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F. G. SLAGEL

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REFRIGERATING APPARATUS

Filed Aug. 13, 1926

Fig. 1.

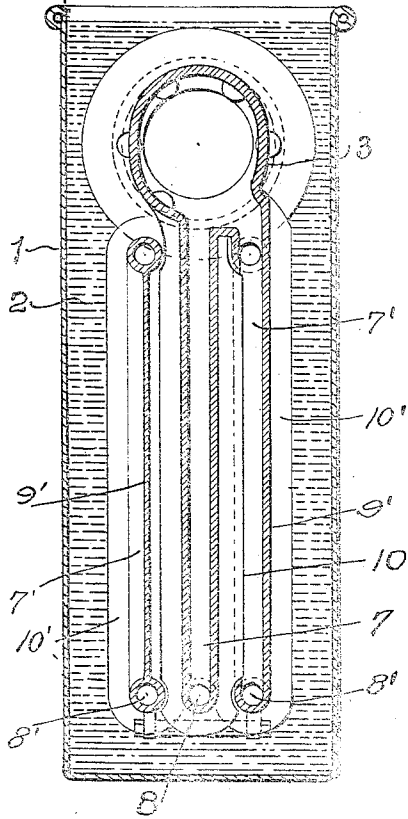


Fig. 2.

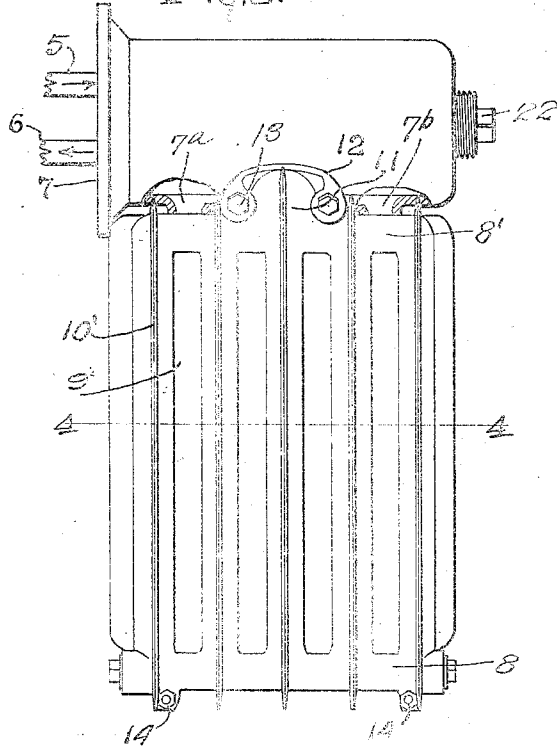


Fig. 3.

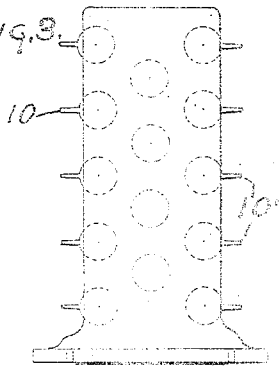


Fig. 4.

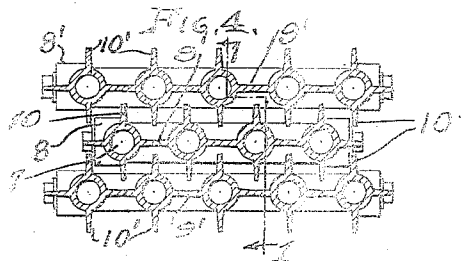


Fig. 5.

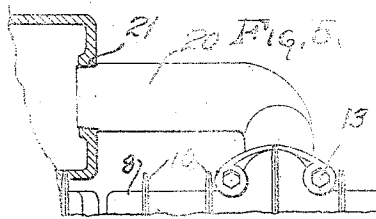


Fig. 6.



Fig. 7.

Inventor  
FRANKLIN G. SLAGEL,

By *Pauline Paulman,*

Attorney

# UNITED STATES PATENT OFFICE

FRANKLIN G. SLAGEL, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS,  
TO FRIGIDAIRE CORPORATION, A CORPORATION OF DELAWARE

## REFRIGERATING APPARATUS

Application filed August 13, 1926. Serial No. 129,043.

This invention relates to refrigerating apparatus and particularly to refrigerating elements or cooling units.

It is one of the objects of the invention to provide a refrigerating element which is adapted for efficient refrigeration either when immersed in brine or when disposed in air.

Another object of the invention is to provide a relatively narrow refrigerating element in which a large amount of heat exchange surface is provided within a relatively small volume.

A further object of the invention is to provide a cooling unit having a relatively large mass which is effective as a thermal hold-over.

Still another object of the invention is to provide a cooling unit of flexible application, that is, one which may be readily enlarged or reduced to meet changing or varied refrigerating requirements.

Still another object of the invention is to provide a refrigerating element which has a relatively great refrigerating capacity but which requires a relatively small amount of refrigerant.

