Dec. 14, 1943. C. S. JOHNSTON 2,336,687

REFRIGERATOR UNIT

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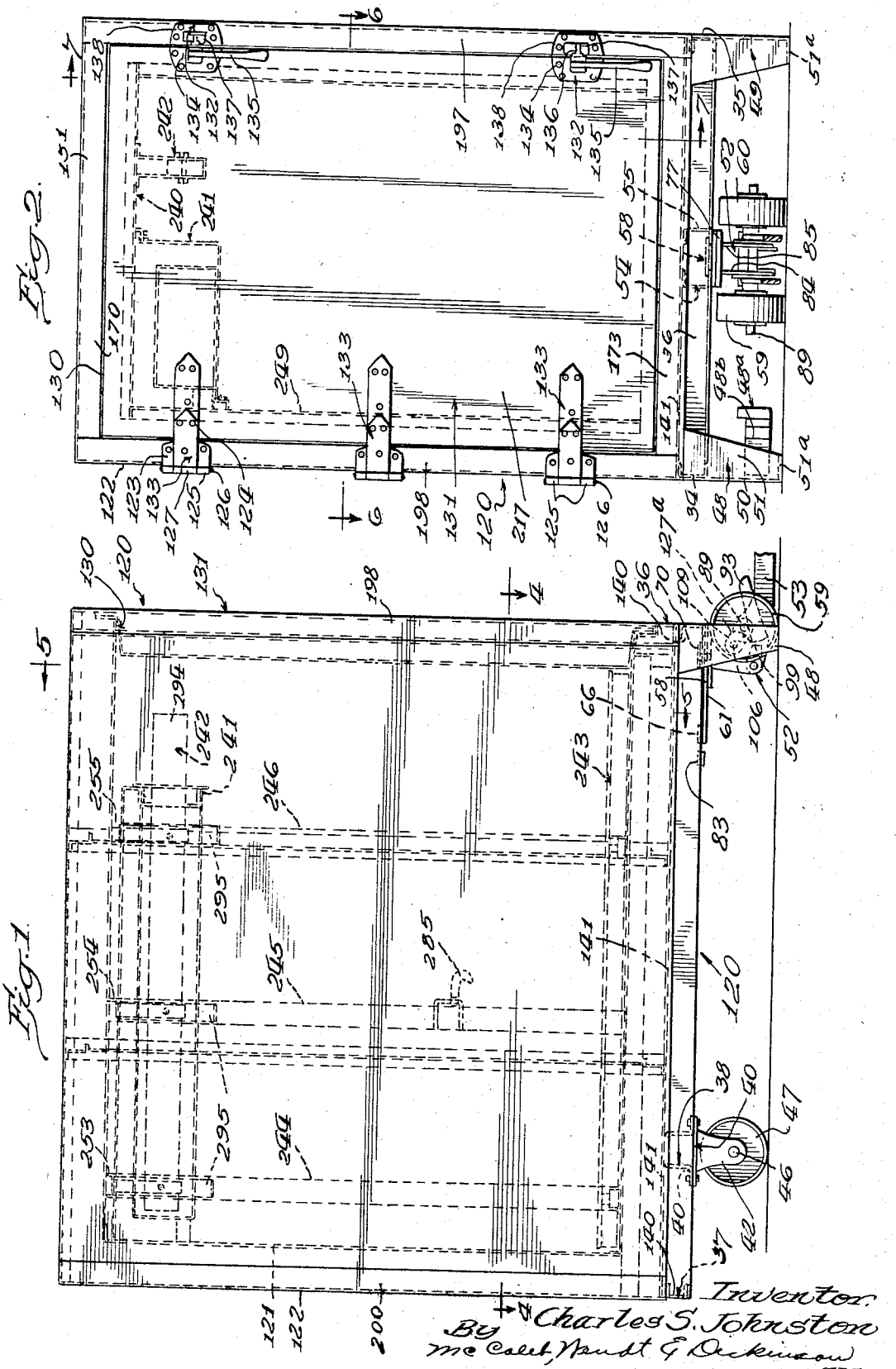

Fig. 2.

Fig. 1.

Inventor
Charles S. Johnston
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REFRIGERATOR UNIT

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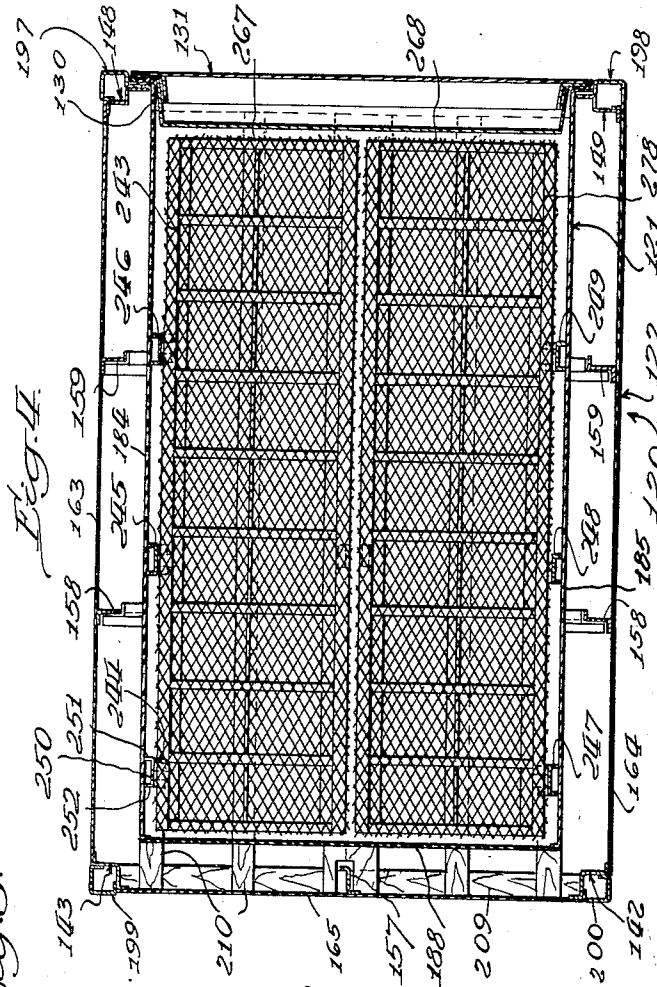

Fig. 4.

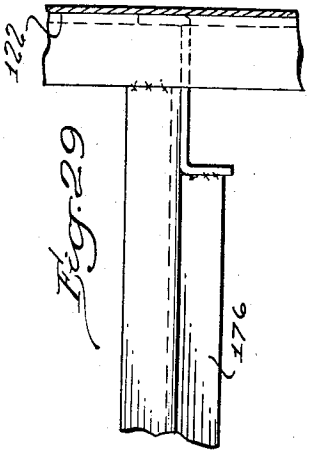

Fig. 29.

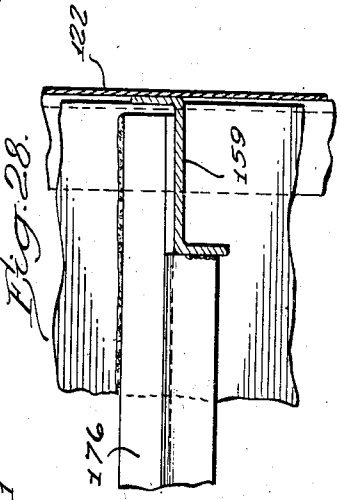

Fig. 28.

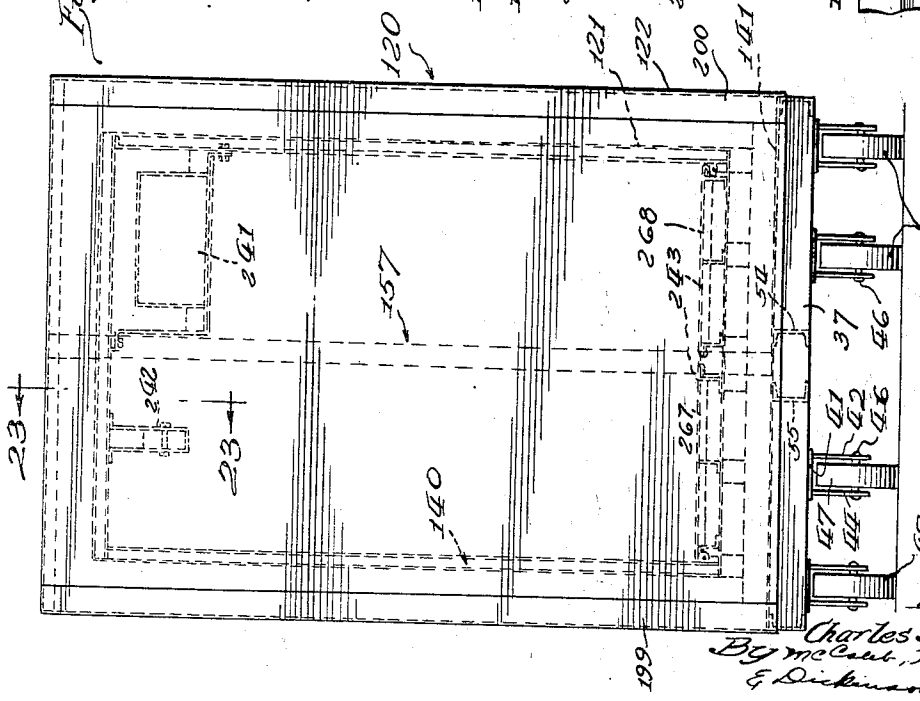

Fig. 3.

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REFRIGERATOR UNIT

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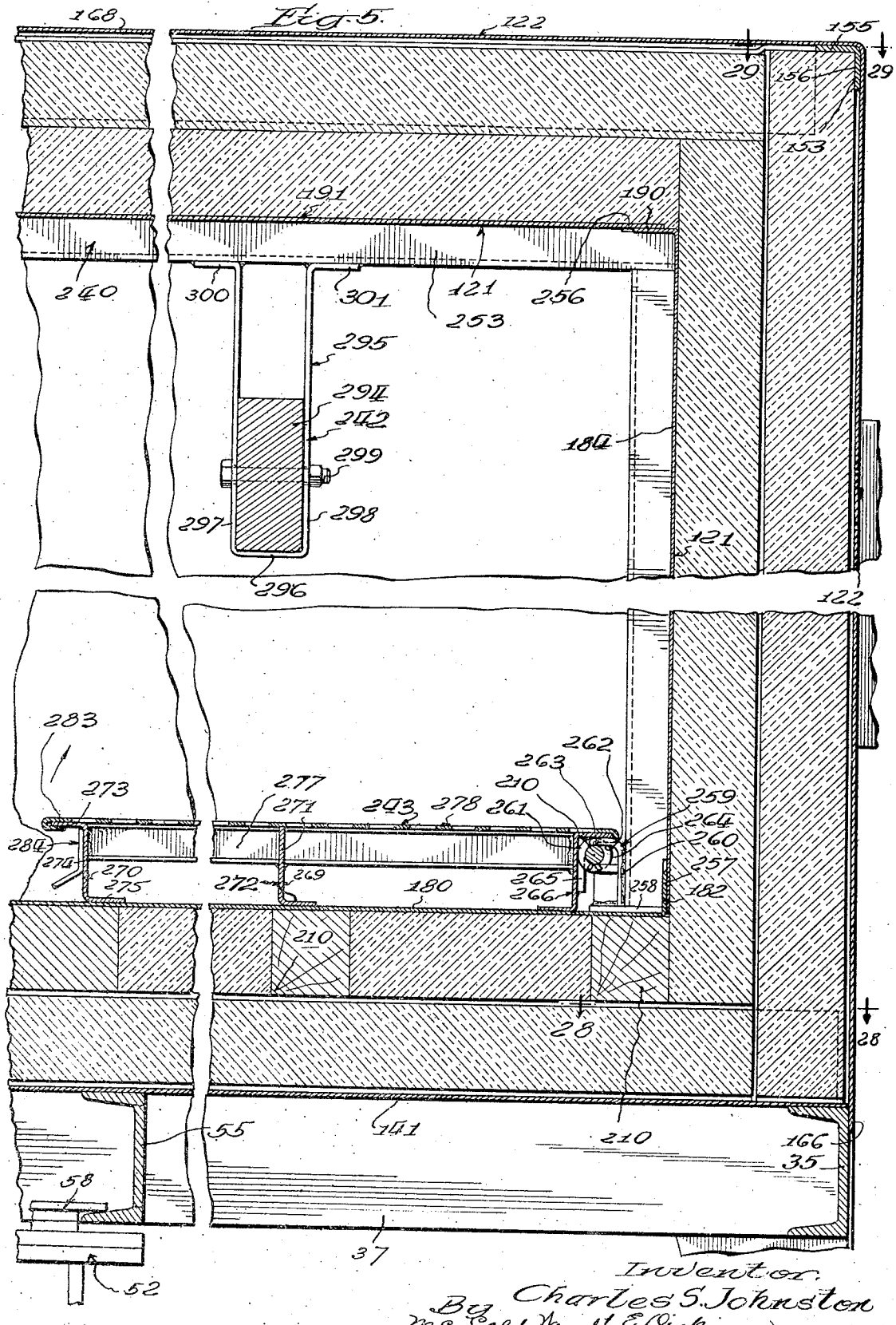
Fig. 5.



