

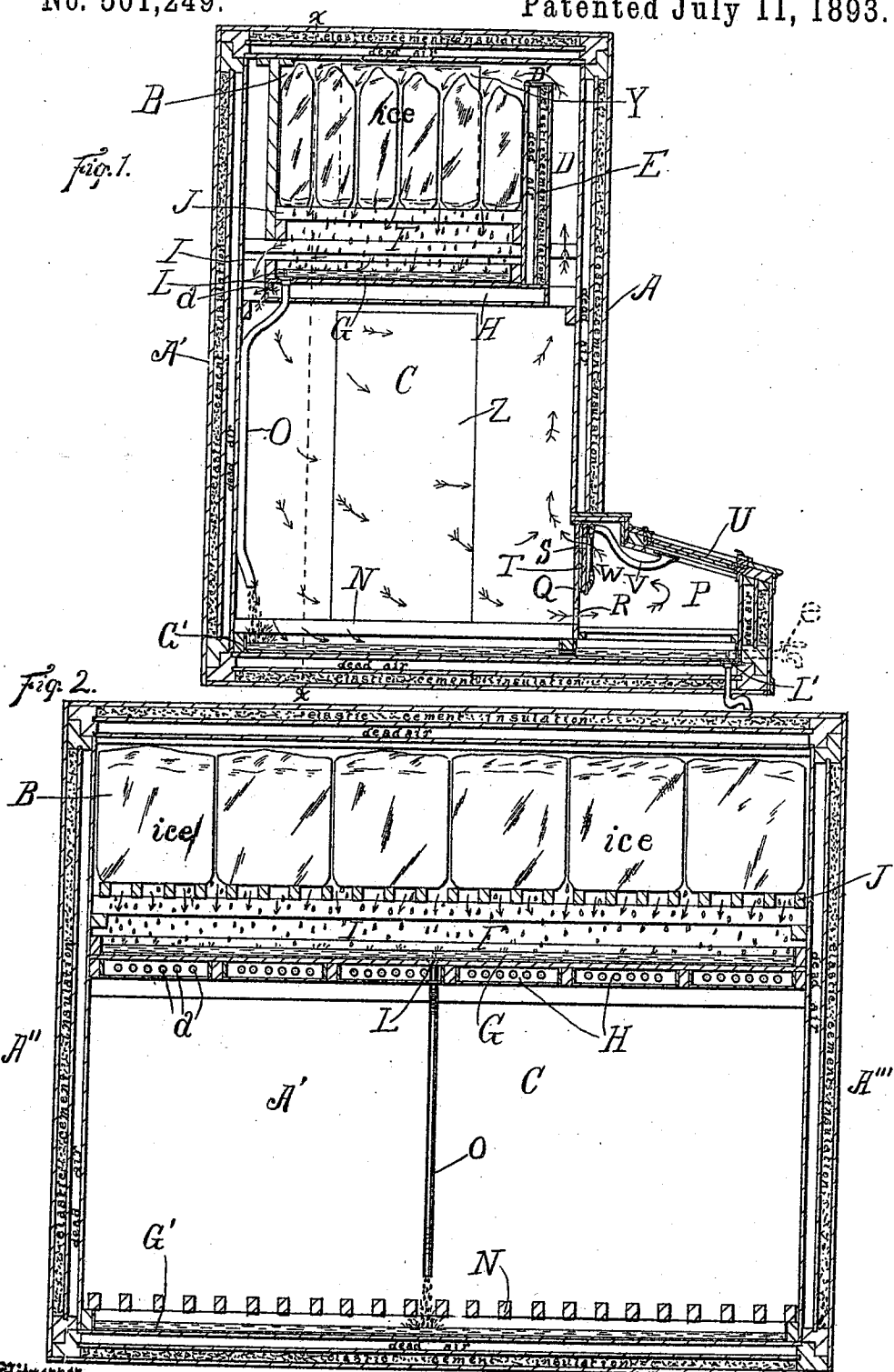
No Model.)

2 Sheets—Sheet 1.

J. H. HISE.
REFRIGERATOR.

No. 501,249.

Patented July 11, 1893.



Witnesses
P. H. Harbison.
W. M. Lee.

John H. Hise Inventor.
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his attys.

