July 13, 1965 D. G. HARTER 3,194,622

FREEZER CABINET CONSTRUCTION

Filed Feb. 8, 1963 3 Sheets-Sheet 1

FIG. 1

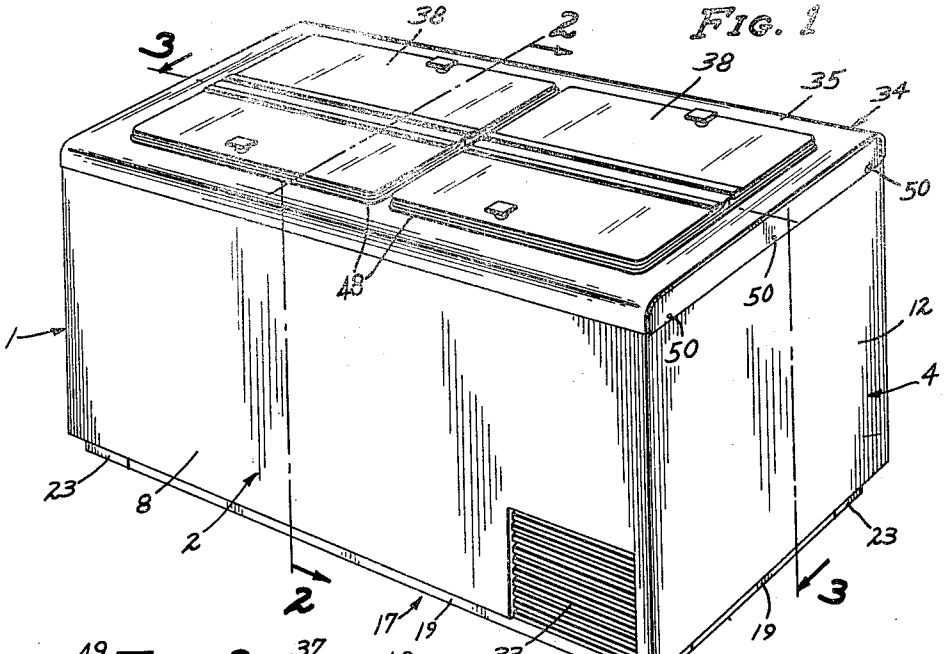


FIG. 2

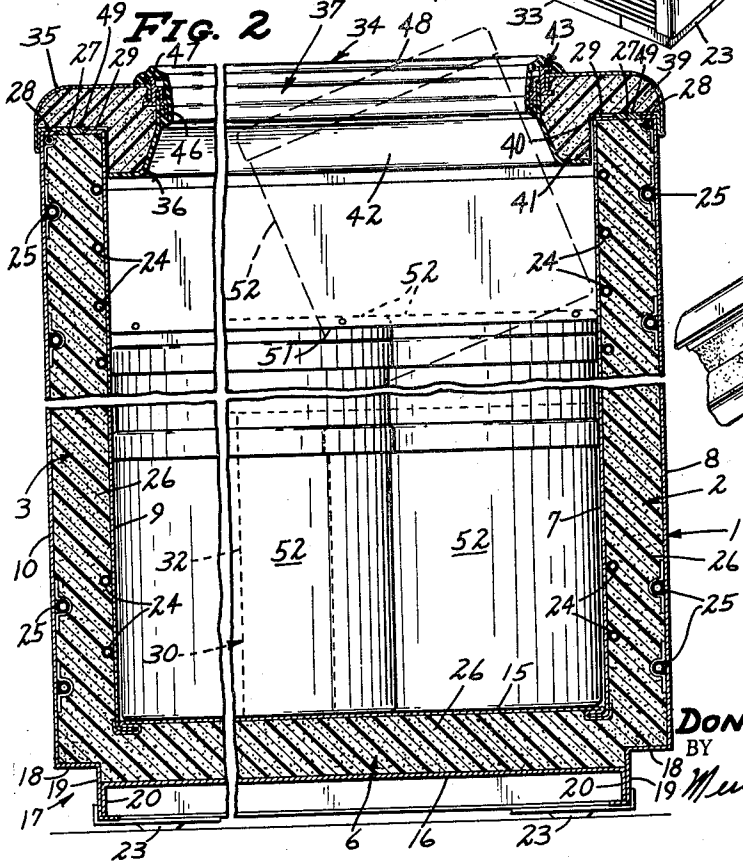
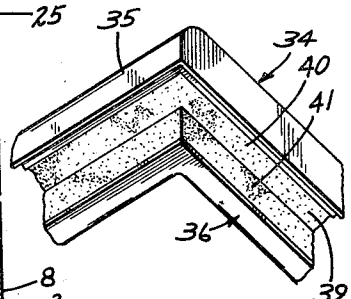


