



Valve

The invention relates to a valve according to the precharacterising part of Claim 1.

Such a valve is known from, say, DE 36 09 772. There has been shown and described a valve in which the point of intersection of all the line segments to the seat surface forms the apex of an imaginary cone, with the valve seat proper representing a diagonal cut through this cone.

The flow throughput of such a valve depends basically upon the flare angle which defines the generating lines and, hence, the flow cross section. The same should be chosen as large as possible in order to facilitate a largely unimpeded flow of the medium.

However, it must be taken into consideration that such valves are standardised in regard to their dimensions, particularly their structural length, so that the known seat surface configuration is not suitable for obtaining flow optimisation.

Thus, for example, a large flare cross section which is advantageous for the flow cannot be obtained because the standard-dependent outer dimensions limit the flare angle of the cone.

In addition to the flow rate and the flow volume, the flow throughput is in the case of solids-transporting liquids given by the same parameters as in the case of pure liquids. In that case, the use of the known valves so far has been problematic.

The problem underlying the present invention is therefore to configure a valve of the generic type in a way such that the flow can be optimised.

This problem is solved by a valve having the features recited in Claim 1 or 2.

These design versions of a valve offer considerable advantages vis-a-vis those known from the prior art.

Firstly, the space available for the structural length as a consequence of standardisation can be used for the greatest possible cross section of the opening in the region of the valve seat.

The angle, under which the seat surface of the valve seat is inclined relative to the direction of flow, depends upon the positional stability of the closure member and its self-centering, with the closure member matching the seat surface in the contact region.

The angle of inclination of the seat surface can be uniform or differing in the circumferential direction, with the angle in all instances referred to the vertical to the direction of flow. It is the important feature that the points of intersection of the diametrically opposite line segments to the seat surface confine an area, i.e., that they do not have a common axis of rotation as is the case in the cited prior art.

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The solution to the problem as set forth in Claim 2, according to which the seat surface extends under a right angle to the vertical to the direction of flow, has the particular advantage of implying a very low resistance to the flow.

In addition to improved functional capability, particularly in regard to reduced resistance to flow, the solutions according to the invention also offer the advantage of a large field of applications.

Furthermore, because of the closure member matching the seat surface in the contact area, self-centering of the closure member takes place. In addition, the closing force which must be applied to the closure member by means of a spindle to obtain sealing, is low, which likewise represents an improvement in the operation of the valve.

Besides that, the manufacture of such a valve is relatively simple since the seat surface can be produced by milling work.

Other advantageous embodiments of the invention are defined in the dependent claims.

Exemplary embodiments of the invention will be described below with reference to the appended drawings.

There show:

Figure 1, a schematic perspective view of a valve seat of a valve according to the invention; each of Figures 2 - 4, schematic representations of various embodiments of valve seats in longitudinal section;

Figure 5, an other exemplary embodiment of a valve illustrated schematically likewise in longitudinal section.

In Figure 1, part of the valve is shown in the form of a feed line 1 having a valve seat 2 which is inclined under an angle, e.g., 45° but which can extend transversely under 90° in the case of flap valves.

This valve seat 2 has a seat surface 3 which extends with an inclination under an angle α , e.g., 45° , relative to a vertical to the direction of flow (Figures 3 and 4).

As shown particularly clearly in Figure 1, all points of intersection of the diametrically opposite line segments 5 and 6, 7 and 8, 9 and 10, and 5a to 10a enclose a surface the circumference of which is indicated by the dash-and-dot line 4.

In the example illustrated in Figure 3, the seat surface 3 is over its circumference inclined under the same angle α vertically to the direction of flow, wherein the vertical can define the direction of action of a spindle 14 through which a closure member 13 (Figure 5) can be pressed against the seat surface 3.

In the embodiment illustrated in Figure 4, the angle α differs over the circumference of the seat surface 3; for the sake of clear explanation, the angle is at the upper seat surface cross section denoted by αA and at the lower seat surface cross section, by αB .

