(No Model.) 2 Sheets—Sheet 1.

C. KOEGEL.

GRINDING MACHINE.

No. 540,499. Patented June 4, 1895.

Fig. 1.

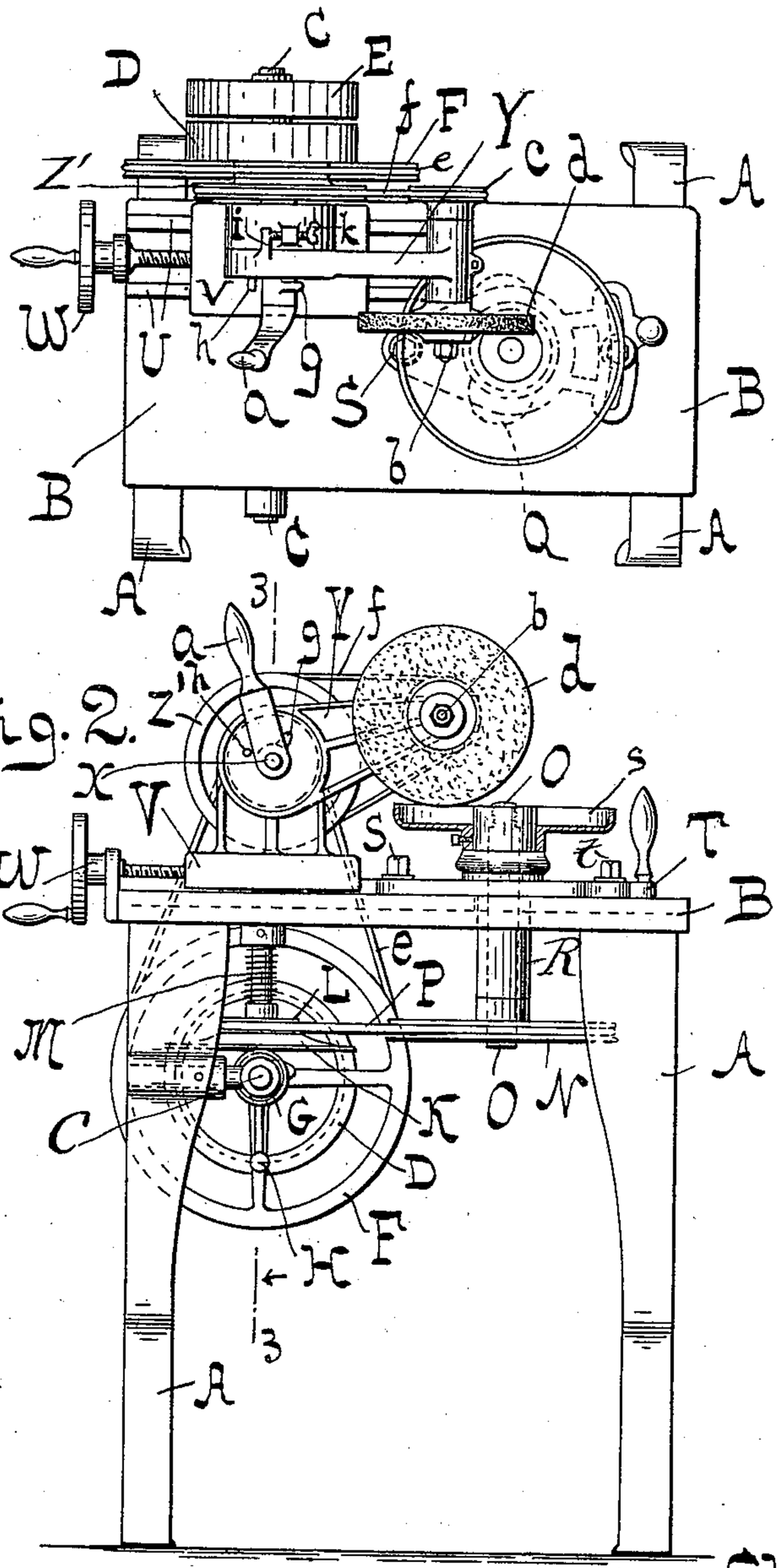

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

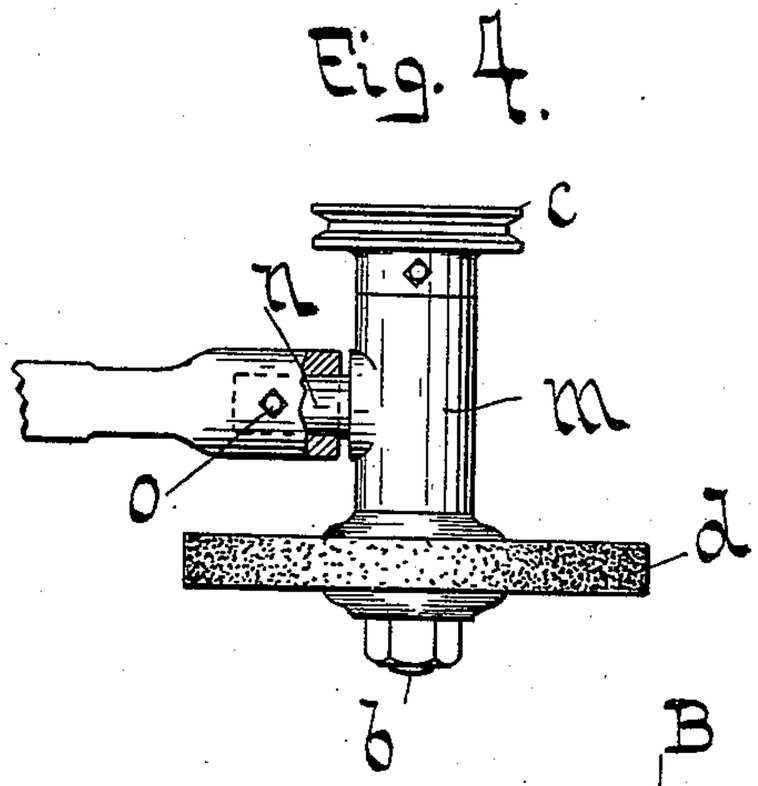


Fig. 3.

