3 Sheets—Sheet 1.

N. JENKINS.

Machine for Dressing and Paneling Stone.

No. 223,230. Patented Jan. 6, 1880.

FIG. 1.

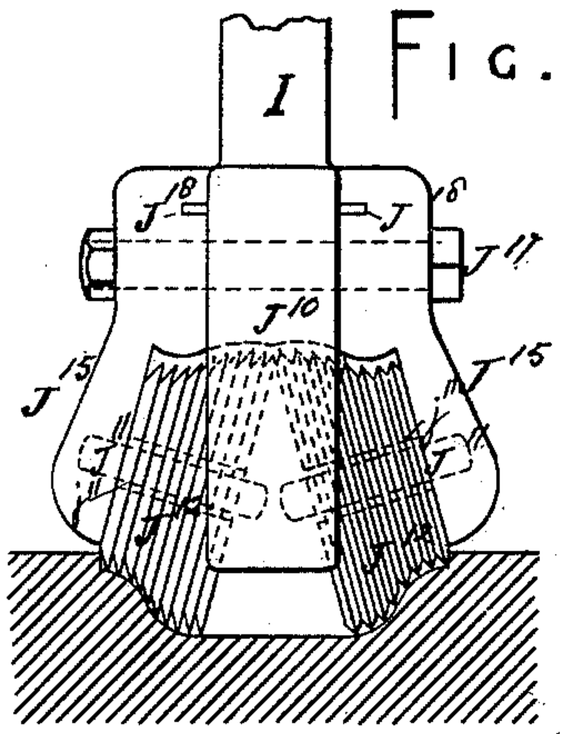


FIG. 2.

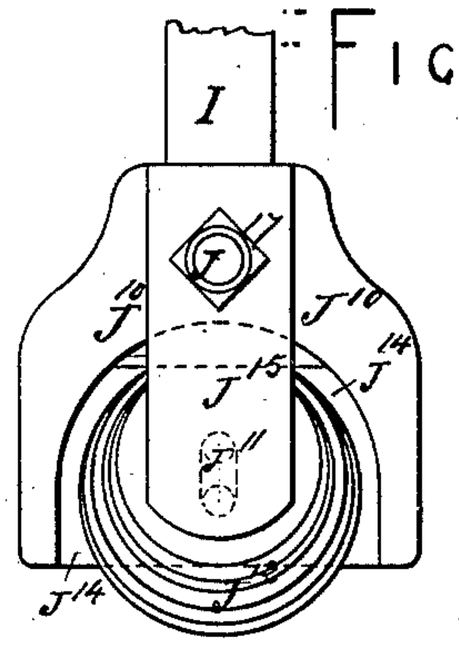


FIG. 3.

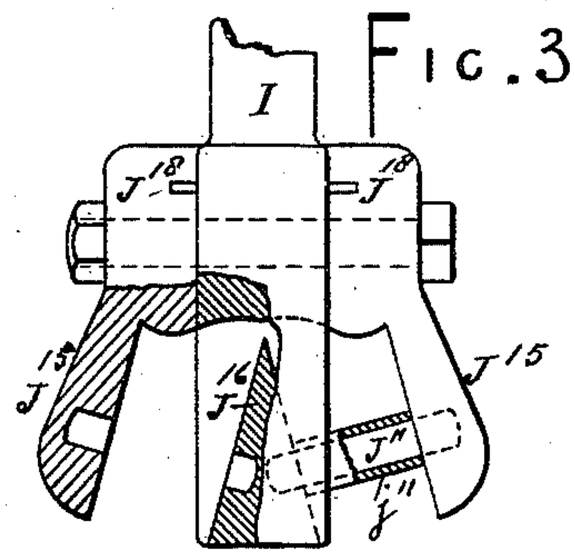


FIG. 4.

