

COAL TIPPING MACHINES AND SCREENS.

Rigg's patent coal tipping and screening apparatus, shown in the annexed engraving, is designed to secure the rapid and economical loading of coal into lighters or railway cars, in such a way that the coal is screened on its way from the bank to its receptacle. These machines have now been fairly tested, and their general introduction into most of the British coal districts is the best indication of their success in attaining the object for which they were designed, viz., that of reducing the labor and the breakage to which coal is generally subject in loading.

The following are some of the special advantages claimed by Mr. James Rigg, the inventor and manufacturer, for his apparatus, viz.: Increase in the percentage of round coal and consequential reduction of slack; greater rapidity of loading, all motions being self-acting; corves or trams cheapened in first cost and repairs, no doors being required; protection of the corves or trams from damage, from the method in which they are held in the tip; reduction of labor, the tip being worked by the coal itself and counterbalance weight; strength and substantial construction of apparatus, rendering it very durable.

Our illustration represents some fixed screens which are in

Petroleum Fuel in Iron Furnaces.

The process of Dr. C. J. Eames for using crude petroleum as a fuel is now at work at the Eames Iron Works, Titusville, Pa. The following description is given in the *Oil City Derrick*. The advantages of petroleum fuel are, the perfect control under which the heat is held, the extremely high calorific intensity, and the freedom of the fuel from any elements injurious to the iron. It is claimed that the work can be performed much quicker, and the quality of the product can be made more uniform and of higher grade, than can be secured with coal fuel.

"The generator wherein the petroleum is vaporized consists of a cast iron vessel with horizontal shelves projecting alternately from opposite sides, over which shelves the oil, entering overhead by a quarter inch pipe, trickles down. This generator is contained in a brick setting about six feet square and five feet high. Around and below this is a large iron box called a superheater, the four sides of which are full of flues. Below that again is the furnace, containing another superheater surrounding the fire.

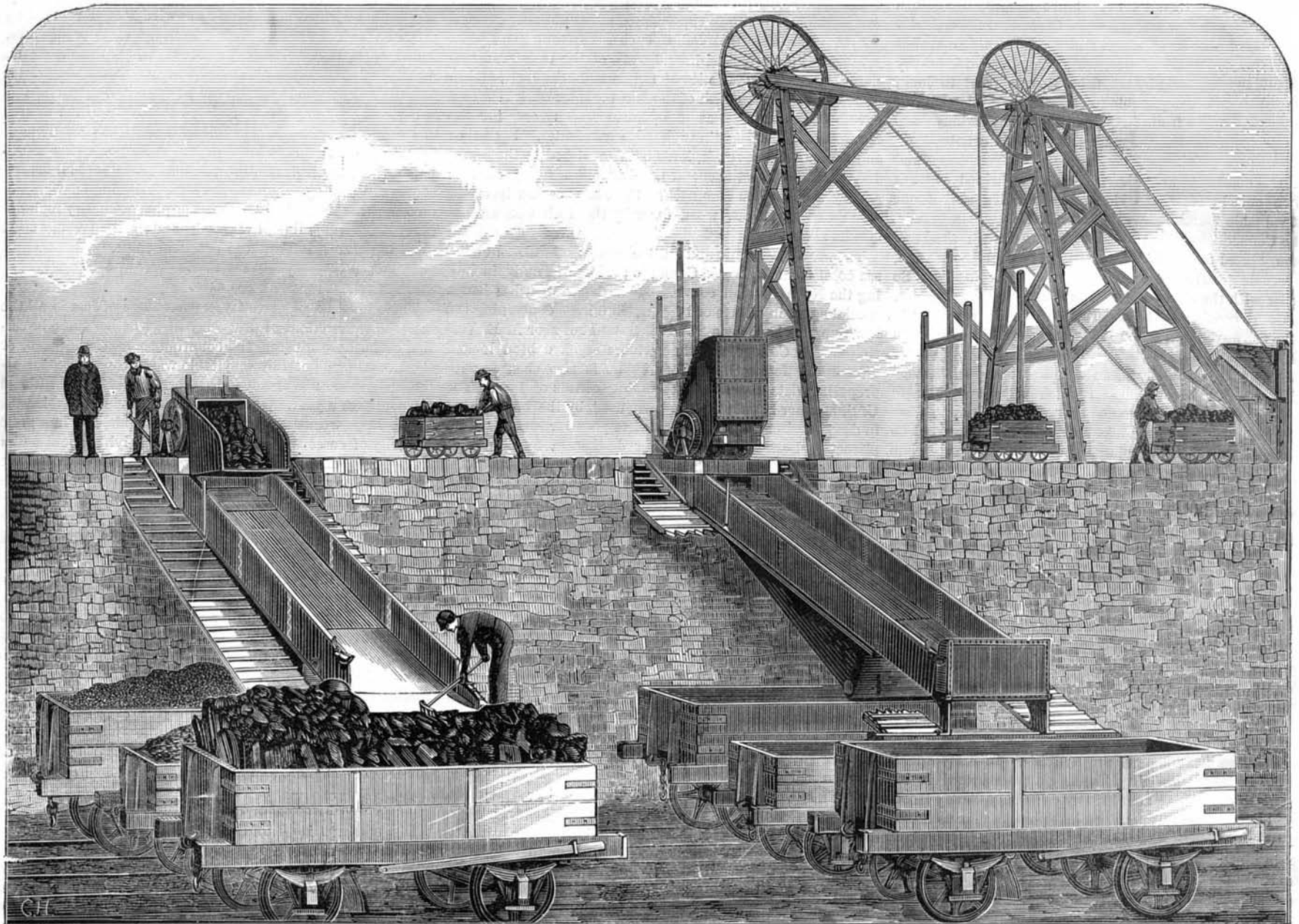
"A six inch oil pipe seventy-five feet high stands a short distance away. This is sealed at the top, and is pumped full of oil by means of a smaller pipe running up its side.

of the two sixty horse boilers, which supply the power for all the heavy machinery in the works. A twelve horse auxiliary boiler furnishes the steam for the generator.

