

Description

As the production from oil and gas fields is depleted, it is desirable to use some of the wells and their associated valving and piping for water injection as part of a secondary recovery program. Typical installations have the gathering lines or piping and choke valves initially installed in a permanent manner with the choke valves oriented for production from the oil or gas well. If the decision is subsequently made to use a particular well for water injection, and flow in the reverse direction through a particular choke valve is required, previous designs have necessitated that the choke valve be unbolted or the pipe line be cut. This is due to previous choke valves having been designed for flow in one direction. Reinstallation then entails rerouting of lines and welding to allow the new choke valve to be properly oriented for reverse flow. This removal, rerouting and reinstallation involves considerable time and expense for the field operator.

This invention is for an improved cartridge choke valve which is pressure balanced to reduce the loads imposed on the actuation means. It uses a cage style trim to provide the superior flow control characteristics and wear resistance typical of the cage design. A removable cartridge assembly allows the body to remain in the flowline during reversal of the trim thereby permitting flow in either direction. Prior valves with reversible trim include the valve disclosed in U.S.-A-2,196,202. This valve allows reversal of its internal trim but requires an actuator which can work in either direction.

U.S.-A-2,596,534 discloses a flow control valve with cage style trim in which a plurality of holes of varying diameter arranged in a helical manner are used to allow a more accurate control of the flow rate. A pressure balanced cage is disclosed with an outlet port disposed at a right angle thereto.

US-A-3,606,911 discloses another valve with reversible trim to allow changing the flow characteristics of the valve. This valve does not provide for pressure balancing of the cage.

US-A-3,589,674 discloses a ball valve with internal trim that can be easily replaced as a complete unit. The structure is not pressure balanced and does not permit throttling of the flow.

US-A-2918087 and US-A-3123091 also disclose valves with reversible cartridge assemblies.

US-A-4384592 discloses a valve closure element being provided with pressure balancing parts.

According to the present invention a pressure balanced cartridge choke valve comprising a valve body with a central bore laterally intersected by a first inlet and a first outlet flow passage; a reversible and pressure balanced cartridge assembly sealingly retained within the valve body with flow

controlling means positioned therein, the cartridge assembly including a cartridge body with a central cavity laterally intersected by a second inlet and a second outlet flow passage, a means for retaining the cartridge assembly within the valve body, and a means for maintaining the second inlet and second outlet flow passages in registry with the first inlet and first outlet flow passages; and an actuation means for positioning the flow controlling means; characterised by the flow controlling means including a cage sealingly positioned within the central cavity of the cartridge body and a flow closure member with pressure balancing ports therethrough sealingly engaging the cage.

In the accompanying drawings:

FIGURE 1 is a sectional view of the improved choke valve having internal sleeve and cage style trim with the internal sleeve in the fully closed position.

FIGURE 2 is a sectional view of the improved choke valve having internal sleeve and cage style trim with the internal sleeve in the fully open position.

FIGURE 3 is a sectional view of the improved choke valve with the position of the removable trim cartridge and bonnet reversed from that of FIGURE 2.

FIGURE 4 is a sectional view of an alternate embodiment of the improved choke valve having plug and cage style trim with the plug in the fully closed position.

FIGURE 5 is a sectional view of a second alternate embodiment of the improved choke valve having external sleeve and cage style trim with the external sleeve in the fully closed position.

With reference to FIGURE 1, the improved choke valve of the present invention, denoted generally by numeral 2, is composed of body 4, cartridge assembly 6 and bonnet assembly 8. Body 4 is in the shape of a rectangular parallelepiped with reduced end portions 10 and 12 having the inlet port 24 and outlet port 26, respectively, extending therethrough. Piping portions 14 and 16 are attached to end portions 10 and 12, respectively, by suitable means such as circumferential butt welds, 18 and 20. As shown in FIGURE 1, flow is from piping portion 14 into choke valve 2 and out piping portion 16.

Choke body 4 has a central cylindrical bore 22 connecting its upper and lower faces which receives cartridge assembly 6. Central bore 22 is intersected by obliquely disposed flow passages 24 and 26, which communicate with passages in inlet piping 14 and outlet piping 16, respectively.

