Sheet 1, 2 Sheets.

J. Crum.

Shaving and Turning Heads of Screws.

No. 5,803. Patented Sept. 26, 1848.

Fig: 1

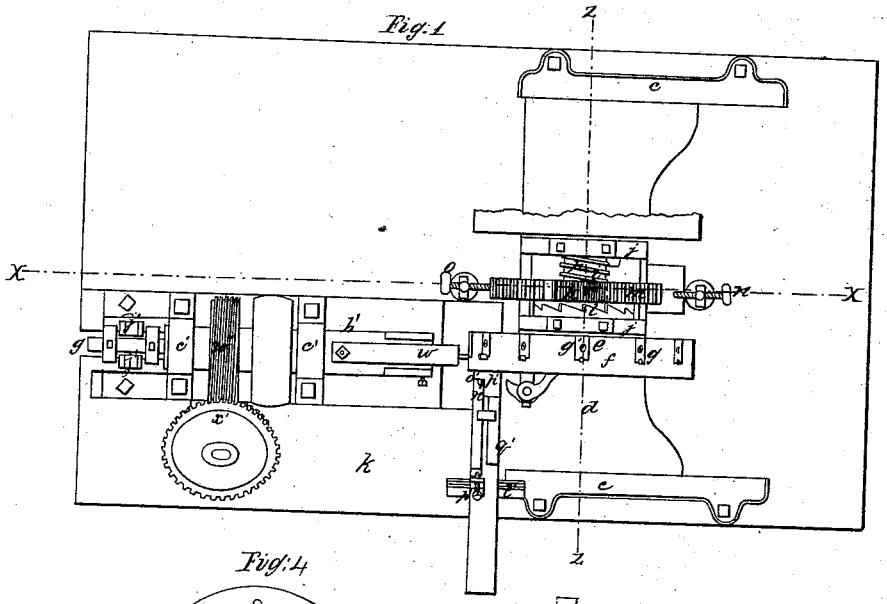

Fig: 4

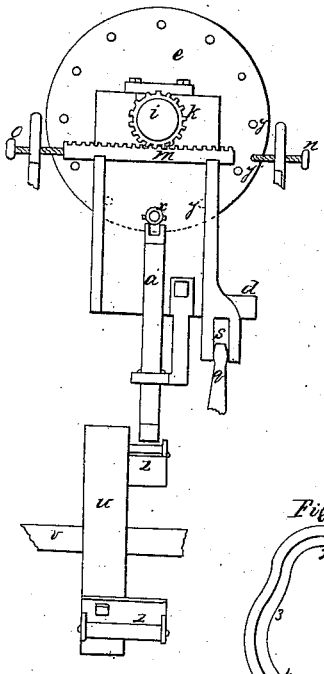

Fig: 5

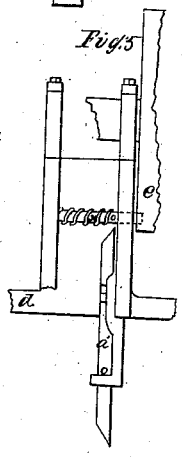

Fig: 8

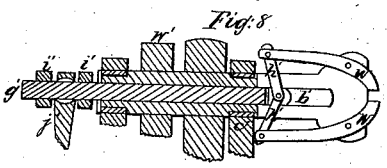

Fig: 6

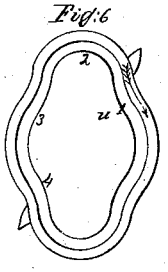

Fig: 7

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J. Crum.

Sheet 2 - 2 Sheets

Shaving and Turning Heads of Screws.

No. 5,803. Patented Sept. 26, 1848.

