J. A. AUBOL.

ICE MACHINE.

APPLICATION FILED AUG. 5, 1912.

1,068,405.

Patented July 29, 1913.

3 SHEETS—SHEET 1.

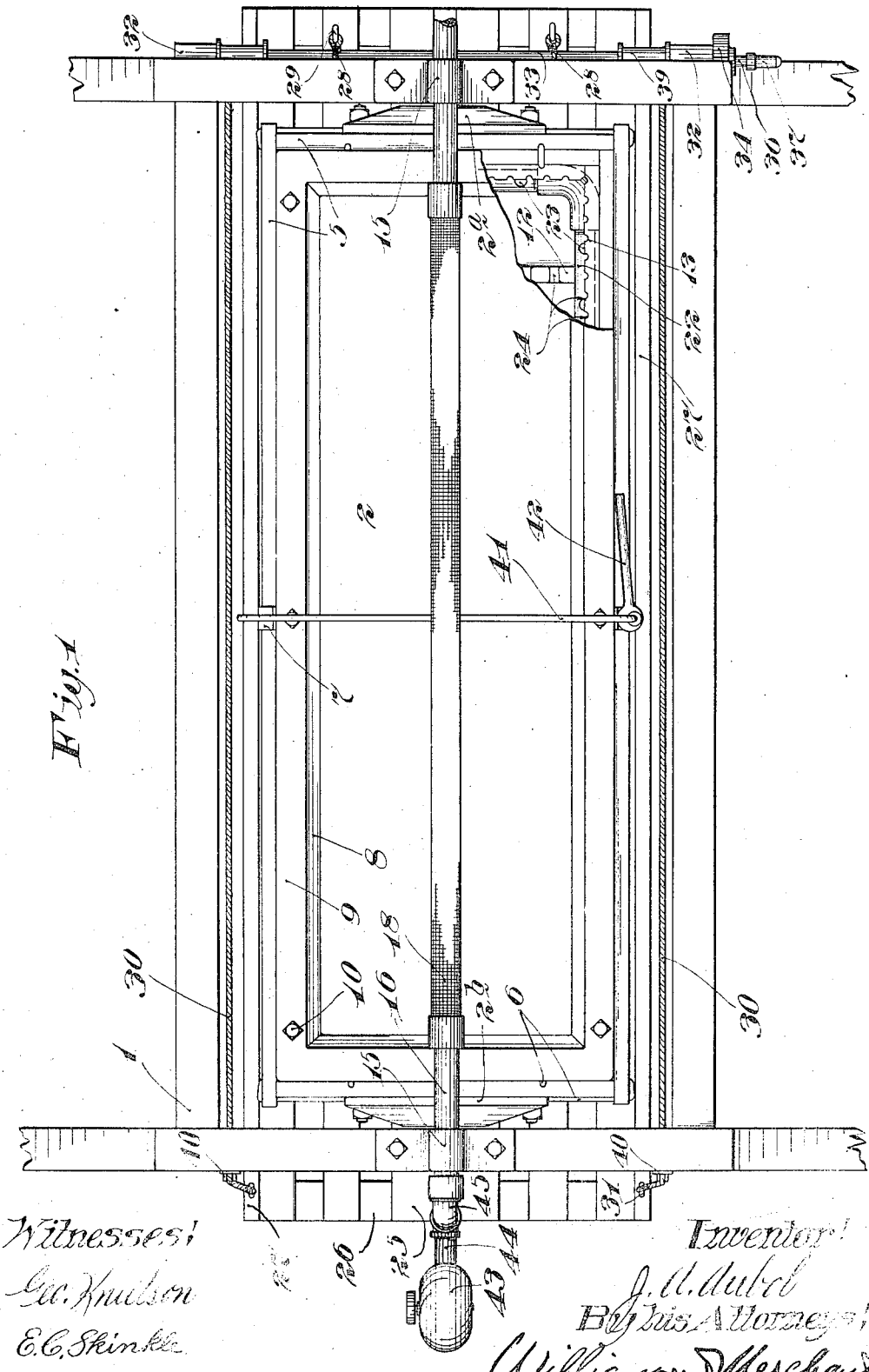


Fig. 1.

