

The present invention relates to a bayonet joint for a pressure line, with a tubular base member, with an operating lever attached to the base member and able to tilt about a pin, for actuating a valve and coupling members, which are provided

5. on the front end of the base member for connecting and disconnecting a connecting plug, these coupling members comprising a push-pull bush, which surrounds the front end of the base member.

10. Known bayonet joints of this type are used in particular for compressed-air lines, in order to connect a compressed-air source to consuming devices.

- Known bayonet joints of this type for compressed-air lines
15. have the drawback that at the time of disconnection, the pressure prevailing on the working side suddenly escapes with great force through the plug just disconnected. Due to this the end of the disconnected compressed-air line may slip out of the operator's hand, strike against surrounding objects,
20. damage them and injure bystanders. Damage to the connecting plug also frequently occurs, due to which the latter begins to leak and cannot be used. Just as in flexible compressed-air lines, during the sudden escape of the pressure medium, a so-called whip effect occurs, which also considerably endangers the operator.
- 25.

- It is the object of the invention to construct a bayonet joint according to the preamble so that the connection to the connecting plug can only be released when the pressure medium
30. has escaped in a controlled manner below the pressure prevailing on the working side.

- This object is achieved by the invention characterised in Claim 1. As a result of this construction the pressure
35. medium first of all escapes below the pressure prevailing on the working side, by way of the pressure outlet provided in the base member and then the connecting plug can be removed. The disconnected line can then be held safely without people or objects being endangered. Damage to the connecting plug
40. is likewise avoided. Also, the whip effect and the related risk of accidents are precluded.

- Further features of the invention will become apparent from the other Claims, description and drawings.
- 45.

One embodiment is illustrated in the drawings and described hereafter.

- Figure 1 is a longitudinal section through a bayonet joint according to the invention with connected connecting plug and open valve,
- 50.

Figure 2 is a plan view of the bayonet joint according to Figure 1,

55. Figure 3 shows diagrammatically one beside the other the respective position of various parts of the bayonet joint with the valve closed and the connecting plug disconnected,

Figure 4 is an illustration according to Figure 3 in a position in which the connecting plug is inserted and further more the valve is closed,

5. Figure 5 is an illustration according to Figure 4 in a position in which the operating lever is swung through 15° for displacing a push-pull bush, the bush closing a pressure outlet before the valve is transferred into its through position,

10. Figure 6 is an illustration according to Figure 5 in a position in which the operating lever is tilted for complete opening of the valve, the other parts retaining the position illustrated in Figure 5.

15. The bayonet joint comprises a one-piece, tubular base member 10, on which an operating lever 1 able to tilt about a pin is attached. The operating lever 1 rotates a valve member 12 of spherical cross-section for opening and closing an inlet for a medium which is under pressure, for example compressed-air, which flows from an inlet side to an outlet side.

20. The inlet line is connected to the end of the base member 10 shown on the left in Figure 1, whereas a connecting plug 11 is connected to the outlet line. The base member 10 comprises passages for balls 9, which are provided as coupling members for the connecting plug 11. If the connecting plug 11 is in its connected position, then the balls 9 sink by part of their periphery into a peripheral groove 15 provided in the plug. By means of a push-pull bush 4, which surrounds a section of the base member 10 forming the outlet line of the bayonet joint, the balls 9 are held in their partially-counter-sunk position in the groove 15, due to which the connecting plug is securely connected to the base member 10. The free end of the plug 11 is seated on a seal 8, which lies in a sleeve 13 loaded by a spring 7 in the direction of the plug. Located between the seal 8 and the valve member 12 in the base member is a pressure outlet 14, which in the embodiment illustrated in Figure 1 is closed by a seal 6, which is fixed in the push-pull bush 4.

40. A guide pin 2 located on the operating lever 1 engages in a guide track 3, which is preferably formed as a groove in the push-pull bush (Figure 2). Depending on the angle of rotation of the operating lever 1, the shape of the guide track 3 determines the axial position of the push-pull bush 4 guided to slide on the section of the base member 10. Furthermore, a compression spring 5 is provided, which biases the bush 4 in the direction of its coupling position.

50. In the basic position of the bayonet joint according to Figure 3, the inlet side is under pressure, whereas on account of the position of the operating lever 1, the valve member 12 lies in its blocking position. The guide pin 2 bears against a curve at the end of the guide track 3 and locks the lever 1

-3-

- in this basic or inoperative position, in which, in the embodiment illustrated, the operating lever 1 is tilted side-wards through 90° . In this position, the outer surface of the sleeve 13 keeps the balls 9 in a position in which they project over part of their circumference from the base member 10 and keep the spring-loaded pull-push bush 4 in its retracted, rear position.

- Figure 4 shows the coupling of the connecting plug 11.
10. The connecting plug 11 is pushed into the tubular base member 10, the seal 8 sealing the gap between the base member 10 and the connecting plug 11. Furthermore, due to the pressing-in of the connecting plug 11, the sleeve 13 is pressed against the force of the spring 7 axially into the
 15. base member 10, so that the balls 9 are now able to drop into the groove 15 provided in the connecting plug 11, due to which the push-pull bush 4 is released. At the same time, on account of the force of the spring 5, the bush 4 is moved forwards in the direction of its coupling position over the
 20. balls 9, so that the latter can no longer be lifted radially outwards and therefore positively lock the connecting plug 11 in its coupled position. Because the bush 4 was moved forwards and thus the associated guide track 3 was likewise moved forwards, the abutment of the guide pin 2 against the curve at
 25. the end of the guide track 3 is discontinued, due to which the lever 1 is now released and can be tilted.

