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GARBAGE DESTRUCTOR AND CARBONIZER.

The matter of disposing of garbage and various kinds of refuse, in our large cities, is becoming a serious one, and is beginning to receive the attention its importance demands. Some experiments have been tried in this direction in the city of New York, in Chicago, and elsewhere in this country, but with indifferent success.

In England, however, the case is different, a number of furnaces for this purpose being in successful operation, consuming all refnse without nuisance. The furnaces were designed by Mr. Fryer, of Nottingham, and are thus described in an address delivered by Mr. Alfred W. Morant to the Association of Municipal and Sanitary Engineers, and published in the *Engineering*:

The destructor consists of six compartments or cells, formed of brickwork lined with firebricks, and tied with iron rods; it occupies a space of 22 feet by 24 feet, and 12 feet in height, and is so arranged that there is an inclined road leading to a platform over the top of it, on to which the refuse is carted; and there is also another incline from the level of the firing floor to the adjoining road, by means of which the mortar, charcoal, old iron, and other matters which resist the action of the fire, are carted away.

Each of the six cells is capable of destroying 7 tons of refuse in 24 hours, and consists of a sloping furnace with hearth and fire grate covered in by a reverberatory arch of firebrick, with one opening for the admission of the refuse, another for the gases to escape into the flue, and a furnace frame and doors for the withdrawal of the clinkers. The brick arch above concentrating the radiant heat upon it. The opening for the entry of refuse is divided from the opening for exit of gases by a wall, a bridge preventing the refuse, which is heaped up immediately below, from finding its way into the flue also. At intervals of about two hours the clinkers are withdrawn through the furnace doors, and a further charge of refuse shoveled in at the top. The result of the process is that everything is consumed, or converted either into clinkers or a fine ash. Every two cells are also provided with an opening for the introduction of infected mattresses, diseased meat, etc., on to the fire, where everything is readily consumed without causing a smell.

The gases from the furnaces on the way to the chimney shaft pass through a multitubular boiler, 6 feet in diameter, 10 feet in length, and make steam to drive a horizontal engine with 12 inches cylinder and 2 feet stroke, which works the two mortar mills with pans 8 feet in diameter. In these the clinkers made in the destructor are mixed with lime, and ground into an exceedingly strong mortar, which is readily sold at 5s. per load. No fuel of any kind is required, the ashes mixed with the refuse being amply sufficient. The old tins and iron which have passed through the furnace are sold for old metal. During the year 1879 the following quanti-

[*Continued on page* 165.]

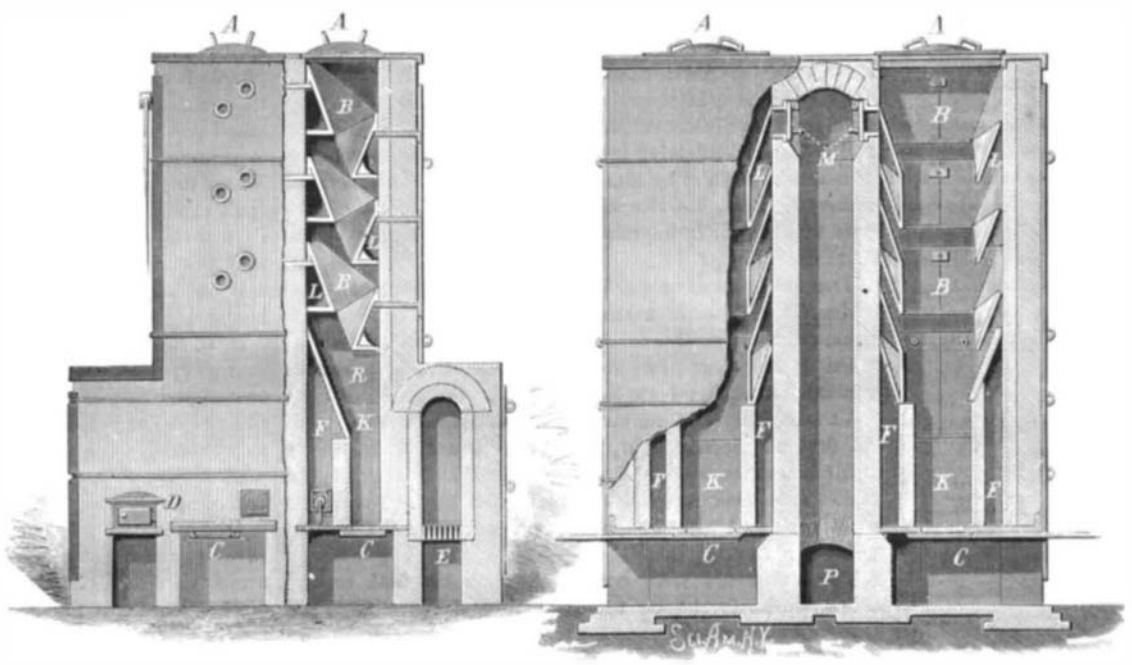


Fig. 1. Fig. 2.