Witnesses:
Geo. Knudson
E. C. Skinkle

Inventor:
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By his Attorneys:
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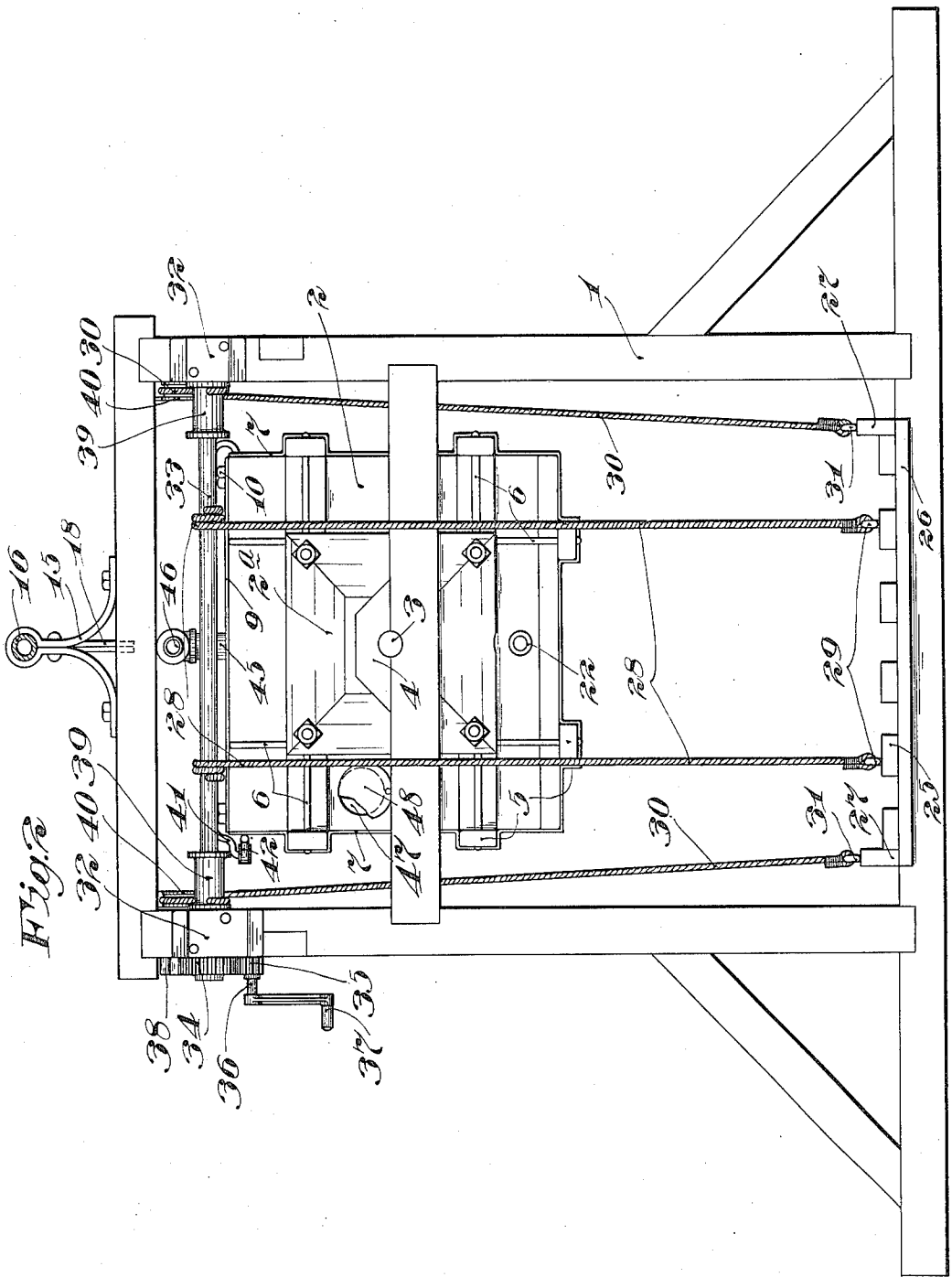


Fig. 2.

