IMPROVED REFRIGERATOR.

We give herewith an engraving of an improved refrigerator by which vessels containing liquids may be kept cold, and from which the vessels may be removed without opening the refrigerator, and without admitting the outer air directly to the cooling chamber.

In this refrigerator are combined an ice receptacle and one or more cooling chambers below the ice receptacle, and it is provided with means whereby vessels may be suspended or introduced into the ice receptacle without admitting the external air.

The inclosing case of the refrigerator may be made in any desired form, and divided into several cooling compartments. In the upper wall of the refrigerator case there are several apertures in which are suspended the vessels containing the liquids to be cooled, the vessels being introduced from the top and projecting into the ice chamber, which is separated from the lower portion of the refrigerator by a horizontal partition.

The ice is introduced through the long door that opens downward. The openings in the top of the ice chamber are lined with suitable non-conducting material, which acts as a packing to prevent the circulation of air. In some of the openings there are rubber disks slotted radially, which admit of inserting and removing vessels of various sizes without requiring any particular attention to the matter of closing the openings, as they close automatically as soon as the vessel is removed. All the apertures may be fitted in this way, or they may be provided with suitable tight fitting non-conducting covers or valves, either entire or having openings adapted to vessels of different sizes and shapes.

BLAKE'S REFRIGERATOR.

In this refrigerator access may be had to the contents of the cans or vessels without disturbing the contents in the cooling chambers, and any air that enters through the openings in the top passes directly into the ice receptacle and is cooled before it can reach the cooling chambers below. Access may be had to the contents of the cooling chambers without disturbing the cans, and the outer air that enters into these chambers will be cooled before it can reach the vessels inserted in the top.

This improved refrigerator is particularly applicable to cooling butter and milk, and the inventor informs us that it is very economical in the use of ice.

The invention has been patented by Mr. J. C. Blake, of Petersburg, Va.

A Carbureted Incandescent Gas Light.

Another new intense gas burner has been constructed to meet the demand for a white light, and is reported to be in use at a gold lace factory at Colombes, in France. It is the invention of M. Helouis, who calls it the carbo-oxhydric burner; and it is described as being a combination of the incandescent and carbureted systems of gas lighting. The burner can be employed to render incandescent any refractory body, and also to effect the combustion of a jet of highly carbureted gas. In both cases an auxiliary jet of pure oxygen is utilized. The method of operating appears to be as follows:

