R. Eastman,

Dressing Stone.

No. 7,438. Patented June 18, 1850.

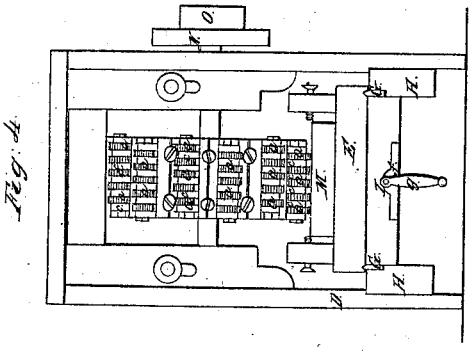

Fig. 4.

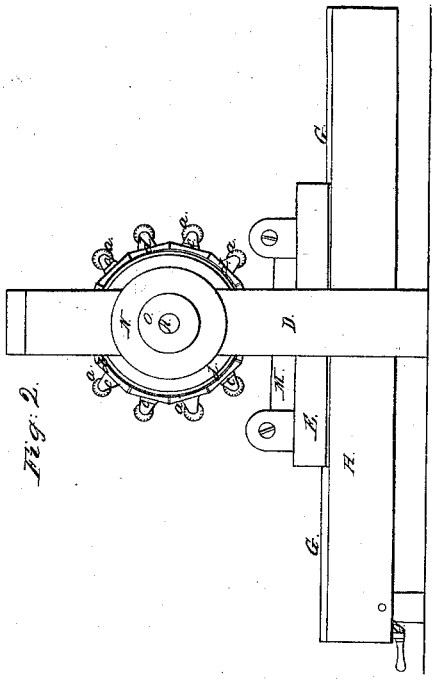

Fig. 2.

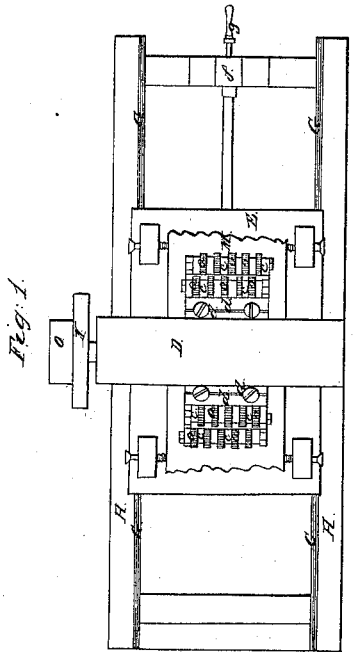

Fig. 1.

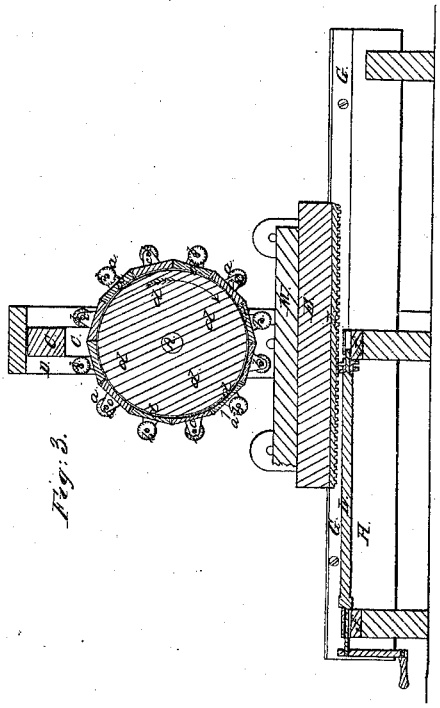

Fig. 3.

UNITED STATES PATENT OFFICE.

ROBERT EASTMAN, OF CONCORD, NEW HAMPSHIRE.

MACHINE FOR DRESSING STONE.

Specification of Letters Patent No. 7,438, dated June 18, 1850.

To all whom it may concern:

Be it known that I, ROBERT EASTMAN, of Concord, in the county of Merrimack and State of New Hampshire, have discovered a new and Improved Method of Dressing Stone by Means of Chilled Cast-Iron Burs or Rolling Toothed Cutters, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, which make part of this specification, and which represent a stone-dressing machine, to which these burs are applied, Figure 1 being a top view, Fig. 2 a side elevation, Fig. 3 a vertical longitudinal section through the middle of the machine, and Fig. 4 an elevation of one of its ends.

My discovery consists in having ascertained that stone may be dressed by means of chilled cast iron burs or rolling toothed cutters with advantage and economy, by a mode of operation theoretically very perfect, but heretofore practically useless, by reason of the very rapid abrasion of the best and hardest tempered steel tools that could be made, steel having heretofore, been considered the best and most refractory material for tools for dressing stone for architectural purposes, and other stones requiring to be dressed in an analogous manner.

