

(No Model.)

4 Sheets—Sheet 1.

G. H. SMITH.  
GRINDING MACHINE.

No. 329,781.

Patented Nov. 3, 1885.

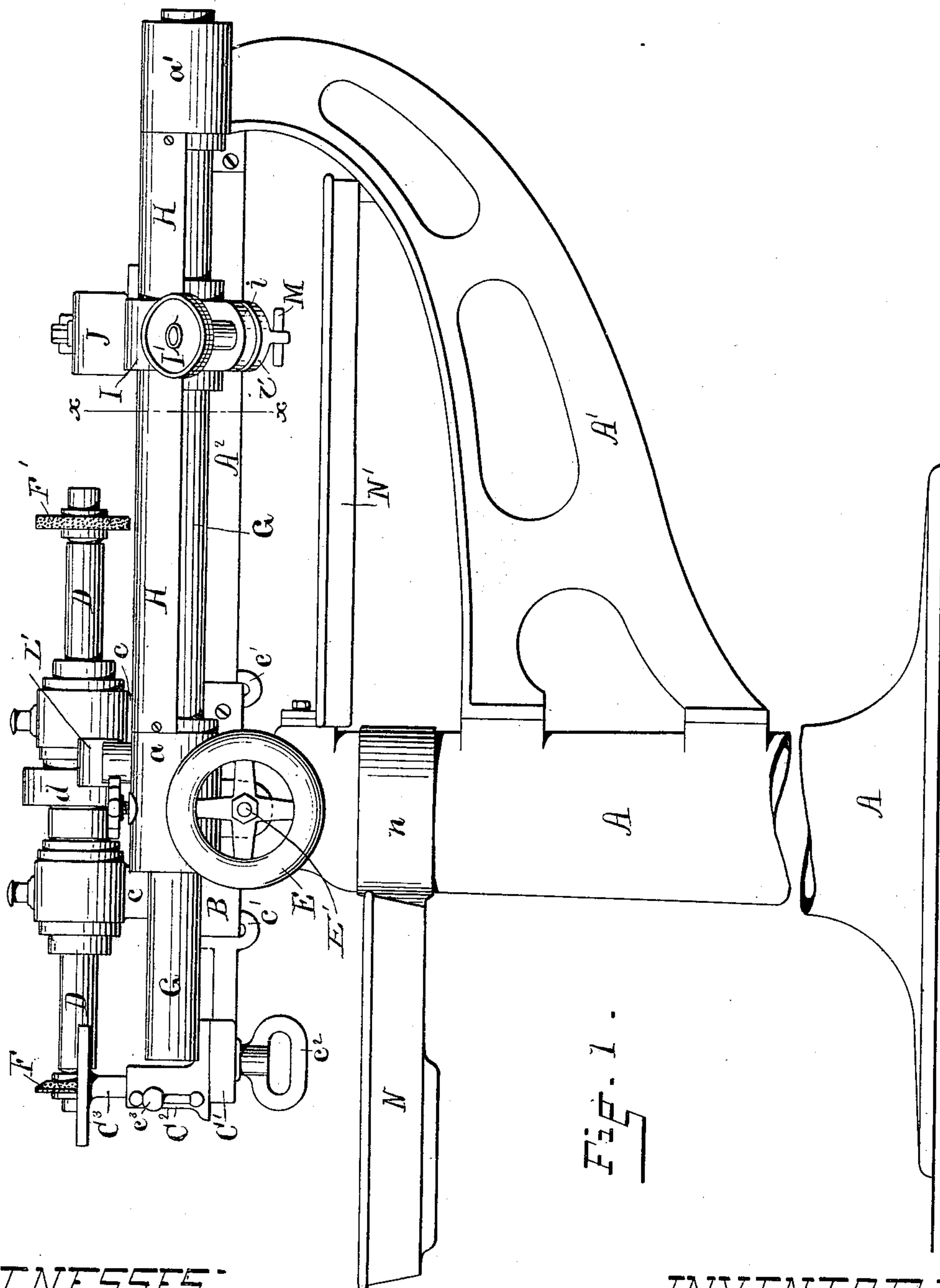


Fig. 1.

