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ACCUMULATOR DRIER FOR REFRIGERATING APPARATUS

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FIG. 1.

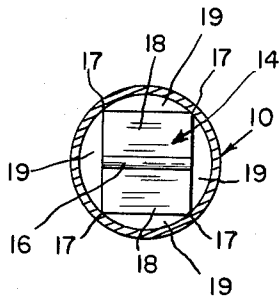
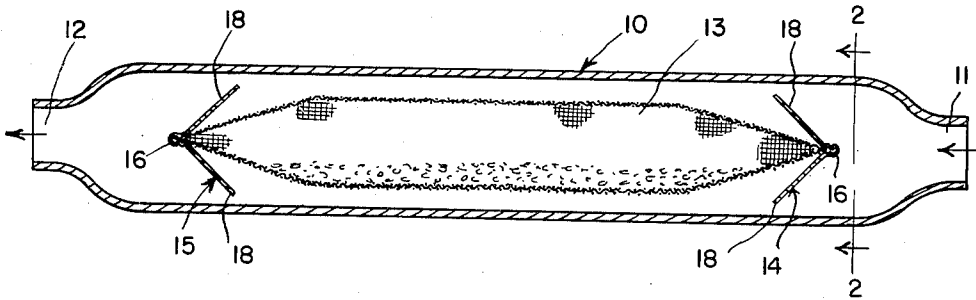


FIG. 2.

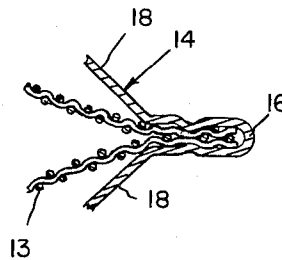


FIG. 3.

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ACCUMULATOR DRIER FOR REFRIGERATING APPARATUS

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6 Claims. (Cl. 210—131)

This invention relates generally to refrigerating apparatus and refers more particularly to improvements in a combined accumulator and drier for use in connection with refrigerating systems.

The present invention concerns itself more specifically with the type of accumulator drier wherein particles of a drying agent such, for example, as silica gel are contained within a mesh bag housed in an elongated tubular casing having an inlet opening at one end and an outlet opening at the opposite end. The interstices in the mesh bag are smaller than the particles of drying agent so that said particles are prevented from escaping into the refrigerant passing through the casing. However, the force of the stream of liquid refrigerant discharged into the casing through the inlet opening has a tendency to reduce the size of the particles of the drying agent to such an extent that said particles escape through the interstices in the bag into the stream of refrigerant and are carried by the refrigerant through the outlet opening into the refrigerating system. The accumulation of particles of drying agent in the refrigerating system detrimentally affects the operation of the various instrumentalities of the system and frequently is the cause of failure of the system to operate properly.

With the above in view it is an object of this invention to provide means supported within the casing for diffusing the stream of refrigerant admitted to the casing through the inlet opening before the refrigerant impinges or contacts the drying agent. Thus the force applied to the particles of drying agent by the refrigerant is considerably reduced and there is little or no tendency for the refrigerant to reduce the size of the particles contained within the mesh bag.

It is another object of this invention to provide an accumulator drier having baffle plates respectively supported within the casing directly opposite the inlet and outlet openings in the casing and secured to opposite ends of the bag containing the drying agent for supporting said bag in spaced relationship to the adjacent walls of the casing. The arrangement is such that the bag is firmly held within the casing by the baffle plates and any tendency for the bag to vibrate or shift laterally during operation into rubbing contact with the casing is minimized.

The foregoing as well as other objects will be made more apparent as this description proceeds especially when considered in connection with the accompanying drawing wherein

Figure 1 is a longitudinal sectional view through an accumulator drier embodying the features of this invention;

Figure 2 is a cross sectional view taken substantially on the plane indicated by the line 2—2 of Figure 1; and

Figure 3 is an enlarged sectional view of a part of the accumulator drier shown in Figure 1.

