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R. S. GAUGLER

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DESICCANT CARTRIDGE AND METHOD OF MAKING

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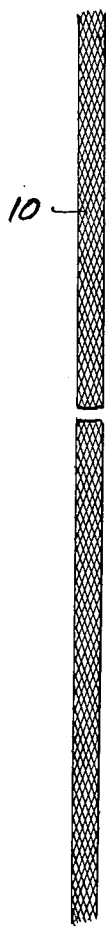


FIG. 1

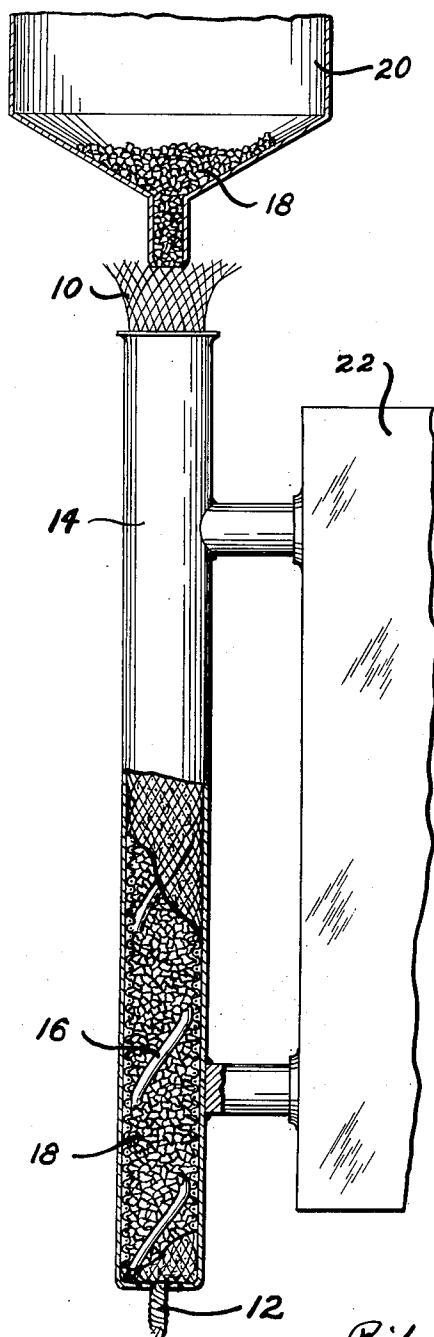


FIG. 2

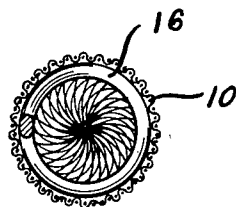


FIG. 4

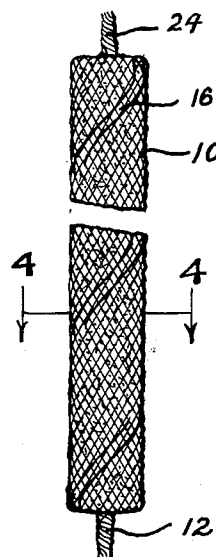


FIG. 3

Richard S. Gaugler, INVENTOR.

BY Spencer, Handman & Fehr.
His Attorney

UNITED STATES PATENT OFFICE

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DESICCANT CARTRIDGE AND METHOD OF MAKING

Richard S. Gaugler, Dayton, Ohio, assignor to
General Motors Corporation, Dayton, Ohio, a
corporation of Delaware

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4 Claims. (Cl. 210-131)

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This invention relates to refrigerating apparatus and more particularly to an improved drier unit for use in refrigerant circuits and to an improved method of making the drier unit.

It is an object of this invention to provide a low cost drier unit or desiccant cartridge which is not subject to breakage when handled roughly.

It is another object of this invention to provide an improved method and apparatus for manufacturing drier units of uniform size.

It is another object of this invention to provide drier units of uniform size in which granular particles of a desiccant material are compactly arranged within an outer perforated casing.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Figure 1 is an elevational view showing a woven wire tube of the type used in the manufacture of the drier unit;

Figure 2 is an elevational view with parts broken away showing apparatus used in the manufacture of the drier unit and showing one drier unit in the process of manufacture;

Figure 3 is an elevational view of a drier unit; and,

Figure 4 is a sectional view taken on line 4-4 of Figure 3 showing the arrangement of the spiral reinforcing wire within the woven wire tubing which forms the outer casing of the unit.

This application is related to application S. N. 697,980, filed September 19, 1946, wherein there is shown and claimed one form of drier unit.

It has been found desirable to maintain complete uniformity in the outer dimensions of the drier units and to make them sufficiently rigid so that the likelihood of breakage during rough handling will be largely or entirely eliminated. Both of these desirable objectives are accomplished by my invention as set forth more fully hereinafter.