The absolute value of the respective angle is given by the operational requirements which, inter alia, depend upon the flowing medium.

Furthermore, Figures 2 - 4 show that the feed line 1 communicates with a discharge line 11, while a vertically arranged sleeve 12 forms the receptacle for the closure member 13 and the spindle 14, respectively.

An embodiment as defined by Claim 2 is shown in Figure 2. There the seat surface 3 extends under an angle of 90° to the vertical to the direction of flow so that, when viewed in cross section, the seat surfaces 3 are parallel to each other.

Also in Figure 5 there can be recognised a valve seat 2 the seat surface 3 of which is inclined so that it forms different angles αA and αB relative to the vertical in the upper region and in the oppositely situated lower region, respectively.

It is also recognised in that figure that on its side adapted to contact the seat surface 3, the closure member 13 matches the angles αA and αB , with self-centering of the closure member 13 taking place upon closing.

List of reference numbers

- | | |
|----|----------------|
| 1 | feed line |
| 2 | valve seat |
| 3 | seat surface |
| 4 | circumference |
| 5 | line segment |
| 6 | line segment |
| 7 | line segment |
| 8 | line segment |
| 9 | line segment |
| 10 | line segment |
| 11 | discharge line |
| 12 | sleeve |
| 13 | closure member |
| 14 | spindle |

Claims

1. A valve, comprising a housing having a feed line and a discharge line (1, 11) adapted to be separated from each other by an adjustable closure member (13) which then bears against a valve seat the generating lines (5 to 10a) of which are inclined as straight lines, characterised in that the seat surface (3) of the valve seat (2) is inclined in the circumferential direction so that the points of intersection of the respective diametrically opposite generating lines (5 to 10a) contacting the seat surface (3) define an area.
2. The valve according to the precharacterising part of Claim 1, wherein the seat surface (3) of the valve seat (2) is inclined under an angle relative to the direction of flow, characterised in that the circumferential seat surface (3) extends at a right angle relative to the vertical to the direction of flow.
3. The valve according to Claim 1, characterised in that the angle α of inclination of the seat surface (3) relative to the vertical to the direction of flow is the same over the entire circumference.
4. The valve according to Claim 1, characterised in that the angle α of inclination of the seat surface (3) relative to the vertical to the direction of flow differs at least over part of the circumference.
5. The valve according to one or more of Claims 1 to 4, characterised in that a spindle (14) is connected to the closure member (13) excentrically in dependence upon the inclined position of the valve seat (2).



