

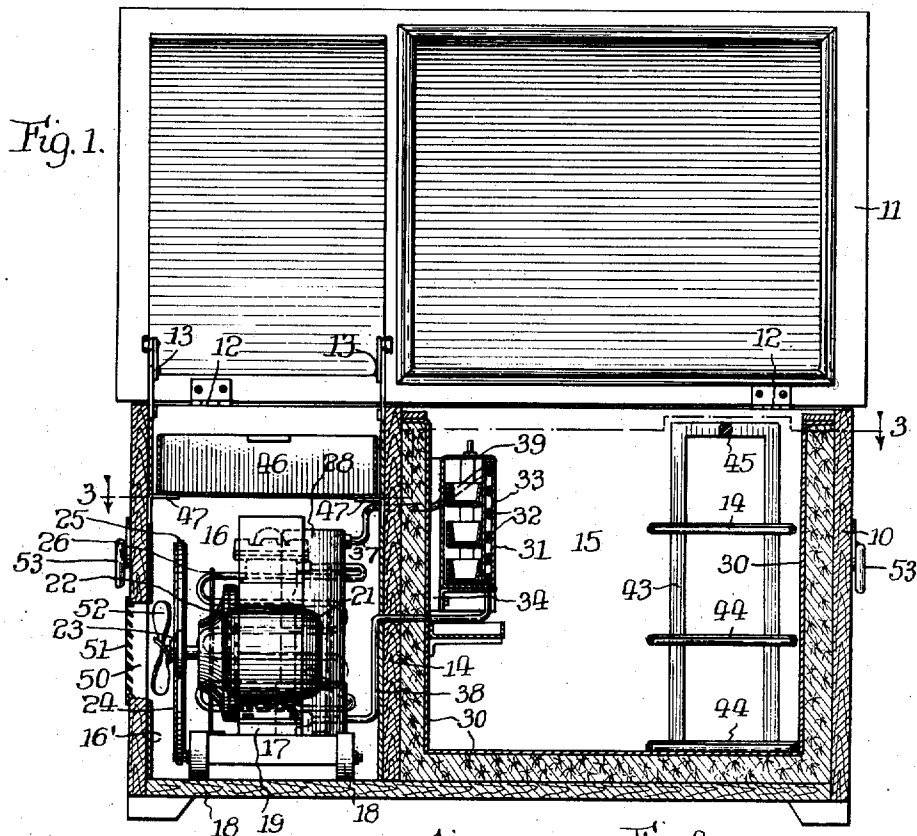
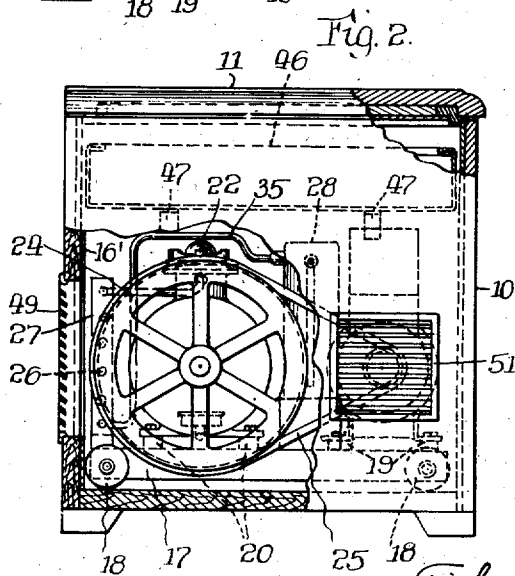
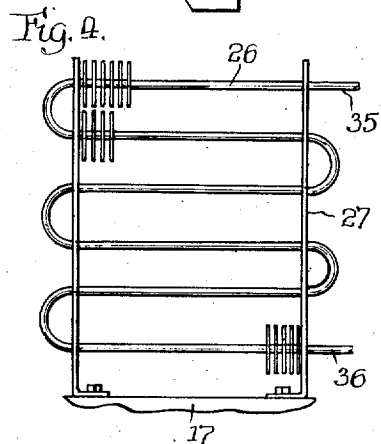
Jan. 28, 1936.

S. A. LIMPERT
PORTABLE REFRIGERATOR

2,029,175

Filed Dec. 4, 1933

3 Sheets-Sheet 1



Inventor:
Sylvester A. Limpert,

By Fisher, Clapp, Sousa & Pond Attys.

