

A 750-TON METAL MIXER.

Herewith we give an illustration of an interesting metal mixer which has recently been installed in the works of the Ebbw Vale Steel Company, of Great Britain. This mixer, which is of 750 tons capacity, is constructed upon the patents of Col. Charles Allen and Mr. Charles Davy, of Sheffield, and is the largest of its type that has been constructed, the average capacities ranging from 100 to 750 tons. The higher capacity for this particular installation, however, was rendered necessary to cope with the extensive additions to the steel plant that have been carried out at these works, and furthermore it is intended to serve as a reservoir for the week-end make.

The body of the mixer is constructed of a double thickness of steel plating and is carried at each end upon two circular massive steel rockers of box section. These rockers are machined on the underside, and rest on turned-steel rollers, 4 feet 6 inches in diameter, which are mounted on bearings on cast steel girders. The bottom of the mixer is further stiffened by a number of rolled-steel joists, 24 inches deep, so as to obviate any tendency that may develop to bulge owing to the weight of the metal within. The top is held together by four 6-inch tie-bolts. The ends are coned, the cones terminating in heavy cast-steel rings machined on the face.

Port ends are provided for gas-firing, by means of which the temperature of the metal within may be maintained. The port ends are mounted on wheels so that they can be easily moved back when required.

Two large hydraulic cylinders mounted on trunnions serve as a means for tilting the mixer. They are of sufficient stroke to empty the mixer completely when required, the pouring spout being on the opposite side.

The mixer is provided with an acid lining, and consequently no side doors are required. It is of much more substantial construction than is actually requisite for strength; but stiffness of structure very much favors the life of the lining, and the movement in tilting is found to be very smooth and free from vibration.

In any steel works having blast furnaces the use of a mixer greatly cheapens the manufacture of the steel, besides improving and equalizing its quality, and this type of gas-fired metal mixer possesses the convenience that the metal as received from the blast-furnace can be maintained in its molten condition for an indefinite period, the gas-firing being easily regulated to replace any lost heat or to increase the temperature if required.

For basic steel, doors are provided both on the sides of the body of the mixer and on the cone ends, so as to render the whole of the lining easily accessible for inspection and fettling. In some of the mixers of this type, moreover, an extra large door is provided for the purpose of charging heavy lumps of scrap. When such melting of scrap and deoxidizing is to be done in the mixer, the port ends are made larger than in the present case, thereby enabling the mixer to be worked at a higher temperature. In these instances the cone ends of the mixer and the port ends are provided with cooling-blocks, and the port ends are fitted with hydraulic draw-back gear.

The earliest marine cylindrical boilers were single-ended with two furnaces, but with the advent of reliable mild steel the diameters were increased and the boiler was made double ended, with upper ends rounded to save bracing, so that the largest cylindrical boilers today have as many as eight furnaces, four in each end in pairs; that is, the two furnaces at each end on the same side of a vertical diameter have a common combustion chamber. The saving in weight is evident at once and also the reduction in the feeding apparatus required.

A BEEHIVE INCUBATOR.

Henry Decker, of Rome, O., by repeated tests has demonstrated that a setting of eggs may be successfully hatched within an ordinary beehive as the incubator. As more than a dozen eggs can be cared for at a time, it is claimed that one hive can be made to do

**UTILIZING AN ORDINARY BEEHIVE AS AN INCUBATOR.**

the work of eight hens, and also produce 100 pounds of honey annually.

Mr. Decker, who had previously used an incubator, one day while handling a swarm of bees observed that the temperature within the hive was similar to that of his incubator. His supposition was later verified by placing a thermometer in the hive, and comparing the temperature with that of the incubator. Thereupon he placed twenty eggs in the upper section of the hive, separating them from the working apartments of the bees by a cotton cloth. Around the sides a cushion made from a quilt was placed, and over the eggs another cushion. Eighteen of the twenty eggs were hatched.

Free Government Coal Tests.

An opportunity has been offered the coal producers of the country to co-operate with the United States Geological Survey in its work of testing the coals and lignites of the United States. This work was begun at the World's Fair grounds, St. Louis, during the Exposition and will be continued along the lines laid down at that time. The Survey is desirous of securing from operators and others interested in the prob-

lems of fuel consumption an expression of opinion as to whether they desire to co-operate in this work. Offers of coal for testing purposes should be addressed to the Director of the United States Geological Survey, Washington, D. C.

It is not possible to promise at the present time that all offers of coal will be accepted, but the plan is to make the investigation as complete as practicable, distributing the work as impartially as possible over the entire country. The distribution of the work will depend largely upon the replies received to the circular which the Survey is now sending out to coal operators and upon the present and possible future development of the coal and lignite deposits of several States.

The tests will be made for the purpose of determining the fuel values of the different coals and lignites and the most economical methods for their utilization. Arrangements have been made with the manufacturers of the equipment used during the Exposition to have practically all of this testing machinery left at the disposal of the government.