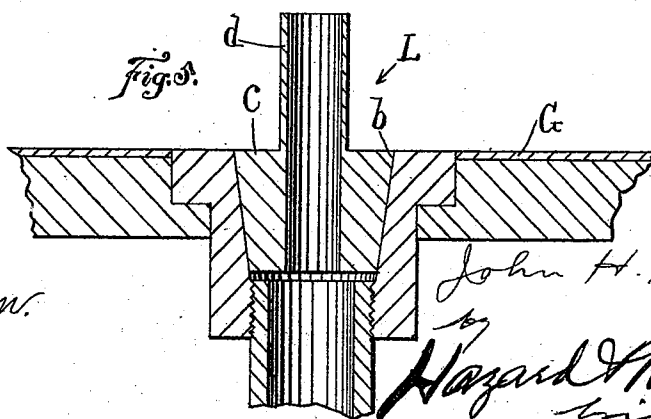
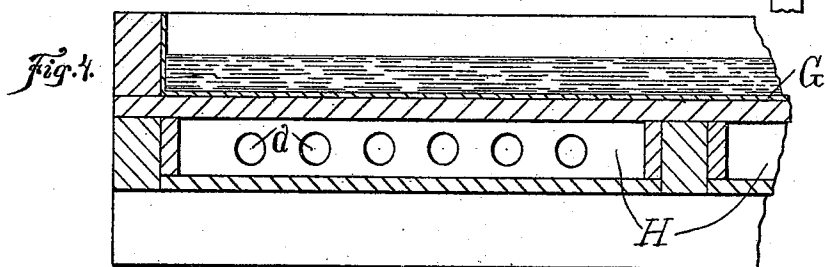
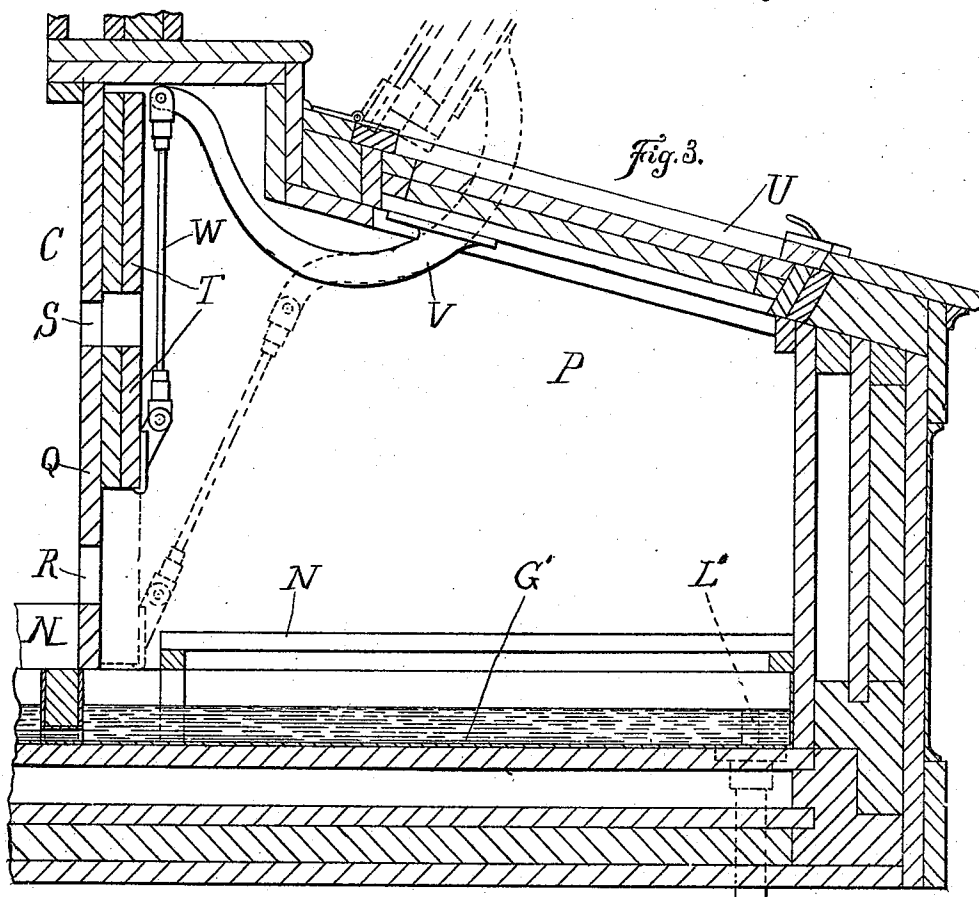
(No Model.)

