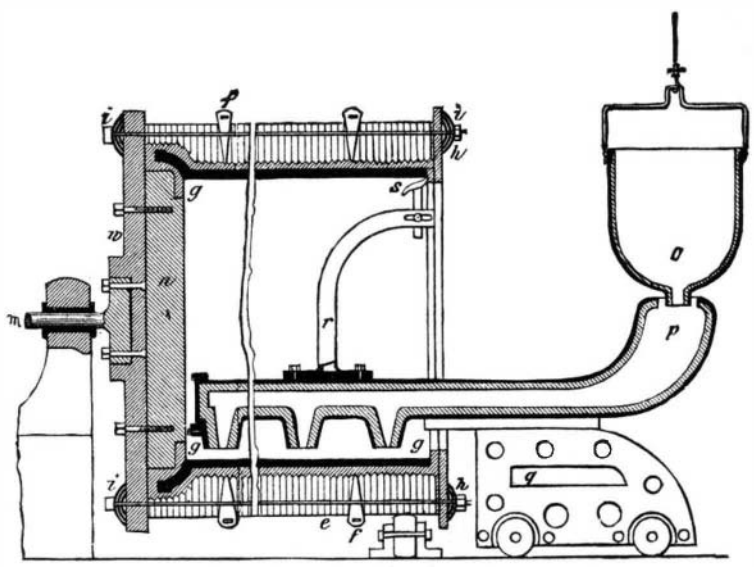
ROTARY MOULD FOR CASTING PIPES.

To cast pipes of large diameter Mr. Whitley, of Leeds, employs the rotary mould shown in the accompanying cut. The mould is fixed so as to project from a disk, *w*, mounted on the axle, *m*, and consists of a series of iron rings, *e*, which are held together by bolts, *h*. The springs, *i*, permit the mould to expand in a longitudinal direction, while the conical ring segments, *f*, which can be thrust outwardly, render contraction possible. The outer extremity of the mould is supported by one or two rollers.

The mould, properly so called, is formed by covering the rings, *e*, and the plate, *n*, with moulding clay, *g*. Before moulding, the carriage, *q*, carrying the mouth piece, *o p*, is shoved up against the mould, and the latter is made to rotate rapidly during the inflow of the metal. In order to determine the thickness of the sides of the pipe, a peculiar measuring apparatus, *r s*, is affixed to the mouth piece. The internal surface of the mould may also be produced by templets fixed on a carriage similar to *q*, in such a way that it can revolve.—*Dingler's Polytechnisches Journal.*



ROTARY MOULD FOR CASTING PIPES.

Rapid Growth of a Colt.

A yearling colt in Mr. Robert Bonner's celebrated breeding stud, in Westchester County, New York, weighs 1,062 pounds, and yet is fine in all his points, and promises to turn out a fast trotter. Mr. Bonner thinks he gets this early exceptional size from an experiment he tried with his dam. Before the colt was weaned, he says he had the mother brought up from pasture every night, and fed six quarts of oats; and since the colt has learned to eat he also has been fed abundantly with oats, in addition to good pasture in the summer and hay in winter. Following up this system, Northern horse breeders may get the same size at as early an age as is now obtained in our Southern States and the milder winters of California. In the latter country there is good pasture all winter, and the colts receive no check in their growth, as is common with all kinds of stock unless they receive extra care during the rigorous winters of the Northern States. Mr. Bonner's treatment of this colt is the same as that pursued by English breeders of race horses. The dam is not only fed an abundance of oats, but the colt is also taught to eat them just as soon as possible, which he learns to do at an early age from the same trough as his mother. At six months old—the general age for weaning the colt—he has learned to sustain himself well on grain, grass, and hay, so that when weaned there is no check in his growth, but he keeps steadily along the same as when sucking his dam.—*Rural New Yorker.*

IMPROVED ICE MACHINE.

This apparatus is the invention of Franz Windhausen, of Berlin. It is claimed that by its means ice can be commercially manufactured of a better and more durable quality than that produced by the freezing machines at present in use, and at from one-third to one half the cost.

