No. 754,328.

PATENTED MAR. 8, 1904.

L. MANTELL & W. J. PRIM.

COLD AIR CHAMBER OR REFRIGERATOR.

APPLICATION FILED MAR. 20, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

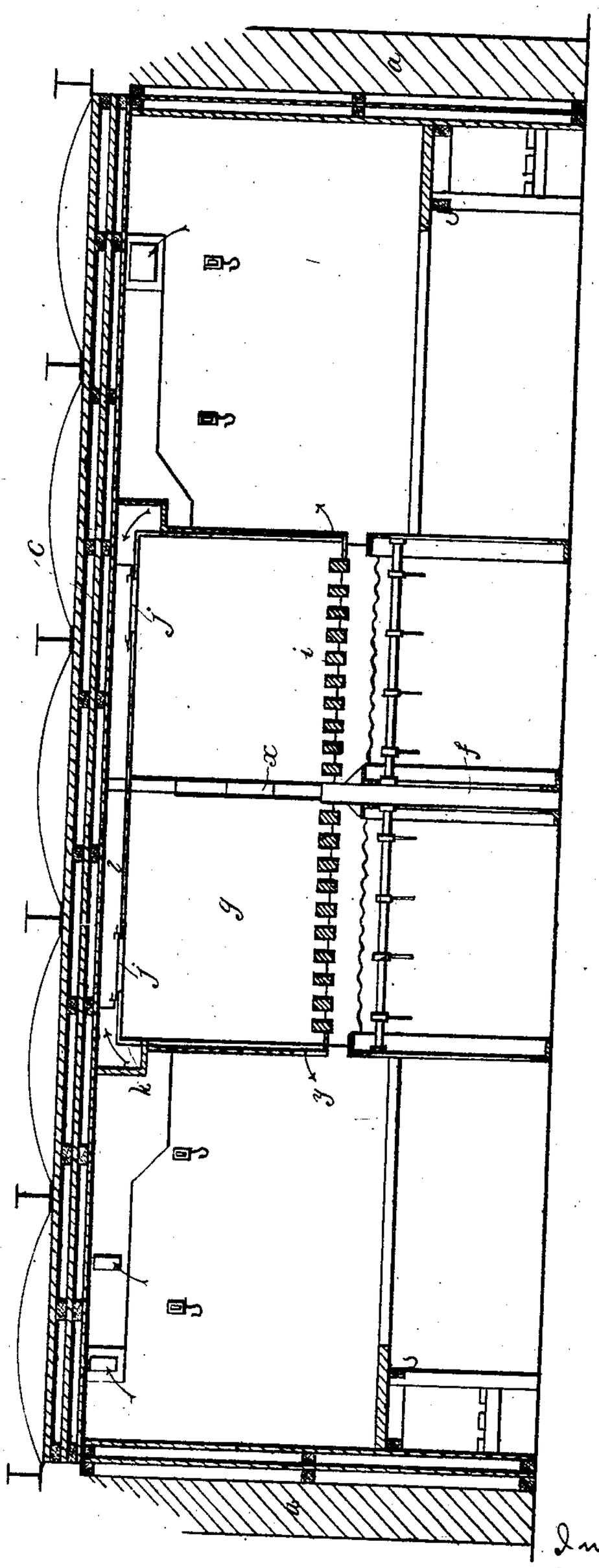

FIG. 1.

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NO MODEL. 4 SHEETS—SHEET 2.

