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IMPROVED JET CLEANING MEANS

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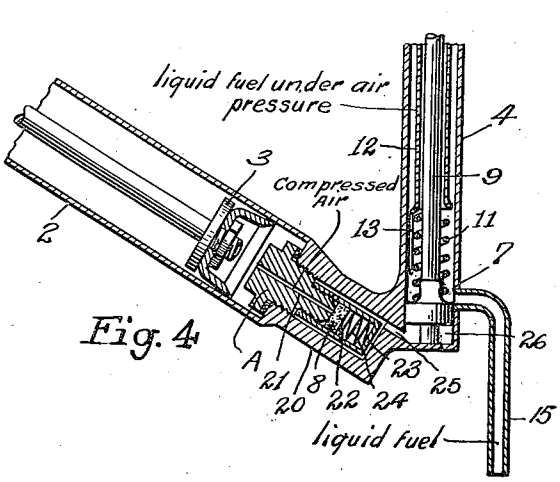


Fig. 4

Fig. 1

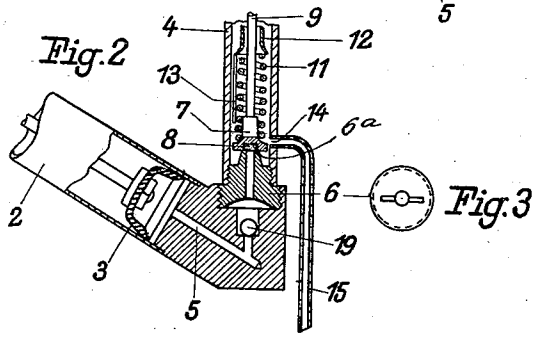


Fig. 2

Fig. 3

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IMPROVED JET CLEANING MEANS

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3 Claims. (Cl. 158—120)

This invention relates to an improved jet cleaning device for apparatus used for heating and lighting purposes and which apparatus are fed with liquid fuel under pressure, especially air under pressure. It has been found that such apparatus suffer from the serious disadvantage of the jet getting choked by small particles of dirt or residue in the fuel. In order to remove such dirt and provide a free passage for the fuel such apparatus are usually provided with mechanical cleaning devices of different constructions. A well-known cleaning device for such purpose comprises a rod arranged within a vaporiser, such rod having a needle at one end and a lever at the other for operating the said rod and consequently the needle. The lever which is operable externally, usually comprises a crank eccentrically arranged on the inner end of a shaft. Such constructions although workable are found defective in that the operator who starts working the apparatus frequently forgets to clean the jet, which is an important step at the time of lighting the apparatus. Another mistake which usually and easily occurs is that the operator in order not to forget cleaning, cleans the jet too early, that is, while the vaporiser is still cold, and before the vaporiser is preheated by the flame of the preheating device or means. Under such conditions, the cleaning needle, which is very fine, can be readily bent as there are in the cold jet hard tar-like deposits and such deposits only become soft after the jet is heated up. The needle is likely to bend, as the correct operation of the device always requires one or more manipulations.

Another disadvantage of existing constructions is that if the needle remains too long a time in the jet, the flame extinguishes or blows back into the mixing tube.

In addition to the aforesaid drawbacks it is not always possible to avoid frequent leakage of fuel at the stuffing boxes of the needle operating lever. It is therefore the object of this invention to avoid all the aforesaid defects occurring in the devices hertofore known.

In the lower part of the vaporiser tube there is provided a hole having a pipe fitted thereat which leads into the fuel container, the arrangement being such that when the piston is raised by the compressed air pumped by the pump and the piston goes beyond the said hole, then the compressed air through the said hole and pipe connected thereto enters the fuel container, when however the piston of the pump goes back then the spring causes the piston with washer to occupy the valve seat preventing thereby the escape of fuel or air already pumped. In order however to avoid any likelihood of fuel or air entering the pump the channel in the piece may be provided with an additional ball valve.

The invention will now be more fully described with reference to the accompanying drawing which illustrates the constructional features of our invention. In the drawing:

Fig. 1 shows the fuel container with the device according to this invention in section.

Fig. 2 shows a modified form of the device.

Fig. 3 shows in plan the valve seat.

Fig. 4 shows a further embodiment of the invention.

Referring to the drawing, 1 shows the oil container and 2 the pump built in the said container, the piston 3 being axially movable inside the pump cylinder. The lower part 4 of the vaporiser is connected with the pump 3 by a channel 5 which terminates at the valve seat part 6. The valve seat part 6 is connected with the lower part 4 of the vaporiser.

7 shows a piston having a washer 8 at its lower end, said piston being axially movable in the lower part 4 of the vaporiser. The piston 7 carries the needle rod 9, the latter having at its upper end the needle 10. The washer 8 by the aid of spring 11 acting on the piston 7 presses tightly on the valve seat 6a on the piece 6. The spring 11 is held at its upper end by a tube 12 which has an extension 13 for limiting the upward movement of piston 7. The lower part 4 of the vaporiser has a hole 14 from which a tube 15 extends downwards to the bottom of the container 1. By means of the nut 16 part 4 is connected to the upper part 17 of the vaporiser having the jet 18. It will thus be seen that according to this invention the pump 2, the valve seat 6a and lower part 4 of the vaporiser are all interconnected by a common piece which has at its inside a channel 5. The channel 5 within the piece may have a ball valve 19 as shown in Fig. 2.