Central bore 22 has metal seal rings 28 and 30 disposed in grooves on the upper and lower faces of body 4 for sealingly engaging cartridge assembly

bly 6. Cartridge assembly 6 is composed of body 32, cage 34, inner sleeve 36 and retainer cap 38. Cartridge body 32 is a generally cylindrical member with a closed lower end 40 and integral flange 42 on its upper end. The central portion of body 32 has obliquely disposed flow passages 44 and 46 extending through the wall on opposite sides.

Radially disposed and press fit into the lower face of integral flange 42 is orientation pin 48 coacting with hole 50 on the upper face of choke body 4 to maintain flow passages 24, 44 and 26, 46 in proper orientation. Pin 48 on the lower face of flange 42 and hole 52 on the lower face of body 4 function similarly in a manner to be explained hereinafter. Bore 54 of body 32 has counterbore 56 on its upper end, with sealing means 58 and the raised face of bonnet assembly 8 retained therein by suitable means, as studs 60 and nuts 61.

Retainer cap 38 is connected to lower end 40 by suitable retaining means such as cap screws 62 and cooperates with flange 42 to lock cartridge assembly 6 in place within bore 22. Seal rings 28 and 30 seal on the outside surface 64 of cartridge body 6 thereby balancing the pressure end loads caused by the pressure in flow passages 24 and 26 acting across the bore 22 of body 4. Consequently, the retaining means 62 carries no pressure end load.

Cage 34 is a generally cylindrical member with a closed lower end which is a slip fit in bore 54 of cartridge body 32. The central portion of cage 34 has a reduced diameter thereby providing annular chamber 71 for improved flow characteristics. A plurality of radially disposed apertures 66, are equally spaced circumferentially on cage 34. Cage 34 is installed into bore 54 and is oriented to place a pair of apertures 66 adjacent inlet flow passage 44 to enhance distribution. Axially displaced below apertures 66 is radially disposed outlet aperture 68, aligned with outlet flow passages 26 and 46. The top, middle and lower portions of the exterior of cage 34 are sealed against bore 64 by O rings 70. Seal shoulder 72 is disposed on the interior of cage 34 for engagement with inner sleeve 36 in a manner to be described hereinafter. Groove 74 is provided on the upper exterior of cage 34 to aid in removal of the cage when required for servicing.

Coacting with cage 34 to control fluid communication between inlet port 44 and outlet port 46 is internal sleeve 36. Sleeve 36 is a generally cylindrical member with a closed upper end 76 and a cylindrical neck portion 78 extending therefrom. Neck 78 is sealingly received within counterbore 80 of bonnet assembly 8. Suitable sealing means as chevron type packing assembly 82, seals the annulus between neck portion 78 and counterbore 80. Pressure balancing ports 84 in upper end 76 of sleeve 36 provide fluid communication between the

interior of internal sleeve 36 and the interior of bonnet assembly 8 to minimize the load imposed on the actuation means 92, described hereinafter.

The interior portion of internal sleeve 36 is stepped and includes a plurality of radially disposed flow passages 86 of varying diameters, passing through the wall of the lower portion. Passages 86 are arranged in pairs of the same diameter on opposite sides of internal sleeve 36 in facing relationship. This arrangement of flow passages 86 serves to direct incoming flow streams against one another thereby dissipating their energy and reducing their erosive effects.

The exterior of internal sleeve 36 adjacent closed upper end 76 has suitable sealing means such as a plurality of seal rings 88 disposed thereon which also function as wiper rings. Shoulder 90 is disposed on the central exterior portion of internal sleeve 36, above flow passages 86. It is shaped to conform to seal shoulder 72 such that when internal sleeve 36 is in the closed position as shown in FIGURE 1, apertures 66 and inlet passage 44 are blocked.

Similarly when internal sleeve 36 is in the fully open position as shown in FIGURE 2, the flow path is into inlet passages 24 and 44, through flow apertures 66, across flow passages 86 and through outlet aperture 68 to outlet passages 26 and 46. Internal sleeve 36 can be set at any position between fully open or fully closed to obtain the desired flow rate. The actuation means of internal sleeve 36 is denoted generally by numeral 92. Actuation means 92 is a travelling nut assembly of conventional design well known by those skilled in the art. Stem 94 of actuation means 92 threadably engages neck 78 with lockwasher 96 interposed therebetween to prevent disengagement. Antirotation key 98 mounted on stem 94 coacts with groove 100 of bonnet assembly 8 to provide axial movement of inner sleeve 36 when handwheel 102 is rotated.

