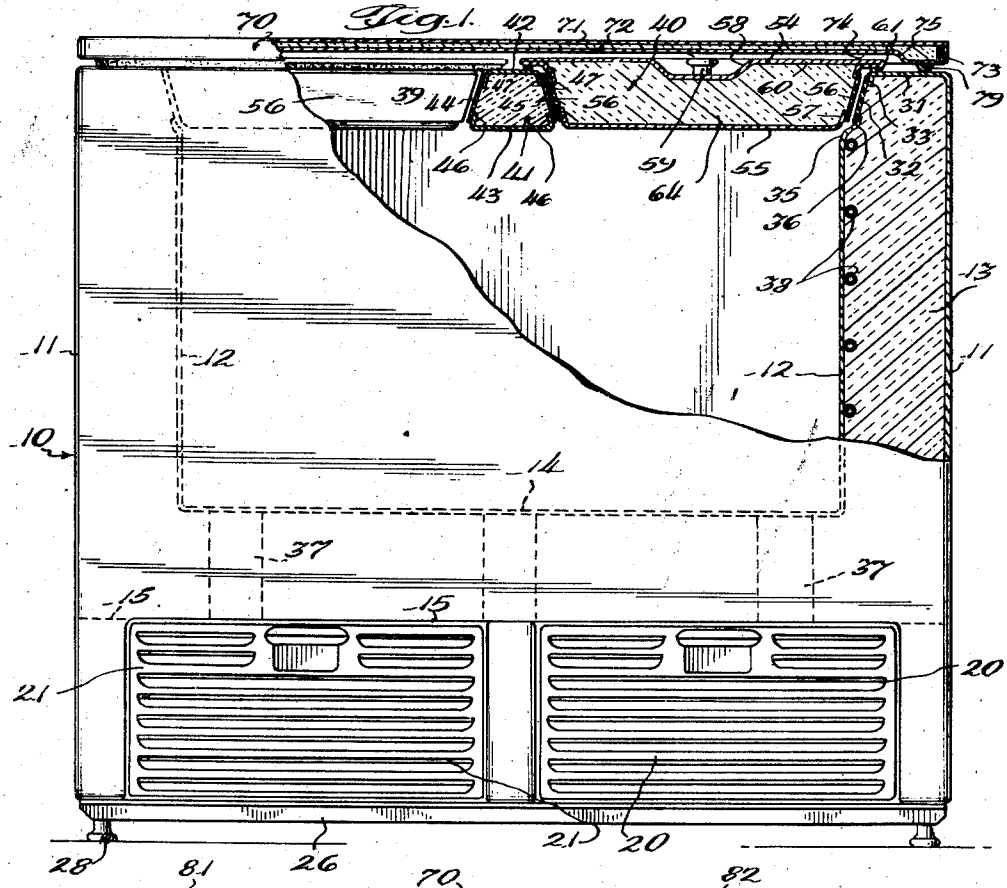
Jan. 7, 1947. W. E. RICHARD ET AL 2,414,061

HOME FREEZER CABINET

Filed Aug. 2, 1944 3 Sheets-Sheet 1

Fig. 1.



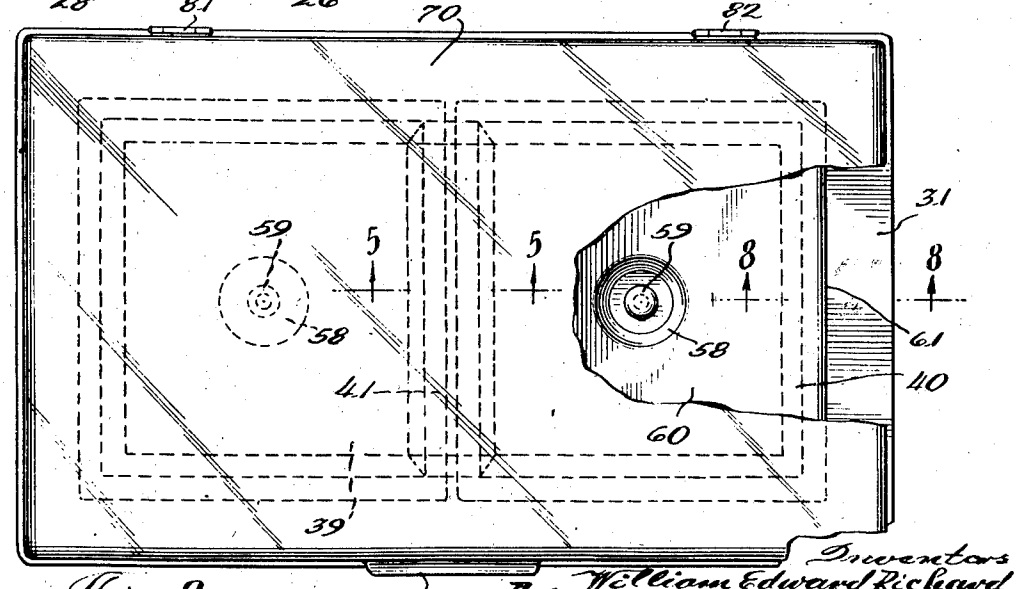


Fig. 2.

