(No Model.)

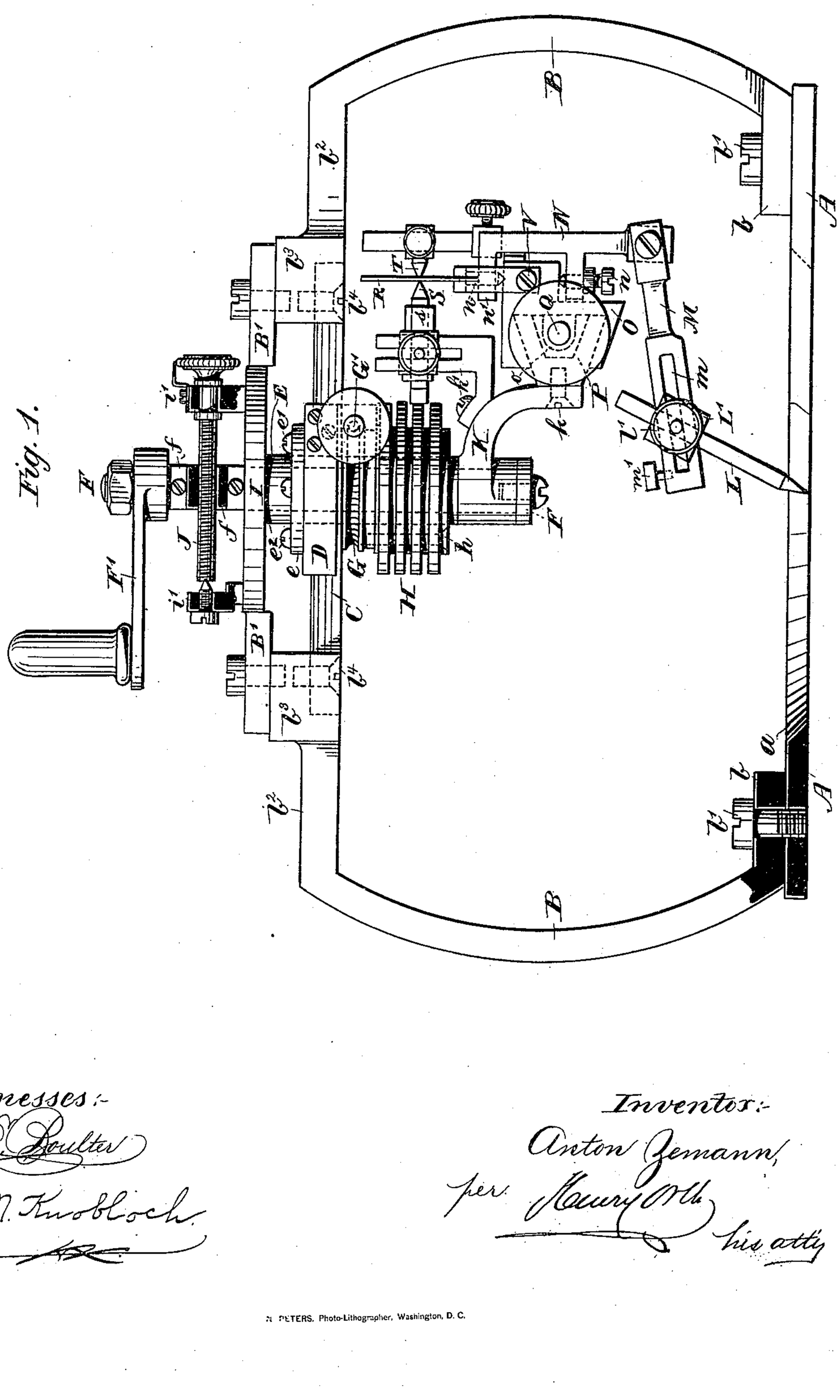
2 Sheets—Sheet 1.

A. ZEMANN.

ROSE ENGINE.

