

(Model.)

4 Sheets—Sheet 1.

L. WENCHEL.

Apparatus for Turning Cutters for Molding Machines.
No. 234,635.

Patented Nov. 16, 1880.

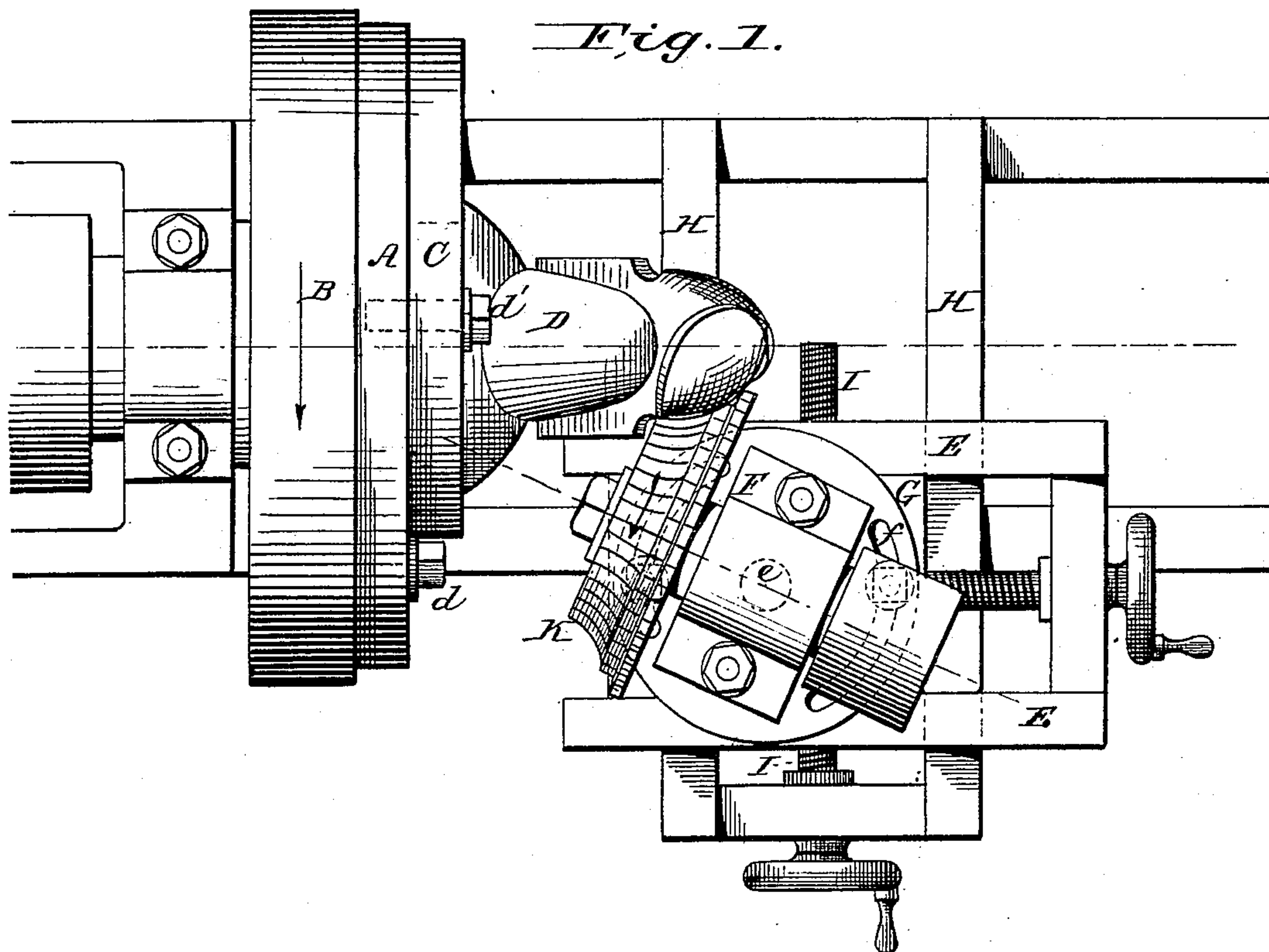
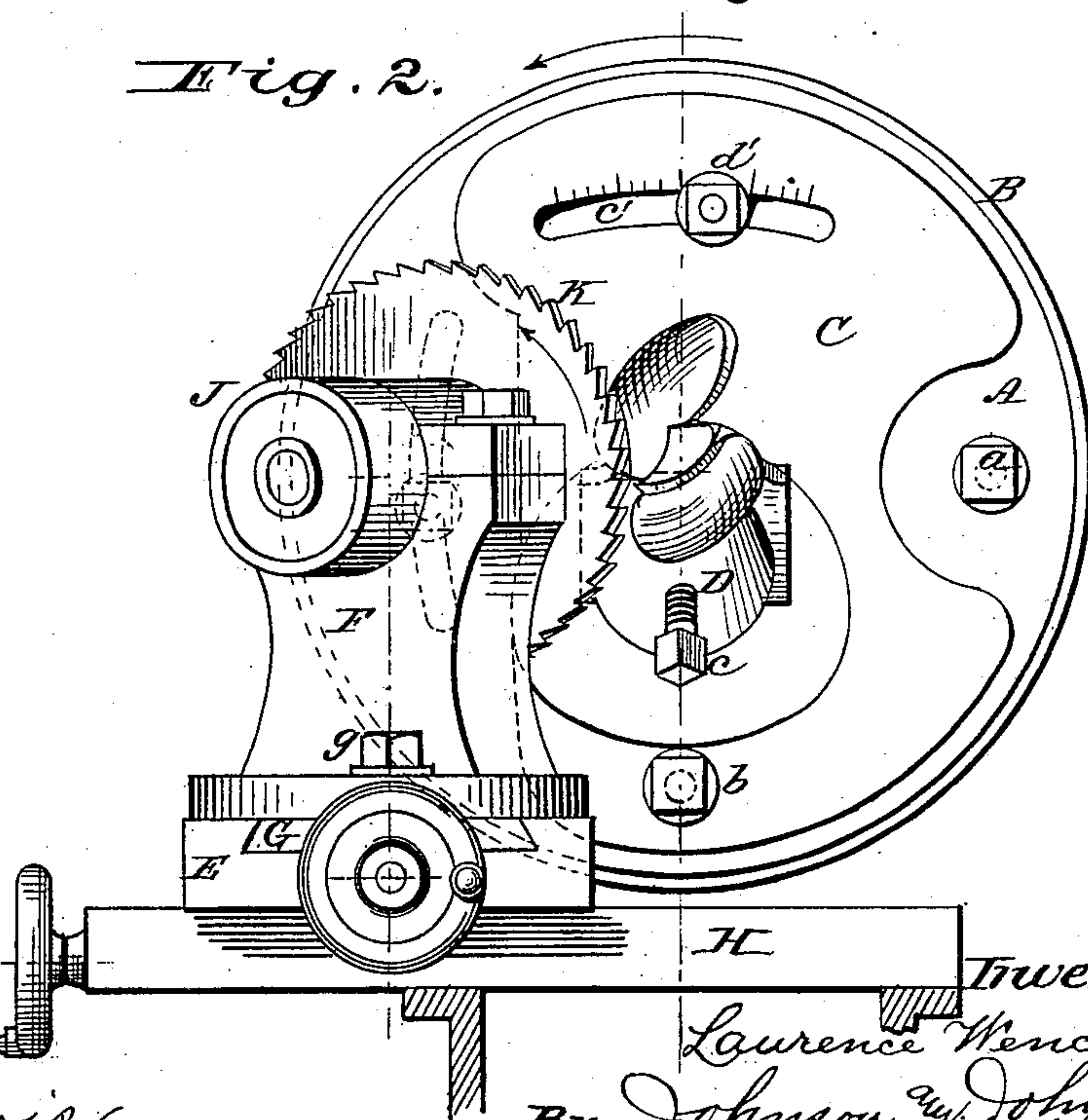


