

RAISING SHAFT AT ROLLING MILL MINE, NEGAUNEE, MICH.*

By Edwin N. Cory.

The new shaft of the Rolling Mill Mine of the Jones & Laughlin Steel Co., was raised from the 621-foot level to the surface by the following method:

The work was started from this level and carried through to surface with one continuous raise. A force of nine miners divided into three shifts of three men on each shift working eight hours per day was employed. These men also trammed the material from the raise to No. 1 shaft, a distance of 750 feet, and put in the timber. The difficulties of raising so great a distance were successfully overcome and no accidents or delays occurred during the progress of the work.

The raise was 8x8 feet in size and was divided into three compartments. One compartment, 4x4 feet, including the timber, was used as a bucket way for hoist-

The type drill used was an Ingersoll-Rand, 2-inch cylinder B. C. 21, butterfly valve hammer drill. Three drills were operated at one time to drill the raise over, which consisted of 18 holes in three rows, six holes in each row. The cutting-in holes were drilled, so as to cut a space when blasted through the entire length of the raise directly over the rock compartment (Fig. 1) so that the other holes would throw the rock toward this opening and fall into the rock compartment. Before blasting, the ladder and bucket compartments were covered with 10-inch round timber, flattened on two sides to prevent rolling, and placed at an angle to deflect the falling rock into the rock compartment, necessitating only a minimum amount of shovelling. The space directly over the ladder compartment, was covered with 3-inch plank to permit the men to get away quickly when blasting, also to give them perfect protection in going up and down the raise (Fig. 2). The blasting was all done with fuse cut in various lengths to give the desired results. After blasting, and

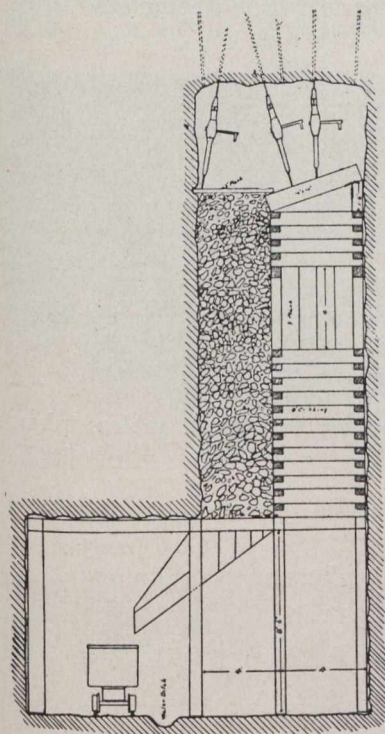


Fig. 1.

Method of raising shaft through rock.

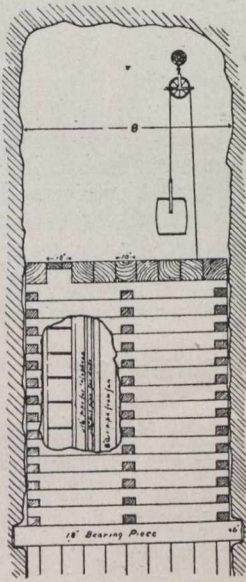


Fig. 2.



Fig. 3.

Method of raising to surface and enlarging shaft

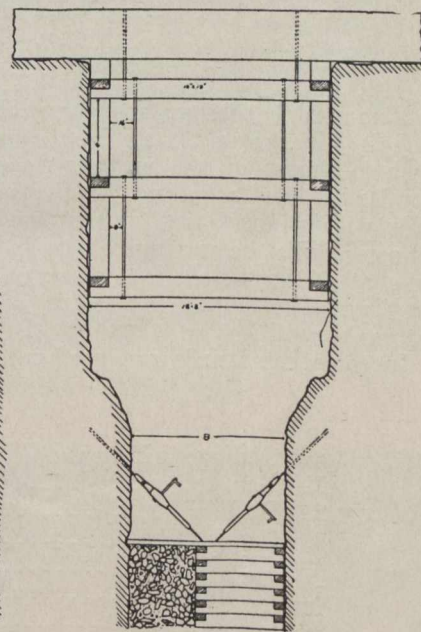


Fig. 4.

ing tools and timber and a station was cut at the bottom of this compartment on the main level, in which was placed a small hoist. Another compartment, 4x4 feet, was used for ladders and an 8-inch pipe from air fan, also one 1 1/4-inch pipe for speaking tube and one 1 1/2-inch air pipe for the power drills. The other half of the raise, 4x8 feet, was used for the rock broken in the raise, and was not timbered but kept filled with rock up to the height of the timber in the other compartments. A chute was constructed in the bottom of this compartment through which the rock was run when loading into tram cars. (See Fig. 1). A fan was placed at No. 1 shaft which forced the air through the 8-inch pipe up to the top of the raise, the current being down through one of the compartments, thus securing perfect ventilation.

while the smoke was clearing out of the raise, the miners would tram enough rock out of the chute so that timbering could be commenced at the top of the raise. A gin-pole was erected about 8 feet from the last set of timber on which was hung a 10-inch sheave wheel for the rope used in hoisting the timber from the level below (Fig. 2). After the timber had been put in it was also used for hoisting the sharp drills and machines to start drilling. The drilling machines were thoroughly overhauled after each round of holes while the miners were blasting and timbering, and no delay was occasioned during the work.

When the raise had been carried to a height of about 200 feet, hitches were cut in the rock and a set of bearing pieces put in about four feet above the last set of timber, and planked up with 3-inch plank. This

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