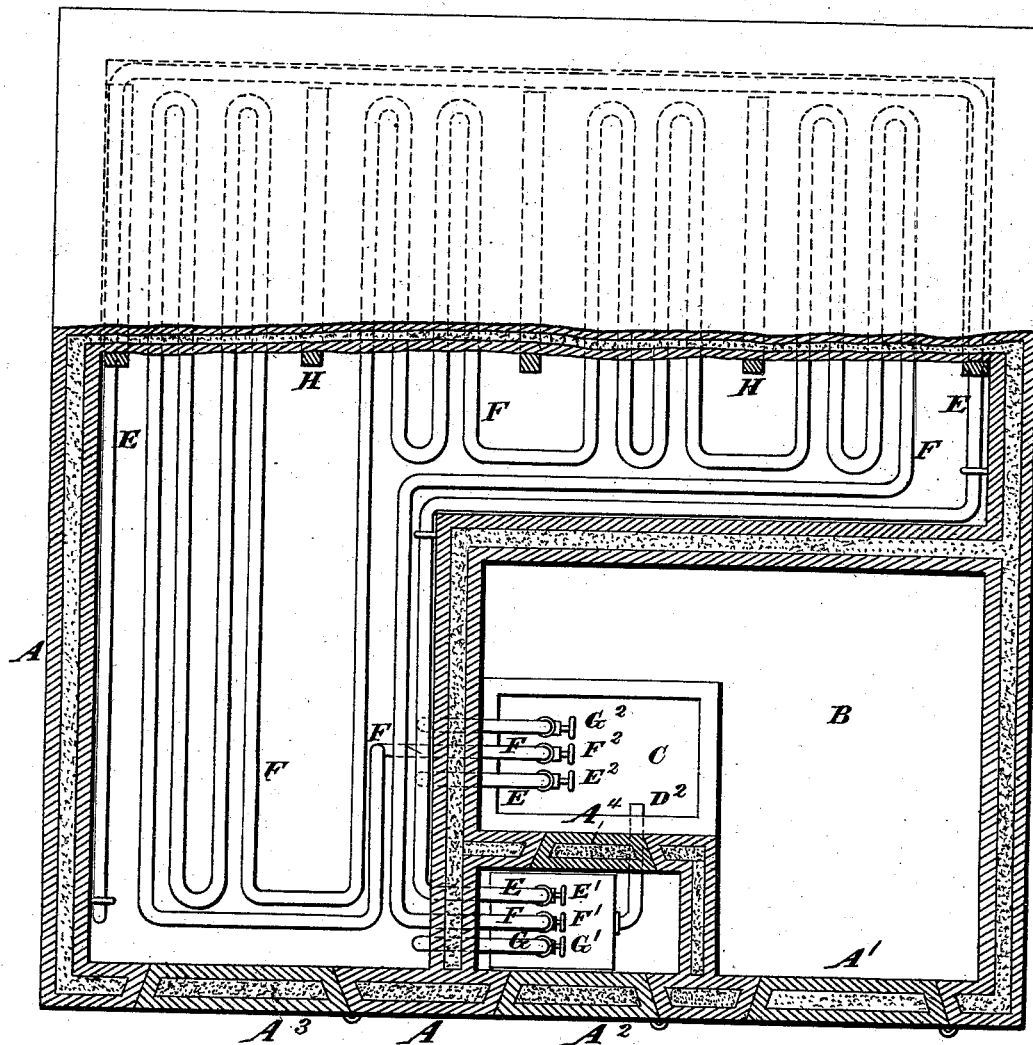


B. W. GILLETT.  
Refrigerator.

No. 215,272.

Patented May 13, 1879.

