Patent claims

1. Valve for the substantially gastight interruption of a flow path (F), comprising

- a valve housing (1) having a first wall (2), which wall has a first opening (3) for the flow path (F), said opening having a geometric opening axis (4) and a valve seat (5), enclosing the first opening (3), on a first side (20) of the valve housing (1),
- a valve disk (8) having
  - an, in particular, ring-like or frame-like outer disk portion (9), and
  - a closed inner disk portion (11), which is mounted in a sealtight manner such that it is linearly movable within the outer disk portion (9) in a direction parallel to the opening axis (3) relative to the outer disk portion (9) between a retracted setting (A) and an extended setting (B),
- at least one drive (12), which is connected to the outer disk portion (9) and which is configured such that the valve disk (8)

  is pivotable or displaceable between
  - an open setting (O), in which the valve disk (8) is positioned in a retention portion (13) disposed beside the first opening (3) and frees the first opening (3) and the flow path (F), and
  - an intermediate setting (I), in which the valve disk (8) is positioned over the first opening (3) and covers the apertural cross section of the first opening (3),

  by means of a transverse motion (x) made substantially transverse to the opening axis (4),

  and is displaceable

  between

- the intermediate setting (I) and
- a closed setting (C), in which a gastight contact, which closes the first opening (3) in a gastight manner and interrupts the flow path (F), exists between the outer disk portion (9) and the valve seat (5),

by means of a longitudinal motion (y) made parallel to the opening axis (4),

wherein, in the closed setting (C), a pressure differential at the valve disk (8) acts substantially upon the movable inner disk portion (11) and the inner disk portion (11) is supported in a direction parallel to the opening axis (4), substantially decoupled from the outer disk portion (9), directly or indirectly on the valve housing (1),

characterized in that

- the valve seat (5) has a first inner face (14), which points radially inward and runs parallel to the opening axis (4),
- the outer disk portion (9) has a first outer face (15), which points radially outward and runs parallel to the opening axis (4) and which is arranged and configured such that in the closed setting (C), via an intervening first seal (10), there exists a radially sealing contact with the first inner face (14),
- the outer disk portion (9) has a second inner face (16), which points radially inward and runs parallel to the opening axis (4), and
- the inner disk portion (11) has a second outer face (17), which points radially outward and runs parallel to the opening axis (4) and which is arranged and configured such that, via an intervening second seal (18), a radially sealing contact with the second inner

face (16) exists in the region between the retracted setting (A) and the extended setting (B).

2. Valve according to claim 1,
characterized in that

- the first wall (1) has a first bearing surface (19), which encloses, in particular, the first opening (3), and
- the first bearing surface (19) and the outer disk portion (9) are arranged and configured such that, in the closed setting (C), the outer disk portion (9) rests with a first face (26) in the direction of the first side (20) on the first bearing surface (19).

3. Valve according to claim 2,
characterized in that
the first bearing surface is configured as an offset (19) in the first opening (3), which offset adjoins the first inner face (14) and runs substantially perpendicular to the opening axis.

4. Valve according to one of claims 1 to 3,
characterized in that
a stop (22) is arranged between the outer disk portion (9) and the inner disk portion (11) in order to limit the relative linear mobility of the inner disk portion (11) in the direction of the first side (20) and of the first opening (3), such that in the closed setting (C) the inner disk portion (11), when relative underpressure (23) prevails on the first side (20) of the first opening (3), rests in the retracted setting (A) on the outer disk portion (9).

5. Valve according to claim 4,
characterized in that
the stop is configured as a shoulder (22) of the inner disk portion (11), which shoulder extends radially outward from the second outer face (17).

6. Valve according to one of claims 1 to 5,
characterized in that

- the valve housing (1) has on a second side (21) a second wall (6), which, in remote, substantially parallel, opposition to the first wall (2) and to the first opening (3), has a second opening (7) for the flow path (F),
- the second wall (2) has a second bearing surface (24), which encloses, in particular, the second opening (7), and
- the second bearing surface (24) and the inner disk portion (11), in order to limit the relative linear mobility of the inner disk portion (11) in the direction of the second side (21) and of the second opening (7), are arranged and configured such that in the closed setting (C) the inner disk portion (11), when relative underpressure (25) prevails on the second side (21) of the second opening (7), rests in the extended setting (B) with a second face (27) in the direction of the second side (21) on the second bearing surface (24).

7. Valve according to claim 6,
characterized in that
the second face (27) of the inner disk portion (11) is disposed on a shoulder (22) extending radially outward from the second outer face (17).

