3 Sheets--Sheet 1.

C. D. ROGERS.

MACHINERY FOR THREADING SCREWS.

No. 177,282. Patented May 9, 1876.

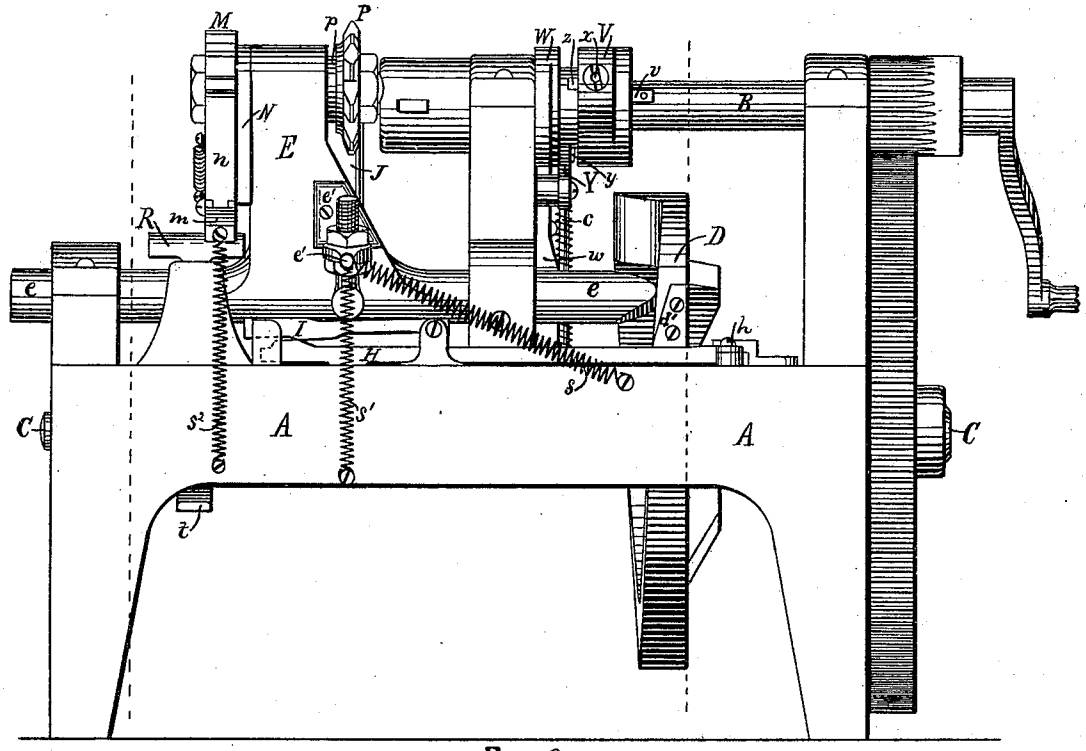

FIG. 2.