Inventor.
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By McCobb, Marshall & Dickinson Attys

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REFRIGERATOR UNIT

Filed June 11, 1941 10 Sheets-Sheet 4

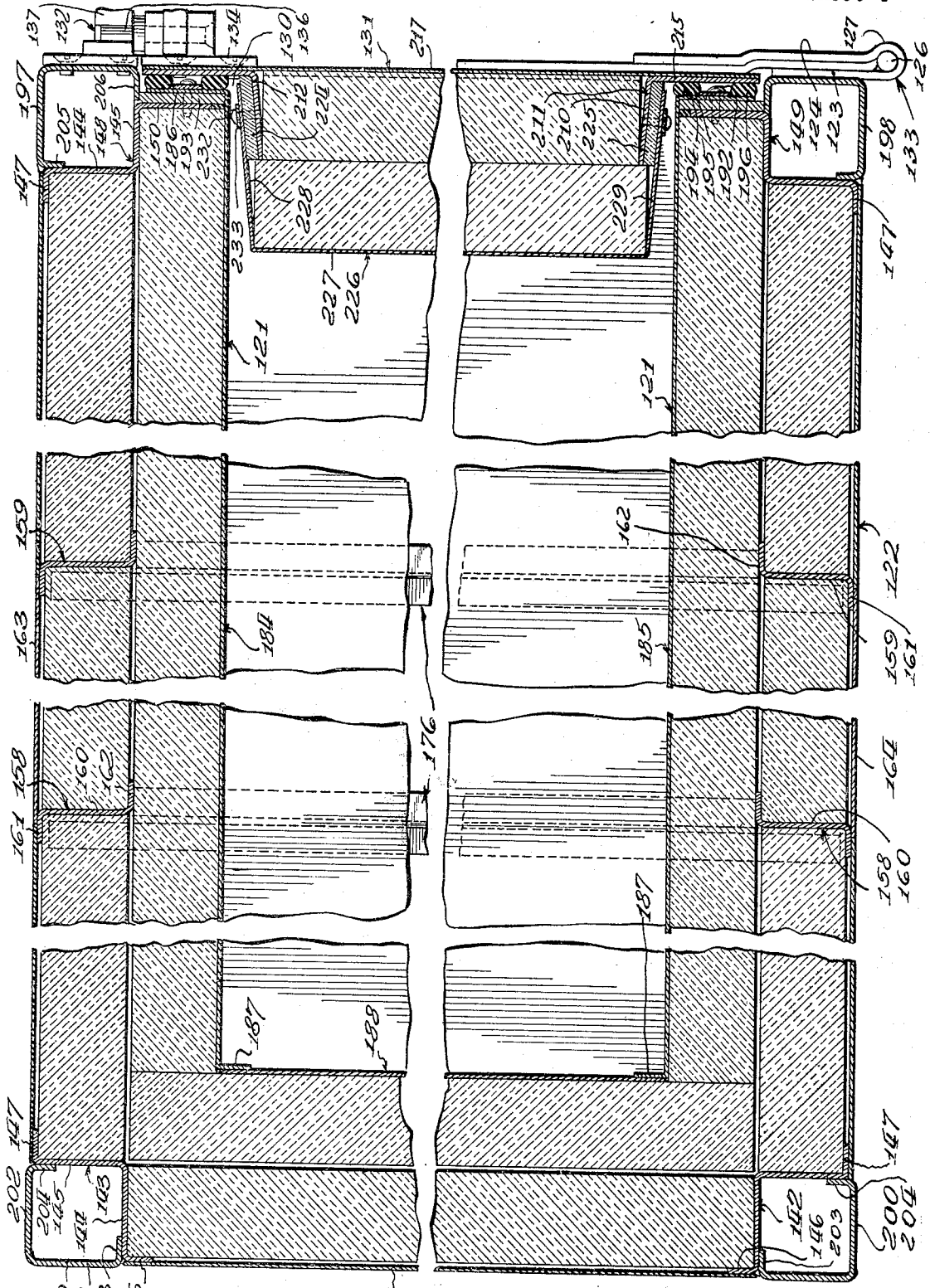

Fig. 6.

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Dec. 14, 1943. C. S. JOHNSTON 2,336,687

REFRIGERATOR UNIT

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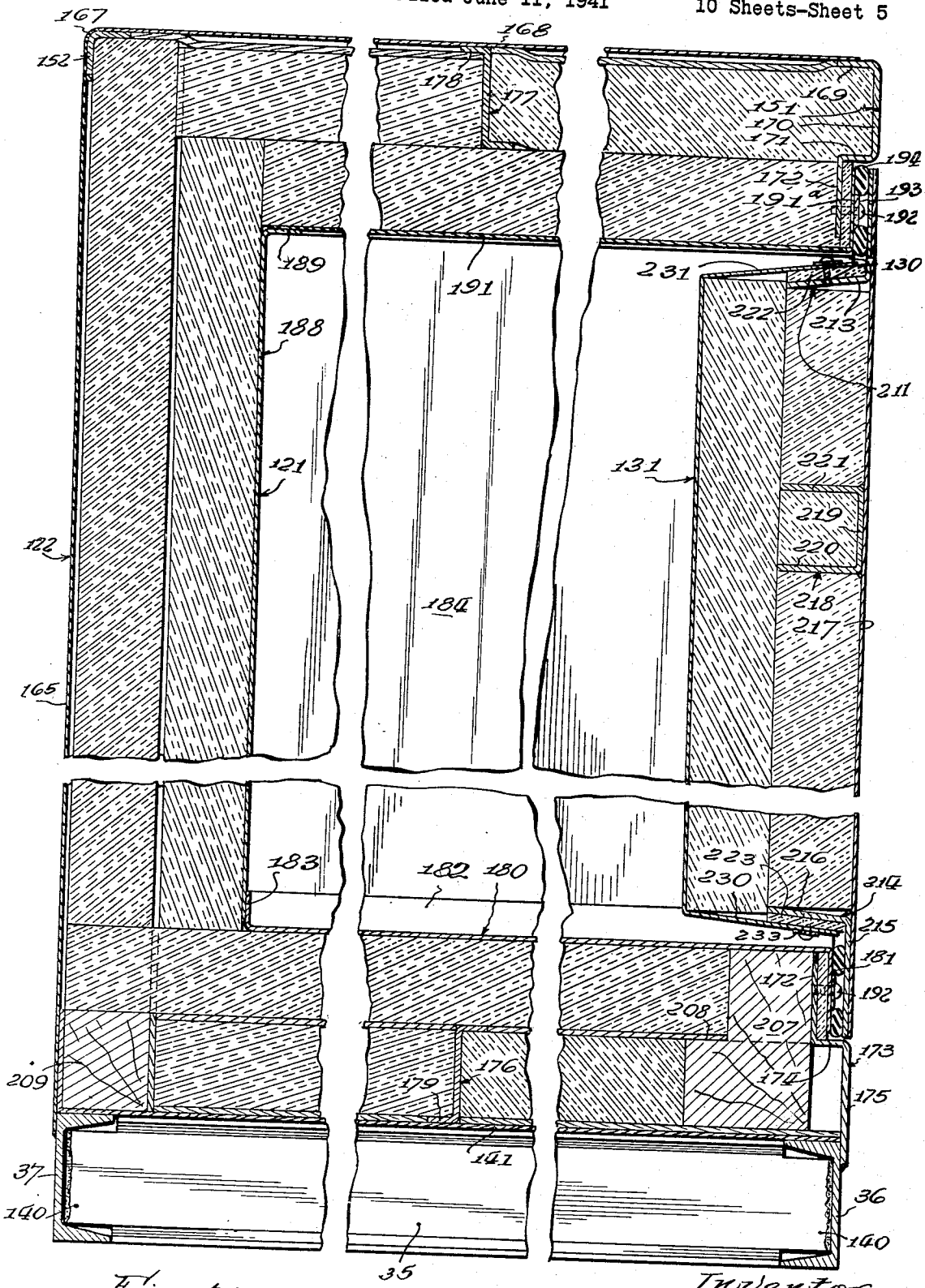

Fig. 7.

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Dec. 14, 1943. C. S. JOHNSTON 2,336,687

REFRIGERATOR UNIT

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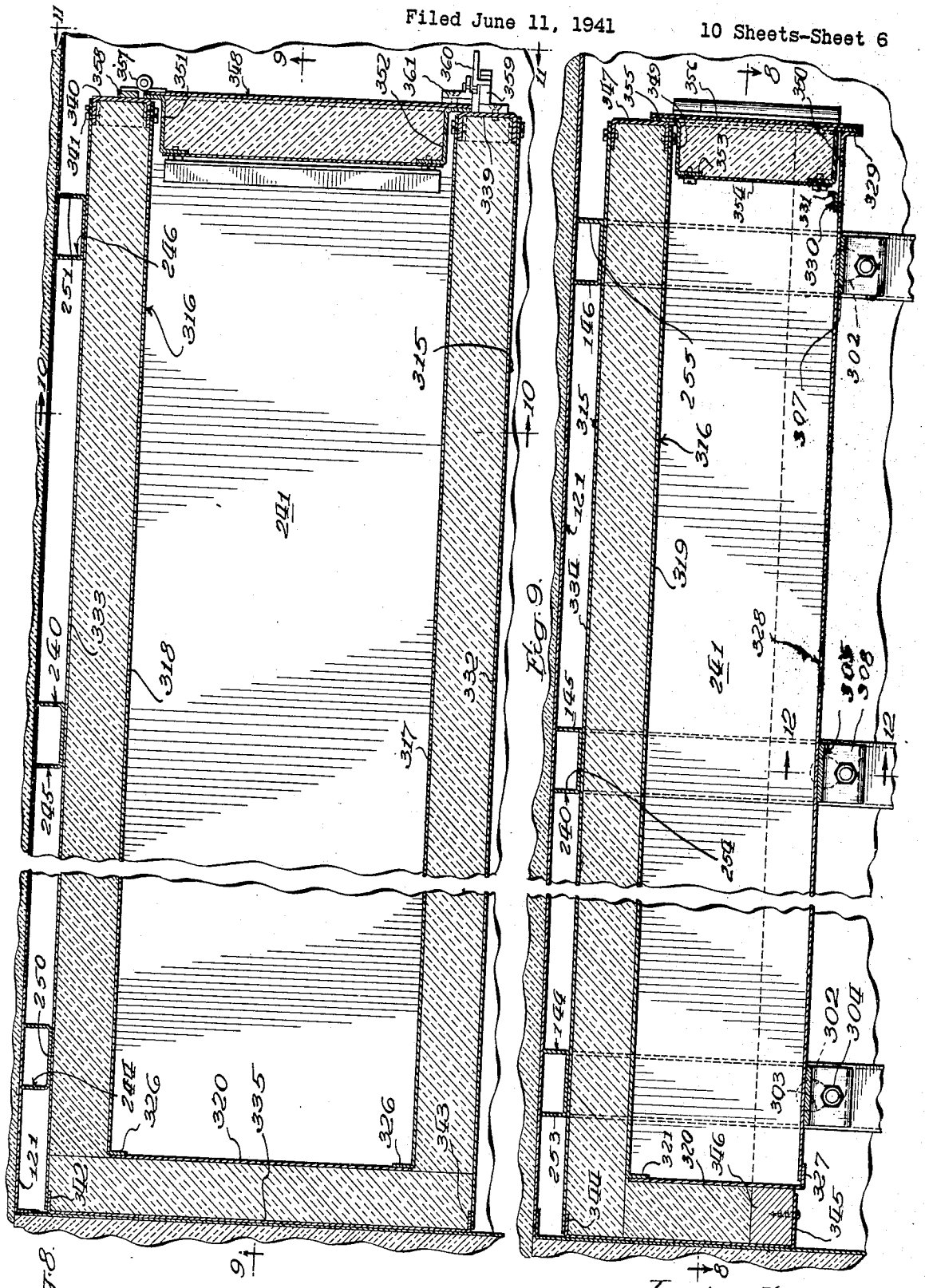

Fig. 8.