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Abstract

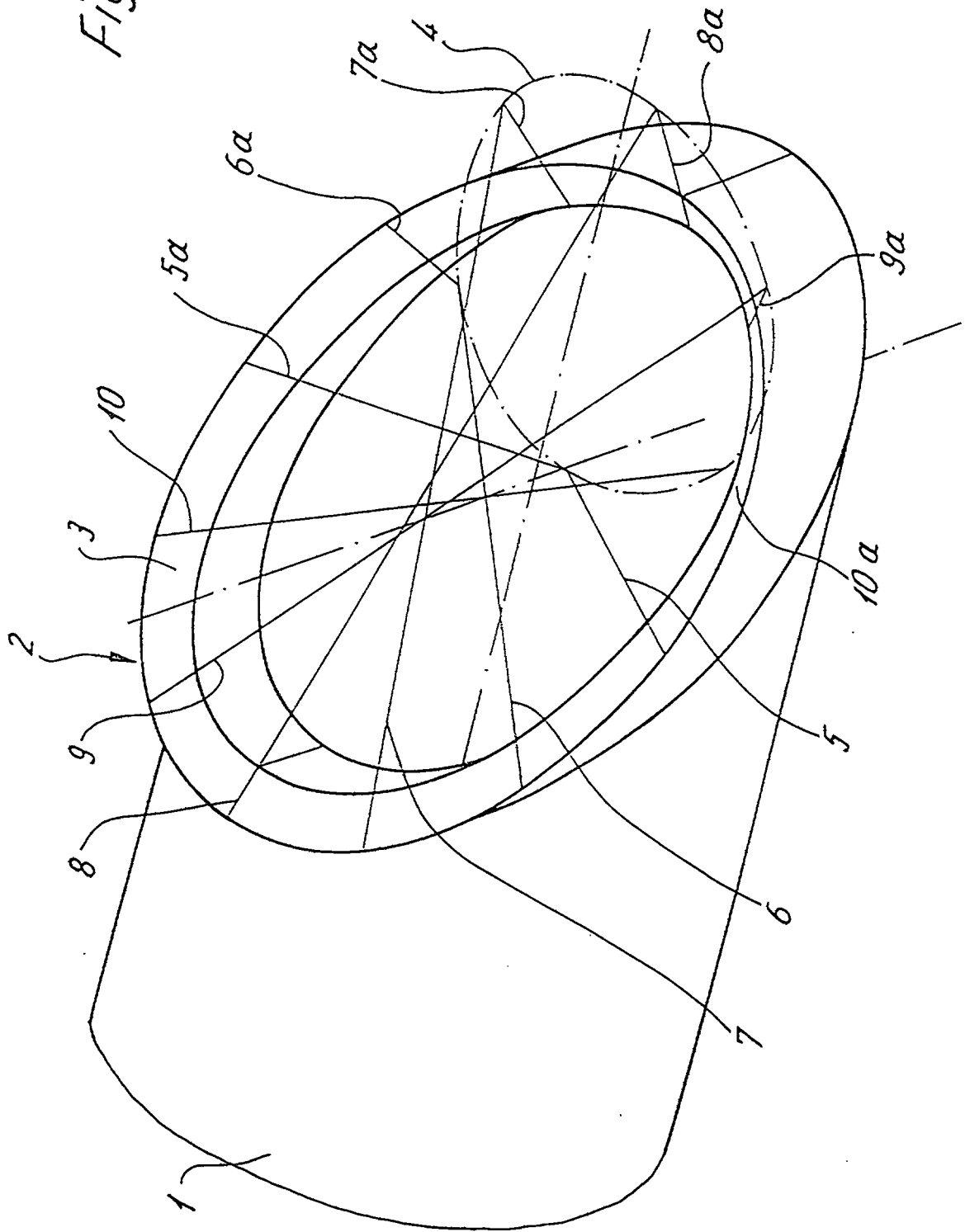
The valve, comprising a housing and having a feed line and a discharge line (1, 11) adapted to be separated from each other by an adjustable closure member (13) which then bears against a valve seat arranged in a position inclined relative to the direction of flow is configured so that the seat surface (3) of the valve seat (2) is inclined in the circumferential direction so that the points of intersection of the respective diametrically opposite line segments (5 to 10a) contacting the seat surface (3) define an area or that the seat surface (3) extends at a right angle relative to the vertical to the direction of flow.