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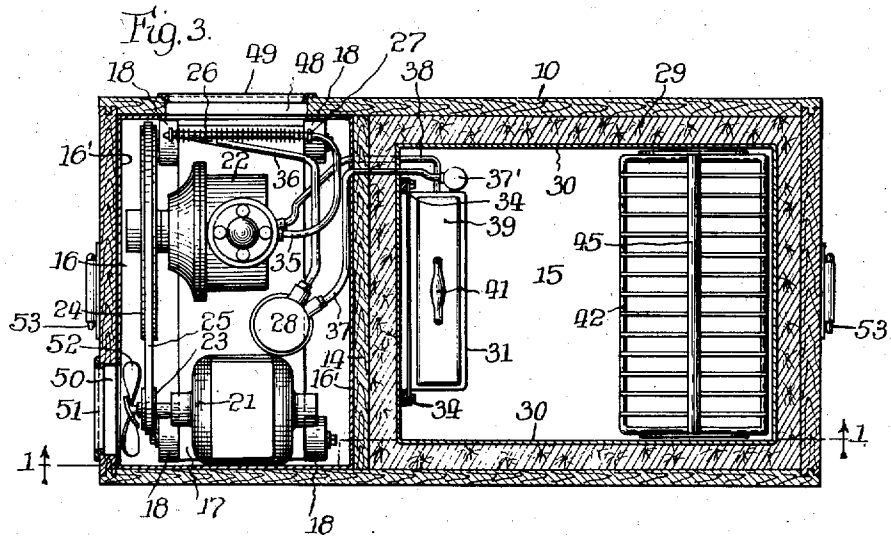
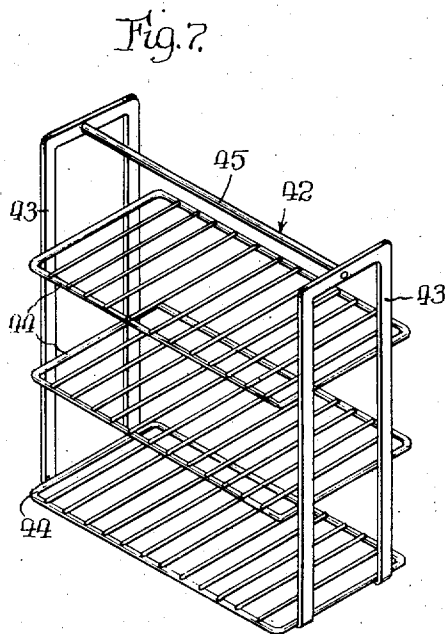
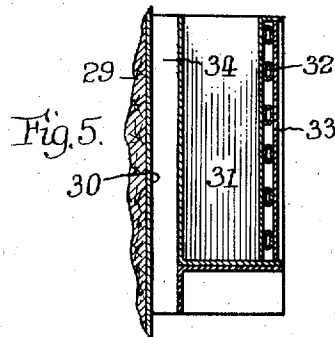
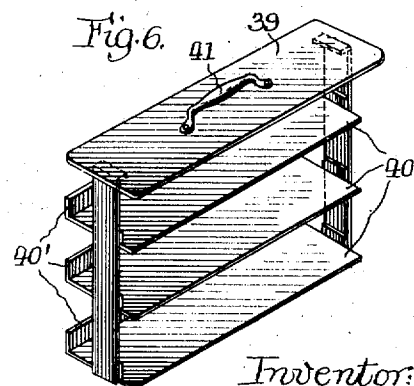
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3 Sheets-Sheet 2



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 By Fisher, Clapp, Soans & Pond, Attys.