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By Joseph A. Miller  
Att'y

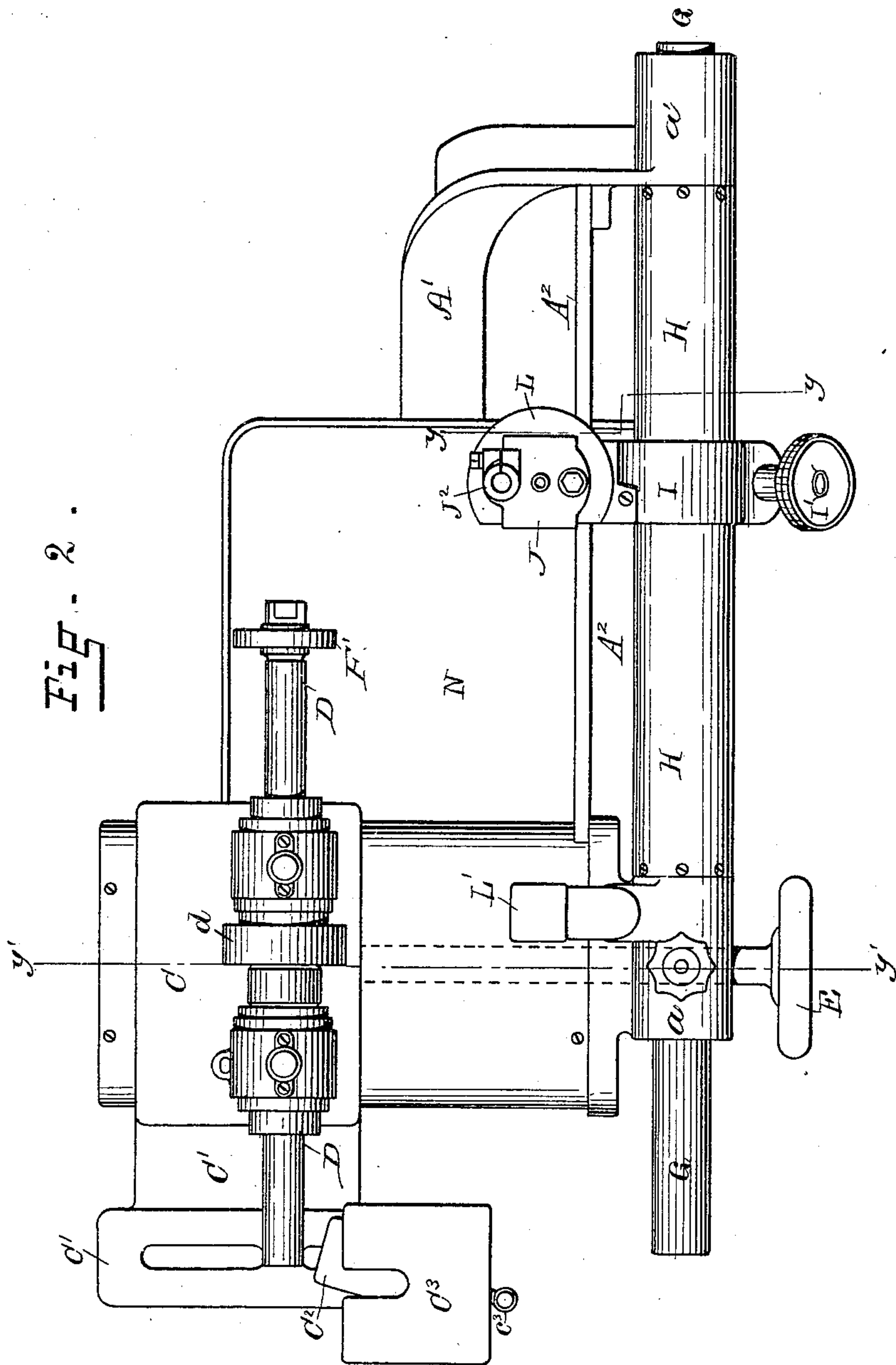
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4 Sheets—Sheet 3.

