

No. 749,265.

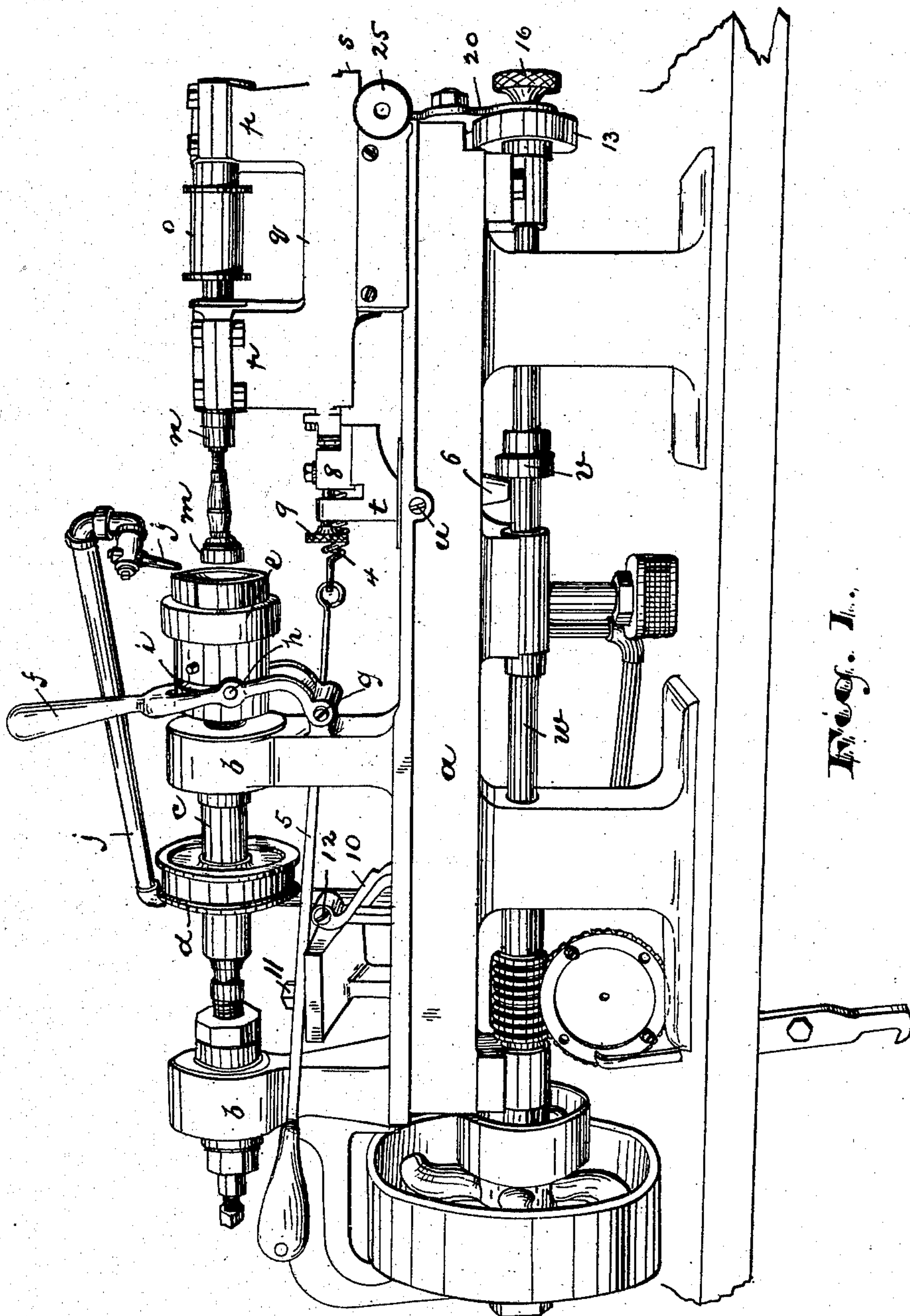
PATENTED JAN. 12, 1904.

H. M. CROWELL.
POLISHING LATHE.

APPLICATION FILED MAY 1, 1903.

NO MODEL.

6 SHEETS—SHEET 1.



WITNESSES:

Henry Plugg

Russell M. Everett

Henry M. Crowell,

INVENTOR:

BY

Charles H. Bell
ATTORNEY.