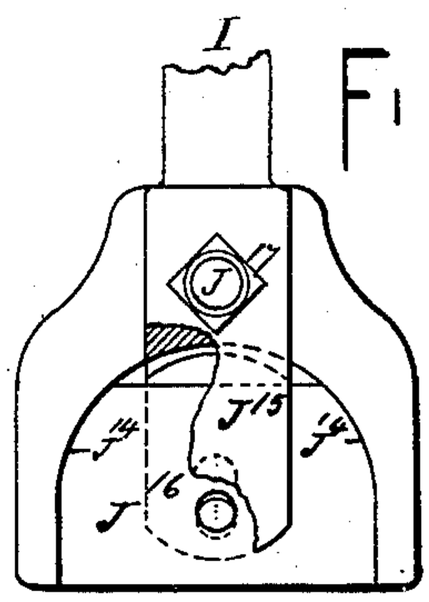
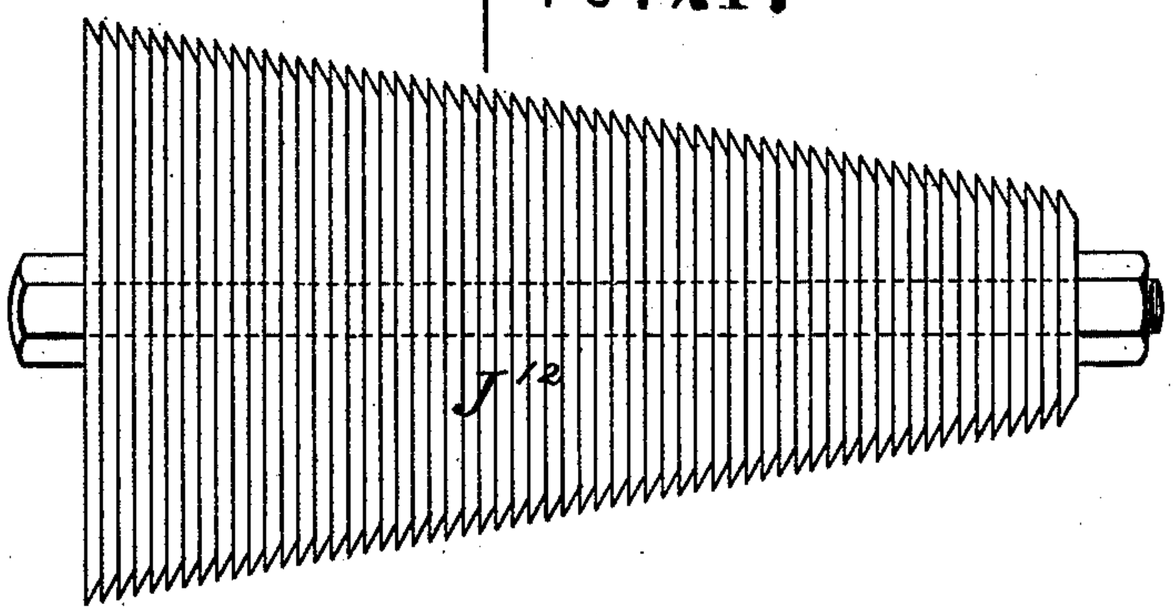


FIG. 21.



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3 Sheets—Sheet 2.

N. JENKINS.

Machine for Dressing and Paneling Stone.

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FIG. 5.