The accumulator drier selected herein for the purpose of illustration comprises an elongated tubular casing 10 having the opposite ends reduced in diameter to provide an inlet opening 11 and an outlet opening 12. The casing

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10 may be formed of any suitable material which is not detrimentally affected by the refrigerant flowing through the casing. In the interests of economy and simplicity in manufacture, it is preferred to form the casing 10 of copper or a copper alloy.

Housed within the casing 10 between the inlet opening 11 and the outlet opening 12 is a bag 13 composed of a foraminous material and containing particles of a desiccant or drying agent. The bag 13 is also formed of a material which is not detrimentally affected by the refrigerant and in the present instance the bag 13 is formed of a metal mesh having interstices smaller than the particles of the drying agent contained therein. In any case the opposite sides of the bag 13 adjacent the ends converge toward one another and are respectively secured to baffle plates 14 and 15.

The baffle plates are preferably formed by a stamping operation from stainless steel or some other sheet metal having the required resiliency and which will not be detrimentally affected by the refrigerant. As shown in Figure 2 of the drawing, the baffle plates are rectangular in shape and are formed with beads 16 which extend transversely of the plates midway between opposite ends thereof. The baffle plates are assembled within the casing 10 in a manner such that the beads 16 open inwardly or in directions toward one another and respectively receive the opposite ends of the bag 13. The opposite side walls of the beads are crimped toward one another into gripping relationship with the adjacent ends of the bag 13 and form a unitary assembly with the bag 13.

In practice, the bag 13 together with the baffle plates is installed within the casing 10 prior to reducing one or the other of the ends of the casing. The size of the baffle plates is so determined that the corners 17 of the plates frictionally engage the adjacent inner surface of the casing in a manner such as to hold the bag 13 together with the baffle plates in position within the casing. However, if desired, the baffle plates may be brazed or otherwise fastened to the casing 10. In the interests of simplicity of manufacture, it is preferred to retain the baffle plates within the casing 10 by frictional engagement of the corners 17 with the adjacent inner surface of the casing 10 and in order to facilitate this operation the portions 18 of the plates at opposite sides of the beads 16 are inclined inwardly as shown in Figure 1 of the drawing. Thus, the portions 18 of the baffle plates coact to form in effect spring fingers which yieldably grip the inner surface of the casing 10 with sufficient force to maintain both the bag 13 and the baffle plates in position within the casing. In this connection, it is to be noted that the cross sectional area of the bag 13 is so determined with respect to the internal diameter of the casing 10 that the bag is held by the baffle plates in spaced relationship to the adjacent inner surface of the casing 10. This is advantageous in that it prevents vibration or shifting movement of the bag within the casing 10 during operation and also prevents the bag from rubbing against the casing 10.

Referring again to Figure 2 of the drawing, it will be noted that the side edges of the baffle plates coact with the adjacent inner surface of the casing 10 to form openings 19 through which refrigerant may be bypassed around the baffles. However it is to be noted that both baffle plates are imperforate and are of sufficient area to prevent direct impingement on the bag of liquid refrigerant entering either end of the casing. In the present instance, the refrigerant enters the casing 10 through the opening 11 in the form of a stream and the baffle 14 intercepts the stream of refrigerant or in other words diffuses the refrigerant. In this connection, attention is called to the fact that the bead 16 as well as the inwardly inclined portions 18 of the baffle 14 assist in

diffusing the stream of refrigerant without causing undue turbulence.

After the stream of refrigerant is diffused or intercepted by the baffle 14, the refrigerant passes through the openings 19 and moisture is absorbed from the refrigerant by the desiccant material contained within the bag 13. The force of the refrigerant coming in contact with the particles of desiccant material contained in the bag 13 is materially reduced by the baffle 14 and even after long periods of continued use there is little or no tendency for the flow of refrigerant through the casing 10 to reduce the particle size of the desiccant material sufficiently to allow this material to escape through interstices in the bag 13 into the refrigerating system connected to the outlet opening 12 of the casing. Hence, contamination of the refrigerating system by powdered desiccant material escaping from the accumulator drier is prevented and servicing of the system is reduced to a minimum.

