Jan. 2, 1940. L. RUTHENBURG 2,185,953

REFRIGERATOR

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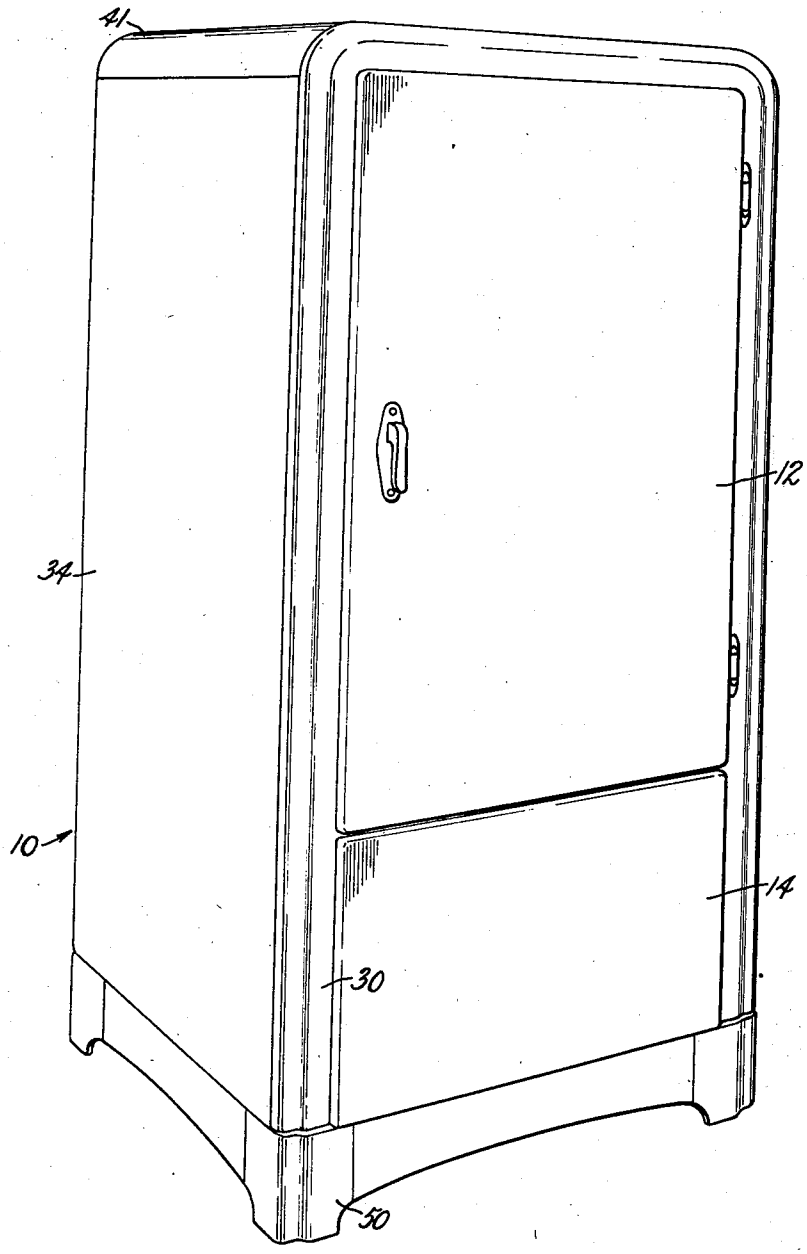


Fig. 1.

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REFRIGERATOR

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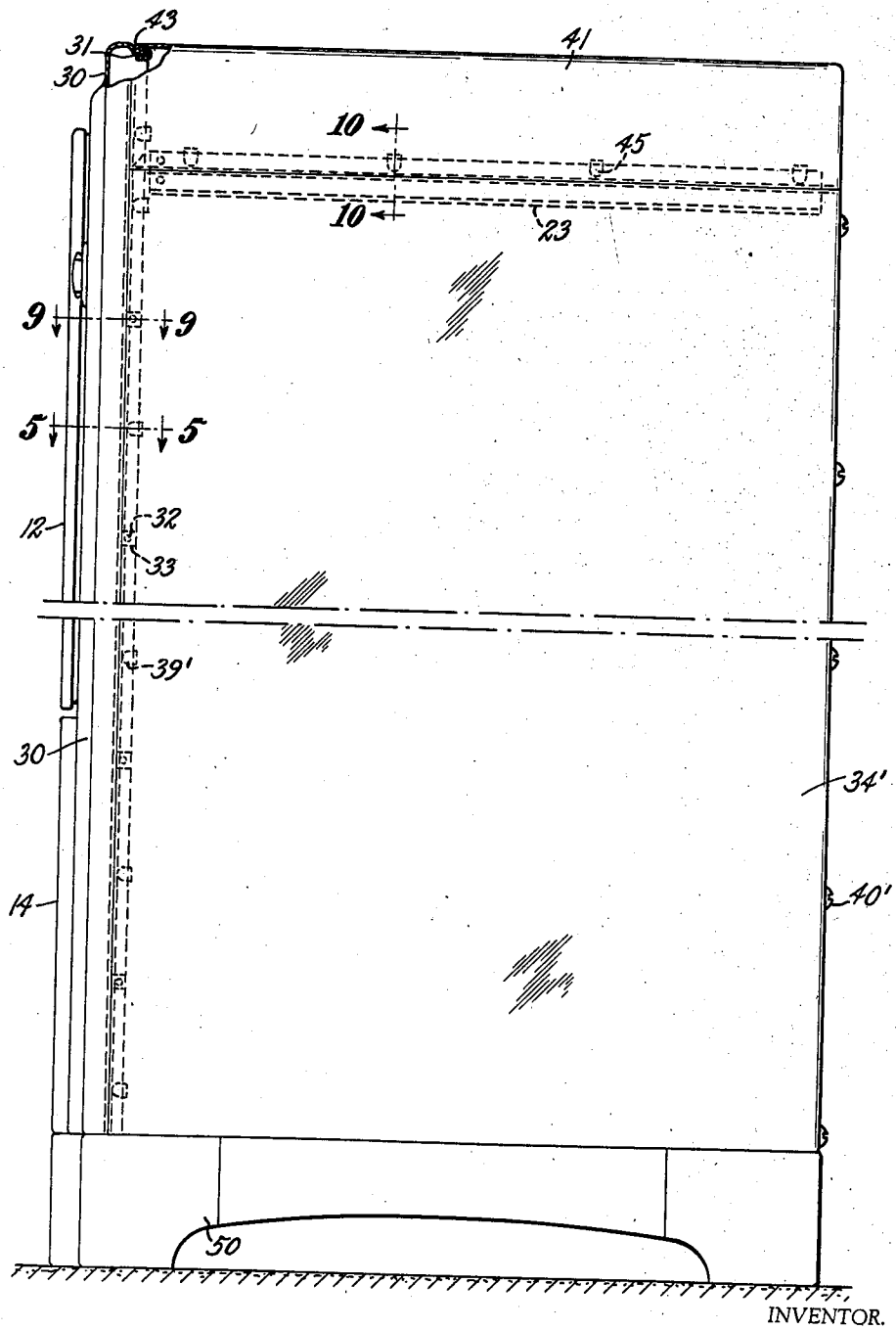


