No. 648,288. Patented Apr. 24, 1900.

G. A. OWEN.

ROTARY PROFILING MACHINE.

(Application filed Nov. 5, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

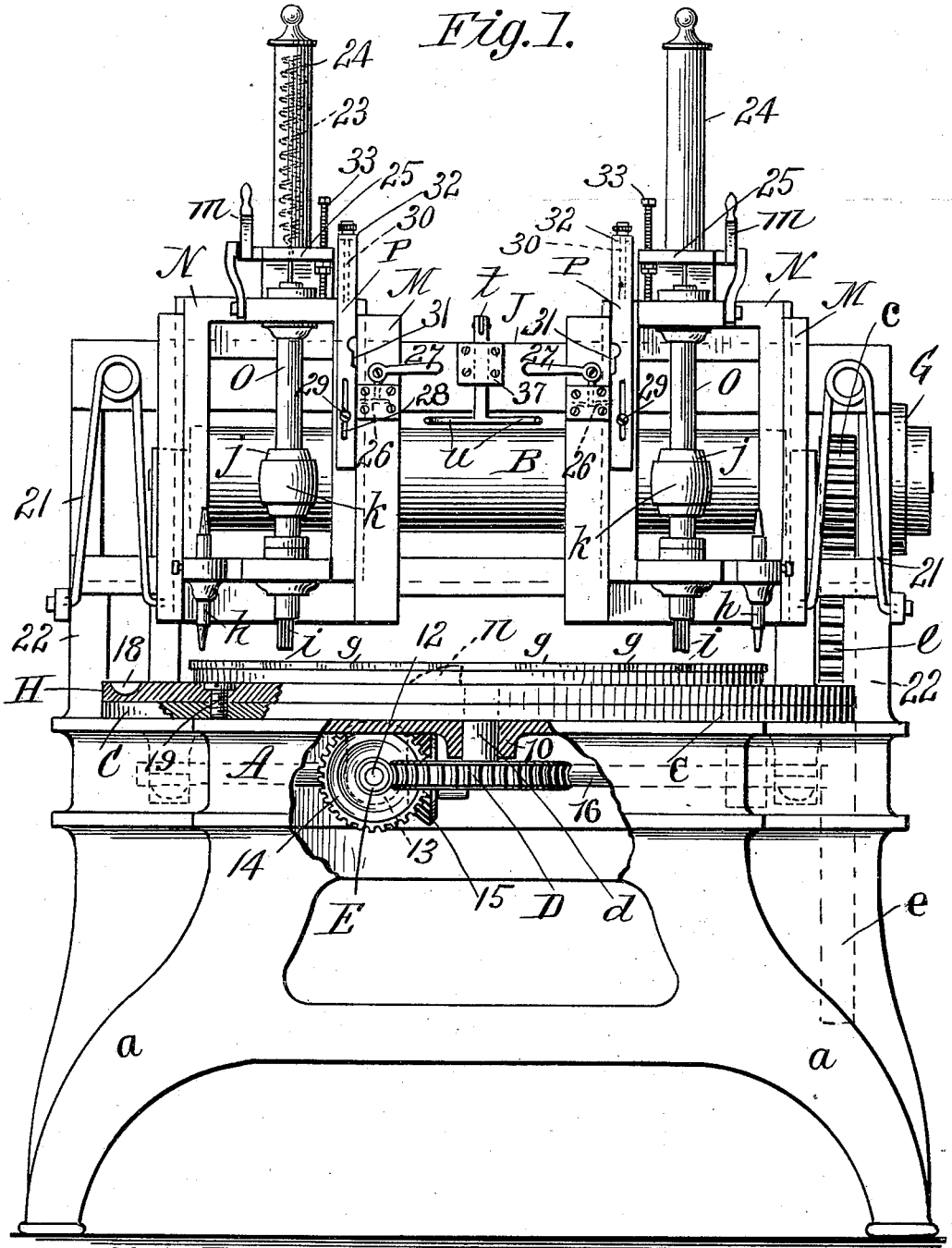

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Fig. 2.

