Filling connector, corresponding container and corresponding filling method

The present invention relates to a filling connector, a faucet, a pressurized-fluid container and a filling method using such a connector.

More specifically, the invention relates to a filling connector for pressurized-gas containers intended to engage with a filling nozzle to enable said container to be filled, the connector comprising a body defining an internal filling circuit between an upstream extremity intended to be connected to a filling nozzle and a downstream extremity intended to be connected to a container, the connector comprising an isolating valve that is movable in relation to a seat between an upstream closed position of the circuit and a downstream open position of the circuit, said isolating valve being pushed towards the upstream position thereof by a return member, the connector also including a dust valve placed upstream of the isolating valve, said dust valve having a downstream extremity and being movable in relation to the body between an upstream closed position of the upstream extremity of the circuit and a downstream open position of the upstream extremity of the circuit, said dust valve being pushed towards the upstream position thereof by a return member.

This document in particular relates to a filling connector comprising a dust valve and an isolating valve arranged in series from the upstream extremity to the downstream extremity (the terms "upstream" and "downstream" relate to the direction of gas flow when filling).

The dust valve is provided in particular to form a barrier upstream of the isolating valve to prevent or limit the ingress of particles or dust, which could affect the seal of said isolating valve.

Filling connectors usually have a dust stopper that retracts when it comes into contact with the extremity of the filling nozzle to enable the filling nozzle to penetrate the filling connector to actuate the isolating valve located downstream in the filling connector. This usually provides good protection against the ingress of foreign bodies in a filling connector. However, this protection is not usually sufficient because, when the dust valve is open, the filling nozzle penetrating the filling connector downstream of the dust valve may introduce particles.

Contamination of the isolating valve may result in a high rate of leakage throughout the service life of the product to which this filling connector is fitted. This is caused by the fact that much of the sealing capacity of the sealing area of the isolating valve contaminated (dust, particles, etc.) is lost. This risk of particle ingress increases if the filling connector is vertical (top filling).

A known solution involves providing a filter for solid particles in the connector, upstream of the isolating valve. This makes it possible to catch particles or dust upstream of the isolating valve, but prevents the isolating valve from being opened by mechanical contact (as the filter effectively forms a mechanical barrier for a valve actuator).

Another solution involves providing a filter downstream of the isolating valve. This enables the mechanical actuation of the isolating valve, and protects the downstream extremity of the isolating valve (the inside of the faucet and the inside of the container) from dust. However, the upstream extremity of the isolating valve is then susceptible to contamination by particles or dust, which may affect the sealing capacity thereof.

Document W02009101350 describes a gas filling and dispensing device of a pressurized gas tank comprising an extraction pipe with a pressure regulator and two valves arranged in series that can be actuated by a user system for extracting gas. To fill the tank, a bypass is provided on part of the extraction pipe, forming a filling channel bypassing one of the two valves and the pressure regulator of the extraction pipe.

One objective of this invention is to mitigate some or all of the drawbacks of the prior art as set out above.

For this purpose, the connector according to the invention, while corresponding to the general definition given in the preamble above, is essentially characterized in that the dust valve is selectively movable towards the downstream extremity, either:

- To a first predetermined downstream "no contact" position opening the upstream extremity of the circuit, in which the downstream extremity of the dust valve is not pushing against the upstream extremity of the isolating valve, the upstream extremity of the isolating valve being pushable towards the downstream open-circuit position thereof by the pressurized fluid entering via the upstream open extremity of the circuit, or

- To a second predetermined downstream "contact" position opening the upstream extremity of the circuit, in which the downstream extremity of the dust valve pushes against an upstream extremity of the movable isolating valve to move the isolating valve by contact to the downstream open-circuit position thereof, and in that the dust valve includes one or more passages to guide at least some of the fluid flowing downstream through the body of said dust valve.

Thus, according to the invention, the movable dust valve slides in the internal circuit of the filling connector and forms a screen between the filling tool (filling nozzle) and the isolating valve.

Such an arrangement also helps to improve the reliability and safety of the filling system. Indeed, the dust valve guides and constrains the incoming gas flowing downstream during filling operations. The ducts passing through the dust valve may in particular help to reduce gas turbulence during filling operations. This also helps to reduce vibrations. The convergence of the flow or flows passing through the dust valve in particular help to accelerate the gas flow and to concentrate it in a central zone of the passage, in particular around the aperture of the seat (upstream part of the downstream isolating valve). This arrangement helps at least partially to protect the spring of the valve from the filling gas flow. This guiding of the filling gas can also enable the gas flow to be directed towards the zone forming the seat for the downstream isolating valve, facilitating the cleaning thereof with each filling operation. This helps to reduce the risk of leaks caused by a dirty isolating-valve seat.

