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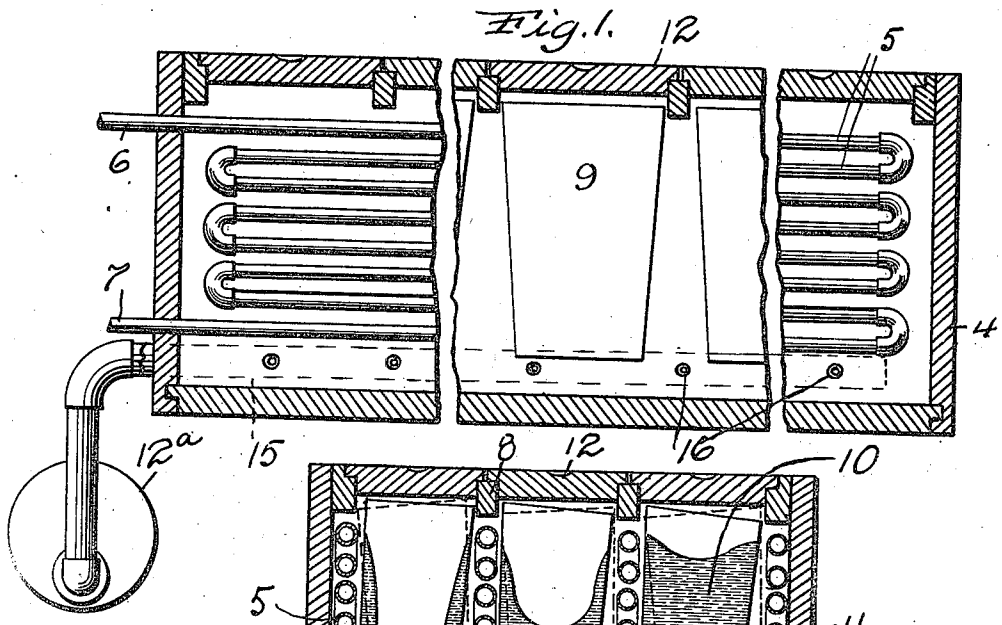
MANUFACTURE OF PURE ICE.

APPLICATION FILED FEB. 18, 1914.

1,144,312.

Patented June 22, 1915.

Fig. 1.



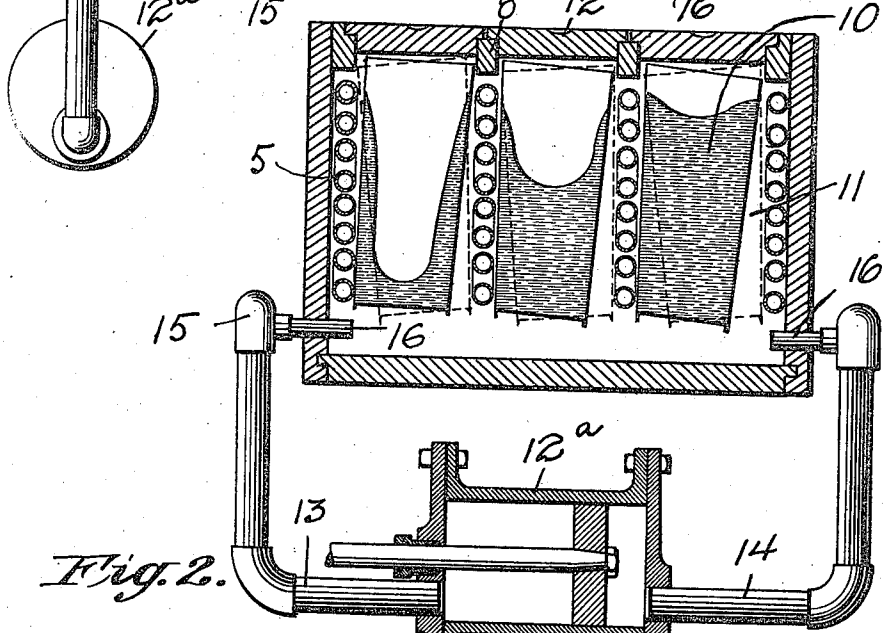


Fig. 2.

