(No Model.) 2 Sheets—Sheet 1.

A. VON KRAUSE.

PORTABLE ICE FREEZIMG HOUSE.

No. 276,508. Patented Apr. 24, 1883.

Fig. 1.

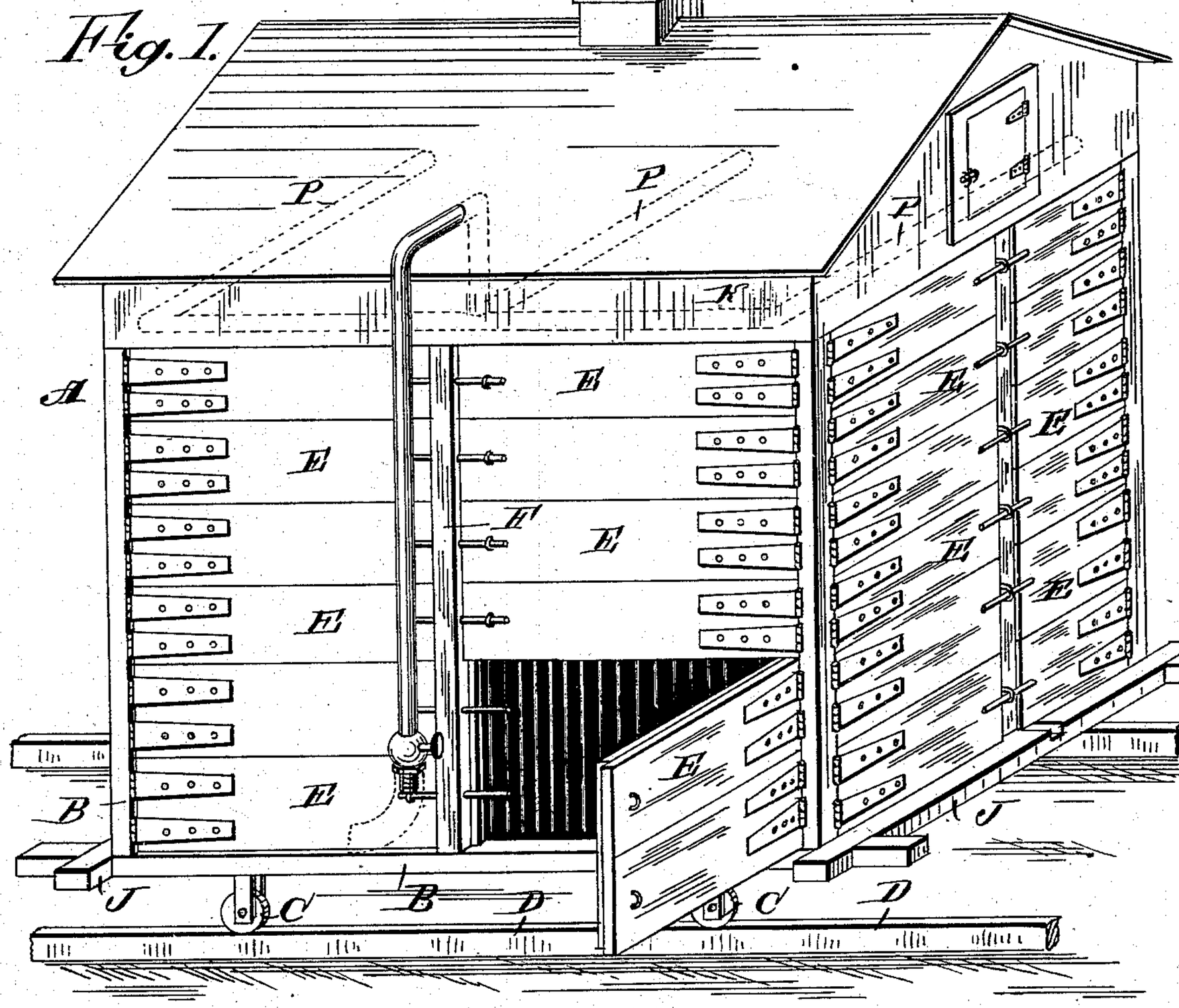


Fig. 2.