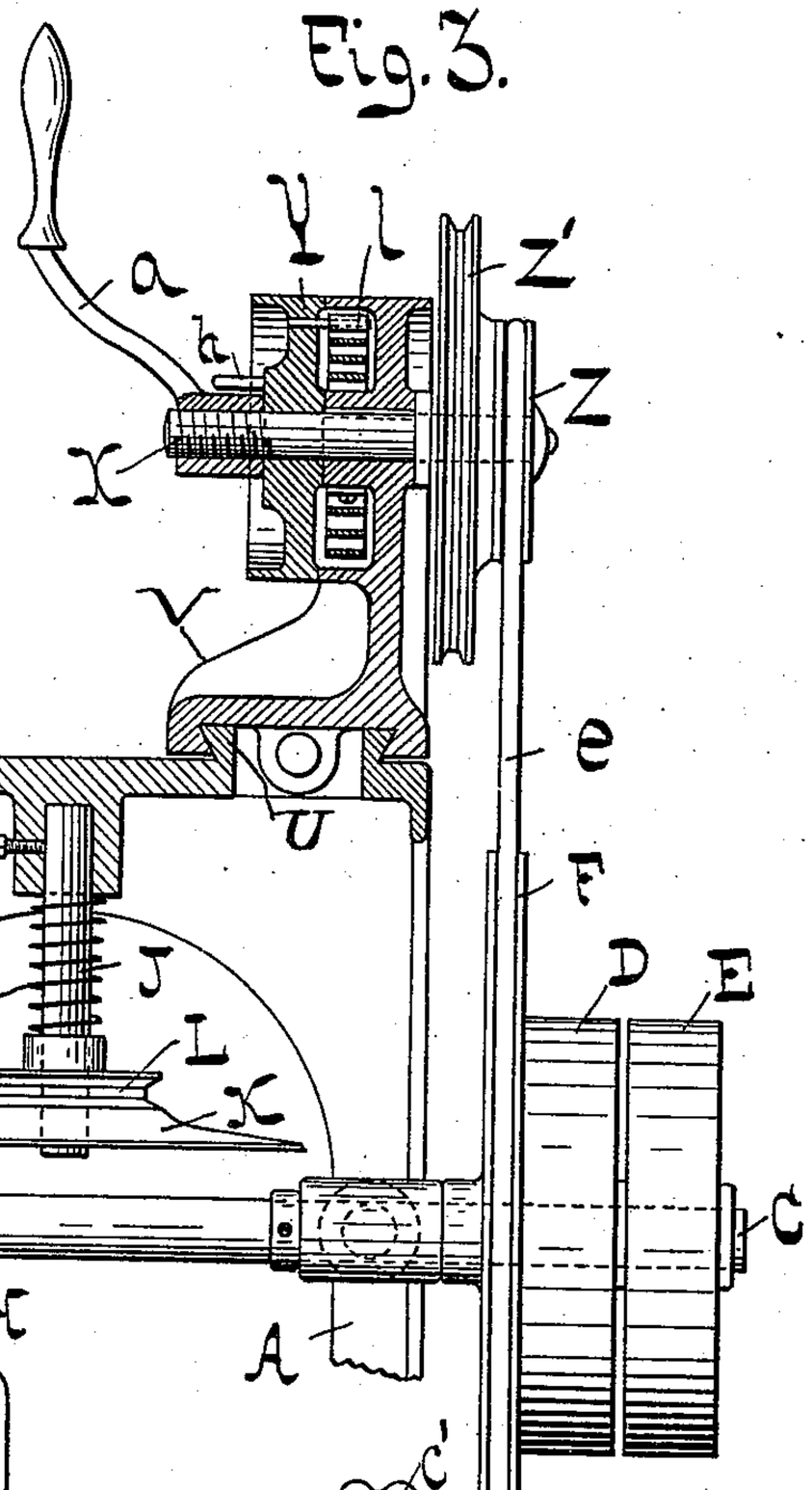


Fig. 5.