The arrangement therefore helps to significantly improve the safety of the cylinder during the repeated filling thereof.

This architecture also helps to protect the isolating valve during successive filling operations.

Thus, in the closed position, the upstream dust valve protects the downstream isolating valve from dust, but also protects the downstream isolating valve from direct contact with the extremity of a filling nozzle.

Furthermore, this architecture comprising two moveable valves arranged in series and sliding along a single axis forms an efficient protection mechanism in a filling process, improving protection of the downstream isolating valve.

The arrangement of the two valves in series enables effective engagement with a given filling nozzle.

In particular, the sliding dust valve can enable the upstream extremity of the connector to open while:

- Protecting the downstream isolating valve from particles, and
- Enabling this downstream isolating valve to be actuated by mechanical contact.

The arrangement of the upstream dust valve and of the downstream isolating valve also combines easily with the filling nozzles, opening the downstream isolating valve by means of a pressurized gas flow delivered into the connector (instead of a mechanical contact).

Furthermore, the dust valve regulates the incoming gas flow during a filling operation because the gas is forced to pass through the body of the dust valve. This advantageously regulates the gas flow towards the downstream part by minimizing turbulence that is disadvantageous for the isolating valve mechanism.

The arrangement of the dual serial valve connector therefore provides a high level of protection for the isolating valve against dirt and provides opening sequences that adapt to different types of filling operation.

The invention provides a high degree of safety in the opening/closing sequences of the filling connector. Furthermore, the filling according to the invention preserves the sealing capacity of the connector throughout the service life of the connector.

Thus, as a non-limiting example, the upstream dust valve may advantageously be involved in the mechanical opening of the downstream isolating valve by transmitting an opening force from the upstream extremity towards the downstream extremity, i.e. in certain filling arrangements, the dust valve may act as a movement transmission member between a filling nozzle and the downstream isolating valve.

Equally, the movable dust valve may open the upstream extremity of the connector, enabling the downstream isolating valve to open with the pressure of the filling gas (as a function of the pressures and weighting of the valves).

The upstream dust valve can then perform the following functions:

- Opening/closing the upstream extremity of the circuit,

– Guiding the fluid flow upstream of the isolating valve during a filling operation, and possibly

– Transmitting mechanical movement to selectively control the opening or closing of the downstream isolating valve.

According to possible features:

– The body of the dust valve slides in the circuit, the passage or passages forcing all or nearly all of the fluid flowing downstream in the circuit to pass through the body of said dust valve, regardless of the downstream position of the dust valve,

- The passage or passages include at least one convergent portion to guide at least some of the gas passing through the dust valve towards the central part of the internal filling circuit,

– The passage or passages converge and guide at least some of the gas passing through the dust valve in parallel in the central part of the internal filling circuit,

- The passage or passages converge to guide at least some of the gas passing through the dust valve towards the central part of the upstream extremity of the isolating valve,

- The passage or passages converge to guide at least some of the gas passing through the dust valve towards a convergent zone of the internal filling circuit forming the seat of the isolating valve,

- The isolating valve is movable selectively into a downstream open position of the circuit by mechanical actuation by the dust valve,

- The isolating valve is movable selectively into a downstream open position of the circuit by a pressurized fluid flow,

- The dust valve is selectively movable towards the downstream extremity by mechanical actuation and/or the pressurized fluid,

- The external and/or internal surface of the body of the connector includes indentations forming attaching recesses and/or reliefs intended to engage with the matching forms of a filling nozzle to form a selective mechanical attachment system, in particular a quick-connection system,

- The dust valve has an upstream extremity that can be actuated mechanically and/or by the pressurized fluid,

- The movable isolating valve includes a soft packing seal intended to engage with the seat to sealingly close the circuit when the valve is pushed against the seat at a predetermined pressure,

– In the upstream closed position of the upstream extremity of the circuit, said dust valve sealingly closes the inlet orifice of the upstream circuit extremity, for example making it watertight,

– In the upstream closed position of the upstream extremity of the circuit, said dust valve non-sealingly closes the inlet orifice of the upstream circuit extremity,

