

means, which should not only be provided for in new dredges, but, if possible, be capable of attachment to existing machines. As the result of our consideration, we think the desired object may be gained somewhat in the following manner: A dredge working flat land to have a tailings-elevator; this may either be a fairly long elevator of the ladder type, or a centrifugal elevator such as that already referred to and illustrated in this report. When a ladder elevator is adopted in the case of an existing dredge, it may be necessary to provide for increased flotation by means of small auxiliary pontoons bolted to the stern end at each side of the dredge's hull, in order to counteract the leverage of the elevator. In working, the bucket-ladder will be raised so as to strip the ground down to the top of the gravel, and the elevator (if of the ladder type) lowered to as nearly a horizontal position as circumstances will admit, in order that the material passing over it may be conveyed as far back from the dredge as possible. The revolving screen is to be thrown out of gear, and a box shoot (made in sections so as to be readily set up and taken down) is run through the screen to act as a conveyor for the material from the discharged buckets to the foot of the elevator. Where a dredge is not fitted with a revolving screen, blind plates would be placed over the ripples in the sluice-box, and answer the same purpose as a box shoot inside a revolving screen. The machinery is now started and a cut made across the face of the paddock, the width being determined by the distance the dredge can move forwards before the bows come in contact with the gravel left below the stripping. When this cut is completed the box shoot is removed, revolving screen thrown in gear, and elevator either raised or thrown out of gear, as circumstances may require (in the case of a dredge with sluice-box and ripples the blind plates are lifted), and the dredge set back to work the gravel. These changes can be quickly accomplished, and in many instances there would not be any need for the elevator to work except when stripping is being done. This, of course, depends largely on the relative thickness of the overburden and gravels. No question of patent rights is involved in connection with this method, which owners of dredges are at perfect liberty to adopt.

PARTICULARS OF A RECENT DREDGE.

The new dredge for the Sheddon's Freehold Gold-dredging Company (Limited), at Waikaka Valley, Southland, of which an illustration is given, is the design of Mr. C. L. Watt, consulting engineer, Dunedin. Whilst the general appearance of the dredge is very similar to many others working on flats, there are several differences in detail, for particulars of which, and also a drawing of the dredge, I have to acknowledge my indebtedness to Mr. Watt. There is a departure in the construction of the bucket-ladder, the bulk-heads being placed diagonally. This plan (which is not considered suitable for river-work) has been devised for paddock-dredging, where grass, tussock, flax, and small scrub have to be dealt with, and it is claimed that, owing to the absence of cross-stays and bracings, the ladder is kept free from accumulations of *débris*. In the Southland dredging field several machines are fitted with tines connected to the bottom tumbler or its shaft. These act as picks, and cut into the ground so as to loosen it a little in advance of the buckets. Mr. Watt has deviated from the ordinary style of tine by fitting those on the dredge in question with side cutters in addition to the ordinary points, so as to allow the ladder more freedom at the face of work, and admit of its being more easily moved.

There is no revolving screen on this dredge, a sluice-box being used. This is on somewhat different lines from the ordinary run of sluice-boxes as used on dredges, and is made of iron instead of wood. Reference to the drawing (elevation) will show that there is a considerable drop from the buckets to the shoot in the head of the sluice-box, and at about 25 ft. down the box there is another drop of 30 in. Beyond this the sluice-box is increased in width to 6 ft. for a distance of some 40 ft., the entire length of the box being 65 ft. The upper part (25 ft. long) is covered with perforated plates, the lower portion (40 ft. long) being fitted with ripple-bars laid longitudinally and transversely, with perforated plates intervening, the usual matting being adopted throughout. An appliance resembling in principle a suggestion embodied in my report of last year has been adopted on this dredge. This consists of an endless belt of matting revolving upon an endless revolving grid-iron made the full width of the box. It is fixed inside the box below the perforated plates, and travels upwards, making one revolution every three minutes. The gold, sands, silt, &c., which pass through the perforated plates fall on the travelling mat, on which jets of water, having a head of from 3 ft. to 4 ft., are made to play. This is plainly shown on the drawing. The sands, gold, &c., washed off the mat fall on the streaming-down tables, which are constructed with boil-boxes something after the style adopted at the Round Hill claims by the late manager, Mr. G. Lee, and introduced by him on some of the dredges at Waikaka. Provision is made by means of a trough (not shown in drawing) to catch any gold which may find its way through the revolving mat, and carry it forward to the streaming-tables. The "save-all" box or shoot is brought under and to one side of the sluice-box, and enters the latter where it widens out.

The water from the centrifugal pump does not enter the sluice-box at right angles, as is usually the case, but by a deflection in the delivery-pipe is made to attack the wash as it falls from the buckets on to the dump-plate. A churning-action is thus set up which has a tendency to dislodge any particles of gold that may be adhering to the wash. The latter then travels down the sluice-box for some 25 ft., where it drops 30 in. as already stated, and becomes further disintegrated, finally travelling over the ripples and plates in the wide box to its discharge beyond the stern of the dredge. The dredge is working with excellent results.

ACCIDENTS AND FATALITIES.

The following table shows the number of persons who have lost their lives, and also the number of those who have met with injuries, whilst employed in connection with gold-mining work during the year :—