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## Description

The invention relates to a gate valve comprising a valve body, wherein the valve body has a spindle drive, wherein the spindle drive has, at its one end, a wedge for blocking a pipe.

5 “Axially displaceable” in the sense of claim 1 means a displacement in the direction of the longitudinal axis of the spindle or the axis.

A gate valve of the type mentioned in the introduction is known from the prior art. Such gate valves are built into pipes of different nominal sizes, wherein a pipe may be blocked  
10 by a gate valve. Such a gate valve comprises a valve body that is built into a pipe, which means that the pipe is flanged onto the valve body on both sides. A wedge, which is insertable into a corresponding wedge receptacle in the valve body via a spindle drive in order to block the pipe, is provided in the valve body. To this end, the wedge is configured, as expressed by the term “wedge”, to be shaped as a wedge pointing in the direction of  
15 insertion into the wedge receptacle. In order to achieve a complete blocking, it is provided that the wedge and the wedge receptacle for the wedge have sealing elements on their surfaces facing each other.

The spindle drive is mainly motor-driven. Such spindle drives must be very effective,  
20 which is more specifically embodied by the fact that the spindle of the spindle drive is mostly formed from high-strength tool steel. However, it is also known that highly corrosive media are transported in the pipes to be blocked. Tool steel does have high strength but it is not resistant to corrosion.

25 In this context connecting the spindle in a lowering valve with an axis in an axially displaceable manner by way of a coupling is known from DE 10014796 A1. Incidentally, such a two-part spindle configuration is also known from DE 2635688 A1, DE 1226847 B1 and DE 3342998. The part of the spindle drive that holds the actual spindle is made of high-strength tool or screw steel, wherein the axis that is displaceable by the spindle is  
30 made of a corrosion-resistant material, e.g. stainless steel. This means that two different components are coupled to each other by the coupling. Together with the drive, the spindle provides for the displacement of the axis, the axis transmits the axial movement of the spindle to the wedge in the area of the part of the valve body conducting the medium.

The problem underlying the invention is to prevent the wedge from being pressed by the spindle drive into the wedge receptacle in the valve body with excessive force, which would ultimately lead to damage to or destruction of the seals.

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In order to solve the object, it is proposed according to the invention that the column has at least one bottom limit stop and preferably also a top limit stop for the coupling bar.

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Advantageous features and embodiments of the invention may be gathered from the sub-claims.

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In addition, it is provided that the coupling has a coupling bar with a sleeve, wherein the coupling bar is displaceably guided by at least one column extending parallel to the spindle drive. The coupling bar is thus not only a part of the connection of the two parts of the spindle drive, namely the actual spindle, which is drivable by a motor, and the axis, at the end of which the wedge is attached, but the coupling bar also provides for a guiding of the spindle drive.

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Regarding the connection between the ends of the spindle and the axis by way of the coupling bar, the following must be mentioned:

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The sleeve of the coupling bar captures respectively the end of the axis and of the spindle and connects them in such a manner that axial forces are transferable. The connection of the ends of the spindle and of the axis by the sleeve of the coupling bar can hereby occur with a force-fit or positive-fit connection. In a positive-fit connection, the ends of the spindle and of the axis respectively have a more specifically circumferential groove, wherein the sleeve has corresponding protrusions on the inner side of the sleeve, which engage with the previously described grooves. In this respect, the sleeve in the coupling bar makes it possible to transfer axial forces such as occur for example when the wedge is pulled out of the wedge receptacle. Hereby, it is pointed out that neither the spindle nor the axis rotate. Both parts merely execute a longitudinal movement.

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According to another feature of the invention, the coupling bar comprises two bar shells, which form a bearing bush in the area of the column, wherein the bearing bush comprises a

slide or ball bearing. This makes it possible to have an essentially smooth and extremely precise guiding of the spindle drive by the column disposed on the body of the valve parallel to the spindle drive.

