961,038

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvement in or relating to Inlet Valves for Liquefied Gas Lighters

We, LA NATIONALE S.A., a Company organised under the laws of Switzerland, of 2, Rue des Falaises, Geneva, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a valve which is an improvement in or modification of the valve described and claimed in our British Patent No. 784,357 and which is for use in filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel.

According to the present invention the improved valve comprises a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is formed with a longitudinal bore which constitutes a part of the inlet passage and with a part adapted to co-operate with the connecting piece of the filling vessel to connect the vessel with the inlet passage, and wherein the valve is so arranged that as it closes, the exhaust passage and the inlet passage are closed simultaneously.

The improved valve according to the present invention also comprises a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is not provided with a hollow needle or other tubular member which penetrates the connecting piece of the filling vessel during the filling operation, and is formed with a longitudinal bore which constitutes part of the inlet passage and the outer end of which is adapted to effect a free fluid-tight connection with the connecting piece of the filling vessel when applied thereto, and wherein the valve is so arranged that as it closes the exhaust passage closes at the earliest at the same time as the inlet passage.

Figures 1 and 2 of the accompanying drawing represent schematically and by way of example two embodiments of the valve of the present invention.

The valve shown in Figure 1 comprises a body 2 screwed into a threaded bore formed in the base 1 of the reservoir of a lighter. In the position shown in the drawing, the valve is closed but the connecting piece 3 of the filling vessel (not shown) is shown as inserted into the opening in the body 2. The latter comprises a circular internal shoulder 7, beneath which is formed a socket 8 for a sealing member 9, the outer face of which is held by a flange 10. This member 9 is cylindrical and in section four-sided and square-cornered.

The valve also includes a control member 11 which is movable axially in the body 1 and of which a part extends through the central passage in the sealing member 9 and is held elastically thereby. The control member 11 also comprises a head 12 projecting from the

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body 2 which is of larger diameter than the part passing through the member 9 and which is formed with a shoulder 13 located opposite the outer face of the member 9.

The control member 11 also carries a nut 14 provided with a circular projection 15 on which rests one end of a spring 16, the other end thereof bearing against the shoulder 7 of the body 2, this spring operating to press the shoulder 13 against the outer face of the sealing member 9 which forms its seat. As shown a free space is left between the projection 15 and the body 2.

The head 12 is provided with a circular groove 17 connected by a bore 18 to a passage 19 which opens on the exterior of the control member 11 in the space containing the spring 16.

The outer end of the control member 11 has a recess in which is located an annular sealing member 58 to ensure fluid-tightness between the connecting piece 3 of the filling vessel and the inlet passage of the valve which consists in part of an axial bore 20 leading to a radial bore 21. The latter leads to the exterior of that part of the control member 11 which is held resiliently by the sealing member 9. In this embodiment the opening of the bore 21 is located at such a distance from the outer face of the sealing member 9, when the valve is closed as shown, that when the control member is moved axially away from its closed position the circular shoulder 13 separates from the face of the sealing member 9 before the opening of the bore 21 is uncovered.

In this embodiment, the inlet passage for the admission of liquefied gas is formed by the bores 20 and 21 and the annular space existing between the member 9 and the shoulder 13 when the latter is moved away from its seat.

The exhaust passage is formed by the annular space between the sealing member 9 and the shoulder 13, when the latter is moved away from its seat, the circular groove 17, the bore 18, the passage 19 and the space in the body 2.

The cross-sections of the inlet and exhaust passages are so selected that the delivery of the inlet passage is smaller than that of the exhaust passage with the result that it is not possible to exceed the level of filling determined by the height in the reservoir of the opening of the exhaust passage.

This form of construction works as follows:

The valve being in the position shown in the drawing, to fill the reservoir 1, the connecting piece 3 of the filling vessel is placed in the central recess of the body of the valve and the filling vessel is moved to press the end of the connecting piece against the fluid-tight member 58 and to move the control member axially of the body against the spring so that the shoulder 13 of the head 12 separates from the outer face of the member 9. The interior of the reservoir 1 of the lighter is then connected to the atmosphere through the exhaust passage.