8. Valve according to claim 6 or 7,
characterized in that
the at least one drive (12) is configured such that the valve disk (8) is pivotable or displaceable between
- the open setting (O), and
- the intermediate setting (I)

by means of the transverse motion (x), and is displaceable between
- the intermediate setting (I),
- the closed setting (C) and
- an initialization setting (N), in which the distance of the outer disk portion (9) from the second wall (6) is reduced such that the inner disk portion (11) rests with its second face (27) on the second bearing surface (24) and is pushed fully into the retracted setting (A),

by means of the longitudinal motion (y), wherein the intermediate setting (I) lies between the closed setting (C) and the initialization setting (N).

9. Valve according to claim 8,
characterized by
a control system (29), which is configured such that and is connected to the drive (12) such that the valve disk (8), for the gastight interruption of the flow path (F), is adjustable
- by means of the transverse motion (x) of the drive (12)
  - from the open setting (O)
  - into the intermediate setting (I)

  and
- by means of the longitudinal motion (y) of the drive (12)

  from the intermediate setting (I)

- into the closed setting (C)

and, for the complete opening of the flow path (F), is adjustable

- by means of the longitudinal motion (y) of the drive (12)
  - from the closed setting (C), in which the inner disk portion (11) is in an optional setting between the retracted setting (A) and the extended setting (B),
  - via the initialization setting (N) for pushing the inner disk portion (11) fully into the retracted setting (B)
  - in the intermediate setting (I)

  and
- by means of the transverse motion (x) of the drive (12)
  - from the intermediate setting (I)
  - into the open setting (O).

10. Valve according to one of claims 1 to 9, **characterized in that** the first seal (10) is fixed on the first outer face (15) of the outer disk portion (9) for the creation of the radial sealing contact with the first inner face (14) of the valve seat (5).

11. Valve according to one of claims 1 to 10, **characterized in that** the second seal (18) is fixed

- on the second inner face (16) of the outer disk portion (9) for the creation of the radially sealing contact with the second outer face (17) of the inner disk portion (11), or
- on the second outer face (17) of the inner disk portion (11) for the creation of the radially sealing contact

with the second inner face (16) of the outer disk portion (9).

12. Valve according to one of claims 1 to 11,
characterized in that
the outer disk portion (9) is connected to the at least one drive (12) by an arm (28) arranged in such a way on the side of the outer disk portion (9) and extending in such a way perpendicular to the opening axis (4) that the arm (28), in the closed setting (C), is located outside the apertural cross section, geometrically projected along the opening axis (4), of the first opening (3).

13. Valve according to one of claims 1 to 12,
characterized in that
- the outer disk portion (9) is of annular configuration,
- the inner disk portion (11) has the form of a closed circular disk and
- the first inner face (14), the first outer face (15), the second inner face (16) and the second outer face (17) are geometric circular-cylindrical shell surfaces.

14. Valve according to one of claims 1 to 13,
characterized in that
- the valve is configured as a shuttle valve and
- the drive (12) is configured such that the valve disk (8) is pivotable by means of the transverse motion (x) substantially parallelly over the cross section of the first opening (3) and perpendicularly to the opening axis (4).

What is claimed is:

1. Valve for the substantially gastight interruption of a flow path, comprising:

a valve housing having a first wall, which wall has a first opening for the flow path, said opening having a geometric opening axis and a valve seat, enclosing the first opening, on a first side of the valve housing,

a valve disk having

an, in particular, ring-like or frame-like outer disk portion, and

a closed inner disk portion, which is mounted in a seal tight manner such that it is linearly movable within the outer disk portion in a direction parallel to the opening axis relative to the outer disk portion between a retracted setting and an extended setting,

at least one drive, which is connected to the outer disk portion and which is configured such that the valve disk is pivotable or displaceable between

an open setting, in which the valve disk is positioned in a retention portion disposed beside the first opening and frees the first opening and the flow path, and

an intermediate setting, in which the valve disk is positioned over the first opening and covers the apertural cross section of the first opening,

by means of a transverse motion made substantially transverse to the opening axis, and is displaceable between the intermediate setting and

a closed setting, in which a gastight contact, which closes the first opening in a gastight manner and interrupts the flow path, exists between the outer disk portion and the valve seat,

by means of a longitudinal motion made parallel to the opening axis, wherein, in the closed setting, a pressure differential at the valve disk acts substantially upon the movable inner disk portion and the inner disk portion is supported in a direction parallel to the opening axis, substantially decoupled from the outer disk portion, directly or indirectly on the valve housing,

wherein

the valve seat has a first inner face, which points radially inward and runs parallel to the opening axis,

the outer disk portion has a first outer face, which points radially outward and runs parallel to the opening axis and which is arranged and configured such that in the closed setting, via an intervening first seal, there exists a radially sealing, contact with the first inner face,

the outer disk portion has a second inner face, which points radially inward and runs parallel to the opening axis, and

the inner disk portion has a second outer face, which points radially outward and runs parallel to the opening axis and which is arranged and configured such that, via an intervening second seal, a radially sealing contact with the second inner face exists in the region between the retracted setting and the extended setting.