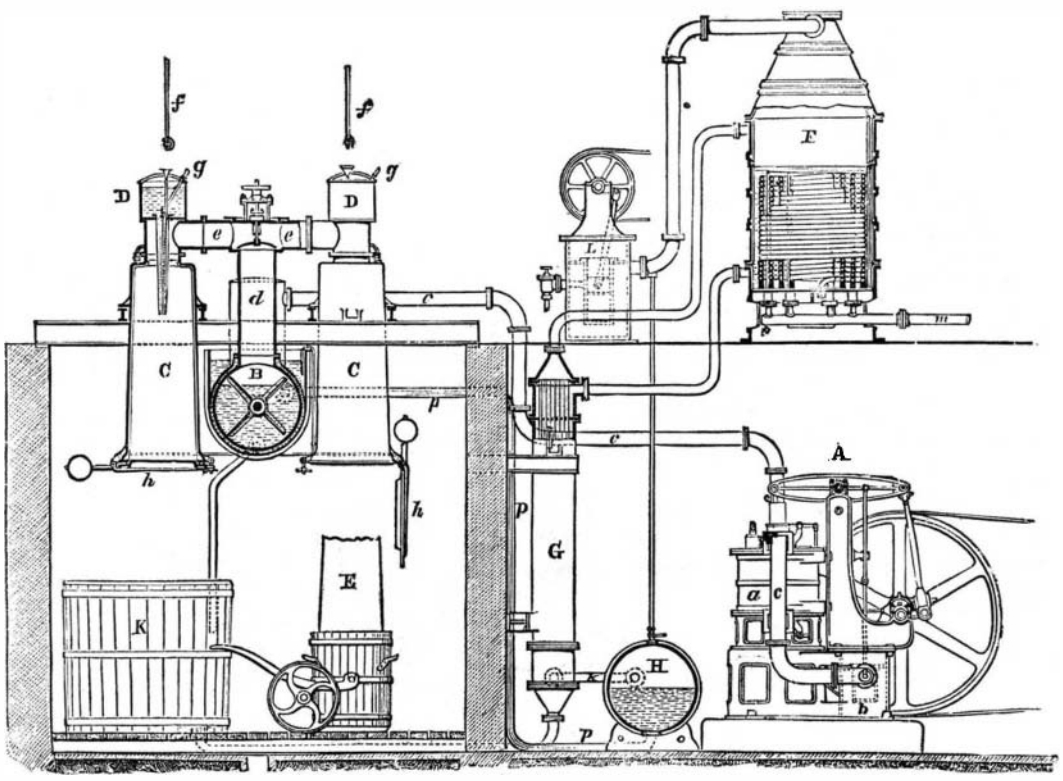
It has long been known, says the *Engineer*, that extreme cold can be produced by the rapid evaporation of water in a comparatively perfect vacuum, the heat required for vaporization being abstracted from the remaining water, which consequently becomes reduced in temperature, and if the process be sufficiently prolonged, actually converted into ice. Machines to carry out this principle have been constructed by Leslie, Carré, and others, but in all these cases the air pump served only for the rarefaction of the air in the refrigerating compartment, and not for the removal and condensation of the vapor, which had to be entirely absorbed by sulphuric acid, requiring renewal after each operation. Owing to this defect, continuity of action could not be obtained, while the removal and replacement of the acid was not only an expensive operation, but was open to obvious objections from the danger and difficulty of dealing with such a highly corrosive material as oil of vitriol. For these reasons the introduction of vacuum machines has never been general, and in point of fact they were little known or used, except for producing very small quantities of ice for household purposes and for laboratory experiments, in both of which cases the air pump was worked by hand.

In Windhausen's machine is introduced a combined air and vapor pump, which serves for maintaining the extreme vacuum of about four millimeters absolute pressure in the refrigerator, and at the same time to remove and condense the steam, while the renewal of the sulphuric acid is avoided by a cooling and concentrating arrangement, by which the absorbed water is abstracted and the acid rendered available for use over and over again.

Our illustration below gives a general view of a complete vacuum ice machine, arranged as it actually is in practice. The pump, A, shown in the present instance as driven by an independent engine, maintains an almost perfect vacuum in the freezing cylinders, C C, with which it is connected by the suction pipe, *c*, through the absorber, B, containing concentrated sulphuric acid continually agitated by revolving arms. Pure water is delivered by pipes, *f f*, into cisterns D D, from which it is gradually admitted to the cylinders, C C, by pipes with adjustable valves, projecting somewhat into the interior, and water jacketed to prevent obstruction from the formation of ice. The vacuum within the freezing cylinders at once causes rapid evaporation, and the vapor, together with a certain amount of air given up by the water, is drawn toward the pumps through connecting pipes, *e e*, and *d*, over the surface of the sulphuric acid in B, which absorbs the greater part of the vapor.