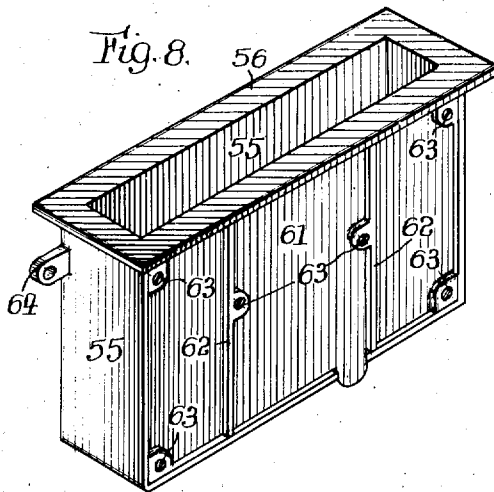
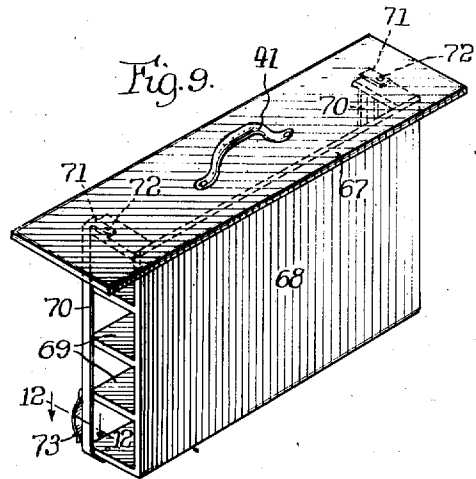
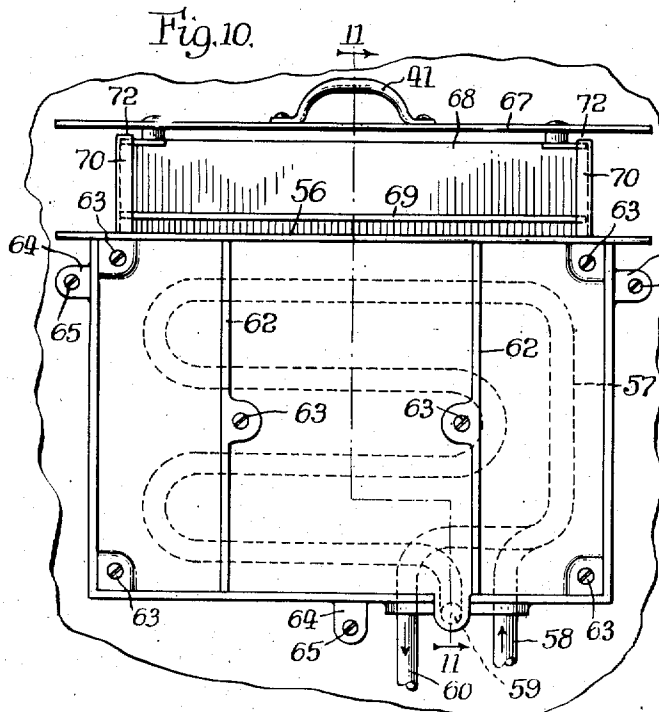
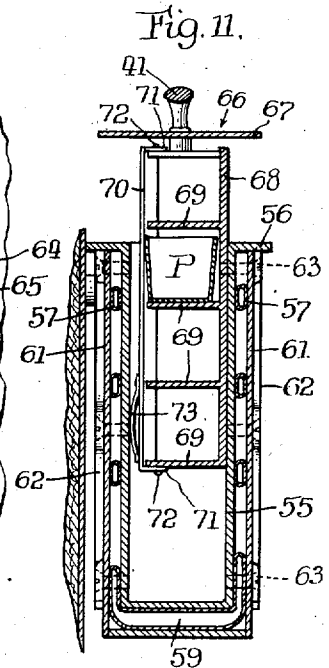
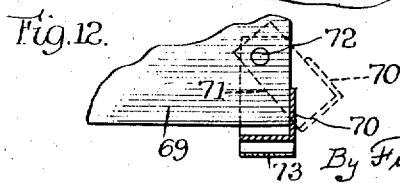
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S. A. LIMPERT
PORTABLE REFRIGERATOR

2,029,175

Filed Dec. 4, 1933

3 Sheets-Sheet 3



Inventor:
Sylvester A. Limpert
By Fisher, Clepp, Soans & Pond, Attys.

UNITED STATES PATENT OFFICE

2,029,175

PORTABLE REFRIGERATOR

Sylvester A. Limpert, Bay Shore, N. Y., assignor
to Mechana Kold Corporation, Bay Shore, N. Y.,
a corporation of New York

Application December 4, 1933, Serial No. 700,789

9 Claims. (Cl. 62—116)

This invention pertains to the art of refrigeration, and relates more specifically to that type of self-contained portable refrigerators that comprises a box or cabinet containing a freezing coil, a machine for compressing, condensing and circulating through the freezing coil a refrigerating agent, a cellular water holder for making ice cubes, and space for the reception of bottled beverages and articles of food to be kept at a low temperature.

