July 29, 1952 C. R. QUINN 2,604,762

BAFFLE STRUCTURE FOR REFRIGERATORS

Filed March 11, 1950 3 Sheets-Sheet 1

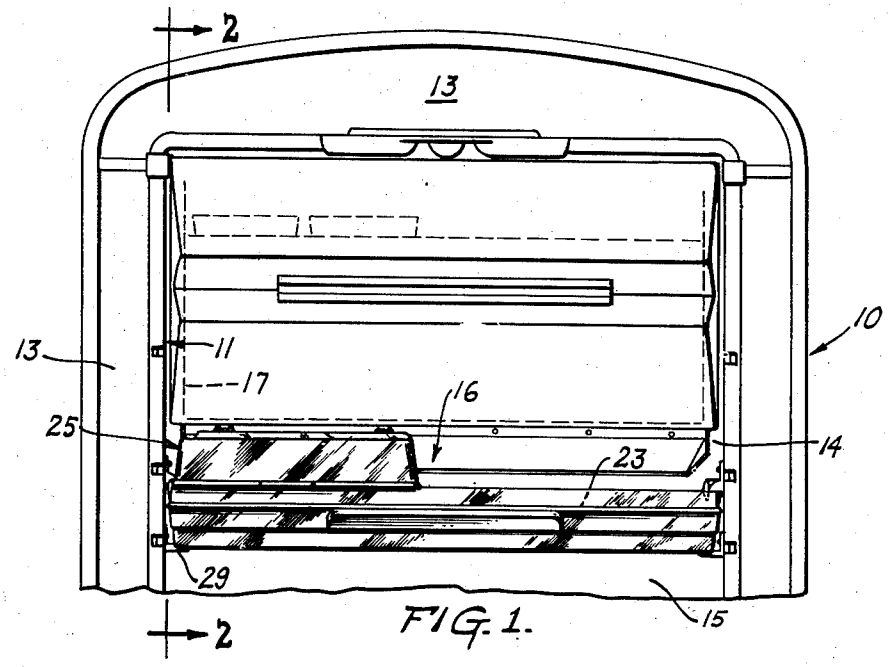


FIG. 1.

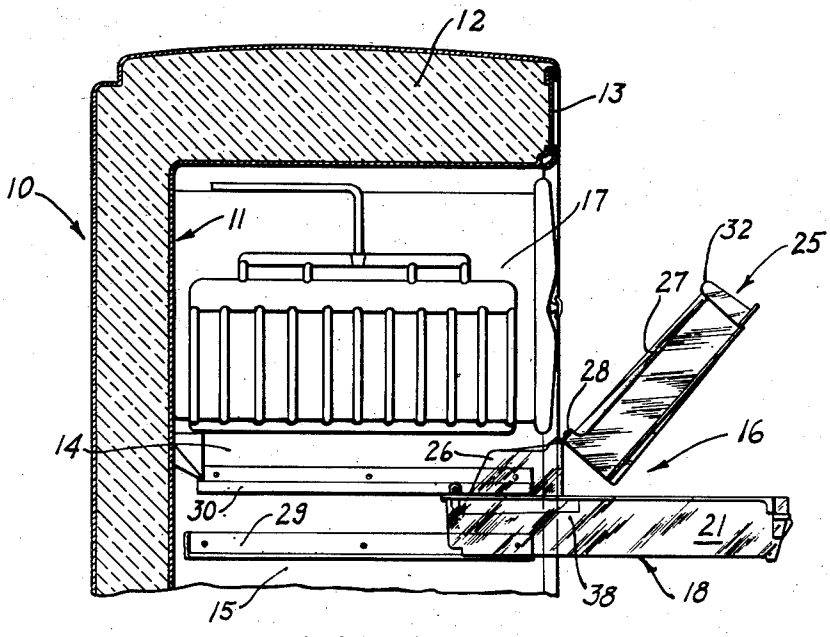


FIG. 2.

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July 29, 1952 C. R. QUINN 2,604,762

BAFFLE STRUCTURE FOR REFRIGERATORS

Filed March 11, 1950 3 Sheets-Sheet 2

FIG. 3.

