June 26, 1951 J. C. RAMSEY ET AL 2,558,462

DEHYDRATOR

Filed Oct. 21, 1949

Fig. 1.

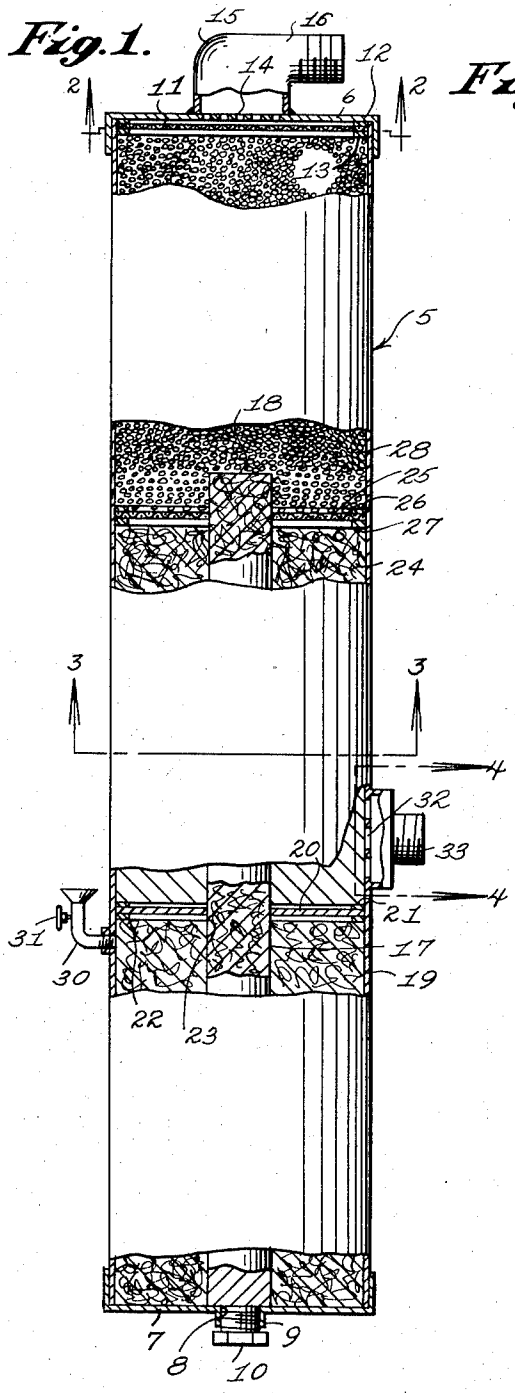


Fig. 2.

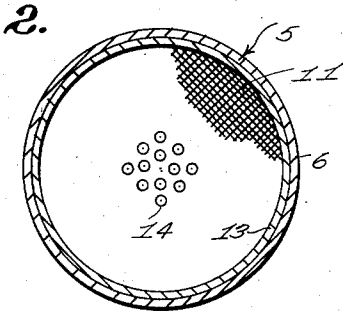


Fig. 3.

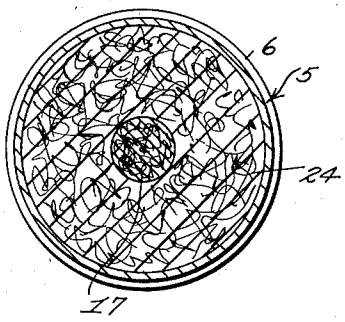
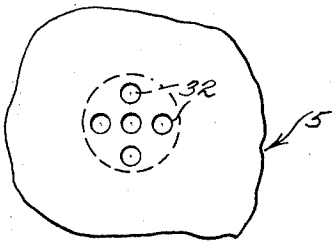


Fig. 4.



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DEHYDRATOR

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5 Claims. (Cl. 210—134)

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This invention relates to improved apparatus for dehydrating liquids and gases flowing therethrough, the primary object of the invention being to provide a device of this kind which removes moisture from liquids and gases passed therethrough in a manner to prevent freezing of such moisture which would otherwise take place, as in a refrigeration or gas supply system.

Another important object of the invention is the provision of an efficient and serviceable device of the above indicated character which is simple and inexpensive in construction and can be employed in upright and horizontal positions.

A further important object of the invention is the provision of a device of the character indicated above which mixes anti-freeze liquid with the moisture removed from the fluid passed through the device whereby freezing of the removed moisture in the device and in the fluid of the system in which the device is incorporated, is precluded.

Other important objects and advantageous features of our invention will be apparent from the following description and the accompanying drawings, wherein, merely for illustrative purposes, a specific embodiment of the invention is set forth in detail.

In the drawings:

Figure 1 is a side elevation with portions broken away to expose interior structure.

Figures 2 and 3 are horizontal sections taken on the lines 2—2 and 3—3, respectively, of Figure 1, and,

Figure 4 is a fragmentary transverse vertical section taken on the line 4—4 of Figure 1.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the numeral 5 generally designates the plain cylindrical tubular casing of the illustrated device, which in practice may have a diameter of about two inches and a length of from 12 to 14 inches, or a length about six or seven times the diameter thereof. The casing or cylinder 5 is of rust resistant, non-corrosive metal or other material, with its upper and lower ends closed by brass or other suitable material caps 6 and 7, respectively, seal welded in place.

