

and 10 in. stroke. The suction is 3 in.; discharge, 2 in.; vertical lift, about 175 feet.

Nearly all of the water comes from the surface and upper stopes, and the greater part of it is caught and carried out of the tunnel without pumping. The bottom of the mine is so dry that miners occasionally have to carry down water for drilling purposes.

The water is so strongly charged with acids and copper in solution, and is so destructive to iron, that it is necessary to have the water end of the pump, piston, piston rods, etc., made of brass.

The water, when it leaves the tunnel, is caught in troughs and run over scrap iron, on which the copper in solution is precipitated. About two tons of cement, carrying 50 to 60 per cent. of copper is collected in this way yearly.

Two air compressors, one a straight line Ingersoll, 20 in. x 30 in. cylinder, the other a Rand compound 14 in. x 22 in. cylinder with condenser, and each of 10 to 12 drill capacity, furnish the compressed air for drilling. Rand and Ingersoll-Sergeant power drills are used, and eight of them are kept running night and day.

Hand drilling is resorted to only in very small veins or inaccessible places.

The compressors, with two boilers 18 ft. by 6 ft. diameter to run them, are set up outside the mine, and the air carried from them through the tunnel and down the mine in $4\frac{1}{2}$ and 4 inch pipes to a point where it is diverted in smaller pipes to the different workings.

The mine is ventilated by diverting the air which goes in through the tunnel, and confining it by a tight brattice or dividing along the west side of the mine till it reaches the working stopes. It is there scattered through the workings and naturally finds an exit on the top of the mountain through Nos. 5 and 7 shafts. The exhaust from the drills also contributes to the ventilation of the mine.

The hoisting machinery is all set up in the mine at the inside end of the tunnel, and consists of two engines with 14 in. x 26 in. cylinders, coupled on to opposite ends of the main shaft. Three drums 6 ft. 6 in. in diameter are geared to this shaft, two of them being in use, and the third kept as spare in case of breakage. Two boilers 4 ft. x 16 ft. furnish the steam to run the winding engines. The smoke from the boilers and the exhaust steam is carried up to the surface through the old work-