FIG. 6



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FREEZER CABINET CONSTRUCTION

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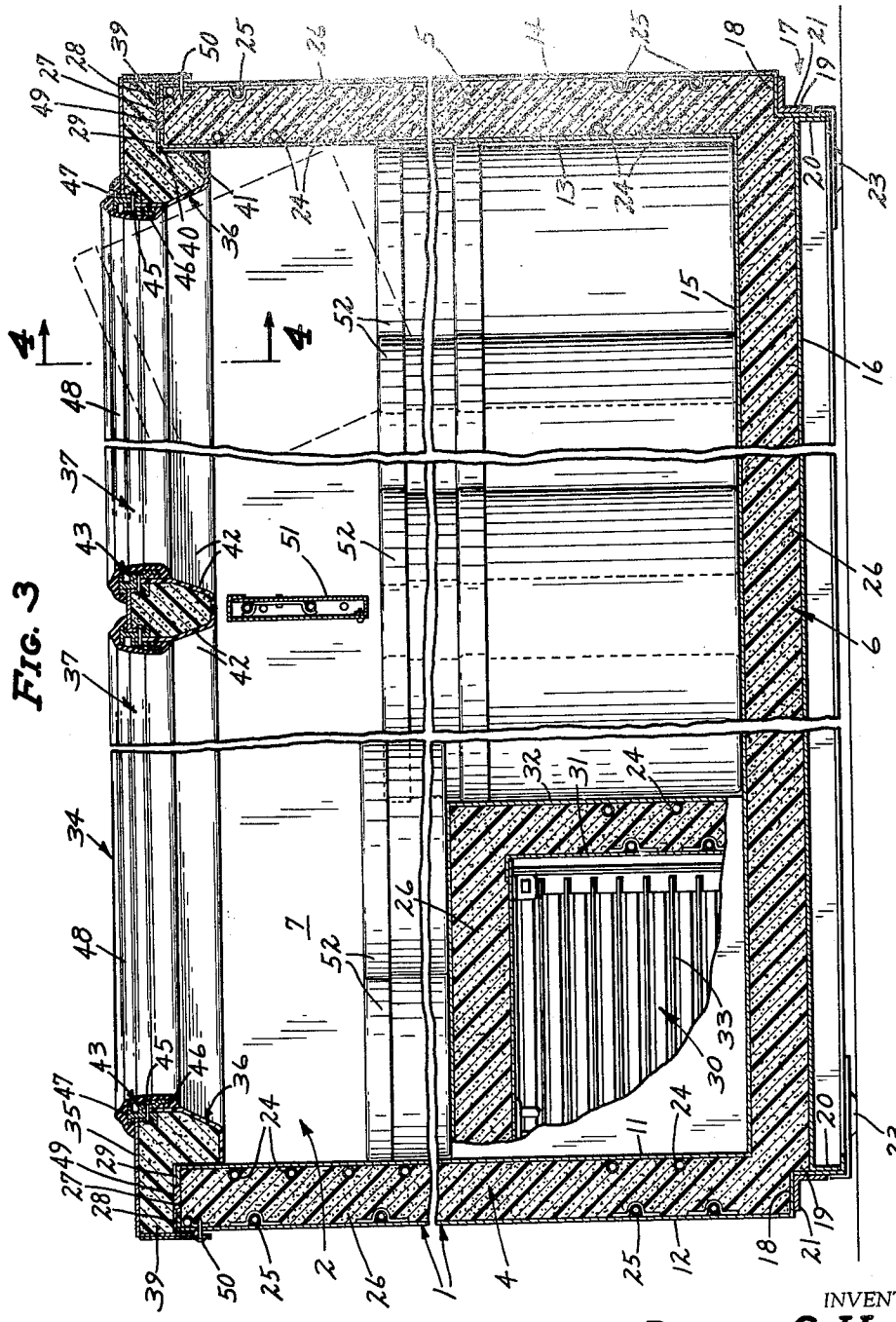

FIG. 3

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FREEZER CABINET CONSTRUCTION