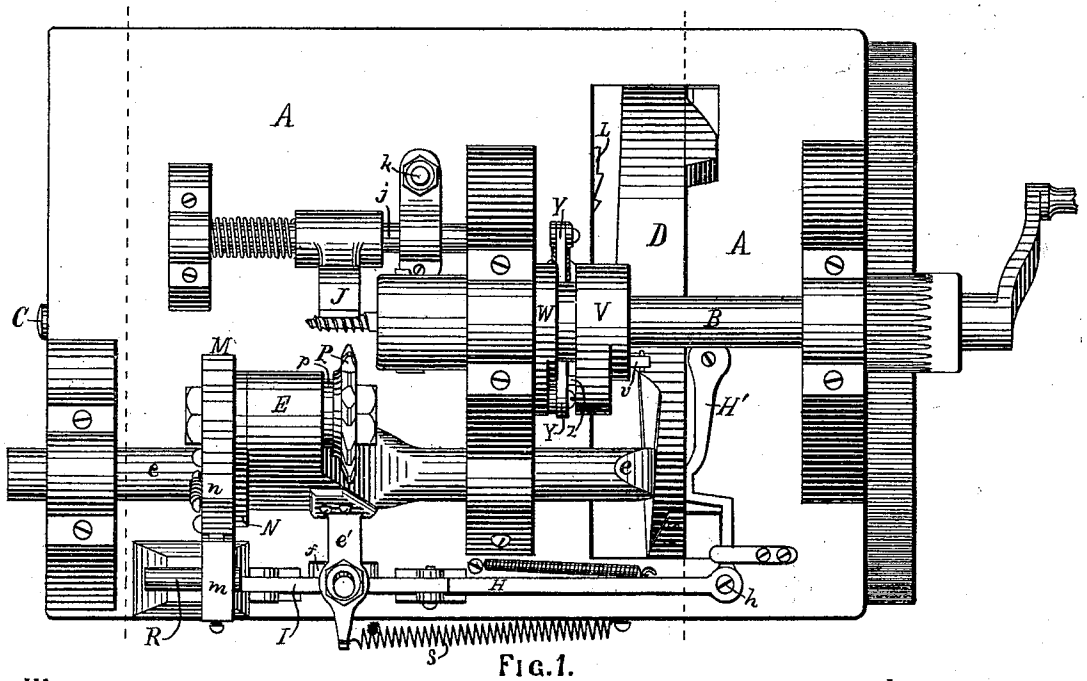

FIG. 1.

WITNESSES.

William W Lurch

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Charles D. Rogers

3 Sheets—Sheet 2.

C. D. ROGERS.

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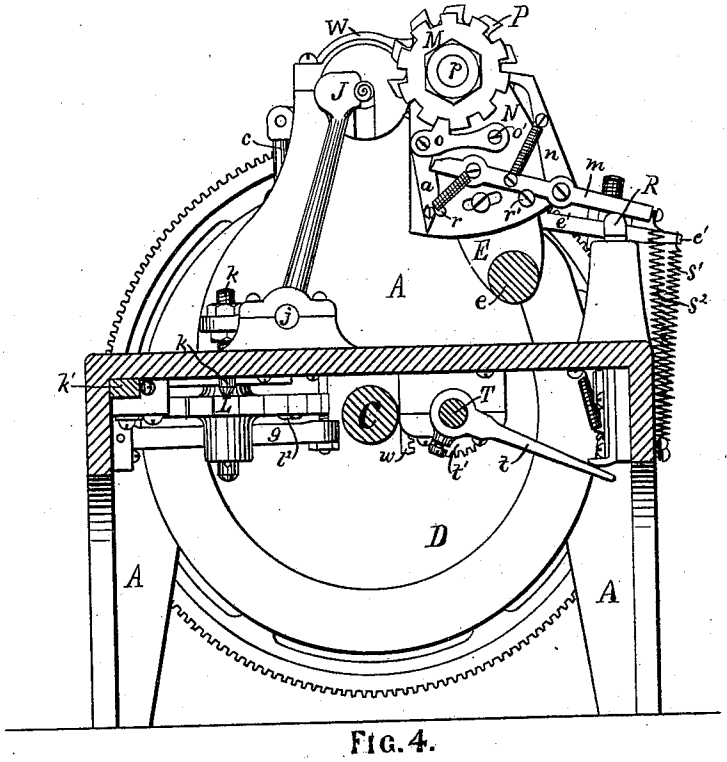

FIG. 4.

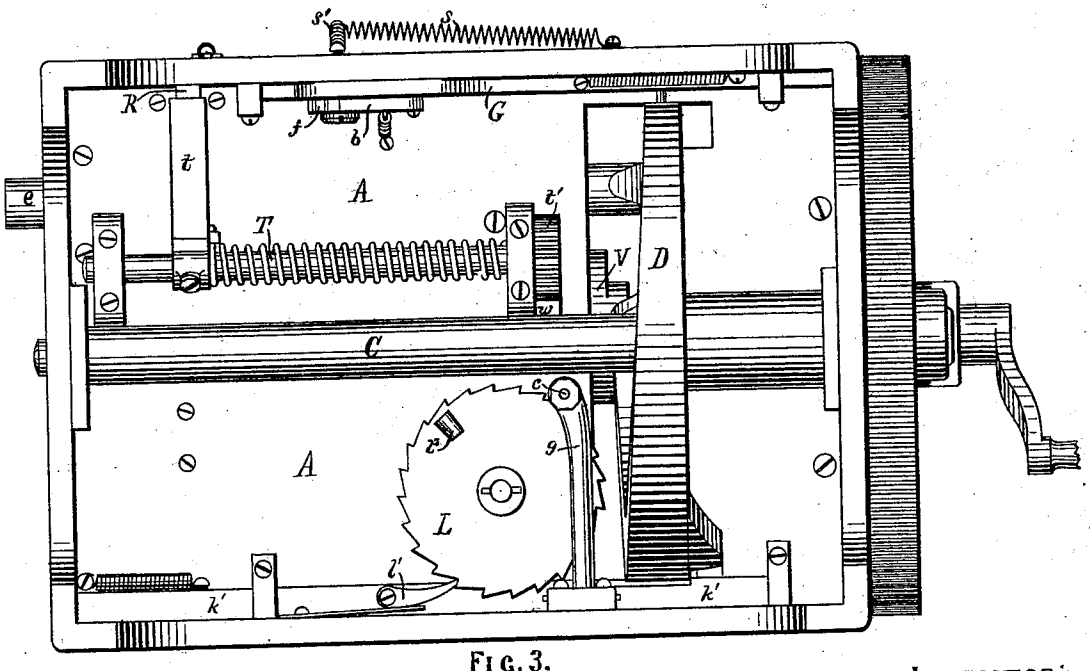

FIG. 3.

