

Jan. 5, 1943.

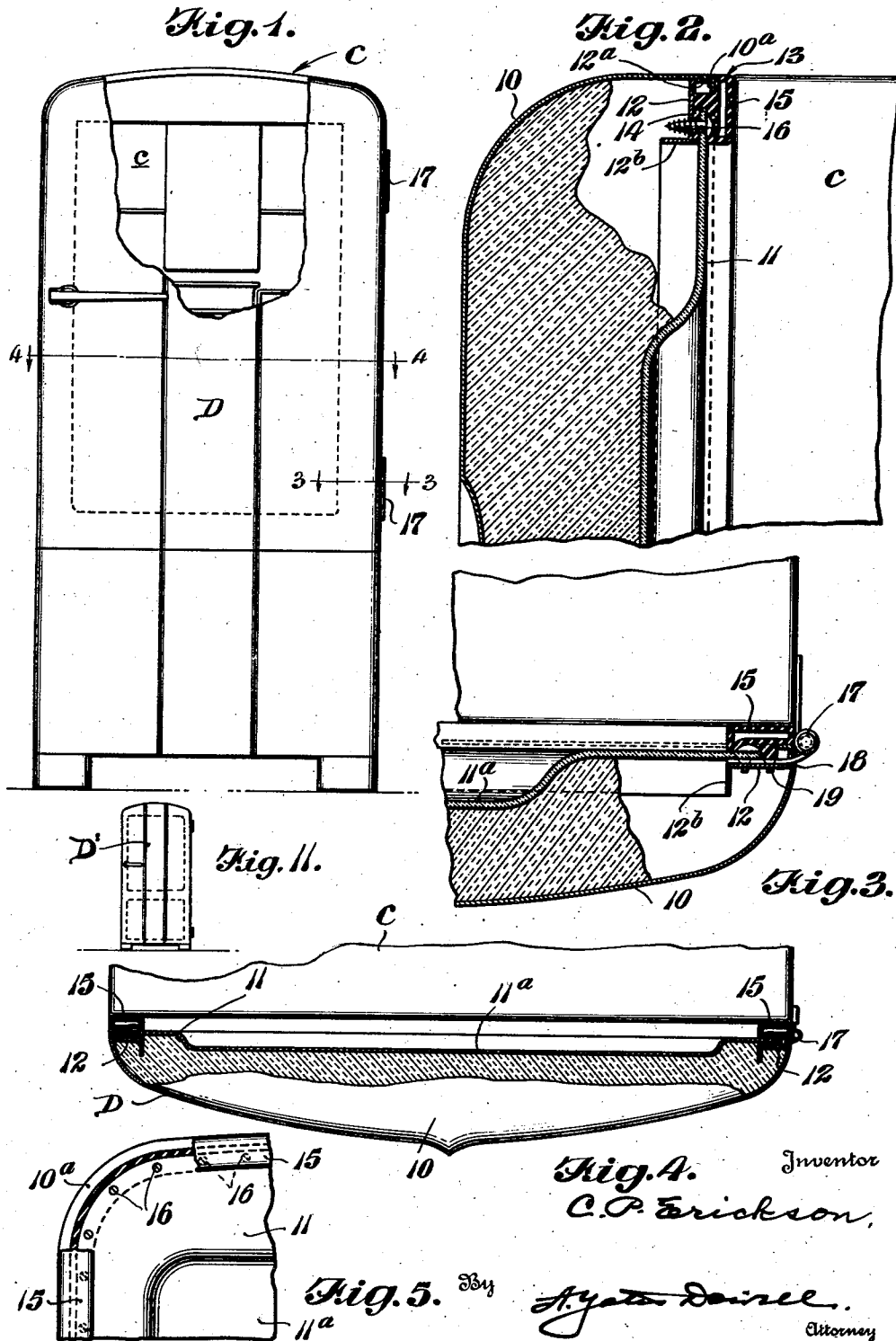
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2,307,121

REFRIGERATOR CABINET CONSTRUCTION

Filed May 9, 1940

2 Sheets-Sheet 1



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Fig. 6.

