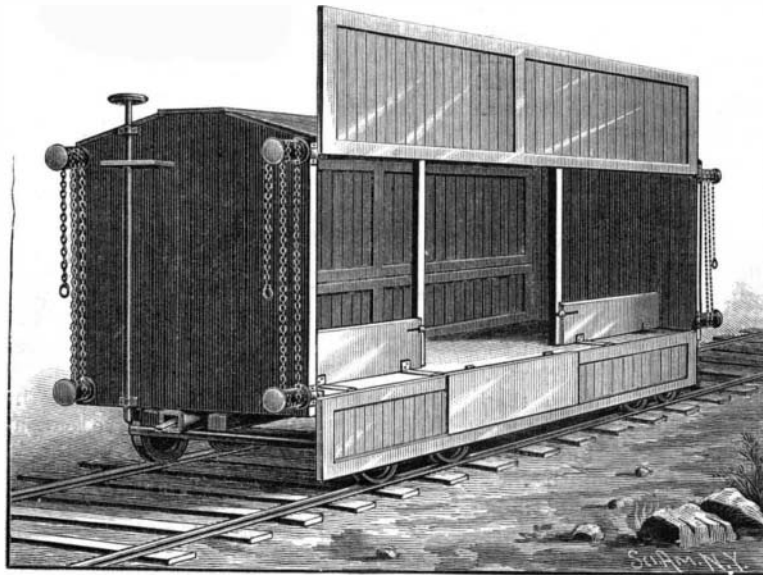


**AN IMPROVED FREIGHT CAR.**

An improvement providing a box freight car with doors extending the entire length of the car, with means for operating and securing them, has been patented by Mr. Hermann L. P. C. Hartmann, and is illustrated herewith. Each upper door is hinged to an upper beam and each lower door to a lower beam of the car body, hinge pivots projecting at the ends of the car carrying top and bottom pulleys. Over these pulleys, at each end of the car, passes a chain which is first secured by one end to the top pulley, around which it is wound several times, then passed over and around the bottom pulley, and again over the top pulley, the end hanging down having a ring to pull upon, whereby the doors may be opened and shut. On the inside of the top of the car, on one or both sides, are pivoted posts, which may be locked against the car roof by hooks, and which when swung down serve as supports for low doors, pivoted to the car floors, which may be locked against them. When the operator desires to place long articles, such as logs, etc., in the car, he entirely opens both the side and the interior doors, throwing open the entire side of the car, although, if desired, the lower door may be placed horizontally on suitable supports, such as a wagon from which articles are being loaded into the car, when the upper door will also be held in a like position.



HARTMANN'S FREIGHT CAR.

For further information relative to this invention, address Mr. H. L. P. C. Hartmann, care of Paul Brummer, Bay Ridge, L. I., N. Y.

**A SUPERFICIAL HEATER FOR BOILERS.**

A feed water heater for stationary boilers, designed to most effectively utilize all the heat given out by the fuel consumed, is shown in the accompanying illustrations, and is the invention of Mr. L. H. Willard, of Rutland, Vt. These heaters are of steel boiler plate, and for an ordinary four-foot boiler are three inches thick, 7½ feet long, and 5 feet high, as shown in Fig. 1. They are placed on each side of the fire box, next to the fire, as shown at B B, Fig. 2, doing away with the use of fire-brick. The heaters are connected with the boiler by pipes near the top of the heaters, the water being taken into the heaters at the bottom, and be-

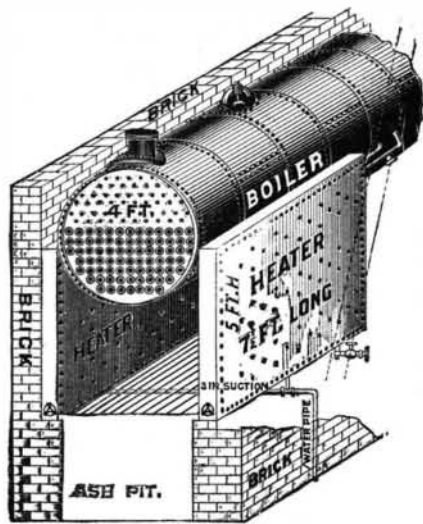


Fig. 1.

