

the length of the line of least resistance.

In the accompanying illustration (Fig. 1) B N is the bore-hole; W L, measured from the centre of the charge in the shortest possible line to the free face, is the line of least resistance, or "burden;" M N is the charge in the bore-hole, which should be about 12 times as long as the diameter of the hole at its bottom; R S K is the outline of the new face which will be produced after the blast. The best results are obtained when the line of least resistance is perpendicular to the line of the bore-hole.

The line of least resistance must be shorter than the bore-hole, else the force of the explosion will expend itself in the direction of the bore-hole. If black powder is used in such a case the charge will blow out the tamping, producing a "pop-shot." If high explosives are used in this case the "crater," or funnel of rupture, will have very steep sides and a relatively small volume of rock will be ruptured.

The forces to be overcome vary with the kind of rock, the number and position of the free faces, and the direction of the blast. The direction of the blast is determined by the direction of the line of least resistance. If this is upwards the explosion must overcome the cohesion of the rock plus the weight of the volume of rock ruptured. If downwards, the explosion has to overcome only the cohesive strength of the rock. A somewhat smaller charge may consequently be used. For each individual shot this difference is trifling, but the aggregate is an important quantity in practical operations. The rupture of rock

in blastings is mainly accomplished by "shearing." The shearing strength of close grained granites varies from about 2,200 lb. to 2,900 lb. per square inch, and of marbles from 1,100 lb. to 1,600 lb. per square inch. As the total surface sheared by an ordinary blast is often as much as 73 square feet, or more, it will be seen how great is the difference in the resistance to be overcome in different cases, and that no mere "rule of thumb" method may be economically adopted for determining the charges. It is wasteful, and at best inaccurate, to continue experimenting unsystematically with different sizes of charges in any given rock to ascertain approximately the right one. It is better to go about it methodically. For this purpose it is necessary first to ascertain what is known as the "rock coefficient."

(To be continued next week.)

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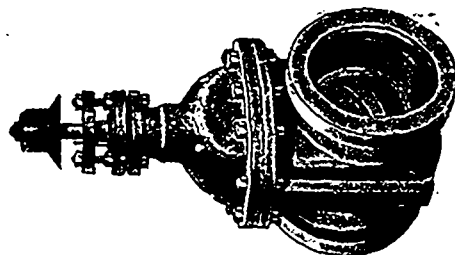


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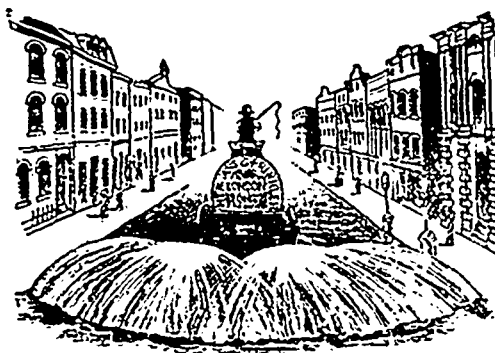
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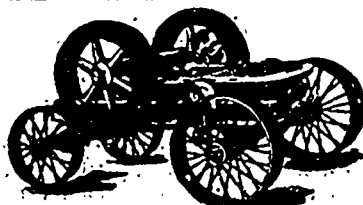
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