

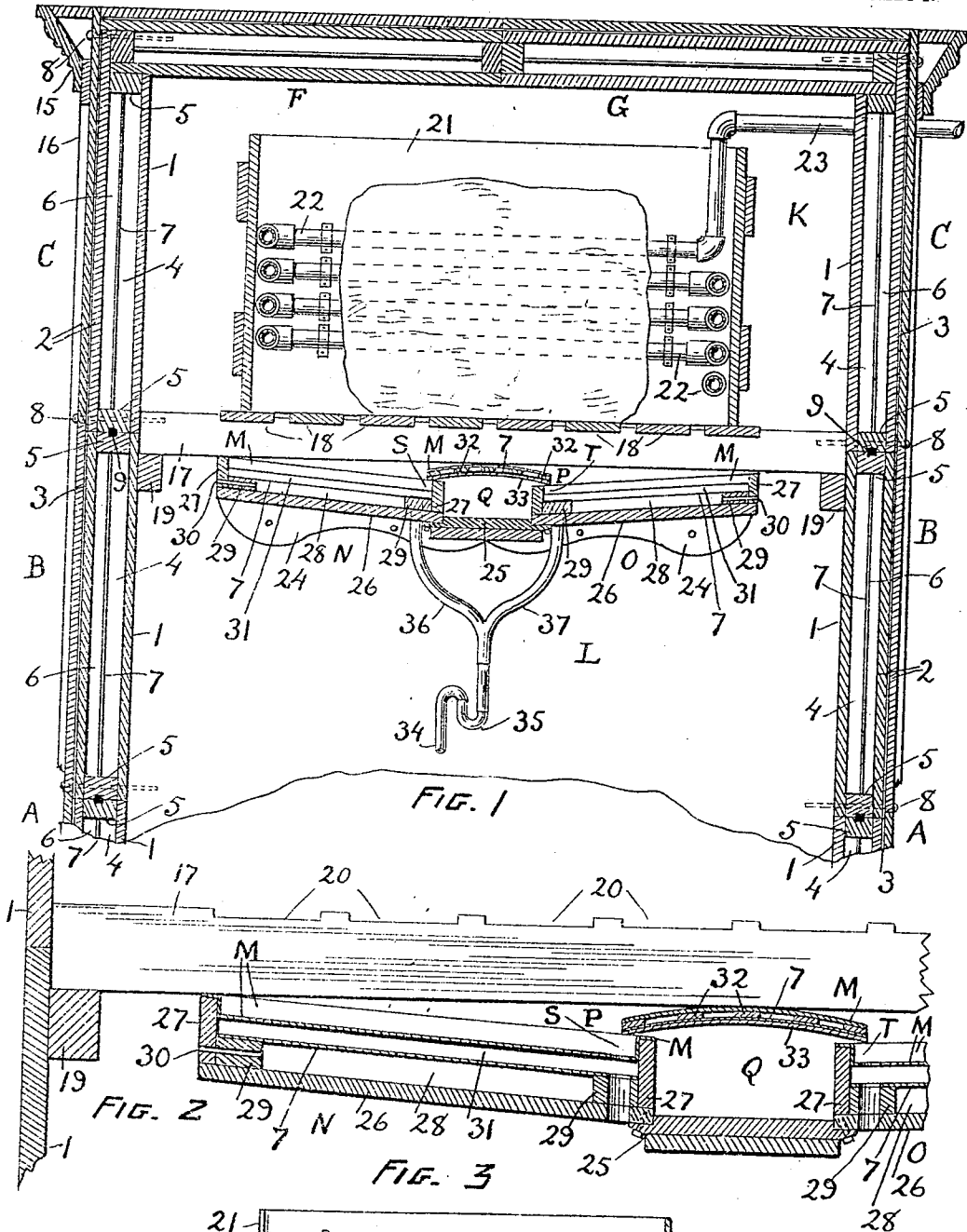
No. 814,523.

PATENTED MAR. 6, 1906.

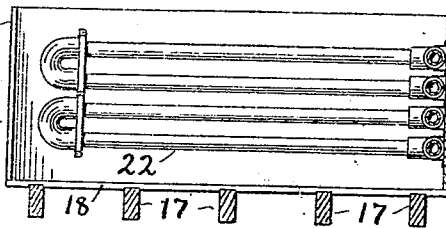
S. DI VECCHIO.
REFRIGERATOR.