On continued movement of the control member 11, the opening of the bore 21 clears the sealing member 9 to open the inlet passage. The filling vessel has a valve, which is not shown, the opening of which may be effected, in a known manner, by the axial displacement of the connecting piece 3 in relation to the filling vessel. When this valve is opened, by the pressure exerted between the filling vessel and the lighter, filling takes place until the stage when the level of liquefied gas in the reservoir reaches the height of the shoulder 13. The liquefied gas then enters the groove 17 and the bore 18 and it flows along the passage 19 to the atmosphere. The arrangement ensures that there is a space free of liquefied gas in the reservoir 1 corresponding substantially to the height of the body 2 within the reservoir and the escape of the liquefied gas also informs the user that filling has been completed. It will be observed that the opening of the exhaust passage in the interior of the reservoir of the lighter is located at a point spaced from the wall of the reservoir 1 carrying the valve.

On withdrawing the connecting piece of the filling vessel, the spring 16 acts to move the control member 11 to the closed position, the control member operating first to close the inlet passage 20, 21 and then to close the exhaust passage 17, 18, 19.

Figure 2 shows another embodiment which is of simpler construction. In this arrangement the valve comprises a body 2 secured to a wall of the reservoir of a lighter and has a screw thread 23 into which is screwed a part 24 having a central bore, a sealing member 35 being clamped between the part 24 and the body 2.

In the bore of the part 24 slides, with clearance, a control member 25 which has a longitudinal bore 26 forming part of the inlet passage for liquefied gas. The bore 26 communicates at its base with a lateral bore 27 which is located above a head 28 which is of larger diameter than the main part of the control member 25. The head 28 carries a sealing member 29 which seats against the lower edge of the part 24.

The control member 25 is maintained in the position shown in Figure 2, which shows the valve in the closed position, by a spring 30, acting under compression and bearing, at one end, against the upper face of the part 24 and, on the other hand, against a split ring 31 which is engaged in a groove 32 in the upper end of the control member 25.

For effecting the filling of the lighter with liquefied gas, the connecting piece 3 of a filling vessel is applied against the conical end of the control member 25 and pressed against

it so as to cause it to slide against the action of the spring 30 to separate the sealing member 29 from its seat. Liquid gas can then penetrate through the inlet passage comprising the bores 26 and 27 into the interior of the reservoir, whilst a portion of the gas, contained in the gaseous state in the reservoir, can escape through the exhaust passage which comprises the clearance provided between the control member 25 and the part 24.

As in the preceding form of construction, when the liquefied gas in the reservoir reaches the level of the lower edge of the bore in the part 24, it passes through the exhaust passage to the atmosphere. The escape of liquefied gas thus warns the user that the reservoir of the lighter is full and that he should withdraw the filling vessel. The control member then resumes its closed position and simultaneously closes the inlet and exhaust passages.

In this second form of construction, the control member 25 may have a diameter corresponding with the bore of the part 24 so as to slide practically without clearance therein. In this case, the exhaust passage may be constituted, for example, by a longitudinal groove provided in the wall of the bore of the part 24, or along the outer cylindrical wall of the control member 25, or even through one or more bores arranged in such a manner as to form at least one flat on the cylindrical wall of the control member 25 which slides in the part 24.

It will be seen that in both embodiments the inlet and exhaust passages both lead through a large common opening into the interior of the reservoir when the valve is open.

This opening is formed by the free circular space between the shoulder 13 and the outer face of the sealing member 9 in the first embodiment and between the sealing member 29 and the lower edge of the bore of the part 24 in the second embodiment.

It will be understood that instead of being carried by the filling vessel, the connecting piece 3 could be joined to the vessel by a flexible passage. The connecting piece could also include the valve for closing the filling vessel.

WHAT WE CLAIM IS:—

1. A valve for filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel, comprising a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is formed with a longitudinal bore which constitutes a part of the inlet passage and with a part adapted to co-operate with the connecting piece of the filling vessel to connect the vessel with the inlet passage, and wherein the valve is so arranged that as it closes the exhaust passage and the inlet passage are closed simultaneously.

2. A filling valve as claimed in claim 1, wherein the valve is so arranged that as it opens the exhaust and inlet passages are opened simultaneously.

3. A valve for filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel, comprising a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is not provided with a hollow needle or other tubular member which penetrates the connecting piece of the filling vessel during the filling operation, and is formed with a longitudinal bore which constitutes part of the inlet passage and the outer end of which is adapted to effect a free fluid-tight connection with the connecting piece of the filling vessel when applied thereto, and wherein the valve is so arranged that as it closes the exhaust passage closes at the earliest at the same time as the inlet passage.

4. A filling valve as claimed in claim 3, wherein the valve is so arranged that as it opens the exhaust passage is opened at the latest at the same time as the inlet passage is opened.

