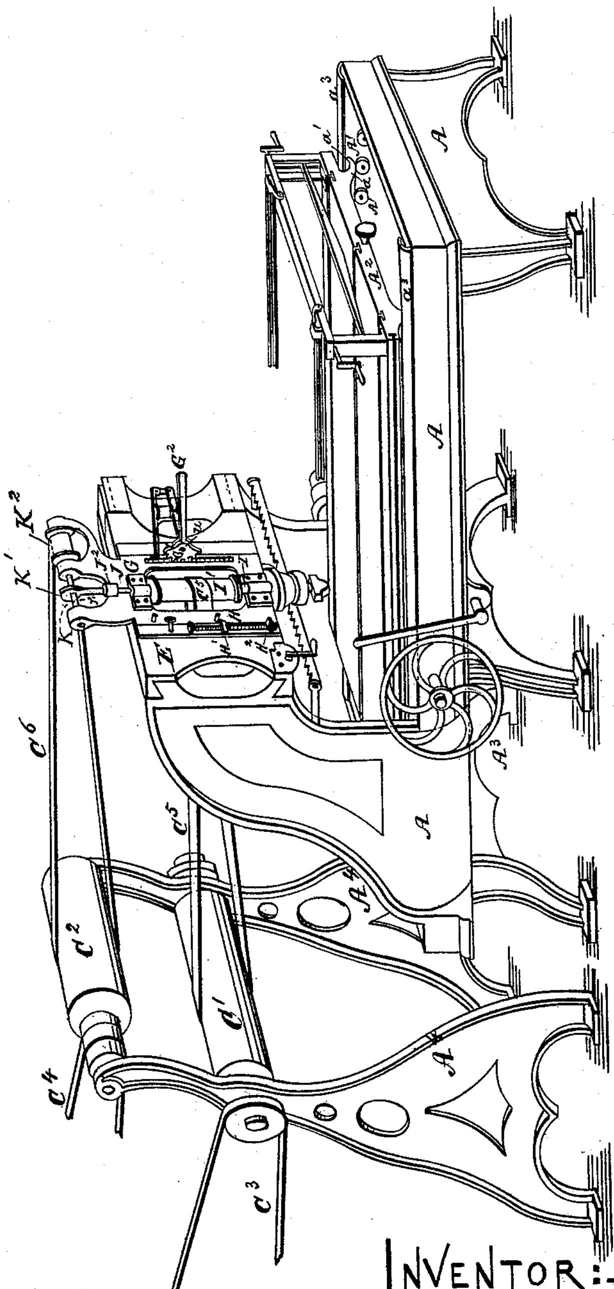
2 Sheets—Sheet 1.

N. JENKINS.

Machine for Dressing and Paneling Stone,

No. 218,180. **Patented Aug. 5, 1879.**

Fig. 1.



WITNESSES:

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2 Sheets—Sheet 2.

N. JENKINS.

Machine for Dressing and Paneling Stone, &c.

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FIG. 2.

