ZINC RETORTS OPERATIONS MECHANIZED

by Albert Ghysens

ONE of the major problems associated with the operation of horizontal zinc retorts has been the very hard work involved in charging and discharging. For many years attempts have been made to design machines to mechanize these operations, but the results have not been wholly satisfactory.

Europe's largest zinc producer, Vieille Montagne, thus, set about designing suitable charging and cleaning-out machines.

Charging machine

The charging machine, shown in Fig. 1, consists of a frame fixed on supporting wheels, travelling in a direction parallel to the furnace face, and supporting a thrower-casing topped by a hopper containing sufficient charge for 24 retorts. Inside of the machine a short rubber belt rotates at high speed between two rollers, as is shown in Fig. 2. The ore-coal mixture from the hopper falls tangentially onto the vertical part of the belt. It is thrown by means of a paddle-wheel onto the lower concave part of the belt and is jetted into the retorts through a throw-pipe at a speed of 20 m per sec.

Today, many Belgian and foreign zinc smelters are fitted with these machines for charging horizontal retorts. Advantages derived from this mechanical charging method are: 1) an increase of production of 6 to 7 pct resulting from charging an increased weight of material into the retorts, 2) regularity of the quantity charged in each retort which gives a better resistance of the retorts, 3) total suppression of arduous hand charging, and 4) labor saving amounting to 33 pct.

Cleaning-Out machine

A cleaning-out machine for the horizontal zinc retorts was also developed in one of the smelters of Vieille Montagne several years ago. Its originality lies in the fact that it carries out exactly the motion of the clean-out ladle previously used by the worker.

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The machine comprises a support chassis which moves in front of the furnace on the same rails used by the charging machine. On this chassis is mounted a horizontal tool supporting frame, which may be raised, lowered, or inclined according to the height and slope of the row of retorts. The frame has four ladles or tools of the same shape as those previously used with hand cleaning, except that they are somewhat longer. As a rule five to six successive passes are sufficient to clean out completely four retorts in about 1 min. According to the sticky state of the residues, the ladles may be cooled with water or not. Operating and maintenance costs are small; the working tool itself is a very simple shape made of carbon steel, hence a low-cost replacement.

Advantages derived from the cleaning-out machine are: 1) decrease in working time at the furnaces, 2) suppression of the hard work of hand cleaning-out, and 3) better cleaning-out.

Both machines working together have permitted a 50 pct saving in labor and a greater ease in hiring and retaining workers. This important improvement, that has been brought to the old horizontal retort process, is the result of close collaboration between the research and manufacturing departments of Vieille Montagne in Belgium.

Fig. 1 (above) and Fig. 2 (right)
—Simplicity of design of these charging machines has relieved the arduous manual labor traditionally associated with the operation of horizontal zinc retorts. In addition, higher production and longer retort life have been achieved.