A. FINK.

REFRIGERATOR.

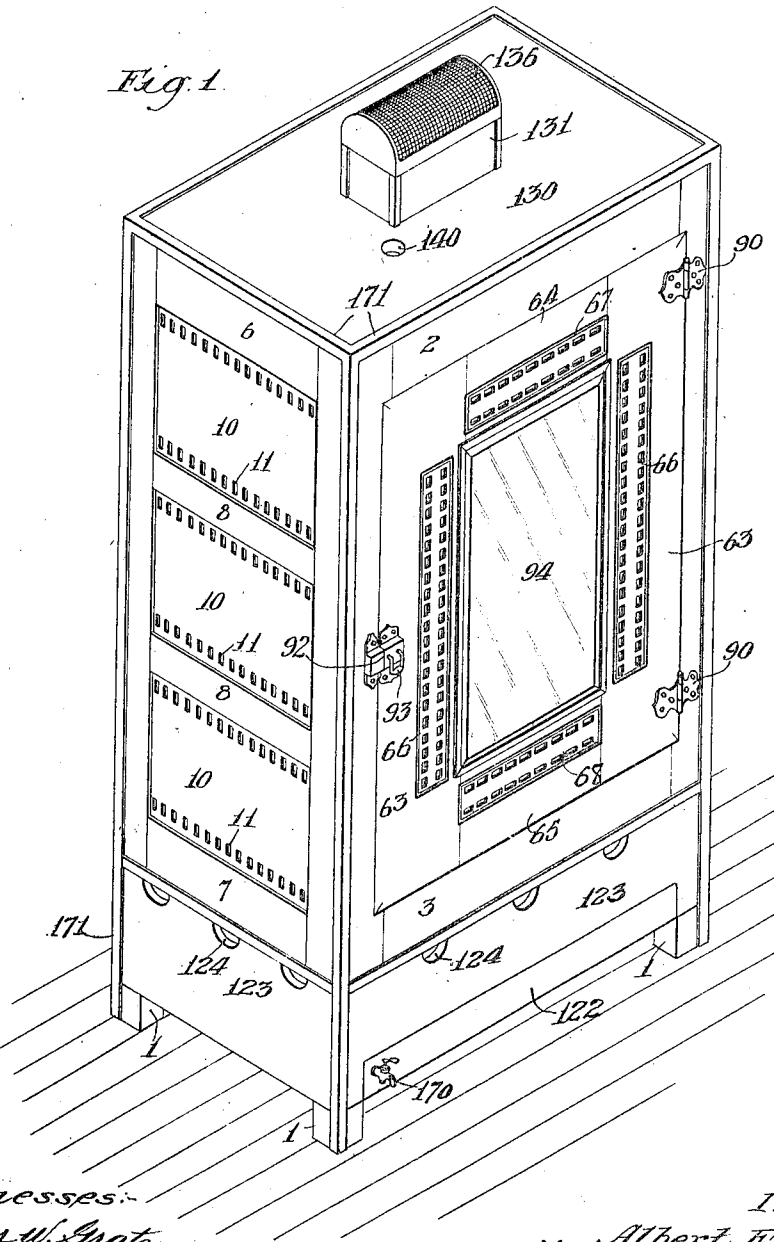
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1,067,724.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-
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2 SHEETS—SHEET 2.

Fig. 3.

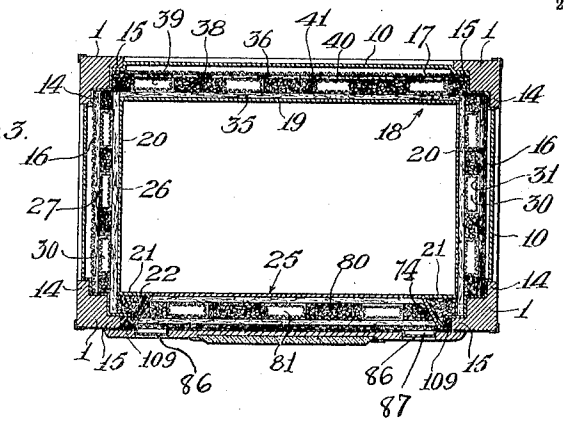


Fig. 7.

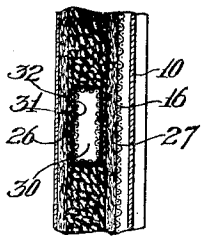


Fig. 4.