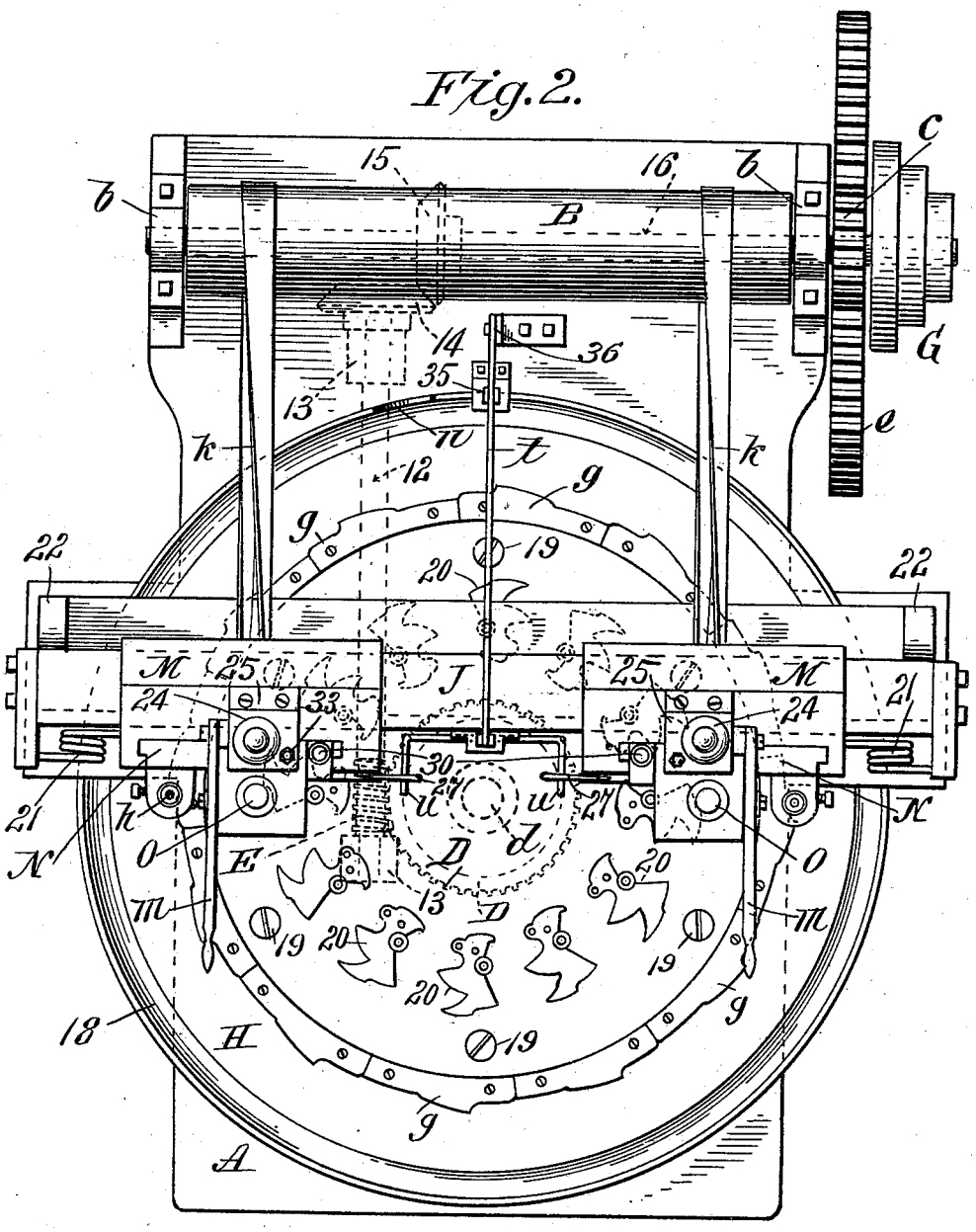
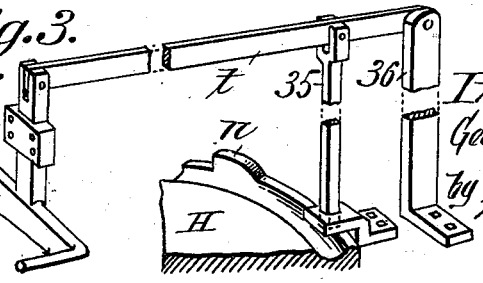


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE ALFRED OWEN, OF SPRINGFIELD, MASSACHUSETTS.