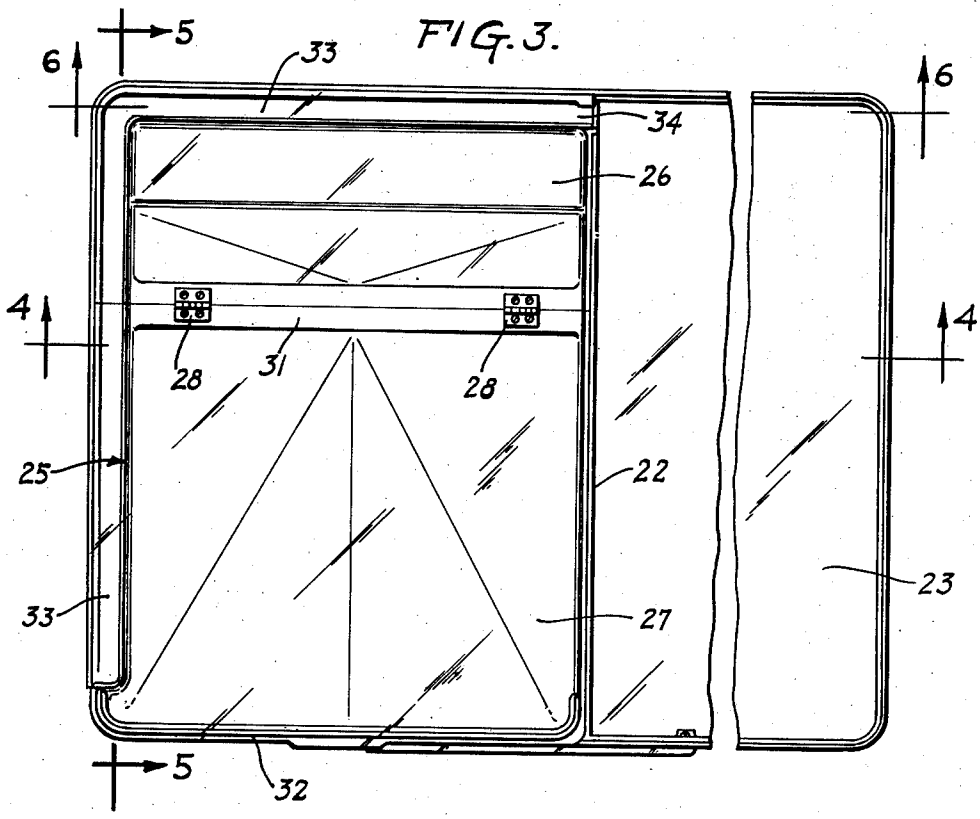
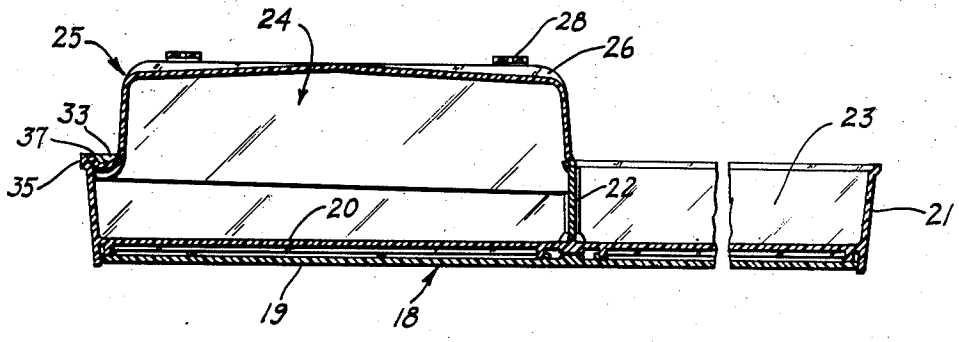


FIG. 4.



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Filed March 11, 1950 3 Sheets-Sheet 3

FIG. 5.