Fig. 2

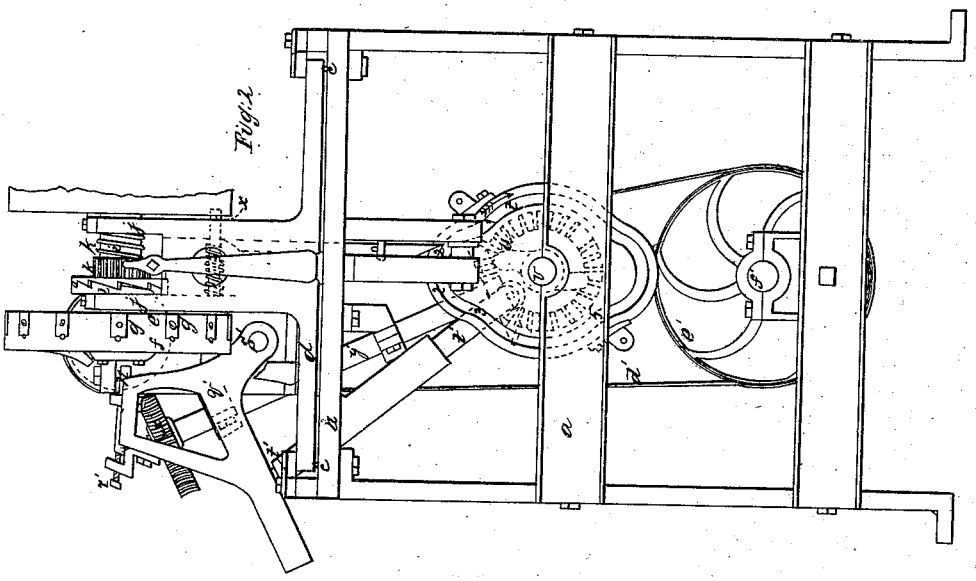


Fig. 4

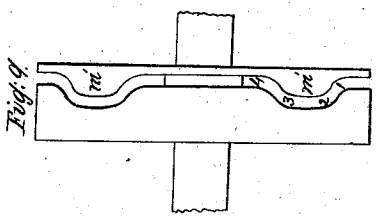
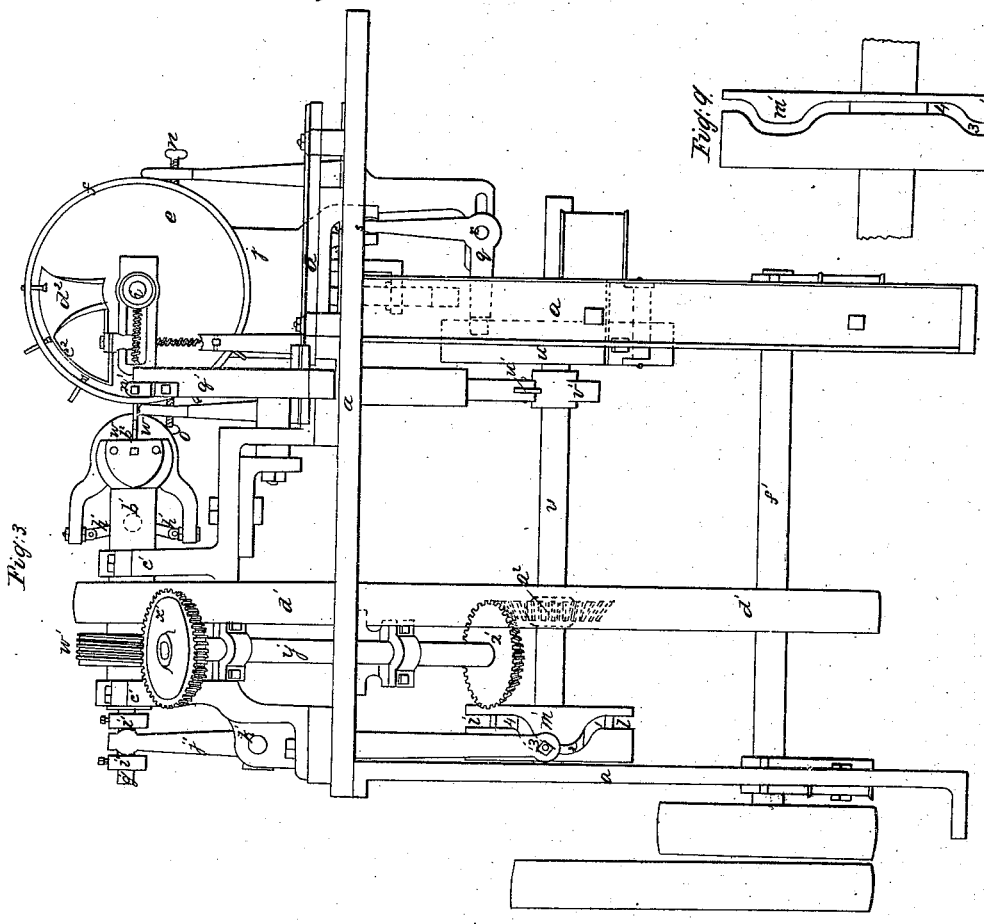


Fig. 3



THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

JOHN CRUM, OF RAMAPO, ASSIGNOR TO H. L. PIERSON, OF NEW YORK, N. Y.

IMPROVED MACHINE FOR TURNING THE HEADS OF WOOD-SCREWS.

Specification forming part of Letters Patent No. **5,803**, dated September 26, 1848.

To all whom it may concern:

Be it known that I, JOHN CRUM, of Ramapo, in the county of Rockland and State of New York, have invented new and useful Improvements in Machines for Turning or Shaving the Heads of Wood-Screws; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of the machine; Fig. 2, a front elevation; Fig. 3, a side elevation; Fig. 4, a vertical longitudinal section taken at the line X X of Fig. 1; Fig. 5, a cross vertical section taken at the line Z Z of the same figure; Figs. 6 and 7, face views of the carrying-wheel cam and the cutter-cam; Fig. 8, a longitudinal section of the mandrel, and Fig. 9 a representation of the jaw-cam developed.

