

grades at the same time, the plant consists of a double system throughout, each half working independently, the water-supply alone being common to both. Thirty-five and a half cubic feet of clear water per minute should be sufficient for the whole plant, including condensation, feeding of the boilers, and of the different washing apparatus—i.e., in no case should the water used exceed that formerly used in the two old washers or the Thurmshof plant. Therefore, the water that has already been circulated through the washer must partly be repumped into the main reservoir already described. Owing to the carrying-out of the principle of crushing and sizing gradually, and at the same time avoiding too fine a pulverisation of the ore, only 7,266 square feet of settling-tanks were at first erected. It has, however, been found necessary to increase this space by one-third, to allow of the emptying of the tanks. Although the whole area is very limited, it has, so far, satisfied all requirements.

"The Interior Arrangements of the Concentrating Plant, regarding Power and Transmission.

"Taking into account that the plant should be arranged to work simultaneously yet separately ores which, although of the same mechanical composition, differ greatly in silver-value, it was arranged (notwithstanding the fact that in the Himmelfahrt Mine the amount of ore from the richer silver lodes is smaller) to divide the washer into two separate but symmetrical parts, each of which is capable of treating about 70 tons of crude ore (70,000kg. to 75,000kg.).

"It has thus become possible, in the event of there being a momentary falling-off in the supply of ore of either sort, to concentrate similar ores from other mines in the central plant, or to work the crude ones of any particular vein or lode separately, in order to ascertain accurately the percentage of valuable product in each. This division of the plant has not only not interfered with the supervision and control of the machinery and workmen, but has greatly facilitated it.

"Principal Division for Roller- and Jigging-work.—The crude ore composed of the roller- and stamping-ore, resulting from a rough hand-separation, and the natural amount of dust and smalls which cannot pass the hand-separation, is brought by means of a horse-tramway in trucks to the west side of the main building to the bottom of the hauling-tower. The trucks are here hoisted to the top level by means of a separate hoisting-engine. The floor to which the material is hoisted is 41ft. (12·50m.) above the level of the tramway and 62·8ft. (19·15m.) above the foundation of the principal building. The trucks, which carry a load of from 2,669lb. to 2,868lb., are run out on rails from the hoisting-cage on to a platform, and into a circular movable tipper, which can be run on rails over the four large hoppers, in which the ore is tipped according to its quality. Each hopper has a content of about six tons, or 85 cubic feet. Two men are required on this floor to attend to the lift. These two men run the trucks out into the tipper, and tip the ore into the various hoppers; they have also to mark the number of the truck delivered to the washer. Roller- and stamping-ore and smalls pass all together over a moving grating, through which the smalls fall, whilst the separated larger pieces are broken in the stone-breakers. It is necessary to supply the stone-breakers as regularly as possible. To accomplish this a very practical arrangement has been put in by C. Lübrig. This consists of an iron sole-plate let in at the pointed bottom of the hoppers, and this moves slowly backwards and forwards with the ore resting upon it. By means of this forward motion, which is worked by machinery at the back of the hoppers, the ore is carried or forced on to the forward and backward moving sieves, a sort of shaking-sieve, with holes through which all under $1\frac{1}{2}$ in. falls, whilst the larger pieces over $1\frac{1}{2}$ in. fall slowly and regularly into the stone-breakers. This automatic feeding of the stone-breakers requires only two men to the four stone-breakers and shaking-sieves. The forward and backward motion of the automatic feeder can be stopped at will or set in motion by the workman by means of a lever. A perfectly automatic supply is not practical owing to the ore changing in composition, it containing at one time more smalls, at another more roller- and stamping-ore. The smalls which fall through the grating pass directly into a large double sieve-drum directly below.

"The stone-breakers are arranged in a row in front of the hoppers and gratings. There are two for each system, and each stone-breaker can crush 660lb. to 770lb. of ore over the size of 4in. to 5in. cubes per hour. The crushed ore from the stone-breakers falls into the same lead as that which fell through the grating, and passes with it into the sieve-drums. The drums are double, formed of sheet iron, with holes of $\frac{5}{16}$ in., $\frac{1}{2}$ in., $\frac{5}{8}$ in., and $\frac{3}{4}$ in.

"The separate grains of $\frac{5}{16}$ in., $\frac{1}{2}$ in., and $\frac{5}{8}$ in.—16m., 12m., and 9m.—which come from the first large drums, are further worked on the large five-partitioned coarse-sand jiggers, being automatically carried directly on the jigs by means of leads. These jiggers (called Bergemaschinen) are arranged for the purpose of removing gangue, and besides, with the exception of collecting a few grains of galena, essentially produce concentrated lead milling-ore, mixed with arsenical or iron-pyrites, and stamping-ore with very little galena—that is, they give concentrated material for further treatment. The outflow from the drums falls upon the picking-bands, which move slowly upwards, being slightly inclined. From off these pure galena, blende, pyrites, and gangue are picked out, whilst the mixed ore is allowed to pass on. The picked ore and the gangue are thrown by boys into boxes, connected with leads, arranged on both sides of the picking-tables. These leads convey the separated ore and gangue to the lowest floor of the main building. The bands carry the remainder—that is, mixed ore, &c.—into the receivers of the first pair of large rolls, where the second crushing takes place. The ore that passes through the rolls is carried through leads direct below to the second pair of double sieve-drums, for above middle-sized grains. These drums have holes of $\frac{5}{16}$ in., $\frac{3}{8}$ in., $\frac{7}{8}$ in., and $\frac{5}{4}$ in. These drums also receive the grain from the first drums. Each of these different sized grains, with the exception of those under $\frac{5}{8}$ in., pass direct through leads to different five-partitioned jiggers, there to be directly separated into their different mineral components. The outflow from the drums goes direct into the second pair of rollers, where the third crushing takes place. The third pair of sieve-drums, which receive the crushed middle grains from the rolls, and the grains under $\frac{5}{8}$ in., are situated directly under the above pair of rolls, and are also