3 Sheets—Sheet 1.

C. D. ROGERS.

Machine for Burnishing the Heads of Screws, &c.

No. 217,024. Patented July 1, 1879.

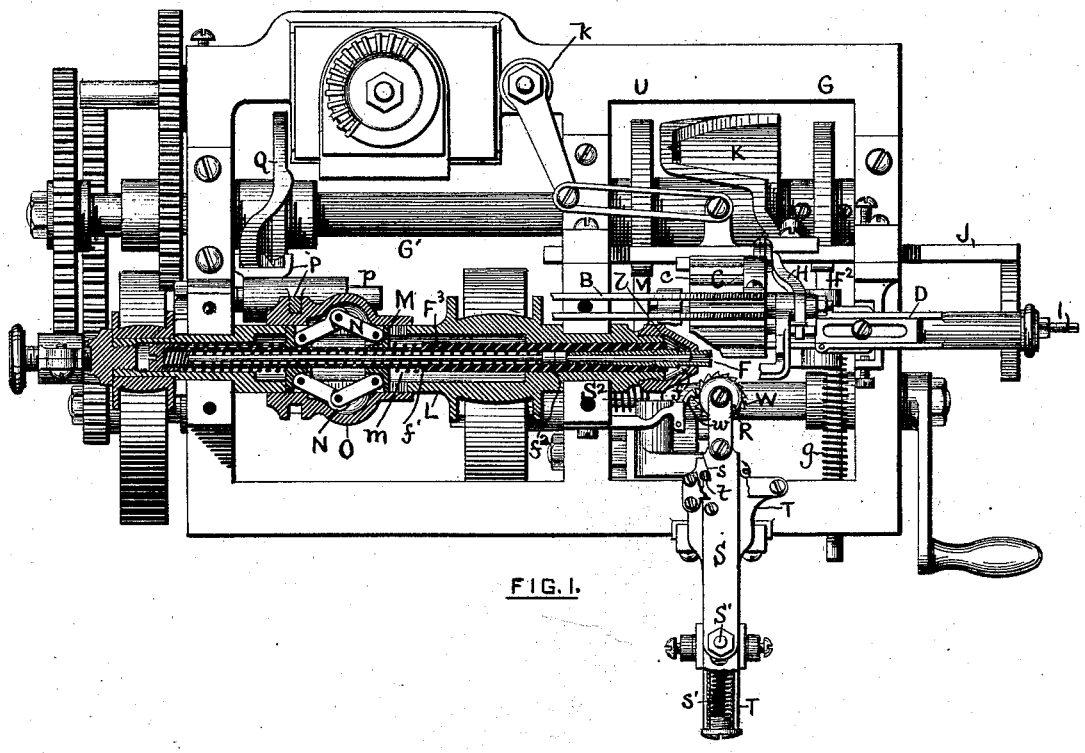

FIG. 1.

WITNESSES.

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3 Sheets—Sheet 2.