2 Sheets—Sheet 2.

J. H. HISE.
REFRIGERATOR.

No. 501,249.

Patented July 11, 1893.



Witnesses.

P. W. Fairbank.
W. M. Lee.

Inventor.

John H. Hise

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UNITED STATES PATENT OFFICE.

JOHN H. HISE, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO GEORGE R. SHATTO, OF SAME PLACE.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 501,249, dated July 11, 1893.

Application filed September 21, 1892. Serial No. 446,472. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. HISE, 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 Improvement in Refrigerators, of which the following is a specification.

My invention relates to the construction of refrigerators and cooling rooms, &c.

10 The object of my invention is to increase circulation, prevent mustiness and bad odors within the refrigerator and to cause the refrigerator to preserve perishable articles such as meats, berries, &c., and to remove slight
15 taint from meat, &c; also to allow articles of different odors and aromas to be kept in the same cooling chamber without injury to any of them.

My invention consists in a refrigerator comprising the combination of an ice chamber arranged at the upper portion of the refrigerator, closed throughout except an air inlet at the top and an air and drip outlet at the bottom, and having its floor arranged to allow
25 the water from the melting ice to pass through; the cooling chamber arranged in the lower portion of the refrigerator and having an open drip pan at the bottom thereof; an ascending warm air draft flue communicating between the top of the cooling chamber and the top of the ice chamber; an upper open drip pan arranged between the ice chamber and the cooling chamber at such a distance below the ice chamber as to provide
30 a drip chamber of material depth so that the water falling from the ice chamber will create a downward draft of air from the ice chamber toward the bottom of the drip chamber; a cold air discharge communicating between
40 the rear of the drip chamber and the rear top of the cooling chamber; an open lower drip pan arranged at the bottom of the cooling chamber, and the drip discharge arranged to discharge the drip from the upper
45 drip pan into the cooling chamber, and there-through into the lower open drip pan.

My invention more broadly stated also consists in a refrigerator having an open drip pan arranged between the cooling chamber
50 and the ice chamber to receive the drip from the melting ice, and also having an open

drip pan arranged at the bottom of the cooling chamber; a drip discharge arranged to discharge from the upper drip pan into the lower open drip pan, the air passage leading
55 from above the upper drip pan into the cooling chamber, the air passage leading from the cooling chamber and opening into the top of the ice chamber, and the air and drip passage leading through the bottom of the ice
60 box into the upper drip pan.

My invention also comprises other features and combinations hereinafter set forth.

The accompanying drawings illustrate my invention.

Figure 1 is a vertical section from front to rear of a cooling room for use of butchers, &c. Fig. 2 is a vertical longitudinal section of such cooling room on line *x-x* looking toward the rear. Fig. 3 is a section of the front receptacle showing details of a device for counterbalancing the lid of the front receptacle and closing the passage between the front receptacle and the main cooling room when the lid of the front receptacle is raised, so that there
75 will be no unnecessary escape of cold air from the cooling room when the front receptacle is opened. Fig. 4 illustrates the construction of the upper water pan and the ceiling of the cooling chamber. Fig. 5 is a detail of the
80 over flow.

A A', &c., indicate the insulated walls of the refrigerator or cooling room.

B indicates the ice chamber in the upper portion thereof.

C indicates the cooling chamber.

D indicates the ascending warm air draft flue at the front side of the refrigerator communicating between the top of the cooling chamber and the top of the ice chamber.

E is an insulated wall interposed between the draft flue D and the ice chamber B, the drip chamber or space F, drip pan G and air chambers H.

I is the cold air discharge communicating
95 between the rear of the drip chamber and the top of the cooling chamber. The upper drip pan G is arranged beneath the slatted floor J of the ice chamber at such a distance therebeneath that the water falling from such slatted floor will acquire sufficient velocity to
100 cause an agitation or splashing of the water

in the drip pan and will also act upon the air to impel it downward, thus to assist in forcing the air out of the drip chamber through the rear cold air discharge passage I. The over-flow L is arranged to discharge the water from the drip pan when the water has risen therein to about one inch and a half. The distance between the slatted floor J of the ice chamber and the surface of the water, when the drip pan is properly filled is about a foot. It is to be understood that this distance may be varied within the judgment of the constructor. The greater the distance the greater will be the velocity of the water and the circulation of air through the cooling chamber.