WITNESSES.

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3 Sheets—Sheet 3.

C. D. ROGERS.

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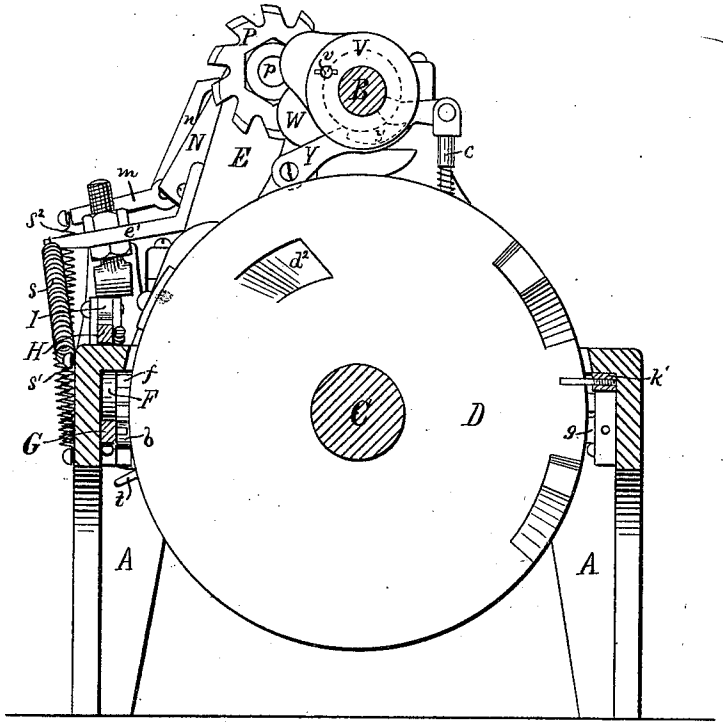

FIG. 5.

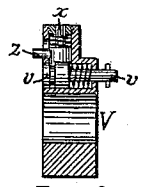

FIG. 6.

FIG. 8.

FIG. 7.

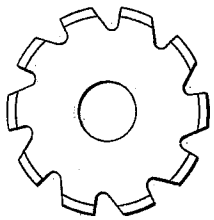

FIG. 9.

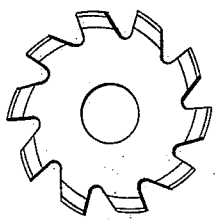

FIG. 11.

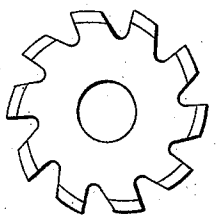

FIG. 13.

FIG. 10.

FIG. 12.

FIG. 14.

WITNESSES.

William W. Swan

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Charles D. Rogers

UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN MACHINERY FOR THREADING SCREWS.

Specification forming part of Letters Patent No. **177,282**, dated May 9, 1876; application filed April 22, 1876.

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Machinery for Shaving, Pointing, and Threading Wood-Screws, of which the following is a specification:

The invention consists in the employment of a multiple tool in each or either of the operations of shaving, pointing, and threading the screw in machines in which a single tool has been used heretofore; in devices for bringing the different cutting parts of the multiple tool into operation successively as they may be required, with especial reference to the continued use and adjustment of the tool as it wears away; and in a contrivance by which the times at which the different cutting parts of the tool are brought into operation may be determined automatically.

It is well known that in shaving, pointing, or threading screw-blanks the tools employed for those operations become dull after operating upon a small number of blanks, and that there is great loss of time and skilled labor in changing the dull for a sharp tool, and in adjusting the new tool for further work.

The object of my invention is to remedy this difficulty, and for that purpose I have so cut teeth in circular steel plates that each tooth, when brought up to the blank by partially revolving the plate, shall present to the blank the same cutting edge or edges presented by the ordinary single tool; and I have also devised mechanism, which may be embodied in the ordinary shaving, pointing, or threading machine, for successively presenting the different teeth of the plate to the blank with sufficient exactness at required times.

In the drawings forming a part of this specification I have shown several multiple tools, which I have made for respectively shaving, pointing, and threading the screw, and the mechanical devices for operating and adjusting such tools as embodied in a threading-machine, that machine differing from pointing and shaving machines only in unimportant particulars.

