies préalablement qui, en cours d'utilisation, confèrent le chargement initial des lèvres de scellage précitées et une base à l'extrémité fermée de l'évidement, qui a une dimension radiale extérieure plus grande que la dimension radiale extérieure de l'anneau de chargement à l'extrémité ouverte de l'évidement précité.

9. Assemblage de scellage de tige suivant la revendication 8, caractérisé en ce qu'il comprend une série de lèvres de scellage (62, 64; 90, 92) à l'extérieur et à l'intérieur du noyau de scellage.

10. Assemblage de scellage de tige suivant la revendication 9, caractérisé en ce qu'il comprend un anneau de scellage souple (46, 48; 78, 80) à l'intérieur et à l'extérieur des rainures précitées les plus proches de l'extrémité fermée de l'anneau de scellage.

11. Assemblage de scellage de tige suivant la revendication 10, caractérisé en ce que les anneaux de scellage souples (46, 48; 78, 80) sont en polytétrafluoréthylène souple.

12. Assemblage de scellage de tige suivant la revendication 8, caractérisé en ce que la surface extérieure de l'anneau de chargement (46; 76) précité est conique vers l'extérieur loin de l'extrémité d'évidement de l'anneau de scellage précité.

13. Assemblage de scellage de tige suivant la revendication 8, caractérisé en ce que la surface intérieure de l'anneau de chargement (44; 76) est conique vers l'intérieur et loin de l'extrémité d'évidement de l'anneau de scellage précité.

14. Assemblage de scellage de tige suivant la revendication 8, caractérisé en ce que l'anneau de scellage (42; 72) est constitué d'un polytétrafluoréthylène modérément chargé.

15. Assemblage de scellage de tige suivant la revendication 14, caractérisé en ce que la matière de l'anneau de scellage est chargée d'une matière de carbone.

16. Assemblage de scellage de tige suivant la revendication 14, caractérisé en ce que la matière de l'anneau de scellage est chargée d'approximativement 11 % en volume de matière de charge.

17. Assemblage de scellage de tige suivant l'une quelconque des revendications 10 à 16, caractérisé en ce que l'aire transversale de chaque anneau de scellage souple (46, 48; 78, 80) avant l'emplacement dans une rainure est supérieure à l'aire transversale de la rainure respectue.