APPLICATION FILED AUG. 11, 1904.

2 SHEETS—SHEET 1.



WITNESSES:
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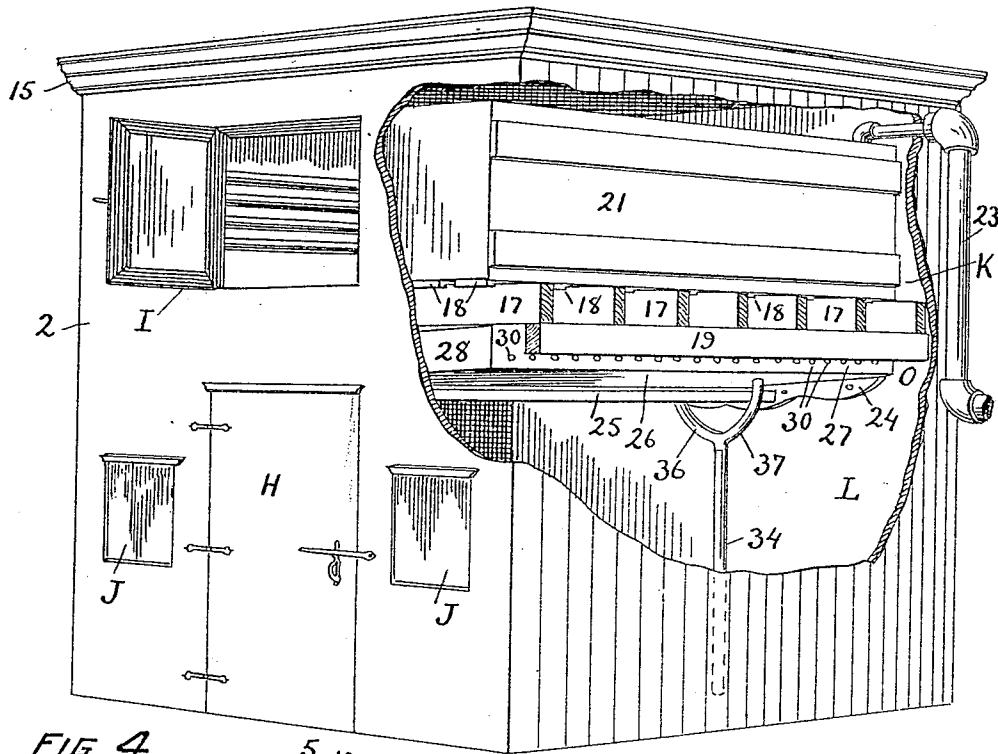


