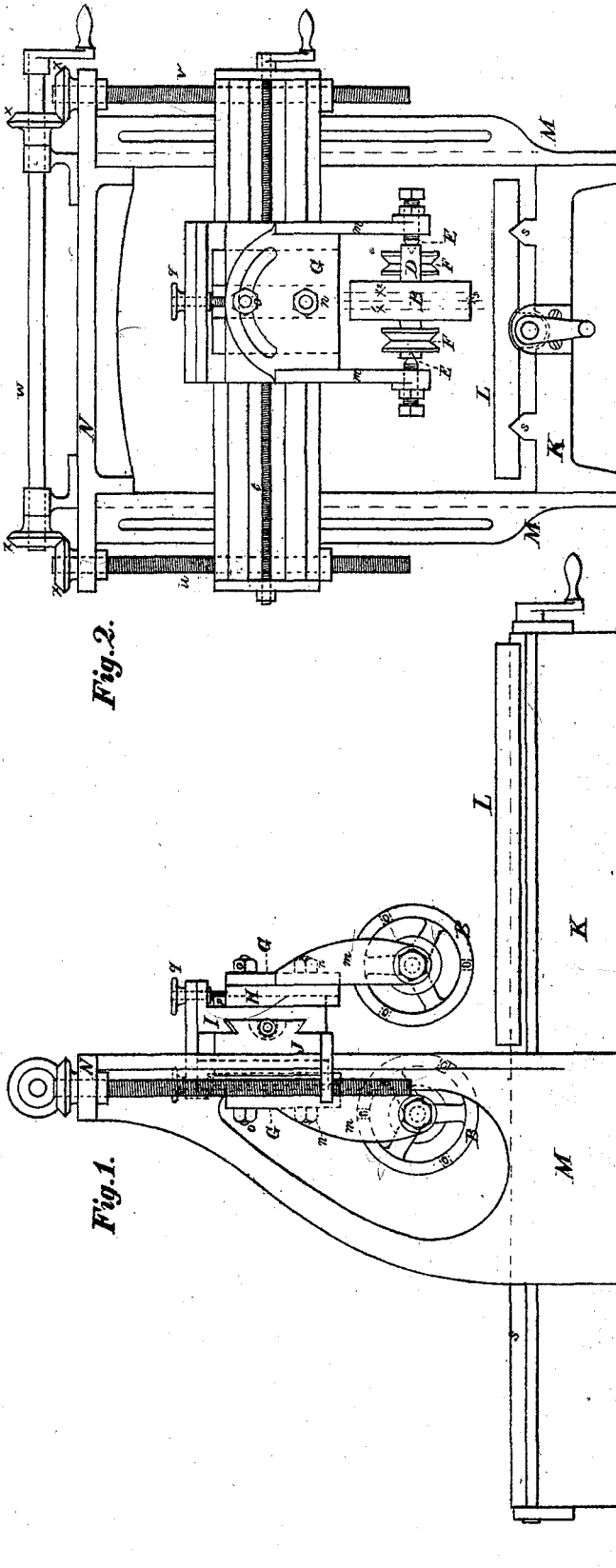


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Machine for Cutting & Dressing Stone.

No. 120,482.

Patented Oct. 31, 1871.



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Machine for Cutting & Dressing Stone.

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Fig. 3.

