

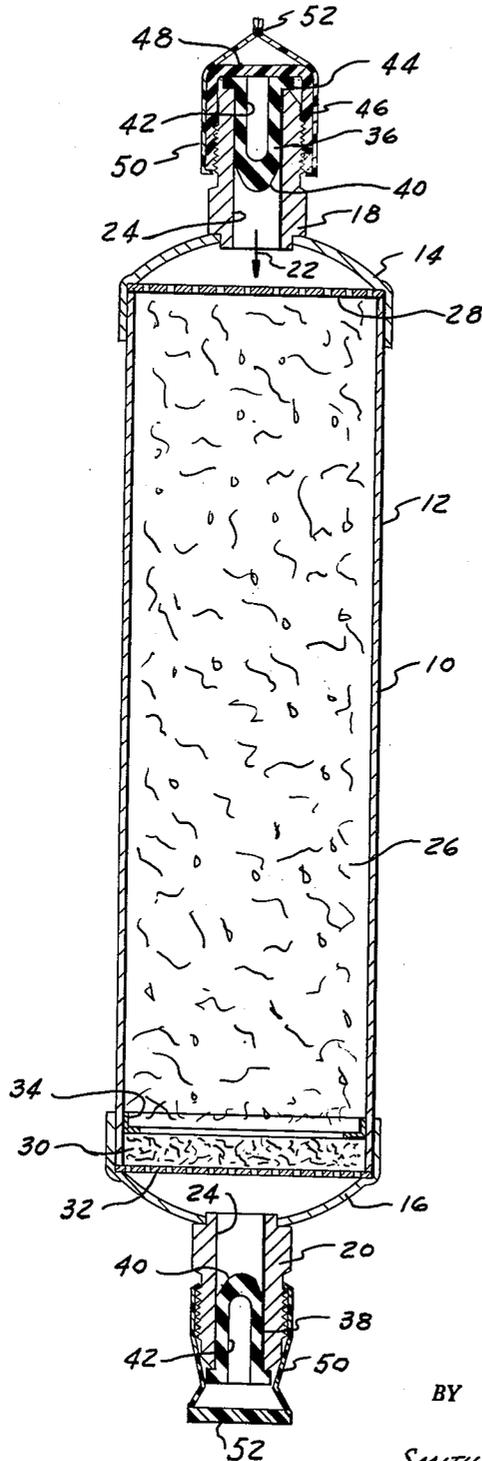
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DRIER

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2,987,175  
DRIER

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This invention relates to driers useful in refrigerant lines for removing moisture accumulations before they can freeze so as to block the flow of refrigerant.

Driers of the present type employ silica gel or other dehydrating material, and it is desirable that the dehydrating material be free of moisture at the time the drier is installed in the refrigerant line. Often a considerable time period elapses after manufacture of the drier and before its installation into a refrigerant line. During this "storage" period the dehydrating material in conventional types of driers takes moisture out of the atmosphere so as to reduce its effective "drying capacity" when installed in the refrigerant line.

Objects of the present invention are to provide a drier wherein:

(1) gas under superatmospheric pressure is sealed into the drier at the time of its manufacture so as to establish a pressure relationship with respect to the exterior atmosphere so that entrance of any moisture into the drier during its storage period is prevented;

(2) the superatmospheric pressure condition is established by means of a hollow needle (connected to suitable source of high pressure gas) in such manner that the needle is inserted through a resilient sealing plug carried by the drier, thereby enabling easy and quick introduction of the pressurized gas with inexpensive equipment, and permitting the resilient plug to instantaneously seal the drier after withdrawal of the needle without any loss of pressure;

(3) the rubber sealing plug is provided with a compressible flange portion which is adapted to be squeezed against the drier fitting by a cap so as to enhance the sealing action over long periods of time and thereby provide a "fresh" drier at the time of installation into the refrigerant line;

(4) the resilient sealing plug and cap are capable of low cost formation, easy and quick installation on the drier, and quick removal by persons installing the drier in the refrigerant line.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

The single figure is a cross sectional view through a drier forming one embodiment of the invention.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown one embodiment of the invention, including a metal housing 10 formed by a tubular casing 12, and end walls 14 and 16. Annular fittings 18 and 20 are secured to the end walls to provide passages 24 for the flow of refrigerant into and out of the housing in the arrow 22 direction.

Silica gel or other suitable dehydrating material 26 is contained within housing 10 between foraminous plate 28 and filter disk 30, which may be felt, sintered glass

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fibers or similar material. Disk 30 is retained within the housing by means of a foraminous plate 32 and ring element 34.

In order that the dehydrating material may retain its initial drying characteristics at the time it is installed in a refrigerant line, the drier (at the time of its manufacture) is charged with air, CO<sub>2</sub>, nitrogen, a refrigerant, or an inert gas under relatively high superatmospheric pressure (as for example twenty-five pounds). The charging material is treated to have a low moisture content which may range from as low as minus 70° F. dewpoint to a dewpoint below minus 250° F. The optimum condition is to provide the lowest possible moisture content within practical production limits and costs.

