July 14, 1936. G. J. DOYLE 2,047,462

REFRIGERATING CABINET

Filed Dec. 13, 1934 3 Sheets-Sheet 1

Fig. 1.

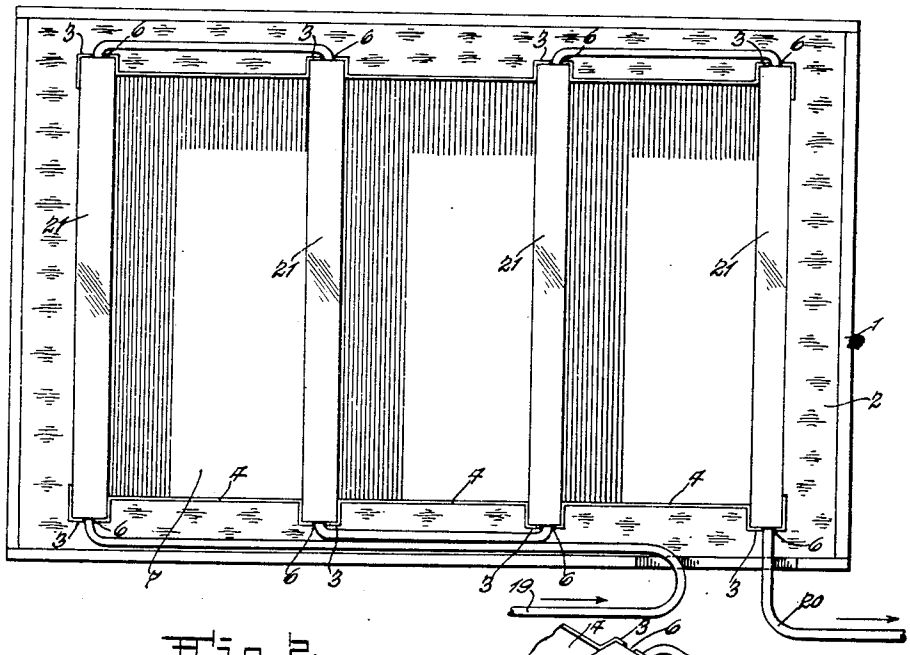
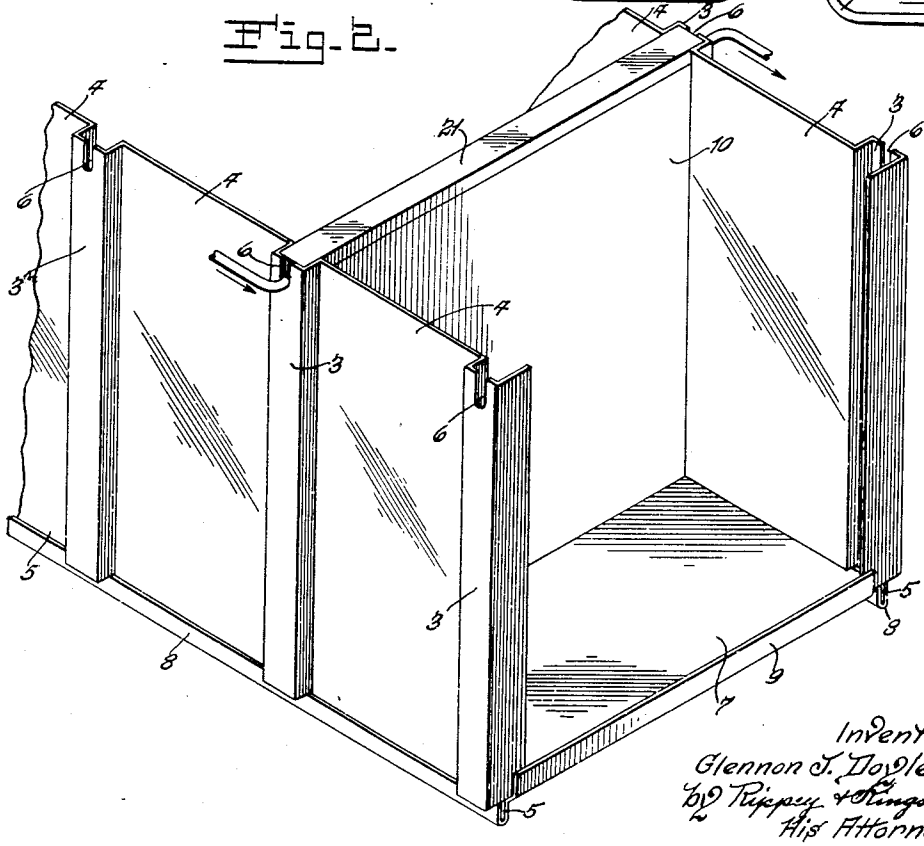


