The present invention relates to a filling device (1) for filling a dispensing container with a fluid (7) with a filling nozzle (9), which has a non-return valve (16), the non-return valve (16) having an actuating portion (22, 36) for opening the non-return valve (16) by an actuating element (23, 42) of a filling valve (11) of the dispensing container (6). In order to provide a filling device and a combination of a dispensing container and a filling device, which permit reliable refilling of a dispensing container partially filled with fluid, it is proposed according to the invention that the filling nozzle (9) has an actuating element (23, 42) for opening the filling valve (11) of the dispensing container (6) on connecting the dispensing container (6) to the filling nozzle (9).
REFILLABLE DISPENSING CONTAINER

[0001] The present invention relates to a filling device for filling a dispensing container with a fluid with a filling nozzle which has a non-return valve and the non-return valve has an actuating portion for opening the non-return valve by an actuating element of a filling valve of the dispensing container.

[0002] The present invention further relates to a combination of a refillable dispensing container for a fluid with a dispensing valve for dispensing the fluid and a filling valve for filling the dispensing container with the fluid and a filling device for filling the dispensing container with the fluid with a filling nozzle which has a non-return valve.

[0003] Most dispensing containers for fluids, in particular spray cans and aerosol cans, are intended to be used once and are discarded after dispensing the fluid. Despite extensive efforts to create closed cycles for these disposable dispensing containers as well, they account for a considerable volume of waste.

[0004] Therefore there are dispensing containers for fluids which are refillable. Refilling can either be done by the manufacturer or preferably by the end user. An example is aerosol cans which are used in craft businesses, in particular in motor vehicle workshops, with the most varied of fillings, for example brake cleaners. When a dispensing container has been emptied, it can be refilled by the craftsman himself or by support personnel on site, and can be used again.

[0005] European patent document EP 0 662 431 B1 proposes, for this purpose, a dispensing container with a dispensing valve for dispensing the fluid and a filling valve for filling the dispensing container with the fluid as well as a suitable filling device with a filling nozzle complementary to the filling valve of the dispensing container.

[0006] When filling the refillable dispensing containers, these are filled with the substance to be sprayed, i.e. a fluid, and simultaneously charged with a gas, preferably compressed air, so that after the filling operation the filled fluid can be sprayed through the dispensing valve.

[0007] It is found to be a disadvantage that dispensing containers that are not completely pressure-free, i.e. their internal pressure is greater than the ambient atmospheric pressure, can only be partially refilled, if at all.

[0008] Such a situation arises in particular after replacing the storage tank for the fluid connected to the filling device. On initial use, the filling device sucks the fluid to be filled into the dispensing container through a hose from the storage tank. The reduced pressure required for this is produced by the movement of a piston in a metering cylinder. The metering cylinder has a defined metering volume, but in the initial suction operation after changing the storage tank it is only partially filled, because at first the volume of air in the suction line also goes into the metering cylinder. If this first metering volume of the metering cylinder is released into the dispensing container by charging with compressed air, then during this filling the dispensing container will only be filled with a smaller amount of fluid than is in principle possible. Simultaneously, however, it is charged with a maximum pressure of compressed air. On attempting to refill such a dispensing container which is partially filled, but fully charged with compressed air, this fails, as the dispensing container and the metering volume of the metering cylinder have the same pressure, namely that of the compressed air used for charging.

[0009] Therefore the object to be achieved by the present invention is to provide a filling device and a combination of a dispensing container and a filling device, which reliably makes possible refilling of a dispensing container partially filled with fluid.

[0010] This object is achieved according to the invention with a filling device for filling a dispensing container with a fluid, with a filling nozzle which has a non-return valve, the non-return valve having an actuating portion for opening the non-return valve by an actuating element of a filling valve of the dispensing container, and the filling nozzle having an actuating element for opening the filling valve of the dispensing container.

[0011] The object is further achieved with a combination of a refillable dispensing container for a fluid with a dispensing valve for dispensing the fluid and a filling valve for filling the dispensing container with the fluid and a filling device for filling the dispensing container with the fluid with a filling nozzle which has a non-return valve, the filling valve of the dispensing container and the filling nozzle of the filling device being arranged so that on connecting the filling valve to the filling nozzle, first the filling valve is opened by an actuating element of the filling nozzle, so that the dispensing container undergoes pressure equalization, and then the non-return valve of the filling nozzle is opened by an actuating element of the filling valve.