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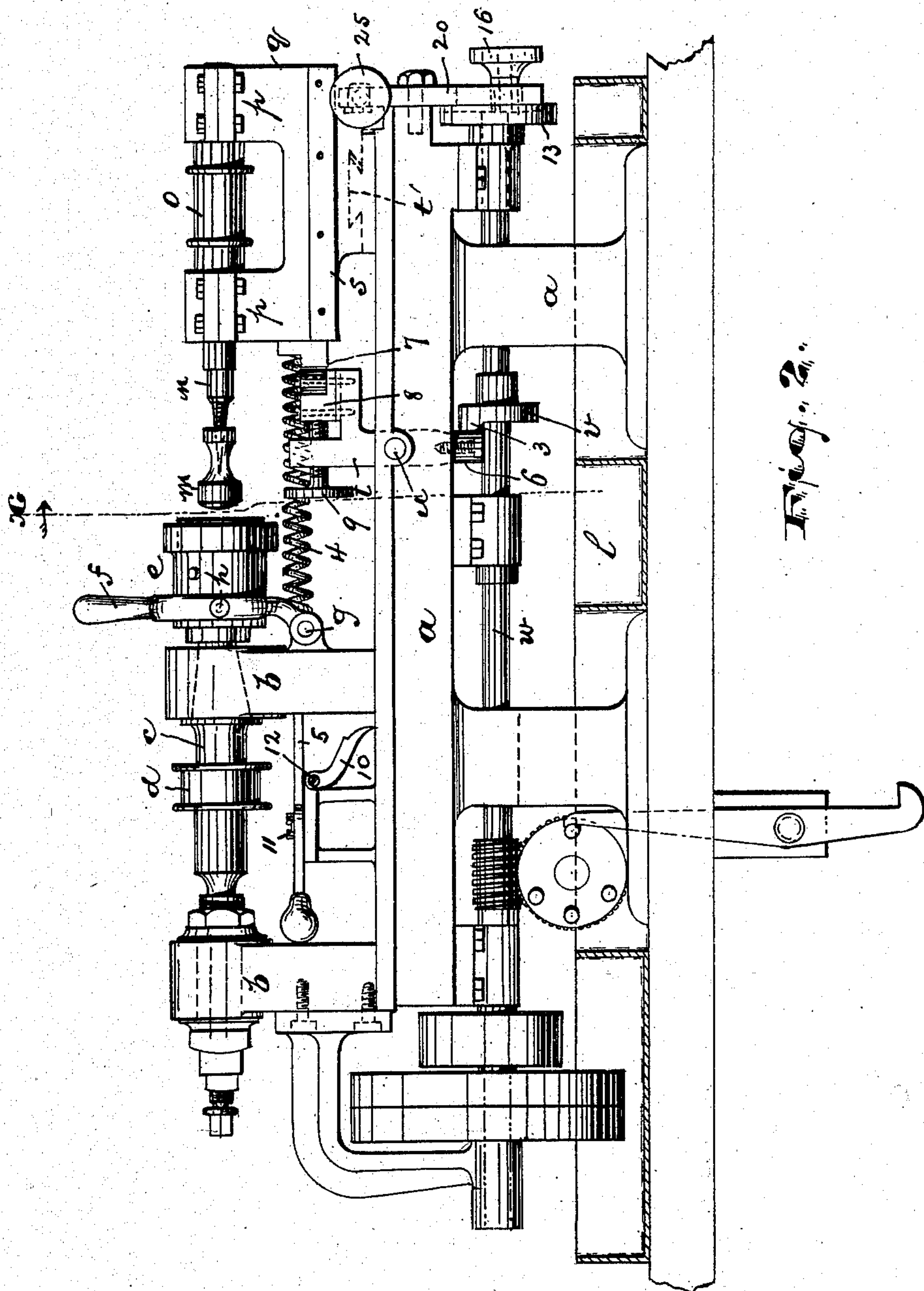
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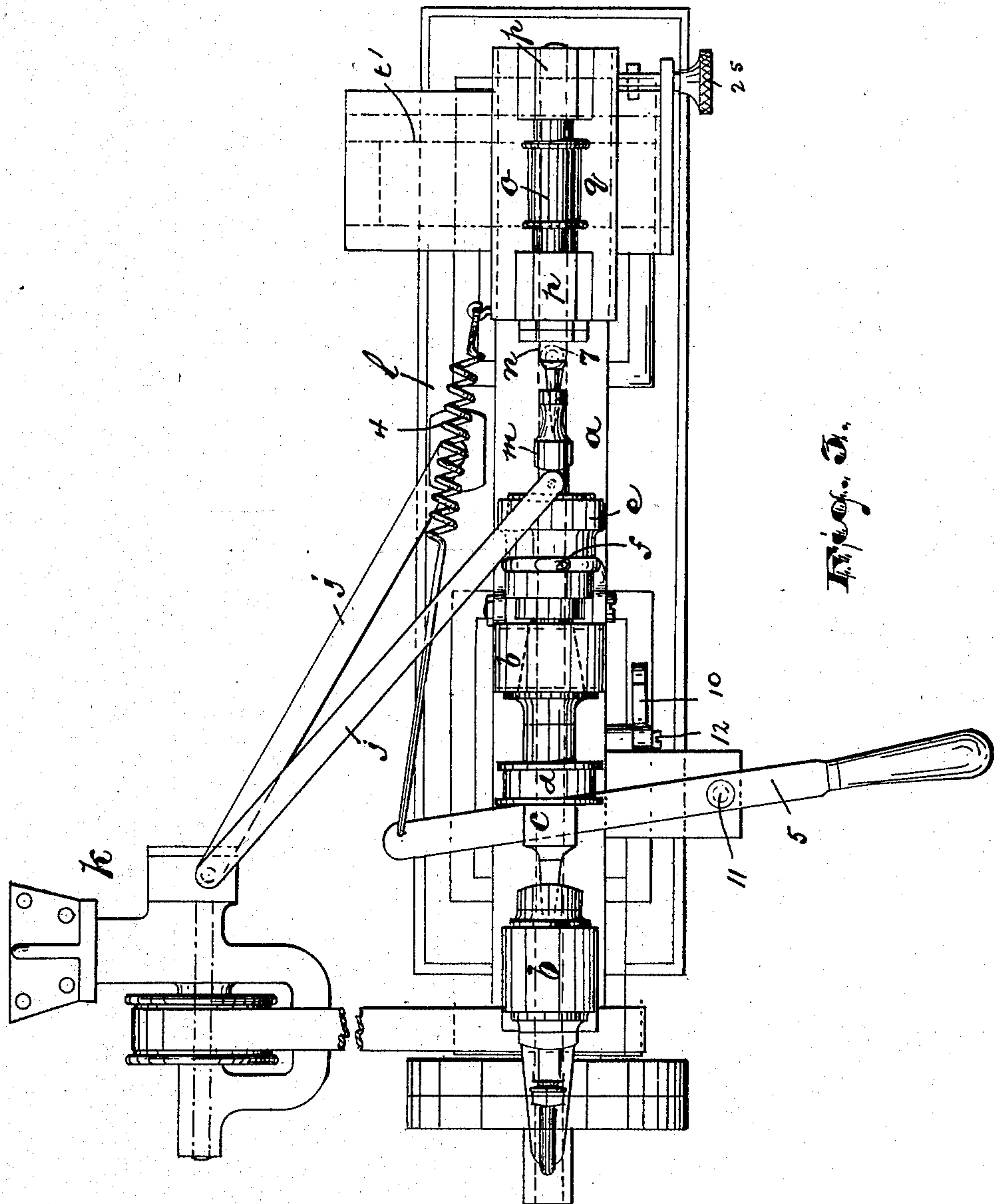


