(No Model.)

A. MARSHALL.

LATHE.

No. 281,539. Patented July 17, 1883.

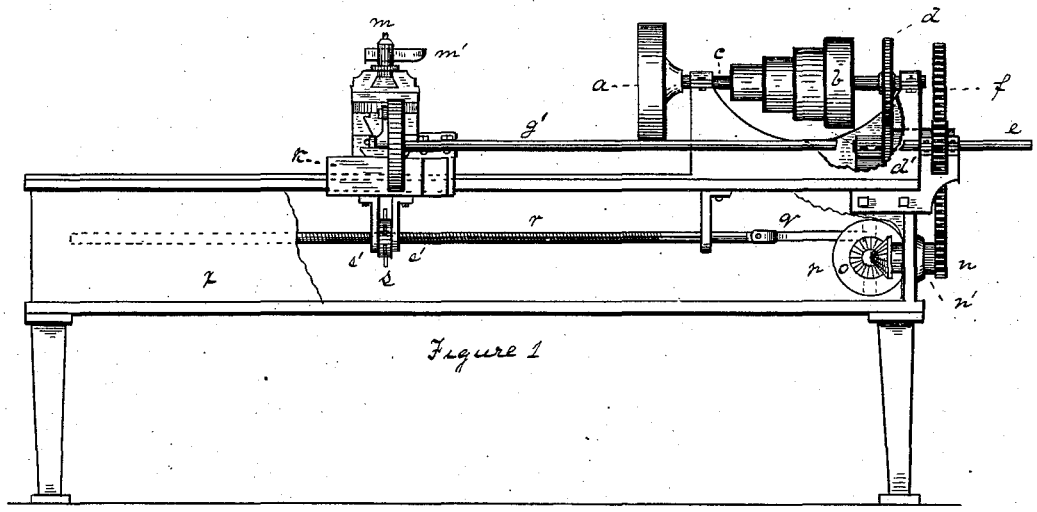

Figure 1

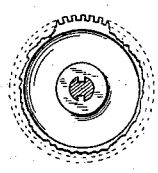

Figure 2

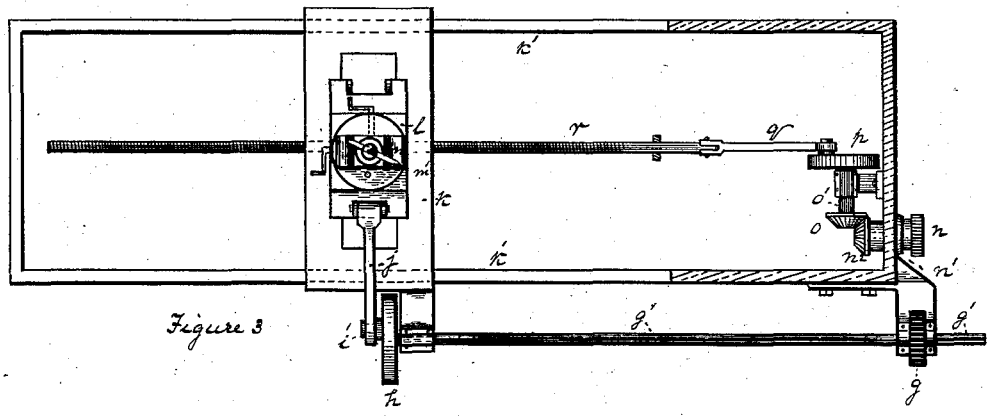

Figure 3

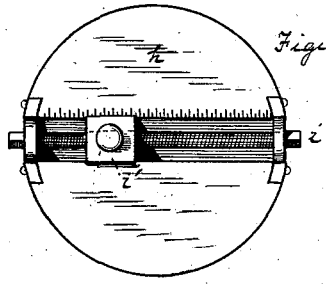

Figure 4

Witnesses—
Inv. k. Smith
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UNITED STATES PATENT OFFICE.

ANDREW MARSHALL, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO IDA MARSHALL, OF SAME PLACE.

LATHE.

SPECIFICATION forming part of Letters Patent No. 281,539, dated July 17, 1883.

Application filed March 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, ANDREW MARSHALL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Lathes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a lathe showing my improvement. Fig. 2 is a detached view of a portion of the wheel by which power is transmitted to the shaft which gives a lateral reciprocating motion to the tool. Fig. 3 is a plan view, showing the tool and mechanism for imparting motion thereto. Fig. 4 is an elevation of the center-head.