Fig. 9.

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REFRIGERATOR UNIT

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Fig. 10.

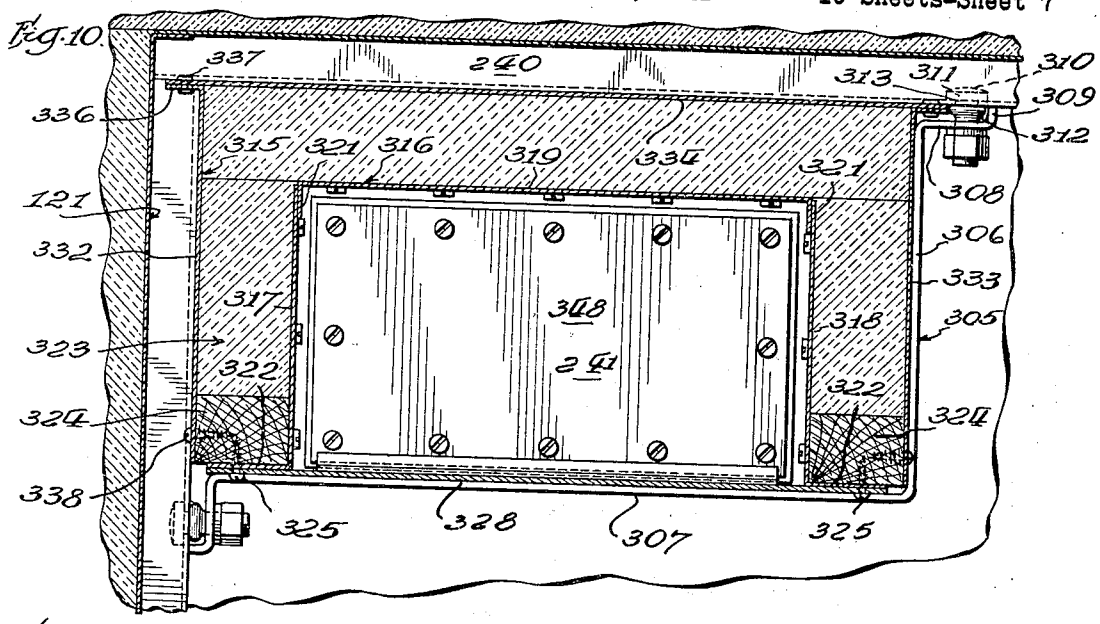
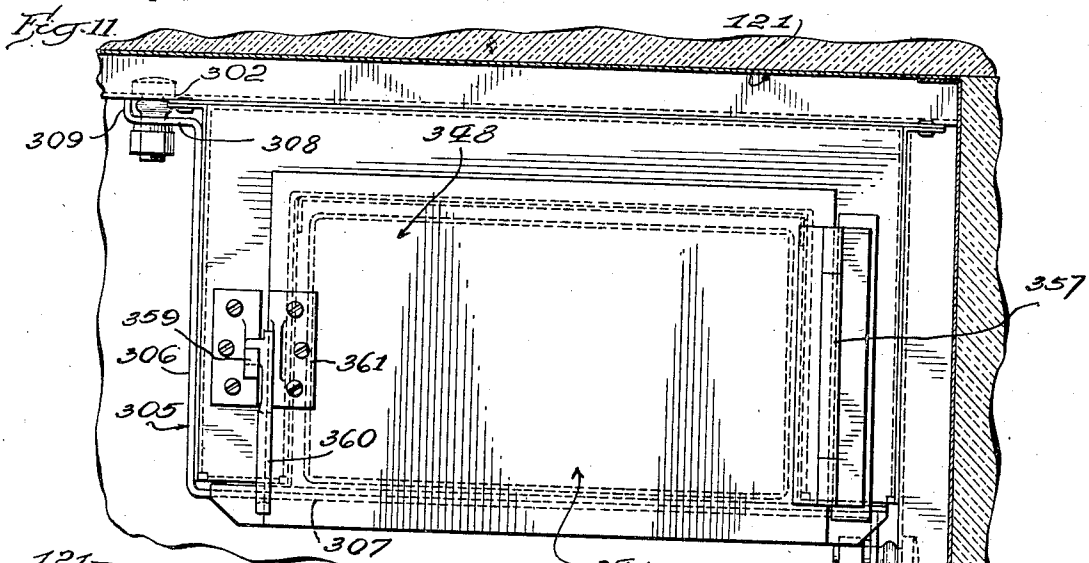


Fig. 11.



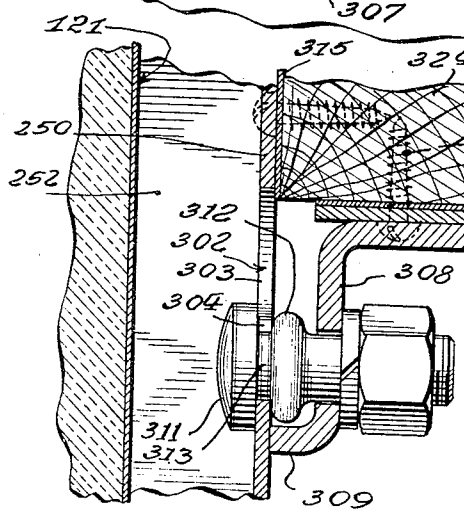


Fig. 12.

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Dec. 14, 1943. C. S. JOHNSTON 2,336,687

REFRIGERATOR UNIT

Filed June 11, 1941 10 Sheets-Sheet 8

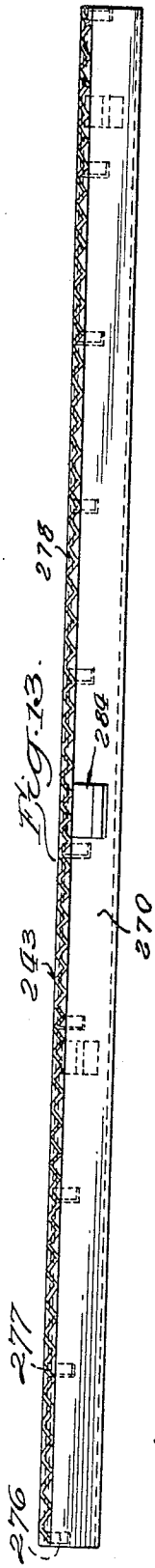

Fig. 13.

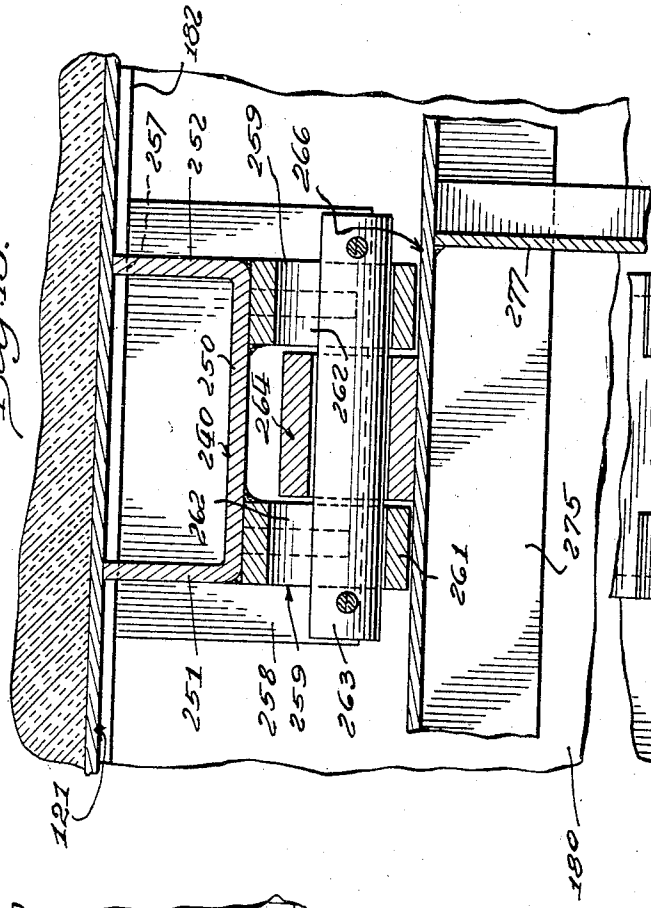

Fig. 15.

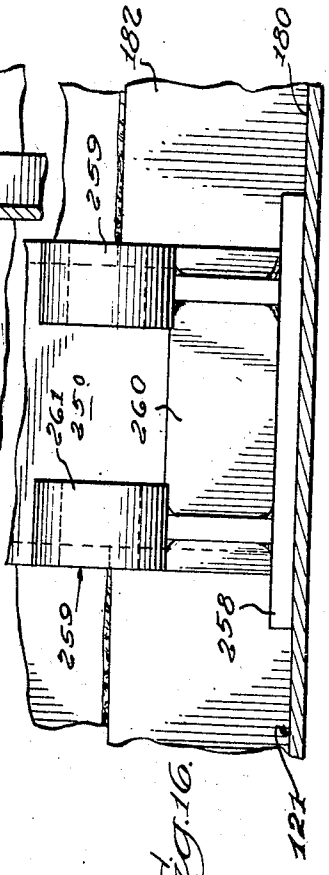

Fig. 16.

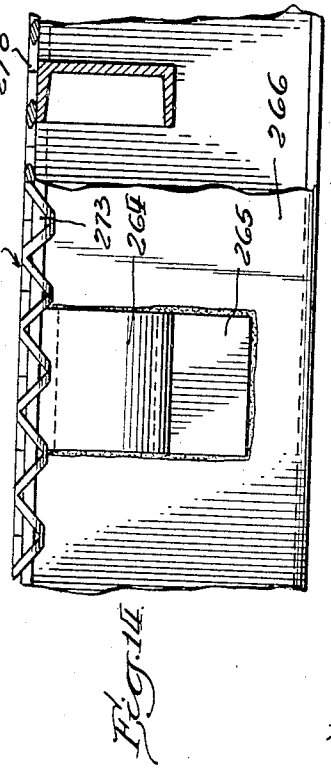

Fig. 14.

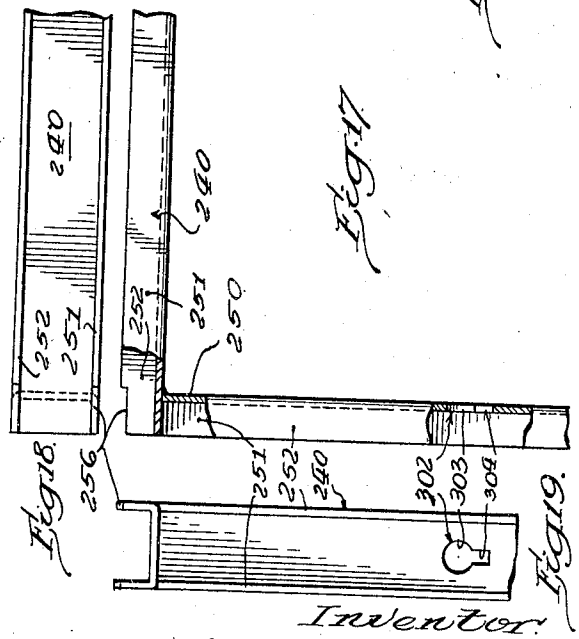

Fig. 18.

Fig. 17.

Fig. 19.