Fig. 2.



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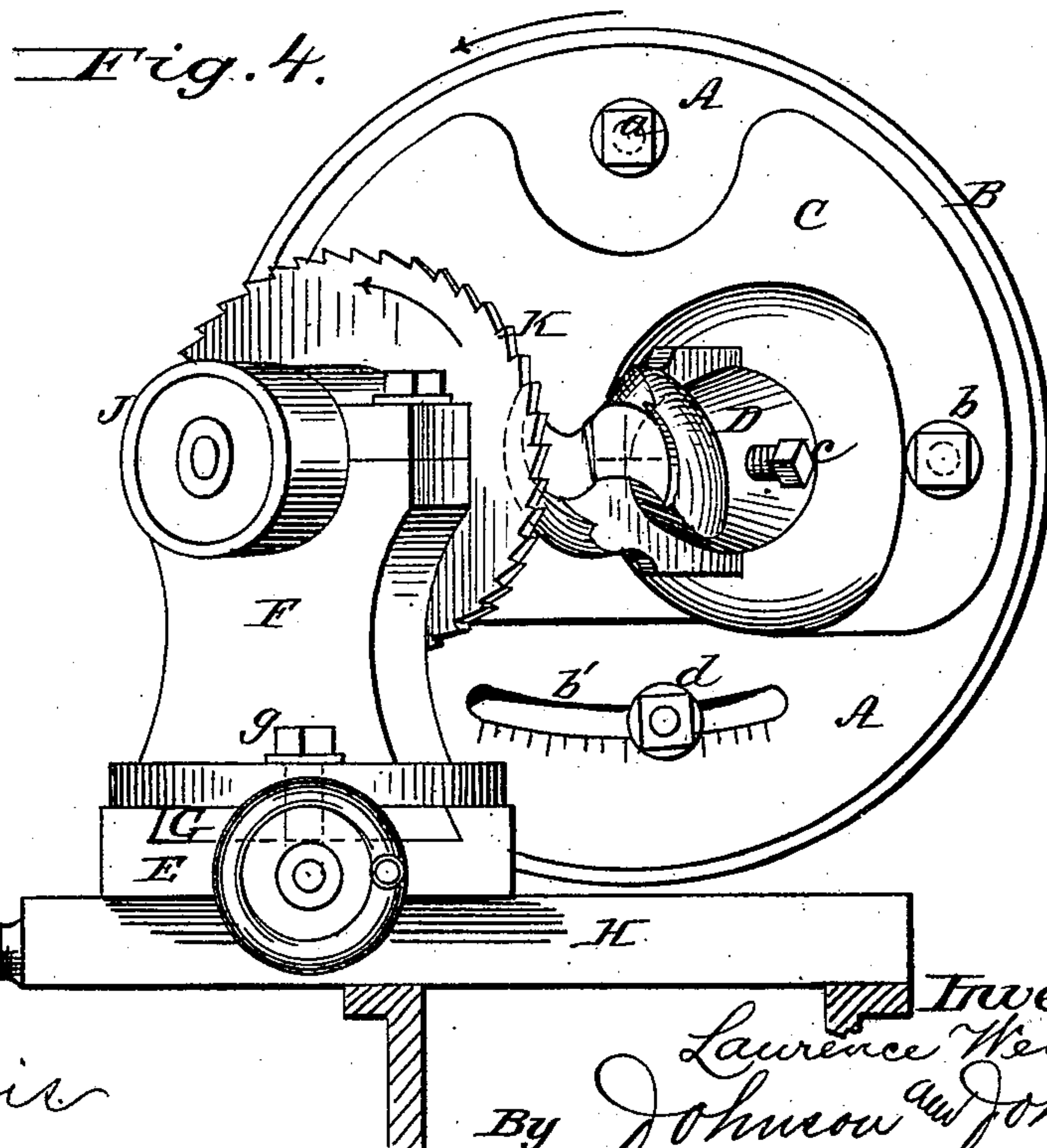
