

Dec. 6, 1949

E. R. WIDMAN
REFRIGERATOR CABINET

2,490,494

Filed April 11, 1947

3 Sheets-Sheet 1

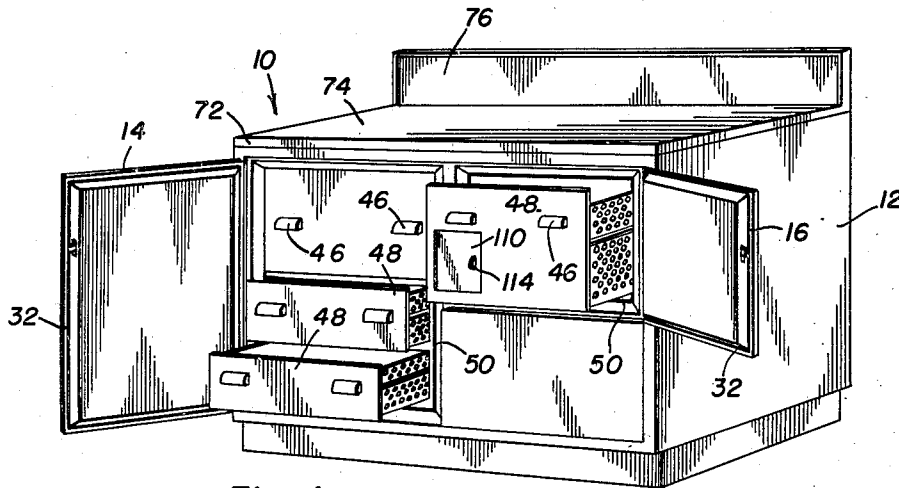


Fig. 1.

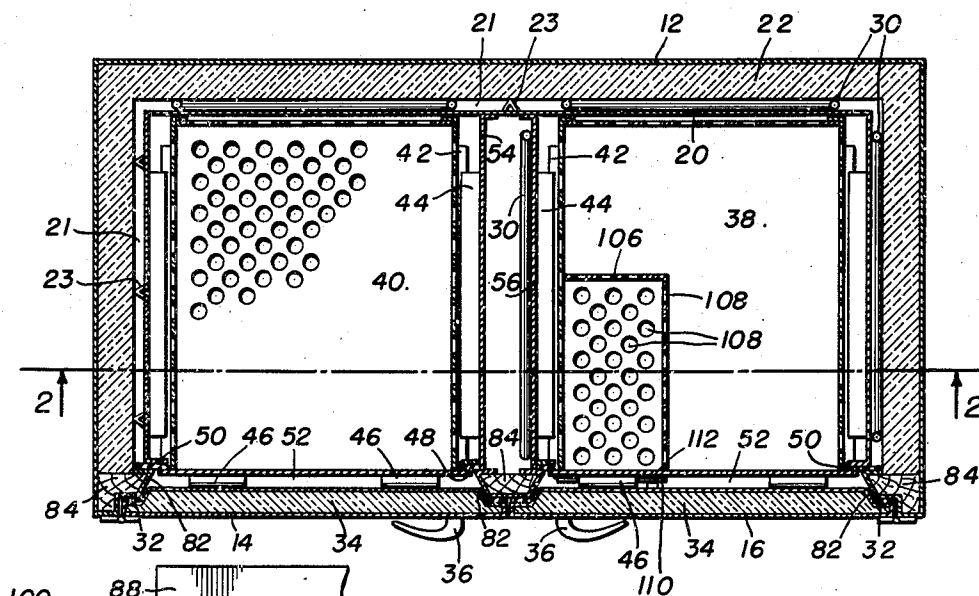


Fig. 3.

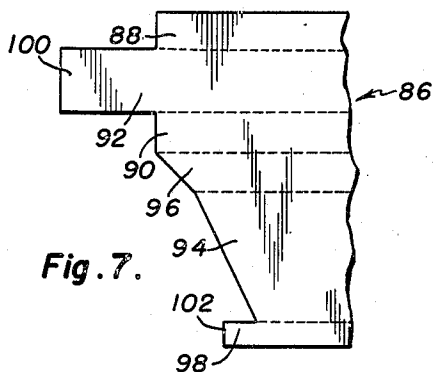


Fig. 7.