- The body of the connector and/or the dust valve includes a flexible lip forming a watertight barrier between the body of the connector and the dust valve, at least while this latter is in the upstream closed position,

- The flexible lip has a free extremity enabling the passage of gas or liquid when there is a predetermined gas differential on either side of the lip, in particular to enable gas to be evacuated from the downstream extremity towards the upstream extremity, for example in the event of an isolating valve leak,

- In the upstream position of the dust valve, the upstream extremity of the dust valve re-closes the upstream extremity of the circuit flush with the upstream extremity of the body of the connector,

- The body of the dust valve slides sealingly in the circuit,

– The seal between the dust valve and the body of the connector is formed by metal/metal contact and/or by at least one joint,

– The passage or passages include one or more internal ducts passing through the body of the dust valve and/or passing through the body of the connector,

- The passage or passages include at least one gap between the dust valve and the body of the connector to force all or nearly all of the fluid flowing downstream in the circuit to pass through the dust valve,

- The return member pushing the isolating valve towards the upstream position thereof includes at least one of the following: a compression spring or a traction spring,

- The return member pushing the dust valve towards the upstream position thereof includes at least one of the following: a compression spring,

– The downstream extremity of the dust valve includes a rod to mechanically actuate the upstream extremity of the isolating valve,

– The upstream extremity of the isolating valve includes a surface intended to engage in mechanical contact with the downstream extremity of the dust valve,

– The isolating valve is closed before the dust valve is closed,

– The seat of the isolating valve is formed by a shoulder of a tubular frame rigidly connected to the body of the connector, the isolating valve sliding in this frame, the downstream extremity of the dust valve entering said frame when the dust valve moves into the downstream position,

– The connector includes a stop intended to engage with the dust valve to limit the maximum downstream position of this latter,

– The stop intended to engage with the dust valve to limit the maximum downstream position of this latter is rigidly connected to the body of the connector and/or to a frame rigidly connected to the body and defining the seat of the isolating valve,

– The isolating valve includes a non-return valve generating a force on the isolating valve pushing it towards the upstream extremity when the upstream part of this latter is subject to fluidic pressure,

– The non-return valve includes a channel linking the upstream extremity of the isolating valve to a downstream chamber, to transform a fluid pressure on the upstream part of the valve into a force acting on the downstream extremity of the isolating valve tending to move said isolating valve into the upstream closed position,

– The non-return valve (NRV) includes a given surface ratio between the upstream extremity of the isolating valve subjected to an upstream fluid, and the downstream extremity of the isolating valve communicating with the chamber, to

push said isolating valve into the upstream closed position when the upstream extremity thereof is subjected to pressurized fluid.

The invention also relates to a faucet for pressurized fluid, in particular for pressurized gas, with or without a pressure regulator, including a filling connector intended to engage with a filling nozzle to enable said container to be filled via said connector, the filling connector having any one of the features set out above or below.

The invention also relates to a pressurized fluid container, in particular a pressurized gas cylinder, including a faucet having any one of the features set out above or below.

The invention also relates to a method for filling such a pressurized gas container using a filling nozzle connected mechanically and detachably to said filling connector of the container, the method including a first step in which the dust valve is moved towards the downstream extremity to open the upstream extremity of the circuit under a mechanical and/or fluidic action of the filling nozzle and a second step in which the isolating valve is moved towards a downstream open position under a mechanical action of the dust valve and/or a fluidic action of the gas delivered by the filling nozzle.

According to other possible features:

- During the first step, the dust valve is moved into the first predetermined downstream "no contact" position thereof, the isolating valve being moved in the second step towards a downstream open position under a fluidic action of the gas delivered by the filling nozzle,

- During the first step, the dust valve is moved into the second predetermined downstream "contact" position thereof, the isolating valve being moved in the second step towards a downstream open position under a mechanical action of the dust valve,

- The dust valve is moved towards the downstream extremity under a mechanical action of one extremity of one valve actuator belonging to the filling nozzle,

- On completion of the process to fill a pressurized gas container, the isolating valve is automatically re-closed when the mechanical and/or fluidic force exerted on the upstream part of the valve drops below a predetermined threshold,

- The filling method includes a first step in which the dust valve is moved towards a downstream open position of the upstream extremity of the circuit under a mechanical and/or fluidic action of the filling nozzle and a second stage in which the isolating valve is moved towards a downstream open position under a mechanical action of the dust valve,

