

No. 630,551.

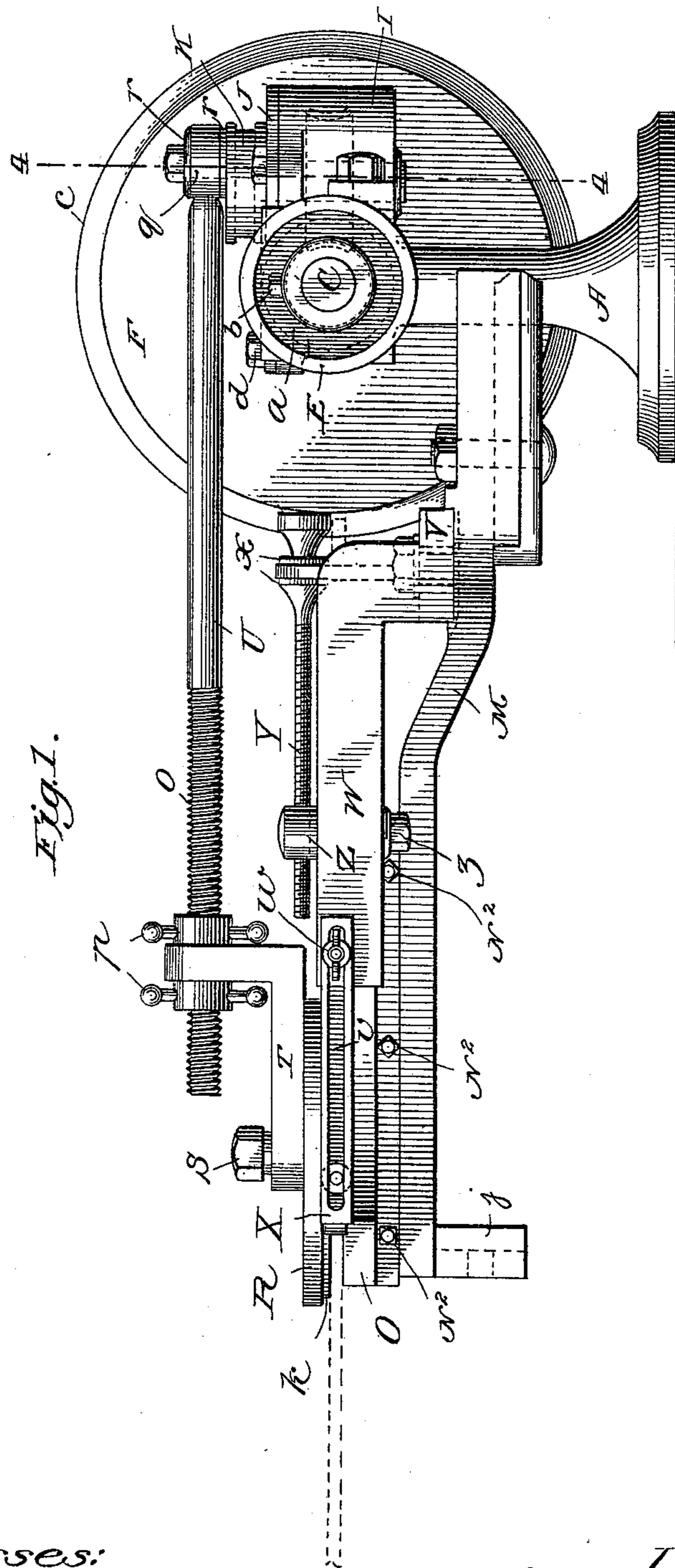
Patented Aug. 8, 1899.

J. McCARTHY.  
AUTOMATIC SAW GRINDING MACHINE.

(Application filed Dec. 31, 1898.)

(No Model.)