Fig. 2.

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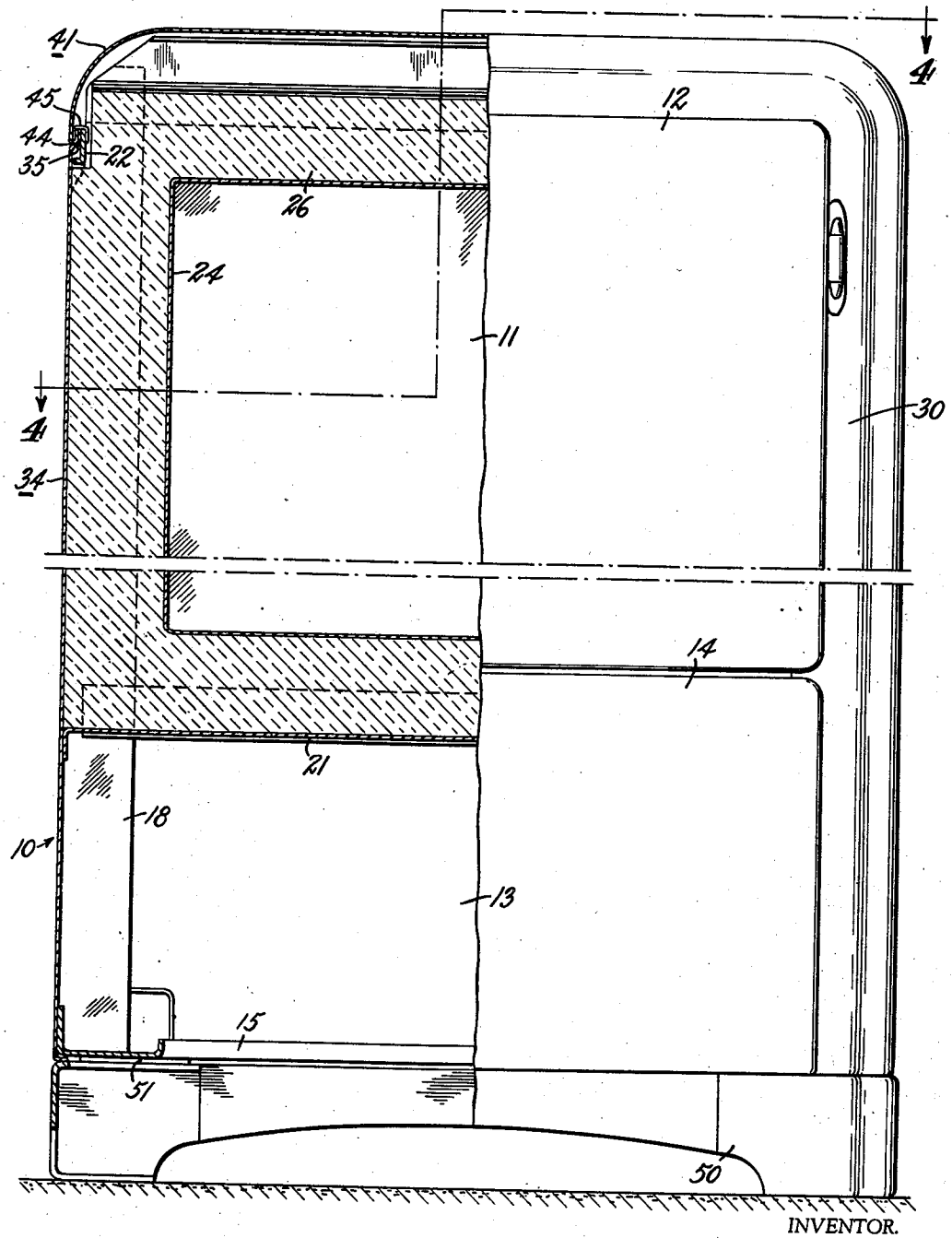


Fig. 3.

