

New Electric Smelter at Rustenburg

A FURTHER STAGE IN THE EXPANSION PROGRAMME

As part of the major expansion programme now under way at Rustenburg Platinum Mines, a new type of furnace has been installed to smelt the flotation concentrates.

Hitherto the concentrates, consisting mainly of nickel, copper and iron sulphides with that portion of the platinum metals not already separated by gravity concentration, have been smelted in a series of blast furnaces. To cope with the greatly increased throughput, and also to effect economies in both labour and fuel, a change has been made to electric smelting, and although the blast furnaces are still in operation a large proportion of the concentrates are now treated in this new plant.

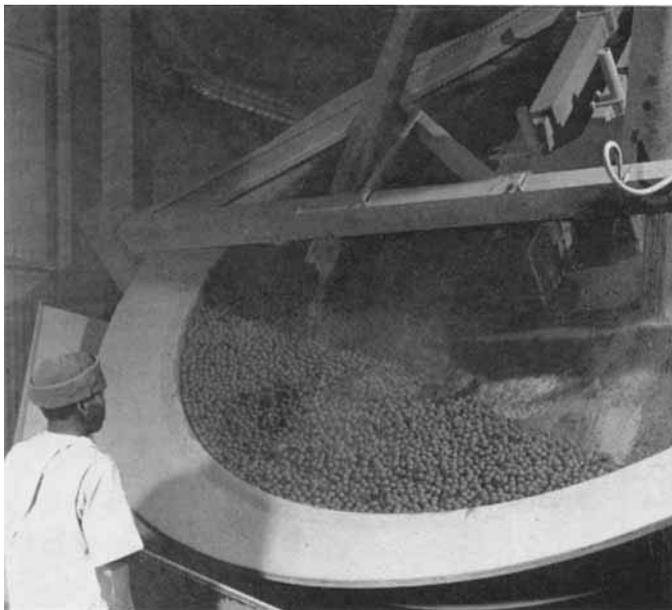
The new furnace, built by Elkem A/S of Oslo, is of the submerged arc type. It is rated at 19.5 MVA and is rectangular in shape, measuring 90 feet in length by 27 feet wide and 14 feet to the top of the arch. Six electrodes, each some four feet in diameter and weighing 15 tons, are arranged in line and are automatically controlled.

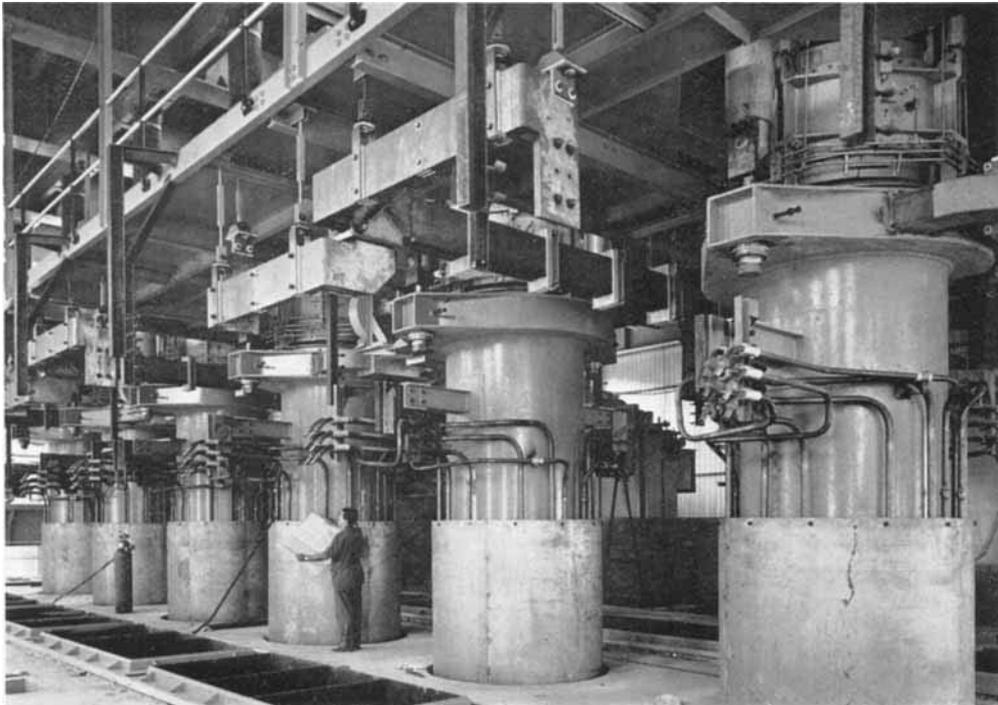
The flotation concentrates are first thickened and filtered over vacuum drum filters and are then dried and pelletised. After further drying, the pellets are charged to the furnace continuously, together with

lime and iron ore. The slag is tapped continuously, granulated and dumped, while the furnace matte is tapped periodically into ladles and transferred to Pierce-Smith converters. Here it is blown to a high-grade matte which is cast into moulds and then broken up in a jaw crusher. Part of this converter matte is shipped to the Johnson Matthey smelter in England, the balance being treated by Matte Smelters, a joint subsidiary of Johnson Matthey and Rustenburg, in a plant adjacent to the mine.

This electric smelter has now been in successful operation for some months, and it has already been decided to install a second unit alongside the first. In addition, a third furnace of the same type is to be erected at the Union Section of Rustenburg Platinum Mines. This operation, some sixty miles further north, is to be the location for the latest stage in the expansion programme designed to yield 1,200,000 ounces of platinum a year by 1972.

Gravity concentration to separate the coarse particles of platinum-bearing minerals is followed by flotation to recover the remainder. The flotation concentrates are then thickened, filtered, dried and converted to pellets ready for charging to the smelting furnace





The electrode structure of the new smelting furnace. There are six consumable electrodes in line, each 4 feet in diameter. The furnace is 90 feet in length, 27 feet wide and 14 feet high



The copper-nickel-iron matte containing the platinum metals is tapped from the electric furnace, transferred to Pierce-Smith converters and blown to a higher grade matte. Here the converter matte is being poured into moulds. After cooling and breaking up it is passed either to Johnson Matthey or to Matte Smelters for the extraction of copper, nickel and the six platinum metals