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3 Sheets-Sheet 2

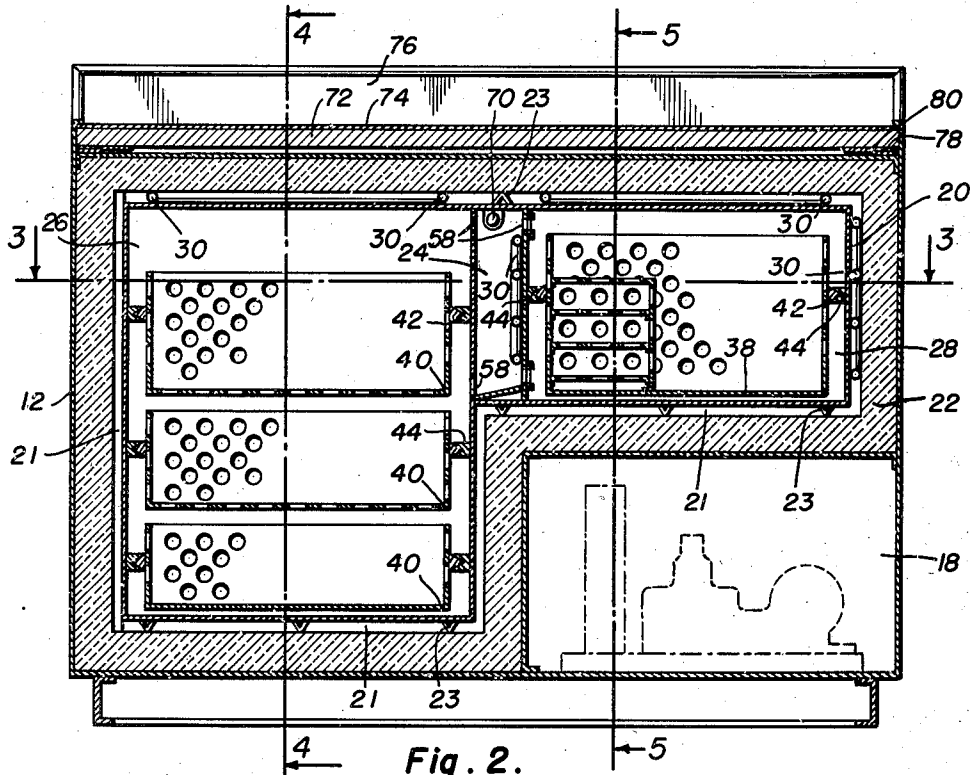
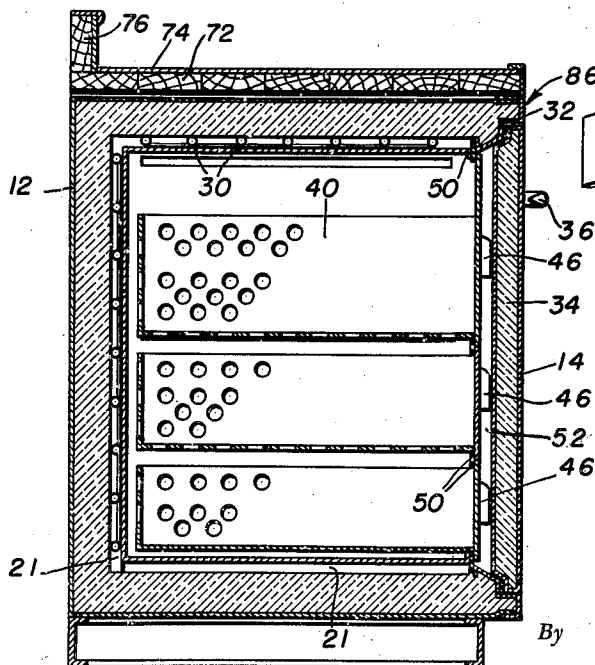


Fig. 4.

