Dec. 8, 1931. F. E. MACKEY 1,835,887

LIQUID GAS CONVERTER

Filed March 24, 1931

Fig. 1.

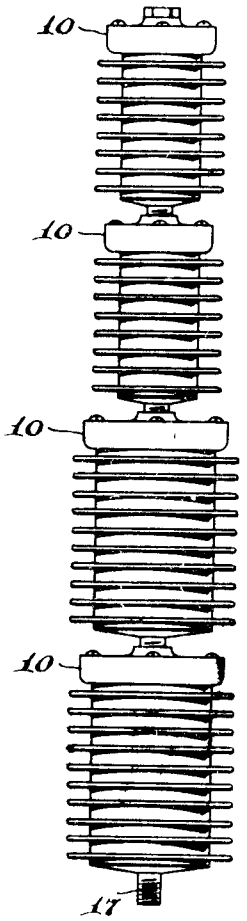


Fig. 2.

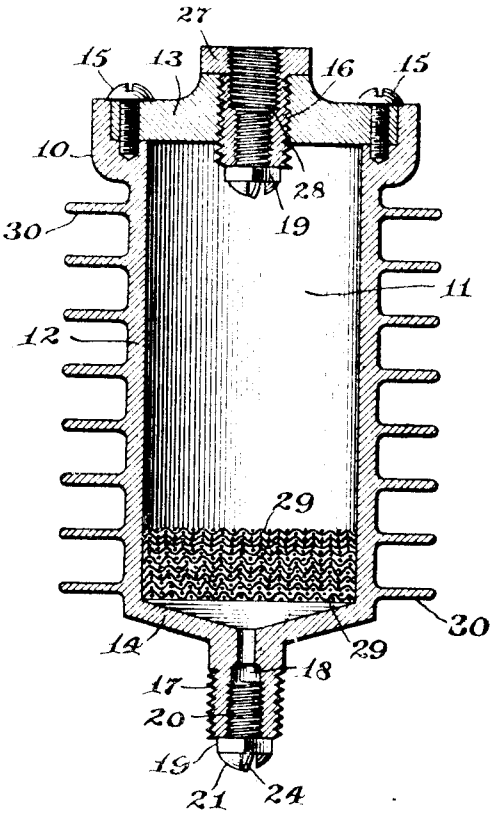


Fig. 4.

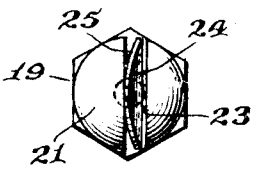
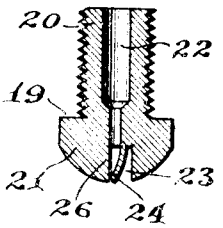


Fig. 3.



WITNESSES

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LIQUID GAS CONVERTER

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This invention relates to a device which is designed and adapted to convert a liquid gas into a dry gas (vapor), that may be used in any standard gas range, heater, laboratory apparatus, or other appliances made to burn natural or manufactured gas without any change in the burners thereof.

The conversion from the liquid gas to the dry gas (vapor) is accomplished by the simple, safe and efficient device hereinafter fully described and illustrated in the accompanying drawings, in which

Figure 1 is a side view of a plurality of interconnected units embodying the features of the invention;

Figure 2 is a central section through one of the units;

Figure 3 is a central section of an atomizer;

Figure 4 is an end view of the atomizer shown in Figure 3.

Referring now more particularly to the several views of the drawings, it will be apparent from Figure 1 that a plurality of substantially similar units 10 are utilized for the intended purpose. As shown most clearly in Figure 2, each unit 10 consists of a gas expansion chamber 11 which is formed by a side wall 12 and end walls or heads 13 and 14. The side wall 12 is cylindrical in the present instance. The end wall 13 is removable and is held in place on the side wall 12 by suitable fastening elements such as screws 15. The wall or head 14 is fixed or integral with the wall 12. The end wall or head 13 has a threaded bore 16 centrally thereof. The end wall or head 14 has a nipple 17 disposed centrally thereof. The nipple 17 has a discharge passage 18 therein which communicates with the chamber 11. The nipple 17 has connected therewith an atomizer 19. The atomizer 19 consists of a body having a threaded portion 20 and a head 21. A discharge passage 22 extends through the body of the atomizer and this passage consists of relatively large and small sections to act as a nozzle. The head 21 has a transverse slot 23. A deflector 24, which is preferably curved, is formed integral with the head and has a curved free edge 25. The deflector 24 is arranged in relation to the outlet end of the passage 22 and also in relation to the wall 26 of the slot 23 for a purpose to appear hereinafter. By reason of the threaded portion 20 the atomizer may be detachably connected with the nipple 17, with the passage 22 of the atomizer in communication with the passage 18 in the nipple 17.

