C. L. RIKER.

REFRIGERATOR BUILDING.

No. 189,958. Patented April 24, 1877.

Fig. 2.

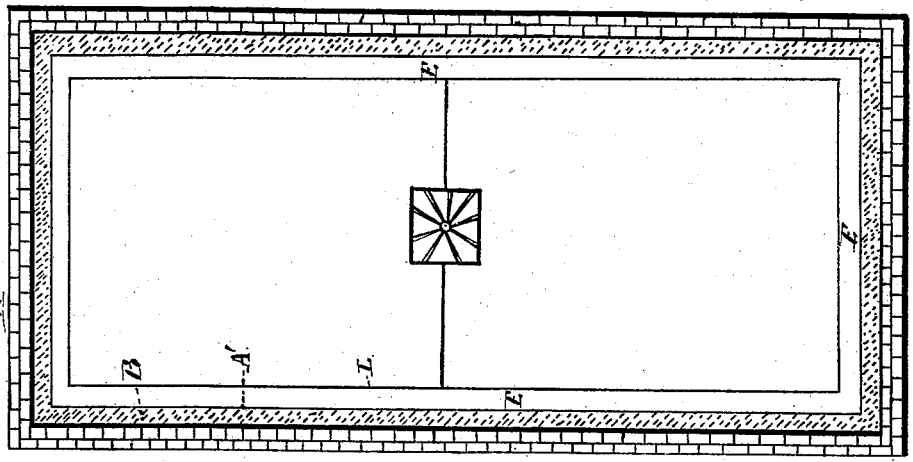
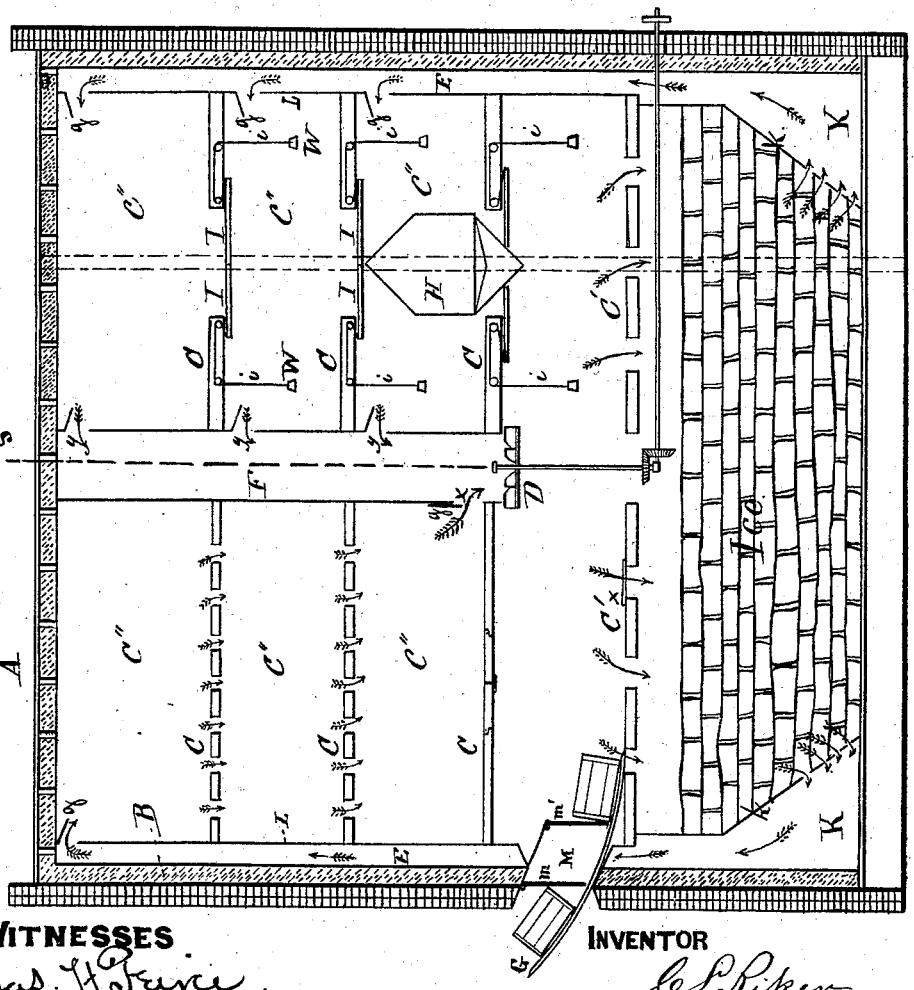


Fig. 1.