3 Sheets—Sheet 1.



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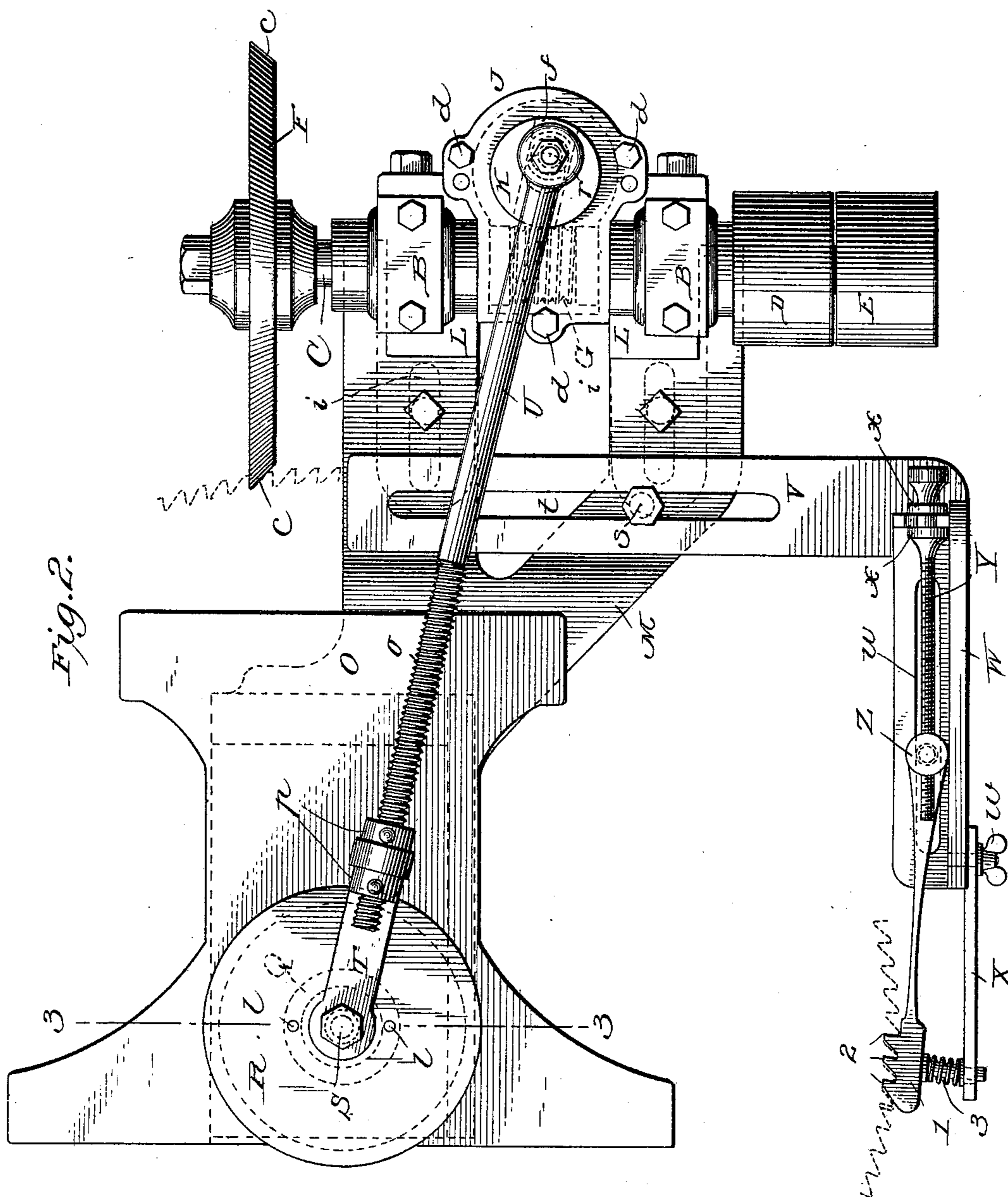
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## AUTOMATIC SAW GRINDING MACHINE.

(Application filed Dec. 31, 1898.)

(No Model.)

**3 Sheets—Sheet 2.**



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No. 630,551.