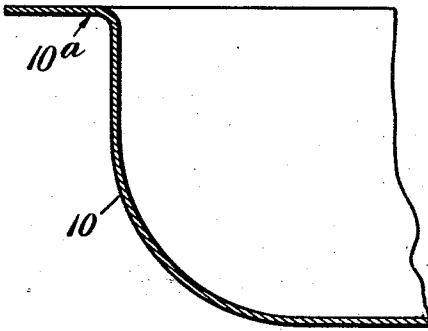
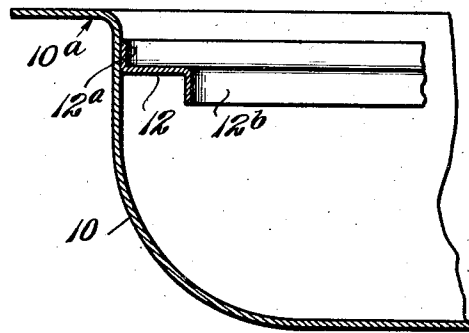


Fig. 8.



BLANK OF (12)

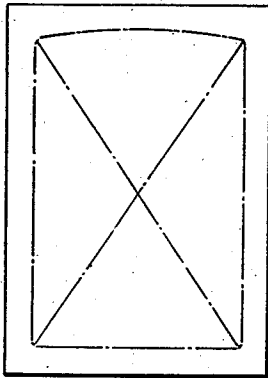


Fig. 7a.

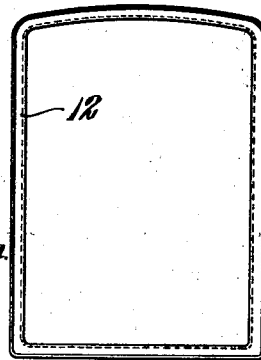


Fig. 7.

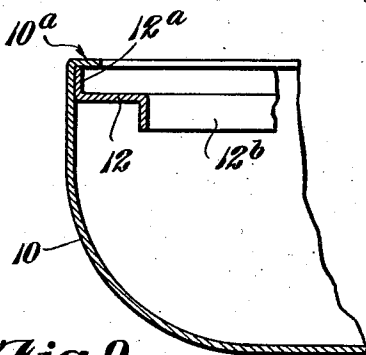


Fig. 9

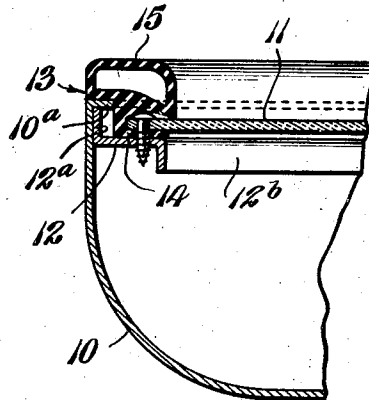


Fig. 10.

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REFRIGERATOR CABINET CONSTRUCTION

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8 Claims. (Cl. 20-35)

This invention relates to refrigerator cabinet construction and, generally stated, has for its object to provide an improved method of and means for assembling in connected relation outer and inner spaced insulated wall structures with interposed gasket or like sealing means. The improvements are especially adapted for the fabrication of doors for refrigerator cabinets and have been practically applied to large scale or volume production thereof, particularly doors for cabinets of the so-called "streamline" type, in which instance the door forms the entire upper front portion of the cabinet with side and top edges flush with the outer side and top walls of the cabinet as in the U. S. Patent to Erickson No. 2,079,608. The appearance of cabinets of this character is much improved by having the door panel fit relatively close to the front face of the cabinet when in closed position, so that only a very small gap remains between the door and the cabinet face and which gap is filled by the sealing gasket.

The improvements disclosed herein have resulted in a number of advantages, among which may be mentioned:

The fabrication of door panels or walls from sheet metal or the like having uniformity and exactness in construction and overall dimensions at a low production cost;

A door particularly adapted for refrigerator cabinets of the "streamline" type which may be readily constructed in a manner such as to fit close to the face of the cabinet when in closed position without unduly restricting or confining the door compression gasket into too small a space, permitting the use of a large balloon type gasket which results in an easy closing door and high sealing efficiency;

A door for refrigerator cabinets which is relatively light in weight so that wear on the hinges and resultant sagging and misalignment of the door is reduced;

Connecting means for spaced outer and inner insulated walls particularly adapted for use with doors of the type utilizing a non-metallic inner wall or door pan;

A frame member in the nature of a reinforcement ring for connecting outer and inner spaced insulated walls of a refrigerator cabinet, and particularly the door of the cabinet, which is conducive to simplicity and accuracy in construction, ease in assembly and reduction in the number of parts while at the same time maintaining strength and rigidity.