- 5 It has already been pointed out that the spindle drive comprises a motor-driven spindle. The motor drive comprises a motor and a screw drive that receives the spindle.

Such a motor-driven spindle comes with a control that ultimately ensures that depending on a predetermined spindle path, the motor is stopped. If the control is defective, the wedge  
10 is pressed by the motor into the receptacle for the wedge in the pipe. Thereby it can happen that the spindle drive bulges, with the consequence that the spindle drive is damaged. Since the spindle is guided by the column extending parallel to the spindle drive during the movement of the spindle, a bulging can now be avoided even in case of an over-rev of the drive.

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The screw drive can be configured as a planetary or roller screw drive. It transforms the rotational movement of the drive motor into an axial movement of the spindle. Both types of screw drives are characterized by a high load capacity, great durability and great dependability. Furthermore, such drives have a very high repeat accuracy for small  
20 travelling distances.

In the following, the invention is exemplarily described in more detail based on the drawings.

25 Fig. 1 shows the gate valve in a lateral sectional view;

Fig. 2 shows a section according to line II – II from fig. 1.

The gate valve labeled 1 as a whole has the valve body 2, which is inserted in a pipe 3,  
30 which means that the pipe 3 is flanged onto both sides of the valve body. The valve body 2 has a wedge receptacle 5 for receiving the wedge 10. The wedge 10 is inserted in a sealed manner in the wedge receptacle, wherein seals 11 disposed on the wedge and seals 6 disposed on the wedge receptacle are provided for sealing. The spindle drive labeled 20 as a whole is disposed on the wedge 10, which in the view according to the cross-section of

the pipe has an approximately circular configuration. The spindle drive 20 is mounted in a spindle head 22, wherein a screw drive 23 is provided in the spindle head 22 for bearing the spindle, said spindle drive serving together with a motor (not shown) to drive the spindle 25 of the spindle drive. The spindle head 22 is connected to the valve body 2 by  
5 four columns 30 (fig. 2). The screw drive is for example configured as a roller or as a planetary roller screw drive. The axis 28 is adjacent to the spindle 25 and is connected with the spindle 25 of the spindle drive 20 via the coupling labeled 29 as a whole. The spindle consists of high-strength tool or screw steel, whereas the axis is formed from a corrosion resistant material, e.g. a stainless steel.

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As has already been explained, the spindle head 22 is connected with the valve body 2 by at least two, preferably four columns 30 running parallel to each other, wherein a coupling bar 31 is provided, which displaceably connects the spindle drive 20 with two columns 30. In order to ensure a sliding of the coupling bar 31 on the column 30, a bearing bush 35 in  
15 the form of a slide bearing or a corresponding ball or roll bearing (fig. 2) is provided in the coupling bar in the area of the column 30.

It has already been pointed out that the drive motor has a control, which ensures that when the wedge 10 has reached its end position in the wedge receptacle 5, the motor (not shown)  
20 is stopped. In case the control malfunctions, a bottom limit stop 34a and a top limit stop 34b is provided in the area of the ends of at least one column 30, against which the coupling bar 31 abuts when the motor attempts to over-rev the spindle. Thus it is prevented on the one hand that the wedge 10 is pressed with an excessive force into the wedge receptacle 5, with the consequence that at least the seals 6, 11 or even the entire wedge or  
25 the wedge receptacle in the valve body are damaged.

On the other hand, the coupling bar prevents the spindle drive 20 from bulging in case of an over-rev of the motor. This means that the coupling bar stabilizes the spindle drive more specifically in case the control for stopping the spindle drive does not stop the drive after  
30 having travelled a determined distance.

Furthermore, the coupling bar 31, together with a sleeve 32 disposed in the area of the ends of the axis and of the spindle, forms the coupling, inasmuch as the two ends of the spindle and of the axis are held together by the sleeve of the coupling bar so that they transfer a

force in the axial direction (fig. 2). To this end, the two bar shells 33 of the coupling bar 31 are connected at both sides of the sleeve 32 by a screw connection 39.