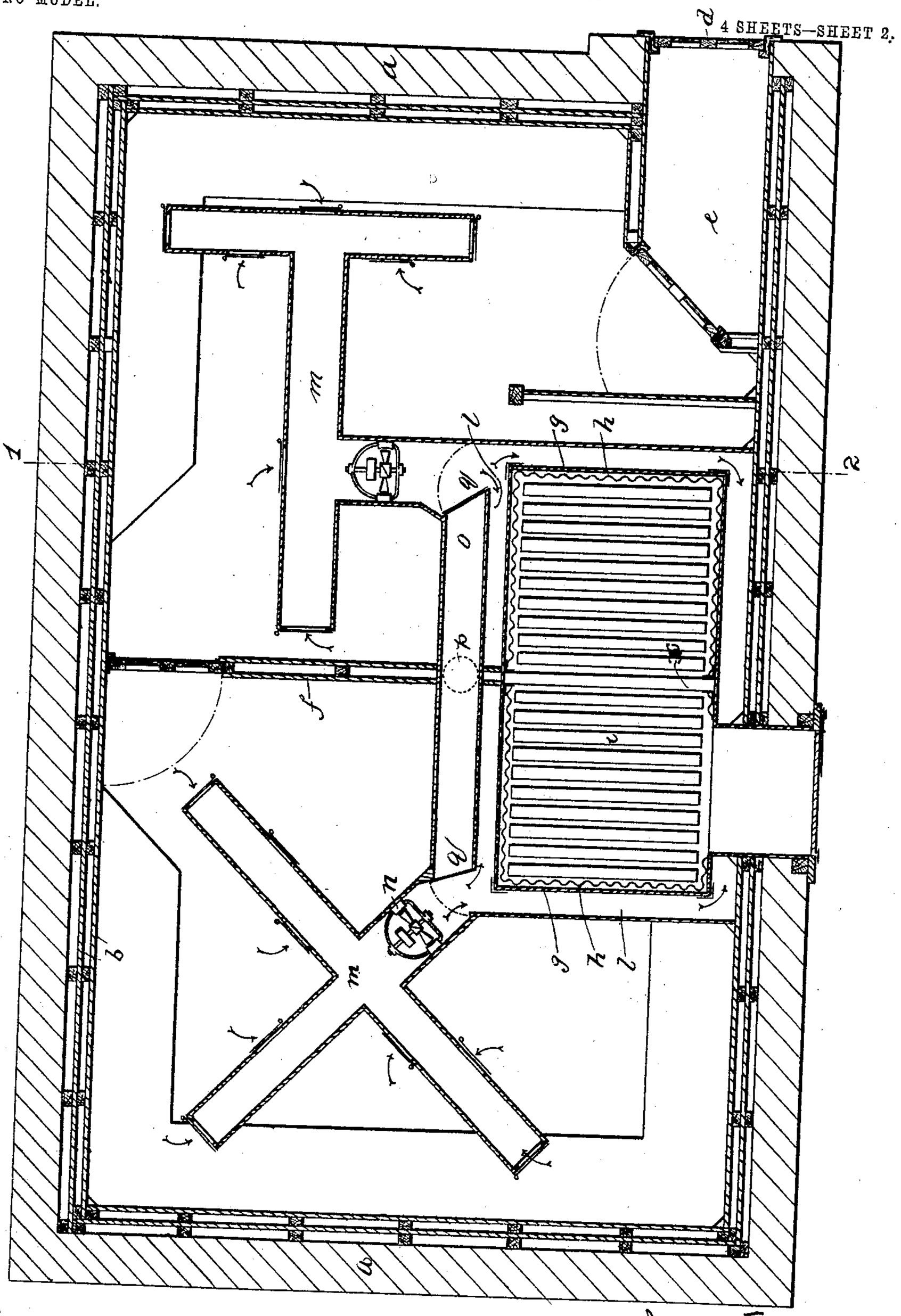

FIG. 2.

Witnesses
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4 SHEETS—SHEET 3.

FIG. 3.