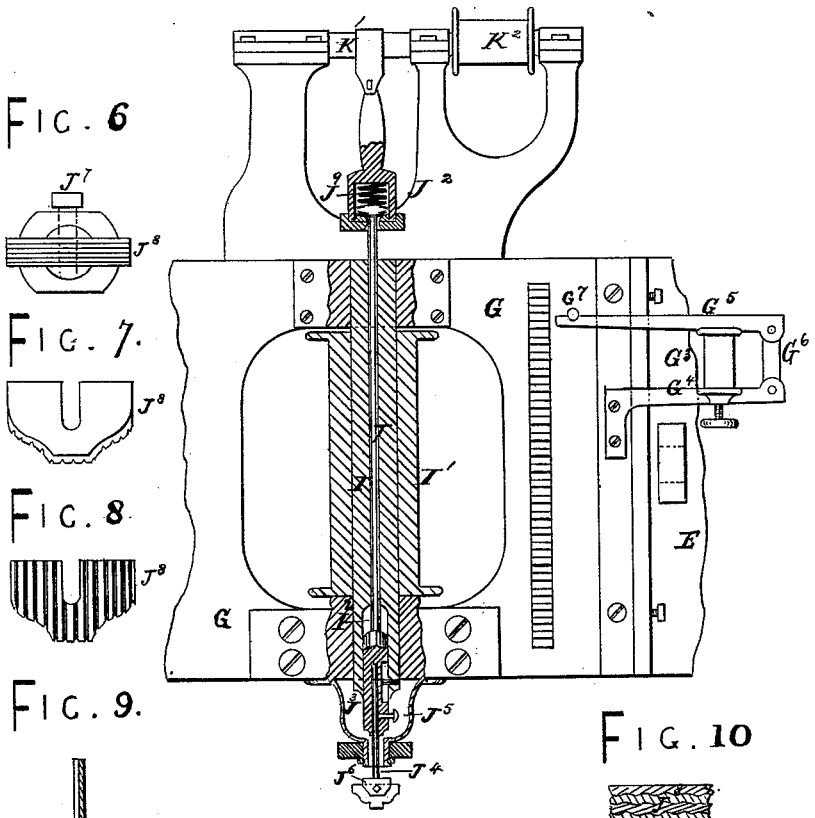


FIG. 4.

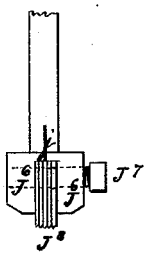


FIG. 5.

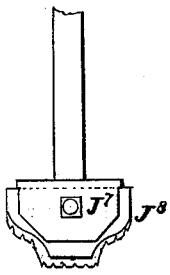


FIG. 6

FIG. 7.

FIG. 8.

FIG. 9.

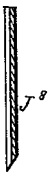
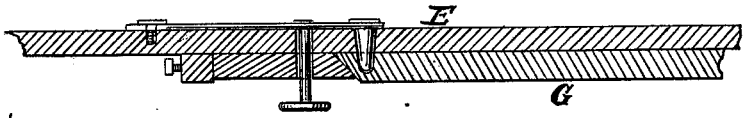


FIG. 10

FIG. 3.



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UNITED STATES PATENT OFFICE.

NICHOLAS JENKINS, OF NEW HAVEN, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STEPHEN K. STANTON AND BELA HUBBARD.

IMPROVEMENT IN MACHINES FOR DRESSING AND PANELING STONE, &c.

Specification forming part of Letters Patent No. **218,180**, dated August 5, 1879; application filed December 27, 1878.

To all whom it may concern:

Be it known that I, NICHOLAS JENKINS, of the city and county of New Haven, in the State of Connecticut, have invented certain new and useful Improvements relating to Machines for Dressing and Paneling Stone and analogous material; and I do hereby declare that the following is a full and exact description thereof.

My improved machine acts with a reciprocating motion derived from a crank or eccentric through an elastic connection. It strikes a number of points against the stone with a direct and nearly positive thrust and return. It is positive except for the elasticity introduced. I employ a rapid rotary motion in the shaft to impart the reciprocating movement. I employ a slower rotary motion in the cutting device itself in revolving on its own axis. The action is particularly efficient. In channeling, the excavations or channels are uniform and of an exactly predetermined section.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a perspective view of a complete machine. The additional figures represent details on a larger scale. Fig. 2 is a front view of the cutter and its immediately-connected parts with a section through the hollow shaft within which the reciprocating motion is performed, and by the rotating of which the rotating of the cutter is effected. Fig. 3 is a horizontal section through a portion of the machine, showing my provisions for engaging and releasing. Fig. 4 represents a side view; Fig. 5, a front view, and Fig. 6 an under-side view, of the cutter-holder and cutter on a larger scale. Figs. 7 and 8 represent opposite side views, and Fig. 9 a vertical section, the latter on a still larger scale, of one of the cutters separately. Fig. 10 is a plan view, partly in section, of a set of cutters constructed according to a slight modification of my invention.

Similar letters of reference indicate corresponding parts in all the figures.

A is a stout stationary frame, serving as a foundation or support for the principal parts. A^2 is a carriage sliding longitudinally on friction-rollers A^1, and A^3 a hand-wheel mounted on a transverse shaft, a pinion on which engages with and moves the carriage A^2 by engaging in a rack. (Not shown.) The carriage A^2 at each side is provided with a curved extension, *a*, projecting from the under side thereof, the outer edges, a^1, of which extend upward, and are adapted to be received within reversed curved extensions a^3 a^3 from the sides of the frame A.

The object of these curved parts a^1 a^3 overlapping within each other, as described, is to prevent any fluid or solid matter falling or dropping from the table A^2 onto the friction-rollers A^1 and impeding or disturbing the motion of the table A^2, or injuring either the rollers A^1 or the guide or supporting ways formed on the under side of the carriage A^2 and resting on the friction-rollers A^1. Separate stands A^4 support the bearings of long drums C^1 C^2, which receive motion through belts C^3 C^4, driven by a steam-engine or other convenient power at a high velocity. Small belts C^5 C^6, running on the drums C^1 C^2, travel at a high velocity, and are able to give rapid motion to any suitable cutting means.

