

Switching Apparatus for a Fluid Flow

The invention relates to a switching apparatus for a fluid flow, in particular for conducting a high pressure fluid from a first treatment device to a second treatment device, so that the fluid can be subjected, according to the configuration of features disclosed in the preamble of claim 1, to a chemical and/or physical process step in each treatment device.

DE 600 05 552 T2 discloses a switching device conforming to its genre. In this case, a high pressure fluid can be conducted selectively through a first or a second treatment device, in which the fluid experiences a treatment, such as a filtration operation. For this purpose, the two treatment devices can be connected to each other by means of a first and a second fluid-conducting connection. According to the solution known from the prior art, an outlet valve that is intended for the treated fluid is provided in an approximately centered manner in the first fluid-conducting connection; and an inlet valve that is intended for the untreated fluid is provided in an approximately centered manner in the second fluid-conducting connection. A safety valve is provided on both sides adjacent to the inlet and the outlet valve in the two fluid-conducting connections. The safety valve can supply the treatment devices with the fluid, supplied by means of the inlet valve; and, with respect to the other fluid-conducting connection, the treated fluid can be fed from the treatment devices to the outlet valve. In the known solution, the inlet valve and the outlet valve as well as the two safety valves, which are assigned in pairs to the two treatment

devices, are connected together in each instance by means of a shaft that couples the valve pairs. In order to change the switching position of the valve elements disposed in the valves, a switching lever is connected to the respective shaft; and the shafts can be rotated by means of the respective switching lever. The shafts are positively coupled by means of connecting link guides in such a way that the valve pairs can be actuated only in a predefined order of sequence. In the prior art solution, both the coupling shafts and the fluid-conducting connections that are provided for arranging the valves must satisfy high quality requirements with respect to the tolerance during production and assembly, so that the valves that are coupled together in each instance are arranged exactly coaxially to the shaft and can be actuated by an operator with as little obstruction as possible.

Based on the prior art, the object of the present invention is to provide a switching device that is intended for a fluid flow and that is easy to produce and assemble and yet ensures reliable operation, in particular a reliable coupling of the movement of valve pairs.

Such an object is achieved with a switching device having the features specified in claim 1 in its entirety. Owing to the fact that a first pair of switching levers, which are assigned to the first and second distributor valves, and a second pair of switching levers, which are assigned to the third and fourth distributor valves, are arranged in different planes in such a way that the switching levers of the first pair can be actuated by an operator without being impeded by the switching levers of the second pair and vice versa, it is ensured that the switching positions of the valve elements of the distributor valves can be changed in a reliable way by an operator even if a coupling shaft is not provided between the first and the third distributor valve or between the second and the fourth distributor valve, respectively. Due to the fact that the switching levers are arranged in pairs in different planes, it is ensured that the switching levers of the first pair can be actuated without being impeded by the switching levers of the second pair, and vice versa.

In one embodiment, the first and the second pair of switching levers for actuating the respectively assigned pair of distributor valves from a fluid-passing position into a fluid-blocking position and vice versa define a first pivoting range, which is assigned to the first pair of switching levers, and a second pivoting range, which is assigned to the second pair of switching levers. These two pivoting ranges can partially overlap in the projection. Since the first pair of switching levers and the second pair of switching levers are arranged in different planes, each of the two pairs can enter in a collision-free manner into the pivoting range of the respective other pair of switching levers in any actuating position. This arrangement ensures that the switching device can be reliably actuated even in the presence of large pivoting ranges, so that even in the case of spatially expanded switching levers, for which the operator does not have to apply as much force, the collision-free and reliable operability of the switching device is ensured.

In one embodiment, the switching levers of the first pair and the switching levers of the second pair are arranged in such a manner that both switching levers of a pair can be jointly actuated over the entire pivoting range with one hand of an operator. As a result, a simple operability is achieved, in particular, an operability that enables an efficient and speedy actuation by the operator despite the use of two switching levers for an assigned pair of distributor valves. The result of a joint actuation with one hand is a positive coupling of the movement of the valve elements of a pair of distributor valves, so that separate means, such as shafts, are not necessary to achieve a coupling.

One embodiment provides that the switching levers to be actuated by the operator are designed ergonomically in their grip region. Rounded-off shapes of the free ends of the switching levers lend themselves especially well for this purpose. In order to facilitate the joint actuation of the switching levers of a pair, provision can be made such that the switching levers that are to be jointly actuated have a formation that is approximately hemispherical in shape, so that the switching levers of a pair that are to be grasped by one hand are complemented to form a spherical

shape in their grip region that can be grasped in an easy and secure way by the hand of the operator.

