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THE HOLDEN ICE MACHINE.

In our issue of August 18, 1877, we illustrated and described in detail the above named invention, showing its application to refrigerating purposes in breweries. The machine has recently been adapted to ice making, and has achieved, we are informed, very notable success. In using it for this purpose the manufacturers have added some valuable improvements which have materially increased its efficiency, and to these, more especially, it is our object now to direct the reader's attention.

The machine is adapted to the use of any volatile liquid, such as common ether, methylic ether, chymogene, sulphurous oxide, etc., the vapor of which is used to lower the temperature of a non-congealable liquid, and this last freezes the water contained in suitable vessels and immersed in it. The action of the apparatus, as shown on the left of Fig. 1, is briefly as follows: A is the engine; B B are circulating pumps, which force the non-congealable liquid through a rotating coil in the cylinder, C, thence into the freezing tank, D. From the further extremities of the latter the liquid is conducted by the pipe, E, back to the pumps, and so passes again to the cylinder. At the bottom of the cylinder the ether or chymogene is placed so that the coil through which the water passes as it revolves dips in the volatile material, and the thin film of this which remains on the core is rapidly evaporated through the action of the pumps, F, which communicate with the cylinder by the pipe, G. In this way the temperature of the non-congealable liquid passing through the tubes is lowered. The vapor carried off by the pumps is by them driven into the condenser, H, and here it is cooled by water, liquefied and collected in the reservoir, I, whence it once more passes to the bottom of the cylinder, C. It will be noticed that there are two circulations, one of the non-congealable liquid, through cylinder, C, pumps, B, and tank, D, and another of the volatile material, or its vapor, through cylinder, C, pumps, F, condenser, H, and reservoir, I.

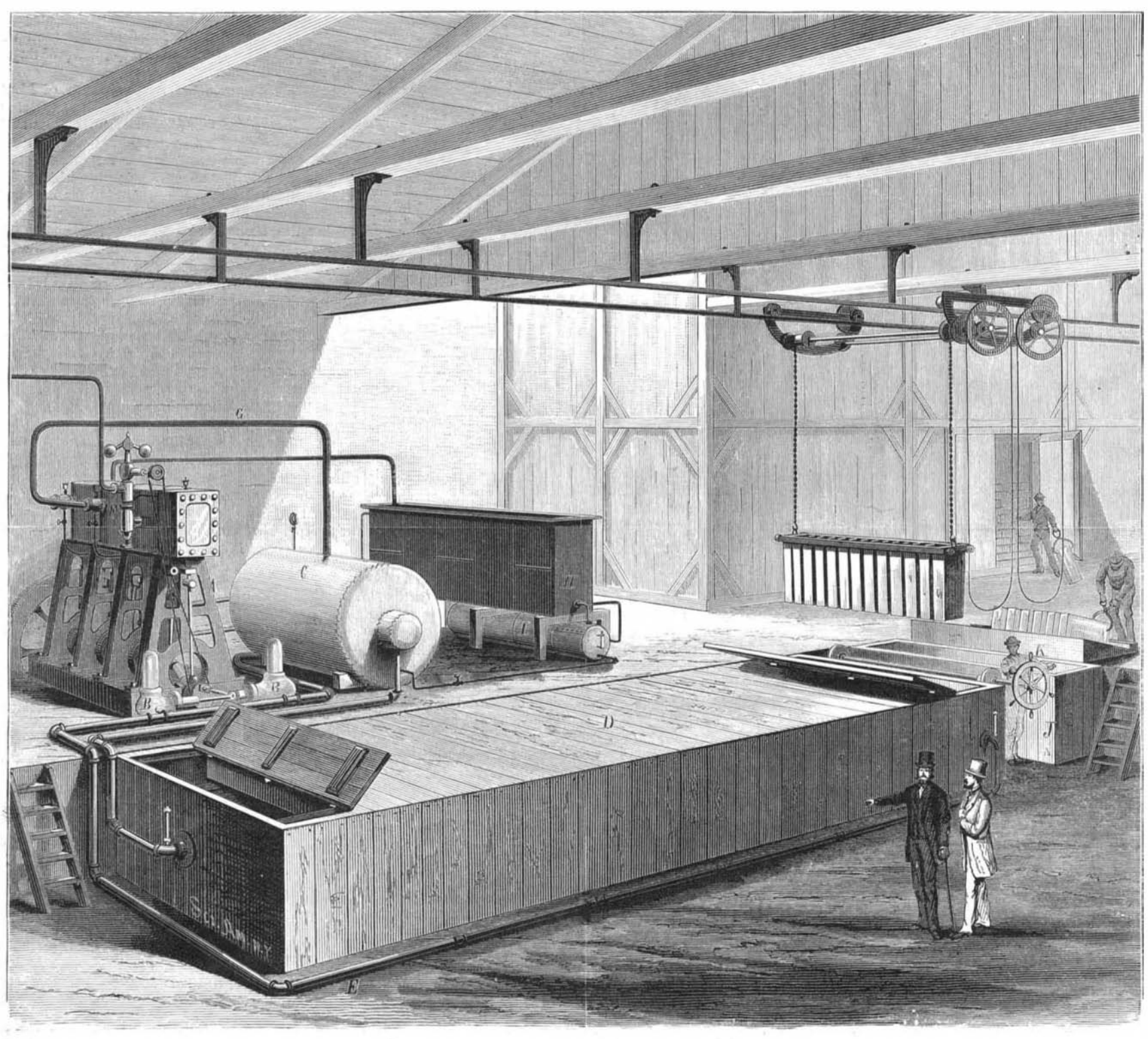
The new portions of the apparatus can now be clearly understood; and these are found in the tank, D, and its appurtenances. The water to be cooled is placed in deep cans, thirteen of which are set in a carrier, as shown in Fig. 2. When the cans are immersed in the tank, this carrier extends across the same, and the rollers at its extremities rest on ways made on the sides, as shown in the transverse section Fig. 3, page 162. The tank is capable of holding twenty-six of these carriers placed side by side. That is, this number would be inserted at the beginning of operations.

