

UNITED STATES PATENT OFFICE

2,002,305

REFRIGERATOR

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Application April 29, 1931, Serial No. 533,693

3 Claims. (Cl. 62—37.3)

The object of my invention is to produce a display-counter refrigerator for the efficient cooling of foods, particularly meats, by means of water ice, under such conditions that said foods are readily accessible to the dispenser, and fully visible to the purchaser, the construction being such that the ice-receiving chamber may be readily and quickly charged by the ice-dispenser without great inconvenience to the food dispenser and without inconvenience to the food purchaser, and being also such that a single charge of ice will be effective for a much longer period than has heretofore been considered possible.

The accompanying drawing illustrates my invention.

Fig. 1 is a fragmentary vertical section of an embodiment of my invention, and

Fig. 2 a fragmentary vertical section in a plane at right angles to the plane of Fig. 1.

In the drawing 10 indicates a counter structure having an upper box portion comprising a bottom 11, a front wall 12 the upper edge of which is somewhat less than waist height of an average adult and the rear wall 13 of which is somewhat higher, say, about waist high. The bottom, front and rear walls are supplemented by end walls 14 which also form the end walls of the super-structure to be described.

The bottom, front, rear and side walls are lined with heavy insulation 15 within which the novel refrigerant element of my construction is nested. The refrigerant element comprises a water-tight pan composed of bottom 20, end walls 21, front wall 22, rear wall 23, and an upwardly and rearwardly-inclined top wall 24 of high heat conductivity, conveniently a metal plate secured to the end walls 21 and the front wall 22, and provided at its rear with an upturned portion 24' conveniently parallel with, but spaced from, the upper part of the rear wall 23, the arrangement being such as to produce a water-tight refrigerant-container substantially L-shaped in vertical section, the longer arm being horizontal and the upper portion of the vertical arm forming an ice-receiving hopper 25 of substantial vertical extent above the highest portion of the inclined plate 24.

Projected upwardly through bottom 20 to a point slightly above the highest point of the main portion of plate 24 is a drainage tube 26 the top of which is covered by an air-trap cap 27 so formed as to prevent the entry of ice into the tube but to permit free flow of water thereinto in such manner as to automatically maintain a water level in the refrigerant-receiving chamber

at or slightly above the junction between plate 24 and its vertical extension 24'.

The hopper 25 is closed by a door 30 hinged at 31 and having a suitably heat-insulated under surface, said door, when in normal position, serving as a service counter.

The food receptacle formed by the top plate 24—24' is conveniently covered by a heat-insulating super-structure the front wall 32 of which is upwardly and rearwardly inclined starting at a point very close to the level of the lowest part of plate 24 and this wall conveniently comprises, in a well-known manner, air-spaced heat-insulating glass plates 33, 33.

The rear wall of the super-structure is upwardly and forwardly inclined, starting at the top of the upward extension 24' of plate 24 and is conveniently formed of overlapping sliding doors 34, 34.

The plate 24, at its ends, extends slightly beyond the end walls 21, say, about an inch, and the heat insulation is carried under the bottoms of these extended portions as shown in Fig. 2. The heat insulation at the ends of the super-structure is covered by finish plates 35 the lower edges of which are carried down past the ends of plate 24. This construction eliminates possibility of sweating on the plates 35.

The refrigerator is charged with comparatively small chunks of water ice 37, as indicated in the drawing, and a body of ice-cold water is maintained automatically by drainage tube 26, in contact with the entire width of plate 24 to a point at or slightly above the lowest part of the upward extension 24' and the hopper 25 contains a sufficient body of ice, above the later level, to keep portions of ice, practically until ice exhaustion, in direct contact with plate 24 because the ice in the hopper will prevent rearward movement of ice in the horizontal arm of the refrigerant container.

The direct contact of the refrigerant with the highly heat-conductive bottom of pan 18 serves to very efficiently extract heat from material placed on plate 24.

The door 30 extends for a major portion of the length of the counter and the width of the mouth of the hopper is such that the refrigerant-receiving chamber may be very quickly charged at a minimum of inconvenience to the food dispenser and with no inconvenience to purchasers. The charging takes place semi-occasionally and the chunks of ice may be very readily crowded downwardly and forwardly and packed very closely beneath plate 24, the body of water facilitating

the movement of the ice chunks to the front of the horizontal arm of the refrigerant-containing chamber and the surplus water passing outwardly through the drainage pipe 26.