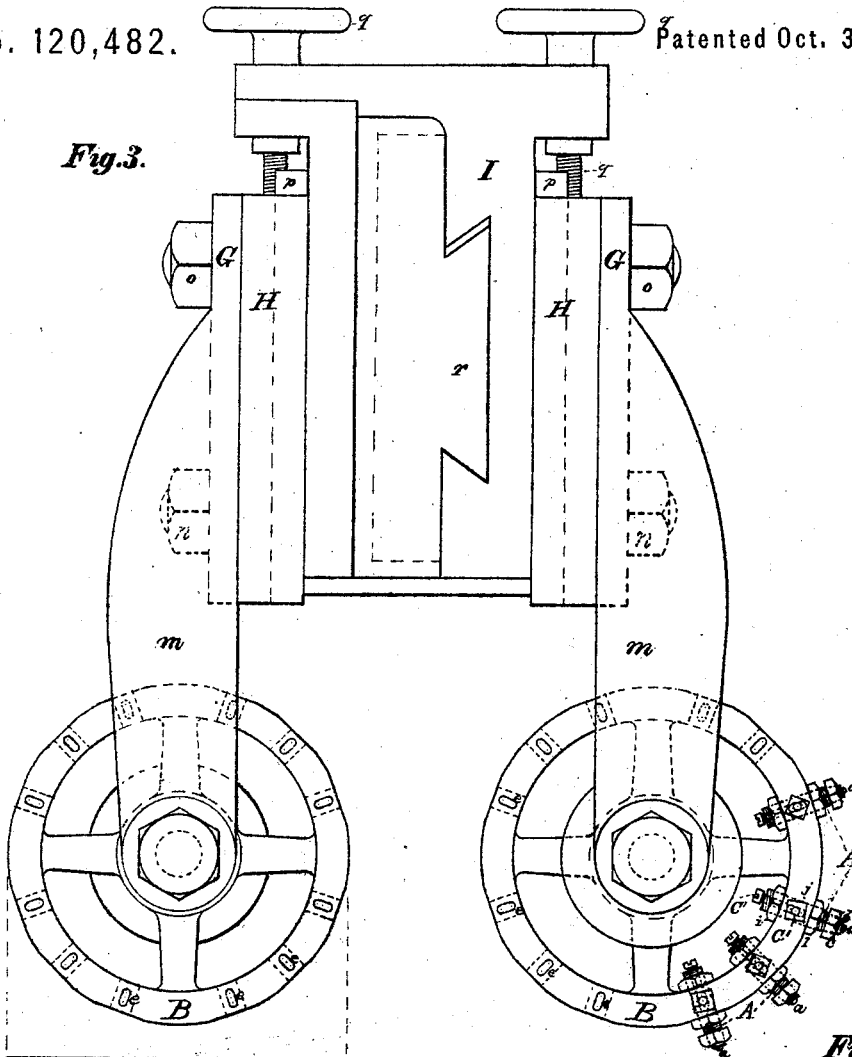


Fig. 4.

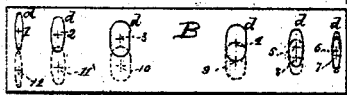


Fig. 8.



Fig. 5.

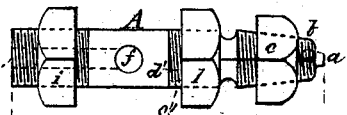


Fig. 7.

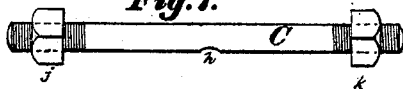
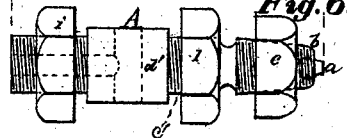


Fig. 6.



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Fig.9.

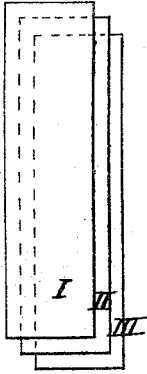


Fig.10.

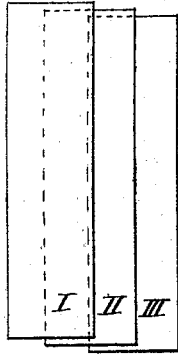


Fig.11.

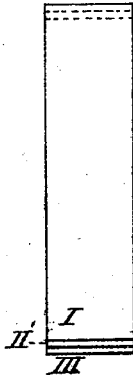


Fig.12.

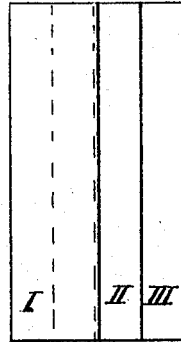


Fig.14.

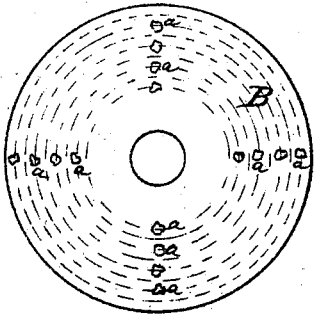


Fig.15.