*Fig. 1.*



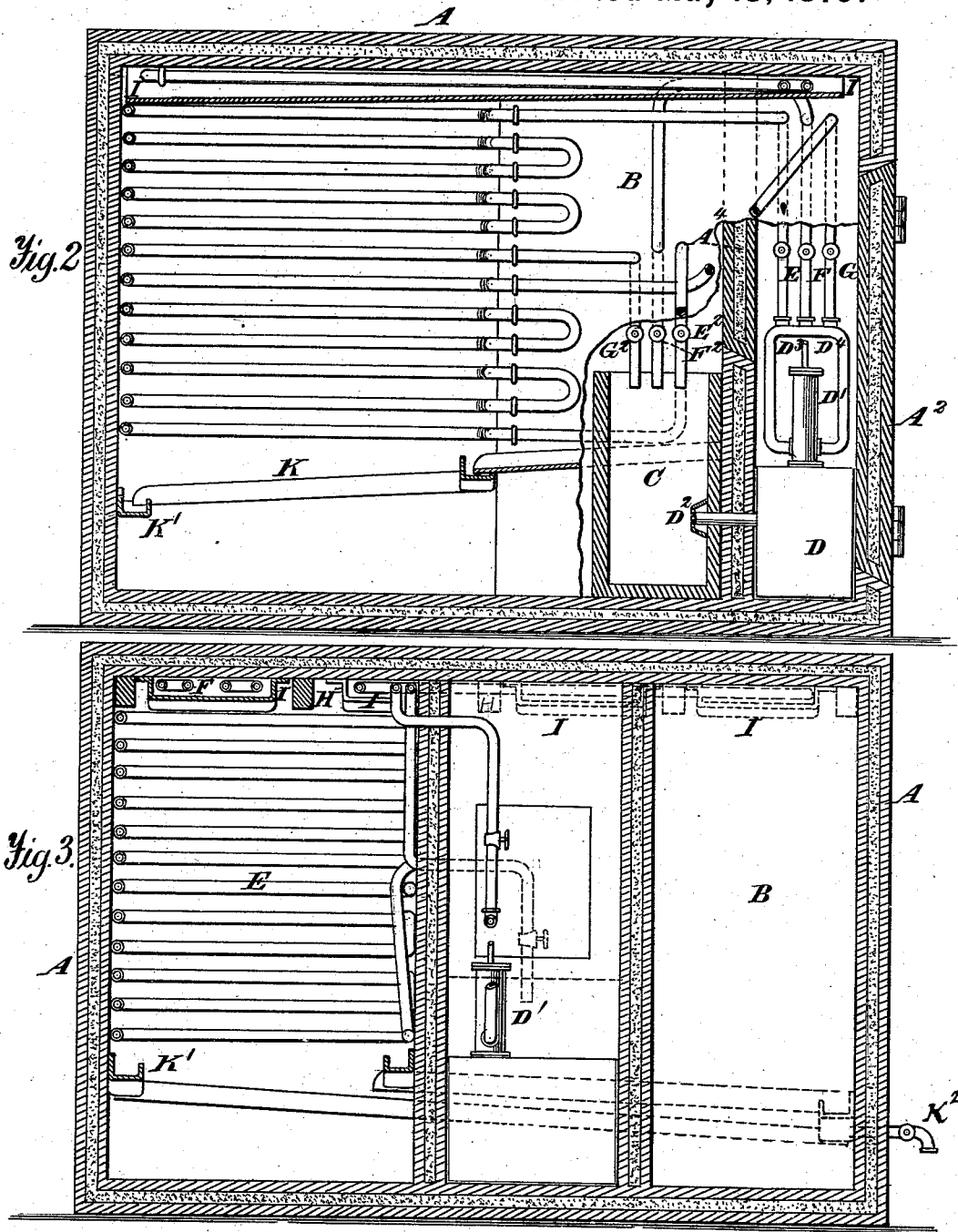
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# UNITED STATES PATENT OFFICE.

BENJAMIN W. GILLETT, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO HIMSELF AND JEROME D. GILLETT, OF SAME PLACE.

## IMPROVEMENT IN REFRIGERATORS.

Specification forming part of Letters Patent No. **215,272**, dated May 13, 1879; application filed April 5, 1879.

*To all whom it may concern:*

Be it known that I, BENJAMIN W. GILLETT, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Refrigerators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification—

Figure 1 being a plan view, partly in section, showing double outer walls of the structure, with suitable doors for gaining an entrance thereto, the space between the walls being filled with a non-conducting substance, and showing also the separate compartments in which the ice-reservoir, the fluid-receptacle, and the apartment in which the pump or other fluid-forcing device is located, as well as a series of pipes, each one of the series having an independent connection with the pump and with the fluid-receptacle, and each supplied at its induction and eduction ends with a valve or cock for controlling the flow of fluid through the respective pipes. Fig. 2 is a sectional elevation, showing the double walls with non-conducting material between them, the ice and fluid reservoirs, the pump-compartment, the pump, and the series of pipes connected therewith by independent connections, and drip-pans for collecting the condensed vapor and conducting it to some suitable outlet; and Fig. 3 is a transverse vertical section, showing the parts last enumerated, and, in addition thereto, the arrangement of that one of the series of the pipes which is located upon the upper wall of the preserving-chamber, its connection with the pump, and the drip-pans, which are placed underneath said pipes, and a cock for drawing off the drip-water.

Like letters of reference denote like parts in all of the figures.

This invention relates to that class of refrigerating-structures which are designed with special reference to the preservation of fresh meats and other perishable articles while on board vessels and in transit from one point to another, but which are also applicable to rail-

road-cars, the structures erected in or adjacent to slaughtering-establishments for cooling meats, and to refrigerators in which fresh meats or other substances are to be kept for retail trade; and it consists in combining with a suitable cooling or refrigerating chamber an independent series of pipes, through which salted water or any other cooled refrigerating substance may be forced to various parts of the chamber by a suitable pump or other forcing device, each of the series of pipes having an independent connection with said pump or forcing mechanism and with the fluid-receptacle, in order that the temperature in the different parts of said chamber may be regulated with the expenditure of the least possible amount of ice.