No. 334,210. Patented Jan. 12, 1886.

Fig. 1.



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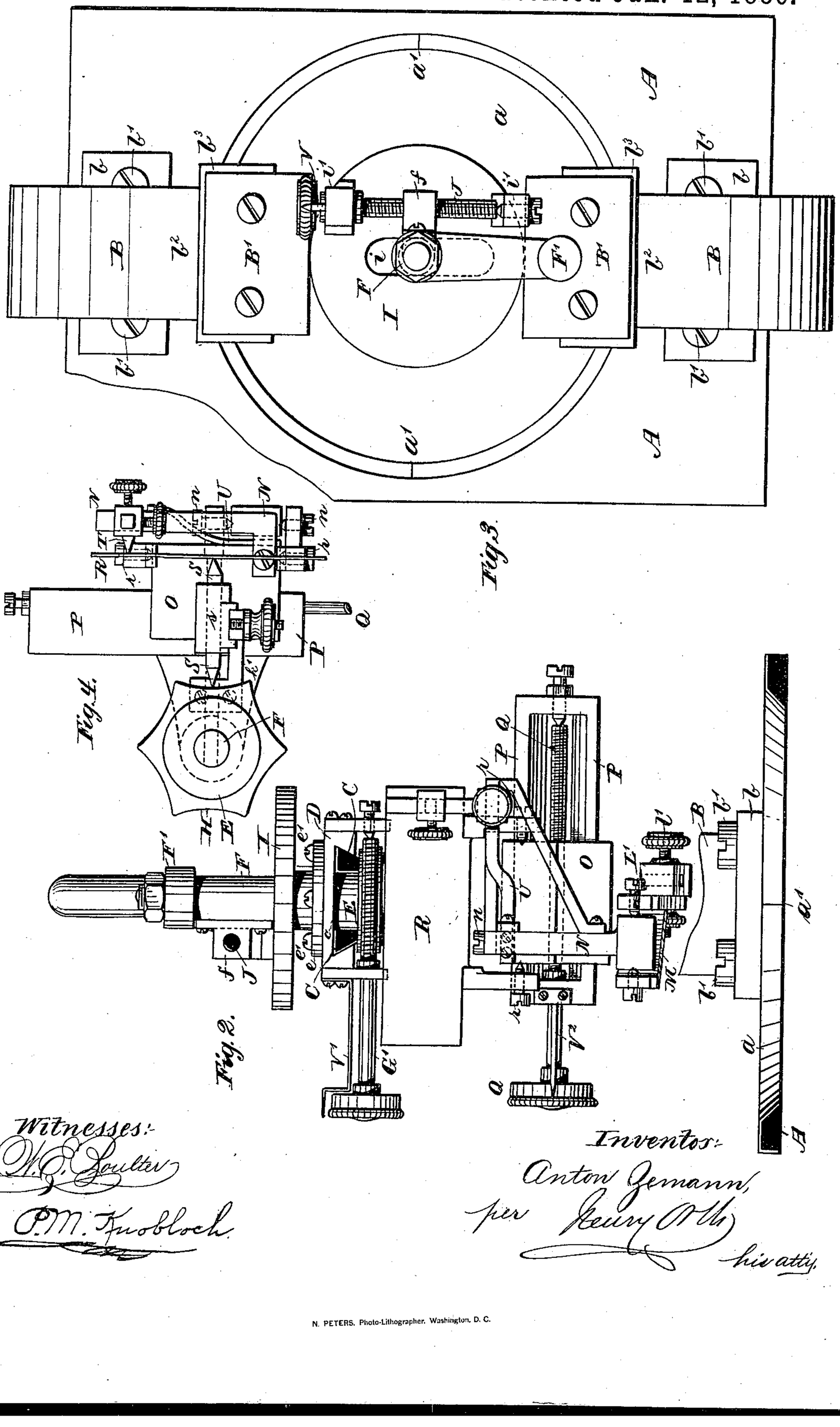

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UNITED STATES PATENT OFFICE.