The same letters indicate like parts in all the figures.

My improvements for which I claim Letters Patent are based on the general principle of a machine for the same purpose invented by Henry Crum, of Ramapo, New York, and secured by Letters Patent bearing date the 16th of November, 1839, in which the blanks are fed by being placed in holes in the rim of a carrying and holding wheel with the heads inward and carried around and the points presented to and caught by a pair of rotating jaws that the under surface of the head may be shaved by teeth made around the holes in the rim of the carrying and holding wheel while the top of the head is turned by a tool presented to it within the wheel, the jaws being opened and closed at the required time by means of a rod within the arbor or mandrel, which rod is connected with a lever actuated at the required time by a cam, and the carrying and holding wheel rotated by an intermittent motion to carry off the blank after the head has been turned and shoved and to present a new one to the jaws.

The nature of the first part of my invention or improvement in the before-mentioned machine consists in giving to the frame or carriage that carries the carrying and holding wheel (sometimes misnamed the "feeding-wheel") an intermittent reciprocating motion to withdraw the turned blank and insert the points of others in the jaws in succession, instead of giving an endwise motion to the mandrel for this purpose, as heretofore, and also in giving to the carrying-wheel an intermittent rotary motion to present a new blank to the jaws preparatory to the insertion of the same into the jaws by the motion of the carriage.

The second part of my invention consists in shaving the under and upper surface of the heads within the rim of the carrying and holding wheel by means of a tool properly adapted to the purpose, which is attached to the end of vibrating tool-holder that receives its appropriate motions at right angles to the axes of the blank from a cam on the main shaft.

In the accompanying drawings, *a* represents a frame properly adapted to the purpose, but which may be changed at the discretion of the constructor. On the table *b* of this frame, and near one end thereof, there are two ways *c c*, in which slides a carriage *d*, that carries the carrying and holding wheel *e* for the purpose of withdrawing from the jaws the blank that has been turned and presenting a new one to the jaws. The carrying and holding wheel *e* is made with a projecting rim *f*, in which spaces are cut out at equal given distances apart and extending from the face of the wheel to the middle of the width of the projecting rim, and in these recesses are fitted dies *g*, which are secured by screws to the wheel. The holes that receive the screw-blanks are made half in the end of the dies and the other half in the edge of the recesses, so that by sliding the dies the holes can be adapted to different sizes of screw-blanks. The wheel thus formed is hung on the end of a shaft *i*, which turns in standards *j j* of the carriage *d*, and it is turned the distance required at each operation by a clutch-wheel *l*, one half of which is attached permanently to the shaft, and the other to a cog-wheel *k*, that turns freely on the shaft, the cogs of the wheel *k* engaging with a rack *m*, that slides freely in the standards of the carriage, so that when this carriage is moved back from the jaws during the operations of the machine the end of the rack strikes against the end of a set-screw *n*, attached to the frame, which slides the rack and turns the carrying-

wheel the required distance to take the turned blank from the jaws and present another to be turned, and on the return motion of the carriage the other end of the rack strikes against another set-screw *o*, which forces it back, and also the cog-wheel and that half of the clutch-wheel attached to it, the form of the clutch-cogs being such as to permit the two halves to turn in that direction independently of one another, the movable half being forced toward the other by the tension of a helical spring *p* on the shaft.