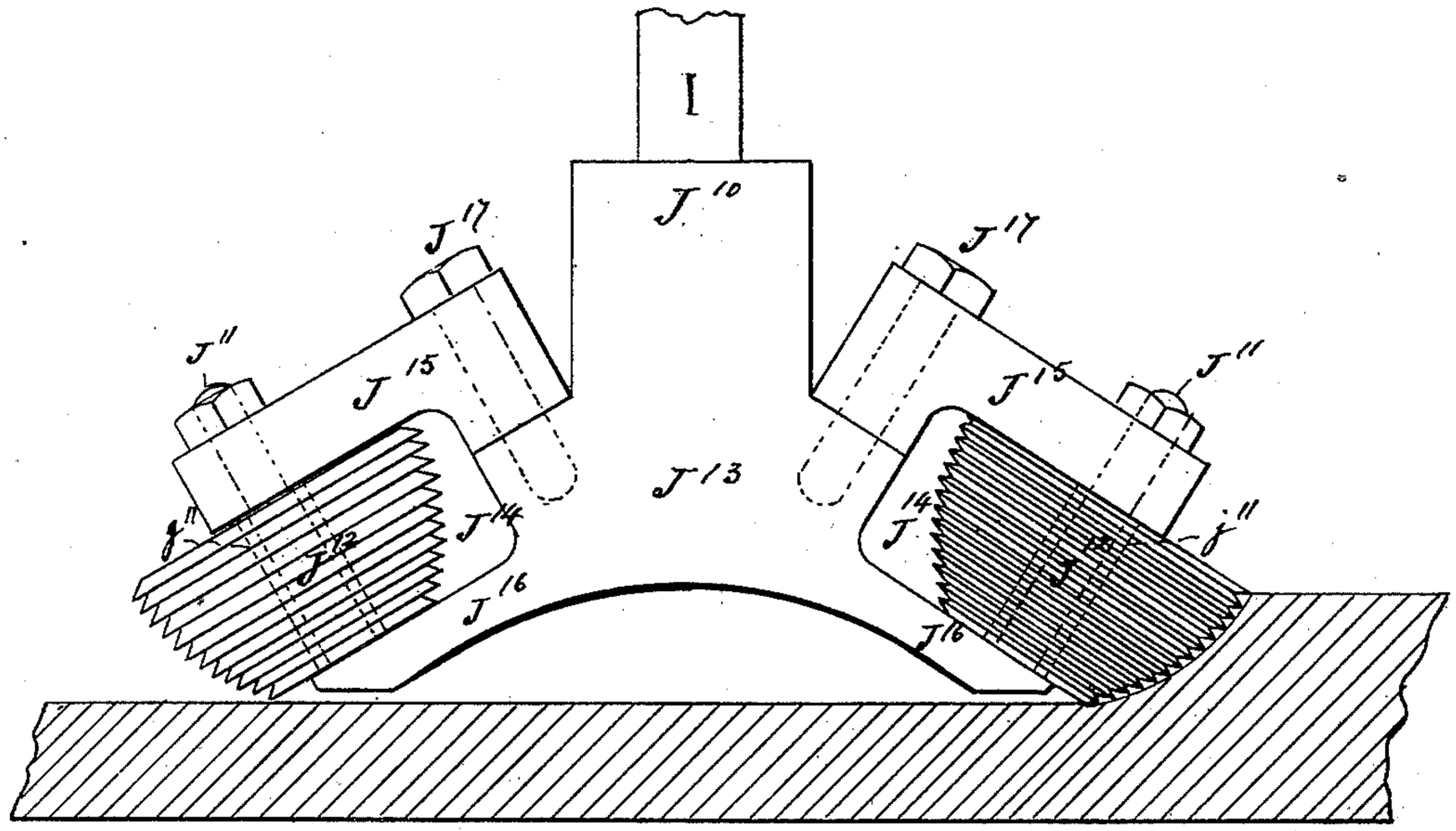
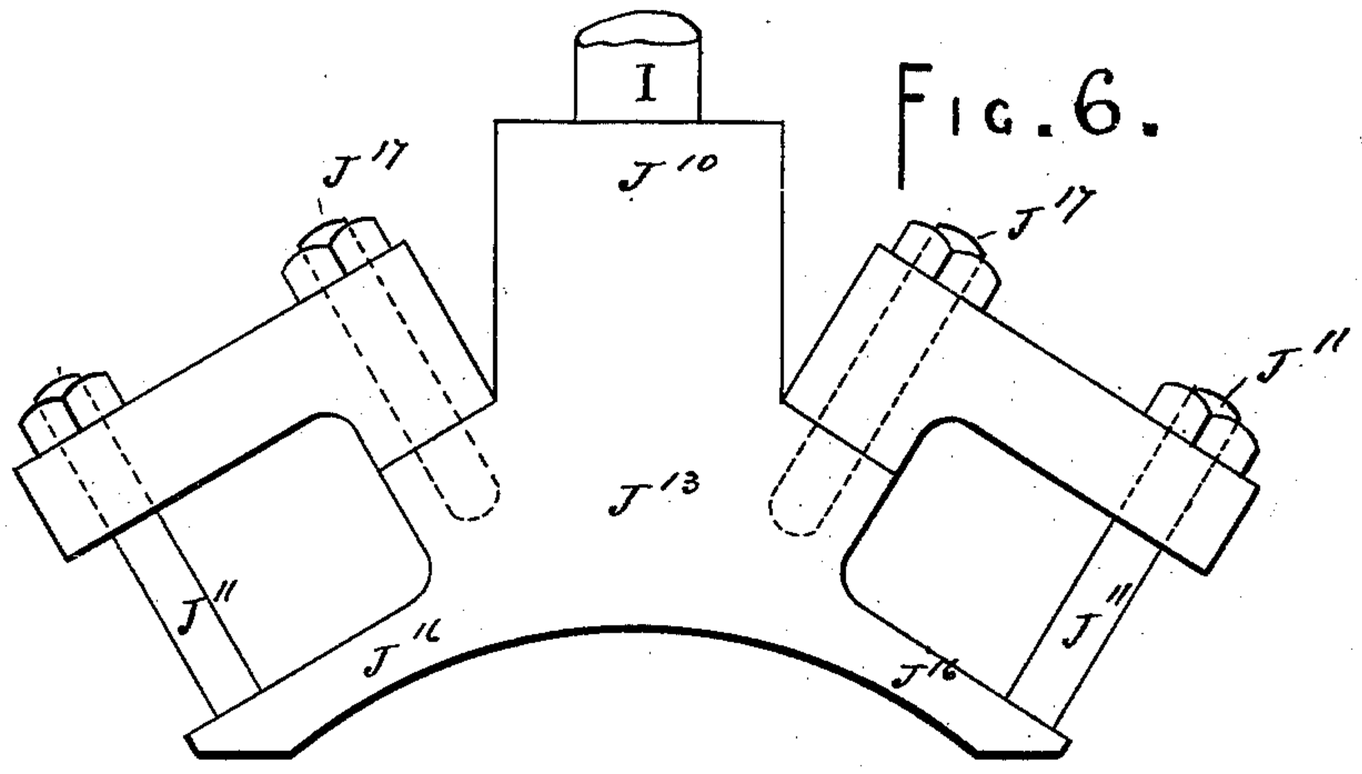