ANTON ZEMANN, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR OF ONE-HALF TO WILHELM PUTZKER, OF OLBERNHAU, SAXONY, GERMANY.

ROSE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 334,210, dated January 12, 1886.

Application filed April 13, 1885. Serial No. 162,089. (No model.) Patented in Germany March 22, 1885, No. 33,307; in France March 23, 1885, No. 167,825; in England March 24, 1885, No. 3,796, and in Austria-Hungary July 22, 1885, No. 11,501 and No. 37,927.

To all whom it may concern:

Be it known that I, ANTON ZEMANN, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Rose-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of rose-engines by means of which closed or jointed undulatory curves can be traced having a general circular or elliptic form.

The object of my invention is to improve this class of engines; and it consists in the construction, arrangement, operation, and combination of its several parts, substantially as hereinafter fully described.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is a front elevation, partly in section, of my improved rose-engine. Fig. 2 is a sectional side elevation thereof; Fig. 3, a plan view, and Fig. 4 a detail view.

A indicates the bed or supporting-plate, upon which the operative devices are secured. It is provided with an opening, *a*, in this case of annular form, though it may be of other form, and *a' a'* are indices on opposite edges of the opening by means of which the apparatus is set in proper position upon the plate operated upon, and upon which plate the apparatus is set, the graver working in said opening *a*.

B B are curved arms, secured to the plate A by means of screws *b' b'* passing through feet *b b*, formed on the lower end of said arms, and through plate A. At their upper ends the arms B have a horizontal portion, b^2, which terminates in a head, b^3, in which is secured, by means of screws b^4, a guide-rail, C, the lateral faces of which are beveled in opposite directions, as shown in Fig. 2. Upon this rail is mounted a carriage, D, in which is secured the rosette or pattern carrier, consisting of a short cylinder or sleeve, E, that projects through a longitudinal slot, *c*, Fig. 2, formed in the guide-rail C, said cylinder or sleeve E forming a bearing for the operating shaft F, which extends above and below said sleeve. Immediately below the guide-rail the carrier E carries a worm-wheel, G, loosely mounted thereon, and below the worm-wheel are arranged the pattern disks or rosettes, also loosely fitted on sleeve E, but rigidly connected therewith and the worm-wheel G by means of a feather or spline, *h*, (shown in dotted lines in Fig. 1,) so that said plates may be removed and others fitted in their places. The worm-wheel G gears with an endless screw, G', that has its bearings in the carriage D, by means of which screw the patterns are adjusted around the sleeve E, as may be desired. It will be seen that by connecting the rosette or pattern carrier rigidly with the carriage D through the adjusting-screw said carrier remains stationary when the shaft F is rotated.

As more clearly shown in Figs. 1 and 2, the sleeve E has an annular flange, *e*, that serves to secure the same, by means of screws *e'*, to the upper face of the carriage D, and an extension, e^2, projecting above the flange *e*, that serves as a seat for a disk, I, in which is formed a slot, *i*, Fig. 3, through which the shaft F passes.

Upon the heads b^3 of the arms B are secured stop-plates B', Figs. 1 and 3, that hold the disk or chuck I against movement with the carriage D, and upon said disk I are secured bearings *i'* for a screw, J, that operates in a block or nut, *f*, secured to shaft F, which latter carries at its upper end the operating-crank F', by means of which it is rotated. It is obvious that if the screw J is rotated the shaft F will be moved laterally in the slot *i* of disk I in one or the other direction, according to the direction of rotation of said screw, and that in this movement of the shaft it will carry along with it the carriage D and rosette-carrier E on the guide-rail C. It is also obvious that when the shaft F is in a position

eccentric to the center of disk I and rotated the latter will be caused to oscillate between the stop-plates B′; but when said shaft is concentric with the center of the disk the shaft will carry the disk along with it, and a reciprocating movement will be imparted thereto on the guide-rail C.