[0012] This configuration of the filling device on the one hand and of the dispensing container on the other hand makes it possible to refill dispensing containers that are not completely emptied, as the configuration of the filling nozzle on the device side and of the filling valve on the dispensing container side ensures that before fluid is filled, the dispensing container is made pressure-free, i.e. its internal pressure is made equal to the ambient atmospheric pressure.

[0013] For this, on connecting the dispensing container to the filling device, first the filling valve is opened through engagement of an actuating element of the filling nozzle with an actuating portion of the filling valve. After the filling valve has been opened, the necessary pressure equalization of the dispensing container with the surroundings can take place. During further connection of the dispensing container to the filling device, the non-return valve of the filling device is then opened through engagement of an actuating element on the dispensing container side with an actuating portion of the non-return valve of the filling nozzle, thus providing fluid communication between the filling device and the dispensing container.

[0014] In order to permit pressure equalization of the dispensing container, without fluid which is to be dispensed from the dispensing container escaping from the dispensing container, in one embodiment of the invention the filling nozzle is arranged so that a dispensing container with a filling valve arranged at the bottom must be connected to the filling nozzle upside down, i.e. with the dispensing valve downwards.

[0015] In one embodiment of the invention, the actuating element of the filling nozzle is a pin which can be engaged with the actuating portion of the filling valve of a dispensing container.

[0016] If this pin as actuating element is a portion of the closing body or is connected thereto, it is expedient for the spring force of the spring of the filling nozzle to be greater than the spring force of the spring of the filling valve.

[0017] In one embodiment the non-return valve has a valve seat, a closing body, which is movable relative to the valve seat from a position closing the non-return valve into a posi-
tion opening the non-return valve, and a spring element, the
spring element biasing the closing body into its position clos-
ing the non-return valve, the closing body having an actuating
portion, which can be engaged with the actuating element of
the filling valve of the dispensing container, so that the actu-
ing element moves the closing body against the spring force
of the spring element from the position closing the non-return
valve into the position opening the non-return valve.

[0018] In one embodiment of the invention, the actuating
portion of the non-return valve is a portion of the closing body
forming a ring around the pin.

[0019] Similarly, the filling valve of the dispensing con-
tainer has, in one embodiment, a valve seat, a closing body,
which is moveable relative to the valve seat from a position
closing the filling valve into a position opening the filling
valve, and a spring element, the spring element biasing the
closing body into its position closing the filling valve, the
closing body having an actuating portion which can be
engaged with the actuating element of the filling nozzle, so
that the actuating element moves the closing body against the
spring force of the spring element from the position closing
the filling valve into the position opening the filling valve.

[0020] Moreover, in particular, the filling valve and the
dispensing valve of the dispensing container are two separate
valves. Preferably the dispensing valve is arranged at the top
of the container and the filling valve is arranged at the bottom
of the container. A typical dispensing container is a spray can
or an aerosol can.

[0021] In one embodiment the actuating element of the
filling valve is an annular portion of the valve housing of the
filling valve.

[0022] It is advantageous if in the connected state the actu-
ing element of the filling valve and the actuating portion of
the non-return valve surround the actuating element of the
filling nozzle and the actuating portion of the non-return valve
concentrically.

[0023] In a preferred embodiment of the invention, the
filling valve of the dispensing container and the filling nozzle
of the filling device are configured so that on connecting the
filling valve to the filling nozzle, after opening the filling
valve and before opening the non-return valve of the filling
nozzle, an annular sealing surface of the filling valve and an
annular sealing surface of the filling nozzle closely engage
with one another, so that a sealed fluid connection is provided
between the filling nozzle and the filling valve.

[0024] In this way, on connecting the dispensing container
to the filling device, first pressure equalization of the dispens-
ing container can take place, and then a fluid-tight connection
is provided between the filling nozzle and the filling valve,
before finally the non-return valve of the filling nozzle of the
filling device is opened and fluid is forced into the dispensing
container.

[0025] Moreover, an embodiment is preferred in which the
filling valve and filling nozzle are configured to be comple-
mentary to one another.