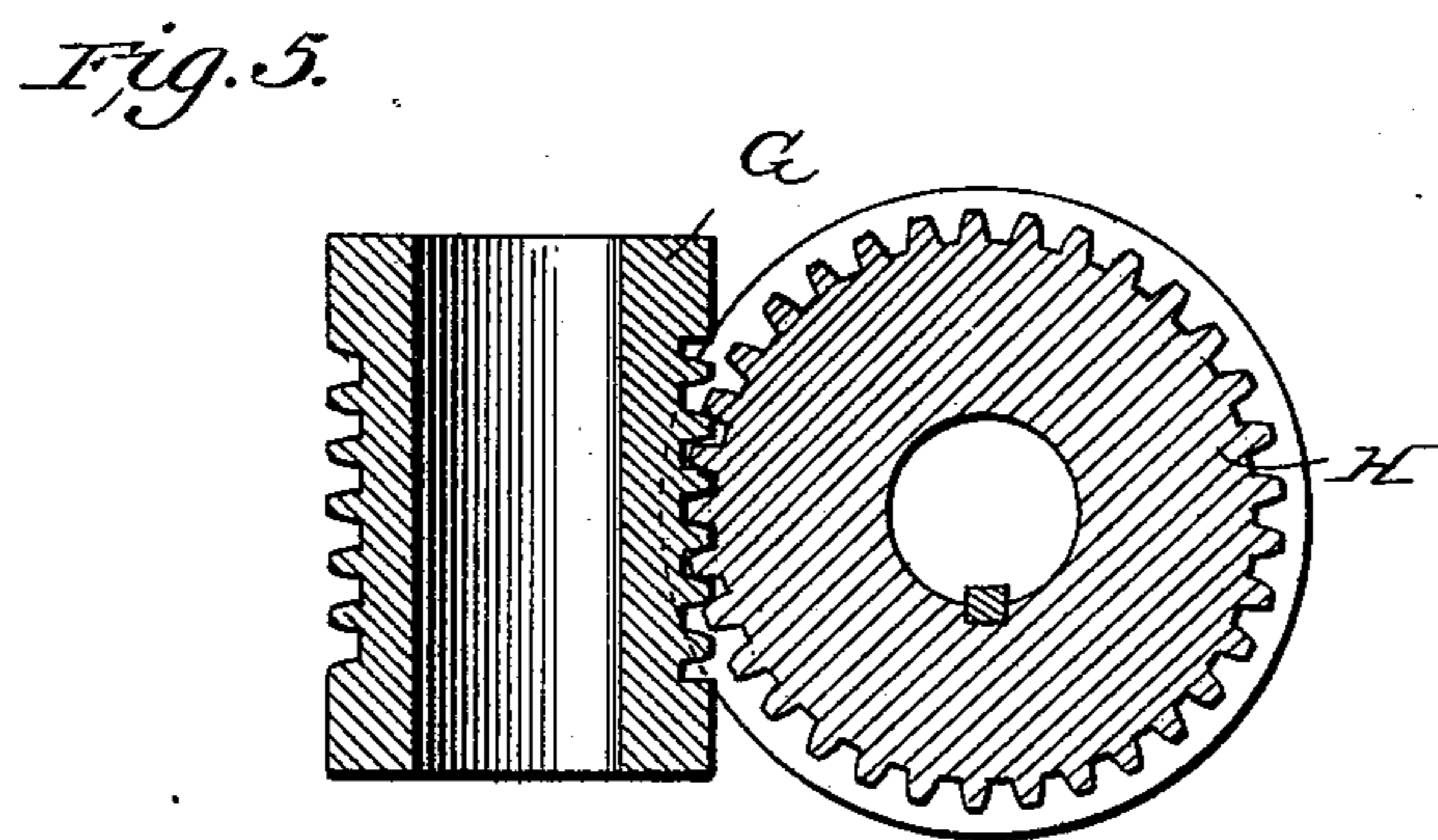
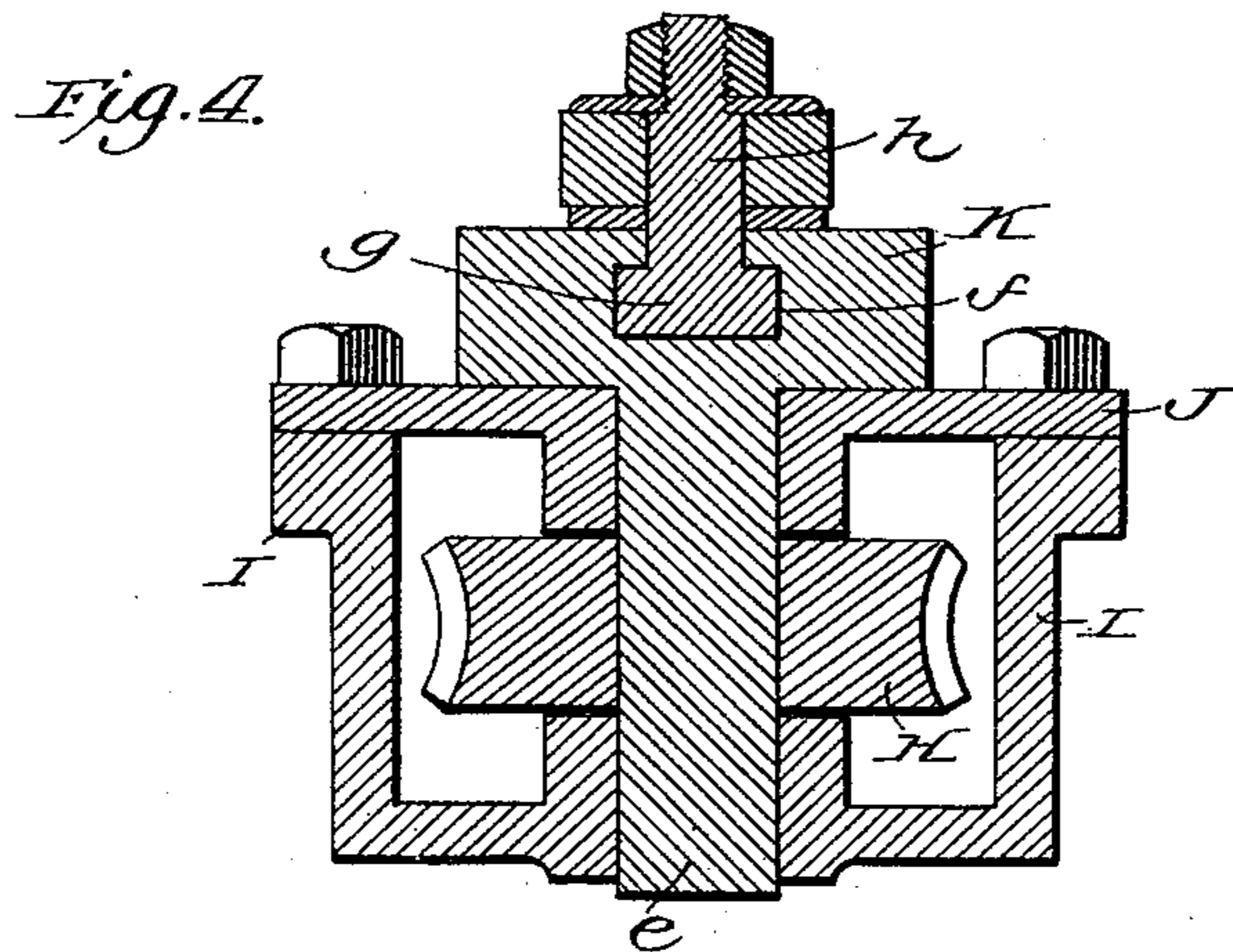
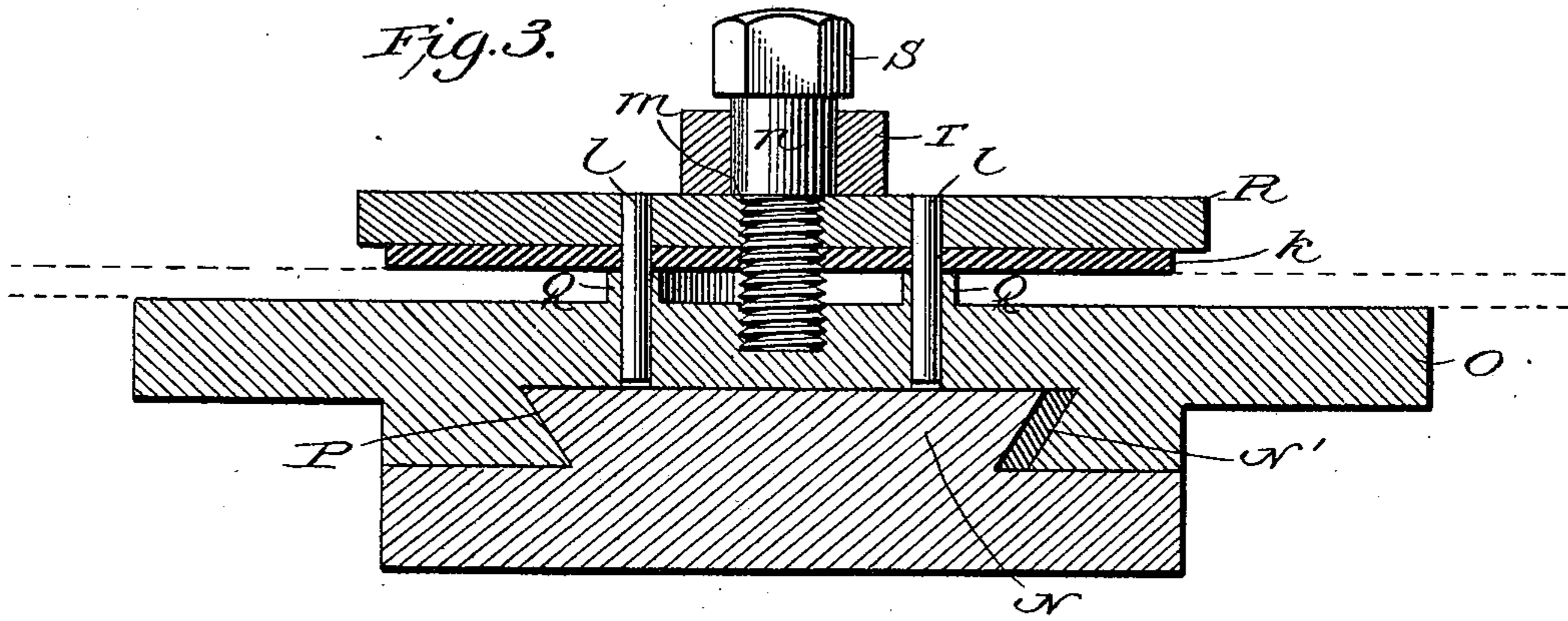
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(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