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Fig. 4.

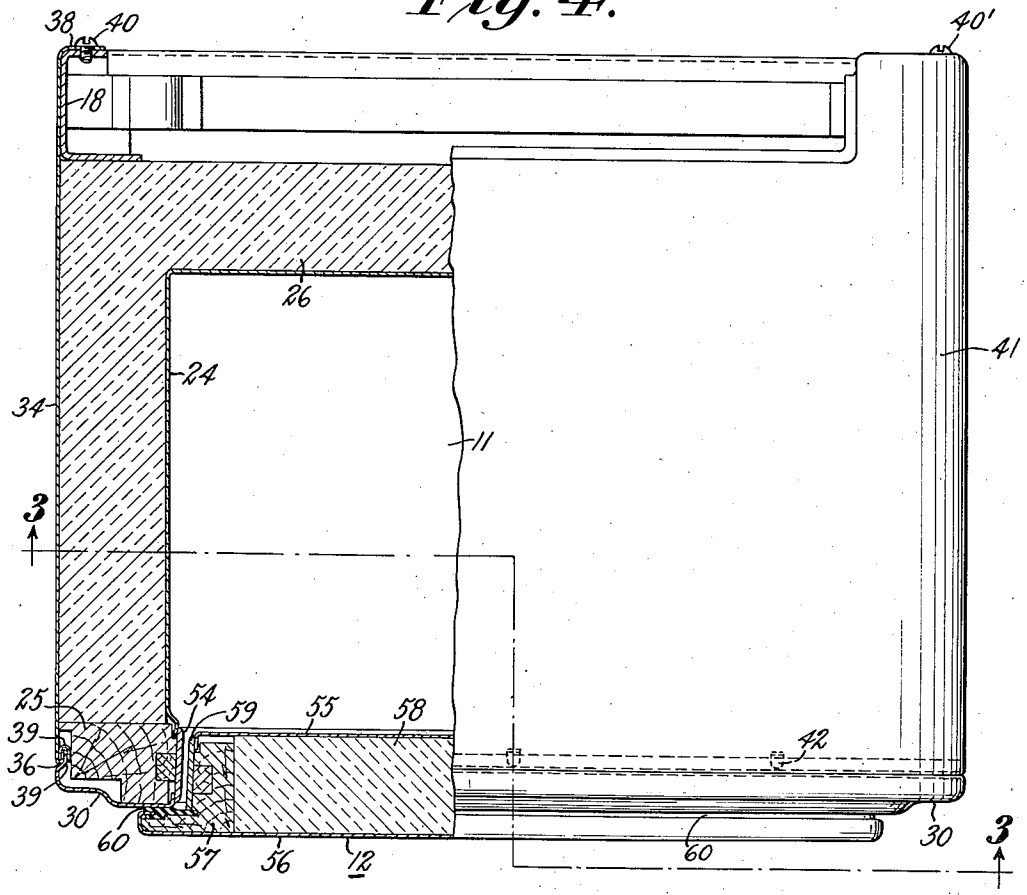


Fig. 5.

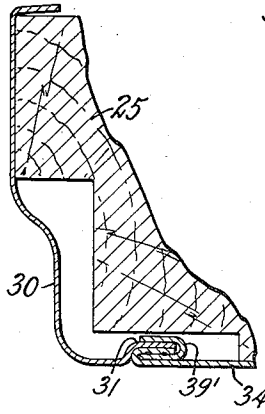


Fig. 6.



Fig. 7.

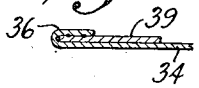


Fig. 8.



Fig. 9.

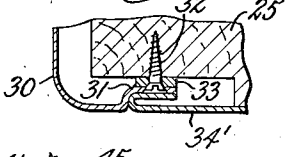
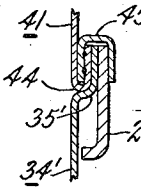


Fig. 10.



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Fig. 13.

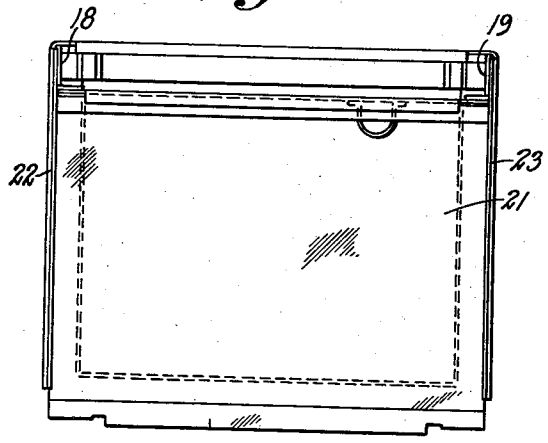
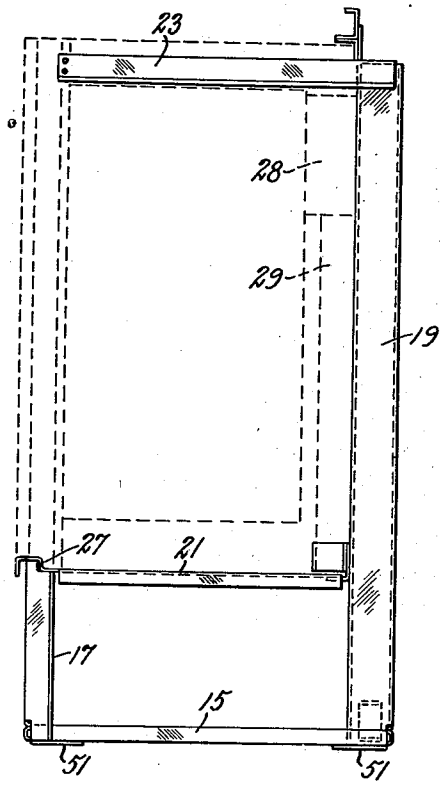


Fig. 12.



