

Dec. 8, 1942.

P. MANISCALCO

2,304,465

REFRIGERATOR WITH DEEP FREEZING CHAMBER

Filed March 5, 1941

4 Sheets-Sheet 1

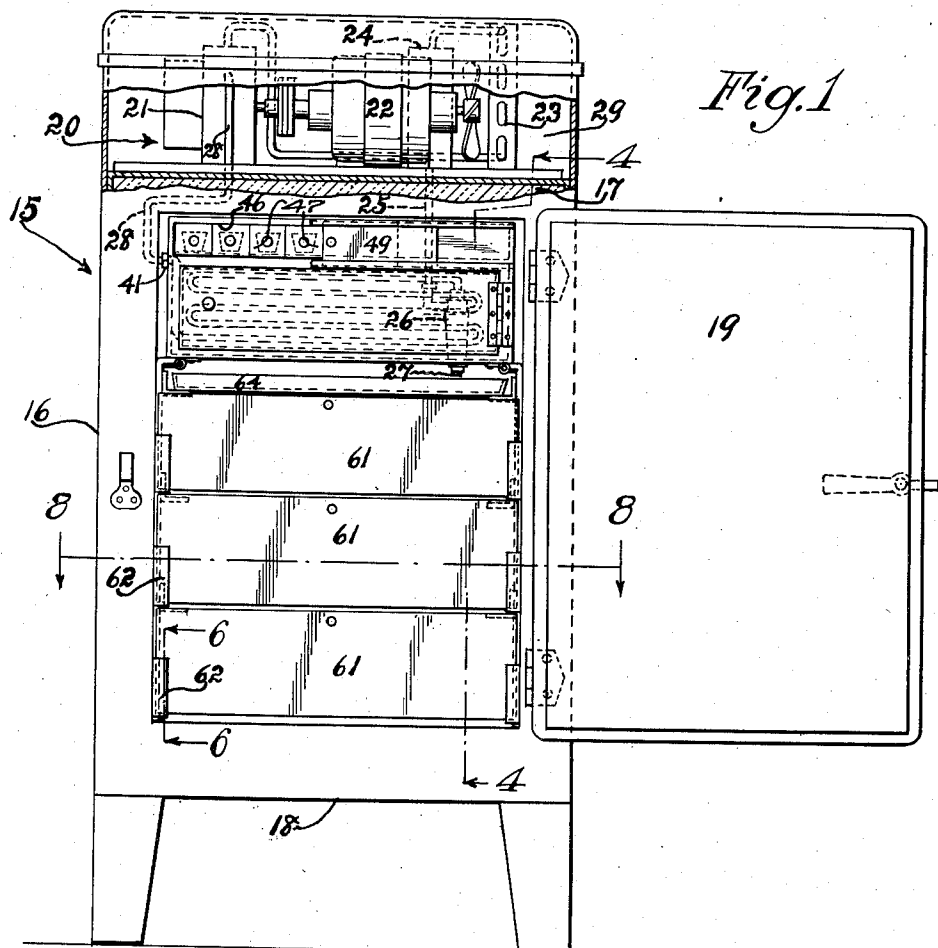


Fig. 1

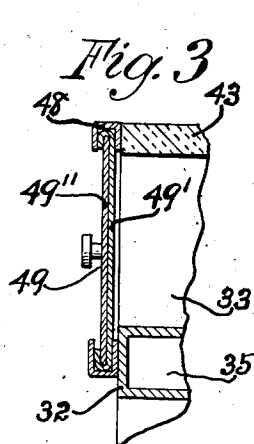


Fig. 3