Domestic refrigerators of this type have hitherto taken the form of a relatively tall and narrow cabinet provided with a vertically hinged front door, a horizontally slidable tray for the ice cubes within or adjacent to the freezing coil, and shelves for the articles of food and drink; the compressing and condensing equipment being housed in a bottom compartment of the cabinet and no particular attention being paid to external appearance of the unit, since it is regarded more as a machine performing a useful food preserving function than as an article of furniture and is usually located in the kitchen or on a back porch or vestibule.

The article of the present invention has been designed more particularly for use in apartment hotels, small apartments, and the like, where the living space is very limited, and one object has been to provide a domestic refrigerator in the form of a neat and attractive article of furniture that may be located in the living or dining room and will have the appearance in effect of a chest that, with or without cushions, may serve as a seat, its mechanical character and function as a refrigerator being effectively concealed, except when it is open.

Another object had in view in the design of the present invention has been to provide a portable domestic refrigerator of very compact form so as to occupy but small space in the living quarters of the user, to design a construction and arrangement of freezing unit and food holders that will allow easy access to and replacement of the ice cubes, and the articles of food and drink, to provide a construction that will conserve the cold air when the refrigerator is opened, and to provide a construction that will practically eliminate all noise and vibration when the ice making equipment is in operation.

Still other objects and attendant advantages of the invention will be apparent to persons familiar with this class of refrigerator from the following detailed description, taken in connection with the accompanying drawings in which

I have illustrated one practical and approved embodiment of the invention and wherein—

Fig. 1 is a vertical section of the refrigerator chest on the line 1—1 of Fig. 3, with the lid or cover raised.

Fig. 2 is an end elevation viewed from the left of Figs. 1 and 3 and showing the lid closed, with a portion of the end wall broken out.

Fig. 3 is a horizontal section on the offset line 3—3 of Fig. 1.

Fig. 4 is a detail view of the refrigerant condenser.

Fig. 5 is an enlarged vertical section through the freezing unit.

Fig. 6 is a perspective view of a vertically insertible and removable ice cube tray fitting within the freezing unit of Fig. 5.

Fig. 7 is a perspective view of a vertically insertible and removable food tray.

Figs. 8 to 12, inclusive, illustrate an improved form of freezing unit; Fig. 8 being a perspective view of the casing; Fig. 9 being a perspective view of the removable tray; Fig. 10 being a side elevation of the unit showing the tray partly withdrawn; Fig. 11 being a vertical section on the line 11—11 of Fig. 10; and Fig. 12 being a fragmentary horizontal section on the line 12—12 of Fig. 9, enlarged.

Referring now to the drawings for a detail description of the article, 10 designates as an entirety a rectangular box or chest, the walls of which are preferably made of wood both for its heat insulating quality and its capacity to receive an ornamental exterior finish. 11 designates as an entirety a lid or cover hinged to one longitudinal side wall of the tray body, as shown at 12 in Fig. 1, and equipped with the usual folding braces 13 to support it in open position.

Extending across the interior space of the chest body 10 is a partition wall 14 also preferably of wood, dividing the space into relatively large and small compartments 15 and 16 respectively. In the bottom of the small compartment 16 is placed a platform 17 that is supported on the bottom wall of the chest by cushion mountings preferably taking the form of rubber or other resilient wheels 18. Resting on the platform 17 are rubber pads 19 and 20, on the former of which is mounted an electric motor designated as an entirety by 21, and on the latter of which is mounted a gas compressor designated as an entirety by 22. As best shown in Fig. 3, the motor 21 drives the compressor 22 by a small pulley 23 fast on the armature shaft of the motor, a large

pulley 24 fast on the compressor shaft, and a drive belt 25.

Directly behind the compressor 22 is a condenser coil 26 supported in a suitable rack 27, also mounted on the platform 17, and between the motor and compressor is similarly mounted a refrigerant tank 28.

Referring to Fig. 3, the walls of the larger compartment 15, including its lid or cover, are lined, first with a relatively thick body of insulation, such as wood fiber, felt, cork, or the like, indicated at 29, and this latter is covered with a water-tight metal lining 30 that, in the case of the body, may form a sweet water tank for the immersion of bottled beverages for rapid cooling. The walls of the smaller compartment 16 are preferably lined with sound deadening material 16' such as insulite or celotex. On the partition wall 14 within the compartment 15 is mounted the freezing unit 31, one side wall of which is overlaid by a freezing coil 32, the turns of which are flattened and held in place by a plate 33. A convenient means of mounting the freezing unit which permits circulation of air over both sides thereof, consists of a pair of bars 34 extending vertically along the outer side of the unit and bolted to the lining 30 on the wall 14.

