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REFRIGERATING APPARATUS

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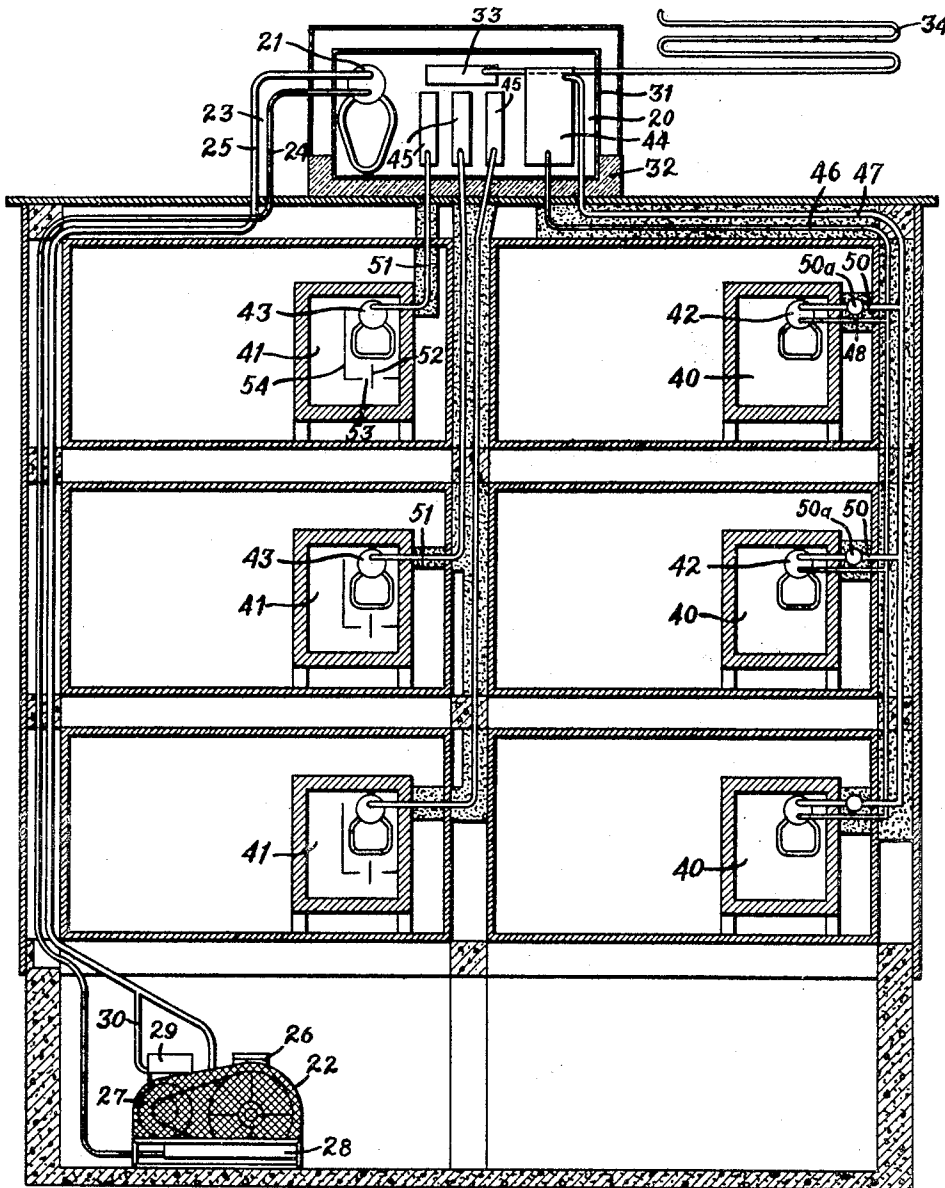


Fig. 1

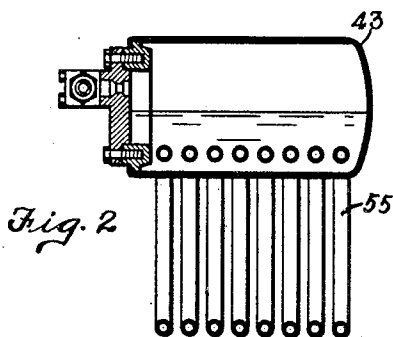


Fig. 2

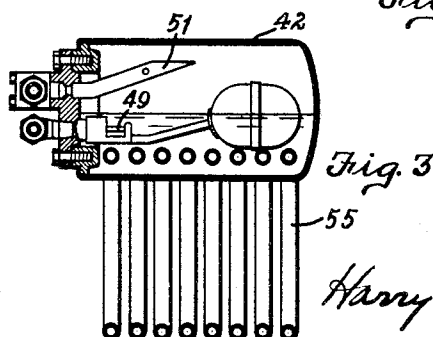


Fig. 3

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REFRIGERATING APPARATUS

Application filed May 30, 1929. Serial No. 367,163.

This invention relates to refrigerating apparatus.

An object of this invention is to provide a refrigerating system adapted to refrigerate a plurality of cabinets or the like.

