

(No Model.)

4 Sheets—Sheet 1.

E. H. GIESY.
REFRIGERATOR.

No. 588,139.

Patented Aug. 17, 1897.

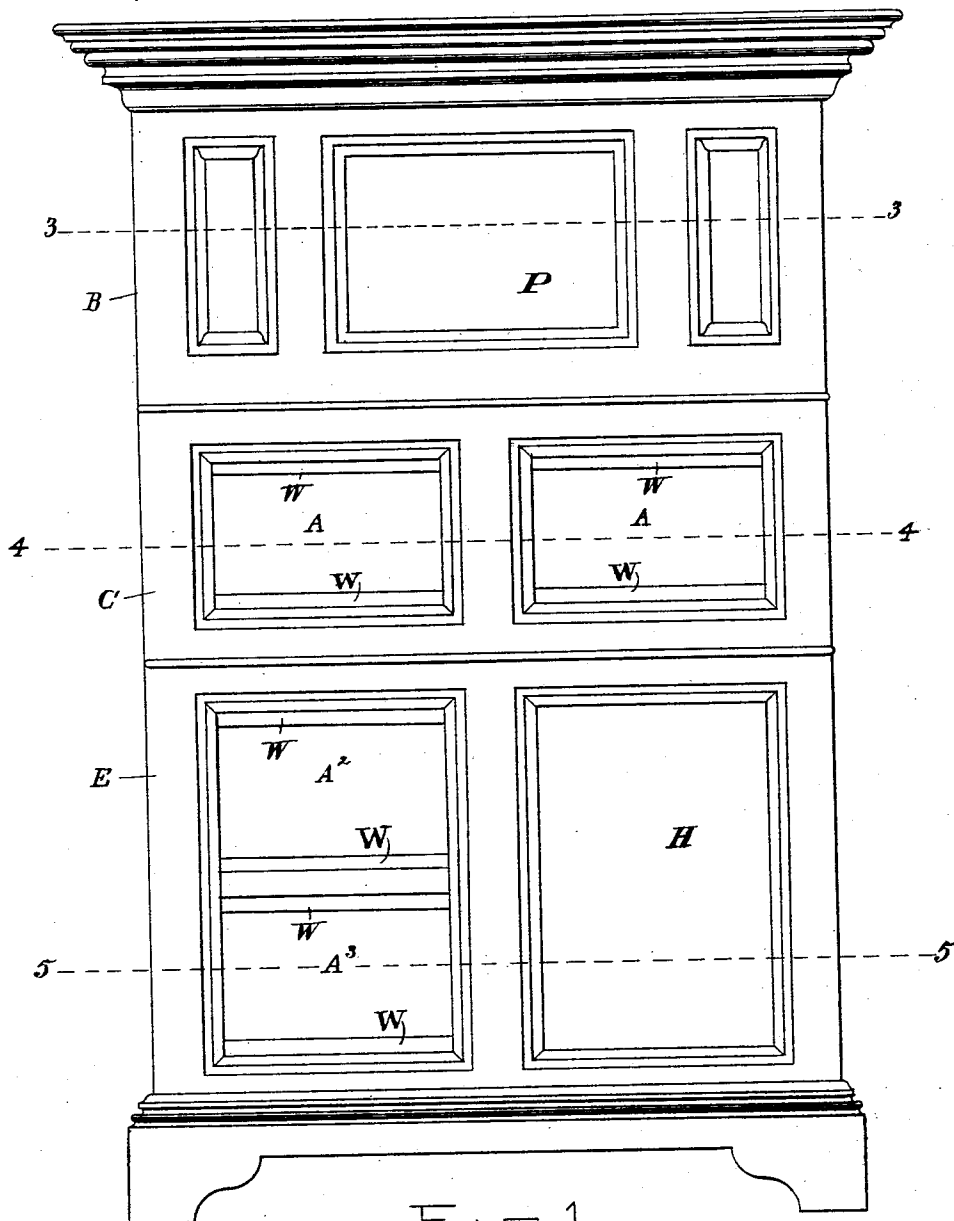


FIG 1

WITNESSES

W. E. Jones
H. Smith.

INVENTOR

Edward H. Giesy

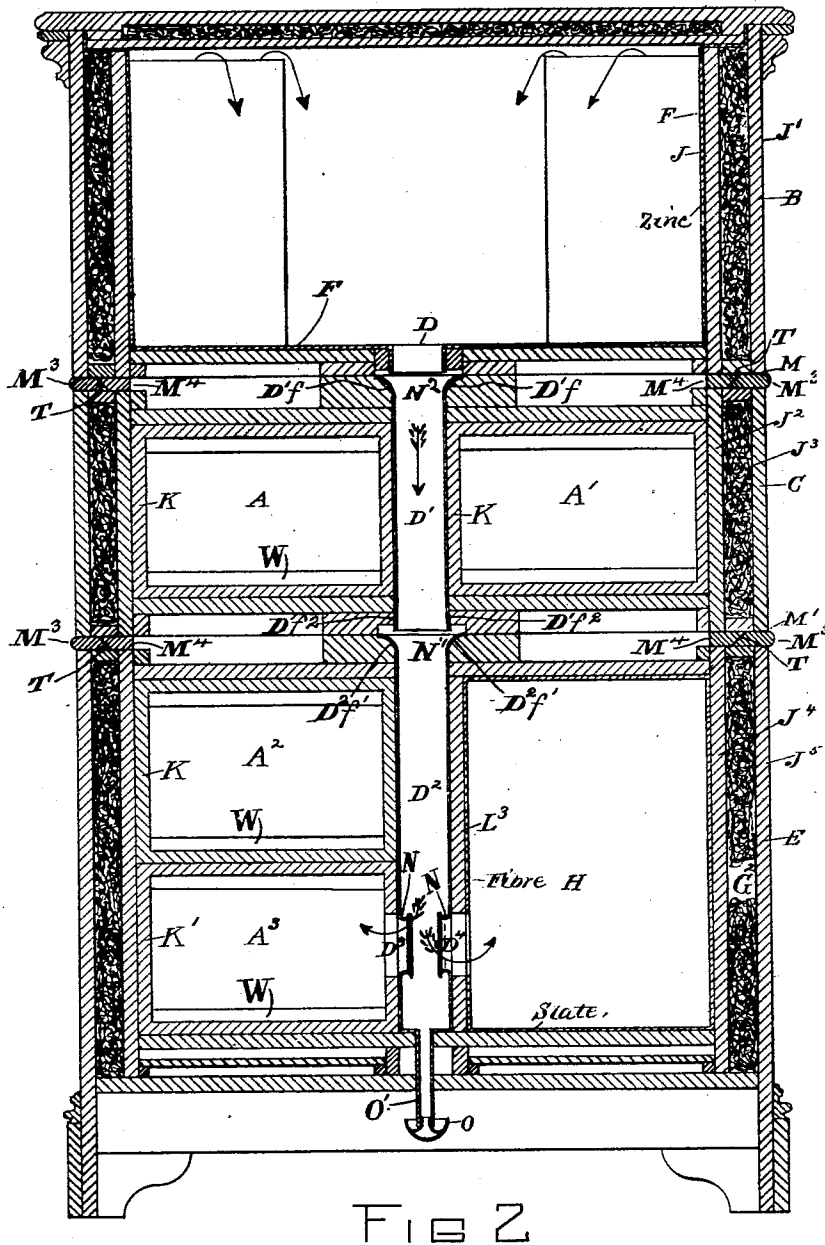
(No Model.)

4 Sheets—Sheet 2.

E. H. GIESY.
REFRIGERATOR.

No. 588,139.

Patented Aug. 17, 1897.



WITNESSES

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(No Model.)

4 Sheets—Sheet 3.

E. H. GIESY.
REFRIGERATOR.

No. 588,139.

Patented Aug. 17, 1897.