With reference to FIGURE 3, the cartridge assembly 6 and bonnet assembly 8 have been reversed with respect to FIGURES 1 and 2 without removing the body 4 from the flowline. This is accomplished by first removing cap screws 62 and retainer cap 38. Cartridge assembly 6 with bonnet assembly 8 connected thereto is removed from body 4 and then rotated about the horizontal and vertical axes to align pin 48 with hole 52. Pin 48 enters hole 52 as cartridge assembly 6 is reinserted in body 4 thereby maintaining proper orientation. Retainer cap 38 and cap screws 62 are replaced and flow can now be directed from piping portion 16 through choke valve 2 and into piping portion 14. It will be observed that in this reversed position, inlet flow passage 44 is now aligned with passage 26 and outlet flow passage 46 is aligned

with passage 24. Thus, the direction of flow is reversed while maintaining the original flow control features and ease of operation without requiring any cutting, welding or disassembly of flowlines.

An alternate embodiment of the improved cartridge choke valve is shown in FIGURE 4. This alternate embodiment differs from the preferred embodiment of FIGURES 1-3 only in the change of trim style from internal sleeve and cage to plug and cage. Those components in FIGURE 4 which are identical to those in the preferred embodiment carry the same numeral designation.

The alternate embodiment, denoted generally by numeral 202 is composed of body 4, cartridge assembly 206 and bonnet assembly 8. Cartridge assembly 206 is composed of body 32, cage 234, plug 236 and retainer cap 38. Cage 234 is a generally cylindrical member differing from cage 34 only in the quantity and placement of flow apertures 266. The middle portion of cage 234, adjacent annular chamber 71, has a plurality of radially disposed flow apertures 266 therethrough. Flow apertures 266 are arranged in axially aligned pairs of different diameters with a matching pair of flow apertures on the opposite side of cage 234 in facing relationship. As in the preferred embodiment, this arrangement of flow apertures allows incoming flow streams to be directed against one another, thereby dissipating their energy and reducing their erosive effects.

Cage 234 is installed into bore 54 and oriented to place a pair of apertures 266 adjacent inlet flow passage 44 to enhance flow distribution. The top, middle and lower portions of the exterior of cage 234 are sealed against bore 64 by O rings 70. Seal shoulder 72 is disposed on the interior of cage 234 for engagement with plug 236 in a manner to be described hereinafter.

Coacting with cage 234 to control fluid communication between inlet port 44 and outlet port 46 is plug 236. Plug 236 is a generally cylindrical member with a closed upper end 76 and a cylindrical neck portion 78 extending therefrom. Neck 78 is received and sealed within bonnet assembly 8 in the same manner as the preferred embodiment of FIGURES 1-3. Pressure balancing ports 84 in upper end 76 provide fluid communication between the recess 278 and bonnet assembly 8 to minimize the load imposed on the actuator means 92.

The exterior of plug 236 adjacent closed upper end 76 has suitable sealing means such as a plurality of seal rings 88 disposed thereon which also function as wiper rings. Shoulder 290 is disposed on the lower exterior portion of plug 236 and shaped to seal shoulder 72. When shoulders 290 and 72 are in contact as shown in FIGURE 4, apertures 266 and inlet passage 44 are blocked. Plug 236 can be set at any position between fully

open and fully closed to obtain the desired flow rate. In all other respects choke valve assembly 202 functions the same as choke valve assembly 2, providing the pressure balanced cartridge assembly 206 with its reversibility feature.

A second alternate embodiment of the improved cartridge choke valve is shown in FIGURE 5. This second alternate embodiment differs from the preferred embodiment of FIGURES 1-3 only in the change of trim style from internal sleeve and cage to external sleeve and cage. Those components in FIGURE 5 which are identical to those in the preferred embodiment of FIGURES 1-3 carry the same numeral designation.