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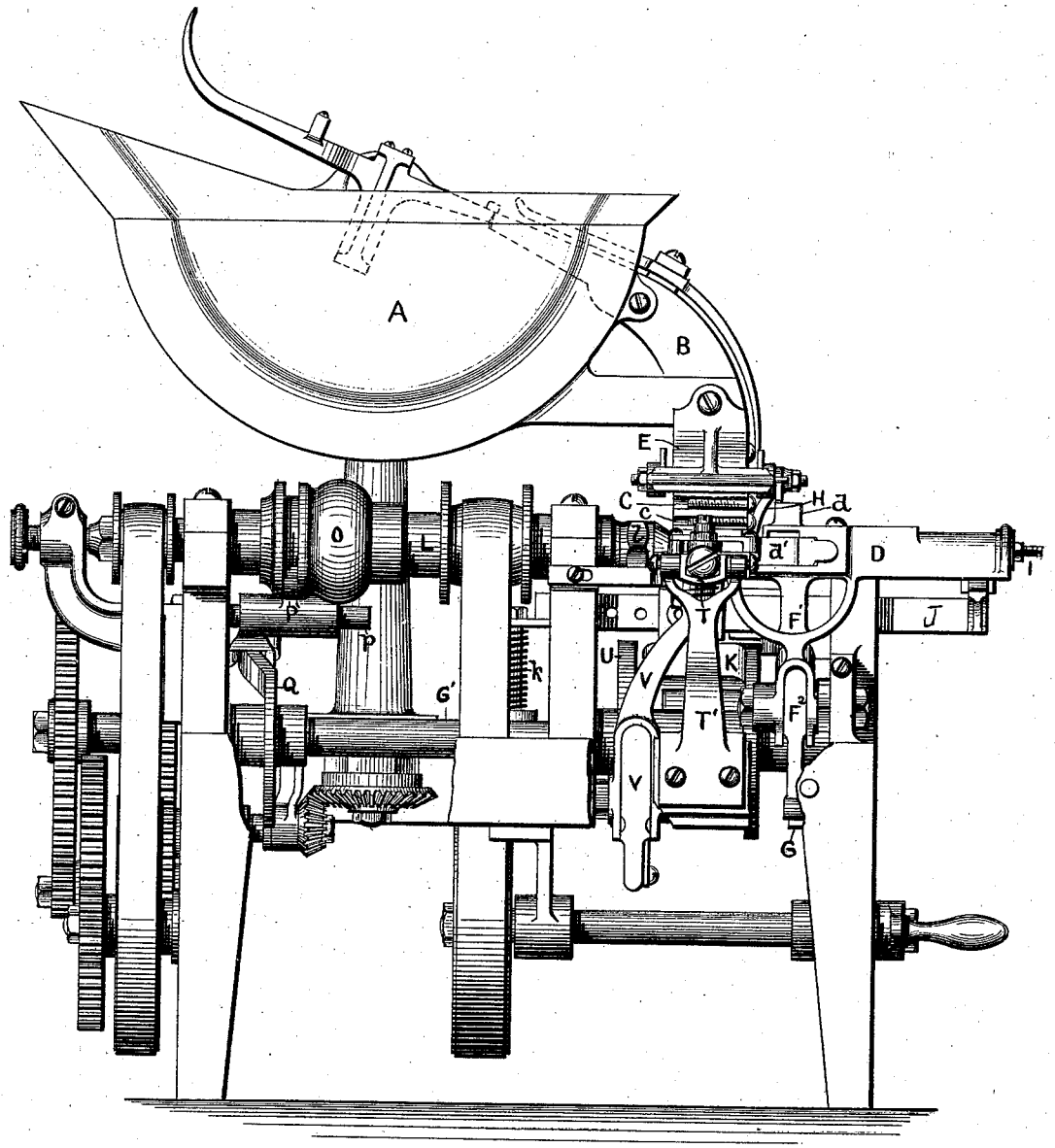

FIG. 2.