Like letters of reference indicate like parts wherever they occur.

Heretofore, in such lathes as have been used for engraving or cutting designs on various articles, it has been customary to attach the article to be engraved to the revolving face-plate or chuck, and to guide the tool, which is secured to the tool-post, by the hand of the workman.

It is the object of my invention to provide such necessary mechanism as will give to the tool an automatic reciprocating movement parallel with the axis of the work-holder and lateral reciprocating motion transversely of the lathe, either singly or together, so as to cut on or form on the article a certain pattern or design, which pattern or design may be varied at pleasure by altering the position of the mechanism, as will hereinafter more fully appear.

In the drawings there is shown but one tool post and rest; but two or more such rests carrying tools may be employed, so as to form a pattern or design on the inside and outside of the article at one and the same time.

I will now describe my invention, so that others skilled in the art may manufacture and use the same.

In the drawings, *a* represents the face-plate or chuck, which is secured to the spindle or mandrel in the usual manner, and is caused to rotate by means of the band-wheels *b* on the shaft *c*. Keyed to this shaft *c* is a cog-wheel, *d*, which meshes into and operates another cog-wheel, *d'*, on the shaft *e*. Keyed to the shaft *e*, on the outer side of the frame *x* of the lathe, is a great cog-wheel, *f*, which in turn meshes into a smaller cog-wheel, *g*, which is secured on the shaft *g'* by a feather and spline or other suitable device for turning the shaft, and at the same time permitting the movement of the shaft back and forth through the wheel. On the other end of the shaft *g'* is keyed a center-head, *h*, in the face of which center-head is a groove, in which groove is a screw-bolt, *i*, and nut *i'*, by means of which the arm *j* is pivotally secured to the face-plate in such a manner that its point of attachment may be regulated at any desired distance from the center of the center-head, so as to give a shorter or longer sweep to the arm *j*. On the carriage *k*, which moves back and forth on the ways *k'*, is a carriage, *l*, fitted on suitable ways, so that a lateral motion may be given to the carriage. The outer end of the arm *j* is pivotally connected with this carriage *l*, so that when the shaft *g'* is turned on its axis a lateral reciprocating movement is given to the carriage transversely of the lathe. Upon this carriage *l* is the tool-post *m* and tool *m'*, which may be of any suitable form, such as are now in common use. Below the great cog-wheel *f* on the shaft *e* is a small cog-wheel, *n*, on the shaft *n'*. At the inner end of this shaft *n'* is a miter-wheel, n^2, which meshes into and imparts motion to a miter-wheel, *o*, on the shaft *o'*. At the other end of the shaft *o'* is a center-head, *p*, similar to the center-head *h*, already described, having a groove, bolt, and nut, by means of which the arm *q* is pivotally attached to the center-head at the desired distance from its center. Hinged to the free end of the arm *q* is a shaft, *r*, which is provided with a screw-thread and passes through a nut, *s*, which is also screw-threaded, which nut is situated between two leaves, *s'*, extending down from the bottom of the carriage *k*.

The operation of these devices is as follows: Power being applied to the band-wheel *b*, the face-plate or chuck is caused to revolve, and also the cog-wheel *d* on the shaft *c*, which in turn imparts motion to the great wheel *f* on the shaft *e* by means of the cog-wheel *d'*. The