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FIG. 4

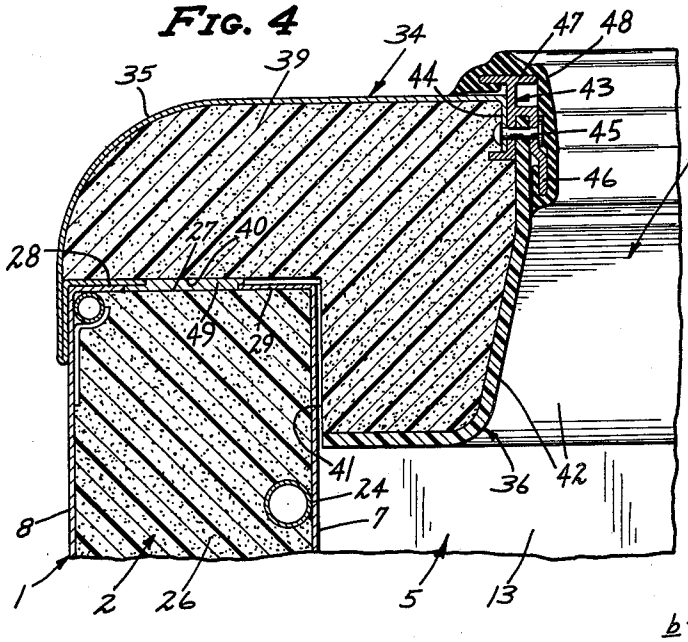


FIG. 7

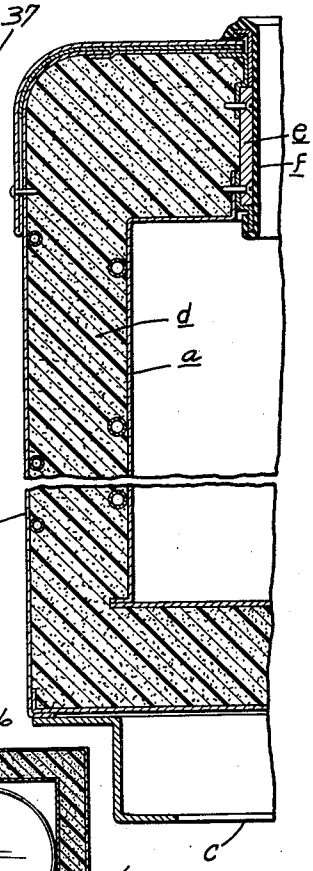
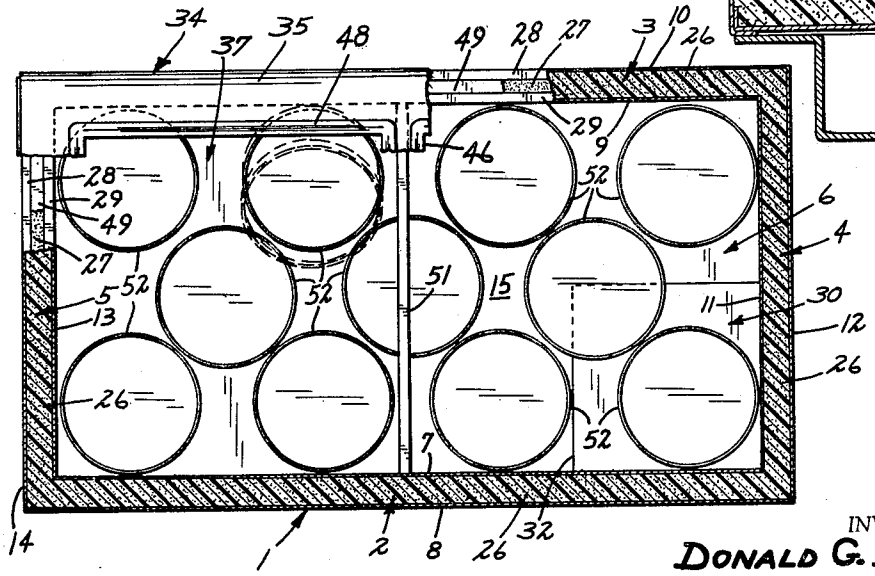


FIG. 5



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3,194,622

FREEZER CABINET CONSTRUCTION

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Filed Feb. 8, 1963, Ser. No. 257,167
4 Claims. (Cl. 312—214)

This invention relates generally to cabinet constructions for frozen food products, and more particularly it relates to a freezer cabinet and method of making said cabinet which is adapted to store containers of ice cream.