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Fig. 3.

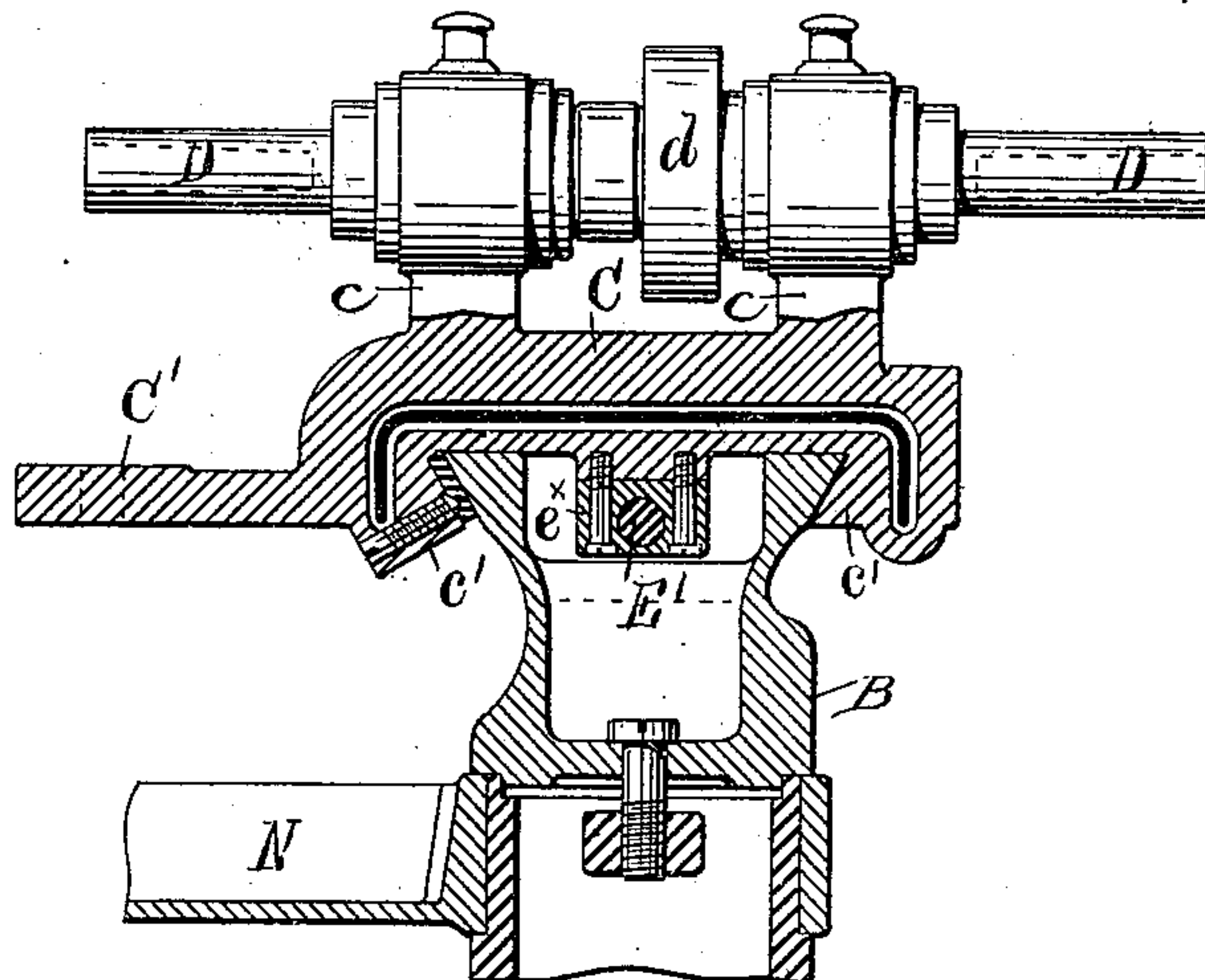
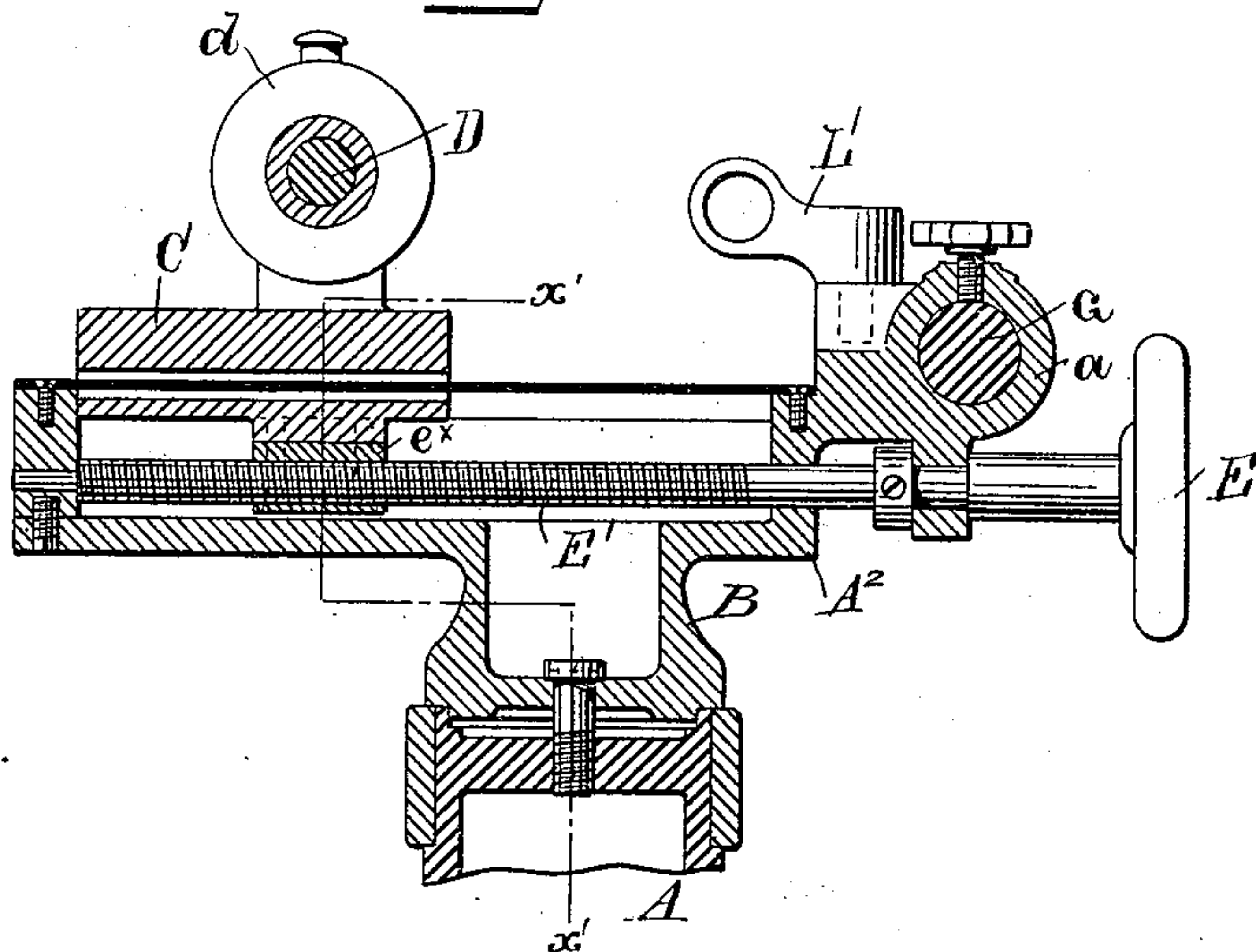


Fig. 4.