The lower cap 7 has a center opening 8 from which a threaded collar 9 depends which is normally closed by a drain plug 10. The upper cap 6 retains in the top of the cylinder a fine mesh circular screen 11 whose edges are retained by upper and lower steel rings 12 and 13. The upper cap 6 is formed centrally with a circular group of holes 14 opening therethrough and communicating with the bell 15 of an elbow type outlet adapter 16 welded on the cap 6.

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A cotton or similar material cylindrical wick 17 is positioned axially in the casing 5 with its lower end resting upon the lower cap 7 and with its upper end 18 rising slightly above two-thirds of the height of the casing.

The lower half of the wick 17 is surrounded by a cotton packing 19 filling the space between the wick 17 and the sidewall of the casing, the upper end of the packing 19 rising to one-third of the height of the casing 5 and being surmounted by a solid aluminum washer or separator 20 supported at its upper end edges by steel rings 21 and 22 and formed with a center hole 23 fitting the wick 17.

Filling the space in the cylinder 5 around the wick 17 for another third of the height of the casing is the body 24 of aluminum wool, which is surmounted by a fine mesh screen 25 supported at its edges by upper and lower steel rings 26 and 27.

The upper end 18 of the wick 17 projects slightly above the screen 25 and into the lower part of a body 28 of pea-size gravel or the like, which fills the cylinder space between the screen 25 and the screen 11.

The side of the cylinder 5 is fitted with a bowl type valved fitting 30 which opens into the interior of the cylinder below the separator 20 and at the upper end of the cotton packing 19 and is provided with a handle 31 for opening and closing the fitting. The fitting 30 enables introducing into the lower part of the cylinder an amount of alcohol or other suitable anti-freeze liquid sufficient to saturate the packing 19 and the wick 17, the alcohol preferably not being introduced until the device is to be installed. When the device is installed in a system not requiring the presence of the alcohol, the alcohol is not used in the device, and the device can then be installed in either an upright or a horizontal position. In introducing alcohol the gas or liquid pressure of the associated system must be shut off.

Immediately above the partition 20 the sidewall of the casing 5 is formed with a group of inlet holes 32 therethrough and an inlet flare adapter 33 is welded in place around the holes 32.

The device is adapted to be installed in the associated system (not shown) by connecting the same in a conduit thereof with the inlet adapter 33 connected to receive fluid under pressure from the conduit and the outlet adapter 16 connected to return the dehydrated fluid to the system. The device is adaptable to dehydrate the liquid

of such as a refrigeration system or the gas of such as a liquid petroleum or similar gas system, and in either case provides for free flow of the fluid even in the coldest weather. As the fluid to be dehydrated fills the cylinder above the partition **20** moisture present in the fluid is stripped therefrom by the aluminum wool **24** and alcohol supplied by the wick **17** mixes with the stripped moisture. On further upward travel of the fluid sediment therein is retained by and below the lower screen **25** through which the fluid passes into the gravel **28**. The gravel further strips the fluid of any remaining moisture and baffles the moisture from reaching the outlet adapter **16**. Any further sediment remaining in the dehydrated fluid is retained by the upper screen through which the fluid passes to the outlet adapter **16**. Any traces of moisture remaining in the fluid passing into the outlet adapter is a non-freezable mixture or solution of the moisture and the alcohol.

We claim:

1. In a dehydrator for fluid under pressure, a vertically elongated cylindrical casing having closed upper and lower ends, a fluid outlet on said upper end, a wick rising vertically in said casing from the lower end of the casing, said wick having its upper end spaced at a substantial distance below the upper end of said casing, an absorbent body in the lower part of the casing and rising part way up the interior of the casing, said absorbent body filling the space between a lower part of the wick and the sidewall of the casing and being in contact with the wick, an imperforate separator surrounding said wick above said absorbent body and isolating said absorbent body from the remainder of the interior of the casing except through said wick, means traversing the casing sidewall and opening into the interior thereof at a point below said imperforate separator for supplying said absorbent body with dehydrating fluid, a stripping body rising part way up the interior of the casing from said imperforate separator and occupying the space between said wick and the casing sidewall and being in contact with the wick, a sediment screen separator fixed across the interior of the casing at the upper end of said first stripping body, the upper end of said wick rising only slightly above said sediment screen separator, a baffling body occupying the space in said casing between said sediment screen separator and the upper end of the casing and being in contact with the upper end of the wick, a sediment screen at the upper end of said baffling body, and an inlet traversing the sidewall of the casing and opening into the interior of the casing at a point between said imperforate separator and said first sediment screen separator whereby the fluid to be dehydrated enters the casing through said stripping body and is dehydrated by passing upwardly toward said fluid outlet through said stripping body and said baffling body in contact with dehydrating fluid supplied thereto by said wick.