To the lower end of shaft F is secured an arm, K, from which is supported the style or graver, and the intermediate mechanism that imparts the oscillatory or undulatory movement to the said graver or style, which movement is controlled by one of the patterns or rosettes H on the carrier E. This mechanism is constructed and arranged as follows: L is the style or graver, supported from a carrier-arm, M, pivoted to the lower end of a frame, N. The forward end of the arm has a slot, *m*, along which the style may be adjusted by means of a thumb-screw, that passes through the style-holder L′, through suitable clamping-plates, and the slot *m*. The graver or style is adjustable in a slot of the holder L′ by means of a set-screw, *l*′. It will be seen that the graver bears upon the plate under operation with a force corresponding to its own weight. This may, however, be increased by securing to the carrier a suitable weight, *m*′, Fig. 1, to cause the graver to bear upon the plate to be engraved with greater or less force, according to the weight applied.

The frame N, that supports the carrier-arm M, is pivoted to a carriage, O, on vertical pivotal screws *n n*, that pass through bracket-arms *n*′ *n*′, and have their bearings in suitable blocks secured to the upper and lower faces of the carriage O, so that said frame N can oscillate on its verti-pivotal screws. The carriage O is arranged to slide on a V-shaped guide-rail P (shown in dotted lines in Fig. 1) in a direction at right angles to that of carriage D, said guide-rail being secured to the arm K, on the lower end of the operating-shaft F, by means of a screw or screws *k* or otherwise. From the inner face of the carriage O projects a lug, *o*, in the threaded perforation of which operates an endless screw, Q, that has its bearings in the ends of the guide-rail P, by means of which screw the carriage O can be adjusted along said rail.

R is a plate arranged to oscillate on horizontal pivotal screws *r r*, Fig. 2, that have their bearings in the ends of the carriage O. The plate R bears against a pin, S, that passes loosely through a sleeve or bearing, *s*, and the opposite end of the pin bears upon the periphery of one of the patterns or rosettes H. The bearing *s* of the pin S is adjustable vertically in a slotted or forked standard, *k*′, secured to the arm K, at the lower end of shaft F, as more plainly shown in Fig. 1, so that said pin may be brought in contact with any one of the patterns or rosettes on carrier E. On the frame N is arranged a pin, T, that is adjustable vertically and horizontally, as shown in Fig. 4. A plate-spring, U, is secured to the carriage O, which spring tends to constantly force the frame N inwardly or toward the plate R, the pin T impinging upon said plate. When the shaft F is rotated, the irregularities in the peripheral configuration of the pattern or rosette H, with which the pin S contacts, and the power exerted upon frame N by the plate-spring U, cause the pin S to reciprocate in its bearings, and as this pin, as well as the pin T, bears upon opposite sides of plate R, an oscillating movement is imparted to the latter on its pivots, as well as to the frame N, that carries the style or graver. The latter consequently follows the movements of the frame N, and said style will therefore trace an undulatory curve, the form of which will depend upon the peripheral configuration of the pattern-disk H that actuates the pin S and on the position to which the pin T is adjusted—that is to say, on the distance of the latter from pin S, which distance determines the amplitude of the vibrations or oscillations of plate R, and consequently those of the frame N, and through them, the amplitude of the undulatory curves traced by the graver.

From the foregoing description it will be seen that, irrespective of the undulatory movement imparted to the graver L by the pattern or rosette, the said graver will not change its position when its point lies in the plane of the axis of the shaft and when the latter's axis lies in the plane of the axis of the disk I—that is to say, if the pattern were a perfect disk, and the parts were in the described position, the point of the graver when the shaft E is rotated will rotate upon itself as a fulcrum. When, however, the position of the point of the graver L is changed relatively to the vertical axis of shaft F, by means of the adjusting-screw Q, so that said point will be in a plane eccentric to the plane of the axis of the shaft, always supposing the pattern or rosette to be a perfect disk, the graver will rotate around the axis of the shaft F when the latter is rotated and traces perfect circles. On the other hand, when the axis of the shaft F is displaced relatively to the axis of the disk I, and the point of the graver brought into the plane of said shaft, it will trace straight lines; and, finally, when the shaft is in the last-described position, and the point of the graver placed in a plane eccentric to that of the shaft, ellipses will be produced.