The alternate embodiment, denoted generally by numeral 302, is composed of body 4, cartridge assembly 306 and bonnet assembly 8. Cartridge assembly 306 is composed of body 32, cage 334, external sleeve 336, cage retainer 338 and retainer cap 38. Cage 334 is a generally cylindrical member with a reduced upper portion 335. Vertical bore 337 extends from the upper face 333 of reduced upper portion 335 inwardly to its intersection with radially disposed outlet passage 339. The enlarged lower portion of cage 334 is a slip fit in bore 54 with O rings 70 disposed on the exterior thereof. Reduced upper portion 335 has a plurality of radially disposed flow apertures 340 of varying diameter extending through the wall. Seal shoulder 341 is disposed on the exterior of reduced upper portion 335. Apertures 340 are arranged in axially aligned pairs of different diameters with a matching pair of flow apertures on the opposite side of upper portion 335 in facing relationship.

Cage 334 is installed in bore 54 with outlet passage 339 aligned with passages 26 and 46. Cage 334 is retained in position by cage retainer 338. Retainer 338 is a tubular member, slidably received within bore 54 and sitting on the enlarged lower portion of cage 334. The upper end of retainer 338 has a shoulder thereon for retaining O ring 71. The lower end of retainer 338 has a radially disposed flow port 344 therethrough which is aligned with inlet passages 24 and 44. Cage retainer 338 abuts the lower face of bonnet assembly 8 and retains cage 334 in position when bonnet assembly 8 is secured to body 32.

External sleeve 336 is a generally hollow cylindrical member with a closed upper end 76 and a cylindrical neck portion 78 which is received and sealed within bonnet assembly 8 as in the previously described embodiments. Pressure balancing ports 84 in upper end 76 function as previously noted. The exterior of external sleeve 336 adjacent closed upper end 76 has suitable sealing means such as O ring 348 disposed thereon which seals in the bore of cage retainer 338. The lower end of external sleeve 336 is counterbored to closely fit

about reduced upper portion 335. Shoulder 390 is disposed on the lower interior edge of external sleeve 336 and shaped to conform to mating seal shoulder 341. When shoulders 390 and 341 are in contact as shown in FIGURE 5, apertures 340 and inlet passage 44 are blocked. External sleeve 336 can be set at any position between fully open and fully closed to obtain the desired flow. In all other respects choke valve assembly 302 functions the same as choke valve assembly 2, providing the pressure balanced cartridge assembly 306 with its reversibility feature.

It should be noted that while the preferred embodiment is shown with a handwheel operated actuation means the invention is readily usable with a pneumatic or hydraulic actuator. The pressure balancing ports 84 serve to balance the forces acting on internal sleeve 36 and thereby minimize the size of actuator required to open or close the choke valve.

Claims

1. A pressure balanced cartridge choke valve comprising: a valve body (4) with a central bore (22) laterally intersected by a first inlet (24) and a first outlet (26) flow passage; a reversible and pressure balanced cartridge assembly (6) sealingly retained within the valve body with flow controlling means positioned therein, the cartridge assembly including a cartridge body (32) with a central cavity (54) laterally intersected by a second inlet (44) and a second outlet (46) flow passage, a means (38,62) for retaining the cartridge assembly within the valve body, and a means (48,50,52) for maintaining the second inlet and second outlet flow passages in registry with the first inlet and first outlet flow passages; and an actuation means (92) for positioning the flow controlling means; characterised by the flow controlling means including a cage (34) sealingly positioned within the central cavity (54) of the cartridge body and a flow closure member (36) with pressure balancing ports (84) therethrough sealingly engaging the cage.
2. A valve according to claim 1, wherein the registry maintaining means includes a first orientation hole (50,52) adjacent the central bore of the valve body (4), a second orientation hole disposed on the cartridge body (32) for alignment with the first orientation hole and an alignment pin (48) interposed therebetween.
3. A valve according to claim 1 or claim 2, wherein the retaining means (38,62) includes a retainer cap (38) and bolting means (62) at-

taching the retainer cap to the cartridge body (32).

