No. 838,250. PATENTED DEC. 11, 1906.

J. W. HUDLOW.

5 SHEETS—SHEET 1.

MACHINE FOR GRINDING OR CUTTING.

APPLICATION FILED MAR. 10, 1904.

Fig. 2.

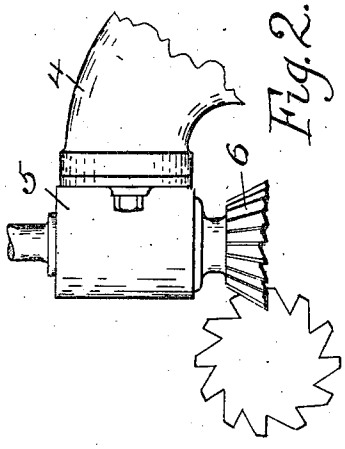


Fig. 3.

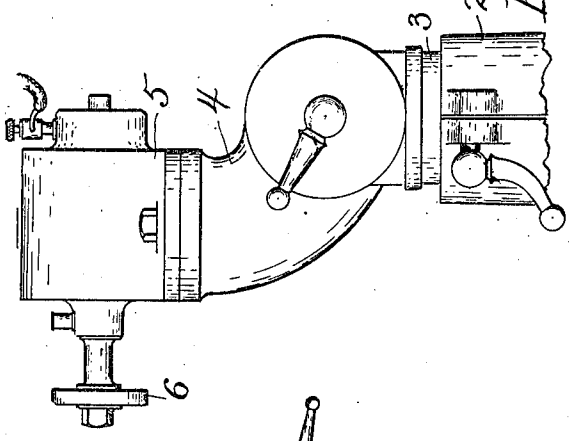
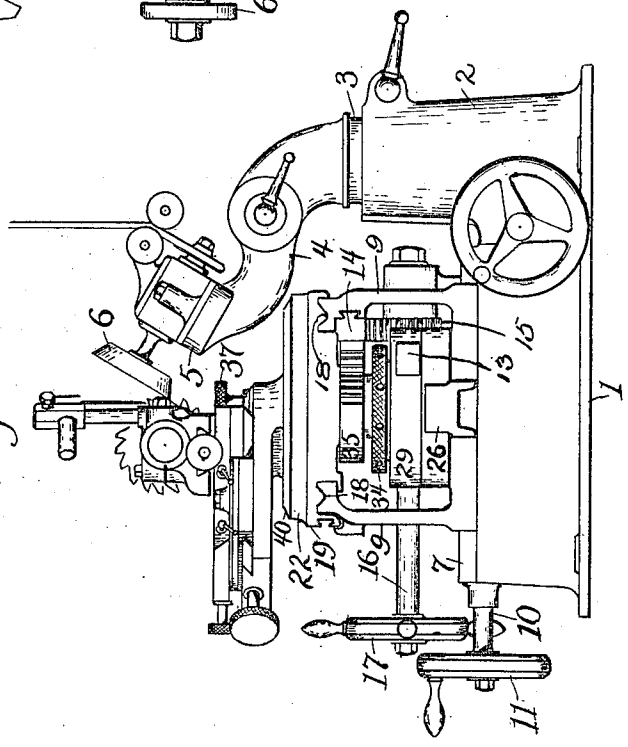


Fig. 1.



Witnesses

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5 SHEETS—SHEET 2.

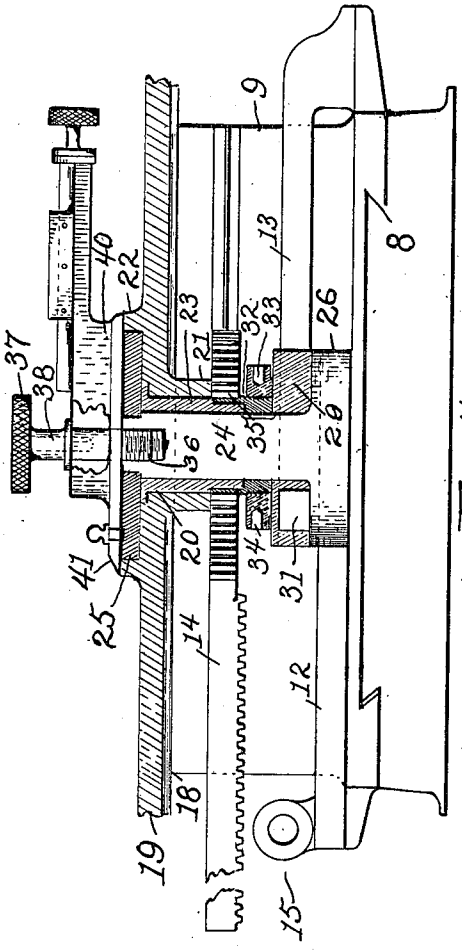


Fig. 4.