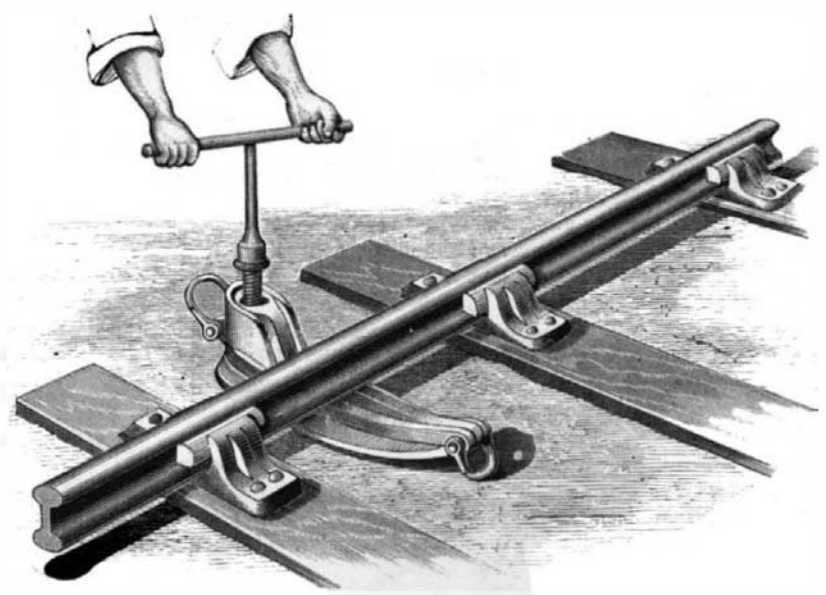
A current of common coal gas is highly carbureted, close to the point of combustion, with the vapor of naphthaline, and is then ignited with oxygen in something like the usual double blow pipe arrangement; the flame being directed against a refractory block. The light is produced by the incandescence of the carbon in the gas, which gives a warmer tone than lime or magnesium. It is continually being deposited upon the block of lime, which it protects, and aids in eventually transforming into a kind of hard porcelain. The blocks preferred by M. Helouis are made of fat lime, steeped in hot paraffine to preserve them from injury before being placed in position for use. The oxygen is obtained by means of a special arrangement, also patented by M. Helouis; the source of supply being sulphuric acid subjected to a red heat. The result of the decomposition of 500 kilos of sulphuric acid in this apparatus is 72 cubic meters, or 99·4 kilos of pure oxygen, 35 kilos of acid liquor, and 365 kilos of sulphurous acid. M. Helouis also obtains oxygen from air by means of an India-rubber dialyzer. It is stated that in comparison with the burner named after the city of Paris, in the photometer room of the Municipality, the Helouis burner, consuming 50 liters of gas, 42 grammes of naphthaline, and 138 liters of oxygen, gave the light of 15·6 carcels; which was equal to the illuminating power of 2,170 liters of gas in the Ville de Paris burner. Compared with the burner of the Rue du Quatre Septembre, which gave the light of 13 carcels with a consumption of 1,400 liters of gas, costing 42 c. per hour, the Helouis burner, of equal illuminating power, consumed 43 liters of gas, costing 1·3 c.; 120 liters of oxygen, costing 7·8 c.; and 40 grammes of hydrocarbon, costing 0·4 c., or altogether 10·5 c.

Softening Boiler Feed Water.

For the complete softening of boiler feed water, and the consequent prevention of scale, the *Engineer* recommends pure 98 per cent caustic soda, as sold in ten pound drums by some Lancashire alkali manufacturers. The substance in these drums is in the form of powder, and consequently there is no difficulty in weighing out the exact quantity required for daily use, which will be instantly dissolved in cold water. All that is necessary, therefore, is to put a small quantity daily into the feed water. The effect is to throw down all the salts of lime that may exist in the water, and would otherwise make scale, in the form of soft mud capable of being blown out in the usual way. Very little soda is required, a small quantity of the pure article going a long way. In ordinary cases it is estimated that about three pounds of it added to the feed water every day will keep a twenty horse power boiler perfectly clean and free from scale. In order to ascertain the exact proportion, it is recommended to add one-sixteenth part of an ounce of the caustic soda to a gallon of the feed water, and boil it. When the sediment thereby thrown down has settled, the clear water is to be poured off, and another half drachm of the soda added. If the water remains clear, the first addition of soda has removed the lime; but if it becomes muddy, the second allowance is necessary. In this way, remarks our contemporary, a sufficiently accurate estimation of the quantity of pure soda required can be made, and the proportion to be added to the feed water can be adjusted in the same proportion Thus, if half a drachm of soda will soften a gallon of water, there will be used about 4 pounds to 1,000 gallons. The cost of 98 per cent caustic soda is about 2d. per pound; and hence the cost of perfectly softening the water in this instance would be 8d. per 1,000 gallons—a small expense in comparison with the benefit of having no boiler scale.

THE DE BERGEN RAIL LIFTER.

One of the most useful labor-saving implements for railroad making and repairing we have seen seems to be the rail lifting device shown in our engraving. The implement is so simple, both in construction and operation, and our cut shows it so clearly, that no description seems necessary. The *Iron Monger* (London), from which paper we reproduce the engraving, says the machine is so light that one man can carry it about with ease, place it in position under the rail to be lifted, and, unaided, raise the rail to the required height, and when the rail has been raised he can leave the lifter without the attendance of any one. When placed under the rail the lifter in no way intercepts the platelayer's view. One man with this little machine can wrench up the rail, chairs, sleepers, and ballast without first opening out the ballast in the usual manner, or he can raise heavy crossings with the same facility.



A PRACTICAL RAIL LIFTER.

