of the compressor, as it required the steam to be at high pressure to do the work, whereas if the cylinder of the steam-engine was a little larger than the cylinder of the compressor, it would not require so high a pressure of steam to work it. "Wayman and Kay's" is what is termed a "wet compressor," and is highly spoken of by those companies that use it; but it requires much more room, and is not nearly so compact as the "National." At the same time it does its work satisfactorily. Plans of this compressor are attached (*See* Drawing No. 7). These compressors force the air into a receiver, which is generally in the shape of an egg-end boiler, and from this the air is led, in gas-pipes of from 2in. to 3in. in diameter, into the mine on the various levels where it is required. When rock-drills are used in stoping out, the air is taken from the main service-pipe in flexible tubing made of vulcanized rubber. This flexible tubing is likewise used for connecting the main- and branch-pipes with the different machines that are at work. The power required to supply air for an ordinary rock-borer is equal to about from two to three horse power. A 12in.-cylinder steam-engine would be amply sufficient to drive a compressor capable of supplying air to work four drills.

Compressed-Air Rock-Drills.

The managers and those interested in all the mines that I visited were unanimous in their opinion with regard to the use of these drills, and stated that they not only cheapen the cost of working the mine, but likewise, by their use the large amount of air required to work them, they assist materially in ventilation. In sinking shafts, winzes, and in driving tunnels, levels, &c., their use enables the work to be done for nearly one-half of the cost of ordinary hand-labour; but in stoping out the lode the actual cost of breaking down the stone, in some instances, is as much as by hand-labour. But even in this case their use enables the lode to be worked out at a greater rapidity, thereby effecting a saving in the surface expenditure. The rock-drills mostly in use are the "National," "Ingersoll's," "Eclipse," "Mitchell's," "Naylor and Thornton's," and "Wayman and Kay's." Plans of the two last are annexed (*See* Drawings Nos. 5 and 6).

From what I have seen of the working of these drills, the two last named seem to give great satisfaction. These drills are mostly used at Stawell, where the rock is harder than in any other district in Victoria; and one of the chief advantages of the Naylor and Thornton drill is that it is lighter than any of the others, at the same time combining strength and simplicity of construction, whilst its equilibrium valve renders the friction very little and allows the whole of the power to be concentrated on the main piston, which works the drill. Several of these drills are used in the Inangahua district, and every one of them has given great satisfaction. But, at the same time, while I think highly of this drill, I do not wish to depreciate the value of any of the others, which may be equally effective in doing their work.

As stated previously in the case of the "Wayman and Kay's" drill, which was worked under similar conditions with those of the "National" and "Eclipse" drills, it proved to be superior, inasmuch as the cost of repairs was considerably less, as also the amount of air consumed in working it. This drill is only about 4lb. heavier than the "Naylor and Thornton" and costs about £25 less in the first instance.

Diamond Drills.

These drills have been greatly used in Victoria and New South Wales, and their use has been marked with great success in boring through sandstone, shale, and basaltic rocks for coal and alluvial gold deposits. But in boring through metamorphic-schist formations for gold in quartz-reefs they have not been successful. The district where they have been chiefly employed in prospecting for quartz-lodes is Stawell, in Victoria, where thirty-one bores have been put in, equalling 12,080ft. 8in. The managers of companies, and others interested in mining in this locality, do not consider their use of any particular advantage, and look upon them as misleading with regard to the thickness of the lodes bored through, inasmuch as, in boring through silurian rocks, the alternate hard and soft veins in the strata cause them to run away from the initial direction of the bore, especially if it is following nearly in the direction of the strata. They have, in some instances, in this district, cut the lode-veins at such an angle that the bore almost followed along them, thereby representing a much greater thickness of lode than actually existed. As, for instance, one of the bores in the Oriental Company's mine showed a deviation from the initial direction (at 400ft.) to be about 50ft., and also showed the quartz-leader which was cut containing gold to be two or three times thicker than it really was. This was the means of inducing the company to sink their shaft and put in levels to work the supposed lode, which when found was not of sufficient thickness to pay.