H. A. ROBERTS.

Refrigerators for Slaughter-Houses.

No. 145,968. Patented Dec. 30, 1873.

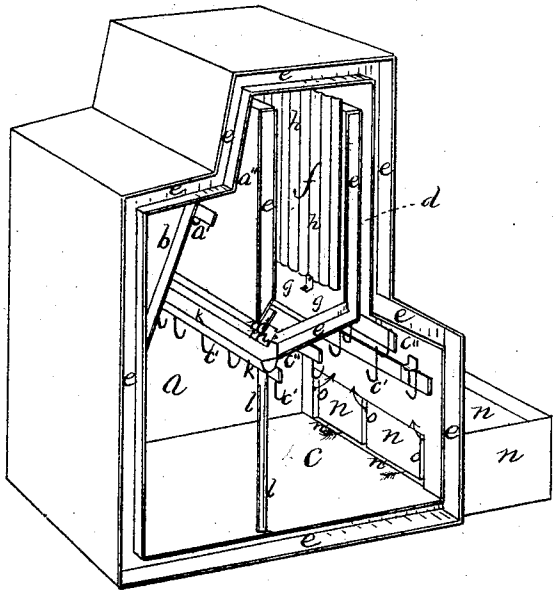

Fig. 1.

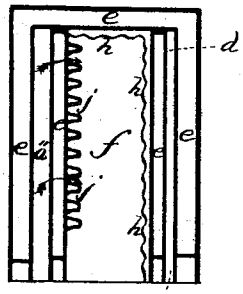

Fig. 3.

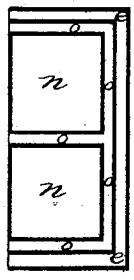

Fig. 4.

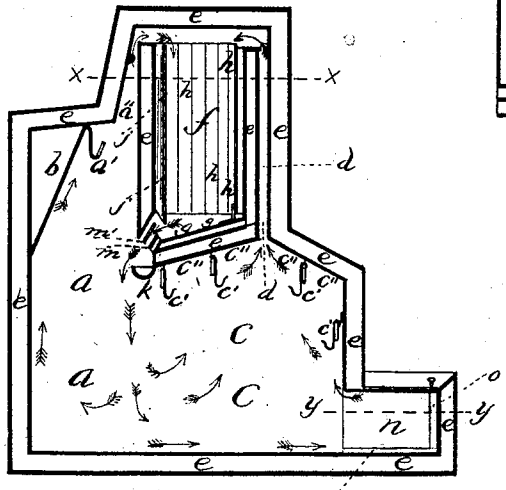

Fig. 2.

WITNESSES

D. M. Williams.

E. A. Ober.

INVENTOR

Henry A. Roberts.

By his Attys

Henry W. Williams & Co

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

HENRY A. ROBERTS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN REFRIGERATORS FOR SLAUGHTER-HOUSES.

Specification forming part of Letters Patent No. **145,968**, dated December 30, 1873; application filed May 10, 1873.

To all whom it may concern:

Be it known that I, HENRY A. ROBERTS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and valuable Improvement in Slaughter-House Refrigerators, of which the following is a specification:

This refrigerator is intended more particularly for slaughter-house use, and is intended to be used both for conditioning sides of beef after slaughtering, and also for keeping smaller meat, such as veal, mutton, &c. Particular attention is paid to obtaining a perfect circulation of cool, dry, and pure air.

The nature of my invention is fully described below.

In the accompanying drawings, Figure 1 is an interior view, in perspective, of a slaughter-house refrigerator which embodies my invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a horizontal section through the line *x x*. Fig. 4 is a horizontal section through the line *y y*.

Similar letters of reference indicate corresponding parts.

e represents the walls of the refrigerator, and also those forming the ice-chamber, all being filled, as usual, with non-conducting filling. *a* is the conditioning-chamber. This is a high chamber, terminating in a flue, *a''*, which communicates with the ice-chamber. This chamber *a* is intended for conditioning sides of beef after they are slaughtered, and is entirely distinct from a smaller chamber, *c;* and although no visible partition extends between the two chambers, yet the air from one does not pass to the other, and the two chambers are practically divided by a descending current of air, which divides at the lower portion of the refrigerator, a portion passing up through one chamber, and a portion through the other. The sides of beef in the chamber *a* are suspended from hooks, *a'*, upon sliding trucks, as usual. *b* is a plate, so placed in order to direct the current of ascending air directly upon the portion of the side which hangs highest, and is smaller in bulk than the rest. Were it not for this plate *b* the ascending current of air would be apt to follow up the wall, and not come in direct contact with the part of the side above alluded to. *c* is a smaller chamber, and might perhaps be termed "an auxiliary chamber." This is a lower chamber than the chamber *a*, and is intended for keeping smaller meats, such as mutton, veal, &c., which may be suspended from hooks *c'*. The roof *c''* of the chamber is inclined upward toward its center, and at its apex is a flue, *d*, which carries the air from the chamber *c* to the ice-chamber. The inclined roof *c''* facilitates the passage of the air into the flue *d*, which may be of any desired length. *f* is the ice-chamber.

Much annoyance has been caused in ice-chambers of refrigerators on account of the deposition upon the floor of the ice-chamber of impurities from the ice, which gradually accumulate until they become offensive and detract from the perfect preservation of the contents of the refrigerator, unless often removed. Again, a serious obstacle to perfect refrigeration presents itself in the effect of the action of the descending current of warm air upon the ice, which is to create a passage vertically between the ice and the dividing-partition, thus making a flue for the circulating current of air, while the intention is, that the air shall come in direct contact with the ice.