FIG. 6.



Witnesses

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3 Sheets—Sheet 3.

N. JENKINS.

Machine for Dressing and Paneling Stone.

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FIG. 7.

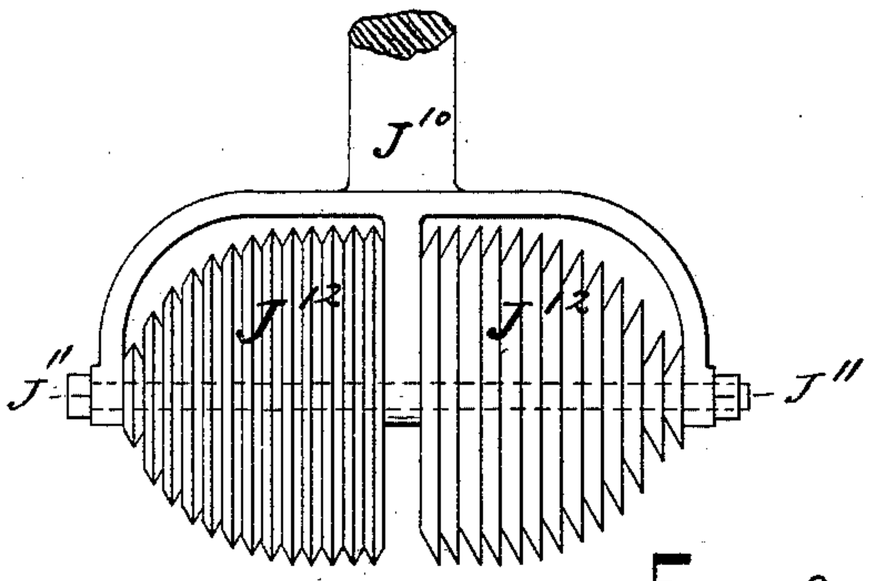


FIG. 8.

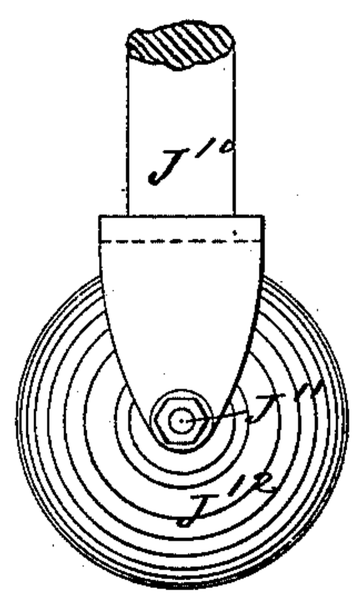


FIG. 9.