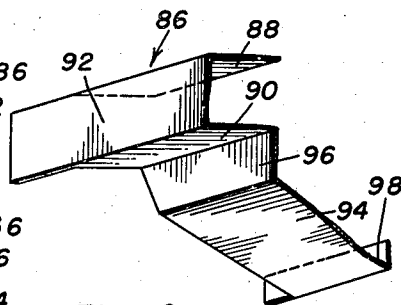


Fig. 6.

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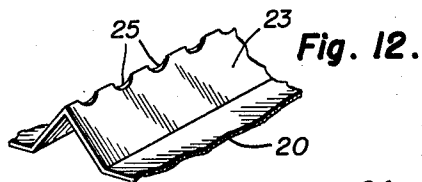
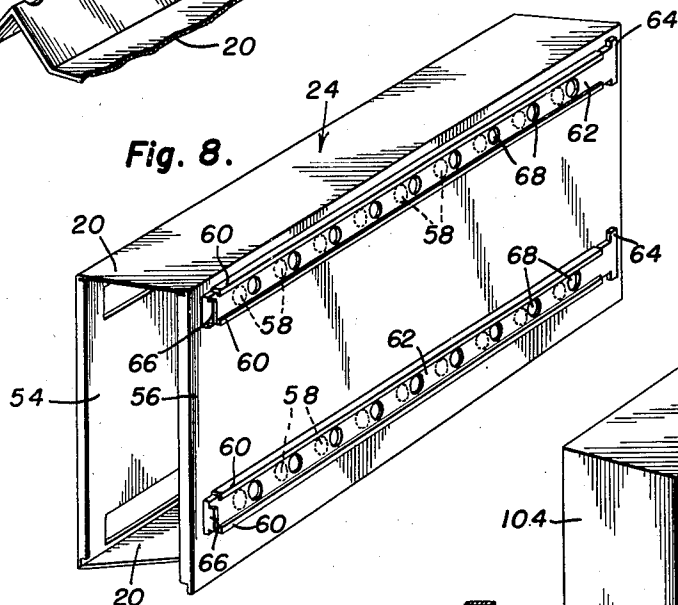
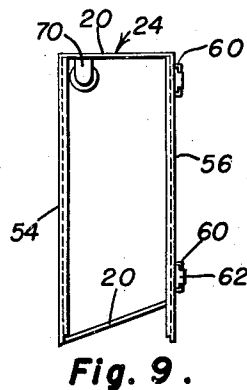
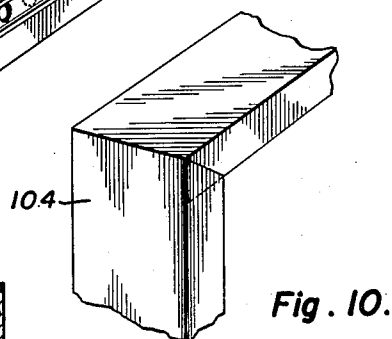
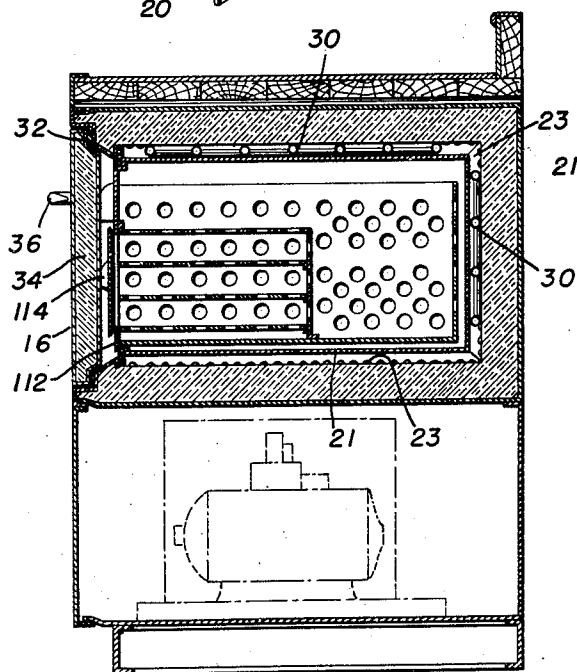
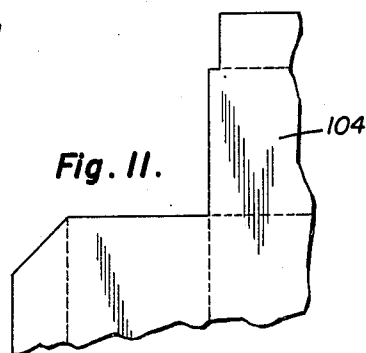
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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REFRIGERATOR CABINET