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Dec. 14, 1943. C. S. JOHNSTON 2,336,687

REFRIGERATOR UNIT

Filed June 11, 1941 10 Sheets-Sheet 9

Fig. 21

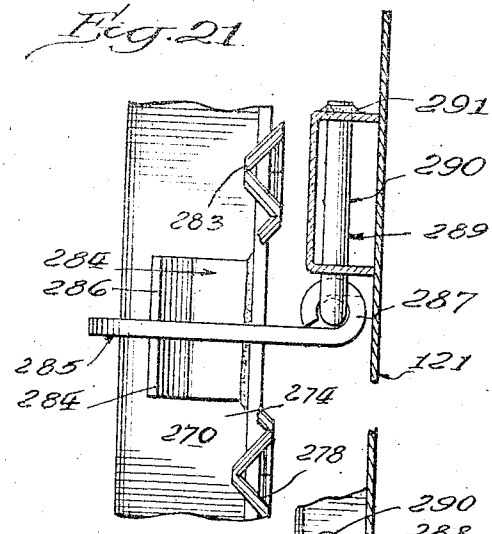
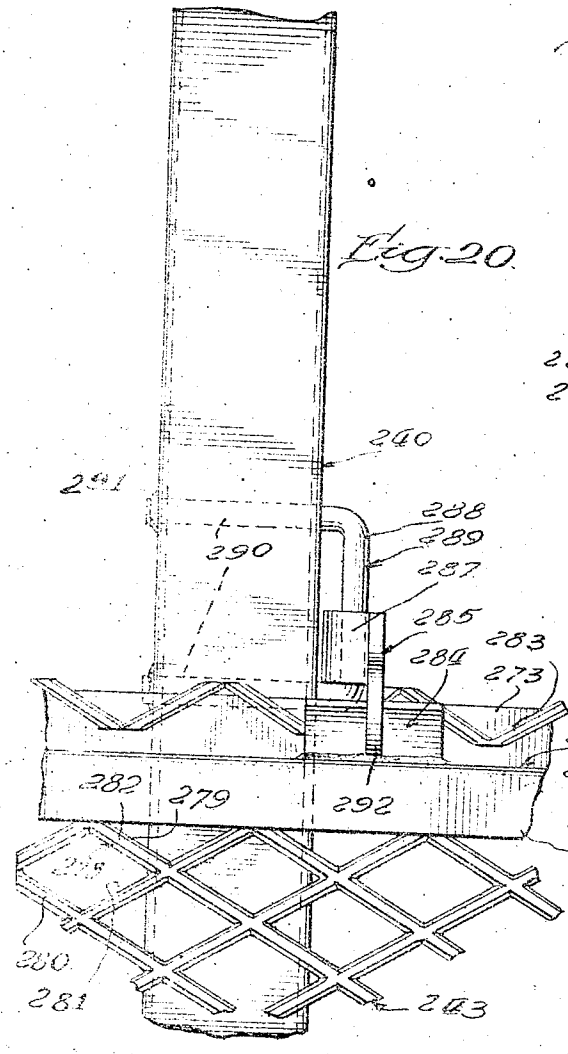


Fig. 20



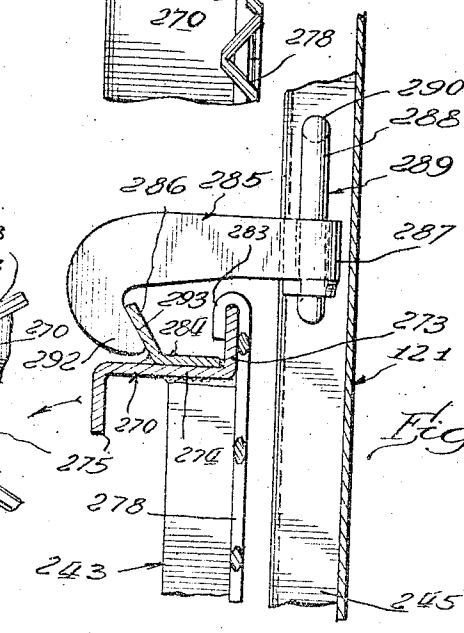
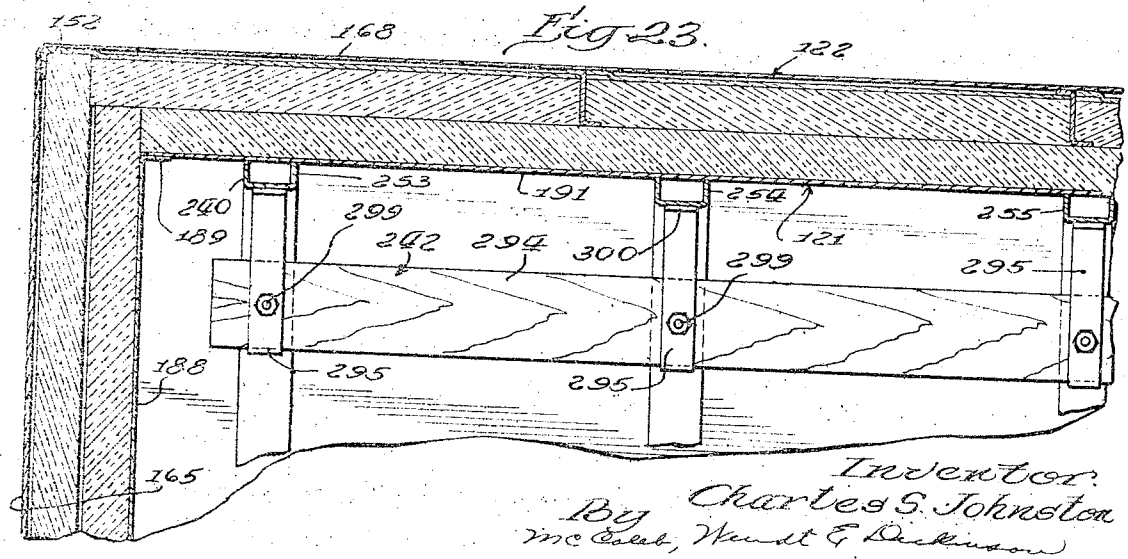


Fig. 22.

Fig. 23.



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Dec. 14, 1943. C. S. JOHNSTON 2,336,657

REFRIGERATOR UNIT

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Fig. 24

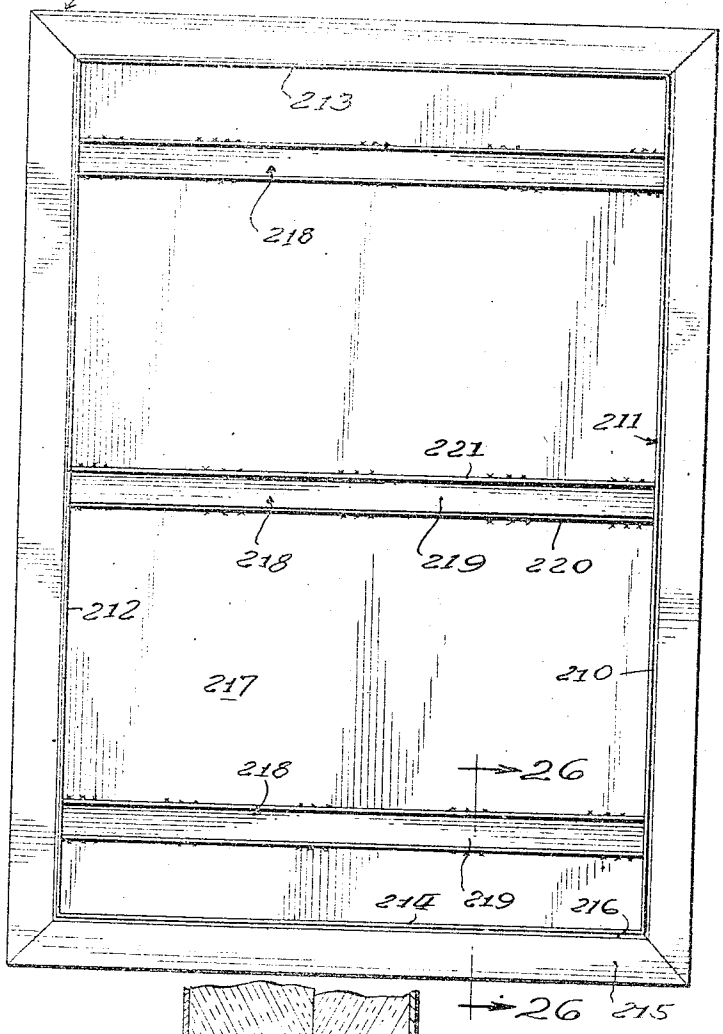

Fig. 25

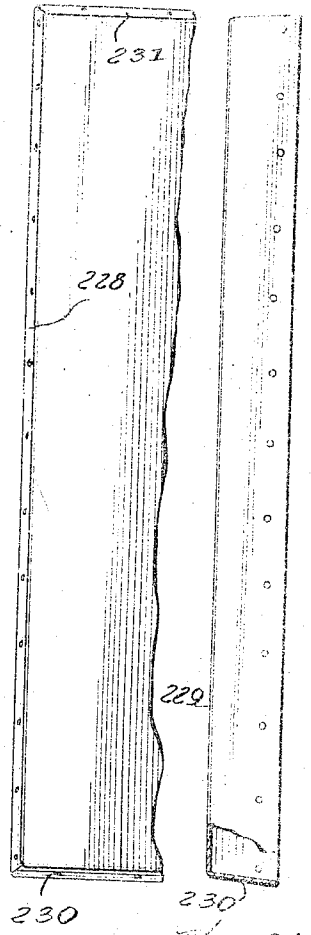

Fig. 26

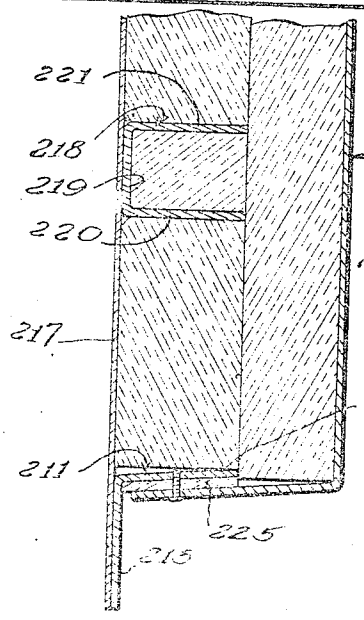

Fig. 27.

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Patented Dec. 14, 1943

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UNITED STATES PATENT OFFICE

2,336,687

REFRIGERATOR UNIT

Charles S. Johnston, Glencoe, Ill., assignor to Transportation Specialties Company, Chicago, Ill., a corporation of Illinois

Application June 11, 1941, Serial No. 397,557

2 Claims. (Cl. 220—9)

The present invention relates to refrigerator units, and is particularly concerned with refrigerator units of a portable type adapted to be used for less than carload shipments of perishable commodities in ordinary freight cars.

One of the objects of the invention is the provision of an improved portable refrigerator unit which is of convenient size, adapted to utilize the space in an ordinary freight car to the greatest advantage, and which is adapted to be moved about with facility so that it can be moved into the freight car or removed therefrom with its load of perishable merchandise intact.

One of the objects of the invention is the provision of an improved refrigerator, having means for facilitating its movement into such a position in a railway freight car that a multiplicity of the refrigerators may be so arranged in the car as to utilize the space most effectively.

Another object of the invention is the provision of an improved refrigerator for less than carload shipments of perishable products, which is adapted to be handled as a unit so that it may be placed in a railway freight car as such, and it may be removed from the car by means of its associated equipment, and delivered as a unit with its perishable products intact and in good condition.

Another object of the invention is the provision of an improved supporting structure for refrigerators of the class described, by means of which the refrigerator is adapted to be held in relatively fixed position in the car by virtue of its weight and the engagement of its lower structure with the floor of the car and by means of which the refrigerator is adapted to be loaded or unloaded as a unit without necessity for using other wheeled vehicles.

Another object of the invention is the provision of an improved refrigerator of the class described, comprising an external metal shell for housing all of the framework, and an internal metal shell forming a lining for the unit, in which the arrangements are such that these shells are insulated from each other in such manner as to reduce to a minimum the transmission of heat from the outside to the inside of the unit.

Another object of the invention is the provision of a refrigerator unit of the class described which is provided with an improved form of floor racks so arranged that they may be moved upward against the sides of the internal walls of the refrigerator and secured in vertical position.