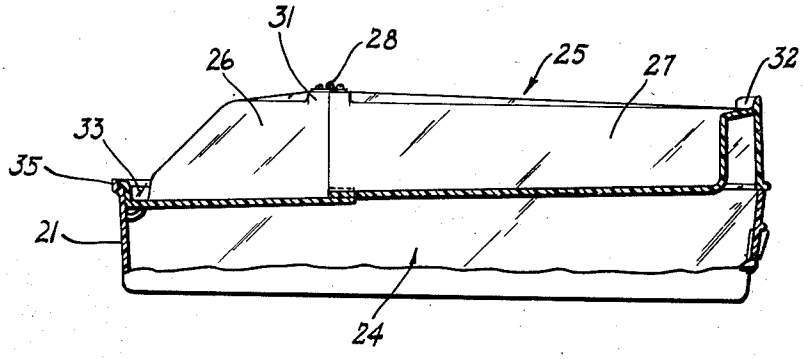
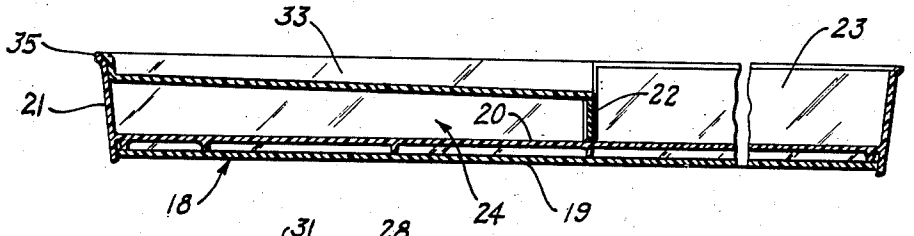


FIG. 6.



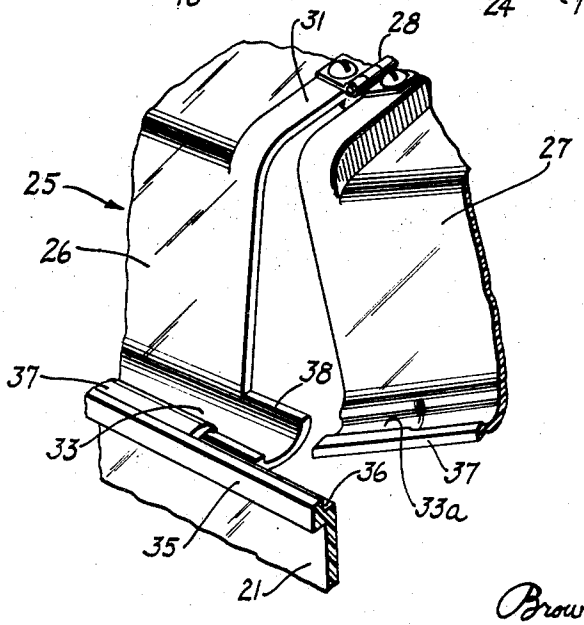


FIG. 7.

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UNITED STATES PATENT OFFICE

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BAFFLE STRUCTURE FOR REFRIGERATORS

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6 Claims. (Cl. 62—103)

1

The invention hereinafter disclosed and claimed relates to refrigerator construction and, more particularly, is concerned with refrigerators of the type which have a tray-like partition or baffle structure adapted to control the degree of heat exchange between certain compartments provided within the refrigerator.

In considering the invention it is to be borne in mind that it has proven desirable to provide within a refrigerated cabinet not only a compartment maintained at temperatures suitable for the preservation of frozen foods, but also a compartment maintained at a temperature above the freezing point of water, in order to provide for the proper preservation of fresh fruits, vegetables and other foodstuffs which should not be subjected to sub-freezing temperatures. Such compartments, or zones, may conveniently be provided by dividing the space defined by the inner liner of the cabinet into and upper and lower food storage compartments, by means of a generally horizontal partition or baffle which limits, but does not eliminate, the circulation of air between said upper and lower compartments. In this way it is possible to maintain one compartment at a relatively low, sub-freezing temperature, and yet control the degree of heat exchange between the two compartments in such manner as to provide, in the other compartment, temperatures above the freezing point of water. One of the two compartments is usually refrigerated through the agency of an evaporator, the walls of which may define that compartment, and which evaporator is maintained at a temperature well below 32° F., while the other compartment is maintained at a temperature slightly above 32° F., being cooled primarily by means of heat exchange effected through the said partition or baffle.

The partition member is commonly shaped in such manner that it serves also as a tray or shelf adapted for the storage of foodstuffs, and may be used to accumulate water resulting from defrosting of the evaporator of the colder compartment.