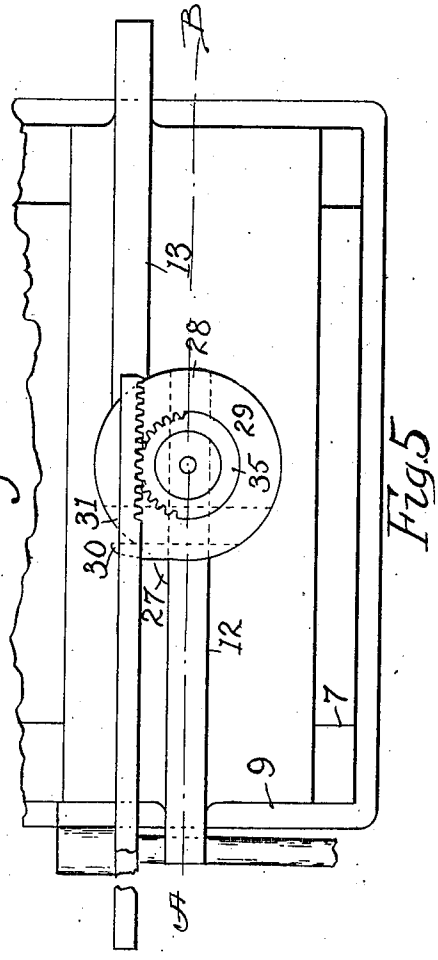


Fig. 5.

Witnesses

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No. 838,250. PATENTED DEC. 11, 1906.

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MACHINE FOR GRINDING OR CUTTING.

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5 SHEETS—SHEET 3.

Fig. 8.

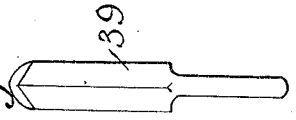


Fig. 7.

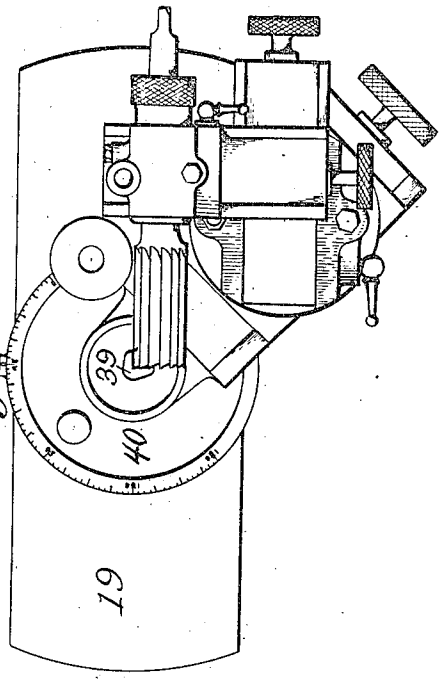


Fig. 6.

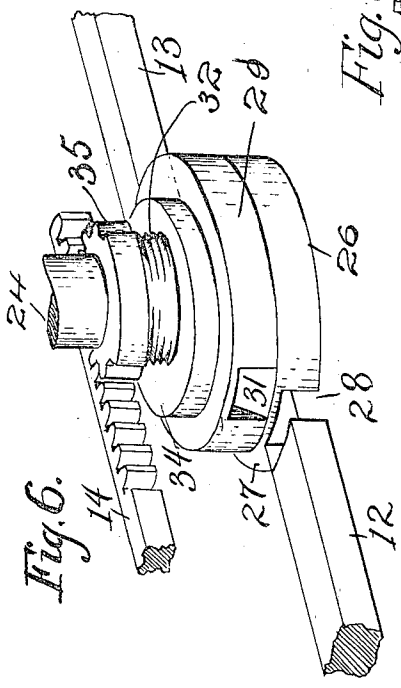
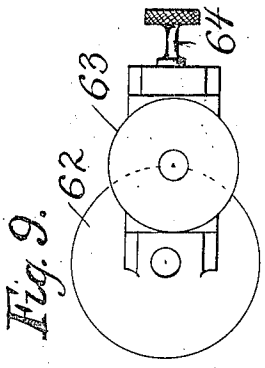


Fig. 9.



