

(No Model.)

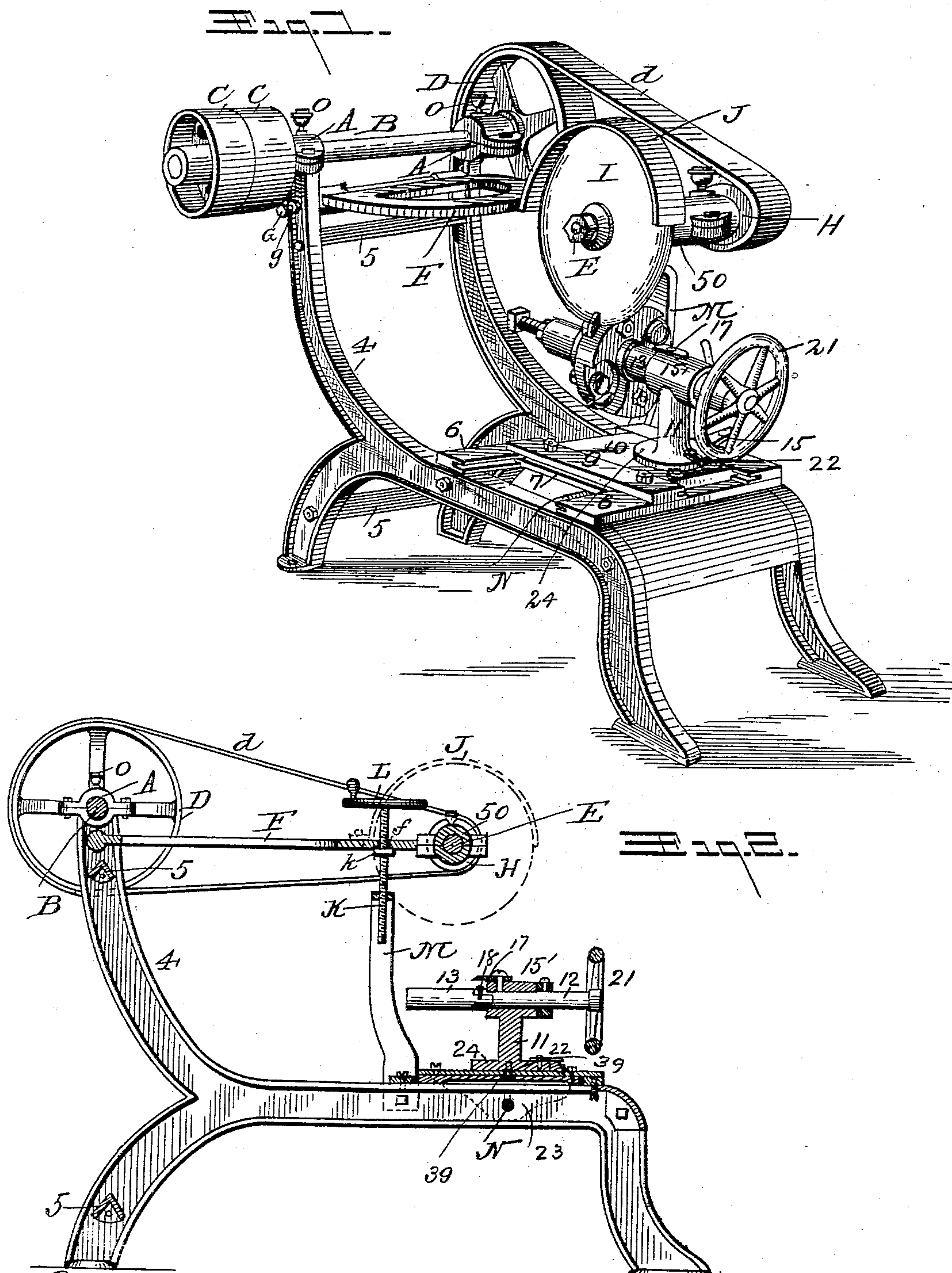
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D. E. BICE.

MACHINE FOR GRINDING ROTARY CUTTERS.

No. 504,655.

Patented Sept. 5, 1893.