ROTARY PROFILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,288, dated April 24, 1900.

Application filed November 5, 1898. Serial No. 695,555. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ALFRED OWEN, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Rotary Profiling-Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in profiling-machines, one object of the invention being to produce an automatic machine of novel organization and construction whereby the capacity of the machine for the production of duplicated profiled parts is very great and whereby the parts have the cuts or profiling thereof extremely accurate and uniform.

Another object of the invention is to produce a profiling-machine having the capabilities aforesaid which is quite simple and inexpensive; and the invention consists in the automatic profiling-machine comprising a rotary bed or table for supporting the work and other mechanisms and devices in combination therewith, all substantially as hereinafter fully described, and set forth in the claims.

Reference is to be had to the accompanying drawings, in which the improved profiling-machine is illustrated.

Figure 1 is a front end elevation of the machine, and Fig. 2 is a plan view. Fig. 3 is a perspective view of parts in detail to be hereinafter referred to.

Like characters of reference denote the same parts in all of the views.

In the drawings, A represents the bed or main support of the machine, having the legs *a a* and provided at its rear end with the upstanding journal-supports *b b* for the drum or elongated pulley B, which at its end is provided with the spur gear-wheel *c*. More or less nearly centrally on the bed for rotation in a horizontal plane is mounted the rotary work-carrying table C, the same being centrally provided with a depending journal-stud *d*, having bearings through the depending hub 10 therefor formed on the under side of the bed A. On the lower end of the depending stud *d*, which is formed as one with or affixed to the work-table, is a worm gear-wheel D, with which meshes the worm-screw E at the forward end of the shaft 12, which extends horizontally and longitudinally along under the bed, being supported in suitable journal-brackets 13, and said shaft 12 has at its rear end the bevel gear-wheel 14, which meshes into the bevel gear-wheel 15, carried on the horizontal shaft 16, journaled under the bed and having its length at right angles to the shaft 12. The said shaft 16 has provided thereon the spur gear-wheel *e* beneath, but extending upwardly to mesh with the aforementioned gear-wheel *c* on the arbor of the said drum B.

G represents a cone-pulley on the end of the arbor of the pulley B. It will therefore be seen that the driving power applied for speeding the drum B will drive the work-table C rotatively, but at a very much slower rate of speed.

The work-table receives removably superimposed thereon the circular work-holding plate H, which is marginally provided with the oil-receiving trough 18, said work-holding plate being secured on the rotary table by the screws 19.

g g represent a succession of former-plates arranged in circular course around on the top of the work-holding plate, the edge of the individual former-plates having contours corresponding to those of the edge of the work to be profiled, and in the illustration here presented the series of hammers 20 for firearms are shown as held upon the top of the work-holding plate each inside of its corresponding former or pattern plate *g*.

The bed is provided with suitable upstanding supports 22 22, sustaining between them horizontally over the bed the support J transversely of the length of the machine.

The carriages M M are movable freely horizontally on the stationary elevated horizontal support J, and they are provided with vertical ways to permit vertical movements therein of the vertically-sliding tool-carrying supports N, the same also constituting the supports for the tracers *h h*. Each vertically-movable tool-carrying support has the sustaining-spring 23 located within the vertical case 24 therefor, said case being supported on a bracket 25, upstanding above the top of the carriage M and having an angular member which overhangs the top of the tool-

support. O represents the vertical tool shaft or spindle, journaled in suitable bearings therefor in the said support N and receiving or being provided at its lower end with the profiling tool or cutter *i*, and intermediately thereof provided with the pulley *j*, around which is passed the belt *k*, which also runs around and is driven by the drum B. The tool-carrying supports have thereon each a vertically-adjustable bar P, having in its edge a notch or stop 31, with which engages a latch-bolt 26, to which is connected the angle-lever 27. The adjustable bar P has the vertical slot 28, through which passes the threaded shank of a headed bolt 29, by means of which the bar is held in its adjusted position, and the adjustment of the bar is effected by the screw 30, the shank of which is tapped into the upper part of the vertically-sliding tool-support, the head of this screw having a bearing against the top provided angular member 32 of the said bar P.