JAMES MCCARTHY, OF CHICAGO HEIGHTS, ILLINOIS, ASSIGNOR TO THE Q & C COMPANY, OF CHICAGO, ILLINOIS.

## AUTOMATIC SAW-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 630,551, dated August 8, 1899.

Application filed December 31, 1898. Serial No. 700,784. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MCCARTHY, a citizen of the United States, residing at Chicago Heights, county of Cook, State of Illinois, have invented certain new and useful Improvements in Automatic Saw-Grinding Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description, such as will enable others skilled in the art to apply the invention.

My invention relates to that class of machines designed and arranged for grinding or sharpening saw-blades, and particularly to the sharpening of circular saws.

It has for its object, therefore, the organization of a saw-grinding machine universally adjustable to accommodate saws of varying diameter, thickness of blade, or pitch of teeth and a machine entirely automatic, accurate, and efficient in its operation.

The invention will be hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings, which form part of this specification, and wherein corresponding reference letters and figures indicate identical parts in the several views, Figure 1 is a side elevation of the invention, comprising the grinding mechanism, the feeding mechanism, and supporting-frame. Fig. 2 is a top plan view of parts shown by Fig. 1. Fig. 3 is a transverse sectional view taken through the saw-feeding table and correlative parts on the line 3 3, Fig. 2. Fig. 4 is also a transverse vertical section taken on the line 4 4 of Fig. 1 through an oil-tight gear-case and part of the feed-gearing. Fig. 5 is a detached sectional view of the worm-gearing for reciprocating the saw-holding table.