G' is a water pan or receptacle arranged beneath the slatted floor N of the cooling chamber.

O is the drip pipe leading from the upper over-flow L and discharging at the rear side of the cooling chamber at such a distance below the lower pan as to allow the water to gain a desirable velocity after its discharge from the end of such drip pipe and before it reaches the surface of the water within the lower water pan and to also cause an agitation and splashing of the water within the lower water pan.

It will be understood by those acquainted with the construction of refrigerators that the domestic refrigerators will not be provided with the front receptacle P which is shown in the drawings, but that the refrigerator will be provided at its front side with a suitable door to give access into the cooling chamber.

Q indicates a partition between the front receptacle P and the main cooling chamber.

R indicates an opening at the bottom through such partition to allow the cool air to flow from the cooling chamber into the front receptacle.

S indicates an opening arranged at the top of the partition above the opening R to allow the warm air from the front receptacle to flow into the main cooling chamber.

T indicates a vertically reciprocating valve arranged to close the openings R and S.

U indicates the lid of the front receptacle.

V is a curved valve operating lever fixed to the rear of such lid and projecting backward therefrom and connected with the valve T by the connecting rod W, which is hinged at one end to the valve and at the other end to the valve operating lever, the several parts being so arranged that when the lid is raised as indicated in dotted lines in Fig. 3 the valve will be forced down to close the openings R and S, thus to prevent the passage of air from the cooling chamber when the front receptacle is open. There is free passage beneath the partition to allow the water in the lower water pan to pass freely from the rear of the cooling chamber to the front receptacle whence it is discharged through the lower overflow L'. By this arrangement the water is caused to flow through the refrigerator or

cooling room in the direction in which the cooled air flows. The ascent of the warm air is at the front part of the refrigerator directly from the front side of the cooling room and refrigerator, which is the side most exposed to the admission of heat. The insulated wall between the draft flue D and the ice prevents the air in the draft flue from becoming cooled until it has come in contact with the top of the ice. The air chambers H arranged between the ceiling of the cooling chamber and the upper drip pan insulate the drip pan from the cooling chamber and prevent the condensation of moisture which might occur on the ceiling of the cooling chamber if it were not insulated or properly separated from the bottom of the drip pan.

a indicates air passages in the rear walls of such air chambers to allow circulation of air between the outside and inside of such chambers.

My refrigerator is provided with an improved refrigerator over-flow consisting in the combination of a plug seat b inserted in and opening through the bottom of the water pan or drip pan and an over-flow plug c arranged to fit in the plug seat to close the same water tight and provided with an upwardly extending over flow tube d of a height equal to the depth of water desired in the drip or water pan and opening downward through the plug so that when the water rises within the drip pan or water pan to the top of such tube d the water will escape through the tube and when it is desired to empty the drip pan or water pan the same may be accomplished by withdrawing such plug, thus allowing the water to flow directly out through the open plug seat b. The floors of the drip pan and water pan are arranged to slope sufficiently toward their respective plug seats or discharges b to drain the water into such discharge opening but no attempt has been made to illustrate such construction for the reason that the same is well understood and does not require illustration and the scale of the drawings is too small to allow such construction to be indicated as the slope is very slight.

Y and Z indicate doors into the ice and cooling chambers respectively.

In practice the ice is placed upon the slatted floor of the ice chamber with sufficient space between the blocks to allow air to pass downward between such blocks, and materials to be cooled are placed in the cooling chamber in the customary manner, the heated air within the cooling chamber being forced to the top of the refrigerator by the cool air which falls from the ice, rises through the draft flue D and passes over and upon the ice blocks and thus becoming cooled falls downward between the ice blocks. The water formed from the ice melted by the heat from such air flows downward along the sides of the cakes of ice and by its friction upon the air assists in carrying the air downward and when such water has reached the bottom of the ice cakes or the