To charge and seal the gas into the drier there are provided two resilient plugs 36 and 38 preferably formed of rubber or a resilient plastic material and having slightly greater diameters than the diameters of passages 24. Each of the resilient plugs is provided with a "bullet" nose portion 40 and bore portion 42; as a result, when the plug is positioned with its bore portion 42 on the shank of a manually actuable tool (not shown) the plug can be easily forced into passage 24 without buckling or otherwise sticking before reaching its illustrated position. Each of the plugs is provided with an annular flange 44 which engages against the outer end of the fitting (18 or 20).

In charging the drier with gas a hollow needle (not shown) is connected to a suitable source of pressurized gas and inserted through one of the plugs so as to discharge the gas into the space within housing 10. When the gas pressure reaches the desired value the needle is withdrawn, and the resilient plug immediately seals the puncture against the escape of the gas from the housing.

When the drier is to be stored for a fairly long period of time before its installation into a refrigerant line the seal provided by the resilient plugs is sometimes not sufficient to maintain the gas pressure and prevent the introduction of moisture into the drier housing. To maintain the gas pressure over long periods of time there is here shown in association with fitting 18 one embodiment of the present invention which utilizes an internally threaded plastic cap 46 which is provided with an end wall 48. When cap 46 is screwed down on the external threads provided on fitting 18 pressures are exerted by the cap end wall 48 against flange 44 so as to squeeze it against the end of the fitting in such manner as to provide a second seal. If desired, an unthreaded fitting in the form of a tube may be utilized in place of the threaded fitting 18. This construction frequently is utilized when it is desired to make a soldered or brazed connection between the drier and the refrigerant lines. In this instance a tightly fitted unthreaded cap is provided. Such a cap may be a plastic cap which is shrunk fitted in place by any of several well known methods.

In either case this second seal which is thus provided, cooperates with the seal between passage 24 and plug 36 to maintain the internal gas pressure inside the drier until installation of the drier in a refrigerant line. As an added precaution however there may be provided a cylindrical "shrink on" collar 50 which is formed of a plastic material having the ability to shrink when being dried. Collar 50 is installed over cap 46 in a moist condition and dried while on the cap. As it dries it contracts so as to tightly and sealingly grip cap 46. The outer open end portions 52 of collar 50 are sealed together so as to close that end of the collar.

Either the inlet fitting or the outlet fitting may be provided with the sealing construction shown in association with fitting 18. However in some cases cap 46 may be omitted, and collar 50 "shrunk" directly onto

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the outer surface of the fitting as shown for example in connection with fitting 20.

When it is desired to install the drier in a refrigerant line collar 50 may be cut through with a knife and easily "peeled off" the fitting or cap in one piece, and cap 46 may be manually removed from the fitting (18 or 20). Thereafter the flange 44 of each rubber plug may be manually gripped to remove the plug from passage 24. As the plug is removed from passage 24 there is an audible sound denoting the escape of the high pressure gas from the housing. This sound enables the installer to be certain that he has a "fresh" drier and one which does not leak.

I claim:

1. A drier for refrigerant lines comprising a casing, fittings secured to said casing and providing passages for fluid flow through the casing, dehydrating material within the casing, removable, imperforate, resilient plugs sealingly positioned in said passages, at least one of said plugs having a bore extending from its outer end partly through said plug to facilitate insertion of the plug into its fitting and permitting a hollow needle to be inserted therethrough for the introduction of gas into the casing, sealing members telescoped over the fittings, and gas under superatmospheric pressure within the casing establishing a pressure relationship with respect to the exterior atmosphere to prevent the entrance of moisture into the drier, said gas constituting a signal and producing an audible sound when released from the casing to indicate that there has been no leakage of said gas during storage of the drier.

2. A drier for refrigerant lines comprising a casing,

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annular fittings secured to said casing and providing passages for fluid flow through the casing, dehydrating material within the casing, removable, imperforate resilient plugs sealingly positioned in said passages, at least one of said plugs having outwardly radiating flange portions engaged with the external end of its fitting, said last mentioned plug having a bore extending from its flanged end partly through said plug to facilitate insertion of the plug into its fitting and permitting a hollow needle to be inserted therethrough for the introduction of gas into the casing, a sealing member telescoped over one of said fittings, a cap telescoped over the other fitting having the plug with the bore, said cap having an end wall pressuringly engaging the plug flange portions, and gas under superatmospheric pressure within the casing establishing a pressure relationship with respect to the exterior atmosphere to prevent the entrance of moisture into the drier, said gas constituting a signal and producing an audible sound when released from the casing to indicate that there has been no leakage of said gas during storage of the drier.

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