While constructions of the type thus far described are well known, they have been found, in practice, to be subject to certain difficulties, particularly in that the presence of the tray-like partition, which generally is disposed in close subjacency to the evaporator, makes it difficult to provide within the refrigerator a zone or space maintained under conditions suitable for storage of certain foods, and particularly meats. Meats which are to be used after a relatively short storage period should be maintained at a temperature intermediate the temperatures of the two described compartments, and preferably they should be stored in a covered receptacle which prevents or limits access of air to

2

the meat. If meats are stored in the tray-like partition above-mentioned they may become frozen and, by reason of the fact that they are exposed to the cold evaporator of the upper compartment, there may be some undesirable dehydration of the meat and consequent shrinkage losses. Further, if a covered meat storage receptacle is disposed below the tray-like partition, the meats may not be maintained at a sufficiently low temperature due to the thermal impedance of the interposed partition. Also, as will be readily understood, meats placed in the tray must be removed prior to a defrosting operation.

Accordingly, and with the foregoing in mind, it is the primary object of the present invention to provide in a refrigerator of the type set forth, a partition or baffle structure which, while serving as a tray for the storage of certain classes of foodstuffs and effective as a receptacle to collect the defrost water, is of such a nature as to include a section adapted for the proper preservation of meats under all conditions of operation, including times when the refrigerator is being defrosted. With more particularity, it is an object of the invention to provide a refrigerator of the stated type, including a single structure or device capable of functioning within said refrigerator as a baffle controlling the degree of heat exchange between the two main compartments, as a covered meat receptacle from which articles need not be removed during defrosting of the refrigerator, and as an open-topped tray providing additional storage space and serving to collect the water which results from the defrosting operation.

In another aspect of the invention, it is an object to provide a unitary tray-like device useful in refrigerators, for the above-stated purposes.

It is a feature of the invention that the stated advantages are accomplished by the provision of a tray-like partition structure or device which is inherently inexpensive to manufacture and is of unusually good appearance.

To the foregoing general ends, the invention contemplates provision of a refrigerator of the type including an evaporator which is preferably of a width and depth substantially equal to the width and depth of the refrigerator cabinet, and a tray-like structure disposed beneath said evaporator in spaced relation thereto and also having a width and depth substantially equal to the width and depth of said compartment, whereby to serve as a baffle controlling the heat exchange between the said evaporator and the refrigerated space below the structure; the invention being particularly characterized in that said structure comprises: portions defining a bottom wall and upstanding side walls extending

peripherally about the structure to define a relatively shallow tray adapted for the storage of foodstuffs and to serve as a receptacle for the collection of defrost water, one section of the structure having cover means cooperating with a portion of the bottom wall and with portions of said peripheral walls to define an enclosed meat receptacle disposed adjacent to an open-topped section of said tray-like member, and said cover means being so contoured as to conduct water collected upon the upper surfaces thereof to the said open-topped section.

The foregoing objects and advantages of the invention, together with certain subordinate features and details of construction thereof, are hereinafter fully described and illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of the upper portion of a refrigerator embodying the present invention, the main door of the refrigerator being omitted, in the interest of clarity in illustration;

Figure 2 is a vertical sectional view taken as indicated by the line 2—2 of Figure 1, and with the tray-like structure so disposed and adjusted as to provide access to the meat storage section thereof;

Figure 3 is a plan view of the partition structure of the present invention;

Figures 4, 5 and 6 are sectional illustrations taken as indicated by the corresponding sectional designations applied to Figure 3; and

Figure 7 is a fragmentary view, in perspective, illustrative of a feature of construction.

Now making more particular reference to the drawings, and especially to Figures 1 and 2 thereof, it will be seen that the invention is therein illustrated as embodied in a domestic refrigerator comprising an outer shell 10 and an inner shell or liner member 11, spaced inwardly of and insulated from the outer shell 10 by means of any suitable insulation, shown at 12. As is customary, a breaker strip 13 of low thermal conductivity extends about the forward face of the cabinet and bridges the gap between the said outer shell 10 and the inner liner 11. It will be understood that the refrigerator also includes a compartment housing a compressor-condenser unit of any desired type, but illustration of this portion of the apparatus is not necessary herein since the present invention is not concerned therewith.

As clearly appears in both of Figures 1 and 2, the space within the inner liner 11 is sub-divided into an upper relatively low temperature storage compartment 14 and a lower, above-freezing compartment 15, by means of the tray-like partition structure of the present invention, which latter is designated generally, by reference character 16. As will be recognized, the front access opening of the refrigerator is normally provided with a door (not shown) adapted to seal the space defined by the inner liner by seating against the cabinet in the plane of the aforesaid breaker strip 13. The upper zone or compartment 14 is utilized as the colder temperature compartment adapted for the storage of frozen foods, as indicated hereinabove, and to this end the compartment is provided with an evaporator 17 which may be of U-shaped configuration, and preferably is of a width and depth substantially equal to the width and depth of the compartment 14 defined by the upper wall portions of the inner liner 11. The evaporator 17 would, of course, be coupled to the condensing unit mentioned above, through suitable suction and feed lines, which it is not necessary to illustrate herein.