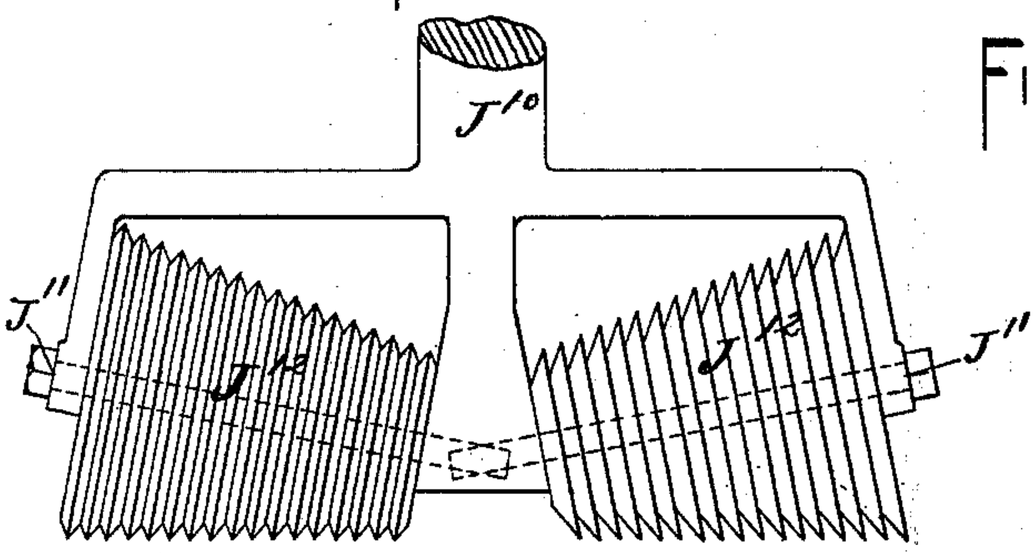


FIG. 18

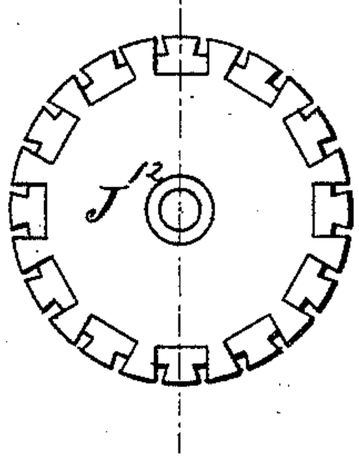


FIG. 19 FIG. 20

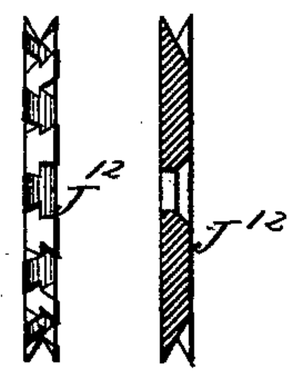


FIG. 10.

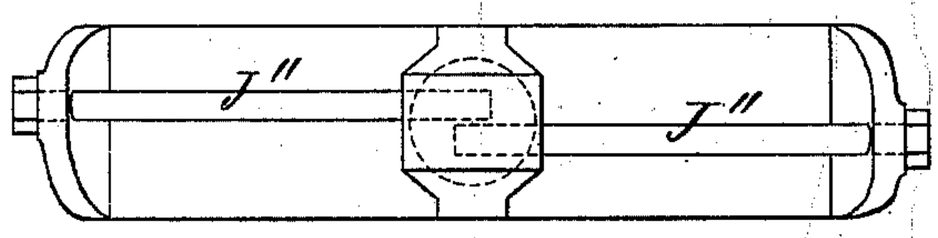
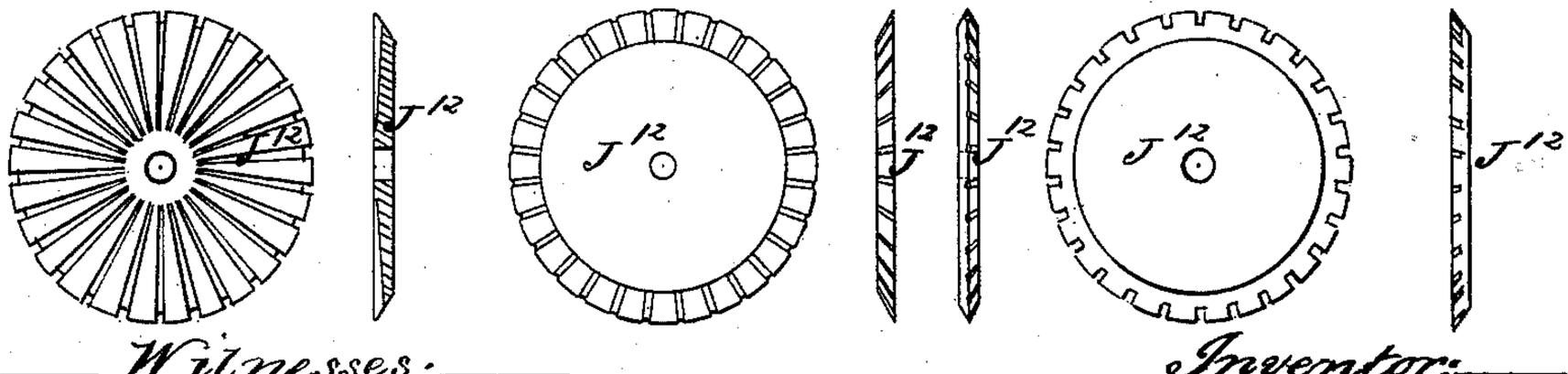