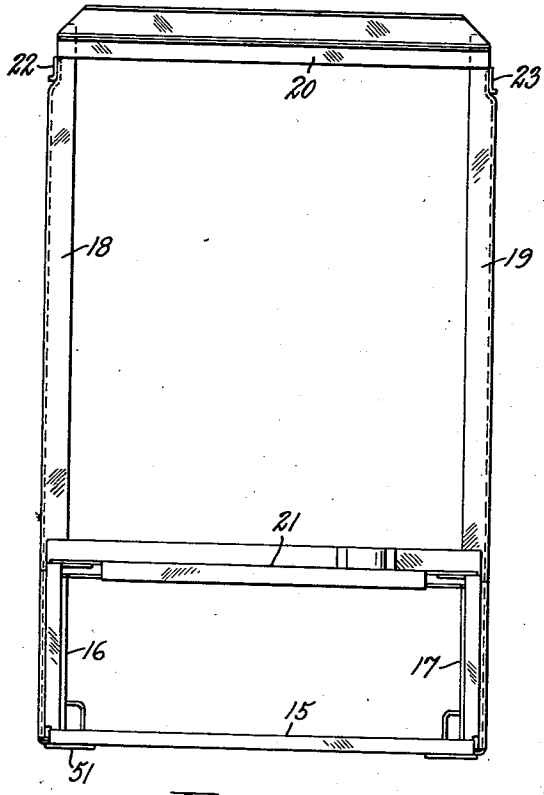


Fig. 11.

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REFRIGERATOR

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Fig. 15.

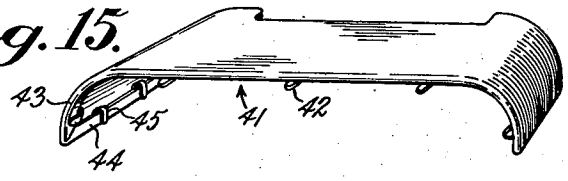


Fig. 16

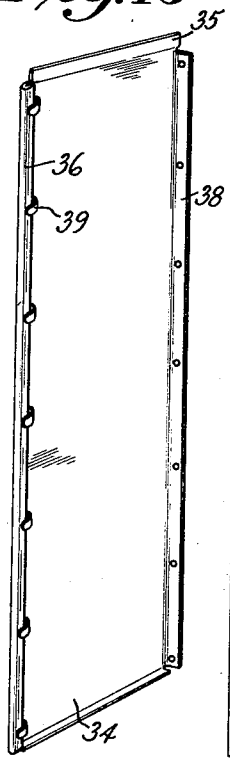


Fig. 14.

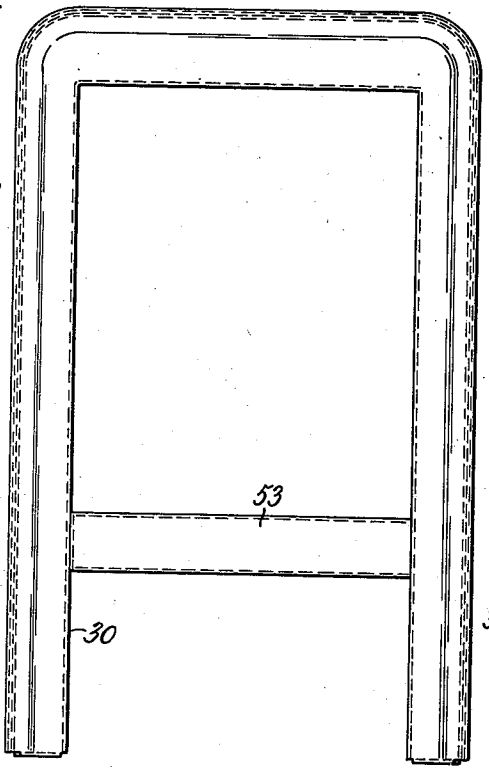
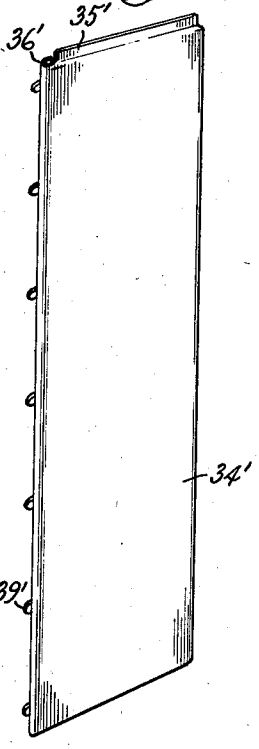


Fig. 17.