The invention further consists in the combination of a cooling or refrigerating chamber, a fluid-receptacle, into which the material used for refrigerating the preserving-chamber is placed, a pump-chamber, a pump or other forcing device for circulating the cooling substance, and a series of independently-arranged pipes for receiving the substance from the pump or other forcing machinery and conducting it to different parts of the chamber and to the fluid-receptacle; and the invention further consists in the combination, with the series of independent refrigerating-pipes, of a preserving-chamber and a series of drip-pans, whereby any condensed vapor will be collected and prevented from falling upon, and thus injuring, the articles in the preserving-chamber, and whereby all such drip will be conducted to a common outlet and allowed to pass out of the chamber through a cock or trap arranged for that purpose.

In constructing preserving-chambers with my improvements attached, I use a rectangular or other suitably-formed chamber, A, the dimensions being such as are required by the amount of material to be placed therein, or as is permitted by the vessel, car, or other structure in which it is to be placed. This chamber has double walls, the space between the two being filled with any of the well-known non-conducting substances, the object being to prevent the passage of caloric.

The outer walls of the structure are supplied

with doors  $A^1$ ,  $A^2$ , and  $A^3$ ,  $A^1$  opening into the ice-reservoir,  $A^2$  into the pump-compartment, and  $A^3$  into the preserving-chamber. These doors are beveled upon their edges, as shown in Fig. 1, in order that when in their places they may exclude the atmosphere; and, if found necessary, their beveled portions may be covered with cloth, rubber, or some elastic substance which will insure a tight joint.

Between the ice-reservoir and the pump-compartment there is a door,  $A^4$ , similar in all respects to those already described, which, when removed, will allow the operator to have access to the fluid tank or receptacle for the purpose of manipulating the cocks or valves which control the discharge of the cooling substance. Within the chamber A there is formed an ice-reservoir, B, the walls of which, by preference, are double, and the space between them is filled with some non-conducting material, like the outer walls.

Within the ice-reservoir B there is formed a tank or fluid-receptacle, C, with which the discharge ends of a series of circulating-pipes communicate. Adjoining this fluid-receptacle there is a separate compartment, D, in which the pump or other circulating mechanism  $D^1$  is located.

For the purpose of forming a communication between the fluid-receptacle and the pump, a pipe,  $D^2$ , is passed through the wall which separates them, that end thereof which is within the fluid-receptacle being supplied with a strainer, to prevent any solid substance from passing into the pump or other forcing mechanism, its opposite end communicating with the pump-chamber, into which the fluid flows or is drawn from receptacle C.

The mechanism shown for forcing the fluid through the series of pipes is a common pump; but instead of that any other suitable mechanism for that purpose may be used, the only requirement being that it shall be capable of giving such a movement to the fluid as to cause it to be taken from the receptacle C, and delivered to any one or all of the circulating-pipes, carried through them and returned to the receptacle from which it was taken, and so on continuously as long as the circulating mechanism is in operation. In the example shown, there are two pipes or chambers,  $D^3$  and  $D^4$ , which communicate with the pump in such a manner that each is supplied with a portion of the fluid put in motion thereby, said pipes or chambers being united at their opposite ends, so as to form a common receptacle, to which the circulating-pipes are attached. In this instance the series of circulating-pipes heretofore referred to consists of three; but the number may be increased, if desired, the induction or receiving ends being, as before stated, connected to the water-chamber  $D^3$   $D^4$  of the pump. From the point of connection just alluded to these pipes E, F, and G extend upward for a short distance, and then are bent, so as to cause them to pass out through the partition which divides the pump-

apartment from the preserving-chamber A, they being supplied, respectively, with cocks or valves  $E^1$ ,  $F^1$ , and  $G^1$ , with which to regulate the amount of fluid which shall be allowed to pass through each, or with which to entirely shut off the same from any one or more, while it is allowed to pass through another or others. This arrangement of the circulating-pipes forms an important feature of my invention, as it enables the person in charge to send into any required part of the preserving-chamber a greater or less amount of cooling substance, and thus to regulate the temperature therein according to its requirements.

In order that the last-named result may be successfully produced, the pipe E extends from the point where it enters the preserving-chamber A in the direction indicated in Fig. 1 of the drawings, and finally returns to the fluid-receptacle C, into which its contents are discharged through the cock or valve  $E^2$ , it having traversed in its course a portion of the wall of the ice-reservoir and a portion of one end and two sides of the preserving-chamber, and finally retraversed the portion of the wall of the ice-reservoir to its point of discharge. The pipe F, starting from the same point, passes upward, as shown in Fig. 2, and connects with a coil placed upon the interior surface of the upper wall or cover of the chamber, and finally back to the fluid-receptacle, into which its contents are emptied through the cock or valve  $F^2$ .