5. A filling valve as claimed in any preceding claim, wherein the control member includes a head which extends beyond the end of the body and which in the closed position of the valve engages a seat on the end of the body.

6. A filling valve as claimed in claim 5, wherein the seat is constituted by an annular sealing member mounted on the body.

7. A filling valve as claimed in claim 5, wherein the control member also includes a part which is slidably mounted in a bore formed in the body.

it so as to cause it to slide against the action of the spring 30 to separate the sealing member 29 from its seat. Liquid gas can then penetrate through the inlet passage comprising the bores 26 and 27 into the interior of the reservoir, whilst a portion of the gas, contained in the gaseous state in the reservoir, can escape through the exhaust passage which comprises the clearance provided between the control member 25 and the part 24.

As in the preceding form of construction, when the liquefied gas in the reservoir reaches the level of the lower edge of the bore in the part 24, it passes through the exhaust passage to the atmosphere. The escape of liquefied gas thus warns the user that the reservoir of the lighter is full and that he should withdraw the filling vessel. The control member then resumes its closed position and simultaneously closes the inlet and exhaust passages.

In this second form of construction, the control member 25 may have a diameter corresponding with the bore of the part 24 so as to slide practically without clearance therein. In this case, the exhaust passage may be constituted, for example, by a longitudinal groove provided in the wall of the bore of the part 24, or along the outer cylindrical wall of the control member 25, or even through one or more bores arranged in such a manner as to form at least one flat on the cylindrical wall of the control member 25 which slides in the part 24.

It will be seen that in both embodiments the inlet and exhaust passages both lead through a large common opening into the interior of the reservoir when the valve is open.

This opening is formed by the free circular space between the shoulder 13 and the outer face of the sealing member 9 in the first embodiment and between the sealing member 29 and the lower edge of the bore of the part 24 in the second embodiment.

It will be understood that instead of being carried by the filling vessel, the connecting piece 3 could be joined to the vessel by a flexible passage. The connecting piece could also include the valve for closing the filling vessel.

WHAT WE CLAIM IS:—

1. A valve for filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel, comprising a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is formed with a longitudinal bore which constitutes a part of the inlet passage and with a part adapted to co-operate with the connecting piece of the filling vessel to connect the vessel with the inlet passage, and wherein the valve is so arranged that as it closes the exhaust passage and the inlet passage are closed simultaneously.

2. A filling valve as claimed in claim 1, wherein the valve is so arranged that as it opens the exhaust and inlet passages are opened simultaneously.

3. A valve for filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel, comprising a body, a control member mounted in the body and movable axially thereof to an open position against the action of a spring by the application of the connecting piece of the filling vessel thereto, said valve including an inlet passage for transmission of liquefied gas from the filling vessel to the reservoir and an exhaust passage for placing the reservoir in communication with the atmosphere, the opening of the exhaust passage in the interior of the reservoir when the valve is assembled thereon being located at a point spaced from the wall of the reservoir which carries the valve so as to provide after filling a space free of liquefied gas in the reservoir, wherein the control member is not provided with a hollow needle or other tubular member which penetrates the connecting piece of the filling vessel during the filling operation, and is formed with a longitudinal bore which constitutes part of the inlet passage and the outer end of which is adapted to effect a free fluid-tight connection with the connecting piece of the filling vessel when applied thereto, and wherein the valve is so arranged that as it closes the exhaust passage closes at the earliest at the same time as the inlet passage.

4. A filling valve as claimed in claim 3, wherein the valve is so arranged that as it opens the exhaust passage is opened at the latest at the same time as the inlet passage is opened.

5. A filling valve as claimed in any preceding claim, wherein the control member includes a head which extends beyond the end of the body and which in the closed position of the valve engages a seat on the end of the body.

6. A filling valve as claimed in claim 5, wherein the seat is constituted by an annular sealing member mounted on the body.

7. A filling valve as claimed in claim 5, wherein the control member also includes a part which is slidably mounted in a bore formed in the body.

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8. A filling valve as claimed in claim 7, wherein the exhaust passage is constituted in part by clearance between the said part of the control member and the wall of the bore in the body.

9. A filling valve as claimed in any of claims 5 to 8, wherein the inlet passage includes the longitudinal bore formed in the control member and a communicating lateral bore which opens to the exterior of the control member adjacent the head.

10. A valve for filling the reservoir of a gas lighter with liquefied gas supplied from a filling vessel, substantially as herein described with reference to Figure 1 or Figure 2 of the accompanying drawing.

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