The outer casing of the drier unit is made by taking a section of expansible woven wire tubing 10, such as shown in Figure 1 of the drawing, and twisting the lower end of the tubing as indicated at 12 in Figures 2 and 3 and then inserting this into a sizing tube or fixture 14 having an internal diameter substantially equal to the desired external diameter of the finished drier unit. As shown in the drawing, the tubing 10 consists of interwoven wires extending helically in opposite directions.

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In order to expand the woven wire tubing to the desired diameter, pressure is first applied to push the upper end toward the lower end of the tubing and then a helically wound relatively stiff wire 16 is forced into the upper end of the tubing while the tubing is mounted within the fixture 14. Woven wire tubing of this type may be purchased cheaply and comes in long lengths of small diameter tubing which is easily expanded by this shortening method to the desired larger diameter tubing. The external diameter of the spiral reinforcing wire 16 substantially corresponds to the desired internal diameter of the woven wire tubing. After the spiral wire 16 has been forced into place, loose granular desiccant material 18 is fed into the upper end of the tubing 10 through the funnel 20.

The fixture 14 is vibrated by means of the vibration producing element 22 while the loose granular material is being fed into the tubing 10 so as to cause the granules to be packed in place. Since vibration producing elements are old and well known, and since the details of construction of the vibrating element are immaterial they need not be shown or described in greater detail.

After the tubing 10 has been filled to the desired level, the upper end of the tubing is twisted as indicated at 24 in Figure 3 so as to close the upper end of the tubing. Closing the tubing against the ends of the wire 16 and the desiccant 18 prevents foreshortening of the tubing thereafter. Any dust which may result from abrasion of the particles during the filling operation may be blown off, if desired, during or subsequent to the filling operation. The assembly is thereafter removed from the fixture 14 and is coated with a moisture permeable, moisture insoluble but dustproof material.

Preferably granular anhydrous calcium sulphate is used as the desiccant, although other materials such as lime, silica gel, or other alkali earth oxides may also be used. The coating material which I prefer to use is cellulose acetate, although other materials such as ethyl cellulose, methyl cellulose, or any of the hygroscopic coatings of cellulose esters or ethers, may be used depending upon the particular application. Thus in a refrigerating system employing Freon refrigerant, it is preferred to use anhydrous calcium sulphate granules coated with cellulose acetate so as to completely enclose the anhydrous calcium sulphate whereby fine particles of calcium sulphate are prevented from passing through the coating.

The coating operation may be performed by sat-

urating the entire assembly comprising the screen tubing 10, the reinforcing helical wire 16 and a granular desiccant material 18 with a five to ten percent solution of cellulose acetate and thereafter allowing the excess solution to drain off from the assembly so as to leave a porous structure. The assembly may be saturated in any manner such as by dipping it into a liquid solution of a coating material or by placing the assembly in a vessel, evacuating the vessel of air, replacing the evacuated air with the liquid solution so as to fill all of the voids, and thereafter removing the assembly from the vessel and allowing the excess solution to drain off leaving only a thin cohesive binding coating on the parts. Woven wire tubing material which will provide approximately a 16-mesh screen closure for the desiccant material is preferably used.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. A cohesive drier unit of large effective surface area comprising a perforated casing; a helical-shaped reinforcing member within said perforated casing contacting and supporting the inner wall of said casing to prevent its collapsing and crushing; a granular desiccant material within said casing; and a binding coating for said granular desiccant material, said reinforcing member, and said casing comprising a moisture permeable, moisture insoluble but dustproof combined binding and coating material; said coating serving to bond said granular desiccant, said reinforcing member and said casing into a unitary cohesive structure.

2. The method of fabricating a drier unit of the type in which a desiccant material is disposed within an expansible woven wire tube which comprises closing one end of said tube, expanding said tube while confined within a fixture having an internal diameter substantially corresponding to the final external diameter of said drier unit, placing an expander element within said tube for establishing the internal diameter of said tube, placing granular desiccant material within the tube, closing the other end of said tube and thereafter applying a moisture permeable, moisture insoluble but dustproof binding coating to the exposed surfaces of said desiccant material and said tube.

3. In combination, a flexible woven wire tube element having helically extending interlaced

wires, a rigid helical wire within said tube limiting inward flexing of said tube element, said tube element having closed end-portions engaging the ends of said spiral wire so as to prevent shortening of said tube element, desiccant material within said tube element, and a coating of water permeable bonding material on the surface of said desiccant material and said helical wire and said woven wire tube element for increasing the rigidity of the assembly.

4. The method of fabricating a drier unit of the type in which a desiccant material is disposed within an expansible woven wire tube which comprises closing one end of the tube, expanding the tube to the desired final diameter of the drier unit, placing an expander element within said tube for establishing the minimum internal diameter of the tube, vibrating the tube and expander element while placing granular desiccant material within the tube, closing the other end of the tube, and thereafter applying a thin moisture permeable moisture insoluble dustproof binding coating to the entire assembly including the entire surfaces of the desiccant material and the expander element and said tube to bind the assembly into a unitary cohesive structure.

RICHARD S. GAUGLER.

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