Fig. 3.

WITNESSES:

Henry King
Russell M. Everett.

INVENTOR:

Henry M. Crowell,

BY

Charles H. Bell,
ATTORNEY.

No. 749,265.

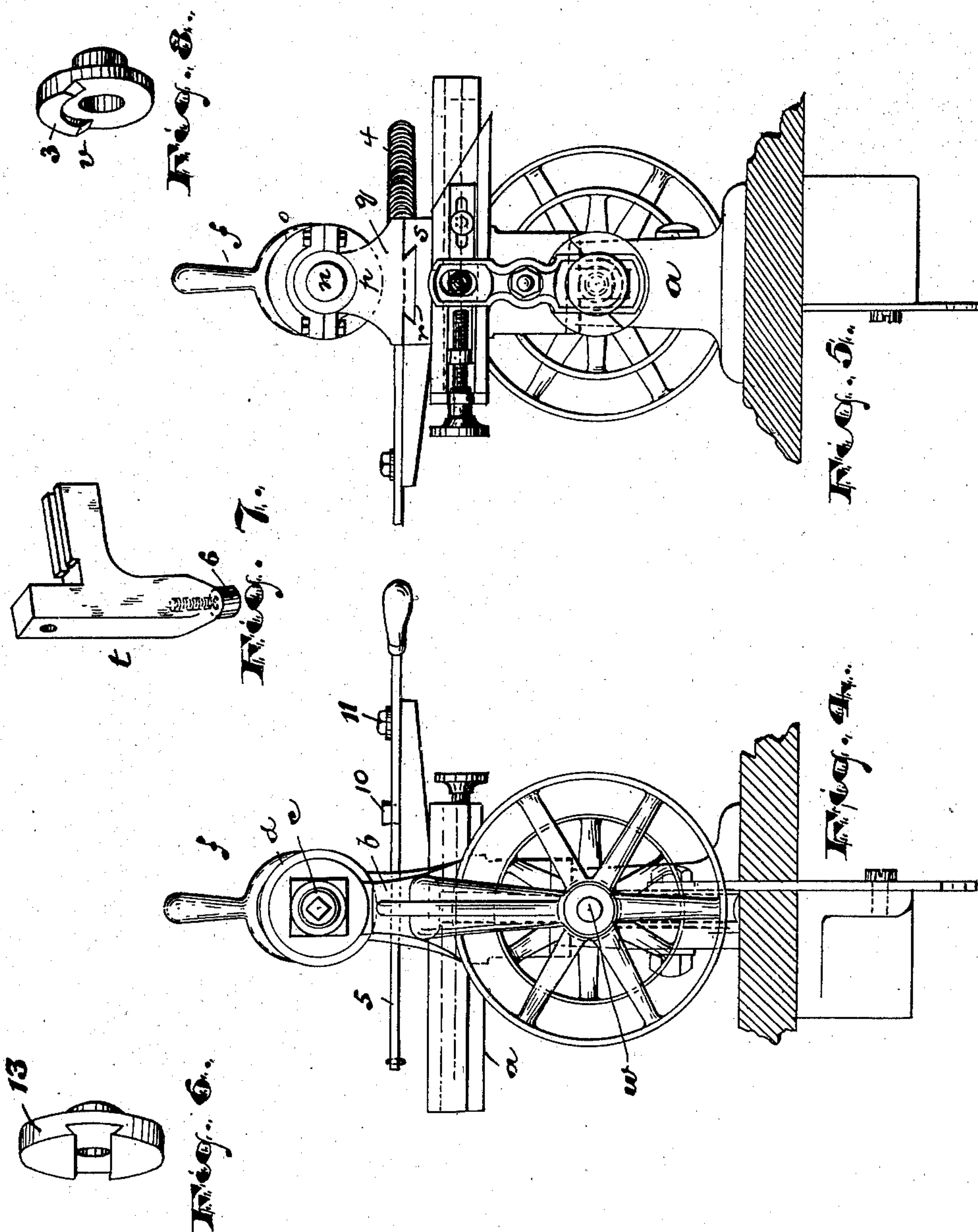
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6 SHEETS—SHEET 4.



WITNESSES:

Henry D. Brug

Russell M. Everett

INVENTOR:

Henry M. Crowell

BY

Charles S. Fell
ATTORNEY

No. 749,265.

