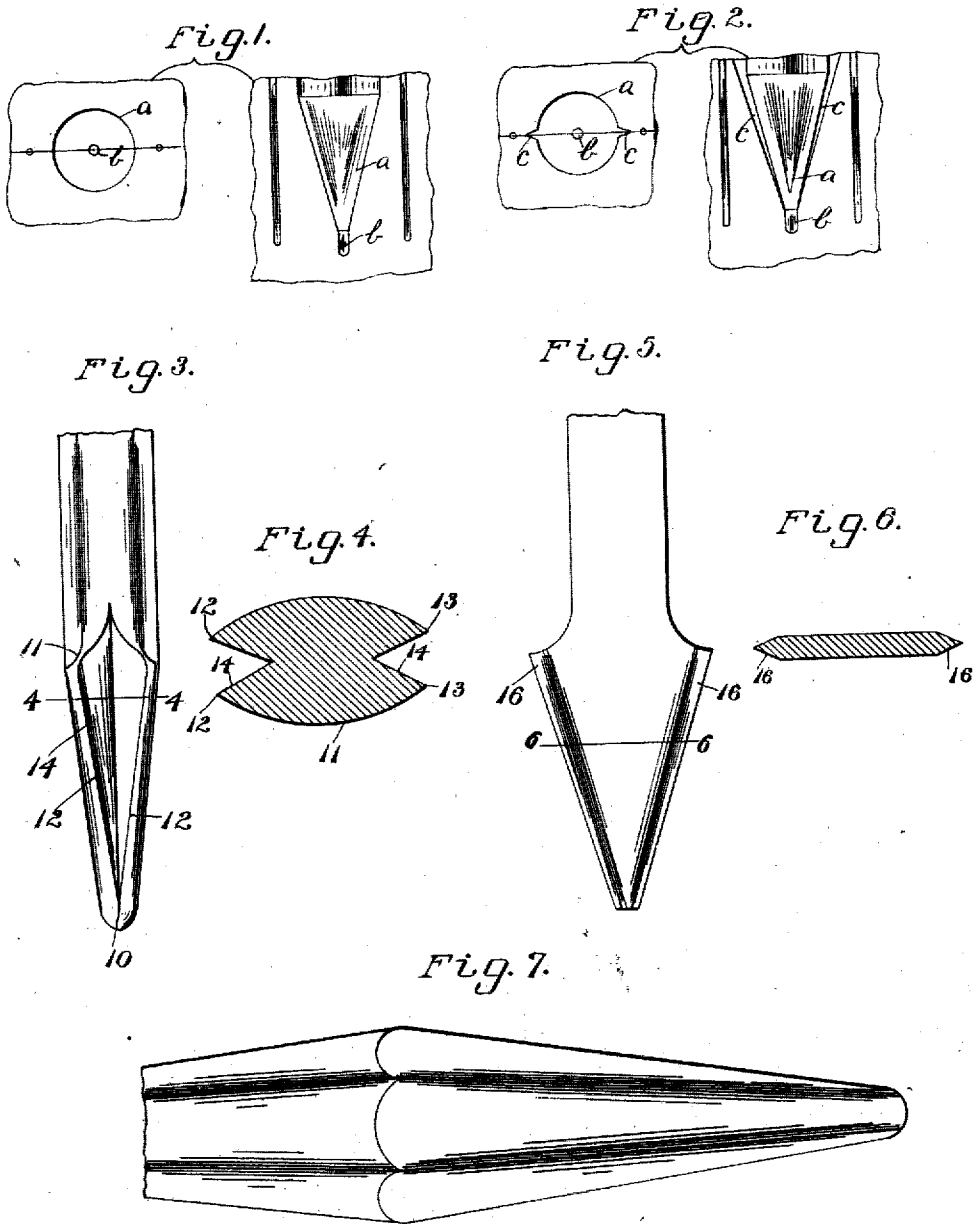


No. 853,546.

PATENTED MAY 14, 1907.

G. S. GITHENS.
METHOD OF FRACTURING ROCK.
APPLICATION FILED JUNE 14, 1906.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE S. GITHENS, OF BOSTON, MASSACHUSETTS.

METHOD OF FRACTURING ROCK.

No. 853,546.

Specification of Letters Patent.

Patented May 14, 1907.

Application filed June 14, 1906. Serial No. 321,745.

To all whom it may concern:

Be it known that I, GEORGE S. GITHENS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Method of Fracturing Rock; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improved method of fracturing rock, which is particularly adapted to the fracturing of comparatively thin rock, or rock of sheet formation.

