April 7, 1931. E. GRUBER 1,799,744

REFRIGERATOR

Filed Sept. 3, 1927 3 Sheets-Sheet 1

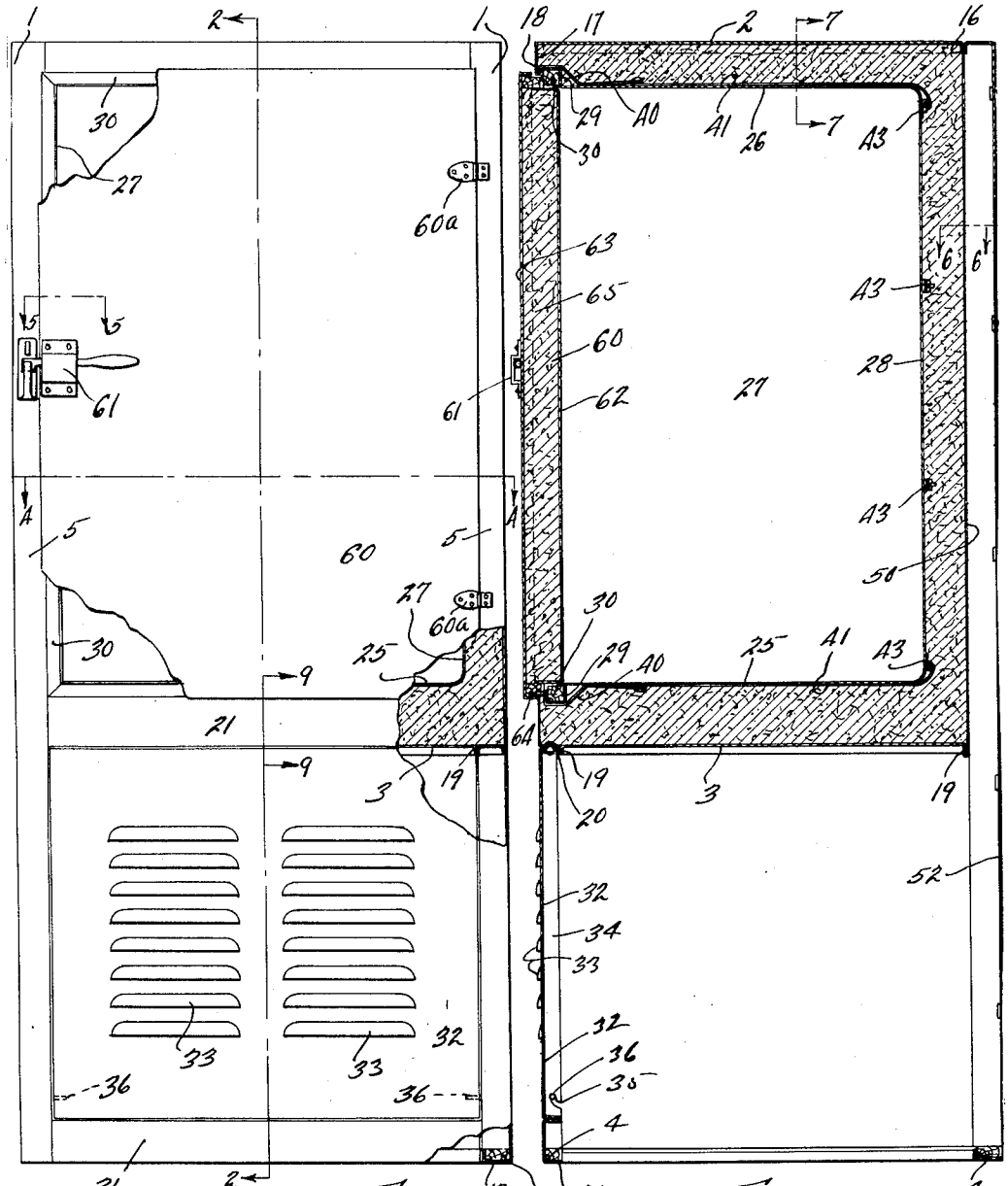


Fig.-1

Fig.-2

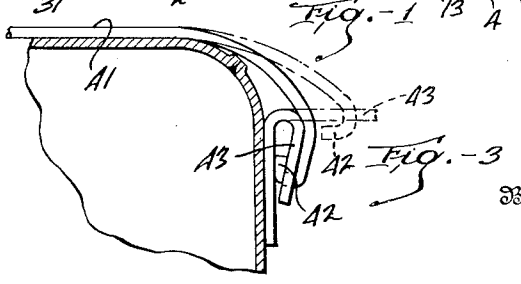


Fig.-3

Inventor

Edward Gruber

By Brockett & Hyde

Attorney

April 7, 1931. E. GRUBER 1,799,744

REFRIGERATOR

Filed Sept. 3, 1927 3 Sheets-Sheet 2

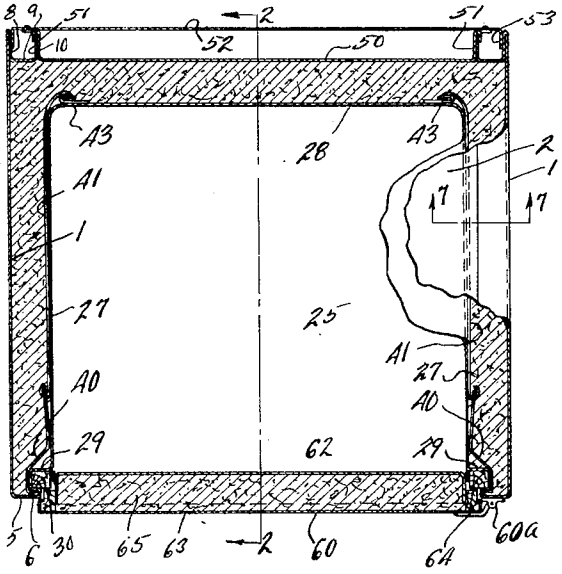


Fig.-4

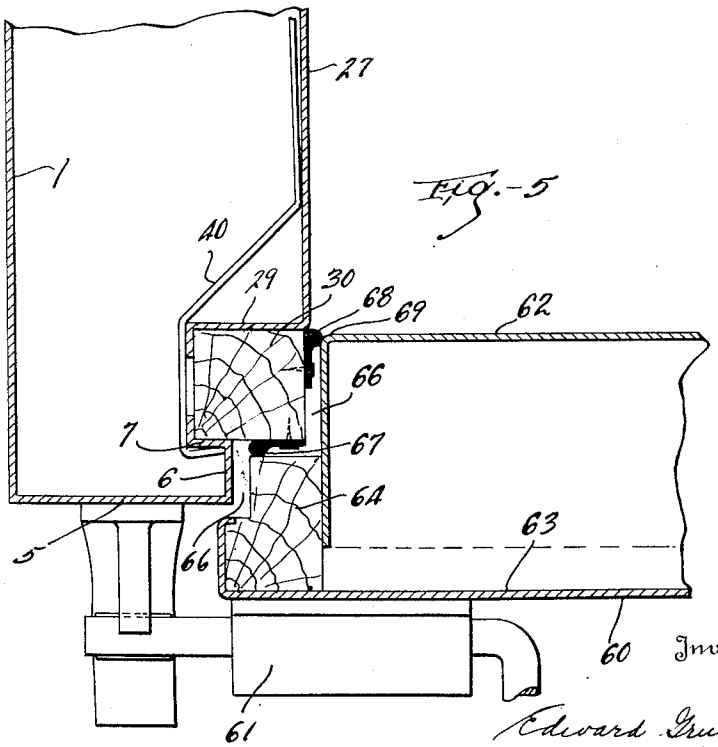


Fig.-5

Inventor

Edward Gruber

By Brockett & Hyde

Attorney

April 7, 1931. E. GRUBER 1,799,744

REFRIGERATOR

Filed Sept. 3, 1927 3 Sheets-Sheet 3

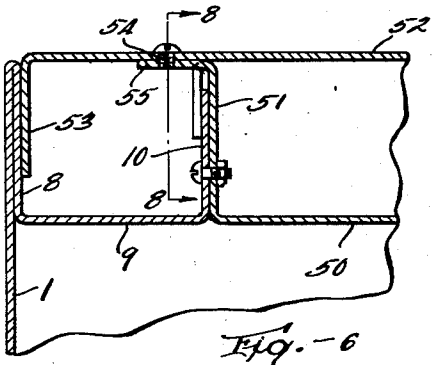


Fig.-6

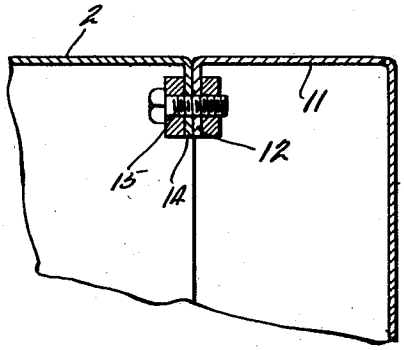


Fig.-7

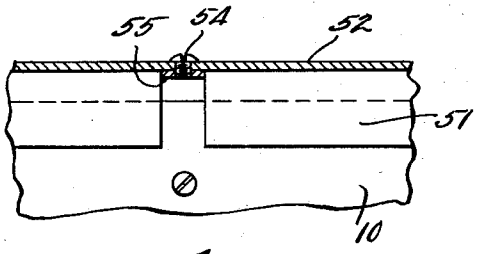


Fig-8

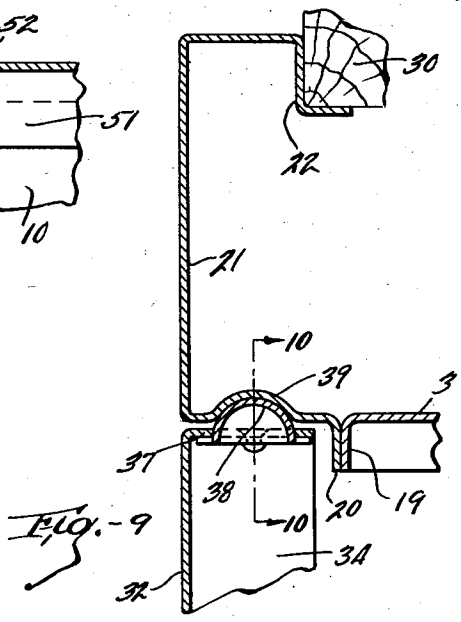


Fig.-9

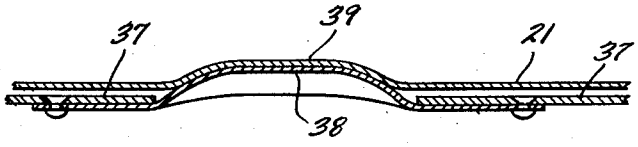


Fig.-10

Inventor

Edward Gruber

By Brockett & Hyde

Attorneys

Patented Apr. 7, 1931 1,799,744

UNITED STATES PATENT OFFICE