It will be seen from the foregoing that straight as well as curved lines are produced by the engine, and that by means of the pattern or rosette—of which one form is shown in plan view in Fig. 4—and by means of the adjusting devices described any desired undulations may be given to these lines.

V V′ V² are pointers for the screws J, G′, and Q, the heads of which are or may be provided with suitable indices to indicate the extent of the adjustment of the parts displaced thereby.

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

1. In a rose-engine, the combination of a rotary shaft, a pattern or rosette carrier loosely mounted on said shaft, a slotted centering disk or chuck, I, through which the shaft passes, and an adjusting-screw for adjusting the shaft along the slot of the chuck, with a graver controlled in its movements by said shaft and the pattern or rosette on the carrier, as described.

2. In a rose-engine, the combination of a rotary shaft, a pattern or rosette carrier fitted thereto and adjustable around the same, a slotted centering disk or chuck, I, through which the shaft passes, and an adjusting-screw for adjusting the shaft in the slot of the chuck, with a graver controlled in its movements by the shaft and pattern or rosette, as described.

3. In a rose-engine, the combination, with a rotary shaft, a pattern or rosette carrier fitted thereon, a slotted centering plate or chuck, through which the shaft passes, an adjusting-screw for adjusting the shaft along said slot, and a sliding carriage connected with the shaft, of a graver controlled in its movements by the shaft and pattern or rosette, as described.

4. In a rose-engine, the combination, with a rotary shaft, a pattern or rosette carrier loosely fitted thereon, a worm-gear for rotating the carrier on the shaft to adjust the same, a centering plate or chuck having a diametrical slot, through which the shaft passes, an adjusting-screw for adjusting the shaft along said slot, and a sliding carriage connected with the shaft, of a graver controlled in its movements by the shaft and pattern or rosette, as described.

5. In a rose-engine, the combination, with a rotary shaft, a pattern or rosette carrier loosely fitted thereon, a worm-wheel mounted on the carrier, a centering plate or chuck having a diametrical slot, through which the shaft passes, an adjusting-screw for adjusting the shaft along the slot of the chuck, and a sliding carriage connected with the shaft, of a worm or screw having its bearings in said carriage and meshing with the worm-wheel on the rosette-carrier, substantially as and for the purpose specified.

6. In a rose-engine, the combination, with a rotary shaft, a pattern or rosette carrier loosely fitted thereon, a sliding carriage connected with the shaft, a centering plate or chuck having a diametrical slot, through which the shaft passes, and an adjusting-screw for adjusting the shaft along the slot and connecting the same rigidly with the chuck, of stop-plates arranged on opposite sides of the chuck in the plane of its slot, for the purpose specified.

7. In a rose-engine, the combination, with a rotary shaft, a rosette-carrier fitted thereon, a slotted centering-chuck, and adjusting devices for adjusting the shaft along the slot of said chuck, of a graver connected with the shaft and intermediate mechanism controlled by the rosette or pattern to transmit a differential movement to the graver, according to the form of the rosette or pattern, as described.

8. In a rose-engine, the combination, with a rotary shaft, a stationary rosette-carrier fitted thereon, a slotted centering disk or chuck, and adjusting devices for adjusting the shaft along the slot of the chuck, of a graver connected with the shaft and adjustable in a plane at right angles to the plane of adjustment of said shaft in the chuck, as described, for the purpose specified.