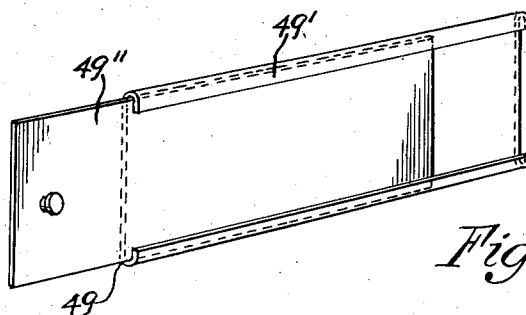


Fig. 2

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4 Sheets-Sheet 2

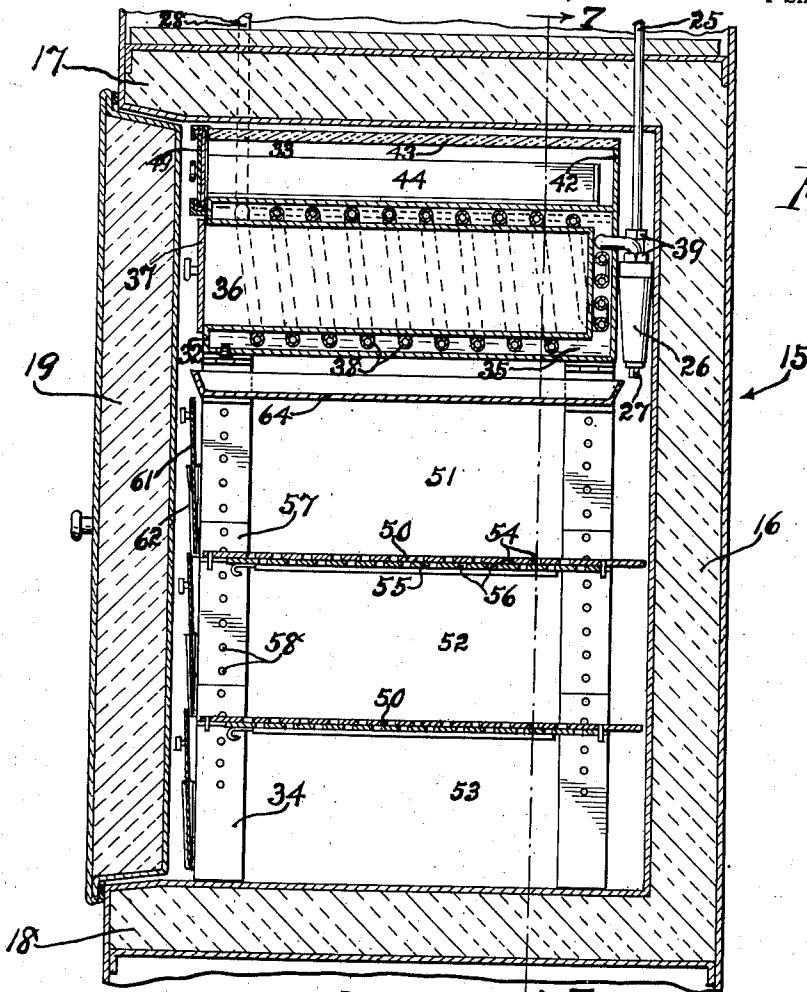


Fig. 4

Fig. 6

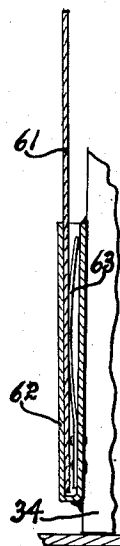
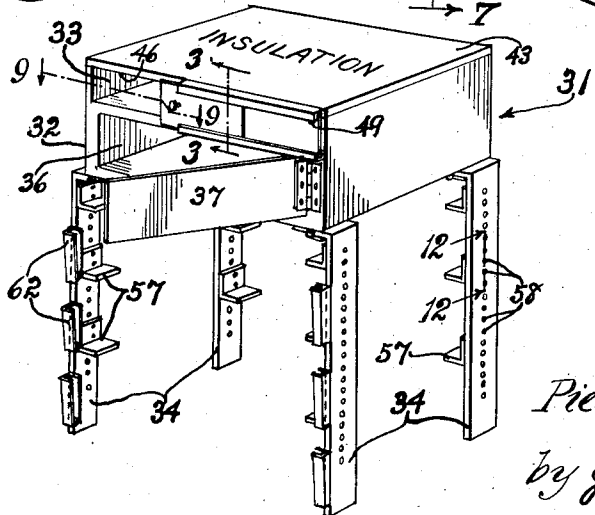