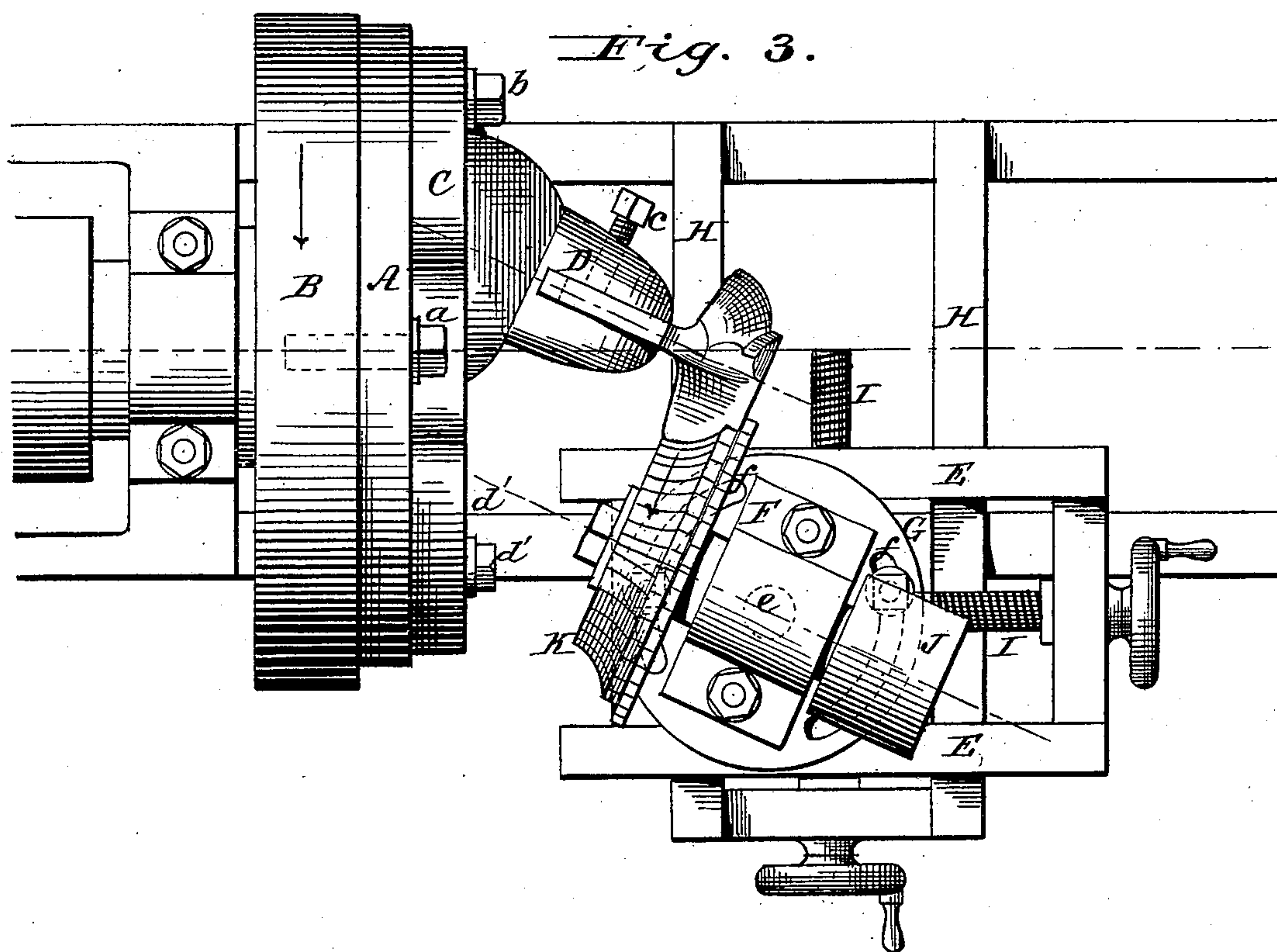
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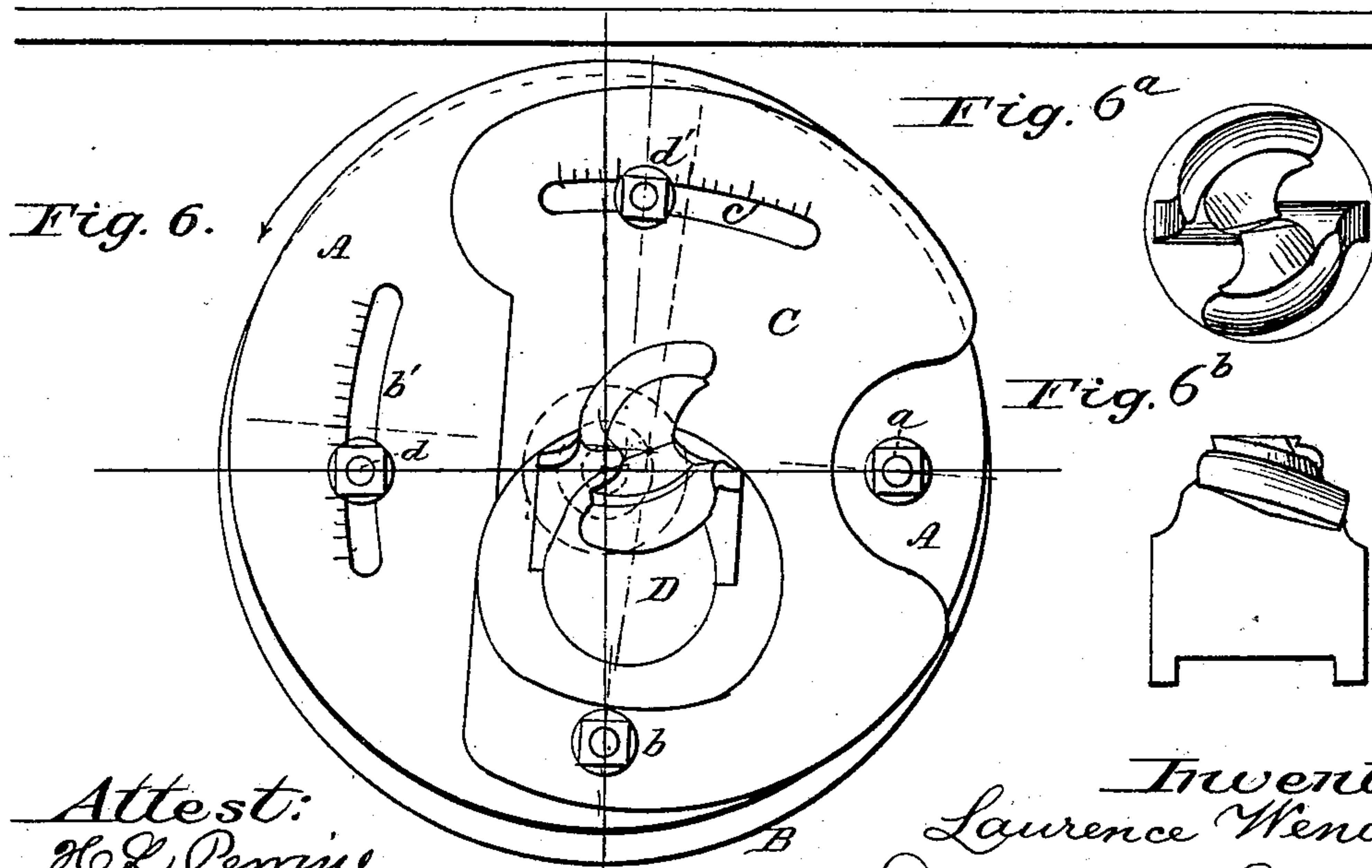
