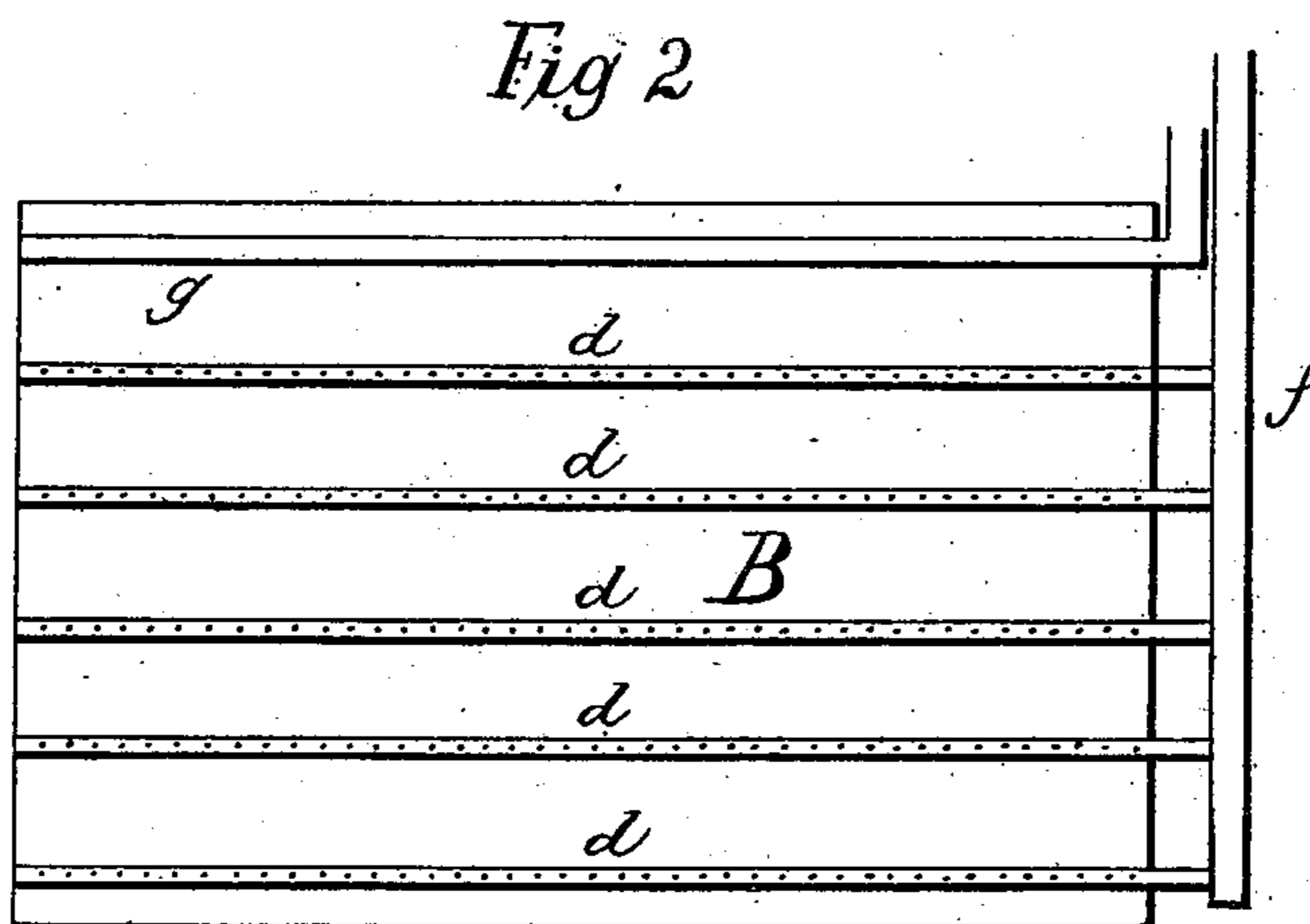