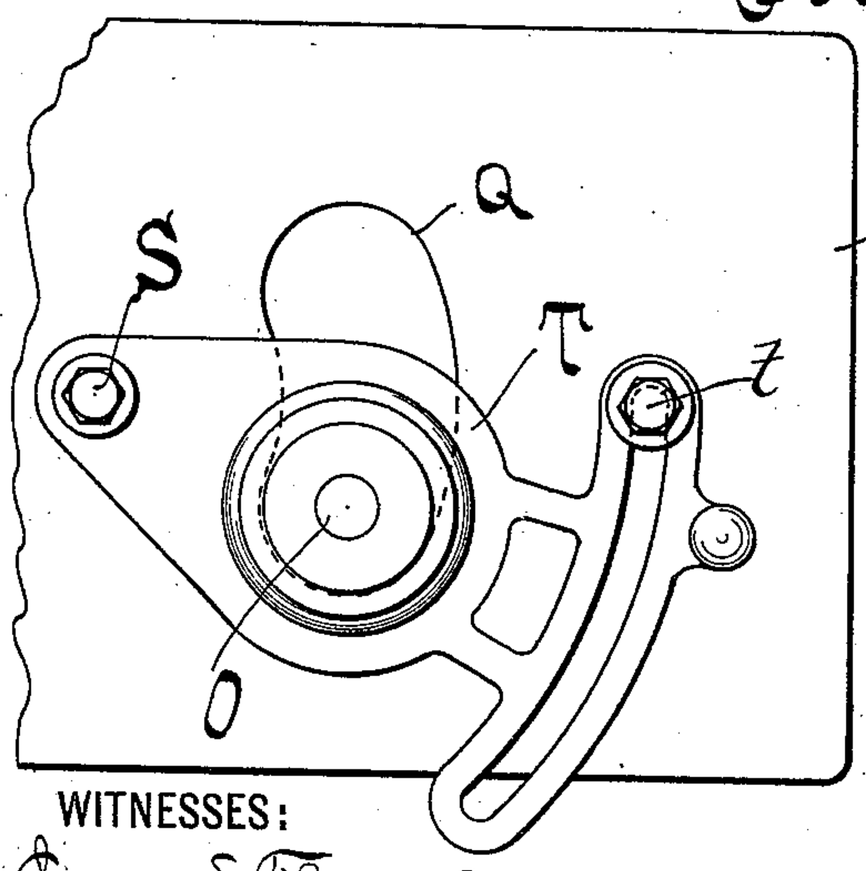
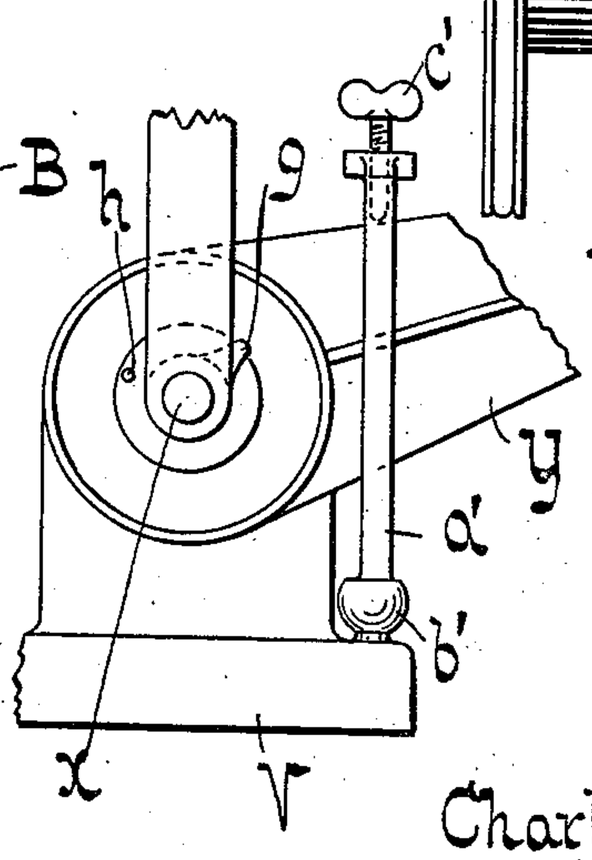