In one embodiment, the switching levers have in each instance a spacer section that is bent relative to the free ends of the switching levers and that extends more or less in the direction of the axis of rotation of the assigned distributor valve, in order to arrange the switching levers in different planes. Starting from the free end of the switching lever, which can be grasped by an operator as a kind of grip region, a switching lever has initially an oblong section that extends more or less in a plane perpendicular to the axis of rotation of the assigned distributor valve. Then the oblong section merges with the bent spacer section, which has a length that can be selected as a function of the requirements. Attached to the bent spacer section is another section of the switching lever that is designed to be fastened to the assigned distributor valve. This section of the switching lever in turn can be bent, as desired. Due to the fact that the plane in which the pivoting range of a switching lever is arranged in the switching device according to the invention and is defined in essence by the longitudinal dimension of the associated spacer section, it is possible to achieve a cost-effective adaptability of the position of the pivoting range without having to resort to the other components of the switching device.

In one embodiment, the spacer sections of the switching levers of a pair have a varying longitudinal extension. In this case, the sum of the two spacer sections can be chosen in such a way that the two switching levers of a pair are adapted to the geometric dimensions of the switching device, in particular to the distance between the assigned distributor valves.

In one embodiment, the switching levers are designed in each instance as two-armed levers, which the operator grasps; and the two arms of the lever are arranged diametrically opposite each other in relation to the axis of rotation of the assigned distributor valve. Designing the switching levers as two-armed levers allows the switching levers to be actuated from two sides of the

switching device; and in particular, when the two-armed lever is designed symmetrically, the lever is in equilibrium relative to its central point of rotation, a state that makes it easier to mount the lever on the assigned distributor valve and that allows the lever to be actuated with negligible impedance.

In one embodiment of the switching device according to the invention, the one switching lever of the first pair is designed as an identical part of a switching lever of the second pair; and the other switching lever of the first pair is designed as an identical part of the other switching lever of the second pair. Since this feature makes it possible to reduce the number of different parts, this solution offers not only a cost advantage during the production of the switching device according to the invention, but it also simplifies the assembly process.

In one embodiment of the switching device according to the invention, a fifth valve is arranged between the first and the third distributor valve in the first fluid-conducting connection; and a sixth valve is arranged between the second and the fourth distributor valve in the second fluid-conducting connection. Preferably, the sixth valve for feeding the untreated fluid to the switching device is designed as an inlet valve, whereas the treated fluid can issue again from the switching device by way of the fifth valve, which is designed as an outlet valve.

In one embodiment, the fifth valve and the sixth valve can be actuated by means of a shaft that couples said fifth and sixth valves; and an additional switching lever engages with the shaft. Due to the additional switching lever being arranged in a plane that is different from the planes of the pivoting ranges of the first pair of switching levers and the second pair of switching levers, the pivoting range of this additional switching lever can enter in a collision-free manner into the pivoting range of the first pair of switching levers and the second pair of switching levers. At the same time, the coupling shaft ensures that the fifth valve and the sixth valve are automatically actuated together.

For this purpose, one embodiment provides that the pivoting range of the additional switching lever is arranged between the two planes of the pivoting ranges of the first and the second pair of switching levers.

In one embodiment of the switching device according to the invention, the pivoting range of the additional switching lever is arranged in such a plane that is adjacent only to the respective plane of the pivoting range of the first or the second pair of switching levers.

In one embodiment of the switching device according to the invention, the additional switching lever for jointly actuating the fifth and the sixth valve is designed as a rod and at least partially penetrates, guided in a receptacle, the shaft transversely to the longitudinal extension of said shaft, so that the additional switching lever can be moved into the opposite operating positions. In one embodiment, the receptacle is designed in its cross section to correspond to the cross section of the shaft that is designed as a rod. In particular, in the case of a shaft having a circular cross section, a corresponding passage borehole transversely to the longitudinal extension of the shaft is provided as the receptacle in this shaft.

In one embodiment of the switching device according to the invention, from the process side of the switching device, the inflow of fluid can be controlled by means of the sixth valve in the second fluid-conducting connection; and the switching levers of the first, second, third, and fourth distributor valve as well as the additional switching lever of the fifth and sixth valve can be actuated by an operator from the operator side of the switching device that is located opposite the process side. The lines that are provided on the process side for supplying the untreated fluid or for discharging the treated fluid do not impede an operator from actuating the switching levers.

