Dec. 25, 1945. L. A. PHILIPP 2,391,507

REFRIGERATING APPARATUS

Filed Aug. 24, 1944 2 Sheets-Sheet 1

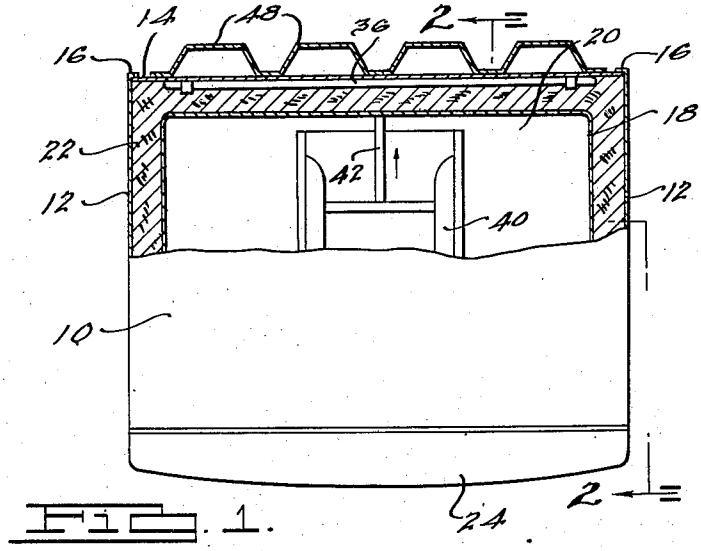


Fig. 1.

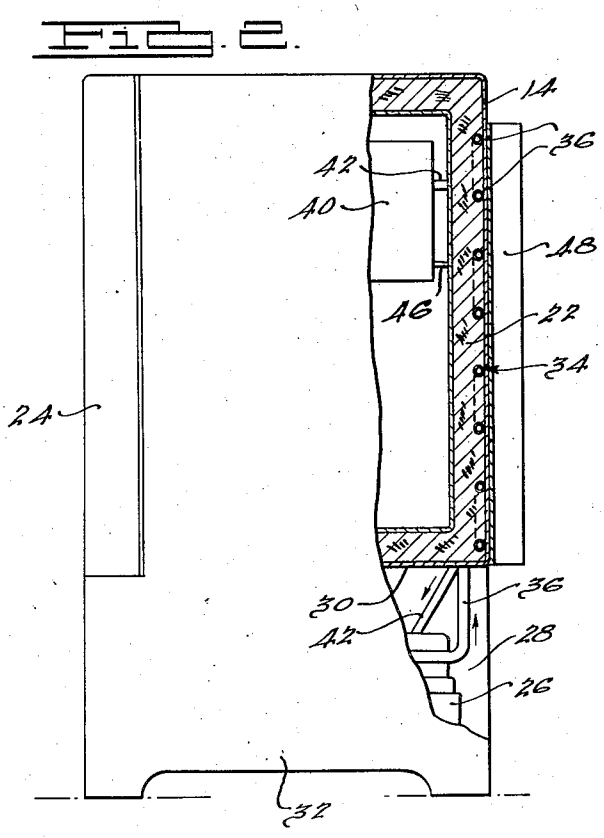


Fig. 2.

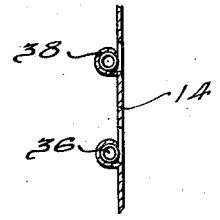


Fig. 3.

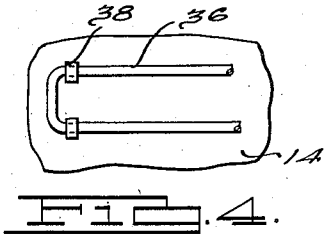


Fig. 4.