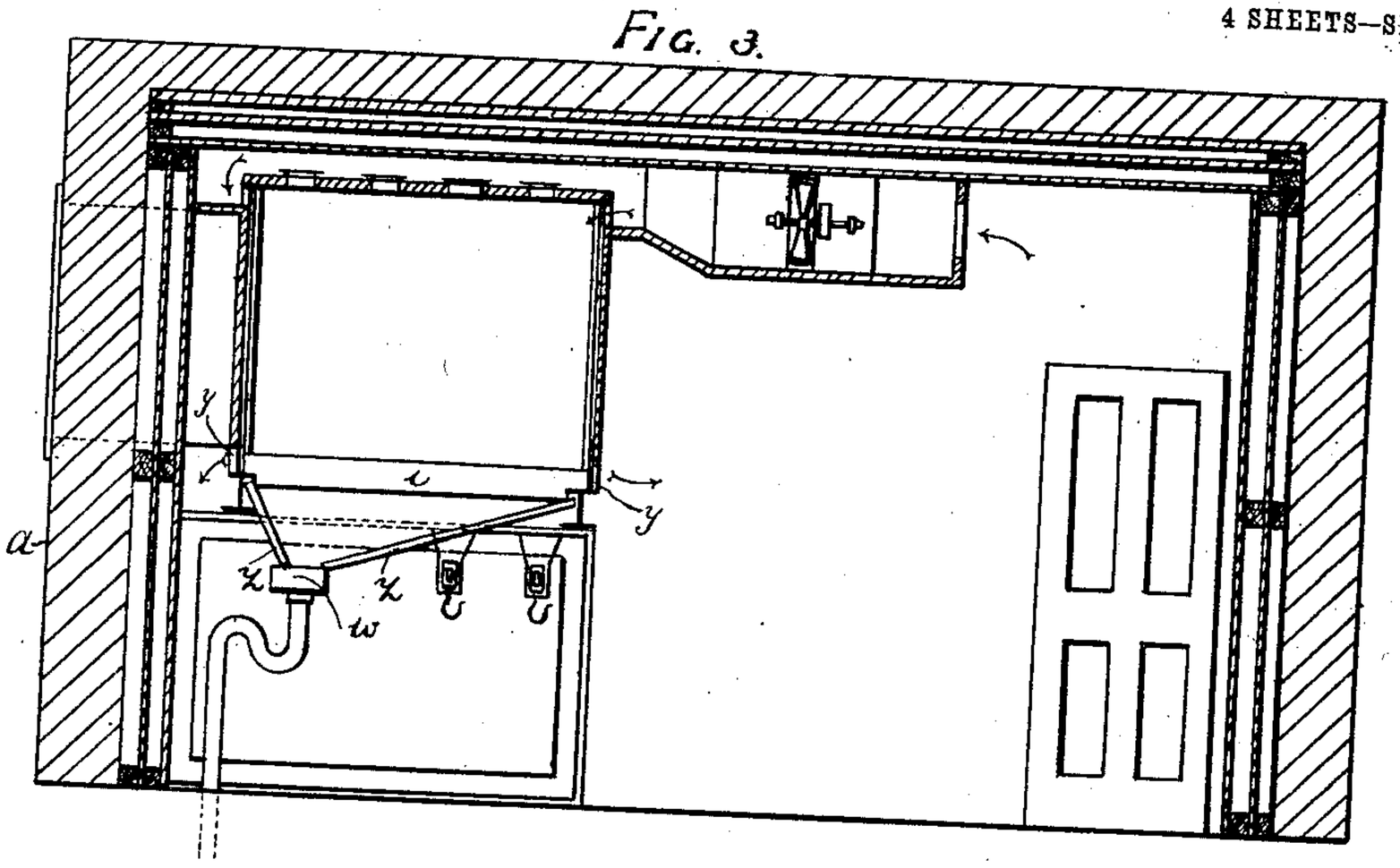
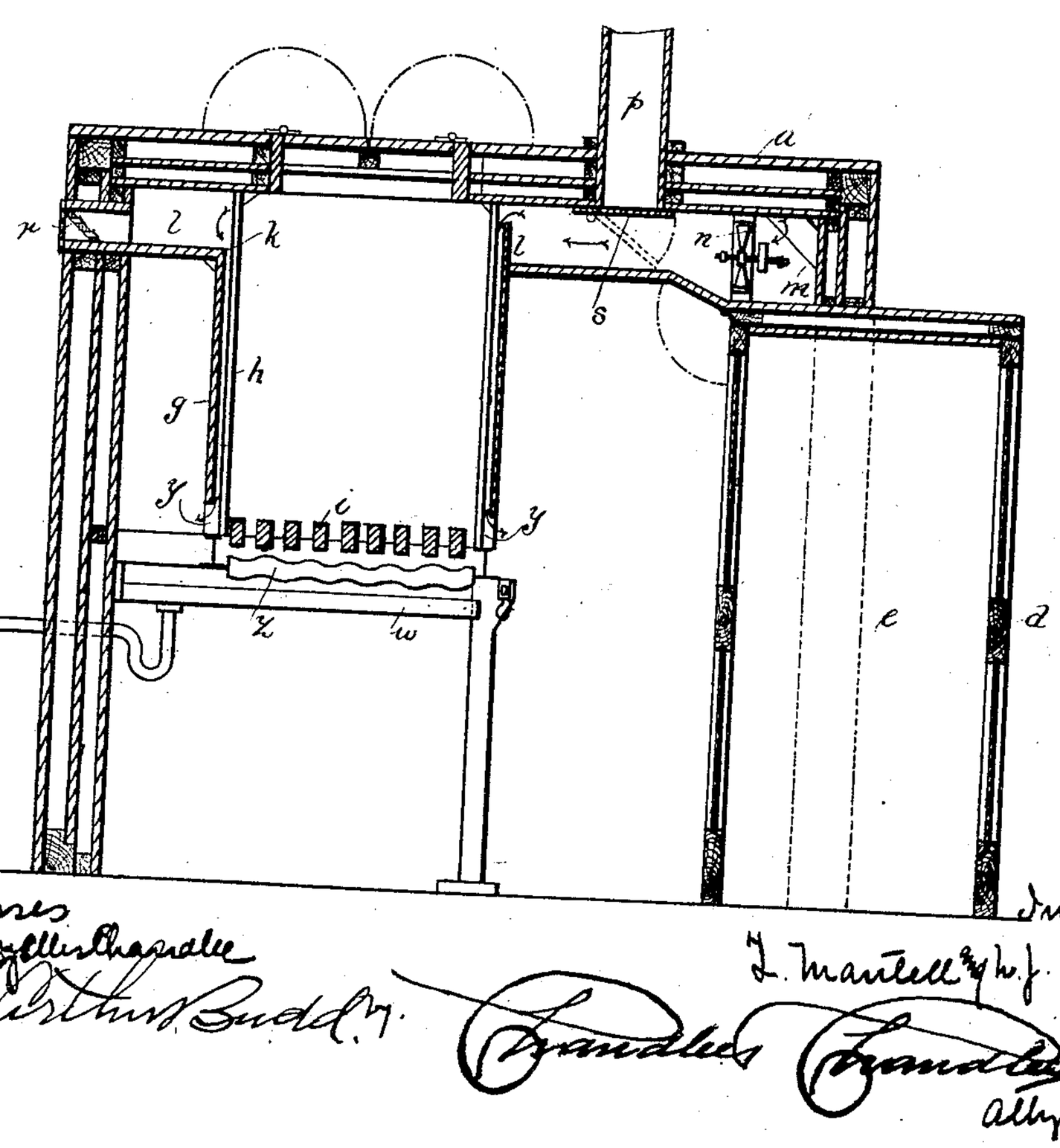