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Application April 11, 1947, Serial No. 740,816

9 Claims. (Cl. 62—89)

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This invention consists of novel and useful improvements in a refrigerator cabinet and more specifically pertains to a refrigerator cabinet construction having inner and outer casing members which are completely insulated from each other, and wherein improved sealing means and insulating means are provided to increase the efficiency of operation of the device.

The principal purpose of this invention is to provide an improved construction of refrigerator cabinets wherein highly efficient heat insulating means is provided between an inner cabinet casing and an outer casing.

A further object of the invention resides in providing a refrigerator cabinet in accordance with the preceding objects wherein the necessary door and drawer openings of the refrigerator cabinet are provided with multiple and improved heat insulating and sealing means for preventing the loss of heat thereby.

A further purpose of the invention consists in providing an apparatus in accordance with the preceding objects wherein thorough circulation of air between the various refrigerated compartments in the cabinet are provided; wherein the circulation of air is adequately controlled; and wherein a novel sterilizing means is provided conveniently disposed in air circulating passage means.

Still further important objects of the invention reside in providing a construction which is particularly adapted to economical methods of manufacture from sheet metal and/or adapted for assembling elements into a unitary construction by spot welding or the like.

Yet another important object of the invention resides in providing a refrigerator cabinet construction wherein the inner cabinet casing is completely insulated from the outer casing; wherein this insulating arrangement is rendered more efficient by an additional dead air insulating space; and wherein the refrigerating coils are disposed most advantageously in the insulating mediums.

And a final important object of the invention to be specifically enumerated resides in providing an appliance in conformity with the preceding objects wherein a novel arrangement is provided for detachably and slidably supporting a top member upon the refrigerator cabinet, for selective use as a table or the like; and to provide a construction wherein the refrigerating means is housed in a separate chamber from the refrigerating compartment of the apparatus.

These, together with various ancillary objects

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of the invention which will later become apparent as the following description proceeds, are attained by this device, one embodiment of which has been illustrated, by way of example only, in the accompanying drawings, wherein:

Figure 1 is a perspective view showing a preferred form of construction;

Figure 2 is a transverse vertical sectional view through the improved refrigerator cabinet, being taken substantially upon the section line 2—2 of Figure 3;

Figure 3 is a horizontal sectional view through the cabinet, taken substantially upon the section line 3—3 of Figure 2;

Figure 4 is a vertical transverse sectional view through the refrigerating cabinet, taken substantially upon the section line 4—4 of Figure 2;

Figure 5 is a vertical transverse sectional view through the quick freezing compartment of the cabinet, taken substantially upon the section line 5—5 of Figure 2;

Figure 6 is a fragmentary perspective detail view showing an element of the frame construction of the refrigerator cabinet;

Figure 7 is a fragmentary plan view showing a portion of a blank for forming the frame construction illustrated in Figure 6;

Figure 8 is a perspective view of a partition wall between the quick freezing and refrigerating compartment of the refrigerator cabinet;

Figure 9 is an end elevation of Figure 8;

Figure 10 is a fragmentary perspective detail view of another feature of the frame construction of the instant invention;

Figure 11 is a fragmentary plan view showing a blank adapted to be formed into the construction depicted in Figure 10, and

Figure 12 is a perspective detail view showing a portion of a spacer rib construction.

Referring now more specifically to the annexed drawings, wherein like numerals indicated similar parts throughout the various views, it will be seen that the numeral 10 generally designates the refrigerator cabinet forming the subject matter of this invention, and which is provided with an outer casing 12 preferably of sheet metal construction and which is provided with suitably and conveniently mounted and hinged doors 14 and 16 respectively for giving access to the refrigerating and quick freezing compartments of the cabinet.