- The valve or valves may be opened independently of the mechanical attachment of the filling nozzle to the connector, in particular the valve or valves may be opened by the filling nozzle following mechanical attachment of the filling nozzle to the connector and via an action separate from the attachment system,

- The filling nozzle provided to engage with a filling connector of a pressurized fluid container faucet includes at least one claw extending longitudinally about a longitudinal axis, the central space located between the claw or claws and the longitudinal axis forming an enclosure intended to receive a filling connector of cylindrical overall shape, the internal face of the at least one claw positioned facing the central space having reliefs and/or recesses of predetermined dimensions, the reliefs and/or recesses being spaced apart from one another such that they fit into the matching grooves and/or reliefs formed on the external face of a filling connector, the at least one claw being movable transversely in relation to the longitudinal axis between an "open" position to enable the insertion of a connector into the central space and a "closed" position to enable the internal face of the claws to fit the external face of a connector, said nozzle having a locking member that is movable between an active position locking the claws in a closed position and an inactive position enabling the movement of the claws to the open position.

The invention may also relate to any alternative device or method including any combination of the features set out above or below.

Other features and benefits are set out in the description below, provided with reference to the figures in which:

– Figure 1 is a schematic cross section showing a first example embodiment of a filling connector according to the invention in a closed position,

- Figure 2 is a partial schematic cross section showing the filling connector in Figure 1 mounted on a container faucet, in an open position under the action of a filling nozzle,

– Figure 3 is a partial schematic cross section showing the structure of a filling connector according to the invention in a closed position (two valves closed),

- Figure 4 shows the filling connector in Figure 3 in an open position (two valves opened by mechanical contact),

– Figure 5 shows the filling connector in Figure 3 in an open position (two valves opened respectively by gas pressure and by mechanical contact),

- Figure 6 shows the filling connector in Figure 3 in an open position (two valves opened respectively by mechanical contact and by gas pressure),

- Figure 7 shows the filling connector in Figure 3 in an open position (two valves opened by gas pressure),

- Figure 8 is a magnified cross section of a detail of the upstream extremity of a filling connector showing another possible example embodiment of the upstream valve in a closed position),

- Figure 9 shows the filling connector in Figure 3 in a closed test position (upstream valve open and downstream valve closed).

With reference to Figure 1, the filling connector 1 includes a body 2, for example of cylindrical overall shape. The body 2 defines an internal filling circuit 6 between an upstream extremity 3 intended to be connected to a filling nozzle and a downstream extremity 4 intended to be connected to a pressurized gas container (for example via an internal circuit of a faucet).

The upstream extremity 3 of the circuit 6 (and of the connector 1) is selectively re-closable by a moveable dust valve 10 in the body 2 of the connector. The dust valve 10 is selectively movable in the body 2 (preferably in translation) between an upstream closed position of the upstream extremity 3 of the circuit 6 and a downstream open position of the upstream circuit extremity 3. Preferably, the dust valve 10 is pushed towards the upstream position thereof by a return member 14, for example a spring such as a compression spring.

Preferably, in the upstream closed position of the upstream extremity 3 of the circuit 6, the dust valve 10 is enclosed in the body 2 of the connector and shows on the far surface of the body 2 of the connector 1.

The dust valve 10 closes the upstream inlet 3 of the circuit sealingly or non-sealingly by contact with the body 2 of the connector 1. The body of the dust valve 10 may include one or more joints 105 sealing the circuit 6.

The dust valve 10 may include one or more passages 103 guiding at least some or preferably all of the fluid flowing from the upstream extremity 3 to the downstream extremity 4 through the body of the dust valve 10, i.e. if gas is flowing from the upstream extremity 3 towards the downstream extremity 4, the passage or passages 103 force all or nearly all of the gas flow to pass through the body of the dust valve 10, regardless of the downstream position of the dust valve 10. The passages 103 may include internal ducts passing through the body of the valve 10. As a variant or combination, it is possible for the ducts or passages to pass through the body 2 of the connector 1. Moreover, as a variant or combination, there may be one or more passages 103 formed by a gap between the dust valve 10 and the body 2 of the connector. As a variant or combination, if the dust valve 10 opens the upstream extremity 3 of the circuit 6, the pressurized gas flows downstream, bypassing the dust valve 10 (i.e. the gas passes between the dust valve 10 and the body 2 of the connector).

