

beaten up with a stick to a species of ointment—a process which occupied five or six minutes. A sovereign dropped into this mixture of oil and mercury came out untouched by the mercury. For all purposes of amalgamation the mercury was useless, and must remain so until retorted. The bowl was now nearly filled with water, and the end of a negative wire from a battery was plunged into the mercury and oil, while the positive wire was just dropped into the water, which stood 2in. or 3in. deep. The moment the contact was made with the water the oil began to rise in streams from the mercury, which could be seen collecting itself into little drops, two or three of which would coalesce. In about three minutes the whole of the oil had come to the surface of the water, and the mercury lay, pure and bright, at the bottom of the bowl.”

I witnessed a trial made with this appliance by the agent for the company at Melbourne, which surprised me at the effect produced on the quicksilver by a current of electricity; and I am convinced that this appliance will be the means of more gold being saved than hitherto. It consists of a common riffle-table, such as would ordinarily be placed next a battery of five head of stamps, the length and width being about the same as the tables now in use. The table has riffles, and is covered with electro-plated copper plates such as those now used on the ordinary riffle-tables. Across each riffle is a bar or band of carbon, which comes down to within a quarter of an inch or so of the surface of the quicksilver in the riffle. There are likewise sliding carbon bars which, by a mechanical motion, are made to move up and down directly above the surface of the copper plates that are between each riffle, so as to touch the water that flows over the tables, but not to touch the surface of the plates. The negative wires from the battery are placed in the quicksilver and to the copper plate, while the wires from the positive pole are attached to the carbon bar or bands that are placed across the box, thus sending the current through the water into the quicksilver. I mixed up some mercury with grease in a dish to test the effect that the electricity had upon it, and, although the mercury was so sickened with the grease that it was perfectly useless for amalgamation, in a few minutes after the current was turned on the effect produced was almost magical: the grease and impurities came boiling out of the mercury, and left it in a pure and bright condition.

Mr. J. Naylor, of Stawell, informed me that a company with which he was connected had made arrangements to erect a plant of these amalgamators to treat the heaps of quartz-tailings then on the ground, and he promised to send me a full description, with the result of its manipulations.

WINDING MACHINERY.

The winding machinery in Victoria is far superior to that in use in New Zealand, every winding plant being fitted with powerful brakes on the winding-drums, and fly-wheels of the engine, so that it can be stopped at once on a signal being given. The winding-ropes have all safety-hooks coupling them with the cages, which detach the rope automatically in the event of over-winding; and the cages are all fitted with approved safety appliances to prevent the cage falling down the shaft should the winding-rope break. The majority of the companies in the Sandhurst District have likewise safety-braces, about ten feet above the main brace, as an extra safety-guard should the cage be taken up to the poppet-heads and the hook or safety appliances on the cage fail to act. These precautions are essentially necessary in working deep mines. In the Sandhurst District they have been the means of saving a number of lives, either through accidents to the winding appliances, or through the carelessness of the engine-drivers. This is a subject which deserves the attention of mine-proprietors and mine-managers in New Zealand, and more so in future than what has been the case in the past, as our mines are getting deeper every year, and some of them are at present a considerable depth. For instance, the Big Pump shaft and the Queen of Beauty shaft at the Thames, the Golden Fleece shaft at Reefton, and the shaft at the Greymouth Coal-mine, belonging to the Westport Coal Company, are all considerably over 600 feet in depth, while the Golden Fleece and Queen of Beauty shafts are over 700 feet in depth. Yet none of these companies have proper safety appliances for winding. It is not only the companies named that these remarks apply to, but likewise every company working its mine from a shaft by which the workmen go up and down.

The Inspection of Mines Act in Victoria makes it compulsory on the owners of every mine using winding-machinery to have approved safety appliances, and the Inspectors of Mines for the various districts inspect and test them periodically. Mr. Grainger, the Inspector of Mines for the Sandhurst District, which is the largest field where mining operations are carried on in Victoria, states that he experiences very little trouble in getting companies to comply with the Act in this respect, as they find it to their own advantage to do so.

COMPRESSED-AIR ROCK-BORING MACHINE.

Air-Compressors.—These machines are in use by almost every mining company in Victoria, and they are coming into use in New South Wales. Compressed air is not only used for rock-drills, but also as a motive-power for working underground winding-winchies, and its use generally tends to assist the ventilation of the mines. The compressors differ greatly in construction. Some are known as the “wet” and others as the “dry.” It is unnecessary to enter into the merits of each compressor, for which several patents are held. Those generally in use in the Sandhurst District are the “National” and “Ford’s,” while in the Stawell Districts “Wayman and Kay’s” and the “National” are generally in use. The most compact and simple compressor that I saw was the “National,” which may be termed a “dry compressor,” having hollow ends on the air-compressing cylinder, so that a current of cold water can be circulated to keep it cool: the compression of air in the cylinder causes an evolution of heat, which it is necessary to keep below a certain temperature, or else the air would lose much of its expansive power as a motor. The only objection that I could see in the “National” was that the cylinder of the steam-engine was rather small for the cylinder