4. A valve according to any one of the preceding claims, wherein the flow closure member is an internal sleeve member (36).
5. A valve according to any one of claims 1 to 3, wherein the flow closure member is an external sleeve member (336).
6. A valve according to any one of claims 1 to 3, wherein the flow closure member is a plug member (236) with pressure balancing ports therethrough.
7. A valve according to any one of the preceding claims, wherein the actuation means (92) includes a bonnet assembly (8) with a stem (94) sealingly received therein and connected to the flow closure member (36) with a travelling nut assembly connected to the stem for positioning the flow closure member.
8. A valve according to claim 1, further comprising a cartridge retainer cap (38) and bolting means (62) attaching the retainer cap to the cartridge assembly maintaining the cartridge assembly within the central bore, an orientation means including a first and a second orientation hole (50,52) disposed in facing relationship on the valve body and the cartridge assembly, respectively, and an orientation pin (48) interposed in the orientation holes to maintain the inlet and outlet passages (24,26,44,46) of the valve body and cartridge in fluid communication, and a bonnet assembly (8) sealingly secured to the cartridge assembly and including a travelling nut assembly operatively connected to the flow closure member (36) by a stem (94) for positioning the flow closure member.

Patentansprüche

1. Einsatzdrosselventil mit Druckausgleich, umfassend einen Ventilkörper (4) mit einer zentralen Bohrung (22), der seitlich von einer ersten Einflußöffnung (24) und einer ersten Ausflußöffnung (26) durchquert wird; eine reversible und mit einem Druckausgleich versehene Patroneneinheit (6), die dichtend im Ventilkörper mit einer darin angeordneten Durchflußregelungseinrichtung gehalten wird, wobei die Patroneneinheit aus einem Patronenkörper mit einem zentralen Hohlraum (54), der seitlich von einer zweiten Einflußöffnung (44) und einer zweiten Ausflußöffnung (46) durchquert wird, einer Einrichtung (38, 62) zum Halten der Pa-



about reduced upper portion 335. Shoulder 390 is disposed on the lower interior edge of external sleeve 336 and shaped to conform to mating seal shoulder 341. When shoulders 390 and 341 are in contact as shown in FIGURE 5, apertures 340 and inlet passage 44 are blocked. External sleeve 336 can be set at any position between fully open and fully closed to obtain the desired flow. In all other respects choke valve assembly 302 functions the same as choke valve assembly 2, providing the pressure balanced cartridge assembly 306 with its reversibility feature.

It should be noted that while the preferred embodiment is shown with a handwheel operated actuation means the invention is readily usable with a pneumatic or hydraulic actuator. The pressure balancing ports 84 serve to balance the forces acting on internal sleeve 36 and thereby minimize the size of actuator required to open or close the choke valve.

Claims

1. A pressure balanced cartridge choke valve comprising: a valve body (4) with a central bore (22) laterally intersected by a first inlet (24) and a first outlet (26) flow passage; a reversible and pressure balanced cartridge assembly (6) sealingly retained within the valve body with flow controlling means positioned therein, the cartridge assembly including a cartridge body (32) with a central cavity (54) laterally intersected by a second inlet (44) and a second outlet (46) flow passage, a means (38,62) for retaining the cartridge assembly within the valve body, and a means (48,50,52) for maintaining the second inlet and second outlet flow passages in registry with the first inlet and first outlet flow passages; and an actuation means (92) for positioning the flow controlling means; characterised by the flow controlling means including a cage (34) sealingly positioned within the central cavity (54) of the cartridge body and a flow closure member (36) with pressure balancing ports (84) therethrough sealingly engaging the cage.
2. A valve according to claim 1, wherein the registry maintaining means includes a first orientation hole (50,52) adjacent the central bore of the valve body (4), a second orientation hole disposed on the cartridge body (32) for alignment with the first orientation hole and an alignment pin (48) interposed therebetween.
3. A valve according to claim 1 or claim 2, wherein the retaining means (38,62) includes a retainer cap (38) and bolting means (62) at-

taching the retainer cap to the cartridge body (32).