Referring to Fig. 4, wherein is shown a modification of the invention, the lower end of the pump 2 containing the piston 3 is connected to the upper end of a member 20, which is machined to receive at its upper end a valve member A. This valve member A has a passage 21 extending axially therethrough and has associated with the lower end thereof a valve 22, usually consisting of cork. Surrounding the lower end of the valve A is a housing 23, perforated to permit passage of air through the sides

thereof and within such housing is placed a spring 24, which urges the valve 22 into association with the lower end of the valve member A. The member 20 is provided with a passage 25 connecting the valve member A with a chamber 26. Connected to or formed integral with the member 20 is the lower end of the vaporiser 4, having, as in the remaining figures, the needle rod 9 carrying the needle 10 at its top end and provided with a piston 7 at its lower end. As in Figs. 1 and 2, the lower end of the vaporiser 4 is provided with a hole 15 to which is connected the tube 15, extending to a point adjacent the lower end of the container 1. Located within the vaporiser 4, and at the lower end thereof, is the spring 11 which urges the piston 7 downwardly into a position to open the passage through the tube 15 into the vaporiser. The lower end of the spring engages, as is usual with the upper end of the piston 7, while the upper end of such spring 11 is engaged by a tube 12 located within the vaporiser 4, and such tube 12 has an extension 13 thereon for limiting the upward movement of the piston 7.

The operation of the device shown in Fig. 4 is identical with that of the devices shown in Fig. 1.

Referring to the operation of the device: when the piston 3 is operated, the compressed air flows through the channel 5 to the valve seat part 6, lifts the piston 7 thereby providing passage for the air towards hole 14. Thus the compressed air escapes through the hole 14, then through the tube 15 into the fuel container 1. When this happens the needle rod 9, as it is connected to the piston 7, is lifted up to the same amount as the piston 7 and the needle 10 therefore enters the jet 18. When however, the piston 3 of the pump goes back, the spring 11 forces down the washer 8 of the piston on the valve seat 6a and prevents the air already entered the container to escape from the valve seat 6a. The needle rod 9 and piston 7 may be detachably secured to each other.

In the case of a vertically arranged vaporiser the action of the spring in keeping the piston 7 on the valve seat 6A is aided by the weight of the piston and the needle rod, while in any other position the action of the spring 11 will be helped by the air pressure in the container. In this way several forces cooperate to secure the tight closing of the valve. If however by chance small quantities of fuel enter the valve seat 6a, or the channel 5 or even the pump cylinder, then the operation of the pump would not be affected. In order to prevent the fuel entering the pump the construction shown in Fig. 2 will be found useful in view of the provision of ball valve 19.

Generally speaking there is no difference in the function of the device, whether the means which transmit the pressure for the operation of the needle are liquid or gaseous.

It will be realised that in the device according to this invention everytime the apparatus is started the jet is cleaned thoroughly and automatically. Further during the operation of the apparatus when the pump is worked the jet will be also cleaned. Experience has however shown that every apparatus with a cleaning needle operated by hand directly or with a mechanical cleaning device is very seldom cleaned. Mostly it is cleaned only when it is too late, i. e., only when the carbon has so much accumulated in the jet that the efficiency of the lantern is reduced. In the improved device according to this invention neglect on the part of the operator is overcome as the operator must pump air from time to time thereby cleaning the jet automatically.

Further in the device according to this invention the jet is cleaned so often during the functioning of the apparatus that soot cannot accumulate in the jet. The needle also enters the jet softly or it is operated by air pressure and it stays for a very short time in the jet. The time required for cleaning the jet is very short and during the cleaning operation no perceptible effect is produced in the case of lantern on the luminosity of the incandescent mantle due to a temporary stoppage of fuel supply. The short period for cleaning does not permit the flame to create soot or extinguish.

Another advantage of the device is that due to the absence of any stuffing box the leakage of fuel or air is prevented. A further very important advantage of the construction is that the pump and the lower part of the vaporiser are rigidly connected to each other. In this way if the container is deformed by the compressed air in its inside, this deformation has no influence on the position of the vaporiser.

It will of course be understood that this invention applies to heating apparatus e. g. stove as well as to lighting apparatus i. e., the lantern.

We claim:

1. In liquid fuel combustion apparatus, the combination of container means for containing liquid fuel, jet means, hollow passage means connecting said jet means with said container means for affording flow of the liquid fuel from said container means to said jet means, needle means for cleaning said jet means disposed within said hollow passage means, said needle means having a pointed end disposed normally adjacent said jet means and further including a rod member disposed reciprocably within said hollow passage means, piston means controlling said rod member, air pump means extending into said container means for supplying air under pressure within said container means, fluid passage means connecting the discharge of said air pump means within a zone proximate said piston means, and resilient means biasing said rod member and said piston means toward the discharge opening of said hollow passage means, whereby upon actuation of said air pump means for supplying air under pressure within said container means in conjunction with said resilient biasing means said rod member is reciprocated within said hollow passage means affording movement of said needle means within said jet means to clean the same.

2. In liquid fuel combustion apparatus, as in claim 1, characterized by a tubular abutment for the resilient biasing means being disposed within the hollow passage means.

3. In liquid fuel combustion apparatus, as in claim 1, characterized by a movable valve member disposed between the discharge of the fluid passage means and the piston means.

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