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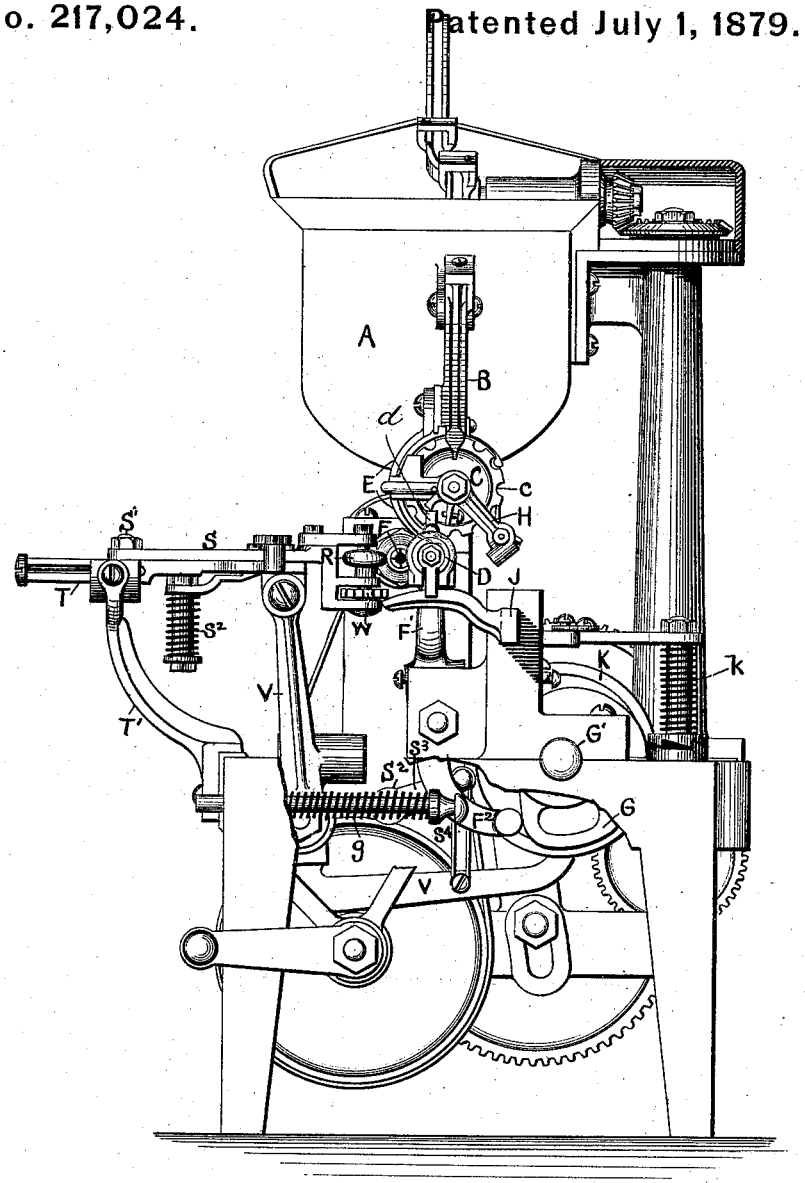

FIG. 3.

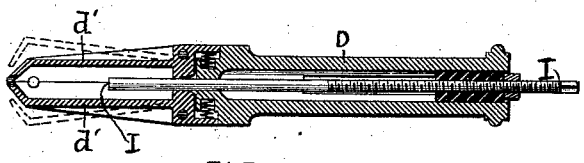

FIG. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE AMERICAN SCREW COMPANY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR BURNISHING THE HEADS OF SCREWS, &c.

Specification forming part of Letters Patent No. **217,024**, dated July 1, 1879; application filed March 20, 1879.

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Machines for Burnishing the Heads of Screws and similar articles; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

The purpose of the improved machine hereinafter described is to burnish the heads of round-headed screws; and my invention consists in combining a revolving spindle adapted to receive and hold a screw with a burnishing-tool, so arranged that it is capable of adapting itself to the contour of the heads of screws held in said spindle, and perform the burnishing operation upon the entire surface of said heads.

Referring to the three sheets of drawings, Figure 1 represents a plan of my improved machine, with the hopper removed and the spindle in section. Fig. 2 shows the machine in side elevation. Fig. 3 represents an end view, with a portion of the frame cut away, the better to show the working parts; and Fig. 4 shows a horizontal section of the feeding device, which conveys the screws to the spindle.

As shown in Figs. 2 and 3, A represents the hopper, in which are placed the screws in mass whose heads are to be burnished. This hopper is supplied with mechanism in common use for selecting the screws from the mass and delivering them to a conveyer, as at B, from which the said screws are supplied one by one to a roulette recipient, as at C. This recipient has upon its periphery a series of grooves, *c*, for receiving the screws, which are carried by intermittent partial revolutions of said recipient to a "spoon-feed," as at D, the screws being retained in the grooves until discharged therefrom by a semicircular guard-plate, as at E, Figs. 2 and 3.

The office of the spoon-feed D is to convey the screws from the roulette C into axial alignment with a holding-spindle, as at F, in which they are seated and held by mechanism hereinafter described.

