

THE PULVERIZED CHARCOAL INDUSTRY.

Pulverized charcoal is used principally for purifying water, wines, glycerine, etc., and also used for packing purposes. The lump charcoal used here comes principally from Delaware and New York State. The material is bought by the carload by the manufacturer, who first extracts the gas from the coal by reburning it in kilns, after which the material is passed through a cracking, softening and grinding process which produces any grade of charcoal, ranging from flour to pieces as large as peas. The kilns are made of $\frac{1}{2}$ inch boiler plate iron. They are about 10 feet in height, about $6\frac{1}{2}$ feet in diameter inside and lined on the interior with fire brick. Each kiln is pierced with about 18 draught holes about 4 inches in length and about 3 inches in height. A wood fire is first started in the bottom of a kiln and about two or three barrels or

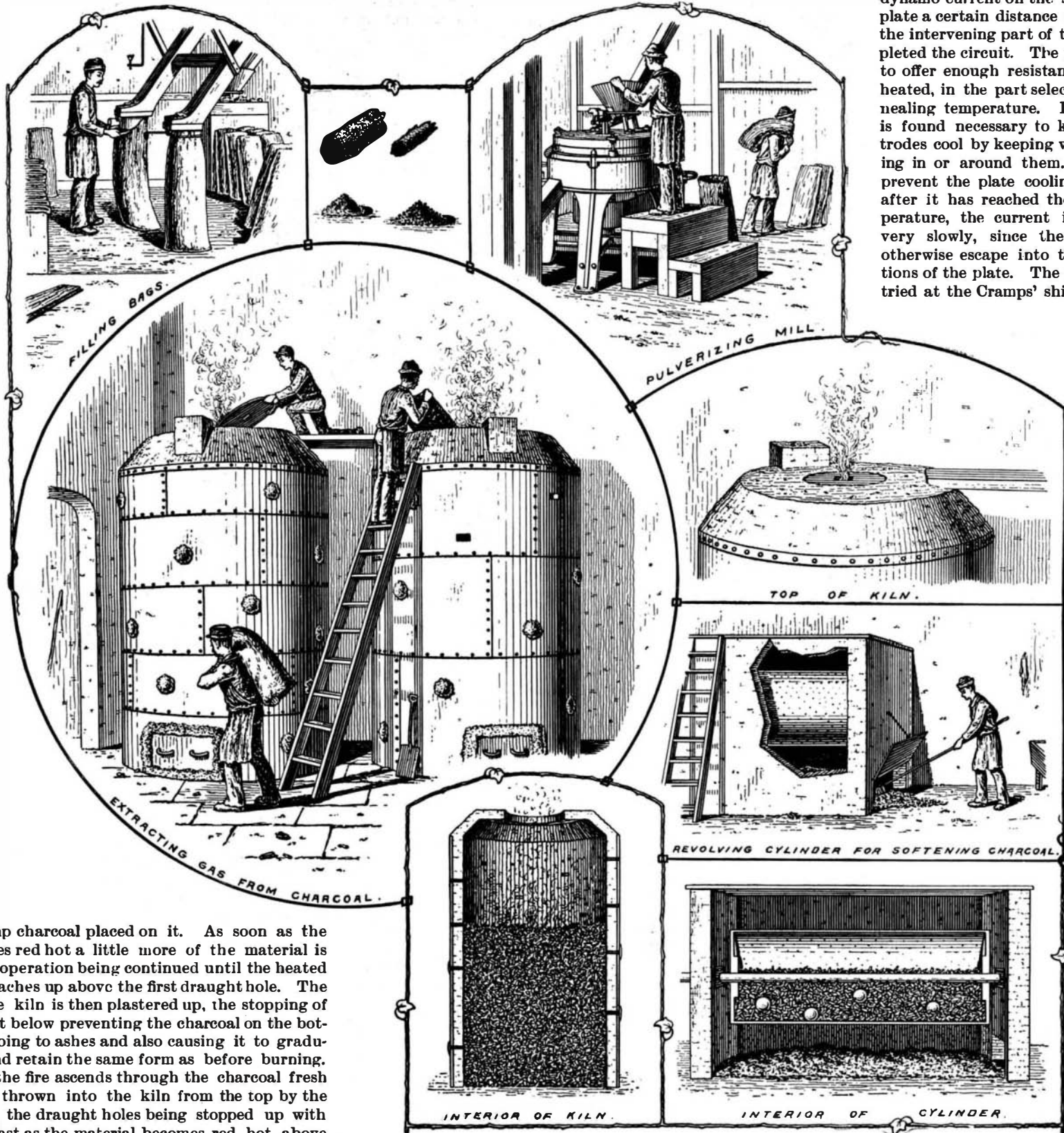
grade. From the pulverizing mill the charcoal is carried by elevator to a revolving screen or sieve. The screens are about 4 feet in length, hexagon shaped and about 2 feet in diameter, the wire cloth from which the screen is made ranging from 3 to 24 meshes to the inch. From the screen the material passes down through wooden chutes, where it is packed into 78 lb. bags for the market. The tailings or coarse material not properly ground is taken back and run through the pulverizing mill again. The apparatus for softening charcoal for hard packing are hollow circular iron cylinders about 8 feet in length and about 4 feet in diameter. They revolve in the interior of inclosed brick compartments, two cylinders in each geared together.