CARBONIZER FURNACE.

FIGS. 1 AND 2.—A, feeding hole, with covers; B, cast iron plates; C, discharge door; D, fire door; E, fire grate; F. F. F. flues; K, hot chamber; L, flue behind cast iron plates; M, damper; P, flue to chimney.

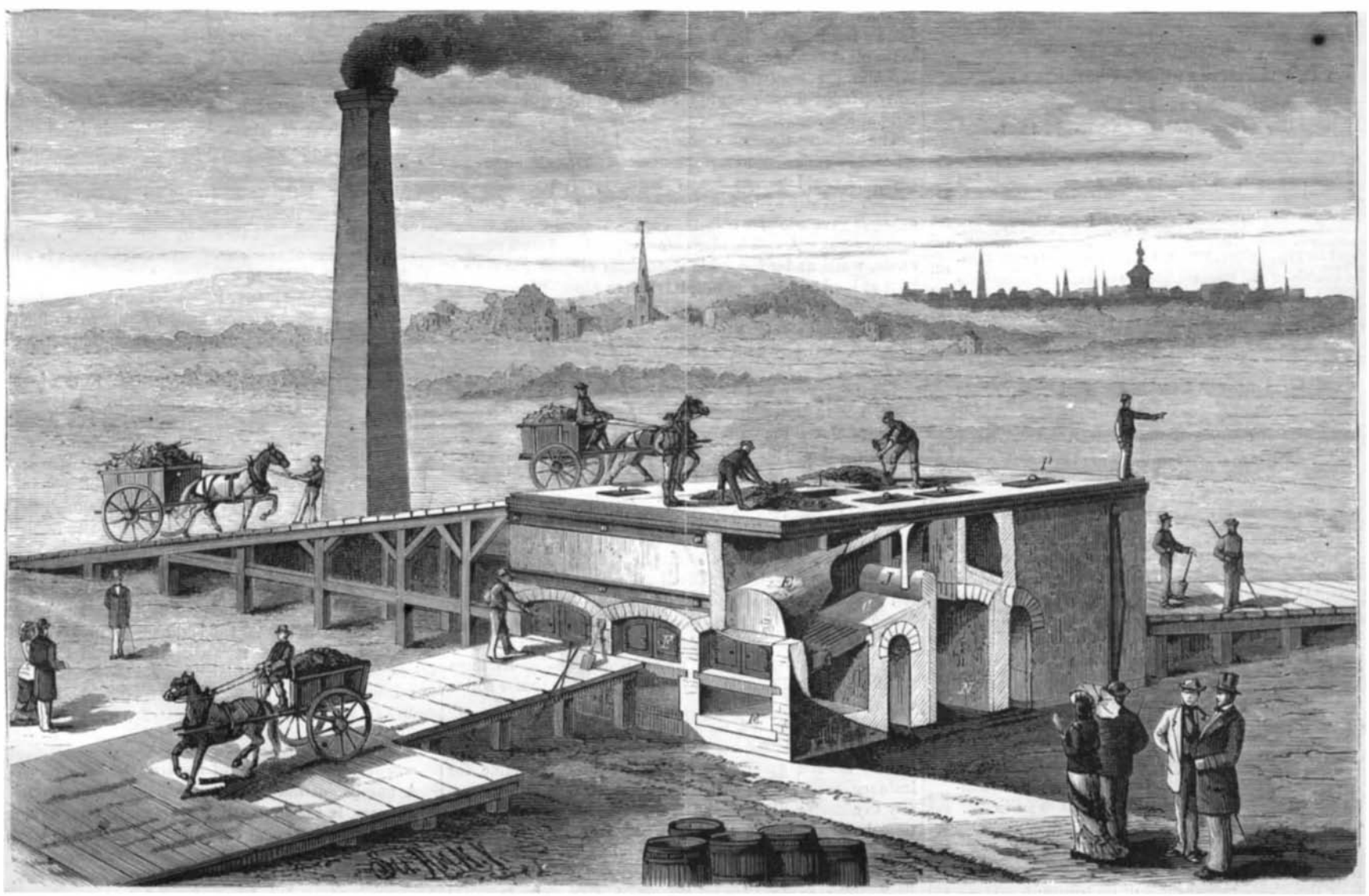


FIG. 3.—A, refuse feed opening; C, drying hearth; D, fire bars; E, reverberatory arch; F, clinkering doors; G, opening for gases; J, bridge to keep refuse out of the flue; M, ash pits; N, flue to chimney; P, mattress opening.

Fig. 3. FURNACES FOR TREATING GARBAGE AND OTHER REFUSE MATTERS.

FRYER'S DESTRUCTOR AND CARBONIZER.

[*Continued from first page.*]

ties of materials were consumed in the destructor: 14,000 tons of rubbish, 59 beds, 131 mattresses, 264 carcasses of pigs which had suffered from swine fever, 1 cow, 8 sheep, 2 lambs, 28 quarters of bad meat, 13 cwt. of bad meat.

The total quantity of rubbish consumed in 2½ years in the Burmantofts destructor was 30,041 tons.

For each depot the following men are required: One foreman, who also acts as engine-driver; four furnacemen, one laborer, who also attends to two mortar mills; and the same for night duty.

The carbonizer is used to convert the refuse obtained from the sweepings of the paved streets and the markets, and other vegetable refuse, into a carbon very useful as a manure and deodorizer, and which finds a sale at the rate of 30s. per ton.

The carbonizer consists of a group of brickwork cells and furnaces, each cell having its own distinct furnace alongside of it. It is 26 feet long, 12 feet wide, and 15 feet 6 inches high, tied together with iron rods and angle-irons.

The refuse to be carbonized is fed into the apparatus at the top, the loose cover of the cell being removed for that purpose and immediately replaced; within the brickwork cells are hung, by means of cast iron plates fixed in its walls, a series of cast iron plates or eaves, touching the walls along their top edges, but standing free from the walls some inches along their lower edges. These plates are arranged to overlap one another, and form a continuous sloping ledge or eave, winding round and round the cell in a kind of spiral. Near the bottom of the cell the spiral eave finishes with a fire-block eave, the lower edge of which rests on a wall dividing the contents of the cell on one side from the hot gases of the fire which are admitted to it on the other side.