What I claim as my invention is:

1. In refrigerating apparatus, a tubular casing of circular cross section having an inlet opening at one end and an outlet opening at the opposite end, a foraminous bag containing a desiccant material supported within the casing between the openings, a polygonally shaped baffle plate supported within the casing between the bag and inlet opening being so dimensioned and arranged as to entirely shield the bag from direct impingement by a stream of refrigerant entering the inlet opening, said baffle plate having a central portion positioned in alignment with the inlet opening lengthwise of the casing and having portions diverging from opposite sides of the central portion toward the outlet opening, the opposite side edges of the plate frictionally engaging the inner surface of the casing at points spaced circumferentially of the casing to hold said baffle plate in place, said opposite side edges coacting with adjacent walls of the casing to form openings enabling refrigerant to bypass the baffle plate, and the side wall of said bag being spaced inwardly of said casing to define an annular passage extending lengthwise of the casing from said outlet opening to said bypass opening.

2. The structure defined in claim 1 wherein the baffle plate has a bead which extends transversely of the central position between the diverging portions, the bead opening in a direction toward the outlet opening, and wherein the bag has one end projecting into the bead and gripped between opposite sides of the bead.

3. In refrigerating apparatus, a casing having spaced inlet and outlet openings, a foraminous bag containing a desiccant material housed within the casing between said openings, a baffle supported within the casing between the bag and inlet opening, said baffle being in the form of a plate having a central portion positioned in alignment with the inlet opening lengthwise of the casing to intercept a stream of refrigerant flowing into the casing through the inlet opening and thereby diffusing the refrigerant and also having portions diverging from opposite sides of the central portion toward the outlet opening, the opposite side edges of the plate frictionally engaging the inner surface of the casing at circumferentially spaced points to hold the baffle in place, said opposite side edges coacting with the inner surface of the casing to form openings enabling the refrigerant to bypass the baffle plate, said

baffle plate having a bead extending transversely of the central portion between the diverging portions and opening in a direction toward the outlet opening, one end of the bag projecting into the bead and being gripped between opposite sides of the bead.

4. In refrigerating apparatus, a tubular casing having an inlet opening at one end and having an outlet opening at the opposite end, baffles supported within the casing in spaced relationship axially of the casing and having imperforate portions respectively positioned opposite said openings, and a bag containing a desiccant material extending between the baffles, said baffles being in the form of plates having transversely extending inwardly opening beads at the center thereof, the opposite ends of the bag respectively extending into the beads and being gripped between opposite side walls of the beads, the side edges of the baffles frictionally engaging the inner surface of the casing at circumferentially spaced points to hold said baffles together with the bag in place within the casing, and the edges of the baffles between said points of frictional contact coacting with the inner surface of the casing to form fluid passages.

5. The structure defined in claim 4 wherein the portions of the baffle plates at opposite sides of the beads diverge in directions toward one another.

6. In refrigerating apparatus, a tubular casing having an inlet opening at one end and having an outlet opening at the opposite end, baffles supported within said casing in spaced relationship axially of said casing and having imperforate portions respectively positioned opposite said openings, and a foraminous receptacle containing a desiccant material extending between said baffles and having the opposite ends of said receptacle respectively secured to said baffles, the side edges of said baffles frictionally engaging the inner surface of said casing at circumferentially spaced points to hold said baffles together with said receptacle in place within said casing, the edges of the baffles between said points of frictional contact coacting with the inner surface of said casing to form openings for the passage of fluid, said receptacle being supported within said casing by said baffles with the side wall thereof spaced from the adjacent inner surface of the casing to provide an annular open passage for fluid between the openings formed by the edges of the baffles in cooperation with the inner surface of the casing, said baffle plates being formed of a resilient material and being generally V-shaped to provide spring fingers yieldably frictionally gripping the inner surface of the casing.

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