FIG. 11 FIG. 12. FIG. 15 FIG. 16 FIG. 17. FIG. 13 FIG. 14



Witnesses:

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Chas. C. Stetson

Inventor:

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by his attorney T. A. Stetson

UNITED STATES PATENT OFFICE.

NICHOLAS JENKINS, OF NEW HAVEN, CONNECTICUT.

MACHINE FOR DRESSING AND PANELING STONE.

SPECIFICATION forming part of Letters Patent No. 223,230, dated January 6, 1880.

Application filed September 24, 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 for Treating the Edges of Stone-Work, as the marble tops of tables, ornamental cornices, and the like; and I do hereby declare that the following is a full and exact description thereof.

This mechanism acts by presenting hard and sharpened surfaces with a rolling action. It is found that this mode of treating stone removes the hard material with rapidity, and that but a moderate pressure is required to induce the desired disintegrating action. I have devised important modifications in the construction of the parts and in the mode of operation thereof. My cutters may produce channeling. A modification may produce plane surfaces. Another may treat the edges of marble and other stone.

I employ cutters in the form of thin, loose, independent disks or plates, properly hardened and sharpened at the periphery. They turn on axes or pivots, which, in one arrangement, are held in a pronged or trident-shaped holder, which latter is pressed upon the stone and rapidly rotated by any suitable power. It may be also moved slowly in any desired direction, producing a corresponding channel in the stone. A templet being employed to guide it, channels may be produced and repeated with great perfection and rapidity, without the necessity for any but ordinary labor after the templets are determined and constructed.

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.

Figures 1 and 2 represent one of my cutting devices complete. The views are quartering to each other. Figs. 3 and 4 represent corresponding views, partly in section, of what I sometimes term the "trident." Figs. 5 and 6 represent a modification. Fig. 5 is a side view of the cutting device complete. Fig. 6 is a similar view of the holder with the cutters removed. Fig. 7 is a side view, and Fig. 8 a quartering view or end view, of another modification. Figs. 9 and 10 represent another form which may be adopted. Fig. 9 is a side elevation, and Fig. 10 is an under-side view, with the wheels or disks removed. The remaining figures represent the wheels or disks. The different views of a disk or wheel given in Figs. 11, 12, 13, and 14 show a form by which my invention is fully carried out. Figs. 15 and 16 show a form which may be adopted in any case, if preferred. Fig. 17 represents another form of the disk. Fig. 18 represents a front view, Fig. 19 an edge view, and Fig. 20, a vertical section, of a still further modification, in which the disk is provided with grooves or corrugations alternately on opposite sides thereof. Fig. 21 represents a series of wheels or disks arranged in the form of a cone on a spindle or shaft.

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

There have long been known machines having upright spindles with means for revolving such spindles rapidly. Such machines are also provided with means for imparting a traversing motion either to the material or to the cutter, or both. There is also a provision for raising and lowering the cutting-spindle and for moving it to the right or left. My cutters may be applied to any machines of this class.

The figures represent the devices which I employ at the base of the spindle, which is the working point. These devices being pressed upon the stone will remove the stony material by acting on it with the cutting-edges of their disks by traversing either the stone or the cutting-spindle or holder, or both, controlled either by the judgment of a skillful operator or by means of a templet previously provided, of the proper form to guide and control the motions.

The treatment of the stone may be in lines which may be straight, longitudinal, or transverse, or at various inclinations on the stone; or they may be curved, as desired, to produce an ornamental effect.

Referring to the figures, J^{10} represents the lower end of a rapidly-revolving upright or spindle; or it may, if preferred, be a piece distinct from the shaft, but applied therein and secured by a pinching-screw or other suitable means. This part J^{10} is a trident, or has triple jaws, as indicated.