Witnesses;

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3 SHEETS—SHEET 3.

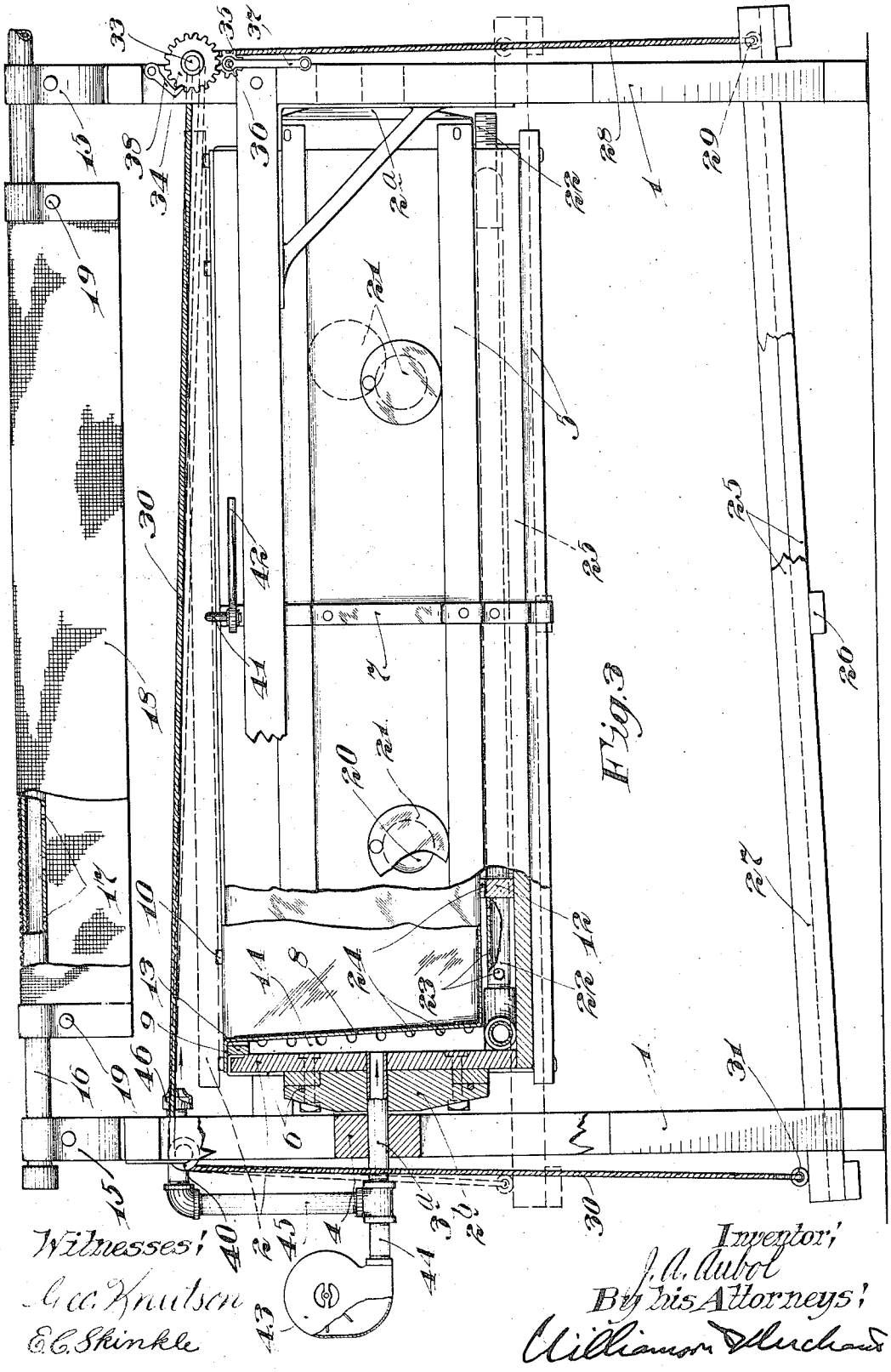


Fig. 3

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UNITED STATES PATENT OFFICE.