Figure 1



Fig. 1



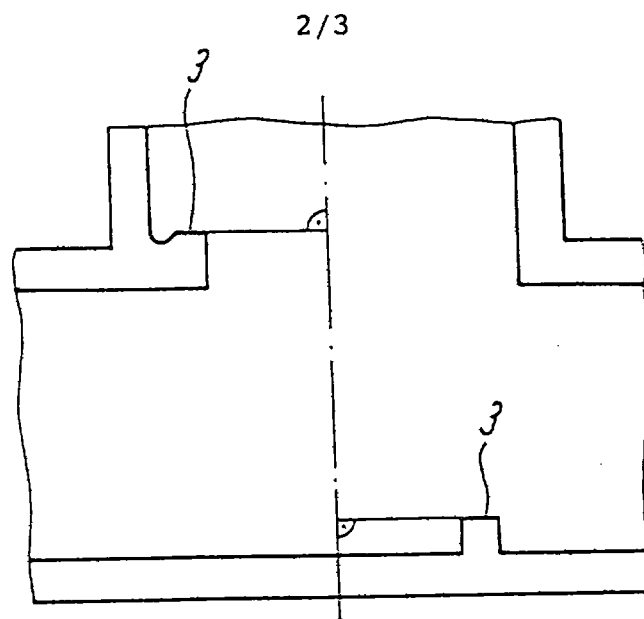


Fig. 2

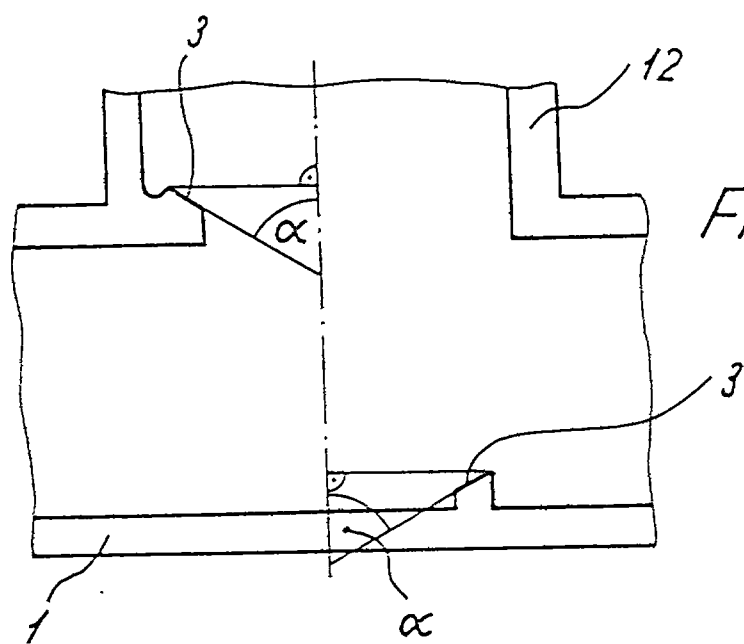


Fig. 3

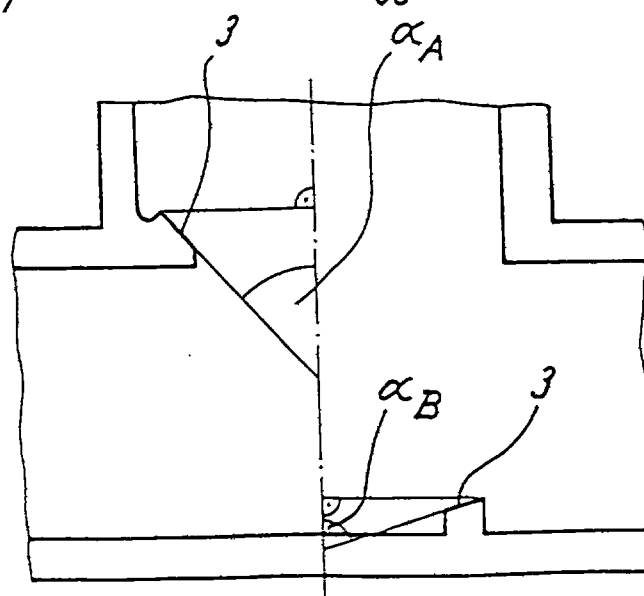
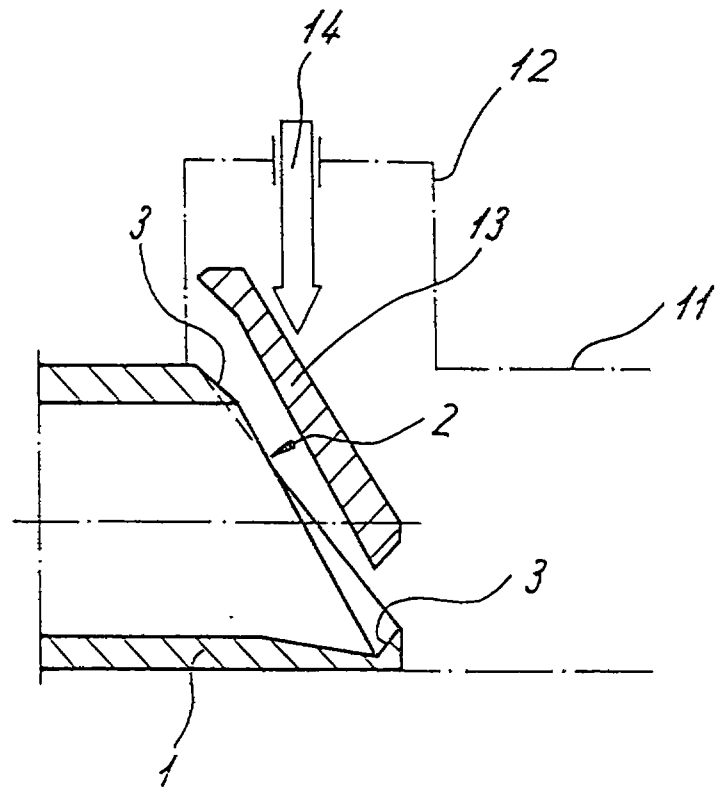


