

[54] **APPARATUS FOR DISTRIBUTING GAS UNDER PRESSURE**

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[58] Field of Search 137/613, 608, 505.35, 505.41,
137/505.42, 505.29, 546, 171, 172

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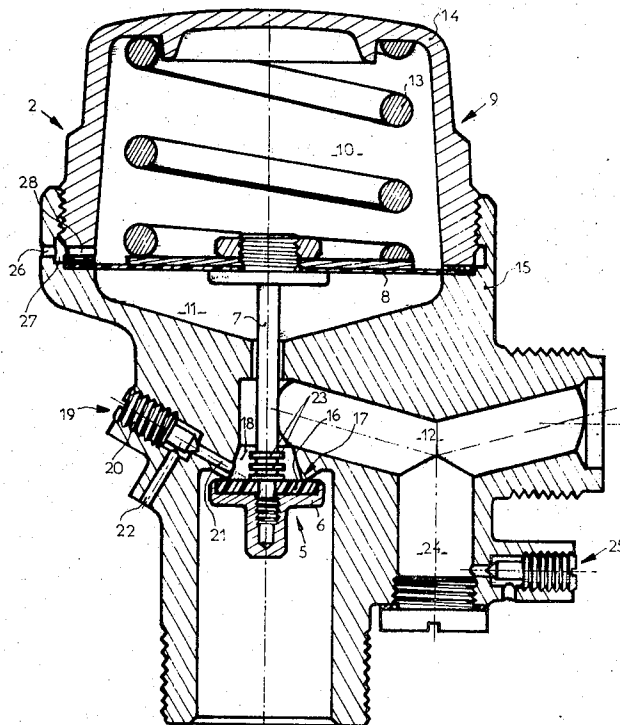
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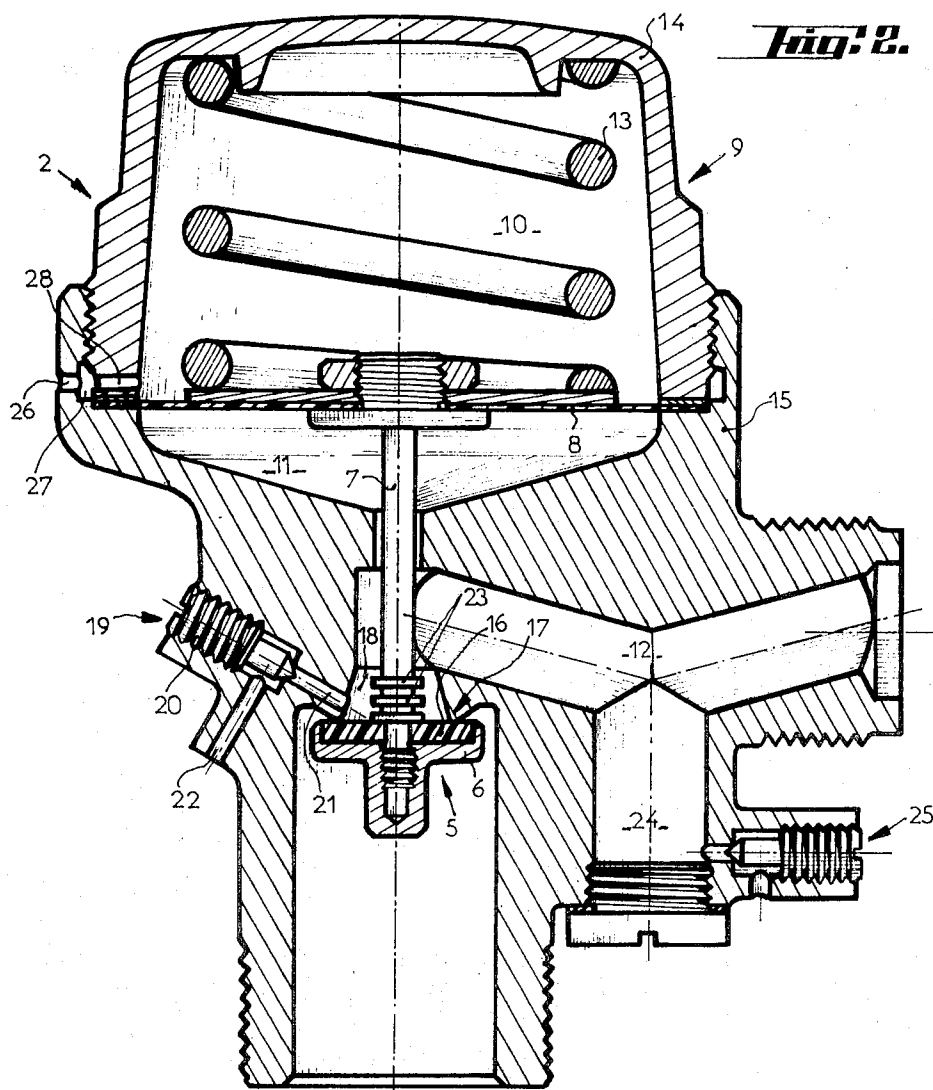
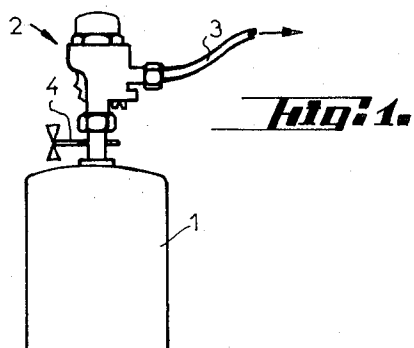
[57] **ABSTRACT**