The refuse is fed into the cell until it forms a solid mass within the well of the spiral eave, being withdrawn at the bottom as it gets sufficiently charred, but it is not mobile enough in its nature to rise up again either underneath or behind the eaves, so that a space is there left forming a continuous flue in connection with the chamber behind the fire-block at the bottom of the cell, and up this flue pass the hot gases from the fire, heating the contents of the cell. At the top of the cell these gases pass through the damper frame into the vertical flue, and so into the main flue and thence to the chimney. The process undergone by the refuse is as follows: After being thrown in at the top of the cell it sinks gradually as it becomes closer packed, and as the finished charcoal is withdrawn at the bottom it sinks, and continually comes in contact with hotter and still hotter plates, until at the bottom of the cell it enters a chamber of nearly redhot firebrick.

No air is admitted during the process, except a slight amount which reaches it from the flue behind the eaves, so that instead of being consumed it is charred. The cell terminates about 2 feet from the ground in a strong cast iron plate, in which is an opening closed on the underside by a sliding door; this is opened at certain intervals (about three hours) by letting out a charge of charcoal into a small truck which is run in below the plate ready to receive it. The furnace with firegrate and door is of ordinary construction, and within it a thick, dull fire is kept up. Sight or peep boxes are provided to enable the flues nearest the fire to be cleansed, and similar peep boxes higher up allow a view on to the backs of certain of the cast iron plates for the purpose of seeing that they do not become overheated.

Though the cast iron plates are bolted to the walls, or through the walls to one another, they are removable if need be without pulling down any of the brickwork.

The charcoal, which comes out of the carbonizer redhot, is cooled in a char cooler, by passing through a revolving cylinder, over which cold water is continuously streaming, and is sifted as it issues from the outer end. This cooler is also driven by the steam engine which works the mortar pans.

Each cell deals with about 50 cwt. of refuse in every twenty-four hours, and the fuel required for the furnaces is sifted from the contents of the dry ashpits, it not being necessary to purchase any.

