Aug. 15, 1933. E. L. POWELL 1,922,456

REFRIGERATOR

Filed March 16, 1933 2 Sheets-Sheet 1

Fig. 1.

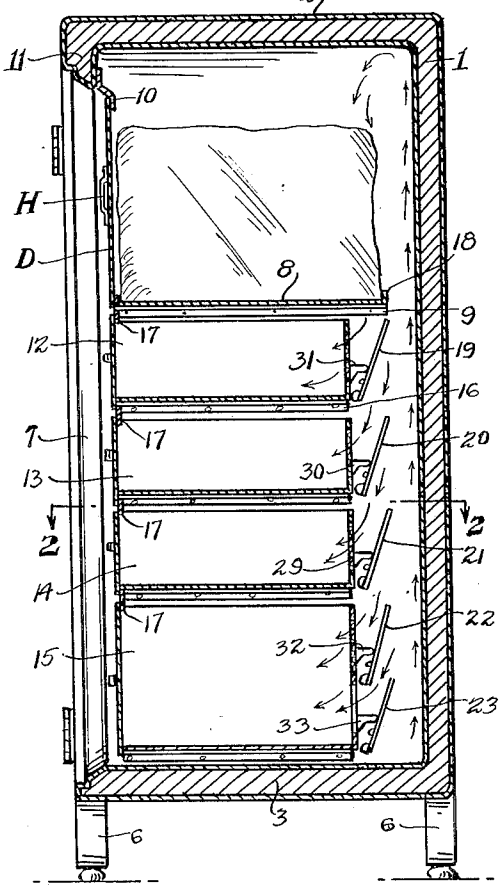


Fig. 3.

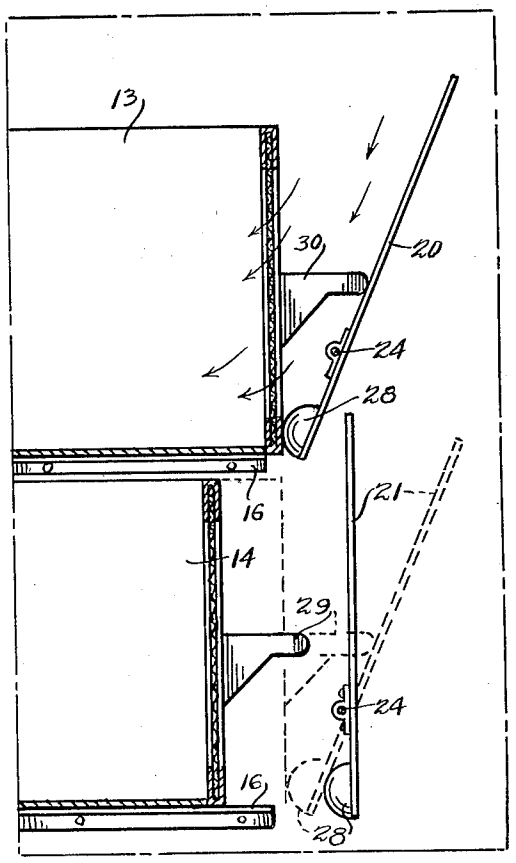


Fig. 2.

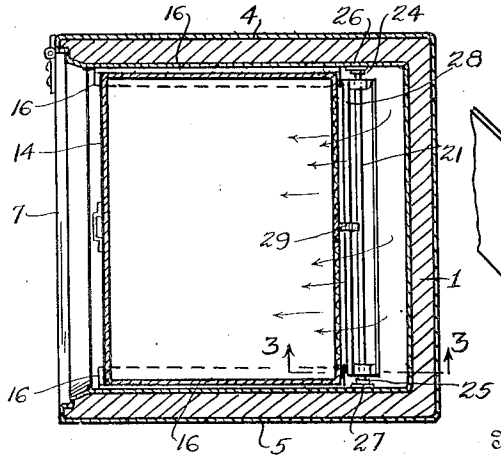
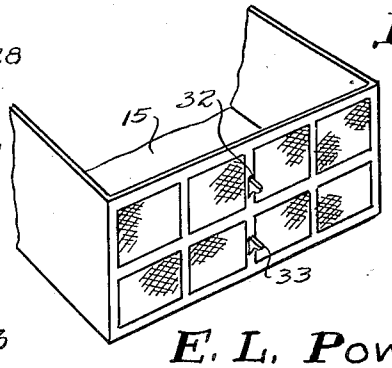


Fig. 4.