Fig. 4

*Fig. 5*

Valve

According to a first embodiment of the invention, there is provided a valve with a housing which comprises an inflow duct and an outflow duct, which are separable from one another by an adjustable closure member, wherein this then bears against an encircling valve seat defined by a plurality of surface lines, characterised in that the seat surface of the valve seat is so inclined rotationally that the points of intersection of the respective diametrically opposite surface lines include an area.

Such a valve is known from, say, DE 36 09 722. There has been shown and described a valve in which the point of intersection of all the line segments to the seat surface forms the apex of an imaginary cone, with the valve seat proper representing a diagonal cut through this cone.

The flow throughput of such a valve depends basically upon the flare angle which defines the generating lines and, hence, the flow cross section. The same should be chosen as large as possible in order to facilitate a largely unimpeded flow of the medium.

However, it must be taken into consideration that such valves are standardised in regard to their dimensions, particularly their structural length, so that the known seat surface configuration is not suitable for obtaining flow optimisation.

Thus, for example, a large flare cross section which is advantageous for the flow cannot be obtained because the standard-dependent outer dimensions limit the flare angle of the cone.

In addition to the flow rate and the flow volume, the flow throughput is in the case of solids-transporting liquids given by the same parameters as in the case of pure liquids. In that case, the use of the known valves so far has been problematic.

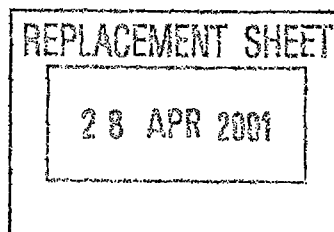
The problem underlying the present invention is therefore to configure a valve of the generic type in a way such that the flow can be optimized.

This problem is solved by a valve having the features recited in Claim 1 or 2.

These design versions of a valve offer considerable advantages vis-a-vis those known from the prior art.

Firstly, the space available for the structural length as a consequence of standardisation can be used for the greatest possible cross section of the opening in the region of the valve seat.

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Claims

1. A valve with a housing which comprises an inflow duct and an outflow duct, which are separable from one another by an adjustable closure member, wherein this then bears against an encircling valve seat defined by a plurality of surface lines, characterised in that the seat surface of the valve seat is so inclined rotationally that the points of intersection of the respective diametrically opposite surface lines include an area.
2. The valve according to the preamble of Claim 1, whereby the seat surface of the valve seat is inclined with respect to the flow direction, characterised in that the circumferential seat surface is in a right angle to a perpendicular of the flow direction.
3. The valve according to Claim 1, characterised in that the angle α of inclination of the seat surface relative to the vertical to the direction of flow is the same over the entire circumference.
4. The valve according to Claim 1, characterised in that the angle α of inclination of the seat surface relative to the vertical to the direction of flow differs at least over part of the circumference.
5. The valve according to any one of Claims 1 to 4, characterised in that a spindle is connected to the closure member excentrically in dependence upon the inclined position of the valve seat.