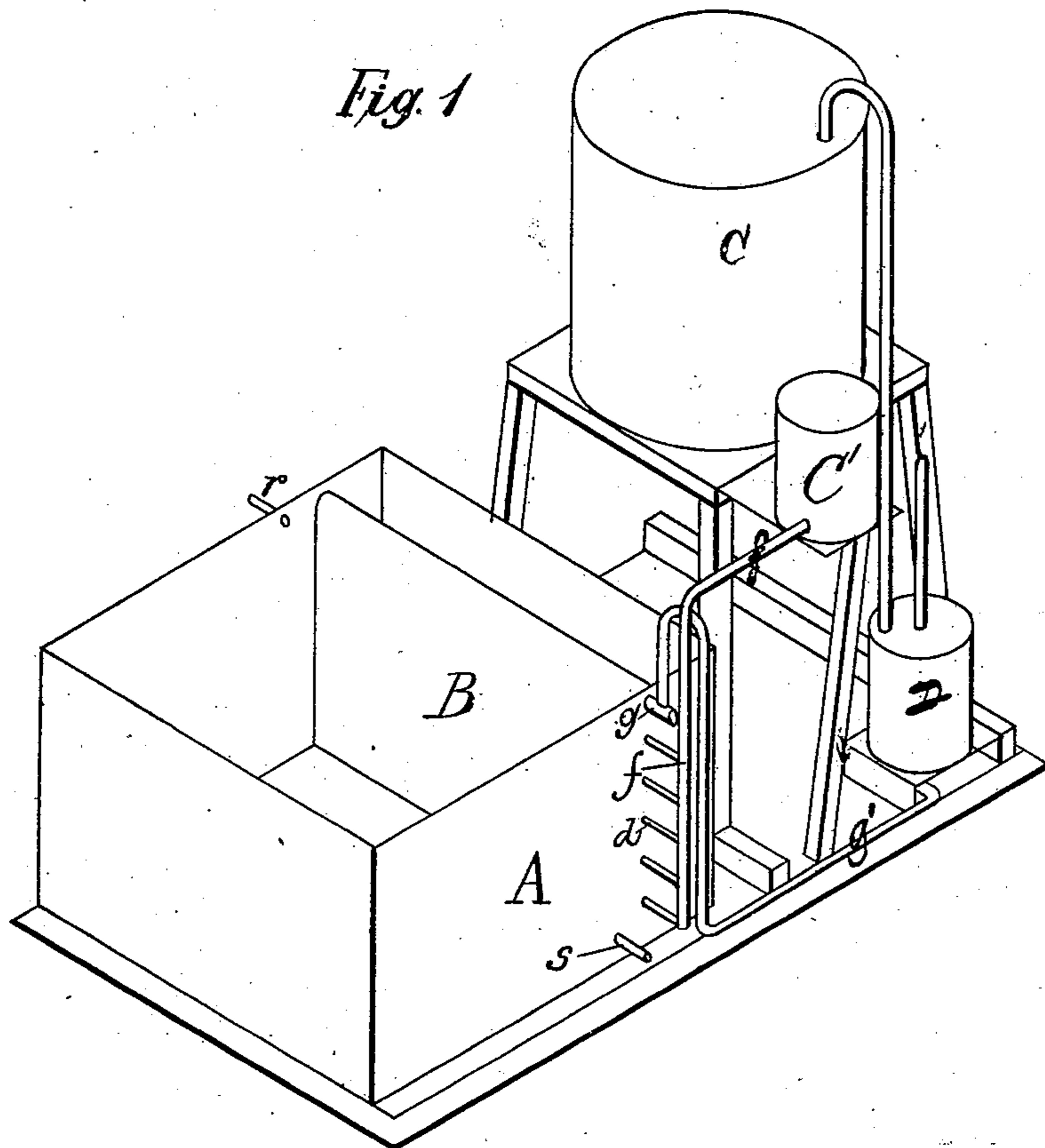


