

Dec. 17, 1929.

O. P. GREENWOOD ET AL.

1,740,237

REFRIGERATOR LINING AND METHOD OF MANUFACTURING SAME

Filed March 5, 1927

2 Sheets-Sheet 1

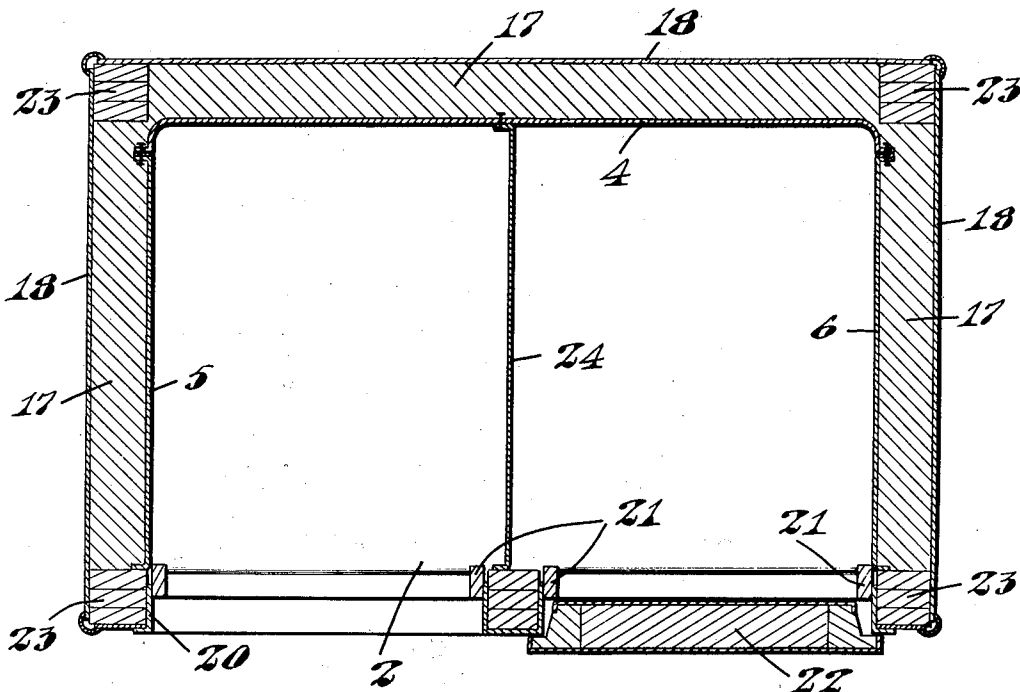


Fig.1.

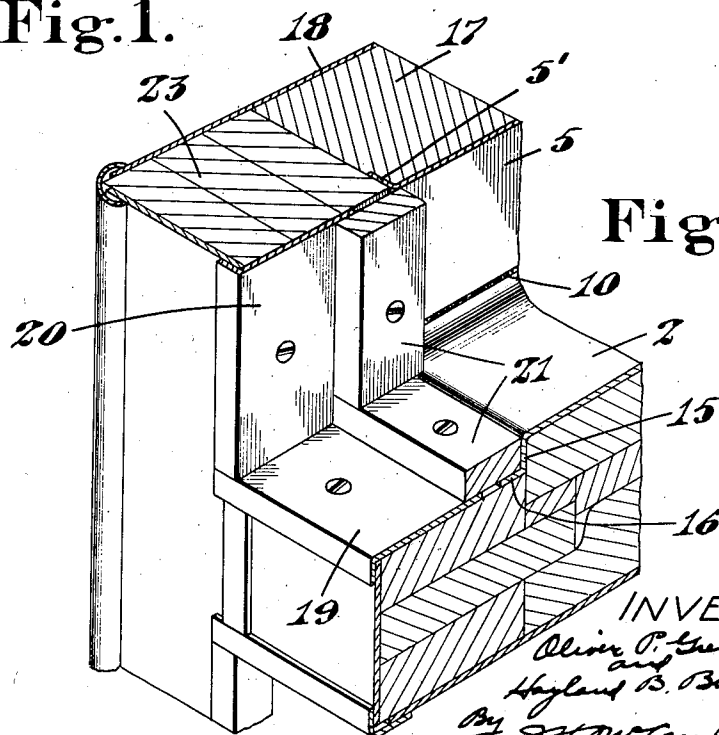


Fig.2.

