

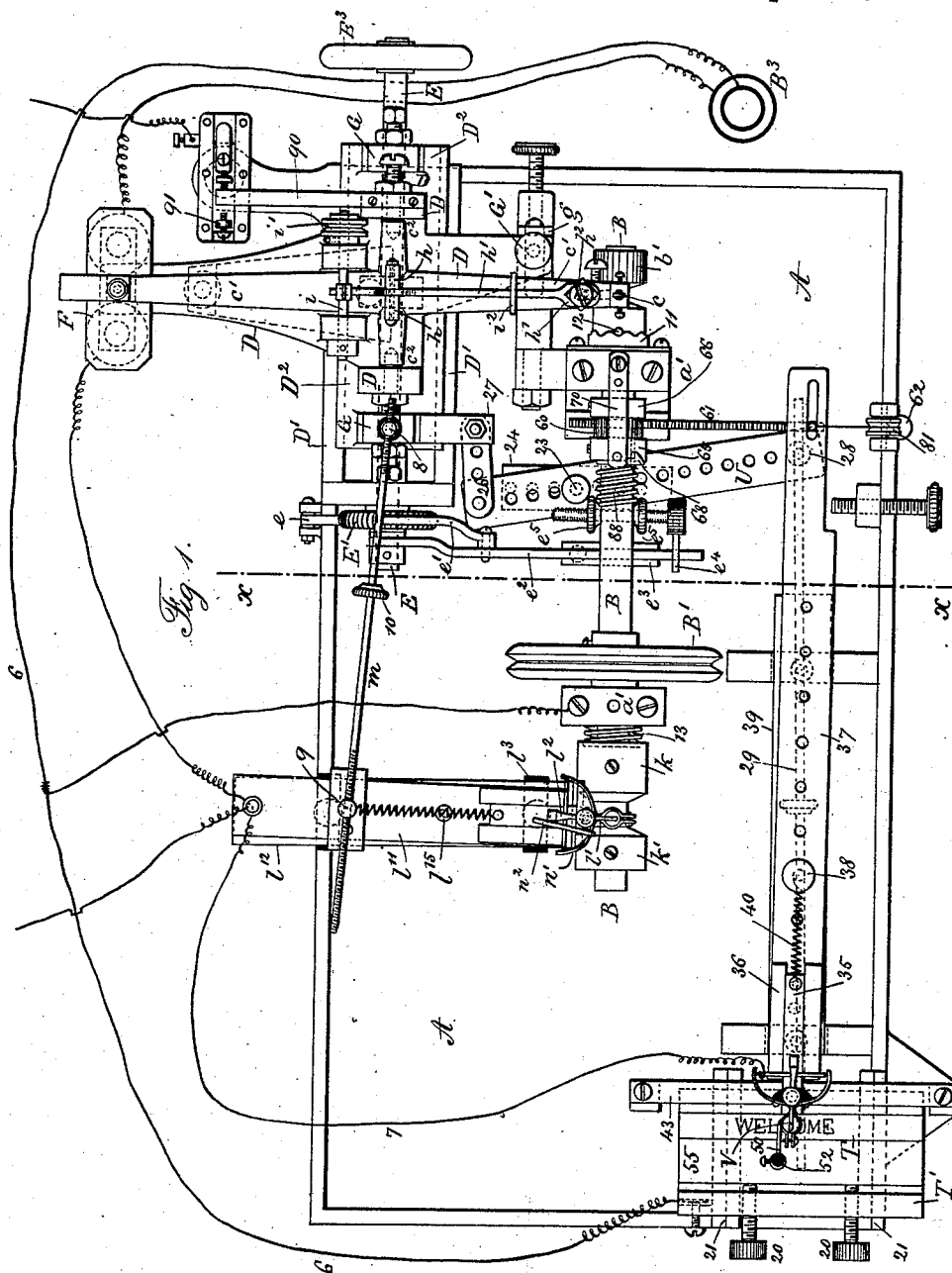
(No Model.)

G. M. & J. C. GUERRANT.
ENGRAVING MACHINE.

3 Sheets—Sheet 1.

No. 305,178.

Patented Sept. 16, 1884.



Witnesses

Chas. H. Smith
J. Stair

Inventors

Geo. M. Guerrant
John C. Guerrant
per Samuel W. Perrell atty

(No Model.)