Fig. 2.



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Fig. 3.

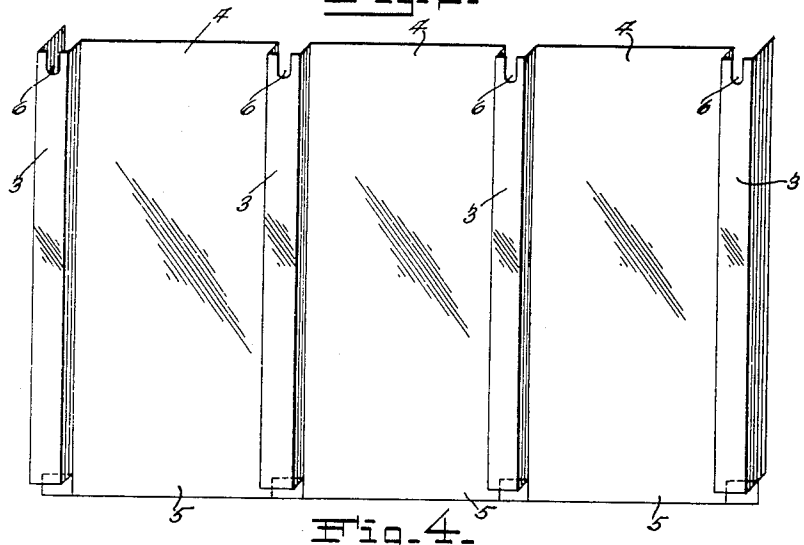


Fig. 4.

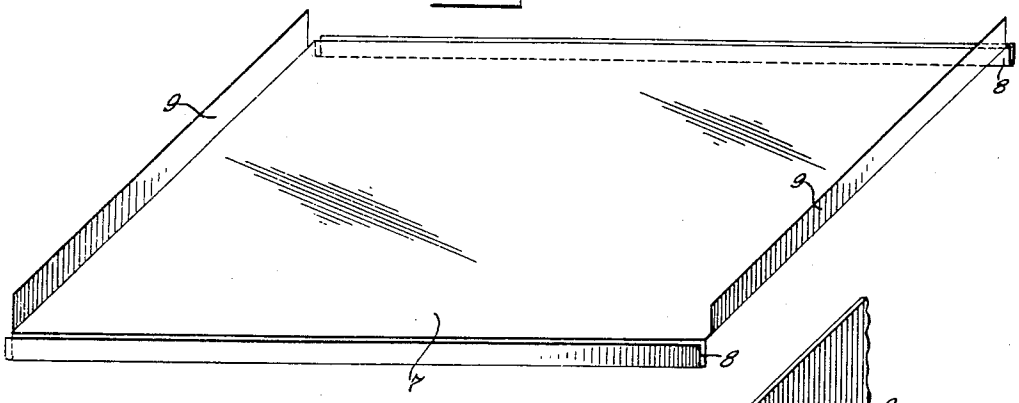


Fig. 6.