INVENTORS

Oliver P. Greenwood
and
Hayland B. Bittenger,
By J. H. McCord,
their attorney.

Dec. 17, 1929.

O. P. GREENWOOD ET AL

1,740,237

REFRIGERATOR LINING AND METHOD OF MANUFACTURING SAME

Filed March 5, 1927

2 Sheets-Sheet 2

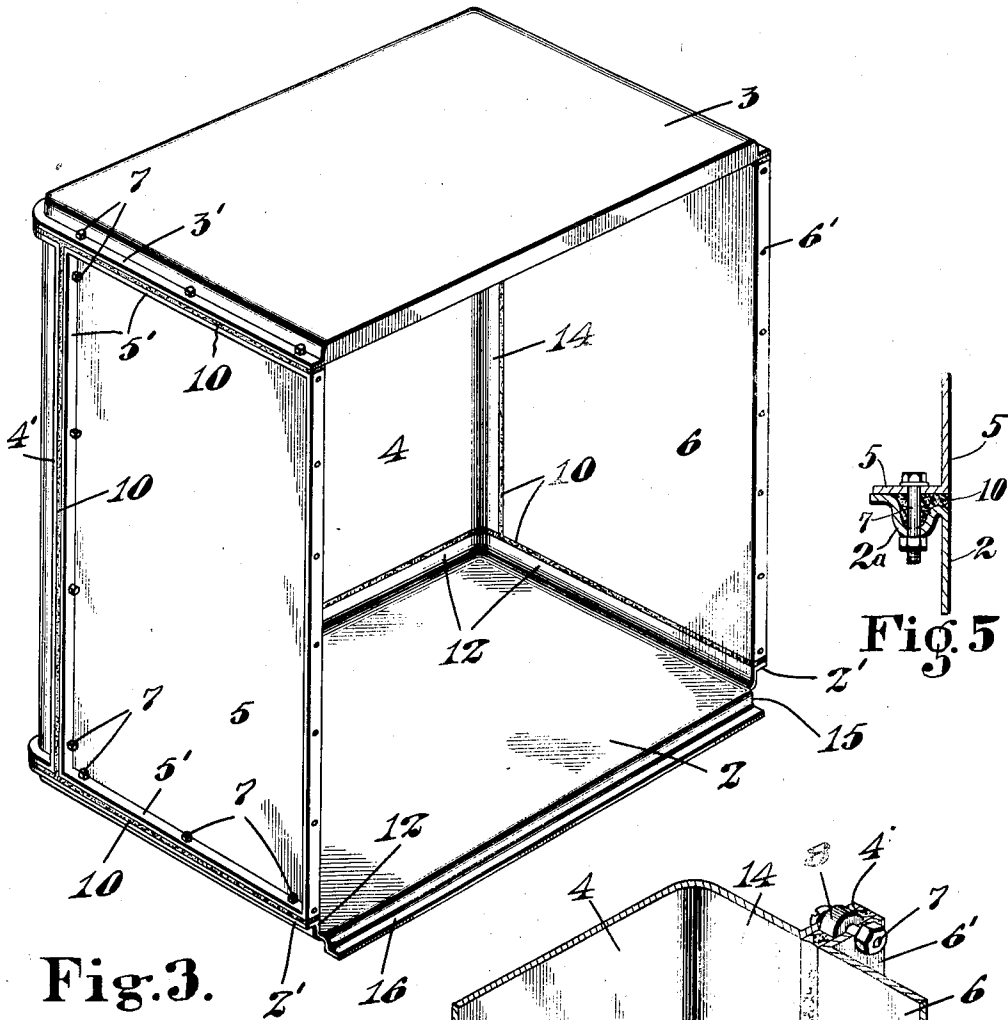
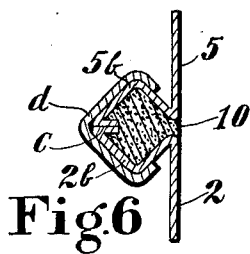
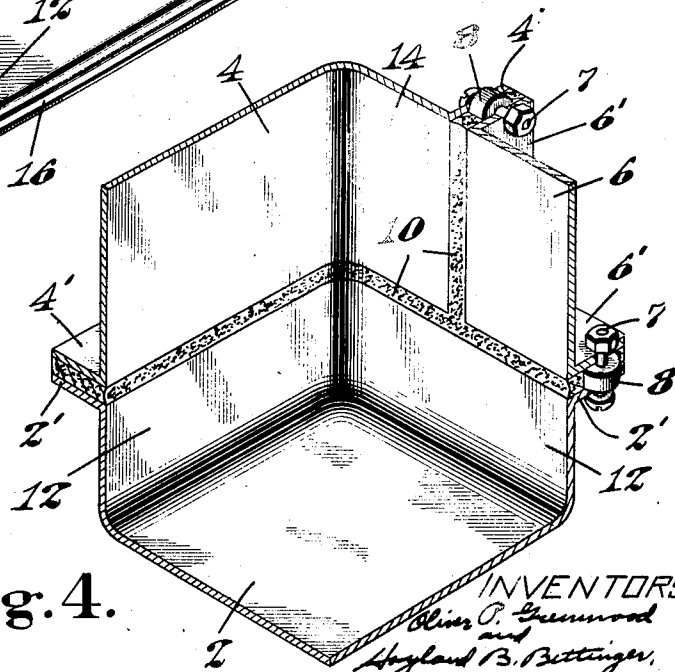


