(No Model.) 3 Sheets—Sheet 1.

J. W. MALOY.

LATHE FOR TURNING NON-CIRCULAR FORMS.

No. 403,120. Patented May 14, 1889.

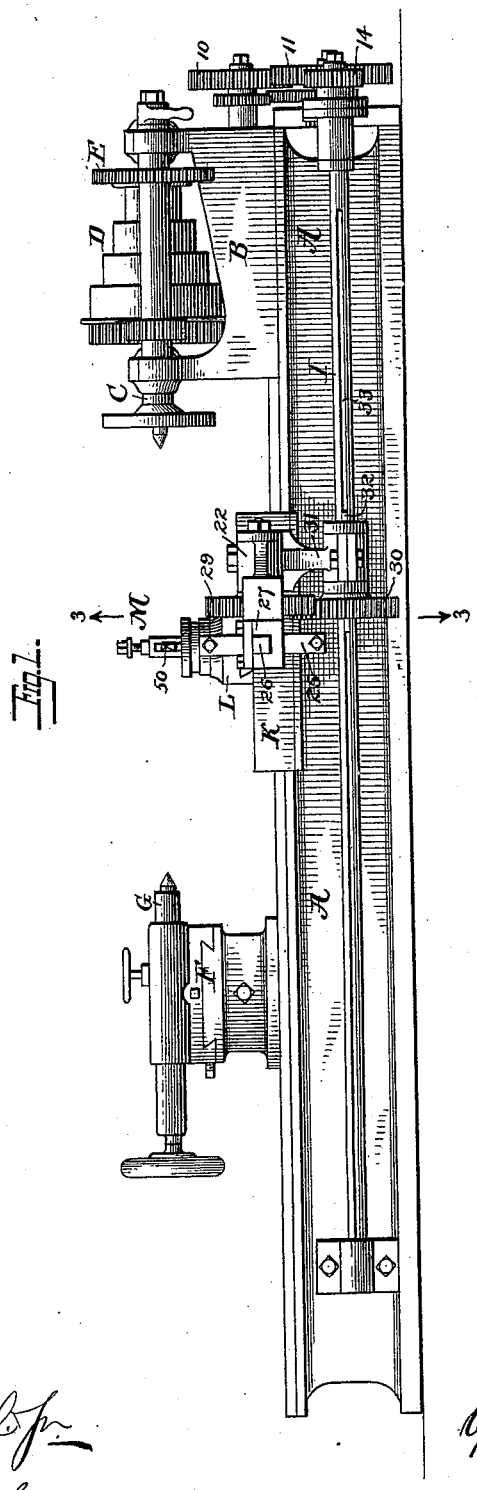

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

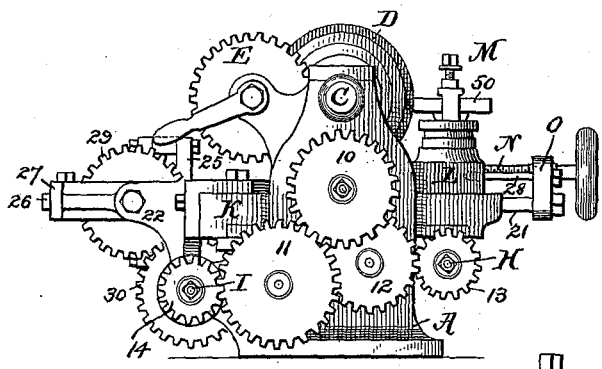

Fig. 3.