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HOME FREEZER CABINET

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Fig. 1

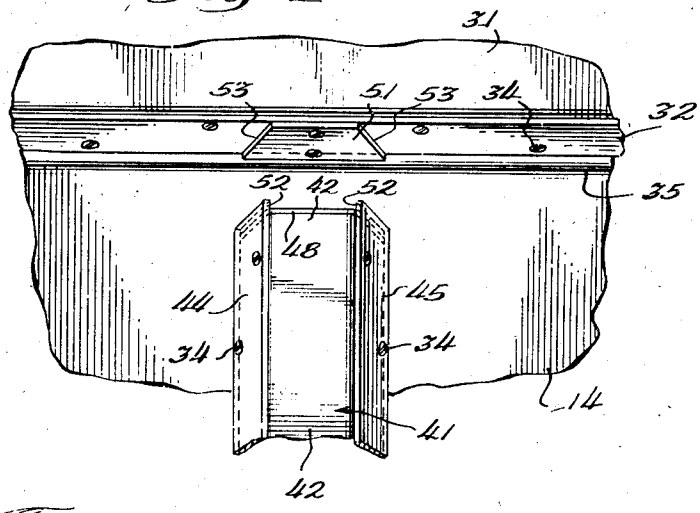


Fig. 3

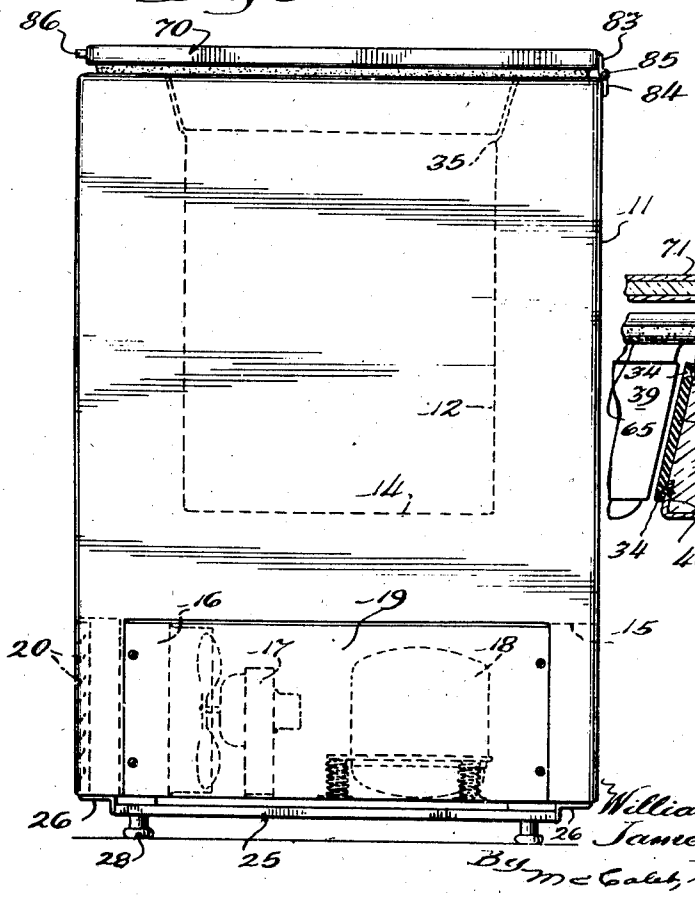
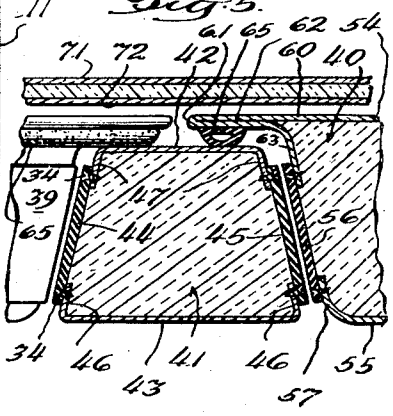


Fig. 5



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Jan. 7, 1947. W. E. RICHARD ET AL 2,414,061