Fig. 6



INVENTORS
Olin P. Greenwood
and
Hayland B. Bettinger,
By J. J. Greenwood
their attorney.

UNITED STATES PATENT OFFICE

OLIVER P. GREENWOOD, OF BILLERICA, AND HOYLAND B. BETTINGER, OF WALTHAM, MASSACHUSETTS; SAID GREENWOOD ASSIGNOR TO SACO-LOWELL SHOPS, OF LOWELL, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

REFRIGERATOR LINING AND METHOD OF MANUFACTURING SAME

Application filed March 5, 1927. Serial No. 173,203.

This invention relates to refrigerators of the domestic type, and it is especially concerned with the inner boxes or linings of refrigerators. Usually these linings are referred to simply as "boxes."

The better class of refrigerators, whether of the ice or iceless types, have a so-called "porcelain" lining. That is, the walls of the inner compartment or box are of metal on which a porcelain enamel has been baked. The usual practice has been to make these inside boxes of as few parts as possible, to weld the parts or sections together, and then to enamel the interior of the boxes so constructed. A very high temperature is required to bake on the enamel, and a relatively large percentage of these boxes are ruined in this process due chiefly to warping and imperfect enameling.

The present invention aims to improve the construction and methods of manufacture of refrigerator boxes with a view to reducing the manufacturing expense, while at the same time producing an entirely satisfactory article.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a horizontal cross-sectional view through a refrigerator constructed in accordance with this invention;

Fig. 2 is a cross-sectional perspective view showing details of construction at the lower corner of the food chamber at the front part thereof;

Fig. 3 is a perspective view of a refrigerator box embodying this invention in the form at present preferred;

Fig. 4 is a perspective view on a larger scale of one corner of the box; and

Figs. 5 and 6 are fragmentary sectional views showing different joint constructions.

Referring first to Fig. 3, the box there shown consists of a bottom section 2, top section 3, rear section 4, and two side sections 5 and 6. Each of these sections is made of

sheet metal, and each section is provided with flanges which project outwardly or backwardly from the marginal portions of the sections, these flanges being designated by primed numerals corresponding to those designating the respective sections.

The flanges are punched or drilled at intervals to receive bolts 7 by means of which the sections are secured together. Preferably the flanges are spaced slightly apart, and for this purpose a washer 8 of fibre, or other suitable material, is interposed between the flanges at each bolt, the bolt passing through the hole in the washer. The spaces or seams thus provided between the flanges are closed by a plastic filler 10 which hardens in the seams. Preferably a filler is used which will adhere firmly to the surfaces of the flanges, and for this purpose I prefer to use the filler known commercially as "plastic wood," although other seam compositions or plastic fillers can be substituted for it.

The preferred method of manufacturing the box consists in making the individual sections from sheet metal of suitable thickness, sheet steel ordinarily being used, and the shaping operation being performed by pressing the metal between suitable punches and dies. The sections next are enameled, and they are then assembled and secured together, as above described. After the bolts 7 have been tightened up, the plastic filler 10 is forced into the seams, the exposed portions of this filler are smoothed off, and it is allowed to harden or set. Plastic wood has been found particularly valuable for this purpose because it becomes very hard upon setting, it does not shrink or swell appreciably, and it forms an adhesive union with the surfaces of the flanges so firm that it might even be possible to dispense with many of the bolts used if it were not for the fact that they perform a valuable function in holding the flanges in the proper relationship to each other while the plastic composition is being forced into the seams.