FIG. 4.



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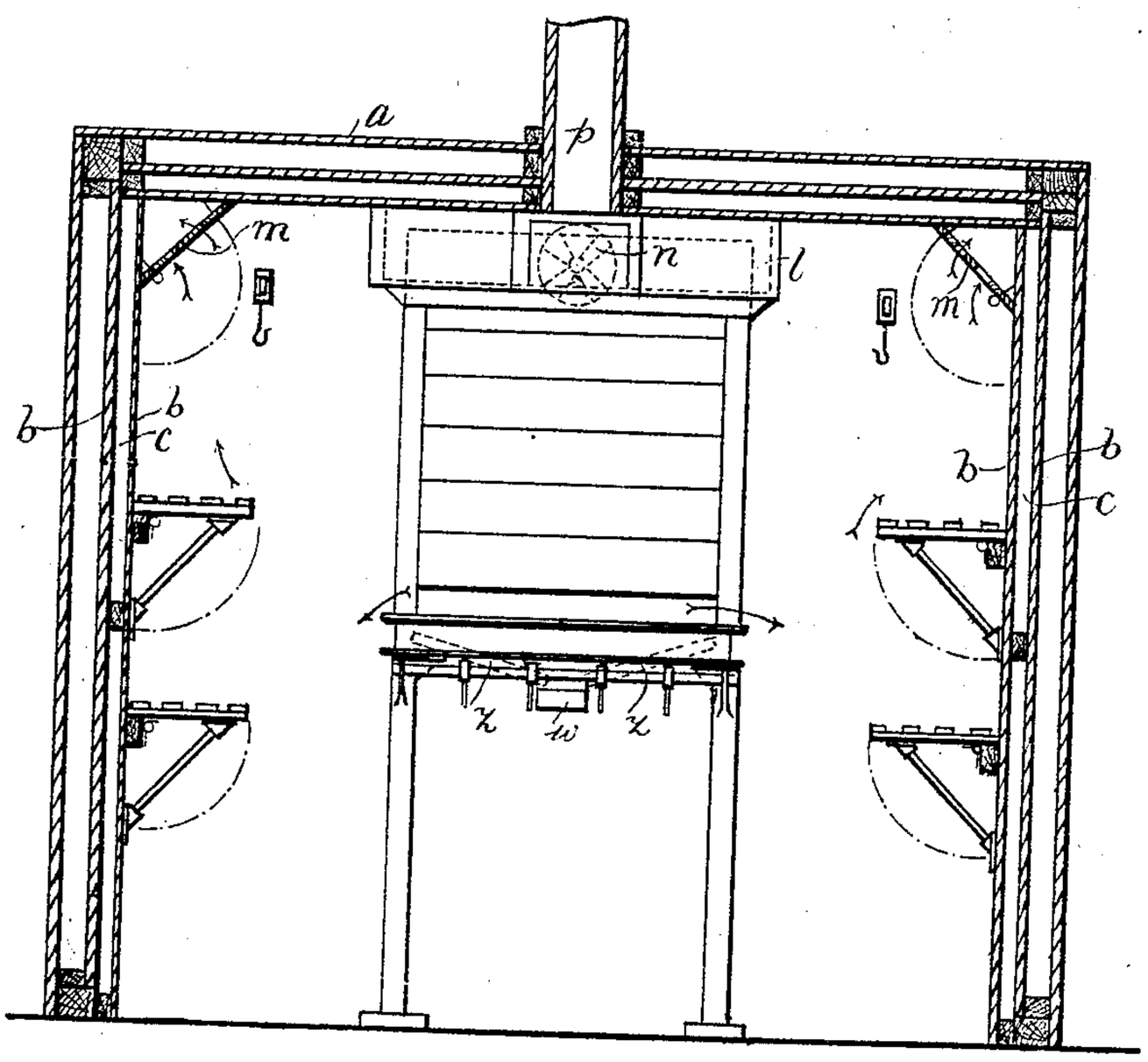
NO MODEL.