The intense hardness and diamond like resistance to abrasive action of chilled cast iron renders it peculiarly adapted for making burs to dress stone; the teeth of such burs retain the sharpness of their outer angles for a long time when rolled under pressure against a stone to reduce and smooth its surface, while the best hardened steel burs under the same circumstances yield so rapidly to abrasion, that the angles of their teeth are quickly worn down and blunted; hence, it becomes necessary to remove the blunt burs and replace them by sharp ones so frequently that the time occupied in making those changes added to the expense of softening and recutting the teeth, and rehardening the burs, makes the cost of dressing the stone, greatly exceed the value of the stone when dressed.

The first cost of the chilled cast iron burs is very trifling, as they are wholly formed and finished by casting; the first cost of the steel burs, is very great, as the raw material of which they are made is of many times the value of cast iron, and the process of forging and finishing them by hand, is both costly and tedious.

The accompanying drawings represent one of the forms which I have given to the burs, and one of the machines by which I have applied them to the dressing of plane surfaces on stone. The burs themselves, may however, be made of any suitable form or proportions, and arranged in any suitable manner, they may also be applied by means of any suitable machinery, my invention being irrespective of peculiarities in the construction of either the burs or the machinery, provided the principle or general mode of operation be preserved. In this instance, the burs (*a*) are small disks of cast iron with teeth or ribs on their periphery, they are cast in a chill mold with either a hollow axis to receive a shaft, or in one piece with the shaft, as may be most convenient.

The machine represented in the drawings to exemplify the application of these burs to the dressing of stones, consists of a strong horizontal frame (H) surmounted by an upright frame (D); to the upper surface of the side pieces of the horizontal frame (H) guide rails or ways (G) are secured on which a carriage (E) slides, that carries the stone to be dressed; this carriage is moved to and fro by means of a screw so as to bring every part of the upper surface of the stone in succession under the action of the burs or cutters. A large revolving cylinder (*d*) is supported by the upright frame (D) on a shaft (A) which rests in pillow blocks that slide up and down in grooves or slots in the side pieces; these pillow blocks, may, if necessary, be held down by a weight or spring to increase the downward pressure of the cylinder; the latter is put in motion by means of pulleys or drums (N or O) which are turned by a belt encircling them, and driven by any available power. The periphery of the cylinder is provided with several series of studs or standards (*c*) arranged in rows parallel to its shaft (A). These standards are provided with suitable bearings in which the axles (*b*) of the burs (*a*) are secured.

The burs when secured in position, are arranged as seen in Figs. 1 and 4 so that those of one row shall be opposite the spaces between those of the adjacent rows, so that each row of burs shall act upon that portion of the surface of the stone passed over by the spaces between the burs which preceded it.

The operation of dressing stone is as follows: the rough stone is secured upon the

carriage by suitable clamps, and stops are adjusted below the pillow blocks to prevent the descent of the cylinder (*d*) below the plane to which it is desired the surface of the stone shall be reduced; the cylinder (*d*) is now put in motion in the direction of the arrow by the power imparted to the driving pulley, and the carriage is moved forward toward the cylinder, by means of the screw, as soon as the stone meets the circle in which the burs rotate they press on its surface, and being turned on their axles by the friction of the stone against their periphery, and carried forward by the rotation of the cylinder (*d*), they are rolled over the stone their teeth penetrating and crushing its surface, which is rapidly removed in the shape of fine chips and dust. As the stone is steadily advanced under the cylinder, the pressure of the burs upon its surface is increased, until it equals the whole weight of the cylinder and the tension of the springs which hold it down, and if the stone is not sufficiently reduced by passing once under the cylinder, the operation must be repeated until the required result is produced.

The abrasive action of the stone upon the burs (*a*) under the operation of both motion and pressure is, immense, and nothing hitherto tried has been found sufficient to resist it, except the chilled cast iron bur, but as it is plain, that the rapidity with which the stone is reduced, is exactly proportioned to the amount of abrasive action, it follows, that the more abrasion the better, provided the bur is capable of withstanding it.

By making the burs cylindrical, as represented in the drawing, the surface of the stone when finished by them, will be a plane, but if their peripheries are convex the dressed surface of the stone will be alternately curved grooves and angular ridges, if concave the dressed surface will be alternate curved ridges and angular grooves, and if concave and convex edged burs were arranged in alternate rings, round the cylinder, a surface of alternate curved ridges and curved grooves, would be formed. By giving the edges of the burs a zig-zag shape, the grooves and ridges would be of a corresponding form—and by varying in this manner the form and arrangement of the burs, ornamental surfaces of varied patterns may be produced.

What I claim as my invention and desire to secure by Letters Patent, is—

Dressing stone by means of chilled cast iron burs, substantially as herein set forth.

ROBERT EASTMAN.

Witnesses:
MARIA L. EASTMAN,
THOMAS CHADBOURNE,
CLARISSA CHADBOURNE.