In the drawings, Figure 1 is a plan of said threading-machine. Fig. 2 is a front elevation of the same. Fig. 3 is an inverted plan. Figs. 4 and 5 are sections in elevation on dotted lines in Figs. 1 and 2. Fig. 6 is a section of a clutch employed in said machine. Fig. 7 is a plan, and Fig. 8 is an elevation, of swinging arm Y, showing double cam *y* in detail. Figs. 9 and 10 are, respectively, a plan and a section of a multiple pointing-tool. Figs. 11 and 12 are the same views of a multiple shaver. Figs. 13 and 14 are the same views of a multiple threader.

A is the frame of the machine. B is the spindle, with any ordinary means of holding the screw-blank. C is the cam-shaft, driven from the spindle, as shown, and carrying the principal cam D. E is the tool-post, having all the motions of the tool-post in ordinary threading-machines. Its motion to give the lead to the screw is derived from a lift on the side of the cam D, acting upon the end of a rocking-shaft, *e*, to which the tool-post is rigidly connected, and which rocks and slides in bearings projecting from the table or frame, a spring, *s*, attached to the frame and to a rigid elbow-projection, *e'*, from the tool-post, keeping the end of the rock-shaft *e* in contact with the cam.

The rocking of the tool-post forward, to carry the tool forward toward the axis of the blank, is governed by a small cam, F, under the table, which is revolved by a ratchet, *f*, rigidly attached to it, and a pawl, *b*, attached to a sliding bar, G, which in turn is operated by a wedge-shaped projection, d^1, on the periphery of cam D, and a spring. As the cam F revolves, it gradually raises a bar, H, lying on the table, which bar in turn lifts a former, I, the former I in turn lifting the elbow-projection *e'*. A spring, *s'*, draws back the tool-post when the cam F permits.

When the invention is applied to a shaving or a pointing machine the mechanism for giving the lead to the screw is omitted, and the cam F acts directly upon the elbow-projection *e'*.

In the threading-machine the upper surface of the former I is so shaped as to cause the point of the screw to be threaded, the end of the elbow-projection *e'* traveling along that surface. The tool is released from the blank

between the successive cut by means of a projection on the lower side of the former I, and a projection on the upper side of the bar H, and a sliding motion given to the bar H. When the projections are disengaged the spring s^1 draws back the tool from the blank. When they are engaged the tool-post and tool are directly under the control of the cam F. The bar H gets its sliding motion from a lever, H′, to which it is pivoted at *h*, and which, in turn, is pivoted to the table, and is vibrated once in every revolution of the cam D by having a projection from it enter a depression, d^2, in the side of the cam, the said projection being constantly held up against the side of the cam D by a spring attached to the bar H and the table. J is a rest for the blank, and is rigidly attached to a rock-shaft, *j*. A spring coiled around the shaft *j* keeps the rest back from the blank. The rest J is held up to the blank by means of a pin, *k*, screwed into an arm clamped to the rock-shaft *j*, so as to form an elbow, the lower end of the pin *k* resting upon the upper surface of a ratchet, L, under the table, revolved by means of a pawl, l^1, the pawl being operated by a sliding bar, *k*′, having a pin engaging two projections on one side of cam D. There is a depression in the upper surface of the ratchet L, into which the pin *k* enters once in every revolution of the ratchet, remaining there during a partial revolution of cam D to permit the rest J to fall back from the blank.

Thus far, with the exception of the multiple tools as units, I have merely described ordinary screw machinery, to which my inventions are applicable. I proceed to describe the manner in which I have ingrafted my inventions upon such machines.

P is a multiple tool, secured by a set-screw to a shaft, *p*, which revolves in bearings in the tool-post E. M is an index-wheel, having projections or teeth corresponding in number and position to the teeth of the multiple tool. The index-wheel is mounted on the same shaft as the multiple tool, being keyed thereto; and it is obvious that by turning the index-wheel one tooth forward, and locking it by any ordinary means, the multiple tool will be turned one tooth forward and a new tooth will be presented to the screw-blank ready to operate upon it; and this operation may be continued by an operative of the most ordinary skill until all the teeth of the tool have been used to such a degree as to require sharpening. As the teeth rapidly wear away in use, however, it is desirable to have in the machine some contrivance for bringing a repaired tool up to its work, or for adjusting the tool whatever may be its diameter. Such a contrivance consists of a quadrant plate, N, loose upon shaft *p*, and secured to the tool-post by a set-screw working in a slot in the quadrant, as shown; a vibrating arm, *m*, pivoted, as shown, with an attached pawl, *n*; a locking-pawl, *o*, pivoted to the quadrant at *o*′, and having pivoted to a wedge-shaped piece, *a*, with a notch, into which the projecting end of the vibrating arm *m* enters, as shown; two pins, *r* and *r*′, and two springs, as shown.