E is a carriage mounted on the fixed framework A, capable of sliding crosswise on suitable guides formed thereon in the manner familiar in metal-planers and analogous mechanism. G is a carriage capable of traversing up and down in guides in the carriage E. It is moved up and down by a segment, G^1, turning on a center, *u*, fixed on the carriage E, and operated by a lever, G^2, and engaging with the carriage G by a rack. The connection of the handle or lever G^2 may be changed at will.

H is a depth gage or latch fixed on the carriage E, and provided with adjustable stops H^1 H^2, either of which may receive one of the projections or stops on the carriage E and hold up the latter thereby.

The construction of these will be more fully described hereinafter.

Supported in fixed bearings in the carriage G is a freely-revolving upright shaft, I, having a long pulley, I^1, which receives the belt C^5, and is revolved thereby. J is a jumping or striking rod moving up and down through

its center, and feathered or otherwise adapted to be turned thereby. The upper end of the rod J is connected, by a link, J^1, to an eccentric or crank, K^1, on a revolving shaft, K, which is supported in bearings on the carriage G, and is provided with a small pulley, K^2, receiving the belt C^6. This imparts a very rapid reciprocating motion of small extent to the central rod J, the link J^1 being connected to the rod J by a swiveling joint, J^2. (See Fig. 2.)

The rod J is as small as is consistent with the proper strength. Its lower end, however, is enlarged, as indicated by J^3. A corresponding chamber, I^2, of a little greater length, is formed in the revolving part I, in which a quantity of air is imprisoned. As the reciprocating part J moves rapidly up and down, the air in this chamber is ultimately expanded and compressed. Its elasticity aids in overcoming the inertia of the part J and inducing the reversing of the motion.

The enlargement J^3 is socketed to receive the cutter-shaft J^4, which is confined by a pinching-screw, J^5, and is adapted at its lower end to receive peculiar cutters. These cutters may be varied according to the nature of the material being treated.

I will describe the construction adapted for channeling stone. The lower end of the piece J^4 is formed with a pair of jaws, J^6, made elastic by sawing or otherwise splitting a little distance up, as indicated by *j*. (See Fig. 4.) The jaws are connected by a strong screw, J^7. In the jaws I insert a set of removable cutters, J^8, which are of hardened steel of small thickness, and both curved and toothed on their lower edges. The rapid reciprocation of their carrier causes these points to strike repeated blows on the stone (not represented) and to disintegrate, while the slow rotary motion imparted to the carrier by the action of the bell C^5 insures that the cutting-points are presented in new positions at each stroke. A hole sunk by the cutter on a fixed axis will be circular. By traversing the carriage E slowly across the machine while the cutter is in motion the cutting-points will excavate a symmetrical groove in the stone. By holding the carriage E stationary and traversing the carriage A^2, which supports the stone, (not represented,) a corresponding groove will be excavated at right angles to the first, and by skillfully combining these motions oblique grooves and variously-curved grooves may be produced at will.

The reciprocating motion induced by the belt C^6 should bear such a relation to the revolving motion induced by the belt C^5 that the change of position of the cutting-points will be just sufficient with each blow to take a fair chip—that is to say, the points should not strike into the same cut or mark as in the preceding blow, nor should they be turned so far from the last cut as to make an entirely independent cut; but they should be just so much to one side of the previously-formed cut as is found by practice in working that material to be the best adapted to chip out and remove material effectively with each blow.

It is obvious that the rate of turning at each reciprocation should be different for different materials, according to their relative hardness. The power for operating the different motions being independently applied, it is evident that the relative speeds may be readily regulated.

It is obviously possible that in consequence of meeting an extra hard place in the material, or from some other cause, the cutters may not be able to sink the channel to its full depth, and it is important to provide against fracturing the machine under such circumstances.

J^9 is a coiled spring or a piece of vulcanized rubber or spring of other convenient character introduced in the joint J^2, which allows the rod J to yield.

By operating the jumping-rod J by a crank-motion with the swiveling and elastic connection, as shown, I provide for all contingencies, and act on the rod by a positive motion both in striking and in returning.

I rotate the shaft K with as high velocity as the parts will stand, inducing, if possible, some scores of reciprocations of the rod J per second, and, consequently, a corresponding number of effective blows by the many-pointed cutters on the stone.

