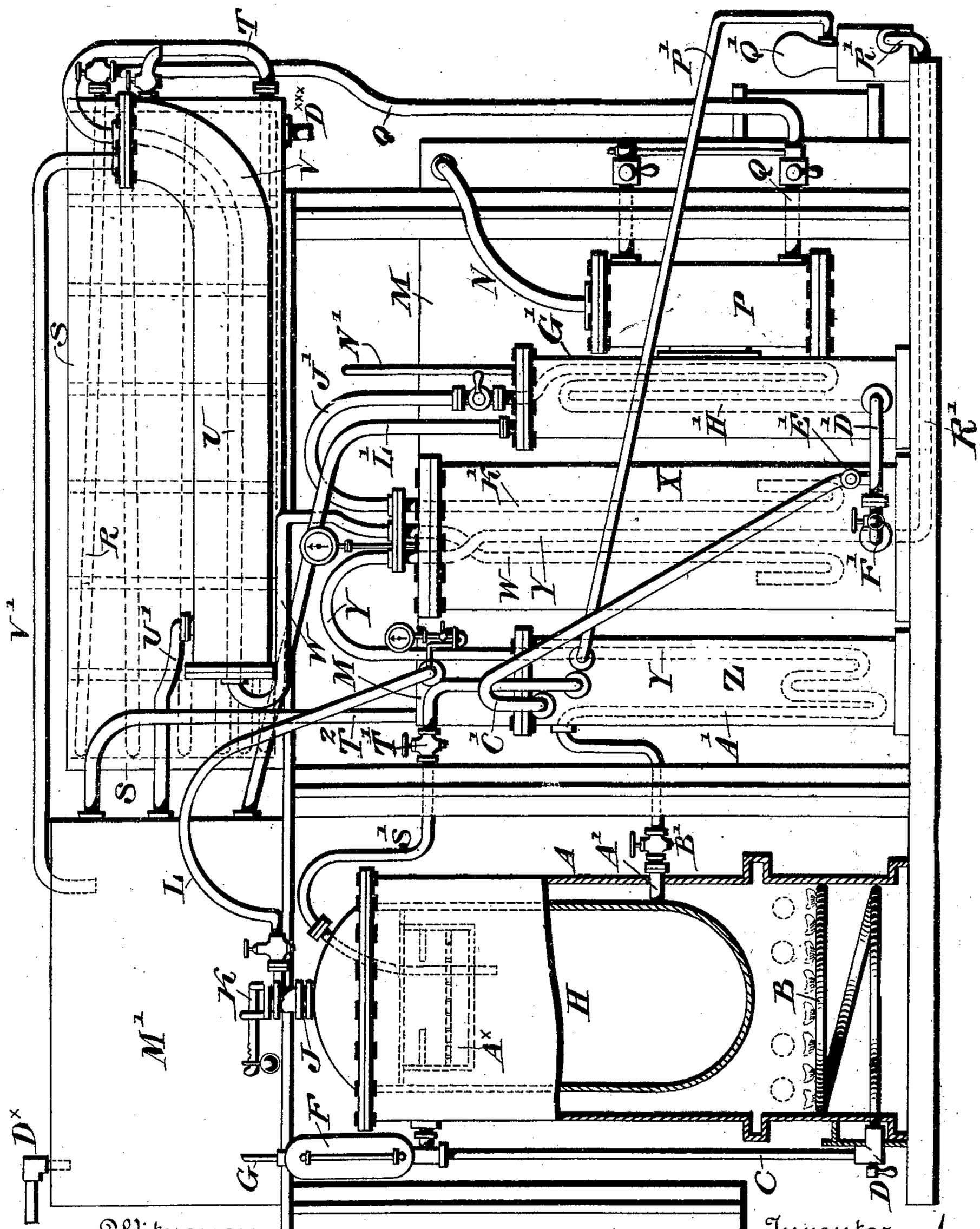
(No Model.)

C. A. KÜNZEL, Jr.

ICE MAKING MACHINE.

No. 553,681. Patented Jan. 28, 1896.



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CHARLES A. KÜNZEL, JR., OF NEW YORK, N. Y.

ICE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,681, dated January 28, 1896.

Application filed May 15, 1894. Serial No. 511,320. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. KÜNZEL, Jr., a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Ice-Making Machines, which improvement is fully set forth in the following specification and accompanying drawing.

My invention consists of improvements in ice-making machines, as will be hereinafter set forth and pointed out in the claim that follows the specification.

In the figure in the accompanying drawing, which represents a partial side elevation and partial vertical section of an ice-machine embodying my invention, A designates a still, in the base of which is a jet-pipe B, which is connected with the supply-pipe C, the latter being provided with the cock D, whose shell projects into the base of the still, the inner plug E of said cock being hollow and communicating with the supply-pipe C and with the said pipe B. H designates a retort located within the shell of said still and above the said pipe B.

J designates an eduction-pipe which is connected with the retort H and provided with a safety-valve K, said pipe being attached to a pipe L, which is connected with the condenser M, from which latter leads the pipe N which is attached to the receiver P.

Q designates a pipe which leads from the receiver P and joins the expansion-coils R within the freezing-tank S.