Above the tank is a traveling crane, which is used for lifting the carriers with their cans out of or into the freezing liquid. Obviously the latter is coldest at its point of entry, and therefore the ice is removed by the crane from that extremity, and transported over the tank to a bath at J, into which the cans are dipped for a moment to loosen their contents, and the ice is then turned out on an inclined plane.

Meanwhile the attendant revolves the wheel, K, which, by a pinion, operates a rack which pushes the carriers bodily to the further end of the tank, so as to close up the space left by the carrier removed, and to afford a place on the right for the insertion of the same carrier, the cans of which are at once refilled with water. The crane then moves forward again and takes out the endmost carrier, and thus the operation continues, carriers newly filled being inserted at one extremity, while those the contents of the cans of which are frozen are removed from the other.

The economy of this arrangement will be obvious when the varying temperature of the liquid in the tank is remembered. The newly filled cans enter liquid of a temperature of, say, 32°, a film of ice at once forms, and as they gradually move forward they are subjected to greater degrees of cold as the ice film thickens, until finally they reach the coldest point, when the warmth of the remaining uncongealed water has to be extracted through the greatest thickness of ice. The cold, to use a very unphilosophical but

[*Continued on page* 162.]



THE HOLDEN ICE MACHINE.

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convenient term, is thus economized to the extent that, instead of the entire contents of the tank being reduced to, say, zero, the temperature of only a portion of the same is thus lowered, with equally as good results.

The manufacturers have recently constructed one of these machines for the Virginia and Gold Hill Water Company, of Virginia City, Nevada. From the report of the superintendent submitted, we learn that, although the contract requirement was 15 tons of ice in 24 hours on actual trial, the results exceeded 20 tons, with indications that even this yield could be surpassed, the apparatus working at only two thirds of its capacity. For brewers' purposes the Holden machine is already favorably known through its successful use in the brewery of Messrs. Bergner & Engel, in Philadelphia.

For further particulars address the manufacturers, Messrs. D. L. Holden & Bros., Penn Iron Works, corner Beach and Palmer Sts., or P. O. Box 1808, Philadelphia, Pa.

