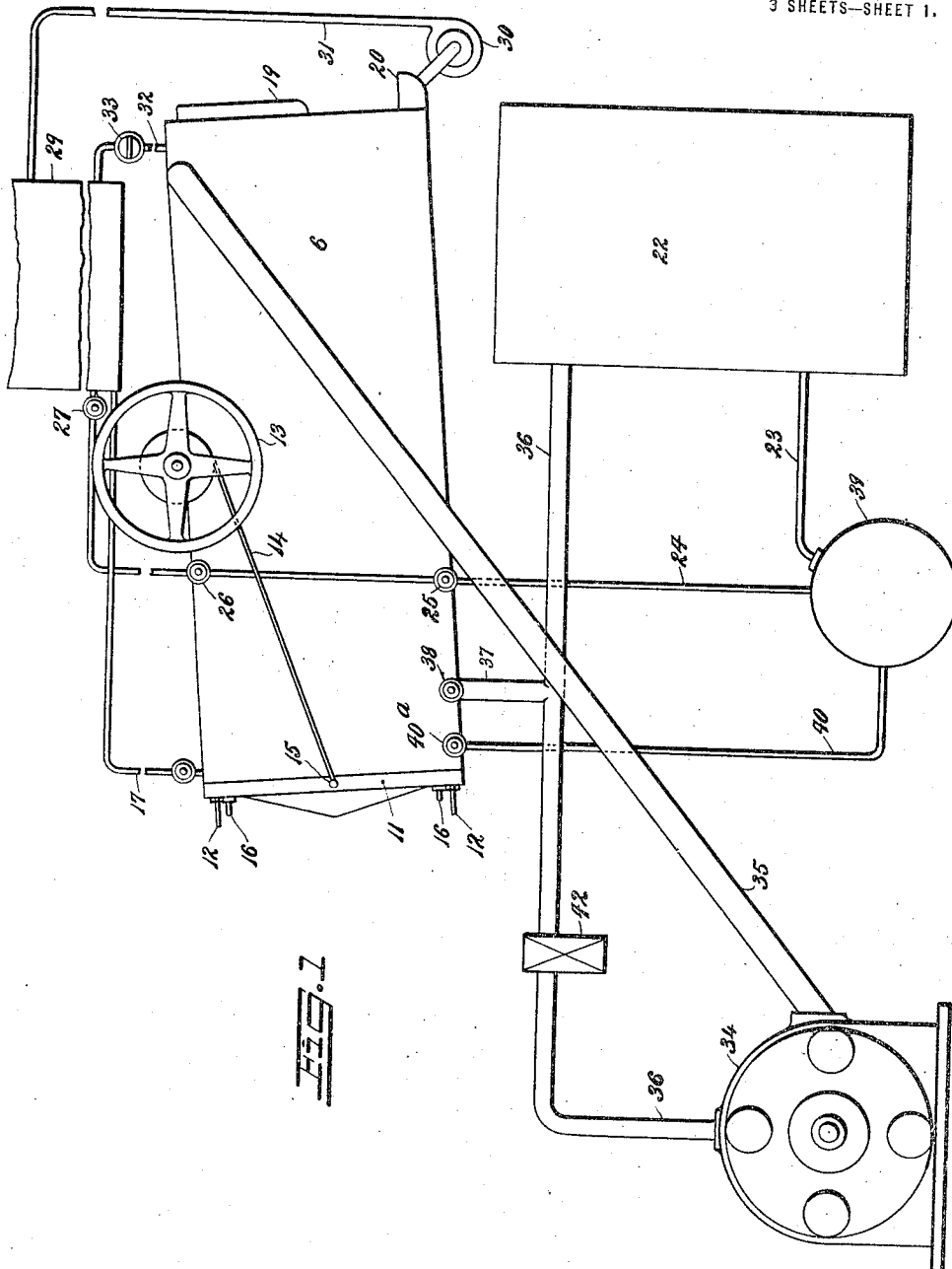


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ICE MAKING APPARATUS.
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ICE-MAKING APPARATUS.

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To all whom it may concern:

Be it known that I, WALTER D. WILLCOX, a citizen of the United States, residing at Upper Darby, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Ice-Making Apparatus, of which the following is a specification.

One object of my invention is to provide means which will make cake ice in less time than has been required to make the same prior to my invention.