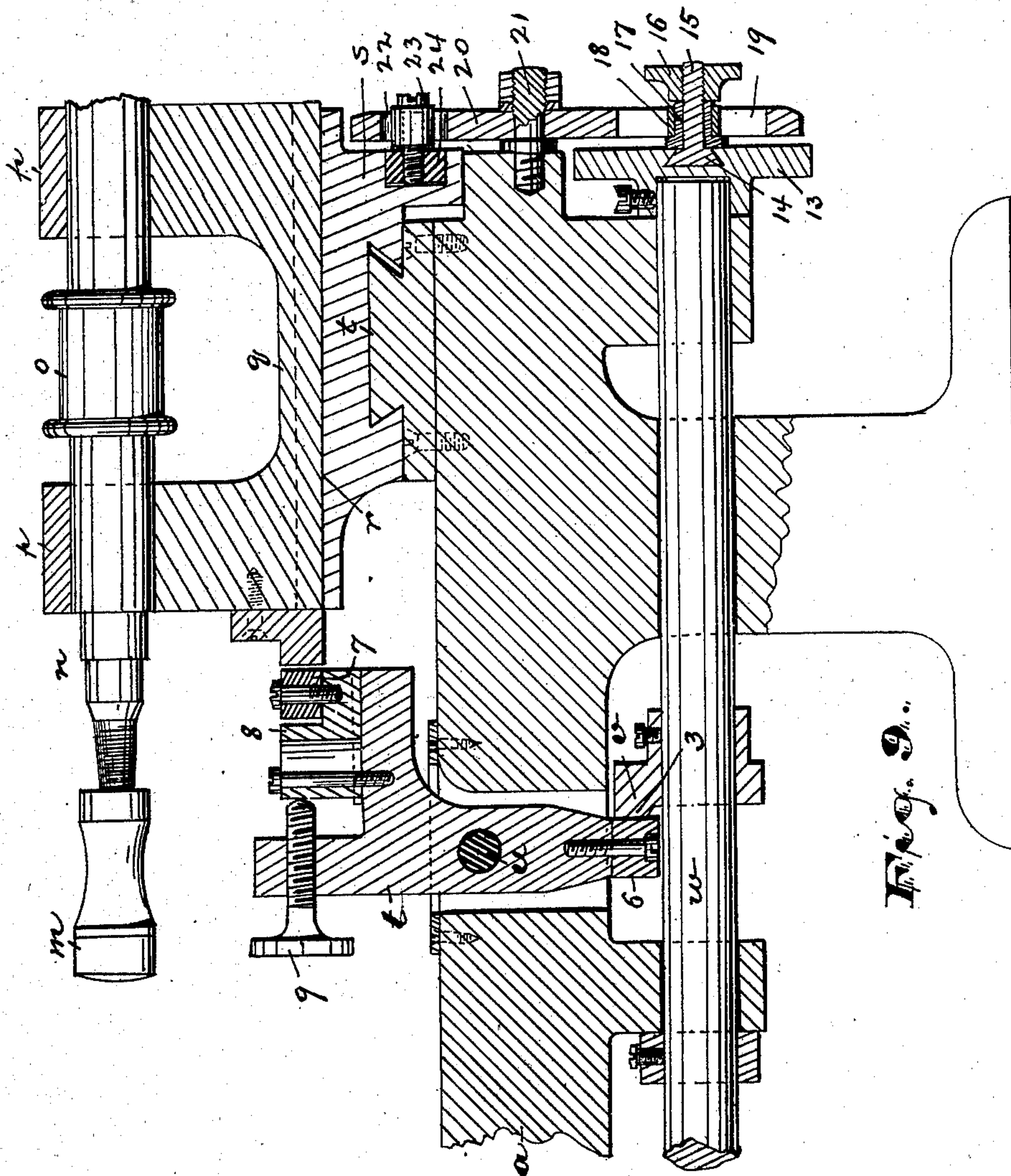
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6 SHEETS—SHEET 5.



WITNESSES:

Ernest Krug

Russell M. Everett

INVENTOR:

Henry M. Crowell,

BY

Charles F. Bell
ATTORNEY.

No. 749,265.

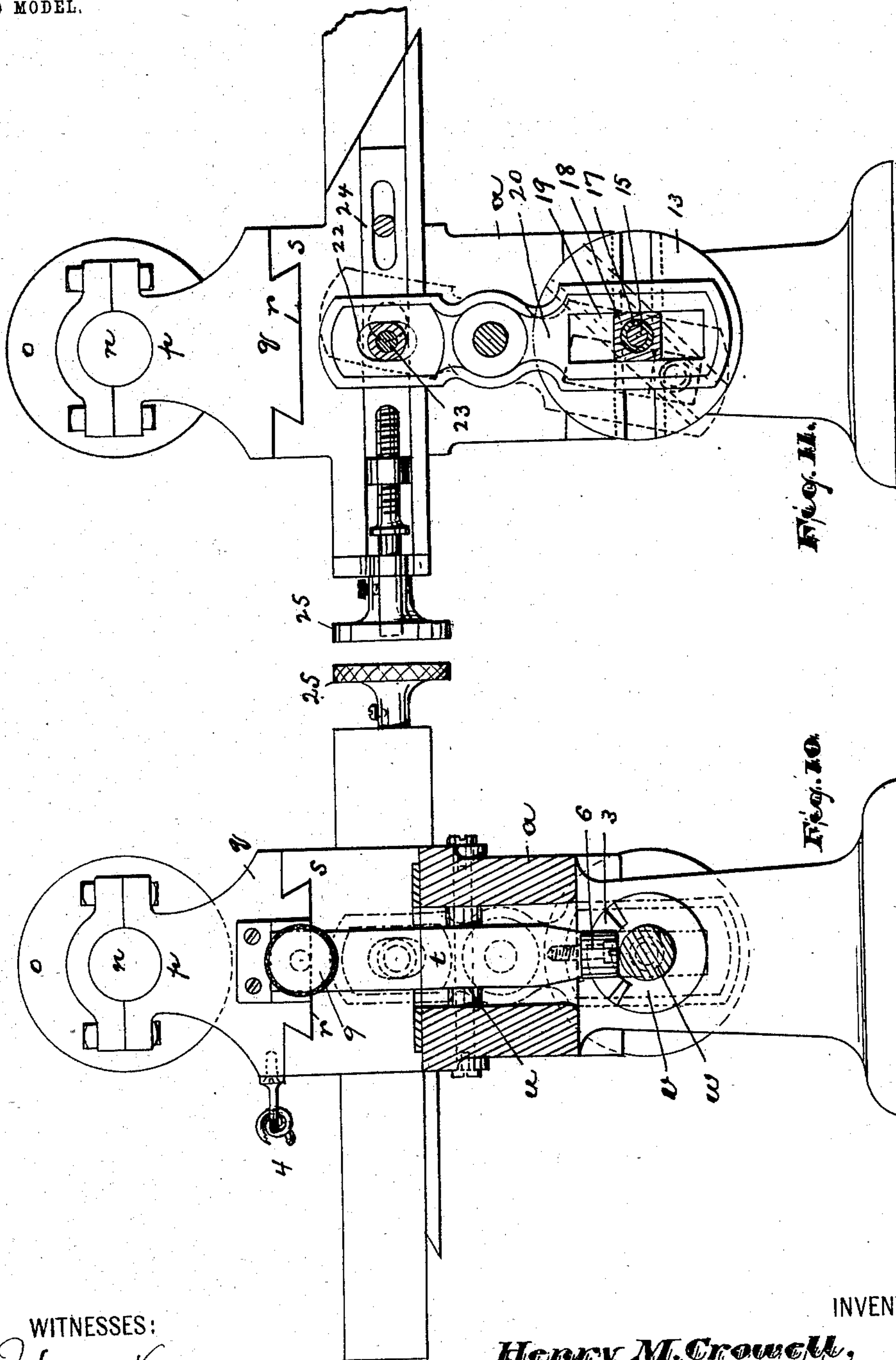
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APPLICATION FILED MAY 1, 1903.