Both these objections—the latter a serious one—are obviated by my inclined floor *g*. By means of this inclined floor *g*, the ice is automatically pressed against the dividing-partition, thus preventing the formation of the passage alluded to, and melting against the said partition. The water and impurities run into the trough *k*, and out through the conductor *l*. *h* is a non-contact condensing-wall, made of metal, and intended to prevent the condensation and absorption of moisture by the wood-work surrounding or forming the walls of the ice-chamber. *j j* are raised ribs or cleats, against which, in my ice-chamber, the ice automatically presses. As the ice continuously presses against these ribs *j j*, a greater ice-surface is exposed to the current of air, thus obtaining a more perfect refrigeration. *m m'* are inclined drip-vanes, extending outwardly toward the conditioning-chamber *a*. They are placed equidistant from each other, and they are inclined so as to be parallel to the line of direction of the current of air, so that the flow of air is in no degree retarded. The object of

the drip-vanes *m m'* is to prevent the spatter from the ice-meltings from entering the chamber *a*. The upper vane *m'* extends at its lower edge a little beyond the vane *m*, the object being to prevent any drippings upon the vane *m'* from striking the vane *m*, and then spattering into the chamber *a*. The vanes *m m'* are placed directly over the trough *k*.

It will be seen, by noticing particularly Fig. 2 in the drawing, that the current of air in the chamber *a* passes up the flue *a''*, down through the ice-chamber *f*, between the vanes *m m'*, down to the lower portion of the chamber *a*, and up over the side suspended there, and by the plate *b* to the ice-chamber again. This current of air does not touch any meat excepting that suspended in the chamber *a*.

The air in the chamber *c* passes up under the inclined roof *c''*, up the flue *d*, through the ice-chamber *f*, down between the vanes *m m'*, and into the chamber *c*, without coming in contact with the meat in chamber *a*, or even entering the said chamber *a*. The current descending from the ice-chamber divides into two portions, completely separating the chambers *a* and *c*. This is an important result to be attained, as it would be a serious objection if the air should pass from the side suspended in chamber *a* to the small meats in chamber *c*, or, having passed over the contents of chamber *c*, should enter the chamber *a*.

n is an auxiliary chamber or tank for salting purposes. It is here represented as a double tank. Air passages or flues extend underneath it, and upon all sides of it, and between the two tanks. A portion of the air, after leaving the ice-chamber *f*, descends to the bottom of the refrigerator, and passes into the air-space *n'* under the tanks, (see Fig. 1,) and, passing around the air-passages *o*, passes out at the upper part of the said air-passages *o* and up through the flue *d*. The interior of the tank *n* is accessible from the outside, so that the saline vapors need not discolor the fresh meats in the interior of the refrigerator.

I hold that in this invention I have produced a refrigerator which, by means of the thorough isolation of its chambers, and more particularly by means of the automatic movement of the ice, insures as cool, dry, and perfect refrigeration upon subsequent days as it does upon the first day of its use. The space between the cleats or ribs *j* is so deep that a continuous flue is formed between each cleat, allowing a thin stratum of air to pass down and become thoroughly cool.

It will be understood that, on account of the automatic movement of the ice, all impurities upon the floor *g* are carried with the moving ice until they are ready to fall into the trough.

The auxiliary chamber *c* is very useful, not only for containing veal, mutton, &c., but also for preserving quarters of beef after they have been conditioned in the chamber *a*.

It will easily be seen that any properly inclined support may be used in addition to or as a substitute for the inclined floor *g*. A level floor might be used with an inclined support for the body of ice.

My improvement may be applied to all varieties of refrigerators.

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

1. The ice-chamber *f*, having the floor or other support for the ice inclined downward toward a partition-wall, at the upper and lower portions of which wall are placed, respectively, an induction and eduction air-passage.

2. The arrangement, with the ice-chamber, of the non-contact condensing-plate *h*, said plate being constructed and arranged substantially as above described, for the purpose of allowing free circulation above, below, and on each side of the same, so that the condensed moisture may adhere to both surfaces of the said plate.

3. The arrangement, with my ice-chamber *f* and floor *g*, of the ribs or cleats *j j*, or their equivalent, for the purpose of exposing more ice-surface to the descending current of air, as above specified.

4. The arrangement of the auxiliary chamber *c* with the flue *d*, said flue being of any desired length, and leading from the apex of the inclined roof *c''* to the ice-chamber *f*, for the purposes described.

5. The arrangement of the ice-chamber *f* and flue *d*, of any desired length, with the tank or chamber *n*, having air-spaces *n' o* around and below it, as and for the purposes above set forth, and particularly for the purpose of preventing any stagnation of air in the portion of the chamber *c* which is nearest the tank *n*.

6. The drip-vanes *m' m*, the lower edge of the former projecting beyond the lower edge of the latter, and arranged so as not only to discharge the drippings into a receptacle below, but also to facilitate the passage of the descending current of cool air, as hereinbefore specified.

7. The arrangement, with the chamber *a*, of the plate or wall *b*, as and for the purpose above described.

8. The arrangement, with the high conditioning-chamber *a*, of the lower auxiliary chamber *c*, said chamber *c* being constructed either with or without the inclined roof *c''*, to facilitate the passage of air into the flue *d*, as and for the purposes hereinbefore described.

9. The arrangement with the chambers *a c*, or with either, of the chamber or tank *n*, said tank *n* having air-spaces *n' o* around and below it, constructed and arranged substantially as and for the purposes hereinbefore set forth.

HENRY A. ROBERTS.

Witnesses:
HENRY W. WILLIAMS,
E. H. OBER.