The discharge from the compressor 22 leads through a pipe 35 into the upper end of the condenser coil 26, and from the lower end of the latter the refrigerant flows through pipe 36 into the bottom of the refrigerant tank 28. From the latter the refrigerant flows through pipe 37 and expansion valve 37' into the upper end of the freezing coil 32, in which latter it expands. From the lower end of the freezing coil 32, the gas returns by pipe 38, equipped with the usual thermostat bulb and switch (not shown) to the intake side of the compressor 22.

Vertically slidable within the casing of the freezing unit 31 is a tray 39 equipped with a plurality of shelves 40 each adapted to receive and support a cellular pan to hold the water that is frozen into ice cubes. This tray 39 is equipped with a top handle 41 by which it may be readily inserted and withdrawn, and the shelves 40 are formed on their rear sides with back stops 40' limiting the inward sliding movement of the ice cube holders.

42 designates as an entirety a food tray comprising, as shown in Fig. 7, vertical end frames 43, a plurality of wire shelves 44, and a handle 45, this food tray being designed to fit neatly between opposite side walls of the larger compartment 15, preferably in the position shown in Fig. 3. Both the freezing unit 31 and the food tray 42 are relatively deep and narrow, so that ample space between the two is left for the insertion of bottled beverages or other articles too large to be carried by the food tray.

Referring to Fig. 1, the refrigerating capacity of the chest is further increased by shortening the vertical dimensions of the compressor and motor sufficiently to permit of the insertion of a pan 46 supported on brackets 47, said pan being well adapted to support small articles and leave the basket or tray 42 for the reception of larger articles. This also provides a dead air space at the top of the machine compartment that prevents the flow of heat from the machine compartment to the lid, the latter often serving as a seat.

The cooling of the condenser coil 26 is, in the equipment illustrated, effected by forming in the rear side wall of the chest, directly behind the

condenser, an opening 48, preferably covered by a grill 49, and forming in the end wall of the chest, directly opposite the motor 21, a similar opening 50 covered by a grill 51, and equipping the armature shaft of the motor with a propeller fan 52, which latter maintains a continuous flow of outside air across the condenser, and over the compressor, refrigerant tank and motor, the air being discharged into the room through the grill 51. This not only air cools the condenser, but it also abstracts the heat of compression and the internal heat generated by the motor, thereby to that extent enhancing the efficiency of the freezing unit. The ends of the cabinet are equipped with handles 53 to facilitate portability.

In Figs. 8 to 12, inclusive, I have illustrated a somewhat more efficient form of freezing unit than that shown in Figs. 5 and 6 and, like the latter, well designed to serve a refrigerator of this type wherein the access to the interior is through the open top of the refrigerator casing. The casing of this improved freezing unit comprises a relatively long and narrow box 55 preferably formed on its upper edge with a flange 56. Both side walls of the box 55 are overlaid by freezing coils 57 preferably of the flattened or oval type shown in Fig. 11. One of these coils is served by an inflow pipe 58, and the other coil is served by a cross-over pipe 59 (Fig. 11) extending across the bottom wall of the box 55 and communicating with said other freezing coil, this latter communicating at its other end with a discharge pipe 60. The two freezing coils are covered by detachable side plates 61 preferably equipped with stiffening ribs 62 and secured to the box 55 as by screws 63; the box itself being provided with lateral lugs 64, by which it may be attached to vertical strips on a side wall of the chamber 15 as by screws 65. The tray 66 is generally similar to that previously described and shown in Fig. 6, but is preferably a one-piece open front frame formed with a side wall 68 and shelves 69. To lock the pans in place on the tray when inserting or withdrawing the latter, I equip the two vertical corners on the open side or front of the latter with shiftable guards, preferably in the form of pivoted angle strips 70; one limb of the angle strip having top and bottom bent portions 71 overlapping the top and bottom horizontal members of the tray and pivoted thereto at 72. Fig. 11 and Fig. 12 (in full lines) show the locking position of the guard strip, confining the pan P both sidewise and endwise on its shelf. When the pan is to be inserted or withdrawn, the guard strips are simply swung to the dotted line position shown in Fig. 12. To insure a close contact of the rear wall 68 of the tray with the adjacent wall of the box 55 for good heat exchange, the strips 70 are preferably equipped with bow springs 73 that engage with the opposite wall of the box 55 in the manner clearly shown in Fig. 11. The tray is equipped with a lid or cover 67 normally resting on the casing flange 56, and with a handle 41.