The foregoing and other objects and advantages will become apparent in view of the following description taken in conjunction with the drawings, wherein:

Fig. 1 is a view in front elevation of a refrigerator cabinet embodying the features of the

present invention, the door being partly broken away;

Fig. 2 is an enlarged fragmentary transverse sectional view taken through the upper portion of the door, the adjacent cabinet being shown in elevation;

Fig. 3 is a section through the hinge portion of the door taken substantially on the line 3-3 of Fig. 1;

Fig. 4 is a further section taken on the line 4-4 of Fig. 1;

Fig. 5 is a view in elevation of one corner of the door as viewed from the inner side thereof with the sealing gasket or bead partly broken away;

Fig. 6 is a section through the outer edge of the door outer panel after the drawing operation;

Fig. 7 is a plan view of the blank from which the frame member or reinforcement ring is struck;

Fig. 7^a shows the ring in finished form after it has been drawn or otherwise shaped;

Fig. 8 is a section through the door with the frame member or reinforcement ring spot-welded in place;

Fig. 9 shows the completed door outer panel;

Fig. 10 is a sectional view of the outer edge portion of the completely assembled door; and

Fig. 11 is a view in front elevation, on a reduced scale, of a refrigerator cabinet of the type wherein one main door covers the entire front face of the cabinet.

A refrigerator cabinet is generally indicated at C and the door at D. An evaporator E is mounted within the food compartment C and serves to maintain the latter at the proper temperature.

The cabinet illustrated in the drawings is of the so-called "streamline" type hereinbefore referred to wherein the walls about the door opening have substantially flat or non-beveled faces and the marginal edge portions of the door overlap said faces and are substantially coextensive with the top and sides of the cabinet. In such types of cabinets, the construction of the door and coacting parts presents problems not present in cabinets of conventional construction.

The door is made up of an outer panel or shell 10 and an inner panel or door pan 11 with suitable insulation material therebetween. The door pan 11 may be formed of plastic, fibrous composition or like material capable of being molded or pressed into the desired shape. Such material is lighter than sheet metal and at the same time has a high coefficient of thermal insulation efficiency.

The central portion of the door pan is dished or formed with an inset 11^a to increase the capacity of the food storage compartment. The

marginal edges of the pan project straight or are unbent, since material of this type does not lend itself to bending and flanging in a manner similar to sheet metal.

Adjacent the outer marginal portion of the shell 10 is a metallic substantially Z-shaped frame or reinforcement member 12, the outer intumed flange 12^a thereof lying flush against and being secured as by welding to the shell and the inner flange 12^b of the frame member projecting free and serving as a reinforcement for the marginal edge of the door pan. This frame member is continuous or constitutes a ring which extends completely around the door.

Figs. 6 to 10 inclusive illustrate the successive steps in the method of fabricating the door outer panel or shell and the frame member or reinforcement ring and the manner of assembling the parts in connected relation with the inner wall or door pan.

The outer shell or panel 10 is first drawn to the approximate shape shown in Fig. 6, the particular shape of course depending upon the desired contour to be given the face of the door. It will be noted that the marginal edge portion 10^a of the panel 10 after the initial drawing operation is turned outwardly and projects free.

Figs. 7 and 7^a show the preferred method of forming the reinforcement ring or frame member 12. A blank of sheet metal of suitable overall dimensions is utilized and has the member 12 stamped out from the marginal portion thereof, the completely formed ring detached from the blank being shown in Fig. 7^a. The central portion from which the ring is stamped may be utilized elsewhere in the cabinet, as for example, the food compartment top and bottom.

The reinforcement ring is then secured to the panel 10 as shown in Fig. 8, preferably by spot welding. It will be noted that the point at which the ring is secured to the door outer panel determines the overall dimensions of the door for size and shape and serves as a definite gauge for succeeding operations. In other words, the ring may be used as a means for accurately dimensioning the door, and if each ring is stamped or formed with the same dimensions, the line of doors to which the rings are applied will likewise have constant dimensions.

