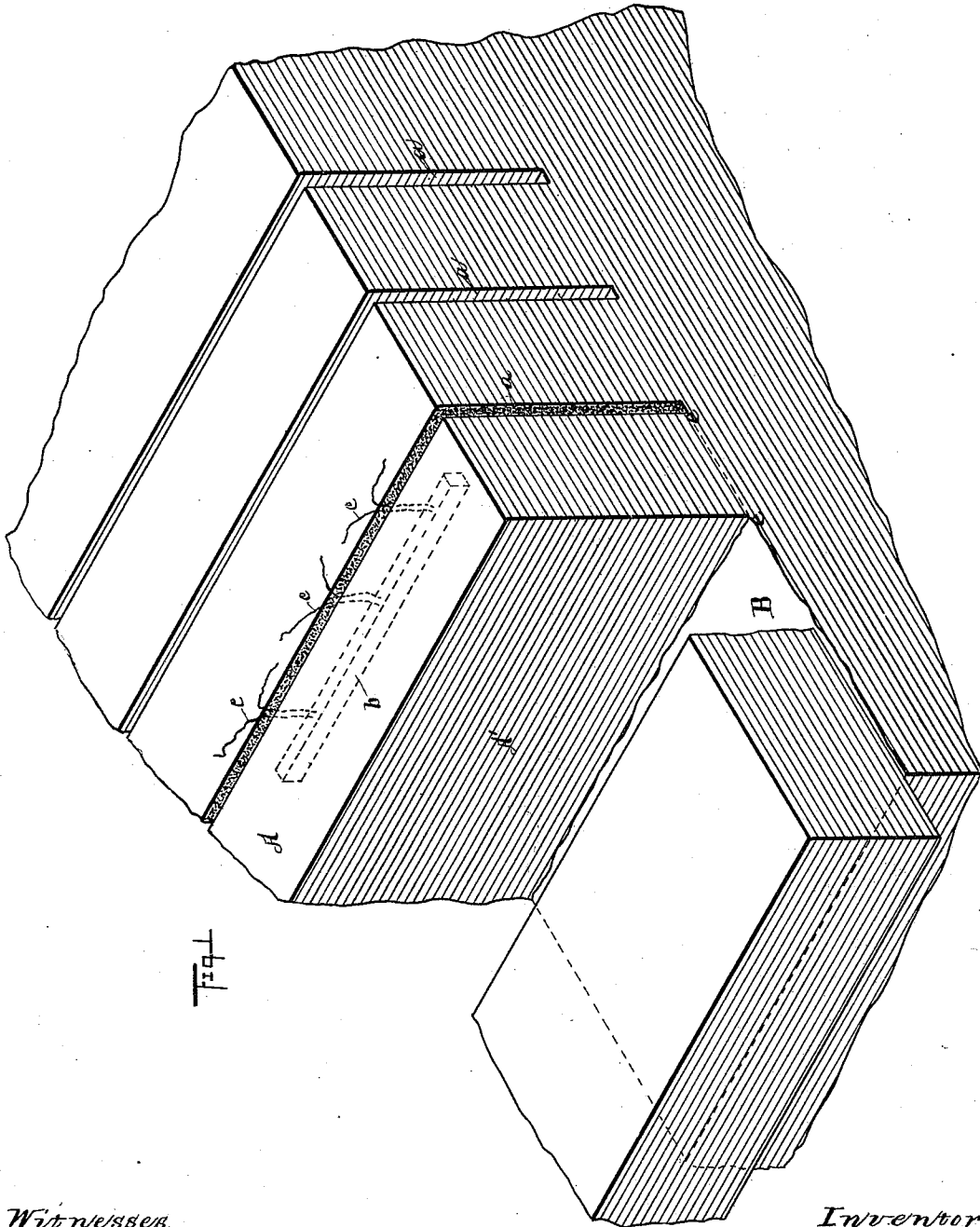


(No Model.)

L. D. CONNER.
PROCESS OF BLASTING ROCK.

No. 423,908.

Patented Mar. 25, 1890.



Witnesses.
B. J. Conner.
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UNITED STATES PATENT OFFICE.