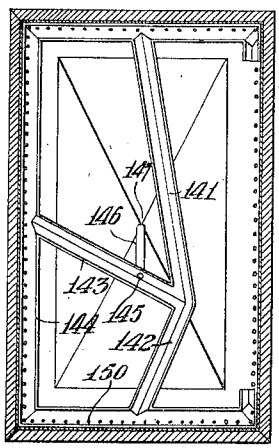


Fig. 2.

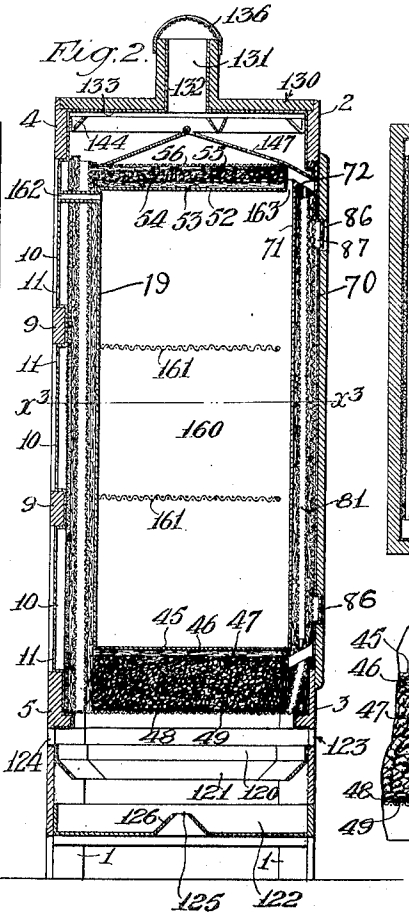


Fig. 8.

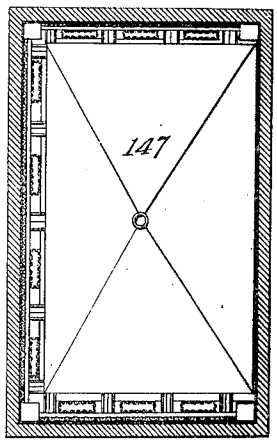


Fig. 5.

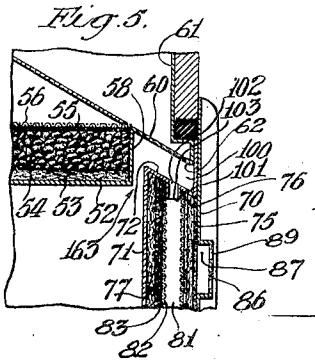
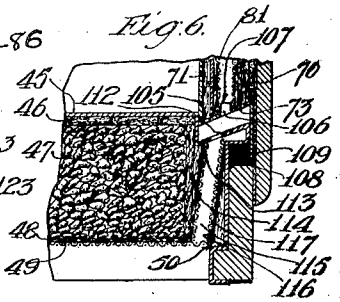


Fig. 6.



Witnesses:-

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Inventor

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by Townsend & Graham

his Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT FINK, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO NO ICE REFRIGERATOR COMPANY, A CORPORATION OF CALIFORNIA.

REFRIGERATOR.

1,067,724. Specification of Letters Patent. Patented July 15, 1913.

Application filed April 8, 1912. Serial No. 689,425.

To all whom it may concern:

Be it known that I, ALBERT FINK, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Refrigerator, of which the following is a specification.

My invention relates to improvements in refrigerators used for the purpose of preserving foods, being particularly of the type of refrigerator in which the evaporation of moisture is utilized for the purpose of reducing the temperature within the refrigerator, so that the contents thereof may be kept at a lower temperature than the outside atmosphere without the necessity of using ice.

Referring to the drawings, which are for illustrative purposes only: Figure 1 is a perspective view of a refrigerator. Fig. 2 is a vertical, sectional view of the refrigerator. Fig. 3 is a horizontal, sectional view on line x^3—x^3 Fig. 2. Fig. 4 is a plan view with the top of the refrigerator removed. Fig. 5 is an enlarged, vertical, sectional view of the upper portion of the door of the refrigerator and the adjacent parts of the refrigerator. Fig. 6 is an enlarged, sectional view of the lower portion of the door of the refrigerator and the adjacent parts of the refrigerator. Fig. 7 is an enlarged, horizontal sectional view of a portion of the wall of the refrigerator. Fig. 8 is a sectional, plan view of the refrigerator showing a modified form of water distributer.