4 SHEETS—SHEET 4.

FIG. 5.



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No. 754,328. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

LOUIS MANTELL, OF LONDON, AND WILLIAM JACOB PRIM, OF WIMBLEDON, ENGLAND, ASSIGNORS TO JAMES KEITH & BLACKMAN COMPANY, LIMITED, OF LONDON, ENGLAND.

COLD-AIR CHAMBER OR REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 754,328, dated March 8, 1904.

Application filed March 20, 1902. Serial No. 99,192. (No model.)

To all whom it may concern:

Be it known that we, LOUIS MANTELL, residing at The National Liberal Club, Whitehall Place, London, and WILLIAM JACOB PRIM, residing at 80 Warple road, Wimbledon, county of Surrey, England, subjects of the King of the United Kingdom of Great Britain and Ireland, have invented certain new and useful Improvements in Cold-Air Chambers or Refrigerators, of which the following is a specification.

This invention relates to cold-air chambers or refrigerators for storing fresh meat, fish, and other perishable goods; and it has for its object by improved construction of such chambers and the provision of means for directing the circulation of the air therein to insure that a practically uniform temperature may be maintained under varying conditions of outside temperature and removal of moisture in the air may be effected as and when required. A suitably lined or jacketed chamber is employed and fitted with an ice-chest which is normally closed to the chamber, so that the air may not be charged with moisture from the ice, and a fan or air-propeller is provided to circulate the air of the chamber through suitable channels and direct it against the walls of the ice-chest, so as to cool the air and at the same time effect the condensation of moisture contained in the air by contact with the heat-absorbing surfaces of the ice-chest, the drip or water of condensation being drained off from the sides of the ice-chest and led out of the chamber along with the water due to melting of the ice.

In the accompanying drawings, which illustrate the invention, Figure 1 is a longitudinal sectional elevation of a permanent chamber constructed according to our invention. Fig. 2 is a sectional plan taken at or about the line of the ceiling of the chamber, and Fig. 3 a transverse sectional elevation at or about the line 1 2, Fig. 2. Figs. 4 and 5 are sectional elevations at right angles to one another of what may be termed a "portable" or "removable" apparatus.

Referring to Figs. 1, 2, and 3, the cold-air chamber is constructed of brickwork *a*, with air-spaces in the walls to prevent radiation. We prefer, however, to line the chamber walls and roof with two thicknesses of wood *b*, filled with slag, wool, or other non-conductor *c*, the lining being placed a certain distance from the brickwork *a* to allow an air-space, as before mentioned.

d is a door in the brickwork *a*, leading to a vestibule *e*, having walls lined in the same manner as the chamber, and from which vestibule a second door leads into the chamber. When the cold-air chamber is of large dimensions, there may be provided a center partition *f* of similar construction as the lining of said chamber, this partition dividing the cold-air chamber into two compartments and having a door, so that by closing this door the size of the chamber may be reduced at certain times of the year when a large storage is unnecessary.

g is an ice chamber or chest supported centrally by a wall and at its ends by girders and columns or in any other convenient manner, and the box is provided with a door for the insertion of the ice. A partition *x* (see Fig. 1) is provided in order to shut off a portion of the ice-chest when it is desired to reduce the size of the apparatus.