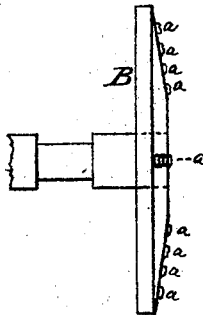
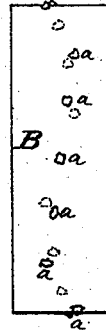


Fig.13.



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Fig.16.

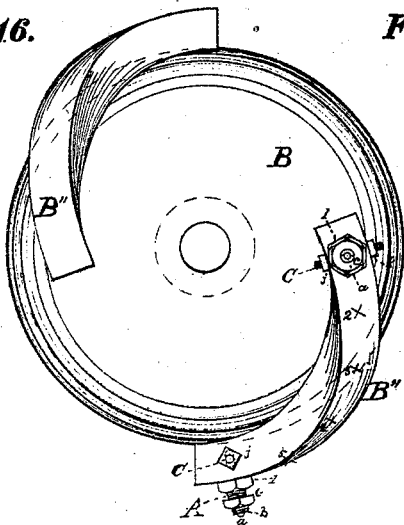
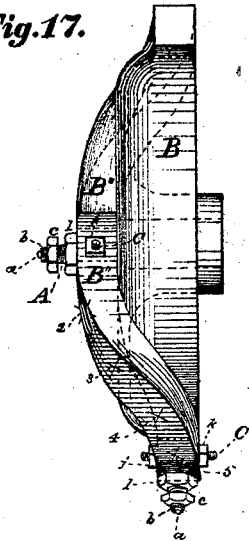


Fig.17.



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Fig. 18.

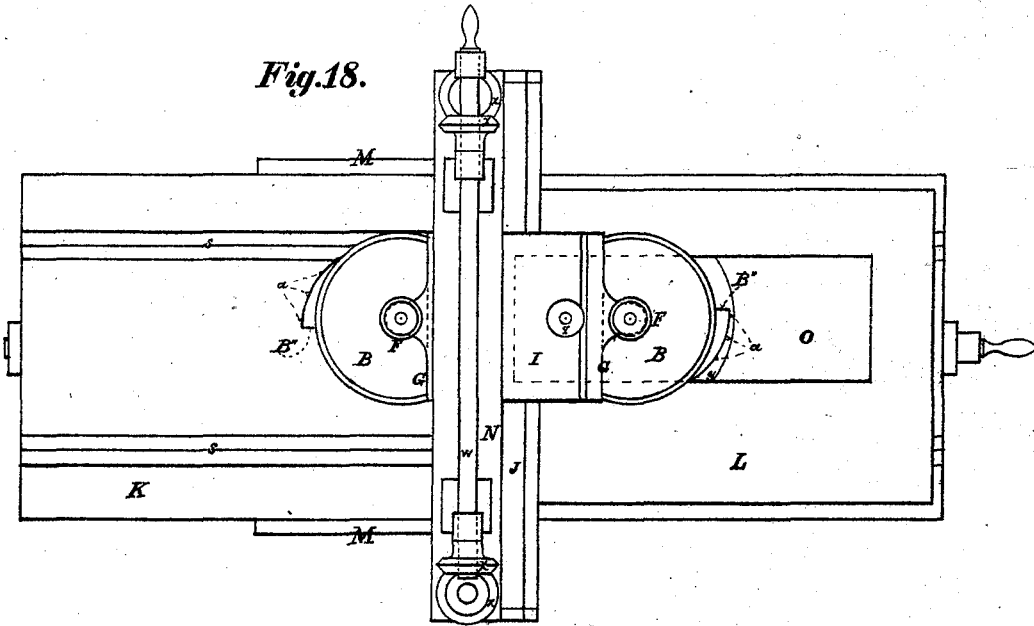
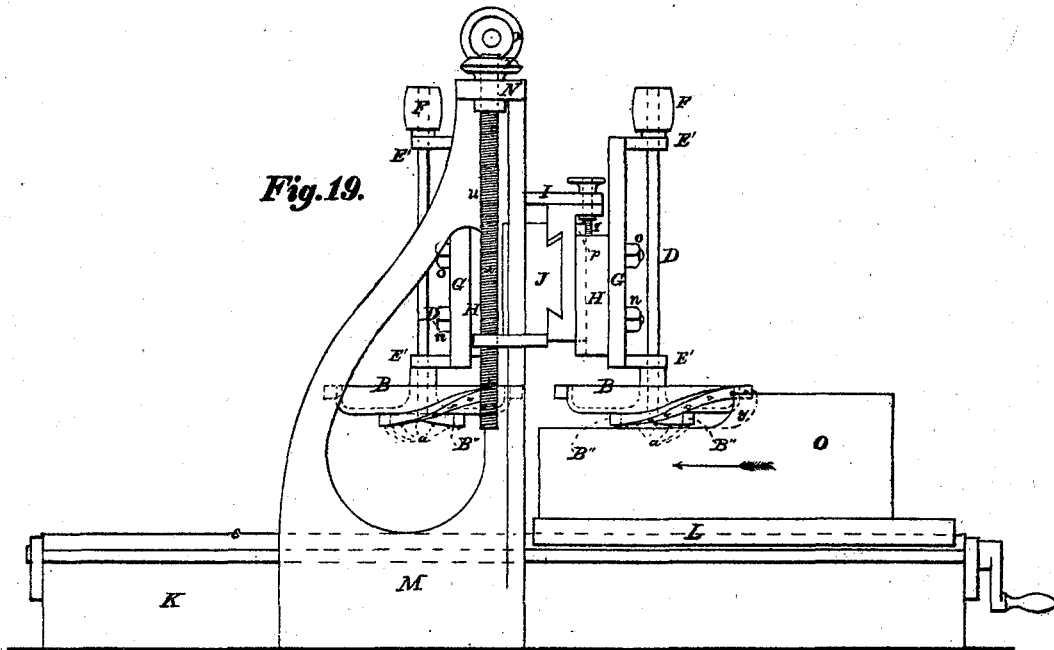