As the machine is organized the revolution of the recipient C is dependent upon the movements of the spoon-feed D, which is mounted upon an arm, as at F^1, Figs. 2 and 4, pivoted to the frame. This arm is engaged by a bell-crank lever, F^2, which is operated by a cam, as at G, on the shaft G′ and a reactionary spring, as at *g*, to produce a laterally-reciprocating movement of the feed D. Upon the spindle which carries the roulette recipient C is also mounted a bell-crank lever, as at H, the short arm being forked and the long arm carrying a pawl upon its end. During the movement of the feed D toward the recipient the forked arm of the lever H is acted upon by a projection, *d*, on said feed, causing the pawl to engage one of the grooves *c* and partially rotate the recipient C, thereby releasing a screw which falls into a receptacle in said feed and is conveyed into axial alignment with the spindle F. The receptacle in the feed D, for receiving the screws, has sides formed by two separable hinged wings, *d′*, controlled by springs, as shown at Fig. 4, the inner surface of the free end of each wing being rounded or beveled and furnished with a semicircular opening, to facilitate and allow of the outward passage of the screws.

For seating the screws in the spindle F, the feed D is supplied with a plunger, as at I, Figs. 1 and 4, the said plunger being in engagement with an arm, as at J, Fig. 1, which has a longitudinal reciprocating movement imparted to it by a cam, as at K, and a spring, as at *k*. The action of the cam K causes the plunger to advance, its end coming in contact with the screw-head, and push the screw longitudinally out of the feed D and into the spindle F, where it is griped directly under the head, and held against rotation upon its own axis.

As shown in Figs. 1 and 3, the griping-spindle F is a split tube, secured within and to a tube, F^3, which is mounted in a cylindrical casing, as at L, having bearings in the frame of the machine. The diameter of the rear portion of the tube F^3 is reduced, producing a shoulder, as at f^1, against which bears a spiral spring, *m*, the other end of said spring taking bearing on a sliding block, M, to which

are pivoted toggle-levers, as at N. These levers N are inclosed in a cylindrical sliding sleeve, O, which is engaged by a forked arm, P, mounted on a stud, as at *p*, and controlled by a cam, as at Q, on the cam-shaft G′. At the proper time the cam Q causes the arm P and sleeve O to advance and straighten the levers N, which action, through the block M and spring *m*, advances the tube F^3 and produces an engagement between the shoulders *f* on the spindle F and the conical end *l* of the casing L. The end of the spindle is thus closed upon the screw with sufficient force to hold it, as above specified. After the burnishing has been completed the screws are released by a backward movement of the spindle, &c., and are expelled by a spring-plunger. (Shown at f^2, Fig. 1.)

The machine, as thus far described, is not essentially different from the organization of screw-machines heretofore employed, which have combined therewith dressing-tools for shaving or shaping the heads of screws. Therefore no claim is made to the feeding devices, griping-spindle, or its mechanism.

The distinctive difference between the present machine and machines employing dressing-tools for shaving or shaping the heads of screws consists in the employment, in the general organization described, of a tool for burnishing the heads, the action of which in the combination is peculiar and distinctive from the action of the head-dressing tools in the machines referred to.

Referring to Figs. 1 and 3 of the drawings, R represents the burnisher, mounted on an axle in the forked end of a radius-arm, S, which arm is pivoted to a carriage, as at T, so as to be capable of longitudinal and lateral movements on said carriage. The pivotal pin S^1 passes through a slot in the carriage, and is seated against a cushion-spring. (Shown at s^1, Fig. 1.) Upon one side of the arm S is an inclined plane, *s*, Fig. 1, and when the burnisher R is not in contact with the head of a screw the lateral position of the forward portion of the arm S relative to its carriage T is as shown in Fig. 1, the foot of the inclined plane *s* bearing against a pin, as at *t*, by the force of a spring, s^2, Fig. 3, which exerts pressure upon the arm S.