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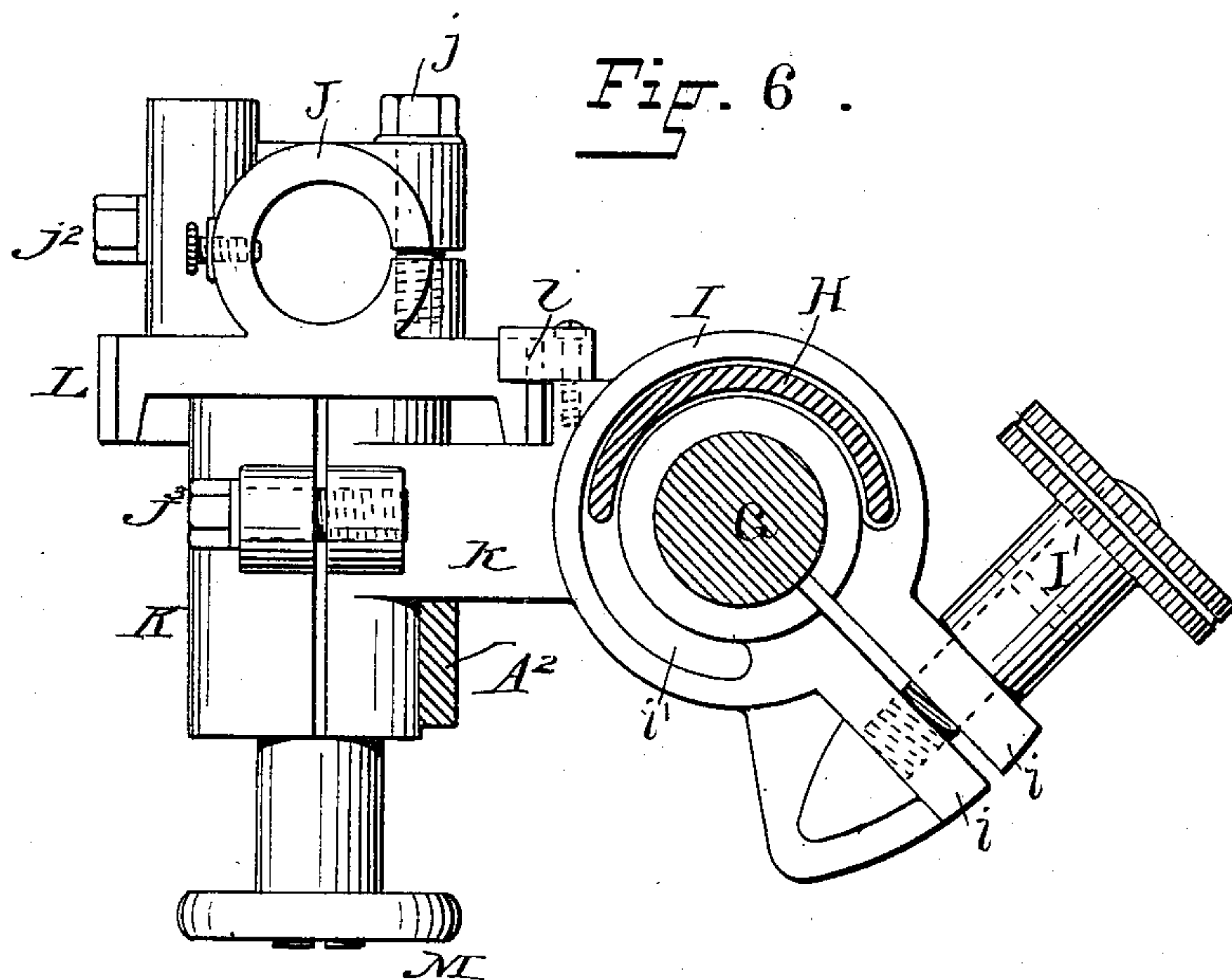
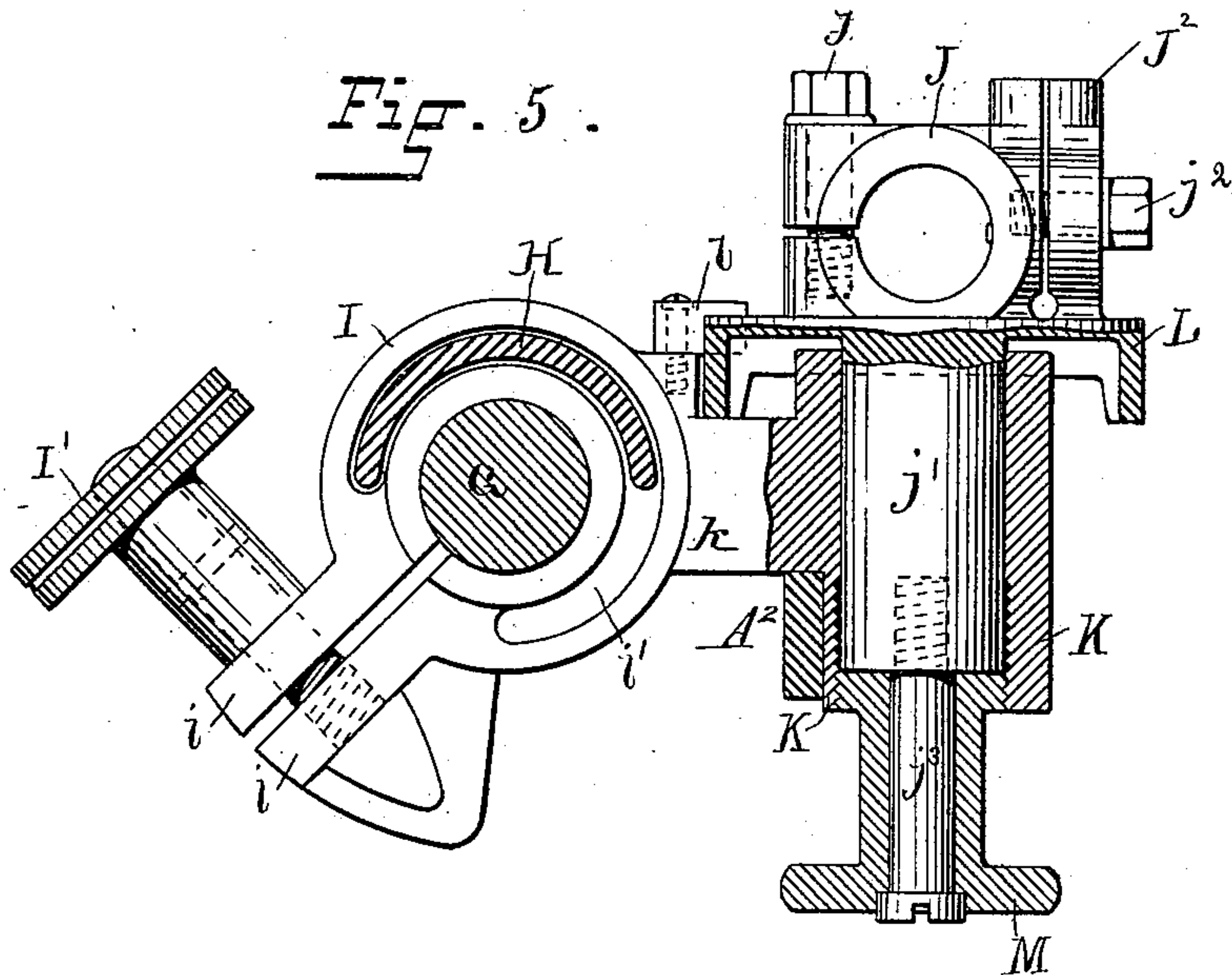
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G. H. SMITH.  
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# UNITED STATES PATENT OFFICE.