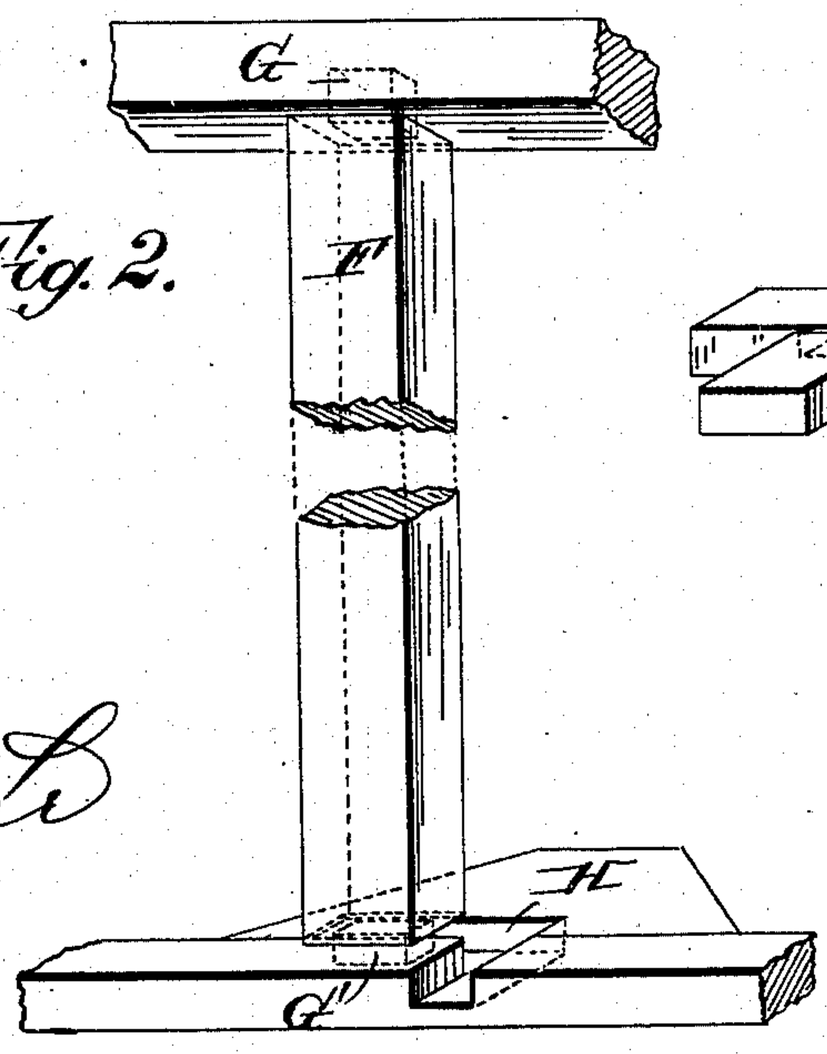
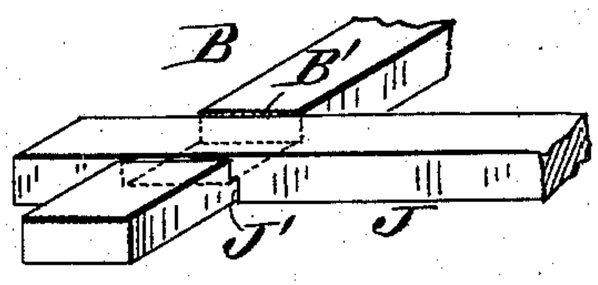