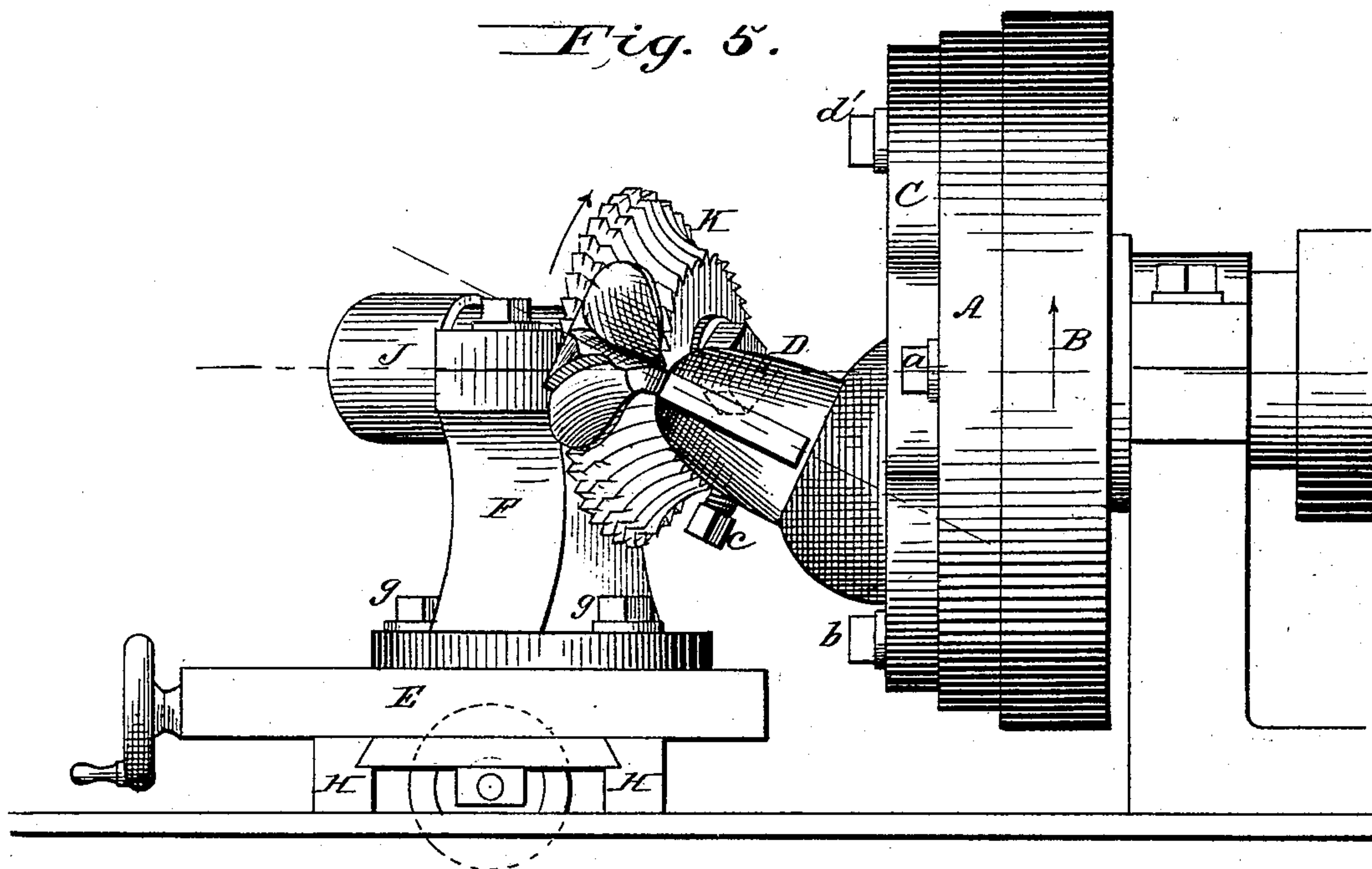
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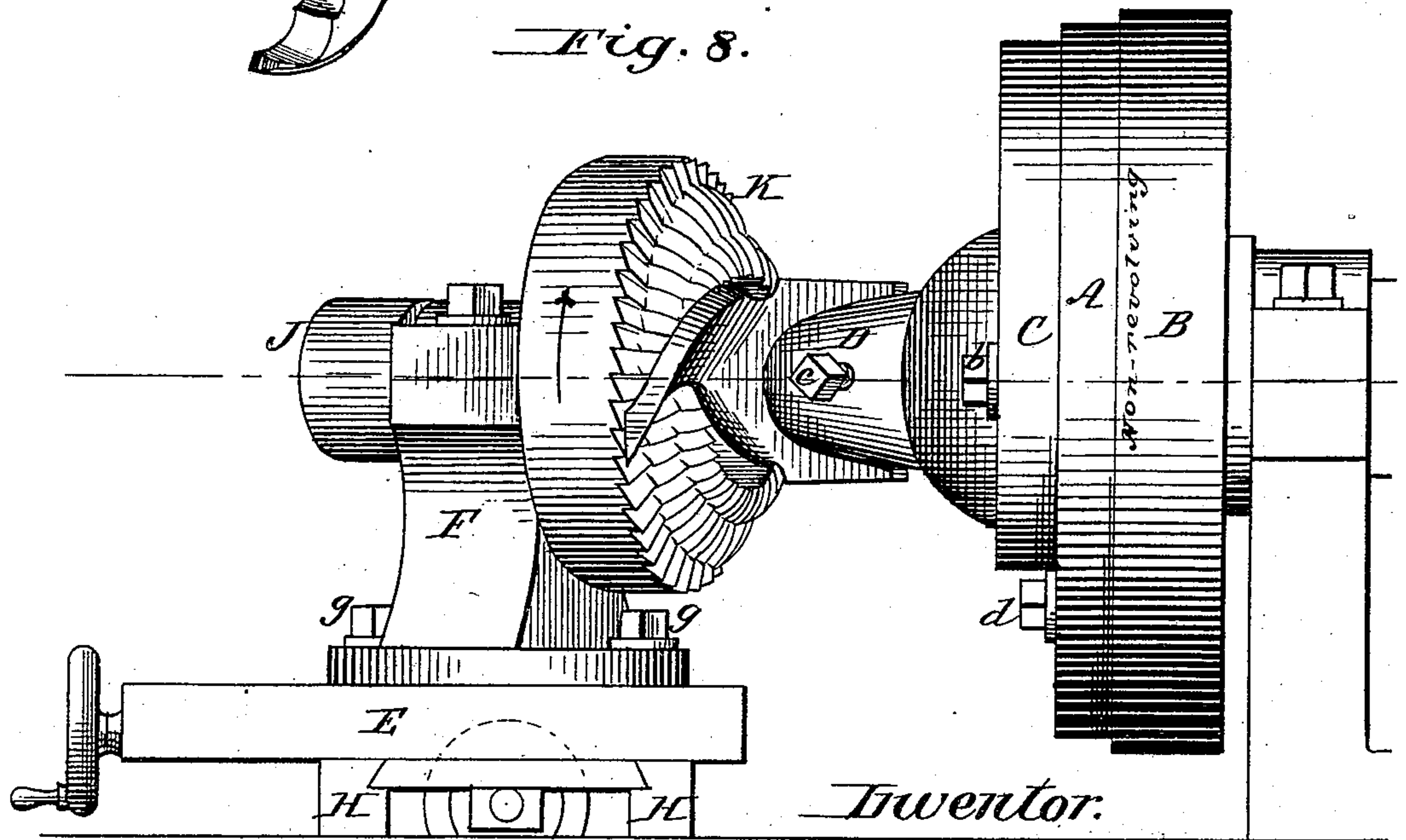