Fig. 5

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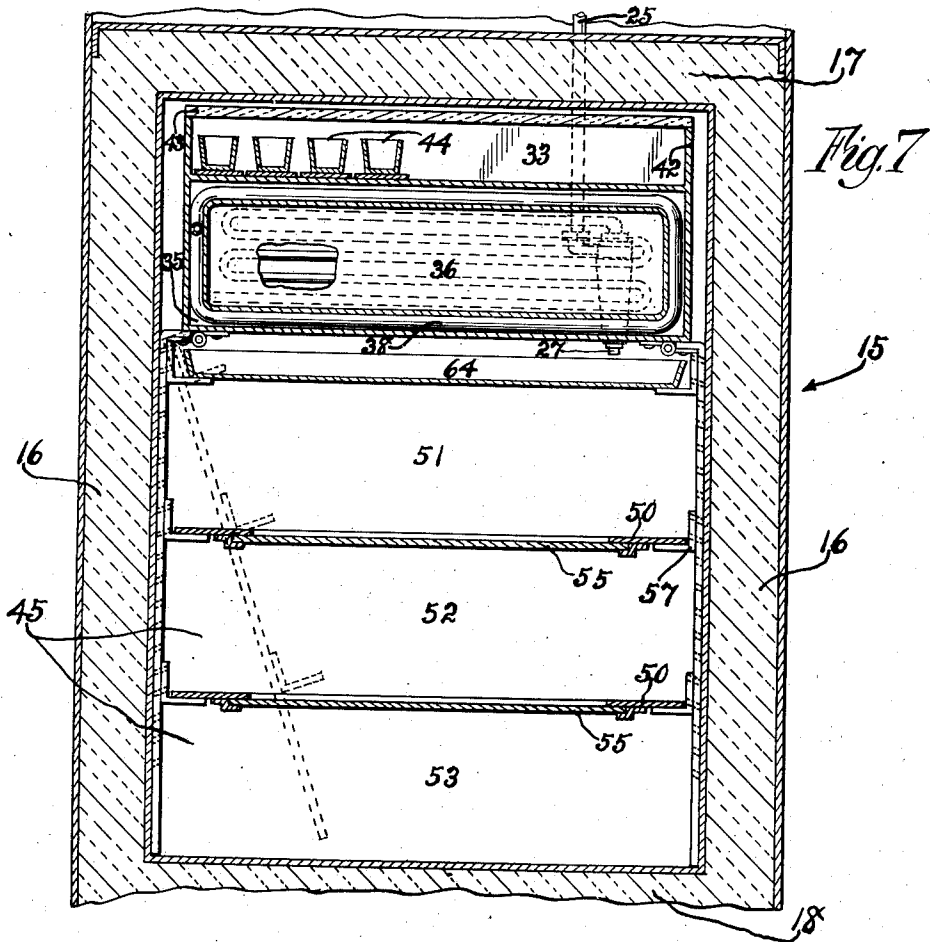
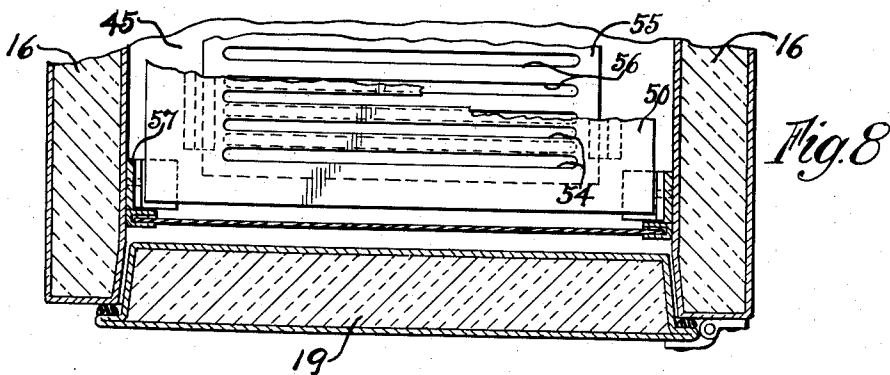
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REFRIGERATOR WITH DEEP FREEZING CHAMBER