Witnesses

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No. 838,250. PATENTED DEC. 11, 1906.

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5 SHEETS—SHEET 4.

Fig. 10.

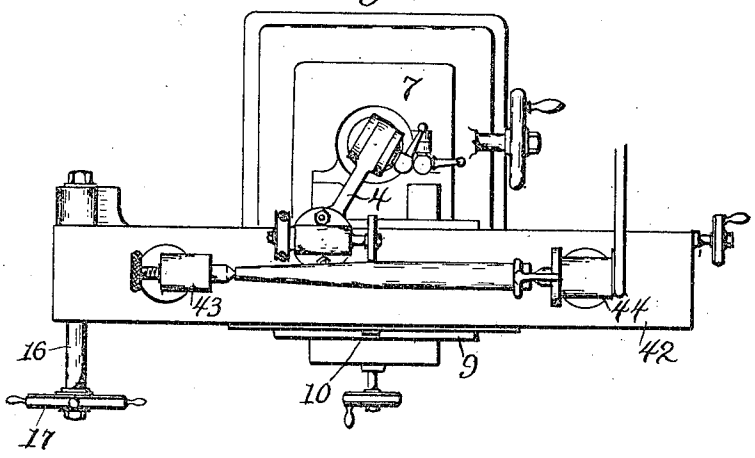
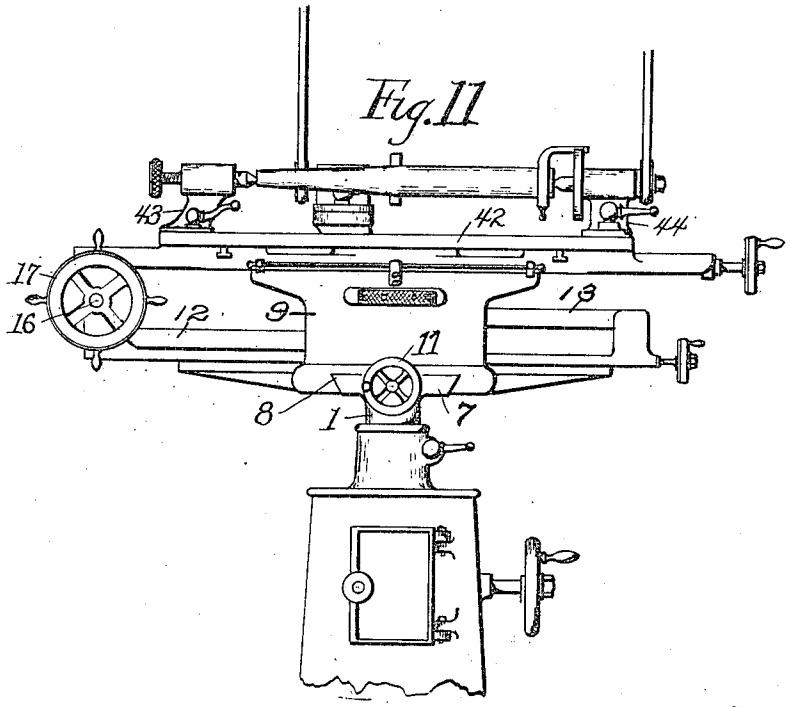


Fig. 11.



Witnesses

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5 SHEETS—SHEET 5.

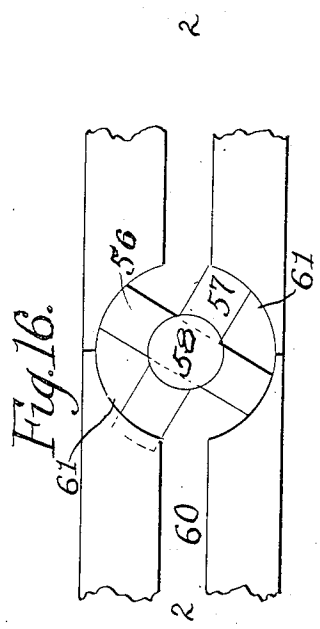


Fig. 16.