EDWARD GRUBER, OF CLEVELAND, OHIO, ASSIGNOR TO EDMUND E. ALLYNE, OF CLEVELAND, OHIO

REFRIGERATOR

Application filed September 3, 1927. Serial No. 217,413.

This invention relates to refrigerators and more particularly to the cabinets or casings thereof.

The object of the invention is to provide an improved refrigerator cabinet provided with an external metal sheath or shell which can be enameled, painted or otherwise provided with a suitable protective coating or surface, and in which is mounted an inner metal shell forming the chamber or compartment in which the material to be cooled is stored, and which shell is thoroughly insulated from the outer shell.

A further object of the invention is to provide a double walled refrigerator which is of simple and rigid form; can be made and sold at a low cost, and which nevertheless thoroughly insulates the cooling compartments against loss of refrigerating effect.

A further object of the invention is to provide a refrigerator in which the inner material containing shell or casing is suspended or floats within the outer casing, but is nevertheless firmly and rigidly connected thereto in a manner to avoid heat transfer between the two parts.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention, Fig. 1 is a front elevation, parts being broken out and in section to expose interior construction; Fig. 2 is a sectional elevation on the line 2—2, Fig. 1; Fig. 3 is a detail view, on a larger scale, of a securing clamp; Fig. 4 is a sectional plan view on the line 4—4, Fig. 1; Fig. 5 is a detail sectional plan view, on a larger scale, on the line 5—5, Fig. 1; Fig. 6 is a detail sectional plan view through a back corner of the box on approximately the line 6—6, Fig. 2; Fig. 7 is a detail sectional elevation on the line 7—7, Fig. 2; Fig. 8 is a detail sectional elevation on the line 8—8, Fig. 6; Fig. 9 is a sectional elevation on the line 9—9, Fig. 1; and Fig. 10 is a sectional elevation on the line 10—10, Fig. 9.