WITNESSES
F. L. Ourand
J. Gregory

INVENTOR:
DAVID E. BICE,

by J. F. Reilly,
his Attorney

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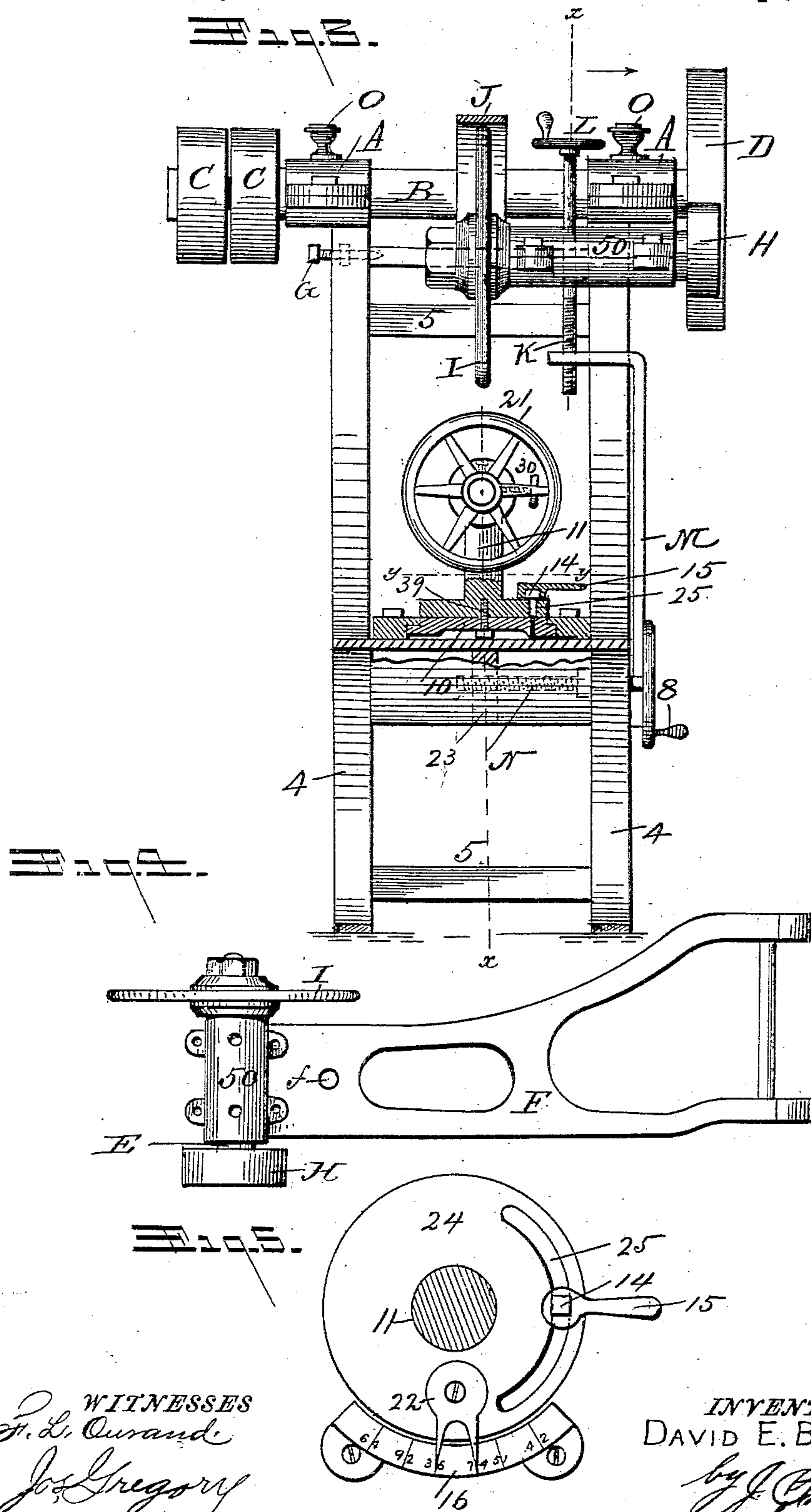
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UNITED STATES PATENT OFFICE.