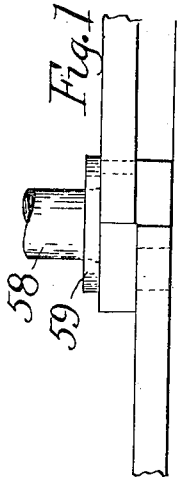


Fig. 17.

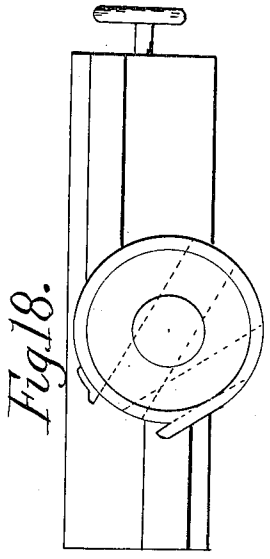


Fig. 18.

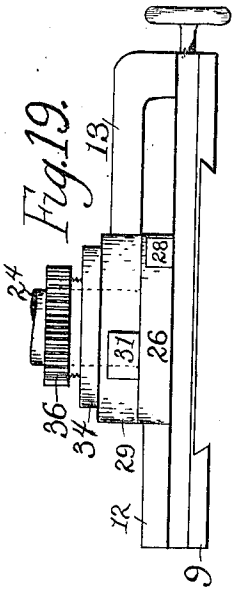


Fig. 19.

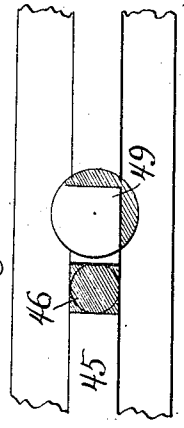


Fig. 12.

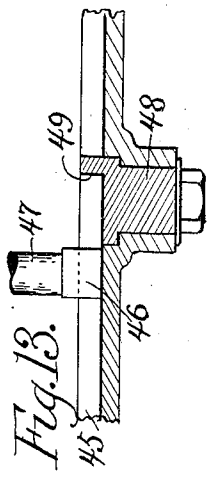


Fig. 13.

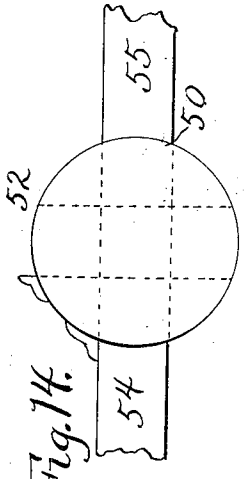


Fig. 14.

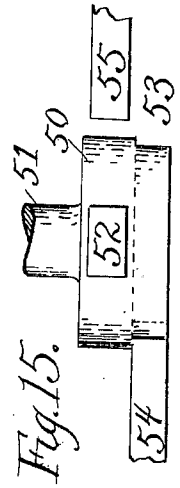


Fig. 15.

Witnesses

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by O. H. Fowler

Attorney

UNITED STATES PATENT OFFICE.

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MACHINE FOR GRINDING OR CUTTING.

No. 838,250. Specification of Letters Patent. Patented Dec. 11, 1906.

Application filed March 10, 1904. Serial No. 197,548.

To all whom it may concern:

Be it known that I, JOHN W. HUDLOW, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Grinding or Cutting, of which the following is a specification.

The object of this invention is to provide a machine for grinding or cutting any desired angle, curve or curves, or radius upon milling-cutters, lathe, tools, or gages, or any other tool, male or female, without resetting the machine after it has once been adjusted.

With this end in view the invention consists in the particular construction of the various parts and in the novel manner of combination and arrangement of said parts, all of which will be fully described, and specifically pointed out in the appended claims.