6 SHEETS—SHEET 6.

NO MODEL.



WITNESSES:

Henry Krug

Russell M. Everett

INVENTOR =

Henry M. Crowell

BY

Charles H. Pell
ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY M. CROWELL, OF MAPLEWOOD, NEW JERSEY.

POLISHING-LATHE.

SPECIFICATION forming part of Letters Patent No. 749,265, dated January 12, 1904.

Application filed May 1, 1903. Serial No. 155,124. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. CROWELL, a citizen of the United States, residing at Maplewood, in the county of Essex and State of New Jersey, have invented and produced a new and original Improvement in Polishing-Lathes; and I do hereby 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 characters of reference marked thereon, which form a part of this specification.

The objects of this invention are to facilitate the operation of polishing disks or plates—such, for example, as watchcase-backs, &c.—to enable the work to be performed at a reduced expense of labor, and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved lathe for polishing and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like characters of reference indicate corresponding parts in each of the several figures, Figure 1 is a perspective view of a lathe of my improved construction. Fig. 2 is a front elevation of the same. Fig. 3 is a plan. Fig. 4 is an end view of the machine. Fig. 5 is a view from the opposite end. Fig. 6 is a perspective detail of a grooved wheel for operating a certain eccentric. Fig. 7 is a perspective view of a certain oscillating lever, and Fig. 8 is a detail view of a cam for operating or giving movement to said lever. Fig. 9 shows in section the said lever and cam in connection with co-operating parts of the machine; and Fig. 10 is a transverse section on line *x* of Fig. 2, showing the same parts. Fig. 11 is an end view of the machine, parts being in section to show the construction more clearly.

In said drawings, *a* indicates the bed-plate or frame of a machine, having studs *b b* in

which the chuck-shaft or spindle *c* has its bearings, said spindle being driven by the pulley *d*, adapted to receive its power from a belt and counter-shaft and its pulley (not shown) in any suitable manner. At one end of said shaft or spindle is arranged a chuck *e* of any suitable kind or construction adapted to hold the plate or article to be polished as the same is being rotated at a speed of, say, four hundred rotations per minute. The chuck may have a conical part and a part to ride on the inclined surfaces of said conical part to effect a clamping of the plate, the parts of the chuck being operated to clamp and release the plate or disk by means of a hand-lever *f*, fulcrumed at *g*, Fig. 2, upon one of the studs *b* or otherwise, said lever being preferably forked and provided with a pin or pins *h*, working in a groove *i* of the movable outer part of the chuck, as indicated in Fig. 1. The plate or part to be polished having been clamped in said chuck rotates in a given plane, and oil is fed thereto from an oil-duct *j* by means of a pump *k*, Fig. 3, the oil gravitating from the said plate or disk into a suitable receptacle *l*, Figs. 2 and 3, beneath the chuck, from whence it is again raised by said pump to the work after having been suitably strained. The oil serves to prevent the gold removed from the polished surface from flying away, and thus being lost. The chuck thus rotating with the plate or work contained therein, the polishing-wheel is intermittently presented to the said work and caused to traverse the same, the period of intermittent service being regulated and controlled by automatic mechanism adapted to stop the said wheel *m* after the same has traveled laterally over its work and produced its desired polish or finish. To this end the said polishing-wheel *m* is attached to a spindle *n*, operated at high speed by a pulley *o* and having bearings *p p* on a slide *q*. Said slide *q* is arranged in a slideway *r*, formed on or in a transverse slide *s*, the latter being movable on or in a track or way *t'*, formed or fixed to the bed or frame *a*.