Each pound of vapor formed in the cylinders, requiring a supply of some 1,100 thermal units, has no other source of heat to draw from but the water itself, and as about 200 units are given off in the formation of one pound of ice, it will be seen that by properly arranging the supply nearly six pounds of water might be converted into ice for every pound evaporated. Actually, about five pounds of ice are obtained, the balance of the heat being drawn from the iron casings by conduction from the outside. When the process is sufficiently advanced, that is, when the freezing cylinders are filled, which takes place in about an hour—more or less depending on their size—the doors, *h*, at the bottom are swung open, and the blocks of ice permitted to fall by their own weight into receptacles of any convenient description. The freezing vessels are placed in two rows, one on each side of the absorber, with which they communicate by separate pipes with shut off valves, so that if desired each cylinder can be worked and discharged independently of the other.

The absorber, B, containing the sulphuric acid, is a horizontal cylinder within which a shaft provided with arms rotates. These arms stir the acid and mix the surface portion, which is diluted from absorbed moisture with the more concentrated portion at the bottom, and being made spoon-shaped, carry up acid with them, so promoting absorption. A cold water jacket surrounds the cylinder and cools the acid, which would otherwise become heated. From the absorber the dilute acid is conveyed by a pipe to the bottom of the heat exchanger, G, and, ascending through tubes, is heated by hot concentrated acid outside, traveling in the contrary direction on its passage to the reservoir, H. From the exchanger the dilute acid, now somewhat raised in temperature, enters the concentrator, F, by a pipe at the top, and is further heated by a steam coil in order to evaporate off the water, the vapor being removed by the small supplementary pump, L. The hot concentrated acid then passes from the bottom of the concentrator round the outside of the tubes in heat exchanger, where it is cooled, into H, from which the pipe, *p*, conveys it for reuse in the absorber.



THE WINDHAUSEN ICE MACHINE.

In a report by Dr. John Hopkinson, F.R.S., who has personally inspected one of the vacuum machines erected in Berlin in 1880, and in use since that date, it is stated that no undue depreciation or corrosion was apparent in any part of the apparatus, and that after most careful examination no trace of acid could be found either in the condensed vapor from the large air pump or in that from the small concentrator pump. With regard to cost, the report states that the writer found from experiment that 1 ton of coal would produce 12½ tons of ice, the average net horse power to work a machine making 12 tons in twenty-four hours not exceeding three, and that he is of opinion that, after allowing interest on capital, depreciation at 10 per cent, and estimating other expenses on a liberal scale, solid block ice can be produced by the vacuum process for from 3s. 4d. to 5s. per ton, depending upon the magnitude of the plant and whether it was continuously worked up to its full power or otherwise. Even in this country the manufacture of ice and the refrigeration of water and other liquids have become such necessities that it is quite certain the advantage of a cheaper method of producing cold than those now in use will be readily appreciated; while in hot climates, where, from the difficulties resulting from the high pressures required in ice machines in which cold is produced by the evaporation of ammonia or other volatile liquids, the use of cooling apparatus has hitherto been attended with considerable difficulties and expense, the new vacuum plant should be worked as effectually and economically as in this country.

The ice produced is not transparent, but opaque, this appearance being caused by vacuoles due to its formation in a vacuum, and which, so soon as the doors of the freezing cylinders are opened, become filled with air. On this account it is claimed that the ice is more durable than if transparent. The experimental trial lately made in London was a complete success in every respect.

Gunpowder Engine.

Herr Beck, of Nordhausen, Germany, has invented a machine of which the motive force is supplied by gunpowder. In a horizontal cylinder a piston is set in motion by small quantities of powder, which are alternately ignited before and behind it. The gases which have been used escape through lateral openings closed by slide valves at the return movement of the piston. The heavy residuum accumulates in the deepest part of the cylinder, and is pushed by the piston into receptacles which are emptied from time to time. The ignition of the gunpowder is effected by a spirit flame or by a gas jet, which is brought to bear upon it by the sucking action of the piston, through an opening provided with a slide valve. A Cologne firm of engineers has, according to the *Deutsche Industrie Zeitung*, undertaken the construction of this machine, with a view to its being introduced for sale during this autumn. Among the advantages claimed for it are the comparatively small space it takes up and the fact of its being constantly ready for use. The consumption of powder is relatively small, and no special attendance is required, as the machine is self-regulating.

Large Sugar Yields.

The sugar yields in some parts of Louisiana have been uncommonly large this year. The Donaldsonville *Chief* gives a list of "reliable reports" from some of the principal plantations in Ascension, on which the yield has ranged between 5,500 to over 6,000 pounds of sugar to the acre. The crop has, generally, largely exceeded the estimates made when the grinding began.