minutes at Egg Harbor and Absecon, the actual running time being seventy-one minutes. The fastest mile was made in fifty-eight seconds, and two consecutive miles, each fifty-nine seconds, three cars on the train."

IMPROVED ICE MACHINE.

We give an engraving of a new machine for manufacturing ice on a commercial scale, which possesses many points of novelty and interest. It is the invention of Mr. D. L. Holden, of Philadelphia, the well-known inventor of ice machinery. The cooling agent employed in this machine is ammonia, which is manipulated in much the same way as is usual in this class of machines; but there are several improvements on pumps, valves, etc., which add greatly to the perfection and efficiency of the machine.

The freezing, as will be observed by reference to the engraving, takes place in a chamber, A, thoroughly protected against external heat and provided with a hollow central shaft, D, arranged to receive the non-congealable liquid from above and the water to be frozen from below.

Around this central shaft, and some distance from it, there are two concentric metal walls, C, resting in a circular trough, F, for receiving the non-congealable liquid, and in the center of the space between the plates, C, there are vertical pipes, V, in which the liquid ammonia is expanded into gas. Above these pipes, and in communication with the upper portion of the hollow central shaft by a pipe, H, there are two rose nozzles which receive a supply of the non-congealable liquid from the trough, F, through the pipes, G, I, the circulation being maintained by the pump, O.

The water to be frozen is forced by a pump, P, through the lower portion of the hollow shaft, D, and through the nozzles carried by the tubular arm, G. The water is directed in a stream against the circular wall plates, C, upon which it freezes and forms the foundation of the solid coating of ice that gradually forms within and outside of the walls, C.

When the cylinders of ice have acquired the desired thickness they are sawed up into rings by the circular saws which are carried by the shafts. *i i;* one set of saws being arranged for the inner cylinder of ice and another set for the outer cylinder.

The ice is loosened from the circular walls by temporarily elevating the temperature of the non-congealable liquid sufficiently to detach it. The ice is then cut into cubes and discharged through chutes in the bottom of the chamber.

In starting the machine the aqua ammonia is warmed in the still, W^1, and drawn through the dehydrator, W^2, and drier, W^3, by the pump, R, and forced through the cooling coils, L, where it is condensed, and from which it is conveyed to the reservoir, Q, in a liquid form.

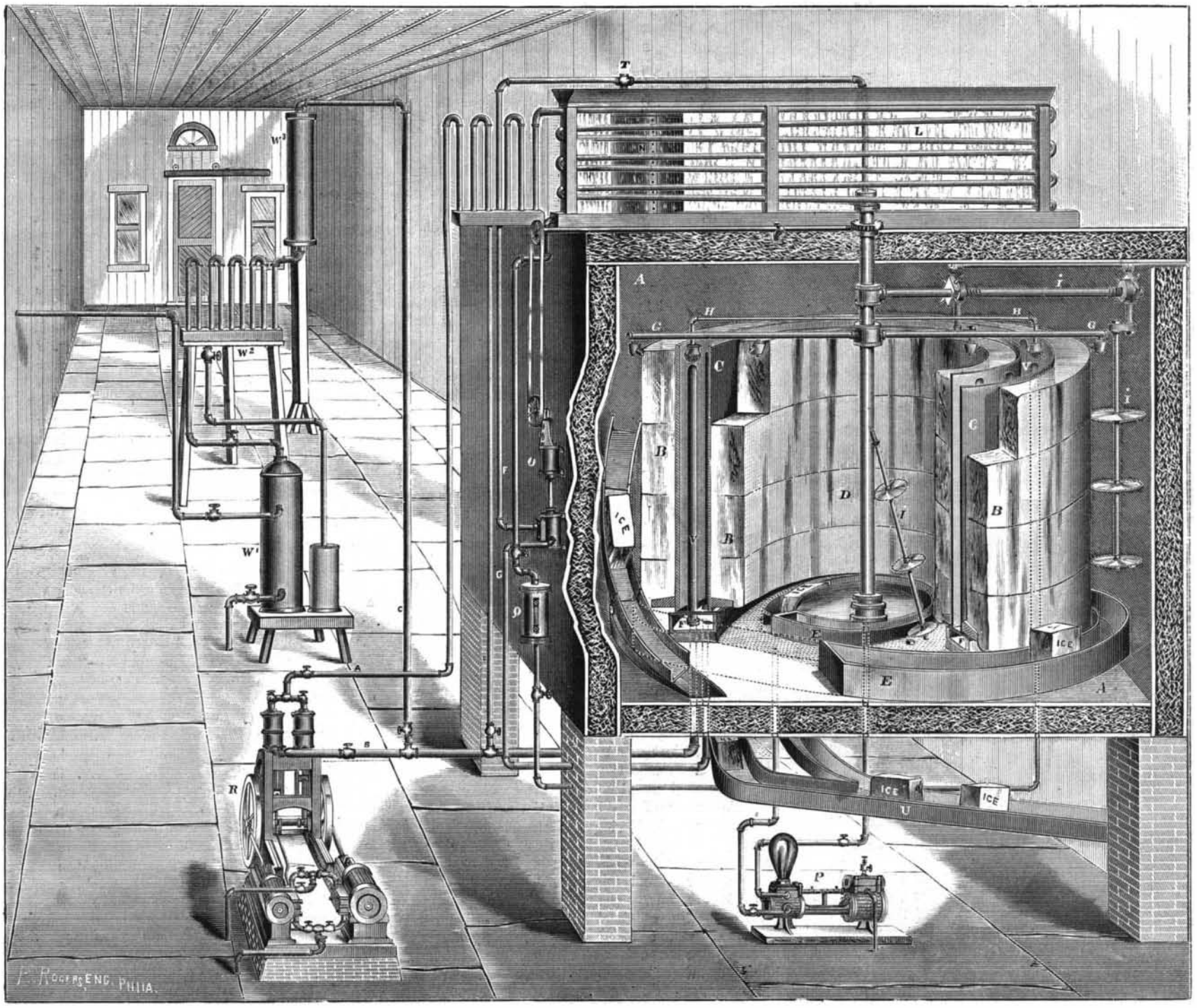
After this reservoir is once filled the valves of the pipes leading to the pumps are changed so that the cycle is from the pipes, V, in which the liquid ammonia is expanded into gas, to the pump, thence to the coolers, L, thence back to the reservoir, Q.

