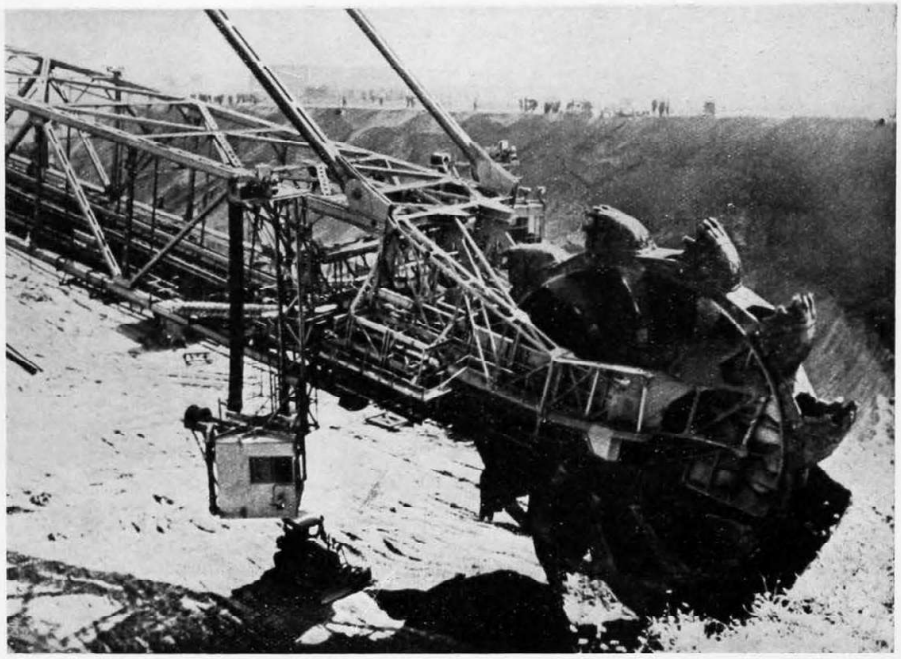
LARGE BUCKET EXCAVATOR FOR A GERMAN LIGNITE MINE



In August, the first of a group of five very large bucket wheel excavators came into service at the opencast mine "Fortuna," west of Cologne, which belongs to the Rheinische Aktiengesellschaft fuer Braunkohlenbergbau und Brikettfabrikation; 200m long, 66m high, and having a capacity of 100,000 cubic metres per 19½-hour day, the machine is the largest of its kind in existence. It was built by Orenstein-Koppel und Luebecker Maschinenbau Aktiengesellschaft with electrical equipment by Allgemeine Elektricitaets-Gesellschaft and weighs 5600 tons, including 170 tons of material on the conveyor belts. The bucket wheel (right), with its twelve 3·6 cubic metre buckets, is driven at 2·3 r.p.m. by two geared, 3kV slipring motors, each of 525kW. The entire machine comprises three main sections, the excavator itself, the conveyor bridge, and the wagon loading station (lower illustration). Both the excavator and the loading station move on caterpillar tracks of sufficient area to limit the average ground pressure to 1·25 kg per square centimetre, the excavator on three groups of four tracks, and the loading station on three groups of two. Powered by d.c. motors, the machine can move at up to 600m per hour, and each portion can turn in a 100m diameter circle. The jib can be raised to 50m above track level and lowered to 6m below, by means of a twenty-four-purchase block operating the topping boom. Two independent winches are provided to increase safety and enable the 59mm thick wire ropes to be changed without propping up the jib. The superstructure is supported on the central portion by a 15m diameter slewing ring containing 156 ball bearings of 150mm diameter. A similar ring supports the central part on the chassis. In this way the counterbalanced superstructure can turn through a full circle, and the conveyor bridge, one end of which slides in the central portion, can be arranged independently of the tracks. The central excavator section also houses a coal crusher, which can be moved into position when required and serves to limit the coal size to 500 millimetres. From the bucket wheel, near which is the driving cabin, band conveyors, 2·6m wide, carry some 2 cubic metres per second of material to the loading station. There, the overburden is loaded into wagons holding 180 tons, while for coal, wagons of 93 tons capacity are provided. The two reversible loading conveyor bands are alternately supplied from a swinging intermediate conveyor. Each of the two rail tracks is supervised by one loader, who radio-controls the 129-ton electric locomotives. Apart from a few maintenance men, the excavator thus requires three operators—the driver and the two loaders. Rated at a total of 10,300kVA, the installation is supplied at 25kV by a 24-ton trailing cable 1500m long. It is intended to equip the machine with programme control so that slewing cuts 10m high, 1·2m deep, and 89m wide can be taken automatically. Bucket wheel excavators are stated to have been chosen as being most suitable for the irregular coal seams of the district. The mine aims at an output of 25,000,000 tons of lignite per year (5·4 per cent of 1954 world lignite production), and will eventually reach a depth of 250m