HOME FREEZER CABINET

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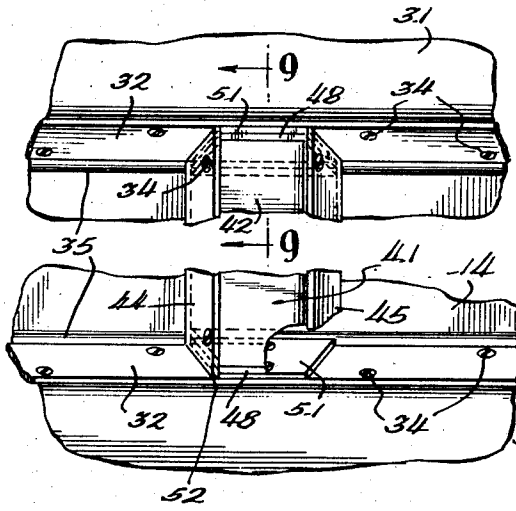

Fig. 7.

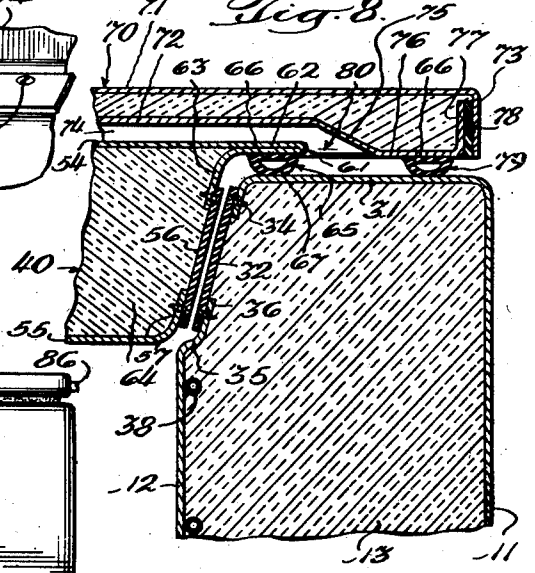

Fig. 8.

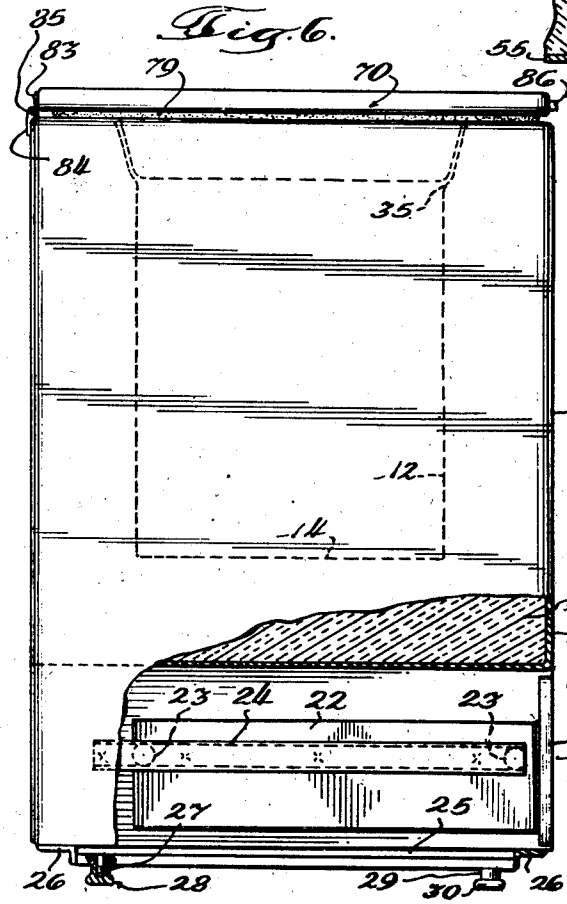

Fig. 6.

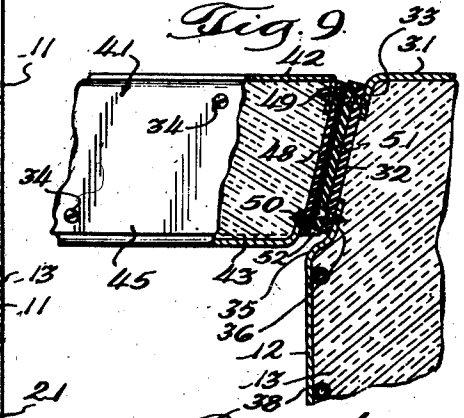

Fig. 9.

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UNITED STATES PATENT OFFICE

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HOME FREEZER CABINET

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Application August 2, 1944, Serial No. 547,682

6 Claims. (Cl. 220—9)

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The present invention relates to home freezer cabinets and is particularly concerned with cabinets for housing freezing apparatus adapted to be used in the home to freeze food and to maintain it at a very low temperature for its preservation.

