

UNITED STATES PATENT OFFICE.

WILBUR S. HINMAN, OF STREATOR, ILLINOIS, ASSIGNOR OF ONE-HALF TO
JOHN H. SHAY, OF SAME PLACE.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 465,043, dated December 15, 1891.

Application filed August 4, 1891. Serial No. 401,636. (No model.)

To all whom it may concern:

Be it known that I, WILBUR S. HINMAN, of Streator, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Refrigerators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in refrigerators for household and other purposes, the object of the invention being to provide means whereby the cooler air in the room or other compartment where the refrigerator is located is drawn into the refrigerator, passed under or over the ice and thoroughly cooled, thence through the provision-chamber of the refrigerator, and from thence out into the open air, thereby keeping up a constant flow or circulation of fresh air, which necessarily removes all odors from the provision-chamber and prevents one article from becoming impregnated with the odors of another article; and it consists in parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of an ordinary cooling compartment, room, or portable refrigerator with the top, sides, and one end removed, and Figs. 2, 3, and 4 are views showing several forms of lining or covering for the ice-bed.

This invention is designed for use in cars, ships, warehouses, stores, or other places where permanent ice-boxes or refrigerators are used, and also in the portable refrigerator commonly used.

A represents the box or room, one side and one end thereof removed. The walls of the box or room are made double with an air-space between them, and through the outer wall, near the bottom thereof, is an opening 1 (one near each end) for the admission of air to the outer air-chamber, or, rather, the air-chamber between the walls of the refrigerator. These openings are covered by slides, (not shown,) by means of which the quantity of air admitted can be regulated.

Instead of admitting the air to the outer chamber, pipes may be led from the openings 1 to the pipes 2, which latter convey the air

to the interior of the box. By bringing the air in from the bottom of the room where it is coolest and carrying it up through the outer chamber the temperature is considerably lowered before it comes in contact with the ice. Hence a considerable saving in ice is effected. The pipes 2 pass from the outer chamber B through the inner wall and from thence over and through partition 3, which latter forms one side of the ice-box. The partition 3 is located a suitable distance from the outer wall to permit of the free circulation of air between them. The ice-bed 4 is narrower than the box to permit of the passage of air at the sides *a a* and fits closely at its ends *b* against the inner end walls of the box. This ice-bed consists of joists 5, secured at their ends to the end walls of the box, and are preferably covered on their under sides with a zinc or other suitable material *c*, and support at their upper sides the ice pans C. (Shown in Figs. 2, 3, and 4.)

Secured to one of the joists or to any convenient part of the box is a curtain 6, preferably made of wood and covered with zinc or other suitable metal. This curtain extends throughout the length of the box and is set at a suitable distance from the adjacent side wall to permit of the free passage of air downwardly from the ice-box to the provision-chamber below. This curtain extends well down in the provision-chamber and operates to prevent the return of the air from the provision-chamber below to the ice-chamber above, and is provided at its lower end with a trough or gutter having a suitable water-escape, through which the waste water from the ice passes.

The ice-pan shown in Fig. 4 is made in one piece without ribs or projecting seams, and is designed more particularly for portable refrigerators or household use. For larger rooms, cars, &c., where a single pan is impracticable, I employ a sectional pan having standing seams. (Shown in Figs. 2 and 3.)

The ice-pans are inclined to carry the water toward the curtain 6 and are provided at their lower ends with aprons, which latter overlap the top of curtain 6 and conduct the water onto the latter.