Inventor

E. L. POWELL

By Mason Fenwick & Lawrence

Attorneys

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Fig.5.

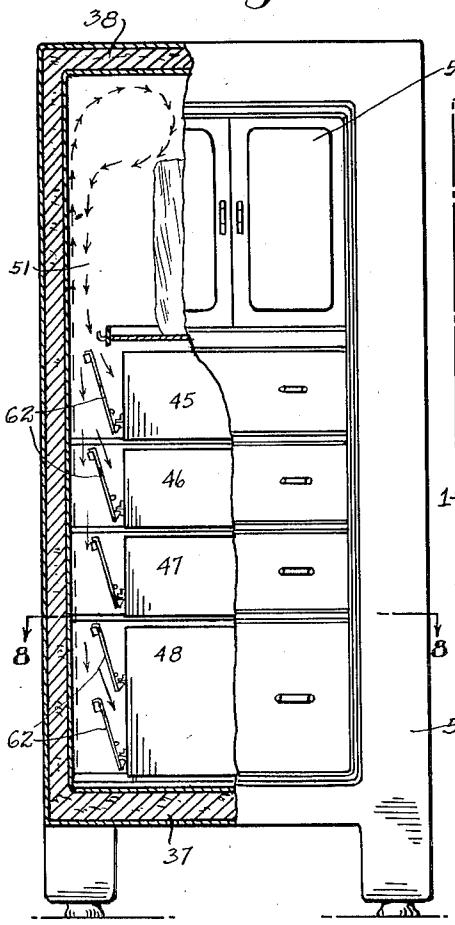


Fig.6.

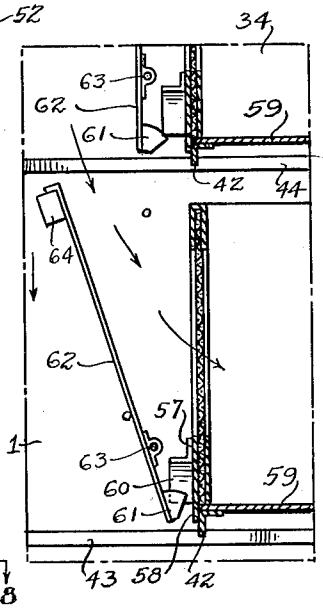


Fig.7.

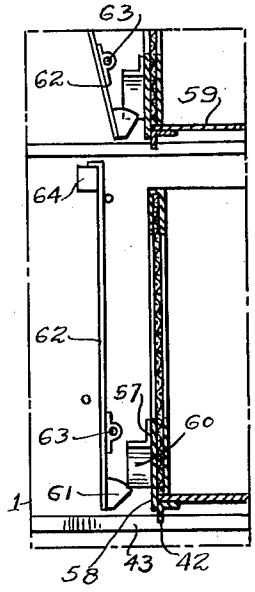


Fig.9.

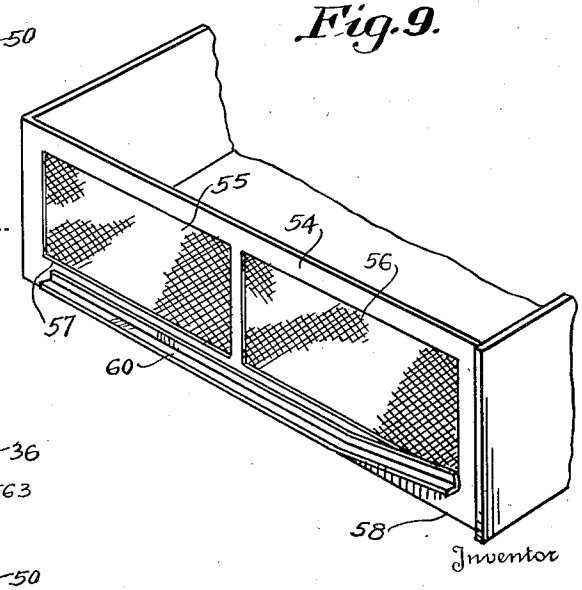
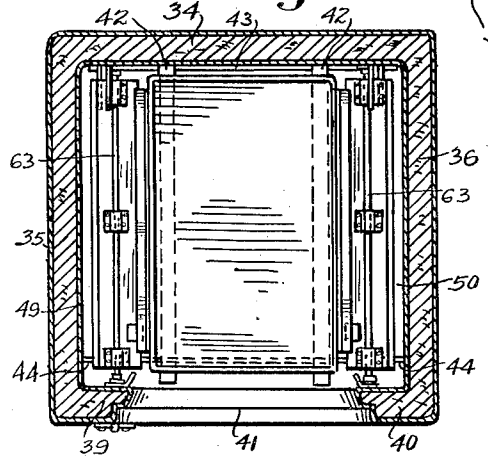