One of the disadvantages of the freezer cabinets of the prior art is that the cabinets have the defect that excessive sweating occurs on and surrounding the cover of the cabinet so that the condensed moisture runs off the cabinet on the floor.

The cabinets of the prior art cannot be installed in a kitchen because of this defect. With the devices of the prior art it is possible to provide adequate insulation for the bottom and sides, but it apparently is impossible to insulate adequately the cover structures so as to eliminate the excessive sweating caused by condensation of moisture in the air. This problem is due to the very low temperatures maintained in such freezer cabinets, and one of the objects of the invention is the improvement of a home freezer cabinet structure by which this defect is eliminated, and substantially all sweating of the exterior of the cabinet is eliminated.

Another object of the invention is the provision of an improved home freezer cabinet including a top structure which is so adequately insulated that the external portions of the top are not maintained at such a low temperature as to cause excessive condensation on the exterior of the cabinet.

Another object of the invention is the provision of an improved home freezer cabinet construction by means of which the cabinet is given additional utility, being provided with a table top that is adapted to be used as a working surface, and which is also adapted to harmonize with built-in cabinet structures of the modern kitchen.

Another object of the invention is the provision of an improved home freezer cabinet structure by means of which the entire top of a double hole cabinet may be opened so that especially large bulks of food may be inserted in the cabinet whenever necessary or, if desired, only one of the holes may be opened to exclude as much heat as possible during the operation.

Another object of the invention is the provision of an improved home freezer cabinet structure which is efficient from the point of view of the exclusion of heat, sturdy, simple and capable of being manufactured at a low cost.

Other objects and advantages of the invention

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will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are three sheets,

Figure 1 is a front elevational view of the home freezer cabinet embodying the invention partially broken away to show the structure of the top of the cabinet;

Fig. 2 is a top plan view of the cabinet partially broken away to show one of the covers for the two holes of the home freezer cabinet;

Fig. 3 is a side elevational view of the cabinet;

Fig. 4 is a fragmentary top plan view showing the structure of the cabinet at its upper opening and separated therefrom, the removable mullion which divides the opening into two holes;

Fig. 5 is a fragmentary, sectional view taken on the plane of the line 5—5 of Fig. 2, looking in the direction of the arrows;

Fig. 6 is another side elevational view, similar to Fig. 3, of the other end of the cabinet partially broken away to show the drawer and guides for the drawer;

Fig. 7 is a fragmentary top plan view showing the mode of connection of the mullion to the top cabinet opening;

Fig. 8 is a fragmentary, sectional view taken on the plane of the line 8—8 of Fig. 2, looking in the direction of the arrows;

Fig. 9 is a fragmentary, sectional view taken on the plane of the line 9—9 of Fig. 7, looking in the direction of the arrows.

Referring to Figs. 1 to 3, 10 indicates in its entirety a home freezer cabinet embodying the invention. This cabinet preferably comprises an outer metal shell 11 and an inner metal shell 12, the outer and inner shells being spaced from each other to provide a space for insulation 13 of suitable type, such as rock wool, which insulates the interior of the cabinet from the exterior against the passage of heat.

The inner shell and the outer shell may be built up of a plurality of panels welded together, or the side walls may be built up of a single sheet of sheet metal having its abutting or overlapping edges welded.

The bottom 14 of the inner shell 12 is spaced from the bottom 15 of the outer shell 11, and the space below the bottom 15 of the outer shell may be utilized also for housing the refrigerating apparatus, comprising the usual condenser 16, ventilating fan 17, and motor compressor 18.

The front of this compartment 19 is preferably

provided with louvers 20 to permit the free passage of air about the motor compressor unit and condenser 16, while the back of the compartment is preferably open for access to the latter. For ornamental appearances the lower front panel is preferably so shaped that the drawer front 21 has substantially the same appearance as the louver front 20 of the compartment 19.

However, the other half of the space below the floor 15 of the outer shell 11 is preferably utilized for housing the metal drawer 22, which may consist of a rectangular box-like container of metal carrying the drawer front 21 and provided with rotatably mounted rollers or wheels 23 on each side of the drawer at the front and back. The rollers 23 roll in the channeled guides 24 which are carried by the side walls of this compartment at an appropriate height.

The entire cabinet is preferably supported on a base panel 25, which has its edge welded or otherwise secured and angular members 26 defining a rectangular frame that is secured to the lower edge of the side walls of the exterior shell 11. The base 25 preferably carries a plurality of threaded studs 27, one being located at each corner for supporting the cabinet feet 28, which may take a form substantially similar to half a spool, with cylindrical top portion 29 and a larger foot portion 30. The feet being threaded on the studs 27, they may be threaded upward or outward so as to cause the cabinet to stand in a stable manner even where the floor is irregular or out of level.