It is self-evident that the switching device according to the invention can also be designed in such a way that the first, second, third, and fourth switching levers as well as the additional

switching lever can be accessed by an operator from the process side, especially if on the process side of the switching device the lines for supplying the untreated fluid or for discharging the treated fluid are arranged in such a suitable way that the operator is not impeded.

A switching device for switching a fluid flow between two treatment devices and their function are explained in detail below by means of exemplary embodiments. Referring to the drawings:

FIG. 1 shows an exemplary embodiment of a switching device for a fluid flow, in particular for conducting a high pressure fluid in two treatment devices.

FIG. 2 shows an additional exemplary embodiment of a switching device for a fluid flow, in particular for conducting a high pressure fluid in two treatment devices.

FIGS. 3 to 9 are in each instance a schematic side view of the treatment device; and in the center of each figure is a schematic top view of the switching device from the drawing in FIG. 1 in various operating phases, when the fluid flow is switched over from one treatment device to the other treatment device.

FIG. 1 shows an exemplary embodiment of a switching device 1 for conducting a fluid 2, which represents a liquid or gaseous process flow that is to be filtered; and this process flow can also contain aerosols. The fluid 2 can be conducted selectively into a first or a second treatment device 3 (= A) or respectively 4 (= B). In the illustrated exemplary embodiment, the treatment devices 3, 4 are designed in each instance with a filter housing; and these two filter housings contain suitable filter elements. In this case, the switching device 1 is used, in particular, to control the inflow of fluid 2, through a valve 22 selectively into the first treatment device 3 or into the second treatment device 4.

The treatment devices 3, 4 can be connected to each other in a fluid-conducting manner by means of a first fluid-conducting connection 5 and a second fluid-conducting connection 6 or can be separated again from each other. The fluid-conducting connections 5, 6 are arranged between the respective pressure-tight housings 26, 27 of the first treatment device 3 and the second treatment device 4 as pressure-tight pipelines with bolted flanges. The first fluid-conducting connection 5 serves to discharge filtered fluid 2, whereas the second fluid-conducting connection 6 is provided to feed unfiltered fluid 2 into the one or the other treatment device 3, 4.

The discharge of filtered fluid is performed by means of a valve 21, which is arranged in a centered manner in the first fluid-conducting connection 5. Similarly, the valve 22 is arranged in a more or less centered manner in the second fluid-conducting connection 6. In particular, the two valves 21, 22 may be found in a valve block 28, 29, each of which comprises two laterally adjacent distributor valves. In the first fluid-conducting connection 5, both sides of the valve 21 have a first distributor valve 7 and a third distributor valve 13, both of which are arranged in the valve block 28. In the second fluid-conducting connection 6, both sides of the valve 22 have a second and a fourth distributor valve 8, 14, both of which are arranged in the additional valve block 29. The distributor valves 7, 13 and 8, 14 are provided with valve elements 9, 10, 39, 40, which are designed as spherical segments. These valve elements have passage openings 19, 20, 41, 42 that are designed in each instance in the shape of a T (cf. FIGS. 3 to 9).

The first and the second distributor valve 7, 8 are adjacent to the first treatment device 3 and are assigned to it in the sense that they can block or open the respective fluid-conducting connections 5, 6 to the first treatment device 3. The third and the fourth distributor valve 13, 14 are assigned to the second treatment device 4 in the same operating mode. When the distributor valves 7 and 8, assigned to the treatment device 3, or the distributor valves 13 and 14, assigned to the treatment device 4, are in the blocked state, the treatment devices 3 or 4 can be emptied or used for

process steps other than the passage of fluid, such as for repair and maintenance work, for changing the process management elements, such as the filters and the like.

In addition to the discharging function of fluid or cleaning agents or the like processing substances, the fifth valve 21 also has the task, together with an integrated needle valve 36, of balancing the pressure in preparation for the switchover from one treatment device to the other treatment device in the fluid-conducting connections 5, 6. As an alternative or in addition, such a needle valve can also be provided at the sixth valve 22. The valve elements 23, 24 of the fifth and sixth valve 21, 22 have L-shaped passage openings 25, which can control a switchover of the supply or discharge fluid flow from the first treatment device 3 and the second treatment device 4, respectively.