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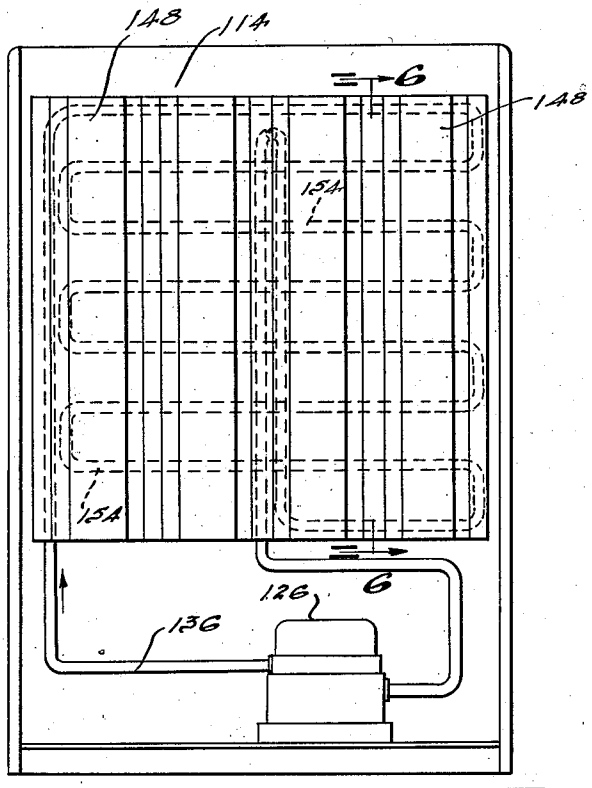


Fig. 5.

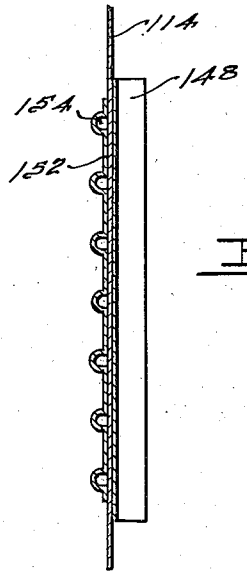


Fig. 6.

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UNITED STATES PATENT OFFICE

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REFRIGERATING APPARATUS

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Application August 24, 1944, Serial No. 550,919

2 Claims. (Cl. 62—116)

This invention relates to refrigerating apparatus and more particularly to an improved refrigerant condenser for household refrigerators.

It has been common practice in the domestic refrigerator field to employ a refrigerant condenser of compact design to absorb heat from the compressed gaseous refrigerant received from a motor compressor unit to liquify the gaseous refrigerant. The condenser occupies an undesirable proportion of the space available in household refrigerators and provides a concentrated source of heat.

An object of this invention is to provide an improved refrigerant condenser wherein an exterior wall of the refrigerator cabinet is employed as a heat radiating surface to dispel heat from gaseous refrigerant and to condense it to a liquid.

A further object of the invention is to provide refrigerant condenser tubes bonded to the inner surface of an exterior wall of a refrigerator cabinet to utilize the cabinet for dissipating heat from gaseous refrigerant thereby reducing the thermo differential by increasing the heat radiating surface area and utilizing what would otherwise be waste space to increase the over-all efficiency of the refrigerator.

A further object of the invention resides in the provision of refrigerant carrying tubes interposed between an exterior wall of a refrigerator cabinet and the insulation associated therewith to utilize the exterior wall as a refrigerant condenser, and wherein vertically extending flues secured to the exterior wall are provided to direct the flow of air to permit convection currents to dissipate heat from the refrigerant condenser surface.

Yet another object of this invention is to provide an economical refrigerant condenser formed of a contoured sheet of metal secured to the back wall of a refrigerator cabinet and cooperating therewith to provide refrigerant passages to utilize the cabinet as a refrigerant condenser.

A further object is to provide a refrigerator having a motor compressor unit positioned beneath a refrigerated compartment having refrigerant condensing passageways associated with its back wall, and vertically extending flues carried by the back wall to receive heated air from the motor compressor unit to induce convection air currents to flow through the flues to dissipate heat from the refrigerant condenser associated with the back wall.

Other objects and advantages of this invention will be apparent from the following detailed description considered in connection with the accompanying drawings, submitted for purposes of illustration only and not intended to define the scope of the invention, reference being had for that purpose to the subjoined claims.

In the drawings, wherein similar reference characters refer to similar parts throughout the several views:

Fig. 1 is a plan view partly in section of a household refrigerator embodying the present invention;

Fig. 2 is a side elevation, partly in section, taken substantially on the staggered line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a fragmentary sectional view showing one desirable form of securing the refrigerant conducting passages to a wall of the refrigerator;

Fig. 4 is a front view of Fig. 3;

Fig. 5 is a rear view of Fig. 2; and

Fig. 6 is a modified form of condenser arrangement embodying features of my invention.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the embodiment of the invention illustrated in Figs. 1 to 4, the refrigerator cabinet 10 is formed of side external walls 12 positioned to engage a thin metal back external wall 14 and to be secured thereto as illustrated at 16. An internal wall 18 is spaced from the external walls 12 and 14 and defines a refrigerated compartment 20. Suitable insulation 22, such, for example, as cork, rock wool, etc., may be interposed between the internal wall 18 and the external walls 12 and 14. A vertically extending door 24 is provided to close the compartment 20.