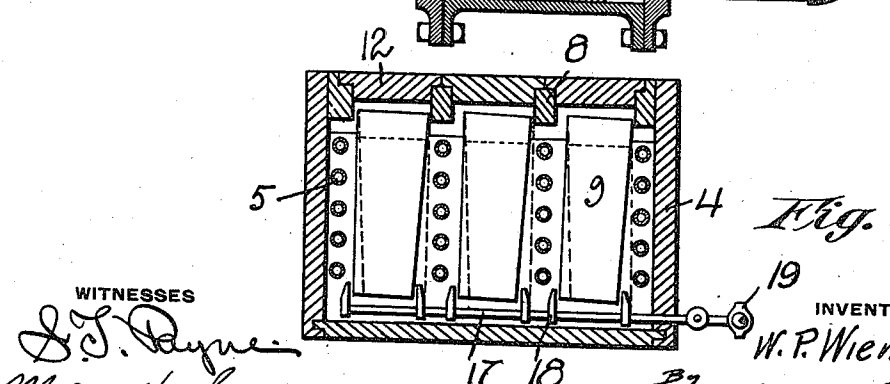


Fig. 3.

WITNESSES

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MANUFACTURE OF PURE ICE.

1,144,312. Specification of Letters Patent. Patented June 22, 1915.

Application filed February 18, 1914. Serial No. 819,528.

To all whom it may concern:

Be it known that I, WILLIAM P. WIEMANN, a citizen of the United States of America, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Pure Ice, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a method and apparatus for the manufacture of pure ice by the can system, and has for its object to reduce the time of freezing, and to further eliminate the slush bottom and central core, as well as prevent the formation of air needles in the block of ice.

The improvement in the manufacture of pure ice by the can system in accordance with this invention, is to confine to that part of the process of manufacture known as the freezing or brine tank, and relates primarily to the peculiar movement as hereinafter set forth, of the brine and ice cans, also the water within the cans, and the method or means for securing or producing said movement.

With the foregoing and other objects in view, the invention consists of the novel method and apparatus as hereinafter more fully described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

As showing two forms of an apparatus capable of carrying the method into effect, reference is had to the accompanying drawings in which:—

Figure 1 is a longitudinal section of the apparatus; Fig. 2 a cross sectional view of one form of an apparatus, and Fig. 3 is a cross sectional view of another form of apparatus.

Referring to the drawings in detail, 4 denotes a brine tank and arranged therein is a series of stationary ammonia pipes arranged in the form of coils and indicated at 5. The sets of coils are maintained in space relation with respect to each other, and the inlet end of the coils is indicated at 6 and the outlet at 7. The coils extend from one end of the tank to the other, returning again and back and forth until a bank of several pipes high is formed. The first and last ends of the coils of each set are respectively the inlet 6 and outlet 7, and are connected to the headers of an ammonia system.

The top of the tank 4 is composed of a wood frame work 8 arranged in numerous small squares to receive the ice cans 9, and these latter are provided with the required amount of distilled water as at 10. The ice cans 9 are floated in the brine 11 which is arranged within the tank 4, and the height of the brine and the amount of water in the cans is so adjusted that the cans float several inches out of the brine and several inches from the bottom of the brine tank. The tops of the cans fit loosely in the frame work of the tank top and the cans float between the sets of pipe coils, these latter being so spaced to allow from two to four inches therebetween and the cans, that is to say a space from two to four inches between each side of the can and a set of coils. It will be noticed that the lower end of the can is free to oscillate or swing between the sets of pipe coils several inches without coming in contact with them. The upper end of the can is held loosely in position by the frame 8 of the tank which is covered with a lid 12.

In the process of freezing the water within the cans, the heat contained in the water is extracted by the expanded ammonia gas within the coils, through the medium of the brine, which is in contact with both the ice cans and the pipe coils. It is well known that the freezing process is greatly promoted by agitating the brine, that is, the brine in contact with the can is rapidly and continuously exchanged with that in contact with the pipe coils, to convey the heat from the water in the cans to the ammonia in the pipe coils. The method of brine agitation, now in general use, is the circulating system, in which the brine is pumped from one part of the tank to another, or by a distributing pipe system over the entire tank, or is circulated by an agitator which sets up a current throughout the tank by an arrangement of partitions, however, in all the methods specified, the flow of brine is in the same direction and is comparatively slow, neither does the current flow across the path of the pipe coils between the cans, and there is little or no movement of the brine directly under the cans. It will now be seen that the freezing of the water into

ice depends on the extraction of the heat from the water, and the more rapid and perfect the exchange of brine between the ice cans and pipe coils, the more rapidly the heat will be conveyed from the water in the cans to the ammonia in the coils.