Downstream of the dust valve 10, the circuit 6 contains an isolating valve 7 movable in relation to a seat 8. The isolating valve 7 is movable, preferably in translation, between an upstream closed position of the circuit and a downstream open position of the circuit. The isolating valve 7 is pushed by default towards the upstream position thereof by a return member 9 such as a spring, in particular a compression spring.

As shown, the isolating valve 7 may include a soft packing seal 17 intended to engage with the seat 8. The soft packing seal may be made of plastic, a polymer, a vulcanized elastomer or any other appropriate material.

As shown, without being essential, the seat 8 of the isolating valve 7 may be formed by an annular shoulder rigidly connected to a tubular frame 15 attached to the body 2 of the connector (for example, using sealed screws).

For example, the isolating valve 7 slides in this frame 15. An extremity 16 of this frame 15 or of the seat 8 may for example form a stop 16 intended to engage with the dust valve 10 to limit the maximum downstream position of this latter. Equally, the spring 14 of the dust valve may bear against this frame 15.

Thus, the dust valve 10 has an upstream extremity or surface 104 that can be actuated mechanically (i.e. by mechanical contact) and/or by the pressurized fluid.

In Figure 2, the connector 1 is shown schematically on a faucet 12 of a container 13. Furthermore, a filling nozzle 11 opening the connector 1 is shown symbolically using a dotted line.

Preferably, the external surface of the body 2 of the connector 1 includes indentations 116 forming attaching recesses and/or reliefs intended to engage with the matching forms of a filling nozzle 11 to form a mechanical attachment system, in particular a quick-connection system (not shown in detail). In particular, preferably, the indentations 116 are dimensioned and positioned in accordance with a predetermined geometry, to preferably fit a specific matching filling nozzle 11 only.

As shown in Figure 2, the dust valve 10 is selectively movable towards the downstream extremity by a mechanical action, for example by a valve actuator 111 that is selectively movable in response to an actuator such as a pivoting lever 204 for example. The valve actuator 111 may also be moved automatically, for example pneumatically and/or using an electromechanical system.

The valve actuator 111 is preferably inserted sealingly into the connector and delivers pressurized gas via a channel inside or outside the valve actuator 111 (not shown).

As shown in Figure 2, when the dust valve 10 is moved to a predetermined downstream "contact" position (with the upstream extremity 3 open), a downstream extremity 101 of the dust valve 10 pushes against an upstream extremity 107 of the isolating valve 7 to move the isolating valve 7 towards the downstream position thereof, opening the circuit 6,

i.e. the isolating valve 7 is movable selectively into a downstream open position of the circuit by mechanical actuation by the dust valve 10.

For this purpose, as shown in the figures, the dust valve 10 may include a rod-shaped downstream extremity 101, the tip surface of which is intended to mechanically actuate the upstream extremity of the isolating valve 7. The upstream extremity of the isolating valve 7 may also be formed by a rod that protrudes towards the upstream extremity in relation to the seat 8 of annular overall shape.

Thus, from a closed position (dust valve 10 closed F and isolating valve closed F) shown schematically in Figure 3, a filling nozzle 11 can mechanically push the upstream extremity 104 of the dust valve 10 (pressure P). The dust valve 10 is moved towards the downstream extremity. The inlet of the circuit 6 of the connector 2 is open (Figure 4). The downstream extremity 101 of the dust valve 10 in turn pushes the upstream extremity 107 of the isolating valve 7 (mechanical pressure P) which then opens the downstream extremity of the circuit 6. The pressurized gas can flow downstream (symbolized by the arrows).

Naturally, this opening and filling method is not limited to this example. Thus, as shown in Figure 5, depending on the filling conditions, the upstream extremity 104 of the dust valve 10 may be pushed towards the downstream extremity by the gas flow itself (symbolized by the arrows). The downstream extremity 101 of the dust valve 10 can then mechanically push (pressure P) the isolating valve 7.

In the variant in Figure 6, the dust valve 10 is opened (0) mechanically by a filling nozzle 11 (pressure P), but the isolating valve 7 is opened (0) not by the downstream extremity 101 of the dust valve 10, but by the force exerted by the pressure of the incoming gas.

In the variant in Figure 7, the dust valve 10 and the isolating valve 7 are opened (0) by the force exerted by the pressure of the filling gas.