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4 Sheets-Sheet 3



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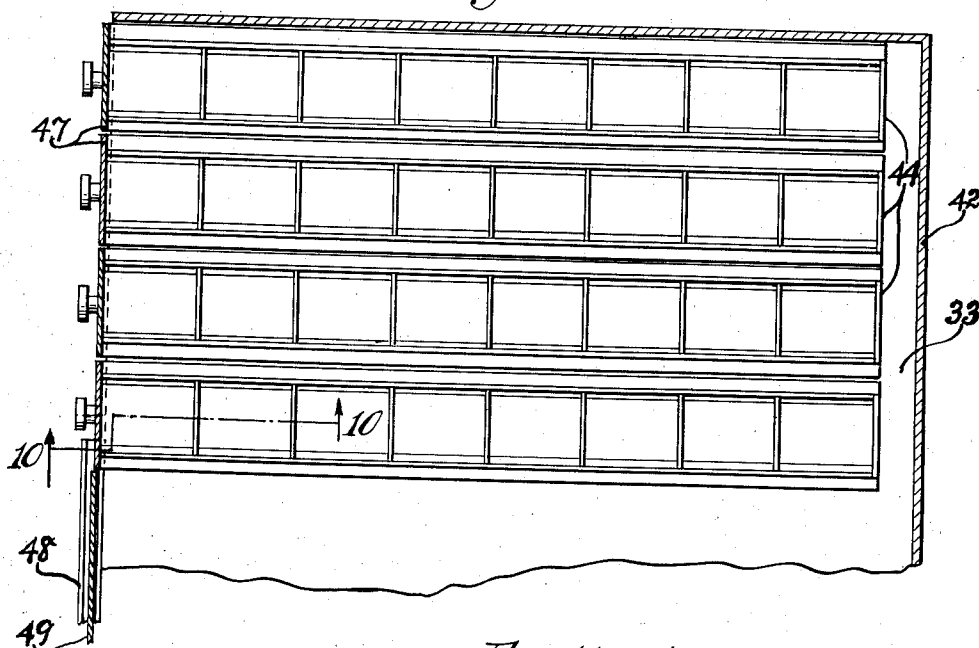
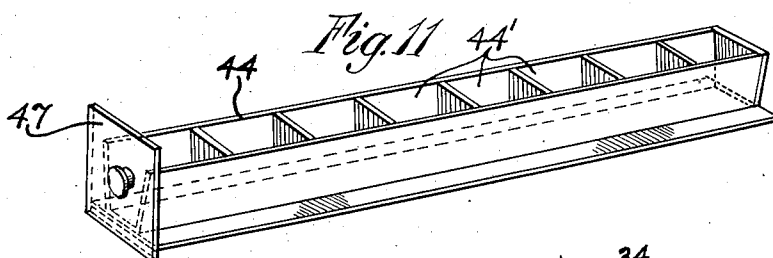
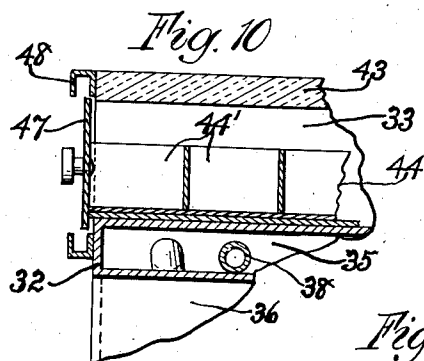
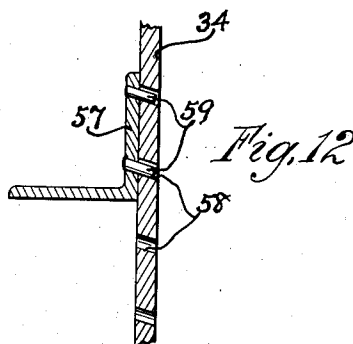
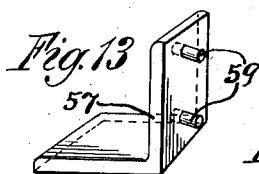
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REFRIGERATOR WITH DEEP FREEZING CHAMBER

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4 Sheets-Sheet 4

Fig. 9



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UNITED STATES PATENT OFFICE

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REFRIGERATOR WITH DEEP FREEZING CHAMBER

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Application March 5, 1941, Serial No. 381,873

16 Claims. (Cl. 62—89)

This invention relates to improvements in refrigerators with deep freezing chambers.

One of the main objects of this invention is to provide a refrigerator which includes not only a deep freezing chamber therein, but also improved adjustable storage chambers, and furthermore comprises a novel ice cube making chamber which is arranged to receive a number of novel cube trays arranged to close said chamber and is also convertible partially into an auxiliary storage chamber when some of the trays are omitted therefrom.

A further object of this invention is to supply such a refrigerator comprising an ice cube making chamber which is provided with a number of specially constructed cube trays arranged to close the front opening of said chamber, and which trays each carry a few cubes in a single row and can be singly removed when only a few cubes are desired; said chambers being furthermore equipped with readily removable and adjustable door means adapted to be used when only a few of the trays are in use in the chamber, and in conjunction with the trays in use will thus provide a small closed auxiliary storage chamber.