5 Regarding the connection between the spindle and the shaft, which transfers a force in the axial direction, the following must be explained. The ends of the spindle and of the shaft stand above each other so that they are aligned. In the area of the sleeve 32 of the coupling bar, the axis and the spindle both have a groove, more specifically a circumferential groove 36, 37. The sleeve engages with these grooves with corresponding protrusions (not shown), so that a positive-fit connection is formed by the sleeve of the coupling bar between the  
10 spindle and the axis.

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## List of reference numbers:

	1	gate valve
	2	valve body
5	3	pipe
	5	wedge receptacle
	6	seal
	10	wedge
	11	seal
10	20	spindle drive
	22	spindle head
	23	screw drive
	25	spindle
	28	axis
15	29	coupling
	30	column
	31	coupling bar
	32	sleeve
	33	bar shell
20	34a	bottom limit-stop
	34b	top limit-stop
	35	bearing bush
	36	circumferential groove in the spindle
	37	circumferential groove in the axis
25	39	screw connection for the bar shells



## Patentkrav

- 5 1. Skyder (1) omfattende et skyderhus (2), hvor skyderhuset (2) har et spindeldrev (20), hvor spindeldrevet (20) ved sin ene ende har en skyderkile (10) til afspærring af en rørledning (3), hvor spindeldrevet (20) omfatter en motordrevet spindel (25),  
hvor spindlen (25) via en kobling (29) er forbundet aksialt forskydeligt med en akse (28), hvor aksen (28) på endesiden har en skyderkile (10),  
10 hvor spindeldrevet (20) har en koblingsstang (31) i området ved koblingen (29), hvor koblingsstangen (31) er ført forskydeligt ved hjælp af mindst en søjle (30), som strækker sig parallelt med spindeldrevet (20),  
og hvor søjlen (30) har mindst et nedre anslag (34a) for koblingsstangen (31).
- 15 2. Skyder (1) ifølge krav 1,  
**kendetegnet ved**, at koblingsstangen (31) omfatter to stangskåle (33), som danner en lejbøsning (35) i området ved søjlen (30).
- 20 3. Skyder (1) ifølge krav 2,  
**kendetegnet ved**, at lejbøsningen (35) har et glide- eller et kugleleje.
- 25 4. Skyder (1) ifølge et af de foregående krav,  
**kendetegnet ved**, at aksen (28) er udformet til optagelse af skyderkilen (10) af et korrosionsbestandigt materiale.
- 30 5. Skyder (1) ifølge et af de foregående krav,  
**kendetegnet ved**, at koblingen (29) omfatter en i koblingsstangen (31) anbragt manchete (32), som er i en form- eller kraftssluttende forbindelse både med spindlen (25) og med aksen (28).
- 35 6. Skyder (1) ifølge krav 5,  
**kendetegnet ved**, at både aksen (28) og spindlen (25) har en not (36, 37), som fremspringene i manchetten (32) går i indgreb med.

7. Skyder (1) ifølge et af de foregående krav,  
**kendetegnet ved**, at spindlen (25) er udformet som et rullegevinddrev.

5 8. Skyder (1) ifølge et af de foregående krav,  
**kendetegnet ved**, at spindlen er udformet som et planetrullegevinddrev.