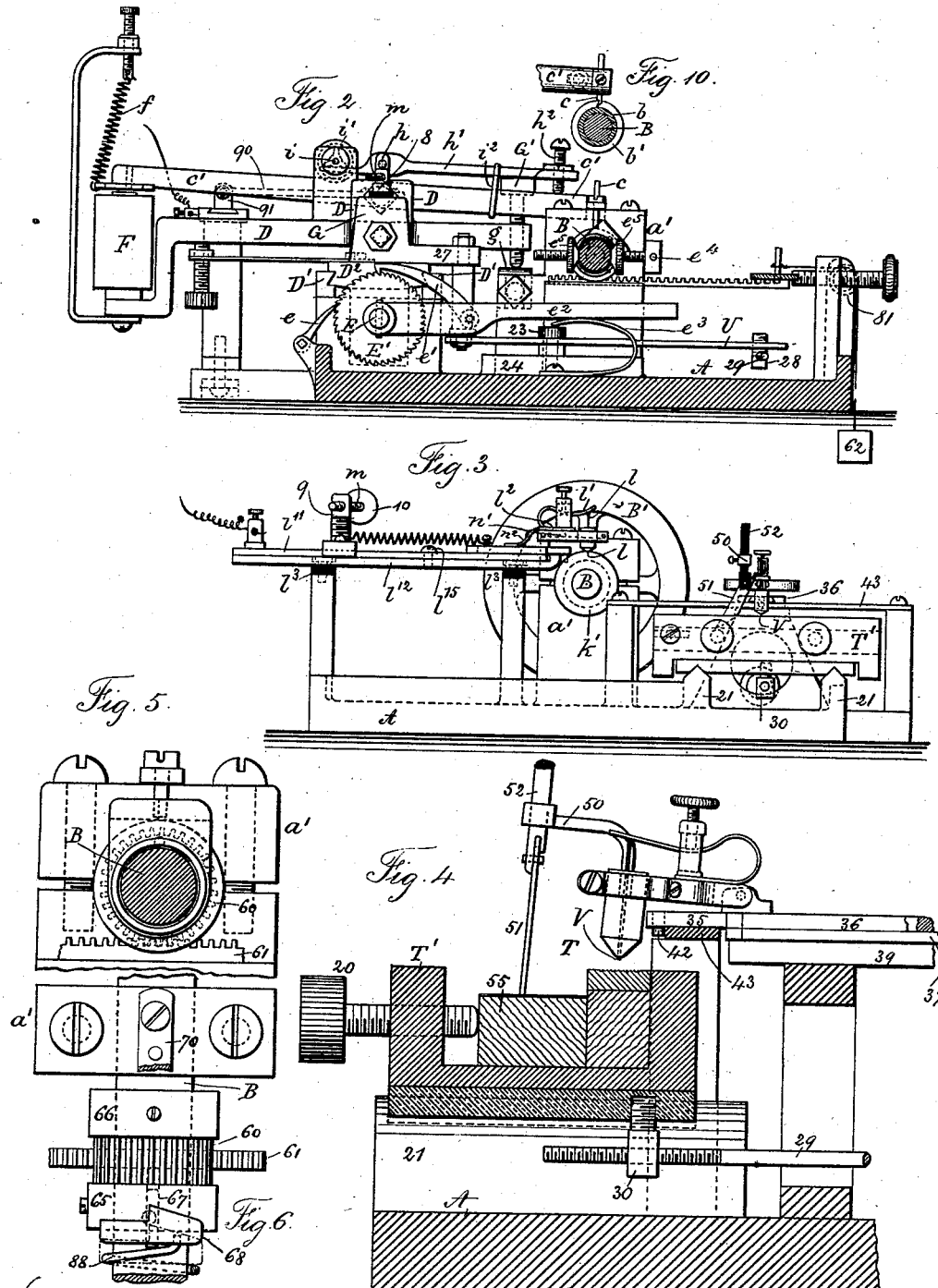
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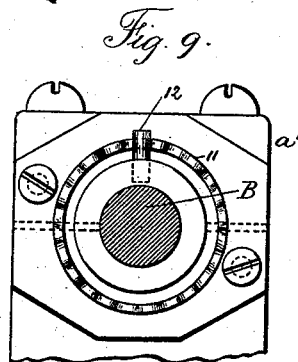
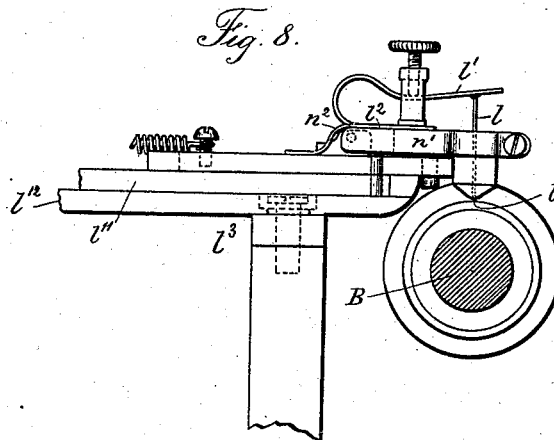
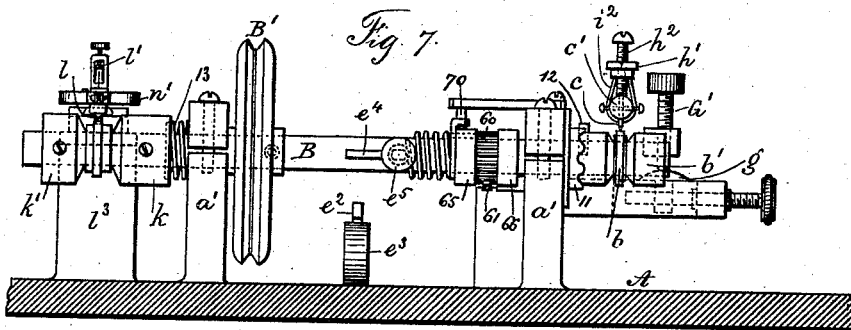
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att'y