One object of the invention is to prevent waste and damage to the under surface of the rock by bottoming of the drill or of the wedge.

Another object of the invention is to prevent the break, in fracturing, to roll or run, off the proposed line of fracture.

Other objects of the invention will appear from the following description.

The invention consists in the several steps in the method of fracturing rock and in the complete method, therefor as shall hereinafter be more fully described and pointed out in the claims.

The drawings represent diagrammatic views illustrating the steps of the new method in preparing the rock for the action of the fracture wedge.

Figure 1, represents a plan view and a vertical section on proposed line of fracture of a piece of rock illustrating one of the steps in the new method. Fig. 2, represents similar views of the complete wedge hole. Fig. 3, represents an elevation of the drill bit by which the frusto conical portion of the hole is formed as in Fig. 1. Fig. 4, represents a cross sectional view taken on line 4—4 Fig. 3. Fig. 5, represents an elevation of the drill bit by means of which the sides of the frusto conical portion of the hole are enlarged, approximately on the proposed line of fracture. Fig. 6, represents a cross sectional view taken on line 6—6 Fig. 5. Fig. 7, represents an elevation of one of the preferred forms of wedges designed to be inserted in the drill hole as represented in Fig. 2.

Similar numbers of reference designate corresponding parts throughout.

In carrying my invention into practice my object has been first to so form the drill hole that undue bottoming of the drill is prevented, in order to obviate the knocking out

of portions of the bottom of the rock by the concussion of the unsupported end of the drill, and second to so enlarge the frusto conical hole thus formed, approximately on the line of cleavage that, under the action of the splitting wedge, the break will not roll, or run, off the proposed line of fracture. In this method, the drill illustrated in Figs. 3 and 4 is tapering in shape from the comparatively short curved cutting edge 10 to the upper end 11 and has the inclined side cutting edges 12—12 and 13—13 separated respectively by the channels 14.

The hole may be started with a small bit of any usual construction; the bit, Figs. 3 and 4 is then introduced and operated upon in the ordinary manner, being rotated as usual. This bit acts on the sides of the hole by means of its cutting edges 12—12 and 13—13 which being at angles with the axis of the bit act in parallel lines on the tapering walls of the hole, the action of each of the edges 12 being opposed to the action of the diagonally disposed edge 13, so that the bit runs true to the center of the hole; the edge 10 at the same time cuts away the bottom of the hole without undue impact therewith, the force of the driving blow being taken up largely by the tapering shape of the drill. After the formation of the frusto conical portion of the hole a small bit of ordinary construction is preferably used to form the pocket *b* whereby room for the action of the wedging tool is provided to prevent bottoming of said tool as it is driven to place.

After the formation of the frusto conical hole *a*, preferably having the pocket *b*, the drill Fig. 3 is removed and the cutter Fig. 5 is introduced into the hole, the cutting edges 16—16 of this cutter extending in line with the line of proposed fracture, this cutter is operated in the usual manner by concussion, but is rotated only sufficiently to effect slight clearance as it is not necessary that the bases of the channels *c—c* at their points of juncture with the curved wall of the tapering hole *a* should be very wide. By the use of this cutter, Fig. 5 the thin edges of the channels, as enlargements, *c—c* may be accurately gaged in the line of the proposed fracture and a strain is exerted on the stone, in said line, by the use of said tool.

The wedging tool shown in Fig. 7, of ordinary construction should, preferably, have a conical shape considerably larger in diameter than the hole *a* so that when inserted in such

hole the end of said tool will not reach to the pocket *b*. This tool 7 is inserted in the hole *a* and driven into place to force apart the sides of said hole, at right angles with the channels *c—c*, whereupon the rock will cleave quite accurately on the line indicated by the thin edges of the channels *c—c*.

Having thus described my invention, I claim as new and desire to secure by Letters Patent.

1. The method of fracturing rock which consists in forming in the rock a frusto conical hole, enlarging said hole at opposite sides, and exerting pressure on the walls of said hole in directions at right angles with said enlargements.

2. The method of fracturing rock which consists in forming in the rock a frusto con-

ical hole, forming **V** shaped tapering grooves extending from said hole approximately in the line of proposed cleavage, and exerting pressure on the walls of said hole at right angles to said proposed line of cleavage, as and for the purpose described.

3. The method of fracturing rock which consists in forming in the rock a frusto conical hole, forming a clearance pocket at the bottom of the hole, enlarging said hole at opposite sides, and exerting pressure on the walls of said hole between said enlargements.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE S. GITHENS.

Witnesses:

HENRY J. MILLER,
PHYLLIS TONER.