[0026] In one embodiment of the invention, this is achieved
in that the filling valve has a substantially hollow cylindrical
valve housing projecting opposite the external wall of the
dispensing container, the closing body being arranged inside
the valve housing, and on the outside of the valve housing, a
sealing surface being provided for sealing engagement with
the filling nozzle.

[0027] In one embodiment, the filling nozzle complemen-
tary to said filling valve forms a bush, which can receive the
hollow cylindrical valve housing of the filling valve. Prefer-
able the bush has, internally, a sealing surface which can be
brought into sealing engagement with the sealing surface of
the filling valve.

[0028] In a preferred embodiment the sealing surface of
the filling valve is formed by an O-ring formed into the outside
wall of the hollow cylindrical valve housing.

[0029] Providing an O-ring on the filling valve on the dis-
ensing container side allows easy replacement of this sealing
element, which in operation is subjected to severe stressing,
in particular by embrittlement.

[0030] Furthermore, damage to the external O-ring, in par-
ticular swelling of the O-ring, can easily be recognized by the
user.

[0031] Moreover, arrangement of the O-ring on the dis-
ensing container side greatly increases the life of any seal
between dispensing container and filling nozzle, as a large
number of seals (one on each dispensing container) are used.
Moreover, the filling nozzle is maintenance-free owing to
arrangement of the O-ring seal on the filling valve.

[0032] However, alternative embodiments are also con-
ceivable, in which the bush of the filling nozzle has, internally,
an O-ring as sealing element, inserted into the inside wall of
the bush, which can be engaged with a corresponding sealing
surface on the outside wall of the hollow cylindrical filling
valve.

[0033] In a preferred embodiment, the bush of the filling
nozzle and the hollow cylindrical valve housing of the filling
valve are dimensioned so that on connecting the filling valve
to the filling nozzle, after opening the filling valve and before
opening the non-return valve, an annular gap is formed
between the valve housing of the filling valve and the bush of
the filling nozzle, forming a fluid connection to the surround-
ings. This allows simple and effective pressure equalization
of the dispensing container.

[0034] In an alternative embodiment to this, the bush of the
filling nozzle and the hollow cylindrical valve housing of the
filling valve are dimensioned so that on connecting the filling
valve to the filling nozzle, the valve housing of the filling
valve or its seal and the bush of the filling nozzle or its seal
come into sealing engagement with each other before the
filling valve is opened. In such an embodiment it is expedient
if the bush of the filling nozzle has at least one venting
channel, which connects the interior space of the filling
nozzle to the surroundings.

[0035] The venting channel is preferably arranged, and the
filling valve and the filling nozzle are configured, so that on
connecting the filling valve to the filling nozzle, after opening
the filling valve and before opening the non-return valve, the
venting channel is opened, whereas on further connection of
the filling valve to the filling nozzle, in particular before and
during opening of the non-return valve, it is sealed by the
filling valve or its seal, to prevent escape of fluid from the
filling nozzle.

[0036] In one embodiment of the invention, a vent pipe with
a first and a second end is provided in the dispensing con-
tainer, the first end of the vent pipe being connected to the
filling valve, so that a sealed fluid connection is provided from
the filling valve to the second end of the vent pipe.

[0037] In this way it is possible for the filling device with
the filling nozzle to be configured so that a dispensing con-
tainer, which has a filling valve at its bottom and a dispensing
valve on a side of the dispensing container opposite the filling
valve, is fitted on the non-return valve so that the dispensing
container is upright. “Upright” means that the dispensing valve is located at the top and the filling valve at the bottom. In this arrangement, without the vent pipe, any fluid remaining in the dispensing container would, on opening the filling valve, escape from the filling valve and cause contamination of the filling valve of the non-return valve and in particular of the environment. The vent pipe, however, provides fluid-tight connection of the filling valve to an upper, fluid-free volume of the dispensing container at least in the partially emptied state of the dispensing container, so that during venting, no fluid escapes from the dispensing container via the filling valve.

[0038] The vent pipe is preferably long enough so that, measured on the total height of the dispensing container between filling valve and dispensing valve, it ends in the uppermost third of the dispensing container, i.e., its second, free end is arranged there. This is also advantageous because the maximum liquid level in typical dispensing containers is about two thirds of the total volume.