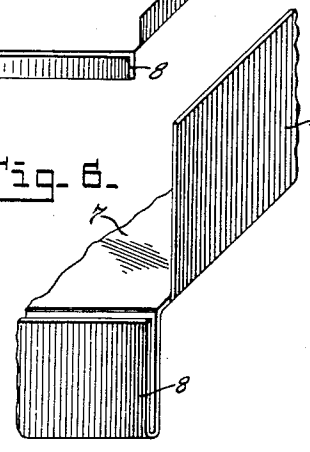
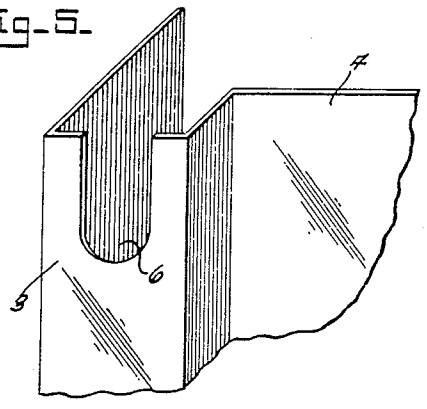


Fig. 5.



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REFRIGERATING CABINET

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Fig. 7.

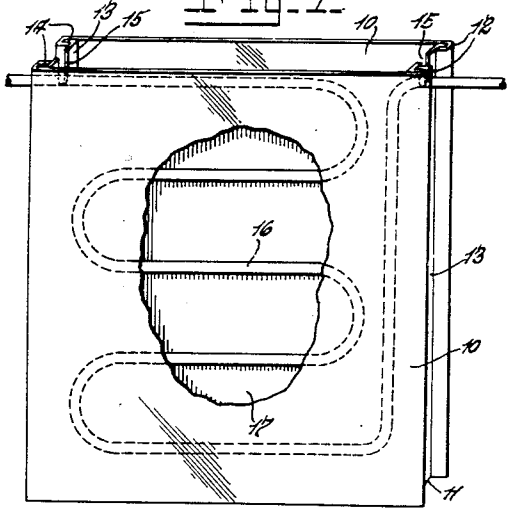


Fig. 8.

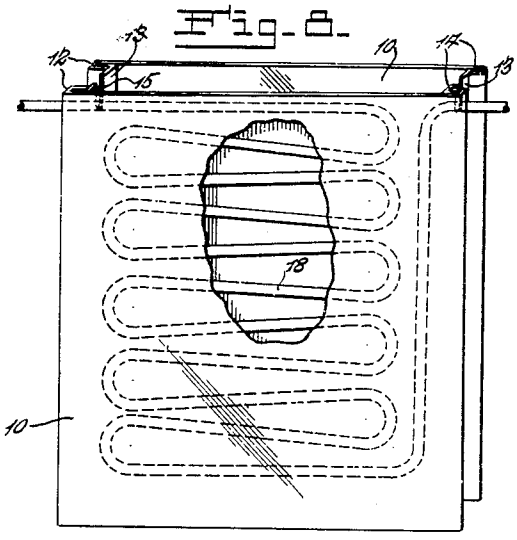


Fig. 9.

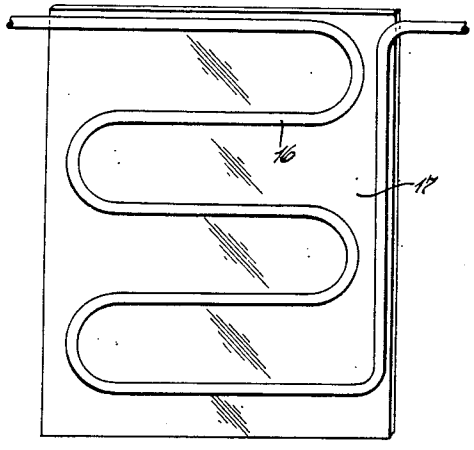


Fig. 10.

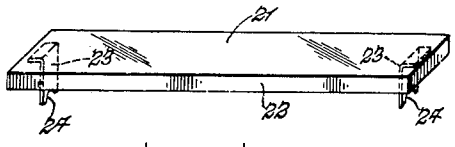


Fig. 12.

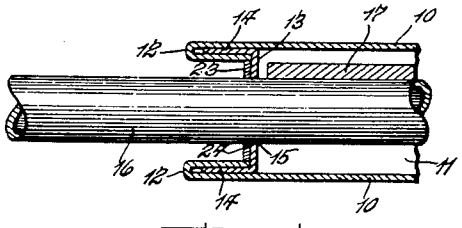


Fig. 11.