Each tool-carrying support is provided with a depressing-lever *m*, whereby such support may be lowered to carry the tool or cutter down to its work, and when said supports are forced down against their sustaining-springs 23 they are held down until the rotary work-table has made a complete rotation by the engagement of the latch-bolt 26 in the apertures or rests 31, such latch engagement being terminated after the rotary table has made a complete rotation automatically, by means which will be hereinafter pointed out.

33 denotes an adjustable stop for limiting the extent to which the tool and its support may be elevated when permitted by the disengagement of the latch-bolts.

The rotary plate H is provided near its edge with a rising cam projection *n*, which when it comes under the thrust-rod 35 elevates the latter. The thrust-rod engages the lever *t*, pivotally hung at 36 to a bracket or fixture at the rear of the machine, said lever extending forwardly over the central part of the horizontal support J, on which the transversely-movable carriages are sustained, and to the forward end of this lever *t* is hung the depending T-shaped trip device *u*, the median vertical member of which is constrained in its movement by passing through the slide 37, and the oppositely-extending horizontal members of this trip device have their positions below the latch-bolt-operating levers 27 27 aforementioned. Now, therefore, after the machine has been run to cause one complete rotation of the work-table and the plate, with the formers and work thereon, the tool-carrying supports will be automatically unlatched, whereby under the reactions of their elevating-springs they will be upwardly moved to carry the tools and tracers above the level of the work and the pattern-plate.

Each of the pattern-plates has its location on the work-holding plate in a line radially extended beyond the piece of work to which such pattern-plate corresponds, and it thereby becomes expedient to have the length of the determining face or edge of the pattern-plate somewhat longer than the corresponding edge of the piece of work to be profiled, and in the revolution of the tracer *h* on the edge of the pattern the movement of said stud is necessarily somewhat greater than the bodily-revoluble movement of the tool.

The provision of the duplicated sets of carriages M and tool-supporting vertically-movable supports N with spindles and cutters enables the employment simultaneously of a rough-cutting tool and a smooth-cutting tool, whereby each piece of work after being brought subject to the action of the first tool is then brought subject to the action of the second; but manifestly both of the tool-spindles may carry either rough-cutting or smooth-cutting tools.

The pieces of work affixed on the work-holding plate need not be all of the same shape or size, for several pieces having a variety of edgewise contours may be held on the said work-holding plate, which is provided with former or pattern plates having controlling or determining edges to correspond to the work.

Usually substitute work-holding plates having suitable formers or patterns will be provided for different work, as occasion may demand, the removal of one of such plates and the substitution therefor of another being simply and conveniently performed by merely loosening the confining-screws 19 to permit the removal of one work-holding plate, replacing the screws in their engagements with the work-table for the confinement of the newly-provided work-holding plate in its superimposed position on the rotary table.

The operation and manner of utilization of the hereinabove-described rotary profiling-machine will be briefly described as follows: The work-holding plate constructed with the patterns for the work to be performed having been set and confined upon the rotary table and the pieces to be profiled having been confined on the plate in their appropriate positions relative to the patterns, suitable jigs-clamping devices or other fixtures or appliances being provided therefor, as commonly practiced in the holding of work on profiling and other machinery, the machine is started by a belt running on the cone-pulley G, and the vertically-sliding tool-carrying supports N are forced into their lowered positions by the hand-levers *m* and automatically latched or restrained by the latch-bolts 26, so that the tracers *h* will course around in contact on the outer edge of the formers, being held firmly thereagainst by the springs 21, the carriages M M and the tool-supports N N having inward and outward movements radially relative to the center of the work-holding plate—that is, transversely relatively to the circular course of the patterns—according as they are through the tracers crowded outwardly by prominent or outwardly-protruding portions of the pattern-plates or forced inwardly on re-

entrant or depression portions of the pattern-plates coming relatively next to the said tracers by said springs 21. The rotary table and work-holding plate having made their circuit and the cam *n* having come into engagement with the thrust-rod 35, the latch-bolts 26 26 are automatically released from their engagements with the tool-carrying supports, whereby the latter are permitted to be elevated by their springs 23 to place the tools or cutters *i i* above the work. The machine is then stopped, the profiled pieces removed from the work-holding plate, a new series of pieces to be profiled placed and confined on the work-holding plate. The machine is started, the tool-supports N N being lowered and restrained, and the operation repeated.