In addition to being insulated from the outer shell 11 by means of the spacing and rock wool 13, the inner shell 12 is also insulated from the outer shell at the point where it is connected to the outer shell at the top. The outer shell is preferably provided with an inwardly extending horizontal flange at the top to provide a facing for the covers.

Flange 31 practically traverses the space between the inner and outer shells, but it is slightly narrower than this space so that the fiber plate 32 which connects the inner and outer shells may be disposed at an angle causing the opening to taper downwardly. Flange 31 is then provided with an inwardly and downwardly extending attaching flange 33 which is overlapped by the insulating fiber plate 32, as shown in Fig. 8, and the fiber plate may be secured to the flange 33 by merely providing openings in both these members and driving home a plurality of self-threading screws 34.

The inner shell 12 preferably has its side walls provided with outwardly extending offsets 35 at their upper edges and with diagonally extending attaching flange 36 that is overlapped by the lower portion of the fiber plate 32. These are also preferably secured together by means of simple screw members, as shown in Fig. 8.

Thus the inner shell 12, which is at a relatively low temperature, is not in heat-conducting contact with the outer shell 11 which is at room temperature, but it is insulated by the heat-insulating fiber plates 32, one of which is utilized for each side of the opening at the top of the cabinet.

The inner shell may also be provided with suitable insulating blocks 37 interposed between the bottom 15 of the outer shell and the bottom 14 of the inner shell, to give the inner shell mechanical support over that which is provided by the suspension from the top and from the rock wool which is interposed between the shells. Various forms of cooling or evaporator coils 38 may be utilized, these tubes being preferably located immediately outside the inner shell, as shown in Fig. 1.

Although the present cabinet is of the two-hole type, being provided with a pair of covers 39, 40, the top of the cabinet is preferably provided with a single rectangular opening, the walls of which are formed by the fiber plates 32 which slope inwardly as they extend downwardly.

In order to provide for the support of the two covers 39 in such a single opening, the top of the cabinet is provided with a removable million 41 which extends across the top opening and separates it into two openings, one for each cover 39, 40.

The removable mullion may be formed of an outer shell 42 and inner shell 43 and a pair of fiber plates 44, 45. The shape of these shells is such that the fiber plates 44, 45 are at the same slope with respect to the two holes inwardly and downwardly as the fiber plates previously described for the sides of the big opening. Thus the lower shell 43 of the mullion is made wider than the outer shell 42, as is necessary to make the openings for the covers smaller at the bottom.

Lower shell 43 is provided with an upwardly attaching flange 46 which is bent at an acute angle corresponding to the slope of the fiber plates 44, 45. Upper shell of the mullion is likewise provided with integral attaching flanges 47 along each of its sides, these being bent downwardly at an obtuse angle so that they are in alignment with the attaching flanges 46.

These attaching flanges 46, 47 are secured to the overlapping portions of the fiber plates 44, 45 with screws or threaded members 34 in exactly the same manner as described for the fiber plates 32. Referring to the ends of the mullion 41, as shown in Fig. 9, here again the outer shell 42 is longer than the lower shell 43 by an amount which is necessary to dispose the end fiber plate 48 at the same angle as the fiber plates 32.

Here again the outer shell 42 has an attaching flange 49 which is bent downwardly at an acute angle and the attaching flange 50 at the end of the lower mullion is bent upwardly at an obtuse angle. Each end of the mullion is thus closed with a fiber plate 48 extending at substantially the same angle as the fiber plates 32, and the fiber plates 48 preferably wedge tightly against supplemental fiber plates 51 that are carried by the sides of the opening so that the mullion is wedged into place and is of suitable length to fill the opening into which it is placed.

In order to make sure that the mullion is firmly secured in its place each of the fiber side plates 44, 45 is preferably made longer than the upper and lower metal shells 42, 43 by an amount at each end of the mullion which is equal to the thickness of the auxiliary wedge plate 51.

Thus it will be noted that the fiber plates 44, 45 in Fig. 4 project at 52 beyond the upper and lower shells and beyond the end fiber plate 48. These projecting portions 52 are adapted to engage the edges 53 of the trapezoidal fiber plate 51 upon which they are wedged when the mullion is in place. The mullion is likewise filled with rock wool or other suitable insulation, and it will be observed that the outer shell is adequately insulated from its inner shell.

The large opening in the top of the cabinet is thus separated into two smaller rectangular openings, which may be square and which are suitably tapered downwardly to receive the two

covers 39, 40. The mullion may be removed after the two covers have been removed by merely lifting up on it and thus the entire cabinet is opened if desired or necessary to permit an amount of food of relative large bulk to be placed inside.