Fig. 19.



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Fig.20.

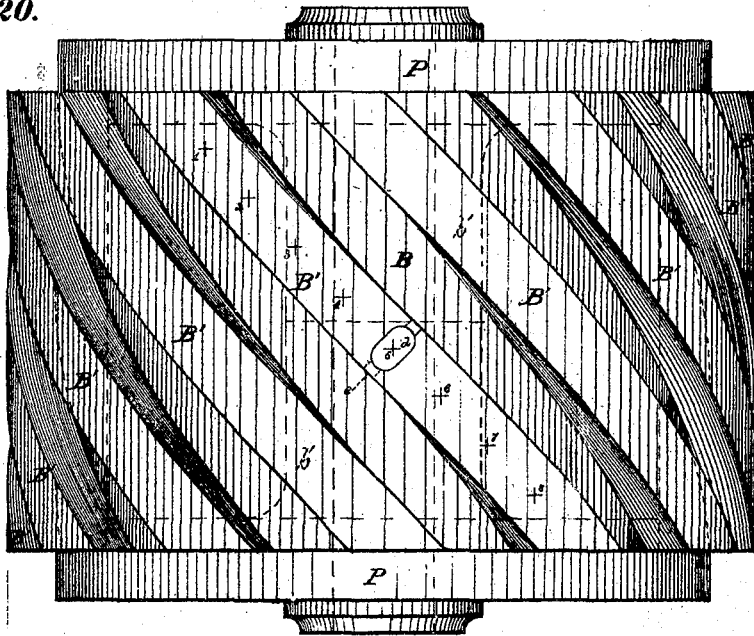
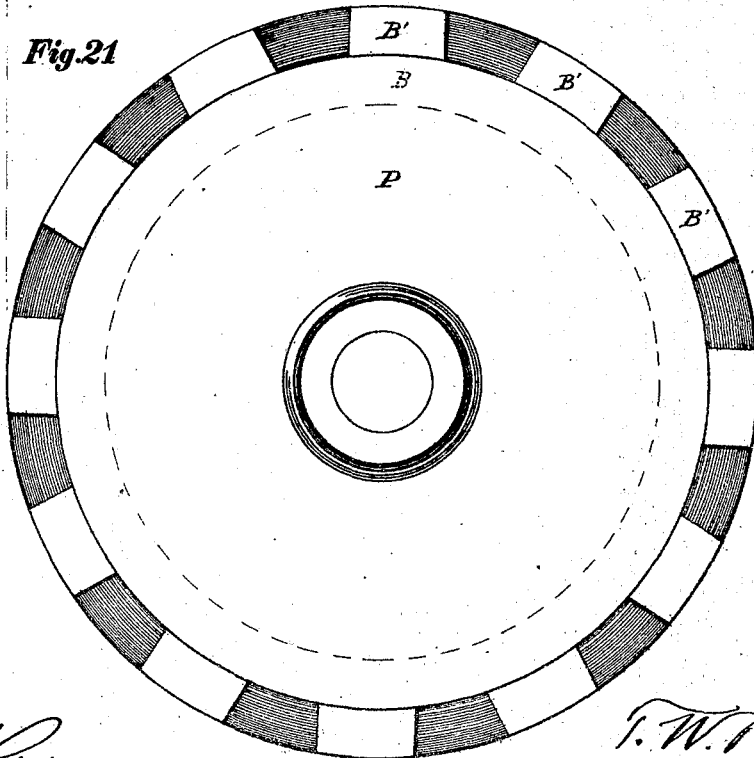


