stope the drift was first widened, then, instead of all the broken ore being removed, only the excess was taken away and the machines were then set up on what remained and another slice taken off the roof. This operation was repeated and the height of the stope further increased. All the ore was then removed, leaving an untimbered stope averaging 25 feet in height, about 50 feet wide and about 600 feet long. A longitudinal section is shown in the diagram of the quarry workings.

The square set method is gradually giving place to a cheaper method. Reference to Fig. 6 will explain

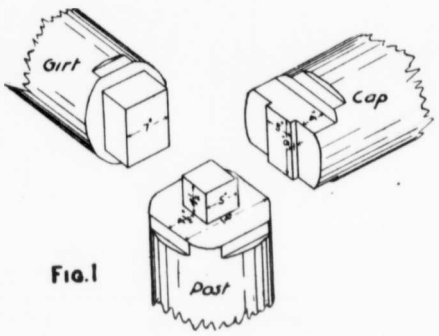

FIG. 1

this. Heavy chutes with iron gates have been built and the raise started in above the timbers. The excess of ore is drawn off through the chutes. Several of these raises will run parallel to each other and as they increase in height openings will be broken through from one to the other for convenienece and for ventilation.

All large pieces of rock left after blasting are bull-dozed so that nothing too large to go through reaches the chute. Bull-dozing consists in placing a stick or two of powder on a rock too large or too hard to treat with a hammer. This is covered with a shovelful of finely broken rock and the fuse ignited, when the rock is shattered.

BLASTING.

This is performed by a separate gang, who work on the night shift. The holes have previously been cleaned out by the machine men, all tools removed and turn sheets laid down to receive the ore blasted and thus aid the shovelling. The blasters then load the holes and cut the fuse to the length required so that the charges in the different holes will explode in regular order, each hole breaking towards space. The firing is then proceeded with. Sixty per cent. powder is used in almost all cases in both mine and quarry.

TRAMMING.

Most of the mine cars in use stand 4 feet 2 inches above the track and will hold 20 cubic feet. This means a capacity of one and a half tons. Cars of slightly different dimensions are in use in the Knob Hill. A few ton-cars are still used to a small extent. Cars are all pushed to the shaft stations by man power and caged by a cage tender. At the surface a topman replaces the full car with an empty and dumps the contents of the loaded car in the adjacent bins.

Tracks in the mine are 12 lbs. to the yard, and switches in use are shown in the sketch (Fig. 7). Where most of the traffic goes by the side line a hinged tongue is occasionally put in. This is easier to make and a turn may be made in less space with this arrangement. When the other switch is put in, the carman has to guide his car to the right track by throwing his weight on one side of the car or the other. On the 250-foot level the cars are not caged, but their contents dumped into a chute leading to the 300-foot level.

HOISTING.

The shafts in which ore is hoisted are both of the two-compartment type. The extra compartment is used for ladders, pipes, etc. The hoisting compartment is lagged with two-inch plank. At level stations posts 15 feet long are used. The upper end plates run across the station a distance of about 20 feet and are kept in place by braces and posts. The lower end plates are also extended and support the steel turn sheet. The timber hoist is situated between the blacksmith and carpenter shops. It has been sunk to the 200-foot level and is slightly inclined. A skip is mounted in the shaft and is used solely for lowering timber and steel, men being forbidden to ride on it. It is operated by a small compressed air hoist. The hoisting signals are all pull bell.

PUMPING.

The greater part of the mines are dry. Shaft No. 2 is, however, wet, so that the cage tender always

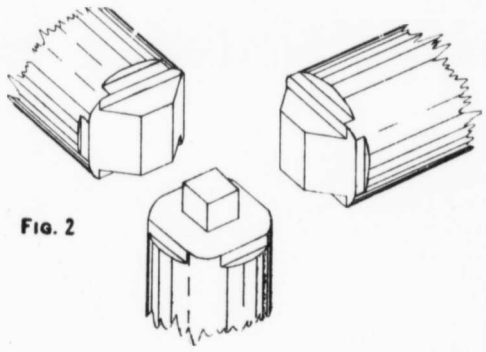
FIG. 2

wears rubber caps, coat and boots while on shift. A Knowles steam plunger pump is stationed at the 300-foot level in No. 2 shaft, and another at the 200-foot level in No. 1. These handle the mine drainage with ease. The water is pumped into large reservoirs on the surface. These are situated at elevations greater than the mine buildings and are used as a source of water supply in case of fire.