The underlying, warmer compartment 15 is preferably cooled solely through heat exchange effected through the partition structure 16 and, to insure the proper degree of heat exchange, the material of the partition and the construction thereof are such as to present the desired degree of thermal impedance. In this connection, it has been found that it is desirable to construct the partition of certain plastic materials, preferably clear or transparent material, and polystyrene has been found not only to yield good results thermally, but also to lend itself to inexpensive manufacture and pleasing appearance. Further, as will more clearly appear hereinafter, the floor of the partition is of double wall construction.

While the utility of the apparatus of the present invention is not limited to arrangements in which the lower compartment is cooled solely through the tray-like partition 16, this is a simple arrangement which presents a number of advantages and is therefore to be preferred.

In particular accordance with my invention, the partition structure 16 comprises a tray-like member defined, generally, by a bottom wall 18 formed of a pair of spaced sheets 19 and 20, and by upstanding wall portions 21 extending peripherally about the partition. As shown in Figures 4 and 6 a number of strengthening ribs extend downwardly from the sheet 20 and into contact with the upper surface of sheet 19. As above indicated the partition is preferably of polystyrene, and the sheets 19 and 20, as well as the peripheral wall 21, are bonded in any suitable manner throughout their contiguous portions in order to provide a water tight tray.

As clearly shown in Figures 1, 3, 4 and 6, the structure is divided by means of a central upstanding wall 22 into a right-hand open-topped receptacle 23 and a left-hand covered meat receptacle 24. The wall 22 is, of course, suitably bonded in a water tight manner to the upper surface of the sheet 20 and to the adjacent portions of the peripheral wall 21 and, accordingly, section 23 serves not only as a receptacle for certain classes of foodstuffs, but also to provide for the accumulation of defrost water without necessitating removal of the contents of the covered meat receptacle 24.

A split cover, or hood 25 cooperates with portions of the peripheral wall 21 and with the upstanding wall 22 to complete the enclosure of receptacle 24, the cover comprising a stationary rear portion 26 and a forward portion 27 pivotally secured to said rear portion through the agency of hinge means shown at 28 (see particularly Figures 2, 3 and 5). As clearly appears from Figures 2 and 3, the forward hinged portion 27 may be swung upwardly about the hinge means 28 to provide access to the meat storage space, such access being facilitated by withdrawal of the partition structure, as best appears in Figure 2. To accommodate such withdrawal, in order to obtain access to the structure and to pour out defrost water collected in the open-topped section 23, the lateral walls of the inner liner are provided with suitable track means 29 and 30 (see particularly Figures 1 and 2) cooperable to provide a guideway within which the partition structure is slideably received.

As indicated hereinabove the evaporator which overlies the partition is of substantial size, pref-

erably being approximately equal in width and depth to the corresponding cross-sectional dimensions of the cabinet. During normal use of the refrigerator all of the exterior surfaces of the evaporator, and especially the bottom wall thereof, become coated with frost and this coating must periodically be removed to maintain the effectiveness of heat transfer. During the defrosting operation water will, of course, drip from the entire lower surface of the evaporator, and it will be clear that much of this water will be delivered to the upper surface of the cover 25 of the meat storage receptacle. In the apparatus of my invention water so delivered is conducted to the adjacent open-topped section 23, and this is accomplished without objectionable spillage into the lower compartment 15 or leakage into the interior of the meat receptacle.