Another object of the invention is the provision of an improved refrigerator unit of the class described which is provided with an improved form of meat rail whereby sections of meat may be suspended in the refrigerator unit after the same manner in which they are usually hung in refrigerated storage spaces.

Another object of the invention is the provision of an improved refrigerator unit which is adapted to utilize as its refrigerant a supply of carbon dioxide in the solid form, the refrigerant being housed in an insulated container having such a limited area of contact with the air of the refrigerator chamber that the refrigerant may be utilized to keep the refrigerator cool over a relatively long period of time.

Another object of the invention is the provision of an improved door structure which is also so constructed that it transmits a minimum amount of heat and so that the cool air in the refrigerator chamber is tightly sealed therein to prevent the ingress of heat by passage of air when the door is closed.

Another object of the invention is the provision of an improved refrigerator unit which is sturdy so that it is adapted to withstand the strains to which it is subjected by the starting and stopping and the pushing and bumping of freight cars, which is adapted to be manufactured most economically so that the shipment of less than carload lots of perishable products may be brought within the means of a larger number of shippers.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are ten sheets,

Fig. 1 is a side elevational view of the refrigerator unit constructed according to the invention;

Fig. 2 is a front elevational view;

Fig. 3 is a rear elevational view;

Fig. 4 is a horizontal sectional view, taken on the plane of the line 4—4 of Fig. 1, looking in the direction of the arrows, showing the structure of the frame and door and showing the floor racks in plan;

Fig. 5 is a fragmentary vertical sectional view, taken on the plane of the line 5—5 of Fig. 1, looking in the direction of the arrows, showing details of structure of the walls, floor rack, and frame;

Fig. 6 is a horizontal sectional view, taken on

the plane of the line 6—6 of Fig. 2, looking in the direction of the arrows, showing the details of structure of the walls and door of the unit;

Fig. 7 is a vertical sectional view, taken on the plane of the line 7—7 of Fig. 2, showing the structure of the walls and door;

Fig. 8 is a horizontal sectional view, taken on the plane of the line 8—8 of Fig. 9, looking in the direction of the arrows, showing the structure of the refrigerant chamber;

Fig. 9 is a fragmentary sectional view, taken on the plane of the line 9—9 of Fig. 8, looking in the direction of the arrows;

Fig. 10 is a fragmentary sectional view, taken on the plane of the line 10—10 of Fig. 8, looking in the direction of the arrows, showing the structure of the refrigerant container;

Fig. 11 is a fragmentary sectional view, taken on the plane of the line 11—11 of Fig. 8, showing the front elevational view of the refrigerant container;

Fig. 12 is a fragmentary sectional view, taken on the plane of the line 12—12 of Fig. 9, looking in the direction of the arrows, showing the mode of support of the refrigerant container on the frame of the refrigerator unit;

Fig. 13 is a side elevational view of the floor rack in the refrigerator unit;

Fig. 14 is a fragmentary elevational view of a portion of the floor rack, showing the rack hinge;

Fig. 15 is a fragmentary horizontal sectional view of the floor rack hinge taken on the plane of the line passing through the axis of the pintle;

Fig. 16 is a fragmentary elevational view of the hinge bracket carried by its supporting channel;

Fig. 17 is a fragmentary elevational view, partially broken away to show sections of the channelled frame members on the inside of the inner shell, which are utilized for supporting the refrigerant container and meat rail, without these members having metal-to-metal contact with the exterior shell, and without piercing the inner shell;

Fig. 18 is a fragmentary top plan view of the channels shown in Fig. 17;

Fig. 19 is a fragmentary side elevational view, taken from the right of the channel in Fig. 17;

Fig. 20 is a fragmentary elevational view of the upper part of a floor rack and the latching means for securing it in vertical position;

Fig. 21 is a fragmentary plan view of the floor rack and its latch, as shown in Fig. 20;

Fig. 22 is a fragmentary vertical sectional view, taken through the floor rack, showing the latch in side elevation;

Fig. 23 is a fragmentary sectional view, taken on the plane of the line 23—23 of Fig. 3, showing details of construction of the meat rack and its support;

Fig. 24 is a rear view of the door frame, with the rear cover plate removed;

Fig. 25 is a fragmentary elevational view of the rear cover plate for the door;

Fig. 26 is a side elevational view, in partial section, of the rear cover plate for the door;

Fig. 27 is a fragmentary sectional view of the assembled door structure;

Fig. 28 is a fragmentary sectional view, taken on the plane of the line 28—28 of Fig. 5, showing the connection of one of the posts of the frame to the bottom framework;

Fig. 29 is a fragmentary plan view, taken on the plane of the line 29—29 of Fig. 5, looking in the direction of the arrows, showing the connection of the posts of the frame to the top frame members.

The present application is directed particularly to the structure of the improved refrigerator unit. The jack structure, by means of which the refrigerator unit is lifted from its front legs and placed on wheels, so that it may be moved about, is covered by my co-pending application, Ser. No. 392,513, filed May 8, 1941, entitled Refrigerators, Case 4.

Referring to Fig. 1, 120 indicates one of a plurality of refrigerator units which are preferably made of such size that a given number of the units will substantially fill a railway freight car of standard size. For example, in my co-pending application, above referred to, there is illustrated an assembly of such units in a freight car of standard size, showing that four refrigerator units may be placed in each end, and another one in the middle of the car.

I desire it to be understood, however, that the units may be made in various different sizes, the dimensions being preferably suited to some one of a number of different arrangements inside the freight car.

For example, the refrigerator units illustrated herein are preferably of such width that two of them arranged side by side will use substantially all of the space in one end of the car, with some clearance between each of the units and the walls and between the two units themselves.

The refrigerator units are preferably made longer than they are wide, and the height is preferably sufficient to permit the hanging of meat, such as quarters of beef, etc., from a rack carried in the top of the unit.

The refrigerator unit preferably comprises a pair of complete and separate metal shells, one on the inside, and the other on the outside, separated and insulated by layers of rigid insulation, under compression, so that there is no metal-to-metal contact between the inner and outer metal layers, and the interior of the unit is well insulated.

Referring to Figs. 1 to 3, the refrigerator unit, which is indicated in its entirety by the numeral 120, constructed according to the invention, preferably comprises the separate inner and outer shells, each of which is indicated in its entirety by the numerals 121, 122.

Both of these shells are preferably made of suitable metal, such as steel, and the outer shell is carried by a frame, which is also preferably made of steel.

Each unit is provided with a front door opening 130, closed by a door 131 of similar construction to the walls, that is, comprising two complete and separate metal shells, separated and insulated by layers of rigid insulation under compression so that there is no metal-to-metal contact between the inner and outer metal layers of the door.

The door 131 is preferably supported on the frame of the unit by means of suitable hinges, such as the strap hinges 133, which have one plate 123 secured to the frame of the door and the strap 124 secured to the door.

The plate 123 is provided with a pair of spaced cylindrically curved pintle bearings 125 for receiving the pintle 126. The strap 124 fits between the pintle bearing flanges 125, and likewise has a cylindrical portion 127 engaging the pintle, the strap being bent back on itself and provided with a long and a short leg, which appear on the front of the door.

The plates of the hinge 133 may be secured to the door and to the door frame by spot welding at suitably spaced points, as indicated by the marks on Fig. 2.

The doors are preferably adapted to be held in closed position, with the gaskets (further to be described) compressed by means of one or more locks, indicated in their entirety by the numeral 132. Each lock may consist of a cast metal fitting 134, upon which there is pivotally mounted a hand lever 135, having an eccentrically mounted pin 136.

The pin 136 is adapted to engage behind the upwardly extending keeper flange 137 of a cast metal keeper member 138, and is located in such manner that the door is forced tightly into the door opening when the handle is pushed downward to the position of Fig. 2.

An upward movement on the handle 135 pivots the pin 136 in such manner as to relieve pressure and then lift the pin 136 from behind the keeper flange 137 so that the door may open.

The supporting framework of the refrigerator unit preferably comprises four inwardly open channel members 34, 35, 36, and 37, arranged in a rectangle, with their flanges extending inwardly. The ends of the long side frame members 34, 35 abut against the upper and lower flanges of the shorter end frame members 36, 37. In order to provide a maximum strength, sufficient of the upper and lower flanges of the long members 34 and 35 are cut away at each end so that the web of these frame members 34 and 35 extends far enough to close the ends of the channels 36 and 37. Thus a tongue 140 is provided at each end of the web of the side frame members 34, 35, which fits between the flanges of the end frame members 36 and 37 so that these frame members are fitted together at the corners. They are preferably welded together at the attaching flanges, the webs, and the lower flanges.

In some embodiments of the invention the tongue of metal 140, formed in the web of these frame members, may comprise a simple member of rectangular shape adapted to abut against the other web, but not having a fit against the tapered upper and lower flanges of the frame members 36 and 37 between which the tongue is located. Adequate strength is secured by merely welding the abutting flanges, and labor saved by not fitting this tongue as indicated at the lower left corner of Fig. 1 in such cases.

Referring to Fig. 2, the two end frame members 36 and 37 are preferably joined by a pair of longitudinally extending channelled members 54 and 55 adapted to serve as the guides for slidably supporting a jack unit, indicated in its entirety by the numeral 52.

The channelled members 54, 55 are preferably of the same width as the channelled members 34—37, forming the outer frame. These channelled members are also preferably secured to the end frame members 36, 37 in the same way just described for the corners of the lower frame 34—37.

Thus the lower frame of the refrigerator unit has guides 54, 55 which serve slidably to mount the jack unit 52 so that it may be drawn forward to the position of Fig. 1, or it may be slid back under the refrigerator unit, as described in my prior application, mentioned above.

The jack unit 52 preferably comprises a slider 58, consisting of the upper and lower plates 66, 70, and 61 (Fig. 1), suitably secured together by spacers and bolts, with a clearance so that the entire jack unit rests on the guides when the weight is placed upon the wheels of the jack.

The jack is mounted on a wheel frame 77, the upper plate of which is pivotally mounted on the slider, and the two depending plates 84, 85 pivotally support a pair of links 109, which carry the wheel shaft 89.

The wheel shaft 89 carries a pair of ball bearing wheels 59, 60, and a handle 53 is also mounted on the wheel shaft 89 by means of an enlarged aperture so that it may be shifted to two different positions. In one position of the handle 53 on the wheel shaft 89 a recessed shoulder 127a engages the stub shaft 106 carried by the depending flanges 84, 85, and in the other position this handle 53 may be pivotally moved with the shoulder 127a clearing the shaft 106.

Thus the handle 53 may be brought into engagement with the shaft 106 to pry the wheel shaft 89 downward and the shaft 106 upward, or the handle may be used and held at any desired height to pull the refrigerator around on its wheels.

A foot latch 93 has a latching shoulder 99, which is adapted to engage the wheel shaft 89 and hold it in its lowermost position, with the wheels 59, 60 supporting the weight of the refrigerator. The lower frame includes a stop member 83, depending from the channel members 54, 55 in such manner that the slider 58 can be slid past the stop 83 when the jack unit 52 depends from the guides 54, 55. However, when the wheels 59, 60 support the load of the refrigerator unit and the plate 61 is pushed upward against the channels 54, 55, the slider 58 will engage the stop 83 and the jack unit is held against sliding movement while the wheels are supporting the weight.

All the details of such a jack unit have been fully described and covered by my prior application, above-mentioned, which is hereby incorporated by reference thereto.

The frame, comprising the members 36, 37, and 54, 55, may have secured to it a pair of channelled members 38 for supporting wheels. Each of these channelled members has its ends abutting against the rear side of the channels 34, 54 or 35, 55, to which the various flanges of the channelled members 58 are preferably welded.

The wheel supporting channels 38 (Fig. 1) have laterally turned attaching flanges 40, by means of which the wheel frames 42 may be attached to the lower frame of the unit. The wheel frames may be of identical construction, each comprising an upper attaching flange 41 (Fig. 3), and a pair of depending bearing flanges 44.

These flanges have apertures for passing the pintle 46, which supports the roller bearing wheels 47, the pintle being riveted over at each end.

In the embodiment illustrated, four rear wheels and rear frames are employed, symmetrically located on opposite sides of the middle of the unit, adjacent the rear end. At its forward corners the lower frame is preferably supported by means of a pair of legs 48, 49, and each leg comprises a pair of tapered flanges 50, 51 at right angles to each other and tapering toward the bottom of the leg.