FIG. 4

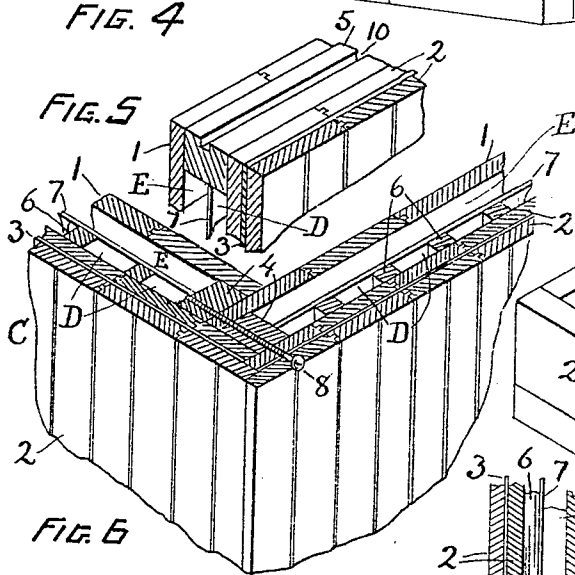


FIG. 5

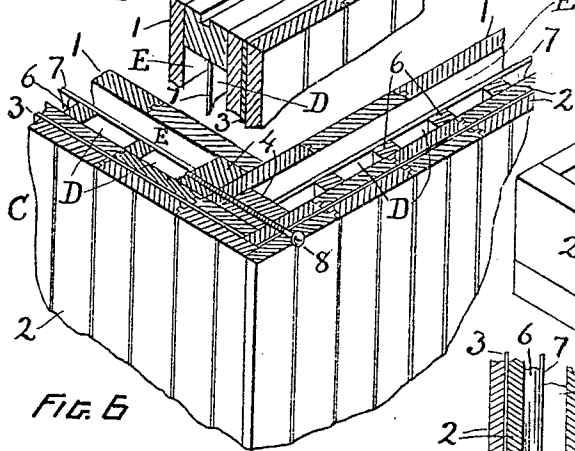


FIG. 6

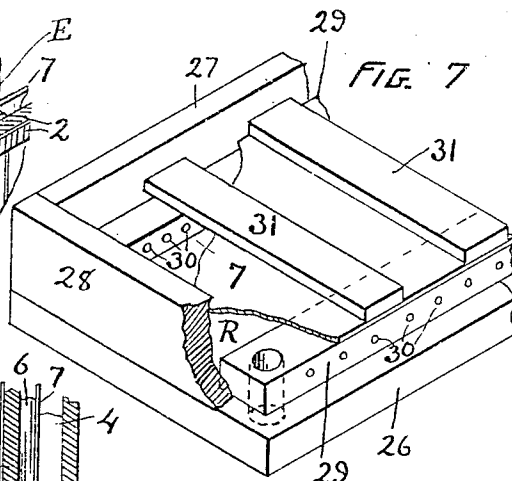
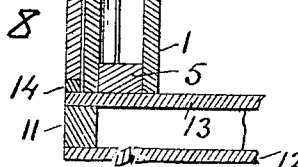


FIG. 7

WITNESSES: FIG. 8

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UNITED STATES PATENT OFFICE.

STEFANO DI VECCHIO, OF SAN FRANCISCO, CALIFORNIA.

REFRIGERATOR.

No. 814,523.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed August 11, 1904. Serial No. 220,425.

To all whom it may concern:

Be it known that I, STEFANO DI VECCHIO, a citizen of the United States of America, and a resident of the city and county of San Francisco, State of California, have invented a new and useful Refrigerator, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is an improvement in refrigerators or cooling-rooms which are used for storing and preserving meats, vegetables, and other edible substances liable to spoil when exposed to heat.

The great essentials on which the successful operation of any refrigerator or cooling-room depends are the confinement of internally-generated cold, the exclusion of external heat, and the elimination of all moisture from the storage-chamber. In order to preserve such substances as are usually stored in refrigerators, the air must not only be cold, it must be dry as well, and since the air which has been in contact with the melting ice is more or less saturated with moisture means must be devised for preventing this dampness from entering the storage-chamber, and if this is not accomplished the utility of the refrigerator is greatly impaired. For instance, meats when placed in a room of low temperature, but in which there is dampness, soon become soft and sticky, while in a room with the air dry even though at a higher temperature, they remain firm and smooth and retain their natural color. In attempting to produce this dry cold so essential to the successful operation of a refrigerator many devices have been employed; but so far as I am aware none has as yet been provided that accomplished the desired end notwithstanding the use of elaborate systems of flues to force the circulation of the air, and these flues were expensive and occupied much valuable space which if employed for storage purposes would have greatly enhanced the utility of the refrigerator.

In this improved refrigerator cold is produced by either ice or a system of refrigerating-pipes alone, as formerly, or both may be used together. These advantages, combined with that of a special sweat-proof draining-pan, provide for all of the points requisite to insure successful refrigeration, and it is believed that the result is the most perfect, practical, and economical refrigerator yet produced.

In the accompanying drawings, Figure 1 is

a view of the refrigerator vertically cross-sectioned with the base and most of the bottom section broken away. Fig. 2 is an enlarged cross-sectional view of part of the draining-pan and the rack upon which the ice rests. Fig. 3 is a longitudinal section of the ice box or chest with a part of the system of refrigerating-pipes attached thereto. Fig. 4 is a diagrammatic perspective view of the complete refrigerator. Fig. 5 is an enlarged fragmentary view of the wall of the refrigerator, showing a groove used in joining sections placed one upon the other. Fig. 6 is a perspective view of one corner of the refrigerator, showing the manner in which the sections forming it are secured together and exposing the manner of construction of the insulated walls. Fig. 7 is a broken perspective view of the frame of the draining-pan. Fig. 8 is a sectional view of part of the base and the side resting upon it, showing details of construction.