5 The vertical wall 24' is kept at a low temperature by the ice which is in direct contact therewith and, as the front wall of the super-structure extends down close to the lowest edge of plate 24, there is a continual circulation of air
10 down along the wall 24', thence downwardly and forwardly across plate 24 and thence upwardly along the warmer wall 32. In practice I have found that, where meats are stored upon plate 24, condensation takes place in immobile drops
15 on wall 24' so that the air which sweeps across the meat does not deposit moisture thereon, yet is not sufficiently dry to rapidly extract moisture from the meat.

I have found in actual practice, over an extended test period, that the described arrangement is much more efficient than any other display counter refrigerator of which I have knowledge and that foods, especially fresh meats, are efficiently refrigerated without either material
25 moisture extraction or moisture condensation, so that meats placed in the structure are at all times attractive to purchasers and are kept at a temperature which prevents deterioration, either in quality or appearance, and with less water ice consumption, for much longer periods than has
30 heretofore been considered possible in water ice refrigerators.

It is highly desirable that a counter display refrigerator of a given dimension between the
35 food dispenser and the food purchaser shall have a relatively large food-display and refrigerating capacity, and that its construction be such that its refrigerant chamber may be very quickly charged by the ice dispenser. It is also desirable
40 that the effective refrigerating period of a maximum charge of refrigerant shall be relatively long so that the food dispenser will not too often be disturbed by the charging operation. The principal function of that portion of the ice
45 charge which lies in the vertical arm of the L-shaped refrigerant chamber is to retain as large a body of ice as possible at all times in the horizontal arm of the L-shaped refrigerant chamber and therefore the front to back dimension of this
50 vertical arm need not be very great. In order therefore to facilitate the charging of the refrigerant chamber the insulation 15, at the top of the rear wall 13 is tapered upwardly and rearwardly and the upper edge of wall 23 is correspondingly flared outwardly and rearwardly, as
55 indicated at 15', thereby widening the mouth of the hopper 25 and making it possible to quickly

charge the refrigerant chamber with ice lumps brought to it conveniently in a bucket or scuttle. The insulation 30 extends down into the mouth of the hopper, as shown, so that the reduction of wall insulation at 15' does not materially decrease
5 the insulating efficiency of the structure.

I claim as my invention:

1. In a refrigerator a water-tight refrigerant container substantially L-shaped in vertical section having a horizontally-extended article supporting top of high heat conductivity upwardly inclined toward the vertical arm of said container and supplemented by a vertical extension forming one side of the vertical arm of said container, and the ends of the inclined top wall projecting
15 beyond the end walls of said container, heat insulation imbedding the bottom, sides and ends of said container and the projected ends of the top plate, and a drainage passage leading from said container approximately at the level of the junction
20 between the inclined top wall and its vertical extension, the vertical arm of the container extending substantially above the level of the drainage outlet.

2. In a refrigerator, a water-tight refrigerant
25 container substantially L-shaped in vertical section and having a horizontally-extended article-supporting top wall of high heat conductivity, the ends of which extend beyond the side walls of the container, heat insulation imbedding the bottom, sides, ends and projected portions of the top
30 wall of said container, a drainage passage leading from said container at or above the level of said top wall, the vertical arm of the container extending substantially above the level of the drainage
35 outlet, and a heat-insulating super-structure enclosing the space above said top plate.

3. In a refrigerator a water tight refrigerant container substantially L-shaped in vertical section having a horizontally-extended article-supporting top wall of high heat conductivity upwardly inclined toward the vertical arm of said container and supplemented by a vertical extension forming one side of the vertical arm of
40 said container, and the ends of the inclined top wall projecting beyond the end walls of said container, heat insulation imbedding the bottom, sides and ends of said container and the projected ends of the top plate, a drainage passage leading from
45 said container approximately at the level of the junction between the inclined top wall and its vertical extension, the vertical arm of the container extending substantially above the level of
50 the drainage outlet, and a heat-insulating super-structure enclosing the space over said top plate.
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