Furthermore, it is especially clear from FIG. 1 that the first and the second as well as the third and fourth distributor valve 7, 8, 13, 14 are provided with manually actuatable switching levers 11, 12, 15, 16. The switching levers 11 and 15 of the first and third distributor valve 7, 13 are screwed in a suspended manner to the respective valve element, whereas the switching levers 12, 16 are oriented inversely with respect to the switching levers 11, 15, to which the respective valve elements of the distributor valves 8, 14 are screwed from the top. Each longitudinal axis 18 of an associated switching lever is configured so as to be bent, starting from the valve element, when viewed in the direction of the respective free end 17 of the switching lever. As a result, the free ends 17 are brought spatially close together, but do not come into contact with each other. Consequently, the respective free ends 17 of the first and second switching lever 11, 12 and the free ends 17 of the third and fourth switching lever 15, 16 can be jointly grasped with one hand and allow the switching levers to be moved in synchronism from one switching position into the other. Preferably, there are no detents that have to be overcome.

The pair of switching levers that consists of the switching lever 11, assigned to the first distributor valve 7, and the switching lever 12, assigned to the second distributor valve 8, is arranged in a plane that is oriented perpendicular to a rotational axis 43 of the distributor valves 7, 8; and this plane is different from the plane of the arrangement of the pair of switching levers 15, 16 that is oriented perpendicular to the rotational axis 44. In particular, it is clear from FIG. 1 that the pair of switching levers 11, 12 is arranged below the pair of switching levers 15, 16, so that the switching levers 11 and 12 can be actuated in a collision-free manner by an operator and unimpeded by the switching levers 15 and 16, and, in particular, irrespective of which position the switching levers 15, 16 occupy.

The fifth and sixth valve 21, 22, or more specifically their valve elements 23, 24, are positively coupled by means of a shaft 30 and can only be jointly rotated. For this purpose, the shaft 30 has an additional, manually actuatable switching lever 31, which is depicted as projecting over the same side of the switching device 1 as the other switching levers 11, 12, 15, 16, so that the entire switching device 1 can be operated by an operator from one side of the switching device 1.

FIG. 2 shows an additional embodiment of the inventive switching device that has, at variance with the embodiment depicted in FIG. 1, the switching levers 11, 12, 15, and 16 that are designed as two-armed levers, so that it is possible for an operator to actuate the associated distributor valves from both the operator side (shown in FIG. 2) of the switching device and also from the opposite process side. The additional switching lever 31, which at least partially penetrates the shaft 30 coupling the valves 21 and 22, can be displaced in the direction of the process side of the switching device by means of the receptacle 38, which is provided for this purpose and which is located in the shaft 30, so that even the additional switching lever 31 can be brought into a position in which said additional switching lever can be actuated from the process side of the switching device. The switching levers 11, 12, 15, 16 are designed symmetrically in the

illustrated embodiment and are connected in their center to the associated distributor valves 7, 8, 13, 14.

The switching lever 16 shall be explained in detail as one example. Starting from the attachment of the switching lever 16 at the distributor valve 14, the two symmetrically arranged spacer sections 37 extend substantially in the direction of the rotational axis 44 of the distributor valve 14 and, hence, form, as a leg together with the attachment section (not specified in detail) of the switching lever 16 at the distributor valve 14, a U-shaped structure. In this case, the attachment section is designed as a yoke that connects the legs. The two arms of the switching lever 16 that extend as far as their ends 17 are bent symmetrically at the level of the plane provided for the pivoting range of the switching lever 16. The switching lever 15 of the third distributor valve 13 is designed in an analogous manner relative to the rotational axis 44 of the distributor valve 13. In this case, when seen in the direction of FIG. 2, the spacer sections 37 of the switching lever 15 extend downward, starting from the third distributor valve 13, so that these spacer sections, together with the attachment section of the switching lever 15, form a U-shaped structure that opens downward. The switching levers 11 of the first distributor valve 7 and 12 of the second distributor valve 8 are also designed in an analogous manner, so that the switching lever 11 is designed as an identical part of the switching lever 16; and the switching lever 12 is designed as an identical part of the switching lever 15. When seen in the direction of FIG. 2, the two switching levers 11, 12 are designed symmetrically to the rotational axis 43 of the associated distributor valves 7 and 8. The U-shaped structure of the spacer sections 37 and of the attachment section of the switching lever 12 points away from the second distributor valve 8 and is open toward the top, whereas the U-shaped structure which is formed by the spacer sections 37 and the attachment section of the switching lever 11 points away from the associated distributor valve 7 and is open toward the bottom, when seen in the direction of FIG. 2.