The blanks are fed into the holes of the carrying-wheel *e* by hand with the heads inward, and the required motions are given to the wheel in the following manner: An elbow-lever *q*, which turns on a fulcrum-pin *r*, has the end of one arm working in a slot *s* of the carriage *d*, while the end of the other arm is provided with a roller or wrist, which runs in a cam-groove *t* made in the face of a plate *u* on a shaft *v*, that makes half a revolution for each complete operation—that is, for every blank that is introduced, turned, and discharged—and the cam-groove is formed so that from the point 1 to 2 in the direction the reverse of the arrow it runs out of the circle to move the carriage and with it the carrying-wheel from the jaws *w* to remove a blank that has had the head turned, and from the point 2 to 3 in the same direction the groove runs toward the shaft by a curve the reverse of that from 1 to 2 for the purpose of moving the carrying-wheel toward the jaws to present a new blank, the previous motion of the carriage from the jaws having turned the carrying-wheel a distance equal to a space between two of the holes in the dies to present a new blank, and then from the point 3 to 4 the groove is concentric to hold the carrying-wheel in the same position while the head of a blank is being turned. The other half of the cam-groove is similar to the one described to repeat the operation. So soon as the carrying-wheel has completed its motion toward the jaws and while that part of the cam-groove from the point 3 to 4 is passing over the end of the lever *q* the carrying-wheel is held firmly in that position to hold the blank firmly while it is being rotated by the jaws and acted on by the cutter, and this is done by the point of a follower *x*, that is forced by a helical spring around it to enter one of the series of holes *y* in the face of the wheel, and preparatory to turning the wheel to shift a blank a cam Z on the periphery of the cam-plate *u* forces up a sliding wedge-piece *a'*, that acts on a follower *x* to force it back out of the hole in the wheel, and the moment that the cam passes the follower *x* is in a condition to be forced by the tension of the spring into the next hole, when the wheel is turned around to present another blank to the jaws. The screw-blanks thus presented are caught, gripped, and rotated by the pair of jaws *w* that are jointed to the end of an arbor or mandrel *b'*, which runs in standards or puppets *c' c'* and rotated by a belt *d'* from a pulley *e'* on the driving-shaft *f'*. This mandrel is hollow, and within it there is a sliding rod *g'*, one end of which is jointed by links *h' h'* with the levers of the jaws, and the other end projects out beyond the back of the mandrel and is there provided with two collars *i' i'*, that embrace the forked end of a lever *j'*, that turns on a fulcrum-pin *k'*, the other end being provided with a roller or wrist that runs in a cam-groove *l'* in the periphery of a wheel *m'* on the shaft of the cam that operates the carrying-wheel. The form of this cam-groove is such that from the point 1 to 2 it runs by a sudden curve to the left to open the jaws just as the carrying-wheel begins to move from the jaws to draw out the blank that has been turned. From 2 to 3 for a short distance it runs in the direction of the periphery to give time for the carrying-wheel to present a new blank, and then from the point 3 to 4 it runs by a curve the reverse of the one from 1 to 2 to close the jaws and grip the end of a blank, and then the groove runs in the direction of the periphery to complete half the circumference from the point 1, the groove for the other half of the circumference being a repetition of the first half to repeat the operation. It will be obvious from the foregoing and the drawings that the sliding of the rod in the mandrel by its connections will open and close the jaws. So soon as the blank has been presented and gripped the cutter *n'* is moved up. The cutting-edge of this cutter is somewhat in the form of an inverted **V**, the edge *o'* being nearly at right angles with the axis of the screw-blank to turn the top of the head, and the other edge *p'*, forming the required angle therewith, to turn the under surface of the head. This cutter is fitted to a stock *q'* and slides therein that its cutting-edge may be properly set by a screw *r'*. The cutter-stock turns on a fulcrum-pin *s'*, and it rests on the upper end of a sliding bar *t*, provided with a friction-roller *u'* at the lower end, which is acted upon at the appropriate time—that is, the moment that the blank is gripped by the jaws—by a cam *v'* on the same shaft with the other cams before described. This cam suddenly runs out from the axis to carry the cutter to the head of the blank, and then runs for a short distance by a slight eccentricity to force the cutter gradually against the blank until the head thereof is sufficiently reduced or turned, at which point the cam suddenly runs toward the axis that the cutter may be drawn back from the blank by the weight of the cutter-stock. There are two cutter-cams *v'* to correspond with the double cams for operating the jaws and the carrying-wheel; but it will be obvious that by doubling the motion of this cam-shaft relatively to the motions of the other parts of the machine the cams may be single. The cam-shaft receives its motions from the mandrel by an endless screw *w*, on the latter, which actuates a spur-

wheel x' on one end of a shaft y', the other end of which has a bevel cog-wheel z', the cogs of which take into the cogs of a similar wheel a^2 on the cam-shaft. (Shown by dotted lines.) As stated before, the screw-blanks are placed in the carrying-wheel and carried up by its rotation, and when presented to the gripping-jaws the point is forced against a stop b^2 within the jaws by the motion of the carrying-wheel, and after being turned the further motion of the wheel carries them up, their heads resting onto a curved rest c^2, which is so curved at d^2 as to permit them to fall out by their weight so soon as they reach the top. By doubling the length of the carriage and putting another carrying-wheel on the other end of the shaft, as represented in Figs. 1 and 2, and putting up a duplicate of the mandrel, gripping-jaws, and cutting-tools, with their connections, the cam-shaft and cams will answer for two machines, with the exception of the cutter-cams, which must also be doubled to avoid complexity; but even these may be dispensed with by changing the form of the cutter-stock and the slide that communicates motion to it from the cutter-cam.

What I claim as my invention, and desire to secure by Letters Patent, is—

Paring off or turning the head of the blanks within the rim of the carrying or holding wheel, which has a reciprocating motion from and toward the mandrel, by combining therewith a cutter or cutters that move toward the blank by a motion at right angles to the axis of the blank, substantially as described.

JOHN CRUM.

Witnesses:
D. RUSSELL LEE,
GEORGE NOCK.