A particular object of this invention is to provide such a refrigerator which comprises an open front ice cube chamber, and in combination therewith a plurality of ice cube trays which include means at the front thereof for closing said opening on the chamber when the trays are mounted in their proper position therein.

Another object of this invention is to arrange the food storage space in such refrigerator into several individual chambers all equipped with door means and partition means which are adjustable, so that the chambers can be closed from each other and the circulation of cool air thru each chamber can be regulated, thus providing for different temperatures in the separate chambers.

Another object of this invention is to provide the refrigerator with means for conveniently adjusting the partition shelves vertically in the cabinet, whereby the relative sizes of these chambers can be readily varied and will be held firmly in position.

These and various other objects and advantages are attained with this invention, as will become apparent from the following description, taken in connection with the accompanying drawings wherein the invention is disclosed in its preferred form, it being apparent that various other arrangements and forms of construction may be adopted in carrying out the objects and purposes of this invention.

The invention comprised in this application involves several improvements over the invention disclosed and claimed in my prior application for Refrigerator, Serial No. 365,766, filed November 15, 1940.

In the drawings:

Fig. 1 is an elevational view of a refrigerator embodying the present invention, shown in its preferred form of construction, parts being broken away.

Fig. 2 is a perspective view of the adjustable and removable door means of the cube making chamber.

Fig. 3 is an enlarged sectional detail view of said door means on said chamber, taken on line 3—3 of Fig. 5.

Fig. 4 is an enlarged vertical sectional view, taken on line 4—4 of Fig. 1.

Fig. 5 is a perspective view showing the main parts of the unitary device, which is removably mountable in the cabinet of a refrigerator.

Fig. 6 is an enlarged sectional detail view of a slidably adjustable door on one of the food chambers, taken on line 6—6 of Fig. 1.

Fig. 7 is a vertical sectional view, taken on line 7—7 of Fig. 4.

Fig. 8 is an enlarged partial horizontal sectional view, taken on line 8—8 of Fig. 1.

Fig. 9 is an enlarged partial horizontal sectional view, taken on line 9—9 of Fig. 5.

Fig. 10 is a partial sectional view, taken on line 10—10 of Fig. 9.

Fig. 11 is a perspective view of an ice cube tray.

Fig. 12 is an enlarged sectional detail view, taken on line 12—12 of Fig. 5.

Fig. 13 is a perspective view of a partition shelf bracket.

The drawings illustrate this invention in its preferred form of construction, and as being embodied in a domestic type of refrigerator which comprises a cabinet 15 including upstanding walls 16 having a top wall 17 and a bottom wall 18 thereon and a door 19 hinged thereto, all provided with suitable heat insulating material, as indicated in the drawings. This refrigerator is shown provided with an operating unit 20, which includes a compressor 21, a driving motor 22, a condenser 23 and a tank 24, and also the conduits connecting the same which include a feed conduit 25 extending from the tank 24 and having an expansion valve 26 thereon with an adjusting element 27 at its lower end, and the return conduit 28 for returning the refrigerant to the compressor 21; this operating unit being mounted in

a machinery chamber 29, which is herein shown located at the top of the cabinet.

The invention involved in this application, similarly to that disclosed in my prior above identified application, comprises mainly a unitary device 31, the main parts of which are shown per se in Fig. 5, which is arranged so that it can be conveniently installed in and likewise removed from a newly built cabinet 15, as shown in the other figures of the drawings; and which is furthermore adapted to be readily installed in a suitable cabinet of a known type of refrigerator and the like.

This unitary device 31 comprises a freezing device 32 adapted to provide a relatively low temperature therein, for quickly freezing foods and the like and conserving the same a relatively long time; and said device 31 further comprises an ice cube making chamber 33 located above the device 32; and upright supporting members or legs 34 under said device 32, being preferably hinged thereto so that they may be swung inwardly, as indicated by the dotted lines in Fig. 7, to facilitate the installation of the unit 31 in the cabinet and the removal therefrom.

The freezing device 32 is constructed in the form of a jacket containing hollow or spaced walls providing a chamber 35 between said spaced walls for containing liquid therein, and also providing a freezing chamber 36 within the inner walls, having a door 37 hinged thereon to close said chamber 36. Refrigerant conducting means 38 is provided on the jacket, and is shown herein as a continuous coil wound around the inner walls and being immersed in the liquid in said chamber 35. Said coil is connected by coupling means 39 with the expansion valve 26 and by a coupling means 41 with the return conduit 28, thereby connecting the coil operatively with the operating unit 20.