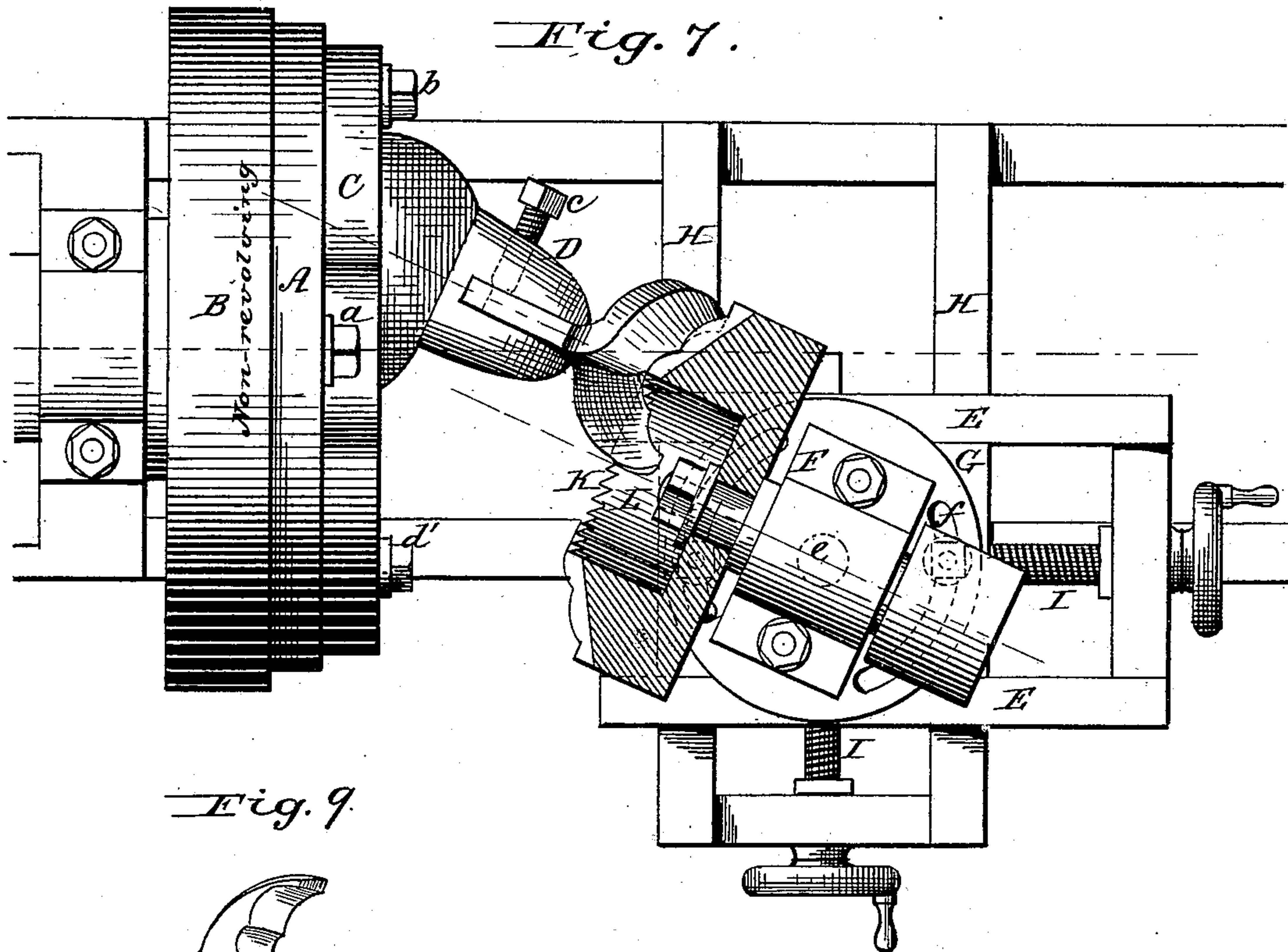
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4 Sheets—Sheet 4.