At their upper ends the leg flanges 50, 51 flatly engage the exterior surface of the webs of the lower frame members 34, 36 and 35, 36, to which they are welded along the edges of the leg, and the edges of the channel.

At their lower ends the leg flanges 50, 51 are preferably joined by a triangular foot flange 51A, which engages the floor and which is welded or

otherwise secured to both leg flanges. The legs 48, 49 are adapted to support the refrigerator unit when it has been moved to the desired place in the freight car. Then the weight of the unit is removed from the jack by stepping on the foot latch 93, and the jack unit is slid back under the refrigerator, with its handle, by means of the slider 58 on the guides 54, 55. Thus the jack unit cannot be lost; and although it is necessary to provide one for each refrigerator, it can be stored in such manner that it will not interfere in any way with the placing of the refrigerator units very close together in the freight car.

One of the legs 48 or 49 preferably has welded to it a handle supporting hook 48A, comprising a piece of sheet metal formed with an upwardly extending lug at one end. Thus, when the depending jack unit has been slid backward under the refrigerator, the handle may be pivoted sidewise on the slider 58 and supported on the hook 48A.

The hook 48A is preferably provided with an offset at 48B so that the hook portion is located behind the leg flange 51 sufficiently so that the entire handle may be located under the frame, including a cross bar at the end of the handle. The outer shell 122 of the refrigerator unit is preferably carried by a vertically extending framework, which includes vertically extending frame members on all of the four sides of the unit. These vertically extending frame members are secured at the bottom to the frame members 34—37, just described, and at the top to another rectangular frame.

The frame, comprising the channelled members 34—37, and 54, 55 (the lower frame) is first covered with a rectangular sheet of metal 141, which forms the bottom of the external metal shell 122. This sheet 141 is welded to the channelled members 34—37 at their upper outer corners, the sheet 141 being of a size to have its edges flush with the outside of the web of the channelled frame member.

The side and end frames and corner posts may then all be supported upon the lower floor sheet 141, to which they may be welded along the lower ends of their flanges. For example, at Fig. 6 the two corners of the unit may be provided with a pair of corner posts 142, 143.

These corner posts are preferably in the form of angles, having a pair of relatively wide flanges 144, 145 at right angles to each other and a pair of oppositely turned narrow supporting flanges 146, 147 at right angles to the flanges 144, 145.

The width of the flanges 144, 145 is substantially equal to the thickness of the sheets of rigid block insulation which are used to insulate the inner shell from the outer shell. The space between the inner and outer shells is substantially equal to twice the thickness of these blocks of insulation so that two layers of the rigid insulation may be used.

I desire it to be understood, however, that these proportions may be varied, depending on the amount of insulation it is desired to employ and on the thermal value of the insulation. At the front end of the unit there are a pair of corner posts 148, 149. These corner posts are of the same shape on each side, and they differ only slightly from the rear corner posts 142, 143.

They both embody the wide flanges 144, 145 and the narrow flange 147, but the other flange 150, forming a part of a door frame, is wider, as shown in Fig. 6, and adapted to be insulated from the inner shell 121 in a manner further to be described.

At their lower ends the corner posts 142, 143, 148, 149 are secured as previously described by having the lower edges of all flanges welded to the bottom floor plate, which in turn is carried by the lower frame.

At their upper ends these corner posts are secured to an upper rectangular frame. This upper rectangular frame preferably consists of the front door header 151 (Fig. 7), the end top angle 152, and a pair of similar side top angles 153 (Fig. 5). The end top angle, and the two side top angles may consist of simply metal angles, having straight ends, and each having a horizontal flange 155 and a vertical flange 156.

The side and end frames of the unit preferably also include a plurality of side and end posts. These may consist of Z bars, and the number of Z bars employed as side or end posts will depend upon the width of the side or end of the unit. For example, in the embodiment illustrated, one end post is employed, and indicated at 157 (Fig. 3 or Fig. 4). Two side posts are employed at each side of the box, as indicated at 158 and 159 (Fig. 4 and Fig. 6).

Each of these side and end posts are of the same size and shape, and they may comprise Z bars, having a web 160 and a pair of flanges 161, 162 extending oppositely and at right angles to the web 160. The distance between the inner faces of the flanges 161, 162 is substantially equal to the thickness of the rigid insulation layer included between these flanges, as shown in Fig. 6. This brings the exterior surface of the flanges 147 and 161 all in the same plane.

Referring again to the top frame, all of the vertically extending frame members, such as the corner posts 142, 143, 148, and 149 of the side and end posts 158, 159, 157, preferably have their outer flanges 147 and 161 cut away at the top by an amount sufficient to provide space for the vertical flange 156 of the top angles.

Thus the lower edge of the flange 156 of the top angles abuts against the upper edge of the outer flanges 147, 61 when the horizontal flange 155 of the upper angles lies on top of the end of the webs 158, 159, 144, or 145.

This permits the outer surface of the top angles, that is, the outer surface of flange 156, to be flush with the flanges 147, 161 so that side plates may be secured to all of these flanges. The side top angles 153, 154 and the top angle are of sufficient length that their upper flanges 155 overlie the flanges 145 on the rear post 143 or 142 and the flange 144 on the front post 148 or 149, to which they are welded.

In the same way the rear top angle 152 has its top flange overlying the flange 144 on the corner post 143 and 142. The top angles and each of their flanges welded to it, adjacent flanges of the corner posts 142, 143, 148, and 149 thus provide a rigid box-like frame for the outer shell.

The top angles are also welded to the side posts 158, 159 and end post 157 at both flanges, these members being shaped so that there is contacting engagement between horizontal and vertical flanges of the top angles, with the adjacent flanges of the side and end posts.

The external shell of the unit is completed by welding the metal side sheets 163, 164 to the flanges 147 and 161 of the side posts and corner posts.

The end sheet 165 is welded to the flanges 161

and 146 of the corner posts and end post. All of these three sheets 163—165 comprise rectangular metal plates and they are of sufficient size to cover the flanges 147 of the corner posts on each side and the flanges 146 of the corner post at the end.

In a vertical direction the side and end sheets are of sufficient length to overlap the bottom floor plate 141 and a portion of the web of the bottom frame members 34—37, as seen at 166 (Fig. 5).

Thus the lower edge of the side sheets 163, 164 may be welded to the lower frame members 34 and 35. At their upper edges these side sheets 163, 164 preferably terminate flush with the top angles 152, 153, 154. The rear sheet 165 may likewise be welded to the rear frame member 37, as shown in Fig. 7; and if desired, it may be bent at right angles at 167 so that the top sheet 168 may consist of a continuation of the rear sheet 165.

The top sheet 168 is wide enough to cover the top flanges of the top side angles 153, 154, and it extends forwardly until it covers the flange 169 of the door header 151. This sheet is also welded to all of the frame members which it engages.

The front header 151 comprises a special channelled member having a vertical web 170, a top flange 169 at right angles thereto, a lower horizontal flange 171, and a depending door frame flange 172. Like the top angles 152—154, this front header has its top flange 169 of sufficient length to rest on the upper edges of the vertically extending flanges 145 of the front corner posts 149 to which the top flange is welded.

The vertically extending corner post flanges 150 of the front corner posts 148, 149 are preferably mitered so that they fit together in forming a door frame, and the horizontal flanges 172 of the door header 151 and the door sill 173 (Fig. 7) are also mitered to fit against the mitered edges of flanges 150 of the front corner posts.

The door sill 173 may comprise a form of Z bar, having a relatively narrow web 174, an upwardly extending flange 172, and a downwardly extending flange 175. The downwardly extending flange 175 overlies the front lower frame member 36, and is welded thereto. The upwardly extending flange 172 is adapted to be secured to the inner shell, from which it is insulated in a method further to be described.

It should be noted that the flanges 172 are shorter than the thickness of the rigid insulation layer used adjacent thereto so as to prevent contact between the inner shell and the outer shell of metal.

The floor and ceiling of the outer shell are preferably reinforced and insulated in exactly the same way as the sides. The floor may be provided with a plurality of transversely extending bottom cross members 176 and the ceiling by a plurality of transversely extending top cross members 177. These cross members are also substantially Z shaped and are similar to the side posts and end post. Sufficient of the top flange 178 of the top cross members 177 is cut away at each end to accommodate the top flange 155 of the top side angles 153, 154 (Fig. 5).

In the same way a part of the lower flange 179 of the bottom cross members 176 is cut away to accommodate the vertically extending web 160 of the side posts 158, 159.

Thus the floor cross members are so shaped that their adjacent flanges fit against the adjacent flanges of the side posts to which they are welded. The lower and upper flanges 179, 178 may also be welded to the bottom and top sheets 141, 168. The inner shell or lining, indicated in its entirety by the numeral 121, is an open ended rectangular box of metal, having outwardly projecting flanges at its open end.

Its bottom may be formed by a metal sheet 180, having a downwardly turned flange 181 at its forward end, upwardly extending flanges 182 at each side, and an upwardly extending flange 183 at its rear edge.

The sides 184, 185 of the inner lining 121 may be formed of a pair of similar metal sheets, each of which is of rectangular shape, but provided with the laterally extending flange 186 at the front end and the oppositely extending flange 187 at the rear end.

The rear wall 188 may be formed of a rectangular sheet of metal overlapping the flange 183 of the bottom sheet 180, and having a horizontally extending attaching flange 189 at the top. The side sheets 184, 185 are each provided with a horizontally extending attaching flange 190 at the top. The top sheet 191 may consist of a simple rectangular sheet of metal, which may overlie the flange 189 of the rear sheet and the flanges 190 of the side sheets, and it is provided with an upwardly extending flange 191a at its front edge.

The depth of the top, side, and bottom sheets from front to back is such that when the insulation has been placed and the shell is inside the insulation there is a clearance between the flanges 181, 191a and 186 of the inner lining and the flanges 172 and 150 of the corner posts, header, and sill. This space is filled by an insulating breaker strip of one-fourth inch indurated fiber.

The flanges 150 of the front corner posts and the flanges 172 of the door, header and sill may be provided with threaded apertures for receiving the screw bolts 192, which are adapted to be engaged by a screw driver. Self-tapping screw bolts may be used. These screw bolts pass through enlarged apertures in the flanges 186 and 181 of the inner lining and are insulated from the flanges 186 and 181 by fiber strips 193.

Thus there is no metal-to-metal contact between the inner lining and any part of the outer metal frame, either through the metal frame members nor lining sheets nor the bolts.

The flanges 186 and 181 of the lining are fastened together by providing an extra rectangular closing piece welded into each corner so that the inner lining is faced with a border flange around its entire boundary. This facing flange is preferably provided with a door gasket 196.

The fiber strips 193 may consist of one-sixteenth inch indurated fiber in the form of a strip three-quarters of an inch wide, provided with a multiplicity of regularly spaced holes for receiving the self-tapping screw bolts 192 which pass through it and the flange 186, and are threaded into the flanges 150.

The gasket 194 may be of the type comprising a pair of substantially circular soft rubber members 195, 196 joined by a layer of reinforced fabric which is clamped beneath the gasket retaining strap 193. In addition to this the gasket may be cemented to the flange 186, and the size of its parts 195, 196 is such that they are compressed when the door is closed, thus providing a double air-tight seal between the door and the door frame on all sides.

It should be understood that the gasket 196 extends all the way around the door frame, and

the retaining strap 193 comprises four such straps, suitably mitered at the corners so as to hold the gasket tightly against the door frame and completely about the door opening.

The ends of the gasket may be suitably beveled and cemented together to form a closed loop. Thus the gasket retaining strap heads of screws 192 are recessed inside the gasket and are kept out of engagement with the door. The inner lining 121 is thus insulated from the outer lining and from the screw bolts 192 by the fiber strip.

The frame of the refrigerator unit is completed by providing the front and rear corner post caps. The front corner post caps are indicated by the numerals 197, 198 and the rear corner posts by the numerals 199, 200. The rear corner post caps comprise angular metal members, each having the flanges 201 and 202 at right angles to each other and of the same width as the flanges 144, 145 of the corner post 143.

These corner post caps have inwardly turned narrow flanges 203 and 204 carried by the flanges 201 and 202, respectively, and adapted to engage the flanges 144, 145 to which they may be welded.