In the illustration here provided, Fig. 2, the pieces to be profiled by the operation of this machine are shown as being hammer thumb-pieces for firearms; but of course the machine is susceptible of utilization for the profiling of parts of different forms and for different purposes.

I may, if desired, instead of having the work-carrying table make its circuit and then be automatically stopped by the removal of the thrust-rod 35 or the removal of the cam *n* permit the rotary work-table and plate to have continuous slow rotary motion, the attendant removing and replacing the parts as fast as they are individually profiled.

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

1. In a profiling-machine, a rotary work-table provided with one or more pattern or former plates; and means for rotating said table, a tool-carrying support movable radially relatively to the patterns, and also adapted for a sliding movement in a plane at right angles to the surface of the work-carrying support having a tracer to contact on the patterns and carrying a tool or cutter, a device for engaging the sliding tool-carrying support for confining it in its position for presenting its tracer in contact on the patterns and its tool for operation on the work, means for sustaining the said support in its position with said stud and cutter removed from their engagements or operative positions relatively to the former and the work, and means periodically operating by the rotary work-table and acting on the confining device for the tool-carrying support for automatically releasing the latter, leaving it subject to its aforesaid means for removing and sustaining it in its position removed from the work-table, substantially as and for the purpose set forth.

2. In a profiling-machine, a horizontal rotary work-table, provided with one or more pattern or former plates, and means for rotating said table, a tool-carrying support movable horizontally radially relatively to the patterns, and also adapted for a sliding movement vertically at right angles to the surface of the work-table, having a tracer to contact on the patterns, and carrying a tool or cutter, a latch-bolt for engaging the sliding tool-carrying support for confining it in its lowered position, a spring elevating and sustaining the said tool-support in its position withdrawn above the rotary support, a cam or projection on the work-table, and a device periodically actuated by the said cam and operating to release the latch-bolt, for the purposes set forth.

3. In a profiling-machine of the character described, the combination with the rotary work-table having the cam projection and the vertically-movable tool-carrying support, and the elevating-spring therefor, of the latch-bolt 26 adapted to engage the tool-carrying support to restrain it in its lowered position, the bolt-operating lever 27, a sliding trip device adapted to engage and swing the bolt-operating lever, a lever connecting said trip device and a part operated by said cam projection for swinging said last-named lever, substantially as described.

4. In a profiling-machine, of the character described, in combination, a horizontally-rotating work-table provided with one or more formers or patterns, a horizontal support J having its position above and crossing the central portion of said table, carriages M movable horizontally radially relatively to the rotary table and each having the spring 21 for forcing it inwardly, the tool-supports N vertically movable on said carriages and provided with an elevating-spring, each provided with a former-stud and provided with a tool or cutter, means for rotating the tools or cutters, means for rotating the rotary table, a device for latching the tool-carrying supports for restraining them in their lowered positions, and automatic mechanism for periodically releasing said latches, substantially as described.

5. In a rotary profiling-machine, a main bed or frame having mounted thereon the horizontal work-table, provided with the stud *d* depending through and journaled in the main bed and provided with a worm-wheel; a shaft journaled on the main bed and having means for driving it and provided with the elongated pulley or drum B and the gear-wheel *c;* the shaft 16 below said pulley-shaft having the large gear-wheel *e* in mesh with the gear-wheel *c* and having the bevel gear-wheel 15; the shaft 12 horizontally journaled under the main bed having the bevel gear-wheel 14 in mesh with the gear-wheel 15 and having the worm E meshing in said worm-wheel; the support J sustained from the main bed above and horizontally crossing the work-table; the carriages M sliding horizontally on said support J and having the springs 21 for forcing them radially inwardly relatively to the rotary table, the tool-carrying slide-supports N having the tool-carrying shafts with pulleys, and cutters on said shafts, and said slide-supports provided with the depending tracer; a

pattern-plate and work-holder detachably confined on said rotary work-table provided with one or more formers *g;* belts running around said pulley D and the tool-shaft pulley; elevating-springs for the sliding tool-supports; latch devices for engaging the sliding tool-supports for restraining them in their lowered positions; and automatic mechanism for periodically releasing the latches, substantially as and for the purposes set forth.

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