Apparatus for distributing gas stored under pressure such as propane or butane.

The apparatus comprising, a pressure-reducing valve mounted between the source of said stored gas and the distributing network, a draining device is provided downstream of said pressure-reducing valve in proximity of the seat of said valve in view to permit positive elimination of the deposits tending to be formed at this level in the pressure-reducing device.

5 Claims, 2 Drawing Figures





APPARATUS FOR DISTRIBUTING GAS UNDER PRESSURE

The present invention has essentially for its object an apparatus for distributing gas under pressure, such as liquefied petroleum-gas, in particular of the C₃ or C₄ type, comprising a pressure-reducing valve so controlled by a manometric device as to be opened over its seat to a extent depending upon the distribution network demand. Such distribution devices are used, in particular, on the cylinders or bottles and the tanks for the storage of butane and propane intended to be supplied to a distribution network.

It is known that such apparatus are liable to failures or operating troubles due to the jamming of the pressure-reducing device and, in particular, the pressure-reducing valve, in open position or closed position. Such jammings may be caused in particular by the formation of solid or semi-solid deposits for example of ice, especially if the external temperature is low, or of gums. The formation of such solid deposits results usually from the presence of impurities in the stored gas, and also from deposits within the apparatus, for example fats and water.

The purpose of the invention is to avoid operating troubles due to the jamming of the pressure-reducing valve in such apparatus.

According to the invention, this purpose is achieved owing to the fact that in order to ensure positive elimination of deposits tending to adhere to or to form in the pressure-reducing device, the apparatus comprises at least one draining device which opens into the pressure-reducing chamber of the apparatus downstream of the pressure-reducing valve in proximity to the bearing surface of the said valve on its seat.

It is thus possible, for example during periodical maintenance inspections, to positively expel the deposits by carrying out a draining by means of the draining device owing to the pressure of the gas stored in the cylinders, bottles or tanks, irrespective of the momentary conditions of use or stop of the distribution network located downstream of the apparatus.

According to another feature of the apparatus of the invention, the rod which controls the pressure-reducing valve is provided, right above the valve, with protuberances such as ridges for the clinging of possible solid deposits such as ice plugs and the said pressure-reducing chamber is substantially in the shape of a truncated cone growing narrower starting from the valve seat. Thus, if there is formed a considerable solid deposit such as, in particular, an ice plug which would normally tend to completely obturate the pressure-reducing chamber, the apparatus can continue to operate owing to the truncated-cone shape of the chamber. Indeed, since the solid deposit is anchored by the protuberances of the control rod of the pressure-reducing valve, when the valve opens as a result of network demand, the cone-shaped plug moves apart from the corresponding cone-shaped wall of the pressure-reducing chamber, thus allowing the gas to pass and the pressure-reducing valve to operate.

The invention will appear more clearly from the following description made with reference to the appended drawings illustrating, by way of example, one form of embodiment of the invention. In the said drawings :

FIG. 1 is a general view of an apparatus according to the invention, mounted on a container of gas under pressure intended to be supplied to a distribution network, and,

FIG. 2 is a sectional view, to a larger scale, of the apparatus shown in FIG. 1.

Reference is first made to FIG. 1 showing a container 1 on which is mounted a distributing apparatus 2 according to the invention, permitting the distribution of gas under working pressure to a distribution network 3. At 4 is diagrammatically shown a stop valve mounted on the container 1.

As seen more clearly in FIG. 2, the apparatus 2 according to the invention comprises a pressure-reducing device 5 constituted by a pressure-reducing valve 6 mounted at the end of a rod 7 for the control of the valve. The other end of the rod 7 is assembled to a membrane 8 of a manometric control device 9 comprising a chamber 10 communicating with the atmosphere and a chamber 11 communicating with the conduit 12 connecting the apparatus to the distribution network 3. A spring 13 is mounted in the chamber 10 under the cap 14 screwed to the body 15 of the apparatus. The spring 13 serves to balance the pressure force applied in the chamber 11 by the pressure of the gas distributed to the network.