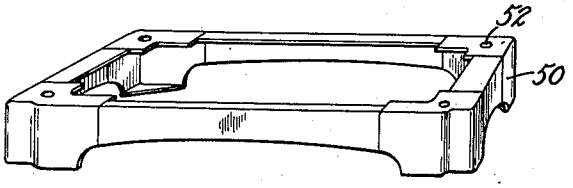


Fig. 18.

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REFRIGERATOR

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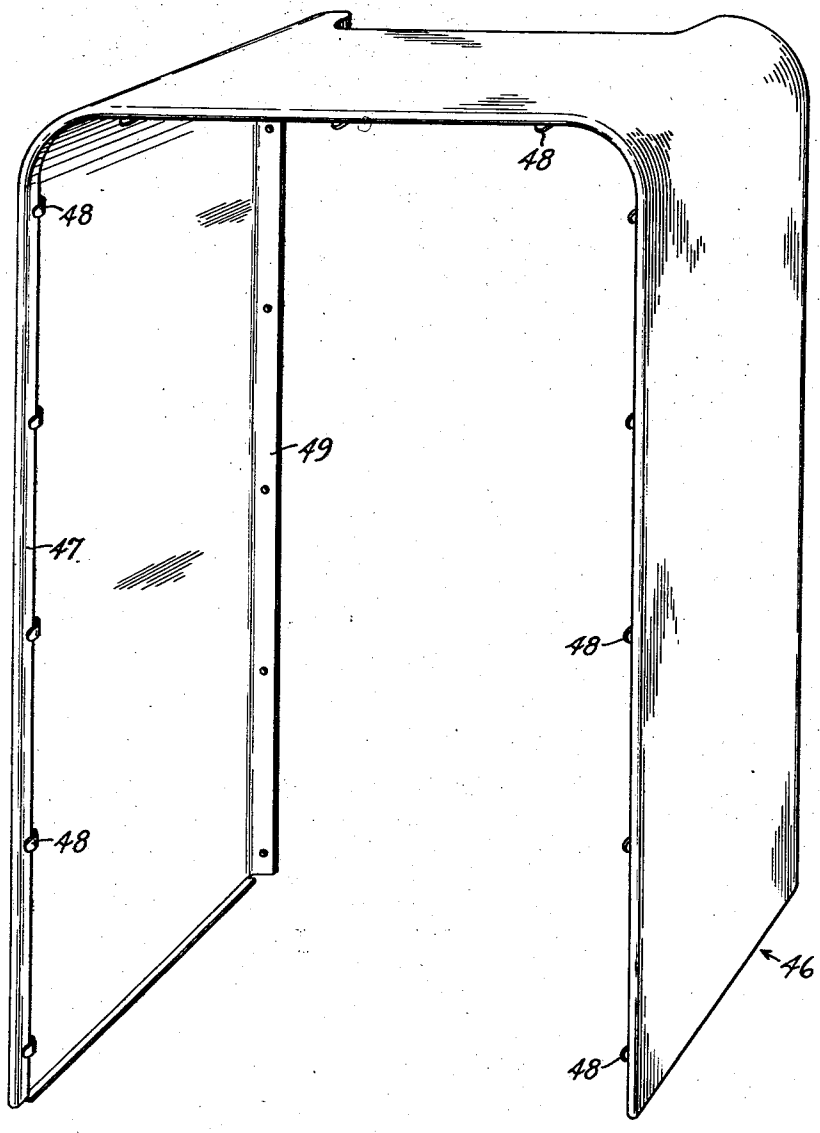


Fig. 19.

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Patented Jan. 2, 1940 2,185,953

UNITED STATES PATENT OFFICE

2,185,953

REFRIGERATOR

Louis Ruthenburg, Birmingham, Mich., assignor to Servel, Inc., New York, N. Y., a corporation of Delaware

Application February 23, 1935, Serial No. 7,667

10 Claims. (Cl. 220—9)

My invention relates to refrigerators and has for an object the provision of a new and improved refrigerator cabinet which is readily fabricated, as fully set forth in the following description and accompanying drawings forming part of this specification and of which:

Fig. 1 is a perspective view of a refrigerator cabinet embodying my invention;

Fig. 2 is a broken side view of the refrigerator cabinet shown in Fig. 1;

Fig. 3 is a broken front view of the cabinet, partly in vertical section;

Fig. 4 is a top plan view of the cabinet, partly in horizontal section;

Fig. 5 is a detail section taken on line 5—5 in in Fig. 2;

Figs. 6, 7 and 8 are detail views illustrating hereinafter described steps in the fabrication of the cabinet;

Fig. 9 is a detail section taken on line 9—9 in Fig. 2;

Fig. 10 is a detail section taken on line 10—10 in Fig. 2;

Fig. 11 is a front view of the cabinet frame;

Fig. 12 is a side view of the cabinet frame;

Fig. 13 is a top view of the cabinet frame;

Fig. 14 is a front elevation of the front panel of the cabinet;

Fig. 15 is a perspective view of the top panel of the cabinet;

Figs. 16 and 17 are perspective views of the side panels of the cabinet;

Fig. 18 is a perspective view of the cabinet base; and

Fig. 19 is a perspective view illustrating an embodiment of my invention in which the top and side panels of the cabinet are formed as a single member.

Referring to Figs. 1 to 4 of the drawings, I have shown a refrigerator cabinet 10 having a thermally insulated storage compartment 11 which is accessible by means of a door 12, and a lower apparatus compartment 13 which is accessible by means of a closure member 14. The structure of this cabinet and the process of fabrication will be more clearly apparent from the further detail views.