2. Valve according to claim 1,

wherein

the first wall has a first bearing surface, which encloses, in particular, the first opening, and

the first bearing surface and the outer disk portion are arranged and configured such that, in the closed setting, the outer disk portion rests with a first face in the direction of the first side on the first bearing surface.

3. Valve according to claim 2,

wherein

the first bearing surface is configured as an offset in the first opening, which offset adjoins the first inner face and runs substantially perpendicular to the opening axis.

4. Valve according to claim 1,

wherein

a stop is arranged between the outer disk portion and the inner disk portion in order to limit the relative linear mobility of the inner disk portion in the direction of the first side and of the first opening, such that in the closed setting the inner disk portion, when relative underpressure prevails on the first side of the first opening, rests in the retracted setting on the outer disk portion.

5. Valve according to claim 4,

wherein

the stop is configured as a shoulder of the inner disk portion, which shoulder extends radially outward from the second outer face.

6. Valve according to claim 1,

wherein

the valve housing has on a second side a second wall, which, in remote, substantially parallel, opposition to the first wall and to the first opening, has a second opening for the flow path,

the second wall has a second bearing surface, which encloses, in particular, the second opening, and

the second bearing surface and the inner disk portion, in order to limit the relative linear mobility of the inner disk portion in the direction of the second side and of the second opening, are arranged and configured such that in the closed setting the inner disk portion, when relative underpressure prevails on the second side of the second opening, rests in the extended setting with a second face in the direction of the second side on the second bearing surface.

7. Valve according to claim 6,

wherein

the second face of the inner disk portion is disposed on a shoulder extending radially outward from the second outer face.

8. Valve according to claim 6,

wherein

the at least one drive is configured such that the valve disk is pivotable or displaceable between the open setting, and the intermediate setting

by means of the transverse motion, and is displaceable between

the intermediate setting,

the closed setting and

an initialization setting, in which the distance of the outer disk portion from the second wall is reduced such that the inner disk portion rests with its second face on the second bearing surface and is pushed fully into the retracted setting,

by means of the longitudinal motion, wherein the intermediate setting lies between the closed setting and the initialization setting.

9. Valve according to claim 8,

comprising:

a control system, which is configured such that and is connected to the drive such that the valve disk, for the gastight interruption of the flow path, is adjustable

by means of the transverse motion of the drive from the open setting into the intermediate setting and

by means of the longitudinal motion of the drive from the intermediate setting into the closed setting

and, for the complete opening of the flow path, is adjustable

by means of the longitudinal motion of the drive from the closed setting, in which the inner disk portion is in an optional setting between the retracted setting and the extended setting, via the initialization setting for pushing the inner disk portion fully into the retracted setting in the intermediate setting and

by means of the transverse motion of the drive from the intermediate setting into the open setting.

10. Valve according to claim 1,

wherein

the first seal is fixed on the first outer face of the outer disk portion for the creation of the radial sealing contact with the first inner face of the valve seat.

11. Valve according to claim 1,

wherein

the second seal is fixed

on the second inner face of the outer disk portion for the creation of the radially sealing contact with the second outer face of the inner disk portion, or

on the second outer face of the inner disk portion for the creation of the radially sealing contact with the second inner face of the outer disk portion.

12. Valve according to claim 1,

wherein

the outer disk portion is connected to the at least one drive by an arm arranged in such a way on the side of the outer disk portion and extending in such a way perpendicular to the opening axis that the arm, in the closed setting, is located outside the apertural cross section, geometrically projected along the opening axis, of the first opening.

13. Valve according to claim 1,

wherein

the outer disk portion is of annular configuration,

the inner disk portion has the form of a closed circular disk and

the first inner face, the first outer face, the second inner face and the second outer face are geometric circular-cylindrical shell surfaces.

14. Valve according to claim 1,

wherein

the valve is configured as a shuttle valve and

the drive is configured such that the valve disk is pivotable by means of the transverse motion substantially parallelly over the cross section of the first opening and perpendicularly to the opening axis.