

casualties occurred during the year, the sufferers receiving aid from the Coal-miners' Relief Fund or the District Sick and Accident Funds in each case.

HUNT COAL-CRACKER.

Many engineers being of opinion that bituminous coal can be more advantageously used in furnaces, and more perfect combustion secured, when the fuel is broken into small lumps, my attention has been directed to the Hunt Coal-cracker, patented by the C. W. Hunt Company, of New York, from the description of which it appears that the machine secures the desired end—viz., to crack, but not to crush, the large lumps of coal into pieces of a smaller and more suitable size for use in the furnaces of stationary or locomotive engines.

MASUT.

In forwarding an extract from *Chambers's Journal* on "masut" recently, the Acting-Inspector of Mines for Otago and Canterbury called attention to the fact that the only coal really suitable for ocean-steamers is that of the West Coast district, and that, so far as Canterbury, Otago, and Southland are concerned, they are dependent on brown coals and lignites; and the same may be said to some extent of the North Island. In the working of our best brown coals there is a good deal of waste slack for which there is no market, and it had often occurred to him that this might be used for the production of oil-fuel. When this slack is left in the mines it generally causes underground fires, and when banked up at the surface it burns away, spontaneous combustion almost invariably taking place. If "masut" or its equivalent could be made from our lignites and brown coals cheaply enough for use on steamers, locomotives, &c., it would prove a great help to the Otago and Southland Districts, and enhance the value of our mineral deposits. In addition to oil-fuel there would, he thinks, be a fair yield of ammoniacal liquor, from which sulphate of ammonia, which is a valuable fertiliser, could be made. In Central Otago there are oil-shales underlying thick beds of lignite, yielding a good percentage of crude oil; also at Orepuki, in Southland, but not so good as that from Central Otago. The following is the extract referred to:—

"For many years in the distillation of raw petroleum there has been a by-product called masut, for which no use could be found. It could not be turned into lubricating oil, or vaseline, or any marketable commodity; but it burns with a steady, clean flame, and gives out a very great heat. In consequence, it has been used extensively in Russia for firing steam-boilers. It has been used on the railways, and in steamships, and in manufactories; but the great difficulty lay in inventing a suitable furnace to burn it in. It is a dark-brown oily liquid, and, of course, the furnaces used for coal are of no use. But at last this difficulty has been overcome. By employing steam to blow it into the furnace, on the principle of the Lucigen light, it can now be used without difficulty. The Russian navy and the Italian navy have used it for some years with success. During the years 1895 and 1896 the German navy has carried on a series of experiments for testing the value of the new fuel, and the results of these experiments are now published. Germany has no great oil-wells like Russia and America, but she has coalfields. A cheap kind of brown coal found in Saxony has been used for the manufacture of masut, and a new and flourishing industry has in consequence been started in that province. It was with this brown coal (masut) that the experiments were made which have been so successful. Masut is said to have many advantages over coal. The first claimed is that it is much cheaper than good coal—as much as 40 to 50 per cent. cheaper. It is difficult to see how it can be produced so very cheaply, unless it be that the materials from which it is made being practically worthless it can be sold at the cost of production. The second advantage claimed is that it is a better heat-raiser. The result of a comparison of masut with the best steam-coal showed a result in favour of masut as a heat-raiser in the proportion of 17 to 10. That is more than half as good again; and, even supposing the same good results could not always be obtained in ordinary cases, we may be safe in saying that masut is at least 20 per cent. better as a heat-raiser than coal. The third advantage claimed is that it burns with a steady, brisk flame, and requires scarcely any stoking; in fact, the lighting of our engine fires may probably become as simple as the lighting of the gas, and likely also to require as little attention. The next point in favour of masut is that it is much better adapted for raising heat in the newer types of steam-boilers than coal. Steam can be got up quicker by it than by coal, and in consequence of its greater heating-power a higher pressure of steam can be kept up, and a greater amount of work got out of the machinery.

"The experiments in the German navy were made during the first year in a torpedo-boat, and afterwards in cruisers and battleships; and this is a point of great importance from a naval point of view. To be able to get up steam quickly and keep up a high pressure are points of vital importance in the navy in time of war. Another point claimed for masut, which weighs heavily in the minds of naval officers, is that it gives out no smoke. The torpedo-boat, and even the battleship, can get up full steam on the shortest notice, and no sign of it can be seen in the sky. In warfare this is of immense importance. At present our swift steamers leave behind them a long trail of smoke across the sky, and the enemy, even below the horizon, can be detected by the black canopy of soot. Henceforth it will be different. A whole fleet might come within striking distance of our shores and remain unnoticed. We have introduced smokeless powder; it may be necessary, if other nations adopt it, that we also adopt smokeless fuel."

KAURI FREEHOLD GOLD ESTATES.

The following account of the Kauri Freehold Gold Estates Company's Mine and works from Mr. Alexander Montgomery, Superintending Engineer for the company, did not reach me in time to be included in my report:—

The freehold property acquired by the Kauri Freehold Gold Estates (Limited) comprises, roundly, 36,000 acres, including the following blocks: Opera, Whangapoua, Maungatapu, Horongo-