As the highly simplified top views according to the drawings from FIGS. 3 to 9 show, the possible switchover operation from one treatment device 3 to the other treatment device 4 through actuation of the respective switching levers using in this respect cam plates 32, 33, 34 is positively coupled. The cam plates 32, 33, 34 are securely connected to the respective, assignable switching levers or valve elements and have, in each instance, a cutout 35 in the form of a circular sector on their peripheral edge. The cutout 35 of each cam plate can interact with a peripheral edge of each adjacent cam plate, so that a rotational motion is enabled or simply blocked.

FIG. 3 shows an operating position of the switching device 1, in which the fluid 2 flows through the sixth valve 22 and the second distributor valve 8 into the first treatment device 3. The fluid 2 leaves such a first treatment device 3 by way of the first distributor valve 7 and the fifth valve 21. The cam plates 32, 33 of the said valves are blocked by the cam plates 32 resting with their sections 35 against the peripheral edge of the cam plates 33. The second treatment device 4 is depressurized and is doubly shut off from the first treatment device 3 by means of the fifth valve 21 and the third distributor valve in the first fluid-conducting connection 5 as well as by means of the sixth valve 22 and the fourth distributor valve 14 in the second fluid-conducting connection 6 and can, for example, be serviced in such an operating phase. The orientation of the L-shaped passage opening 25 of the valve element 23 of the fifth valve 21 and the orientation of the T-shaped passage opening 41 of the valve element 39 of the third distributor valve 13 result in such a double shutoff in the first fluid-conducting line 5. Correspondingly, the orientation of the L-shaped passage opening 25 of the valve element 24 of the sixth valve 22 and the orientation of the T-shaped passage opening 42 of the valve element 40 of the fourth distributor valve 14 in the second fluid-conducting connection 6 result in a double shutoff of the second treatment device 4 in the second fluid-conducting connection 6. Therefore, in this operating phase, a replacement of filter elements (old element against a new element) that are not shown in detail can take place. Otherwise, the same process steps, namely a filtration operation for the fluid 2 to flow through the

filter elements, are intended in both treatment devices 3, 4; and, if desired, a pretreatment and/or aftertreatment by means of a cyclone separator may be added.

Furthermore, FIGS. 4 to 9 show the switchover procedure at the switching device 1 from the operation of the first treatment device 3 to the second treatment device 4. FIG. 4 shows the third and fourth distributor valves 13, 14 being unblocked. Their switching levers 15, 16 are jointly pivoted, when viewed in the direction of FIG. 4 to the left by an operator using one hand. It is very clear from the top view shown in FIG. 4 that the result of this arrangement is that the switching levers 15 and 16 cross over the switching lever 31. Since, however, the pair of switching levers 15, 16 is arranged in a plane that is different from that of the additional switching lever 31, such a crossing does not result in a collision of the switching levers 15, 16 with the additional lever 31. In comparison to the operating position of the switching device 1 shown in FIG. 3, the other distributor valves 7, 8 as well as the valves 21, 22 stay in their illustrated switching position.

FIG. 5 shows a subsequent pressure compensation between the first treatment device 3 by means of the needle valve 36, which bridges the fifth valve 21. Owing to the pressure compensation, the second treatment device 4 is brought to the operating pressure and filled with fluid 2.

In the operating position according to FIG. 6, the pressure compensation operation is completed; and the second treatment device 4 is now completely filled with fluid 2 and is under operating pressure.

FIG. 7 shows the switchover from the operation of the first treatment device 3 to the operation of the second treatment device 4. For this purpose, the additional switching lever 31 on the shaft 30 is pivoted from right to left, when viewed in the direction of FIG. 7. The result in this case is that the additional switching lever 31 crosses over the pair of switching levers 11, 12, but

this crossover does not result in a collision due to the inventive arrangement of the pair of switching levers 11, 12 in a plane that is different from the plane of the additional switching lever 31. Thus, the fifth and the sixth valve 21, 22 guide the fluid flow to the second treatment device 4, which is now traversed by the fluid 2. Although the first treatment device 3 is still under pressure, flow can no longer occur therein.

In FIG. 8, the additional shutoff of the first treatment device 3 is performed by pivoting the pair of switching levers 11, 12 from right to left, which will become apparent when comparing the top views from FIGS. 7 and 8.

FIG. 9 shows the lowering of the pressure in the first treatment device 3. The switching symbols drawn on the valve elements 9, 10, 23, 24, 39, 40 show the respective switching operation in a clear and obvious fashion to the viewer.