[0039] Further advantages, features and possible applications of the present invention will become clear from the following description of one embodiment and the associated drawings.

[0040] FIG. 1 shows a schematic view of the filling device according to the invention with a dispensing container.

[0041] FIG. 2 shows a cross-sectional view through a filling nozzle of a filling device according to the invention.

[0042] FIG. 3 shows a broken-away cross-sectional view through a refillable dispensing container for a fluid with a filling valve.

[0043] FIG. 4 shows a broken-away cross-sectional view through a refillable dispensing container and the filling nozzle of a filling device on connecting the filling valve to the filling nozzle and after opening the filling valve.

[0044] FIG. 5 shows a cross-sectional view of the filling valve from FIG. 4 fully connected to the filling nozzle.

[0045] FIG. 6 shows a broken-away cross-sectional view through an alternative embodiment of a refillable dispensing container and a filling nozzle of a filling device on connecting the filling valve to the filling nozzle and after opening the filling valve.

[0046] FIG. 7 shows a broken-away cross-sectional view through another embodiment of a refillable dispensing container and a filling nozzle of a filling device on connecting the filling valve to the filling nozzle and after opening the filling valve.

[0047] In the figures, identical or similar elements are identified with identical reference symbols.

[0048] FIG. 1 shows the construction of a filling device according to the invention and a dispensing container. The representation in FIG. 1 is schematic and is only intended for describing the functioning of the filling device in the overall context and the arrangement of the elements belonging to the invention.

[0049] The filling device 1 has a metering cylinder 2 with a metering piston 3 that moves therein. The metering cylinder 2 is connected via a suction line 4 to a replaceable storage tank 5 for the fluid 7 for filling the dispensing container 6. The metering cylinder 2 is in its turn connected via a filling line 8 to a filling nozzle 9.

[0050] For filling a reusable dispensing container 6, the filling nozzle 9 of the filling device 1 must be connected to the filling valve 11 arranged at the base 10 of the dispensing container 6. In the embodiment shown, the dispensing container 6 is an aluminum can, which, in addition to the filling valve 11 at the bottom of the can, has a dispensing valve 12 for dispensing an aerosol of compressed air and the fluid 7, for example a brake cleaner.

[0051] For filling the dispensing container 6, its filling valve 11 is connected to the filling nozzle 9 of the filling device. After the connection has been made between the filling nozzle 9 and the filling valve 11, the filling operation takes place as follows. To draw in a defined volume of the fluid 7 for filling the dispensing container 6, the metering piston 3 is retracted from the cylinder 2, so that fluid 7 is sucked from the storage tank 5 into the metering cylinder 2 via the suction line 4. When the metering cylinder 2 has been filled with fluid, a valve (not shown) in the suction line 4 is closed and the metering cylinder 2 is charged with compressed air via a compressed air line 13. As a result of charging with compressed air, not only the fluid is forced via the filling line 8 into the dispensing container 6, but also the compressed air itself, so that the dispensing container filled with the fluid 7 is also under pressure. In the embodiment shown, the pressure is about 6 bar.

[0052] The object on which the invention is based can also easily be understood from the schematic representation in FIG. 1. If a new storage tank 5 has been connected to the suction line 4, when filling the metering cylinder 2 for the first time by raising the piston 3, first the volume of air in the suction line 4 is drawn into the metering cylinder 2, and the fluid 7 only after complete emptying of the air from the suction line 4. As a result, in the first filling operation after connecting a new storage tank 5 the metering cylinder 2 is not filled with the defined amount of fluid 7 and therefore the dispensing container 6 is only partially filled. At the same time, however, the dispensing container 6 is charged with the full pressure of the compressed air. If an attempt is then made to fill the dispensing container 6 again, this is unsuccessful, as the dispensing container 6 has roughly the same internal pressure as the metering cylinder 2 charged with compressed air.

[0053] This problem can be solved with a special, mutually complementary configuration of the filling nozzle 9 of the filling device and of the filling valve 11 of the dispensing container 6. The precise construction of the filling nozzle 9 and of the filling valve 11 can be seen in FIGS. 2 to 5.

[0054] FIG. 2 shows a cross-sectional view through the filling nozzle 9 of a filling device according to the invention. For simplicity, the complete filling device is not shown.