Reference being had to the drawings and letters and figures thereon, A indicates a main supporting-frame or pillow-block, by preference of cast-iron, and surmounted by ordinary journal-boxes B B upon either side of its center, fitted with the usual brasses *a a*, and containing a drive-shaft C, thus rotatably mounted. Secured to shaft C, as by a set-screw *b*, is a driving-pulley D, by agency whereof power is applied to the machine from a source not shown, and E is a corresponding pulley loosely mounted upon same shaft for receiving a

driving-belt when power is not required and the machine is at rest. At the opposite end of shaft C is removably attached a grinding-wheel F, of emery or similar substance, beveled upon its periphery, as at *c*, and adapted to rotate at a high rate of speed with its said supporting-shaft. Intermediate of journal-boxes B B there is a worm-screw G, cut upon or rigidly secured to shaft C, and this, together with an intermeshing worm-gear H, is housed by an oil-tight gear-case I, the walls whereof are preferably cast integral with frame A. The top of case I is closed by a cover J, conforming in shape to the outlines of the case and secured by bolts *d d d*, as best shown by Fig. 2, while through said cover, and likewise journaled in the bottom of case I, is a vertical arbor *e*, to which the aforesaid gear H is keyed. The protruding upper end of arbor *e* terminates in a disk K, broken by an undercut surface slot *f*, within which rests the head *g* of an upstanding wrist-pin *h* (best shown by Fig. 4) and for purposes that will later appear. Projected from the opposite or front side of main frame A, by preference cast integral therewith, at points below boxes B B, are corresponding horizontal brackets L L, slotted longitudinally, as at *i*, and constituting supports for an auxiliary frame M, secured thereto by suitable bolts passing through said slots *i*. Extending forward, this frame M may be supported at its distal end by a suitable leg *j* and upon its surface bears a raised longitudinal dovetailed projection N, forming a track or way for a reciprocating saw-table now to be described.

O indicates the saw holding and manipulating table, having in its under surface a longitudinal indenture P, coinciding with the surface projection of frame M aforesaid and bearing a reciprocal relation thereto. Within the indenture P and interposed between the table and the projection N of the track or way is a gib N', by means of which and the set-screws N<sup>2</sup> (see Fig. 1) wear may be taken up as it occurs. From the longitudinal center of table O rises an annulus Q, whereon is placed the center hole of a saw to be ground, and around this the saw is caused to revolve intermittently when the machine is in operation. Above is located a friction-disk R,

5 faced upon its under side with leather or other pliable yielding material, as *k*, and provided with dowel-pins *ll*, the latter embedded in said annulus *Q* to prevent rotation of the disk, as best shown by Fig. 3.

10 At the center of annulus *Q* is a vertical cap-screw *S* in threaded connection with table *O*, shouldered, as at *m*, for engaging and retaining disk *R* in position, thus permitting adjustment of said disk with relation to the table for the purpose of clamping a saw more or less firmly between the two. Above shoulder *m* the body *n* of screw *S* is cylindrical, and upon this is loosely journaled an angle-iron or extension-arm *T*, through an aperture in the opposite end of which passes the screw-threaded end *o* of an operating pitman-rod *U*, as shown by Figs. 1 and 2. Upon this threaded end *o* of rod *U* and upon each side of the arm *T* are lock-nuts *p p* for retaining said arm in a given position and permitting an extension of the latter according to requirements. The opposite extremity of rod *U*, by means of a suitable eye *q* between washers *r r*, loosely surrounds the protruding wrist-pin *h* aforesaid, as shown, the latter serving to reciprocate the former and dependent parts, as will appear by a statement of operation to follow.

30 Upon the surface of auxiliary frame *M*, adjacent to its connection with the fixed horizontal brackets *L L*, is adjustably mounted a transverse gage-plate *V*, secured by a bolt or bolts, as *s*, passing through a longitudinal adjusting-slot *t* and equipped at its outer end with an automatic saw-revolving mechanism, as will now be set forth. Extending rearwardly from plate *V* is the body *W* of said mechanism, slotted, as at *u*, and terminating in an extension-arm *X*, the latter also slotted, as at *v*, and attached by wing-nut *w* to the side of body *W* for the purpose of permitting a longitudinal adjustment between the two sections.