At the bottom the rear corner post caps have the inwardly turned flanges 203 and 204 cut away to a distance of nine-sixteenths of an inch so that the flanges 201, 202 may overlap the lower frame to that extent to which they are both welded. This is the same kind of overlap which is preferably provided for side plates, and at the front both of these flanges abut against the leg flanges.

The front corner post cap is arranged in the same way at its lower end, being welded to the frame, and having similar inwardly turned flanges 205, 206 welded to the flanges 144 and 145. The flange 206 must necessarily be longer because of the spacing provided by the fiber insulating strips.

All four corner post caps are closed by means of a rectangular metal plate which is welded to the flanges 201, 202, 144, and 145, for example.

Then the top of the refrigerator is finished by means of the top cover plate 168, which covers the complete top area and is welded thereto.

The assembly of the refrigerator unit so far described is accomplished as follows. The lower frame 34—37 and its cover plate 141 are first constructed, and the transverse frame members 176, corner posts 142, 143, 148, and 149, and side and end posts 158, 159, and 157 may be secured in place as described. Blocks of rigid insulation, such as cork, are then prepared, the blocks being of rectangular shape and fitting in the spaces between the various frame members described.

The metal surfaces of the floor plate 141 may be covered with a layer of one-eighth inch sealing compound, such as an initially plastic bituminous or asphaltic compound. At the front of the refrigerator floor, behind the sill 173, the assembly is preferably provided with a wooden insulating member 207 of sufficient depth to fill in the space between the inner lining 121 and the floor 141. This frame member 207, which may be called a wooden sill, is provided with a base portion of greater width and a flat transverse shoulder 208 (Fig. 7).

At the lower rear corner of the unit there may also be provided a wooden sill member 209 of the same height as the cross frame member 176. The purpose of these sill members is to support the rearwardly extending wooden frame members 210 (Fig. 5) which are located on the floor and supported by the frame members 207, 209 and the metal frame member 176.

The thickness of the wooden frame members 210 is such that they fill the remainder of the space between the inner shell and the floor plate 141, and thus the inner shell is firmly supported upon the wooden insulating members 207, 209 and 210. The wooden frame members 210 may extend from the front sill 207 to the back plate of the refrigerator. All of the other space between these frame members in the floor of the refrigerator is filled with rectangular blocks of cork which are separated and held in place by layers of sealing compound.

The inner lining 121 having been assembled into a box-like form, it may then be placed upon the frame members 210, as shown in Fig. 5, and may have its front flanges bolted to the flanges 150 of the front corner posts 148, 149 and suitably insulated from these posts, as previously deserибed.

Then the side walls and back may be filled with blocks of cork insulation as shown, and the cork is in every case secured in place by the intermediate layers of sealing compound so that the entire space between the frame members and the two linings is filled with cork.

It should be noted that in no case does the outer shell or supporting frame have metallic contact with the inner lining. Finally, the top frame may be secured in place and the top transverse frame members also added, and the top of the inner shell may be covered with the blocks of cork as described.

The door 131, previously referred to, has its structure best illustrated in Figs. 6 and 7. It is preferably provided with a supporting frame 211, which may consist of four angle members 210, 212 at the side (Fig. 6), 213 at the top, and 214 at the bottom (Fig. 7). Each of these angle members is of similar shape, and each comprises a vertically extending face flange 215 and an inwardly extending flange 216, which is at an angle slightly greater than ninety degrees.

The angularity is such that the size of the frame tapers inwardly and gives the door a suitable clearance with the walls of the lining, as shown in Fig. 7. The flanges 215 of each door frame member 212—214 are mitered so that they may be welded in abutting relation to form a rectangular frame, and the flanges 215 are beveled, or they might be said to be mitered also, so that they come into abutting relation to be welded together.

Thus the main door frame 214 is a frame of rectangular shape, constructed of angles, having an angle slightly greater than ninety degrees. The front of this frame may be closed by a sheet of steel 217 of rectangular shape and of sufficient size to cover the flanges 215, to which it is spot welded.

At regularly spaced points, such as, for example, three places, the side frame members 212, angles 210, 212 are joined by cross channels 218 (Fig. 7). Only one of these cross channels is shown in Fig. 7, but any number are employed; and in the example shown three are used.

The cross channels 218 have their web 219 welded to the front sheet 217, and at their ends the side flanges 220—221 are suitably beveled to fit against the frame members 210, 212, to which they are welded.

The cross channels 218 are preferably located

one at the center of the door and one at the top, and one at the bottom, the latter two being located at proper position to be engaged by the straps of the hinges. Thus the narrow frame is reinforced and the hinges have a more firm engagement with the door frame.

The flange 216 of the door frame 211 is covered by insulating strips of indurated fiber 222, 223, 224, and 225 on all of the four outer sides of the frame.

These strips serve to insulate the back panel 226 of the door from the front of the door. The back panel 226 of the door comprises a tapered metal box, having a flat body portion 227 and the flat side portions 228, 229, 230, and 231. These side portions 228—231 extend at an obtuse angle to the body portion 227 of the back panel 226 such that they fit against the outer surfaces of the fiber strips 222—225.

The adjacent edges of the sides 228—231 are welded together, and the sides 228—231 are provided with a multiplicity of regularly spaced enlarged apertures for passing the self tapping screw bolts 232.

These screw bolts may have their heads insulated from the side flanges 228—231 by insulating washers 233, and the bolts pass through the fiber strips 224, and are threaded into the angles 210, 212, 213, 214. The space between the rear panel 226 and the front plate 131 of the cover is also filled with blocks of cork suitably shaped to fill substantially the entire space in the door.

Thus it will be observed that the rear panel of the door is heat insulated from the front panel, and in no case need there be any metal-to-metal contact between the inner shell of the refrigerator and the outer shell.

The inner shell 121 is preferably provided with an inner framework, indicated in its entirety by the numeral 240 (Fig. 2) for the purpose of supporting a refrigerant compartment 241, a meat rack 242, and a floor grating 243.

This framework 240 comprises a plurality of channelled members, such as, for example, the three upwardly extending channelled members 244, 245, 246, indicated in Fig. 1, on one side of the unit, and a similar set of channelled members 247–249 on the other side. Each of these channelled members comprises a web 250 (Fig. 4) and a pair of outwardly extending side flanges 251, 252.

The side channelled members are arranged in pairs opposite each other, and at the top they are joined by the top channelled members 253, 254, 255, to which they are welded at the points where the web and side flanges abut the web of the top channelled members 253—255.

Referring to Fig. 5, it will be seen that space must be provided at the top for the inwardly turned attaching flange 190 of the side plate 184 of the inner shell 121. Therefore, the top channelled members are relieved or cut away at 256 at each end of their side flanges to provide this space. In the same way the side channelled members all have their side flanges cut away as at 257 (Fig. 5) to provide space for the upwardly extending flange 192 of the bottom plate 180 of the inner shell 121.

In order to provide a firm bearing for the lower ends of the side channels 244—249, each of these channelled members is welded at its lower end to a bearing plate 258, comprising a rectangular metal plate adapted to bear on the floor 180 of the inner chamber.

The bearing plates 258 of the side channels 244, 246, 247, and 249 project forwardly of the side channels into the inner chamber, and are adapted to provide a support for the hinge butt 259, which supports the floor racks 243.

Referring to Fig. 15, it will be noted that each hinge includes two such hinge butts 259 located on opposite sides of the other hinge plate 264.

The bearing plates 258 are welded to the bottom plate 180, and the hinge butts are welded to the bearing plates and to the channelled members 244, 246, 247, 249. Each hinge plate comprises a vertically extending attaching flange 260, which is bent over into an oval portion 261 at the top. This oval portion has an aperture 262 for receiving the hinge pintle 263.

The hinge pintle 263 (Fig. 15) comprises a stub shaft, having apertures at its ends for receiving cotter pins, which retain it in its proper place.

The hinge pintle rotatably supports another hinge plate 264, having a flat attaching flange 265 and a cylindrical portion surrounding the pintle 263. This hinge plate 264 is fixedly secured by welding to one of the stringers 266 of the floor rack 243.

The floor racks are preferably arranged in a pair of sections, each section covering one-half the floor, and the sections may be separately indicated as sections 267, 268.

Each section is pivotally mounted at its outer edge to the side wall by means of the channelled frame 240, and the hinges just described and shown in Fig. 15 being used for each section. As both sections are identical in construction, only one need be described in detail.

Referring to Fig. 5, each floor rack preferably comprises a plurality of longitudinally extending stringers 266, 269, 270. The stringer 269 may be an angle, having a vertically extending flange 271 and a horizontally extending foot flange 272. The stringers 266 and 270 at the edges of the floor rack preferably comprize Z bars, each of which has a horizontal top flange 273, a web 274, and a bearing flange 275.

The Z bars have their foot flanges extending inwardly and their top flanges extending outwardly. The stringers 266, 269 and 270 are all preferably provided with rectangular notches 276 (Fig. 13) at regularly spaced intervals, for receiving the cross channels 277.

These cross channels are placed in the notches 276 of the stringers and welded in place, with the upper flange of each channel flush with the top of the stringer. The welding is done along the web and along the lower flange of each channel. This provides a rectangular framework having regularly spaced transverse points of support for a foraminous covering 278, which may consist of a sheet of expanded metal which has been flattened until all of its parts are in substantially the same plane.

In addition to this the expanded metal, which is shown in full size in Fig. 20, preferably has beveled surfaces 278, 279, on each side of each of its frame portions 280. The expanded metal has diamond-shaped apertures 281, and by virtue of the beveled edges 278, 279, it is adapted to permit the sliding of commodities over its upper plane surface 282, without possibility of tearing or cutting.

The expanded metal covering 278 is of substantially rectangular form, and it extends over the edges of each of the flanges 273 of the Z bars 270 and 266, and is folded back on the under side of each of these flanges, as indicated

at 283 (Fig. 5). This provides a rounded edge portion which is adapted to engage the commodities that are placed on the rack, without any possibility of cutting or tearing.

The foraminous covering 278 is preferably welded to the framework comprising the channels 277 and girders 266, 269, 270 at a multiplicity of spaced points, preferably at the intersections, so that it is firmly secured to the framework, and a very stiff and strong floor rack is thus provided.

At each end of the rack the channelled members 277 are purposely placed with their flanges extending inwardly so as to provide a finished edge, and the expanded metal covering terminates flush with the outer surface of the web of the outermost channels 277.

At the center stringers 270 there is provided a keeper 284 (Fig. 5) for a latching member 285 (Fig. 22) carried by the adjacent channelled frame member 245 or 248. This keeper comprises a flat strip of metal, having one flange welded to the web 274 of Z bar 270, and having another flange 286 extending downwardly and diagonally in Fig. 5.

The latch 285 comprises a strap of sheet metal provided at one end with a cylindrical portion 287. This cylindrical portion is mounted upon the yoke 288 of a U-shaped stirrup 289. The two legs 290 of this U-shaped stirrup extend through apertures in the side flanges of the channelled members 245 or 248, and the ends of the legs are welded to the side flange at 291. Thus the U-shaped stirrup 289 provides a pintle for supporting the cylindrical portion 287 of latch 285.

The main body of the latch 285 extends vertically and inwardly of the car, although it may be pivoted over against the side plate. When it is used in latching position, it extends in the direction shown in Figs. 21 and 22.

At its outer end it is provided with a hook 292, having a diagonal surface 293 for engaging the keeper 284. The hook 292 is far enough from the wall so that when the rack is pushed up tightly against the wall the hook may slide upward on the yoke 288 of the stirrup 289 to disengage itself from the keeper. When the hook is not used, it may be pivoted over between the channelled members of the inner frame 240.

By virtue of the oval opening 262 in the hinge butts 259 the floor racks may be pushed over more tightly against the side walls and more of the space may be used than could otherwise be used. Thus the floor racks may be moved downward into engagement with the floor, as shown in Fig. 4, or they may be hooked in the uppermost position, as shown in fragmentary view in Fig. 22.

One side of the refrigerator is preferably reserved for the meat rack 242. This rack comprises a rectangular bar 294 of wood, slightly shorter than the front-to-back length of the compartment.

It is supported by a plurality of U-shaped stirrups or brackets 295, three in number, as will be seen from Fig. 1. Each of these stirrups has a yoke 296 and a pair of upwardly extending legs 297, 298, between which the wooden bar 294 fits. A through bolt 299 passes through the legs 297, 298 and the wooden bar 294 to secure it in place, and is provided with a suitable nut.

