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FLUE-TYPE COTTRELL TREATER.

By A. B. YOUNG.

THIS paper describes a Cottrell treater that was placed in operation in April, 1919, at the Tooele plant of the International Smelting Co., to recover solids from the gases from the McDougall roasting furnaces. Fundamentally, the treater is simply a flue containing rows of vertical plates, forming the grounded electrode, alternated with rows of small horizontal pipes, forming the negative electrode, with proper provision underneath for taking away collected dust. There are advantages in construction over the more cumbersome types, both the vertical-tube and the vertical-box, the elimination of heavy supporting columns and massive foundations, giving a much lower first cost. The right-angle turns to interfere with gas distribution, consequently there is greater efficiency; that is, a greater volume of gas per minute can be effectively treated. Another advantage of the horizontal installation over the vertical is that the principle of the selective precipitation of the various components of the dust and fume as they pass along the electric field may be utilized. Since the treater has been placed in operation, the results have been quite satisfactory and, in many ways, particularly in regard to the volume of gas that may be treated, have greatly exceeded expectations.

The outstanding features are the constantly decreasing copper values and increasing lead values as we proceed along the treater toward its discharge end, with the result that a portion of dust collected may be segregated and smelted for its lead content. An examination of the figures for iron and insoluble matter bears out the idea that there is a marked tendency to precipitate the true dust particles near the entrance, and that the more impalpable fumes must travel a greater length through the electric field before being caught.

It is extremely difficult to state, with any degree of accuracy, the power input into the treater, other than that it is much lower than one would expect and is quite variable. For normal gas volumes (125,000 to 150,000 cu. ft. per min.), the input of power will average very closely to 8.4 kva. for the first electrical section and 5.5 kva. for the second. Approximately 85 per cent of the dust caught is collected by the first, and 15 per cent by the second section.

This form of installation has proved admirably adapted to these particular gases. No data are available as to its ability to treat satisfactorily a purely fume product. However, when one compares this compact flue-like building, which is efficiently handling 150,000 cu. ft. of gas per min., with the complex towering structures of the vertical type necessary to treat this amount, one is convinced that a distinct step forward has been taken.

UTILIZATION OF TITANIFEROUS IRON ORE.

By J. A. HESKETT.

NEW ZEALAND is dependent on the outside world for its ferro products yet it has at least two well-defined iron-ore deposits, the Para Para limonite, and the Taranaki iron-sand, a combined magnetite and ilmenite. This latter deposit forms the greater portion of the beach sands of the west coast of the North Island of New Zealand. To all appearances it is a chemical compound of the double oxides of iron and titanium and not a mechanical mixture.

Knowing the difficulty with which the iron-sand is reduced, the writer conceived the idea that if the reduction were

made largely a direct one the chances of reduction would be more complete and the gases would be richer in carbon monoxide, which in turn would give a desired result. By mixing coking coal and fine iron-sand in the proportion of 1 to 1, coke or ferrocoke, that ran 36 per cent metallic iron and 40 per cent carbon was obtained. At the same time a greater portion of the oxide was

8 hr. that elapsed in the coking process. This ferrocoke was charged with the limestone into the experimental furnace, which was like a foundry cupola. It was 8 ft. from charging door to tuyeres, 3 ft. in diameter, and was served with four tuyeres with a 6-oz. blast pressure. It was water-jacketed and had water-cooled tuyeres.

After repeated experiments, this process was abandoned because the friable nature of the ferrocoke at an incandescent temperature caused a congestion of finely divided coke, which became entrapped in slag and gradually contracted the working area of the hearth.

Because of the indifferent quality of iron produced by the cold-blast practice a hot stove was installed and the existing furnace heightened. Eventually the U-pipe hot blast was installed and the modern practice of ore reduction, relying on a greater percentage of indirect reduction. The amount of pig iron produced was 50 tons, averaging 5 tons per day.

The slags were fluid and no trouble was experienced in their handling. In fact, the titanic-acid content would lead one to believe that it had lowered the fusion point as well as the viscosity of the slag. At times the titanic-acid content was brought up to 20 per cent as an experiment, on subsequent trials, and the fluidity was in no way impaired, so the theory of viscid slags due to normally high titanic-acid content might easily be dispelled.

Whether the practice of mixing equal parts of nontitaniferous and titaniferous ores, as practiced at Port Henry, N. Y., is beneficial to foundry practice remains to be seen. Our experience is that the pig iron produced from titaniferous ore will not grain out as will other iron of similar analysis. It has a ready tendency to chill even in ordinary sand casting with 2.5 per cent silicon and 0.04 per cent sulfur. This chill is only to a depth of 1/32 in. The iron is exceptionally strong and tough, easily standing 25 per cent greater breaking strain and deflection. Castings made from this iron have a wonderful finish, surpassed by no other iron used in the writer's foundry experience. Where extreme softness is required in thin castings some foundries object to this iron. It is more adapted to steel production than every-day foundry iron, and the steel produced has exceptional strength, ductility, and malleability.

NEW METHOD OF MAKING FIFTEEN PER CENT PHOSPHOR-COPPER.

By P. E. DEMMLER.

PHOSPHORUS combines with copper in various proportions, forming true alloys, some of commercial importance, which find wide application as deoxidizers and as a means of introducing phosphorus into other alloys, as in phosphor-bronze. Phosphor-coppers containing 10 and 15 per cent phosphorus are the commercial grades most generally offered.

Processes for making phosphor-copper may be divided into two classes: (1) Those depending on the smelting of phosphate rock or superphosphate of calcium with copper or copper-