As a general rule, however, only one cover need be removed for access to the cabinet at either hole.

The covers 39, 40 are identical in construction and, therefore, only one of them need be described. They also comprise an upper metal shell 54 and a lower metal shell 55, these shells being joined together on four sides by fiber plates 56. Lower shell 55 is a square metal plate having its four borders provided with upwardly turned attaching flanges 57.

The upper shell 54 of each cover may consist of a substantially plane body formed with a centrally located pressed depression 58 for housing the knob 59, and the plane body 60 is preferably backwardly turned at 61 to provide a double facing plate 62 for engaging the top of the cabinet. Facing plate 62 terminates a downwardly and inwardly extending attaching flange 63 which is secured to the insulating fiber or breaker strip 56 in the usual manner.

The covers are preferably filled with rock wool 64 and the facing flange 62 is preferably provided with a resilient insulating sealing member 65. The sealing member 65 may consist of a hollow tube made of rubber, natural or synthetic, and preferably is provided with one flat side 66 that may be cemented to the facing flange 62. The other side of the tubular seal may be partially cylindrical at 67 for resilient sealing engagement with the facing flange 31 of the cabinet. Of course, the seal 65 extends completely around the cover and preferably has its ends cemented together to provide a continuous, endless tubular member.

The cabinet comprising the inner and outer housing 11 and 12, and covers 39 and 40 and the mullion 41 is provided with an auxiliary cover 70 which is preferably of sufficient size to cover the complete top of the cabinet.

In some embodiments of the invention the auxiliary cover 70 may be of slightly smaller dimensions and may still serve to prevent the sweating of the top of the cabinet, as the facing flange portion 31 is itself quite adequately insulated from the interior of the cabinet. It is, however, better from point of appearance and from point of view of providing maximum insulation to have the auxiliary cover 70 of the same size and shape as the top of the cabinet.

This cover may be constructed of a pair of sheet metal plates 71, 72. The upper sheet metal plate 71 is preferably provided with a depending border flange 73 of sufficient width to embrace and enclose the lower cover plate 72 on all of its four sides. The lower cover plate 72 is preferably formed with a centrally located stamped depression 74 formed by providing an offset 75 along each of the sides of this lower plate 72 at a point slightly spaced from the outer edges of the covers 40.

From the downwardly extending offset 75 the lower plate 72 has an outwardly extending flat flange 76. This flange may be provided with an upwardly turned border flange 77 which telescopes inside the flange 73 on each of the four sides of the two plates 71, 72.

In another embodiment of the invention, illustrated at Fig. 8, there may be an insulating fiber plate 78 serving the purpose of a breaker strip frictionally held between each of the border plates 73, 77 on the four sides of the plates 71, 72.

The interior of the shell formed by plates 71, 72 is preferably filled with rock wool and the shape of the depressed portion 74 of the plate 72 is such that the auxiliary cover 70 is out of contact with every part of the cabinet except that engaged by the sealing member 79 of the auxiliary cover 70. Sealing member 79 may be of the same construction as previously described for the sealing member 65.

The flat side portion 66 is cemented to the flat facing flange 76 on the auxiliary cover 70 extending about the four sides and supporting the cover on the cabinet. By means of the sealing strip which is adapted to adjust itself to any irregularities, there is provided a dead air space 80 between the auxiliary cover 70 and the top of the cabinet and this dead air space is insulated from the exterior of the cover 70, that is, from the top plate 71. By this means the top of the freezer cabinet is so adequately insulated that there is a much greater temperature differential between the top plate 71 and the exterior of the top of the cabinet over that which exists between the top of each cover 39, 40 and the interior of the cabinet.

It has been found that sweating of the top of the cabinet is practically eliminated and since this provides a dry insulation, a home freezer cabinet of the present structure may be placed in a kitchen where the devices of the prior art could not be used.

Auxiliary cover 70 is preferably hinged at 81, 82 by means of a suitably shaped hinge having a pair of hinge plates 83, 84 provided with bearing portions pivotally mounted on the pintle 85.

In Fig. 6 the hinge is of the offset type due to the fact that the auxiliary cover 70 has been made slightly smaller than the top of the cabinet. This arrangement permits the downwardly open scoop handle 86 to be arranged substantially within the top border of the cabinet also. When it is desired to have access to the interior of the cabinet, the auxiliary cover 70 may be permitted to rest backward against an adjacent wall. Then the hole covers or the covers and mullion may be removed for access to the interior of the freezer cabinet. When the covers are replaced, the auxiliary cover 70 should be closed also, and it is adapted to provide an additional work surface at a convenient height, which is at substantially the same height as the usual cabinets employed in a modern kitchen.