The fact that the box is made of sections reduces the cost of manufacture very materially when compared to the expense of making the one piece box which has been com-

monly used heretofore. This saving is due partly to the elimination of the expense for welding, but another very important factor is that there is practically no loss of material due to poor enameling. The sections do not warp appreciably during the enameling operation, the instances of poor enameling are greatly reduced, and if a section is imperfectly enameled, only a small part of the box is lost. At the same time an entirely satisfactory construction is provided.

It should be noted that in the box shown in Figs. 3 and 4, the inner corners and edges are formed in the sections instead of being formed at the junction of the sections. That is, the marginal portions of the bottom 2 are curved upwardly at three sides of this section, as clearly shown at 12 in the drawings, to meet the vertical sections 4, 5 and 6. The margins of the top sections 3 are similarly curved downwardly at three sides thereof to meet the vertical sections. The opposite vertical margins of the rear section 4 are curved forwardly, as shown at 14, to meet the side sections 6. In other words, the edges of the sections are not joined together along the inner edges of the box, but the meeting edges of said sections are spaced, along the walls of the box, away from said inner edges. This construction produces rounded inner edges and corners which are easily cleaned, and it avoids the use of the plastic filler or composition directly in the corners and edges where it would make the cleaning of the box more difficult. It is particularly advantageous to have the bottom constructed substantially in the manner shown since any condensation which collects on the inner walls and runs down into the bottom, or any liquid which is accidentally spilled in the refrigerator box, can be more easily wiped out, and such liquids do not have an opportunity to collect at points where they would be contact with the plastic filler.

The cleaning of the refrigerator box is further facilitated by providing the bottom 2 with a front flange which is curved downwardly, as indicated at 15, Figs. 2 and 3, and then forwardly, as shown at 16. This permits any foreign materials in the box to be wiped directly out through the front opening.

In mounting the box in the refrigerator casing, suitable cross pieces are provided to support it, and the flanges projecting from the sheet metal sections are also of convenience, the flanges at the front of the box being particularly useful to receive nails by means of which the box is secured to the frame 23 of the casing. Suitable insulating material, indicated in general at 17, is interposed between the box and the outside sheet metal pieces 18 which are fastened to the casing frame. In securing the finish around the doors, it is preferable to leave a space between the metal finish pieces 19 and 20, Fig.

2, and the forward edges of the box sections so that heat will not be transmitted directly from the relatively warm metal finish to the cool walls of the box. The joint or gap between the metal finish pieces and the box may conveniently be closed by finish strips of heat insulating material, as for instance wooden strips 21. These strips also form stops for the doors, one of which is shown at 22, Fig. 1. Preferably the lower strip 21 abuts against the flanges 15 and 16 and its upper surface lies approximately flush with the inner surface of the bottom 2 so that the cleaning of the refrigerator is facilitated.

In Fig. 1 the box is shown as provided with a partition 24, but this partition may or may not be used, as desired. The internal arrangement will depend upon the size of the box and the uses to which it is to be put. In order to equip it with shelves, the walls may be punched or drilled to receive studs or lugs on which the shelves may be supported.

The seam or joint between sections of the box may take other forms, as for example, those shown in Figs. 5 and 6. In Fig. 5 the lower flange 2^a of the section 2 is longitudinally grooved and the outer wall of the groove is higher than the inner wall. Consequently, when the two flanges are bolted together their outer edges meet or abut, while their inner edges which are located adjacent to the inner surface of the box are spaced apart by a short distance. This provides a seam between flanges which is relatively restricted in width immediately adjacent to the inner surface of the box but is of greater width at more remote points from said surface. Consequently, the filling material 10 is mechanically locked in the seam by this construction.