Fig.8.



Inventor

E. L. POWELL

By Mason Fenwick & Lawrence

Attorneys

Patented Aug. 15, 1933

1,922,456

UNITED STATES PATENT OFFICE

1,922,456

REFRIGERATOR

Edwin L. Powell, New Orleans, La.

Application March 16, 1933. Serial No. 661,158

10 Claims. (Cl. 62—66)

This invention relates to refrigerating apparatus in general, and is particularly adaptable for use in household refrigerators, whether using ice, or generating low temperatures by the use of mechanical refrigerating apparatus operated by steam, electricity or gas.

The main object of the invention is to provide a refrigerating cabinet having a cold air reservoir surrounding a plurality of food receiving drawers, the reservoir being provided with louvers or doors establishing communication between the cold air reservoir and the drawers, individually, only when the drawers are in closed position in the cabinet, and preventing the outlet of cold air from the reservoir when the drawers are opened.

Another object of the invention is to provide a refrigerating cabinet, or casing, with a reservoir having doors or louvers normally closed but adapted to be opened automatically by moving a drawer into closed position within the cabinet. In refrigerators of the old type, the cold air contained in the refrigerator is to a large extent lost every time the refrigerator door is opened. This loss of cold air is prevented by the system disclosed in the present application.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawings:

Figure 1 is a central vertical section through a refrigerator embodying one form of the present invention;

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary section to an enlarged scale illustrating adjacent superimposed drawers and reservoir doors in different operative positions;

Figure 4 is a fragmentary perspective view of an end of one of the drawers used in the form shown in Figures 1, 2 and 3;

Figure 5 is a front elevation of another form of the invention, parts being broken away and shown in section to illustrate details of construction;

Figure 6 is a fragmentary transverse section illustrating parts of two adjacent superimposed drawers in different operative positions;

Figure 7 is a view similar to Figure 6, but showing the drawers of Figure 6 in reversed position;

Figure 8 is a horizontal transverse section taken on the line 8—8 of Figure 5; and

Figure 9 is a perspective view of one of the drawers used in the form of the invention illustrated in Figure 5.

As shown in Figures 1 to 4 of the drawings, the invention comprises a casing or cabinet of usual refrigerator construction comprising a rear wall 1, a top 2, a bottom 3, and side and end walls 4 and 5 supported by feet 6. The front of the casing is shaped to form a door frame adapted to receive a door 7 hinged at one of its edges to the sidewall 4. There is nothing novel in the casing and door arrangement so far described.

In the present invention, the casing instead of being provided with the usual wire shelves is constructed so as to support slidably a series of superimposed drawers of various sizes in which the food stuff to be refrigerated is arranged. A horizontal partition 8, supported by angle irons suitably secured to the opposite sides 4 and 5 of the casing, is adapted to receive ice or other suitable refrigerant material. A door D, provided with a handle H is suitably hinged to one of the side walls of the casing; and is constructed so that its upper end makes air-tight contact with a strip 10, substantially Z-shaped in cross section and suitably secured to a flange 11 extending downwardly from the top 2 of the casing to form part of the door frame closed by door 7.

A series of drawers 12, 13, 14 and 15 are arranged below partition 10 to slide on pairs of angle iron runners 16 suitably secured to the opposite side walls 4 and 5 of the refrigerating casing. Strips 17 extend across the front ends of the runners 16 and are adapted to contact with the upper ends of the front of each of the drawers 12, 13, 14 and 15. The object of the strips 10 and 17 is to exclude air from outside of the refrigerator casing when the drawers 12, 13, 14 and 15 are closed.