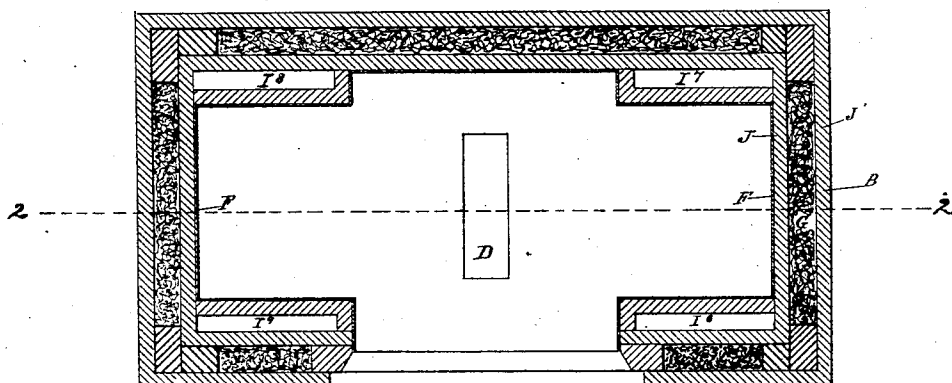


FIG 3

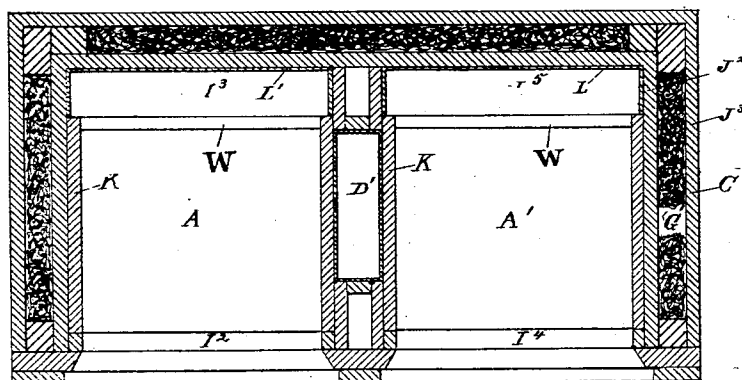


FIG 4

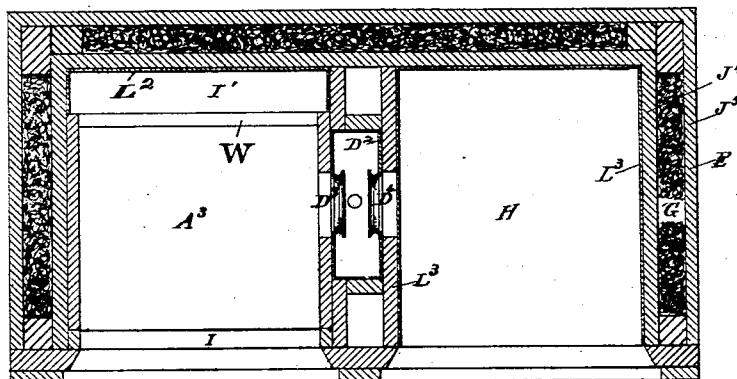


FIG 5

WITNESSES

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(No Model.)

4 Sheets—Sheet 4.

E. H. GIESY.
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No. 588,139.

Patented Aug. 17, 1897.