THE NATIONAL STEAM PUMP.

Among the numerous steam pumps now constructed for manufacturing, mining, and other purposes, the one represented here has received much attention for its simplicity, strength, and efficiency. The improvements that have been introduced from time to time, in order to render it valuable for general as well as specific requirements, are protected by numerous letters patent, and these improvements have been recognized by competent judges and experts who have carefully and critically examined its distinguishing features. It was awarded one of the highest medals at the Centennial Exposition, a silver medal and diploma at the Fair of the American Institute in 1876, and also a silver medal at the New Jersey State Fair held during the same year.

The engraving is a perspective view of this pump in complete working order, and from this the exterior form and the general disposition of its mechanism will be readily comprehended.

The pump is one of the direct-acting kind. The centers of the steam cylinder and pump cylinder are in the same horizontal line, and the steam piston and pump plunger are connected by the same rod. The steam and pump cylinders are each secured to the foundation by a strongly-ribbed support, the base of which is well spread to allow the insertion of strong bolts, and both cylinders are connected together by three horizontal wrought iron brace rods, which keep the strain between the two in a direct and central line. The steam piston and pump plunger have packing rings, actuated by the pressure within their respective cylinders. One of the most important features is the mechanism of the valve gear, which consists of an auxiliary motor that operates the valve of the main engine when it is in an inoperative state—that is, when the main engine is at the point of reversing—and comprises the usual number of elements, namely, an auxiliary steam cylinder with its piston and valve. The main steam valve is the well known piston valve, performing with its opposite ends or faces the function of the auxiliary piston, and the main valve stem the function of auxiliary valve in combination with the main valve chest, which also performs the office of an auxiliary cylinder.

This pump has no dead centers where it will stop. It will start from any part of the stroke without the use of any starting bar or hand work to get it over the center; and one of the especial points of excellence which it possesses is, that it will work its steam valve with water, and will start even if the steam pipe is filled with the water of condensation, as is very often the case in factories where the pump is not in continual use. In most pumps, where the main valve is operated by steam admitted by a small auxiliary valve, when moving at a high speed, the steam will not work the main valve quick enough, and consequently the piston strikes the head of the cylinder. This objection is entirely overcome in this pump. When running slowly, the steam operates the main valve; but if, in running rapidly, the steam should not operate the valve quickly enough, then the momentum of the main piston rod, which is connected direct with the valve rod, by means of a tappet, will reverse the valve, and thus change the direction of the piston before it can strike the cylinder head, so that at any speed there will invariably be a full port of steam for the return stroke before the piston reaches the end of the stroke.

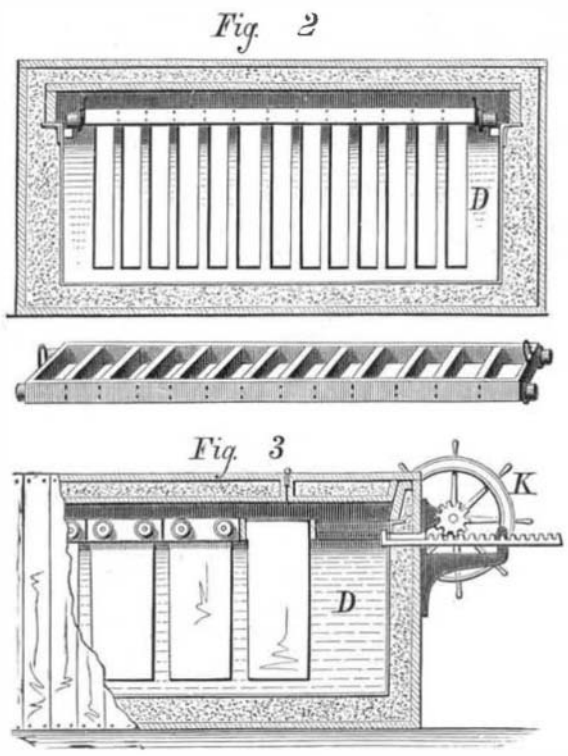
The water passages are very large and ample, and in consequence of the valves being in the cylinder heads it is possible to do away with all crooked and complicated water passages, thus reducing the loss of power caused by the friction of the water in turning short corners in crooked passages, and making the pump work with greater ease and economy.