This machine is continuous in its action, and easy to manage.

The engines and pumps used in this machine are duplex, and so arranged that either pump or engine can be stopped and the other continue to work. The pump pistons are converted into valves, and are as automatic as a slide valve. This is an important feature that will be appreciated by users of pneumatic pumps. The improvement in valves, connections, etc., is of great value, making them, as we are informed, absolutely ammonia tight.

Perhaps the greatest improvement is the method by which the water is frozen, insuring perfect clearness and great rapidity in making the ice. The uncongealable fluid performs a double function; first, it conducts the heat from the water to be frozen through the iron plates; it refrigerates the room down to a low degree of temperature, and by this means causes surface freezing, thus permitting of freezing ice twelve inches thick in twenty-four hours, whereas by the old system of conduction alone it required from six to eight days.

The water flows in a stream upon the freezing surface in sufficient quantities to allow a surplus to run down and fall in the tank or pan beneath, washing off all air bubbles and other foreign substance, leaving the ice perfectly transparent and as hard as Kennebec ice.



HOLDEN'S NEW ICE MACHINE.

ENGINEERING INVENTIONS.

A machine by which cuts on railroads can be cleared of snow rapidly and without the labor of shoveling, has been patented by Mr. Wayne Choate, of Glenwood, Iowa. The invention consists, essentially, in oscillating boxes and movable end gates, by which the snow is first gathered and then dumped.

Mr. Gordon Land, of Alamosa, Col., has patented an improvement in water races in which the sand and all other sedimentary matters brought into it by the current of the water may be trapped off and prevented from passing through the head gates of the race. The invention consists in forming a trap in the bottom of the race which communicates with waste gates made in the side walls of the race.

A central unloading car, specially designed for dumping earth on railroads, has been patented by Mr. Joseph S. Halsey, of Lebanon, Ohio. The invention consists of a car having a platform constructed in longitudinal sections, pivoted at their ends within inclined slots made in the car sills in such a manner that when the platforms are elevated at their outer edges the weight of the load will cause their pivots to slide down the incline of the slots and depress the platforms at their inner edges, so that the load will be centrally dumped through an opening along the entire length of the platform.

An improvement in stamp mills has been patented by Mr. Frederick L. Preston, of Walworth County, Wis. The improvements relate to mills for crushing and pulverizing ores, and have for their object to furnish a simple, durable, and inexpensive mill. This mill consists of a V-shaped grating adapted to receive the angular face of a heavy hammer which crushes the ore as it is raised by wipers or friction rollers carried by the shaft of the machine.

An improvement in duplex steam engines has been patented by Mr. George Aab, of Brooklyn, N. Y. The invention consists in constructing a duplex steam engine with the piston rod of the one cylinder connected with the valve of the other cylinder by an arm, a connecting rod, and a crank arm, whereby the movement of the piston rod of each cylinder will shift the valve of the other cylinder.

Mr. John W. Thomason, of Salado, Texas, has patented an improvement in car couplings, which consists of certain devices whereby the coupling pin raised in the drawhead is supported until the drawheads strike each other in coupling, when the coupling pin falls by gravity. The invention also consists of devices whereby a link or pin may be raised separately or both raised simultaneously, as the case may require.

A novel rotary engine, patented by Mr. David O. Holman, of Adams, N. Y., consists in a new form of the cylinder and piston, and certain details connected therewith, whereby an engine is produced which will run with equal facility in both directions. It is what is practically two engines combined in one, which may be used either separately or both together.