(No Model.) 2 Sheets—Sheet 1.

E. FOERSTER.

STONE CUTTING MACHINERY.

No. 419,193. Patented Jan. 14, 1890.

Fig. 2.

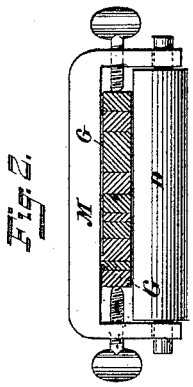

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

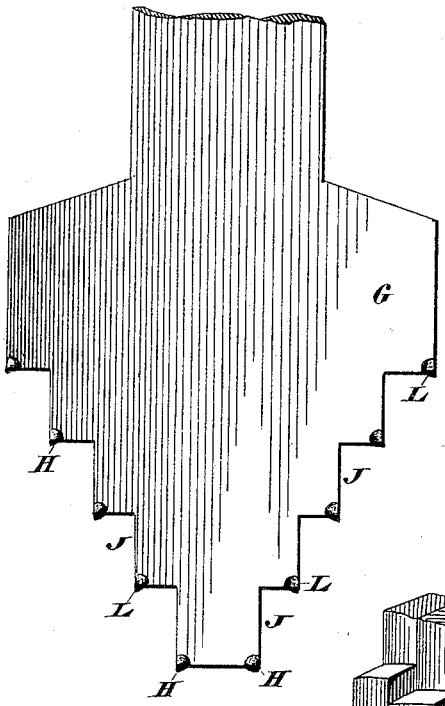


Fig. 4. Fig. 5. Fig. 6.

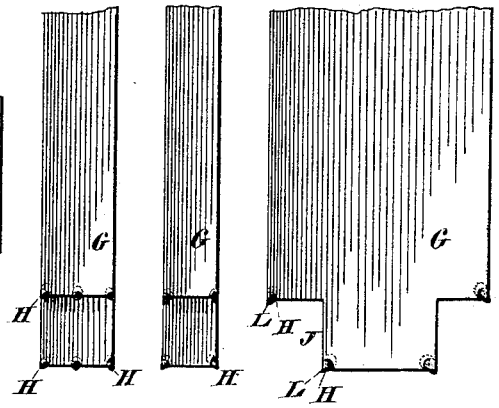
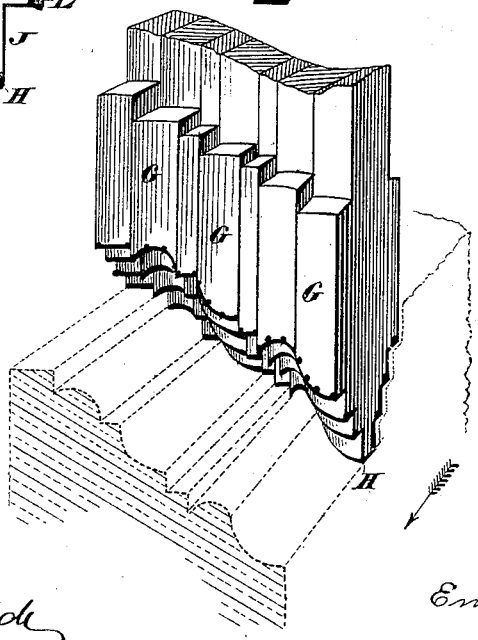


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EMANUEL FOERSTER, OF NEW YORK, N. Y.

STONE-CUTTING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 419,193, dated January 14, 1890.

Application filed January 5, 1889. Serial No. 295,501. (No model.)

To all whom it may concern:

Be it known that I, EMANUEL FOERSTER, a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Stone-Cutting Machinery, of which the following is a specification.

One object of my invention is to provide improved means for cutting stone, so that the stone will not be chipped off or injured during the cutting process.

Another object of my invention is to provide an improved tool for cutting stone that will be simple in construction and yet durable and efficient in use.

The invention consists in the details of improvement and the combinations of parts that will be more fully hereinafter set forth.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal sectional elevation of a stone-cutting machine containing my invention. Fig. 2 is a cross-sectional view of the reciprocating tools, showing the means for supporting them in face view. Fig. 3 is a side view of one of my cutters or tools. Figs. 4 and 5 are detail face views of cutting-tools. Fig. 6 is a side view of a tool; and Fig. 7 is a perspective view of tools in position for cutting a design in a stone.

In the accompanying drawings, the letter A represents the frame of a stone-cutting machine, at the upper part of which is suitably journaled a horizontal shaft B, that is provided with an eccentric *a*. The shaft B may be rotated in any suitable manner.

D is a sliding reciprocating tool-carrying plate that is guided in movable guides *b*, carried by the frame A. The reciprocating plate D is pivotally connected by straps *d* with the eccentric *a*, whereby when said eccentric rotates, the plate D will be reciprocated.

e is an arm connected with the strap *d*, which arm is also pivotally connected by a link *f* with a sliding rod *g*, whereby when the rod *g* is moved the reciprocating plate D will be swung or raised and lowered.

