Oct. 27, 1931. J. C. ARNOLD 1,829,387

REFRIGERATING APPARATUS

Filed Nov. 30, 1927 2 Sheets-Sheet 1

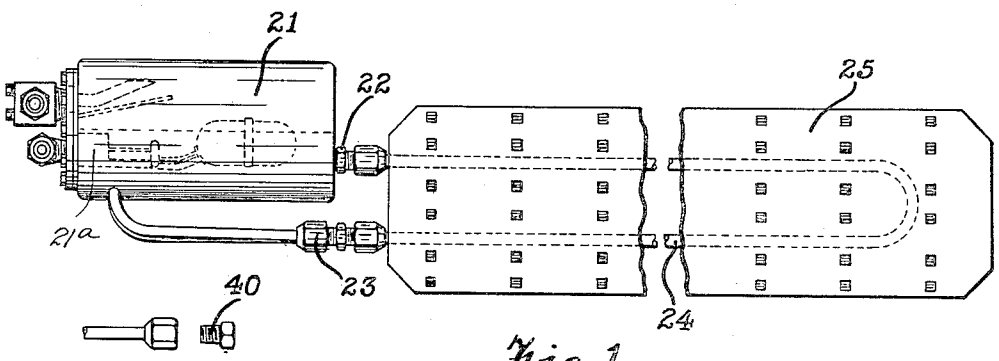


Fig. 1



Fig. 5

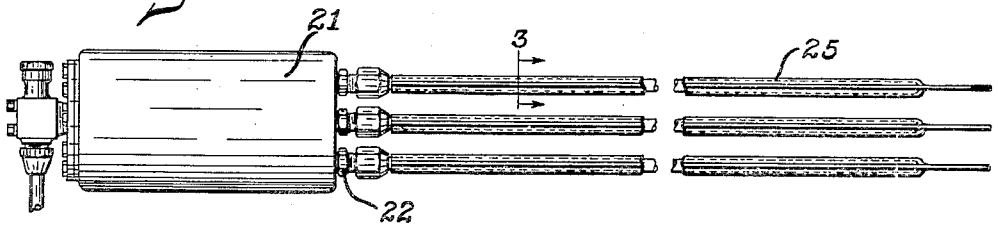


Fig. 2

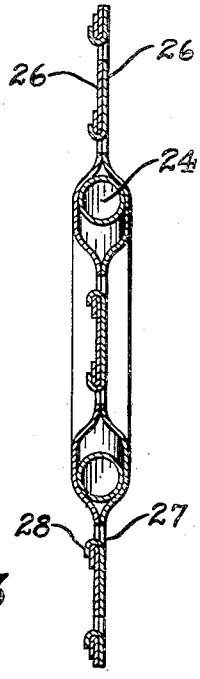


Fig. 3

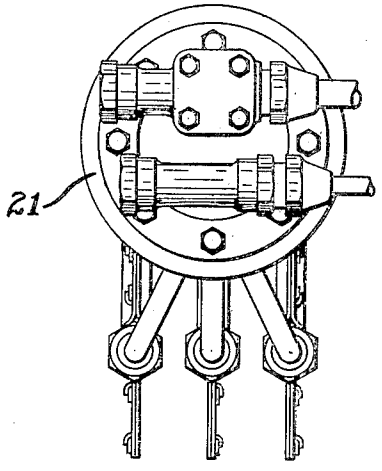


Fig. 4

Inventor

James C. Arnold

By Spencer, Hardman & Fehr

Attorney

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REFRIGERATING APPARATUS

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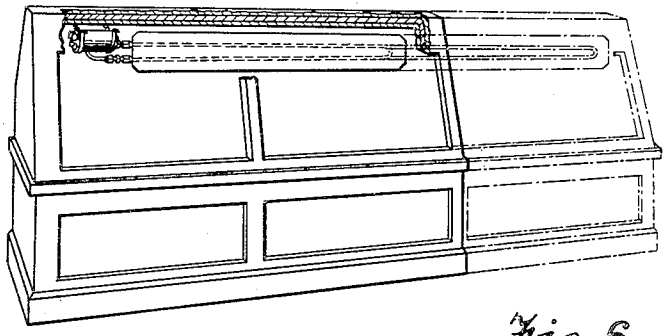