bottom of the slats of the floor upon which such cakes rest, it forms in drops and passes thence down into the drip pan carrying with it a current of the air contained in the drip space between the slatted floor and the drip pan. This falling water which is expanding and acts as a sponge to take up the impurities comes into intimate contact with the particles of air in the drip space so that the air is caused to part with odors, &c., which water is capable of absorbing from air. It also attracts from the air the vapors and suspended moisture which may be contained within the air and which has not been absorbed by the water while the air was passing over the ice and downward between the cakes of ice; the air therefore issues from the rear discharge I in a purified and comparatively anhydrous condition and passes on downward through the cooling chamber toward the front part of the same, absorbing from the materials within the cooling chamber the heat and moisture which such materials may give off and when the air thus becomes heated and expanded it ascends again through the draft flue D, and the circuit is repeated. The discharge of the drip water from the drip pipe O causes a downward flow of air at the rear of the cooling chamber to beneath the slatted floor and the air is thus caused to circulate over the water in such lower water pan. The air which comes into contact with the water in the drip pan is warmer than such water and the water will attract therefrom particles of moisture which may be carried thereby and will at the same time remove odors and purify the air. The splashing of the water at this point also assists in purifying the air as above stated with relation to the upper drip pan.

The attraction of the water for odors and impurities of the air is very great at the time the water is expanding under the influence of the currents of warm air which pass over the ice and through the drip chamber and the odors are so perfectly removed from the air that the different articles which might be contaminated by interchange of flavors, odors or aroma may be kept without injury within the one cooling chamber.

In practice when the lid U of the outer receptacle is raised the arm V and connecting rod W operate to slide the valve T downward, thus to close the openings S and R.

e indicates in dotted lines a faucet which may be arranged in lieu of the overflow L' in case of a domestic refrigerator having no connection with the sewer or outside drain. Where such faucet is used it is necessary, from time to time, to drain the water off from the pan to prevent the pan from becoming too full and also to prevent the water from becoming foul. Where it is desired to empty the water from the pan in the direction shown in full lines, the plug *c* is withdrawn from its seat *d*, thus allowing the water to discharge entirely from the pan. This should be done once or twice a week in order to keep the

water sufficiently free from accumulated impurities.

It is important that the ice chamber be closed at the sides and that its air inlet be at the top of such chamber and the air outlet at the bottom thereof through the ice rack or slatted floor above the drip pan, so that the air will be driven downward by the force of the drip and will be caused to pass downward between the cakes of ice and will be driven down and caused to strike upon the water in the drip pan; the air outlet I from the drip pan being so arranged as to increase or to facilitate this effect. It is also important that the ice in the ice chamber shall not be allowed to become exhausted while water remains in the water receptacles, for the reason that in time the water will throw off impure vapors which will taint the refrigerator and its contents and the inside of the refrigerator will become moist and moldy.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A refrigerator comprising the combination of an ice chamber arranged at the upper portion of the refrigerator, closed throughout except an air inlet at the top and an air and drip outlet at the bottom, and having its floor arranged to allow the water from the melting ice to pass therethrough; the cooling chamber arranged in the lower portion of the refrigerator and having an open drip pan at the bottom thereof; an ascending warm air draft flue communicating between the top of the cooling chamber and the top of the ice chamber; the upper open drip pan arranged between the ice chamber and the cooling chamber at such a distance below the ice chamber as to provide a drip chamber of material depth so that the water falling from the ice chamber will create a downward draft of air from the ice chamber toward the bottom of the drip chamber; a cold air discharge communicating between the rear of the drip chamber and the rear top of the cooling chamber; the open lower drip pan arranged at the bottom of the cooling chamber, and the drip discharge arranged to discharge the drip from the upper drip pan into the cooling chamber and therethrough into the lower open drip pan.

2. A refrigerator having an open drip pan arranged between the cooling chamber and the ice chamber to receive the drip from the melting ice, and also having an open drip pan arranged at the bottom of the cooling chamber, a drip discharge arranged to discharge from the upper drip pan into the lower open drip pan; an air passage leading from above the upper drip pan into the cooling chamber, the air passage leading from the top of the cooling chamber and opening into the top of the ice chamber and the air and drip passage leading through the bottom of the ice box into the upper pan.

3. In a refrigerator having the cooling cham-

ber and the front receptacle; the combination set forth of a vertical partition arranged between the front receptacle and the cooling chamber and provided at its bottom with the cool air opening and at its top with the warm air opening; the lid of the front receptacle; the vertically reciprocating valve arranged to close the warm and cool air openings; the curved valve operating lever fixed to the rear of the lid, and the connecting rod hinged at one end to the valve and at the other end to the valve operating lever.

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Witnesses:

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