Thus, it is clear that, depending on the geometry of the filling nozzle and the filling conditions (in particular the flow rate and pressure of the filling gas inserted into the connector by the filling nozzle 11), the two valves 10, 7 in series can be opened (moved towards the downstream extremity) by a mechanical contact and/or by the pressure of the filling gas.

This makes use of the connector according to the invention very flexible. Indeed, gas filling operations guarantee protection of the isolating valve 7 in all cases.

Moreover, the connector can be opened during a filling operation by sequentially opening the two valves 10, 7 in series (first the dust valve 10, then the isolating valve 7).

On completion of the process to fill a pressurized gas container, the isolating valve 7 is automatically re-closed by the action of the spring 9 when the mechanical and/or fluidic force exerted on the upstream part of the valve 7 drops below a predetermined threshold. On completion of the filling operation, the isolating valve 7 is in principle re-closed before the dust valve 10 is re-closed.

The structure according to the invention also makes it possible to implement filling procedures that are particularly efficient in terms of safety for operators in charge of the filling and end users of the faucet fitted with such a connector.

Thus, for example, the movable dust valve 10 adopts, during movement thereof, at least two sealed positions enabling filling to be secured.

In a first sealed position, the dust valve 10 is moved towards the downstream extremity and opens the upstream extremity of the circuit 6, without the isolating valve 7 being opened (see Figure 10). In this open position (0) of the upstream valve 10 and closed position (F) of the downstream valve 7, the chamber located upstream of the isolating valve 7 can be vacuumized (predetermined low pressure) for example using a filling tool to perform pre-filling tests. In this arrangement, it is in effect possible to measure any leaks coming from the isolating valve 7.

In another sealed position, the isolating valve 7 can also be opened to perform a fill and/or to purge the circuit 6 and the cylinder before filling (see for example the arrangement in Figure 4, but with an inverted gas flow in the case of purging).

On completion of the fill, the isolating valve 7 can be re-closed and the dust valve 10 can be kept open (see Figure 10) to perform any necessary post-filling seal tests, like the pre-filling tests described above.

These filling methods make it possible to guarantee the safety of filling and the seal of the connector after multiple fills.

The variant in Figure 8 differs from the variant in Figure 1 only in that the body 2 of the connector 1 includes a flexible lip 27, the free extremity of which engages with the dust valve 10 to form a watertight barrier between the body 2 of the connector and the dust valve 10 (at least when this latter is in the upstream closed position).

The flexible lip 27, which is preferably a ring arranged about the dust valve 10, is for example made of elastomer attached or vulcanized to the body 2.

The lip 27 is made flexible to prevent the ingress of water towards the downstream extremity, while enabling the passage of fluid (in particular gas) at a given pressure (in particular in the event of a leak from the isolating valve 7).

The use of this connector on gas faucets preferably fitted with pressure regulators offers numerous advantages. Indeed, the containers (for example cylinders) of gas fitted with such faucets may be filled safely and may keep a single filling connector without thereby jeopardizing the seal of the connector.

The filling method according to the invention therefore helps to improve the protection of the packing seal of the sealing valve against contamination (metal particles, dust, etc.) via the removable filter moved during filling.

This helps to increase the reliability of the seal of the connector during the service life of the faucet and of the cylinder to which it is fitted.

According to the invention, the isolating valve 7 can be pushed mechanically, but only by the dust valve 10.

The filling method according to the invention therefore helps to improve the safety of filling by means of the actuation of the dual serial valve mechanism described above.

The invention applies advantageously to filling connectors and filling systems for pressurized gas cylinders (for example between 150 and 750 bar) fitted with faucets with built-in or detachable pressure regulators.

The filling connector may also be the gas extraction connector, where necessary.

CLAIMS

1. Filling connector for pressurized-gas containers intended to engage with a filling nozzle to enable said container to be filled, the connector (1) comprising a body (2) defining an internal filling circuit (6) between an upstream extremity (3) intended to be connected to a filling nozzle and a downstream extremity (4) intended to be connected to a container, the connector comprising an isolating valve (7) that is movable in relation to a seat (8) between an upstream closed position of the circuit and a downstream open position of the circuit, said isolating valve (7) being pushed towards the upstream position thereof by a return member (9), the connector (1) also including a dust valve (10) placed upstream of the isolating valve (7), said dust valve (10) having a downstream extremity (101) and being movable in relation to the body (2) between an upstream closed position of the upstream extremity (3) of the circuit (6) and a downstream open position of the upstream circuit extremity (3), said dust valve (10) being pushed towards the upstream position thereof by a return member (14) characterized in that the dust valve (10) is selectively movable towards the downstream extremity either:

