

Title: Valve for a door closer or an electro-hydraulic door drive

Description

The invention relates to a valve for a door closer or for an
5 electro-hydraulic door drive, which is charged by a piston
disposed in a cylinder of the door closer or the door drive,
the valve pin of the valve having a valve cone locatable
against a valve seat and, by means of a male thread
disposed at the valve pin, being screwed into a female
10 thread disposed at the cylinder or at the housing of the
door closer, comprising a sealing ring, which seals the
valve pin in relation to a pressure-free space and which, at
the side of the valve pin opposite the valve cone, is
disposed in a circular groove of the valve pin.

15 A multi-functional valve is known from EP 0 601 597 A1,
which, on the one hand, can operate as an overflow valve
or as a pressure control valve with adjustable
counterpressure force or static locking force and, on the
other hand, as a throttle valve with adjustable flow
20 resistance. The prior art valve is screwed into a cylinder of
a door closer by means of a male thread.

As a rule, the sealing of such valves in relation to an
unpressurized space is realized through an O-ring seal
disposed in a groove of the valve or of the valve pin

bearing against the cylinder or the housing of the door closer. In this case, an O-ring seal generally prevents an unintentional arresting of the valve through an unwanted misadjustment of the screw connection between the valve
5 and the cylinder or the housing.

If the valve is exposed to high stress, i.e. when abrupt high pressure surges occur, in particular after an extended operating period, arrestment of the valve will occur though, which will result in a defective opening or closing function
10 of the door, the cause thereof being determinable only through an extensive examination of the complete door closer.

It is an object of the invention to find a technically simple, inexpensive and functionally reliable solution, which
15 prevents an arrestment of the valve through a misadjustment of the screw connection between the valve on the one hand and the cylinder or the housing of a door closer on the other hand, even if the valve experiences stress by abrupt high pressure surges.

20 The invention solves of the given problem with the teaching according to claim 1.

According to the invention, the function of the O-ring seal can be limited to a pure sealing function, whereas an inventive anti-rotation means is formed in that it will

exclusively prevent a rotation of the male thread of the valve in relation to the female thread of the cylinder or of the housing of the door closer and thus present an arresting of the valve.

- 5 Advantageous embodiments of the invention are the subject matter of the dependent claims.

A technically simple and functionally reliable solution consists in that, at the end side at the valve pin subsequent to the circular groove, a second groove having at least one
10 surface extending tangentially in relation to the circumference of the valve pin is disposed for receiving an anti-rotation means.

The above embodiment solution simply requires completing the valve pin by an additional groove, which is
15 delimited by the end flange and is situated at the end opposite the valve cone of the valve pin.

Thus, the above mentioned groove, on account of the groove bottom's surfaces extending tangentially in relation to the circumference of the valve pin, delimits a square or
20 rectangular cross-section of the valve pin.

In an advantageous embodiment of the invention, the anti-rotation means itself consists of a plastic ring, which is insertable into the groove and bears against a pocket bore of the cylinder or of the housing by means of a

predetermined pretension. On account of a predeterminable oversize, the partially elastic plastic ring can bear against the stepped boring of the cylinder or of the housing with sufficient contact force and thus can reliably prevent the valve from arresting. As in known way, the pocket bore is a circular bore, the plastic ring has a circular exterior contour and an interior contour corresponding to the square or rectangular cross-section of the valve pin and is advantageously formed as a ring open on one side, such that, prior to mounting the plastic ring, it does not require to be thrust into the associated groove, but only to be slid in laterally.

In order to be able to form the plastic ring with a material strength sufficient for the elastic contact force, a further feature consists in that the depth of the groove receiving the anti-rotation means, i.e. the plastic ring, is greater than the depth of the groove receiving the sealing ring.

Hereinafter, the invention will be explained in detail based on the drawings of one diagrammatically illustrated exemplary embodiment, wherein:

Figure 1: shows a view of a valve pin,

Figure 2: shows a lateral view of Figure 1,

Figure 3: shows the section A-A according to Figure 1,

Figure 4: shows a partial section according to section B-B of Figure 2,

Figure 5: shows the disposition of the valve within the housing of a door closer,

5 Figure 6: shows a view of the anti-rotation means in an illustration, which is enlarged in relation to Figure 1 to 5,

Figure 7: shows a lateral view of Figure 6,

Figure 8: shows a top view of Figure 6.