[0055] The inlet channel 14 of the filling nozzle 9 forms the end of the filling line 8 at the dispensing container side. The filling nozzle 9 has a substantially hollow cylindrical housing 15, which is configured as a bush, so that it can accommodate a complementary filling valve (11, shown in FIG. 3) within it.

[0056] The filling nozzle forms within it a non-return valve 16. This has a closing body 17, which is arranged movably relative to the housing 15 of the filling nozzle 9. The closing body 17 can be moved against the biasing by a helical spring 18 from a position closing the filling nozzle (shown in FIG. 2) into a position releasing the filling nozzle 9. For sealing the filling nozzle 9, the closing body 17 has a circumferentially arranged O-ring seal 19, which engages with a sealing surface 20 of the valve seat 21. To open the non-return valve 16 it is necessary to exert a force on the closing body 17 against the spring force of the spring 18. For this purpose, the closing body 17 has an actuating portion 22.
element 22, which can be engaged with a complementary actuating element of the filling valve 11.

Furthermore, the closing body 17 of the non-return valve 16 has in its turn an actuating element in the form of a pin 23, with which the filling nozzle 9 can act upon the filling valve 11 on the dispensing container side or its closing body.

The fluid outlet 24 of the filling nozzle 9 is of stepwise tapering configuration.

The filling valve 11 complementary to the filling nozzle 9 in FIG. 2 is provided at the base 10 of a spray can 6. The filling valve 11 has a hollow cylindrical housing 27, which passes through the base 10 of the spray can 6 and is sealed by means of an O-ring seal 28 against the base 10. The filling valve has a closing body 29, which can be moved relative to the housing 27 from a position closing the filling valve (shown in FIG. 3) into a position opening the filling valve 11. The closing body 29 is biased by a helical spring 30, so that the O-ring seal 31 of the closing body 29 is pressed against the sealing surface 32 of the valve seat 33 of the filling valve 11, so that the filling valve 11 is closed in its position of rest.

The closing body 29 of the filling valve 11 is of elongated shape, so that it extends through the internal space 34 of the housing 27 and is accessible from the inlet side 35 of the filling valve 11. Therefore the pin-shaped actuating element 23 of the filling nozzle 9 of the filling device 1 can be engaged with an actuating portion 36 of the closing body 29 of the filling valve 11.

The hollow cylindrical housing 27 of the filling valve 11 has an O-ring 38 formed into its external surface 37. The purpose of this is to seal, in the connected state, the filling nozzle 9 against the filling valve 11, so that a fluid-tight channel is provided from the filling device 1 into the spray can 6.

FIG. 3 is a broken-away view, in which the dispensing valve 12 of the spray can 6 is not visible. However, a riser 39 is indicated, which connects the internal space of the spray can 6 to the dispensing valve 12.

The functionality of the filling nozzle 9 according to the invention in FIG. 2 and of the complementary filling valve 11 of the spray can 6 in FIG. 3 will now be described, referring to the diagrams in FIGS. 4 and 5.

FIG. 4 shows the filling nozzle 9 and the filling valve 11 when the filling device 1 is connected to the spray can 6, whereas FIG. 5 shows the fully connected state of filling nozzle 9 and filling valve 11, an open fluid channel being formed between the filling device 1 and the spray can 6.

The individual elements of the filling nozzle 9 and of the filling valve 11 are dimensioned and arranged so that on connecting the two together, the pin-shaped actuating element 23 first engages with the actuating portion 36 of the closing body 29 of the filling valve 11. During this, the closing body 29 is moved against the bias of the helical spring 30 so that the sealing ring 31 disengages from the valve seat 33 of the valve housing 27 of the filling valve. That is, the filling valve 11 is opened. At this time point, the non-return valve 16 of the filling nozzle 9 is still closed and the O-ring 38 or its sealing surface is still not engaged with the complementary sealing surface of the filling nozzle. In this way, through the opened filling valve 11, pressure equalization can take place between the interior of the spray can 6 and the surroundings, i.e. the atmospheric pressure. Any excess volume of gas escapes through the annular gap 40 formed between the filling valve 11 and the outlet end 24 of the filling nozzle 9.