- To a first predetermined downstream "no contact" position opening the upstream extremity (3) of the circuit (6), in which the downstream extremity (101) of the dust valve (10) is not pushing against the upstream extremity (107) of the isolating valve (7), the upstream extremity (107) of the isolating valve (7) being pushable towards the downstream position thereof opening the circuit (6) by the pressurized fluid entering via the upstream open extremity (3) of the circuit (6), or
- To a second predetermined downstream "contact" position opening the upstream extremity (3) of the circuit (6), in which the downstream extremity (101) of the dust valve (10) pushes against an upstream extremity (107) of the movable isolating valve (7) to move the isolating valve (7) by contact to the downstream position thereof opening the circuit (6), and in that the dust valve (10) includes one or more passages (103) to guide at least some of the fluid flowing from the upstream extremity (3) to the downstream extremity (4) through the body of said dust valve (10).

2. Connector according to Claim 1, characterized in that the body of the dust valve (10) slides in the circuit (6), and in that the passage or passages (103) force all or nearly all of the fluid flowing downstream in the circuit to pass through the body of said dust valve (10), regardless of the downstream position of the dust valve (10).

3. Connector according to Claim 1 or 2, characterized in that the passage or passages (103) include at least one convergent portion to guide at least some of the gas passing through the dust valve (10) towards the central part of the internal filling circuit.

4. Connector according to any one of Claims 1 to 3, characterized in that the passage or passages (103) converge and guide at least some of the gas passing through the dust valve (10) in parallel in the central part of the internal filling circuit.

5. Connector according to any one of Claims 1 to 4, characterized in that the passage or passages (103) converge to guide at least some of the gas passing through the dust valve (10) towards the central part of the upstream extremity (107) of the isolating valve (7).

6. Connector according to any one of Claims 1 to 5, characterized in that the passage or passages (103) converge to guide at least some of the gas passing through the dust valve (10) towards a convergent zone (15) of the internal filling circuit forming the seat of the isolating valve (7).

7. Connector according to any one of Claims 1 to 6, characterized in that the isolating valve (7) is movable selectively into a downstream open position of the circuit by mechanical actuation by the dust valve (10).

8. Connector according to any one of Claims 1 to 7, characterized in that the isolating valve (7) is movable selectively into a downstream open position of the circuit by a pressurized fluid flow.

9. Connector according to any one of Claims 1 to 8, characterized in that the dust valve (10) is selectively movable towards the downstream extremity by mechanical actuation and/or the pressurized fluid.

10. Faucet for pressurized fluid, in particular for pressurized gas, with or without a pressure regulator, including a filling connector intended to engage with a filling nozzle to enable said container to be filled via said connector, characterized in that the filling connector (1) conforms to any one of Claims 1 to 9.

11. Pressurized fluid container, in particular a pressurized gas cylinder, having a faucet (12) according to Claim 10.

12. Method for filling a pressurized gas container according to Claim 11 using a filling nozzle (11) connected mechanically and detachably to said filling connector (1) of the container (13), characterized in that it includes a first step in which the dust valve (10) is moved towards the downstream extremity to open the upstream extremity of the circuit (6) under a mechanical and/or fluidic action of the filling nozzle (11) and a second step in which the isolating valve (7) is moved towards a downstream open position under a mechanical action of the dust valve (10) and/or a fluidic action of the gas delivered by the filling nozzle, during filling at least some of the gas flowing from the upstream extremity (3) to the downstream extremity (4) is guided in the passage or passages (103) of the dust valve (10), through the body of said dust valve (10).

13. Method according to Claim 12, characterized in that, during the first step, the dust valve (10) is moved into the first predetermined downstream "no contact" position thereof, and in that the isolating valve (7) is moved in the second step towards a downstream open position under a fluidic action of the gas delivered by the filling nozzle.

14. Method according to Claim 13, characterized in that, during the first step, the dust valve (10) is moved into the second predetermined downstream "contact" position thereof, and in that the isolating valve (7) is moved in the second step towards a downstream open position under a mechanical action of the dust valve (10).

15. Method according to any one of Claims 11 to 14, characterized in that the dust valve (10) is moved towards the downstream extremity under a mechanical action of one extremity of a valve actuator (111) belonging to the filling nozzle (11).