The burnisher R is brought into contact with a screw-head by the forward movement of the carriage T, which movement is caused by the engagement of a cam, U, Figs. 1 and 2, with a bell-crank lever, V. The vertical arm of this lever supports and is hinged to the forward end of the carriage T, the rear portion of said carriage being splined to a standard, T′, secured to the frame of the machine. The retreat of the burnisher after it has completed its work is accomplished by a spring, S^2, Fig. 1, which, through an arm, s^3, and link s^4, Fig. 3, operates upon the lever V to move the carriage T and its burnisher into their rearward position.

That a new portion of the surface of the burnisher may be presented to each successive screw, the spindle upon which it is mounted is provided with a ratchet, W, which ratchet is engaged by a stationary hook, *w*, Fig. 1, each time the burnisher moves forward, and it is thereby partially revolved.

The operation of those portions of the machine which act to convey the screws from the hopper to the holding-spindle and clamp them therein will be sufficiently understood from the foregoing description to need no further explanation; therefore I will proceed to show the operation of the burnishing-tool.

A screw being clamped in the holding-spindle F, the cam U acts upon the bell-crank lever V, and produces a forward movement of the carriage T, arm S, and burnisher R, the burnisher being partially turned upon its axis during this movement by the engagement of the hook *w* with the ratchet W. The forward movement of the carriage T brings the burnisher in contact, under a yielding pressure, with the edge of the screw-head, the axis of the arm S being perpendicular to that of the screw; but further longitudinal advancement is prevented, owing to the relative position of these axes until the said burnisher is laterally moved. This is accomplished by the engagement of the pin *t* upon the moving carriage with the inclined plane *s* on the arm S. This pin, during the continued advancement of the carriage T, moves over the inclined plane *s*, and causes a lateral movement of the burnisher until it has arrived at such a portion of the screw-head that the contour of said head will alone serve to complete the lateral movement.

During the remaining portion of the forward movement of the burnisher, and during such portion of the retreat as is necessary to bring it back to the position specified, the contour of the screw-head wholly governs the lateral movements of the burnisher, the longitudinal movements being produced by the cam U and spring S^2, and the burnisher being held up to its work by the spring s^2.

It will be seen from the foregoing that the burnishing-tool is capable of yielding to enable it to conform its path of movement to the particular shape of the half-round or other formed head to be burnished, and that the head itself performs an office in giving direction to the path of movement of the tool; whereas in machines employing dressing-tools for shaving or shaping the heads of screws or similar articles the tool has a positive movement given to it, which is unaffected by the particular shape of the head operated upon. Again, the feature of construction which provides for making the burnishing-tool intermittingly revoluble upon its axis upon each backward and forward movement of the carriage upon which it is mounted, is important in machines which may give a positive movement to the burnisher and dispense with the means which in my organization enables it to yield to the particular shape of the head.

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

1. The combination of a revolving spindle capable of holding a screw or other article the head of which is to be burnished and a burnishing-tool held to its work by spring-pressure and moved by suitable means in the plane of the longitudinal axis of the revolving spindle, said burnishing-tool having a horizontally-lateral movement given to it as it advances, modified by the shape of the head to be burnished, substantially as described.

2. The combination, substantially as specified, of a revolving spindle capable of holding a screw or other article the head of which is to be burnished, a burnishing-tool which has the proper movements given to it by suitable mechanism, described, for enabling it to exert pressure upon such head, and a pawl and ratchet or equivalent means for intermittingly revolving the burnisher to present a fresh section of its surface to each successive head, as set forth.

3. The combination of a revolving spindle and a yielding burnisher mounted upon a radius-arm pivoted to a carriage, which has a movement given to it in a direction radial to the axis of the revolving spindle by suitable mechanism, as described, the said radius-arm, as it is advanced by the carriage, receiving a horizontally-lateral movement by means as described, to enable the burnisher to conform to the shape of the head to be burnished, substantially as specified.

CHARLES D. ROGERS.

Witnesses:
JOHN D. THURSTON,
I. KNIGHT.