Referring first to Figs. 11, 12 and 13, there is shown a frame fabricated of iron or steel members which are welded together to form, in a general way, a chair-like structure. The base of the frame comprises a lower horizontal rectangular portion 15 formed by four generally channel shaped members welded together at their ends, and two upright members 16 and 17 welded at their lower ends to the front corners of the lower rectangular portion 15. The back of the frame is formed by two upright channel members 18 and 19 which are welded at their lower ends to the rear corners of the lower rectangular portion 15 and connected adjacent their upper ends by a cross bar 20. On the upper ends of uprights 16, 17 and against the rear uprights 18 and 19 is secured a horizontal plate 21. Near the top of the rear upright members 18 and 19 are secured forwardly projecting arms 22 and 23. It will be understood that a particular frame structure is not essential to the present invention and that any suitable type of frame may be employed or a frame may be omitted as will hereinafter appear.

Referring now to Figs. 3 and 4, the refrigerator storage compartment 11 is formed by a substantially rectangular shell 24, generally referred to as a liner. The liner 24 is preferably heavily porcelained or otherwise treated on the interior to provide sanitary walls for the storage compartment. The liner 24 is open at the front and the edge of the liner around the opening is secured to what may be referred to as a door opening frame 25 which is made of wood or other suitable material. The liner 24 is surrounded by thermal insulation material 26. As disclosed in Patent No. 1,878,111 to William D. Collins, the liner 24, the door opening frame 25, and the insulation material 26 may be assembled as a unit by strapping or otherwise securing the thermal insulation material around the liner in position with respect to the door opening frame. This unit may be referred to as a storage compartment assembly.

The storage compartment assembly, just described, is then mounted on the frame in the position indicated in dotted outline in Fig. 12, and the forward ends of the projecting arms 22 and 23 are secured to the upper part of the door opening frame which is thereby held securely in position. The frame base may be formed, as illustrated in Fig. 12, with a step 27 at the forward edge of the horizontal plate 21 which is supported on the upper ends of the front upright members 16 and 17. The step 27 engages a corresponding step in the lower edge of the door opening frame to quickly and accurately locate the storage compartment assembly in position on the frame. The storage compartment assembly is provided with an opening or window which extends through both the liner 24 and the insulation material 26 at the rear for the purpose of permitting insertion of a cooling element of a refrigeration apparatus. This opening is not shown in the drawings except by the dotted out-

line in Fig. 12 where the opening is indicated by the reference number 28. In this figure there is also indicated a vertical depression or channel 29 in the outer surface of the insulation material to receive a gas heat exchanger of an absorption type refrigeration apparatus which may be used in this refrigerator.

In accordance with my invention I provide a unitary front panel 30, generally in the shape of an inverted U as may be seen in front elevation in Fig. 14. The front panel 30 is flanged rearwardly along both inner and outer edges and therefore is generally channel shape in cross-section as may be seen in Figs. 4 and 5. Referring more particularly to Figs. 4, 5, and 9, the outer edge of the front panel 30 is formed with a shallow L-shaped inward flange 31. The panel 30 is placed in position against the front of the previously described frame and storage compartment assembly with the L-shaped flange 31 around the upper part of the panel 30 extending around the outside of the door opening frame 25 in very slightly spaced relation with respect to the sides of the frame. The L-shaped flange 31 is secured along the sides of the door opening frame 25 at a desired number of points, for instance, by screws 32. The heads of the screws 32 are preferably countersunk in the flange 31 and spacing washers 33 are employed around the screws between the flange 31 and the frame 25. This construction is shown in detail in Fig. 9.

In Fig. 16 is shown in perspective a side panel 34. The upper edge of the panel 34 is provided with a shallow inward L-shaped flange 35. This flange may be seen in section in Fig. 3 and it will be understood that it is similar to the flange 31 on the outer edge of the front panel 30. The forward edge of the side panel 34 is folded back on itself on the inside of the panel, forming a fold 36 of a thickness equal to the depth of the L-shaped flange 31 on the outer edge of the front panel 30. The rear edge of the side panel 34 is provided with an inward flange 38. The side panel 34 is placed in position against the side of the frame and storage compartment assembly with the fold 36 on its forward edge lying in the shallow L-shaped flange on the outer edge of the front panel 30 which has already been placed in position as previously described. The forward edge of the panel 34 is secured to the outer edge of the front panel 30 by a plurality of U-shaped clips 39 which extend over and secure together the edges of the fold 36 and the flange 31.

The clips 39 are preferably formed integrally with the side panel 34. In Fig. 6 there is shown a detail section through a clip 39 and the forward edge of the side panel 34 prior to forming the fold 36 and bending the clip 39. One end of a small strip which is to form the clip 39 may be welded on the edge of the flat panel 34 with the other end extending beyond the edge of the panel and substantially perpendicular thereto. When the fold 36 is formed in the forward edge of the side panel 34, the strip which is to form the clip 39 will lie in the position shown in Fig. 7. The strip is then bent into a U-shape to form a clip 39 as shown in Fig. 8. The fold 36 and clips 39 together form a substantially flat S. It will be understood that the clips 39 could be formed from the same sheet of material utilized for the side panel 34 by forming tabs along the forward edge of the panel 34 and then folding the tabs back after the previously described fold 36 has been made. However, in the interest of saving material, it is believed preferable to utilize separate small strips for forming the clips 39 as illustrated.