To greatly facilitate the conveyance of the heat from the ice cans to the pipe coils is one of the essential features of the invention. As before stated, the tank 4 is provided with sets of stationary pipe coils 5, brine 11, ice cans 9 provided with distilled water 10 to be frozen. The cans are floated in the brine between the sets of coils, and under such conditions the brine and lower portion of the cans are free to move or swing. The brine and the cans are given a reciprocating or surging motion in the direction across the path of the pipe coils, resulting in the back and forth washing of the brine over the pipe coils between the cans and thus agitating the brine, in such a manner, as to alternately bring the brine in contact with the ice cans and pipe coils for the purpose of conveying the heat from the water in the cans to the ammonia in the coils, thereby promoting the freezing of the water within the cans.

The method further resides in the securing of a continuous movement of the water in the ice cans, for the purpose of preventing the lodgment of foreign matter and air bubbles on the surface of the ice in the process of freezing, which matter forms slush bottoms, cores, and also air needles in the ice. The movement of the water in the cans is secured by the swinging or reciprocating motion of the lower portion of the cans, which motion does not disturb the level of the water in the cans, but does cause a washing action between the water and ice within the can, thus preventing the lodgment of foreign matter and air bubbles adhering to the surface of the ice during the process of freezing.

In Figs. 1 and 2 of the drawings, a means is set up to obtain the agitation of brine in a manner as stated, the swinging of the cans and the movement of the water in the cans, and such means consists of a valveless surge pump 12, having pipe connections 13—14 from each end of the cylinder of the pump, and the said pipe connections 13—14 extend along the sides of the tank 4, as at 15, and the portions 15 of the pipe connections 13—14 which extend along the sides of the tank 4, are provided with branch pipes 16 which open into the tank 4 near the bottom of the latter, and the said branch pipes 16 are arranged at each cross row of ice cans. The pump 12, having no valves, acts to displace and replace a portion of the brine alternately from either side of the brine tank, causing an oscillating motion to the brine and cans at the lower part of the brine in the tank, and in the direction across the path of the pipe coils. The pulsating action is continuous and the number or speed of pulsations may be regulated by the pump.

While the means illustrated in Figs. 1 and 2 for causing the oscillating motion to the brine and ice cans by a displacement and replacement of the brine in the lower portion of the tank is preferable, as it does not cause a sea-saw motion to the brine at the surface of the tank, however, other means may be employed to secure an oscillatory motion of the brine and cans, by way of example, as is illustrated in Fig. 3, and which consists of a pusher bar 17, having lugs 18 in contact with the cans, and which is operated through the side of the brine tank by cams or other means 19.

What I claim is:—

1. In the manufacture of ice, a brine tank containing brine, and further having ammonia pipes arranged therein, ice cans floating in the brine and containing water, a surge pump, and a pipe system leading from said pump to the sides of the tank whereby when the pump is operated a reciprocatory motion to the brine will be imparted to the brine, causing the brine to move across the path of the ammonia pipes.

2. In the manufacture of ice, a brine tank containing brine, and further having ammonia pipes arranged therein, ice cans floating in the brine and containing water, a surge pump and a pipe system leading from said pump to the sides of the tank whereby when the pump is operated a reciprocatory motion will be imparted to the brine, causing the brine to move across the path of the ammonia pipes, said pipe system including branch connections extending into the brine tank at a point near the bottom of the tank, and having their openings directed against the cans.

3. In the manufacture of ice, a brine tank, ammonia coils arranged therein, ice cans within the tank, said tank containing brine, and means for alternately displacing and replacing a quantity of brine from each side of the tank, causing thereby the reciprocation of the brine in the tank.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM P. WIEMANN.

Witnesses:
MAX H. SROLOVITZ,
HENRY C. EVERT.