As best shown in Figure 2, the outer casing member is provided with a refrigerating mechanism housing compartment 18 of conventional design within which is housed a motor and com-

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pressor unit for circulating refrigerant throughout the cabinet in any suitable manner, this mechanism being indicated by dotted lines in Figure 2. A unitary inner casing 20 preferably of sheet metal construction formed in any suitable manner as by spot welding the various elements thereof, is suitably positioned in the outer casing 12 but separated therefrom by an insulating lining 22 completely encasing the inner casing.

This insulating lining 22 which completely envelops on all sides, top and bottom, the inner casing 20 may be of any suitable construction, and may be separately formed and applied to the space between the casings 20 and 12, or may be bonded to one or both as desired. The actual composition of this insulating lining forms no part of my invention, and various known materials may be employed for this purpose.

A dead air space 21 surrounds the inner cabinet at the back, sides, top and bottom thereof, this space being maintained by the spacing ribs 23 formed upon or secured to the outer surface of cabinet 20 for spacing the latter from the insulation 22.

The inner cabinet casing 20 is divided by a laterally extending partition designated generally by the reference numeral 24, into a refrigerating compartment 26 and a quick freezing compartment 28. The compartments 26 and 28 are refrigerated or chilled by the refrigerating unit through the medium of refrigerating coils indicated at 30 which are disposed upon the exterior surface of the inner casing 20 and are received in the dead air space 21 between the casing 20 and the insulating layer 22 thereby preventing frosting of the coils, providing unobstructed interiors of the compartment, acting as spacers similar to ribs 23 and resulting in a more compact construction.

As shown best in Figures 2, 3 and 5, the front walls of the outer casing 10, the inner casing 20 and the insulating lining 22 are provided with openings communicating with the interior of the refrigerating compartment 26 and the quick freezing compartment 28, these openings being closed by the above mentioned doors 14 and 16. These openings are provided with countersunk surfaces which are adapted to receive insulating gasket or sealing means designated generally at 32 and with which correspondingly shouldered portions of the doors are adapted to abut and establish a sealing engagement therewith, the doors being recessed flush with the exterior surface of the outer casing as illustrated. In accordance with conventional practice, the doors are likewise provided with insulating material 34 to prevent the inflow of heat into the interior of the cabinet. The doors are preferably provided with conventional handles 36 in accordance with conventional practice.

The quick freezing compartment 28 is provided with a drawer 38 slidable therefrom, while the refrigerating compartment 26 is provided with a plurality of vertically spaced drawers 40 likewise slidably mounted therein. As shown best in Figure 2, each of these drawers is provided with lateral supporting flanges 42 adapted for sliding engagement in channel shaped supporting ribs 44 rigidly or adjustably attached to the inner walls of the compartments 26 and 28. As shown in Figures 1, 3 and 4, the forward ends of these drawers are provided with insulation covered handles 46 and are provided with marginal flanges 48 adapted to overlie the adjacent surrounding surface of the inner casing 20 and to establish

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a heat insulating sealing engagement therebetween by means of insulating gaskets as indicated at 50 in Figures 1, 3, 4 and 5. In order to further augment the efficiency of this seal, it is intended that the inner surfaces of the doors 14 and 16 shall press against the insulated handles 46, thereby urging the flanges 48 of the drawers against the above mentioned sealing means 50, whereby a triple seal is established by the gaskets 32, 50 and the insulating space between the drawers and the inner surfaces of the doors by reason of the interposed handles 46. This insulating dead air space is designated at 52 in Figures 3, 4 and 5. It will thus be seen that the inner casing 20 is completely surrounded by the dead air, insulating spaces 52 and 21.

In order to facilitate the free flow of currents of air between the refrigerated compartments and throughout the drawers of the same, the latter are provided with perforated sides, rear end walls and bottoms as clearly shown throughout the drawings. Further efficiency of circulation throughout the inner cabinet is promoted and regulated by passageways extending through the partition member 24 to be now described.