With the clips 39 formed integrally with the side panel 34, the latter may be placed in position on the side of the cabinet by slipping the forward edge into place, as previously described, with the clips 39 inserted beneath the flange 31 of the outer edge of the front panel 30. The flange 38 along the rear edge of the side panel 34 may be secured to the frame upright 18 at the rear of the cabinet, for instance, by screws 40. The other side panel 34' is fabricated in the same manner as the previously described side panel 34 except that the flanges are made in the opposite direction so that this panel may be placed in position on the other side of the cabinet in the same manner as described in connection with the side panel 34.

A top for the cabinet is illustrated in perspective in Fig. 15. The top 41 is substantially flat with downwardly rolled sides, the curve of which corresponds to the curve at the upper corners of the front panel 30. Both the forward and side edges of the top 41 are folded back and inwardly similarly to the forward edges of the side panels and likewise provided with clips 42 which are formed in the same manner as the previously described clips 39 on the side panels. The fold 43 along the front edge of the top 41 is of a thickness corresponding to the depth of the L-shaped flange 31 on the front panel, and the folds 44 on the side edges of the top 41 are of a thickness corresponding to the depth of the L-shaped flanges 35 on the top edges of the side panels 34. The top 41 is placed in position on the cabinet by placing the fold 43 on the forward edge of the top on the L-shaped flange 31 around the top of the front panel 30 with the clips 42 engaging beneath the flange 31, and then lowering the top so that the folds 44 along the side edges of the top rest in the flanges 35 along the upper edges of the side panels 34 with the clips 45 engaging the flanges 35. It will now be understood that the forward edges of the top and side panels are locked beneath the edge of the front panel 30, and the top edges of the side panels 34 are locked beneath the side edges of the top 41. The front panel 30, the side panels 34, and the top 41 may be outwardly coated as desired as, for instance, by porcelain or other suitable enamel.

For further rigidity, the clips 45 along the side edge of the top 41 may be made slightly larger than the clips 39 on the side panels and the clips 42 on the front edge of the top in order to also engage the top edge of the forwardly projecting arms 22 and 23 of the frame. This is illustrated in section in Figs. 3 and 10.

I may also form the top and sides of the refrigerator cabinet of a single piece of material as illustrated in Fig. 19. In this embodiment I utilize a single sheet of metal 46 formed into the shape of an inverted U conforming to the shape and size of the previously described front panel 30. The forward edge of the shell 46 is folded back and inwardly to form a peripheral fold 47. A plurality of U-shaped clips 48 are secured with one leg beneath the fold 37 similarly to the clips 39 as previously described. The clips 48 may also be formed from the same sheet of material but with more waste. The rear edges of the side portions of the shell 46 are formed with inward flanges 49. It will now be understood that the shell 46 may be placed in posi-

tion on the refrigerator instead of and in the place of the previously described top 41 and side panels 34. The peripheral fold 47 is placed in the flange 31 of the front panel 30 with the clips 48 engaging beneath the flange 31 whereby the forward edge of the shell 46 is locked beneath the edge of the front panel 30.

The refrigerator cabinet may be mounted on a base 50 shown in Figs. 1 and 18, the frame being provided with corner plates 51 (Figs. 11 and 12) which are provided with holes registering with holes 52 in the legs of the base 50 to receive bolts or other securing means.

It will be understood that due to the channel shaped cross section of the front panel 30, I may dispense with a frame and secure the front panel 30 directly to a base as, for instance, by welding to the base 50, and lock the top 41 and side panels 34 (or shell 46) beneath the outer side edges of the front panel as described and connect the rear edges of the side panels 34 (or shell 46) by a suitable back plate or stays. The storage compartment assembly may then be supported by the panels or separately supported on the base in any desired manner.

In Fig. 14 there is shown a cross plate 53 between the side portions of the front panel 30. The plate 53 is for the purpose of covering the lower edge of the refrigerator storage compartment assembly at the bottom of the door opening. As shown in Fig. 4, the inner periphery of the door opening frame 25 may be finished, as shown, by a trim strip 54 of suitable thermal insulating material which overlies and conceals the edges of the liner 24 and the front panel 30. The door 12 is of a known construction comprising an inner plate 55 and outer plate 56 spaced by a peripheral wooden frame 57 and containing thermal insulation material 58. The periphery of the door 12 is finished by a trim strip 59 similar to the trim strip 54 and overlying the edge of the inner door plate 55. The door is formed with a peripheral lip which abuts the front panel 30 around the door opening when the door is closed, this abutment being cushioned and sealed by a suitable gasket 60.

It will be understood that other changes may be made within the scope of my invention which is therefore not limited to that which is shown in the drawings and described in the specification but only as indicated in the following claims.

What is claimed is:

1. A refrigerator cabinet including a front sheet metal panel shaped to form the top and side front corners of the cabinet, the outer edge of said panel being formed with a shallow inward L-shaped flange, a top sheet metal panel forming the upper side corners of the cabinet and having its forward and side edges folded inwardly and provided with tabs folded reversely in the form of a flat S, and side panels also having shallow inward L-shaped flanges along their upper edges and having their forward edges folded inwardly and provided with tabs folded reversely in the form of a flat S, the forward edges of the top and side panels being locked beneath the outer edge of said front panel with the upper loop of said S folds lying in said shallow L-shaped flange and the lower loop of said folds comprising said tabs engaging beneath said L-shaped flange, and the upper edges of said side panels being locked beneath the side edges of said top panel with the L-shaped flanges engaged by said tabs comprising the lower loop of said S folds.