The last described structure of freezing unit provides for the efficient cooling or freezing of the contents of the tray on both sides of the latter, and the improved construction of the tray permits the latter, when loaded, to be inserted and withdrawn easily and without any danger of spilling the contents.

From the foregoing it will be seen that the described article affords a very simple, convenient, compact, and easily portable refrigerator, the

contents of which can be easily gotten at by merely raising the lid 11; and at the same time when the lid is closed, the article has the appearance of a simple piece of furniture in the nature of a chest which can also be utilized as a seat. The insulation of the compressor and motor, and the lining of the walls of the machine chamber, effectually absorb all noise and vibration, so that a visitor unacquainted with the real nature of the article would never suspect that the article was a mechanical ice box. The cabinet being opened from the top, prevents the cold air therein from falling out every time the cabinet is opened, which makes for greater economy.

I claim:

1. A portable refrigerator of the character described, comprising a chest having a top lid and a transverse partition dividing the body of the chest into two compartments, refrigerant circulating means mounted in one of said compartments, and a freezing unit mounted in the other compartment and pipe connected to said circulating means, said freezing unit comprising a relatively narrow and deep box open at its top, and an ice cube tray vertically insertible and removable through the open upper end of said box.

2. A portable refrigerator of the character described, comprising a chest having a top lid and a transverse partition dividing the body of the chest into relatively small and large compartments, refrigerant circulating means mounted in said small compartment, and a freezing unit mounted in said large compartment on said partition and pipe connected to said circulating means, said freezing unit comprising a relatively narrow and deep box open at its top and having the expansion coil in a wall thereof, and an ice cube tray vertically insertible and removable through the open upper end of said box.

3. A portable refrigerator of the character described, comprising a rectangular chest having a top lid and a transverse partition dividing the body of the chest into relatively small and large compartments, refrigerant circulating means mounted in said small compartment, a relatively narrow and deep freezing unit mounted in said large compartment on said partition and pipe connected to said circulating means, and a removable food tray in said large compartment fitting between the side walls of the latter.

4. A portable refrigerator of the character described, comprising a rectangular chest having

a top lid and a transverse partition dividing the body of the chest into relatively small and large compartments, refrigerant circulating means mounted in said small compartment, a relatively narrow and deep freezing unit mounted in said large compartment on said partition and pipe connected to said circulating means, and a removable food tray in said large compartment fitting between the side walls of the latter, the combined widths of said freezing unit and food tray being substantially less than the length of said large compartment.

5. A freezing unit for a refrigerator, comprising an open top casing equipped with refrigerant flow means in a wall thereof, a tray insertible and removable through the open top of said casing, and spring means pressing said tray against said casing wall.

6. A freezing unit for a refrigerator, comprising an open top casing having a refrigerating coil in a side wall thereof, a tray insertible and removable through the open top of said casing, and springs between the opposite side wall of said casing and the tray pressing the latter into contact with said first named side wall.

7. A freezing unit for a refrigerator, comprising an open top casing equipped with means for cooling the walls thereof, an open front tray having one or more shelves insertible and removable through the open top of said casing, and shiftable guards on the open front of said tray for preventing articles on the shelves from sliding off the latter.

8. A freezing unit for a refrigerator, comprising an open top casing equipped with means for cooling the walls thereof, an open front tray having one or more shelves insertible and removable through the open top of said casing, pivoted guard strips on the front corners of said tray for preventing articles on the shelves from sliding off the latter.

9. A freezing unit for a refrigerator, comprising an open top casing equipped with means for cooling the walls thereof, an open front tray having one or more shelves insertible and removable through the open top of said casing, provided guard strips on the front corners of said tray for preventing articles on the shelves from sliding off the latter, and springs on said guard strips in sliding contact with the opposed wall of said casing.

SYLVESTER A. LIMPert.

CERTIFICATE OF CORRECTION.

Patent No. 2,029,175.

January 28, 1936.

SYLVESTER A. LIMPert.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 46, claim 9, for "provided" read pivoted; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of February, A. D. 1936.

Leslie Frazer

Acting Commissioner of Patents.

(Seal)

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