Thus the present home freezer unit is adapted to be installed in a kitchen without danger of sweating and it provides a useful adjunct to the other fixtures in the kitchen.

Without the structure of the present cabinet, a home freezer unit is entirely impractical for the modern kitchen because of the heavy sweating which occurs on the covers of the devices of the prior art, causing a pool of water on the floor.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a closure structure for a home freezer cabinet, the combination of a heat insulated cabinet having an opening at its upper end provided with tapered walls about said opening, said opening being substantially rectangular, a transverse mullion of insulated construction adapted to fit between the opposite tapered walls of said

opening, said mullion having end portions with corresponding taper, and a pair of heat insulated closure plugs of tapered formation for closing each of the openings on the opposite sides of said mullion, said mullion having each of its sides formed out of an insulating breaker strip, said breaker strips projecting beyond the body of said mullion at each end and engaging a complementary tapered block on the side wall of the opening at each end of the mullion.

2. In a home freezer cabinet, the combination of a liner forming a receptacle for the articles to be refrigerated, with an external shell for the cabinet, the said shell having a bottom wall and a side wall and having a substantially plane top wall bridging a space between the liner and the external shell, said top wall being joined to the liner at an upper opening in the liner by an insulating breaker strip, the space between said shell and said liner being filled with heat insulating material insulating the bottom and side wall of the cabinet, the opening in the cabinet being substantially rectangular and defined by said breaker strips which extend downwardly and inwardly, two of said oppositely disposed breaker strips being provided with a substantially trapezoidal plate of insulating material secured thereto and adapted to support a removable mullion, a removable mullion comprising an upper shell of sheet material, a wider lower shell of sheet material, the two shells being joined by lateral insulating breaker strips, the breaker strips extending in such direction that the mullion tapers upward in cross section at substantially the same angle as the breaker strips of the cabinet, the breaker strips on said mullion extending beyond the end of the upper and lower shells of the mullion and being adapted to fit against the ends of the trapezoidal plates, the mullion also tapering downward at its ends which are joined by trapezoidal breaker strips, whereby the mullion fits in the opening over the trapezoidal plates to divide the opening into two tapered rectangular openings, insulating closures for each of said latter openings, and an auxiliary closure having a sealing means on its lower side for engaging the plane top surface of the outer shell of the cabinet, said auxiliary covering being spaced from said insulating closures to provide a temperature differential which substantially eliminates sweating on the outside of said auxiliary covering.

3. In a home freezer cabinet, the combination of a liner forming a receptacle for the articles to be refrigerated, with an external shell for the cabinet, the said shell having a bottom wall and a side wall and having a substantially plane top wall bridging a space between the liner and the external shell, said top wall being joined to the liner at an upper opening in the liner by an insulating breaker strip, the space between said shell and said liner being filled with heat insulating material insulating the bottom and side wall of the cabinet, the opening in the cabinet being substantially rectangular and defined by said breaker strips which extend downwardly and inwardly, two of said oppositely disposed breaker strips being provided with a substantially trapezoidal plate of insulating material secured thereto and adapted to support a removable mullion, a removable mullion comprising an upper shell of sheet material, a wider lower shell of sheet material, the two shells being joined by lateral insulating breaker strips, the breaker strips extending in such direction that the mullion tapers upward in cross section at substantially the same angle as the breaker strips of the cabinet, the breaker strips on said mullion extending beyond the end of the upper and lower shells of the mullion and being adapted to fit against the ends of the trapezoidal plates, the mullion also tapering downward at its ends which are joined by trapezoidal breaker strips, whereby the mullion fits in the opening over the trapezoidal plates to divide the opening into two tapered rectangular openings, insulating closures for each of said latter openings, and an auxiliary closure having a sealing means on its lower side for engaging the plane top surface of the outer shell of the cabinet, said auxiliary covering being spaced from said insulating closures to provide a temperature differential which substantially eliminates sweating on the outside of said auxiliary covering, said auxiliary covering comprising a pair of shells of sheet material of such size and shape that their bordering flanges are adapted to telescope with respect to each other, with an insulating breaker strip located between the border flanges and frictionally holding the two shells together.