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Patented Nov. 16, 1880.



UNITED STATES PATENT OFFICE.

LAURENCE WENCHEL, OF BALTIMORE, MARYLAND.

APPARATUS FOR TURNING CUTTERS FOR MOLDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 234,635, dated November 16, 1880.

Application filed July 14, 1880. (Model.)

To all whom it may concern:

Be it known that I, LAURENCE WENCHEL, a citizen of the United States, residing at Baltimore city, in the State of Maryland, have
5 invented new and useful Improvements in Apparatus for Turning Cutters for Molding-Machines, of which the following is a specification.

In patents granted to me July 1, 1879, certain improvements in the construction and in the method of producing wood-molding cutters are set forth, and in which the reverse cutting-wings have an eccentric or oval and a spiral form, which gives a curved cutting-
15 edge longer than the width of the molding it produces and a smooth drawing and feeding cut upon the work. In such cutters the wings are more or less eccentric, and are the counterpart of that portion of a conical or pyramidal former over or upon which they are made, and it is the form thus given the wings that holds and draws the work with a planing or shearing cut; but the formation of the molding-surfaces are effected by hand
25 manipulation and turning in a lathe, rendering this part of the work in completing such cutters slow and expensive, and it is exceedingly difficult to make the molding-surface of each wing exactly alike. That the molding-surface of one wing should be the counterpart of the other and that such cutters should be produced quickly and at little cost are matters of great importance, since the cutter has been found in practice to give entire satisfac-
35 tion.

My present invention is an apparatus or machine and method for producing the moldings upon such cutters, or upon cutters in which the wings have an oval or eccentric
40 form, and in which the formation of such moldings and completion of the cutters are effected in an exceedingly expeditious and economical manner.

Lathe attachments or chuck-heads have been
45 used in which a slide-rest carries the cutter or other piece of metal so as to cause it to revolve in an eccentric arc for the purpose of reducing or flattening portions of the surface of a true circle; but, so far as I know, cutters have
50 not been formed by such attachments with molding-surfaces, both oval or eccentric and

of spiral form, for the reason that a slide-rest movement or ordinary chuck-head attachments have not been adapted for such work as effected by my improvement.

My invention embraces a novel construction and adaptation of apparatus in which the cutter is held and operated upon in a position eccentric to and at an angle to the axis of its carrying mandrel or arbor, in connection with
60 a milling-tool for forming the molding-surface adapted to suit the position in which the cutter is supported. The design is to give the desired spiral and eccentric form to the molding by the eccentric and by the angular position of the cutter-holder or nose-chuck. By
65 this means I am enabled to throw any part of the cutter-wing nearer to or farther from the axis of the carrying mandrel or arbor, and thereby suit the eccentric and spiral form of
70 the wings in cutting the moldings thereon.

In my new apparatus the moldings upon both wings are produced one at a time and exactly alike upon formed eccentrics, or upon surfaces which are by the same operation made
75 eccentric, or upon surfaces which are by the same operation made both of spiral and eccentric form.

The cutters are formed and shaped in blank, as described and shown in my said patents, or
80 in any other suitable way, and in the operation of giving them the spiral and eccentric moldings the cutter-holder or nose-chuck has an intermittent revolution for operation upon the wings of the cutter separately and in reversed
85 positions, while the milling-tool has a continuous revolution. As the molding upon one wing is formed it passes free of the milling-tool and the revolution of the cutter-carrying head or arbor is stopped, and the position of the cut-
90 ter is changed in the nose to present the other wing to the action of the milling-tool, and the mandrel again set in motion.

The milling-tool is mounted upon a slide-rest capable of adjustment in the line of the
95 mandrel of the cutter-carrying holder, and at right angles thereto, while the tool-holder proper is mounted upon this slide-rest, with capacity for adjustment upon a central pivot, whereby the tool is adapted to be presented in
100 various positions to cutters of different forms, and the cutter and the tool turn in the same

direction, the cutter having a comparatively slow motion. In forming rosette-cutters the cutter-carrying mandrel does not turn.