The refrigerator shown in the drawings comprises an outer metal shell or casing which forms a support for an inner shell providing the chamber or compartment for storing the material to be cooled, both shells being made of sheet metal, such as steel or iron, of proper gauge to be readily worked by the usual sheet metal working methods, together with the necessary connecting means between said shells adapted to prevent heat transfer and to provide proper space for insulating material between them.

The outer shell comprises two side plates 1 alike in construction and cross connected by a top 2, a horizontal intermediate wall 3 and a wooden bottom frame 4. The vertical side members are metal sheets channeled along their front edges, as shown in Fig. 5 to provide a front flange 5 and an inwardly extending flange 6 bent to form an angular seat 7, while along their vertical rear edges the metal of the side members is bent back upon itself, as at 8, Fig. 6, then inwardly at 9 and again outwardly at 10 to form a channel opening toward the rear. At their upper ends the side members are flanged inwardly at 11 and downwardly at 12, Fig. 7, while at their bottoms they are likewise provided with channels 13, Fig. 1, to rest upon the floor. At their upper ends, the side members are connected by the top 2, which is a metal sheet flanged along its side edges at 14 for suitable securement to the side flanges 12, as by the bolts 15, and is likewise flanged downwardly at its rear edge at 16. The front edge of the top is flanged downwardly at 17 to a cross section similar to that of the front edges of the side walls to form a similar angular seat 18. Between the upper and lower ends the side members are cross connected by the wall 3 which is a metal sheet flanged downwardly at its edges, as at 19, and secured to vertical supports at the rear, and to depending flanges 20 on a front cross member 21 bolted at its ends to the side members and having its upper edge flanged inwardly to a cross section similar to that at the front of the side and top members, as shown in Fig. 9, to form another angular seat 22, thus providing similar angular seats around the edges of a front opening formed by the side and top members 1, 2 and the front member 21. Said seat is provided to receive the front edge of the inner material containing shell,

which is a box-like member formed of sheet metal having a bottom 25, top 26, side walls 27 and back wall 28, the edges of the side, top and bottom walls thereof being flanged to form a continuous rectangular channelled seat 29 for a connecting frame 30 by means of which the inner shell is anchored to the outer shell. This frame may be made of suitable heat insulating material and in the drawings is shown as a rectangular wooden frame made of four bars, each of substantially square cross section.

The inner portion of the cabinet below the horizontal wall 3 serves as a chamber for storage purposes or for containing refrigerating mechanism. Its bottom frame 4 may support said mechanism directly. Its front may be closed by a bottom bar, shown as a sheet metal channel 31 bolted to the side members, leaving a front opening closed by a sheet metal door 32 provided with louver or ventilating openings 33 and having flanged side edges 34 provided with curved slots 35 to receive pivot pins 36 on the side members 1. A horizontal flange 37 at the upper edge of said door may be provided with a protuberance, such as a small sheet metal button 38 designed to be sprung into a recess 39 formed by depressing a portion of the flange of cross member 21, to releasably hold the door closed. By pulling out on its top the door may be tilted forwardly and downwardly and may also be lifted off from its pivots to fully expose its interior.

In assembling the cabinet, the side members 1 are laid in parallel relation and are cross connected by the top 2, the front cross bar 21, the bottom cross bar 31, the intermediate plate 3, and frame 4, these several parts being bolted, riveted or welded together, but all bolts or connections are across interior flanges and are not exposed on the outside.

The inner shell, with its frame 30 in place in its channel, is then inserted from the back between the vertical channels at the rear of the side members. This may be accomplished by slightly cocking the inner shell sidewise as it is moved into place. It is pushed forwardly until the frame 30 enters the angular seat formed along the front edges of the flanges of the side and top members and cross member 21 and it is there clamped in place in any suitable manner.