Means for giving a transverse reciprocating movement to the slide *s* are provided, and other means are provided for giving to the

slide *g* a reciprocating movement in a direction parallel with the axis of the polishing-wheel spindle. The latter movement, however, is not a continuous back-and-forth movement, but is intermittent, the polishing-wheel *m* moving up into effective contact with the plate or work on the chuck undergoing the polishing operation, then stopping in its movement lengthwise of its axis for a short period, when it is made to traverse the surface of said work or plate. It then moves backward or away from said work or plate, thus giving it an opportunity to cool and the working surface of the wheel *m* or of the said work to receive a supply of oil and tripoli or polishing-powder, which would otherwise be prevented from entering between the contacting surfaces.

The longitudinal movement of the polishing-wheel *m* and spindle *n* toward and from the chuck is effected by means of a lever *t*, fulcrumed upon the bed or frame *a*, as at *u*. At its upper end said lever is adapted to bear against the slide *g*. At its lower end said lever *t* is engaged by a cam *v*, arranged on a driving-shaft *w*, the said cam *v* having a cam projection 3 adapted to throw the lever against the power of the spring 4, attached to the slide *g* at one end and to a hand-lever 5 at the other. Thus with each rotation of the cam *v* and engagement of the cam projection said cam presses against the slide *g* and forces it and the spindle *n* and polishing-wheel *m* against the power of the said spring 4 away from the work clamped to the chuck. This is immediately followed by a return of the said wheel *m* into contact with said work. The lever *t* is preferably provided with an antifriction-roller where engaged by the cam and slide, and the roller 7 is preferably seated on a slide 8, controlled by an adjusting-screw 9 for regulating the distance of movement of the polishing-wheel from the work and to take up the wear upon said wheel. The spring 4 can be relieved of tension by releasing the lever 5 from its catch 10, and when said spring is thus relaxed the polishing-wheel *m* is not automatically returned to the work after having been thrown away therefrom by the cam *v* and the lever *t*, and thus the plate or work on the chuck can be removed from the said chuck after having been released by means of the hand-lever *f*. After inserting the work in the chuck the lever 5 is turned on its fulcrum 11 to stretch the spring and is fastened in position to maintain the tension by the catch 10, which latter may be a pawl or detent pivoted at 12 and adapted to engage the edge of the lever or otherwise arranged to hold said lever.

To cause the polishing-wheel *m* to traverse the surface of the rotating work on the chuck from or toward the axial center thereof, I have provided the driving-shaft *w* with a cam-wheel or eccentric 13, preferably a grooved

wheel, having a slide 14 in the groove thereof. Said slide is provided with a pin 15, which is threaded to receive a clamping-nut 16. On said pin 15 between the clamping-nut and slide is arranged a collar 17, and this last is arranged within an annular block 18, which in turn is arranged within a slot 19 of a lever 20. The parts are so disposed that by tightening the clamping-nut 16 the collar will be fastened in its relation to the pin 15 and slide 14; but the said collar will be permitted to turn within the block as the lever oscillates on its fulcrum 21. Also by means of the clamping-nut the slide 14 will be fixed or adjusted within the groove of the wheel 13 at any desired distance from the axis of the shaft *w*. The block 18, arranged within a groove or slot 19 of the lever 20, moves lengthwise of said slot to enable the lever to freely oscillate, as before indicated. Said lever 20, fulcrumed on the pin or bolt 21, extends upward toward the slide *s*, where it is slotted, as at 22, and thus adapted to receive a stud or projection 23 on the transverse slide *s*. The lever 20, caused to oscillate by the rotary cam or eccentric 13, imparts a reciprocating movement to the said slide in a direction perpendicular to the axis of the polishing-wheel, and this movement is imparted to the parts carried by said slide. The stud or projection 23 is preferably arranged on an adjustable slide 24, controlled by an adjusting-screw 25, Fig. 11, by which latter the lateral or transverse movements of the slide *s* and the wheel *m* are modified to suit the work wrought upon.