A partial revolution of the tool is made by raising the vibrating arm *m*. This causes the pawl *n* to enter between two teeth of the index-wheel M, and at the same time the inner end of the vibrating arm *m* enters the notch of the wedge-shaped piece *a*, and pulls that piece down, thus disengaging the tooth of the locking-pawl *o* from the teeth of the index-wheel, and allowing the pawl *n* to move the index-wheel forward. The wedge-shaped piece *a* is held against the pin *r* by a spring, as shown, and from the shape of the wedge finally releases the arm *m* from the notch, when the tooth of the locking-pawl *o* flies back between the teeth of the index-wheel. The vibrating arm *m* is then permitted to fall back upon the pin *r*′, the spring bringing its attached pawl *n* back with it.

As the mechanism for revolving and locking the tool just described (more especially the locking device) is secured to the quadrant, it follows that, by changing the position of the quadrant on the tool-post, by means of the set-screw and slot before referred to, the tool may be adjusted to any required position, and it follows, further, that the adjustment having been made for one tooth of the tool, it is made for all the teeth.

It remains to describe an automatic device for operating the vibrating arm *m*.

This arm is automatically pulled down by force of a spring, s^2. It is lifted by a T-shaped bar, R, working up and down in a socket in the table, the bar R being lifted by an arm, *t*, clamped to a rocking shaft, T, under the table, the arm *t* being kept away from the bar R by force of a spring coiled on the shaft, except when the shaft is rocked by a pinion, *t*′, operated by a rack, *w*, when the latter descends, the rack *w* being in turn caused to descend, at required intervals, by a cam, W, loose upon the spindle, and having a slot in its side to recieve the pin *v* of a spring-clutch, V, keyed to the spindle. Y is a swinging arm pivoted to the frame, as shown. It is pulled down at proper intervals by a rod, *c*, whose lower end is attached to a swinging lever, *g*, pivoted below the table, and operated by a projection, l^2, upon the lower side of the ratchet-wheel L, the means of turning which have already been described. The swinging arm Y has on one side a projection, *y*, serving as a double cam for a purpose next to be described.

The spring-clutch V has a spring-pin, *v*, one half of the end of which is against the face of the cam W, or, when the pin is unlocked, enters the slot in cam W, while the other half or the end is uncovered, or, when the pin is unlocked, presses against the side of the double cam *y*. The spring-clutch pin *v* for most of the time is held in place by a second pin, *x*, also having a spring coiled around it, which pin, *x*, in turn,

from time to time, is drawn out to release the clutch-pin by a third pin, *z*, rigidly secured to it at right angles, and working in a slot in the clutch V, as shown, this third pin *z* being moved in the slot by striking against the cam-shaped periphery of the double cam *y*, when the arm Y is drawn down. The operation of the clutch is, accordingly, as follows: At intervals, determined by the projection on the lower face of the ratchet L, the swinging arm Y falls, and the cam on the periphery of the double cam *y* moves the pin *z* in its slot, thereby releasing the clutch-pin *v*, which enters in part the slot of cam W; but, while the clutch Y and cam W are making a revolution together, the pin *v* strikes the cam on the side of the double cam *y*, and is gradually drawn back into its recess in the clutch V, thus disengaging the clutch V and cam W. The arm Y is raised by a spring coiled around the rod *c*. As before stated, the rack *w* is caused to descend by the cam W acting upon its upper end. When released from the cam it rises by force of the spring before referred to, coiled on the rocking shaft T.

When the vibrating lever *m* is not operated automatically it should be provided with a suitable handle.

I claim—

1. In machines for shaving, pointing, or threading screws, a multiple tool mounted on the tool-post, and so governed by a locking index-wheel that, by turning forward and locking the index-wheel, a new tooth may be presented to a revolving blank, and caused to operate upon it, substantially as described.

2. In machines for shaving, pointing, or threading screws, a multiple tool having bearings in the tool-post, in combination with an index-wheel and mechanism for making and preserving the adjustment, whatever may be the diameter of the tool, substantially as described.

3. In machines for shaving, pointing, or threading screws, a multiple tool revolved and adjusted substantially as described, in combination with mechanism, substantially as described, for controlling the revolution of the tool automatically.

CHARLES D. ROGERS.

Witnesses:
WILLIAM W. SWAN,
H. G. OLMSTED.