Generally speaking, cabinet constructions for frozen food products have usually heretofore been insulated with a fiberglass insulating material disposed between the inner casing portion of the cabinet and outer shell portion. Further, previous cabinet constructions of the type generally referred to above have usually been constructed with a structure supporting base formed from channel beams or Z-bars.

Due to commercial and market demands, it has become desirable for manufacturers of frozen food cabinets of the general class described herein to product cabinets having greater interior storage capacities consistent with the same outside cabinet dimensions as were previously in use. To meet these demands, cabinet manufacturers have turned to the use of more efficient insulating materials, such as plastic or resin foam materials. Since these plastic foam materials have lower thermal-conductivity and therefore greater insulating abilities than the insulating materials commonly in use previously, it is possible to reduce side wall thicknesses by using the newer plastic foam insulating materials and therefore to increase the interior cabinet dimensions without a corresponding increase in the outside cabinet dimensions. However, optimum reductions in the cabinet wall thicknesses were soon reached. The present invention provides further means for increasing the interior storage volume of freezer cabinets by alterations in cabinet structure design.

In light of the above, an important object of the present invention is the provision of a cabinet construction for frozen food products wherein the previously utilized structure supporting bases formed from channel beams or Z-bars have been eliminated, and in which a structure supporting angle section disposed generally at the lower edge portion of the side and end walls has been substituted.

Another object of the present invention is the provision of a cabinet construction for frozen food products in which the structure supporting angle sections comprise a generally horizontally extending part and a generally vertically extending part and in which said angle sections are secured to the lower shell portion of the bottom wall of the cabinet.

Another object of the present invention is the provision of a freezer cabinet for frozen food products in which the lower shell portion of the cabinet bottom wall is disposed below the generally horizontally extending parts of the cabinet angle sections noted above.

A further object of the present invention is the provision of a freezer cabinet for frozen food products in which the cabinet is constructed with a box-like lower cabinet section and a cabinet top wall section adapted to fit on the lower cabinet section with the two cabinet sections being previously filled with a foamed-in-place insulating material and with a mastic material interposed between and securing together the foam surfaces of the lower cabinet section and the top wall section.

Another object of the present invention is the provision of a cabinet construction for frozen food products

in which the cabinet top wall includes a liner having a generally annular portion which slopes upwardly and inwardly toward a general convergence above the cabinet so as to permit the easier removal of product containers from within the cabinet and also to provide generally greater accessibility to the cabinet.

A further object of the present invention resides in the provision of a freezer cabinet for ice cream adapted to contain the cylindrical type bulk ice cream containers and which cabinet is constructed so as to provide greater interior roominess than cabinets of equal exterior dimensions manufactured by competitiors whereby to contain a greater number of the bulk ice cream containers than the cabinets of competing manufacturers.

A further object of the present invention is the provision of a method of producing a freezer cabinet for frozen food products, which method provides a more reliable and efficient placement of the insulating materials and also provides greater interior roominess in the cabinet.

The above and still further objects and advantages of the present invention will become apparent from a consideration of the following detailed specification, appended claims and attached drawings.

Referring to the drawings, wherein like reference characters indicate like parts or elements throughout the several views:

FIG. 1 is a view in perspective showing a freezer cabinet constructed according to this invention and including the lids or doors which are not shown in the remainder of the drawings;

FIG. 2 is an enlarged view in section taken on the line 2—2 of FIG. 1, some portions thereof being broken away, and showing by broken lines the position of a container during removal from the cabinet;

FIG. 3 is an enlarged view in section taken on the line 3—3 of FIG. 1, some portions being broken away, and showing a product container positioned for removal from the cabinet;

FIG. 4 is a further enlarged view in section taken on the line 4—4 of FIG. 3;

FIG. 5 is an enlarged view in top plan with some portions being broken away and some parts shown in section;

FIG. 6 is a view in perspective of a corner portion of the top wall section seen generally from the under side thereof; and

FIG. 7 is a fragmentary view in section taken transversely through the side wall and showing a previous type of cabinet construction.

Referring more specifically to the drawings, the freezer cabinet disclosed by the present invention comprises generally a box-like lower cabinet section, represented generally by the reference numeral 1. The lower cabinet section 1 comprises opposed side walls 2, 3, and opposed end walls 4, 5. The lower cabinet section 1 further comprises a bottom wall 6. The opened-top lower cabinet section 1 is formed with a box-like outer casing structure and a smaller generally box-like inner casing structure disposed within and spaced at its sides, ends and bottom inwardly from the outer casing structure. With this construction, the cabinet side wall 2 comprises an inner casing portion 7 and an outwardly spaced outer casing portion 8, the side wall 3 comprises an inner casing portion 9 and an outer casing portion 10, the end wall 4 comprises an inner casing portion 11 and an outer casing portion 12, and the end wall 5 comprises an inner casing portion 13 and an outer casing portion 14. The cabinet bottom wall 6 also comprises and upper casing portion 15 and a lower casing portion 16 spaced below the upper casing portion 15 thereof.