Fig. 9 shows the completed door outer panel with the marginal edge thereof trimmed to size and bent inwardly over the contiguous flange of the reinforcement ring.

The outer panel with the reinforcement ring secured thereto is now ready for assembly with the door pan 11 and combined thermal break and sealing gasket 13, the latter being provided with a web 14 and a hollow sealing bead 15. It will be noted that the bead 15 is relatively large or is of the so-called balloon type. A gasket of this type permits the door to close easily and at the same time provides a highly efficient seal. The thermal insulating portion of the gasket is engaged between the outer edge of the door pan 11 and intumed edge of the door outer panel with the web 14 lying between the reinforcement ring and the said marginal edge of the door pan. Suitable fasteners, here shown in the form of screws 16, are projected through the marginal edge of the door pan 11, the web 14 of the gasket and the reinforcement ring 12.

This construction permits the gasket to be assembled in non-displaceable position without unduly confining or restricting the gasket, the hollow sealing bead 15 overlying the joint between

the intumed edge of the door outer panel and the marginal edge of the door pan and extending well out to the marginal edge of the door as well as inwardly over the fasteners 16.

The reinforcement ring or frame member 12 constitutes the entire door frame structure or the sole connecting means between the outer and inner spaced walls of the door. By making the reinforcement ring or frame member as shown, its strength is materially increased so that in actual practice the ring may be formed of sheet metal of substantially the same gauge as that used for other parts of the cabinet. It will also be seen that the door is materially simplified and reduced in weight, and that the inner horizontal flange of the reinforcement ring extends substantially at right angles to the edge of the marginal door pan and reinforces the latter.

This type of frame structure also provides a convenient and stable connection for the door hinge, indicated at 17. The hinge has one leaf thereof projected through a slot 18 formed in the outer shell and secured to the body portion of the frame member 12 by means of fastening devices such as screws 19, the stationary leaf of the hinge being anchored to the adjacent portion of the cabinet in any suitable manner. Thus, the weight of the door is taken by the hinge through the frame member 12 and distributed throughout the entire peripheral portion of the door. This construction also permits the use of lighter and cheaper hinges for low cost cabinets.

A door of the type herein disclosed is easily fabricated and actual experience has demonstrated its ruggedness and capability of long service.

Fig. 11 illustrates a cabinet utilizing one door only indicated at D' for the entire face of the cabinet, this door serving the dual purpose of a food compartment and machine compartment door.

It will be understood that certain minor changes in construction and design may be adopted without departing from the spirit or scope of the invention as defined by the appended claims.

What is claimed is:

1. In a door for a domestic refrigerator having a dished-out metal outer shell forming the entire front of said door and bounded by rearwardly extending edge portions terminating in coplanar intumed marginal flanges, a one-piece dimensioning and reinforcing ring of rigid angle section disposed within said shell and having a flange at its outer edge extending parallel to the rearwardly extending edge portions of the shell and substantially perpendicular to its intumed marginal flanges, said ring flange being secured to said shell in substantially continuous contact with the inner surface thereof to accurately shape and dimension said door, and said ring having a body portion extending inwardly from said flange in spaced parallel relation with respect to the coplanar marginal flanges of said shell and free from contact with the shell.

2. In a door for a domestic refrigerator comprising a dished-out metal outer shell bounded by rearwardly extending edge portions terminating in coplanar intumed marginal flanges, and an inner panel member, a one-piece dimensioning and reinforcing ring of rigid angle section disposed within said shell and having a flange at its outer edge extending parallel to the rearwardly extending edge portions of the shell and towards and to its intumed marginal flanges, said

ring flange being secured to said outer shell in substantially continuous contact with the inner surface thereof to accurately shape and dimension said door, and said ring having a body portion extending inwardly from said flange in spaced parallel relation with respect to the coplanar marginal flanges of said shell and underlying and supporting the edge portion of said inner panel member.