DAVID E. BICE, OF LA CROSSE, WISCONSIN.

MACHINE FOR GRINDING ROTARY CUTTERS.

SPECIFICATION forming part of Letters Patent No. 504,655, dated September 5, 1893.

Application filed April 29, 1893. Serial No. 472,287. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. BICE, a citizen of the United States, residing at La Crosse, in the county of La Crosse and State of Wisconsin, have invented certain new and useful Improvements in Machines for Grinding Rotary Cutters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to machines for sharpening tools. In its special construction the machine is particularly adapted for grinding and sharpening rotary cutters, such as matching, reed, molding, and similar cutter heads, without requiring the removal of the cutter blades from the head.

The object of the invention is to secure the proper bevel and pitch to the cutters, which is obtained by proper adjustment of the support or stock carrying the cutters to be ground, the adjustment being effected by suitable indicators and marks on the cutter head provided with the cutter to be sharpened.

A further object of the invention is the provision of a machine for the purpose aforesaid which is adjustable in all its essential parts to adapt it to different sizes of cutters, and to cutter heads having bores of various diameters, and which when set for a given tool will grind the several blades uniformly and quickly.

A still further object of the invention is the production of a machine in which the various adjustments can be readily effected by simple mechanism, and which will be durable and perform the work in a rapid and efficient manner.

To these ends my invention consists in the novel features and the peculiar construction and combination of parts which will be hereinafter more fully set forth and claimed, and which are shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a vertical

central longitudinal section of the machine, on the line $x-x$ of Fig. 3, looking to the right as indicated by the arrow, the grind wheel and the cutter head supporting spindle being shown in full. Fig. 3 is an end view of the machine, the lower portion of the stock or cutter support, the carriage and guides being broken away to better illustrate the relative disposition and construction of these parts. Fig. 4 is a top plan view of the arm carrying the grind wheel. Fig. 5 is a horizontal section of the stock or cutter support on the line $y-y$ of Fig. 3, showing the indicating mechanism for obtaining the proper bevel to the cutter blades.

The frame for supporting the operating parts will be of suitable construction, being preferably composed of side pieces 4 of similar outline and having the form substantially shown, and cross bars 5 which are L-shaped irons having their ends closed and bolted to the side-pieces 4. Bearing blocks A are provided at the upper ends of the side pieces 4 to receive the shaft B, one end of which has two pulleys C, one tight, the other loose, the other end of the shaft having a pulley D around which a belt d passes to drive the grind wheel I. Oil cups O are located on the bearing blocks A to lubricate the journals.

The arm F is narrow at its forward end, which is provided with a bearing 50, and widens rapidly at the inner end to extend across the space between the side pieces 4 to which it is attached by conical bearings formed by screws G which pass through the said side pieces and have their ends pointed to enter corresponding recesses in the sides of the said arm. The jam nuts g on the screws G admit of the position of the screws being fixed when adjusted by being screwed up against the sides of the pieces 4. The arbor E is mounted in the bearing 50 and has a pulley H on one end to receive the belt d , and the grind wheel I is mounted on the other end of said arbor. This grind wheel may be of any desired substance usually employed for grinding purposes, and is held on the arbor between washers clamped thereon by a nut on the threaded end of the arbor, in the ordinary manner. The outer end of the arm F is

adjusted vertically by means of a long set screw K which passes through an opening *f* near the outer end of the arm and through the bent end of a standard M which is attached at its lower end to the frame of the machine. This set screw K is rotated by means of a crank or hand wheel L on its upper end, and has a shoulder *k* on which the arm rests. A guard J attached at its inner end to the arm F extends over the upper edge of the grind wheel to protect the operator from injury by accidentally coming in contact with the grind wheel.