The pipe G starts from the same point, passes down to near the bottom of the preserving-chamber, and from thence into pipes parallel with the pipes E, but rising as they pass, and empties its contents into receptacle C through valve or cock  $G^2$ .

From the above it will be seen that the pipe E conducts the fluid through pipes located in the upper portion of chamber A while it is at its lowest temperature, and that the pipe G conducts it through the lower portion of said chamber while it is in that condition. As a consequence, the temperature in both portions can be equalized by allowing the fluid to pass through both pipes in about equal quantities; or the upper or lower portions may be made respectively warmer or cooler than the other by allowing the fluid to pass through the proper pipe, and shutting it off from the others. In obedience to the well-known law of gravitation, the cooler air in an inclosure where there are no currents to prevent always settles to the bottom, while the warmer rises to the top; and hence, with this apparatus, the person in attendance is enabled to not only create a circulation of the air around and among the articles to be preserved, by shutting the fluid out of the pipes E and G and allowing it to pass through F, but he can direct a downward current of cooled air upon said articles, which is of great importance, especially in the preservation of fresh meats, as it will prevent the septic gases from remain-

ing in contact with any portion thereof while hanging in the chamber.

It will be seen that by using cocks or valves at both ends of the circulating-pipes the cold fluid may be retained therein for any desired length of time by the closing of said cocks or valves, and that thus a considerable economy in the ice used will be effected.

In making provision for hanging the carcasses, or parts of carcasses, of meat in the preserving-chamber, I provide thwarts or beams H H, which are secured to the upper wall of said chamber, and which are to be provided with hooks upon which to suspend the meat, the circulating-pipes passing between them, as shown in Figs. 1 and 3 of the drawings.

It is well known that in passing through pipes any substance which is cooler than the air which surrounds such pipes the moisture in the air will be condensed upon their surfaces to such an extent as to cause water to drip therefrom, and hence it becomes necessary to make some provision for receiving such drip-water, and for conveying it away from the articles to be preserved, as, if it should be allowed to come in contact therewith, the effect would be to injure them.

For this purpose drip-pans I I are provided, which are suspended to the upper wall of the preserving-chamber A, and underneath the pipes, one end of which is lower than the other, in order that any water which falls from the pipes may be speedily conveyed to one side of said chamber and allowed to fall into troughs K K<sup>1</sup>, which pass around the chamber upon its vertical walls at a proper inclination, and terminate in a cock, K<sup>2</sup>, which passes through the outer wall at a point where it is desirable to discharge the water.

The troughs or conduits K K<sup>1</sup> are so placed as to receive and conduct to the common outlet any water that may result from condensation and drop from the pipes upon the sides or ends of the chamber. As the upper end of the fluid-receptacle is open, and is, upon two of its sides, exposed to the ice in the ice-reservoir, it follows that the fluid, as it returns to said receptacle and remains therein for some time, will be reduced to a low temperature; but should it be found necessary to do so, ice may at any time be placed therein, access thereto being gained by removing the doors A<sup>2</sup> and A<sup>4</sup>, when the attendant can take ice

from the reservoir B and place it in receptacle C, in such quantities as may be required. When this is done, it may be found necessary to add more salt to the water, when that is used as the circulating medium, and this may easily be done when the ice is placed in the receptacle C.

For driving the pump, a suitable engine or other motor may be provided; or it may be driven from the engine of a steamship or vessel, or from the axle of a railroad-car, or in any other suitable manner.

Should the fluid-reservoir at any time become full of fluid, and be likely to overflow, a pipe controlled by a cock or valve may be applied thereto, which will deliver a portion of said fluid outside of the structure, and thus prevent any injurious effect which would result from its overflow.

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

1. In combination with a refrigerating or preserving chamber for meats and other perishable articles, a pump or other suitable fluid-forcing device, and a series of independently-operating pipes connected therewith, whereby the cooling-fluid may be directed to different portions of said chamber, for the purpose of regulating the temperature therein, substantially as set forth.

2. The combination of a preserving or refrigerating chamber for meats and other perishable articles, an ice-reservoir, a fluid-receptacle, a pump-chamber, a pump or other fluid-forcing device, and a series of independently-operating circulating-pipes, one of which series is made to traverse the ceiling or inside of the upper wall of the preserving-chamber, substantially as and for the purpose specified.

3. In combination with the circulating-pipes of a refrigerating or preserving chamber, the drip-pans I I and troughs K K<sup>1</sup>, whereby to collect and convey away the water dripping from the circulating-pipes, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature, in presence of two witnesses, this 3d day of March, A. D. 1879.

B. W. GILLET.

Witnesses:

F. M. GILLET,  
WILSON A. DIXON.