E is a frame or track upon which a stone-carriage F is adapted to move. The frame E is adapted to be raised and lowered, and is supported by screw-rods *h* at the sides of the machine, which are turned by suitable means so as to raise and lower the track or frame E and thereby the stone-carriage F.

i is a longitudinal shaft that extends parallel with the track or frame E, and is connected by gearing *j l m* with the stone-carriage, so that as said shaft is rotated the stone-carriage will be moved longitudinally. The shaft *i* is connected by gearing *n*, *o*, *p*, and *q* with the main shaft B of the machine, whereby the shaft *i* is driven.

The above construction and arrangement of parts are similar to that shown in Letters Patent of the United States, No. 392,601, granted to me November 13, 1888, and I therefore refer to such patent for a more particular and detailed description of the construction and operation of the before-mentioned stone-cutting machine; but it is evident that the reciprocating plate D may be actuated and the stone-carriage F raised and lowered and moved longitudinally by means other than that shown herein, if desired.

G represents my improved tool, which is constructed as follows: The tool G is made of hard metal and of any desired width or outline at its cutting end, as shown in Figs. 4 and 5. On the cutting end of the tool G, I place one or more diamonds H. (See Figs. 3, 4, 5, and 6.) These diamonds H are secured to the cutting-edge of the tool G by setting said diamonds into the tool and casting metal around them, so as to leave a part of the diamonds projecting beyond the end of the tool. There may be any desired number of diamonds set side by side along the width of the same tool G, (see Fig. 4,) and they will be arranged to follow the outline or curve of the tool at the cutting end, as indicated in Figs. 4 and 7. In order that any one diamond will not have to withstand too large a resistance, and in order, also, to produce the desired outline by a series of diamonds, one behind the other at each blow, I prefer to construct the tool with one or more steps J, thereby producing corners L, upon which the diamonds H are placed, as shown. When the tool is set to cut the stone, it is adjusted at an angle to

the stone, say eighty degrees, so that the inner diamonds, or the diamond farthest from the lower end of the tool, will first encounter the stone. The tool, will be reciprocated, so that said inner diamond will dress off part of the stone to a certain degree, until the diamond on the corner or edge L next lower than the one just mentioned will encounter the stone. Both diamonds will now cut the stone, each taking off its certain small amount of stone as it is reciprocated. The next diamond on the edge L lower or nearer the end of the tool than the previous diamonds will next begin to cut, and so on until the diamonds on each edge L of the tool, however many there may be, will all encounter the stone, so that each diamond is only required to do a small amount of work, while the aggregate of all the diamonds will do a large amount of work.

Each tool G is a plate or bar and has diamonds on its stepped end, as in Figs. 3, 4, and 5. For cutting a stone a proper series of such tools is secured side by side in a suitable clamp M, so that conjointly they will produce the desired effect, as in Fig. 7.

In order that the tool will not chip or break off the stone, as is done with stones that are fed toward the tool, I move the stone from under the tool; or, in other words, I move the stone in the direction in which the cutting-tool is moved to cut. For instance, supposing the cutting-tool G to be moved in the direction of the arrow in Fig. 1 to dress the stone, the stone will be moved in substantially the same direction, as indicated in said figure by the arrow a^4. When setting the stone to be cut, the stone is first placed under and behind the tool, and is then moved toward the tool in the direction of the arrow a^4, or of cutting movement of the tool, so that the edge of the stone will first be encountered by the tool. As the tool is now reciprocated, the first diamond to cut will begin its work on the edge of the stone, and as there is no part of the stone in front of said tool there will be no chipping of the stone. As the stone is now moved in the direction of the arrow a^4, the tool will cut or dress the stone that is fed to it from beneath or behind, thereby leaving a dressed edge on the stone in front of the tool, as shown. As the tool does not encounter a mass of stone in its front, but rather shaves the stone off from behind, the stone will not be chipped or broken, but an even cutting will be effected. The tools being all set in the clamp, the stone will be moved up to the tool, when the highest diamonds will all encounter the stone and gradually eat into the stone, while as the stone is moved the lower diamonds will step by step encounter and dress the stone. This is kept up until the lower diamonds encounter the stone, when all the diamonds will act to dress the stone. The lower diamonds are the ones that give the outline to the stone, the other diamonds above them merely cutting away the stone above, so that the lower diamonds will have little work to do. By thus giving each diamond a small amount of work and providing a number of diamonds a large amount of work can be accomplished.

In Fig. 7 is shown a number of tools G, having diamonds H placed together to cut a design in a stone. The stone is moved in the direction of the arrow, and the diamonds dress off the stone that is fed from behind, all the diamonds above the lowest ones dressing off the superfluous stone, while the lowest diamonds give the outline to the stone.

The double cutter or tool shown in Fig. 3 I prefer, because when the stone has been cut by moving it in one direction the tool can be swung under or around and the stone fed in the reverse direction to smooth or plane the stone. This can be done without moving the stone or tools from the machine, thereby effecting a saving of time, &c.

Having now described my invention, what I claim is—

1. In a stone-cutting machine, a stone-carriage and means, substantially as described, for moving said carriage in the direction of the cutting motion of the cutting-tool, combined with a cutting-tool having projecting diamonds for engaging a stone, and with means, substantially as described, for reciprocating the tool, substantially as described.

2. A tool for cutting stone, consisting of a plate or bar G, having steps J and corners L on different planes in the length of the tool, and diamonds set on the corners L, substantially as described.

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Witnesses:
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THEO. F. BOURNE.