LEWIS D. CONNER, OF OBERLIN, OHIO.

PROCESS OF BLASTING ROCK.

SPECIFICATION forming part of Letters Patent No. 423,908, dated March 25, 1890.

Application filed July 3, 1889. Serial No. 316,473. (No model.)

To all whom it may concern:

Be it known that I, LEWIS D. CONNER, of Oberlin, in the county of Lorain and State of Ohio, have invented certain new and useful
5 Improvements in the Process of Quarrying Rock; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and
10 use the same.

My invention relates to an improved method of quarrying stone; and it consists in the steps hereinafter described, and pointed out in the claim.

15 Stone-quarries are usually worked in benches, and the modern practice has been, by means of channeling-machines, to cut deep channels in the floor of an upper bench, such channels being intended to be approxi-
20 mately parallel with the face of the bench, and extending downward to a horizontal plane flush with the floor of the next bench below, thus leaving an upright wall or block of solid rock usually some feet in thickness,
25 and sometimes from ten to sixteen feet in depth, and extending the length of the quarry usually several rods. The difficulty has been to break such wall or block of rock at the bottom, so as not to waste the stone, and to leave
30 approximately a level bed where the rock is fractured. A common practice heretofore has been to drill, by means of a machine, a series of holes near the bottom and along the front face of such channeled rock for inserting im-
35 plements known as "plug and feather" to break the rock laterally at the bottom. Such holes, however, were necessarily drilled on an incline, and hence in breaking the rock by such means the fracture was not on a hori-
40 zontal plane, and consequently much rock was wasted and much labor was expended to subsequently level off the bed or floor; also, the holes had to be drilled from four to six inches from the bottom of the rock, and this
45 increased the difficulty. To overcome these difficulties, and to insure approximately a horizontal fracture at the bottom of the channel, I proceed as follows, reference being had to the accompanying drawing to illustrate
50 more clearly my improved method.

The figure is a view in perspective.

A represents the upper bench from which

the channeling is done, and B the floor of the next lower bench. A series of channels
55 *a* are cut approximately parallel with the face *A'* of the upper bench, the channels being cut to such depth as will intersect a horizontal plane coincident with the floor of bench B. I then fill the front channel to near the top
60 with sand, earth, or any suitable material at hand, and on top of such filling I place a quantity of powder either in a continuous train, as shown at dotted lines *b*, or, if preferred, the powder may be distributed in
65 charges at suitable intervals. Electric cartridges, connected with wires *c*, are used for simultaneously firing the charges of powder or firing the train of powder at different points. Above the train of powder or the
70 charges of powder, as the case may be, I fill the channel with any suitable material, firmly tamped. Only a comparatively small quantity of powder is used, the object being only
75 to fracture the rock at the bottom, or at most to cant the rock, so that it may fall on the bench below, in which latter case skids or blocking should be laid upon bench B to receive the falling mass. The rock thus
80 quarried is supposed to be of the seamless variety—such, for instance, as some kinds of limestone.

The greatest leverage on which the force of the blast is exerted will of course be at the bottom of the channel, and from thence forward the shortest line of fracture will be
85 on horizontal line *e e*; and it is found that under such conditions the fracture will approximately follow such line, causing a square break of the rock and leaving approximately a level bed forming a continuation of the
90 floor of the bench B.

With my improved method much rock, time, and labor are saved over the aforesaid method of drilling and breaking the rock by means of plug and feather. If two or more
95 channels *a* have been cut, the blast will likely break the blocks of rock on either side of the blast.

What I claim is—

The process herein described of quarrying
100 rock so as to produce approximately a horizontal fracture and bed, and consisting, essentially, in channeling the rock from the floor of the bench downward and approxi-

mately parallel with the face of such bench;
second, filling such channel to near the top,
placing powder next above such filling, with
tamping above the powder, and simultane-
ously exploding the powder at different points
5 by means of electricity, substantially as set
forth.

In testimony whereof I sign this specifica-
tion, in the presence of two witnesses, this 1st
day of May, 1889.

LEWIS D. CONNER.

Witnesses:

CHAS. H. DORER,
S. G. NOTTINGHAM.