As connecting of the filling nozzle 9 to the filling valve 11 proceeds further, i.e. with movement of the two elements relative to one another in the axial direction, the O-ring seal 38 on the outside of the valve housing 27 of the filling valve 11 engages with the inside wall 41 of the housing 15 of the filling nozzle 9. This forms the sealing surface of the filling nozzle 9 complementary to the O-ring seal 38.

Only then, through further axial displacement of the two elements 9, 11 relative to one another, the non-return valve 16 is opened. This situation is shown in FIG. 5. The annular actuating element 42 engages with the annular actuating portion 22 of the non-return valve 16 and moves the closing body 17 connected to the actuating portion 22 against the spring force of the helical spring 18 from its position closing the non-return valve 16 into a position releasing the non-return valve 16.

In this way, on connecting the filling nozzle 9 to the filling valve 11, successively first the filling valve 11 is opened, then the filling nozzle 9 is sealed against the filling valve 11 and then the non-return valve 16 is opened, therefore the connecting of the two elements 9, 11 automatically provides a sealed fluid connection between the filling nozzle and thus the filling device 1 and the spray can 6.

The actuating element 23 of the filling nozzle 9, which opens the filling valve 11, is integral with the closing body 17 of the non-return valve. Therefore for the functioning of the embodiments of the invention shown in FIGS. 2 through 5 it is important that the spring force of the helical spring 18 biasing the closing body 17 of the non-return valve 16 of the filling nozzle 9 is far greater than the spring force of the opposing helical spring 30 of the filling valve 11.

FIG. 6 shows an alternative embodiment of the dispensing container 6, the dispensing container 6 with its filling valve 11 being fitted so far on the filling nozzle 9 of the filling device that the filling valve 11 is already opened. In this case the filling nozzle 9 is arranged on the filling device 1 in such a way that the spray can 6 as dispensing container must be placed upright on the filling nozzle 9. In this way, during the filling operation the dispensing valve 12 is at the top and the filling valve 11 is at the bottom. In this arrangement, any fluid remaining in the spray can 6 flows under the action of gravity downwards towards the filling valve 11 and collects there above the base 10 of the spray can 6. So that no fluid remaining in the spray can 6 during filling of the spray can 6 in this orientation can escape via the filling valve, in the embodiment shown in FIG. 5 the filling valve 11 is connected to a vent pipe 50. For this purpose, a first end 51 of the vent pipe 50 is fitted fluid-tight on the valve housing 27 of the filling valve 11. The second end 52 of the vent pipe 50 ends in the upper region of the spray can 6 near the dispensing valve 12, so that even in the least favorable case of a spray can 6 that is filled completely, i.e. to about two thirds of its volume, no fluid can pass via the vent pipe 50 into the filling valve 11 and escape through this.

FIG. 7 shows an embodiment of the invention that is identical in many respects to the embodiment in FIG. 6. This embodiment also shows a spray can 6 for filling in the upright state, i.e. with the dispensing valve 12 at the top and the filling valve 11 at the bottom. The embodiment in FIG. 7 also has a vent pipe 50 for this purpose.

The embodiment in FIG. 7 differs from the other embodiments shown by the configuration of the filling nozzle 9. The hollow cylindrical housing 15 of the filling nozzle 9 has two venting channels 53 on its end opposite the filling
valve. Via these, the internal space of the hollow cylindrical housing 15 communicates with the surroundings, to permit venting of the interior of the spray can 6 after the filling valve 11 is opened.

[0073] In this embodiment, the bush of the filling nozzle 9, i.e. in particular the inside diameter of the hollow cylindrical housing 15 and the housing 27 of the filling valve 11 or the sealing ring 38 formed into the outside wall of the housing 27 of the filling valve 11 are dimensioned so that the sealing ring 38, on connecting the filling valve 11 to the filling nozzle 9, engages hermetically together even before one of the two valves is opened. The volume thus enclosed between the housing 27 of the filling valve 11 and the housing 15 of the filling nozzle 9 is connected via the vent channels 53 to the surroundings.

[0074] If now, with further connecting together of the filling valve 11 and of the filling nozzle 9, the closing body 29 of the filling valve 11 is moved so that it opens the filling valve, any overpressure still present in the spray can 6 can be released via the filling valve 11, the filling nozzle 9 or its housing 15 and the venting channels 53. This state of the arrangement is shown in FIG. 7.