Fig. 6

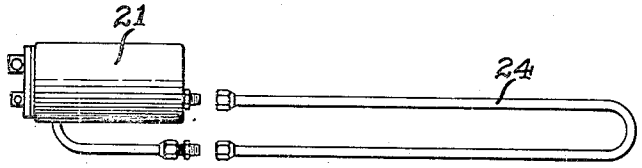


Fig. 7

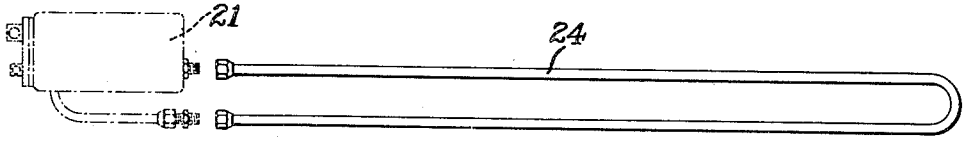


Fig. 8

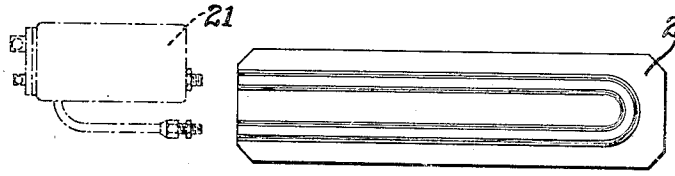


Fig. 9

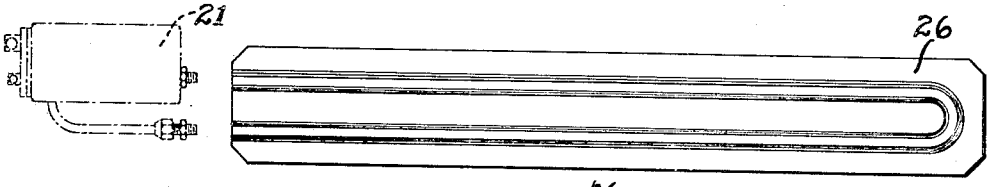


Fig. 10

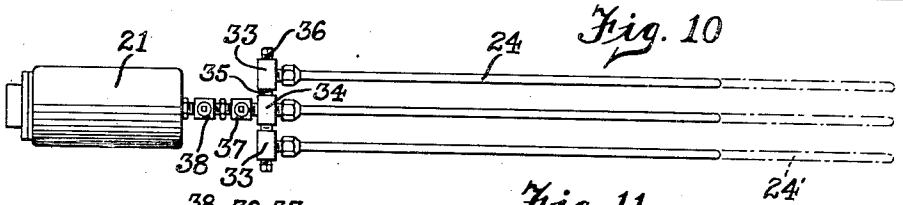


Fig. 11

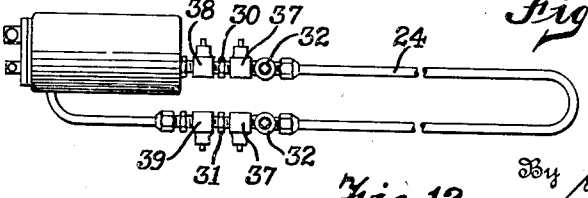


Fig. 12

Inventor

James C. Arnold

By Spencer, Hardman & Fehr

Attorney

Patented Oct. 27, 1931 1,829,387

UNITED STATES PATENT OFFICE

JAMES C. ARNOLD, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO FRIGIDAIRE CORPORATION, A CORPORATION OF DELAWARE

REFRIGERATING APPARATUS

Application filed November 30, 1927. Serial No. 236,732.

This invention relates to refrigeration apparatus in which the size of the cooling member may be selectively varied, and in which the cooling member may be made of a size to conform with the requirements of the installation to be made, from a stock of a relatively small number of standard parts.

One object of the invention is to provide a refrigerator in which the size of the cooling unit may be selectively varied.

Another object of this invention is to provide a refrigerator in which the relative size of the cooling unit may be selectively varied.

Another object of the invention is to provide elements for the cooling unit of a refrigerator whereby with a relatively small stock a dealer may be ready to assemble a cooling unit of many different sizes and shapes.

Another object of the invention is to reduce the required number of headers which a dealer must have on hand in order to be ready to install cooling units of many different sizes or shapes.

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

In the drawings:

Fig. 1 is a side view of a cooling unit according to my invention;

Fig. 2 is a plan view of the same;

Fig. 3 is an enlarged cross-sectional view along the line 3 in Fig. 2;

Fig. 4 is an enlarged end view of the cooling unit shown in Figs. 1 and 2;

Fig 5 is a detail view of the cooling unit;

Fig. 6 is a view of a cabinet in which my cooling unit may be installed, the dotted lines indicating a cabinet of different relative size or shape;

Fig. 7 is a view of a disassembled cooling unit;

Fig. 8 is a view of a cooling conduit of different size from that shown in Fig. 7, the header being shown in dotted lines to indicate that this header may be the same one used in Fig. 7;

Fig. 9 is a side view of a fin which may be used with the cooling conduit shown in Fig. 7;

Fig. 10 is a side view of a fin of different size from that shown in Fig. 9 which may be used with the cooling conduit shown in Fig. 8;

Fig. 11 is a plan view of a modified cooling unit; and

Fig. 12 is a side view of the cooling unit shown in Fig. 11.