In the water cylinder the valves and valve seats are placed in the cylinder heads, and are easily removed or replaced without disturbing the air chamber, suction, or discharge pipe.

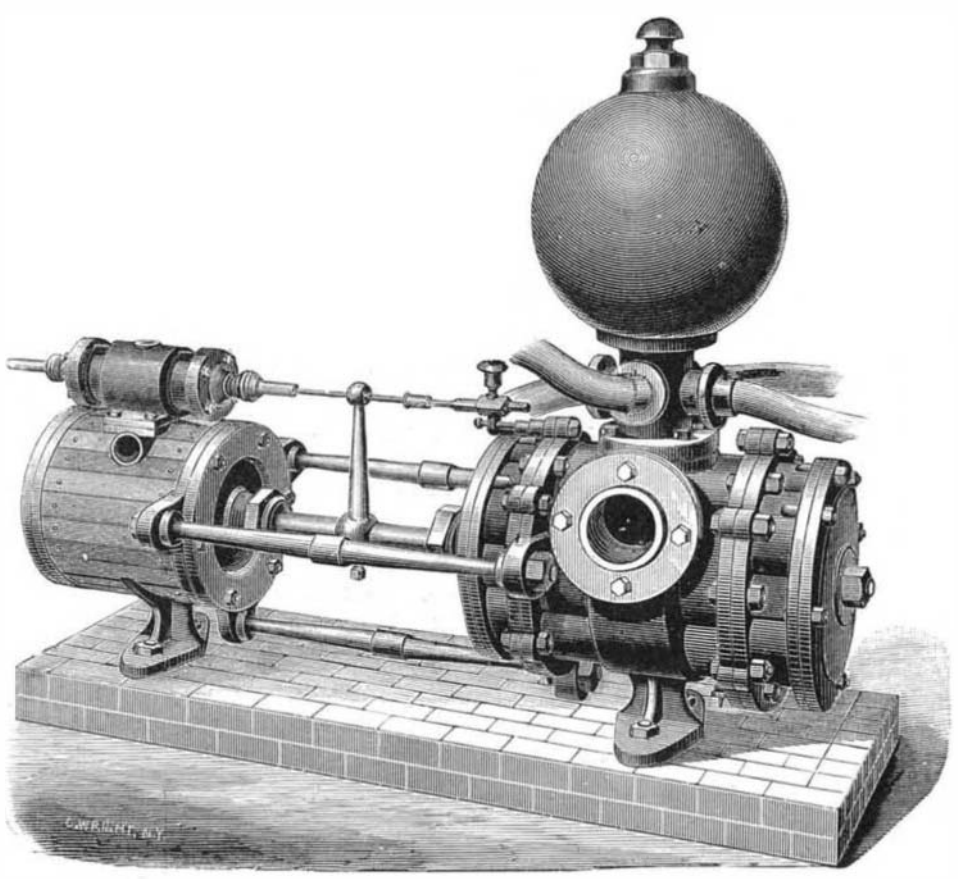
All parts are made interchangeable, so that in case of wear or accidental breakage duplicate parts can be supplied without the trouble and annoyance of taking out the pump and sending it to the manufactory.

The best materials are used in the construction of these pumps. The piston rods, valves, valve seats, and the linings in the water cylinder, are of the best composition metal.

Pumps of this description are constructed at the National Iron Works, New Brunswick, N. J. Wm. E. Kelly and Brother are the general agents for these pumps at 46 Cortlandt street, New York city, where an extensive stock is on hand and where all further information can be obtained.



HOLDEN ICE MACHINE.



THE NATIONAL STEAM PUMP.

Color Vision.

From a series of experiments with regard to the varying capacity of the eye to distinguish colors in different parts, Dobrowotsky finds that if the same illumination be given to disks of different colors, white, and coincidently blue, are first perceived in all parts of the retina, then green, and finally red. Another observer, Woinow, finds in regard to colors three zones of perceptivity around the *macula lutea*. In the first zone, immediately surrounding the spot, all colors appear less saturated than in the center, some of them being apparently bluish or yellowish. In the second zone only yellow and blue are distinguished, while mixed colors appear pure yellow if (when seen with the *fovea centralis*) they seem to contain much yellow or pure blue. In the third or outermost zone perception of light remains, but no color can be recognized.