The cost of an establishment with one six-celled destructor, a carbonizer with eight cells, boiler, steam engine, two mortar pans, cooler, chimney shaft, and buildings, is about £4 500.

No nuisance of any kind is experienced in the vicinity of the depots, and this system of dealing with the refuse of towns appears to be gaining ground; the apparatus has been adopted in Kralingen, near Rotterdam, Leeds, Heckmondwike, Blackburn, Bradford, Warrington, and Derby, and is, I hear, about to be adopted in Bolton, Dewsbury, and Rotherham.

Prize from the Belgian King.

In December, 1874, the King of the Belgians offered a yearly prize of 25,000 francs "for the encouragement of intellectual effort." The prize for the year 1881, which is open to the competition of citizens of all nations, will be awarded to "the best work on the means of improving ports established on low and sandy coasts, like those of Belgium." The conditions of the competition and award are as follows: 1. Foreigners desiring to compete will be required to send their works, either printed or in manuscript, to the Minister of the Interior at Brussels before March 31, 1881. 2. A manuscript work obtaining the prize must be published in the course of the year following that in which the prize shall have been awarded. 3. The award will be made by a jury appointed by His Majesty the King of the Belgians. The jury will be composed of seven members, three of whom are to be Belgians, and four foreigners of different nationalities. General Eaton, Commissioner of Education, in a circular calling the attention of American scientists, engineers, and educators to the subject, says: "Competitors in the United States are advised that they should forward their articles through the Department of State."

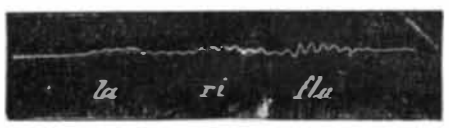
RECORDING TELEPHONIC RECEIVER.

Doctor Boudet has published a very interesting volume upon the application of the telephone and microphone to physiological and clinical uses. The book is made up entirely of details of the researches and experiments which he has made in his laboratory.

We extract some passages relative to the electrical recording of speech.

The automatic recording of telephonic messages is the first step towards the solution of a problem which has been declared insoluble. In order to arrive at a result which so many scientists have considered paradoxical, Dr. Boudet modified the telephone receiver in the following manner: Removing the diaphragm of the Bell telephone, he screwed

to the wood one end of a steel spring, the other end being opposite the pole of the magnet. To the free end he soldered a small piece of soft iron weighing a tenth of a gramme. Attached to this piece and in the prolongation of the axis of the spring he fixed a light bamboo arm ten centimeters long and terminated by a needle of whalebone. In fact the diaphragm is replaced by a movable armature resembling the interrupter of an induction coil. By means of this instrument, the tracings shown in the annexed engravings were obtained These tracings were made upon smoked



paper, and transferred to glass to be studied with a microscope.

As will be seen in the examples given, there are some remarkable points of difference between the several tracings as well as some points of resemblance, which make it probable that tracings of this character may be deciphered. These tracings, though far from being perfect, seem to contain the germs of success.

Dr. Boudet has made practical use of some of these experiments. He expects to enable deaf mutes to hear singing by means of a microphone, in cases where the auditory nerve is not entirely lacking, but where some defect in organization renders speech impossible.

The musical sounds are inscribed upon a smoked cylinder, which permits of the comparison of the visual record with the audible sounds which have been heard. It remains to be seen whether the reversal of this process will reproduce the voice as in the phonograph.

Cultivation of and Trade in Peanuts.

The trade in peanuts, already large, is annually increasing. Because the unreflecting public sees it mostly as conducted by petty retailers on stands at street corners, it is generally inferred that the peanuts are at best an unimportant article of commerce, but this, as is usually the case with conclusions derived from superficial observations, is erroneous. The trade extends in a similar way to not only all our large cities, but also to inferior towns and villages.

The *Confectioner's Journal* has compiled some statistics of the trade which are worthy of attention. By those who have entertained false impressions regarding the value of this crop it will scarcely be credited that it amounted last year to 2,220,000 bushels, which, at prices realized to first hands, reaches an aggregate of $2,150,000. The crop is principally raised in Virginia, which last year produced 60 per cent of the entire consumption. The crop is generally harvested in October, beginning a little earlier in Virginia. Tennessee produces about 35 per cent of the crop annually sold, and North Carolina about 5 per cent. Peanuts are elsewhere raised for home consumption, the amount so produced being difficult to estimate. "The nuts marketed in New York and hereabouts come chiefly from Virginia, while those from other Southern States find a market in the West. When peanuts are scarce and high, the African nut is imported, but with the present supply and low prices, foreign nuts have no place in the market. Peanuts are sold by dry measure by jobbers, but retailers sell by wine measure, making forty quarts to the bushel.