I am aware that various modifications of construction may be employed without departing from the spirit or scope of the invention, and I do not wish to be understood as limiting myself by the positive terms employed in the above description, excepting as the state of the art may require.

From the construction above described it will be evident that as the work rotates at a high rate of speed with the chuck the rotating polishing-wheel moves automatically up to the surface lying in a plane perpendicular to the axis of the chuck and traverses the perpendicular surface, polishing the same, and then moves away again to permit the wheel to cool and a supply of oil to be furnished to the working surface, the movements being repeated until the driving-wheel is stopped by suitable automatic shifting devices of any ordinary description. On stopping the machine the attendant, by means of the hand-lever *f*, opens the chuck, removes the polished plate, inserts another to be polished, and starts the machine.

Having thus described the invention, what I claim as new is—

1. The improved polishing-machine, in which is combined with a suitable bed or frame and chuck, a polishing-wheel, spindle supported on slides, one slide being movable par-

allel with said spindle, and the other at right angles thereto, means for moving said slides and spindle intermittingly in a direction parallel with the axis of said spindle, whereby
 5 said movement will cease momentarily when the polishing-wheel is in engagement with the work lying in said chuck, and means for moving the wheel, spindle and its immediately-supporting slide at right angles to the line of
 10 said spindle-axis, at the end of the movement toward the chuck, when said movement parallel with the said axis has ceased.

2. In a polishing-lathe, the combination with a rotary chuck and means for rotating the
 15 same, of a rotary polishing-wheel movable on its axis, in the line of its axis and transversely or perpendicular to its axis and means for thus moving said wheel, the means being timed to move the rotating wheel transversely
 20 at the end of its movement in the line of its axis whereby the said wheel may be first presented to the plate lying in the chuck and afterward moved over the face of the said plate to or from its center of rotation, substantially
 25 as set forth.

3. In a polishing-lathe, the combination with the rotary chuck and means for rotating the same, of a rotary polishing-wheel and means for rotating the same, a spring adapted to
 30 draw the wheel toward the chuck, means opposed to said spring for periodically forcing said wheel away from said chuck, and means for moving said wheel transversely, substantially as set forth.

35 4. In a polishing-lathe, the combination with the rotary chuck, and means for rotating the same, of a rotary polishing-wheel having bearings on a slide movable toward and from said chuck, means for rotating the wheel, a lever
 40 adapted to engage said slide, a spring tending to draw the polishing-wheel toward the chuck, a rotary cam having a cam projection temporarily engaging the lever to oppose the action of the spring and effect a movement of the
 45 wheel away from the chuck, a driving-shaft and means for rotating the wheel, substantially as set forth.

50 5. In a polishing-lathe, the combination with the rotary chuck and means for rotating the same, of a rotary wheel, arranged at the end of a shaft or spindle, said spindle having bear-

ings on a slide, said slide being movable on a slideway of said lathe in a direction parallel with the spindle, a lever fulcrumed in said lathe and having an adjustable bearing adapted
 55 to engage the said slide, a driving-shaft having a cam adapted to engage the lever and means for transversely moving said slide and its spindle and wheel, substantially as set forth.

6. In a polishing-lathe, the combination with
 60 the bed-frame, of a driving-shaft having a cam and eccentric, a lever operated by the cam, another lever operated by the eccentric, a slide carrying a spindle and engaged by the first
 65 said lever to move the same in a direction parallel with the spindle, said slide being carried by a second slide movable in a direction perpendicular to the said spindle, the said second
 70 slide being in connection with the second lever and operated thereby, substantially as set forth.

7. In a polishing-lathe, the combination with the bed-frame carrying a driving-shaft, a slide carrying a spindle and means for moving said
 75 slide in a direction parallel with the spindle, a second slide carrying the first, an eccentric on the driving-shaft, a lever oscillated by said eccentric and connections of said lever and the
 80 second said slide whereby it is moved perpendicular to the direction of movement of the first said slide, the parts being timed to alternate the transverse or perpendicular movement with the movement parallel with the
 85 spindle, substantially as set forth.

8. In a polishing-lathe, the combination with
 85 the bed-frame carrying a driving-shaft having an eccentric at one end thereof, said eccentric having an adjustable pin, a nut and collar, a block arranged on said collar in a slot of a lever, said lever and connections thereof with
 90 a slide carrying a spindle whereby said spindle is moved in a direction perpendicular to the axis of said spindle, means for rotating said spindle, and a polishing-wheel arranged on said spindle, substantially as set forth.
 95

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of April, 1903.

HENRY M. CROWELL.

Witnesses:

CHARLES H. PELL,
 C. B. PITNEY.