UNITED STATES PATENT OFFICE.

GEORGE M. GUERRANT, OF NEW YORK, N. Y., AND JOHN C. GUERRANT, OF DANVILLE, VIRGINIA, ASSIGNORS TO SAID GEORGE M. GUERRANT.

ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,178, dated September 16, 1884.

Application filed December 28, 1883. (No model.)

To all whom it may concern:

Be it known that we, GEORGE M. GUERRANT, of the city and State of New York, and JOHN C. GUERRANT, of Danville, in the State of Virginia, have invented an Improvement in Engraving-Machines, of which the following is a specification.

This machine is adapted to engraving or chasing various articles of jewelry and silverware, such as rings and circular or curved articles. In this machine we are able to use either a flat or a circular pattern, and the tool is either brought down upon the article to be engraved by the action of an electro-magnet, or, by preference, raised off such work by the magnet, and a percussive device is employed, when needed, for striking the tool-holder with numerous light blows, to render the action of the tool more certain, especially in engraving stones and hard substances.

In the drawings, Figure 1 is a plan of the machine. Fig. 2 is a sectional elevation at the line *x x*. Fig. 3 is an elevation endwise of the reciprocating tracer. Fig. 4 is an enlarged section of the tracer and lifter. Fig. 5 is an enlarged section, and Fig. 6 is a detached plan, of the loose pinion on the revolving shaft. Fig. 7 is a detached view of the revolving shaft. Fig. 8 is a detached view in larger size of the tracer and circular pattern. Fig. 9 is a face view of the cam for moving the revolving shaft endwise, and Fig. 10 is a side view of the engraving-tool and section of the holder for the article to be engraved.

Upon a suitable bed-plate, A, there are the journal-bearings *a'* for the shaft B, which is revolved at a moderate rate of speed by the pulley B'. This shaft B receives the article to be engraved—such as a ring or thimble, or a stone for a ring, or any article to which the machine is adapted—there being a suitable clamp near one end for holding the article. We have shown a ring, as at *b*, and conical faces, between which such ring is received, the nut *b'* having one of those conical faces, and screwing upon the end of the shaft B, for clamping the ring *b*. Immediately over the ring is the engraving-tool *c*, at the end of the lever