[0075] With further connecting together of the two elements 11, 9, the seal 38 of the filling valve 11 itself seals off the venting channels 53, so that in the subsequent opening of the closing body 17 of the non-return valve 16 of the filling nozzle 9, fluid can flow from the filling nozzle 9 through the filling valve 11 into the spray can 6.

[0076] For purposes of the original disclosure, it is pointed out that all features, as they become clear to a person skilled in the art from the present description, the drawings and the claims, even if they have only been described concretely in connection with certain further features, can be combined both individually and in any associations with other features or groups of features disclosed here, unless this has been expressly excluded or technical circumstances make such combinations impossible or meaningless. Comprehensive, explicit presentation of all conceivable combinations of features is omitted here purely for the sake of brevity and readability of the description.

[0077] Although the invention has been presented and described in detail in the drawings and the foregoing description, this presentation and description are only provided as examples and are not intended as a restriction of the scope of protection, as defined by the claims. The invention is not limited to the embodiments that have been disclosed.

[0078] Modifications of the disclosed embodiments are obvious to a person skilled in the art from the drawings, the description and the appended claims. In the claims, the word “have” does not exclude other elements or steps, and the indefinite article “a” or “an” does not exclude a plurality. The mere fact that certain features are claimed in different claims does not exclude their combination. Reference symbols in the claims are not intended as a restriction of the scope of protection.

LIST OF REFERENCE SYMBOLS

[0079] 1 filling device
[0080] 2 metering cylinder
[0081] 3 metering piston
[0082] 4 suction line
[0083] 5 storage tank
[0084] 6, 6' spray can or dispensing container
[0085] 7 fluid
[0086] 8 filling line
[0087] 9, 9' filling nozzle
[0088] 10 base
[0089] 11 filling valve
[0090] 12 dispensing valve
[0091] 13 compressed air line
[0092] 14 inlet channel
[0093] 15, 15', 27 hollow cylindrical housing
[0094] 16 non-return valve
[0095] 17, 29 closing body
[0096] 18, 30, 31 helical spring
[0097] 19, 28, 38 O-ring seal
[0098] 20, 32 sealing surface
[0099] 21, 33 valve seat
[0100] 22, 36 actuating portion
[0101] 23 pin-shaped actuating element
[0102] 24 fluid outlet/outlet end
[0103] 31 O-ring
[0104] 34 internal space
[0105] 35 inlet side
[0106] 37 external surface
[0107] 39 riser
[0108] 40 annular gap
[0109] 41 inside wall
[0110] 42 annular actuating element
[0111] 50 vent pipe
[0112] 51 first end of vent pipe 50
[0113] 52 second end of vent pipe 50
[0114] 53 venting channel

1. Filling device (1) for filling a dispensing container with a fluid (7) with a filling nozzle (9), which has a non-return valve (16), the non-return valve (16) having an actuating portion (22, 36) for opening the non-return valve (16) by an actuating element (23, 42) of a filling valve (11) of the dispensing container (6), wherein

the filling nozzle (9) has an actuating element (23, 42) for opening the filling valve (11) of the dispensing container (6) on connecting the dispensing container (6) to the filling nozzle (9).

2. The filling device (1) as claimed in claim 1, wherein the actuating element (23, 42) of the filling nozzle (9) is a pin that can be engaged with an actuating portion (22, 36) of the filling valve (11).

3. The filling device (1) as claimed in claim 1 or 2, wherein the non-return valve (16) has a valve seat (21, 33), a closing body (17, 29), which is movable relative to the valve seat (21, 33) from a position closing the non-return valve (16) into a position opening the non-return valve (16), and a spring element, the spring element biasing the closing body (17, 29) into its position closing the non-return valve (16), the closing body (17, 29) having an actuating portion (22, 36), which can be engaged with the actuating element (23, 42) of the filling valve (11) of the dispensing container (6), so that the actuating element (23, 42) moves the closing body (17, 29) against the spring force of the spring element from the position closing the non-return valve (16) into the position opening the non-return valve (16).