To accomplish these purposes the cover is so contoured as to shed water to either side thereof, and also forwardly and backwardly of a raised rib section 31 (Figures 3 and 5) to which are secured the hinged assemblies 28. The contouring of the forward hinged portion 27 of the cover appears to best advantage in Figures 3 and 4, from which figures it will be evident that the cover is sloped downwardly to either side of a higher region extending centrally from the front of said hinged member back to the rib 31. The hinged portion 27 also has a slight downward slope from the region of the rib 31 toward the upper forward edge of the cover which is provided with an upstanding dam or rib 32 (Figure 5), effective to conduct the water laterally. From consideration of the plan view of Figure 3, it will now be understood that water falling upon the right-hand side of the hinged portion 27 flows downwardly and is delivered directly to the open-topped section 23. Similarly, water delivered to the left-hand side of the member 27 flows downwardly from said side and into a trough 33, provided along the left-hand edge of the partition and also extending along the rear edge of the meat storage section 24, from whence it is delivered into the adjacent open section 23, as shown at 34. As clearly shown in Figures 4, 5 and 7, trough 33 takes the form of flanging extending outwardly from the lower edge portions of the cover assembly, the flanging having a depressed central section providing the aforesaid trough. To promote proper drainage toward the open-topped section 23, the trough slopes downwardly from the region of the left-hand forward corner of the partition structure to the outlet 34, in which connection see the showings of Figures 5 and 6. As will now be apparent from inspection of the drawings, the rear stationary cover portion 26 also has its upper surface sloped to provide for delivery of water either directly into the adjacent open-topped section 23 or into the described trough 33, through the agency of which it is conducted to said open-topped section 23.

Referring to Figure 7 it will be seen that the peripheral wall 21 is flanged, as at 35, to provide a shoulder portion 36 adapted to receive a bead member 37 which defines the outer edge of the trough 33. With respect to the stationary cover portion 26, the bead member is bonded in any suitable manner to the shoulder portion 36, whereas those parts of the trough 33 which are provided upon the forward hinged cover portion 27 are freely received within the confines of flanging 35 and are supported upon adjacent portions of the shoulder 36. In order to conduct water from that part of the trough which is carried by the hinged cover portion 27 (see trough portion 33*a*) to the continuation of trough 33 provided about the base of fixed cover portion 26, said fixed cover portion has a forwardly directed trough extension 38 within which is received trough portion 33*a*, when the cover is in closed position. Since the trough is sloped throughout its length, there is no appreciable leakage of water through this joint and into the closed receptacle.

In use, and as now will be appreciated, water delivered to the upper surface of the meat storage section 24 either drains directly into the open-topped section 23, or is conducted to said section through the agency of the trough structure just described. Thus the refrigerator may be defrosted at any time, without concern as to whether or not the meat receptacle is being used, and the entire partition structure may be withdrawn from the refrigerator when the defrosting operation is complete, at which time the collected water is of course disposed of in any convenient manner.

From the foregoing description it will now be understood that the invention provides a partition which not only serves effectively as a defrosting tray and as a baffle controlling the heat exchange between adjacent compartments of the refrigerator, but which also includes within it confines a covered receptacle within which meats or other foods may be maintained at a temperature intermediate the temperatures of the two main refrigerated compartments. By this latter feature, the construction presents a particularly important advantage over prior refrigerators utilizing tray-like baffle members. Further, defrosting of the overlying evaporator may be accomplished without the necessity of removing food from the covered receptacle.

While a single embodiment of my invention has been illustrated, and described in this disclosure, it will be evident to those skilled in the art that the invention is susceptible of changes and modifications without departing from the essential concept thereof, and that such changes and modifications are contemplated as come within the terms of the appended claims.

I claim:

1. In a refrigerator, a cabinet having a food storage compartment therein, an evaporator disposed within the food storage compartment and adapted to cool the latter, and a baffle structure disposed beneath said evaporator in spaced relation thereto and having a width and depth substantially equal to the width and depth of said compartment, whereby said baffle structure serves to divide the space within said compartment into upper and lower zones and is effective to control the heat exchange between said upper and lower zones to maintain said zones under predetermined unequal temperature conditions, said baffle structure including: a bottom wall and upstanding side walls defining a relatively shallow open-topped tray, whereby said structure is further adapted for storage of foodstuffs and may serve as a receptacle for collection of moisture dropped from said evaporator under certain conditions of operation; a cover extending across a portion only of said open-topped baffle structure and cooperating with said baffle structure to define an enclosed compartment upstanding from the bottom wall of the baffle structure and over-lying a portion only of said baffle structure beneath said evaporator, said enclosed compart-

ment, by virtue of its disposition intermediate said evaporator and said bottom wall, being normally maintained at a temperature intermediate the temperatures prevailing in said upper and lower zones and at a value slightly above the surface temperature of said evaporator, at least a portion of said cover being movable to afford access to said enclosed compartment and said cover being so shaped and disposed that moisture deposited upon the upwardly presented surfaces thereof drains freely therefrom; and means for receiving the moisture drained from said cover and for delivering said moisture to a portion of said tray-like baffle structure adjacent to said enclosed compartment.