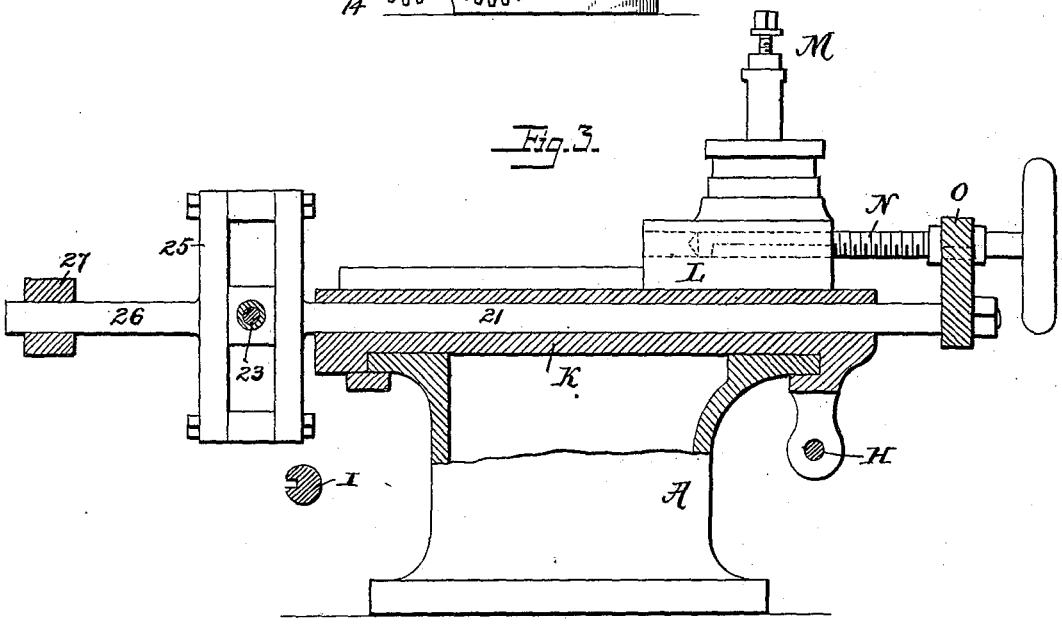

Fig. 4.

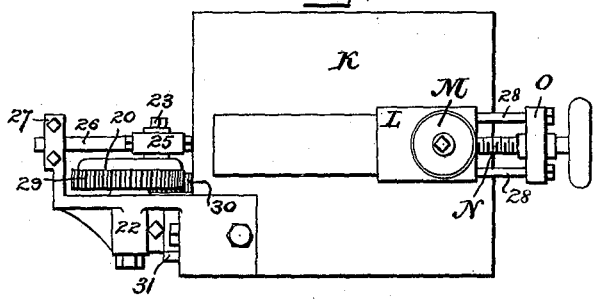

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Fig. 5.

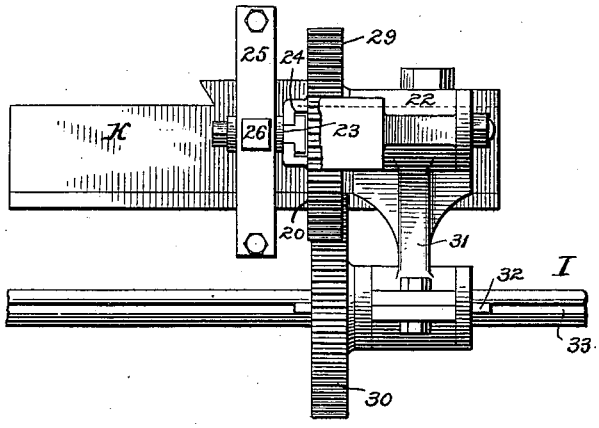
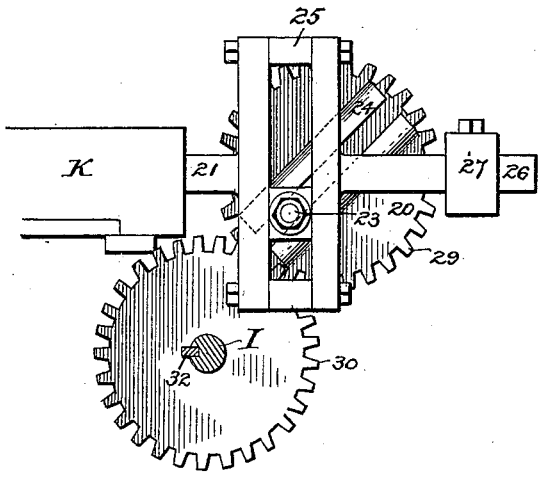


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES W. MALOY, OF MARIETTA, GEORGIA.

LATHE FOR TURNING NON-CIRCULAR FORMS.

SPECIFICATION forming part of Letters Patent No. 403,120, dated May 14, 1889.