Referring to the accompanying drawings, 5 Figure 1 represents a top view of a machine embracing my invention, and in which a cutter is shown in the position it occupies in relation to the milling-tool for having the molding formed upon one of its wings, and Fig. 2 10 an elevation of the same, looking at the front of the cutter-holder; Fig. 3, a top view, showing the cutter in the position it occupies to the milling-tool in completing the molding upon one of the wings, and Fig. 4 an elevation of 15 the same, looking at the end of the cutter-holder; Fig. 5, a side elevation of the same, the cutter being shown in the position seen in Figs. 1 and 2; Fig. 6, a face view of the cutter-holder and its pivoted parts, showing the 20 adjustment to suit the eccentric form of the cutter-wings, or to give such eccentric form. Figs. 6^a and 6^b are top and side views of a panel-sinking cutter; Fig. 7, a top view of the apparatus with a milling-tool adapted for forming 25 the moldings on the wings of a cutter for making rosettes; Fig. 8, a side view of the same, and Fig. 9 a top view of a rosette-forming cutter.

The apparatus is shown as adapted for forming 30 the moldings upon cutters having opposite spirally-formed wings and flat shanks; but it is equally adapted for forming eccentric and spiral moldings upon cutters having wings with cylindrical or hub shanks.

35 In the example shown the cutter-carrying head consists of three parts—a disk, A, eccentrically pivoted at *a* to the outer face of the mandrel-head B, a plate, C, eccentrically pivoted at *b* to the outer face of the pivoted disk 40 A, and a nose-chuck or holder, D, for the cutter, eccentrically secured to and carried by the outer pivoted plate, C. This nose-chuck is secured in any suitable manner, and extends from the face of the pivoted plate C at an angle oblique to its face and to the axis of the 45 mandrel, and it is provided with a longitudinal slot to receive the shank of the cutter, and within which it is clamped by a screw, *c*, so that the cutter-wings extend beyond the end 50 of the nose.

The line of projection of the nose-chuck or cutter-holder is oblique, and the degree of its eccentricity is such as to conform to the spiral form of the wings, or to give such form. The 55 disk and plate A C are pivoted at quarter-diameters, or nearly so, and at points at or near their edges, to give the greatest adjustment, while each part is provided with a segmental slot, *b' c'*, concentric with its pivot-connection, 60 so that each part can be adjusted relatively with each other and clamped—the inner part or disk, A, to the mandrel-head B and the outer part, C, to the inner part—by the screws *d d'* passing through said slots. This construction is for the purpose of giving the cutter-carrying nose D various adjustments upon the

mandrel-head, to cause the cutter to revolve in an arc eccentric to the axis of the mandrel, and this eccentricity can be made greater or 70 less, in proportion to such adjustments in relation to its center of motion. The cutter-head is held and carried at an angle to the axis of the mandrel-head B, to conform to or receive the desired spiral form of the wings, and the eccentric or oval form of the wings is pro- 75 duced by the adjustment of the pivoted parts so as to vary the position of the cutter in relation to the axis. The adjustment of the disk A in one direction throws the point of the cutter, or that part which is farther from the 80 shank, out or farther from the center of the head B, while by adjusting the plate C the part of the cutter which joins the shank is thrown out, and by adjusting both parts the heel and the point of the cutter may be thrown 85 out, and such adjustment in the other direction will throw such parts of the cutter toward the center. The slots of these pivoted parts are provided with scales by which they can be set to the required eccentricity of the cutter- 90 wings, and it is only for paneling and edge-molding cutters that such adjustments are required to give the oval or eccentric form, because for rosette-cutters the form of the molding does not require such adjustment. This 95 adjustment of the eccentric pivoted parts may be made either separately or together to suit different forms of cutters—that is, to give a flat or more rounded surface to cut with more or less freedom from sidewise drawing upon 100 the work. The cutter-holder or nose-chuck, however, may have a fixed relation as to its angle of deflection and eccentricity to the axis of the mandrel or arbor, in which case cutters of precisely the same eccentricity can only be 105 produced.

The device for supporting and carrying the milling-tool consists of a slide-rest, E, and an adjustable holder, F, for the tool. The slide-rest has capacity for adjustment upon the 110 lathe fed transversely to the axis of the mandrel, while the tool-holder has capacity for adjustment upon a central pivot, *e*, Figs. 1, 3, and 7, and also in the line of the mandrel. These adjustments are adapted to present the tool 115 in various positions to the cutter and in accordance with the adjustment of the parts which carry the cutter. The pivoted holder F allows the tool to be presented to the cutter-wings at any desired angle to the axis of 120 the mandrel, and for this purpose the base of the tool-holding part is provided with segmental slots *f* and screws *g*, by which said part F is clamped to the slide G, which is fitted within the slide-rest proper, which latter is 125 fitted within ways H, and these slides may be adjusted by the screws I, and the tool thereby given the proper relation to the cutter. In this arrangement for giving the tool a compound adjustment, it may be driven by a cross-band 130 from a pulley, J, on the shaft of a milling-tool, or any other suitable carrying and adjusting

device for the tool may be employed with any suitable driving connection.

The milling-tool K is a wheel of cutting-edges having the exact counterpart of the molding to be formed. It is of hard steel, and is secured upon its shaft so that it may be removed and replaced by others of different forms for turning different forms of moldings.

In some forms of moldings the tool may be adapted to cut only a specific part of the molding, and in this way each part of the molding may be cut by a separate milling-tool, and a greater variety or style of molding made with fewer tools. This makes the tool less expensive and more easily produced, and renders the work easy; or the complete molding-tool may be formed of separate parts connected together.

The important point of my invention is the oblique and eccentric relation of the nose-chuck or cutter-holder to the mandrel-axis, in connection with a milling-tool capable of adjustment to suit the movement of the wing on which the molding is to be formed. By adjusting the cutter-holder on an eccentric arc or arcs in connection with its oblique line of projection, any part of the cutter-wing may be set nearer to or farther away from the axis of revolution, and thereby give the molding of the wing more or less flat or conical surface, or conform to such formed wings; but the oblique nose-chuck or cutter-holder may be carried upon the mandrel-head without being made adjustable, for when once fixed or set to give the proper spiral and eccentric form to the moldings on the wings it will answer for all sizes of cutters, the milling-tool holder only being adjustable.