Fig.21



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UNITED STATES PATENT OFFICE.

THOMAS W. BAXTER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN STONE-DRESSING MACHINES.

Specification forming part of Letters Patent No. 120,482, dated October 31, 1871; antedated October 21, 1871.

To all whom it may concern:

Be it known that I, THOMAS W. BAXTER, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Machine for Cutting, Dressing and Working Stone, of which the following is a specification.

My invention relates to the use of a series of cutting-points or tools of diamond or other equivalent hard substance, set either in the periphery or face of a rotating stock, for the purpose of cutting, dressing, or otherwise working stone to reduce it to any given surface.

For this purpose my invention consists: First, in machinery for dressing or facing stone by a diamond or equivalent cutter, one or more, mounted on a rotating stock, so combined with mechanism for imparting a longitudinal feeding motion, given either to the carriage which carries the stone to be dressed, or, as the equivalent thereof, to the rotating stock, so that the stone, by the combined operation of the feeding motion and the rotation of the stock so armed, shall have the whole or a considerable portion of its width acted upon and along its length. Second, in the arrangement of the diamonds or equivalent cutters upon a rotating stock in such a manner that the cut or track of each of said cutters shall be immediately adjacent to or slightly lapping the cut of another of said cutters, in order that a smooth cut of considerable width and of any given profile may be produced by the successive cuts of the said cutters, as described. Third, in making the said cutters individually adjustable, so that the depth that each shall cut, as well as the lateral position of each in the aggregate cut made, may be regulated at will. Fourth, in a chuck or holder for gripping and firmly holding the diamond or equivalent cutter, as a means of combining it with a rotating stock. Fifth, in a combination with a holder or chuck and the rotating stock, means by which the adjustment of the cutting edge or diamonds or equivalents may be readily effected. Sixth, in the combination, in a series of two or more, of such rotating stocks, each armed with a series of such cutters as described, whereby the width of the aggregate cut, or the depth thereof, or both, may be increased at pleasure. Seventh, in so mounting each of said stocks that each may be individually adjustable to regulate the form and extent of the aggregate cut at will. Eighth, and in the combination of such stock or series of stocks, armed with dia-

mond or equivalent cutter or cutters, slides and adjusting devices, to hold and move the said stocks laterally and toward and from the stone to be operated upon.

The accompanying drawing represents a machine which embodies my invention, and in which I prefer to use cutters of the material variously known as diamond, black diamond, carbon, carbonate, and "boart."