As noted above, and as shown in FIG. 7 of the draw-

ings, it has been the usual practice previously in the construction of freezer cabinets of the general class disclosed herein to support the lower cabinet section with a base formed of channel beams or Z-bars. Referring particularly to the previous type of cabinet construction shown in FIG. 7, the same comprises an inner casing structure *a* and an outer casing structure *b* which rests upon a base *c* formed with a Z-bar construction. The cabinet shown in FIG. 7 is filled with an insulation material *d*, and the top wall portion of the cabinet defines a generally vertically extending opening formed with a generally vertically extending thermal-breaker *e* and a suitable molding *f*.

In order to lower the elevation of the lower casing portion **16** of the bottom wall **6** so as to permit the lowering of the upper casing portion **15** thereof, a structure supporting angle section, represented generally by the reference numeral **17**, is disposed generally at the lower edge portion of the outer casing portion of each of the side and end walls **2–5**. The structure supporting angle sections **17** have a generally horizontally inwardly extending part **18** and a generally vertically downwardly extending part **19**. It is noted that the vertical parts **19** of the angle sections **17** are secured, as by welding, to corresponding depending flanges **20** of the lower casing portion **16** of the bottom wall **6**, as shown particularly in FIGS. 2 and 3. The angle sections **17** are preferably, and as shown in the drawings, formed by bending the lower edge portions of the outer casing portions of the side and end walls **2**, **5**, and as shown in FIG. 3, the angle sections **17** disposed adjacent the end walls **4**, **5** are provided with reinforcing angle bars **21**. As shown in FIGS. 2 and 3, the base of the lower cabinet section **1** further comprises a plurality of corner feet **23**.

A particular feature of the construction of the lower cabinet section **1** and its inclusion of the structure supporting angle section **17** is illustrated particularly in FIGS. 2 and 3 of the drawings, and this feature comprises the positioning of the lower casing portion **16** of the bottom wall **6** below the horizontal parts **18** of the angle sections **17**. With this feature of the cabinet construction of the lower cabinet section **1**, it is permissible to lower the elevation of the upper casing portion **15** of the cabinet bottom wall **6** so as to provide greater interior roominess for the cabinet.

As shown particularly in FIGS. 2 and 3, a plurality of generally vertically spaced evaporator coils **24** are secured to the outer surfaces of the inner casing portions **7**, **9**, **11** and **13** of the lower cabinet section **1**. Also, a plurality of generally vertically spaced condenser coils **25** are secured to the inner surfaces of the outer casing portions **8**, **10**, **12** and **14** of the lower cabinet section **1**. The outer casing portions of the lower cabinet section **1** define at their top edge portions inturned top flanges **28**, as shown particularly in FIGS. 2 and 3, and the inner casing portions of the lower cabinet section **1** define outturned top flanges **29**.

The spaces between the inner and outer casing portions of the lower cabinet section **1** contain a foamed-in-place thermal insulating plastic foam material **26**, an example thereof being a polyether resin plastic foam material. The lower cabinet section **1** is filled with the plastic foam material **26** to define generally co-planar top foam surfaces **27** located adjacent the top flanges **28**, **29** of the inner and outer casing portions of the lower cabinet section **1**.

Referring to FIGS. 3 and 5, the lower cabinet section **1** defines an inner equipment compartment, represented generally by the reference numeral **30**, adapted to contain a refrigeration compressor motor, and suitable control apparatus, not shown. The equipment compartment **30** comprises an inner casing portion **31** and an outer casing portion **32**, the two being separated by plastic foam material **26**. Also, evaporator coils **24** are secured to the inner surface of the outer casing portion **32** of the equipment compartment **30**, and suitable condenser coils **25** are

secured to the outer surface of the inner casing portion **31** of the equipment compartment **30**, as shown specifically in FIG. 3 of the drawings. The equipment compartment **30** is open to the outside of the cabinet by means of a louvered door structure **33** provided in the cabinet side wall **2**, as shown in FIGS. 1 and 3 of the drawings.