The partition member designated generally at 24 is composed of a pair of transversely extending partition walls 54 and 56 which are connected and secured to the upper and lower interior surfaces of the inner cabinet member 20 as shown in the drawings. The wall 56, forming a side wall of the quick freezing compartment 28, is provided with an upper and lower series of apertures 58 while the wall 54 forming an inner wall of the refrigerating compartment 26 is similarly perforated, to establish passage means connecting the two compartments. Upon the outer surface of the partition 56, are secured pairs of complementary channel shaped guide members 60 which slidably receive valve member 62 having enlarged ends 64 for preventing disengagement of the valve with the guide and having thumb grip lugs 66 extending laterally therefrom for manipulating the same and ports 68 adapted to cooperate with apertures 58.

As will be readily seen from an inspection of Figures 3 and 2, the slidable valve members 62 may be suitably adjusted in their retaining guides 60 in order to provide proportionate registry of their valve ports 68 with the above mentioned apertures 58, to thereby selectively throttle the flow of air and convection currents from one compartment to the other. Access to the valve members for adjusting the same are obtained from the interior of the quick freezing compartment 28 by opening or removing the drawer 38 therefrom.

As shown best in Figure 2, the interior of the hollow partition 24 may be provided with a violet ray or sterilizing lamp mounted in any suitable manner, as indicated at 70 in order to condition or treat the air flowing from one compartment to the other. When so mounted, the lamp is in a protected position, is mounted unobtrusively, and yet is positioned to treat all of the air flowing from one compartment to the other.

In order to enhance and augment the utility of the refrigerator cabinet, it is intended that the same shall be of suitable proportions to match with and correspond to the dimensions and shape of other equipment found in a kitchen or the like, and to further this purpose, the cabinet is preferably provided with a detachable top 72 having a covering 74 of any suitable material and a

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splash board indicated at 76. In order to facilitate the removal of the top when desired, the outer casing member 12 of the refrigerator cabinet upon its upper surface is provided with marginal, intumed flanges 78 vertically spaced above the top surface of the cabinet, while the lower surface of the top 72 is provided with depending marginal flanges 80 adapted to underlie the flanges 78 for sliding engagement therewith for retaining the top upon the refrigerator cabinet. As will readily be seen, the detachable fastening engagement of the top upon the cabinet is thus concealed and protected, thereby rendering this construction extremely practical and serviceable.

It is to be understood that the actual construction of the inner and outer casing members forming the cabinet may be of any suitable desired type and the principles of the invention are not limited to any particular construction thereof. However, in the interest of economy of construction, lightness of weight and the long life attendant to a unitary construction, it is contemplated that each of these elements of the cabinet shall be formed of sheet metal construction from appropriately formed, stamped or extruded blanks or metal forms, and united as by spot welding or the like. In order to facilitate the attachment of the doors to the cabinet, the metal members forming the above mentioned casings are preferably channeled to provide tubular or hollow vertical columns 82 for the reception of wooden joists 84 for receiving the customary hardware for hanging and latching refrigerator doors.

As indicated generally at 86 in Figure 4, a channel member of a particular construction is provided which may be spot welded to provide a flush outer surface with the outer casing 12 and which is provided with angularly disposed shoulders and inclined surfaces adapted to receive in counter-sunk relation the shouldered surfaces of the door members. As shown in Figure 6, the sheet metal channel member is provided with a U-shaped section having upper and lower walls 88 and 90, which respectively overlie the upper surfaces of the front end of the casing 12 and the upper surfaces of the doors 14 and 16, while the connecting vertical portion 92 is formed flush with the outer surface of the doors. The depending inclined surface 94 is adapted to match the corresponding surface of the inner chamber of the doors while the connecting surface 96 constitutes a shoulder for receiving the interposed above mentioned sealing gasket 32. The extremity of the sheet metal frame member 96 is intumed as at 98 for embedding in anchoring engagement in the insulating material 22 and for receiving the hereinbefore mentioned sealing means 50. As shown in Figure 7, the portion 92 is extended as at 100 for folding back upon itself for spot welding engagement with the rest of the frame construction of the cabinet, while the end portion 98 is similarly extended as 102 for a similar purpose.

As shown in the detail views of Figures 10 and 11, the sheet metal forming the drawers 38 and 40 may be constructed of flat sheets of material as indicated at 104, with their edges and marginal ends appropriately shaped and cut away to permit compact assembly and convenient spot welding thereof.

