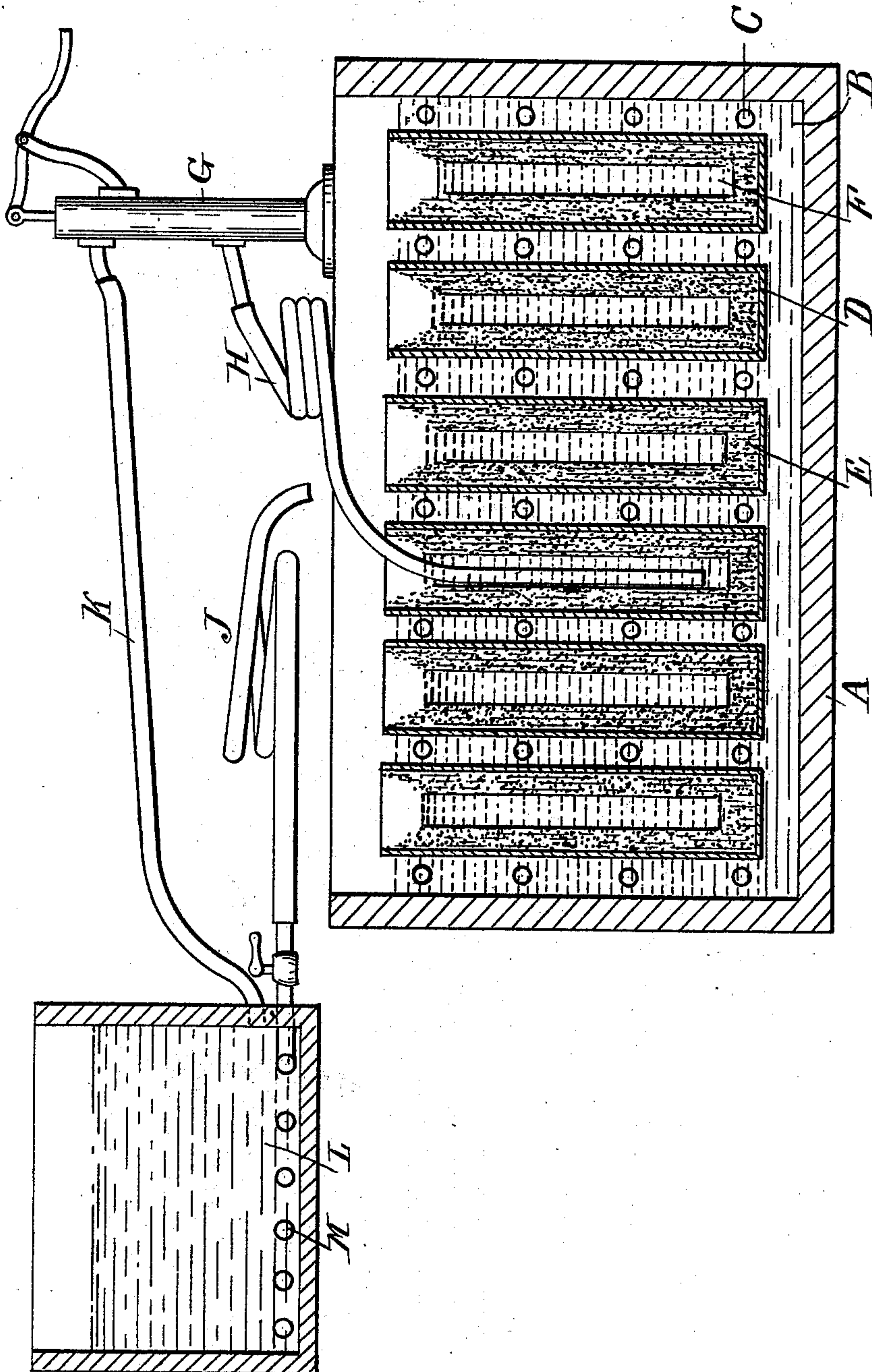


(No Model.)

R. M. TAYLOR.
MANUFACTURE OF ARTIFICIAL ICE.

No. 519,359.

Patented May 8, 1894.



Witnesses;
James A. Allen
William H. Brown

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UNITED STATES PATENT OFFICE.

ROBERT M. TAYLOR, OF MELROSE, MASSACHUSETTS.

MANUFACTURE OF ARTIFICIAL ICE.

SPECIFICATION forming part of Letters Patent No. 519,359, dated May 8, 1894.

Application filed May 17, 1893. Serial No. 474,520. (No specimens.)