45 Swiveled in lugs *x x* upon gage-plate *V* is an adjusting-screw *Y*, the latter threaded into the head of a bolt *Z*, adapted to be adjusted in longitudinal slot *u* of body *W*, and bearing at its lower end a bur *z* for locking it in a given position, while projecting still rearwardly from said bolt *Z* is a spring-pawl *1*, having upon its face a plurality of teeth *2 2 2*, in substantial conformity with the teeth of a saw-blade. Interposed between said pawl *1* at its outer end and the corresponding end of arm *X* is a tension-spring *3* for the purpose of keeping said parts normally, but yieldingly, apart and insuring contact at all times between the teeth *2 2 2* and the throat of several teeth upon the saw-blade.

65 The foregoing being a description of my invention in its preferred form of construction, it will be noted that I by no means limit or confine myself to the particular arrangement and combination of parts shown. These may be variously modified and changed without departing from the spirit of my invention;

but based upon the disclosures herein made a brief statement of operation is as follows: Power applied to driving-pulley *D* is transmitted by shaft *C* to grinding-wheel *F*, at same time rotating worm *G*, fixed to said shaft, within the walls of gear-case *I*, also horizontal gear *H*, in mesh with the latter, its supporting-arbor *e*, and finally the disk *K* above, all moving continuously, but at greatly-reduced speed as compared with the wheel *F*. By means of wrist-pin *h*, movably secured in an eccentric position upon said disk *K*, this rotary motion is converted into a slow reciprocal movement and transmitted by agency of pitman-rod *U* to the saw-holding table *O*, moving in a direction at right angles to the axis of wheel *F* and carrying the saw to be operated upon, the extent of such movement being accurately governed by the degree of eccentricity accorded wrist-pin *h* upon its disk *K*. Resting upon the surface of table *O* a saw undergoing the grinding operation is yieldingly bound beneath friction-disk *R* by pressure of cap-screw *S*. It is further retained by annulus *Q*, rising through its center hole and constituting a bearing around which the saw is automatically rotated for the purpose of presenting successive teeth to action of the grinding-wheel. During each forward movement of a saw, as described, the teeth *2* of spring-pressed pawl *1* ride over or jump adjacent teeth upon the saw-blade; but upon the reverse or receding movement said teeth cause the saw to rotate slightly, presenting a succeeding tooth for action of wheel *F* when next advanced. The same process is thus repeated automatically and continuously as long as there are teeth in the saw to be ground.

It will be noted that the depth of grinding action is governed by the throw of pitman-rod *U*, as stated, and that saws of different diameters may be provided for by the following adjustments: Presuming the saw to be of reduced size, auxiliary frame *M* is shortened by overlapping brackets *L L*, and the table *O* is taken up by adjustment of extension-arm *T* upon the threaded end *o* of rod *U*, thus bringing the teeth of said saw at one point in its circumference into close proximity with the beveled edge of grinding-wheel *F*.

In order to properly coöperate, the automatic rotating mechanism must be correspondingly adjusted. This is accomplished by a transverse movement of gage-plate *V* in a direction at right angles to that ascribed to the auxiliary frame *M* with dependent parts, and, further, by a proportionate shortening of the sectional body *W* of said saw-revolving mechanism, effected through the agency of wing-nut *w* and adjusting-screw *Y*. In like manner the range of adjustment is of liberal proportions, accommodating saws in a great variety of sizes, and it will be noted that the efficiency of the machine is in no wise impaired by such adjustments in whole or in part. It will also be particularly noted that

a plurality of feed-teeth 2 are employed upon pawl 1 in order to absolutely insure rotation of the saw at all times, even though, perchance, there be a tooth missing from its periphery, as is sometimes the case.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an automatic saw-grinding machine the combination with a driving-shaft mounting a grinding-wheel, of worm-gearing positively driven by said shaft, a reciprocating saw-holding table, and a superposed pitman-rod for connecting said table and gearing, substantially as and for the purposes specified.