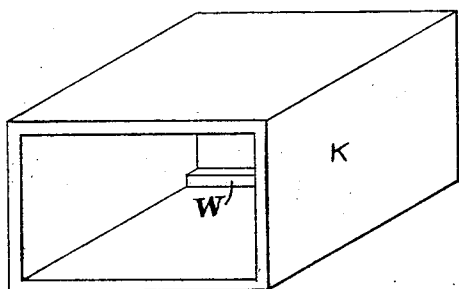


FIG 6

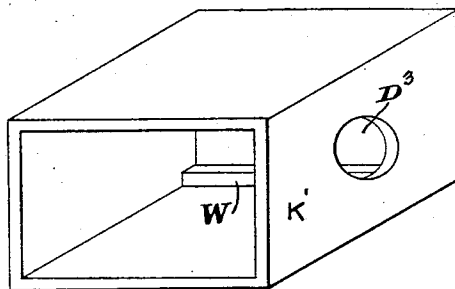


FIG 9

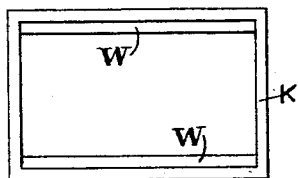


FIG 7

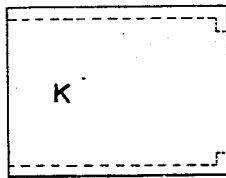


FIG 8

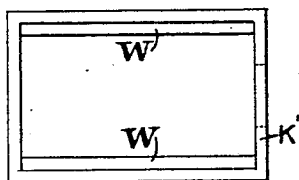


FIG 10

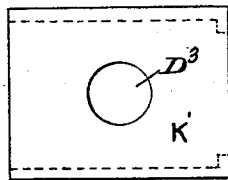


FIG 11

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWARD H. GIESY, OF WYOMING, OHIO, ASSIGNOR TO ALFRED M. STEARNS,
OF SAME PLACE, AND HENRY H. GIESY, OF LANCASTER, OHIO.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 588,139, dated August 17, 1897.

Application filed July 20, 1893. Serial No. 481,002. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. GIESY, a citizen of the United States, and a resident of the town of Wyoming, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Refrigerators, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use conjointly or otherwise will be apparent from the following description and claims.

In the accompanying drawings, making a part of this application, and in which similar letters of reference indicate corresponding parts, Figure 1, Sheet 1, is a front elevation of a refrigerator, illustrating my invention, the doors of the refrigerator being removed. Fig. 2, Sheet 2, is a transverse vertical section taken in the plane of the dotted line 2 2 of Fig. 3. Figs. 3, 4, and 5, Sheet 3, represent horizontal sections, respectively taken at the dotted lines 3 3 4 4 5 5 of Fig. 1. Fig. 6, Sheet 4, is an isometric perspective of the crock used in the compartments A, A', and A². Fig. 7, Sheet 4, is a front and Fig. 8 is a side elevation of the said crock. Fig. 9, same sheet, is an isometric perspective of the crock used in compartment A³. Fig. 10, same sheet, represents a front and Fig. 11 a side elevation of the crock used in said compartment A³.

The refrigerator is divided into three main divisions—viz., bottom division E, middle division C, and top division B. Division B is lined with zinc, this zinc lining being indicated by the letter F in Figs. 2 and 3.

In the upper division B, Fig. 3, is shown a cold-air duct D, through which the air falls to division C, it being understood that the duct D', Fig. 4, of division C and the duct D², Fig. 5, of division E are successive continuations of the duct D. (See also Fig. 2.) Each of these ducts is lined with zinc, substantially as shown. The cold air after passing down through the duct D D' D² to division E divides and a part thereof passes from said duct through opening D³ to the left into compartment A³ and the other part passes through opening D⁴ into compartment H. (See Figs. 2 and 5.) From these compartments A³ and H the air rising passes up to division C and then into division B through the air-passages

I I' I² I³ I⁴ I⁵ I⁶ I⁷ I⁸ I⁹. The passages I, I², and I⁹ constitute one entire conduit, and passages I', I³, and I⁸ constitute another entire conduit. The passages I⁴ and I⁶ make another conduit, and the passages I⁵ and I⁷ constitute another conduit. (See Figs. 5, 4, and 3.) A complete circulation of the air is obtained, as shown.

Division B has an inner wall J and an outer wall J'. (See Figs. 2 and 3.) Both of these walls are preferably of wood. The space between the inner wall J and outer wall J' is filled with mineral wool G. The inside of section B is lined with zinc, as F, this layer of zinc being close to and against the wall J.