"When the vapor passes into the heating or puddling furnace, as the case may be, it is lighted with a piece of waste. It ignites with a slight explosive sound.

"Thus far the work has been confined to manufacturing old junk into blooms. Men sort the wrought from the scrap iron, the latter having to go through the ordeal twice.

"The works now shut down at 6 in the evening. At 6:15 the next morning, the fire is let into the furnace, and at 7 o'clock puddling can be commenced. Two heats are made in one hour, and in three hours a ton of iron is manufactured. The puddling furnace is first lined with Lake Superior Republic ore No. 1, about a thousand pounds in quantity, and charged with 457 lb. of pig iron. At the expiration of forty-five minutes, the molten iron is puddled and conveyed to one of the ponderous steam hammers, where it is pounded into two blooms, each six inches square by twenty inches long. Then these blooms are placed in the heating furnace, where they remain for ten minutes under the spell of another intense heat. After this reheating they are taken to the other hammer and made into finished blooms, which



RIGG'S COAL-TIPPING MACHINES AND SCREENS

successful operation in the North Staffordshire coal field. One view represents the tipping machine at rest, and in the other the tipping apparatus has been checked in its revolution by the banksman, in order to show the manner in which the coal, which, under ordinary circumstances, would have been broken on the screen bars, is being carried carefully down to their surface, and in this process spread over the rotating plate ready for the operation of efficient screening. The machine is self-acting, both forward and in its return, being worked by the weight of the coal itself and by a counterbalance weight which comes into play when the corve has discharged its contents. A brake is conveniently attached to the tipping apparatus, as shown in the engraving, and gives the banksman complete control of the operation by which the coals are delivered upon the screen.

The screen bars are of steel, which is now admitted to be the most suitable material for the purpose. They are set at such an angle as is adapted to the character of coal to be screened, as it is impossible to draw a hard and fast line fixing any angle as the most suitable for coal screens. The upper bars are fixed and of a taper section; the lower or "nut" screen is either of wire and made to shake, or steel bars, set at a greater angle than the upper one, if the slack is not wet. The hoppers are flat-bottomed in most cases, and the screens have wrought iron sides, which are both stronger and much more durable than timber. The manufacturer of this apparatus is Mr. James Rigg, of Chester, England.

There is also an overflow pipe attached, by means of which the large pipe is relieved when full, the oil returning to a tank built in the ground for that purpose. At the bottom of the great pipe is a small one that leads to the top of the generator, while another pipe runs from the boilers to the bottom of the same vessel and supplies the steam. The seventy-five foot column of oil yields a uniform pressure of a trifle over twenty-four lb., but a steady twenty lb. is all that the gauge is required to indicate for the generator. The column is used in preference to a pump on account of the evenness of its pressure, which never varies in the slightest degree. From this column the generator is fed through a small aperture, the oil trickling down by drops on to the different series of shelves mentioned above.

"The steam, after leaving the boilers, is passed through the coil of pipes in the superheater until it is heated to incandescence and finds vent in the bottom of the generator, and there meets the oil as it drips from the bottom shelf. Every trace of oil is taken up and swept on to the combustion chamber, where it is ignited, and also forced into the furnaces by the air blasts which it encounters at this point. The combustion chamber consists simply of a cellular tier of fire bricks placed on ends, extending across the bridge wall. Within these cells combustion begins; and it is found that if this combustion space has a horizontal thickness of more than eighteen inches, the fire bricks fuse down. The heat escaping from the two furnaces passes through the flues of

weigh between 175 and 200 lb. apiece, their market value ranging from \$71 to \$80 per ton. The daily capacity of both furnaces is thirty tons of iron, for which thirty barrels of crude oil are used. To do the same work would require at least forty tons of coal."

Sanitas.

Russian turpentine and water are placed in huge earthenware jars, surrounded by hot water. Air is driven through the mixture in the jars continually for three hundred hours, the result being a decomposition of the turpentine, and the formation of a watery solution of the substance, to which Dr. Kingsett, the discoverer, has given the name of "Sanitas." After evaporation, the substance, as sold in tin cans, is a light brown powder, of a pleasant taste and odor, and capable in a very remarkable degree of preventing or arresting putrefactive changes. This new disinfectant has been in use for some time in England, and is highly spoken of. It is said to have a pleasant odor, is not poisonous, and does not injure clothing, furniture, etc. For household uses it would seem to be well adapted.

A FUNGUS, similar to that which Dr. Salisbury first noticed in the blood of persons suffering from malaria, is now announced as constantly present in the blood of consumptives, and therefore is suspected as being the cause of this dreadful malady.