9. In a rose-engine, the combination, with a rotary shaft, a stationary rosette-carrier fitted thereon, a centering disk or chuck having a diametrical slot, through which the shaft passes, and adjusting devices to adjust the shaft along the slot of the chuck, of transmitting devices for transmitting variable motion to the graver controlled by the rosette or pattern on the carrier, and consisting of a stud or pin and a pivoted graver-carrier controlled by said pin, as described.

10. In a rose-engine, the combination of a laterally-adjustable rotary shaft and a stationary pattern or rosette carrier fitted thereon, with a graver supported from the shaft and controlled by the pattern or rosette on the carrier, said graver being arranged to bear on the plate operated on by gravity, substantially as and for the purpose specified.

11. In a rose-engine, the combination of a laterally-adjustable rotary shaft and a stationary pattern or rosette carrier fitted thereon, with an adjustable graver actuated by gravity supported from said shaft and transmitting devices controlled by the pattern or rosette on the carrier and controlling the graver, substantially as and for the purpose specified.

12. In a rose-engine, the combination of a laterally-adjustable rotary shaft and a stationary pattern or rosette carrier fitted thereon, with an adjustable support whose movements are controlled by the pattern or rosette on the carrier, and a graver-holder pivoted to said support and carrying an adjustable weight, substantially as and for the purpose specified.

13. In a rose-engine, the combination, with a rotary shaft and a stationary rosette or pattern carrier, of a sliding carriage connected with the shaft, a graver-carrier supported from said carriage, and an adjusting-screw for adjusting the carriage in a plane at right angles and eccentric to the vertical plane of the shaft, substantially as and for the purpose specified.

14. In a rose-engine, the combination, with a rotary shaft, a stationary rosette or pattern carrier, and a guide-rail rigidly connected with the shaft, of a sliding carriage fitted to and adjustable on said guide-rail, and a vibratory graver-carrier connected with said sliding carriage and controlled from the pattern or rosette carrier, as described, for the purpose specified.

15. In a rose-engine, the combination, with a rotary shaft, a stationary rosette or pattern carrier, and a transmitting stud or pin fitted loosely in bearings rigidly connected with the shaft and controlled by the rosette or pattern on the

carrier, of a pivoted graver-carrier connected and rotating with the shaft, and an intermediate pivoted transmitting-plate controlled from the transmitting lug or stud, whereby the reciprocating movements of the latter are transmitted to the graver-carrier, substantially as and for the purpose specified.

16. In a rose-engine, the combination, with a rotary shaft, a stationary rosette or pattern carrier, and a transmitting stud or pin fitted loosely in bearings adjustable vertically in their support along the pattern-carrier, said support being rigidly connected with the shaft, said stud or pin being controlled by the rosette or pattern on the carrier, of a pivoted graver-carrier connected and rotating with the shaft and an intermediate pivoted transmitting-plate controlled from the transmitting lug or stud, whereby the reciprocating movements of the latter are transmitted to the graver-carrier, substantially as and for the purpose specified.

17. In a rose-engine, the combination of a stationary pattern or rosette carrier, a rotary shaft, a graver-carrier connected with and rotating around said pattern-carrier, and transmitting devices controlled from the pattern-carrier and controlling the graver-carrier, to impart to the latter a differential motion corresponding with the contour of the pattern, and an adjusting device for varying the amplitude of said differential motion, substantially as and for the purpose specified.

18. In a rose-engine, the combination of a stationary pattern-carrier, a centering disk or chuck having a diametrical slot, a rotary shaft passing through the chuck and carrier, adjusting devices for adjusting the carrier in the plane of rotation of the shaft and for adjusting the latter in a horizontal plane, a graver-carrier connected and rotating with the shaft around the pattern-carrier, adjusting devices for adjusting the graver-carrier in a plane at right angles to the plane of adjustment of the shaft, and transmitting devices controlled from the pattern or rosette carrier and controlling the graver-carrier, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ANTON ZEMANN.

Witnesses:

JAMES RILEY WEAVER,

HENRY DAVIDS.