This invention relates to a cooling unit in which a refrigerant is introduced. The refrigerant may be a volatile liquid such as SO_2 or it may be non-volatile liquid such as a cold brine.

As an embodiment of my invention the cooling unit may comprise a header indicated at 21 having therein a float controlled refrigerant inlet valve 21*a* to control the level of the refrigerant in said header. This header may be provided with outlets 22 and 23 to which may be detachably secured the cooling conduits 24. These cooling conduits may be of different sizes or shapes as indicated in Figs. 7 and 8 in order to adapt the evaporator to cabinets of different sizes or shapes. The cooling conduits 24 may be provided with fins 25 which may be assembled from two sheet metal plates 26. These plates 26 may be of such shape that they may fit over the conduit 24 as shown in Fig. 3, and after they have been placed over the conduit 24, the plates 26 may be punched as at 27, the metal being bent over as at 28 to secure the plates together and to form a rigid fin. It is to be understood, however, that the conduits 24 may be used without the fins 25 if the requirements of the installation should justify it.

Figs. 7, 8, 9 and 10 indicate that with the one header 21 shown in Fig. 7 and with one set each of the other standard parts shown in these figures, it is possible to assemble four different types of evaporators from a stock which has only one header 21 and one set each of standard parts. The headers shown in dotted lines in Figs. 8, 9 and 10 need not be held in stock in accordance with my invention, but would have to be held in stock

if the cooling conduits were not detachably secured to the header. In the case illustrated, it would be necessary, with permanently attached conduits, to have in stock four assembled units, requiring three extra relatively expensive float chambers and one extra set each of the different size of conduits. The plates shown in Figs. 9 and 10 are shown unpunched as they might be before assembly with the cooling conduits.

According to the modification shown in Figs. 11 and 12 there need be only two connections to the header 21 as shown at 30 and 31. In this modification the cooling conduits 24 are connected to distributors 32 which may be constructed of T's 33 and a cross 34 united by means of nipples 35, the ends of the T's 33 being sealed by plugs 36. The plugs 36 may be replaced by other nipples 35, and other T's 33 may be added to the installation in order to increase the number of conduits 24 which may be attached to the headers 32. The headers 32 are connected to valves 37.

The header 21 is provided with two outlets connected to valves 38 and 39. The valves 37 of the distributors and the valves 38 and 39 of the header may be connected by the right and left threaded nipples 30 and 31. It will thus be seen that the relative capacity of the evaporator may be increased or decreased either by changing the length of the cooling conduits, as indicated in Figs. 7 and 8, and by dotted lines 24', Fig. 11, or it may be changed by increasing or decreasing the number of conduits as indicated in Figs. 11 and 12, or both expedients may be resorted to by changing not only the size of the conduits but also the number thereof.

After manufacture and desiccation of these parts, refrigerant under low pressure may be placed in the header 21 and the conduits 24, and this refrigerant may be sealed therein by means of plugs 40 as shown in Fig. 5 or by means of the valves 37, 38 and 39 shown in Figs. 11 and 12. By so filling these parts with low pressure refrigerant the necessity of desiccation and of air removal at the place of assembly is obviated. By the use of valves 37, 38 and 39, as shown in Figs. 11 and 12, the refrigerant may be sealed in the float chamber and the conduits prior to assembly and also prior to disassembly.

While I have disclosed header 21 as a float chamber, my invention is also applicable when such a header is an expansion device, or merely a distributor device. In some cases, it is possible that the conduits 24 need not return to the same distribution device, but may be connected to a distributing device at one end, and a collecting device at the other.

This invention is applicable also where the cooling unit is not an evaporator, and may be of some other type such as a brine cooling unit.

The relative size of the cooling capacity of the cooling unit may be increased not only before but also after installation, either by the addition of fins, by the change of size or shape of the cooling conduits, or by change of the number of conduits.

While the forms of embodiment of the invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A refrigerating element comprising a header, a looped duct, a vertical cooling fin, means for detachably connecting said looped duct to said header, and means for detachably connecting said fin to said duct.

2. A refrigerating element comprising a looped duct and a fin attached thereto, said fin comprising two flat members secured around said duct by punching the material of said two flat members.

3. A refrigerating element comprising a cylindrical chamber, a float controlled refrigerant inlet valve therein, refrigerant flow connections permanently secured to said chamber having means for readily attaching and detaching ducts thereto, a looped duct readily detachably secured to said cylindrical chamber by said means and a fin detachably secured to said duct.

4. A refrigerating element comprising a cylindrical chamber, a float controlled refrigerant inlet valve therein, refrigerant flow connections permanently secured to said chamber having means for readily attaching and detaching ducts thereto, looped ducts readily detachably secured to said cylindrical chamber by said means and fins detachably secured to said ducts.

In testimony whereof I hereto affix my signature.

JAMES C. ARNOLD.