Division C has an inner wall J² and an outer wall J³, each of wood, and the space between these walls is filled with mineral wool G', as shown in Figs. 4 and 2. The interior of division C is provided with earthen crocks K, open at front and also at rear. These crocks extend from the air-spaces I² I⁴ at the front of the refrigerator back to the air-spaces I⁴ I⁵. The sides and backs of the air-spaces I' and I³ and I⁵ are each lined with indurated fiber, (marked, respectively, L², L', and L,) substantially as shown. (See Fig. 3.)

The inner surface of the inner wall of the back of division C and also of the corresponding wall of division E are lined with indurated fiber, and also the side walls back of the crocks.

Division E has an inner wall of wood J⁴ and an outer wall of wood J⁵, and the space between said walls is filled with mineral wool G². (See Figs. 5 and 2.)

It may be here remarked that indurated fiber is a pure, sweet, and impervious substance well adapted for lining.

The large compartment H has a lining of indurated fiber L³ on the back and sides and slate on the bottom.

The compartment at the left of compartment H is subdivided into compartments A² A³ by means of earthen crock K and earthen crock K'. Each of these crocks is open at the back to the air-space I' and at the front to the air-space I.

The earthen crock K' has an opening D³ on the right side, (see Fig. 2,) which opening connects it with the central air-duct D².

The floor of division E behind the crocks is covered or lined with indurated fiber.

The joint M where the division C meets the division B and the joint M' between divisions C and E are each made air-tight. The preferred manner of forming these joints consists as follows: Between the outer walls of each division are located strips or pieces M³ and M⁴, which extend around the entire refrigerator. The piece M³ is fixed to the upper end of the wall J⁵ of division E and the piece M⁴ is fixed to the bottom of the wall J² of division C. Thus the outer walls J⁵ of division E extend higher than the inner walls J⁴ and the outer wall of division C is correspondingly shortened. The division-strip M³ of division C is flush with the top of the outer wall J³ of said division and the bottom of the strip M⁴ of division C is on a level with the bottom of this outer wall J³, while the inner wall J² of division C extends down beyond the strip M⁴ and wall J³. When the divisions C and E are fitted together, the wall J² of division C fits down within and below the strip M³ and closely upon wall J⁴ of division E. The bevels T enable the one to be readily and properly adjusted to the other. The inner edge of the strip M³ is beveled at T from below upward and outward, and the inner edge of strip M⁴ is conversely beveled. Thus the division C is held in place upon division E and securely held from lateral deflection. A similar construction of the meeting portions of the divisions C and B is present, and thus lateral displacement of these divisions upon each other is prevented.

Preferably all meeting portions of adjacent divisions make a tight joint.

The central air-duct D D' D² is so arranged that the water collecting in division B will not fall from the top of the duct to the bottom, clear of and away from the sides of said duct, but will run down on and against the sides of said duct. This result I accomplish by the following means:

The distance between the walls of the upper conduit D increases as they descend, or the conduit is made slightly larger than D'. The upper end of the duct D' is flared outwardly, as at D' f, the flare being preferably a rapidly-curved one, as shown. The lower end of this duct has an outward gentle flare D' f². The upper end of duct D² has a flare D² f' corresponding in shape to the flare D' f of the duct D'. Thus the water flowing from division B down this central duct D D' D², running from the part D, drops down upon the lower portion of the flare D' f and runs down the part D', thence falls upon the lower portion of the flare D² f' and runs down the latter part D². This arrangement prevents the water from dashing down from division B to the lower portion of division E and from entering into the horizontal joints formed between the meeting divisions B and C and C and E.