Another object of this invention is to provide a refrigerating system adapted to utilize any low prevailing temperatures in the atmosphere outside of the building or the like.

Another object of this invention is to provide an individual temperature control for each of a plurality of evaporators connected to a central refrigerating system.

Another object of the invention is to provide a plurality of cabinets with a novel refrigerating system.

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 the present invention is clearly shown.

In the drawing:

Fig. 1 is a diagrammatic view of a system embodying features of this invention;

Fig. 2 is an enlarged vertical cross-sectional view of an evaporator which may be used in the system; and

Fig. 3 is a view similar to Fig. 2 of a modified form of evaporator.

A refrigerating system embodying features of this invention may include a heat transfer receptacle generally designated as 20. A mechanical or absorption refrigerating system may be connected to the receptacle 20 in order to maintain the receptacle below a predetermined temperature limit. If of the mechanical refrigerating type, the system may be of any desired type. Thus it may comprise an evaporator 21, a refrigerant liquefying unit 22, a refrigerant line 23, which may include a liquid refrigerant section 24 and an evaporator refrigerant section 25. The refrigerant liquefying unit may be any suitable automatic type, either of the compression or of the absorption type. If it is of the compression type it may include a compressor 26, a motor 27, a condenser, not shown, which discharges liquid refrigerant to a liquid refrigerant receiver 28. The

motor 27 may be started and stopped by means of a snap switch 29 responsive to the temperatures in the refrigerating system, for instance, by connecting an expansible bellows of the snap switch through the pipe 30 with the section 25. The snap switch 29 starts the motor when the refrigerant in the evaporator 21 reaches a predetermined high temperature and stops the motor when the refrigerant drops to a predetermined low temperature. The evaporator 21 may be of any suitable float valve controlled type, for instance, of the type shown in Fig. 3 and more fully described in the patent to R. G. Osborn, No. 1,556,708, dated October 13, 1925.

The heat transfer receptacle 20 may be any suitable means for promoting the transfer of heat. Thus it may include a brine tank 31 adapted to be filled with any suitable non-freezing liquid such as calcium chloride brine or a solution of alcohol. The brine tank may be provided with insulation 32 which may extend along all sides, top and bottom of the tank as indicated by the dotted lines, or it may be provided with a removable insulation portion which may be removed when the temperature of the atmosphere is sufficiently low as during the winter time. The insulation may thus be placed on the tank during the summer time and may be removed during the winter time when the temperature of the atmosphere is sufficiently low.

The heat transfer receptacle may also be provided with automatic means for placing it in thermal contact with the atmosphere when the temperature of the atmosphere falls any desired amount below the predetermined low temperature limit maintained by the automatic refrigerating system. This may be accomplished by placing a suitable evaporator 33 in the brine tank and this evaporator may be connected to a condenser 34 placed, preferably above the level of the evaporator 33. The evaporator 33 and the condenser 34 may be filled with a suitable volatile refrigerant adapted to condense in the condenser 34 only when the atmospheric temperature falls below the desired limit. Thus when the atmosphere is sufficiently cold the volatile refrigerant in the evaporator 33 flows to the

condenser 34 in a gaseous form and returns in a liquid form. This action automatically establishes thermal contact between the heat transfer receptacle 20 and the atmosphere 5 when the atmospheric temperature is sufficiently low.

The heat transfer receptacle 20 may be provided with a heat transfer system leading to one or a plurality of spaces to be refrigerated, 10 which may be, for instance, cabinets 40 or cabinets 41. The heat transfer system may include one or more evaporators 42 or 43. A suitable connection may be provided between each of the evaporators and the heat transfer 15 receptacle. This may include one or more condensers 44 or 45. The evaporators 42, which may be constructed as shown in Fig. 3 and as more fully described in the said patent to R. G. Osborn, may be connected to the 20 condenser 44 by any suitable connection as by a liquid refrigerant line 46 and an evaporator refrigerant line 47. The line 46 may be provided with branches 48 connected to the float controlled valve 49. The line 47 may be 25 connected by branches 50 with the evaporators 42 and preferably at the outlet 51 in the evaporator.

The evaporators 42 may be provided with means for maintaining independent tempera- 30 tures in said evaporators. Thus automatic adjustable regulating valves 50a may be connected to the refrigerant outlets of the evaporators. These valves may be made to maintain a suitable pressure within the evaporators 42 and may be provided with easily ac- 35 cessible regulating means for varying the desired pressure. These valves may be constructed, for instance, in the same manner as disclosed in the application of Ernest Dickey, 40 Serial No. 349,796, filed March 25, 1929.

The cabinets 41 may be provided with evaporators 43 which may be individually connected to the heat transfer receptacle 20. Thus each evaporator 43 may be connected to 45 a refrigerant line 51 leading to one or more condensers 45 in the heat transfer receptacle. A suitable volatile refrigerant is placed in the evaporators 42-43 and this refrigerant rises in a gaseous phase to the condenser and then 50 flows back into liquid phase to the evaporators where it is re-evaporated. The temperature of the cabinet 41 may be individually controlled by means of a manually operated baffle plate 52 adapted to close the opening 53 55 in the lining 54 forming the cooling unit compartment. All of the evaporators may be provided with suitable ice tray sleeves placed within the coils 55 in the well-known manner. The closing of the baffle 52 causes the freezing 60 action in the ice tray sleeves to be increased because of the reduced air circulation over the sleeves.