In order to support the ice, so that the air

will have free unrestricted flow down, under, and around the same, I provide racks E, which latter are placed on the sides and bottom, as shown in Fig. 1. These racks consist of
 5 wooden strips, of proper dimensions, secured in vertical position against the sides and ends of the box and strips or joists placed horizontally over the ice-pans, the said strips being secured in place by any suitable means,
 10 and metal strips secured to said wooden strips or joists, forming an open or skeleton support for the ice. The sides, ends, and bottom racks are preferably made in separate sections and secured to the walls by staples or hooks.
 15 The lower edges of the sides and end racks rest inside the outer edges of the pan, so that the drip from the ice contained therein will always fall onto the pan. By this means the ice is kept away from the walls of the ice-
 20 box, and the air, as it is admitted thereto, has free circulation around, over, and under the ice, and is thoroughly cooled before it passes from the ice-chest. The lower rack projects beyond the pan on the side adjacent to the
 25 curtain 6 and extends completely across the air-space *a* for the support of the apron F on which the side rack on that side of the refrigerator rests. This apron is preferably made of two pieces of board secured together at
 30 an angle and covered with sheet metal and is designed to carry the drip falling thereon over onto the ice-pan.

The arrows represent the circulation of air through the box.

35 When ice is placed in the ice-chamber, it lowers the temperature of the air therein, and the latter increasing in specific gravity settles down and passes into the provision-chamber through the passage formed by the curtain 6
 40 and adjacent wall of the box or room, and forces the light air upwardly until it has been expelled from the box through the escape-pipes 8 8. This movement of the air, by its suction or siphonic action, draws in air through
 45 pipes 1 and 2 into the ice-chamber, and from thence through the provision-chamber and out through pipes 8, the movement of the air being comparatively rapid at first until the specific gravity of the air within the several parts
 50 of the box is nearly equal, when it becomes comparatively slow. Though the air in escape-pipes 8 8 may be heavier than the outer air, it is overbalanced by the heavier air in the ice-chamber and is forced out. Thus it
 55 will be seen that the current of air always passes through the provision-chamber in one direction, and hence never returns to impregnate the food with the odors it has taken up in a previous passage. Again, the air taken
 60 from next the floor is the coolest of outside air, and as it is brought to a still lower temperature by passing through pipes 2 before entering the ice-chamber it follows that the consumption of ice is comparatively small.

65 It is evident that numerous slight changes in the constructive details might be resorted to without departing from the spirit and scope

of my invention. Hence I would have it understood that I do not wish to limit myself to the exact construction shown and described; 70 but consider myself at liberty to make such slight changes and alterations as fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters 75 Patent, is—

1. The combination, with a compartment or box having an air-opening therein near the bottom thereof, an ice-chamber located within the compartment or box at the top thereof, 80 and pipes for conveying the air into the ice-chamber, of a curtain depending from the ice-chamber on the side opposite the side where the air enters, an air-opening from the ice-chamber leading to the space between the cur- 85 tain and adjacent wall of the box, and air-escape openings at the top of the box or compartment, substantially as set forth.

2. The combination, with a compartment having an air-inlet near the bottom thereof, 90 an ice-chamber within said compartment and near the top thereof, and pipes for conveying air from the air-inlet into the ice-chamber, of a curtain depending from the ice-chamber, 95 an air-outlet leading from the ice-chamber into the space between the curtain and the adjacent side wall of the compartment, a trough or gutter at the lower end of said curtain, and air-escape openings leading out of 100 compartment from or near the top thereof.

3. The combination, with a compartment, air-inlet opening near the bottom thereof, and an ice-chamber in the upper end thereof, of racks located within the ice-chamber, air-in- 105 let pipes leading to said chamber, and air-outlet openings located on the side opposite the inlet-openings and beneath the racks, substantially as set forth.

4. The combination, with a compartment, an ice-chamber therein near the top thereof, 110 and a curtain depending from one side of the ice-chamber, of racks located within the ice-chamber, air-pipes leading to said ice-chamber near the top thereof, and air-exits located below the bottom rack and leading into the 115 space between the curtain and the adjacent side wall of the compartment.

5. The combination, with a compartment and an ice-chamber therein near its top, of the racks E, located within the ice-chamber, 120 the curtain 6, depending from the ice-chamber, the apron F, air-inlet pipes leading to the ice-chamber, outlet below apron F and leading into the space between curtain 6 and the adjacent side wall, and air-pipes leading from 125 the top of the compartment, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILBUR S. HINMAN.

Witnesses:

GEO. C. POWERS,
 SAMUEL STEEL.