The cutter-nose chuck may be mounted in an adjustable slide-rest and have all the required adjustments, and the milling-wheel may be mounted upon a fixed support, the relations of the parts and the results being the same. The cutting-edge is finished after the molding is formed by applying the inner or under surface of the wings to an emery-wheel, so as to make them hollow ground. In thus turning the moldings on panel and edge molding cutters the milling-wheel is given a rapid continuous motion and the mandrel-head a comparatively slow intermittent revolving motion in the same direction—that is, it revolves through an arc sufficient to form the molding upon one wing only, when the motion of the mandrel is arrested by suitable shifting devices. (Not shown.) This partial intermittent revolution of the cutter-nose chuck is necessary because the positions of the milling-wheel and the cutter are such as to prevent the full revolution of the cutter; and besides, as the wings are separately formed, the motion of the cutter-holder must be stopped to allow the cutter to be removed therefrom and changed in its position to form each wing and to form both wings alike; but the device for effecting

this stopping of the mandrel must be set and operated so as to do this at the proper time.

The change of the cutter is merely to reverse its position in the nose-chuck, for, on account of the oblique projection of the nose-chuck, one wing will be held in position to receive the molding, but the other will not be, and hence the cutter must be changed in position to form the molding upon both the wings alike, and with the nose-chuck revolving in the same direction. This operation will produce cutters for panel-sinking and edge-molding; but for rosette-cutters the nose-chuck or cutter-holder is set in the proper position to receive the tool, and is fixed by throwing the mandrel out of driving connection and making it fast in any suitable way by screws or otherwise. For such cutters, however, the milling-wheel K must have a hollow head or central depression, L, to receive and revolve over one wing of the cutter while the other is being turned, as shown in Figs. 7 and 8. In this work the slide-rest and tool-holder only are adjustable; but I may have the tool-holder fixed and the cutter adapted for proper adjustments, so as to bring the cutter up to the tool, the center depression in which receiving one wing of the cutter while the other wing is being turned with its molding, the cutter being changed in position as each wing is formed.

The adjustment of the eccentrically-pivoted parts A and C will be better understood by referring to Fig. 6, in which it will be seen that by adjusting the part or disk A with the set-screw *d* near the end of the slot *b'*, as shown, the point of the wing to be operated upon will be thrown up in relation to the center of the mandrel, and by then adjusting the part C with the set-screw *d'* near the end of the slot *c'*, as shown, the heel of the cutter-wing will be carried away from said center, thus causing the wing to turn through an arc eccentric to the axis of the mandrel—that is, a less arc from the center of the cutter than that through which the point of the cutter-wing moves. This adjustment will give the proper eccentric form to the moldings on the face of both wings. For rosette-cutters the particular set of the nose-chuck in relation to the milling-wheel gives the proper clearance or eccentricity to the molding ridges. These adjustments are reversed for cutters adapted to cut in a reverse direction, and such adjustments are made with reference to the middle of the length of the slots. Moldings may also be cut by this apparatus upon reversible cutters, in which there will be a double spiral and a double eccentric form of wings with cylindrical or hub shanks.

It will be understood that as each wing has the molding formed it will pass out of contact with the milling-tool, and that the motion of the cutter-holder will cease at a point so as to bring the space between the cutter-wings op-

posite the tool, and thus allow the cutter to be removed from the nose and changed to present the other wing for action as the arbor or mandrel is again set in motion.

5 I claim in a machine for turning or forming wood-molding cutters having eccentric and spirally-formed wings—

1. The cutter-holder or nose-chuck having an oblique or angular set or position in relation to its carrying-head or arbor axis, whereby the cutter-wings are held and carried to receive the spiral form, substantially as and for the purpose herein set forth.

2. The cutter-holder or nose-chuck having an oblique or angular and an eccentric set or position to its carrying-head or arbor axis, whereby the cutter-wings are held for operation in giving the spiral and eccentric form, substantially as and for the purpose herein set forth.

3. The combination, with a cutter-holder or nose-chuck having an oblique or angular set or position in relation to its carrying-head or arbor axis, of a milling-tool adapted for relative adjustment with said oblique cutter-holder, substantially as and for the purpose herein set forth.

4. The cutter-holder or nose-chuck having an oblique or angular set or position in relation to its carrying-head or arbor axis, and having an intermittent motion, the rotary milling-tool adjustable in relation to the nose-chuck, as described, the said parts operating in the same direction and with unequal speed, substantially as and for the purpose herein set forth.

5. The cutter-carrying head, consisting of the eccentrically pivoted and adjustable parts, and the nose-chuck holder for the cutter, eccentrically secured to and carried by the outer one of said pivoted parts, substantially as and for the purpose herein set forth.

6. The disk A and plate C, pivoted to each other at quarter-centers, or nearly so, and at

points at or near their edges, the pivot of the disk A uniting these parts to the mandrel-head B, and the plate C carrying the oblique projecting nose-chuck or cutter-holder, the pivoted parts having each a slot concentric with its pivot and a clamping-screw, whereby to effect the adjustment of the the nose-chuck, substantially as and for the purpose herein set forth.

7. The device for supporting and carrying the milling-tool, consisting of the adjustable slides E and G and the adjustable holder F, said parts having the capacity for adjustment substantially as herein set forth, in combination with a nose-chuck or cutter-holder having an oblique relation to its carrying part, substantially as and for the purpose herein set forth.

8. Forrosette-cutters, the rotary milling-tool having a hollow head or central depression, in combination with a nose-chuck or cutter-holder having an oblique position in relation to its arbor axis and to said milling-tool, substantially as herein set forth.

9. The method herein set forth of turning or forming wood-molding cutters having spiral and eccentric wings, consisting in presenting both the cutter and the rotary milling-tool in relative oblique positions, the cutter-holder operating intermittently and reversing the position of the cutter for separate operation upon each wing during the continuous operation of the milling-tool, and while the cutter is without motion and in position free from the milling-tool, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LAURENCE WENCHEL.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.