2. A dehydrator for fluid under pressure comprising an axially elongated cylindrical casing having closed ends, an outlet adapter on one of said ends for discharging dehydrated fluid from said casing, a wick arranged axially in said casing and spaced from the sidewall thereof, said wick reaching inwardly from the other of said ends into substantially spaced relation to the said one end of casing, an absorbent body, surrounding said wick and filling the space between said wick and the casing sidewall adjacent said other casing end, an imperforate separator surrounding said wick and extending across the space between said casing sidewall and said wick at the inward end of said absorbent body, stripping body of metallic wool surrounding said wick and reaching inwardly from said imperforate separator to a point adjacent to the inward end of the wick, a baffling body of solid comminuted moisture baffling material filling the space in said casing between the inward end of said stripping body and the said one end of casing and in contact with the inward end of said wick, a first sediment screen extending across said casing between said stripping body and said baffling body, a second sediment screen extending across said casing between said baffling body and the said one end of said cylinder, a fluid inlet adapter traversing the sidewall of said casing at a point between said imperforate partition and said first screen whereby the fluid to be dehydrated is passed into the casing through said stripping body, and a quantity of anti-freeze liquid saturating said absorbent body and said wick whereby anti-freeze liquid is mixed with moisture present in the fluid as said fluid passes toward said outlet adapter, and whereby excess mixture of moisture and anti-freeze liquid is stripped and baffled from the fluid before the fluid reaches said outlet adapter.

3. A dehydrator for fluid under pressure comprising an axially elongated cylindrical casing having closed ends, an outlet adapter on one of said ends for discharging dehydrated fluid from said casing, a wick arranged axially in said casing and spaced from the sidewall thereof, said wick reaching inwardly from the other of said ends into substantially spaced relation to the said one end of the casing, an absorbent body, surrounding said wick and filling the space between said wick and the casing sidewall adjacent said other casing end, an imperforate separator surrounding said wick extending across the space between said casing sidewall and said wick at the inward end of said absorbent body, a stripping body of metallic wool surrounding said wick and reaching inwardly from said imperforate separator to a point adjacent to the inward end of the wick, a baffling body of solid comminuted moisture baffling material filling the space in said casing between the inward end of said stripping body and the said one end of the casing and in contact with the inward end of said wick, a first sediment screen extending across said casing between said stripping body and said baffling body, a second sediment screen extending across said casing between said baffling body and the said one end of said cylinder, and a fluid inlet adapter traversing the sidewall of said casing at a point between said imperforate partition and said first screen whereby the fluid to be dehydrated is passed into the casing through said stripping body, said metallic wool consisting of aluminum wool.

4. A dehydrator for fluid under pressure comprising an axially elongated cylindrical casing having closed ends, an outlet adapter on one of said ends for discharging dehydrated fluid from said casing, a wick arranged axially in said casing and spaced from the sidewall thereof, said wick reaching inwardly from the other of said ends into substantially spaced relation to the said one end of the casing, an absorbent body, surrounding said wick and filling the space between said wick and the casing sidewall adjacent said other casing end, an imperforate separator

surrounding said wick and extending across the space between said casing sidewall and said wick at the inward end of said absorbent body, a stripping body of metallic wool surrounding said wick and reaching inwardly from said imperforate separator to a point adjacent to the inward end of the wick, a baffling body of solid comminuted moisture baffling material filling the space in said casing between the inward end of said stripping body and the said one end of the casing and in contact with the inward end of said wick, a first sediment screen extending across said casing between said stripping body and said baffling body, a second sediment screen extending across said casing between said baffling body and the said one end of said cylinder, and a fluid inlet adapter traversing the sidewall of said casing at a point between said imperforate partition and said first screen whereby the fluid to be dehydrated is passed into the casing through said stripping body, said comminuted moisture baffling material consisting of gravel.

5. A dehydrator for fluid under pressure comprising an axially elongated cylindrical casing having closed ends, an outlet adapter on one of said ends for discharging dehydrated fluid from said casing, a wick arranged axially in said casing and spaced from the sidewall thereof, said wick reaching inwardly from the other of said ends into substantially spaced relation to the said one end of the casing, an absorbent body, surrounding said wick and filling the space between said wick and the casing sidewall adjacent said other casing end, an imperforate separator surrounding said wick and extending

across the space between said casing sidewall and said wick at the inward end of said absorbent body, a stripping body of metallic wool surrounding said wick and reaching inwardly from said imperforate separator to a point adjacent to the inward end of the wick, a baffling body of solid comminuted moisture baffling material filling the space in said casing between the inward end of said stripping body and the said one end of the casing and in contact with the inward end of said wick, a first sediment screen extending across said casing between said stripping body and said baffling body, a second sediment screen extending across said casing between said baffling body and the said one end of said cylinder, and a fluid inlet adapter traversing the sidewall of said casing at a point between said imperforate partition and said first screen whereby the fluid to be dehydrated is passed into the casing through said stripping body, said absorbent body consisting of cotton.

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