The refrigerator comprises a frame consisting of four vertical corner posts 1 joined at the front by means of cross bars 2 and 3, at the back by cross bars 4 and 5 and at each side by means of upper and lower bars 6 and 7. The standards 1 are also joined on each side by means of bars 8 which extend therebetween. The back of the frame is also provided with cross bars 9. Mounted within the frame just described is an outer casing 10 which extends on the inner side of the frame across the back, across each side, and over the cross bars 2 and 3 of the front of the frame, the space between the cross bars 2 and 3 and the standards 1 on the front of the frame being left open for the purpose of receiving the door hereinafter described. The outer casing 10 extends outwardly into the space between the cross bars on the back and sides of the refrigerator to form an air space between the casing 10 and the evaporating surfaces of the body walls of the refrigerator. Perforations 11 are formed in the casing 10 for the purpose of permitting the atmosphere to enter within the outer casing for the purposes hereinafter described. The inner corner of each post 1 is cut to form two vertical ledges 14 and 15 respectively, the outer casing 10 being bent over the ledges to form seats to receive the body walls of the refrigerator, as hereinafter described. Each end wall of the refrigerator consists of a sheet of foraminous material, preferably a wire screen 16, which rests upon the seats 14, the body of the screen being spaced apart from the casing 10 at each end of the refrigerator leaving an air space therebetween. The back of the refrigerator is provided with a sheet of foraminous material or screen 17 extending across the back of the refrigerator and seated upon the respective seats 15 formed by the back upright posts 1 and the casing thereon, the screen 17 being spaced apart from the rear wall of the casing 10 to form an air space therebetween.

The inner member of the refrigerator wall consists of a sheet metal casing 18 having a back portion 19, end walls 20 and front portions 21 which extend parallel with the front of the refrigerator, thence forwardly and flaring outwardly to form a seat 22 for the door 25, at which point the front portions are secured to the outer casing in any suitable manner. Placed on the outer face of the ends 20 of the inner casing 18 is a sheet 26 of asbestos or other absorbent material, a sheet 27 of similar material being placed on the inner side of the screen 16 at each end of the refrigerator, the space between the sheet 26 and the sheet 27 of asbestos being filled with charcoal or other similar porous material, except that at intervals there are provided vertical flues or air passages 30 formed of screen 31, the cross section of which, in the form shown, is rectangular, and having a thin sheet 32 of asbestos placed about the screen 31. The rear wall of the refrigerator is similarly formed and consists of a sheet 35 of asbestos placed on the outside of the wall 19 of the inner casing, a sheet of asbestos 36 placed on the inner side of the screen 17, and a charcoal filling 38 therebetween. Air flues

39 are also provided in the rear wall of the refrigerator extending vertically therethrough consisting of wire screens 40 having a cross sectional area of rectangular shape, each covered on the outside with a thin sheet of asbestos 41.

The inner casing of the refrigerator is provided with a bottom wall 45 on the underside of which is placed a sheet 46 of asbestos which rests upon a body 47 of charcoal or other porous material supported on a sheet of asbestos 48 on the top of a screen 49, which screen 49 extends across the bottom of the refrigerator and rests upon ledges or seats 50 formed on the cross bars of the frame of the refrigerator. The inner casing is also provided with a top wall 52 upon which is placed a sheet of asbestos 53, then charcoal filler 54, upon which rests a sheet of asbestos 55, upon which is placed a screen 56. The front edge 58 of the top wall 52 is bent upwardly, as clearly shown in Fig. 5, for the purpose of forming a holding means for the sheets of asbestos 53 and 55, charcoal filling 54 therebetween and the screen 56. Extending downwardly from the upper edge 58 of the top wall 52 is a sheet of metal 60 which extends downwardly to a sheet 61 of metal placed on the inner face of the cross bar 2. The sheet 60 forms a trough for the purpose of conducting water to a series of perforations 62 formed in the lower end of the sheet 60, as hereinafter described.

