water run on to it from No. 2 will show whether the belt is level across: if not it is easily levelled by the wedges at the foot. Now the ore-feed is started.

Supposing all instructions to be followed the machine will be working now regularly and smoothly. The water and sand flow down the belt uniformly over the whole width of the belt; the lighter sand, kept gently moving, floats along towards the lower end of the belt; the heavy mineral settles on the surface of the belt, and, having once touched the latter, clings with a force not easily overcome. The belt, moving always onwards, brings all mineral up to the clear water No. 2, and here the difference between rock and mineral becomes apparent. The clean mineral passes between the jets of water, and is deposited in the tank below: the sand works gradually down, to be replaced by other particles.

In treating slimes—as, indeed, with all other qualities of material—as little water as practicable should be fed on with it. A large volume of water on a plane inclined surface implies speed and force—two undesirable elements in the separation of fine mineral. For this reason slimes cannot be treated as fast as a rougher quality of sand, since with a given volume of water a greater weight of material can be carried on to the belt when rough than when in the form of slime. From an extended experience with the machine it has been found that with a slightly-increased speed of the shaking-motion any rough particles of rock are much more easily moved than fine mineral; that it is easy to work the coarse sand off the belt, and at the same time produce extremely slight loss even of the very finest mineral. This observation led to the working of mixtures of sizes which should properly, on the usually-accepted theory, have been classified and treated separately. When a mixture of rough and fine—as, for instance, the discharge from a stamp-battery—is fed on the machines, much more can be treated in a given time on a given number of machines. For instance, in treating slimes from 3 to 4 tons in twenty-four hours is about as much as can be fed, while with rough and fine 6 tons can be treated in the same time on one machine, and both coarse and the very finest material saved together. What is meant by comparatively coarse rock is, say, all that will pass a screen of twenty holes to lineal inch. It is preferred to use a screen of forty holes to lineal inch, and with this extremely good results are always obtained. Even with forty holes to lineal inch there is, of course, great difference between the largest particles of rock and the finest "slime" also present; but the side-motion works off the rock and never moves the very finest mineral when it has once touched the belt.

It is not good to make the pulp flowing on the belt too thick, or the particles of mineral cannot settle through it. For this reason a pretty fair current of water must be allowed to go on with the slimes, and the belt placed with very slight inclination, so that the current of water will not be too rapid.

Occasionally, and at intervals varying with the quantity of mineral in the ore treated, the collections are scraped from the box No. 4, in order to prevent the accumulation in such quantities as, by forming a mound, may come in contact with the belt, and, by the rubbing, wear it. This cleaning of the box is accomplished without stopping the machine, as before mentioned.

In most of the mills already erected the material flows directly from the stamps over the machines, and then flows out of the mill as waste, too poor to rehandle; so that from the time of entering the stamps the rock is never handled in any way.

The tailings from the Frue concentrators of some silver-ores contain a varying amount of silver present as chloride; but the base minerals, and the sulphurets containing the gold and silver, have been thoroughly separated and saved in the concentrations, and whatever chloride is present can be saved at a small expense by leaching or by amalgamation without roasting.

To recapitulate, in conclusion, the chief points to be observed in working: The speed of the belt, being once adjusted in conformity with the inclination and the material worked upon, must be kept absolutely regular. The supply of ore must be steadily continuous, and the water flowing with it as small in quantity as possible. Clear water at No. 2 must equally be kept constant, and arranged both in quantity and form of distribution to allow of the necessary discharge of mineral. No jar or blow must be permitted in working, but the whole machine should work smoothly and almost noiselessly. With the proper attention to these details no trouble at all will be experienced in obtaining uniformly good results from working; the concentrated ore will always be clean, and the tailings poor. One man can attend to sixteen of these machines without difficulty, the only work being to occasionally scrape the collected ore from the tanks and to watch the machines generally, that nothing interrupt the feed or water-supply, and that the bearings contain oil. A superintendent is of course necessary to insure attention.

The Triumph Ore-concentrator.

This concentrator is similar to the Frue vanner (see Fig. 14), the difference being that the shaking-motion is lateral instead of crosswise, as in the case of the Frue vanner. It is highly spoken of as a concentrator, and its price is less than the Frue, being only about £100 delivered in Auckland. They are manufactured by Joshua Hendy, Nos. 39 and 51, Fremont Street, San Francisco. This concentrator is greatly in use in America, and a plant consisting of these is now in course of erection at the Globe Company's mill at Reefton, which will be the first in New Zealand. The following is the manufacturer's description of them: "Triumph ore-concentrators possess many advantages over any other style of vanners, vanning-machines, or concentrators yet introduced to the notice of mining-men. These advantages consist in the superior features which enter into their construction and facilitate their operation. They are constructed in the best manner: their frames being of iron insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight-space in boxes, by which their cost of transportation is reduced, and occupy less mill-room when set up. The endless belt is carried upon a supplementary frame, which is mounted upon springs. The reciprocating movement which is imparted to this supplementary frame and belt tends to settle