A motor compressor unit 26 is positioned in a mechanism compartment 28 beneath a bottom wall 30, and the mechanism compartment closed on the sides of the side walls 12 extending beyond the bottom wall 30 as illustrated. The mechanism compartment 28 is open at the back as illustrated in Fig. 2 to permit heat generated by operation of the motor compressor unit to flow upwardly along the external back wall 14.

The motor compressor unit 26 is connected to a refrigerant condenser 34 secured to the inner surface of the external back wall 14. The condenser 34 consists of a network of interconnected

tubes 36 secured to the wall 14 in any suitable manner as by means of clips 38. The tubes 36 extend back and forth across the inner surface of the wall 14, and in addition to the clips 38 are secured to the back wall in intimate thermal contact therewith by any good cementitious material of high thermal conductivity.

An evaporator 40 is positioned in the refrigerated compartment 20 and is provided with a conduit 42 connected to the motor compressor unit 26. The motor compressor unit 26 subjects the evaporator 40 to suction to withdraw gaseous refrigerant therefrom and direct it through the tubes 36 of the condenser 34 under pressure. As the gaseous refrigerant flows through the tubes 36 heat is absorbed from it and dissipated to the atmosphere through the external wall 14 of the cabinet. When the ratio of pressure and heat dissipation reach a substantially predetermined range the gaseous refrigerant in the condenser tubes 36 turns to liquid and the liquid refrigerant is supplied to the evaporator 40 by means of a tube 46 of small diameter connected to the tube 36 to control the flow of liquid refrigerant to the evaporator 40.

Vertically extending flues 48 are secured to the back wall 14 as illustrated in Figs. 1 and 2. The flues are open at the bottom and at the top and extend from a point adjacent the bottom wall 30 to receive heat from the open back wall of the mechanism compartment 28 and direct it upwardly along the back wall 14. The heat generated by the motor compressor unit thus rises through the flues 48 and initiates a convection flow of heat therethrough. Heat absorbed from the gaseous refrigerant flowing through the tubes 36 by the wall 14 is dissipated to atmosphere to accelerate the convection flow of air upwardly through the flues 48. The thin metal flues also serve as heat dissipating fins.

The embodiment of the invention illustrated in Figs. 5 and 6 is similar in many respects to that illustrated in Figs. 1 to 4. Corresponding parts have therefore been given corresponding reference numerals with the addition of 100. A contoured thin metal plate 152 having fluid passages 154 therein may be secured to the internal surface of the back wall 114 of the refrigerator cabinet to provide passages 154 for the gaseous refrigerant to flow in contact with the surface of the back wall 114 to transfer heat thereto to liquify the refrigerant.

It will be apparent that I have provided an improved condenser unit wherein an otherwise non-functioning element, the back wall, is utilized as a heat radiating surface to condense and liquify the gaseous refrigerant in an improved manner whereby greater efficiency is attained and more space is available in the mechanism compartment 28 for the storage of foodstuffs and for other useful purposes.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. Refrigerating apparatus comprising an outer metallic casing and an inner liner arranged in spaced apart relationship, insulation between said casing and liner, a coiled condenser tube united to the inside surface of the rear wall of said casing between the insulation and said casing, and fins united to the exterior surface of said rear wall to form flues and to dissipate heat from said condenser tube.

2. Refrigerating apparatus comprising an outer metallic casing and an inner liner arranged in spaced relationship, said liner forming walls of a food storage compartment, said cabinet also having a mechanism compartment, a cooling element for refrigerating said food compartment, a motor compressor unit in said mechanism compartment, a coiled condenser tube united to the inside surface of the rear wall of said casing and a corrugated metallic strip secured to the exterior surface of said rear wall to form a plurality of flues which also serve as fins to dissipate heat from said condenser tube, said motor compressor unit being connected to said cooling element and condenser tube and being positioned in said mechanism compartment so that heat generated thereby may initiate a flow of convection air currents through said flues to absorb heat radiated from said condenser tube.

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