None of the drawers extend into contact with the rear wall of the casing. The rear edge of partition 8 has a cross strip 18 secured thereto to hold the ice from sliding to and fro. It will be noted that the partition 8 supports the ice clear of the top of the refrigerator casing and of the back of the same in order to form a cold air duct or reservoir. Each of the drawers 12, 13, 14 and 15 has its back perforated or formed of wire screening so that the air from the cold air reservoir may have ready access to the food stuff placed within the drawer. The length of the drawers are such that when the drawers are closed, the perforated backs are at a def-

inite distance from the rear wall 1, providing the circulation space to permit the cold air from the cold air reservoir to circulate in the drawers.

In order to prevent the escape of cold air from the cold air reservoir when any of the drawers 12, 13, 14 and 15 are opened, the casing is provided with a series of louvers or doors 19, 20, 21, 22 and 23. The louver 21 is pivoted between the side walls 4 and 5 by means of trunnions 24 and 25 pivoted in bearing brackets 26 and 27 suitably secured in the aforesaid side walls. The lower edge of the louver 21 is provided with a weight 28 which normally holds the louver 21 in vertical closed position.

The drawer 14 is provided at its rear end with a projecting ram 29 adapted to contact with the louver 21 above the axis of its trunnions 24 and 25 to force the louver into such inclined position as to direct the cold air from the reservoir into the drawer 14 through the perforated back. All the other louvers are similarly pivoted between the side walls of the refrigerator cabinet. The drawer 13 above the drawer 14 is provided with a lug 30 for operating the louver 20 in the same manner as the lug 29 operates the louver 21. So also the drawer 12 is provided with a lug 31 for operating the louver 19. The deeper drawers, such as the drawer 15, may be provided with two lugs 32 and 33 to operate simultaneously the louvers 22 and 23 giving access to the cold air reservoir at the back of the refrigerator casing. It will be understood, of course, that the louvers at the back of the drawers will be so dimensioned and mounted that when any of the drawers are open the respective louvers will be closed to form a false rear wall to prevent the escape of cold air from the reservoir or duct at the back of the refrigerator.

In the form of the invention illustrated in Figures 1 to 4, the louvers are weighted at their lower edges so as normally to stand in vertical closed position and thereby form a front wall for the cold air reservoir. In this case, the reservoir is constructed by a chamber extending along the back of the reservoir cabinet from bottom to top and including all of the space in the ice chamber not occupied by the ice.

In the form of the invention illustrated in Figures 5 to 9, the cold air reservoir is formed by two chambers extending along the opposite side walls and across the top of the casing from one side wall to the other over the ice chamber, and at the bottom through the space between drawer 48 and bottom wall 37, as is clearly shown in Figure 5. In this form of the invention, the shape of the casing is somewhat different from that illustrated in Figure 1. This is necessitated by the fact that the reservoir is formed by chambers at each side of the casing.

As shown in Figures 5 and 8, the refrigerator casing comprises a back wall 34, side walls 35 and 36, a bottom 37 and a top 38. The side walls 35 and 36 are projected inwardly toward each other to form vertical flanges 39 and 40. A door 41 is hinged to the flange 39 to form a closure for the refrigerator casing.

A plurality of angle iron runners 42 are secured in pairs parallel to the side walls 35 and 36 between the rear wall 34 and the flanges 39 and 40. The rear ends of the angle irons 42 are supported on strips 44 secured to the inside of the back wall 34 of the casing. The front ends of the angle iron 42 are supported by strips 44 extending across the casing and having their ends suitably secured to the side walls 35 and 36. Drawers 45, 46, 47 and 48 are slidably mounted on the pairs of angle iron runners 42 substantially as shown in Figure 5 of the drawings. The runners 42 are spaced inwardly toward each other from the side walls 35 and 36 to form air ducts 49 and 50 which extend from the bottom to the top of the refrigerator casing to meet the cold air chamber 51, which forms, with the ducts 49 and 50, a cold air reservoir. As shown in the drawings, ice is supplied to this chamber 51 through double doors 52 which doors also act as an air seal when closed.