In the drawings forming a part of this specification, Figure 1 is a side elevation of the complete machine; Figs. 2 and 3, enlarged detail views of the rotatable head. Fig. 2 illustrates the head supporting a cutter, and Fig. 3 illustrates the head supporting a grinding-wheel. Fig. 4 is a vertical sectional view taken on line A B of Fig. 5. Fig. 5 is a top plan view with the table removed, parts being broken away. Fig. 6 is a perspective view of the cams, &c. Fig. 7 is a top plan view of table and attachments. Fig. 8 is a side elevation of the centering-pin. Fig. 9 is a modification of the table attachment. Fig. 10 is a modification illustrating another form of the table attachment. Fig. 11 is a side elevation of the form shown in Fig. 10. Fig. 12 is a modified form of the cams. Fig. 13 is head elevation of form shown in Fig. 12. Fig. 14 is another modified form of the cam. Fig. 15 is a side elevation of the form shown in Fig. 14. Fig. 16 is still another form of the cams. Fig. 17 is a side elevation of the forms shown in Fig. 16. Fig. 18 is a top plan view of the cams shown in Fig. 6, and Fig. 19 is a side elevation of the same.

Referring by numerals to the drawings, 1 represents a bed-plate having integral therewith a perpendicular split collar 2, which surrounds a shaft 3, adapted to be raised or lowered and locked in any desired position. Pivoted to this shaft and provided with means for locking the same thereto is an arm 4, having a rotatable head 5, which is also provided with means for locking it in any position. This head is adapted to receive a cutting-tool or emery-wheel 6 and to be driven by a belt or motor, as may be desired.

The bed-plate is formed with a transverse dovetailed guide 7, fitting snugly into a dovetailed guideway 8 upon a saddle 9, which may be moved back and forth by an adjusting-screw 10, operated by hand-wheel 11.

The saddle carries longitudinally-adjustable guides 12, 12, and 13, parallel with respect to each other, yet not in the same plane, and a sliding rack-bar 14 in engagement with a pinion 15 upon a transverse shaft 16, driven by hand-wheel 17, the object of which will be hereinafter explained.

Mounted upon the saddle in guideways 18 is a table 19, in the center of which is an aperture 20, surrounded by downwardly-projecting sleeve or collar 21 and an upwardly-extending circular flange 22, both of which are formed integral with the table. Fitting snugly into the sleeve or collar 21 is a bushing 23, serving as a bearing for a shaft 24, the upper end of which is secured to a disk 25, fitting in the circular flange 22, and its lower end is formed with a cam 26, consisting of a disk provided with an ear 27 and a slot 28, adapted to engage the guide 12. A similar cam 29, consisting of a disk having an ear 30 and a slot 31, which slot is adapted to engage the guide 13, is journaled upon the shaft and rests against the cam 26. This shaft is further provided with sleeve 32, keyed thereupon and externally screw-threaded, as shown at 33, which threads are adapted to receive a lock-nut 34 for securing the two cams together, and a pinion 35, which meshes with the sliding rack-bar 14. The top of the shaft is provided with a central screw-threaded aperture 36, adapted to receive a hand-screw 37, in the center of which is an aperture 38, adapted to receive a center pin 39. This end screw serves to secure a sliding rest 40 to the disk 25, which sliding rest is provided with calibrations 41, adapted to register with the zero-point on the flange 22. This slide-rest is adapted to receive any desired form of a tool-holder.

In Figs. 10 and 11 I have shown a modified form of a tool-holder which consists of a plate 42, adapted to take the place of the slide-rest. This plate is provided with oppo-

sitely-disposed and adjustable bearing-points 43 and 44, between which may be held the work to be ground.

In Figs. 12 and 13 I have shown different form of a cam. This form, however, can only be used for grinding or cutting an angle of ninety degrees. It consists of a guideway 45, in which travels a square portion 46 of a shaft 47. At a point in the guideway is a turn-nut 48, the head of which is cut away, as shown at 49. When the square portion 46 engages the cut-away portion of the turn-nut in its path of travel, the shaft revolves ninety degrees and then continues on, said shaft carrying the table.

In Figs. 14 and 15 I have shown another modified form of a cam for cutting an angle of ninety degrees. It consists of a disk 50, formed upon the end of a shaft 51, with slots 52 and 53 therein at right angles to and one above the other, which slots are adapted to engage the guideways 54 and 55, respectively.

In Figs. 16 and 17 I have shown still another form of cams. By means of this form any desired angle may be ground or cut. It consists of two similar oblong pieces 56 and 57, one of which, the piece 56, is formed upon the shaft 58, the other piece 57 journaled upon the shaft and is adapted to be locked at the desired angle with respect to the piece 56 by lock-nut 59. These pieces are adapted to travel in a slot 60, at a suitable point in which is a cut-away portion 61, where the shaft revolves and changes the cutting or grinding of the tool according to the angle set.