From these observations Woinow is led to admit the existence of five different elements in the human retina—one, the rods, having for their function the perception of light alone; and four kinds of cones, each adapted to perceive a fundamental tint, red, yellow, green, or blue, but having very different distribution. In and near the center all are present, though even in this zone the red are most numerous about the center. In the second zone, in addition to the rods, only yellow and blue percipient cones are present. In the third zone the rods, or light perceiving elements, alone remain. The red and green perceiving elements appear to be very tender and delicate, and are first to fail in function when the eye is injured; the yellow and blue are more resistant. Klug makes a fourth zone within Woinow's red zone, in which only orange and violet are clearly perceptible.

What is Really Wanted.

It is not the stimulus of more money that is wanted to awaken once more the torpid and paralyzed energies of the nation.

This is a truism which it seems impossible any man of sense and reflection can deny.

Mere money is absolutely plenty everywhere. It can now be hired for four per cent per annum every day in the year.

If a carload of greenbacks was run into the center of any town in the country, and proclamation made that they could be had in any quantities to suit, by anybody and everybody who wanted to borrow, and who could give good security for their repayment, in what way would the present situation be improved? Would the proposition bring out a single customer, create one purchaser, or set one wheel of industry in motion? We know it would be of no more utility in reestablishing trade and prosperity in that town than the introduction of a carload of sawdust.

But if a solitary individual should come into one of our towns in the East or in the West, and offer to buy a hundred thousand dollars' worth of its products, whether corn, pork, iron, or calico, and have not one dollar in money, but only the note or bill of some good commercial house payable in six months, we all know a sudden spring would be given to the activity of the town, and idleness would be supplanted suddenly by occupation.

What is wanted, then, to start the wheels of trade is not more of cheap money, but purchasers and consumers. If Congress can do anything toward creating them, they will do something toward reviving business, employing the idle, and feeding the hungry.

But this can only be done by restoring confidence and establishing trade and finance on a fixed and unchangeable basis; and, above all, by being honest about it. This threatening to swindle and threatening to cheat, which we have heard of since Congress assembled in December, has a tendency to unsettle everything, and acts directly to the prejudice of every industry in the country. It operates as a constant oppression upon the producer, and upon the working man.—*N. Y. Sun.*

A Paper Exposition in Berlin.

An International Exposition of paper and paper making is to be held in Berlin, Germany, from July 16 to August 31 next. It will cover the whole field of paper making, involving machinery as well as finished product, and will extend to all branches of the stationery trade. The classification is in eight groups, respectively as follows: (1.) Fibers, chemicals, etc. (2.) Machinery for making and working paper and paper board. (3.) Paper and paper boards. (4.) Colored, embossed, and printed papers. (5.) Manufacture of paper and pasteboard. (6.) Paper for technical and mechanical purposes. (7.) Writing, drawing, and other papers for educational, commercial, and art purposes. (8.) History and literature of the paper industry.

Probably groups 5 and 6 will be exceedingly interesting, as an opportunity is here offered for making a complete collection of all the many objects to the manufacture of which paper is now devoted. It will include paper for roofing and sheathing, paper wheels, paper barrels, paper clothing, paper collars, and the many different wares of paper pulp. Exhibitors must give notice of their intention to participate before April 1, to the agent in this country, Mr. Howard Lockwood, publisher of the *Paper Trade Journal*, this city. A fee of $3·50 is required. Steam power is furnished free.

A Curious Explosion.

One of the most inexplicable explosions took place recently, at the Pine Iron Works, in Montgomery county, Pa., when a teamster tipped a cart load of hot cinders into a snow bank. This apparently innocent action produced an explosion which is described as "fearful." Houses a hundred yards away were shaken, and persons near by burned and cut by flying cinders.

A DOG-FISH weighing 2,500 lbs. was recently captured on the coast of France.