Another object is to so construct my invention that the ice produced thereby will be clear and solid.

A further object is to make said means of simple and durable construction and so that it can be quickly manufactured and assembled. Another object is to reduce the cost of producing ice.

A still further object is to so make certain of the parts of my invention that the ice, after being frozen, can be quickly released or delivered therefrom without requiring difficult or arduous manual work.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a diagrammatic side elevation of my invention,

Fig. 2 is a view of similar nature to Fig. 1, showing certain of the parts in central vertical section, and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, and drawn on an enlarged scale.

Referring to the drawings, a number of freezing cans 5 are arranged in a row and spaced apart. These cans are positioned within a tank or shell 6, said tank or shell being of such size as to provide a space 7 entirely around the sides, rear, top, and bottom of said freezing cans. The front 8 of the shell 6 is closed, as clearly shown in Fig. 2, but the closure does not cover the open ends 9 of the freezing cans 5.

A covering of insulation 10 surrounds the shell 6 at the sides, top, bottom, and rear. The freezing cans 5 are elongated and substantially rectangular in cross section. They are arranged, throughout their length, at an incline to the horizontal and the open

ends 9 of the cans permit the ice to slide out of the cans by gravity, as will herein-after be more completely described.

The ends 9 of the cans 5 are normally closed by a gate 11. This gate, as shown in Fig. 2, is supported and guided on rods 12. A windlass 13 is provided and has a rope or cable 14 thereon which is attached at 15 to the gate 11 so that by turning the windlass the gate can be moved tightly against the open ends 9 of the cans, after which the gate can be secured by auxiliary clamps 16 on the rods 12.

Water inlet jet pipes 17 communicate with the interior of each of the cans 5 at positions adjacent the open ends 9 and each of the cans 5, at its rear end, has a water outlet 18 which is positioned substantially midway between the top and bottom of the can. These water outlets 18 communicate with an overflow receptacle 19 which is open at its top so that when the cans 5 are filled with water any additional water entering the through jet pipes 17 will flow over the top of the receptacle 19 and down into an overflow trough 20.

The rear end of each of the freezing cans 5 is also provided with an air vent 21 adjacent the top or extreme upper corner of the can. These vents 21 lead outwardly to the atmosphere through the shell 6 so that no air can pocket itself within the cans 5.

Freezing means, such for example as ammonia or freezing brine, is admitted into the space 7.

The means for admitting the freezing medium into the space 7 and the water into the cans 5 will now be described.

Taking for example that ammonia is used as a freezing medium, a condenser 22 is provided and the condensed ammonia from the condenser 22 passes through the pipe 23 into a receiving tank 39 and afterward through a pipe 24 into the space 7. Expansion valves 25 and 26 are provided for admission of the ammonia from the pipe 24 into the space 7, and the ammonia thus admitted around the cans 5 freezes the water within the cans 5.

A part of the ammonia from the pipe 24 passes through an expansion valve 27 into an expansion tank 28. This expansion tank 28 is located within a pre-cooler vat 29 which contains the water to be frozen, and the water from this vat 29 enters the cans 5

through the inlet jet pipes 17. Thus the water is pre-cooled to a certain extent before being admitted to the cans 5.

By the arrangement of the inlet jet pipes 17 and the overflow outlets 18 and vents 21, there will be a circulation of the water set up within the cans 5, as indicated by the arrows within the can illustrated in Fig. 2. This causes a rapid freezing of the water and at the same time the ice thus frozen will be clear.

Any water flowing over the top of the overflow receptacle 19 will fall into the trough 20 and this trough is connected by a pump 30 and pipe 31 to return the water to the vat 29. The ammonia after passing into the pre-cooler expansion tank 28 can pass into the space 7 of the shell 6 by means of a pipe 32 which includes a relief valve 33. The ammonia from the space 7 can be returned to a compressor 34 through a suction pipe 35. The compressed ammonia from the compressor 34 is returned to the condenser 22 through a pipe 36. This pipe 36 also has a branch 37 which communicates with the space 7. This branch 37 is used to supply the space 7 with warm ammonia gas for thawing purposes. For example, after the ice has been frozen within the cans, the valve 38 is opened and the warm ammonia gas passes through the branch 37 into the space 7 and sufficiently heats the cans to loosen or free the ice so that it will readily slide out of the cans.