GEORGE H. SMITH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE  
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## GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 329,781, dated November 3, 1885.

Application filed March 27, 1884. Serial No. 125,703. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. SMITH, of the city and county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to machines for grinding cutters and for general grinding work; and the object of my invention is to produce a machine of improved construction, greater facility of operation, and of increased capacity, as compared with previous machines of the same class.

My invention consists in the peculiar and novel construction and arrangement of certain parts of the machine, as hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the operative mechanism of my improved machine. Fig. 2 is a plan view of the same. Fig. 3 is a cross-sectional view of bed B and its contiguous parts, taken on line  $x'x'$  of Fig. 4. Fig. 4 is a longitudinal section taken on line  $y'y'$ , Fig. 2. Fig. 5 is a transverse section on line  $yy$ , Fig. 2, and partial elevation of the machine. Fig. 6 is a transverse section on line  $xx$ , Fig. 1.

In the said drawings, A designates a portion of the machine-frame, which is in the form of a pedestal or column; and A' designates a bracket, which extends outward and upward from the side of the column A.

A<sup>2</sup> designates a portion of the frame of the machine.

B designates a bed, which extends transversely of the machine from the upper end of the column A, and upon this bed is mounted a slide, C, formed with two vertical standards,  $cc$ , at the upper end of each of which is formed a bearing for the driving-shaft D. The movement of slide C is produced by a screw-rod, E', extending beneath the bed and working through a nut,  $e^x$ , on the under side of the slide and beneath bed B. The movement of the slide upon the bed is guided by two down-

wardly-extending projections,  $c'c'$ , which embrace the sides of the bed B and extend somewhat beneath the same. The slide C is formed with a lateral extension, C', which constitutes the support for a sliding socket-piece, C<sup>2</sup>, the latter being secured in any desired position of its permitted movement by a clamp-screw,  $c^2$ , which passes upward through a slot in the extension C' and into the base of the socket-piece.

C<sup>3</sup> designates a rest, the downwardly-extending stem of which works in the upwardly-extending socket of the piece C<sup>2</sup>. The rest C<sup>3</sup> is held at any point of its vertical adjustment by a set-screw,  $c^3$ , which screws horizontally through the neck of the socket and binds against the stem of the rest. The driving-shaft D is provided midway of its length with a band-pulley,  $d$ , for communicating rotary motion to the shaft from the motor, and at either end said shaft carries a grinding-disk, F, which is secured to the shaft in such manner as to turn with it.

G designates a guide-bar, which is set in bearings  $a a'$ , the former being formed upon frame A<sup>2</sup>, while the latter is formed upon the bracket A'. The bar G moves longitudinally in the bearings  $a a'$ , and is surrounded by a shield, H, which is secured at its ends to the inner sides of the bearings  $a a'$ . This shield is placed above the bar G, and extends concentrically half-way around the said bar. Upon the bar G is mounted a clamp-ring, I, which is in the form of a split circle, and is tightened upon the bar G by a clamp-screw, I', which passes through two lugs,  $i i$ , at the ends of the clamp-ring. The clamp-ring is formed with a semi-annular slot,  $i'$ , through which the shield H loosely passes, the said shield being of less width than the slot, as shown at Figs. 5 and 6. The shield H forms a partial housing for the bar G, protecting it from grit and dirt.

J designates the work-holder, which is in the form of a split-ring clamp united by a clamp-screw,  $j$ .