The spaces between the jaws are traversed

by short spindles J^{11}, each serving as an axis for a series of separate and independently-revolving wheels, J^{12}. Each wheel J^{12} is formed of thin steel hardened. One face of each wheel J^{12} is grooved with radial, or nearly radial, grooves. The outer edge of each wheel is ground conical or beveled. This may be done on a grindstone of any ordinary form, and successive grindings thereon reduce the diameter of the wheels and keep the points sharp after they are dulled. This feature of the device will be referred to again.

The wheels may be varied in size, as shown, and when by successive grindings the large wheels have become reduced in diameter, they may be made to take the place of the smaller wheels, and larger new wheels may be introduced in their original places.

By combining wheels J^{12}, of the proper sizes, channels of various cross-sections may be excavated. The device must either be traversed relatively to the material to be operated upon or the material traversed relatively to the cutting device during the period while it is being sunk to the desired level.

There is no provision for cutting out the material in the space between the peripheries of the innermost wheels; but this, it will be understood, induces no mischief, provided the proper traversing motion is employed, so that the surface which lies between these points at any given moment has been previously reduced by the action of the wheels in being traversed over it.

In Figs. 1, 2, 3, 4, 5, and 6 the central portion, J^{13}, of the jaw or trident J^{10} is recessed at J^{14}, so as to form, with the clamps or holders J^{15}, chambers for the reception of the series of revolving cutters J^{12}. A central cross-bar or arm, J^{16}, provided with holes or recesses adapted to support one end of each of the axes J^{11}, is arranged between the series of revolving plates or cutters J^{12}, and the opposite ends of the axes J^{11} are supported and held in place by means of the clamps or holders J^{15}, which are secured to the central portion of the jaw or trident by means of a screw-bolt, J^{17}, the clamps or holders being still further held in place and any lateral motion of the same prevented by means of keys or feathers J^{18}, which, when the bolt J^{17} is screwed firmly in position, as shown by Figs. 1 and 2, hold the axes J^{11} and the cutters J^{12} in proper position.

The independent condition of the several thin wheels J^{12} is important in several respects. One advantage is that the section of the channel may be changed at will by simply changing the sizes or order of the wheels J^{12}.

j^{11} are tubes placed around the axes J^{11} to prevent the disks from wearing the axes J^{11}. One of the tubes j^{11} is shown clearly in Figs. 1 and 3.

In Figs. 7, 8, 9, 10, the jaw-trident is formed in one piece.

Fig. 21 represents a series of wheels arranged in the form of a cone on a spindle or shaft. This form of arranging the wheels is convenient for selection by the aid of calipers. The sizes are so finely graduated that by selecting from a series of cones formed of my disks, which I call "stock sets," a cutter adapted to form any description of groove or channel may be formed at will. The operator can readily pick out from a few sets thus arranged the precise sizes which he requires, and with a little practice can arrange them in the required order on the axes J^{11}. Instead of the pin shown in this figure extending through the whole set, the set may stand in a trough of suitable section. The pin shown holds the wheels a little more reliably. A trough would allow the middle ones to be picked out without disturbing the side ones. Either plan may be adopted; or the wheels of different sizes may be arranged in different chambers, like printers' types.

Another advantage due to the employment of sets of independent wheels, as shown, is the allowing of each to rotate at the required speed. It is important to act by a rolling contact without much motion of the toothed or sharpened edges on the hard or flinty material. The disintegration desired depends on the property of rolling-surfaces to remove the hard material without being itself ground off. If the sets of the wheels are united in a solid mass, the surfaces of the inner parts will necessarily move forward or backward upon the stone while in contact with it.

Another advantage, and one to which I attach great importance, is the facility of sharpening. The edges will endure a large amount of rolling contact without dulling. When they finally become dull the wheels or disks may all be taken apart, and each being ground at the proper bevel around its periphery, the points of the teeth are all sharpened. This results from the presence of the radial grooves on one face. The grinding being beveled from the other face, a sufficient amount of grinding off on a surface of an ordinary stone sharpens all the teeth.

Another advantage is the facility for repairs in case, through excessive pressure or other cause, this high-tempered and severely-worked part of the mechanism shall be fractured.

In case difficulty shall arise from a too exact coincidence of the distances of the cutting-points on the two sides of the center, I can reverse the positions of the whole or a part of the wheels on one side of the center.