Figure 1 is a side elevation of a planer or machine for cutting and dressing stone, the stocks being mounted on horizontal spindles, and the chucks or tool-holders and cutters being omitted, as the drawing is on too small a scale to show them distinctly. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation on a larger scale of the stocks shown in Figs. 1 and 2, and their individual adjusting-slides. Fig. 4 is an edge view, on the same scale as Fig. 3, of one of the stocks, showing the relative positions of the holes or slots for receiving the tool-holders or chucks, and indicating, by the small crosses therein, the positions of the cutters with relation to each other, the dotted crosses indicating their position on the opposite side of the circumference. Figs. 5 and 6 are side views in detail, showing the cutter-holder or chuck full size. Fig. 7 is a side elevation of the rod by which the said chuck is adjusted laterally across the face of the stock. Fig. 8 is a side elevation, in detail, of the screw by which the rod, Fig. 7, is fastened in the chuck, Figs. 5 and 6. Figs. 9, 10, 11, and 12 show different ways of setting the stocks with reference to each other when more than one stock is used. Fig. 13 is a front or edge view of a stock, showing the diamonds or cutters set in three diagonal or helical lines across its face. Fig. 14 is a face view of a disk having four radial lines of diamonds or equivalent cutters set in its face or side. Fig. 15 is an edge view of the same, showing the relative projection of the cutters. In the three last-mentioned figures, and also in Figs. 18 and 19, the diamonds are represented as set in the solid metal of the stock, but adjustable holders or chucks are preferred. Fig. 16 is a face view of a stock so constructed that it may be mounted on the lower end of a vertical spindle and rotated in a plane parallel to the surface to be cut. Fig. 17 is an edge view of the same. Fig. 18 is a plan of the machine for cutting stone to which the stocks, Figs. 16 and 17, are adapted and attached; also showing the stone and the manner in which

the cutters operate upon it. Fig. 19 is a side elevation of the same. Fig. 20 is an elevation of a stock, so constructed that a greater number of overlapping series of diamonds or other equivalent cutters can be mounted on one stock than with the arrangement represented in Fig. 4, and at the same time admit of each cutter having an independent lateral as well as radial adjustment, whereby a cut may be made of any desired width with a single stock. Fig. 21 is an end view of the same.

The chucks or tool-holders A, in which the diamond or other cutters *a* are set or held, are made preferably of steel. The end in which the diamond is to be inserted is tapered, and a thread, *b*, formed upon it, to which the nut *c* is fitted. This tapered end of the chuck is split or divided, and a recess or socket formed in the inner faces of the spring-jaws thus formed. The jaws are permitted to open, or may be forced open after drawing the nut, and the diamond is then inserted between the jaws, in which it is partially embedded, and the nut *c* screwed tightly on to firmly gripe it. If desired, the metal at the end of the chuck may be swaged or upset around the cutter, and forced down so as to make the jaws fit the diamond more completely. When, by the operation on the stone, the diamond becomes loose in the jaws, it can be tightened by turning the nut *c*. A little back of the tapered thread *b* the cylindrical part of the chuck is threaded, as at *c'*, to which a nut, *l*, is fitted, and beyond this thread the body A, of the chuck, is flattened, as at *d*, to prevent the chuck from turning when inserted in the slot *d* in the stock B. The stem of the chuck A being in position a rod, C, is passed through a slot, *e*, in the stock B, and through a hole, *f*, in the flat part of the chuck, and secured by means of a screw, C', which is tapped in a central hole, *g*, in the body of the chuck, and bears against a notch, *h*, in the rod C. A nut, *i*, fitted to the inner end of the stem, is now screwed up against the inner periphery of the stock, so that the chuck is firmly held in the stock by the two nuts *i* and *l*, which embrace it. By means of nuts *j* and *k* on the rod C the lateral position of each cutter in the aggregate cut made by each stock is regulated, while the distance each diamond projects outward from the stock is regulated by the nuts *i* and *l*. The stems A of the chucks are arranged in the stock B in a helical or stepped line, as indicated by the crosses 1, 2, 3, 4, 5, &c., Figs. 4—16, and 20. By this arrangement each cutter cuts its track in the stone immediately adjoining the track cut by the preceding cutter, whereby the whole cut is made of considerable width and very smooth and true. The cuttings and dust from the stone may be washed off by a jet of water. When it is desired to set more than one complete series of adjustable chucks armed with diamonds in the periphery of a cylindrical stock, I form ribs or raised portions B', Figs. 20 and 21, on the said periphery, through which the stem of the chucks are inserted, the rod C, for obtaining lateral adjustment, in this case projecting out through the sides of these ribs. By this construction I am enabled to make a much wider cut