A Milling Engine.

The Jewell Milling Company, Brooklyn, N. Y., have introduced the roller process into their new mill on Fulton Street, with an entire new power plant; the engine being of a new and artistic design, of the compound horizontal type, built by Wm. Wright, of Newburg, N. Y. It is rated at 550 horse power, making 60 revolutions per minute, with an initial pressure of 80 pounds per square inch.

The high pressure cylinder is 26 inches diameter and 48 inches stroke, with steam and exhaust chests on opposite sides of the cylinder, with vertical action gridiron valves—balanced—a variable valve gear, trip cut-off, and dash pot stops.

The low pressure cylinder is 46 inches diameter, or three times the area of the high pressure cylinder, and 48 inches stroke. This cylinder has a single steam and exhaust chest, with double horizontal action gridiron valves, worked directly from the eccentrics, the cut-off valve being adjustable and operated by an index screw working upon a stem passing through the steam chest.

In the steam connection between the two cylinders is a receiver or drum of the same capacity as the high pressure cylinder.

The air pump is located beneath the floor, is double acting, and worked from a rock shaft, which is connected with an eccentric upon the main shaft.

The pistons are connected to disk cranks set at right angles upon the main shaft, which carries a flywheel pulley, 50 inches in width and 20 feet in diameter, over which runs the 48 inch leather belt recently described in this journal.

The manner of locating and connecting the pipe work is rather unique for this class of engines, the steam and exhaust pipes, receiver, air pump, and condenser, as well as the double system of injection pipes, being all hidden beneath the main floor of the engine room. The main valves are operated by wheels set upon finished standards in the space between the cylinders. The only pipe work seen in the engine room are the indicator connections and the drip pipes and valves, which are highly finished and nickel plated. All of the rough parts of the frame are japanned black, with just enough ornamentation to give the whole a high and artistic finish, which is also carried out in the design and finish of the room.

The arrangement of the valve action and their set, has been made with a regard to the smoothness of action of the engine, rather than for a technical card of fine spun curves.

The initial pressure, starting at 80 pounds, is cut off to regulate the exhaust pressure at about 5 pounds, or so as to keep a nearly uniform pressure of 5 pounds in the receiver; thus giving steam to the low pressure cylinder at 5 pounds pressure, and allowing it to follow the piston in this cylinder just long enough to make the equalization in the receiver a constant pressure (which is regulated by the cut-off adjustment alluded to above), when the condenser takes the exhaust, giving a constant vacuum of 27 inches.

An unusual electric phenomenon is developed in this engine room by the action of the great belt, which is in itself quite a wonder.

The stream of atmospheric electricity, a foot in length, is so enormous in quantity that persons standing upon the floor without insulation, with their fingers stretched toward the belt, become instantly charged, as a Leyden jar, while an odor of ozone pervades the whole room.

Steam is furnished by three boilers of the cylindrical tubular type, each 66 inches diameter, 16 feet long, with Steele's revolving grate bars, the application of which brings into use a novel feature in the method of working the fires, thereby avoiding the necessity of slicing or of using the fire irons at all; the doors being only opened for the purpose of passing in coal, thus enabling an easy and continuous run of 144 hours per week without cleaning the fires.

Treatment of Ulcers.

Dr. J. Whitson, in "Notes on the Treatment of Ulcers" (*Practitioner*, January, p. 20), remarks that the application of a specially prepared sand to granulating sores has been tried for some time with success, and that it possesses the advantage, since it absorbs the discharge, of seldom requiring removal, so that healing can proceed without interruption. This sand is prepared as follows: It is first heated to a temperature capable of destroying all organic particles. It is then soaked in a solution of 1 part of bichloride of mercury in 1,000 parts of water. After this the mixture is placed in bottles and can be used when required. This mode of treating ulcers is not new, the sandy earth of the termite ants having long been used for this purpose by the natives of the West Coast of Africa. This substance was some time since imported by Mr. T. Christy, under the name of "termite earth," for trial in this country, but whether it possesses any antiseptic properties derived from the white ants is not known.