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

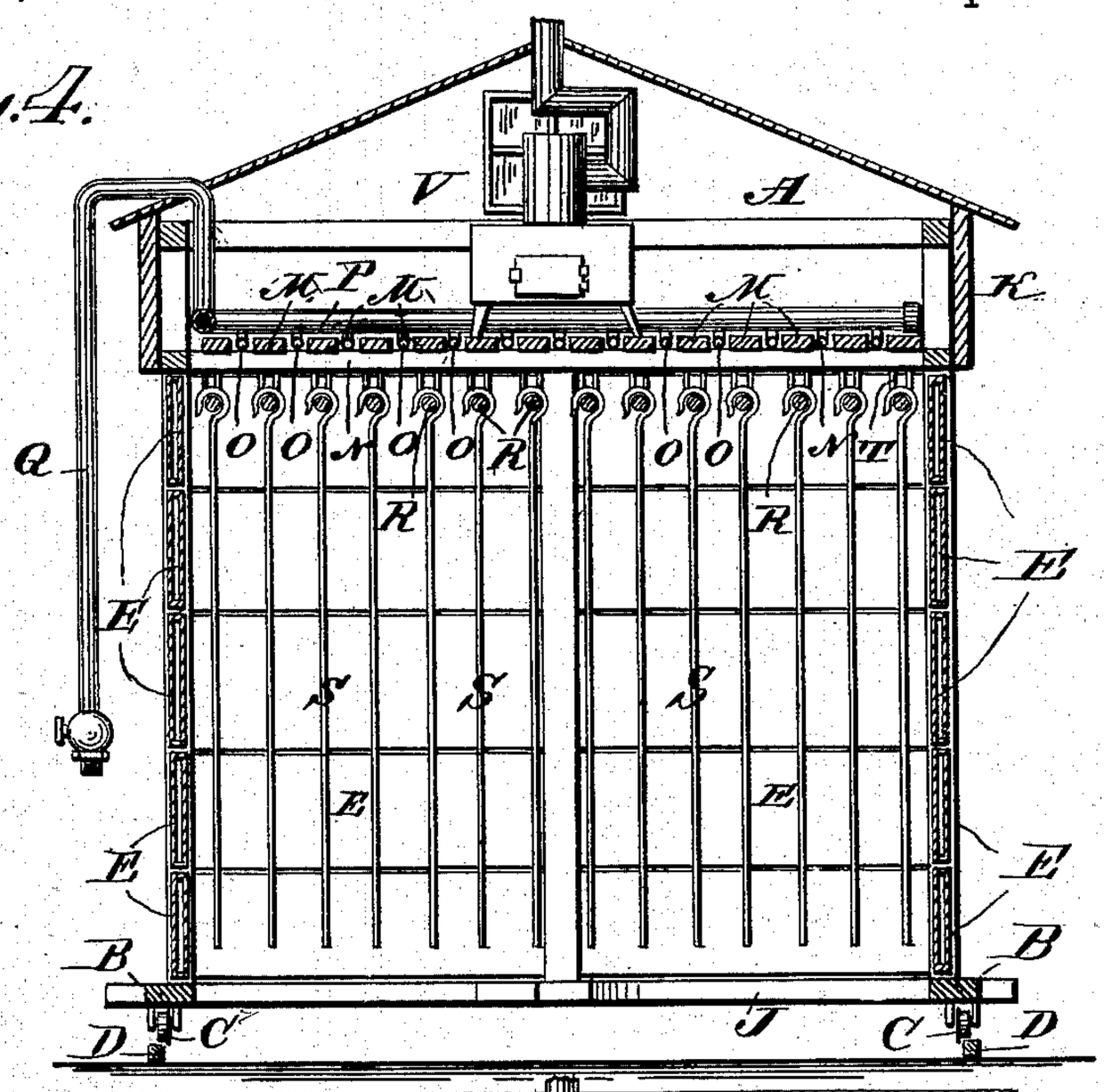
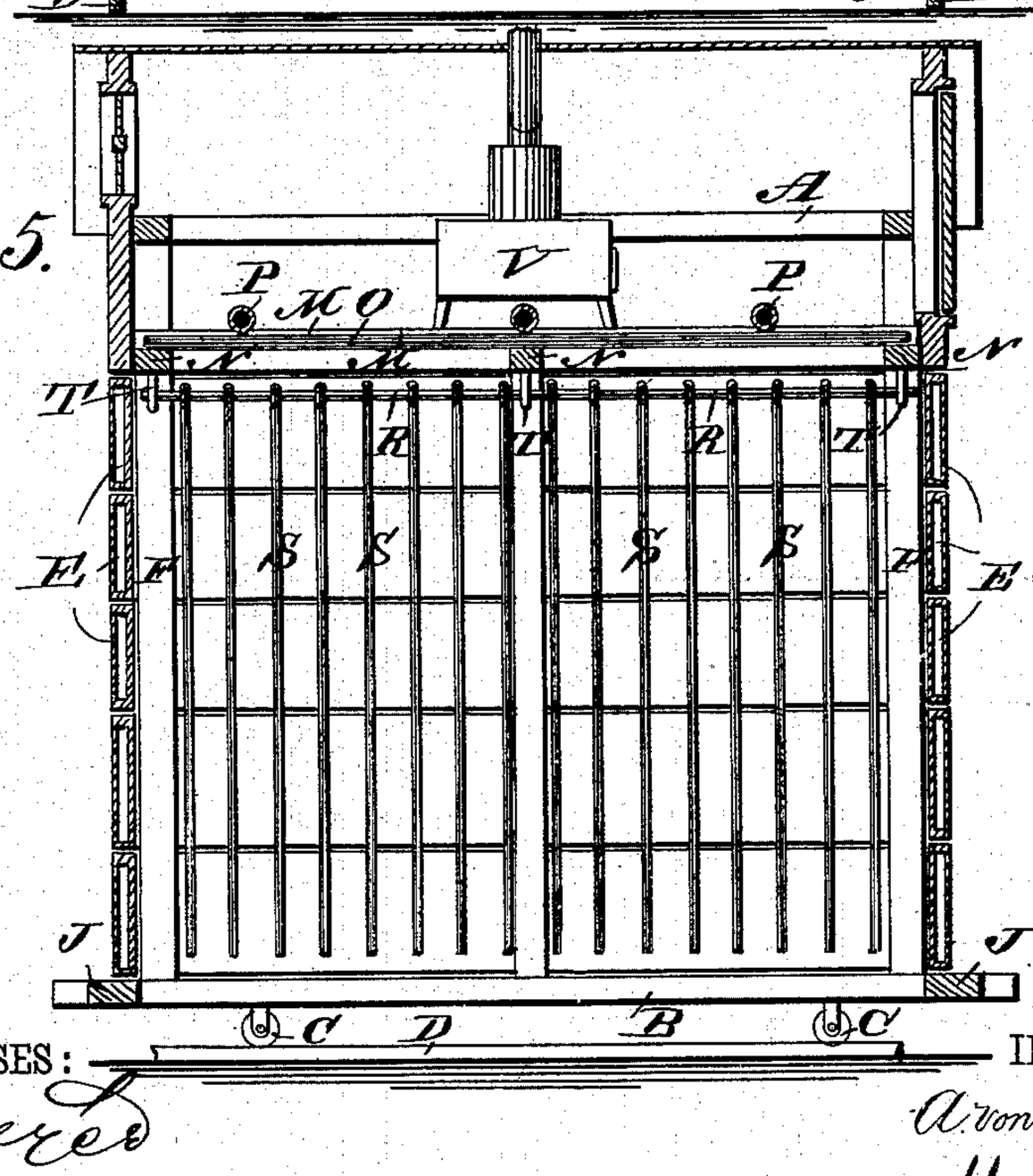


Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR VON KRAUSE, OF WEST NEW BRIGHTON, NEW YORK.

PORTABLE ICE-FREEZING HOUSE.

SPECIFICATION forming part of Letters Patent No. 276,508, dated April 24, 1883.

Application filed February 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR VON KRAUSE, of West New Brighton, Richmond county, New York, have invented a new and Improved Portable Ice-Freezing House, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved portable ice-freezing house for forming large blocks of ice at a temperature but a few degrees below the freezing-point, and when it is impossible to freeze ice of any considerable thickness, except by artificial means.

The invention consists in an ice-freezing house constructed with a frame mounted on wheels running on tracks, which house has its sides and ends or the ends only made removable, or of a series of hinged doors, so that when a block of ice is formed in the building the ends can be opened or removed and the building removed from the block of ice which remains on the ground. In the building a series of wires are suspended in rows from rods, and water is sprinkled against the rods, which water congeals and first forms partitions of ice surrounding the wires, which partitions are gradually united or ice is formed between them, whereby a solid block of ice will be formed, from which the wires can be withdrawn, upon which the block can be cut in pieces.

The invention also consists in various parts and details and combinations of the same, as will be fully described and set forth hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of my improved ice-freezing house. Fig. 2 is a perspective view of the front beam, showing the mortise and tenon of the same. Fig. 3 is a perspective view of the lap-joint of the ends of the side and end beams. Fig. 4 is a cross-sectional elevation of my improved ice-freezing house, and Fig. 5 is a longitudinal sectional elevation of the same.

The frame A of a house, which is preferably made square, rests upon the base side bars, B, which are provided with the rollers or small wheels C, which run on tracks D. The walls of the building are composed of a series of doors, E, hinged to the end posts of the frame and swinging against a middle post, F, which is provided with any suitable device for holding the doors closed. The doors are made hollow—that is, with an air-space in them—and preferably the outer walls of the doors are made of wood and the inner walls of metal. The doors are to be made about from one and one-half to two and one-half feet wide, and are to be so constructed as to fit very closely on each other and against the middle post. The middle posts, F, are each provided at the upper ends with a tenon, G, fitting in a corresponding mortise in the top side beams on top end beams. At the lower ends the posts F are each provided with a tenon, G′, fitting into an L-shaped mortise, H, in the bottom side beams, B, or bottom end beams, J, which L-shaped mortises H have the open end at the outer edge of the bottom side beams, B, or bottom end beams, J, so that the tenons G′ can be passed into the mortises H after the tenons G have been passed into the mortises in the top beams. The side beams, B, are provided in the upper surfaces of the ends projecting beyond the ends of the frame with recesses B′ for receiving the ends of the bottom end beams, J, which are provided with corresponding recesses, J′, in the bottom surfaces, so that the upper surfaces of the beams B and J will be about flush. The upper part of the frame is covered by a sheathing, K, of metal or wood, and at the lower edge of said sheathing a floor is constructed in the house, which floor is formed of a series of slats, M, placed equidistant and resting on a series of transverse beams, N. Between each two slats M a water-distributing pipe, O, is arranged, which is provided on its lower edge with fine perforations. Water is conducted into the pipes O by three transverse feed-pipes, P, which are connected with a pipe, Q, extending down on the side of the building, and which can be coupled to any other suitable feed pipe or hose. A rod, R, is to be held under each slat M, and from each rod R a series of wires, S, is suspended, which wires are provided at their upper ends with hooks or rings, through which

the rods R pass. The rods R are passed through staples T, projecting from the bottom surface of the beams N, supporting the slats M.

I do not wish to limit myself to the above-described manner of hanging the rods R or of suspending the wires S from the said rods, but prefer this method of hanging them, as it is the most simple. If desired, the several wires can be suspended separately and independently from the beams by means of other suitable devices. In all cases the wires are hung in the building in longitudinal rows, which are separated from each other the same distance as the surface of the slats M; or, in other words, a series of parallel wire partitions will be formed. A stove, V, is arranged in the compartment in the upper part of the building for the purpose of preventing the water conducted into this upper compartment from freezing.

The building can be made any desired suitable size, but I have found that it is most advantageous to make the same sixteen feet long, sixteen feet wide, and sixteen feet high, exclusive of the compartment containing the stove, so that a block of ice of the dimensions of sixteen feet in all directions will be obtained. The doors and walls of the building can be filled with sawdust or any other non-conductor of heat, or can be covered with felt on the outside, or made non-conductive in any other suitable manner. The inner sides of the doors, posts, &c., are to be covered with metal, so that the ice will not adhere to the same. The water can be forced into the pipes by means of a steam-pump, or by the natural pressure of a raised body of water.