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES KOEGEL, OF HOLYOKE, MASSACHUSETTS.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,499, dated June 4, 1895.

Application filed September 21, 1894. Serial No. 523,677. (No model.)

To all whom it may concern:

Be it known that I, CHARLES KOEGEL, a citizen of the United States of America, and a resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My present invention has reference to a grinding machine especially adapted for grinding the circular cutters for paper cutting apparatus, &c., but which can also be employed for shaping or grinding other objects.

The nature of my invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a plan or top view of a machine constructed according to my invention. Fig. 2 is a side elevation with the tool-holder in section. Fig. 3 is a vertical section on the line 3 3, Fig. 2, drawn to an enlarged scale. Fig. 4 is a plan detail view illustrating an angular adjustment for the grinding-wheel. Fig. 5 is a plan view of the pivoted segment supporting the work-support. Fig. 6 is a detail elevation illustrating modified means for adjusting the arm supporting the grinding-wheel.

Similar letters of reference designate corresponding parts throughout the several views.

Referring at present to Figs. 1 and 2, the letters B and A designate respectively the bed-plate and supporting legs of a suitable stand. Beneath the bed-plate B is mounted in suitable bearings a driving shaft C carrying the driving-pulley D, loose pulley E, pulley F and a friction roll G adapted to be shifted by a lever H.

K is a horizontal friction disk provided with a pulley L and mounted on a vertical spindle J pendent from the bed-plate B. The friction disk K is pressed downwardly upon the roll G by a spring M.

N is a pulley mounted at the lower end of a spindle O projecting upwardly through the bed-plate. A belt P connects said pulley with the pulley L on the disk K; the two pulleys being located at the same level. A rotary motion is therefore imparted to the spindle O from driving shaft C through roll G, disk K, pulleys L and N and belt P.

In the bed-plate is formed a segmental slot Q (Fig. 5) through which the spindle O passes, the same being guided in a hub R pendent from a segment T arranged to swivel about a vertical pivot S. On the upper surface of the bed-plate are formed ways U for a carriage V which can be moved toward and from the spindle O by a usual feed-screw and handle W.

To a horizontal stud X having a bearing in the carriage is rigidly affixed an arm Y, carrying at its free end a transverse spindle *b* having mounted thereon at one end a pulley *c* and on the other end the grinding wheel *d*. On the carriage are also mounted two loose, but connected driving pulleys Z and Z′, the latter driving the pulley *c* and consequently the spindle *b*, by means of the belt *f*. Pulley Z is driven from pulley F by a belt *e*.

To the threaded end of the stud X is affixed a handle *a* affording means for swinging the arm Y in a vertical plane and for holding the same in any desired position. The handle *a* is provided with a nose *g*, and arm Y with a lug *h* adapted to be engaged by the former, and, in addition thereto, the arm Y is provided with a lug *i*, and the carriage V with an ear through which a set screw *k* passes.

