2 Sheets—Sheet 1.

J. LORENZ & F. W. BENDER.

Refrigerator Building.

No. 204,586. **Patented June 4, 1878.**

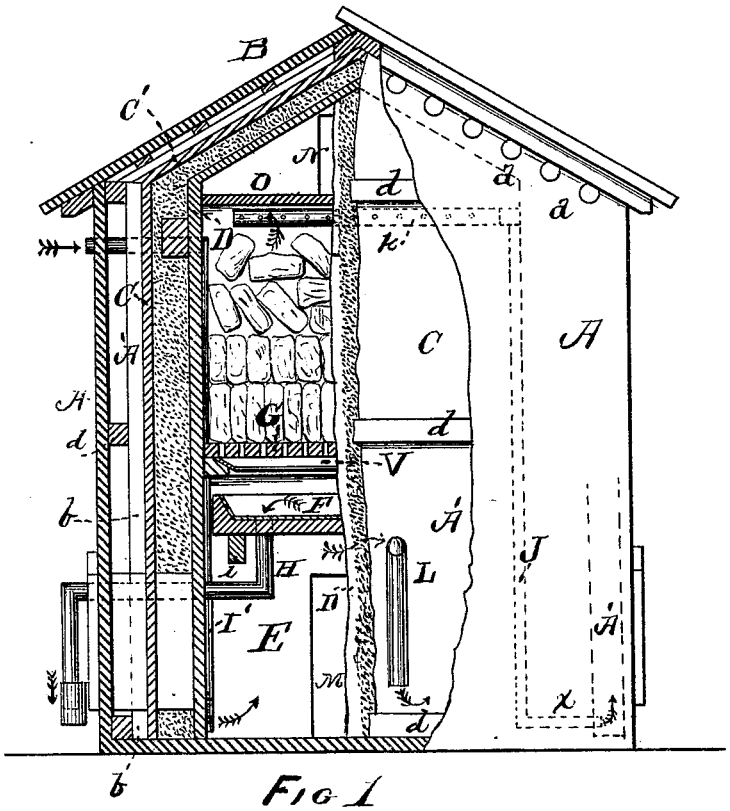

FIG 1

Witnesses
Jas W. See,
H. A. Gray

Jacob Lorenz
F. W. Bender Inventor
By
A. P. K. Peck Attorneys

2 Sheets—Sheet 2.

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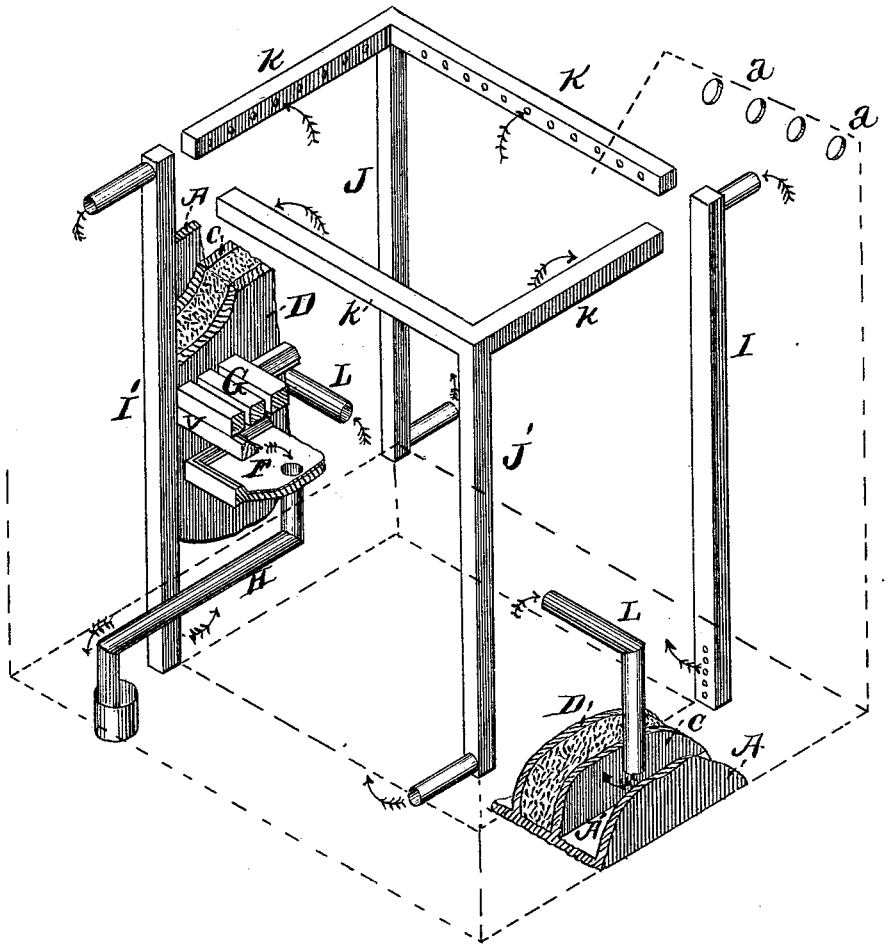

FIG 2

Witnesses
Jas W. See,
W. A. Gray

By

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UNITED STATES PATENT OFFICE.

JACOB LORENZ AND FREDERICK W. BENDER, OF HAMILTON, OHIO.

IMPROVEMENT IN REFRIGERATOR-BUILDINGS.

Specification forming part of Letters Patent No. **204,586**, dated June 4, 1878; application filed August 6, 1877.