The door of the refrigerator consists of a frame comprising vertical bars 63, top bar 64 and lower bar 65. The bars 63 are each provided with vertical openings 66 and the bars 64 and 65 are each provided with openings 67 and 68 into each of which extend hollow ribs 86 formed on a sheet 70 of metal secured to the inner side of the frame of the door.

The inner face of the door consists of a sheet 71 of metal, terminating at its upper end in a downwardly extending top member 72 and at its lower end in an upwardly extending bottom member 73, the edges of the members 72 and 73 terminating in flat portions secured to the sheet or plate 70 in any suitable manner. The member 71 at each side thereof terminates in two inclined side members 74 which are adapted to fit against portions 22 of the inner casing 18. Placed against the inner side of the sheet of metal 70 is a screen 75, the inside of which is covered by a sheet of asbestos 76, and the inner sheet 71 of the door is provided with a sheet of asbestos 77, the space between the sheets 76 and 77 of asbestos being filled with charcoal, as indicated at 80. The door is also provided with three vertically disposed air conduits 81 consisting of an inner layer of wire screen 82 surrounded by a thin sheet of asbestos 83 in the same manner as those heretofore described in the body walls of the refrigerator. The plate or sheet 70 comprising part of the door is provided with longitudinal and transverse hollow ribs 86 formed therein which extend into the respective openings in the front of the door, leaving an air space 87 between the ribs 86 and the screen 75, the ribs 86 being provided with a series of perforations 89, so as to permit air to come in contact with the screen 75 and asbestos sheet 76. The door is mounted on suitable hinges 90 secured to one of the front vertical posts 1, and is also provided with locking means, indicated at 92, operated by means of a handle 93. The door in the present instance is also provided with a mirror 94 which is mounted in any suitable manner on the face of the door.

The upper end of the inner plate 71 of the door is bent downwardly toward the outer plate 70 of the door, thence upwardly along the face thereof, as heretofore described, thereby forming a channel 100 having a series of perforations 101 at the lower end thereof. The portion 72 of the plate which forms the channel is also provided with a series of openings 102 having downwardly extending flanges 103 which extend into the respective air conduits 81 formed in the door. The lower member 73 of the plate 71 is provided with a series of perforations 105 and also having formed therein a series of openings 106 surrounded by flanges 107 formed on the member 73 which extend upwardly into the lower end of the air conduits 81 in the door, as clearly shown in Fig. 6. The members 72 and 73 of the inner plates and the side portions 108 thereof are adapted to engage a rubber gasket 109 secured to the fixed portion of the refrigerator for the purpose of making a tight closure between the door and the stationary portion of the refrigerator. The front edge of the bottom plate or wall 45 is bent downwardly, then upwardly at an angle, as clearly shown in Fig. 6, to form a channel 112 under the inner portion of the door, a series of perforations 113 being formed in the channel at the lowest portion thereof, so that moisture which may be deposited on the channel may drain downwardly onto a sheet 114 of asbestos placed across the front end of the charcoal body 47 in the bottom of the refrigerator. Adjacent to the front edge of the bottom of the refrigerator and arranged to register with the air conduits in the door of the refrigerator is a series of air conduits 115 formed of wire screen 116 on the inner side thereof covered with a sheet of asbestos 117 for the purposes hereinafter described. A deflector 120 is mounted below the refrigerator body having an inwardly extending flange 121 for the purpose of directing moisture which may drop from the body of the refrigerator into a pan 122

mounted upon a frame 123 on the bottom of the refrigerator, which frame 123 is provided with a series of openings 124 opposite or adjacent to each air conduit of the refrigerator for the purpose of permitting free passage of air from the exterior to the interior of the walls of the refrigerator. The drip pan 122 is provided with a central opening or flue 125 formed within an upturned flange 126, which flange 126 prevents the water in the pan from flowing through the opening 125 in the center of the pan. The upper portion of the refrigerator is provided with a top 130 having a central flue 131, the inner walls of which are covered by an extension 132 of a plate 133 at the top of the refrigerator. The upper end of the flue 131 is covered with an arched screen 136 for the purpose of preventing foreign matter falling into the top of the refrigerator.