2. Construction in accordance with claim 1, and further characterized in that said last-mentioned means comprises a trough extending about at least two sides of said cover and being sloped throughout its length toward the point of delivery to said adjacent portion of said baffle structure.

3. In a refrigerator, a cabinet having a food storage compartment therein, an evaporator disposed within the food storage compartment and adapted to cool the latter, said evaporator having a width and depth substantially equal to the width and depth of said compartment, and a baffle structure disposed beneath said evaporator in spaced relation thereto and also having a width and depth substantially equal to the width and depth of said compartment, whereby said baffle structure serves to divide the space within said compartment into upper and lower zones and is effective to control the heat exchange between said upper and lower zones to maintain said zones under predetermined unequal temperature conditions, said baffle structure including: a bottom wall and upstanding side walls defining a relatively shallow open-topped tray, whereby said structure is further adapted for storage of foodstuffs and may serve as a receptacle for collection of moisture dropped from said evaporator under certain conditions of operation; a cover extending across a portion only of said open-topped baffle structure and cooperating with said baffle structure to define an enclosed compartment upstanding from the bottom wall of the baffle structure and overlying a portion only of said baffle structure beneath said evaporator, said enclosed compartment, by virtue of its disposition intermediate said evaporator and said bottom wall being normally maintained at a temperature intermediate the temperatures prevailing in said upper and lower zones and at a value slightly above the surface temperature of said evaporator; and means including a trough formed as a part of said cover and operable to collect moisture dropped from said evaporator upon said cover and to deliver said moisture to a portion of said tray-like baffle structure adjacent to said enclosed compartment.

4. A tray-like baffle structure adapted for use in refrigerators, said baffle structure comprising: a bottom wall and upstanding side walls defining a relatively shallow open-topped tray, whereby said structure is adapted for storage of foodstuffs and collection of moisture dropped upon said tray under certain usage conditions; means including a cover spaced above the bottom wall of said baffle structure and cooperable with said upstanding side walls to define an enclosed compartment forming a part of said baffle structure, said compartment overlying a portion only of said baffle structure; and means, including sloped portions of said cover and a cooperable trough for receiving moisture deposited upon said cover and for delivering said moisture to a portion of said tray-like baffle structure adjacent to said enclosed compartment, said trough extending about at least two sides of the cover and being sloped throughout its length toward the point of delivery to said adjacent portion of said baffle structure.

5. A tray-like baffle structure adapted for use in refrigerators, said baffle structure comprising: a bottom wall and upstanding side walls defining a relatively shallow open-topped tray, whereby said structure is adapted for storage of foodstuffs and collection of moisture dropped upon said tray under certain usage conditions; means including a cover and defining an enclosed compartment or zone overlying a portion only of said baffle structure; and means for receiving water delivered to said cover and for delivering said water to a portion of said tray-like baffle structure adjacent to said enclosed compartment, said last-mentioned means comprising sloping of the upwardly presented surface of said cover in such manner that water dropped upon certain areas thereof is delivered directly to the said adjacent portion of said baffle structure and water dropped upon certain other areas thereof flows downwardly from said cover across one side wall of said enclosed compartment, and a trough extending about at least two sides of the cover and underlying the region of downflow of the water last mentioned whereby to receive said water, said trough being sloped throughout its length toward a point of delivery to the said adjacent portion of said baffle structure.

6. A tray-like baffle structure comprised of material of low thermal conductivity and adapted for horizontal disposition within a refrigerator beneath the evaporator thereof, said baffle structure comprising: an imperforate bottom wall and upstanding side walls defining a relatively shallow, open-topped tray, whereby to provide for storage of foodstuffs and collection of moisture dropped upon said tray under certain usage conditions; and means comprising a hood-like cover member cooperating with a portion of said bottom wall and secured to portions of said upstanding side walls to define a meat storage receptacle overlying a portion only of said tray-like baffle structure, said hood-like cover member being provided with a movable door portion proving access to said receptacle and being sloped and configured to promote drainage of moisture therefrom to a portion of said tray-like baffle structure adjacent to said receptacle.

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