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, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus 70 for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said 75 predetermined limit, means enclosing a space to be refrigerated and a heat transfer system from said space to said receptacle.

2. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus 80 for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below 85 said predetermined limit, means enclosing a space to be refrigerated and a heat transfer system from said space to said receptacle, said heat transfer system including an evaporator containing a volatile refrigerant, a condenser 90 in said heat transfer receptacle and a connection between said evaporator and condenser.

3. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus 95 for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said 100 predetermined limit, means enclosing a space to be refrigerated and a heat transfer system from said space to said receptacle, said heat transfer system including an evaporator containing a volatile refrigerant, a condenser in 105 said heat transfer receptacle and a connection between said evaporator and condenser, said connection including a liquid refrigerant line and an evaporated refrigerant line.

4. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus 110 for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said 115 predetermined limit, means enclosing a space to be refrigerated and a heat transfer system from said space to said receptacle, said heat transfer system including an evaporator containing a volatile refrigerant, a condenser in 120 said heat transfer receptacle and a connection between said evaporator and condenser, said connection including a liquid refrigerant line and an evaporated refrigerant line, and an automatic pressure regulating valve in one 125 of said lines.

5. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus 130 for maintaining said receptacle below a predetermined temperature limit, means for

automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, means enclosing a space to be refrigerated and a heat transfer system from said space to said receptacle, said heat transfer system including an evaporator containing a volatile refrigerant, a condenser in said heat transfer receptacle and a connection between said evaporator and condenser, said connection including a liquid refrigerant line and an evaporated refrigerant line, and an automatic pressure regulating valve in one of said lines, and a float controlled valve in said evaporator connected to the other of said lines.

6. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, a plurality of cabinets each having a space to be refrigerated and a heat transfer system from each of said spaces to said receptacle.

7. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, a plurality of cabinets each having a space to be refrigerated and a heat transfer system from each of said spaces to said receptacle, said heat transfer system including an evaporator in each of said spaces containing a volatile refrigerant, a condenser in said heat transfer receptacle, and a connection between each of said evaporators and said condenser.

8. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, a plurality of cabinets each having a space to be refrigerated and a heat transfer system from each of said spaces to said receptacle, said heat transfer system including an evaporator in each of said spaces containing a volatile refrigerant, a condenser in said heat transfer receptacle, and a connection between each of said evaporators and said condenser, said connections including a liquid refrigerant line and an evaporated refrigerant line.

9. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for

automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, a plurality of cabinets each having a space to be refrigerated and a heat transfer system from each of said spaces to said receptacle, said heat transfer system including an evaporator in each of said spaces containing a volatile refrigerant, a condenser in said heat transfer receptacle, and a connection between each of said evaporators and said condenser, said connections including a liquid refrigerant line and an evaporated refrigerant line, and an automatic adjustable regulating valve for each of said evaporators in one of said lines.

10. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, a plurality of cabinets each having a space to be refrigerated and a heat transfer system from each of said spaces to said receptacle, said heat transfer system including an evaporator in each of said spaces containing a volatile refrigerant, a condenser in said heat transfer receptacle, and a connection between each of said evaporators and said condenser, said connections including a liquid refrigerant line and an evaporated refrigerant line, and an automatic adjustable regulating valve for each of said evaporators in one of said lines, and a float controlled valve in each of said evaporators connected to the other of said lines.

11. A refrigerating system including a heat transfer receptacle, cooling means for refrigerating said receptacle, heat absorbing means for refrigerating said receptacle and a heat dissipating means, said heat absorbing and heat dissipating means being operatively connected and containing a fluid, said heat dissipating means being in thermal contact with the atmosphere for cooling the fluid within the heat absorbing means when the temperature of the atmosphere is below the temperature maintained by said cooling means.

12. A refrigerating system including a heat transfer receptacle, cooling means for refrigerating said receptacle, an evaporator for refrigerating said receptacle containing a volatile liquid, and a condenser connected with the evaporator and in thermal contact with the atmosphere for condensing the gaseous refrigerant vaporized in the evaporator when the temperature of the atmosphere is below the temperature maintained by said cooling means.

13. A refrigerating system including a heat transfer receptacle, a refrigerating apparatus for maintaining said receptacle below a predetermined temperature limit, means for

automatically placing said receptacle in thermal contact with the atmosphere when the temperature of the atmosphere falls below said predetermined limit, means enclosing a
5 space to be refrigerated and a heat transfer system from said space to said receptacle, said heat transfer system including an evaporator containing a volatile refrigerant, a condenser in said heat transfer receptacle and
10 a connection between said evaporator and condenser, and an automatic pressure regulating valve in said connection.

In testimony whereof I hereto affix my signature.

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HARRY B. HULL.

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