G^3 is an elastic support for the carriage G, adapted to take up the force of the vibrations of the shaft J and prevent any violent agitation of the carriage G. The elastic support G^3 is composed of a pair of arms, G^4G^5, hinged together at G^6, the arm G^4 being bolted to the gib or guide of the carriage G, while the outer end of the arm G^5 is adapted to receive a pin or stud, G^7, extending from the carriage G in such position that when the carriage G is down in position so that its cutter is at work it shall rest on the end of the arm G^5, as shown by Fig. 2.

When the cutter J^8 becomes dull the machine should be stopped, the carriage G raised, and the part J^4 removed by slackening the screw J^5, and another may then be substituted and again set by tightening the screw J^5, and the machine again started. The preceding set may then be taken from their holding-jaw J^4 by removing the screw J^7, and the cutters may be sharpened and returned ready for their next use.

I produce each of the cutters J^8 by machinery with fine parallel grooves extending vertically along one of its faces. In grinding the cutters thus formed it is only necessary to hold the end at a considerable angle on an ordinary grindstone and to give it the proper motion to induce the proper roundness or configuration. The toothing of the rounded or shaped end of the cutter will be induced by the presence of the grooves in the side.

I provide by small hose or other means (not represented) for flowing water liberally upon the cutters, both to keep them cool and to wash out the fine powder produced by the

rapid disintegration of the stony mass. In treating French stone and any other stone or material which does not work well with water, I act with currents of air to suck away or to blow away the dust.

Various modifications may be made in the details by any good mechanic. Instead of rounded cutting edges on the several cutters, I can make them variously scalloped, and, care being taken to properly harmonize the forms, a channel of an exactly predetermined section will be produced, with the wear nearly equally distributed over the different cutting edges or teeth. I can introduce vulcanized rubber in place of the spring J^9.

I have described the several cutters J^8 as each grooved only on one face. I believe it practicable to groove both faces, or, in effect, to corrugate the cutters, adopting such a form of groove that the ridges in one plate will match tightly into the grooves in the next. Such a form would obviously produce the desired series of points by grinding the edge obliquely in the same manner as has been above described. Fig. 10 is a cross-section through such a cutter-plate, with outlines of a like plate on each side thereof.

I claim as my invention—

1. In combination with mechanism for revolving the cutters, mechanism for inducing a reciprocating or picking motion thereto, with a positive thrust and return, and means for applying power independently to aforesaid mechanisms for operating the cutters, substantially as herein specified.

2. The combination, with the cutters and mechanism for simultaneously revolving on an axis and reciprocating the same, of a sliding carriage supporting said cutters and mechanism and means for moving the same laterally, substantially as described.

3. The combination, with the cutters and mechanism for simultaneously revolving and reciprocating the same, of a sliding carriage supporting said cutters, provided with means for moving the same laterally, and a carriage for supporting the material to be dressed, provided with means for moving the same under the aforesaid cutters, substantially as described.

4. The combination, with the eccentric or crank and link, of the jumper-rod J, provided at one end with means for securing the cutters thereto, and connected at the other with aforesaid link by a swiveled joint and interposed spring, J^9, the said joint and spring being in line with the axis of said jumper-rod, and means for revolving said jumper-rod, substantially as described.

5. The jaws J^6 on the reciprocating or jumping rod J, clamping-screw J^7, and combs or toothed plates J^8, provided with slots extending from their upper edge, and adapted to serve as herein specified.

6. The ridged plates J^8, adapted to maintain a toothed surface by grinding obliquely, as specified.

7. In combination with the jumping-rod J and means for inducing a rapid and positive reciprocation, as specified, the carriage G, supported by a spring, with liberty to rise and sink as required at each motion.

8. The combination, with shaft I, having a chamber, I^2, formed in its lower end, of the jumper-rod J, extending through said shaft I, and having at its lower end an enlargement, J^3, fitting within said chamber I^2, but free to move therein, substantially as set forth.

9. The cutter described, composed of two or more plates of thin metal, held firmly together, each provided with grooves in one or both faces, so that on separating the plates each may be ground obliquely and caused to present freshly-sharpened cutting-points, as herein specified.

In testimony whereof I have hereunto set my hand this 22d day of June, 1878, in the presence of two subscribing witnesses.

NICHOLAS JENKINS.

Witnesses:

W. COLBORNE BROOKES,

CHAS. C. STETSON.