The opening D³ of the crock K' is continued out into the air-duct D², and an opening D⁴ connects compartment H with said air-

duct. I provide for each of the passages D³ and D⁴ a device to prevent the water which flows down the duct D² from entering the crock K' or compartment H, to wit: The zinc lining is continued out from the side of the duct and then bent outward from the center of the latter, thus forming a concavely-curved gutter or runway N around the entrance of the passage into the lower compartments at the side of the duct D². (See Figs. 2 and 3.) Thus the water running down the sides of the duct D² cannot enter the passages D³ or D⁴ into compartment A³ or H, and hence passes down to the bottom of duct D² and thence through delivery-pipe O' to the trap O. The water enters there and overflows the basin and passes off into a suitable waste conduit or receptacle. The lower end of the pipe O' is below the upper edge of the basin, and the basin being continually full of water air cannot pass from without through the basin into pipe O'. This arrangement of pipe O' and basin O, often known as a "water seal," is an old and often-used device.

The crocks are made of stoneware and substantially as shown on Sheet 4 of the drawings. They are usually, as shown, of a rectangular form, open at the front and rear. At the rear end of the floor of the crock is a raised edge or flange W, which prevents any article introduced into the crock from slipping out the rear end thereof. It is often desirable to reverse the position of the crock, so that what was the top becomes the bottom, and vice versa. Also in putting the crocks in place in the refrigerator it is desirable that no attention be paid to which of the flat sides is uppermost. For these reasons I provide both the top and bottom of the crock with an edge or ledge W similarly shaped and similarly located.

Glazed stoneware crocks are of course exceedingly advantageous and cleanly. They have heretofore been used as mentioned in the United States Letters Patent, respectively numbered 336,057 and 379,521, but their present formation as herein described and their arrangement with and in my present system of air circulation is entirely new.

The door-opening P of the division B and the front openings into compartments A of division C, and the front openings into the compartment containing the crocks A² and A³, and the front opening into compartment H of division E are each provided with suitable doors.

The method in which my invention operates is as follows: The ice for the refrigerator is placed in the upper division B, preferably upon a suitable rack therein. The air in contact with the ice and in this chamber rapidly becomes chilled and falls through the central air-duct D D' D², and part D² of the duct D² divides and part passes through the opening D³ into crock A³ and part through the opening D⁴ into compartment H. The cold air passes out through the front and rear

portions of the crock A³ and gives off some of its cold to the crock A² and the provisions therein—that is to say, it withdraws heat from the crock and its provisions and rises.

5 A portion of it passes up through the front conduit or passage I, thence into passage I², past the front side of adjacent crock A, and thence on up through passage I³, and over the top of the latter into the main compartment of division B. On its way past crock A this air cools the crock and its provisions. The other portion of cold air entering crock A³ passes out of the rear end of the crock and up through passages I¹ I³, past said crock A, on up through conduit I³, and over the latter down into the said main compartment of division B. On its journey, just described, from crock A it has abstracted heat from said crock and the provisions therein and from the crock A and its provisions. These currents of warmer air entering the division B come in contact with the ice and are chilled and then again pass down the central air-duct. In the meantime the cold air entering 25 compartment H through the inlet D⁴ divides and part passes up through the front passages I⁴ and I⁶ and part through the rear passages I⁵ I⁷. Thence these currents pass over into the division B and are cooled by the ice therein, in readiness to again pass down through the central duct. In passing through compartment II and past adjacent crock A they abstract the heat therefrom and from the contents thereof. Thus a perfect circulation of 35 air is obtained. The cold air from the ice in the ice-chamber B passes down and into the lower provision-compartments and then passes up, forcing the warm air before it, in front and behind the provision-compartments to the top of the ice-chamber. This upwardly-moving current of air carries all the vapors and the minute emanations from the food, as fast as the same are given off by the food, to the top of the ice-chamber B and thence into the latter, where the vapors are condensed and the emanations from the food deposited on the ice and carried off by the dripping from the latter. This condensation takes place and the deposit is made before the air 45 again reaches the cold-air passage or duct for the next downward passage of it. Hence the downward current is always dry and pure.

5 Compartment II may be subdivided by placing therein two crocks—a crock, as K¹, below and a crock, as K, above.

When the refrigerator is to be of a diminished capacity, a proper mode of constructing it is to omit the middle division C and 60 have the upper division B set directly upon the division E.