coming heated to a high temperature before it is admitted to the boiler. There is also a bridge wall heater, shown at F, which is adjustable to give more or less space between its top surface and the boiler, this heater extending down to the grate surface, where it is connected with the side heaters. By this construction, as will be seen, the fire is almost completely surrounded by water, in a manner designed to effect a

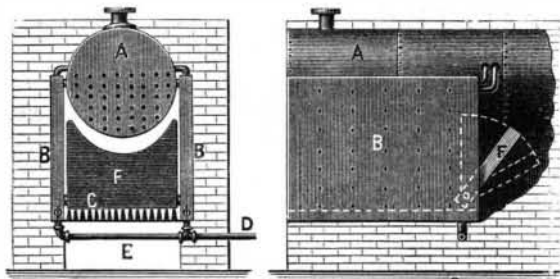


Fig. 2.

great saving of fuel. As the water will also be ordinarily at boiling heat when supplied to the boiler from the heaters, it is expected that the greater portion of the impurities and sediment will be deposited at the bottom of the heaters, where they can be conveniently removed by means of hand holes, and the boiler thus kept free from deposits of scale.

**Compressed Air for Blast in Cupola Furnaces.**

An important experiment for applying compressed air direct to a cupola furnace for the melting of iron for casting purposes was successfully carried out, according to *Ryland's Iron Trade Circular*, a few days ago, by

the Birmingham Compressed Air Power Company. The experiment, which induced the attendance in Birmingham of nearly forty members of the South Staffordshire Institute of Civil Engineers, took place at the iron foundry of Messrs. J. Cartwright & Sons, in New Bond Street, and was superintended by Mr. Locock, resident engineer of the company. Hitherto the air has been applied to the cupola through an American patent blower. The air is now applied direct from the pipe through a jet resembling a steam jet. The volume of compressed air used carried with it nearly 150 times its own volume of free atmosphere. The admission and pressure of the air is easily and promptly regulated by the turning of a wheel which opens or closes the aperture through which the compressed air is admitted. Messrs. Cartwright, the makers of this air injector, state that in the melting of five tons of iron they saved one and a half hours in time, and they estimate that an economy of 40 to 50 per cent will be effected in the cost of the process of melting. By the application of the air direct to the furnaces, the engine, and, consequently, the engineer, are dispensed with, and the apparatus can be regulated by the man in charge of the cupola, the danger of accident from the use of steam boiler or of the machinery being avoided.

**Sending a Soprano's Voice by Express.**

The test of the powers of the phonograph recently given in the Grand Pacific Hotel, Chicago, was not novel save in the fact that the music, a soprano solo with piano accompaniment, was so accurately reproduced. Three weeks before, a well known New York soprano had given the song, a phonograph set up on a near-by table, listening to her, as one might say, with careful attention, so careful indeed that, when the instrument, sent on to Chicago by express, was set agoing, it was well high life-like, being, as we are informed, "only a few shades less perfect than when originally given." There was the high resonant treble, then the liquid vocals, the soft whisperings, as of zephyrs across summer seas; and each with its piano accompaniment, the strings being also so fairly true as to yet delight the ear, even though not at all times actually flawless.

Long ago it was prophesied that the voices of to-day would be "bottled" for future generations by means of the phonograph. But those who heard their own voices reproduced hoped the promise would not be realized for the wheeze and rasp of them. Perhaps the recent exhibition will reassure them.

**AN IMPROVED POWER TREADLE ATTACHMENT.**

An attachment affording a novel means for applying power to the ordinary form of treadle machine is illustrated herewith, as applied to a perforator, and has been patented by Mr. Eugene von Boeckmann, of Austin, Texas. Its frame is adapted to support the machine to be driven, the driving shaft being supported by bearings rigidly connected to the frame, and on this driving shaft are fixed parallel arms, between the outer ends of which a roller is mounted. The machine to be driven is mounted on the frame in such position that its treadle will be borne upon by the roller mounted between the parallel arms, as the driving shaft is revolved, each revolution of the shaft depressing the treadle. By moving the shaft to such position that its arms will be out of the way of the operator, the treadle may be depressed by the foot. Hooked bolts are provided for securely anchoring the frame to the floor, and one of the small views illustrates the manner in which the frame may be made fast to a masonry floor.