4. The filling device (1) as claimed in claim 2, wherein the actuating portion (22, 36) of the filling nozzle (9) is a portion of the closing body (17, 29) of the non-return valve (16) forming a ring around the pin.
5. A combination of a refillable dispensing container (6) for a fluid (7) with a dispensing valve (12) for dispensing the fluid (7) and a filling valve (11) for filling the dispensing container (6) with the fluid (7) and a filling device (1) for filling the dispensing container (6) with the fluid (7) with a filling nozzle (9), which has a non-return valve (16), wherein the filling valve (11) of the dispensing container (6) and the filling nozzle (9) of the filling device (1) are arranged so that on connecting the filling valve (11) to the filling nozzle (9) first the filling valve (11) is opened by an actuating element (23, 42) of the filling nozzle (9), so that the dispensing container (6) undergoes pressure equalization, and then the non-return valve (16) of the filling nozzle (9) is opened by an actuating element (23, 42) of the filling valve (11).

6. The combination as claimed in claim 5, wherein the filling valve (11) has a valve seat (21, 33), a closing body (17, 29), which is movable relative to the valve seat (21, 33) from a position closing the filling valve (11) into a position opening the filling valve (11), and a spring element, the spring element biasing the closing body (17, 29) into its position closing the filling valve (11), the closing body (17, 29) having an actuating portion (22, 36), which can be engaged with the actuating element (23, 42) of the filling nozzle (9), so that the actuating element (23, 42) moves the closing body (17, 29) against the spring force of the spring element from the position closing the filling valve (11) into the position opening the filling valve (11).

7. The combination as claimed in claim 5 or 6, wherein the actuating element (23, 42) of the filling valve (11) is an annular portion of a valve housing (15, 27) of the filling valve (11).

8. The combination as claimed in any one of claims 5 through 6, wherein in the connected state the actuating element (23, 42) of the filling valve (11) and the actuating portion (22, 36) of the non-return valve (16) concentrically surround the actuating element (23, 42) of the filling nozzle (9) and the actuating portion (22, 36) of the non-return valve (16).

9. The combination as claimed in any one of claims 5 through 6, wherein the filling valve (11) and the filling nozzle (9) are arranged so that on connecting the filling valve (11) to the filling nozzle (9) after opening the filling valve (11) and before opening the non-return valve (16) of the filling nozzle (9), an annular sealing surface (20, 32) of the filling valve (11) and an annular sealing surface (20, 32) of the filling nozzle (9) come into sealing engagement with each other, so that a sealed fluid connection is provided between the filling nozzle (9) and the filling valve (11).

10. The combination as claimed in any one of claims 5 through 6, wherein the filling valve (11) has a substantially hollow cylindrical valve housing (15, 27) projecting relative to an external wall of the dispensing container (6), the closing body (17, 29) being arranged inside the valve housing (15, 27) and a sealing surface (20, 32) being provided on the outside of the valve housing (15, 27) for sealing engagement with the filling nozzle (9).

11. The combination as claimed in any one of claims 5 through 6, wherein the filling valve (11) has a sealing ring, which can be engaged with an annular sealing surface (20, 32) of the filling nozzle (9) so that a sealed fluid connection is provided between the filling nozzle (9) and the filling valve (11).

12. The combination as claimed in any one of claims 5 through 6, wherein the filling nozzle (9) has a bush, which can receive the hollow cylindrical valve housing (15, 27) of the filling valve (11).

13. The combination as claimed in claim 12, wherein the bush of the filling nozzle (9) and the hollow cylindrical valve housing (15, 27) of the filling valve (11) are dimensioned so that on connecting the filling valve (11) to the filling nozzle (9), after opening the filling valve (11) and before opening the non-return valve (16), an annular gap (40) is formed between the valve housing of the filling valve (11) and the bush of the filling nozzle (9), forming a fluid connection to the surroundings.

14. The combination as claimed in any one of claims 5 through 6, wherein a vent pipe (50) with a first and a second end (51, 52) is arranged in the dispensing container (6), the first end (51) of the vent pipe (50) being connected to the filling valve (11), so that a sealed fluid connection is provided from the filling valve (11) to the second end of the vent pipe (50).

15. The combination as claimed in any one of claims 5 through 6, wherein the bush of the filling nozzle (9) has at least one venting channel, which connects the interior space of the filling nozzle to the surroundings.