WITNESSES

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CARROLL L. RIKER, OF NEW YORK, N. Y.

IMPROVEMENT IN REFRIGERATOR-BUILDINGS.

Specification forming part of Letters Patent No. **189,958**, dated April 24, 1877; application filed November 18, 1876.

To all whom it may concern:

Be it known that I, CARROLL L. RIKER, of the city, county, and State of New York, have invented certain new and useful Improvements in Refrigerator-Buildings; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of the building; Fig. 2, a horizontal sectional view of the same.

This invention relates to refrigerator-buildings for the storage of articles of food, and maintenance of the same at a low temperature; and it consists in certain features and details of the building, as hereinafter fully described and claimed.

In the accompanying drawings, A represents the outer shell of the building, preferably of brick-work or masonry; and B, a lining of some non-conducting material, such as powdered charcoal.

Inside of the inner lining A′ is another lining, L, arranged at a short distance from the lining A′, so as to leave an open space, E, completely surrounding the part of the interior of the building inclosed by the partition L.

The interior of the structure is furnished with suitable floors C C C, and has a flue, F, extending from the ceiling to the lower floor. At one side of the building the lining L extends imperforate nearly to the top of the building, where an opening is left, the lining of the central flue having no opening except at the bottom. On this side of the building the floors C C are pierced with numerous perforations.

On the opposite side of the building both the central flue F and lining L are perforated at points just below the floors C C, which latter are not perforated, as on the other side, but are furnished with automatically-closing hatches I I.

These hatches consist of two parts, which meet in the center of the opening, and are arranged to slide backward under the floors upon a suitable railway. Weights W W, attached to chains or ropes *i*, serve to close the hatch. An elevator, H, of the form shown in the drawings, is arranged to be lifted in the usual way. The slanting top and bottom of the elevator serve to open the hatches, and allow them to close gently as the elevator is raised and lowered. At the bottom of the central flue is a blower, D, driven by suitable power.

The bottom of the building, beneath what might be termed the "receiving-floor," is filled with blocks of ice. The walls of the ice-chamber slant inward at the bottom, near which point they are perforated, to permit the egress of the current of air from above.

The entrance to the building is constructed as follows: The walls are pierced at some point just above the working-floor C′, and a suitable closed chute, G, is provided, which reaches from the sidewalk to the floor C′. This chute is provided with two doors, *m m′*, hinged at the top, and arranged to swing inward and outward, the doors inclosing a vestibule, M. The object of this construction is to enable goods to be brought into or taken from the refrigerator-building without permitting ingress of the warm air from outside or egress of the cold air from the building.

Other means of access may, of course, be employed.

When the building is in use the blower D is caused to revolve, thus drawing a current of air from the flue F into the working-chamber. This current finds its exit downward through the perforations in the floor C′, and thence through the interstices between the blocks of ice and the perforations in the ice-chamber walls *k* into the chamber K. From this chamber it rises through the passage E, which may or may not completely surround the interior of the building. On the side of the building in which the floors are perforated the current of cold air finds no entrance into the preserving-chambers until it has reached the top of the building, when it enters through the openings there situate, and descends through the various chambers, by means of the perforated floors, to the opening *x* in the lowest chamber, and thence to the blower D, to be again driven through the circuit described. On the opposite side of the building the walls L are perforate at points near the top of each chamber, and a portion of the current of cold air finds entrance into each of the

apartments. The entering cold air sinks to the floor of the chamber, and the incoming current causes it to rise gradually and displace the air of the apartment, which air passes out through an opening, *y*, (also at the top of the chamber,) into the central flue, and thence to the blower.

The advantages attained by the described construction of the two sides or halves of the building may be briefly mentioned.

It is obvious that the current of air is coldest at the moment it emerges from the ice-chamber into the chamber K, and warmest as it passes through the openings in the floor C′. Between these two points the air is gradually increasing in temperature by contact with the walls of the building, the substances to be refrigerated, &c., the principal source of increase, however, being the former.

On the side of the building in which the floors are perforate the temperature is practically uniform, since the incoming air has passed entirely to the top of the building, and thereby has acquired all the warmth which it is going to attain before entering any of the refrigerating-chambers. On the other side of the building this is not the case.