JULIUS A. AUBOL, OF PLAZA, NORTH DAKOTA.

ICE-MACHINE.

1,068,405. Specification of Letters Patent. Patented July 29, 1913.

Application filed August 5, 1912. Serial No. 713,250.

To all whom it may concern:

Be it known that I, JULIUS A. AUBOL, a citizen of the United States, residing at Plaza, in the county of Mountrail and State of North Dakota, have invented certain new and useful Improvements in Ice-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide a simple and efficient machine or apparatus for use in freezing ice into cake form in freezing weather; and to such ends, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

A machine of this character is especially adapted for use to freeze cakes of ice in the winter time for storage, and for use during the summer time in localities, such, for instance, as the Dakotas, where the winters are severely cold and the rivers and lakes are few and far apart, and there is not, therefore, an available supply of ice from these natural sources.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view of the improved ice machine; Fig. 2 is an end elevation of the same; and Fig. 3 is a side elevation of the same, some parts being broken away, and some of the exposed parts being shown in section.

The numeral 1 indicates, as an entirety, a rectangular skeleton frame, as shown, preferably constructed from heavy timbers. Within the frame 1 is mounted, for oscillatory movement, a rectangular wooden tank 2. To the intermediate portions of the ends of the tank 2 are rigidly secured a pair of blocks 2^a and 2^b. Rigidly secured to the block 2^a is a trunnion 3 journaled in one of a pair of bearings 4, secured to the ends of the frame 1. In the other bearing 4 is mounted a hollow trunnion 3^a, which is alined with the trunnion 3 and has its inner end journaled in the block 2^a. The purpose of this hollow trunnion 3^a will presently appear. Horizontally extended reinforcing bars 5 are rigidly secured to the bottom, sides, and ends of the tank 2 by anchoring rods 6. To further reinforce the tank 2, at its intermediate portion, a metallic band 7 is secured thereto.

The tank 2 is provided with a metallic lining, in the form of a deep pan 8, having upwardly and outwardly flaring sides that terminate in an out-turned laterally projecting flange 9 that overlies and is rigidly secured to the upper edge of the tank 2 by lag screws 10, or any other suitable means. This pan 8 is spaced apart from the tank 2 at its bottom and sides to form a chamber 11, the purpose of which will presently appear.

At its bottom, the pan 8 rests on a plurality of transversely extended bars 12, secured to the bottom of the tank 2. To keep this pan 8 properly spaced from the sides of the tank 2, horizontally extended bars 13, in rectangular arrangement, are secured to the inner upper edge portion of the tank 2 and a plurality of vertically extended bars 14 are also secured to the tank 2 and extending from the bars 13 to the bottom of the tank 2.

Mounted in bearings 15, secured to and projecting above the ends of the frame 1 is a horizontally extended water supply pipe provided with a plurality of longitudinally alined small perforations 17 in its under side. For the purpose of delivering the water from the supply pipe 16 to the pan 8 in a finely divided state, a sheet of wire netting 18 is folded over the pipe 16 and rigidly secured thereto by rivets 19. The horizontal edges of this netting 18 depends from the pipes 16, directly above the longitudinal center of the pan 8. Obviously, the water, as the same is discharged through the opening 17, will follow along the wires, constituting the screen 18, and drop therefrom into the pan 8. By this slow process of delivering the water to the pan 8, the expansion of the ice is largely overcome.