In the upper part of the carriage V (Fig. 3) is located a spiral spring *l*, one end of which is attached to the carriage V and the other end to the arm Y. The action of this spring tends to lift the said arm. If desired the free end of the arm Y which is provided with a box *m* for the spindle *b*, may be arranged to swing in a vertical plane at right angles to the plane of motion of the arm Y. This may be accomplished by providing the box *m* with a trunnion *n* fitted in a socket in the arm Y and held by a set screw *o*, (Fig. 4.) This construction permits the grinding wheel to be placed at an angle to the work.

The cutter *s*, or other object, to be ground is secured to the upper end of the spindle O. The cutter is then placed in the desired position with reference to the wheel *d* by moving the segment T about its pivot S and is so held by screwing up the bolt *t*. By means of this laterally movable spindle, cutters of different size can be ground alike and equally well, and, by the provision of a sliding carriage V the grinding wheel *d* can also be adjusted in this direction for every dimension of cutter.

With the aid of the sliding carriage the pivoted arm Y and the laterally movable spindle O, the cutter or other object rotating with said spindle can be ground in any desired manner. The scope of the machine is further increased by the arrangement for setting the grinding wheel at an angle as described with reference to Fig. 4.

The nose *g* is formed on the handle *a* to hold the grinding wheel above the work by engaging with the stop *h* on the carriage when the latter is released, thereby permitting the work to be removed from the spindle O without danger. The lug *i* and the set screw *k* serve to afford means for a fine adjustment of the grinding wheel to the work, and also to prevent excessive biting into the work on lowering the arm Y.

To the same end the construction shown in Fig. 6 may be employed, where *a'* is a bracket attached to the base of the carriage V by a universal joint *b'* and reaching over the arm Y. The said bracket carries an adjusting screw *c'* bearing against the arm, so that the same can be gradually depressed. By reason of the universal joint the bracket accommodates itself to the motion of the arm and can be swung to one side when not in use.

It is of course to be understood that the several mechanical details involved can be substituted for by their equivalents.

What I claim as new is—

1. A grinding machine comprising in its structure a rotary work-support, a carriage mounted to slide toward and from the work-support, a spring supported arm pivoted to swing in a vertical plane toward and from the work-support, and provided with a spindle for the attachment of a grinding wheel, means for rotating said spindle, a handle for securing the arm to the carriage, and an adjustment, as *i k* for the arm, substantially as and for the purpose specified.

2. A grinding machine comprising in its structure a bed-plate, a segment pivoted to said bed-plate to swing in a horizontal plane and provided with means for securing it, a bearing on said segment, a spindle mounted in said bearing and forming a work-support, means for imparting rotary motion to said spindle, a carriage mounted on the bed-plate to slide toward and from the work-support, an arm pivoted to said carriage to swing in a vertical plane toward and from the work-support, a spindle swiveled to the end of the arm for adapting it to be turned in a plane at right angles to the plane of motion of said arm and constructed for the attachment of a grinding wheel, and means for rotating said spindle about its longitudinal axis, substantially as described.

3. A grinding machine comprising in its structure a rotary work-support, a carriage mounted to slide toward and from the work-support, a spring supported arm pivoted to swing in a vertical plane toward and from the work-support and normally held above the work by the action of said spring, a spindle for the attachment of a grinding wheel mounted in said arm, means for rotating said spindle, an adjustment, as *i k* for controlling the downward movement of the arm, and lugs *h g* for lifting the arm above the work, substantially as described.

4. A grinding machine comprising in its structure a bed-plate, a segment pivoted to said bed-plate to swing in a horizontal plane and provided with means for securing it, a vertical bearing formed on said segment, a spindle mounted in said bearing and forming a work-support, a driving shaft C, an operative connection, including a friction clutch, between said driving shaft and the spindle, located beneath the bed-plate, a carriage mounted on the bed-plate to slide toward and from the work-support, an arm pivoted to said carriage to swing in a vertical plane toward and from the work-support, a grinding wheel spindle mounted at the end of said arm, and operative connections between the shaft C and the spindle for rotating the latter, substantially as described.

5. A grinding machine comprising in its structure a bed-plate, a segment pivoted to said bed-plate to swing in a horizontal plane and provided with means for securing it, a bearing on said segment, a spindle mounted in said bearing and forming a work-support, means for imparting rotary motion to said spindle, a carriage mounted on the bed-plate to slide toward and from the work-support, an arm adapted to move vertically toward and from the work-support and provided with a spindle for the attachment of a grinding wheel, and means for rotating said spindle, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of September, 1894.

CHARLES KOEGEL.

Witnesses:
R. G. KILDUFF,
W. H. GRAVES.