None of the chambers communicates directly with those above or below, except by the hatchways, which are always closed either by the hatches or by the elevator itself, each thus constituting a chamber to itself. It is clear that the temperatures in these chambers will vary, the lowest being the coldest, since the air entering it has traversed but a part of the distance to the top of the building, and has not, therefore, absorbed much warmth from the walls of the building. A series of chambers are thus formed, easy of access, and each of a known temperature, varying from that of the others. This construction furnishes a chamber in which the temperature is very low, and suitable for the storage of articles which will spoil at any but very low temperatures, while above it are other chambers for the storage of less perishable goods. The other side of the building contains a series of communicating chambers, in all of which the temperature is about the same, suitable for the storage of goods which do not demand an excessively low temperature, and calculated for the storage of goods—such as butter, &c.—which are to be kept for a considerable time to await a rise in the market-price.

I have described no particular means of access to these chambers, since any convenient one will answer—such as an elevator or pulley and platform. Precautions need only be taken to keep the opening in the lowest floor closed tight, except when goods are being stored; otherwise the current of air from the blower may rise through the opening, instead of descending through the ice.

The large chamber in which the fan works, and which I call the "preliminary cooling or working chamber," is useful for the temporary storage of goods which do not demand a very low temperature to prevent spoiling; but it is especially designed to furnish a chamber in which the goods which are to be placed in the colder apartments will undergo a preliminary cooling before entering the refrigerating-chambers proper. By this means any bad results arising from a too sudden refrigeration of the goods are obviated, as well as the contamination of the temperature of the refrigerating-chambers by the introduction of warm or rather hot articles—such as strawberries or blackberries fresh from the fields, and picked while the temperature reached, perhaps, 125° Fahrenheit.

I attach special importance to the construction of the walls of the ice-chamber, which are formed as shown, slanting inward, with the perforations near the bottom only. Were the walls perpendicular, as is usual, the ice would melt away from them, leaving an open space for the passage of the air, which would not then be compelled to traverse the interstices between the blocks of ice. By my construction the weight of the ice causes it to fall as fast as melted against the inclined walls. The perforations in the walls being only near the bottom, the air is compelled to traverse nearly the entire depth of the ice before entering the chamber K. This chamber is designed to furnish a large compartment, in which the air practically comes to rest before ascending the space E. During this period of rest any spray which the air carries from the ice-chamber is precipitated, and is conducted away with the drip from the melting of the ice.

The pipe for the exit of the water is preferably constructed with a goose-neck to form a water-seal, so as to prevent ingress of warm air from outside.

Buildings similar in construction to that of either of the two halves of the building may be constructed and used separately, their juxtaposition, as shown, being merely for the sake of convenience.

Some of the perforations in the floor C′ may be closed by suitable pieces of board, *x*, if desired; and this feature becomes peculiarly valuable in case the ice in the ice-chamber is seen to be melting irregularly. If such is the case the perforations in the floor C′ are closed over the place where the ice is most melted, and the current of air being thus diverted from that portion of the ice, the melting goes on more rapidly in the other portions of the ice-chamber, and the level of the ice is restored.

It is obvious that the temperature in the chambers having the sliding hatches may be regulated by opening or closing the entrances from the flue E, since the temperature of these chambers will, in great measure, depend upon the amount of cold air introduced.

The openings in the flue F may be closed partially or completely by means of the air-checks *g g g*. Similar air-checks may be used to partially close the entrance to the chambers on the opposite side of the building.

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

1. In combination with the ice-chamber of a refrigerator-building, the compartment K, of relatively larger size than the air-flues E F, communicating with it, the said compartment being separated from the ice-chamber by perforated walls, substantially as described.

2. In combination with a refrigerator-building, an ice-chamber having slanting walls, the same being perforated only at or near the bottom, as and for the purpose described.

3. The chute G, having doors *m m'*, as and for the purpose set forth.

4. In combination with the building A, the chamber C', into which the air passes from the storage-chambers, as and for the purpose described.

5. The combination of the flue F, fan D, and chambers C', K, E, and C'', substantially as described.

6. The method herein described of regulating and controlling the melting of the ice, the same consisting in diverting the current of air from those portions of the ice-chamber where the ice is most melted, substantially as described.

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Witnesses:

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RICHD. D. WILLIAMS.