In the sides of the tank 2 is formed a plurality of ports 20 adapted to be closed by swinging covers 21, pivoted to the sides of its tank 2. During the freezing process of the water in the pan 8 the ports 20 are left open, to permit the cold air to freely circulate through the chamber 11 in close contact with its pan 8. For the purpose of releasing the formed ice cake from the pan 8, steam is introduced into chamber 11 through a rectangular steam pipe 22 mounted on the bottom of the tank 2 within the chamber 11.

A plurality of small openings 23 is found in its steam pipe 22 and are so arranged as to deliver steam in all directions within the chamber 11. To permit free circulation of air and steam within the chamber 11, the bars 12, 13 and 14 are each provided with a multiplicity of notches or grooves 24. The grooves 24 in the bars 13 permit the steam to come in contact with the flange 9 and melt the ice therefrom. One end of the steam pipe 22 extends through one end of the tank 2, and, in actual practice, will be connected to a suitable steam supply, not shown. Obviously, hot water may be used in place of steam.

For receiving the formed ice cakes from the inverted pan 8, as they are released therefrom under the action of the heat, introduced into the chamber 11, a receiving platform 25 is mounted directly under the tank 2. This platform 25 is, as shown, preferably made up of a plurality of laterally spaced longitudinally extended slats connected by cross bars 26. As shown in Fig. 3, the platform 25 is somewhat longer than the frame 1 and extends completely through both ends thereof. Guide strips 27 are secured to the two outer edges of the receiving platform 25 to prevent the ice cake from slipping laterally therefrom.

The lower ends of a pair of hoisting cables 28 are connected to one end of the receiving platform 25, by a pair of eye-bolts 29, and the lower ends of a second pair of hoisting cables 30 are secured to the other end of said platform by a pair of eye-bolts 31. Located directly above the eye-bolts 29 and journaled in bearings 32 secured to the upper ends of two of the corner bolts of the frame 1, is a transversely horizontally extended windlass shaft 33. To the intermediate portions of this shaft 33 are secured the upper ends of the cables 28 and on which shaft they are arranged to be wound. Keyed or otherwise secured to one end of the shaft 33, outside of the frame 1, is a spur gear 34 that meshes with a spur pinion 35 secured to a short shaft 36 journaled in one of the bearings 32. A hand crank 37, for operating the windlass shaft 33, is secured to one end of the shaft 36. For holding the windlass shaft 33 in different set positions, a gravity actuated lock dog 38 is pivoted to the frame 1, in a position for engagement with the teeth of the spur gear 34.

The upper ends of the cables 30 are secured to and arranged to be wound upon a pair of windlass drums 39 secured to opposite ends of the windlass shaft 33. The intermediate portions of the cables 30 run over a pair of guide sheaves 40 secured to two of the corner posts of the frame 1, above the eye-bolts 29. The lengths of the cables 28 and 30 are such that when the platform 25 is in its elevated position, as shown by dotted lines in Fig. 3, the same extends in a true horizontal direction; but, when the platform is lowered, (shown by full lines in Fig. 3) one end thereof is somewhat higher than the other, to permit the ice cakes to be easily slid therefrom. This change of the position of the platform 25, from its raised to its lowered position, is accomplished by the difference in the diameters of the windlass shaft 33 and the windlass drums 39. Obviously, the cables 30 will unwind from the windlass drums 39 faster than the cable 28 will unwind from the windlass shaft 33. In Fig. 2 the platform 25 is lowered into a horizontal position and rests entirely on the cross lower end of the bars of the frame 1. In this position of the platform there would be a small amount of slack in the cables 30.

To prevent spreading of the intermediate portions of the tank 2 during the freezing process, the sides of said tank are temporarily tied together by a removable tie rod 41 having its ends bent laterally to form hooks. This rod loosely rests upon the upper edge portions of the tank 2 with its hooked ends projecting downward outside of the said tank. Pivotally mounted on one of the hooked ends of the tie rod 41, is a cam lever 42 adapted to engage the tank 2 as a base of resistance and to draw the other end of said tie rod onto the tank 2.

