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M. E. ST. CLAIR

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TAKING MINE SAMPLES

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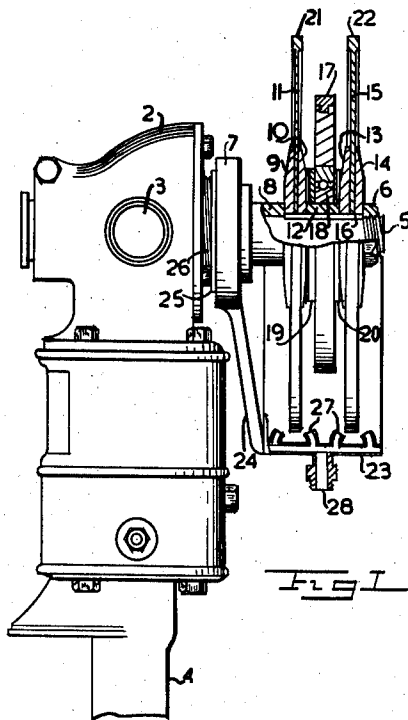


FIG I

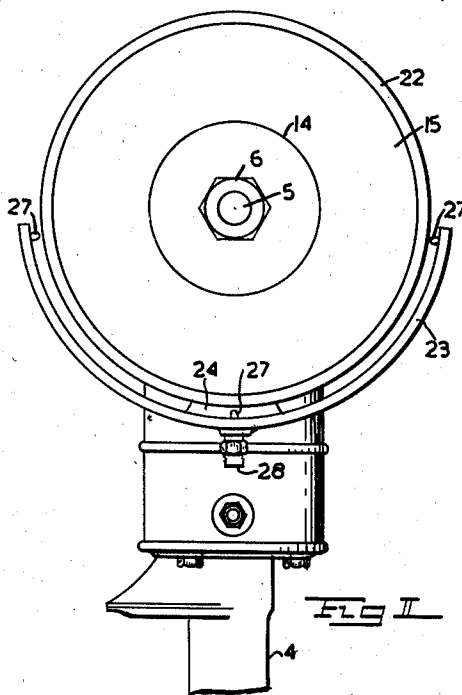


FIG II

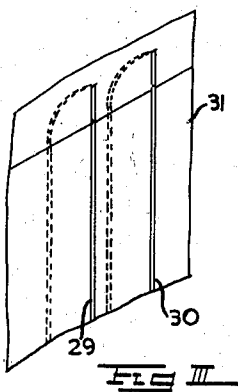


FIG III

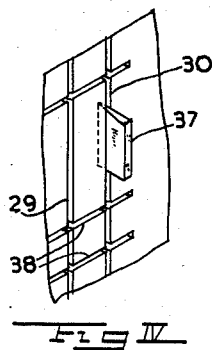


FIG IV

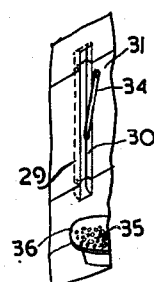


FIG V

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TAKING MINE SAMPLES

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3 Claims. (Cl. 262—19)

The present invention relates to methods of and apparatus for taking mine samples, especially samples of hard rock formations. Such samples are commonly taken by cutting grooves across the exposed face of the formation at a number of places along the face of the formation and collecting the material cut out of each of the grooves. The grooves are cut by manual operation with a hammer and chisel which is not only laborious, especially in the case of hard rock formations, but tends to inaccuracy owing to the difficulty of making each and every groove even in depth and width. An important factor in this respect is that a chisel is not well adapted for simultaneously cutting out material from the body of the groove and cutting the sides of the groove by means of the extremities of its cutting edge.

One object of the invention is to effect the cutting of the grooves in a more accurate manner. Another object of the invention is to cut the edges of the grooves in a less laborious manner. Other objects and advantages of the invention will appear from the following description when taken in conjunction with the accompanying drawing comprising Figures I to V.

Figure I is an elevation of a rock sawing machine according to the invention, showing the sawing mechanism in half section.

Figure II is a side elevation of the machine of Figure I.

Figure III shows a pair of saw cuts made in a rock face by the machine of Figures I and II.

Figure IV illustrates a method of wedging out rock from between two saw cuts made by the machine of Figures I and II.

Figure V illustrates the use of a moid for chipping out rock between the saw cuts of Figure III or IV.