2. In an automatic saw-grinding machine the combination with a driving-shaft mounting a grinding-wheel, of worm-gearing positively driven by said shaft, a reciprocating saw-holding table bearing a raised saw-centering stud, and a pitman-rod for connecting said table and gearing, substantially as described.

3. In an automatic saw-grinding machine the combination with a driving-shaft mounting a grinding-wheel, of worm-gearing positively driven by said shaft, a reciprocating saw-holding table bearing a raised saw-centering stud, a cap-screw for binding a saw to the table, and a pitman-rod connecting said table and worm-gearing, substantially as described.

4. In an automatic saw-grinding machine the combination with a reciprocating saw-holding table, of a raised saw-centering stud, a yielding friction-disk above said stud, and a cap-screw for binding said table and disk with an interposed saw-blade together, substantially as described.

5. In an automatic saw-grinding machine the combination with a reciprocating saw-holding table, of a raised saw-centering annulus, a yielding friction-disk, and a shouldered cap-screw for binding said table and disk with an interposed saw-blade together, substantially as described.

6. In an automatic saw-grinding machine the combination with saw grinding and feeding mechanisms, of a saw-holding table bearing a raised saw-centering annulus, a friction-disk having dowel connections with said annulus, and a cap-screw for binding said disk to the table, substantially as described.

7. In an automatic saw-grinding machine the combination with saw grinding and feeding mechanisms, of a supporting-frame mounting a reciprocating saw-holding table, a saw-centering annulus upon said table, a yielding friction-disk vertically movable, and a cap-screw for binding said disk to the table, substantially as described.

8. In an automatic saw-grinding machine the combination with saw grinding and feeding mechanisms, of a supporting-frame, a reciprocating saw-holding table in dovetail relation with said frame, a saw-centering annulus upon the table, a vertically-movable

yielding friction-disk, and a cap-screw for binding said disk to the table, substantially as described.

9. In an automatic saw-grinding machine the combination with a pillow-block and a driving-shaft mounting a grinding-wheel, of worm-gearing positively driven by said shaft, an auxiliary frame adjustably secured to the pillow-block, a saw-holding table reciprocally mounted upon said auxiliary frame, and a reciprocating pitman-rod connecting said table and gearing, substantially as described.

10. In an automatic saw-grinding machine the combination with a pillow-block and a driving-shaft mounting a grinding-wheel, of a gear-case upon the pillow-block, a worm-gearing within said case positively actuated by the driving-shaft, an adjustable auxiliary supporting-frame, a saw-holding table reciprocally mounted upon the latter, and an adjustable reciprocating pitman-rod connecting said table and worm-gearing, substantially as described.

11. In an automatic saw-grinding machine the combination with a pillow-block and a driving-shaft mounting a grinding-wheel, of incased worm-gearing positively driven by said shaft, an adjustable auxiliary supporting-frame, a saw-holding table reciprocally mounted upon the latter, a screw-retained friction-disk, a coupling-arm connected with the latter, and a reciprocating pitman-rod connecting said coupling-arm and the worm-gearing aforesaid, substantially as described.

12. In an automatic saw-grinding machine the combination with saw grinding and holding mechanisms, of a supporting-frame, a gage-plate adjustably secured to the frame, and an adjustable spring-pressed pawl secured to said plate having a plurality of teeth in fixed relation for automatically engaging teeth upon a circular saw and imparting thereto an intermittent rotary motion, substantially as described.

13. In an automatic saw-grinding machine the combination with saw grinding, holding and feeding mechanisms, of means for intermittently rotating a circular-saw blade comprising a fixed slotted body having a slide-bolt, an adjusting-screw in threaded connection with said slide-bolt, and a spring-pawl projecting from said bolt and adapted to engage teeth upon a saw-blade, substantially as described.

14. In an automatic saw-grinding machine the combination with a reciprocating table, of a clamp-disk provided with a yielding friction-face, and a pawl mounted on a fixed point off of the reciprocating table, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 27th day of December, 1898.

JAMES MCCARTHY.

Witnesses:

W. W. HOLMES,

B. C. WIEDERHOLD.