Each of the legs 297, 298 has laterally extending attaching flanges 300, 301, and the attaching flanges may be welded to the web of the top channels 253—255 (Fig. 1). Thus the meat rack is permanently supported inside the refrigerator compartment by the internal framework 240, which it also serves to reinforce.

In addition to the meat rack, the internal framework 240 supports the container for the refrigerant, also called the "dry ice bunker."

For this purpose the upwardly extending channels 247, 248, 249 (Fig. 4) have their webs provided with the suitably located apertures 302 (Fig. 9). Each of these apertures has a large circular portion 303 adapted to pass the head of a special bolt and a smaller partially circular portion 304 adapted to receive the shank of this bolt. The larger circular portion is uppermost.

In the same way the top channelled members 253—255 of the inner framework 240 are provided with similar apertures in their webs, as shown at Fig. 11, and indicated by the same numeral 302. These apertures 302 have their larger portions extending toward the right.

The ice bunker 241 may thus be supported in place by a plurality of angular metal brackets 305, one bracket being located at each of the side channels 247, 248, 249 of the inner framework 240. Each of these brackets is the same in construction as shown in Fig. 10, and each has an upwardly extending strap portion 306 of sufficient height to embrace a side of the ice bunker. Each has a horizontally extending portion 307 of sufficient length to extend under the ice bunker to the opposite wall.

The portions 306, 307 of the bracket 305 each terminate in a laterally turned foot 308, which has an outwardly turned edge portion 309. This edge portion is rendered necessary by the specific structure of the special bolts which are employed for securing the brackets to the inner framework. These bolts have a head 311 and a short shank portion 313, which is located between the head and the annular flange 312.

The head 310 is adapted to be passed by the large circular portion 302 of the aperture in the channelled members, and the bolt is then adapted to be slid sidewise, with its short shank portion 313 in the smaller aperture 304. Then the channelled member is confined in the head 311, and the annular flange 312 of the bolt is fixedly secured to the channelled member so long as it is kept in the slot 304.

The length of the legs 306, 307 of the brackets 305 is such that the attaching flanges 308 of these brackets has its aperture in registry with the bolt 310 when the short shank 313 is in the slot 304. Thus the brackets retain the bolts in the proper securing position in the apertures 302 of the channels.

A plurality of the brackets 305 are preferably provided so that there is a bracket located at each of the vertically extending side channels 247, 248, and 249, and the upper end of each bracket is secured to the horizontal channels 244, 245, and 246.

The brackets 305 are adapted to support a container for refrigerant, indicated in its entirety by the numeral 241. This container is preferably a separate unit, having ts outer metallic shell 315 and inner metallic shell 316 insulated from each other so that there is no metal-to-metal contact.

For example, the inner shell may comprise a pair of side shell members 317, 318, a top member 319 (Fig. 10), and a rear wall 320 (Fig. 8). The top wall 319 of the inner shell 316 comprises a

rectangular sheet of metal, having a pair of depending attaching flanges **321**, one on each side, at right angles to the main body of the top wall. These attaching flanges **321** of the top wall **319** serve to attach this wall to the side walls **317**, **318** (as indicated in Fig. 10) by welding or other convenient fastening means.

The side walls **317**, **318** may be identical in construction, each preferably consisting of a rectangular piece of metal, having at its lower edge a laterally turned face flange **322**. This face flange is of less width than the thickness of the insulation layer **323**, in order that the inner shell may not have metal-to-metal contact with the outer shell.

The facing flange **322** at each side is secured to a wooden frame and insulation member **324** by means of the wood screws **325**, which pass through this flange into the wood.

At its rear edge (Fig. 8) each of the side walls **317**, **318** of the inner shell has a laterally extending attaching flange **326**. This flange is secured to the rear wall **320** by welding or other convenient fastening means. The rear wall **320** also comprises a rectangular sheet of metal of sufficient size to close the rear end of the inner shell, and it has at its lower edge an attaching flange **327** extending horizontally and secured to the bottom wall **328** by welding. The bottom wall **328** may consist of a rectangular sheet of metal, but in this case the bottom wall is not insulated, and the inner shell is adapted to come into contact with the air in the interior of the refrigerator unit.

Thus the bottom wall **328** may comprise a simple rectangular sheet of metal of sufficient area to close the bottom and to extend over each of the facing flanges **322**, as shown in Fig. 10, to which it may be secured by the same wood screws **325**. Metal-to-metal contact between this bottom wall **328** and the rest of the inner shell is intentionally brought about in order that the bottom wall may provide a heat absorption surface for absorbing heat from the air inside the refrigerator unit to effect a cooling of the air and the merchandise in the unit.

At its front edge this bottom wall may be provided with a downwardly turned face flange **329**, which is in the same plane as the face of the door frame. An angle **330** is located inside the refrigerant chamber **241** and welded to the floor **323** before galvanizing for the purpose of keeping the blocks of carbon dioxide in the chamber when the door is open.

The angle **330** has a very narrow upwardly extending flange **331** amounting to no more than the clearance between the blocks and the walls of the inner chamber so that the blocks can be inserted over the angle **330**.

The outer shell **315** preferably consists of the side walls **332**, **333**, top wall **334** (Fig. 10) and rear wall **335** (Fig. 8). The side walls **332**, **333** of the outer shell **315** may be similar in construction, and each consists of a rectangular plate of sheet metal of sufficient size to enclose the inner shell and the layer of insulation **323**.

Each side wall **332** or **333** preferably has an outwardly turned attaching flange **336** by means of which it is secured to the top wall **334** by rivets **337**, welding, or other convenient fastening means.

The lower edges of the side walls **332**, **333** extend to the front face of the wooden members **324**, to the side of which they are attached by screw bolts **338**. At the front of the refrigerant container **241** the outer shell side walls **332** may be secured to a channelled member **339** or **340** (Fig. 8). The inner side walls **317**, **318** are also secured to the channelled members, which have their yokes serving as facing flanges.

The side walls are secured to channels **339**, **340** by screw bolts **341** passing through the side walls and threaded into apertures in the channelled flanges. Thus the channels form end closures for the installation spaces between the side walls. The rear wall **335** of the outer shell preferably has an inwardly turned flange **342**, **343** at each side.

These flanges are attached to the side walls **332**, **333** by welding, or other convenient fastening means. The rear wall **335** also has an inwardly turned flange **344** at the top and another wider inwardly turned flange **345** at the bottom.

The flange **344** serves to secure the rear wall **335** to the top wall **334** (Fig. 9). The flange **345** is secured by wood screws to a wooden insulation member **346**. Here again the flange **345** is short of contact with the inner shell.

It will be noted that there is metallic contact between the inner shell and outer shell at the channels **339** and **340**. The same is true between the upper wall **319** of the inner shell and the upper wall **334** of the outer shell through the channel **347**.

In some embodiments of the invention these channels **339**, **340**, and **347** may be replaced by lumber members like those at **346** and **324** to eliminate all metal-to-metal contact between the inner and outer shells.

In the embodiment illustrated, this metal-to-metal contact at the front of the inner shell serves to increase slightly the area of absorption of heat from the refrigerant chamber.

This chamber is preferably provided with a door **348** (Fig. 8), which is also insulated. The door preferably comprises a frame made of Z bars, such as the upper and the lower Z bars **349**, **350** (Fig. 9), and the side Z bars **351**, **352** (Fig. 8). These Z bars have their inwardly turned flanges **353** covered by means of an inner plate **354**, which is secured by screw bolts passing through the plate and threaded into the flange **353**.

The Z bars have their outwardly extending flanges **355** covered by an outer plate **356** (Fig. 9), which may be welded to the flange **355**. A relatively long standard hinge **357** is secured by welding to the plate **356**, and has its opposite plate properly spaced from the outer wall by a metal bar **358**, which is welded to the channel **340** and to the hinge.

The size of the frame, comprising the Z bars **349**—**352**, is preferably such that there is adequate clearance between the door and the inner shell **316** to permit the door to move pivotally without making a tapered door. As the refrigerant chamber is not wholly insulated, it is not necessary to insulate the door entirely from the inner shell.

The effect of the lack of insulation of the door is merely to provide a greater heat absorption area for the refrigerant chamber. Furthermore, it is not necessary for the door to be provided with an air-tight gasket, as the gas from the carbon dioxide solid can be permitted to escape through the crack between the door and the chamber.

The door preferably has a very limited area of contact with the channels at the front of the chamber, as otherwise it would not be worth while to insulate the door. The space between the inner and outer shells of the door is preferably

filled with a block of rigid insulation, such as cork, which fits in this space, and which is provided with substantially rectangular plane sides.

In the same way the space between all of the walls of the inner shell and the walls of the outer shell, except the bottom wall **328**, is also filled with blocks of the same insulation, of the same shape and of a size to fill all the space.

At its edge opposite to the hinge **357**, the door **348** is preferably provided with a suitable form of latch, comprising a keeper **359**, a pivoted cam and latch **360**, which is pivotally mounted on a supporting bracket **361** carried by the door.

As previously stated, the refrigerant chamber **241** is filled with blocks of carbon dioxide, commercially known as "dry ice." This refrigerant is adapted to sublime, and the sublimation effects a reduction of the temperature in the refrigerant chamber **241** by virtue of the latent heat of fusion and of vaporization, which is absorbed by the carbon dioxide as it sublimes.

The rate of sublimation is dependent upon the exposed area of the blocks of carbon dioxide in the chamber **241** and upon the escape of the vapor from the refrigerant chamber, and upon the temperatures attained inside the chamber **241**.

It has been found that with one exposed wall, such as the lower wall **328**, which is wholly of metal, the refrigerant will last for a relatively long period of time, thus maintaining the temperature in the interior of the refrigerator at a sufficiently low degree to keep perishable articles for such a period of time that they may be packed in the refrigerator, placed in a freight car, hauled to their destination, and removed intact and in good condition from the refrigerator units.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a portable refrigerator unit, the combination of a lower supporting frame comprising a plurality of inwardly facing channelled members welded together to form a rectangular frame, a sheet metal plate covering the top of said channelled members and forming a part of the outer shell of said unit, angular corner posts, each comprising a pair of main flanges at right angles to each other, and each main flange supporting an attaching flange extending at right angles to the main flange by which it is supported, sheet metal side plates secured to said attaching flanges and forming the outer shell of said unit, a plurality of angle bars having their ends welded together to form a rectangular top frame, said top frame being welded to the upper ends of said angular corner posts, a sheet metal covering plate welded to said top frame member and extending over and down the back of said unit and secured to the corner posts at the back of said unit, and Z-shaped metal members having a body flange and oppositely directed end flanges at right angles to the body flange extending between said lower frame member and said upper frame member and located between said corner posts, and blocks of semi-solid heat insulating material of substantially the same thickness as the body flange of said Z members and located between said Z members and said corner posts, and a second layer of said heat insulating blocks, having broken joints with respect to the first layer and engaging one of the oppositely directed flanges of each Z bar.

2. In a portable refrigerator unit, the combination of a lower supporting frame comprising a plurality of inwardly facing channelled members welded together to form a rectangular frame, a sheet metal plate covering the top of said channelled members and forming a part of the outer shell of said unit, angular corner posts, each comprising a pair of main flanges at right angles to each other, and each main flange supporting an attaching flange extending at right angles to the main flange by which it is supported, sheet metal side plates secured to said attaching flanges and forming the outer shell of said unit, a plurality of angle bars having their ends welded together to form a rectangular top frame, said top frame being welded to the upper ends of said angular corner posts, a sheet metal covering plate welded to said top frame member and extending over and down the back of said unit and secured to the corner posts at the back of said unit, and Z-shaped metal members having a body flange and oppositely directed end flanges at right angles to the body flange extending between said lower frame member and said upper frame member and located between said corner posts, and blocks of semi-solid heat insulating material of substantially the same thickness as the body flange of said Z members and located between said Z members and said corner posts, and a second layer of said heat insulating blocks, having broken joints with respect to the first layer and engaging one of the oppositely directed flanges of each Z bar, and an inner metallic shell for said unit comprising a bottom pan formed with an upwardly extending border flange, side, and back plates welded to said border flange, and a top plate welded to said side and back plates.

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