The freezer cabinet provided in accordance with this invention further comprises a cabinet top wall section, represented generally by the reference numeral **34**. The cabinet top wall section **34** is adapted to fit on the box-like lower cabinet section **1**, and the same comprises an outer shell portion **35** and an inner thermal-breaking liner **36** disposed in generally inwardly spaced relation to the outer shell portion **35**, as shown particularly in FIGS. 2 and 3. The outer shell portion **35**, like the inner and outer casing portions of the lower cabinet section **1**, is preferably formed from a sheet metal material, whereas the inner thermal-breaking liner **36** of the cabinet top wall section **34** is preferably formed from a relatively nonconducting plastic material, such as a reinforced polyester plastic material.

The cabinet top wall section **34** defines a pair of openings **37** adapted to permit the passage of the food products into and out of the lower cabinet section **1**, and the openings **37** are provided with suitable insulated doors **38** fitted thereto, as shown generally in FIG. 1 of the drawings. Since the insulated doors **38** do not form a particular novel feature of the present invention, further description and showing thereof is omitted. As a particular feature of the present invention, the space between the outer shell portion **35** and the inner thermal-breaking liner **36** of the cabinet top wall section **34** contains a foamed-in-place thermal-insulating foam material **39**, similar to the foam material **26**. The plastic foam material **39** is placed within the cabinet top wall section **34** to define generally co-planar generally downwardly exposed generally perimetric foam surfaces **40**, and also depending generally vertical foam surfaces **41**, as shown specifically in FIG. 6. The horizontal foam surfaces **40** are of a configuration which conforms generally to the top foam surfaces **27** of the lower cabinet section **1**.

Another important feature of the present invention resides in the construction of the cabinet top wall section **34** with its inner liner **36** having a generally annular portion **42** defined adjacent each of the openings **37**. The annular portions **42** of the inner liner **36** slope upwardly and inwardly toward a general convergence located above the respective openings **37** whereby to permit the easier removal of product containers from within the cabinet, as will be particularly described hereinafter.

With further reference to the cabinet top wall openings **37**, an extruded molding strip **43** of the cross section configuration shown particularly in FIG. 4 is secured at the junction of the inner liner **36** with a depending flange **44** of the outer shell portion **35**. The extruded molding strips **43** are formed from a suitable metallic material, such as aluminum, and one thereof is provided for each of the top wall openings **37**. The extruded molding strips **43** are secured by suitable fasteners or rivets **45**, and the molding strips **43** define depending inner flanges **46** and upstanding T-flanges **47**. With further reference to FIG. 4, an annular flexible sealing molding **48** is provided for securement upon the molding strip **43** for each of the top wall openings **37**. The sealing moldings **48** engage the doors **38** provided for the openings **37** so as to form a seal in the usual manner.

Completing the freezer cabinet construction, the top wall section **34** is positioned on the lower cabinet section **1** with the horizontal foam surfaces **40** of the top wall section **34** in general alignment with the top foam surfaces **27** of the lower cabinet section **1**, as shown particularly in FIGS. 2, 3 and 4. The cabinet top wall section **34** is secured to the lower section **1** with a mastic sealing material **49** interposed between and securing to-

gether the top foam surfaces 27 of the lower cabinet section 1 and the horizontal foam surfaces 40 of the top wall section 34. The top wall section 34 is further secured to the lower cabinet section 1 by means of a plurality of suitable fasteners 50 driven into the outer casing portions 12, 14 of the cabinet end walls 4, 5. The mastic material 49 forms a seal between the top wall section 34 and the lower cabinet section 1.