This style of refrigerator can be built of any desired dimensions, from eight feet in height upward; but to avoid obscurity the refrigerator herein described will be considered as twelve feet in height and twelve feet in length, with a breadth of six feet, as whatever may be said of this size will apply equally to those of different dimensions.

For convenience in shipping and erection the walls are constructed in sections, as A B C, usually four feet wide and of the same length as the refrigerator itself. Each section comprises an inner wall 1 and a double outer wall 2, between the layers of which is secured a thickness of specially-prepared paper 3, like the so-called "paraffin-paper," which is imperviable both as regards moisture and heat. These walls are secured to opposite sides of posts 4 and scantlings 5, placed at suitable intervals. To the inner side of the exterior wall 2 are nailed furring strips or slats 6, to which is tacked a thickness of heavy absorbent paper 7, known as "felt-paper," which operates to retain all moisture coming in contact with it from either side. This provides for air-spaces, as D, between the slats and also for a continuous air-space, as E, between the absorbent paper and the inner wall. The space E is made twice the width of the space D, preferably. All the boards used in the two layers of the double outer wall and in the inner wall are tongued and grooved, making as close a fit as possible. This construction of the

walls makes complete insulation a fact, for materials are used which are waterproof and through which heat cannot be transmitted, and the cost of manufacture is less than though mineral wool or other expensive materials were used.

The ends of sections combining to form the corners of the refrigerator are built to interlock in order that the transmission of heat and moisture, which is prevented by the construction of the walls, shall not be permitted at the corners. To illustrate the manner of interlocking, let us refer to Fig. 6 and suppose the boards forming the outer and inner walls to be inch boards. The outside board of the double outer wall of one of the interlocking sections will then be extended about two inches past its end post and the inner board of the same wall one inch past the post. In the other interlocking section the outside board of the double outer wall will be located beyond its own post and extended past the post of the first section a distance of about one inch, and the inner board thereof will be cut flush with the post of the first section. This will allow the four boards in the outer walls of the two sections to meet at right angles and abut squarely one against another, the inside boards resting also upon contiguous sides of the post of the first section, which will be the corner-post, as shown. The inner wall of the first section is run in between the two posts and against the inside board of the double outer wall of the second section, and the inner wall of the second section is cut flush with its post and terminates in the rear of the inner wall of the first section, upon which it bears. An even corner is thus produced which when its several parts are fastened together by means of lag-screws 8, as illustrated, is as nearly air and water tight as possible and at the same time very firm.

In order to insure a snug fit of the sections placed one upon another, the top ends of the outside boards of the sections are extended a suitable distance—say four inches—and their lower ends drawn up a similar distance, thus providing something upon which the bottom ends of the inner boards of the superimposed sections may abut and be held firmly in place. They are secured more firmly together by means of a wooden bar 9, about seven-eighths of an inch-square, fitted into grooves 10 in the scantlings 5 of the abutting sections, which bar when inserted in its grooves acts as a lock, preventing any slipping, Figs. 1 and 5.

It is usual to construct this style of refrigerator upon a base of its own, which, as shown in Fig. 8, may be formed by securing joists, as 11, to the floor 12 of the building where it is to be erected and nailing to the upper side of the joists a floor 13 of tongued and grooved or closely - joined boards. The lowermost sections A of the refrigerator rest upon the floor 13 and are kept in place by sills, as 14,

provided around the same, the outside boards of each section bearing upon their respective sill and the inner boards directly upon the floor within the sill; but this base is not necessary, since cold air descends and heated air ascends, and the one would not escape from nor the other be admitted into the storage-chamber through the floor, and the refrigerator may consequently with perfect safety be constructed immediately upon the floor of the building.

The ceiling is conveniently constructed in sections F G, Fig. 1, in the same manner and of the same materials as the walls, and the sections may be made to interlock with those of the walls and bescrewed to them in a manner similar to that in which the corners are formed. For the sake of appearance a cornice 15 is secured around the top of the refrigerator, and strips 16, supporting it, are nailed to the sides near the corners.

