

"The power-supply water is conveyed in a main pipe-line as in ordinary sluicing to the level of the claim to be worked, and conveyed from there to the dredge in a patented flexible submerged line supported by floats. The idea of submerging the line is to relieve the floats of the weight of water in the pipes and to enable a longer span of pipes to be carried from float to float, thus extending the length of face reached by the flexible pipe-line. By carrying the last span underneath the dredge, the dredge is enabled to pass the flexible line to work first on one side of it and then on the other, thus doubling the length of face that can be reached when the flexible line works on one side of the dredge only. The flexible line connects on deck with a deck-pipe supplied with valves, by which the water is deflected as required to the elevating-jet, breaking-down nozzle, and Pelton-nozzle.

"The construction of the dredge is so simple and obvious that a glance at a sketch of the dredge explains the whole thing, and it is almost unnecessary to add detailed description; the altered conditions under which elevating is carried out, however, are accompanied by results which almost entitle the 'submerged jet' to rank as a new principle of working.

"A comparison of the submerged jet with ordinary hydraulic elevating is instructive. In a hydraulic-elevating claim the elevating-jet would in lifting say 50 ft., have to overcome the weight of the whole column of water, *plus* the friction of the whole pipe. In the case of the same lift with a submerged jet, with say 30 ft. of the pipe submerged, the elevating-jet would merely have to overcome the weight of 20 ft. of the column of water, *plus* the friction of the whole pipe, making a saving in the weight of the submerged portion of the column of water in motion. A further increase in effectiveness is due to the fact that a shorter lift is required, as with a fixed elevator it is necessary to put a well-hole in the bottom to give fall for the sluiced material, and raise the outlet an extra height to permit of the tailings stacking; while with the submerged-jet dredge the intake, as in dredging, does not need to go below the level of the bottom, and the tailings are spread almost at the level of the surface of the ground treated. A further great increase in lifting-capacity is due to the altered distribution of the water to the various outlets, a much greater quantity proportionately going to the elevating-jet. Thus, in hydraulic elevating, of a water-supply of twenty-two heads, ten heads would be required for the sluicing-nozzle to disintegrate the material and drive it forward to the elevator, and only twelve heads would be available for the elevating-jet; whereas the same water-supply applied to the submerged-jet process would be distributed thus: two heads divided between the Pelton wheel and breaking-down nozzle, leaving twenty heads available for the submerged elevating-jet. So not only is the lifting-power of each head used on the elevating-jet increased by the submerged process, but of a given water-supply a greater proportion is available for elevating, while plant-shifting is totally dispensed with.

"The first dredge of this type was worked at Waipori for seven weeks, the available quantity of water being fifteen heads. To utilise this a $\frac{3}{8}$ in. tip was used on the Pelton-wheel nozzle, a $\frac{3}{4}$ in. tip on the breaking-down nozzle, and a 4 in. jet for elevating; the throat was 12 in. inside diameter and 15 in. outside, with 15 in. dirt-pipe. A right-angle bend on top deflected the discharge on to a drop-plate 4 ft. by 6 ft., from whence it spread over a spreading-table 12 ft. by 12 ft., and from thence into three chutes, totalling 600 square feet of gold-saving area. The tables and chutes were fitted with perforated plates and angle-bar ripples.

"On starting, the lifting-power of the dredge proved too great for even the large shoots provided, and a regulator had to be provided at the intake to lessen the inrush of gravel, while to break the force of the stream of water and material on the shoots a hood was so placed as to break the force of the current before it left the spreading-tables. I estimate the lifting-power of the dredge-elevator at 1,000 tons per hour, while the capacity of the tables was 250 tons per hour, and no difficulty was experienced in gravelly formation in keeping the tables going at their maximum treating-capacity. The same water used in hydraulic elevating to advantage in the ordinary way lifted less than one-fifth of the material per week."

MCLEOD AND HURLEY'S PATENT "DIVIDEND" GOLD-SAVERS.

The patentees, Messrs H. N. McLeod and G. A. Hurley, of Wellington, have supplied the following description and accompanying photograph of their patent gold-saving appliance:—

"So many forms of gold-saving plates have existed for the past fifty years with very little improvement in the principle of construction that an original idea, involving a radical departure from old ideas, is interesting and worthy of record. The designers have started out with the task of saving fine gold—not necessarily black-sand gold, although that is part of their programme for the future—and in ignoring coarse gold, they have, perhaps, acted wisely. The trouble on dredges and with sluicing claims is not that the coarse gold is lost, but that the fine gold is lost, and in proportion to their success in winning the finest samples of gold, will the savers replace other plates and justify their name. It is claimed that at the tail of save-alls and in streaming down these savers have proved to be far superior to any appliances yet used for saving fine gold, and that so far on the main spread of tables they are, at any rate, as good as present appliances. It is hoped to be able to demonstrate by experiments, now proceeding, that when the savers have been nicely adjusted to the water conditions on the main tables, they will be as effective as on the save-all. It is not claimed that for black sand they have done any more than save exceedingly fine gold, much of which was amalgamated through contact with the silvered plates.

"Further trials are to be made with black sand but at present the inventors are pushing their experiments in the direction of the finest gold in ordinary wash. The plates used are from $\frac{3}{4}$ in. to 2½ in. in thickness, and 1 ft. square, the cells or holes going through them, so that they are really false bottoms resting on the plush or matting of the ordinary tables.

"The cells, by their peculiar shape and aided by the current of water carrying 'wash' with it, set up a motion peculiarly their own, the result being a series of eddies each directed towards