As shown best in Figure 12, protruding vertical channels or ribs 23 may be formed upon or suitably attached to the casing 20, serving to reinforce the same, to act as spacing members for maintaining the above mentioned dead air space

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21 and to regulate the rate of air flow, and hence rate of heat transfer, particularly between the quick freezing and the refrigerating chamber. For this latter purpose, the spacers 23 have transverse notches or grooves 25 for permitting predetermined, restricted flow of air thereby. Thus, a more exact control of the relative temperatures of these compartments can be obtained.

From the foregoing it will be seen that there has been provided a refrigerator cabinet wherein the interior and outer surfaces thereof are completely insulated from each other; wherein adequate air circulating is provided throughout the compartments and drawers within the cabinets; wherein a triple seal is provided at the openings of the refrigerated compartment and wherein individual drawers may be opened to obtain access to their contents without exposing the entire interior of the refrigerator to the inflow of warm air.

It should be here noted that preferably the drawers 38 of the quick freezing compartment is provided with a casing or housing 106 suitably perforated at 108 to facilitate circulation of air therethrough and which is provided with an individual door 110 opening through the front end wall of the drawer 38, for obtaining access to the contents thereof to remove ice cube trays or the like therefrom. This door is provided with similar sealing means 112 to that above mentioned, and is further equipped with an insulated handle 114 fully corresponding in function and construction to the above mentioned handles 46.

Since various modified constructions will be readily apparent to those skilled in the art after consideration of the accompanying specification and drawings, it is not desired to limit the invention to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to falling within the scope of the appended claims.

What is claimed as new is as follows:

1. In a refrigerator cabinet including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, refrigerating coils in said air space, said refrigerating and quick freezing compartments having drawers with handles, said drawers being slidably supported therein, said drawers having sealing means for establishing tight engagement with said inner casing in their closed positions, and an ice cube freezing chamber in said quick freezing compartment, a door in said inner casing for said chamber and means establishing a heat sealing engagement between said door and said inner casing.

2. A refrigerator cabinet including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, refrigerating coils in said air space, a partition between said compartments, passage means in said partition connecting said compartments and manually adjustable ventilating means controlling flow of air between said compartments.

3. A refrigerator cabinet including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, refriger-

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ating coils in said air space, a partition between said compartments, passage means in said partition connecting said compartments, adjustable ventilating means controlling flow of air between said compartments and a sterilizing lamp in said passage means.

4. A refrigerator cabinet including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, refrigerating coils in said air space, and spacers between said inner casing and said outer casing to support said inner casing in spaced relation to provide a dead air space therebetween, said ribs having transverse notches defining restricted passages in said dead air space.

5. A refrigerator cabinet including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, refrigerating coils in said air space, a partition between said compartments, apertures in said partition connecting said compartments, channel guide members secured to said partition and overlying said apertures and a ported valve member slidably secured in said guide members to regulate the flow of air between said compartments.

6. A refrigerator including outer and inner casings having heat insulating means therebetween, said means encasing said inner casing, refrigerating and quick freezing compartments in said inner casing, an air space between said inner casing and said insulating means, a partition between said compartments, passage means in said partition connecting said compartments, manually adjustable ventilating means controlling the flow of aid between said compartments, a sterilizing lamp in said passage means, handled drawers slidably supported in said refriger-

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ating and quick freezing compartments and sealing means on said drawers for establishing tight engagement with said inner casing in closed position, the side walls of said drawers being perforated to effect heat exchange through said compartments.

7. The combination of claim 6 wherein spacer ribs are secured between said inner and outer casings to provide the said air space.

8. A refrigerator cabinet comprising outer and inner casings, heat insulating means within said outer casing, said means encasing but being spaced from said inner casing to define an air space therebetween, refrigerating and quick freezing compartments in said inner casing, a door in said inner casing, drawers mounted in said compartments and slidable through said door, sealing means for establishing a tight engagement between the front end of said drawers and the adjacent portion of said inner casing, the outer ends of said drawers being spaced from the inner surfaces of said door to provide an air space therebetween when said door is closed, and means actuatable by closure of said door for holding said sealing means in sealing engagement with said inner casing.

9. The combination of claim 8 wherein said last means comprises handles on said drawers.

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