

double cylindric. They have holes of $\frac{2}{32}$ in., $\frac{3}{16}$ in., and $\frac{5}{32}$ in. These sized grains go direct through leads to jiggers on the lowest floor of the crushing part of the building. The outflow from the drums passes through the leads to the third pair of rolls (for fine grains), and here the fourth crushing takes place. The crushed grains from these rolls pass into the single cylindrical drums having holes. The outflow from these drums which is not sufficiently crushed fall into the pit, or hoppers, where the bucket-lifts raise it for the stamps. This is a small quantity. The grains which pass through the $\frac{5}{32}$ in. holes of the drums go through leads into the drums in the slime-washer.

"This ends the step-by-step crushing, and next follows a description of the jiggling-work, which is throughout continual, no intermediate transport occurring. On the second stage (from the top) there are six of the large cross-grained jiggers, treating grains from $\frac{5}{16}$ in. to $\frac{2}{32}$ in., supplied from the first pair of drums. Each machine is divided into five compartments—(a) in the first compartments concentrated mixed grains of galena; (b) in the middle compartments those with galena, &c. The first row of hydraulic jiggers, which are, like the remaining similar machines, fitted with eccentric movement work with a throw of from 2 $\frac{1}{2}$ in. to 3 $\frac{1}{2}$ in., and with a varying stroke of 115 to 160 per minute. The second row of similar machines are situated on the third floor from the top, on the same level as the third crushers, and work with a throw of from 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in. and a stroke of 165 per minute. The third row of jiggers (for middle grains) is upon the ground-floor of the crushing part of the building, and they have a throw of 4 $\frac{1}{2}$ in. to 5 $\frac{1}{2}$ in., and a stroke of from 165 to 200 per minute. Each one of these machines delivers rich lead in the first-sieve division; mixed ore (roller-ore) in the second division; rich pyritic ore (delivery-ore) in the third division; poor pyritic ore (delivery-ore) in the fourth division; zinc-blende ore (poor ore for stamps) in the fifth division; whilst clear saleable tailings flow out. In working arsenical ores, the product in the third division consists of zinc-blende delivery-ore. The products from all the second-sieve divisions are crushed again by the rollers, whilst the fourth and sixth divisions are sent to the stamps. The products and mixed products from the jiggers on the two upper floors fall through leads, through which water also runs to the lower stage, where they can be dropped into trucks to be conveyed to the store-room, or dry stamps, or be redelivered to the crushing machinery as required; only the products and mixed products from the jiggers on the lowest floor have to be emptied out with a shovel. The waste and overflow from all the jiggers on the three floors run into a common big lead, and through this to the hopper of the principal waste-bucket works, which stands outside the washer in a special wooden building. The bucket-works lift this mixed waste of all sizes to such a height that it can be separated into two sizes (for sale), and can be easily tipped into loading-hoppers (to facilitate loading into trucks) and carted away. With the foregoing arrangements it can be seen that only on the lowest floor of the crushing part of the building is there any hand-transport work to be done. The working, therefore, is nearly automatic, requiring only the extra hand-work in overlooking the amount of the ore delivered to the stone-breakers, the picking at the transport-bands, the delivery of the mixed middle products, and from the middle-grained jiggers on to the reserve machines.

"The number of hands required for the main building for both systems consist of—Two men at the foot of the hoisting-plant, two men at the top (including engine-driver), two men at the stone-breakers, eight to ten boys or women at the picking-bands, one man on the middle floor, four men (for shovel-work, transport, &c.) on the bottom floor, one overseer, one engine-driver for the driving machine, one stoker, one mechanic (for oiling machinery, &c.). The three sets of rollers have the same diameter, of 2 ft. 3 $\frac{1}{8}$ in., and the same width, of 1 ft. 2 $\frac{1}{2}$ in., and consist of removable cast-steel rings on a conical core.

"*Principal Division for Stamping, Fine Grain, and Slime-working.*—The fourth crushing (with the third pair of rollers for fine grains) is finally followed by the fifth—i.e., stamping, by which means the real stamping-ore, that from the previously mentioned process (that is, the resulting mixed overflow from the jiggers), is treated. This work is performed by two sets of American stampers, each with three boxes of five head of stamps, which are also situated on the lowest floor of the crushing part of the building. The overflow from the jiggers on the upper storeys falls through leads into the pit of the stamp-bucket elevators, on the bottom floor; this in turn is tipped into the supply-hoppers situated at the back of stamps. The poorer stuffs coming from the jiggers on the lowest floor are directly taken out and also thrown into the pit of the stamp-bucket elevators. Each stamp weighs 313 lb. (142 kg.), and is lifted 1 ft. $\frac{7}{16}$ in. (320 mm.) per stroke, and makes 53 falls per minute. Each fifteen stamps, or three sets of five stamps, have a separate iron battery-box. The two-stamp batteries are so arranged that the thirty stamps are in one row. Stamping is done through screens. These two batteries have been found sufficient to work through the required quantity, jigged waste only being required to be stamped, and 176 lb. (80 kg.) being the greatest duty performed, as a rule, by one stamp. This quantity corresponds to 23 $\frac{1}{2}$ tons (or 24,000 kg.) daily of crude stamping-ore to be worked, or 20 per cent. of the whole quantity supplied to the washer. The slimes that pass through the battery-screens are taken up by the collecting-channel which runs in front of the battery-boxes, and this is where the slime-separation commences. There are here erected two pairs (originally four pairs) of single drums, with holes of $\frac{1}{16}$ in. and $\frac{3}{32}$ in. These drums are situated in the principal division for small grains and slime-working, directly over the principal level of the plant. This part of the plant consists of—firstly, the above-mentioned drums, and the hydraulic fine-grain jiggers connected with them; secondly, the Spitzluten and Spitzkasten system, for coarsely-powdered grains, and the jiggers connected with them; thirdly, The Spitzluten Strongerinne, with the appertaining apparatus for the finest sand and slimes. It forms, taken altogether, an unbroken suite of appliances, whose duty is—first, to classify according to specific gravity; second, to concentrate the single kinds; and lastly, to obtain the metallic contents from the previously-prepared materials. The Spitzluten systems for coarsely-powdered grains treat grains from $\frac{1}{32}$ in. to $\frac{3}{32}$ in., of which there are three sorts that come from each system, and flow direct into the five-partitioned round jigger, where they are separated into different components. All the overflow from these Spitzluten passes with the other slimes into the reservoirs of