In offering coal for testing purposes, operators are requested to note the following conditions with which it is necessary to comply:

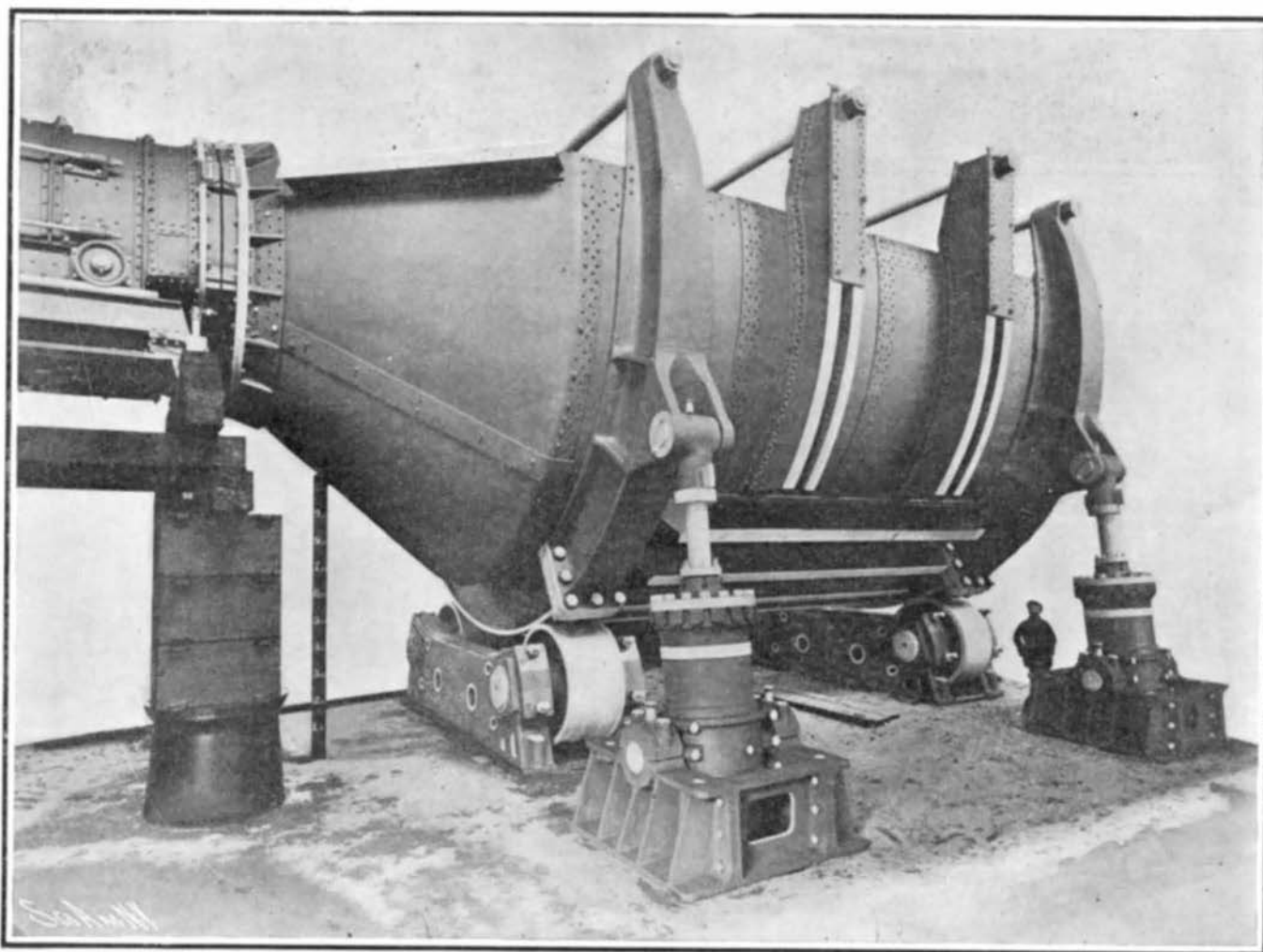
1. The coal must be furnished to the testing plant free of cost to the government.
2. The coal must be loaded under the supervision of one of the inspectors employed for that purpose, who shall be at the same time allowed to visit the working places in the mine to procure samples for analysis.
3. When it is possible to do so, the coal should be loaded in box cars and shipped under seal. Lignites must always be shipped in this way.
4. Where the market requires screened coal, this grade will be accepted for test. The selection of coal is always to be under the direct control of the representative of the testing plant.
5. Where one of the problems involved is the better utilization of slack coal, a carload of slack may be accepted for testing purposes.
6. As soon as possible after the tests are completed a brief statement of the results will be furnished to parties supplying the coal, for their information, but this must not be made public until the results are published by the Geological Survey.
7. Everyone interested in any particular test or in the general operation of the plant is invited to be present at any time, but the official record of the test will not be given out except as indicated in the preceding paragraph.

Prizes for Inventors.

Under date of April 20, 1905, United States Consul-General Richard Guenther, of Frankfort, Germany, states that the Associazione degli Industriali d'Italia, No. 61 Foro Bonaparte, Milan, Italy, invites inventors to compete for two prizes offered by it, as follows:

First prize, \$1,600 and a gold medal, for a new method to prevent danger which may arise from the contact of high tension with low tension winding of electric rotary-current transformers; second prize, \$100 and a gold medal for a simple, strong, and reliable safety device for stopping cars running on an inclined plane in case of the breaking of the wire cable. The device must be capable of adjustment to ordinary cable roads now in use.

In experiments made by Jean-taud with an electric motor car a tractive effort of 42.7 pounds per ton at 10.8 miles per hour was observed on a dry road. On a muddy road the tractive effort rose to 74 pounds per ton at 9.32 miles per hour. Thus the resistance on a dry road is found to be forty-three and three-tenths per cent less than that developed on a muddy road.

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