4. A valve according to any one of the preceding claims, wherein the flow closure member is an internal sleeve member (36).
5. A valve according to any one of claims 1 to 3, wherein the flow closure member is an external sleeve member (336).
6. A valve according to any one of claims 1 to 3, wherein the flow closure member is a plug member (236) with pressure balancing ports therethrough.
7. A valve according to any one of the preceding claims, wherein the actuation means (92) includes a bonnet assembly (8) with a stem (94) sealingly received therein and connected to the flow closure member (36) with a travelling nut assembly connected to the stem for positioning the flow closure member.
8. A valve according to claim 1, further comprising a cartridge retainer cap (38) and bolting means (62) attaching the retainer cap to the cartridge assembly maintaining the cartridge assembly within the central bore, an orientation means including a first and a second orientation hole (50,52) disposed in facing relationship on the valve body and the cartridge assembly, respectively, and an orientation pin (48) interposed in the orientation holes to maintain the inlet and outlet passages (24,26,44,46) of the valve body and cartridge in fluid communication, and a bonnet assembly (8) sealingly secured to the cartridge assembly and including a travelling nut assembly operatively connected to the flow closure member (36) by a stem (94) for positioning the flow closure member.

Patentansprüche

1. Einsatzdrosselventil mit Druckausgleich, umfassend einen Ventilkörper (4) mit einer zentralen Bohrung (22), der seitlich von einer ersten Einflußöffnung (24) und einer ersten Ausflußöffnung (26) durchquert wird; eine reversible und mit einem Druckausgleich versehene Patroneneinheit (6), die dichtend im Ventilkörper mit einer darin angeordneten Durchflußregelungseinrichtung gehalten wird, wobei die Patroneneinheit aus einem Patronenkörper mit einem zentralen Hohlraum (54), der seitlich von einer zweiten Einflußöffnung (44) und einer zweiten Ausflußöffnung (46) durchquert wird, einer Einrichtung (38, 62) zum Halten der Pa-



- troneneinheit im Ventilkörper, und einer Einrichtung (48, 50, 52) zum Halten der zweiten Einfluß- und der zweiten Ausflußöffnung in Ausrichtung mit den ersten Einfluß- und Ausflußöffnungen besteht; sowie einen Betätiger (92) zur Einstellung der Durchflußregelungseinrichtung; **dadurch gekennzeichnet**, daß die Durchflußregelungseinrichtung eine Halterung (34), die dichtend innerhalb des zentrischen Hohlraumes (54) des Patronenkörpers angeordnet ist, und einen den Durchfluß sperrenden Körper (36) mit durch diesen hindurchgehenden Druckausgleichsöffnungen (84), der dichtenden Kontakt zur Halterung hat, umfaßt.
2. Ventil nach Anspruch 1, **dadurch gekennzeichnet**, daß die die Ausrichtung haltende Einrichtung eine erste Orientierungsbohrung (50, 52) neben der zentrischen Bohrung des Ventilkörpers (4), eine am Patronenkörper (32) angeordnete zweite Orientierungsbohrung zur Ausrichtung mit der ersten Orientierungsbohrung und einen dazwischen angeordneten Suchstift (48) umfaßt.
3. Ventil nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die Halteeinrichtung (38, 62) eine Haltekappe (38) und Bolzen (62), die die Haltekappe am Patronenkörper (32) befestigen, umfaßt.
4. Ventil nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der den Durchfluß sperrende Körper ein inneres Buchsenteil (36) ist.
5. Ventil nach einem oder mehreren der Ansprüche 1 bis 3, **dadurch gekennzeichnet**, daß der den Durchfluß sperrende Körper ein äußeres Buchsenteil (336) ist.
6. Ventil nach einem oder mehreren der Ansprüche 1 bis 3, **dadurch gekennzeichnet**, daß der den Durchfluß sperrende Körper ein Stöpselteil (236) mit durch dieses hindurchgehenden Druckausgleichsöffnungen ist.
7. Ventil nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Betätiger (92) umfaßt: eine Deckelkonstruktion (8) mit einer Welle (94), die darin dichtend aufgenommen ist, und die mit dem den Durchfluß sperrenden Körper (36) mittels einer an der Welle befestigten Laufmutter zur Positionierung des den Durchfluß sperrenden Körpers verbunden ist.