article having been attached to the chuck or face-plate, the carriage *k* is moved forward, so as to bring the tool *m'* into contact therewith. The great wheel *f*, meshing into the small wheel *g* on the shaft *g'*, imparts a lateral reciprocating motion to the carriage *l*, by means of the center-head *h* and arm *j*, which causes a certain pattern to be engraved or cut upon the article held on the face-plate or chuck. By securing the arm *j* at any desired position on the center-head *h* the length of the stroke of the arm *j* will be correspondingly either increased or diminished as the pivotal point is removed from or brought closer to the center of the center-head, and thereby the pattern or design cut by the tool *m'* may be changed at pleasure. This automatic motion imparted to the tool, as just described, may be either used alone or in connection with a reciprocating motion, which I will now proceed to describe. The great wheel *f*, also meshing into the small cog-wheel *n*, causes the same to revolve, and by means of the miter-wheels n^2 and *o* the shaft *o'* turns on its axis, carrying with it the center-head *p*, which in turn gives a reciprocating movement parallel to the axis of the work-holder to the arm *q* and the shaft *r*, which shaft, being secured by the nut *s* to the carriage *k*, as already described, imparts the same movement to the carriage, thereby carrying the tool against the article operated upon and removing it therefrom, during which time of contact between the tool and article a certain design is formed or cut either by the rotating movement of the article itself on the face-plate or by the movement of the tool imparted by the center-head *h* and arm *j*, or by both of these motions combined. The tool then retiring from the article operated upon, the face-plate and article continuing to move, a certain distance is traversed before the tool is again brought against the article, when the design is repeated. It is evident that either of these motions—viz., the lateral motion and the reciprocating motion—may be used separately from the other, or they may both be combined. In order to disconnect the mechanism which imparts the reciprocating motion from the carriage *k*, it is only necessary to unhinge the arm *q* from the center-head *p*, and in order to disconnect the mechanism which imparts the lateral motion to the carriage *l*, the rod *j* is either disconnected from the center-head *h* or from the carriage. On each of the center-heads *h* and *p* is a graduated scale along the groove *y*, by means of which the nut and bolt by which the arms *j* and *q* are attached to the center-heads may be moved to the certain desired distance from the center-heads, so as to vary the length of the stroke of said arm or shaft, and consequently thereby vary the design or pattern to be cut on the article.

As the shaft *g'* is attached to the cog-wheel *g* by means of a feather and spline, the carriage *k* may be readily moved by means of the nut *s* on the screw-threaded shaft *r* to any desired distance from the face-plate or chuck, in order to accommodate the lathe to different-sized articles.

By varying the relative diameters of the cog-wheels *n* and *g* and the great wheels *f*, or, rather, the number of teeth on these wheels, different designs may be formed, as the rapidity and relation of the two movements or of either single movement are changed or combined, as desired.

The advantages of my invention are that a great number of mechanical designs may be formed on any kind of articles, such as metal molds, in the manufacture of glass, wooden vessels, and vessels of other material, and also vessels of glass which have first been coated by a substance which will resist the action of fluoric acid. It may also be used not only to engrave designs, but also to form the shape of the article itself from the raw material, and for a great number of other purposes for which lathes are now used.

As I have before remarked, two or more tool-posts may be placed on the carriage *l*, so as to operate on the interior and exterior of the article at one and the same time.

I am aware that the tool-carriage of lathes has heretofore been constructed with an axially-moving and a transversely-moving slide, and that said slides have been actuated by means of springs or weights and cams upon a revolving shaft, and do not herein claim such construction, for the reason that the movements of the slide are less positive, and cannot be regulated as by the shaft and pitman combinations hereinbefore described.

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

1. In a lathe, the combination, with the work-holder, of a reciprocating tool-holder arranged to move to and from the axis of the work-holder, a pitman, *j*, for reciprocating the tool-holder, and a shaft, *g'*, and gearing for transmitting the power from the shaft which carries the rotating work-holder, substantially as and for the purposes specified.

2. In a lathe, the combination, with the work-holder, of a reciprocating tool-holder arranged to move in a line parallel with the axis of the work-holder, a reciprocating rod or shaft, *r*, for imparting motion to the tool-holder, and intermediate gearing for reciprocating the rod from the rotating shaft which carries the work-holder, substantially as and for the purposes specified.

3. In a lathe, the combination, with the rotary work-holder, of a tool-holder having a lower bed or carriage arranged to reciprocate in a line parallel with the axis of the work-holder, and an upper bed or carriage arranged to reciprocate to and from the axis of the work-holder, a reciprocating rod or shaft, *r*, for moving the lower carriage, a pitman, *j*, and sliding rotating shaft *g'*, for reciprocating the

upper carriage, and intermediate gearing for actuating the said shafts from the shaft which carries the rotary work-holder, substantially as and for the purposes specified.

4. The combination, with reciprocating tool-holder *k* and the gearing for actuating the same from the shaft which carries the rotary work-holder, of the threaded coupling-rod *r*, provided with nut *s*, substantially as and for the purposes specified.

5. In a lathe, the combination, with the reciprocating tool-holder, the pitman for actuating the same, and the rotating shaft for actuating the pitman, of the center-head having the sliding nut or crank-pin and screw-bolt for adjusting the same, substantially as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 28th day of February, A. D. 1883.

ANDREW MARSHALL.

Witnesses:
W. B. CORWIN,
JAMES K. BAKEWELL.