3. In a door for a domestic refrigerator having a dished-out metal outer shell forming the entire front of said door and bounded by rearwardly extending edge portions terminating in coplanar intumed marginal flanges, a rigid one-piece dimensioning and reinforcing ring disposed within said shell and having a flange at its outer edge extending parallel to the rearwardly extending edge portions of the shell and secured thereto in substantially continuous contact with the inner surface thereof to accurately shape and dimension said door, said ring having a body portion extending inwardly from said flange in spaced parallel relation with respect to the coplanar marginal flanges of said shell, hinges for said door at one side thereof each comprising a member extending through openings in the outer shell and the flange of said ring and lapping the body portion of the latter, and means securing said hinge member to the body portion of the ring.

4. In a door for a domestic refrigerator comprising a dished-out metal outer shell forming the entire front of said door and bounded by rearwardly extending edge portions terminating in coplanar intumed marginal flanges, and an inner panel member, a rigid one-piece dimensioning and reinforcing ring disposed within said shell and having a flange at its outer edge extending parallel to the rearwardly extending edge portions of the shell and secured thereto in substantially continuous contact with the inner surface thereof to accurately shape and dimension said door, said ring having a body portion extending inwardly from said flange in spaced parallel relation with respect to the coplanar marginal flanges of said shell and underlying the edge portion of said inner panel member, hinges for said door at one side thereof each comprising a member extending through openings in the outer shell and the flange of said ring and between the body portion of the latter and the edge portion of the inner panel member, and means securing said hinge member to the body portion of the ring.

5. A domestic refrigerator door and sealing gasket comprising, in combination, an outer panel member having an intumed flange, a bracket member secured to said outer panel and recessed inwardly thereof, an inner panel member, said bracket and inner panel members having their edge portions in overlapping relation, a resilient gasket member having a lip portion interposed between said lapping edge portions of the bracket and inner panel members, a bead portion outwardly overlying both said intumed flange and the edge portion of said inner panel, and a shank portion joining said lip portion and said bead and extending outwardly between the edges of the intumed flange and inner panel member, hinges for said door along one side edge thereof each comprising a member extending through an opening in the outer panel and bracket members and interposed between the overlapping portions of the bracket and inner

panel members, and means securing said hinge member to said bracket member.

6. A domestic refrigerator door and sealing gasket comprising, in combination, a dished outer panel member having an intumed flange extending continuously thereabout, a bracket member secured to said outer panel and extending continuously thereabout in inwardly spaced parallel relation with respect to said intumed flange, an inner panel member, said bracket and inner panel members having their edge portions in overlapping relation, a resilient gasket member carried by said door and having a bead overlying both the intumed flange and inner panel member, hinges for said door along one side thereof each comprising a member extending through an opening in the outer panel and bracket members and interposed between the overlapping portions of the bracket and inner panel members, and means securing said hinge member to said bracket member.

7. A domestic refrigerator door and sealing gasket comprising, in combination, a dished outer panel member having an intumed flange extending continuously thereabout, a bracket member secured to said outer panel and extending continuously thereabout in inwardly spaced parallel relation with respect to said intumed flange, an inner panel member, said bracket and inner panel members having their edge portions in overlapping relation, a resilient gasket member having a lip portion interposed between said lapping edge portions of the bracket and inner panel members, a bead portion outwardly overlying both said intumed flange and edge portion of said inner panel, a shank portion joining said lip portion and said bead and extending outwardly between the edges of the intumed flange and inner panel member, means securing said inner panel member and gasket to the bracket member, said means underlying the bead portion of the gasket and being concealed thereby, hinges for said door along one side edge thereof each comprising a member extending through an opening in the outer panel and bracket members and interposed between the overlapping portions of the bracket and inner panel members, and means securing said hinge member to said bracket member.

8. A domestic refrigerator door comprising, in combination, a dished outer panel member, a bracket member secured to the internal periphery of said outer panel extending continuously thereabout and recessed inwardly of said periphery, an inner panel member, a resilient gasket member carried by said door and having a lip portion and a bead portion, said bead portion overlapping said inner panel member, said bracket and inner panel members having their edge portions in overlapping relation, said gasket lip portion being interposed between said overlapping edge portions, hinges for said door each comprising a tongue extending through an opening in said outer panel member and overlying said bracket member, said gasket being notched to provide a recess therein for the reception of the tongue of said hinge, and means securing said tongue to said bracket member, means securing said inner panel to said bracket member and compressing said gasket lip around said hinge tongue, whereby a moisture-tight seal may be formed about said hinge member.

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