The operation is as follows: The pipe Q is connected with a water-supply pipe. The water will then be forced through the pipe Q into the pipes P and O, and will be sprinkled in very minute drops, or as a spray through the apertures in the pipes O against the wires S, forming the wire partitions or walls, will flow down the said wires, and will immediately congeal. A very small quantity of water is distributed in a very thin layer over an enormous surface, and can easily freeze at a temperature a few degrees below the freezing-point. In a very short time sufficient ice will have formed between the wires S to unite them or form a partition of ice, which gradually increases as the water is sprinkled against the same; but it may happen that the ice does not freeze equally throughout the entire height of the building, and produces cavities or hollow spaces within the block of ice, which materially impairs the quality of the same. To avoid this I operate as follows: After the ice partitions have been formed—that is, after the wires have been united by a layer of ice and the space between the partitions is to be filled—I open the bottom doors E, but keep all the upper doors closed, so that the cold air can circulate only in the lower part of the house. The water that runs down to the lower part of the wires will then be congealed by the cold air circulating in the lower part of the house. After a solid block of ice has been formed in the lowest part of the house, I open the next higher doors and form ice between those parts of the partitions corresponding to the second set of doors. Then the next higher doors are opened, and so on until the entire building is filled with one solid block of ice. As I form a solid mass of ice in the bottom of the house first, it can never happen that the upper part of the building is filled with solid ice and holes or cavities are formed in the lower part of the block. Another advantage of the doors is that the same can be opened at opposite sides or ends of the house to conduct the wind directly through the building, and they thus serve as wind-guides. As circumstances may require, the doors at the ends and sides or at the ends only may be opened. If the temperature rises so high that it is impossible to freeze the water, all the doors will be closed and the operation interrupted until the return of colder weather. The ice formed does not melt, but remains perfectly firm in the building until the operation is resumed. The stove V must be provided, so as to prevent the water from freezing before it is sprinkled against the partitions. After the block has thus been formed it is necessary to remove it from the building. This is accomplished by moving the building from the ice. For this purpose the end doors E are opened, the bottom tenons, G′, of the middle pieces, F, in each end of the building are removed from the L-shaped mortises H, the upper tenons, G, are removed from the mortises in the top end pieces, and then the bottom end plates or bars, J, are removed. The rods R are all withdrawn from the staples T and from the several loops or hooks at the upper ends of the wires S, which are thus disengaged from the building and are held solely in the block of ice. The building is then pushed from the block of ice in the direction of the length of the building, the block of ice remaining on the ground, and the building moving forward on its wheels, which run on the tracks D. The wires S remain in the block of ice, and must be removed before the block can be cut into pieces. The heat of the air passes onto the wires, is conducted throughout the entire length of the same, and loosens the same sufficiently to permit of withdrawing them. The apertures left in the block by the wires immediately fill with water, which freezes and closes them, so that a solid, clear block of ice is obtained, which may then be cut into pieces of any desired size with suitable devices. As soon as the house has been removed fresh wires can be suspended in the same and a fresh block of ice started immediately and no time will be lost, so that by one of the above-described freezing-houses an enormous quantity of ice can be produced in a short time and as rapidly as the water can be pumped into the house. It is natural that the block of ice should form

much more rapidly when the temperature is considerably below the freezing-point than when it is near that point.

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

1. An ice-freezing house mounted on wheels and provided with removable ends or sides, substantially as herein shown and described, and for the purpose set forth.

2. An ice-freezing house constructed with a series of wires suspended in rows and devices for sprinkling water against the rows of wires, substantially as herein shown and described, and for the purpose set forth.

3. An ice-freezing house constructed with removable ends, with a series of wires hung in rows, and with devices for sprinkling water against the wires, substantially as herein shown and described, and for the purpose set forth.

4. The combination, with an ice-freezing house, of the slats M, the perforated pipes O between the slats, the rods R, hung below the slats, and the wires S, suspended from the said rods, substantially as herein shown and described, and for the purpose set forth.

5. The combination, with an ice-freezing house, of the slats M, the perforated pipes O between the said slats, the feed-pipes P, the pipe Q, the rods R, held below the slats M, and the wires S, suspended from the rods R, substantially as herein shown and described, and for the purpose set forth.

6. The combination, with an ice-freezing house, of a floor containing devices for distributing water, and of a stove in the compartment above the said floor, substantially as herein shown and described, and for the purpose of preventing the water from freezing in the distributing-pipes.

7. The combination, with an ice-freezing house, of a series of hinged doors arranged one above the other, a removable central post, F, and a removable bottom cross-piece, J, substantially as herein shown and described, and for the purpose set forth.

8. The combination, with an ice-freezing house, of a series of hinged doors, E, arranged one above the other, a central post, F, provided with a tenon, G′, at the bottom, and a cross-piece, J, provided with an L-shaped mortise, H, substantially as herein shown and described, and for the purpose set forth.

ARTHUR VON KRAUSE.

Witnesses:

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C. SEDGWICK.