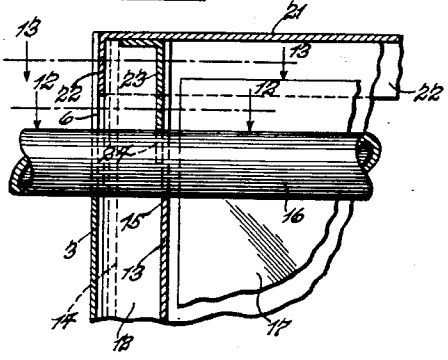
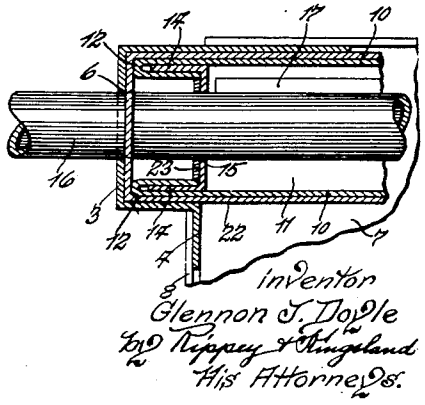


Fig. 13.



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Patented July 14, 1936

2,047,462

UNITED STATES PATENT OFFICE

2,047,462

REFRIGERATING CABINET

Glennon J. Doyle, Clayton, Mo., assignor to C. Nelson Manufacturing Company, St. Louis, Mo., a corporation of Missouri

Application December 13, 1934, Serial No. 757,255

12 Claims. (Cl. 62—95)

This invention relates to improvements in refrigerating cabinets, and consists in the novel construction hereinafter disclosed.

An object of the invention is to provide a cabinet having refrigerating units incorporated therein which may be economically manufactured and efficiently operated, and the detailed advantages of which will be apparent from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a plan view of the cabinet construction.

Fig. 2 is an isometric view of a part of the internal housing showing the manner of the assembly of the parts of the mounting of the refrigerating unit.

Fig. 3 is an elevation of the side plate of the internal housing.

Fig. 4 is a perspective view of the bottom plate of the internal housing.

Fig. 5 is a detail view of that portion of the internal housing in which a refrigerating unit is supported.

Fig. 6 is an enlarged edge view of one corner of the bottom plate shown in Fig. 4.

Fig. 7 is a side elevation, partially in section, of one of the refrigerating units with the top plate removed.

Fig. 8 is a view of similar character of another of the refrigerating units.

Fig. 9 is a side elevation of the refrigerating unit shown in Fig. 7 completely assembled.

Fig. 10 is a top plate for the refrigerating units.

Fig. 11 is a vertical section of the upper corner of a refrigerating unit particularly showing the method of connecting the expansion coil into the unit.

Fig. 12 is a cross section on the line 12—12 of Fig. 11.

Fig. 13 is a cross section on the line 13—13 of Fig. 11.

In the embodiment of the invention illustrated in the drawings, the structure is shown as including an outer housing or cabinet 1 which may be made of wood or any other suitable material and of the general form and type ordinarily used as an ice cream cabinet. Within the cabinet 1 is the internal housing forming the refrigerating compartments, and between the internal housing and the outer cabinet is an insulation space packed with a body of insulation material 2.

The invention herein resides particularly in the construction of the internal refrigerating housing. This housing includes two side plates particularly shown in Fig. 3 of the drawings. These side plates are formed from sheet metal deflected to form a plurality of outwardly extending channels 3 connected by intermediate webs 4 and having a flange 5 along the lower edge thereof extending downwardly from the termination of the lower extremity of the channels 3. The upper edge of the plate forming the side wall is notched to form recesses 6 in the outer wall of that portion of the plate that forms the transverse wall of the channels 3. The housing further includes a bottom plate 7 having the metal of each of the side edges thereof deflected to form a downwardly extending two-wall channel 8, and each of the end edges deflected upwardly to form a single-wall flange 9.