The refrigerator is made not only for the object just named, in three divisions, but also for convenience of manufacture and of transportation. 65

While I employ the word “stoneware” in this description and in the claims, I desire it

to be understood that any vitrified material or material covered with a vitrified glaze or glaze formed on the article by heat is the equivalent 70 of the “stoneware” and is intended to be covered by that term in the description and the claims.

Instead of zinc any suitable metal can be used as a lining for the air ducts or compartments. 75

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In a refrigerator, provision-compartments, a central air-duct for carrying the cold 80 air down to the lower portion of the refrigerator, passages from said air-duct, and passage-ways in front and rear of the open ends of the provision-compartments for the conveyance of the said air as it rises past the said 85 compartments to the ice-chamber above, substantially as and for the purposes specified.

2. In a refrigerator, an ice-chamber above, provision-compartments below, a central duct connected to the ice-chamber and extending 90 down through the refrigerator, for the downward passage of cold air from said chamber, air-ducts D³ and D⁴ respectively leading into the lower compartments of the refrigerator, and upward air-passages leading past the ends 95 of the provision-compartments, the air-ducts D³, D⁴, being extended into the duct D² and provided with annular gutters N, substantially as and for the purposes specified.

3. In a refrigerator, an ice-chamber in one 100 horizontal division above and compartment in a second horizontal division below, and a vertical duct, the upper portion of the duct in the second division and adjacent to the division above, being flared away, and wider 105 than the lower end of the opening in the said upper division, thus enlarging the opening and forming an upwardly-extending deflector for compelling the water descending the duct to pass the meeting edges of said duct, at the 110 junction of the horizontal divisions, the lower end of the upper duct entering down within the flaring mouth of the deflector, substantially as and for the purposes specified.

4. In a refrigerator, an ice-chamber, provision-compartments below, and central duct 115 for the descent of the cold air, and return ducts or passages in conjunction with the provision-compartments, the refrigerator being horizontally divided into divisions, the upper 120 portion of the central duct contained in a given division, and adjacent to the division next above being flared away, thus enlarging the opening and forming an inwardly-extending deflector, the lower part of the duct in the 125 division next above being slightly enlarged so as to insure the water descending on the central duct falling on the adjacent flare below of the duct, and compelling it to run down the said ducts, the lower end of the upper 130 duct entering down within the flaring mouth of the deflector, substantially as and for the purposes specified.

5. In a refrigerator composed of three hori-

zontal divisions, one above the other, a central duct extending downward from the upper division, and side ducts as D^3 and D^4 communicating with the lower chambers on each side of the said duct, substantially as and for the purposes specified.

6. In a refrigerator composed of divisions one over the other, a central duct provided with the side ducts D^3 , D^4 , respectively extending into the central duct and communicating with the adjacent chambers, and provided with the annular groove N, the ducts D, D' , D^2 being respectively lined with metal sheeting, the sheeting forming the extension D^3 , N, and provision-compartments in which said side ducts enter, substantially as and for the purposes specified.

7. In a refrigerator, the stoneware crock shaped substantially as shown and open at front and rear, and provided with the ledge at the rear end of the floor, and air-passages at front and rear of the said crock, substantially as and for the purposes specified.

8. In a refrigerator, the stoneware crock shaped substantially as shown and open at the

front and rear, and provided with the ledge at the rear end of the floor, and a ledge at the rear end of the roof, in conjunction with the air-passages at front and rear of the said crocks, substantially as and for the purposes specified.

9. In a refrigerator, the stoneware crock, open at the front and rear, and provided with the ledge at the rear end of the floor, and the side opening D^3 , and a down air-passage connected to the latter, and up air-passages at front and rear, substantially as and for the purposes specified.

10. In a refrigerator, the stoneware crock, open at the front and rear, and provided with the ledge at the rear end of the floor, and a ledge at the rear end of the roof, and the side opening D^3 , and a down air-passage connected to the latter, and up air-passages at front and rear of the crock, substantially as and for the purposes specified.

EDWARD H. GIESY.

Attest:

WM. E. JONES,
K. SMITH.