A pipe 40 leads from the space 7 adjacent the lower forward end of the shell 6 and communicates with the receiver 39 so that during the thawing operation any ammonia which is condensed within the space 7 will flow downwardly through the pipe 40 into the receiver.

A valve 40^a is provided in the pipe 40 and during the freezing operation the valves 40^a and 38 are kept closed. The cans 5 are preferably made of sheet metal and have grooves 41^a pressed in their outer surfaces. These grooves thus formed provide corresponding ribs 41 on the inner surfaces of the cans. These ribs form grooves in the ice which marks the ice to enable the cakes to be accurately cut. At the same time the grooves 41^a provide expansion means for the cans to prevent the cans from bursting if, for example, the freezing operation is temporarily stopped and then started again. In other words, the grooves 41^a provide corrugations of normally excess metal which permits a slight expansion of the tanks without bursting the tanks.

An oil extractor 42 is preferably provided to remove any oils which find their way into the freezing medium.

After the ice has been produced in the cans and the cans have been sufficiently warmed to loosen the cakes of ice the clamps

16 are loosened and the windlass is permitted to rotate in a reverse direction. Thus the ice slides out of the cans 5 and is held in check by the gate 11 in view of the fact that the gate is connected to the windlass by the cable or rope 14. After the entire cakes of ice have slid from the cans the gate can be removed and the ice can slide to the store-house or any other place provided for it.

My invention reduces the cost of producing ice for the reason that I secure a direct expansion and can therefore operate with a much higher back pressure than heretofore used with brine and at the same time secure as low a temperature. Also, the higher back pressure produces a more dense cylinder pressure and a greater capacity and corresponding saving in fuel.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

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

1. A device of the character described including a shell; a can positioned within the shell and spaced therefrom to provide room for a freezing medium; a gate for closing one end of the can; means for continuously admitting water into said can at a position above the bottom of the can and adjacent one end thereof; and an overflow outlet for the water of said can adjacent the opposite end of the can, said admitted water and overflow effecting the circulation of the water within the can, thereby causing new portions of water to be moved toward the inner surfaces of the can to quicken the freezing of the water; substantially as described.

2. A device of the character described including a shell; a can positioned within the shell and spaced therefrom to provide room for a freezing medium; a gate for closing one end of the can; means for admitting water into said can; an overflow outlet for the water of said can; an air vent for said can positioned at a level above said overflow outlet; and a receptacle for the overflow water, having its discharge portion at a level adjacent the extreme top of the inner portion of said can, substantially as described.

3. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal, said can being spaced from the inner surface of said shell to provide

room for a freezing medium; a gate for closing the lower end of the can; means for admitting water into said can; and an overflow outlet for the water of said can and located at the uppermost end of said can, substantially as described.

4. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal, said can being spaced from the inner surface of said shell to provide room for a freezing medium; a gate for closing the lower end of the can; means for admitting water into said can; an overflow outlet for the water of said can and located at the uppermost end of said can; an air vent for said can positioned at a level above said overflow outlet; and a receptacle for the overflow water, having its discharge portion at a level adjacent the extreme top of the inner portion of said can, substantially as described.

5. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal, said can being spaced from the inner surface of said shell to provide room for a freezing medium; a gate for closing the lower end of the can; means for admitting water into said can; an overflow outlet for the water of said can and located at the uppermost end of said can; an air vent for said can positioned at a level above said overflow outlet; a receptacle for the overflow water, having its discharge portion at a level adjacent the extreme top of the inner portion of said can; and means for re-

ceiving the overflow water whereby it can be returned to said water inlet means to the can, substantially as described.

6. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal; a gate for closing the lower open end of said can, said gate being opened and movable due to the weight of the ice frozen within said can; and means for retarding the opening movement of said gate for holding the ice in check during its sliding movement, substantially as described.

7. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal; a gate for closing the lower open end of said can, said gate being opened and movable due to the weight of the ice frozen within said can; and guiding rods for said gate, substantially as described.

8. A device of the character described including a shell; a can positioned within the shell and extending at an incline to the horizontal; a gate for closing the lower open end of said can, said gate being opened and movable due to the weight of the ice frozen within said can; and means for clamping said gate in position, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

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Witnesses:

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