The ice-box *g* consists of a sheet-metal casing *h*, preferably corrugated, as shown, so that a number of channels is provided between it and an outer wooden shell surrounding the casing *h* for the passage of the air, the corrugations presenting a large surface to effect the condensation of moisture contained in the air. The floor of this ice box or chest, consists, as usual, of a grating *i* to support the ice, and in the roof of the chest are a series of openings closed by a valve or valves *j*. Near the top of the outer shell of the ice-chest openings *k* are made to allow air to enter and pass down the channels formed by the corrugations of the former, corresponding openings *y* being made at the bottom to allow the air to pass out, as shown by the arrows. The moisture of the air is condensed by contact with the chilled casing *h* on its passage along the channels, the water

of condensation running down to a gutter or tray below the ice-supporting grating *i*. The water dripping from the ice is caught by an inclined floor *z* and conducted to a gutter *w*, suitably connected with the drain. Air for refrigerating purposes is drawn from the upper parts of the chamber by means of spreading ducts or trunks *m*, the air so drawn being directed along a duct or trunk *l*, surrounding the ice-chest *g*.

In the trunk *m* fans *n* are fitted for drawing the air from the chamber and directing it along the ducts and outer surfaces of the ice-chest *g*, and this trunk *m* also connects with a passage *o*, lying parallel with the duct *l* and provided with an upcast-shaft *p*.

The air from the duct *m* may be directed either to the duct *l* or passage *o* by means of suitable valves *q*, (see Fig. 2,) which are thrown over to one side or the other, as desired.

The action of the apparatus is as follows: The ice-box *g* being charged with ice and the provisions being placed on the shelves and hooks (shown at Figs. 1 and 5) in the cold-air chamber, the circulation of the air contained within the chamber is effected by means of fans. The warmed air is drawn from the provision chamber or chambers by the trunks *m* and conveyed along these to the duct *l*, where it comes into contact with the chilled walls of the ice-box *g*. The air then enters the openings *k* and passes down the channels formed by the corrugated casing *h* of the box *g*, the cold surfaces of the latter abstracting moisture from and chilling the air during its passage between the casing *h* and the shell of the box. The cooled and dried air then passes out at the openings *y* into the chamber where the meat or vegetables are stored, this operation being continued and the same air circulated as long as it is deemed desirable. If moist air is required, the valves *j* in the roof are opened, and the air passes downward from the trunk *l* through the ice-chamber in contact with the ice and finally passes out through convenient side passages.

When the contaminated air is to be drawn off, the connection between the trunks *m* and *l* is closed by throwing over the valves *q*, and the fans draw this air from the chamber by the trunks or ducts *m* and force it out by the upcast-shaft *p*. An inlet for fresh air is provided and furnished with an automatically-acting valve or valves, as indicated at *r*, Fig. 4.

Referring now especially to Figs. 4 and 5, instead of the brickwork *a* an outer casing, of wood or other non-conducting material, is provided. In this arrangement the upcast-shaft *p* is shown as provided with a shut-off valve *s*, which in its action will correspond to the valves *q*, Fig. 2. The trunk or duct *m* for effecting the circulation of air and for drawing off the vitiated air when required is in this modification arranged round the top angles of the chamber, as shown. In this arrangement the ice-doors are placed at the top.

Having now described the invention, what we claim, and desire to secure by Letters Patent, is—

A refrigerating-chamber comprising non-conducting walls, an ice-receptacle disposed within the chamber and having openings in its top and bottom and longitudinal passages through its walls, closures for the openings in the top of the ice-receptacle, an air-conducting passage surrounding the ice-receptacle at its top, and communicating with the longitudinal passages and the openings in the top of the ice-receptacle, air-conducting passages communicating with the first-named passage and opening into the chamber, fans disposed within the second-named passages for forcing air into the first-named passage, an air-exit passage communicating with the second-named passages and opening exteriorly of the chamber, and doors for closing the communication between the exit-passage and second-named air-passages, said doors being movable to open the communication between the exit-passage and second-named air-passages and to close the communication between the first-named air-passages and second-named air-passages, the closures for the openings in the top of the ice-receptacle being adapted to be opened to permit of a portion of the air to pass through the ice-receptacle and in contact with the ice.

In witness whereof we have hereunto set our hands in presence of two witnesses.

LOUIS MANTELL.
WILLIAM JACOB PRIM.

Witnesses:
WALLACE FAIRWEATHER,
JNO. ARMSTRONG, Junr.