8. Ventil nach Anspruch 1, **dadurch gekennzeichnet**, daß es weiterhin umfaßt: eine Patronenhaltekappe (38) mit Bolzen (62), die die Haltekappe am Patronenkörper befestigen und den Patronenkörper in der zentrischen Bohrung halten, eine Ausrichtungseinrichtung mit einer ersten und einer zweiten Orientierungsbohrung (50, 52), die entsprechend gegenüberliegend in den Ventilkörper und in den Patronenkörper eingebracht sind, und einen Suchstift (48), der in den Orientierungsbohrungen sitzt, um die Einfluß- und Ausflußöffnungen (24, 26, 44, 46) des Ventilkörpers und der Patrone in Fließverbindung zu halten, sowie eine Deckelkonstruktion (8), die dichtend an der Patroneneinheit befestigt ist und eine Laufmutter aufweist, die durch eine Welle (94) funktionell mit dem den Durchfluß sperrenden Körper (36) zur Positionierung des den Durchfluß sperrenden Körpers verbunden ist.

Revendications

1. Vanne d'étranglement à cartouche équilibrée en pression, comprenant un corps (4) de vanne ayant un trou central (22) intersecté latéralement par un premier passage d'entrée (24) et un premier passage de sortie (26), un ensemble (6) à cartouche réversible équilibrée en pression, retenue de manière étanche dans le corps de la vanne avec un dispositif de réglage de débit placé à l'intérieur, l'ensemble à cartouche comprenant un corps (32) de cartouche ayant une cavité centrale (54) intersectée latéralement par un second passage d'entrée (44) et un second passage de sortie (46), un dispositif (38, 62) de retenue de l'ensemble à cartouche dans le corps de vanne, et un dispositif (48, 50, 52) de maintien du second passage d'entrée et du second passage de sortie en face du premier passage d'entrée et du premier passage de sortie, et un dispositif (92) de manoeuvre destiné à positionner le dispositif de réglage de circulation, caractérisée en ce que le dispositif de réglage de circulation comporte une cage (34) disposée de façon étanche dans la cavité centrale (54) du corps de cartouche et un organe obturateur (36) ayant des orifices (84) d'équilibrage de pression qui le traversent et qui coopèrent de manière étanche avec la cage.
2. Vanne selon la revendication 1, dans laquelle le dispositif de maintien en position alignée comprend un premier trou d'orientation (50, 52) adjacent au trou central du corps (4) de vanne, un second trou d'orientation disposé sur le corps (32) de cartouche et destiné à être

aligné sur le premier trou d'orientation, et une broche d'alignement (48) placée entre eux.



3. Vanne selon la revendication 1 ou 2, dans laquelle le dispositif de retenue (38, 62) comporte un capuchon (38) de retenue et un dispositif (62) de boulonnage fixant le capuchon de retenue au corps (32) de cartouche. 5
4. Vanne selon l'une quelconque des revendications précédentes, dans laquelle l'organe obturateur est un organe à manchon interne (36). 10
5. Vanne selon l'une quelconque des revendications 1 à 3, dans laquelle l'organe obturateur est un organe à manchon externe (336). 15
6. Vanne selon l'une quelconque des revendications 1 à 3, dans laquelle l'organe obturateur est un bouchon obturateur (236) ayant des orifices d'équilibrage de pression qui le traversent. 20
7. Vanne selon l'une quelconque des revendications précédentes, dans laquelle le dispositif de manoeuvre (92) comprend un ensemble à chapeau (8) ayant une tige (94) logée de façon étanche à l'intérieur et raccordée à l'organe obturateur (36) avec un ensemble à écrou mobile raccordé à la tige afin qu'il assure le positionnement de l'organe obturateur. 25 30
8. Vanne selon la revendication 1, comprenant en outre un capuchon (38) de retenue de cartouche et un dispositif (62) de boulonnage fixant le capuchon de retenue à l'ensemble à cartouche et maintenant l'ensemble à cartouche dans le trou central, un dispositif d'orientation comprenant un premier et un second trou d'orientation (50, 52) disposés en regard sur le corps de la vanne et l'ensemble à cartouche respectivement, et une broche d'orientation (48) disposée dans les trous d'orientation de manière que les passages d'entrée et de sortie (24, 26, 44, 46) du corps de vanne et de la cartouche communiquent, et un ensemble à chapeau (8) fixé de manière étanche à l'ensemble à cartouche et comprenant un ensemble à écrou mobile raccordé à l'organe obturateur (36) par une tige (94) afin que l'organe obturateur soit positionné. 35 40 45 50