The boards forming the outside of the refrigerator may be grooved half-way between their edges in order to present a neater appearance, and they are so shown in the drawings hereto attached, Fig. 4. The wood used in constructing this refrigerator is usually pine; but other woods may be used.

In the front wall of the refrigerator two doors are provided—a large one, H, opening into the storage-chamber and a smaller one, I, opening into the ice-chamber to admit the ice. The doors are built of materials the same as those of which the walls are constructed and fit into bevel or lock jambs. Windows J may be provided, one on each side of the lower door or in the side walls or at any point desired, and three panes of glass are used in each case, thus providing two dead-air spaces between them and preventing the transmission of heat or the escape of cold.

The interior of this refrigerator is divided into two rooms or chambers K L, one above the other, which are separated by a rack upon which the ice rests. The upper chamber is about half as large as the lower and is devoted exclusively to the cooling apparatus, if any be used, and the ice. The rack upon which the ice rests forms the floor of the upper chamber and is constructed by placing beams 17 transversely of the refrigerator about a foot apart and laying slats 18 across them at intervals of a few inches, leaving, however, a space of about a foot between the side wall of the refrigerator and the first slat on each side. The cross-beams rest upon and are secured to sills 19, nailed or screwed to the side walls of the refrigerator and running the entire length of the same. The slats are loose, though firmly set in notches or depressions 20, cut in the surfaces of the beams. Upon this rack is placed an uncovered and bottomless wooden ice box or chest 21, which is made of such a height as to inclose

the ice completely and at the same time permit the circulation of air above it, the ice being admitted through the door I in the end wall of the refrigerator and through a corresponding opening in the front end of the box 21. On the inside of this box is secured a U-shaped system of refrigerating-pipes 22, the feed-pipe 23 of which connects with the cold-generating machinery on the outside (not shown) and is passed over the top of the box and through the side wall of the refrigerator near the top and rear. An air-space of not less than six inches is left between the ice-box and the walls of the refrigerator all around, so that the air passing up between will be cooled by coming in contact with the ice and the moisture will be condensed before descending into the lower chamber of the refrigerator, which is the storage-room. The advantage in using a system of refrigerating-pipes lies in the fact that much less ice is consumed than is necessary when ice alone is used, and the refrigerator is therefore so constructed that such a system may be supplied at any time it may become desirable to the owner without necessitating any change in the refrigerator, except the cutting of a hole in one of its side walls through which to run the feed-pipe, and as the pipes will be placed around the inside of the ice-box no space will be taken which was previously in use for any purpose.

Directly under the rack 17 18 is placed the draining-pan, which is as long as the interior of the refrigerator and but little wider than the ice-box 21 above it and is supported by wooden brackets 24, secured to the end walls of the refrigerator, Figs. 1, 2, and 4. The pan proper is made of zinc, tin, or other suitable metal (designated by M) and is fitted over a specially-constructed frame, which is conveniently built in three sections N O P, and thus permits the same facility in shipping and handling this part as is characteristic of the other parts of the refrigerator. The sections N and O are placed side by side a short distance one from the other and are interconnected on their adjacent sides by the section P, which forms an overhanging bridge-piece or arched roof above them and constitutes a centrally-raised portion of the pan, leaving a central air-space Q thereunder between the two sections N and O. The air-space Q may be closed on the under side for the sake of improving the general appearance of the interior of the refrigerator by means of boards 25, placed over the opening and secured to the bottom of the sections N and O, as shown. The two sections N and O consist each of a box-like structure, having a bottom 26, sides 27, and ends 28. On the bottom 26 just within the sides 27 are secured two longitudinal bars 29, and to these is tacked a sheet of the same kind of absorbent paper 7 as is used in the construction of the walls of the re-