The drawings show for the purpose of clamping the inner shell in place a series of binding straps distributed two on each side and one at top and bottom of the inner shell. Each strap includes a hook shaped member 40, designed to be hooked around the angular seat 7 or the like, as in Fig. 5, and to which is connected a metal strap, wire or cable 41 extending to the back of the inner shell where it is provided with a hook 42 which is hooked over a recess in the end of an angular strap 43 secured, as by welding, to the back wall of the inner shell, as shown in dotted lines, Fig. 3. After all of the several hooks and straps are assembled in this manner the free leg of the strap 43 is forcibly bent down to the position shown in full lines Fig. 3, which applies tension to the several straps 41 and firmly ties the inner shell to its seat in the outer shell, leaving a fairly wide gap or space between the two shells, say an inch or two in thickness, to receive the insulating material. Other securing devices are suitable for the purpose.

The insulating material is introduced into this space in any suitable manner. It may be a plastic insulating compound flowed or poured into the space, there to harden, or it may be in the form of sheets of cork or other insulating material pushed into place, the remaining free space between the inner and outer shells being filled with molten plastic insulating cement or like material. A back sheet of insulating material is then laid against the back wall of the inner shell and the opening at the rear is closed by a cover 50, having U-shaped flanges 51 designed to nest or telescope over the flanges 10 at the sides, top and bottom of the rear opening. When this back cover is laid in place it leaves at the rear of the cabinet a cavity possibly two inches in depth, divided into three parts by the vertically extending flanges 10, 51, which cavity is useful for containing either circulating pipes for ammonia or other refrigerant or for water or gas, or for containing flues or channels for products of combustion of gas or like fuel, hot air, electric wires or the like. These cavities at the back of the casing are now closed by an outer cover 52, which is a simple metal sheet flanged inwardly as at 53 and secured by the bolts 54 to ears 55 bent out from the flanges of member 50.

The opening in the front wall of the cabinet, where the inner and outer metal shells are joined by anchoring them to the heat insulating wooden frame 30 seated in the angular seats around the edges of the registering shell openings, is closed by a suitable insulated door 60 mounted on suitable hinges 60*a* and held closed by latching mechanism 61. This door may include spaced inner and outer sheet metal walls 62, 63, suitably fastened to a wooden frame 64, the space between said walls being filled with insulation 65. This arrangement provides a more or less tortuous passage or space at the joint between the door and jamb, as at 66, Fig. 5, and brings the frames 30, 64 opposite to each other, enabling them to support sealing means, such as the gasket members 67, 68, the former lying between flat faces of the wooden frame and the latter being on an inner face of frame 30 where it is engaged by a shoulder 69 of the door sheet.

What I claim is:

1. A refrigerator cabinet, comprising an outer metal shell having a door opening, an inner metal shell spaced therefrom and having a storage chamber provided with an opening registering with said door opening, said shells being provided along the edges of said openings with shouldered seats, a heat insulating frame fitting the seats of both shells, and clamping means extending from shell to shell for securing said frame between them.

2. A refrigerator cabinet, comprising an outer metal shell having a door opening the edges whereof are provided with rearwardly facing shouldered seats, an inner shell having a like opening the edges whereof are provided with forwardly facing shouldered seats, and a self-contained frame insertible as a unit into the seats of the outer shell from the rear and also fitting the seats of the inner shell to support the same.

3. A refrigerator cabinet, comprising an outer metal shell having a door opening the edges whereof are provided with rearwardly facing shouldered seats, an inner shell having a like opening the edges whereof are provided with forwardly facing shouldered seats, a frame insertible into the seats of the outer shell from the rear and also fitting the seats of the inner shell to support the same, and clamping means for connecting said shells to said frame.

4. A refrigerator cabinet, comprising an outer metal shell having a door opening the edges whereof are provided with rearwardly facing shouldered seats, an inner shell having a like opening the edges whereof are provided with forwardly facing shouldered seats, a frame insertible into the seats of the outer shell from the rear and also fitting the seats of the inner shell to support the same, and clamping means for connecting said shells to said frame, including parts extending to the rear of the inner shell and there operatable.

5. A refrigerator cabinet, comprising an outer shell including top, bottom and side plates, the latter being provided along their rear vertical edges with rearwardly opening channel portions, a channeled closure plate forming the rear wall and extending across between said side channels, and a cover for said channels removable from the rear.

In testimony whereof I hereby affix my signature.

EDWARD GRUBER.