In the form shown in Figs. 1 to 7 inclusive, an opening 140 is provided in the top 133 of the refrigerator through which water may be poured onto a series of distributing troughs 141, 142 and 143 which deliver the water into a pan 144 which extends around the inner wall of the refrigerator below the top thereof. The troughs 141 and 142 deliver water to the pan at each side of the refrigerator, and the trough 143 delivers water to the pan along the back of the refrigerator. The trough 143 is provided with an opening 145 through which water is carried by means of a pipe 146 to the central portion of the distributer 147, the sloping walls of which distribute the water over the outer edge of the screen 56 at the top of the refrigerator. The pan 144 is provided with a series of perforations 150 which deliver the water in the pan onto the porous walls of the refrigerator for the purposes hereinafter described.

In the form shown in Fig. 8, the distributing pan and troughs are omitted and the water is introduced into the refrigerator through the central opening or flue 131 in the top of the refrigerator, in which case the distributer 147 is relied upon to distribute the water to the porous sides of the refrigerator. The chamber 160 of the refrigerator may be provided with a series of shelves 161, as indicated, which may be supported therein in any of the well known manners of supporting the same. The chamber 160 is provided with a pipe 162 which extends through the rear wall of the refrigerator, so that the interior of the chamber is in open communication with the outer air. A current of air is permitted to pass through the refrigerator, through the air conduits 115 in the bottom of the refrigerator, thence through the air conduits 81 in the door of the refrigerator, thence through passage 163 between the plate 58 and the upper edge of the door to the interior of the refrigerator, thence to the open air through the pipe 162.

The refrigerator is constructed as above described for the purpose of providing a refrigerator having walls adapted to permit a maximum of evaporation taking place both on the exterior of the walls and on the surfaces of the air conduits in the walls, the door of the refrigerator being especially designed and constructed so that evaporation may take place within the air conduits of the door, thereby producing a refrigerator in which the food chamber is entirely surrounded by walls having evaporating surfaces. The lowering and maintaining of the low temperature within the food chamber 160 of the refrigerator is accomplished by pouring a quantity of water through the opening 140 in the top of the refrigerator, which water is distributed by means of the pan 144 to the porous walls of the refrigerator in such a manner that the entire porous portion of the walls becomes saturated, and as the walls are in contact with the atmosphere on the exterior thereof, and as a free current of air is permitted to pass upwardly through the air conduits, thence out the central opening 131 in the top of the refrigerator, which is induced, more or less, by the rising of the water vapor caused by evaporation, evaporating action takes place both on the exterior of the walls and within the walls themselves, thereby reducing the temperature within the refrigerator to a degree favorable to the preservation of the food therein. A drain cock 170 is provided in the pan 122 so that should any water pass entirely through the walls and drip into the pan, the same can be drawn off.

If it is desired, various means may be employed for producing an attractive finish to the exterior of the refrigerator. In the present instance the corners of the refrigerator are shown covered with strips of metal 171.

What I claim is:—

1. A refrigerator having front, rear and side walls each composed of sheets of asbestos with a porous filler between said sheets, conduits of porous material to form evaporating surfaces extending upwardly through each of said walls, a door in one of said walls having a porous filler therein, and conduits of porous material extending upwardly through said door and registering with the conduits in the wall having the door.

2. A refrigerator having front, rear and side walls, having spaced sheets of absorbent material with a porous filler between, a casing spaced from said walls, and provided with openings, conduits of porous material extending upwardly through each of said walls, a door in one of said walls, a porous filler in said door, and a plurality of con-

duits of porous material extending upwardly through said door registering with the conduits in the wall having said door.

3. A refrigerator having front, rear and side walls, composed of spaced sheets of absorbent material and a porous filler in each wall between said sheets, conduits of porous material extending upwardly through each of said walls, a door in one of said walls, a porous filler in said door, a plurality of conduits of porous material extending upwardly through said door registering with the conduits in the wall having said door, and distributing means above said walls adapted to distribute water to the porous filler in said walls.

4. A refrigerator having front, rear and side walls, composed of spaced sheets of absorbent material with a porous filler in each wall between said sheets, conduits of porous material extending upwardly through each of said walls, one of said walls having an opening therein, conduits in said last named wall arranged above and below said opening in open communication therewith, a door hinged to said last named wall adapted to close said opening, a porous filler in said door, and a plurality of conduits of porous material extending upwardly through said door adapted to register with the conduits in the wall having the door therein.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 27th day of March, 1912.

ALBERT FINK.

In presence of—
FRANK L. A. GRAHAM,
ISABEL HALL.