The stock or cutter-support, 11, is mounted upon a carriage which is adapted to travel upon ways or guides formed by cross bars 6, which extend from one to the other of the side pieces, and are secured at their ends thereto. These cross bars 6 are rabbeted in their inner edges to receive corresponding rabbeted edges of the carriage 7, which is reciprocated or moved across the machine to the proper place by means of a screw N, which passes through a side of the frame and through a lug 23 depending from the carriage 7. The screw N is threaded into the lug 23 and is held in a fixed relation to the frame by enlargements which embrace the sides of the side-piece 4 through which the screw loosely passes. A crank 8 on the outer end of the screw N admits of the latter being readily turned or rotated to move the carriage. A second carriage, 10, is located on the carriage 7 and moves thereon between bars 9 which guide it in its various movements. The inner edges of the bars 9 are grooved to receive corresponding tenons on the opposite edges of the carriage 10, the latter being moved parallel with the sides of the frame by hand.

The stock or support 11 has a broad base 24 and is pivotally connected with the carriage 10 by bolt 39 which passes up through the carriage from below and screws into the support 11, the bolt being sufficiently loose to permit the stock to turn freely on the carriage.

The base 24 is provided near its edge with a circumferential slot 25, which extends about one third around the base. A bolt 14, threaded at its lower end, passes through this slot 25 and enters the carriage 10 to serve as a means to secure the stock 11 in the required position.

A lever 15 is attached to the bolt 14 to serve as a convenient means for operating the same to release or secure the stock in the adjusted position.

A pointer 22 is attached to the base 24 and in connection with a properly graduated segment 16 secured to the carriage 10, serves to indicate the required position to be given the stock or support 11 relative to the carriage 10 and the grind wheel I. The upper end of the stock has a bearing sleeve 15 to receive a spindle 12 which is adapted to rotate therein,

being turned by a hand wheel or crank 21. A binding screw 30 in the side of the bearing 15 serves to secure the spindle in the adjusted position. The inner end of the spindle has a socket to receive the tenoned end of a detachable part 13 forming a prolongation of the said spindle, and has a binding screw 18 to secure the part 13 in place when applied to the spindle 12.

The cutter head carrying the blades or cutters to be sharpened, is mounted on the part 13 of the spindle, and as the bore of different cutter heads varies the size of the part 13 should correspond therewith. Hence, the advantage of having the part 13 detachably secured to the spindle so that it can be replaced by corresponding parts of different size to suit the bore of the cutter head. A pointer 17 is provided on the bearing 15 to indicate when the cutter is in proper relative position to be ground.

The operation of the machine is as follows:— The cutter to be sharpened or ground is mounted on the part 13 and held thereon by the same screw which holds it on the mandrel of the machine to which it belongs. The cutter is previously marked to indicate the bottom side, and the spindle is now rotated to bring the said mark opposite the pointer 17, after which the screw 30 is turned up to secure the spindle in the adjusted position. The cutter heads upon which the knives or blades are bolted are marked in the factory, and the stock is turned until the pointer 22 comes opposite a corresponding mark on the graduated segment when the proper bevel will be given the knives during the process of grinding. The screw N is rotated to move the carriage 7 laterally to bring the cutter blade to be sharpened opposite the grind wheel, which latter is now adjusted by means of the set screw K to bring the grind wheel in engagement with the cutter-blade. The shaft B is rotated in any well known manner from a suitable source of power and through pulleys D, H, and the belt *d* rotates the grind wheel. The carriage 10 is moved in the plane of the grind wheel to advance the cutter or withdraw the same from engagement with the grind wheel. The cutter is rotated to bring the blades in engagement with the grind wheel by means of the crank 21 as hereinbefore described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

A machine for grinding rotary cutters comprising a carriage, a screw to move said carriage laterally, a second carriage mounted on the main carriage and adapted to move at right angles thereto, a stock placed on the second carriage and pivotally connected therewith, and having a circumferential slot in its base, a threaded bolt passing through this slot to secure the stock in the proper position.

tion, an indicating mechanism for locating the stock in the required position, a spindle journaled in the stock and having a detachable part to receive the cutter to be ground, 5 a pointer on the stock to properly adjust the cutter, a pivoted arm carrying the grinding wheel, and means for positively adjusting the free end of said arm to raise or lower the grind-

ing wheel, substantially as described, for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID E. BICE.

Witnesses:

E. B. RYNNING,

W. B. TSCHARNER.