The liquid used in chamber 35 is preferably a frost resisting one, as a strong salt brine, or some other prepared anti-freeze liquid; and this liquid aids the refrigerant conducting coils 38 immersed therein in maintaining a relatively constant temperature in freezing chamber 36.

The freezing device or jacket 32 extends substantially as a partition across the cabinet and is positioned adjacent the top wall 17 thereof, thereby providing the small cube chamber 33 between said device and top wall; and the rear wall of said device preferably has an upper extension 42 which forms the rear wall of said cube chamber, while a thin cover plate 43 of insulating material may be optionally mounted upon said chamber, for better retaining therein the cooling effect created by the freezing device 32. This freezing device thus provides a small ice cube making chamber 33 above it, for receiving the ice cube trays 44, and also provides a larger storage space 45 below it in the cabinet, for storing foods and the like therein.

This cube making chamber 33, in combination with the cube trays 44 disclosed herein, are of novel construction. Each tray 44 contains only a few cube cups or pockets 44' therein, which are arranged in a row, and these trays are mounted alongside each other in said chamber 33, thus one tray with a few cubes may be withdrawn at a time, to avoid wasting energy of the operating unit. The front end of this chamber has an opening 46 thereon, and each tray has a front flange or shield 47 thereon, so that these shields of the several trays placed in the chamber will serve to close said front opening 46, and thus

provide a closed ice cube freezing chamber. Guide means or channel means 48 is also provided on part of the front opening 46; and door means 49 which is adjustable for length, as by comprising two parts 49' and 49'', which are slidably connected, is removably mounted in said guide means 48.

With this arrangement the whole group of trays may be used and will fill the chamber 33, while the front shields 47 of said trays will then close the front opening 46, while the door means 49 is then omitted; but when it is desired to utilize only a few of the cube trays, then said door means 49 is inserted in the guide means 48, and the door parts 49' and 49'' are then either slid upon each other or are extended, so that the same will cover that part of said front opening 46 which is left uncovered by the shields of the trays which have been omitted. This also provides a small auxiliary storage chamber behind this door means and alongside the trays which are included in the chamber 33.

An improved shelf arrangement is provided in this cabinet, and this comprises several partition plates 50 which extend substantially across the cabinet, thereby providing several individual storage chambers 51, 52 and 53 in the storage space 45. Each plate has ventilating slots 54 therein, and has control means thereon, shown as including a slide plate 55 adjustably slidable on plate 50 and provided with slots 56 adapted to register with said slots 54, adapted to be adjusted for regulating the circulation of air therethru and also to be closed, substantially as indicated in Fig. 8; and which is more fully disclosed and claimed in my above identified prior application.

In the present case however, the partition plates 50 are supported in an improved manner, whereby the brackets 57 are adjustably mounted on the legs 34, preferably by providing holes or bores 58 in the legs, which are spaced at equal distances vertically thereon, and by providing pins or studs 59 on each bracket adapted to fit in any of said bores, as best shown in Fig. 13. With this arrangement a set of brackets 57 with the partition plate 50 supported thereon can be readily adjusted vertically in the cabinet, so as to modify and provide the particular sizes of storage chambers 51, 52 and 53 as desired.

The doors provided on these storage chambers include plates 61 which are slidably mounted in channel means or guide means 62, as indicated in Fig. 6, which are secured on the legs 34; and spring means 63 are provided in these channel means, thus enabling said door plates 61 to be readily adjusted vertically and then held firmly in position, so as to either close the front of said chambers 51, 52 and 53, or to leave either or all the doors partly open for ventilation and the circulation of the cool air thru the chambers, whereby to control and to vary the temperatures in the several storage chambers.

A drip pan 64 is preferably also mounted under the freezing device 32, adapted to collect any moisture that may be caused by defrosting of the freezing device, etc., and this pan can be readily withdrawn to provide convenient access to the adjusting element 27 on the expansion valve 26. This pan is also well adapted to receive fish and the like to be chilled or frozen therein.