To all whom it may concern:

Be it known that I, ROBERT M. TAYLOR, of Melrose, county of Middlesex, and Commonwealth of Massachusetts, have invented a certain new and useful Process in the Manufacture of Artificial Ice, of which 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 use the same.

My invention relates to a new and useful process by which the defects of artificial ice are removed.

In the formation of natural ice on rivers and ponds the ice forms downward and the air is driven in the same direction as the ice is formed and rests against the under surface of the ice, and in ponds these air bubbles are frozen in layers in the ice and show a series of laminations which indicate the successive formations of the ice. In rivers, on the contrary, the air, as fast as it is moved down by the formation of the ice, is carried away by the current and the ice is formed clear and transparent, that is, it does not have the layers which are shown in ice formed in ponds for the reason above stated. It is a well established fact that air and impurities in water are rejected as the crystallization goes on, and the water alone being congealed to make the ice.

In the formation of artificial ice, remembering that the same law of crystallization takes place and the water alone is congealed and the air bubbles and impurities are rejected, it will be found that in the formation of this ice the air bubbles and impurities in the water are driven to the center of the can as the ice forms, the said bubbles and impurities being rejected from the water as the crystallizing goes on, as above stated, and what is known as the "feather or core" in artificial ice is formed by the continued congealing of the water, with the impurities in solution and the air bubbles in the center of the block. As it is impossible for the air bubbles and impurities to be further rejected, there being no escape as the ice is formed in cans, they are driven to and held in the center of the block by the crystallization of the surrounding water. This center, which thus consists of impurities in solution and the air, not only re-

tards the continued freezing of the water, but forms the objectionable feather or core which gives to artificial ice its perishable character and renders it opaque, in comparison with the clear and transparent natural ice.

In the accompanying drawing I show one form of apparatus by which I propose to carry out the process in manufacturing artificial ice.

In the drawing, which represents a vertical section of the apparatus, A represents the usual brine vat. B the brine; C the ammonia pipes which are arranged in any desirable manner. D a series of cans in which the artificial ice is formed. E the artificial ice in the cans. F the center of the artificial block to which the impurities in solution and the air are driven and which forms the feather or core. G represents a pump. H a flexible pipe for withdrawing from the center of the block of artificial ice the water which contains the air bubbles and impurities. J a flexible connection for supplying fresh water to the center of the block after the water containing the impurities and the air has been removed.

K represents a pipe from which the water is forced from the pump G to a cooling tank L in which the water pipes M for supplying fresh water are located, and the water therein is cooled, before passing to the pipe J, by the surrounding water which is drawn from the center of the block of artificial ice and forced to the said cooler through the said pipe K.

From the above it will be seen that my process consists in withdrawing at the proper time from the center of the block of artificial ice, during the formation thereof, the water in which is contained the impurities in solution and the air bubbles rejected toward the center from the water as the crystallization takes place from the sides and bottom of the can, and replacing for the same fresh water from a suitable supply, which, in this case is shown as above, preferably cooled by the water which is drawn from the center of the block, although it may be cooled, if desired, in any other manner.

By such a process it will be seen that a clear block of artificial ice can be produced without the objectionable feather or core,

which not only retards the rapid freezing of the block of ice, and renders it perishable in character and opaque, but gives to it its objectionable taste caused by the impurities in solution being frozen in the block. The perishable character of artificial ice is due to this objectionable core which consists of air bubbles and impurities found in the water. The net work of fissures in the feather or core of ice permits the free infiltration of water, whereby the structure of the ice is weakened and disintegration is rapid; thus it will be seen by my process that I avoid this feather or core with the net work of fissures, so that this rapid disintegration of the block will not take place and thus destroy the formation of the ice and hasten its breaking up.

I do not limit myself to the exact statement of my process or the manner of carrying it out, but intend to claim broadly in the manufacture of artificial ice the removing from a block of artificial ice, during its formation, the water which contains the air bubbles and impurities by which the objectionable feather or core is formed, and substitute therefor water in its normal condition which may, if desired, be cooled by the water which has been withdrawn from the block during the formation of said block.

Having thus ascertained the nature and set forth a method of carrying out my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein described process in the manufacture of artificial ice which consists, first, in removing from the freezing can during the formation of the block of artificial ice the water which contains the impurities and air bubbles, and, second, in substituting other water for the water withdrawn, substantially as set forth.

2. The herein described process in the manufacture of artificial ice which consists, first, in removing from the block of artificial ice during its formation the water which contains the impurities and air bubbles; second, in utilizing the water withdrawn to cool other water; third, in substituting for the withdrawn water the other water cooled thereby, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 11th day of May, 1893.

ROBERT M. TAYLOR.

Witnesses:

A. F. ACTON,
F. E. C. GREENE.