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

In the drawing:

Fig. 1 is a vertical section through my improved refrigerating element, the section being taken on the line 1—1 of Fig. 4;

Fig. 2 is a side elevation of the refrigerating element;

Fig. 3 is a plan view;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a view partly in section and partly in elevation of a fragment of the cooling unit showing an additional or supplemental unit attached thereto; and

Figs. 6 and 7 are views of closure devices.

Referring to the drawing, 1 designates a container for brine 2, shown as relatively narrow to represent a narrow body of brine, by way of exemplifying confined spaces with-

in which the refrigerating element is intended to be used. The refrigerating element disposed within the container 1 includes a header 3 which forms a reservoir for liquid refrigerant circulated through conduits 5 and 6 by any suitable refrigerating machine (not shown). Depending from the header and substantially within the width of the header is one or more refrigerant circulating elements each consisting of a plurality of vertical conduits 7 communicating with the header by means of openings 7a and 7b and connected in parallel circuit relation by means of one or more conduits 8. The vertical conduits are spaced from each other and are joined together throughout their length by vertical ribs or fins 9 and are provided with additional vertical fins 10 projecting into the surrounding medium.

All of the parts of the element above described are preferably made of thick cast metal such as iron or aluminum in order to provide an evaporator having large mass, the specific heat of which acts as a hold-over during periods when the refrigerating machine is not operating. This is of importance when the refrigerating element is used in air, as shown in Fig. 2, instead of in brine, as shown in Fig. 1.

In order that standard evaporators may be used to meet a variety of refrigerating requirements I provide means for attaching additional circulating elements, each of which may be like the ones just described, including vertical conduits 7' connected by cross conduits 8' and by webs 9' and having fins 10'. The upper conduit 8 is provided with a connection 11 having a flange 12 which may be attached to a suitable opening in the header by means of bolts 13. All of the additional or detachable elements may be secured to the permanently attached elements by bolts 14. When the additional elements are not used the openings in the header are closed by means of closure plates 18 secured in place by the bolts 13.

Other detachable cooling elements like the one described may be connected to the end of the header by means of a pipe 20 bolted to the flange 12 by means of bolts 13, the pipe

being threaded in an opening 21 in the end of the header. This opening may also be closed by a plug 22 when no detachable element is connected to this portion of the evaporator.

It will thus be seen that I have provided a very compact evaporator having both large mass to provide a thermal hold-over and large surface to provide efficient heat transfer. The entire evaporator is contained substantially within the width of the header, thus providing an effective refrigerating element which can be disposed in any space which will receive the header. The evaporator may also be used to supply a larger refrigerating demand by the connection of the additional cooling elements.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, 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. In refrigerating apparatus a refrigerating element comprising a header forming a reservoir for refrigerant, and a unit, forming a plurality of circulating conduits, detachably connected to the header.

2. In refrigerating apparatus, a refrigerating element comprising a header forming a reservoir for refrigerant, a unit forming a plurality of refrigerant circulating conduits, and means for detachably connecting the unit to the header.

3. In refrigerating apparatus, a refrigerating element comprising an elongated header forming a reservoir for refrigerant, and one or more circulating elements depending from and disposed within the width of the header, the circulating elements including a plurality of vertical conduits connected in parallel circuit relation, each conduit having a plurality of vertical fins.

4. In refrigerating apparatus, a refrigerating element comprising an elongated header forming a reservoir for refrigerant, and one or more circulating elements depending from and disposed within the width of the header, the circulating elements including a plurality of spaced vertical conduits connected in parallel circuit relation, each conduit having a plurality of vertical fins.

5. In refrigerating apparatus, a refrigerating element comprising an elongated header forming a reservoir for refrigerant, and one or more circulating elements detachably connected to the header and depending from and disposed within the width of the header, the circulating elements including a plurality of spaced vertical conduits joined together by vertical fins.

6. In refrigerating apparatus, a refrigerating element comprising a header forming a reservoir, one or more circulating elements each of said elements including a plurality

of vertical conduits connected in parallel circuit relation, each conduit having a plurality of vertical fins, and means for detachably connecting said circulating elements to the header.

7. In refrigerating apparatus a cast metal refrigerating element comprising a header forming a reservoir for refrigerant and a unit, forming a plurality of refrigerant circulating conduits of cast metal, detachably connected to the header.

8. In refrigerating apparatus, a refrigerating element of large hold-over capacity, comprising in combination, a thick cast metal header forming a reservoir for refrigerant, and a unit of thick cast metal forming a plurality of refrigerant circulating conduits of large mass detachably connected to the header.

9. In refrigerating apparatus, a refrigerating element having both large hold-over capacity and large heat exchange area comprising in combination, a thick cast metal header forming a reservoir for refrigerant, one or more thick cast metal refrigerant circulating conduits of large mass detachably connected to the header, and a plurality of thick vertical fins cast integral with each conduit.

10. In refrigerating apparatus, a thick cast metal refrigerating element comprising an elongated header forming a reservoir for refrigerant, and one or more thick cast metal circulating elements detachably connected to the header and depending from and disposed within the width of the header, the circulating elements including a plurality of spaced vertical conduits joined together by vertical fins.

In testimony whereof, I affix my signature.  
FRANKLIN G. SLAGEL.