Another modification is shown in Fig. 6 in which the flanges 5^b and 2^b of the sections 5 and 2, respectively, are grooved longitudinally. When these flanges are brought together their outer edges abut at *c*, and the seam between flanges gradually widens as in the construction shown in Fig. 5, and then narrows again as it approaches the inner surface of the box. Here, also, the filling material 10 is mechanically locked in the seam. In this particular construction the flanges instead of being bolted together are secured together by a strong sheet metal clamp or clip *d* which embraces both flanges and may extend for substantially their entire length, or may be made in sections.

It will be understood that any of the seams may be made in these or similar ways. Also, in some cases it may be desirable to make the box of fewer sections, the back and sides being made in one piece. In assembling a box made in the manner above described the grooves in the sections may be filled with the plastic composition before the flanges are brought together, some of the surplus being squeezed out as the flanges are clamped or bolted together,

this surplus being scraped off to make a smooth surface inside.

While we have herein shown and described a preferred embodiment of our invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof.

In enameling the sections preparatory to assembling them it is preferable to wipe the finish coat of enamel off the abutting portions of the flange before baking when the sections are joined in the manner shown in Figs. 5 and 6. This avoids any danger of chipping the enamel which otherwise might occur where the edges of the flanges meet and such chipping might run back on to the inner surface of the box.

Important advantages of this invention reside in the fact that the box can be made of a thinner or lighter gage metal than a welded box, and in the further fact that when a welded box is chipped or cracked in handling or due to poor enameling, the whole box is lost, whereas in a box made up of sections the chipping or cracking of a section results in the loss of that section only.

Having thus described our invention, what we desire to claim as new is:

1. A refrigerator box comprising a series of sheet metal sections, means for securing said sections together with spacers separating adjacent walls of said sections, and a filler closing the spaces between the sections.

2. A metal refrigerator box comprising a series of sections having flanged marginal portions, means cooperating with said flanges to secure said sections together but holding them spaced apart, and a filler of plastic composition closing the seams between adjoining sections.

3. A metal refrigerator box comprising a series of sections, said sections having backwardly directed flanges at their edges, fastening devices for engaging said flanges and securing said sections together, spacing elements located between said flanges to hold them spaced apart and thereby to provide seams between adjacent sections, and filling material closing said seams and adhering firmly to said flanges.

4. A metal refrigerator box comprising two side sections, a rear section, and top and bottom sections, means for securing said sections together but holding adjoining sections spaced apart to provide seams between them, and a filler of plastic composition closing said seams.

5. A metal refrigerator box comprising two side sections, a rear section, top and bottom sections, said bottom section having upwardly curved margins to meet said side and rear sections and said rear section having margins curved forwardly to meet the side sections, all of said sections having rearwardly projecting flanges, means cooperating with

said flanges to secure the sections together, and a filler closing the seams between adjoining sections.

6. In a refrigerator, the combination of a metal refrigerator box having a bottom provided with a flange extending downwardly from the forward edge thereof, and a finish piece of heat insulating material abutting against said flange with its upper surface forming approximately a continuation of the inner surface of said bottom.

7. That improvement in methods of manufacturing enameled boxes of the character described which consists in providing a plurality of sheet metal sections suitable for assembly to form a box, enameling said sections, subsequently assembling said sections and closing the seams between adjoining sections with a plastic filler.

8. That improvement in methods of manufacturing enameled boxes of the character described which consists in providing a plurality of sheet metal sections suitable for assembly to form a box, mechanically securing said sections together in the proper relationship, and at some stage in the manufacturing operation introducing a plastic filler into the seams between adjacent surfaces of said sections and causing said filler to harden in said seams.

9. That improvement in methods of manufacturing enameled boxes of the character described which consists in providing a plurality of sheet metal sections suitable for assembly to form a box, enameling said sections, said sections being provided with flanges, subsequently to said enameling operation fastening flanges of said sections together but providing spaces between portions of the flanges whereby the sections are assembled to form a box and seams are provided between adjoining sections, at some stage of the manufacturing operation coating the flanges with a plastic filler adapted to harden and to close said seams, and allowing the filler to harden after the assembling operation has been performed.

10. A metal refrigerator box comprising a plurality of sheet metal sections, means for securing said sections together but holding adjoining surfaces spaced from each other to provide seams between said surfaces of the sections, the meeting edges of said sections being spaced along the walls of the box from the inner edges of the box, and a filler of plastic composition closing said seams.

In testimony whereof we have hereunto signed our names to this specification.

HOYLAND B. BETTINGER.
OLIVER P. GREENWOOD.