2. A refrigerator cabinet including a front sheet metal panel shaped to form the top and side front corners of the cabinet, the outer edge of said panel being formed with a shallow inward L-shaped flange, a top sheet metal panel forming the upper side corners of the cabinet and having its forward and side edges folded inwardly in the form of a flat S, and side panels also having shallow inward L-shaped flanges along their upper edges and having their forward edges folded inwardly in the form of a flat S, the forward edges of the top and side panels being locked beneath the outer edge of said front panel with the upper loop of said S folds lying in said shallow L-shaped flange and the lower loop of said folds engaging beneath said L-shaped flange, and the upper edges of said side panels being locked beneath the side edges of said top panel with the L-shaped flanges engaged in the lower loop of said S folds.

3. A refrigerator cabinet including a front sheet metal panel shaped to form the top and side front corners of the cabinet, the outer edge of said panel being formed with a shallow inward L-shaped flange, a unitary sheet metal panel forming the top and sides of the cabinet and having its forward edge folded inwardly and provided with tabs reversely folded in the form of a flat S, the forward edge of said unitary panel being locked beneath the outer edge of said front panel with one loop of said S fold lying in said shallow L-shaped flange and the other loop of said fold comprising said tabs engaging beneath said L-shaped flange.

4. A refrigerator cabinet including a front sheet metal panel shaped to form the top and side front corners of the cabinet, the outer edge of said panel being formed with a shallow inward L-shaped flange, a unitary sheet metal panel forming the top and sides of the cabinet and having its forward edge folded inwardly in the form of a flat S, the forward edge of said unitary panel being locked beneath the outer edge of said front panel with one loop of said S fold lying in said shallow L-shaped flange and the other loop of said fold engaging beneath said L-shaped flange.

5. A refrigerator cabinet including a front sheet metal panel shaped to form the top and side front corners of the cabinet, the outer edge of said panel being formed with a shallow inward L-shaped flange, a second sheet metal panel forming the upper side corners of the cabinet and having its forward edge folded inwardly generally in the form of a flat S, the forward edge of said second panel being locked beneath the outer edge of said front panel with one loop of said S fold lying in said shallow L-shaped flange and the other loop of said fold engaging beneath said L-shaped flange.

6. A refrigerator cabinet including an outer wall of independent sections forming an outer casing, a liner, a transverse plate, said liner defining a food storage compartment, said outer casing enclosing and extending below said liner and forming with said transverse plate an apparatus compartment below said food storage compartment, the aforesaid members providing front openings one above the other for access to said food storage compartment and said apparatus compartment respectively, closure means for said openings, said outer casing being formed in part by a unitary sheet metal member having front outer walls and forward side edges coextensive with both of said compartments and also forming the forward top edge, and the upper front

corners, said unitary sheet metal member having a rearwardly extending part at the top forming at least a portion of the top of the outer casing of the cabinet and also having correspondingly rearwardly extending parts at the sides of each compartment continuously coextensive with said compartments in a vertical direction, all of the aforesaid parts of said single sheet being continuous and having a smooth transition from one part to another, said transverse plate connecting the spaced side portions of said unitary member, said cabinet having substantially continuous smooth outer top and side walls with said rearwardly extending parts lying substantially in the same plane as and forming a portion of said outer walls, said rearwardly extending parts being turned inwardly to form connecting flanges at their rear edges, and side and top panelling in the same plane as the rearwardly extending parts of the sheet and having inturned forward flange structure removably mating with the aforementioned flanges and connected therewith inwardly of the general exterior surface of the panelling whereby a substantially continuous outer surface is obtained and external fastening means and pronounced offsets are avoided.

7. A refrigerator cabinet including an outer casing, a liner, a transverse plate, said liner defining a food storage compartment, said outer casing enclosing and extending below said liner and forming with said transverse plate an apparatus compartment below said food storage compartment, the aforesaid members providing front openings one above the other for access to said food storage compartment and said apparatus compartment respectively, said outer casing being formed at least in part by a substantially U-shaped unitary sheet metal member forming front and outer walls and forward side edges coextensive with both of said compartments and also forming the forward top edge, and the upper front corners, said unitary sheet metal member having a rearwardly extending part at the top forming at least a portion of the top of the outer casing of the cabinet and also having rearwardly extending parts at the sides of each compartment continuously coextensive with said compartments in a vertical direction, all of the aforesaid parts of said single sheet being continuous and having a smooth transition from one part to another, said transverse plate connecting the spaced side portions of said U-shaped member, said cabinet having substantially continuous smooth outer top and side walls with said rearwardly extending parts lying substantially in the same plane as and forming at least a portion of said outer walls, said rearwardly extending parts being turned inwardly to form connecting flanges at their rear edges, whereby a substantially continuous outer surface is obtained and external fastening means and pronounced offsets are avoided.

8. A refrigerator cabinet as set forth in claim 6 wherein the top and side panels comprise an integral substantially U-shaped sheet.

9. A refrigerator cabinet as set forth in claim 6 wherein the top and side panels comprise detachable separate top and side members.

10. A refrigerator cabinet as set forth in claim 6 wherein the top and side panels are detachably joined to the unitary sheet of metal panelling forming the front outer wall by interlocking flanges located adjacent the front wall of the cabinet.

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