T designates an outlet-pipe of expansion-coils R, the same having one end connected with the pipe U, which is inclosed in the pipe or chamber V, said pipe U being connected with the pipe W, which enters and opens into the lower part of the absorption-tank X, which latter contains the strong liquor into which the pipe W dips.

Leading through the absorption-tank X is the pipe Y, which enters the heat-exchanger Z, extending to the lower part thereof, adjacent to the end of the pipe A′, which latter leads from the retort H into said exchanger Z, said pipe A′ having a cock B′. A pipe C′ connected at one end with the upper end of the heat-exchanger Z communicates with a branch pipe D′, which is connected with the pipe Y in the absorption-tank and the pipe H′ in the weak-water cooler G′, respectively, said pipes C′ and D′ having cocks E′ and F′, respectively, said cock F′ being between the absorption-tank and the connection of the said pipe C′ with the said branch pipe D′. The pipe H′ joins the pipe J′, the latter being connected with the pipe K′, which is located within and opens into the lower part of the absorption-tank X.

Connected with the weak-water cooler G′ is a water-supply pipe L′, which leads from a water-tank M′, whereby the pipe H′ may be cooled by the water admitted into the said tank G′, the latter being provided with an overflow-pipe N′ for discharging the water from said tank. The tank M′ is supplied with water by means of the pipe $D^{\times}$ which is connected with a suitable pump or other source of supply.

Connected with the heat-exchanger Z is a pipe P′ which is connected with the pump Q′ which also has a pipe R′ connecting it with the tank X.

S′ designates a pipe which is connected with the exchanger Z and provided with the cock T′, one end of said pipe entering the retort H.

T^2 designates a pipe which extends from the tank M′ to the condenser M for supplying the latter with water.

U′ designates a pipe which extends from the tank M′ to the pipe or chamber V for supplying the latter with water and thereby aid in keeping the temperature of the gas in pipe U within the same as low as possible, or lower than it would be if the said pipe U were exposed to the atmosphere. The said chamber V has an overflow-pipe V′ returning to the said tank M′. The pipe V′ is provided with an overflow-cock $V^{\times}$, and the pipe Q has also an expansion-cock $Q^{\times}$ at or near its connection with the expansion-coils R.

The operation is as follows: A chemical, such as aqua-ammonia, suitable for making gas for freezing purposes is placed into the retort H, the gas generated therefrom passing through the dehydrator $A^{\times}$ and discharging through the pipe L into the condenser M. The liquefied gas then passes through the pipe N into the receiver P, where said liquid gas is collected and then passed through the pipe Q into the expansion-coils R, which are

located in the freezing-tank S, where the gas expands from a liquefied condition into a gaseous state, as it is not under pressure in said pipes R, it being noticed that boxes are placed in said freezing-tank S and supplied with water, and as the latter is subjected to the action of the gas-containing expansion-coils R it is frozen, forming blocks of ice. It will here be noticed that the tank S is filled with a fluid mixture of alcohol and seasalt, and as the gas-containing pipes are within said fluid and cool the same it is evident that the boxes are subjected to the freezing action of the fluid, whereby the water in said boxes is frozen, thus forming the ice, as has been stated. The gas now enters the pipe T and then into the pipe U, and passes out therefrom as expanded gas through the pipe W into the absorption-tank X, where it is absorbed by the weak liquor in said tank. The strong liquor in said tank is now pumped out through the pipe R′ by the action of the pump Q′ into the pipe P′ and directed into the heat-exchanger tank Z. Now, if this tank Z is full it will overflow through the pipe S′ into the retort H. It will be noticed that the water in the tank G′ cools the pipe H′, and consequently the weak liquor in said pipe, in which condition said weak liquor enters the pipes J′ K′, and is discharged into the tank X, the strong liquor in the latter being pumped out through the pipe R′. Meanwhile the weak liquor by the high pressure in the retort H passes through the pipe A′ and cock B′ into the heat-exchanger tank Z. The heat carried by the chemical in the pipe A′ changes the temperature in the tank Z by heating the strong liquor therein before it passes back to the still. The weak liquor in pipe A′ passes through the pipe Y, through the tank X, and by the pipe F′ into the cooling-tank G′, in which a continual circulation of cold water flows through pipes L′ and N′, through pipe J′ into the tank X, from which it is sucked in its original strength by the pump and forced through tank Z and pipe S′ back into the still. If the strong liquor foams too much in the retort H, the cocks T′ F′ are closed and the cock E′ opened. Then the pump draws the strong liquor from the tank Z through the pipe C′ into the pipe D′, and thence into the inlet-pipe H′ in the tank G′, where it is cooled to a lower point than it would otherwise be, thus preventing the too sudden release of the gas upon entering the still, and from thence it may be directed into the absorption-tank X, after which it may be pumped out through the pipe R′ and directed into the heat-exchanger tank Z as before.

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

The combination of an absorption ice machine, of a still, a condenser, expansion coils, and absorber, with a heat exchanger and weak water cooler, said exchanger having an overflow into the still for the strong liquor, and also having another overflow connected to the pipe leading from the still to the weak water cooler and cocks in said overflows and pipe whereby the circulation of the weak water through the cooler and of the strong liquor back to the still may be cut off and the strong liquor circulated through the cooler, whereby foaming is prevented when the same is finally introduced into the still, substantially as described.

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