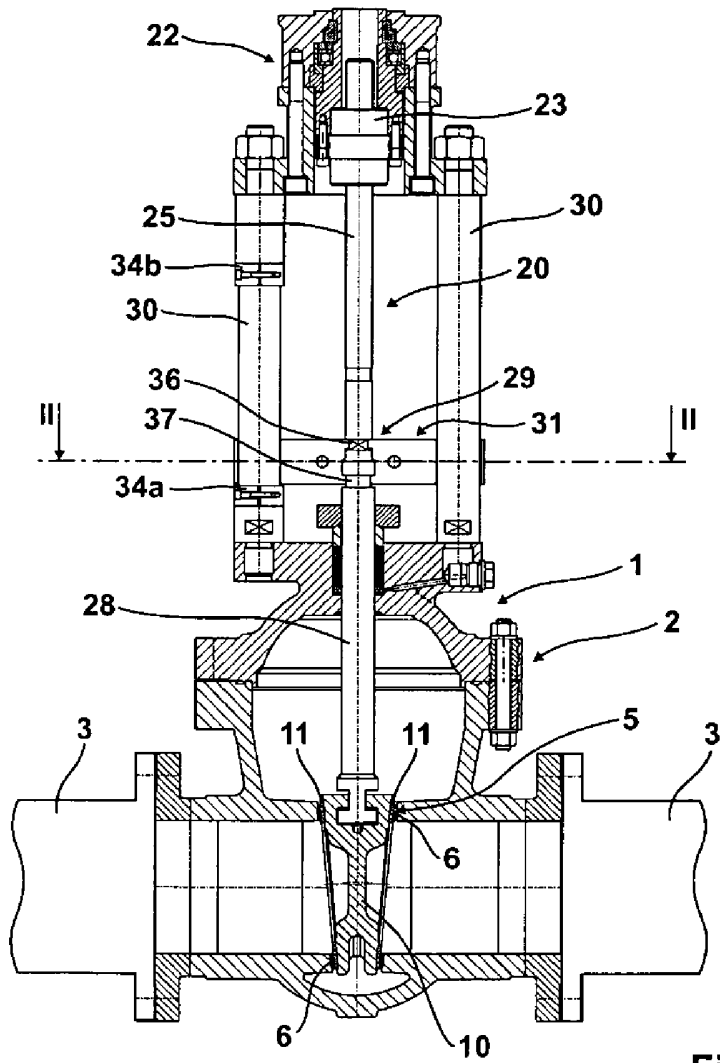


Fig. 1

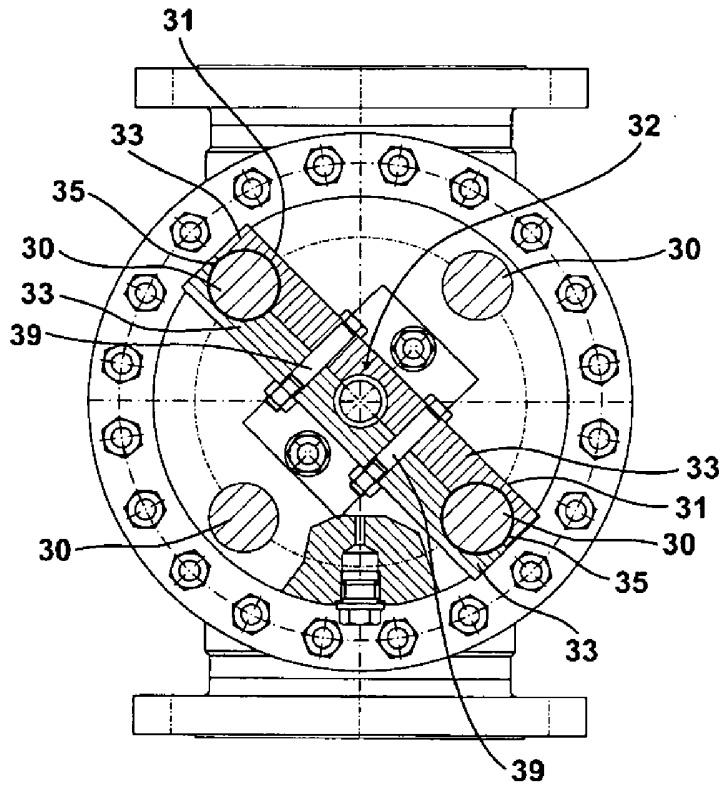


Fig. 2