In accordance with the invention a suitable number of units 10 may be connected together, and it is therefore to be understood that the nipple 17 of each unit will be screwed in the bore 16 of the head 13 forming a part of the unit to which connection is to be made, and so that all of the expansion chambers 11 of the units will be in communication with each other.

In accordance with the invention the expansion chambers 11 of the units used will increase in size or capacity starting from the inlet end of the converter to the outlet end thereof. The head 13 of the first expansion chamber 11 carries a plug 27 which is threaded in the bore 16. The plug 27 has a passage 28 which is tapped to accommodate a pipe leading from the high pressure regulator or reducing valve (not shown). The passage 28 of the plug has relatively large and small sections to act as a nozzle. The small section of the passage 28 is threaded to receive an atomizer 19.

The change from a liquid gas to a dry gas or vapor is accomplished as follows. The liquid gas from a supply tank is first passed through a regulator or reducing valve, referred to above, to reduce the tank pressure of the gas. The liquid gas then flows through the atomizer 19 of the first expansion chamber 11, where under the reduced pressure it partly expands. The gas then flows through the atomizer 19 at the bottom of the first expansion chamber into the second expansion chamber 11. The liquid gas leaves each expansion chamber 11 through the passages 18 and 22, respectively, in the nipple 17 and the atomizer 19. The deflector 24 of the atomizer flattens out the stream of liquid and forces or impinges it against the wall 26, causing the liquid to spread in the form of a fine mist, or, in other words, causes atomiza-

tion or vaporization of the liquid gas. It will therefore be understood that by means of a series of expansion chambers and atomizers, the liquid gas will be broken up in successive stages and will also be allowed to expand freely in successive stages until it is finally converted into a dry gas or vapor, which may be used for the purposes mentioned. The gas flows faster in proportion to the expansion and with a corresponding reduction in the pressure beginning with the first expansion chamber to the last chamber.

If desired, a suitable number of metal screens 29 may be placed in the bottom of each expansion chamber to pick up heavy or oily particles in the liquid gas which are later vaporized by the flow of gas.

If desired, the side wall 12 of each of the expansion chambers may be provided with fins 30 whereby to carry off coldness resulting from the rapid expansion of the gas and also to prevent frost from forming on the outside of the walls of the expansion chamber.

It is to be understood that each unit 10 may be of any size suitable for different gas requirements. For domestic use small units may be used, but for industrial purposes larger units may be used. It is also to be understood that where a large amount of gas is needed a comparatively large number of units will be used with relatively large nozzles to increase the capacity of the converter.

Claims:

1. A liquid gas converter comprising a plurality of intercommunicating gas expansion chambers which increase in size from the inlet end to the outlet end of the converter, and means between and in communication with the chambers to atomize the liquid as it flows from the first toward the last of said chambers.

2. A liquid gas converter comprising a plurality of intercommunicating gas expansion chambers, which increase in size from the inlet end to the outlet end of the converter, nozzles in communication with adjoining chambers, and means which co-operates with each nozzle to convert the liquid gas into a mist as it flows from one adjoining expansion chamber to the other.

3. A liquid gas converter comprising a plurality of intercommunicating gas expansion chambers which increase in size from the inlet end to the outlet end of the converter, means between and in communication with the chambers to atomize the liquid as it flows from the first toward the last of said chambers, and filtering means within each chamber adjacent the atomizing means.

4. A liquid gas converter comprising a plurality of intercommunicating gas expansion chambers, which increase in size from the inlet end to the outlet end of the converter, nozzles in communication with adjoining chambers, and a deflector arranged in relation to each nozzle to cooperate therewith, the provision and arrangement being such as to cause vaporization of the liquid as it flows from the inlet end toward the outlet end of the converter.

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