In assembling the side and bottom walls the flange 5 of each of the side walls seats in each of the channels 8, and the flanges 9 extend slightly upwardly from the bottom of the outer channels 3 of the side wall. This assembly is particularly shown in Fig. 2.

The end and intermediate walls of the refrigerating chamber are formed from the refrigerating units. The case of these units is of the same construction but preferably the units at the inlet end of the refrigerant are of the construction shown particularly in Figs. 7 and 9, and the units adjacent to the exhaust end of the refrigerant are particularly shown in Fig. 8.

The case of the refrigerating units comprises side walls 10 connected by a unitary bottom wall 11 forming a rectangular chamber. The edges of the side walls 10 are inwardly turned to form U-channels 12. The end walls of the refrigerating case comprise plates 13 having outwardly turned flanges 14 and are assembled with the side walls by seating the flanges 14 in the channels 12. The upper edges of the end walls are notched forming openings and seats 15 for the pipe forming the expansion coils.

The cases of the refrigerating units are set respectively transversely of the housing in the channels 3 of the side walls. It will be understood that the joints forming the case of each refrigerating unit are soldered or otherwise sealed so that the cases may contain a heat transfer substance or material.

After the cases of the refrigerating units have been thus assembled a continuous expansion pipe is formed to provide expansion coils mounted within each of the cases of the refrigerating units. These expansion coil sections are arranged so that there is substantially uniform cooling throughout the compartments formed by the refrigerating cases. The coils in the refrigerating

units adjacent to the inlet of the refrigerant have relatively wider turns than those adjacent to the outlet end of the refrigerant. In a four coil refrigerating unit cabinet preferably the first two coils are formed as particularly shown in Figs. 7 and 9 with the relatively wide coil turns 16. In connection with the coils 16 I prefer to use a heat transfer fin comprising a thin copper plate 17 attached to one face of the coil. As the refrigerant entering the first two coils is relatively colder than those passing through the last two coils, less heat transfer surface is necessary. The coils 18 in the last two units are of a relatively narrow bend type, and I do not employ in these units the supplemental heat transfer surface provided by the fins 17.

The inlet lead 19 to the expansion coils is laid in the space between the inner and outer housing and enters through the wall of the outer housing. The coils are so formed that a horizontal inlet and outlet section to each coil is provided and these sections seat in the notches 15 in the side walls of the case. The coils are all connected in series and the end coil has a refrigerant discharge lead 20 that extends outwardly through the side wall of the outer housing.

After the coils have been set respectively in the refrigerating unit cases, each case is closed by a cover member comprising a flat plate 21 having a downwardly extending marginal flange 22 that fits over the side and end walls of the case. At each end of the plate 21 and depending from the under face thereof is an angular plate 23 having a notch 24 in its lower edge. This plate fits into the space externally of the end walls 13 of the case and the notch 24 fits over the top surface of the horizontal sections leading into and from the coil portion of the pipe. It will be understood that the cover of the refrigerating unit cases is sealed by solder or other suitable means, so that each forms a tight container for the heat transfer material that is placed in the case and around the coils.

I am aware that the invention may be varied in numerous particulars without departing from the spirit and scope thereof. I do not limit myself to the exact details of construction shown and described, but what I claim and desire by Letters Patent is:

I claim:

1. In a refrigerating cabinet comprising an outer case and an internal housing mounted therein with a space between the outer case and said housing, insulating material within said case, said internal housing comprising a bottom wall and two side walls, sealed refrigerating unit cases disposed between said side walls and forming end and division walls for the housing, and a continuous refrigerant conduit having coil bends, the coil bends being mounted respectively within the refrigerant unit cases.

2. In a refrigerating cabinet, an internal housing comprising a bottom wall and side walls, said side walls being deflected to form oppositely disposed channels, notches formed in the base wall of said channels, a refrigerant unit case supported in said oppositely disposed channels, respectively, cover plates for said cases each of said cover plates including a downwardly extending member having a notch in its lower edge and cooperating with the notches in said channels to form an opening, a continuous refrigerant conduit formed to provide coils with horizontally extending sections entering the case through said openings, and an external heat insulating structure enclosing said internal housing.