Figs. 7 and 8 show a modification adapted to produce wider channeling generally. This form may be used in advance of the next to be described in producing plane surfaces. This form is well adapted to remove the greater portion of the material.

Figs. 9 and 10 represent a desirable arrangement of the parts for producing or finishing plane surfaces.

Thin wheels of sufficient strength, mounted

independently, may be employed, properly sharpened, without teeth, or they may be toothed by other means.

Figs. 11 and 12 are, respectively, a side view and a cross-section of one of my wheels. Fig. 13 represents the opposite face, and Fig 14 an edge view.

Those familiar with grinding an ordinary sickle will understand how the removal of the material by grinding plane sharpens the teeth.

Figs. 15, 16, 17, 18, 19, and 20 represent different modes of obtaining a toothed surface. In Figs. 15 and 16 the teeth, instead of being formed by radial grooves and kept sharp by grinding, as above described, are formed with each side plane, and the teeth produced by grooving by any suitable means on a beveled surface. I prefer the plan before described.

Fig. 17 is an edge view of another modification.

The modification shown in Figs. 18, 19, and 20 has grooves and teeth formed alternately on opposite sides of the plate. This modification is particularly useful in some cases where it is desired to produce very fine work, or when it is desired to apply the cutters to a plate or band.

Other modifications may be made by any good mechanic, and cutting-surfaces of other material than steel may be used—as, for example, black diamonds may be set in any approved manner in the periphery of thin plates of iron or other suitable material, and allowed to turn loosely and independently in a suitable carrier moved over the stone, in which case I consider the device an equivalent of my thin steel disks so mounted.

I attach much importance, in practice, to the tube j^{11}, which incases the central axis, J^{11}. It facilitates lubrication. It affords a broad fair bearing. The tube is properly a lining for the disks J^{12}. It turns with the disks. The disks J^{12} have only to turn thereon to the extent that they differ in the rate of their rotation. If, as in some instances it happens, the disks are of such a ratio that all turn at the same rate, there is actually no rubbing of the inner edges of the disks upon the exterior of the tube, but all turn together, and there is only the slight abrasive action due to the broad fair bearing of the whole tube in the central axis. In the absence of the tube the disks cut ridges around the cental axis. The presence of the tube avoids them.

It will be readily understood that I can in any of the arrangements use a narrower set, and consequently produce a narrower groove or channel, by using only a portion of the cutting-disks and filling the rest of the space with washers of so small dimensions that they shall not touch the stone.

Although I have represented the shaft I in an upright position, and have so described it, it will readily be understood that it may be worked in a horizontal or in variously-inclined positions, if desired. I believe it practicable to even work on the under face of a stone by a shaft extending up from below and carrying my cutters on the upper instead of the lower end.

I attach importance to the peculiar construction of the cutting-edge of the disks shown in Figs. 19 and 20. They are made the subject of a claim in another and separate application for Letters Patent.

I claim as my invention—

1. The stone-cutting device described, composed of freely-revolving circular disks mounted side by side on a common axis, and capable of revolving independently, in combination with means for supporting and moving them strongly relatively to the surface of the stone, substantially as and for the purposes herein specified.

2. The corrugated or sickle-edged disks J^{12}, adapted to renew the serrated condition by grinding upon a common grindstone mounted to revolve independently, and adapted by changes of position on the axes J^{11} to vary the section of the groove cut, as herein specified.

3. The cutter-head J^{10}, revolving on an axis perpendicular to the face of the stone, in combination with one or more series of freely-rotating independent disks, J^{12}, carried thereon, and acting on the stone in curved paths, substantially as and for the purposes herein specified.

4. The trident or three-pronged revolving head J^{10}, affording firm bearings at the center and outer ends, in combination with two separate axial pins, J^{11}, and two sets of independent disks, J^{12}, mounted thereon, as herein specified.

5. The removable side pieces, J^{15}, of the revolving head J^{10}, in combination with the pins J^{11} and series of cutting-disks J^{12}, as herein specified.

6. The obliquely-mounted disks J^{12}, revolved in cutter-head J^{10}, and turning each independently of its neighbor, as specified.

7. The combination of the axis or axes J^{11}, and independent thin cutting-disks J^{12}, and tubular bearings j^{11}, as herein specified.

In testimony whereof I have hereunto set my hand this 4th day of September, 1878, in the presence of two subscribing witnesses.

NICHOLAS JENKINS.

Witnesses:
H. A. JOHNSTONE,
EDITH BROOKES.