c', which lever is pivoted at *c''* in the frame D, which may be supported by and slide in ways D' upon the bed-plate A; but usually we employ an intermediate carriage, D². Beneath this frame D is a screw, E, and a ratchet-wheel, E', and this screw acts upon a nut on the lower part of the frame D, to move the same and the tool laterally and cause such tool to act on successive parts of the article to be engraved as the same is revolved beneath this tool. The ratchet-wheel E' has rather fine teeth, and it is kept from turning back by a pawl, *e*, and it is turned forward by the pawl *e'* and lever *e''*, there being a spring, *e'''*, beneath the lever, to raise it, and an arm, *e''''*, at the end of a screw that passes through the shaft B, and is provided with clamping-nuts *e'''''*, by which the arm *e''''* is set nearer to or farther from the axis of the shaft B, so as to give more or less motion at each rotation to the lever *e''*, and cause the pawl *e'* to take up one or more teeth upon the ratchet-wheel each movement. The screw-shaft E has a hand-wheel, E², by which the same can be turned back when the pawls are liberated. The frame D is extended to the rear, below the tool-lever *c'*, and carries an electro-magnet, F, the armature of which is at the back end of the tool-lever, so that when the electric current is passed through the magnet the tool is lifted from its work. If the electro-magnet is placed over the rear end of the tool-lever *c'*, the tool will be held to its work by the magnetism. With the parts in the position shown, the adjustable spring *f* holds the armature up from the magnet when not energized and presses the tool to its work.

The frame D, carrying the tool and its lever and the electro-magnet, may be hung upon pivots in the jaws G, so that said parts may be rocked upon such pivots, and there is a screw, G', the end of which rests upon a stationary pattern, *g*, which may be concave or convex, but is to correspond with the concavity or convexity transversely of the article that is being engraved, so that the frame and tool will be rocked up or down gradually, as the screw gives a lateral motion to the parts as the engraving progresses.

Upon the top of the tool-lever c' are pivots h for a percussive lever, h' , that has a screw, h^2 , at the end nearly over the tool, the said screw acting as a hammer to strike the tool-lever, and there is a small shaft, i , with a cam upon it, the same being supported in bearings in the frame D, and rotated by a cord to a pulley, i' . This cam depresses the back end of the percussive lever, and the india-rubber or other spring i^2 causes the stroke as the cam clears the hammer-tail. The cam should have two or more projections and be revolved rapidly, so that the strokes of the hammer will be very numerous and light. By screwing down the hammer-head the tail will be depressed and the extent of movement of the hammer-head lessened and the reverse, so as to regulate the percussive action upon the tool-lever and tool. When a rotary pattern can be used, it is placed between the clamps k k' on the shaft B, and the tracer l is above the same, with a spring l' and frame n' upon a lever, l^1 , pivoted at l^2 upon an insulated-plate, l^3 , resting upon insulating-bearing at l^4 . The tracer itself is similar to the tracers in patents heretofore granted to George M. Guerrant—that is to say, a platina wire is clamped in a glass or other insulating-stock having a conical end. The tracer is carried in a hinged frame, n' , so as to rest upon the pattern, and it is pressed to the same by a spring, n^2 . The pattern is to be of conducting material and raised, or the spaces filled in with non-conducting material. Under all circumstances the electric circuit is completed between the metallic surfaces and the tracer as the pattern moves beneath the tracer, and the conical end of the insulating-stock surrounding the platina wire prevents the circuit being closed, except by the surface-pattern and the very end of the wire. The electric current passes from the battery B³ by wire 6 to frame of machine and pattern, and returns through the insulated tracer and insulated lever-arm l and wire 7 to magnet F and to the battery. When the electric circuit is connected in this manner, the tool will be raised by the circuit being closed, the portion on the ring that is engraved corresponding to the non-conducting portion of the pattern.