3. In a refrigerating cabinet, a housing formed of sheet material, said housing including opposed side walls having opposite channels formed therein and displaced from the planes thereof, said walls extending below said channels, a bottom wall having channels at the side edges thereof, said channels being adapted to receive the extension of the side walls, and a refrigeration unit case adapted to fit across said housing and form a partition wall therein, the ends of said unit case engaging in the channels of the side walls and thereby being held in place.

4. In a refrigeration cabinet, a housing formed of sheet material, said housing including opposed side walls having opposite channels formed therein adjacent the ends of said walls, refrigeration unit cases adapted to form end walls and extending across said housing, the ends of said unit cases engaging in said channels to be held in place, and a bottom wall, said bottom wall having an upturned portion adjacent each end thereof, said upturned portion being adapted to lie against the bottom part of the unit case and form a joint therewith.

5. In a refrigeration cabinet, an outer casing, a unit for installation therein comprising an inner housing of sheet material spaced from said casing, and insulation between the housing and casing, said housing including opposed side walls having opposite channels therein, refrigeration unit cases adapted to extend across said housing and engage in said channels, and form walls across said housing, said unit cases having connector pipes extending from the ends thereof, said channels having slots extending from the edges thereof whereby to accommodate for said pipes when the unit cases are placed in position.

6. In a refrigeration cabinet, refrigeration unit cases adapted to form partitions therein, said cases including side walls having vertical channels at the ends thereof, end walls having flanges engaging in said channels, connector pipes extending from the end walls of said cases, there being cut-out portions extending down from the edges of said end walls to receive said pipes, and covers for said cases, said covers having depending flanges engaging the upper surface of said pipes and holding said pipes in the cut-out portions.

7. In a refrigeration cabinet, refrigeration unit cases including side walls, end walls, and means for fastening said side and end walls together, said end walls having cut-out portions extending downwardly from the upper edge thereof, connector pipes extending through said cut-out portions, covers for said cases comprising sections having flanges around the edge thereof, and adapted to fit over said cases, and depending flanges spaced inwardly from said edge flanges, and adapted to engage the upper surface of said pipes and hold same in said cut-out portions.

8. In a refrigeration cabinet, a housing, refrigeration unit cases adapted to extend across said housing and form walls therein, said cases having end walls, side walls and covers, connector pipes extending from said end walls, said housing having notches extending downwardly from the upper edge thereof to receive said pipes, and said covers having flanges around the edges thereof, the end flanges being adapted to extend down closely adjacent the housing at its notches, and to partially close said notches.

9. A refrigerating unit adapted to be installed

in a box, said unit comprising a series of refrigeration cases, each of which contains a coil and a refrigerant solution, means separate from said box for rigidly attaching said cases together to maintain them in spaced relation, whereby when they are installed in the box they will divide the same into a plurality of compartments, and means connecting the several coils in a continuous series.

10. In a device of the kind described, a plurality of refrigeration cases, each comprising a hollow container enclosing a heat transfer medium and a coil, the ends of the coil extending from the container, means sealing said container to prevent egress of the heat transfer medium, means separate from the box for securing said units together in fixed relation spaced from each other whereby when they are installed in a refrigeration cabinet they will divide the same into compartments.

11. In a device of the kind described, a box, a plurality of refrigeration cases, each comprising a hollow container enclosing a heat transfer medium and a coil, the ends of the coil extending from the container, means sealing said container to prevent egress of the heat transfer medium, means separate from the box for securing said units together in fixed relation spaced from each other whereby when they are installed in the box thus assembled, they will divide the box into a series of compartments, and means connecting the coil ends together to form a single, unbroken, direct pipe free of controls and terminating in two leads extending from the box.

12. In a device of the kind described, a box, a plurality of refrigeration cases each comprising a sealed container enclosing a coil and a heat transfer medium, means comprising walls joining said cases together in spaced relation whereby said cases and said walls when inserted into the box divide the same into a plurality of compartments, and means joining said coils together into a continuous pipe, said pipe terminating in two leads extending from the box.

GLENNON J. DOYLE.