Referring to FIGS. 2 and 3, it will be noted that a supplemental transversely extending cooling plate 51 is provided in the lower cabinet section 1 near the top thereof so as to provide additional cooling means for the freezer cabinet. The use of the freezer cabinet described herein for storing cylindrical bulk ice cream containers of the several gallon capacity type is illustrated particularly in the drawings. The unique arrangement of the bulk containers 52 permitted by the novel cabinet construction disclosed herein is shown in top plan in FIG. 5. It should be stated that the novel cabinet construction provided by the present invention permits the storing of a greater number of the bulk containers 52 than can be stored by previously known constructions of freezer cabinets of the same exterior dimensions. It is further noted that with the present cabinet construction, two of the bulk containers 52 may be stored one on top of the other directly beneath the transverse supplemental cooling plate 51, and this is generally not permissible with the previously known types of cabinet constructions. The provision of the sloping annular portion 42 of the inner thermal-breaking liner 36 is unique and has the particular advantage that the bulk containers 52 may be stored within the cabinet in more closely spaced relation and still be removed from the cabinet with ease. This is because the bulk containers 52 may be tilted or angled, as shown in FIGS. 2, 3 and 5 of the drawings and then removed from the cabinet without interference from the sloping annular portions 42 of the inner liner 36. It will be appreciated with reference to the previous type of cabinet construction shown in FIG. 7 of the drawings, that it would not be possible to introduce or remove bulk containers 52 into this previous type of cabinet if it were desired to store the bulk containers 52 in the closely spaced relation shown in FIG. 5 of the drawings. This is because the generally vertical thermal-breaker of the cabinet construction shown in FIG. 7 would block the insertion or removal of the bulk containers 52 if the same were to be stacked in the closely spaced relation which is desired for greater cabinet capacity. With the above in mind, it will be appreciated that greater cabinet accessibility and storing capacity is provided by the unique cabinet top wall section construction and the unique cabinet bottom wall construction.

Method of manufacture

The novel method of producing the freezer cabinet described above comprises the utilization of the opened-top generally box-like lower cabinet section 1 having a box-like outer casing structure and a smaller generally box-like inner casing structure disposed within and spaced at its sides, ends and bottom inwardly from the outer casing structure. The outer casing structure referred to above comprises the outer casing portions 8, 10, 12 and 14 of the cabinet side walls and end walls 2–5, along with the lower casing portion 16 of the cabinet bottom wall 6. The inner casing structure referred to immediately above comprises the inner casing portions 7, 9, 11 and 13 of the cabinet side walls and end walls 2–5, along with the upper casing portion 15 of the cabinet bottom wall 6.

The next step in the practice of this novel method comprises the filling of the spaces between the outer casing structure described above and the inner casing structure of the lower cabinet section 1 with a foamed-in-place foam insulation material so as to leave generally co-planar top foam surfaces 27 at the top of the lower cabinet section 1. The top foam surfaces 27 are shown particularly in FIGS. 2, 3 and 5 of the drawings.

The next step in the novel method disclosed herein comprises the utilization of the cabinet top wall section 34 which is adapted to fit on the lower cabinet section 1. The cabinet top section 34 is provided with an outer shell structure 35 and an inner thermal-breaking liner 36 disposed in generally inwardly spaced relation to the outer shell structure or outer shell portion 35. Further, the space between the outer shell structure or outer shell portion 35 of the cabinet top wall section 34 and the inner liner 36 thereof is filled with a foamed-in-place foam insulation material so as to leave generally co-planar generally downwardly exposed generally perimetric foam surfaces adapted to mate with the top foam surfaces 27 of the lower cabinet section 1.

The next step in the method described herein comprises applying a thermal-breaking and sealing mastic material to either the top foam surfaces 27 of the lower cabinet section 1 or the horizontal foam surfaces 40 of the cabinet top wall section 34. Finally, the cabinet top wall section 34 is mated and secured upon the lower cabinet section 1 with the above-noted mastic material forming a generally perimetrically extending thermal-breaker and seal between the top foam surfaces 27 of the lower cabinet section 1 and the foam surfaces 40 of the top wall section 34.

It should be appreciated that the novel method disclosed in accordance with this invention provides economy of manufacture consistent with a cabinet construction having foamed-in-place insulation material of the highest insulating efficiency and without the presence of voids in the insulation material. The foam voids normally encountered in constructing freezer cabinets according to previously known methods of manufacture are extremely hard to detect and remedy and also detract appreciably from the insulating efficiency of the foam material.

This invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects; and while I have shown and described above a preferred embodiment thereof in which the principles of the present invention have been incorporated, I wish it to be specifically understood that the same may be modified without departure from the scope and spirit of the appended claims.

What I claim is:

1. A freezer cabinet for frozen food products comprising:

(a) opposed side walls, opposed end walls, a bottom wall and a door-equipped top wall,

(b) said side walls and said end walls comprising an inner casing portion and an outer casing portion spaced from said inner casing portion,

(c) said bottom wall comprising an upper casing portion and a lower casing portion spaced below said upper casing portion,

(d) a structure supporting angle section disposed generally at the lower edge of the outer casing of at least an opposed pair of said side and end walls, said angle sections generally forming a right angle in cross section and having a generally horizontally inwardly extending part and a generally vertically downwardly extending part and said angle sections being secured to the lower casing portion of the bottom wall of the cabinet,

(e) said lower casing portion of the bottom wall being disposed below the generally horizontally extending parts of said angle sections,

(f) depending flanges on the lower casing portions secured to the vertically downwardly extending parts of the angle sections, and

(g) the spaces between the spaced casing portions of said side, end and bottom walls containing a foamed-in-place insulating material.