It will be understood that the top edges of the doors 52 will make closing contact with a strip extending across the door frame similar to the strip 10 shown in Figure 1. Each drawer has its opposite sides formed as a frame 54 having perforated panels 55 and 56. The lower rail 57 of the side of each drawer has its lower edge 58 extending downwardly below the drawer bottom 59 so as to form with said bottom a recess adapted to receive the corner of the angle iron runner 42. This construction is shown in Figures 6 and 7 of the drawings. Each lower rail 57 has a cam rail 60 suitably secured to the side thereof. This cam rail is in the shape of an angle iron, the greater part of which extends parallel to the bottom 59 of the drawer. The forward end of the cam rail 60 is curved or inclined upwardly from the bottom of the drawer and toward the drawer front, and is designed to make sliding contact with a lug 61 suitably secured to the bottom of a door or louver 62.

The door or louver 62 is pivoted near its lower edge on a rod 63 extending from the inner face of the flange 39 to the inner face of the rear wall 34 of the casing. The upper edge of the louver 62 is provided with a weight 64 which overbalances the part of the louver on the other side of the pivot rod 63, so that normally the louver hangs in open position, as shown in the lower part of Figure 6 of the drawings. The cam rail 60 is shaped so that when the drawer is fully closed in the refrigerator cabinet, the louver 62 will hang in open position to direct cold air from the ice chamber downwardly and laterally through the screen panels 55 and 56 into the food compartment formed by the drawer. When the drawer is pulled out from closed position, the upwardly inclined forward end of the cam rail 60 rides on the projection 61 and swings the louver 62 into a closed vertical position shown in the lower part of Figure 7 of the drawings. This vertical position is arrived at just as soon as the drawer reaches such position that the portion parallel to the bottom of the drawer contacts with the projection 61. The operation of this louver closing mechanism will be apparent from inspection of Figures 6 and 7 of the drawings.

It will be understood that the louvers will be so dimensioned and arranged in the cabinet that when all of the drawers are closed each of the louvers will lie in the position shown at the left hand side of Figure 5 of the drawings. When any of the drawers is drawn to open position, the louver immediately at the sides of that particular drawer will be drawn to closed position so as to prevent leakage of the cold air from the air duct into the space formerly occupied by the drawer.

The invention is not particularly concerned with the skeleton structures by which the drawer and louvers are supported, as this construction

may be readily designed by anyone skilled in the art. The broad inventive idea resides in the provision of a refrigerator cabinet with cold air reservoir normally in communication with the food containing drawers or compartments when they are closed and either individually or collectively cut out of communication from the cold air reservoir by means of louvers, doors or shutters, which may be closed either by means of each or any drawer or each or any compartment front being opened. The opening or closing of the louvers, doors or shutters may either be automatic as expressed above or by a manually operated control of the louvers, doors or shutters. Also they may be automatically opened or closed by operation of the main door of the refrigerator.

It will be obvious that this principle can be applied to a refrigerator of any type whether the low temperature be provided by ice or brine, or by any kind of mechanically or electrically operated refrigerator mechanism, or by gas. The invention is not concerned with any particular means for producing low temperatures, the ice chamber shown and described in this application being illustrated merely to explain the principle of the invention.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of my invention, or sacrificing any of its attendant advantages; the form herein described being a preferred embodiment for the purpose of illustrating my invention.

What I claim is:

1. A refrigerator cabinet having top, bottom, side and rear walls, a partition having a section pivoted in said cabinet, and providing with said walls a cold air reservoir, a drawer having a wall thereof apertured, means in said cabinet supporting said drawer to slide into and out of the cabinet, and means on said drawer for moving said section to connect the interior of the drawer through the apertured wall thereof with said reservoir.

2. A refrigerator cabinet having top, bottom, side and rear walls, a partition having a section pivoted in said cabinet, and providing with said walls a cold air reservoir, said section being weighted at its lower edge to be maintained in normally vertical position, a drawer having a wall thereof apertured, means in said cabinet supporting said drawer to slide into and out of the cabinet, and means on said drawer for swinging a section of said partition about its pivot to connect the interior of the drawer through the apertured wall thereof with said reservoir.

3. A refrigerator cabinet having top, bottom, side and end walls, a partition having sections pivoted in said cabinet to form with said walls a cold air reservoir, each of said sections being weighted at its lower edge to be maintained in normally vertical position and to form with the other sections a wall of said reservoir, drawers, each having one wall thereof apertured, means for slidably supporting said drawers to slide into and out of the cabinet, and means on each of said drawers for swinging one of said sections to connect the interior of the drawer through the apertured wall thereof with said reservoir.