10 In the exemplary embodiment, the valve 1 is illustrated as a simple throttle valve; however, the embodiment and the functional range of application of the valve may be basically optional, in this regard reference is made to the content disclosed in EP 0 061 597 A1.

15 According to Figure 5, the valve 1 inserted into a housing 6 of a door closer has a valve pin 2, which by means of a valve cone 4 bears against a valve seat 3. Depending on the adjustment of the valve, pressure fluid can flow to respective consumers via a bore 18 and a gap to be
20 formed between the valve seat 3 and the valve cone 4 and via a pressure passage 19 and further bores, not illustrated. The valve pin 2 has a male thread 5, by means of which it is screwed into a female thread 7 of the housing 6. The depth adjustment during the screw in process is

realized via a hexagon socket 20 provided at the valve pin 2. A circular groove 9 receiving a sealing ring 10 is provided at the side of the valve pin 2 opposite the valve cone 4; the sealing ring 10 is formed as an O-ring seal and seals the valve pin 2 in relation to a pressure-free space 8.

As revealed in Figure 1 to 4 in particular, subsequent to the circular groove 9 and delimited by an end flange 21, the valve pin 2 has another groove 13, which in the exemplary embodiment (see Figure 3) delimits a square cross-section of the valve pin 2. On account of the square cross-section surfaces 12, which are tangential in relation to the circumference of the valve pin 2, are formed in the area of the groove 13. The groove 13 serves to receive an anti-rotation means 11, which is illustrated in Figure 6 to 8 and formed as a plastic ring 15. With its circular exterior contour 16, the plastic ring bears against a pocket bore 14 of the housing 6, whereas its interior contour 17 bears against the tangential surfaces 12 of the groove 13. According to Figure 6, the plastic ring 15 is formed as a ring open on one side and dimensioned such that, as a result, a press fit is created between the valve pin 2 and the housing 6 sufficient for the functioning of the valve.

List of References

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| | 1 | valve |
| | 2 | valve pin |
| | 3 | valve seat |
| 5 | 4 | valve cone |
| | 5 | male thread |
| | 6 | housing |
| | 7 | female thread |
| | 8 | pressure-free space |
| 10 | 9 | circular groove |
| | 10 | sealing ring |
| | 11 | anti-rotation means |
| | 12 | tangential surface |
| | 13 | groove |
| 15 | 14 | pocket bore |
| | 15 | plastic ring |
| | 16 | circular exterior contour |
| | 17 | interior contour |
| | 18 | bore |
| 20 | 19 | pressure passage |
| | 20 | hexagon socket |

Patent claims

1. A valve (1) for a door closer, which is charged by a piston disposed in a cylinder of the door closer, the valve pin (2) of the valve (1) having a valve cone (4) locatable against a valve seat (3) and, by means of a male thread (5) disposed at the valve pin (2), being screwed into a female thread (7) disposed at the cylinder or housing (6) of the door closer, comprising a sealing ring (10), which seals the valve pin (2) in relation to a pressure-free space and which, at the side of the valve pin (2) opposite the valve cone (4), is disposed in a circular groove (9) of the valve pin (2), characterized in that an anti-rotation means (11) is disposed between the valve pin (2) and the cylinder or the housing (6) of the door closer and blocks the male thread (5) of the valve pin (2) in relation to the female thread (7) of the cylinder or of the housing (6).
2. A valve according to claim 1, characterized in that a second groove (13) is disposed at the end of the valve pin (2) subsequent to the circular groove (9) and has at least one surface (12) extending tangentially in relation to the circumference of the

valve pin (2) for the reception of an anti-rotation means (11).

3. A valve according to claim 1 and 2, characterized in that the groove (13) disposed at the end of the valve pin (2) delimits a square cross-section of the valve pin (2).
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4. A valve according to claim 1 and 2, characterized in that the groove (13) disposed at the end of the valve pin (2) delimits a rectangular cross-section of the valve pin (2).
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5. A valve according to claim 1, characterized in that the anti-rotation means (11) consists of a plastic ring (15) insertable into the groove (13) and bears against a pocket bore (14) of the cylinder or of the housing (6) by means of a predeterminable pretension.
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6. A valve according to claim 5, characterized in that the plastic ring (15) has a circular exterior contour (16) and an interior contour (17) that corresponds to the square or rectangular cross-section of the valve pin (2) and is formed as a ring open to one side.
20
7. A valve according to any of the claims 1 to 6, characterized in that the depth of the groove (13)

receiving the anti-rotation means (11) is greater than the depth of the groove (9) receiving the sealing ring (10).