2. A freezer cabinet for frozen food products comprising:

(a) a box-like lower cabinet section, said lower cabinet section comprising:

(1) opposed side walls, opposed end walls and a bottom wall,

(2) said side walls and said end walls comprising an inner casing portion and an outer casing portion spaced from said inner casing portion,

(3) said bottom wall comprising an upper casing portion and a lower casing portion spaced below said upper casing portion, and

(4) the spaces between the spaced casing portions of said side, end and bottom walls containing a foamed-in-place insulating material and being filled therewith to define generally co-planar top foam surfaces,

(b) a cabinet top wall section adapted to fit on the box-like lower cabinet section, said top wall section comprising:

(1) an outer shell portion,

(2) an opening adapted to permit the passage of said food products,

(3) an insulated door fitted on said opening,

(4) an inner thermal-breaking liner disposed in generally inwardly spaced relation to said outer shell portion, and

(5) the space between the outer shell portion and said inner liner containing a foamed-in-place insulating material and being filled therewith to define generally co-planar generally downwardly exposed generally perimetric foam surfaces the configuration of which conforms generally to the top foam surface of said lower cabinet section,

(c) said top wall section being positioned on said lower cabinet section with the foam surfaces of said top wall section in general alignment with the foam surfaces of said lower cabinet section, and

(d) a mastic material interposed between and securing together the top foam surfaces of said lower cabinet section and the foam surfaces of said top wall section.

3. A freezer cabinet for frozen food products comprising:

(a) a box-like lower cabinet section, said lower cabinet section comprising:

(1) opposed side walls, opposed end walls and a bottom wall,

(2) said side walls and said end walls comprising an inner casing portion and an outer casing portion spaced from said inner casing portion,

(3) said bottom wall comprising an upper casing portion and a lower casing portion spaced below said upper casing portion,

(4) a structure supporting angle section disposed generally at the lower edge portion of the outer casing portion of each of said side and end walls, said angle sections having a generally horizontally inwardly extending part and a generally vertically downwardly extending part and said angle sections being secured to the lower casing portion of the bottom wall of the cabinet,

(5) said lower casing portion of the bottom wall being disposed below the generally horizontally extending parts of said angle sections, and

(6) the spaces between the spaced casing portions of said side, end and bottom walls containing a foamed-in-place insulating material and being filled therewith to define generally co-planar top foam surfaces,

(b) a cabinet top wall section adapted to fit on the box-like lower cabinet section, said top wall section comprising:

(1) an outer shell portion,

(2) an opening adapted to permit the passage of said food products,

(3) an insulated door fittted on said opening,

(4) an inner thermal-breaking liner disposed in generally inwardly spaced relation to said outer shell portion,

(5) the space between the outer shell portion and said inner liner containing a foamed-in-place insulating material and being filled therewith to define generally co-planar generally downwardly exposed generally perimetric foam surfaces the configuration of which conform generally to the top foam surfaces of said lower cabinet section, and

(6) said liner having a generally annular portion adjacent said top wall opening which annular portion slopes upwardly and inwardly toward a general convergence above said cabinet whereby to permit the easier removal of product containers from said cabinet,

(c) said top wall section being positioned on said lower cabinet section with the foam surfaces of said top wall section in general alignment with the foam surfaces of said lower cabinet section, and

(d) a mastic material interposed between and securing together the top foam surfaces of said lower cabinet section and the foam surfaces of said top wall section.

4. An insulated cabinet construction comprising:

(a) a lower cabinet section including spaced apart inner and outer casing portions, including a bottom wall, and the outer casing portions having lower edge portions;

(b) structure supporting angle sections disposed generally at the lower edge portions of the outer casing portions;

(c) the angle sections each including a generally horizontally inwardly extending part and a generally vertically downwardly extending part;

(d) the bottom wall of the lower cabinet section being disposed below said horizontally inwardly extending parts of said angle sections and secured to the generally vertically downwardly extending part;

(e) insulation material interposed between the inner and outer casing portions

(f) an insulated cabinet top wall section fitting on the lower cabinet section; and

(g) means sealingly connecting the cabinet sections together.

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