RECENT DECISIONS RELATING TO PATENTS.

Supreme Court of the United States.

FLETCHER, APPELLANT, *vs.* BLAKE.

Mr. Justice Harlan delivered the opinion of the court.

This is an appeal from a decree in the Circuit Court of the United States for the Southern District of New York, dismissing a bill in equity based upon an alleged infringement of letters patent issued to the plaintiff in error on the 8th of June, 1869, for an improvement in stamps used for revenue and other puposes.

Held:—An invention consisting of a postage or revenue stamp having a portion of its surface composed of thin fragile paper or other suitable material loosely attached, and on which a portion of the design or other matter is printed, is not infringed by a stamp composed of one continuous piece of paper, of uniform thickness, upon the face of which is certain printed or engraved matter, with blank spaces, in which are inserted, at the appropriate time, certain figures and names required by law to appear upon revenue stamps, which blank spaces are prevented from adhering to the barrel by the interposition of a red slip of blank paper attached to the back and outside edges of the stamp.

Decree of Circuit Court sustained.

United States Circuit Court.—Southern District of New York.

BUCHAN *et al. vs.* MCKESSON *et al.* SAME *vs.* HENRY *et al.*—PATENT CARBOLIC ACID SOAP.

Blatchford, J.:

1. The first claim of reissued patent No. 5,007, to Isabella Eames and Charles A. Seely, July 30, 1872, being a claim for "a soap made by incorporating carbolic acid, or its equivalent, with ordinary soap, substantially as specified," *Held* to be anticipated by the English patent of Alexander McDougall, No. 2,510, of October 15, 1860, for "improvement in materials or composition for destroying vermin on sheep and other animals, and for protecting them therefrom."

2. If McDougall, by using with a fat and an alkali a crude carbolic acid or creosote which did not contain carbolic acid or cresylic acid as pure or as concentrated as it was afterward made, produced a true soap developing the properties of the acids referred to, there was no invention in subsequently using the purer article. The advance was only one of degree.

3. Although soaps made with the finer carbolic acid existing at the date of plaintiffs' patent may be applicable to purposes to which soaps made with the less pure carbolic acid could not be applied, that shows only a difference in degree and not invention.

4. The effect of an earlier invention upon the claim of a patent not avoided by a specific disclaimer in the specification when it appears that such disclaimer is based upon an unsound view of the invention to which it relates.

Malleable Castings.

Considerable pretense of mystery is assumed by manufacturers of malleable castings both in this and the old country, and doubtless there are some trade secrets of value to those in the trade relative to mixtures of different irons, etc., but the process is in itself simple, and a little experience should enable any foundryman to attain a creditable success in it. Nearly every founder has his own mixtures and methods, but they are all based upon the processes of Samuel Lucas, of Dronfield, which date back to 1811. The general features of the process, as carried out by the Birmingham (England) iron founders, is given in the *Ironmonger*, as follows:

"For the purpose of the casting pig of a fine quality is needed, and great care is used in the preparation of the moulds, so that there may be no flaw or imperfection in the casting. The latter, after cooling, is, of course, hard and brittle, and it is to remove this brittleness and give it the character of malleable iron that the special process is required. The casting is now placed in hermetically sealed pots or boxes surrounded by powdered ore, and subjected for several days to intense heat, which, by cementation, gradually softens it and renders it malleable to the core, when it may be bent or wound into any shape. The annealing process takes ordinarily about ten days. Thus a pot made up on Tuesday is got up to a white heat about Friday, and this heat is maintained for some twenty-four hours or more, according to the size or thickness of the article annealed. The fire is then allowed to die down, and when the mass is cool the castings are found to be thoroughly annealed and malleable. Scarcely a trade in Birmingham fails to use malleable castings for some purpose or another.

"The introduction of Bessemer steel has somewhat operated against the trade, but there is still a great field for malleable iron founders in catering for the requirements of the Birmingham gun, harness, and engineering trades."

The journal quoted thinks it much to be regretted there is not a more free interchange of ideas and experience among English iron founders, as in this only is there hope that the English trade can keep pace with German and French progress in the art.