the engine, is provided with a powerful brake, and the handles of these brakes are connected in such a manner that the engineman has perfect control over the whole of them without leaving the starting-bar of the engine. There is also a circular indicator from 3ft. to 4ft. in diameter, placed some distance in front of the engineman, having feet marked on the outer edge, and on the face of this indicator there is a hand resembling the minute-hand of a clock, which is connected with gearing from the engine-shaft—this makes the hand travel round the face, showing the exact distance that the cage has travelled in the shaft and the different levels that it has passed. This company is at present employed in sinking their shaft, which is 1,250ft. in depth, and they intend, when "opening out," to work with double cages holding two trucks each.

The generality of winding plants in this district have double steam-engines, with cylinders from 18in. to 21in. in diameter; winding-drums, for working with round rope made of steel wire, from 10ft. to 12ft. in diameter; and attached to every winding-engine, there is an indicator to show the exact position of the cage in the shaft, There are some of the winding-engines fitted with a solid round link instead of the ordinary quadrant slot-link for reversing the engines, which is an improvement, as it lessens the number of joints, and consequently reduces the wear and tear, with less liability to rattle.

The cages that are used for winding are, in every instance, fitted with safety appliances—*i.e.*, there is a safety-hook for coupling the rope to the cage, which prevents any accident from overwinding; a safety appliance is fitted on the cage, which is controlled by steel springs attached to the bar that lifts the cages, so that when the tension on the lifting-bar caused by winding is taken off—as for instance, the rope breaking, those springs force the clips to spring out and catch on the guides, or sides of the shaft; thus preventing the cage from falling. The safety-hook is made in the form of an inverted V, having the narrow end upwards, which, should overwinding take place, draws the hook through a short cast-iron tube that is fixed on the top of the poppet-heads. This hook is constructed with a joint, and likewise held together with a copper rivet, so that when force is exerted in drawing the hook through the tube, it cuts the copper rivet, which releases the winding rope and allows the bottom of the hook to widen out, thereby leaving the hook attached to the cage resting on the top of the iron tube and thus preventing the cage from getting down. In addition to these safety appliances, there is an auxiliary or safety-brace constructed about 10ft. above the main brace, where all the trucks are taken out of the cage to be emptied. This safety-brace has folding doors made of iron bars set on edge, the upper edge inclining a little in towards the shaft, so that the cage in passing through this brace, the folding-bars are pressed back, and again return into their former position, thereby preventing the cage from getting below this; or at least if it happened to break through the doors, the fall would be broken to such an extent that the folding-doors at the main brace would hold it from getting down the shaft, in the event of the hook not acting, or the rope breaking, and the spring safety appliance failing to hold the cage at the place where the breakage took place. These safety-cages have been the means of saving several lives; but even the managers, who have been working them for years, question whether they are always to be depended on when an accident takes place, even when constant attention is bestowed on them to see that the springs are always in good order. The Government Inspector of Mines tests them from time to time by severing the rope when the cage, with a loaded truck, is being wound up. The Inspector informed me that, on the whole, the tests were very satisfactory.

Drawing No. 1 shows a cage fitted with Webb's patent safety appliance, which catches on each side of the guides as soon as the tension on the bar for lifting the cage is taken off.

Drawing No. 2 shows a cage fitted with Seymour's patent appliance, known as "Seymour's patent safety-cage." The difference between these patents is that Webb's grips on each side of the guides, and Seymour's on the face of the guides. The latter cage is at the present time considered the best that has yet been tried; but there is this objection to it: the grippers on the face of the guides are likely to make the partitions in the shaft spring to such an extent that the cage might be thrown out of the guides, and if so, there is nothing then to prevent it from falling down. However the two drawings show the two best principles of safety-cages that are used in this district. It may be well to mention that the Inspection of Mines Act makes it compulsory on the owners of mines to use approved safety-cages.

Crushing Machinery.

The crushing machinery, as far as stamping-batteries are concerned, has little or no improvements on those in use at the Thames. They are all revolving stamps in this district, from 7cwt. to 9cwt. each, having a fall of from 8in. to 10in., and making about 70 blows per minute. The general impression here is that the stamp shank screwed to hold the disc is not only more expensive, but does not answer nearly so well as a couple of keys in the disc, inasmuch as the screw-thread weakens the shank, and causes it in some instances to break where screwed. The riffle and blanket tables are somewhat similar to those used in New Zealand; but almost every crushing-battery has concentrators for collecting the pyrites, none of which are in use here, although, according to Professor Black's assay of pyrites from the Invincible Mine, at the head of Lake Wakatipu (which gave over 11oz. of gold per ton), these pyrites are allowed to run to waste—at least they were running to waste at the end of December last, when I visited the works. The manipulation of pyrites will be referred to further on when describing the United Pyrites Company's works.

Quartz Workings.

Sandhurst.

The quartz lodes in this district, as well as in other places in Victoria, are differently formed to those in New Zealand. There are three classes of reefs or gold-bearing quartz lodes—that is, the saddle, the vertical or slightly inclined, and the flat lodes. The two former are the class of lodes that are found here. On the Garden Gully line of reefs they are known as saddle reefs—that is, the