To all whom it may concern:

Be it known that we, JACOB LORENZ and FREDERICK W. BENDER, of Hamilton, in the county of Butler and State of Ohio, have invented a new and useful Improvement in Buildings for Preserving Ice and other substances; and we hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 represents a side elevation of our improved ice-house, with a portion broken away to exhibit the interior construction. Fig. 2 is a perspective view of detached parts, exhibiting the arrangement of the air-tubes for ventilation, and portions of the walls, including also the arrangement of the ice-supporting floor, the water receptacle or pan, its discharge-pipe, &c.

Our invention consists in the construction of the ice-house, in combination with a preserving-apartment, ventilating-tubes, and passages, so as to prevent the preserving-apartment from becoming humid or foul, and to cause the outer walls and roof, as well as the interior of the building, to remain comparatively cool during the warm season, as herein described.

Our building is made of three distinct structures or casings, arranged one within another, as represented. The exterior A is a plain rectangular structure of wood, provided with its roof B, air-egress openings *a a*, and suitable doors. The intermediate structure or casing C corresponds in form with the outer part A, and fits within it, leaving a continuous air-space between parts A and C and their roofs B and C′. Part C is provided with vertical frame-pieces or timbers *b b*, to which the horizontal frame-pieces *d d* are secured, so as to afford the required air-space, and to give the necessary strength to the building. The inner structure D has vertical corner-posts and studs, to which the boards inclosing it are secured upon the inner side. These posts are of a thickness equal to the width of the space (filled with cement) between the parts C and D, and aid to support the whole building. It will be observed that this construction provides a smooth plain surface within the ice-apartment and the preserving-room beneath it.

The construction of the three roofs covering the three divisions A C D of the house corresponds with the respective structures or parts, each roof fitting upon and making complete the part to which it belongs.

Between the ice-apartment and the preserving-room E below it a water-receiver, F, is secured by suitable supporting timbers or joist *i*, and there is a narrow air-space between the inner walls of the building and the edges of the water-pan F.

The ice (represented in Fig. 1) is supported by a strong slatted floor, G, which divides the building into the upper and lower apartments. Between the ice-floor G and the metal water-pan F we have arranged a rectangular frame, consisting of four inclined shelves, V, as represented in the sectional part of Fig. 1. The purpose of these shelves, which rest upon studs projecting from the inner wall of the building, is to convey the drippings of water from the ice-apartment into the water-receiver F, and prevent any moisture from running down the walls into the preserving-room E. By the use of the slatted ice-supporting floor and the open spaces around and between the water-pan F and the inner walls of the building we provide for the free circulation of air between the preserving-room and the ice-apartment. The pan F has an exit-pipe, H, to convey the water out of the building.

Between the inner and intermediate structures D C of the house and between their roofs a packing of cement, made of any suitable material, is used to serve as a non-conductor of heat; but between the outer roof B and roof C′, also between the outer structure A and intermediate structure C, the open continuous space is provided for the free circulation of air.

Four vertical tubes, I I′ and J J′, are located within the corners of the inner structure D, and extend up nearly to the top of the ice-apartment and downward near the floor of the preserving-chamber E. The tubes J J′ are provided with branch tubes K, which are also set into the inner walls of structure D. These tubes K are perforated, as shown, and communicate with their respective vertical tubes

J J′, and near their lower ends they have lateral branches communicating with the air-space A′ surrounding the building between casings A and C, as represented in dotted lines at X, Fig. 1. The tubes I I′ have lateral branches extending entirely outside of the house, and terminating at their lower ends within the preserving-apartment E, and communicating therewith by perforations near their lower ends. The elbow-tube L communicates with the upper part of the preserving-chamber E and the continuous air-space A′. Doors M and N are, respectively, for access to the preserving-room E and for the introduction of ice. The tight floor O above the ice-chamber will be provided with a closely-fitting door to admit the ice, and after the ice-chamber is filled the loft above floor O will be filled with straw or any other suitable material, to aid in the preservation of the ice. The several arrows indicate the directions of the currents of air. The tubes I I′ introduce pure air from outside, which condenses in these tubes, which pass down in contact with the body of ice, and it enters the preserving-chamber near the floor.

The egress-tubes J J′ and L L afford the means of constant circulation of air within the building. This circulation of air is caused and promoted not only by the condensation within the tubes I I′, but by the action of the sun's heat upon the outer wall of the building, which (although the air enters the space A′ in a cold and condensed state, tending to keep the house cool,) rarefies the air within space A′, and causes it to ascend and find egress through the openings *a a* below the projections of the roof. It is apparent that the same result would be attained whether the tubes I I′ and J J′ and branches K are set flush with the inner walls or wholly within the ice and preserving apartments, and the moist and lighter air would be drawn out of the ice-apartment without the lateral perforated branch pipes K, provided the upper ends of tubes J J′ are open.

Our improvement has been tested and proves successful. It prevents the ice from melting, excepting around the ingress-pipes I I′, whereas, in the ordinary ice-houses, the melting at the bottom of the mass of ice causes its weight above to fall and press out the walls of the building.

Having described our invention, we claim—

1. The combination of ingress and egress tubes I I′ and J J′ with air-space A′, to cause the circulation of air, substantially as described.

2. The elbow-tubes L below the ice-floor, in combination with the tubes I I′ J J′ and air-space A′, in the manner and for the purpose specified.

3. The combination, in an ice and preserving house, of the ingress and egress openings I I′ and *a a*, near the roof of the building, with the air-tubes K J J′, substantially as and for the purpose specified.

Witness our hands this 9th day of July, A. D. 1877.

JACOB LORENZ.
F. W. BENDER.

Witnesses:
SAMUEL MALLERT,
JOHN M. DAVIDSON.