with a stock of any given diameter than when the chucks are set as shown in Figs. 3 and 4. The stock shown in Figs. 20 and 21 consists of a cylindrical ring, B, having the projecting helical ribs B' raised on its periphery, and the ends or heads P P with inward projecting hubs, shown by dotted lines at *b'*. A portion of these heads extends into the ring holding it central with the spindle on which they are mounted, while a nut on the spindle at each end of the stock serves to hold the whole firmly together and in place, as well as to adjust the position of the head on the spindle, thus providing a means of lateral adjustment of the stocks as a whole without moving the spindle lengthwise. I also apply the same mode of forming the stock with projecting ribs, and setting the chucks therein to the stock when made of the wheel or disk form, as shown in Figs. 16 and 17 at B''. In Figs. 18 and 19 the stone to be operated upon is shown at O and the form of cut, when the wheel or disk-shaped stocks are used, at *y*. In using two or more stocks set or mounted on vertical spindles, as here shown, each stock should be set lower than the preceding one a distance equal to the depth of its cut. The cut may be made wider by each succeeding stock of the series by setting the stocks as indicated in Fig. 12, or they may be set as in Fig. 11, making each succeeding track or cut deeper; or the cut may be made both wider and deeper by setting them as indicated in Figs. 9 and 10. In these four last-mentioned figures a series of three stocks is indicated by the rectangles I II III. In Fig. 3 each stock is designed to have twelve cutters attached to it, although but four are shown, and all of these in one stock. The number may, however, both in this form of stock and also in the forms shown in Figs. 16 and 20, be varied, at the will of the constructor. The stock B, Figs. 1, 2, 3, and 4, is mounted upon a spindle, D, which is hung or mounted on the adjustable pivots E E, and driven by a belt which runs on the pulley F. The pivots E E, being adjustable, provide a means for the individual lateral adjustment of each stock as a whole. G is a flat plate having brackets *m m* projecting downward from it, in which brackets the screw-pivots E E are tapped. In Figs. 18 and 19 the plate G has, instead of the brackets *m m*, brackets or bearings E projecting from it, in which the vertical spindle D is mounted. This spindle is driven by a belt running on the pulley F. The plate G is pivoted on the bolt N, and is secured at any desired angle by the bolt *o*, whereby angular adjustment of the stock is obtained. These bolts fasten the plate G to the vertical slide H, which is mounted on the dovetailed guide *p*, and is adjusted vertically by the screw *q*. A horizontal dovetailed groove, *r*, in the frame I, fits it to slide on the horizontal guide-bar or cross-head J, Figs. 1 and 2. K is the bed of the machine. A table, L, for carrying the stone to be dressed, is mounted on ways or guides *s*, and has a reciprocating rectilinear motion imparted to it by a screw which is driven by any suitable mechanism to impart the required feed motion. Two posts or side pieces, M, are bolted to the bed K, and are tied together at the top by

a beam or cap, N. The frame I, which carries the rotating stocks B, is moved laterally across the machine, on the guide-bar or cross-head J, by the screw t. The guide-bar J is moved up and down by the right-and-left-hand screws u and v; which are connected together and caused to turn equally by the shaft w and beveled gears x x. By the arrangement of the diamonds on each stock in such a manner that the cut of each one in the series shall be immediately adjacent to or shall slightly overlap the cut of another of the said cutters, an aggregate cut of considerable width may be obtained; while by the individual adjustment of each, as hereinabove described, the desired surface can be obtained. Without this adjustability, a cutter which is somewhat shorter or longer, or which is set a little nearer the center of the stock or a little further from it than those which precede and follow it, will either not cut at all, or will leave a ridge on the surface of the stone, or it will cut too deep, and in either case the work produced will be less in quantity and poorer in quality than that done by a machine capable of such adjustment.