frigerator, thereby forming an air-chamber R between the bottom and the absorbent paper in each outer section of the frame of the draining-pan. (See Fig. 7 in addition to the figures above referred to.) A row of ventilating-holes 30 are bored in the sides 27 and adjoining bars 29 of each section N O to allow free circulation of the ambient air in these chambers R. Cleats 31, running transversely, are nailed over the sheet of absorbent paper 7 and to the bars 29 at a suitable distance apart in each section N O, and upon them and over the edges of each section, which are raised above them, is set the metallic lining or sheeting M. The metal M of the pan, it will be observed, is insulated from the absorbent paper by the cleats 31. The middle section or centrally-raised portion P, that spans and covers the air-space Q, is similar in construction to the sections N O, over the inner sides of which it extends and upon which it rests, except that it is on a smaller scale and convexo-concave transversely with the convex side uppermost. It comprises a top sheet of metal M, longitudinal bars 32, to the upper sides of which this sheet M is secured, a sheet of absorbent paper 7, tacked to the under sides of these bars, and cleats 33, placed under and across the absorbent paper and also secured to the under sides of the bars 32. The outer sections N O are inclined inwardly and downwardly toward each other, as best seen in Figs. 1 and 2, in order that their inner sides, over which the sides of the convex part P project, may be the lowest and shall accordingly cause the corresponding angular bends or corners of the metal lining M to be proportionately lowered, thereby forming two gutters, as at S T, wherein will be collected all the water that may drip from the melting ice above, whether it is shed by the central arched part of the pan or runs down from the raised sides of the pan, so that no water will be suffered to spread or allowed to stand for any appreciable length of time over a larger surface than is expedient to allow. The pan as a whole is given a rearward trend or dip of about one inch in five feet, that the water may be led inwardly and immediately carried to the rear and out of the refrigerator through a waste-pipe, as 34. This pipe is provided with a suitable trap 35 and has two branches 36 and 37, passing up, respectively, through the outer sections N O and opening into the pan on each side of its centrally-raised portion, where the gutters S T are formed. The discharge end of the pipe 34 runs through the floor of the refrigerator and is connected with the sewer or other convenient place for depositing the water. Though the construction of this pan is simple and inexpensive, it is nevertheless of extreme importance, since by its agency, aided by the complete insulation of the walls of the refrigerator, the air in the storage-chamber is kept uniformly dry,

as well as at a low temperature, and the substances placed in the storage-chamber are kept better and longer than would be possible without the pan.

5 The lower chamber L is used exclusively for storage purposes, and it may be fitted with rows of hooks, shelves, drawers, or any other appliances the owner may deem suitable, and the arrangement thereof may be conveniently
10 changed at any time. Also the spaces between the draining-pan and the side walls of the refrigerator permit the posts supporting the interior fittings to extend above and lean against either the walls or the pan, thereby
15 affording a means for hanging sides of beef or other meats in rows one above another without allowing them to touch or rest against each other, and much more can be
20 stored in this refrigerator than in any other of the same size.

As already stated, this style of refrigerator may be built of any desired dimensions and will prove as useful and well adapted for use in hotels, saloons, restaurants, grocery-
25 stores, clubs, public institutions, and families as in butcher-shops and general markets.

In this refrigerator it is unnecessary to force the circulation of air in order to secure dryness in the storage-chamber, since the
30 draining-pan operates to take up and lead away not only the drippings occasioned by the melting of the ice, but also the moisture which is condensed from the air in the upper chamber, and as a consequence elaborate sys-

tems of flues or other cumbersome appliances 35 are unnecessary and much expense and valuable space are saved. By the manner of insulating the walls another most desirable result is attained, the minimum consumption of ice, and consequently the minimum is 40 reached in cost of refrigeration.

The many great advantages of this invention are apparent, and hence will not be dilated upon, nor will the modifications which may obviously be made in the several parts 45 of the invention be alluded to; but it is intended that all modifications as to form or structure shall be fully covered by the subjoined claim.

What I claim, and desire to secure by Letters Patent of the United States, is— 50

A refrigerator including a storage-chamber and an ice-chamber above it, an ice-supporting rack separating said chambers one from the other, and a draining-pan under said 55 rack, said pan comprising three coacting sections having each a frame, a sheet of insulated absorbent paper therein, a metallic lining insulated from said sheet, means for causing a circulation of air under the absorbent 60 paper, and a discharge into a drain-pipe with a suitable trap and connections.

In testimony whereof I affix my signature in presence of two witnesses.

STEFANO DI VECCHIO. [L. s.]

Witnesses:

A. H. STE. MARIE,
GEO. F. CAVALLI.