The operation of such a pressure-reducing device is well known. The combined action of the gas pressure at the inlet of the distribution network acting upon the membrane 8 and of the opposed force of the spring 13 controls the extent of opening of the valve 6, which thus allows more or less gas to pass into the distribution network according to demand. Pressure reduction takes place as a result of lamination between the seal 16 of the pressure-reducing valve and the seat 17.

According to the invention, a draining device 19 provided at the level of the pressure-reducing valve 6 opens into the pressure-reducing chamber 18 downstream of the valve 6 and in proximity to the bearing surface of the said valve on its seat. In the example illustrated, the draining device 19 comprises a needle screw 20 normally closing a channel 21 which opens, on the one hand, into the chamber 18 in immediate proximity to the bearing surface of the seal 16 on the seat 17 and, on the other hand, through the medium of a bore 22, outside the body 15 of the apparatus. Thus, for example during periodical inspections, it is possible to positively eliminate the deposits which might have tended to form in the chamber 18 in proximity to the pressure-reducing valve and to disturb its operation, by performing a simple draining of the apparatus. It should be noted in this connection that the draining operation can be performed irrespective of whether the apparatus is simultaneously used or not to supply the distribution network 3, since the distribution is not disturbed.

According to another feature of the invention, the pressure-reducing chamber 18 is in the shape of a truncated cone, the section of which grows narrower starting from the seat 17 of the valve. Also, the rod 7 is provided with protruding ridges 23. Thus, any solid deposit tending to form in the chamber 18, such as for example an ice plug, clings and adheres automatically to the rod 7. Therefore, the said deposit cannot close the passage. Indeed, when there is a demand in the network, the control device pushes the valve 6 downwards, thus separating it from its seat and simultaneously unsticking

from the chamber 18 the solid plug adhering to the protuberances 23 of the rod 7.

Also to be noted is the specific shape of the conduit 12 of the apparatus, leading to the distribution network, in which is provided a lower portion 24 with a bleeder 25. Thus, most of the liquids or condensates which may appear during the operation of the apparatus will be entrained towards the lower portion 24 and readily eliminated by means of the bleeder 25.

According to another feature of the apparatus of the invention, the atmospheric chamber 10 of the manometric control device communicates with the atmosphere through one or several orifices 26 formed in the screwing wall of the body 15 which receives the cap 14, the said apertures opening into an annular groove 27 formed instead of the last thread ridge of the cap 14 screwed on the body 15, the said groove 27 communicating with one or several orifices 28 formed in the cap 14 at the base of the said cap. Thus, any water condensation of atmospheric origin tending to form in the chamber 10 is automatically discharged outside through the passages 26, 27, 28 formed at the lower portion of the chamber 10 substantially at the level of the membrane 8. Therefore, there is no risk of the said condensations disturbing the operation of the manometric control device, even in case of freezing.

Of course, the invention is by no means limited to the form of embodiment described and illustrated, which has been given by way of example only. In particular, the positive draining device of the invention can be applied to other apparatuses, for example of the stop-cock and pressure-reducing device type described in the patent application filed this same day by the same applicant and entitled "Stop-cock and pressure-reducing device unit for a liquefied-gas reservoir."

The invention therefore comprises all technical equivalents of the means described as well as their combinations should the latter be carried out according to the spirit of the invention.

What is claimed is :

1. Apparatus for distributing gas stored under pressure, such as petroleum liquefied-gas, in particular of the type containing 3 or 4 carbon atoms in a molecule,

comprising a pressure-reducing device constituted essentially by a pressure-reducing valve having a pressure-reducing chamber, a seat formed in said chamber, a valve rod with a head having a seal bearing against said seat, control means for controlling the extent of opening of said seal relative to said seat, an inlet conduit connecting the source of said stored gas to one side of said pressure-reducing valve and an outlet conduit connecting said chamber on the other side of said pressure-reducing valve to the distributing network, said apparatus furthermore comprising at least one draining device opening into said pressure-reducing chamber downstream of said seat of the pressure-reducing valve in proximity to the bearing surface of said seal on its seat.

2. Apparatus according to claim 1, wherein the outlet conduit connecting the apparatus to the network includes a lower portion in which is provided a bleeder.

3. Apparatus according to claim 1, wherein said control means of said valve comprise a control rod provided, right above the seal of said valve, with protuberances such as ridges and the said pressure-reducing chamber is substantially in the shape of a truncated cone growing narrower starting from the seat of the pressure-reducing valve.

4. Apparatus according to claim 1, wherein said control means of said valve comprise a manometric control device comprising an atmospheric chamber provided with at least one orifice communicating with the atmosphere and which is formed at a low point substantially at the level of the membrane of the said manometric device.

5. Apparatus according to claim 4, wherein the atmospheric chamber of the manometric control device communicates with the atmosphere through at least one orifice formed in the wall of the body of the apparatus and opening into a groove made all around the said chamber by cutting off the last turn of the thread by which the cap of the manometric device is screwed on its body, the said groove communicating with at least one orifice formed in the said cap at the same level.

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