These compartments are about 9 feet square, about 8 feet in height, and about 1 foot in thickness, and are covered over at the top with an iron plate. The cylin-

14 bags of pulverized charcoal per hour, weighing about 78 lb. each.

Boring Holes in Hardened Armor Plate.

The success attained of late in hardening the surface of armor plate has made it necessary to devise some especially effective method of boring holes in the plate for the bolts which are to hold it in position. A number of experiments have been made with the idea of softening a spot on a Harveyized plate large enough to allow a drill to pass through, but without weakening the plate itself. The oxy-hydrogen blow-pipe has been used for this purpose, but without success. No method has been found entirely satisfactory until the attempt was made recently to soften a spot by employing an electric current. The successful method consisted in placing the two electrodes of a dynamo current on the surface of the plate a certain distance apart, so that the intervening part of the plate completed the circuit. The plate is found to offer enough resistance to become heated, in the part selected, to an annealing temperature. In practice it is found necessary to keep the electrodes cool by keeping water circulating in or around them. In order to prevent the plate cooling too rapidly after it has reached the proper temperature, the current is diminished very slowly, since the heat might otherwise escape into the other portions of the plate. The plan has been tried at the Cramps' shipyard on the



bags of lump charcoal placed on it. As soon as the coal becomes red hot a little more of the material is added, the operation being continued until the heated charcoal reaches up above the first draught hole. The door of the kiln is then plastered up, the stopping of the draught below preventing the charcoal on the bottom from going to ashes and also causing it to gradually cool and retain the same form as before burning. As fast as the fire ascends through the charcoal fresh layers are thrown into the kiln from the top by the attendants, the draught holes being stopped up with plaster as fast as the material becomes red hot above each opening. The kiln holds about 70 barrels of charcoal. The top of the kiln is bricked over with the exception of a circular opening about $2\frac{1}{2}$ feet in diameter in the center.

After burning for about 12 hours a circular piece of sheet iron is placed over the opening, which smothers the fire, the gas escaping by means of a small hole in the center of the plate. The gas is extracted from the coal to prevent the material passing through it from tasting gassy. It requires about 5 hours to fill a kiln and about 48 hours after the fire has been started before the material is sufficiently cooled so that it can be handled. The kilns are emptied from the bottom, the attendants shoveling out the charcoal, which is put into bags and carried off to a cracking machine to be broken up into small pieces to prevent the choking up of the pulverizing mill. A kiln is emptied in about $1\frac{1}{2}$ hours. From the cracker the charcoal passes to an elevator, where it is carried by means of cupped belts to a pulverizing machine, where the material passes between two circular stones, similar to a miller's grindstone, one of which revolves at the rate of 70 to 75 revolutions per minute, grinding the material up into any

grade. From the pulverizing mill the charcoal is carried by elevator to a revolving screen or sieve. The screens are about 4 feet in length, hexagon shaped and about 2 feet in diameter, the wire cloth from which the screen is made ranging from 3 to 24 meshes to the inch. From the screen the material passes down through wooden chutes, where it is packed into 78 lb. bags for the market. The tailings or coarse material not properly ground is taken back and run through the pulverizing mill again. The apparatus for softening charcoal for hard packing are hollow circular iron cylinders about 8 feet in length and about 4 feet in diameter. They revolve in the interior of inclosed brick compartments, two cylinders in each geared together. These compartments are about 9 feet square, about 8 feet in height, and about 1 foot in thickness, and are covered over at the top with an iron plate. The cylin-

barbette plates of the Massachusetts, and the results are said to be very satisfactory.

Activity in Railway Building.

A very gratifying revival of activity in railway building throughout the United States is announced by the Railway Age. According to the table prepared by this publication, some 20,547 miles of new road are now either in course of construction or are about to be built in the near future. The 20,547 miles of new track comprises many new short lines and extensions on old roads in forty-six States and Territories. The State of Texas, with a proposed new mileage of 2,913 miles, takes the lead, California ranks second with 1,390 miles of new track, Arkansas with 1,377, Pennsylvania 768, New York 393 miles, etc. During the year 1894 less than 2,000 miles of track were laid in the United States. It is stated that the construction of the 20,547 miles of proposed railway is assured by trustworthy financial backing.