Patent Claims

1. A fitting (28) for changing liquid paths, in particular for systems with a pressure exchanger (29) which has pipes (30) having alternating flow direction, with a casing (11), which comprises an inlet piece (2), an outlet piece (3), and a connection piece (1) for a pipe (30), the fitting (28) having at least one shut-off member (17, 18) that is connected to an actuator (8, 10) which is connected to a control device that is designed to produce a liquid flow between the inlet piece (2) and the connection piece (1), or between the connection piece (1) and the outlet piece (3),

characterized in that

a shut-off member (17, 18) is arranged in each of the inlet piece (2) and the outlet piece (3), the shut-off members being axially displaceable so as to vary the size of flow openings.

2. The fitting as claimed in claim 1, characterized in that each shut-off member (17, 18) is connected to a separate actuator (8, 10).

3. The fitting as claimed in claim 1 or 2, characterized in that at least one component (4, 5) is joined to the inlet piece (2) and/or outlet piece (3), at least one flow opening being formed between the casing (11) and the component (4, 5).

4. The fitting as claimed in claim 3, characterized in that at least one shut-off member (17, 18) is guided during its axial displacement by the casing (11) and/or the component (4, 5).

5. The fitting as claimed in one of claims 1 to 4, characterized in that at least one shut-off member (17, 18), during its axial displacement, moves perpendicular to the liquid flow.

6. The fitting as claimed in one of claims 1 to 5, characterized in that at least one of the shut-off members (17, 18) is hollow-cylindrical or cylindrical.

7. The fitting as claimed in one of claims 1 to 6, characterized in that at least one of the shut-off members (17, 18) moves in a hollow-cylindrical guide element (20, 24).

8. The fitting as claimed in claim 7, characterized in that the guide element (20, 24) is closed toward the inflow direction.

9. The fitting as claimed in one of claims 1 to 8, characterized in that the inlet piece (2) and the outlet piece (3) are oriented at an angle of 90° to one another.

10. A method for operating a fitting (28) as claimed in one of claims 1 to 9, said method comprising the following periodically repeating cycles:

- first cycle: flow opening in outlet piece (3) fully closed,
  - first phase: shut-off member (17) opens flow opening in the inlet piece (2),
  - second phase: flow opening in the inlet piece (2) fully open,
  - third phase: shut-off member (17) closes flow opening in the inlet piece (2),

- second cycle: flow opening in the inlet piece (2) fully closed,
  - first phase: shut-off member (18) opens flow opening in the outlet piece (3),
  - second phase: flow opening in the outlet piece (3) fully open,
  - third phase: shut-off member (18) closes flow opening in the outlet piece (3).

11. The method as claimed in claim 10, characterized in that, as at least one of the flow openings opens and/or closes, the actuation speed initially rises with a predefinable gradient and then continues with constant actuation speed.

Claims

1. A fitting (28) for changing liquid paths, in particular for systems with a pressure exchanger (29) which has pipes (30) having alternating flow direction, with a casing (11), which comprises an inlet piece (2), an outlet piece (3), and a connection piece (1) for a pipe (30), the fitting (28) having at least one shut-off member (17, 18) that is connected to an actuator (8, 10) which is connected to a control device that is designed to produce a liquid flow between the inlet piece (2) and the connection piece (1), or between the connection piece (1) and the outlet piece (3),
characterized in that
that the inlet piece (2) and the outlet piece (3) are oriented at an angle of 90° to one another, and
a shut-off member (17, 18) is arranged in each of the inlet piece (2) and the outlet piece (3), the shut-off members being axially displaceable so as to vary the size of flow openings.

2. The fitting as claimed in claim 1, characterized in that each shut-off member (17, 18) is connected to a separate actuator (8, 10).

3. The fitting as claimed in claim 1 or 2, characterized in that at least one component (4, 5) is joined to the inlet piece (2) and/or outlet piece (3), at least one flow opening being formed between the casing (11) and the component (4, 5).

4. The fitting as claimed in claim 3, characterized in that at least one shut-off member (17, 18) is guided during its axial displacement by the casing (11) and/or the component (4, 5).

5. The fitting as claimed in one of claims 1 to 4, characterized in that at least one shut-off member (17, 18), during its axial displacement, moves perpendicular to the liquid flow.

6. The fitting as claimed in one of claims 1 to 5, characterized in that at least one of the shut-off members (17, 18) is hollow-cylindrical or cylindrical.

7. The fitting as claimed in one of claims 1 to 6, characterized in that at least one of the shut-off members (17, 18) moves in a hollow-cylindrical guide element (20, 24).

8. The fitting as claimed in claim 7, characterized in that the guide element (20, 24) is closed toward the inflow direction.

9. A method for operating a fitting (28) as claimed in one of claims 1 to 8, said method comprising the following periodically repeating cycles:
- first cycle: flow opening in outlet piece (3) fully closed,

- first phase: shut-off member (17) opens flow opening in the inlet piece (2),
- second phase: flow opening in the inlet piece (2) fully open,
- third phase: shut-off member (17) closes flow opening in the inlet piece (2),

- second cycle: flow opening in the inlet piece (2) fully closed,
- first phase: shut-off member (18) opens flow opening in the outlet piece (3),
- second phase: flow opening in the outlet piece (3) fully open,
- third phase: shut-off member (18) closes flow opening in the outlet piece (3).

10. The method as claimed in claim 9, characterized in that, as at least one of the flow openings opens and/or closes, the actuation speed initially rises with a predefinable gradient and then continues with constant actuation speed.