It is apparent from the above disclosure that I have provided a refrigerator with an improved unitary refrigerating device which can be installed as a unit in the cabinet and which comprises the deep freezing chamber 36, the ice cube

making chamber 33 with its novel trays, and the several individual storage chambers 51, 52 and 53, which can be conveniently regulated so as to retain them at the various desired temperatures. Moreover, hereby one tray with a few ice cubes can be individually withdrawn at a time, and these trays with their shields 47 will close the chamber 33; furthermore, when only a few of the trays are desired for ice cubes, then they in conjunction with the door means 49 will close said chamber and will also provide an auxiliary storage chamber thereby. It is also apparent that the storage chambers can be readily adjusted to the particular size desired, and they can be closed from each other and the temperatures thereof can also be regulated to provide the different temperatures in these chambers to best suit the foods and materials conserved therein.

I claim:

1. A refrigerator comprising a cabinet having heat insulated walls, a jacket containing double walls providing a chamber therebetween having a freezing unit mounted therein, said jacket constituting a freezing chamber for freezing foods therein and being mounted across said cabinet adjacent one of its walls, providing between it and the adjacent wall a small chamber which is open at the front and is adapted to receive a group of ice cube trays therein, said jacket also providing between it and the other part of the cabinet a larger space for storage of foods and the like, and door means adjustable for length being removably mounted in part of the front opening of said small chamber, adapted to co-operate with those trays of the group which are installed in said chamber and provide a small auxiliary storage chamber.

2. A refrigerator comprising a cabinet having heat insulated walls, a freezing device containing refrigerant conducting means thereon and providing a freezing chamber therein for containing frozen foods, said device extending across the cabinet adjacent one of the walls and providing between it and the adjacent wall a small chamber which is open at the front, adapted to receive a group of ice cube trays therein, also providing a larger space between the device and the other part of the cabinet to serve for storing foods and the like, and guide means provided on said open front having door means removably mounted therein and being adjustable for length, adapted to cooperate with a selected number of trays of said group that may be installed in said chamber and in conjunction therewith close the chamber opening and also provide an auxiliary storage chamber, which is of variable size according to the number of trays omitted.

3. A refrigerator comprising a cabinet having heat insulated walls and having an operating unit associated therewith, a refrigerating device including a jacket containing refrigerant conducting means operatively connected with said operating unit, said jacket being mounted across the cabinet adjacent the top wall and containing a deep freezing chamber therein with a door thereon, a small chamber between said jacket and the top wall being open at its front and adapted to receive a group of ice cube trays therein, a larger food storing space with shelf means below said jacket providing storage chambers, guide means on said open front, and door means including extendible parts adjustably and removably mounted in said guide means, adapted to co-operate with those trays of the group which are installed in said small chamber and in conjunc-

tion therewith close the chamber opening and also provide an auxiliary storage chamber.

4. In a refrigerator including a cabinet, a device mounted as a unit and removably in the cabinet and comprising wall means equipped with refrigerating means and containing a freezing chamber extending across the cabinet, a small chamber above said wall means, being open at its front and adapted to receive a group of ice cube trays therein, door means adjustably mounted in the front opening to close part thereof and co-operate with some trays of said group that are installed in the small chamber to provide an auxiliary storage chamber, supporting members under said wall means thereby supporting the device in the cabinet, and shelf means supported by said members providing storage chambers in the cabinet.

5. In a refrigerator including a cabinet, a device mounted as a unit removably in the cabinet and comprising a jacket equipped with refrigerating means providing a deep freezing chamber therein and extending across the cabinet, legs supporting said jacket in the cabinet, shelves adjustably supported by said legs and containing ventilating means adapted to be adjusted and also closed, providing storage chambers, door means adjustable on said storage chambers, to regulate ventilation thereto and to close the same, thereby regulating the temperatures of these storage chambers individually, a small chamber above said jacket, for receiving ice cube trays therein, and a door on said small chamber.

6. In a refrigerator including a cabinet, a device mounted as a unit and removable in the cabinet and comprising a jacket equipped with refrigerating means providing a deep freezing chamber therein, legs supporting said jacket in the cabinet, shelves supported by said legs providing storage chambers below the jacket, door means on said chambers adapted to close them and also to provide ventilation thereto, thus providing individual chambers, a small ice cube making chamber adjacent said jacket including an open front and guide means thereon, cube trays mountable alongside each other in said cube chamber and including front shields adapted to close said open front, and a door adjustable for length being removably mountable in said guide means, adapted to co-operate with a few of the cube trays which are retained in the chamber and in conjunction therewith close said open front and also provide an auxiliary storage chamber.