The rock sawing machine of Figures I and II has a casing 2 housing a compressed air motor, an electric motor or other power motor. The casing 2 is provided with two handles 3 and 4 for holding it against the rock face. The motor in the casing 2 drives a shaft 5 onto the free end of which is screwed a nut 6 which clamps a rock sawing wheel and depth gauge assembly between itself and a collar 7. The sawing and gauge assembly comprises a distance piece 8, two cheeks 9, 10, one on each side of a rock sawing wheel 11, an exchangeable spacing collar 12 which determines the distance between the cuts of each pair of saw cuts, and two further cheeks 13, 14, one on each side of a second sawing wheel 15; the cheeks 9, 10, 13, 14, the collar 12 and the saw-

ing wheels 11, 15 being all keyed to the shaft by the key 16. A depth gauge in the form of a hard-rubber tyred wheel 17 is mounted on the spacing collar 12 between the sawing wheels 11, 15 by means of a ball race 18 which is protected by means of felt-lined washers 19 and 20 respectively. The sawing wheels 11, 15 have widened rims 21, 22 made of material capable of sawing hard rock, preferably material containing diamond grit.

The rims 21, 22 of the sawing wheels 11, 15 are partly enclosed by means of a semi-circular guard 23 which extends about half way round the length of the rims 21, 22 of the sawing wheels 11, 15 and is supported from the casing 2 by means of a bracket 24 clamped onto a collar 25 screwed onto a bush 26 projecting from the casing 2. The guard 23 is made hollow and is provided with water jets 27 and a water inlet 28 to enable streams of cooling water to be sprayed onto the rims 21, 22 of the wheels 11, 15 when they are in use; these streams of water also have a lubricating action on the rims 21, 22.

In order to use the machine for taking mine samples, the length of the spacing collar 12 is so chosen that the two sawing wheels 11, 15 are at a distance apart which is equal to the width chosen for the samples and the radius of the depth gauge wheel 17 is so chosen that it is less than the radius of each of the sawing wheels 11, 15 by an amount which is equal to the depth chosen for the samples. In practice the width chosen for the samples may be about $\frac{1}{2}$ to $1\frac{1}{2}$ inches and the depth about $\frac{1}{2}$ to 1 inch. The motor is then switched on and the rims 21, 22 of the rotating sawing wheels 11, 15 are pressed against the face of the rock at the place where a sample is to be taken, and the machine is traversed across the exposed face of the formation so as to make two parallel saw cuts, as indicated by the cuts 29 and 30 in Figure III, which are shown cut across a vein of ore 31. The wheels 11, 15 are allowed to cut into the rock to a depth determined by the rim of the guide wheel 17 coming into contact with the rock face.

The sample isolated by the saw cuts 29, 30 may then be removed e. g. by chipping with a moid or hand chisel 34 (Figure V), the rock chippings 35 being collected in a pan 36.

It is preferable, however, to employ a wedge chisel and wedge it into one of the saw cuts as this causes the rock to flake off in large cakes. The use of a wedge chisel in this manner is illustrated by the wedge chisel 37 (Figure IV) inserted into the saw cut 30. When employing a

wedge chisel it is advantageous to make other cuts 38 transverse to the edge cuts 29, 30, so that the wedge chisel will wedge off the cakes of rock more easily; these pairs of transverse cuts may e. g. be 6 inches apart when employing a wedge chisel having a width of 3 inches. After the main body of the rock has been removed from the groove, the bottom of the groove may be smoothed off by the use of a moil as illustrated in Figure V.

In addition to the increased speed and ease of operation, the invention has the advantage that it permits of greater accuracy in getting a true sample of the ore because the long edges of the sample are readily cut in straight lines across the face of the rock, and because the distance between the two saw cuts is accurately fixed for each sample. In addition, the depth of the whole body of the sample is determined by the depth of the saw cuts which is maintained approximately the same for each sample by means of the depth gauge 17. Moreover, the total bulk of rock taken from each sampling position may be made much less than in the case of hand cutting to give an equally representative sample and all the rock from each sampling position may constitute a single sample instead of constituting several samples as in the current practice of hand operation.

It is possible to use a sawing machine which has only one sawing wheel but is otherwise similar in construction to that already described; in this case care has to be taken in guiding the machine to keep the second cut of each pair parallel to the first.

I claim:

1. A machine for making saw cuts through the exposed face of a body of rock, comprising a power driven shaft, two diamond impregnated sawing wheels rigidly mounted on said shaft, and a depth gauge rotatably mounted on said shaft between said sawing wheels.

2. A machine for making saw cuts through the exposed face of a body of rock, comprising a power driven shaft, two rock sawing wheels rigidly mounted on the shaft, and a depth gauge rotatably mounted on said shaft between said sawing wheels.

3. A machine for making saw cuts through the exposed face of a body of rock, comprising a casing providing two handles, a power driven shaft, two rock sawing wheels rigidly mounted on said shaft, and a depth gauge rotatably mounted on said shaft between said sawing wheels.

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