C. C. PALMER.  
Ice Making Apparatus.

No. 227,703.

Patented May 18, 1880.



Witnesses

James H. Wayne  
D. B. Lawler.

Inventor  
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Attorney

# UNITED STATES PATENT OFFICE.

CASSIUS C. PALMER, OF SAN FRANCISCO, CALIFORNIA.

## ICE-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 227,703, dated May 18, 1880.

Application filed August 22, 1878.

*To all whom it may concern:*

Be it known that I, CASSIUS C. PALMER, of the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Ice-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, sufficient to enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and in which—

Figure 1 is a perspective view of my improved ice-machine, and Fig. 2 is a view showing inside of cell or chamber.

This invention contemplates improvements in ice-machines; and it consists of a tank or receptacle with an inner or refrigerant chamber, provided with a number of perforated tubes or pipes, connected by a supply or circulation pipe with the condenser, and in its upper part with a pipe connecting with the suction end of the pump, substantially as hereinafter more fully set forth.

For the purpose of this specification I have represented my invention in connection with an ice-machine, in which A represents the tank, in which the freezing plates, cells, or chambers B are submerged in water in the usual way.

C is the supply-tank, which is placed upon a frame-work at the desired height above the tank A, and through which the condensed liquid passes to the cells.

Inside of the plates, cells, or chambers B, I arrange one or more horizontal pipes, *d*, each of which is perforated with numerous holes. If two or more pipes are used in the plates or cells, they are placed parallel with each other, and one above another, as represented. One end of each pipe passes through the end of the cell or compartment and through the side of the tank A, and is connected with the circulating or supply pipe *f*. The portion of the pipes which projects from the cells or plates is not perforated. At the upper part of each cell or chamber is placed another pipe, *g*, which is also perforated with numerous holes, or it may have only one large hole in it. This pipe also passes through the side of the cell and tank, and is connected with the opposite end of the circulating-pipe, which leads to the suction

side of the pump D, and thence it is forced into the condenser by the pump, as in other ice-machines. The liquid will then be forced by the pump through the condenser-tank C' and pipe *f* into the perforated pipe or series of pipes *d*, from which it is sprayed or showered through the numerous perforations into the cells and against the side plates. This spraying operation facilitates the ready vaporization of the liquid, so that an intense degree of cold is produced, which freezes the surrounding water in the tank.

The upper pipe, being connected with the suction side of the pump, serves to withdraw the gas as fast as it forms and pass it into the condenser, from which, as above stated, it is forced again into the cells through the pipes *d*, thus maintaining a continued circulation and keeping up the freezing action. By this means the vaporization of the liquid is facilitated, as it is delivered into the cells or chambers between the plates in a finely-divided condition, so that it immediately expands into a vapor, producing a uniform and intense degree of cold. This method can also be used, in connection with refrigerating-machines, for lowering the temperature of rooms, mines, and other places where refrigerating-machines are required.

It has been found in manufacturing artificial ice that if the freezing process is hastened, especially at the beginning of the operation, the resulting ice will be opaque or snowy, owing to the imprisonment in the ice of the air contained in the water. It has been necessary, therefore, to produce clean ice, to freeze quite slowly until a sufficient thickness of ice has accumulated on the plates to retard the freezing process and admit of operating the pump faster. By first boiling the water, however, to expel the air from it, and then feeding it in this condition into the tank surrounding the freezing-cells, I can run the pump as fast as desired, so as to make clear ice much faster than by the former method. To do this I keep up through the freezing-tank a circulation of water which has been previously boiled to expel the air from it. This water I admit into the tank in a constant stream through the pipe *r*, near the top of the tank. The freezing process can then be hastened as fast as

desired, and the temperature in the tank can be reduced so as to make ice much faster than when the slow process of freezing and the cold water are used.

5 I am aware that, broadly, it is old to boil water to free it of air previous to freezing it; but it will be noticed that by my machine I maintain a continuous circulation of the water freed of air up to the time of solidification,  
10 thus preventing the admixture of any air with the water before freezing.

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

15 In an ice-machine, the combination, with the chamber B, disposed in the tank A, of the

series of perforated branch pipes  $d\ d$  and a perforated pipe,  $g$ , extending through the upper part of the chamber B, while the branch pipes  $d\ d$  occupy the rest of the chamber B, and are connected by a pipe,  $f$ , with the condenser C', the pipe  $g$  being connected by a pipe,  $g'$ , with the suction side of the pump D, as and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal.

CASSIUS C. PALMER. [L. S.]

Witnesses:

W. F. CLARK,  
D. B. LAWLER.