a deflector, or director plates, can be used, the addition of these being included in the patent rights of the machine. It is understood that the machine has been patented all over the world."

"*Working of Gold-dredges by Hydraulic Pressure.*—The adaptation of water-pressure to the work of driving dredge machinery has been applied by Mr. W. O'Brien, of Waipori, with considerable success, steam-power having been abandoned in its favour in one instance at least—viz., that of the Waipori Consolidated dredge. This dredge has buckets of 3¼-cubic-feet capacity, the working-speed being about thirteen buckets per minute. One Pelton wheel—which is set high enough for the discharge-water to be used in conjunction with that lifted for washing purposes—drives the bucket-chain and centrifugal pump, a smaller and reversible Pelton wheel being used to work the winches. Water is conveyed to the edge of the paddock by a line of pipes from a water-race, and has a pressure due to a head of 160 ft. vertical. To accommodate the water-supply to the varying movements of the dredge, the pipes are carried by a number of small pontoons, on which ball-and-socket joints are mounted; thus the pipe-line is made capable of a certain amount of flexibility without loss of water. The arrangements, as I saw them, worked very sweetly, and I was informed that the substitution of water-power for that of steam had effected a saving of about £1,000 per annum, the weekly working-cost of the dredge being about equal to 6 oz. of gold. It occurred to me that the substitution of armoured hose for the present system of pipes with ball-and-socket joints might probably be an advantage in reducing loss of pressure due to friction and abrupt changes in the direction of the water-current. The practical success of the system has been proved, and this method is being adopted on a new dredge which is to rework the ground already worked by the Jutland Flat dredge near Waipori Township, also on the Lower Enfield dredge, and is being substituted for steam-power on one of the dredges at Cardrona. Mr. W. O'Brien, the patentee, supplies the following particulars:—

"The pressure is obtained as in any ordinary hydraulic claim—viz., the water being conveyed in pipes down the slope of a hill. The water is conveyed on to the dredge from the bottom of the hill or edge of the paddock by means of a floating column of pipes, coupled with revolving joints; each joint to be fixed and supported by means of floating pontoons. The water-pressure, when conveyed on board the dredge, will work the turbine, Pelton wheel, or any other water-motor to drive the dredging machinery. The length of pipes and position of pontoons of floating column will be so arranged as to take up the smallest space up and down the hull of the dredge when the dredge is close to the bank. The pontoons will be worked from the dredge, and can be so manipulated as to permit of the dredge being moved from side to side of the run or face with ease by the ordinary winding-gear on board the dredge. A dredge can be built to work by the above method at a considerably less cost than those which are worked by steam-power, as there will be no expensive engines and boilers to provide for. The turbine or Pelton wheel will be placed at the same elevation as the sluice-boxes. The water discharged from the turbine or Pelton wheel, after working the machinery, will wash the stuff discharged from the buckets. The water-pressure provides a power which can be turned on at any moment, so that time is not lost in lighting fires and getting up steam. A power is always at hand to drive the electric light or work grindstone, water-blast, &c. Water-power, where available, is the cheapest power known, and, when used direct, very poor ground can be made to pay.

"*Advantages claimed.*—No fuel will be required, no engine and boiler to keep in repair, less oil and wear-and-tear, less labour required, as when the water-motor is once set to work it does not require attendants; therefore a second man on the dredge can attend to the lines, sluice-boxes, &c., and give assistance with anything which may require to be done. Bucket-dredging is undoubtedly the quickest method of working ground, on account of regularity of working, everything being afloat, following its work, stripping and cleaning the bottom at the same time, discharging the tailings evenly on worked ground, and requiring no attendance, and the gold going into the boxes continually, giving regular weekly returns. With an uneven bottom, such as holes and rises, the ladder can be raised or lowered to clean the same out. This cannot be said of the hydraulic-elevating system, in which there is a great deal of lost time in shifting and erecting plant, continual shifting of the hydrant, and stoppages through stones getting into the throat of the elevator. The sluice-boxes being stationary, the tailings accumulate at the end of the boxes and require building and looking after. The material also has to be lifted much higher to obtain a dumping-ground for it. In the elevating principle only a small percentage of the water-power is obtained. For example, five Government heads (or 300 cubic feet of water per minute), with 150 ft. of pressure, is about the smallest power used with the hydraulic elevator. These five heads of water 150 ft. high will give a force equal to over 60-horse power, including friction, when applied to the Pelton wheel for driving the machinery. This 60-horse power will work five large dredges, with buckets of 4-cubic-feet capacity, capable of raising over 100 yards of material per hour 25 ft. high, with power to spare."

Advance Stripping by Dredges.

In connection with the working of dredges on flats, I have in previous reports urged the importance of stripping off the soil and clayey matter in advance of the dredging of the auriferous wash, and of depositing the overburden or surface material on the top of the tailings. By this means good land would not sustain much damage by reason of dredging operations, and land which is now cold and useless for cultivation would be vastly improved and made into fairly good farm land, owing to the facilities given for natural drainage by the breaking-up of the tightly packed matter underlying the surface. The operation would also tend to materially increase the yield of gold by reason of the gravels (during their treatment in the screen or sluice-box) being free from contact with the clay, which, under present conditions, is known to carry off a considerable percentage of fine gold. This subject I have at different times discussed with Mr. F. W. Payne, consulting engineer, of Dunedin, with a view to the satisfactory solution of the question by simple