To facilitate the freezing process of the water is attached to the hollow trunnion 3^a a fan for creating a forced circulation of the cold air through the chamber 11. The fan is indicated, as an entirety, by the numeral 43, and may be driven by any suitable means, not shown, and it may also be of any desired design or make. The fan 43 is connected to the outer end of the trunnion 3^a by a short pipe 44 provided with an upwardly projecting branch pipe 45 which terminates in a lateral nozzle extension 46. This nozzle extension 46 is arranged to direct a portion of the cold air from the fan 43 to the water as the same drips from the screen 18 into the pan 8. The cold air forced through the hollow trunnion 3^a is discharged after passing through the chamber 11 through a port 47 in the opposite end of the tank 2. A cover 48 is provided for the port 47 for the purpose of closing the same at the time the steam is turned into the chamber 11, for the purpose of releasing the ice cake.

The operation of the machine may be briefly described as follows: Water is first turned into the pipe 16 and delivered therefrom onto the distributing screen 18 through the perforation 17. From the distributing screen 18 the water drips into the pan 8, where the slow freezing process takes place. During this freezing process, the covers 21 are, of course, left open to permit the cold

air to circulate through the chamber 11. After the ice cake is completely formed, the water is shut off and the tank 2 given a one-half rotation to invert the pan 8, as shown by dotted lines in Fig. 3. Then the platform 25 is elevated, by operating the crank 37, into a position also indicated by dotted lines in Fig. 3. In this position of the platform 25, the same extends completely across the upper end of the pan 8 and also engages the tank 2 to thereby hold the same against rotation. The platform 25 is locked in this elevated position by the engagement of the lock dog 38 with the spur pinion 34. The ports 20 are now closed, by the covers 21, and steam turned into the chamber 11 a sufficient length of time to melt the ice cake where the same adheres to the pan 8. As soon as the ice cake is released from the pan 8, the same will drop onto the receiving platform 25. The platform 25 is now lowered and the formed ice cake removed therefrom. As soon as the platform 25 is moved away from tank 2, the same will immediately turn, under the action of gravity, into an upright or filling position.

What I claim is:

1. In an ice machine, the combination with a support, of a tank mounted on said support for oscillatory movement and having a circulating chamber, means for supplying water to said tank, means for supplying a heating medium to said chamber to release the ice cake therefrom, and a movable platform adapted to receive the ice cake when discharged from said tank, substantially as described.

2. In an ice machine, the combination with a support, of a gravity arighted tank mounted on said support for oscillatory movement and having a circulating chamber, means for supplying water to said tank, means for supplying a heat medium to said chamber to release the ice cake therefrom, a receiving platform mounted under said tank, means for raising and lowering said platform, said platform being arranged to hold said tank in an inverted position when raised.

3. In an ice machine, the combination with a support, of a gravity arighted tank mounted on said support for oscillatory movement and having a circulating chamber, means for supplying water to said tank, ports in said tank leading to said chamber, means for interposing said ports, a perforated steam pipe in said chamber, a receiving platform mounted under said tank, means including windlass shafts and cable connections for raising and lowering said platform, said platform being arranged to hold said tank in an inverted position, when raised, substantially as described.

4. In an ice machine, the combination with a tank, of a perforated water supply pipe overlying said tank, a distributing screen suspended from said pipe, and means for releasing the ice cake from said tank, substantially as described.

5. In an ice machine, the combination with a support, of a tank mounted on said support for oscillatory movement, a receiving platform mounted under said tank, a differential windlass shaft mounted on said support, and cable connections between said platform and differential windlass shaft, substantially as described.

6. In an ice machine, the combination with a support, of a tank mounted on said support and having a circulating chamber, means for supplying water to said tank, and means for causing a forced circulation of cold air through the water as the same is being delivered to said tank, and for causing a forced circulation of cold air through said chamber, substantially as described.

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

JULIUS A. AUBOL.

Witnesses:

H. A. CARLSON,

J. J. LINDE.