7. In a refrigerator including a cabinet containing a freezing chamber equipped with refrigerating means, the combination in said cabinet of an ice cube making chamber which has an opening at its front, a group of slender cube trays mountable alongside each other in said cube chamber and containing shield means at the front thereof which contact each other and fully close said front opening, and door means adjustably mounted in said front opening, adapted to close a certain part thereof which has been left unclosed due to trays that have been omitted, and in conjunction with the trays retained in the chamber to provide a small storage chamber therein.

8. In a domestic type of refrigerator including a cabinet containing walls and a door provided with heat insulating material, the combination in said cabinet of an ice cube making chamber having an opening at its front and being pro-

vided with freezing means, guide means on the open front, a group of cube trays mountable in said chamber and having shields at their front ends which contact each other and together fully close said front opening, and door means mountable in said guide means and being adjustable for length, adapted to close a part of said opening, which has been left uncovered due to trays omitted from said chamber, and in conjunction with the shields of the retained trays to close said opening and also to provide a small auxiliary storage chamber rearward of said door means.

9. A refrigerator comprising a cabinet containing therein a deep freezing chamber with refrigerating means and upright members for supporting said chamber in the cabinet, shelves and sets of brackets for supporting them, and coengaging means on said brackets and on said upright members including means spaced vertically along said members, whereby to readily adjust any shelf with its brackets and selectively vary the distance between adjacent shelves.

10. A refrigerator comprising a cabinet containing a freezing chamber provided with refrigerating means and having legs thereunder for supporting said chamber in the cabinet, shelves and supporting brackets therefor, and co-operating studs on the brackets and bores in the legs which are spaced closely and equally vertically of the legs, whereby to readily and selectively adjust any shelf with its brackets vertically in the cabinet and vary the distance between the shelves.

11. In a refrigerator including a cabinet having heat insulated walls and door thereon, a device mountable as a unit and removably in the cabinet and comprising a jacket equipped with refrigerating means and providing a deep freezing chamber therein, an ice cube making chamber above said jacket, legs under the jacket to support it in the cabinet, shelves and brackets for supporting them, thereby providing several storage chambers in the cabinet, and coengaging means on the brackets and legs including means spaced closely vertically of the legs, whereby to readily adjust the positions vertically of shelves in the cabinet and modify the sizes of said storage chambers.

12. A refrigerator comprising a cabinet containing means having refrigerating means and providing a freezing chamber therein, legs supporting said chamber in the cabinet, bracket means on the legs and shelves mounted thereon and being provided with adjusting and closing means, providing several separate storage chambers in the cabinet, guide means on the legs, and door plate means adjustably mounted in said

guide means, thereby providing several individually adjustable and closeable storage chambers retainable at different temperatures.

13. In a refrigerator including a cabinet having heat insulated walls and a door thereon, a device removably mounted as a unit in said cabinet and comprising a jacket having refrigerating means and providing a freezing chamber therein, legs supporting said jacket in the cabinet, shelves and means to support them on the legs for vertical adjustment thereon, means on the shelves to provide ventilation therethru and to close them, guide means on the legs, and plate-shaped door means adjustable in said guide means, adapted to close the chambers formed between said shelves and also to regulate the circulation of cool air therethru and provide different temperatures therein.

14. In a refrigerator cabinet, a device removably mounted as a unit therein comprising a jacket equipped with refrigerating means and providing a freezing chamber, a small chamber above said jacket for ice cube trays and having adjustable door means thereon, legs supporting said jacket in the cabinet, shelves and means supporting them for vertical adjustment on said legs, means on the shelves to adjust them for ventilation and to close them, thus providing several storage chambers, and door means and means for adjustably mounting them on said legs in front of said storage chambers, thereby providing several individually adjustable and closeable storage chambers retainable at different temperatures.

15. In a domestic type of refrigerator, a cabinet equipped with a jacket having hollow walls containing refrigerating coils and providing a freezing chamber, an ice cube making chamber in said cabinet adjoining said freezing chamber and having an opening at its front, and a plurality of cube trays mountable alongside each other in said cube chamber and each tray containing integral front shield means providing the front wall thereof and extending laterally outwardly therefrom whereby to contact each other and fully close said front opening.

16. In a refrigerator including a cabinet containing a freezing chamber equipped with refrigerating means, the combination in said cabinet of an ice cube making chamber which has an opening at its front, a group of cube trays mountable alongside each other in said cube chamber and containing shield means at the front thereof which contact each other and fully close said front opening, and door means optionally usable for closing a part of said front opening where some of the trays have been omitted.

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