Application filed July 7, 1888. Serial No. 279,255. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. MALOY, a citizen of the United States, residing in Marietta, in the county of Cobb and State of Georgia, have invented certain new and useful Improvements in Lathes, of which the following is a specification.

The present invention relates to that class of lathes adapted to the turning or forming of irregular or non-circular objects—such as polygonal-sided rods or columns, and either straight or tapered—and it consists in the novel structure hereinafter fully set forth.

In the drawings, Figure 1 is a rear elevation of a lathe provided with the improvements. Fig. 2 is an end elevation thereof. Fig. 3 is an enlarged vertical cross-section of the same taken on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the slide-rest and the devices carried thereby. Fig. 5 is an enlarged rear elevation of the slide-rest, crank-disk, its driving-wheel, and lead-shaft; and Fig. 6 is a side elevation of the rear portion of the slide-rest, the crank-disk, driving-wheel, and lead-shaft.

The lathe proper may be of any ordinary construction having the usual bed, A, head B, in which is mounted the main spindle C, cone-pulleys D, and back gear, E, and a tail-stock, F, in which is mounted the usual spindle, G. There is also provided, as is common in automatic feeding-lathes, a lead-screw shaft, H, extending longitudinally in front of the lathe-bed, and a plain lead-shaft, I, similarly extending in rear of the lathe-bed, and the usual change-gearing, 10, 11, and 12, mounted at the end of the lathe-head and bed for transmitting motion from the main spindle to the shafts H and I through their gears 13 and 14, respectively, by means of which continuous rotary motion is imparted to said shafts.

The lathe is furthermore provided with a slide-rest, K, mounted on the bed crosswise thereof and carrying a threaded nut that engages with the threads of the lead-screw shaft H, by which, when the shaft is rotated, the slide-rest is continuously fed longitudinally along the bed. On the slide-rest is mounted an adjustable slide-block, L, carrying the usual tool-post, M, in which is clamped a cutting-tool, 50, adapted to the particular work and material to be turned. The ordinary crosswise adjustment of the slide-block L is had through the medium of a screw-threaded rod, N, mounted to turn in bearings in a head, O, said shaft engaging with a nut seated in a recess within the slide-block.

The devices for effecting the automatic movement of the slide-block L crosswise of the lathe, so as to vary the position of the cutting-edge of the tool 50 with respect to the longitudinal axis of the work being turned or operated upon, and which constitute the present improvements, consist, essentially, in a crank-disk, 20, the movements of which are communicated to the slide-block through a connecting-rod, 21.

The crank-disk is mounted to rotate in bearings formed in a bracket, 22, projecting from the rear side of the slide-rest K and rigidly secured thereto. It carries a stud, 23, that is adjustably mounted in a T or other suitably-shaped slot, 24, formed in the crank-disk and preferably extending diametrically entirely across its face, by means of which the position of the said stud 23 may be changed to either side of the axis of the disk and varied with respect to said axis, whereby its throw and consequently the movement of the slide-block L may be perfectly regulated.

The connecting-rod 21 is preferably of polygonal form, and is seated in a similar-shaped opening or seats provided in the slide-rest K, thus preventing it from turning, and at its front end is fixedly connected to the head O. The opposite or crank end of the connecting-rod is formed into a yoke, 25, into which the crank-stud 23 extends, the slot of the yoke forming an elongated guide therefor. This end of the rod 21 may also be supported by an extension, 26, passing seats 27, provided therefor by an extension of the bracket 22.

The head O in the old and ordinary forms of the slide-rest is secured thereto, so as to form a rigid support of the adjusting-screw rod N, enabling the slide-block to be moved with respect thereto. In the present embodiment the said head, while in all respects serving to rigidly support said adjusting-screw rod and permit the independent adjustment of the slide-block, is, as before described,

mounted to the end of the connecting-rod 21, so that it may partake of the reciprocations of said rod, the connection between the head O and the slide-block being had through the said adjusting-screw rod N. The head O may be steadied, if found necessary, by one or more rods, 28, secured thereto and projecting into openings in the slide-block L, as shown.