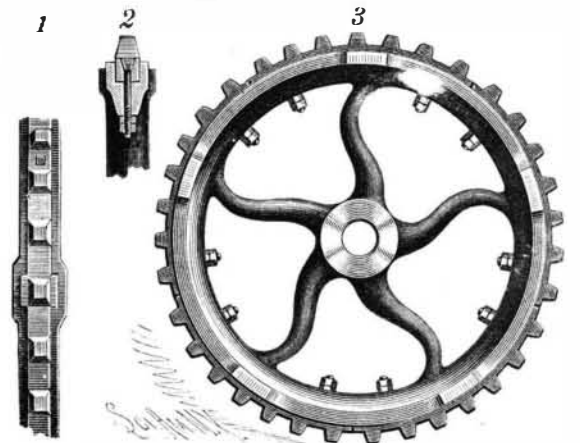
**Boracic Acid as a Preservative.**

Boracic acid only acts when present in large quantity. It prevents the growth and multiplication of germs, but does not kill them even in a 1 per cent solution. Experiments with milk gave very unsatisfactory results, as an addition of 4 per cent boracic acid only preserved the milk for four days. Horseflesh may be preserved for six weeks by the use of 3 per cent of the acid. Boracic acid is supposed to be harmless, but recent investigators, including the author, prove it to be dangerous, as it strongly acts upon the mucous membrane of the large intestine. A dose of 4 grammes killed a large rabbit, 2 grammes made a dog very sick.

The acid is much used in Sweden for preserving fish and milk, but cases of poisoning have already occurred in that country. Long continued use of the acid is not favorable to good health, and at all events its addition to milk should be prohibited.—*Emmerich, Chem. Zeitung, No. 76; L. De K., the Analyst.*

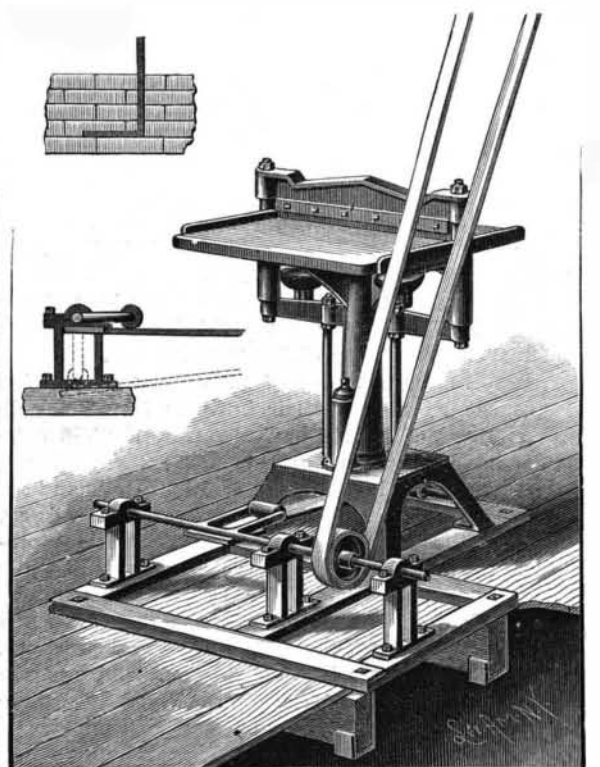
**AN IMPROVED TOOTHED WHEEL.**

A toothed wheel with detachable segmental sections, each carrying one or more teeth or sprockets, whereby a tooth or teeth may be simply and expeditiously removed from the body of a wheel when broken, is illustrated herewith, and has been patented by Mr. John T. Redington, of Ambler, Pa. The body of the wheel is formed in any well known manner, with a continuous groove in its periphery, and offset recesses at intervals intersecting the groove, these recesses being preferably located immediately above the spokes and extending



REDINGTON'S TOOTHED WHEEL.

into aligning offsets on the sides of the wheel, as shown in Figs. 1 and 2. A series of segmental blocks are inserted in the groove, the blocks carrying on their outer face one or more teeth or sprockets, each of the blocks having on its sides aligning lugs adapted to enter the recesses extending from the groove in the periphery, the lugs and recesses thus taking the main strain of the work from the fastening bolts, which project through the body of the wheel and are retained by lock nuts upon the inner face of the rim of the wheel. These bolts have essentially wedge-shaped heads, whereby they are prevented from turning when inserted in the wheel, and by simply withdrawing the bolts, one or more sections may be taken out and other sections substituted without disturbing the remaining sections in the wheel.



VON BOECKMANN'S POWER TREADLE ATTACHMENT.