In using the form of stock shown in Figs. 1 and 20 the first cutter of each series may be set down a short distance nearer the center of the stock than the rest, the next a little further out, and so on, till the third or fourth is brought out on a line with the remainder. By this means the shoulder, which would otherwise be formed on the stone by the cut, will be converted into a curve or slope and any danger of the holder or chuck striking the stone be thus avoided. It is evident that the cutters may be so set as to form a curved surface, or so as to form moldings, grooves, ribs, or beveled surfaces, as may be desired. When diamond or boart is used, the cutters may be shaped to suit the work; or pieces may be selected of suitable form and size, and used without grinding or cutting them.

It is evident that the mechanism hereinabove described may be varied by the substitution of equivalents without departing from the character of my said invention. Instead of making the rotating stocks in the forms shown, they may be of any other suitable form, according to the work required to be produced, the cross-section being of the form or approximating to the cross-section of the surface of the stone when dressed; such, for instance, as moldings, columns, or such other figures, which are very different from flat surfaces. And even for producing flat surfaces the cutters may be arranged on the surface of a conical stock or on the face of a flat disk; but in the latter place the cutters which are furthest from the axis of rotation should be the nearest to the surface of the disk, and gradually further from the face as they are placed nearer the center, as represented in Figs. 14 and 15 of the accompanying drawing; or the diamonds may be set on the periphery of a wheel-stock, as represented in Figs. 16, 17, 18, and 19, in which case the block of stone must be moved to give the feed motion in the direction of the arrow—that is, in a plane parallel with the under face of the wheel—and in such case the surface on the stone will be produced by

the diamonds which project below the lower face of the stock; but if none but the lowest ones are used, and to produce the required surface more than one operation is required, the stock will have to be set lower for each succeeding operation.

For the dressing of stone for columns or other cylindrical or nearly cylindrical blocks, the stone to be so dressed may be mounted as in a lathe, to be rotated slowly, and one or more of the rotating stocks or cutters caused to operate upon it as it turns slowly, and by degrees to reduce the surface from end to end.

I am aware that diamond cutters for sawing stone have been inserted in the edge of reciprocating and circular saws, and for boring or drilling rock; that they have been secured in cavities in the end of solid and of hollow drill-stocks; and that for cracking or dressing the faces, or facing the lands of mill-stones, they have been secured to the edge of a circular saw or wheel having also a longitudinal reciprocating motion; but none of these were intended for or adapted to the purpose of dressing stone, and even for the purpose for which they were designed they were defective for the want of suitable means for securing the diamonds, and, therefore, I do not wish to be understood as claiming, broadly, the use of rotating diamonds; for cutting stone, but limit my claim to the invention of the means described for dressing or facing stone, and to the means for gripping and firmly holding the diamonds and thereby securing them to rotating stocks.

I claim as my invention—

1. In machinery for dressing or facing stone, the devices hereinabove described, or the equivalents thereof, by which the feeding motion is imparted, in combination with a diamond or diamonds, or equivalent cutter or cutters, on a rotating stock, when the diamonds are connected with the rotating stock by chucks or holders which are adjustable thereon, substantially as and for the purpose described.

2. In machinery for dressing stone, the chuck or holder described, or its equivalent, for gripping and firmly holding the diamond or equivalent cutter, when combined with the rotating stock, so that it can be adjusted on the rotating stock, substantially as described.

3. In combination with the rotating stock and the means for gripping and firmly holding the diamonds or equivalent cutters, the means, substantially as described, for adjusting the diamonds relatively to each other, substantially as described.

4. A series of diamonds or equivalent adjustable cutters set in a rotating stock, arranged substantially as hereinabove described, so that the cut of each shall be adjacent to or slightly overlapping the cut of another one of the said series, as described.

5. The arrangement in a series of two or more of stocks, each armed with a series of cutters, substantially as described, whereby the width of the aggregate cut or the depth thereof may be increased.

6. A series of stocks, each armed with a series

of cutters as described, and each independently adjustable in the manner described, so as to regulate the form and extent of the aggregate cut of all the stocks, substantially as set forth.

7. The combination of one or more rotating stocks, each armed with a series of cutters, as described, with the slides and adjusting devices,

and the means for holding and moving the material to be operated upon, substantially as hereinabove described.

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(153)