PICTET'S SMALL ICE-MACHINE.

The small ice-machine shown in the accompanying cut is designed to produce small quantities of ice at a time. It is capable of operating intermittingly and produce a kilogramme of ice in about fifteen minutes, or continuously and give 4 to 5 kilogrammes per hour, with an expenditure of power always below that of a one-horse power steam engine. It is adapted, then, for use on steamboats, in country seats, in colonial dwellings, in agricultural industries, and in all cases where it is easy to take a horse from his ordinary work, or to use him when idle, long enough to effect the operation; in a word, it is applicable in all cases in which there is a motive power at one's disposal, and in which the only means of obtaining ice economically is to manufacture it one's self.

The apparatus is not very different in principle from Mr. Pictet's large ice-machines which we have already made known. It is merely very much simplified so as to supply the special wants of the new applications for which it is designed.

The apparatus consists essentially of a compressing pump actuated by the motor; of a congealing refrigerator, with a condensing tank that also surrounds the cylinder and pump; and of a congealing refrigerator in which are placed the moulds filled with water to be frozen. All these parts and their accessories—suction valves, frame, driving shaft, gearing, etc.—are skillfully grouped so as to occupy but a very limited space, inasmuch as the bed plate is only 50 centimeters square, and the total height does not exceed 1·3 meters. The operation of the apparatus may be readily understood. At the beginning the sulphurous anhydride is in the congealing refrigerator. The pump sucks it up, and evaporation absorbs a large quantity of heat from a solution of glycerine in the refrigerator, and from the moulds filled with water placed in the glycerine. The anhydride is afterward forced by the pump into the condenser, where it liquefies, and gives up to the water in the condensing tank a certain quantity of heat. The colder this water of condensation is, the less the work demanded by compression. The anhydride, then, constitutes an intermedium, which permits, after a manner, of *drawing heat* from the congealer and *pouring* it into the condenser. When the apparatus is operated continuously, it becomes necessary to keep the condenser at a low temperature, this being easily done with a circulation of 200 liters of water per hour in the condensing tank. When the operation, which requires from twelve to eighteen minutes, is finished, the moulds are removed from the congealer, and a distributing cock is opened so as to allow the liquefied anhydride in the condenser to run into the congealer. In about a quarter of a minute the former communication is again established, and the machine is then ready to begin operations anew.

All that the apparatus demands, then, is motive power, since it is closed up, and the anhydride describes a complete cycle at each operation. The duration of the initial change of sulphurous anhydride is indefinite. In practice it depends only on the degree of tightness of the joint of the piston-rod stuffing box.

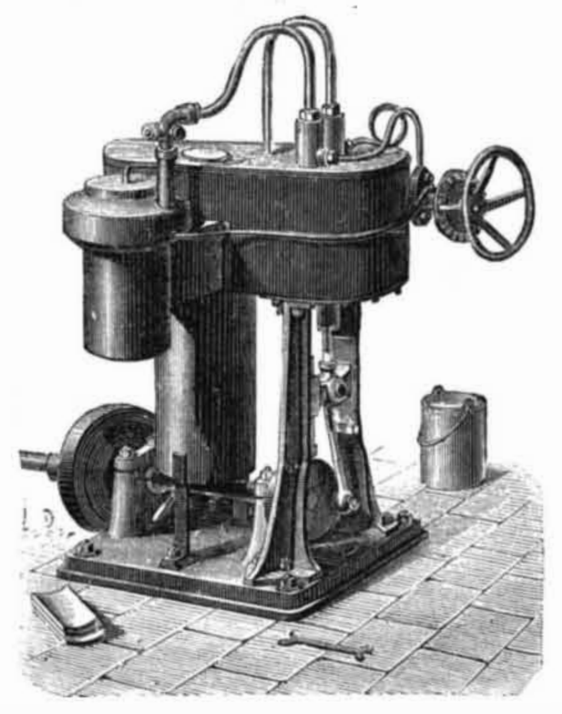
The ice produced in the moulds is in the form of three slightly curved layers, which are afterward superposed so as to make a single compact block, weighing one kilogramme.—*La Nature.*

Incandescent Gas Lights.

