

cost innumerable experiments and great expense, but their combination is absolute in the Schwartzkopff system of coal-dust firing. The idea of utilising coal-dust as the best means of securing perfect combustion is not of recent date, but it may safely be said that the principle was not accurately and economically applied until the Schwartzkopff system was discovered.

Briefly stated, the system is this: Slack of the poorest quality is pulverised to the consistency of flour, then carried along a conveyer or iron pipe and sprayed into the furnace by a revolving steel "brush." No bars or grating are needed in the furnace. A piece of common cotton-waste soaked in petroleum, ignited, and put into the furnace is sufficient to start the fire. Within a few minutes after the brush has been started the furnace attains a white heat. Steam sufficient to drive a 300 I.H.P. engine can, if necessary, be generated in half an hour; but, as this precipitancy would do the boiler no good, the "feed" can be regulated to get up steam as gradually as by ordinary hand firing. A peep into a furnace fed on the Schwartzkopff system affords a truly marvellous sight. There is a greater intensity of heat by many degrees than is possible with hand firing, yet no coal or ashes are present. Only a small quantity of white dust, which falls in a molten state to the bottom of the furnace, is to be seen. Numerous tests have proved that with the very worst slack on the market the Schwartzkopff system shows at least 30 per cent. better results in firing than by hand stoking. This is the especial merit of the system. The smokelessness is an important though subsidiary advantage which enhances the merits of the system. By it the problem of perfect combustion is solved. Hand stoking is, of course, absolutely abolished. One man can with ease look after a battery of a dozen furnaces. To large firms this item of labour-saving would mean many thousand pounds per annum.

The Schwartzkopff system was discovered by a band of German experts and professors, and has been known in Germany a few years. Its introduction into Great Britain is of recent date. A British company has been started and works erected at Haydock, Lancashire, on land adjoining the Princess Pit, Haydock Collieries. These works are really the mill for grinding slack into coal-dust. The mill is driven by a 300 I.H.P. triple-expansion engine, the steam for which is supplied by a water-tube boiler of the Stirling type, heated on the Schwartzkopff system, the efficiency of which thus being demonstrated in the preparation of its own fuel. On the private railway-siding adjoining the works are trucks containing the slack delivered from the colliery. This slack costs 4s. a ton, and, as the price indicates, it is the very poorest kind of fuel that can be bought, containing the lowest percentage of combustible material of any coal produced from the colliery. Results of tests in firing with the coal-dust from this slack are given below.

From the trucks the slack is shot into an elevator, which carries it to the mill. After going through two pre-sifters the slack is separated into two grades. The larger grade passes away and is deposited into a store-chamber; the finer grade is put through a series of sieves, where the dust already fine enough for the process is separated, and the tailings from this go into boxes. The larger grade is then drawn off into a conveyer, by which it is lifted to a series of crushers and discharged thence into the sieves, the dust fine enough for use passing through and the tailings deposited into boxes. These tailings then go into pulverisers, and, reduced to dust, are ready for use. When brought to its intended state the dust goes along a conveyer, and is put into sacks for the market. The process of manufacture is much the same as that of flour-milling. In fact, the coal-dust is as fine as fine flour. It passes through a sieve of 5,800 meshes to the square inch. If desired, the coal-dust can be delivered in covered trucks to consumers as well as in sacks.

This description refers exclusively to the mill which prepares fuel for the market, but a proportion of the coal-dust manufactured is utilised for firing the boilers that drive the works-engine, the dust being taken along a "worm" conveyer to the patent automatic stoker at the furnace. Large factories or works may have a mill sufficient for their requirements attached to the furnace apparatus, and manufacture their own coal-dust; but smaller users may find it more convenient to get their supplies from a central mill or works. The accompanying illustration shows the patent stoker, but not the conveyer which deposits the dust into shoot (a.)