J<sup>2</sup> designates a similar clamp, which is formed upon the side of the clamp J, and serves the general purpose of a holding-vise. The clamp J<sup>2</sup> is closed by the clamp-screw  $j^2$ . The circular gage-plate  $h$  is formed with a cylindri-



cal stem,  $j'$ , which enters a sleeve, K, formed upon extension  $k$ , which bears the gage-finger  $l$ , projecting over the plate L. The stem  $j'$  is provided with a separable extension,  $j^3$ , which screws into the lower end of the stem. The lower end of the sleeve K is closed by the screw-threaded hand-plug M, the external thread on the upper end of which works into an internal screw-thread which is formed on the lower part of the sleeve K. Thus it will be seen that the clamp J may be adjusted vertically by the plug M, and that whatever the degree of such adjustment may be the stem  $j'$  of the clamp will be firmly seated upon the plug by means of the extension  $j^3$ . The sleeve K and the clamp I are united in one by the extension  $k$ , the arrangement being such that the clamp I and the sleeve K, with its clamps J  $J^2$ , may be both turned over, the clamp I being depressed and the sleeve K being raised upon the bar G, for the purpose of allowing the workman to inspect the surface being ground. The movement of the sleeve K is limited by the slot  $i'$ , the ends of which come into contact with the sides of the shield H when the sleeve has been turned sufficiently upon the bar or arbor G.

As shown in Fig. 5, the parts are in their normal position, which is that in which they are during the grinding operation. In this position the extension  $k$  rests upon the portion  $A^2$  of the frame-work.

N designates a drip-pan, which turns upon the column, said pan being provided with a collar,  $n$ , which embraces the column.

$L'$  designates an auxiliary holder for miscellaneous work, which is pivoted upon a projection formed upon the bearing  $a$ .

$N'$  designates a drip-pan, which is placed rigidly in horizontal position between the standard A and the outer end of bracket  $A'$ , and above said bracket, the purpose of this pan and the swinging pan N being to catch water from the grinding-wheels F F'. The purpose of the slot in rest  $C^3$  is to permit the attachment of an ordinary tool-holder to the bed of the rest.

The rest  $C^3$  is used for supporting cutters while their edges are being ground by a grinding-disk, which is supposed to be attached to that end of the driving-shaft. The gage-plate L is set relative to the finger  $l$  to gage the cut or taper to be produced by turning it on its stem  $j'$ .

$J^3$  designates a screw-bolt, which works through a two-part screw-socket formed in a pair of lugs on one side of the sleeve K. The

purpose of this screw is to clamp the stem  $j'$  in any position of its vertical movement.

In using this machine the work is clamped in the holder J or the holder  $J^2$ , so as to extend across the face of the grinding-disk. If the work is to be ground straight, the work is set in line with the bar or arbor G; but if the work is to be ground on a taper the holder J or  $J^2$  is turned to correspond with the angle required, and in either case the holders are registered by the gage-finger  $l$ . The operator now screws up the grinding-disk against the work, and then moves the bar or arbor G back and forth, using the screw  $I'$  as a handle. As the work progresses the operator occasionally tilts the holders toward him upon the bar or arbor G, for the purpose of inspecting the ground surface.

The tool or other piece of work to be ground is clamped upon bar G by means of the holding-clamps in such position as to come into proximity to wheel F'. The work is fed up to the wheel by manipulations of the bar and its attachments, and by reverse movements of said parts the progress and character of the work can be frequently and readily inspected.

Having thus described my invention, I claim—

1. In a grinding-machine, the combination, with a longitudinally-moving bar mounted in bearings on the machine-frame, of a work-holder clamped to said bar and arranged to turn pivotally upon said bar toward and away from the grinding-disk, substantially as and for the purpose described.

2. The combination, with the machine-frame and the bar G, of the clamp I, the circular portion L, the clamp J, and the extension  $k$ , substantially as set forth.

3. The combination, with a longitudinally-movable bar secured in bearings in the frame, of a swiveled work-holder clamped to said bar and arranged to move pivotally thereon, substantially as set forth.

4. The combination, with the movable guide-bar G, carrying thereon double-clamp work-holder J, of the slide C, moving on the plate E, and carrying the shaft D, bearing the grinding-disks, substantially as described.

5. The combination, with the frame and the bar G, of the shield H, and the swiveled clamp J, with its plate L, stem  $j'$ , and plug M, substantially as set forth.

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Witnesses:

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