- During a first tilting movement through an angle of rotation of approximately 15° , the bush 4 is moved forwards
30. by means of the guide pin 2 engaging in the guide track 3 so that the seal 6 closes off the pressure outlet 14 in the base member 10. Over the angle of rotation of 15° , the valve furthermore remains closed, since the valve member is not yet -
 35. not even partly - in its through position.

- If the lever 1 is tilted further (beyond 15°), then the valve member 12 will open slowly. If the lever 1 lies parallel to the base member 10 or to the valve member 12 (Figure 6), then the valve is completely open. The valve
40. member 12 lies in its through position.

- During the rotary movement of the lever 11 from its 15° -position into its position parallel to the base member 10 (transfer from the position according to Figure 5 to the
45. position according to Figure 6), there is no need for the bush 4 to be moved further. The guide track 3 is therefore constructed accordingly. However, for the remaining angle of rotation of 75° , the sliding bolt lock consisting of the guide pin 2 and the guide track 3 secures the bush 4 in the position
 50. which it has assumed, in which it locks the connecting plug 11 - lying above the balls 9.

- The uncoupling of the connecting plug 11 takes place in the following way: The lever 1 is swung from its coupled
55. position according to Figure 6 in the direction of its basic

- position according to Figure 1. The valve member 12 slowly seals the valve according to the rotary movement. On reaching a rotary angle of approximately 75° or approximately 15° before the basic position of the lever 1 (Figure 5), the valve is
5. closed. In the case of a further rotary movement, the guide pin 2/guide track 3 - apparatus displaces the bush 4 in the rearwards direction, in order to pull back the seal 6 from the outer opening of the pressure outlet 14, due to which the latter is released. Now the pressure still prevailing on the
 10. working side after closing the valve can escape in a controlled manner into the atmosphere from the hoses and working machines by way of the connecting plug 11 and the pressure outlet 14. The connecting plug 11 is not released immediately by the rotation of the lever 1 into the inoperative position according
 15. to Figure 4. On the contrary, the lever must be tilted for example by a further 10° beyond the inoperative position, in order to allow the balls 9 to rise in the passages provided in the base member 10. Only when the balls 9 are able to withdraw radially, will the spring 7 push the plug 11 out and push
 20. the sleeve 13 below the balls 9 so that the balls bear on the outer surface of the sleeve 13 and project by part of their circumference above the outer surface of the base member 10, due to which the bush 4 is held in its retracted, uncoupled, rear position. If the operating lever is now released, it
 25. swings back into its inoperative position, which in the embodiment illustrated lies at 90° sideways with respect to the base member 10.

Patent Claims

1. Bayonet joint for a pressure line, with a tubular base member (10), with an operating lever (1) attached to the base member (10) and able to tilt about a pin, for actuating a valve member (12) and coupling members (4, 9), which are provided on the front end of the base member (10) for connecting and disconnecting a connecting plug (11), these coupling members comprising a push-pull bush (4), which surrounds the front end of the base member (10), characterised in that the operating lever (1) directly actuates the valve member (12) for opening and closing a valve and the push-pull bush (4) for connecting and disconnecting the connecting plug (11), that located between the valve member (12) and a seal (8) of the connecting plug (11) in the base member (10) is a pressure outlet (14), which is closed off in the through position of the valve by a seal (6) of the push-pull bush (4) and that in the closed position of the valve, the seal (6) releases the pressure outlet (14), before the push-pull bush (4) is moved into a position for disconnecting the connecting plug (11) so that the pressure prevailing on the outlet side can escape into the atmosphere.
2. Bayonet joint according to Claim 1, characterised in that the driving connection between the operating lever (1) and the push-pull bush (4) consists of a guide pin (2) moving in a guide track (3), the path of the guide track (3) determining the axial displacement position of the push-pull bush (4) depending on the angle of rotation of the operating lever (1).
3. Bayonet joint according to Claim 1 or 2, characterised in that in the direction of its coupling position as well as in the basic position of the lever (1), in which the valve member (12) is in the closing position, the push-pull bush (4) is loaded by a spring (5) and the connected plug (11) can be disconnected by swinging the lever (1) against the force of the spring (5) beyond the basic position of the lever (1).
4. Bayonet joint according to Claim 3, characterised in that a spring-loaded sleeve (13) is located in the base member (10), which sleeve is provided with a seal (8) associated with the end of the connecting plug (11) and that when the plug (11) is disconnected, the outer surface of the sleeve (13) keeps the coupling members (9) in a raised position, in which the coupling members (9) prevent the push-pull bush (4) from sliding into its coupling position (Figure 3).
5. Bayonet joint according to Claim 1, characterised in that the section of the base member (10), which is surrounded by the push-pull bush (4) and on which the latter is guided to slide and which furthermore forms a coupling member for the connecting plug (11), is constructed as a one-piece tubular member.