In order that the tracer may be moved along over the revolving pattern in the proper proportion to the movement of the engraving-tool, we attach a rod, m , at one end to the stud 8 upon the tool-carriage D², and at the other end to the stud 9 upon the lever-arm l^1 . This stud 9 may be moved nearer to or farther from the fulcrum of the lever to vary the relative movement of the tracer to the tool. In this manner the pattern can be wider than the article engraved, and the movements of the tracer and tool proportioned to the pattern and the article. The stud 8 is by preference swiveled and insulated from the tool-carriage, and the stud 9 is pivoted to a slide-base upon the lever l^1 , and the rod m provided with right and left handed screws, so as to be ad-

justed by rotating the same by the thumb-wheel 10. The plate l^2 below the lever l^1 upon insulated supports l' may be adjustable vertically, if desired, so as to adapt the tracer to different sizes of patterns. If desired, the engraved lines may be undulating. To effect this we fasten to the bearing-box a' a plate with a circular flange, 11, having a corrugated edge, (see Fig. 9,) and a pin, 12, is inserted in the shaft B, and the spring 13 tends to move the shaft B endwise, so that the pin 12 will be kept in contact with the corrugated flange; hence as the shaft revolves it will be reciprocated endwise and produce waved or corrugated lines upon the engraved surface.

In the engraving of letters and ornaments it is often difficult to make use of a circular pattern; hence we provide for using a flat pattern or design, the same being placed at T upon a bed, T', and clamped by the screws 20. The bed T' is upon the ways or supports 21 upon A, and can be moved thereon gradually and in proportion to the movement of the tool and carriage by means of the lever U, that is slotted or provided with holes for a movable pivot, 23, that enters a rib or slide, 24, on the bed A, so as to vary the relative lengths of the two arms of such lever U. One end of this lever U is connected to the tool-carriage D² by a link, 26, to a stud depending from an arm, 27, on such carriage. The other end of such lever is provided with a stud-nut, 28, through which passes the rod 29, that has upon it right and left hand screw-threads, the other end passing through a stud-nut, 30, beneath the bed T'. By these devices the bed T' and pattern are adjusted to proper place relatively to the tracer V, and the bed is moved progressively as the engraving-tool and its carriage are moved, as aforesaid.

The tracer V is the same as before described; but it is placed upon a slide, 35, that can move endwise in ways 36 upon the lever 37. This lever has a movable pivot, 38, passing down into the stationary bar 39 below. By moving this pivot into one of the numerous holes the relative lengths of the lever-arms may be varied. The spring 40 tends to move the slide 35 endwise and keep the pin 42 in contact with the edge of the stationary bar 43; hence the tracer will be moved in a straight line across the pattern T, as the lever 37 is swung upon its pivot. The pattern is of conducting material and the electric current is pulsated in the magnet as the tracer passes over the pattern; hence the engaging will be performed as aforesaid; but in order to prevent the pattern pulsating the current upon the return-stroke of the tracer, and also to prevent injury to the surface by the sudden movement as the tracer is drawn back over the types, an arm, 50, is connected with the hinged frame of the tracer, and at the end thereof is the jointed lifter 51, held in an adjustable stock, 52, and there is a block, 55, upon the bed T', and near the pattern T, but wider than such pattern, so that

when the tracer and the lifter 51 are moving in one direction the lower inclined end of this lifter will run upon the surface of 55, and the lifter 51 will swing upon its stop-joint into nearly a vertical position, (see Fig. 4,) and lift the tracer off the pattern. When moving in the other direction, the lifter will turn upon its joint into the inclined position shown in Fig. 3 by the contact of its lower end with 55, and hence the tracer will not be lifted, but remain in contact with the surface of the pattern. It is necessary that the tracer be moved across the pattern once each revolution of the article that is being engraved, and that the tracer should return to the point of beginning on the pattern by the time that the design that is being engraved reaches the tool. To effect this operation we make use of the loose pinion 60 on the shaft B and the rack 61 beneath the same, said rack being attached at one end to the lever 37. There is a cord over a pulley, 81, and a weight, 62, or other device—such as a spring—to give motion to the rack endwise and move the lever 37 and revolve the pinion 60, when the pinion is not coupled to the shaft B, and I place such pinion 60 between two collars, 65 66, fastened firmly on B, and in one of these collars there is a sliding pin, 67, that is fastened to and projects from the latch-ring 68, that can slide endwise of the shaft B, but is kept toward the collar 65 by a spring, 88. This pin 67 enters a hole in one end of the loose pinion 60, and there is an arm and fixed stud, 70, projecting from the bearing *a'*, and this pin is in the path of the latch projecting upon the ring 68; hence as the shaft B revolves the latch on the ring coming into contact with this stud is pushed back, and with it the ring 68, and the pin 67 is withdrawn, uncoupling the loose pulley 60, which, now being free, is rapidly revolved in the other direction by rack 61 and its weight or spring 62, and the latch-ring projection having passed the stud 70, the coupling-pin 67 is thrown into the hole in the pinion as soon as the pinion has revolved to the proper point, and the rack and tracer are then moved in the other direction and the engraving is proceeded with.