In Fig. 9 I have shown a modified form of a table attachment designed for cutting compound curves. It consists of the slide-rest 62, similar to that shown in Fig. 7, which slide rest is provided with an auxiliary table 63, adapted to be adjusted by means of an adjusting-screw 64 to place its turning-point at any desired distance from the turning-point of the slide-rest. This auxiliary table may be revolved by hand or automatically, as may be desired. In setting the machine the cam 29 is first shoved on the guide 13. The cam 26 is then adjusted so as to bring the slots in the two cams in alinement, in which position the slide-rest is at zero. The hand-screw is then tightened and the slide-rest adjusted to the angle it is desired to cut or grind. Upon adjusting the slide-rest it will be seen that the cam 26 is also adjusted, as it is locked thereto by the hand-screw or pin. When the desired adjustment has been made, the cams are locked together by the lock-nut 34 and the hand-screw is loosened and the pin removed, so as to leave the slide-rest free to swing around.

After the cams have been adjusted the table is moved by means of the sliding rack-bar 14, which engages a pinion 35 upon the shaft and is driven by the pinion 15, mounted upon a transverse shaft 16, operated by a hand-wheel. Assuming that the cam 26 is in engagement with the guide 12 and is being moved to the left by the rack-bar 14, it will be seen that upon reaching the space between the guides 12 and 13 the cams will be turned by means of the shaft rotated by the pinion and rack-bar until the ear 30 upon the cam 29 engages the guide 13, at which point the guide 13 enters the slot 31, and the table continues on at the angle previously set.

I deem the various modifications shown and described within the scope of my invention, for such minor changes may be resorted to without sacrificing the broad principle herein set forth.

Having thus described the various features of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a table, a perpendicular shaft carried by the table, a cam formed upon the lower end of the shaft, a cam mounted to revolve upon a shaft, means for locking the cams together, a slide-rest mounted upon the upper end of the shaft, means for locking the said slide-rest and shaft together, adjustable guides adapted to engage said cams, a space between said guides to permit said cams to revolve means for reciprocating and driving the shaft substantially as specified.

2. In a machine of the character described, a bed-plate having a saddle mounted thereupon, a table mounted upon the saddle, a perpendicular shaft carried by the table, the lower end of the shaft being formed with a cam, a cam mounted to revolve upon the shaft, the cams consisting of disks each having an ear and slot, means for locking the cams together, a slide-rest mounted upon the upper end of the shaft, a hand-screw for securing the slide-rest upon the shaft, a centering-pin in the top of the hand-screw, adjustable guides for engaging the slots in the cams, a space between the guides to permit the said cams to revolve and means for reciprocating and driving the shaft, substantially as specified.

3. In a machine of the character described, a bed-plate, a saddle, adjustably mounted upon the bed-plate, a table adapted to reciprocate upon the saddle, a rotatable vertical shaft carried by the table, cams upon the lower end of the shaft, means for locking the cams together at any desired angle, adjustable guides adapted to engage the respective cams, a space between the guides to permit said cams to revolve, means for reciprocating and rotating the said shaft and cams and carried thereby, a slide-rest secured to the upper end of the shaft, means upon the slide-rest for supporting a tool, and a centering-pin in the center of said slide-rest, substantially as specified.

4. In a machine of the character described,

a bed-plate, a vertical split collar formed upon the bed-plate, a column mounted in the collar, means for raising, lowering, rotating, and locking said column, an arm pivoted to the column, means for locking the arm to the column a rotatable head upon the arm, means for locking the head in any desired position, means upon the head for holding and rotating a tool, a saddle adjustably mounted upon the bed-plate, a table mounted to reciprocate upon the saddle, a vertical shaft carried by said table, a fixed and a movable cam upon the lower end of the shaft, means for locking the cams together at any desired angle, adjustable guides for engaging the respective cams, a space between the guides to permit said cams to revolve a slide-rest mounted upon the upper end of the shaft, a hand-screw for securing the slide-rest in position, a centering-pin in the top of the said screw and means for reciprocating and rotating the said vertical shaft and cams carried thereby, substantially as specified.

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Witnesses:
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OWEN H. FOWLER.