The vestry of Clerkenwell have decided to give trial to a new system of gas illumination, introduced by Mr. J. Lewis, of 12 Clerkenwell Green. In this system the old gas burner is discarded, and its place is taken by a thimble or basket of platinum wire gauze inverted over the end of the supply pipe. The coal gas is mixed with compressed air by means of an air-pump, and the mingled gases pass to the platinum gauze, and escape through its meshes. They are lit on the outside, and the wire speedily becomes white-hot. The total combustion of the gas is further assisted by the draught up two side pipes branching from the main supply pipe below the burner and curving downward. The appearance of the incandescent thimble is very pleasing, and the light is brighter, softer, and steadier than a gas flame. No flame is seen above the incandescent wire, and there appears to be total combustion of the gas. The lighting power of the system is said to be 5¼ candle power per cubic foot of gas consumed. A similar plan has been brought out in France by M. Clammond. In this a mixture of gas and heated air is employed, and the gas is burned in the meshes of a platinum basket as above. The air slightly condensed arrives at the burner by a separate pipe to that of the gas, as in Mr. Lewis's arrangement, but it is likewise passed through a tube of refractory material heated to 800° C. or 1,000° C. by means of a number of small gas flames round it. After this heating it is allowed to mingle with the coal gas and proceed to the burner. A horse power of work expended in condensing the air is stated to do for an illumination of 200 Carcel lamps, and one Carcel lamp requires from 0·95 to 1·6 cubic feet of gas according to the burner. The latter has to be replaced every forty or fifty hours. A modification of the platinum burner is also provided for replacing the chalk cylinder in the oxyhydrogen light, and adapted for stage and lecture purposes. Dr. Regnard has further adapted the platinum cage to a petroleum lamp. In this case the compressed air is supplied by a hand-bellows or a bag filled with air and loaded with weights. The air passing over the petroleum oil in a reservoir mingles with the vapor, and the mixture passes to the platinum cage, where it is burnt. While upon this subject we may also mention a new arrangement whereby a strip of platinum foil is passed through a gas flame and traversed by the electric current. It is stated that a light equal to thirty candles can be obtained from two cubic feet of gas per hour by help of a very weak current.—*Engineering.*

An Army in Blue Specs.

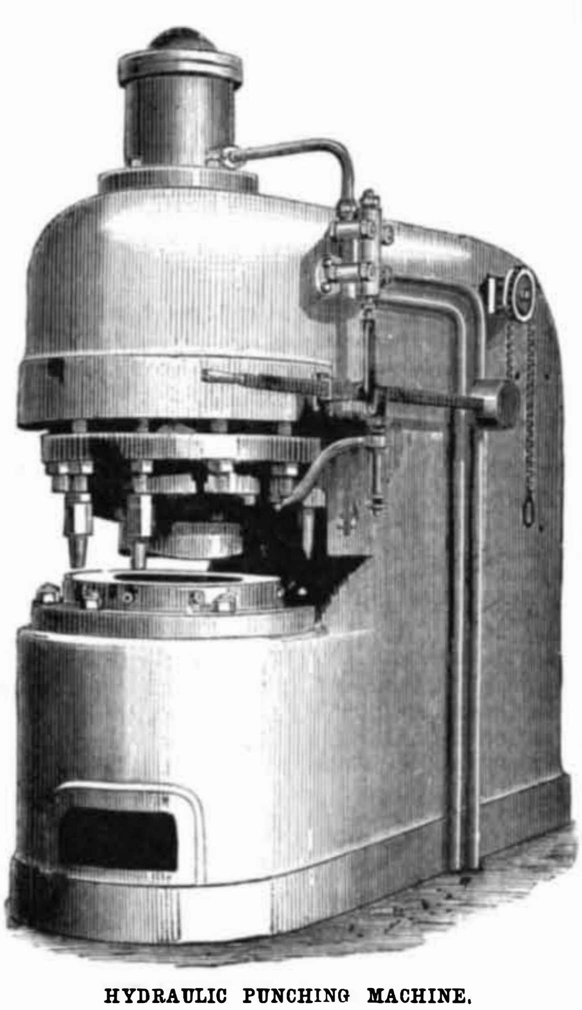
It is said that Arabi, the general of the Egyptian revolutionary forces, is going to be very circumspect and hold his ground quietly, expecting that the English army will soon be disabled by ophthalmia, without the need of fighting. The glare of the sun and the fine sand that floats in the air have been found to play the mischief with foreign soldiers. It is affirmed that during the Egyptian campaign of the great Napoleon two-thirds of his men were at one time distressed with eye diseases. According to the English papers, every precaution is to be taken to save the British troops, now pouring into Egypt, from such maladies; and among other speculations, 25,000 pairs of blue spectacles have been purchased at five cents per pair. Probably Arabi will laugh at the spectacle of an army in specs; but blue glass is held to possess various healing virtues, and if the British expectations are realized, they will yet laugh at Arabi.



PICTET'S SMALL ICE-MACHINE.

HYDRAULIC PUNCHING MACHINE.