It is to be understood that there must be a plain space upon the article that is being engraved in the manner last described, and that this plain portion is under the tool during the time that the pinion is uncoupled and the rack, lever, and tracer are being moved back. This plain portion will be covered with continuous straight or corrugated lines, or left without any lines, according to the electric connections and the position of the electro-magnet to the tool-lever, as aforesaid.

If a plain tablet or space is to be left upon the article to be engraved, we find it convenient to use the tracer *l* at the same time as the tracer *V*, and to place between the jaws *k k'* a pattern at the place where the plain portion is to be left, so that this pattern between *k* and *k'* will close the circuit and lift the tool during the return movement of the tracer *V*.

We make use of a circuit-closing arm, 90, projecting from the tool-carriage, and an adjustable stop, 91, to which an electric circuit is connected, so that the circuit will be closed when the tool-holding carriage reaches its extreme movement, thereby ringing an alarm or operating an electric brake or belt-shifter to stop the revolution of the machine when the piece of engraving is finished.

In Letters Patent No. 212,927, a shaft is shown with a clutch upon it for holding concave or convex articles; but this is not capable of being continuously revolved.

We claim as our invention—

1. The combination, with a continuously-revolving shaft, of a holder for the article to be engraved and a holder for the pattern, a tracer, electric-circuit connections through the tracer, an engraving-tool, a holder for the same, and an electro-magnet to control the operations of the engraving-tool, substantially as set forth.

2. The combination, in an engraving-machine, of a tool-holding lever, an electro-magnet to act upon the same, and a percussive device to operate upon the tool-holder, substantially as set forth.

3. The combination, with the tool-holding lever, of an electro-magnet, a carriage for such magnet and tool-holder, a screw for moving the said carriage, and a continuously-revolving shaft for actuating the holder and article to be engraved, substantially as set forth.

4. The combination, with the tool-holder, of the carriage for the same, the electro-magnet, a screw for moving the parts, a pattern and a screw bearing on such pattern to rock the tool-holding carriage as the parts are moved by the screw, and a revolving shaft and holder for the article to be engraved, substantially as set forth.

5. The combination, with the continuously-revolving shaft and clamps thereon for holding the pattern and the article to be engraved, of a tool-holder, a carriage and screw for moving the same, a tracer, and a connection from the tool-holding carriage to the tracer, for moving the same, substantially as set forth.

6. The combination, with the revolving shaft and the holders for the pattern and article to be engraved, of a corrugated flange and pin and a spring, by which end motion may be given to the revolving shaft and the parts carried by the same, substantially as set forth.

7. The combination, with the revolving shaft and the holder for the article to be engraved, of the tool-holder, the carriage for the same, the screw for moving the carriage, the ratchet-wheel pawls, lever, and adjustable arm on the revolving shaft, for giving motion to the lever, substantially as set forth.

8. The combination, with the continuously-revolving shaft and holder thereon for the article to be engraved, of an engraving-tool and its holder, an electro-magnet for actuating the tool, a tracer and electric connections,

and mechanism, substantially as set forth, for moving the tracer over the pattern, as specified.

5 9. The combination, with the tracer, of a hinged stock carrying the same, and a lifter for raising the tracer from the pattern on the return movement; substantially as set forth.

10 10. The combination, with the continuously-revolving shaft and holder for the article to be engraved, of the tool-holding lever and carriage, a screw to move the latter, a bed for holding the pattern, a connection from the same to the tool-holding carriage, a tracer, and
15 mechanism for moving the same across the pattern, substantially as set forth.

11. The combination, with the revolving shaft and holder, of a tool, a lever and carriage for holding the same, a tracer, a loose pinion on the revolving shaft, a coupling for the same, and a rack and lever connecting the 20 pinion to the tracer, substantially as set forth.

Signed by us this 12th day of December,
A. D. 1883.

GEO. M. GUERRANT.
JOHN C. GUERRANT.

Witnesses:

J. A. HERNDON, Jr.,
H. D. GUERRANT.