4. In a home freezer cabinet, the combination of a liner forming a receptacle for the articles to be refrigerated, with an external shell for the cabinet, the said shell having a bottom wall and a side wall and having a substantially plane top wall bridging a space between the liner and the external shell, said top wall being joined to the liner at an upper opening in the liner by an insulating breaker strip, the space between said shell and said liner being filled with heat insulating material insulating the bottom and side wall of the cabinet, the opening in the cabinet being substantially rectangular and defined by said breaker strips which extend downwardly and inwardly, two of said oppositely disposed breaker strips being provided with a substantially trapezoidal plate of insulating material secured thereto and adapted to support a removable mullion, a removable mullion comprising an upper shell of sheet material, a wider lower shell of sheet material, the two shells being joined by lateral insulating breaker strips, the breaker strips extending in such direction that the mullion tapers upward in cross section at substantially the same angle as the breaker strips of the cabinet, the breaker strips on said mullion extending beyond the end of the upper and lower shells of the mullion and being adapted to fit against the ends of the trapezoidal plates, the mullion also tapering downward at its ends which are joined by trapezoidal breaker strips, whereby the mullion fits in the opening over the trapezoidal plates to divide the opening into two tapered rectangular openings, insulating closures for each of said latter openings, and an auxiliary closure having a sealing means on its lower side for engaging the plane top surface of the outer shell of the cabinet, said auxiliary covering being spaced from said insulating closures to provide a temperature differential which substantially eliminates sweating on the outside of said auxiliary covering, the said closures each comprising an upper shell, a lower shell of smaller size, and diagonally disposed insulating breaker strips joining said latter shells to form a tapered plug, and an insulating filling in said plug.

5. In a home freezer cabinet, the combination of a liner forming a receptacle for the articles to be refrigerated, with an external shell for the cabinet, the said shell having a bottom wall and

a side wall and having a substantially plane top wall bridging a space between the liner and the external shell, said top wall being joined to the liner at an upper opening in the liner by an insulating breaker strip, the space between said shell and said liner being filled with heat insulating material insulating the bottom and side wall of the cabinet, the opening in the cabinet being substantially rectangular and defined by said breaker strips which extend downwardly and inwardly, two of said oppositely disposed breaker strips being provided with a substantially trapezoidal plate of insulating material secured thereto and adapted to support a removable mullion, a removable mullion comprising an upper shell of sheet material, a wider lower shell of sheet material, the two shells being joined by lateral insulating breaker strips, the breaker strips extending in such direction that the mullion tapers upward in cross section at substantially the same angle as the breaker strips of the cabinet, the breaker strips on said mullion extending beyond the end of the upper and lower shells of the mullion and being adapted to fit against the ends of the trapezoidal plates, the mullion also tapering downward at its ends which are joined by trapezoidal breaker strips, whereby the mullion fits in the opening over the trapezoidal plates to divide the opening into two tapered rectangular openings, insulating closures for each of said latter openings, and an auxiliary closure having a sealing means on its lower side for engaging the plane top surface of the outer shell of the cabinet, said auxiliary covering being spaced from said insulating closures to provide a temperature differential which substantially eliminates sweating on the outside of said auxiliary covering, the said closures each comprising an upper shell, a lower shell of smaller size, and diagonally disposed insulating breaker strips joining said latter shells to form a tapered plug, and an insulating filling in said plug, the said upper shell being provided with an outwardly extending and backwardly turned supporting flange, overlapping the top of the cabinet, outer shell, and the mullion top, and provided with sealing means.

6. In a home freezer cabinet, the combination of a liner forming a receptacle for the articles to be refrigerated, with an external shell for the cabinet, the said shell having a bottom wall and a side wall and having a substantially plane top wall bridging a space between the liner and the external shell, said top wall being joined to the liner at an upper opening in the liner by an insulating breaker strip, the space between said shell and said liner being filled with heat insulating material insulating the bottom and side wall of the cabinet, the opening in the cabinet being substantially rectangular and defined by said breaker strips which extend downwardly and inwardly, two of said oppositely disposed breaker strips being provided with a substantially trapezoidal plate of insulating material secured thereto and adapted to support a removable mullion, a removable mullion comprising an upper shell of sheet material, a wider lower shell of sheet material, the two shells being joined by lateral insulating breaker strips, the breaker strips extending in such direction that the mullion tapers upward in cross section at substantially the same angle as the breaker strips of the cabinet, the breaker strips on said mullion extending beyond the end of the upper and lower shells of the mullion and being adapted to fit against the ends of the trapezoidal plates, the mullion also tapering downward at its ends which are joined by trapezoidal breaker strips, whereby the mullion fits in the opening over the trapezoidal plates to divide the opening into two tapered rectangular openings, insulating closures for each of said latter openings, and an auxiliary closure having a sealing means on its lower side for engaging the plane top surface of the outer shell of the cabinet, said auxiliary covering being spaced from said insulating closures to provide a temperature differential which substantially eliminates sweating on the outside of said auxiliary covering, said closure members having their upper shells provided with a depressed formation, and a knob for lifting the closures disposed in the depression of said formation.

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