C l a i m s

1. A switching apparatus for a fluid flow, in particular for conducting a high pressure fluid (2) from a first treatment device (3) to a second treatment device (4), so that the fluid (2) can be subjected to a chemical and/or physical process step in each treatment device (3, 4), with a first fluid-conducting connection (5) and a second fluid-conducting connection (6) between the first and the second treatment device (3, 4) and with at least a first distributor valve (7) and a third distributor valve (13) in the first fluid-conducting connection (5) as well as a second distributor valve (8) and a fourth distributor valve (14) in the second fluid-conducting connection (6), wherein the respective switching position of the valve elements (9, 10, 39, 40) of the distributor valves (7, 8 13, 14) are variable by means of at least one respective switching lever (11, 12, 15, 16), **characterized in that** a first pair of switching levers (11, 12), which are assigned to the first and second distributor valves (7, 8), and a second pair of switching levers (15, 16), which are assigned to the third and fourth distributor valves (13, 14), are arranged in different planes in such a way that the switching levers (11, 12) of the first pair can be actuated by an operator without being impeded by the switching levers (15, 16) of the second pair, and vice versa.
2. The switching device according to claim 1, characterized in that the first (11, 12) and the second (15, 16) pair of switching levers for actuating the respectively assigned pair of distributor valves (7, 8; 13, 14) from a fluid- (2) passing position into a fluid- (2) blocking position, and vice versa, define a first pivoting range, which is assigned to the first pair of switching levers (11, 12), and a second pivoting range, which is assigned to the second pair of switching levers (15, 16); and these two pivoting ranges can partially overlap in the projection; and that the arrangement of the first (11, 12) and the second (15, 16) pair of switching levers in different planes allows each of the two pairs to enter in a collision-free

manner into the pivoting range of the respective other pair of switching levers in any actuating position.

3. The switching device according to one of the preceding claims, characterized in that the switching levers (11, 12) of the first pair and the switching levers (15, 16) of the second pair are arranged in such a manner that both switching levers (11, 12; 15, 16) of a pair can be jointly actuated over the entire pivoting range with one hand of an operator.
4. The switching device according to one of the preceding claims, characterized in that the switching levers (11, 12, 15, 16) have in each instance a spacer section (37) that is bent relative to the free ends of the switching levers and that extends more or less in the direction of the axis of rotation (43, 44) of the assigned distributor valve (7, 8, 13, 14), in order to arrange the switching levers in different planes.
5. The switching device according to one of the preceding claims, characterized in that the spacer sections (37) of the switching levers (11, 12; 15, 16) of a pair have a varying longitudinal extension.
6. The switching device according to one of the preceding claims, characterized in that the switching levers (11, 12, 15, 16) are designed in each instance as two-armed levers, which the operator grasps; and that the two arms of the lever are arranged diametrically opposite each other in relation to the axis of rotation (43, 44) of the assigned distributor valve (7, 8, 13, 14).
7. The switching device according to one of the preceding claims, characterized in that the one switching lever (11) of the first pair is designed as an identical part of a switching lever

(16) of the second pair; and that the other switching lever (12) of the first pair is designed as an identical part of the other switching lever (15) of the second pair.

8. The switching device according to one of the preceding claims, characterized in that a fifth valve (21) is arranged between the first and the third distributor valve (7, 13) in the first fluid-conducting connection (5); and that a sixth valve (22) is arranged between the second and the fourth distributor valve (8, 14) in the second fluid-conducting connection (6).
9. The switching device according to one of the preceding claims, characterized in that the fifth valve (21) and the sixth valve (22) can be actuated by means of a shaft (30) that couples said fifth and sixth valve; and that an additional switching lever (31) engages with the shaft (30); and the arrangement of the additional switching lever (31) in a plane that is different from the planes of the pivoting ranges of the first pair of switching levers (11, 12) and the second pair of switching levers (15, 16) allows the pivoting range of this additional switching lever to enter in a collision-free manner into the pivoting range of the first (11, 12) and the second (15, 16) pair of switching levers.
10. The switching device according to one of the preceding claims, characterized in that the additional switching lever (31) for jointly actuating the fifth (21) and the sixth (22) valve is designed as a rod and at least partially penetrates, guided in a receptacle (38), the shaft (30) transversely to the longitudinal extension of said shaft, so that the additional switching lever (31) can be brought into the opposite operating positions.
11. The switching device according to one of the preceding claims, characterized in that from the process side of the switching device, the inflow of fluid (2) can be controlled by means of the sixth valve (22) in the second fluid- (2) conducting connection (6); and that the switching levers (11, 12, 15, 16) and the additional switching lever (31) can be actuated by

an operator from the operator side of the switching device that is located opposite the process side.