4. A refrigerator cabinet having top, bottom, side and rear walls, a partition in said cabinet spaced apart from one wall thereof to form a cold air reservoir, and comprising a plurality of independently pivoted sections, a drawer supporting structure mounted in said cabinet, drawers mounted on said structure to slide into and out of said cabinet, each drawer having an apertured wall, and cooperating means on said drawers and sections for moving said sections to prebent escape of cold air from the reservoir when the drawers are open and to establish communication between said reservoir and drawers through their apertured walls when the drawers are in closed position.

5. A refrigerator cabinet having bottom, top, side and rear walls, a partition in said cabinet spaced apart from one wall thereof to form a cold air reservoir and comprising a plurality of independently pivoted sections, means for normally holding said sections aligned in substantially the same vertical plane, a drawer supporting structure in said cabinet, drawers mounted on said structure to slide into and out of said cabinet, each of said drawers having an apertured end wall, and means on each of said end walls for moving said sections to establish communication between said reservoir and drawers through their apertured end walls when the drawers are in closed position.

6. A refrigerator cabinet having top, bottom, side and rear walls, partitions in said cabinet spaced apart from and parallel to the side walls to form cold air reservoirs, each partition comprising a plurality of independently pivoted sections arranged to lie in the same plane when each section is in substantially vertical position, means for normally holding each of said sections inclined to the vertical plane, a drawer supporting structure in said cabinet, drawers mounted on said structure to slide into and out of said cabinet, each of said drawers having an apertured wall adjacent one of said partitions, and cooperative means on the apertured walls of said drawers and sections for moving said sections into substantial alignment with each other to prevent escape of cold air from the reservoir when the drawers are open and to establish communication between said reservoir and drawers through their apertured walls when the drawers are in closed position.

7. A refrigerator cabinet having top, bottom, side and rear walls, a partition in said cabinet spaced apart from and parallel to the side walls to form a cold air reservoir, said partition comprising a plurality of independently pivoted sections arranged to lie in the same plane when each section is in substantially vertical position, a drawer supporting structure in said cabinet drawers mounted on said structure to slide into and out of said cabinet, each of said drawers having an apertured wall adjacent said partition, and cooperative means on said sections and the apertured end walls of said drawers to effect movement of said sections into substantial alignment with each other to prevent escape of cold air from the reservoir when the drawers are opened and to establish communication between said reservoir and drawers through their apertured walls when the drawers are in closed position.

8. A refrigerator cabinet having top, bottom, side and rear walls, a partition parallel to and spaced apart from one of said walls to form a cold air reservoir, said partition comprising sections movable into closed position to prevent

leakage of cold air from said reservoir and into open position to permit the flow of cold air from said reservoir, a drawer supporting structure in said cabinet, drawers slidable on said structure into and out of said cabinet, each of said drawers having an apertured wall, said drawers and sections being constructed and arranged to effect movement of the sections into closed position when the drawers are open and to effect movement of the sections into open position to direct cold air from said reservoir into the drawers through the apertured walls thereof when the drawers are closed.

9. A refrigerator cabinet having top, bottom, side and rear walls, partitions parallel to and spaced apart from said side walls to form a cold air reservoir, each of said partitions comprising sections movable into closed position to prevent leakage of cold air from said reservoir and into open position to direct the flow of cold air from said reservoir, a drawer supporting structure between said partitions in said cabinet, drawers slidable on said structure into and out of said cabinet, each of said drawers having an apertured wall, said drawers and sections being constructed and arranged to effect movement of the sections into closed position when the drawers are open and to effect movement of the sections into open position to direct cold air from said reservoir into the drawers through the apertured walls thereof when the drawers are closed.

10. A refrigerator cabinet having a partition spaced apart from a wall of the cabinet to form a cold air reservoir, said partition having a section movable to closed position to prevent leakage of cold air from said reservoir and to open position to direct cold air from said reservoir, a drawer slidable in said cabinet, and cooperating means on said drawer and section to move the section to open position when the drawer is closed and to closed position when the drawer is open.

EDWIN L. POWELL.