In order to impart automatic movement to the devices just described, the crank-disk 20 is rotated through connections with the rear lead-shaft, I. For this purpose the disk is provided with a toothed edge, 29, the teeth of which mesh with a toothed wheel, 30, mounted on the shaft I, so as to rotate therewith. When the slide-rest K is being automatically moved longitudinally along the lathe-bed through the rotations of the lead-screw shaft H, and consequently carrying with it the slide-block and crank-disk and their connections, it is necessary that the toothed wheel 30 should either travel with the slide-rest, so as to be kept in gear with the toothed edge of the crank-disk, or that the said toothed wheel 30 extend the length of the shaft I. The former is the more practicable, and is effected by mounting the wheel 30 in a bearing, 31, that projects from the slide-rest and embraces the hub of the wheel, the latter being provided with a spline, 32, that enters a spline-groove, 33, extending longitudinally in the shaft I, thus partaking of the rotations of the latter and at the same time being capable of moving longitudinally thereon.

Rotary movement may be imparted to the crank-disk 20 without necessarily also imparting a feeding movement to the slide-rest by simply disengaging or slipping out of gear either of the gears 12 13, in which case the cutting-tool will simply cut over the same portion of the material operated upon.

From the foregoing it will be readily understood that any desired number of reciprocations may be imparted to the cutting-tool to and from the longitudinal axis of the material supported in the lathe by simply varying the size of the driving-gear or that upon the end of the shaft I, and that the extent of each reciprocating movement may be varied by changing the position of the crank-stud 23 in its slot in the crank-disk. It will also be noticed that the cutting-tool may be adjusted so as to commence its cutting action either at the limit of its inner or of its outer movement by simply adjusting the crank-stud to a position upon either side of the axis of its disk. By this embodiment of the invention any of the ordinary lathes now in common use may be provided therewith without any alteration in its structure or rearrangement of its operating parts. If the rear lead-shaft, I, be a screw-shaft like the front one, H, the spline-groove 33 may be as readily cut in it, the wheel 30 and its hub being sufficiently large to permit it to slide along the shaft, no threads being provided therein to engage with this shaft.

It is to be remarked, in passing, that objects may also be turned to irregular or polygonal tapered form as readily as those of straight form by simply setting the tail-stock over to one side of the true longitudinal axis of it and the lathe-head.

What I claim is—

1. The combination, with a slide-rest and a tool-post mounted thereon, of a driven crank-disk carrying an adjustable stud, and a rod mounted to reciprocate in fixed bearings having connections with said tool-post and having a yoke embracing said stud for reciprocating said tool-post, substantially as described.

2. The combination, with a slide-rest, means for moving it longitudinally, and a tool-post mounted adjustably thereon, of a crank-disk carrying an adjustable stud, a rod mounted to reciprocate in fixed bearings having connections with said tool-post at one end and at the other provided with a yoke embracing said stud for reciprocating said tool-post, a driven shaft, and a gear mounted to turn therewith and slide longitudinally thereon for driving the crank-disk, substantially as described.

3. The combination, with a slide-rest, a tool-post mounted thereon, a head, and an adjusting screw-rod for varying the position of the tool-post on the slide-rest, of a driven crank-disk carrying a stud, a connecting-rod mounted to reciprocate in fixed bearings, one end provided with a yoke embracing said stud and the other rigidly secured to said head to reciprocate the tool-post, substantially as described.

4. The combination, with a slide-rest, a tool-post mounted thereon, a head and an adjusting screw-rod for varying the position of the tool-post on the slide-rest, and a lead-screw shaft for moving the slide-rest and tool-post longitudinally, of a toothed crank-disk carrying a stud, a connecting-rod, one end provided with a yoke embracing said stud and the other rigidly secured to said head to reciprocate the tool-post, a driven lead-shaft, and a gear mounted to rotate therewith and slide longitudinally thereon for driving the said crank-disk, substantially as described.

5. The combination, with a slide-rest and a tool-post mounted thereon, of a driven crank-disk carrying a stud, a rod mounted to reciprocate in said slide-rest and provided with a yoke at one end embracing said stud and at the other end secured to a head, O, and an adjusting screw-rod between said head and the tool-post, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES W. MALOY.

Witnesses:
H. C. DERBY,
FRANCIS KENDALL.