The engraving illustrates a very large punching machine, constructed by Mr. R. H. Tweddell, of Delahay street, Westminster, for Messrs. Raylton, Dixon & Co. It is intended for stamping out manholes in marine boiler plates at one operation, and will stamp a hole 18 inches by 14 inches in a ¾ inch plate. It weighs 14½ tons. The machine is so simple, and its construction is so clearly shown in our engraving, that we do not think any special description is necessary.



HYDRAULIC PUNCHING MACHINE.

Modern Improvements in Glass Making.

The following is a record of the principal improvements in glass making during the last fifty years, as given by a prominent manufacturer:

Robert Lucas Chance, of Birmingham, England, successfully introduced the manufacture of Bohemian sheet glass into his district in 1838. James Chance perfected the process of grinding and polishing sheet glass, now known as patent plate.

The substitution, about the year 1830, of carbonate of soda, as the alkaline ingredient in glass in place of kelp, and subsequently, for crown and sheet glass, of sulphate of soda (saltcake) in the place of carbonate.

An increase in the size and improvement in the workmanship of the plates, sheets, and tables produced.

An improvement in the color of the glass by the use of purer materials and modifications in the process of melting.

Numerous improvements in the flattening of sheet glass, resulting in the removal or diminution of many imperfections.

The use of the diamond in the process of splitting cylinders in the place of a red hot iron.

An increase in the size of the melting pots and furnaces, with the view of economizing coal and labor.

The adoption, in the casting of plate glass, of various mechanical contrivances. The origin of some important improvements of this class is due to the manager of the Birmingham Plate Glass Works.

The use of the same pot for the two processes of melting and casting plate, superseding the old method of transferring the contents of the melting pot into the vessel used for casting.

The substitution of small coal, or slack, in the melting processes in the place of the large coal or lumps.

The application of Siemens' regenerative process to the melting of glass, by which the amount of smoke is greatly diminished, the color of the glass is improved, a greater control is obtained over the furnace, and a saving of fuel is effected wherever, by this process, slack can be substituted for large coal or lumps. These advantages are to some extent counterbalanced by the increased cost of the furnace, and its increased liability to get out of order. The process, however, as applied to glass making, is so new that there has been scarcely time as yet to overcome the difficulties that have presented themselves.

The introduction of the Gill furnace, whereby coal is economized to a remarkable extent without sacrificing the effectiveness of the combustion or the evolution of heat.

There have been many improvements, besides, in machinery for pressing and ornamenting glassware, but they are too numerous and intricate to detail here. The most important of these, too, have had their origin in the United States, which have rapidly come to the front with labor-saving devices in glass manufacture as in other industries.—*Pot. and Glass. Reporter.*

Fireproof Cement.

A fireproof cement is being introduced made from a material found in the Eifel Mountains. It is alleged by eminent professional men to be the only material known to science which possesses besides its plastic qualities the virtue of being fireproof. Moistened with water, this cement forms an elastic mass, which can be exposed when dry to great heat without shrinking or showing any cracks. Such a cemet should be peculiarly adapted for repairing defective fireplaces, cracks in retorts, etc., as mortar for fireproof buildings, and for the interior plastering of furnaces. The mode of its preparation is as follows:

The cement is to be well mixed in a dry state, a small quantity of water is added and mixed well together. As a mortar it can be used in the ordinary way. In lining furnaces, however, care must be taken to press the cement well into the walls, so as to leave a smooth, even surface, as when dried by the air the cement easily crumbles and will not harden till ignited. Moreover it must not be treated roughly until it has been well burnt. Cracks in furnaces, retorts, etc., should be well cleansed and scraped, and if possible roughed before applying the cement. The parts to be mended should be damped beforehand.

An analysis by Dr. Bischof, of Wiesbaden, gives the following results:

The cement is a pale gray, gritty substance, consisting of a good deal of fine dust, with angular and round particles of quartz. When mixed with water it is very sticky, compact, and easily moulded. In 100 parts of the material dried at 120° C. there were:

Clay earth	10·18
Silica, chemically combined	11·03
Silica, mechanically mixed (sand)	73·58
Iron oxide	0·41
Lime	0·23
Magnesia	0·17
Potassium	0·99
Loss by heat	3·46
	100·05

As will be seen, the quantity of fusible matter such as iron, etc., is very small indeed, if any. Under the fire treatment the cement showed the following results: After being heated to silver smelting heat, or about 1,000° C., the cement turned to a gray color, speckled with a few black spots, the fracture being eartby and porous.

To remove smoke stains from ivory, immerse the pieces in benzine, and go over them with a brush.