No. 608,550. Patented Aug. 2, 1898.

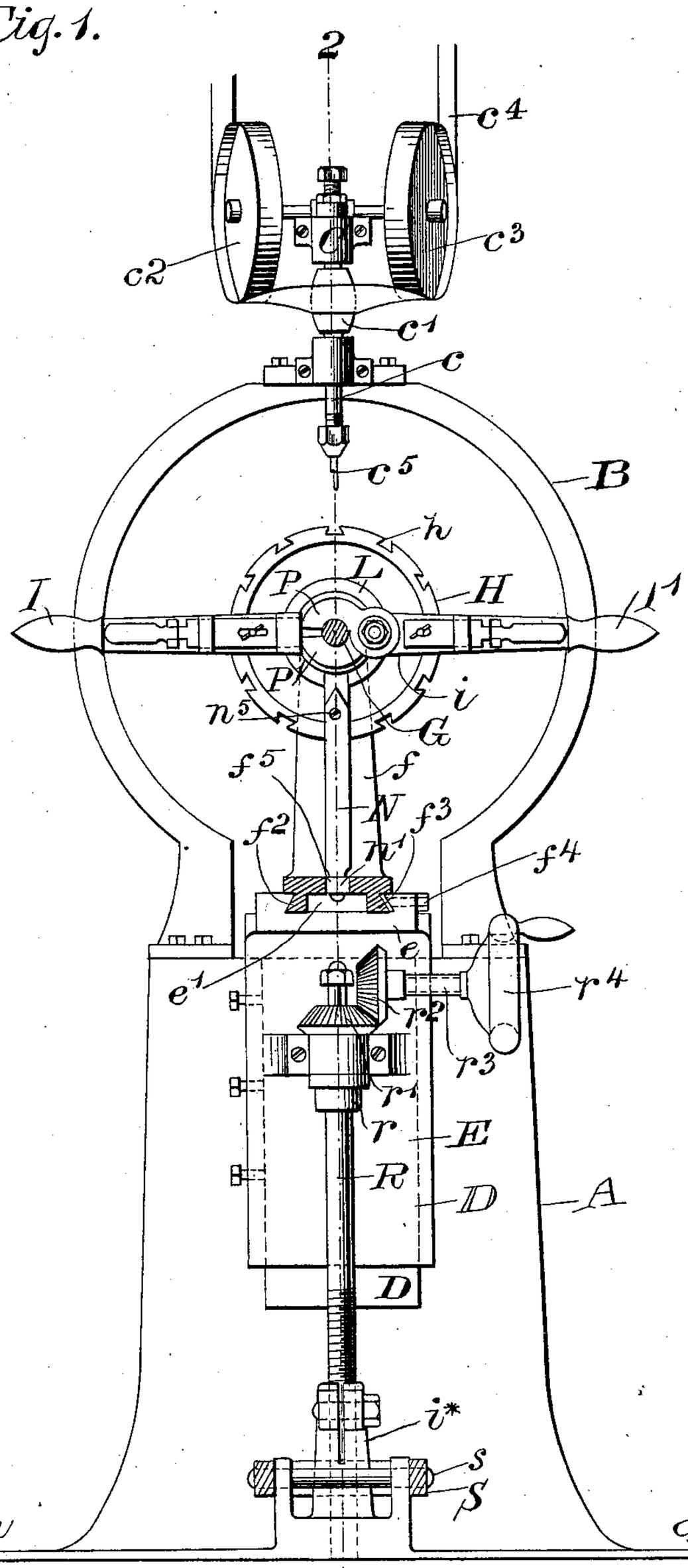
J. H. FERGUSON.

ROUTING MACHINE FOR ELECTROTYPE PLATES.

(Application filed Nov. 12, 1896.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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by attorneys
Brown Seward

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Fig. 2.

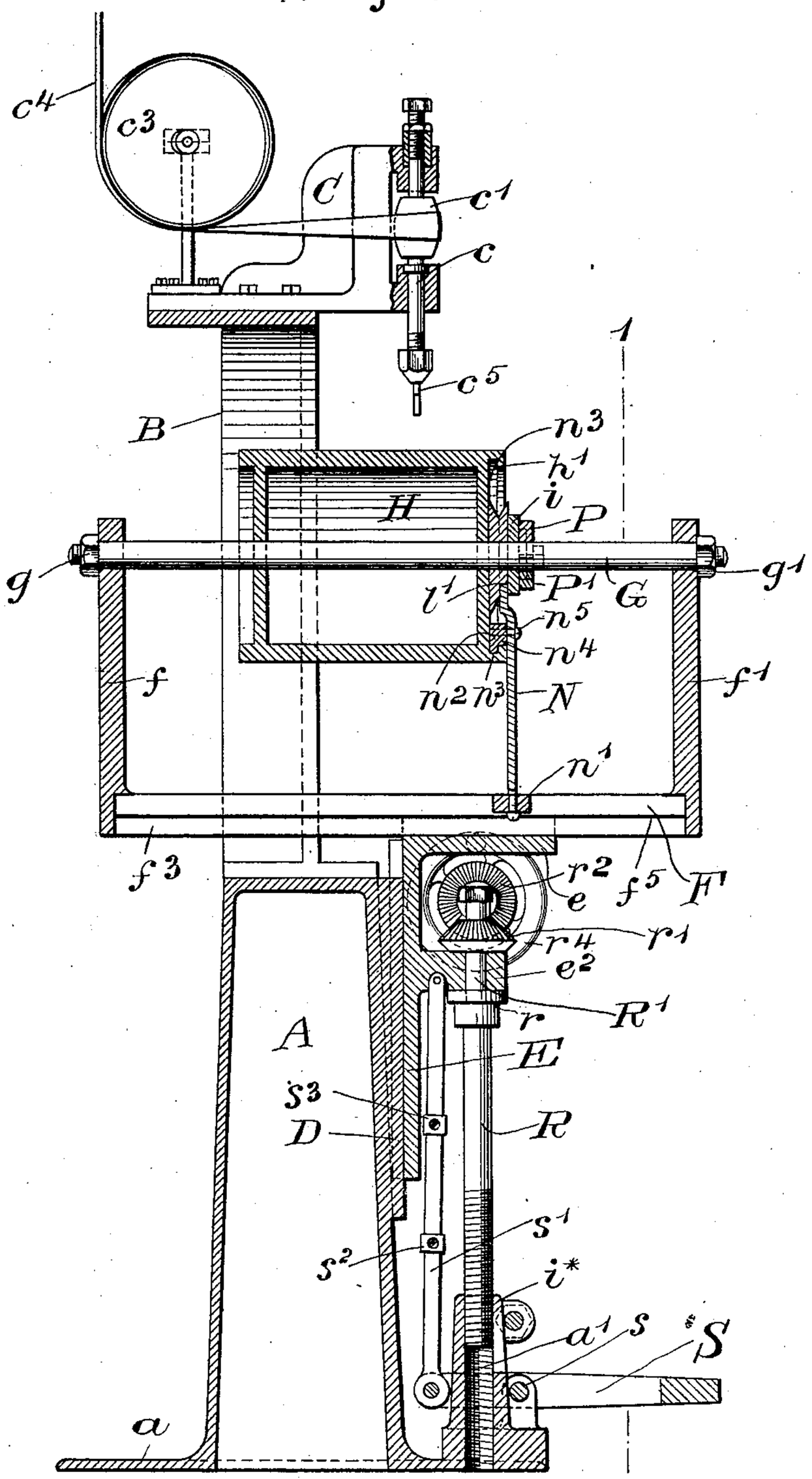

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Fig. 3.

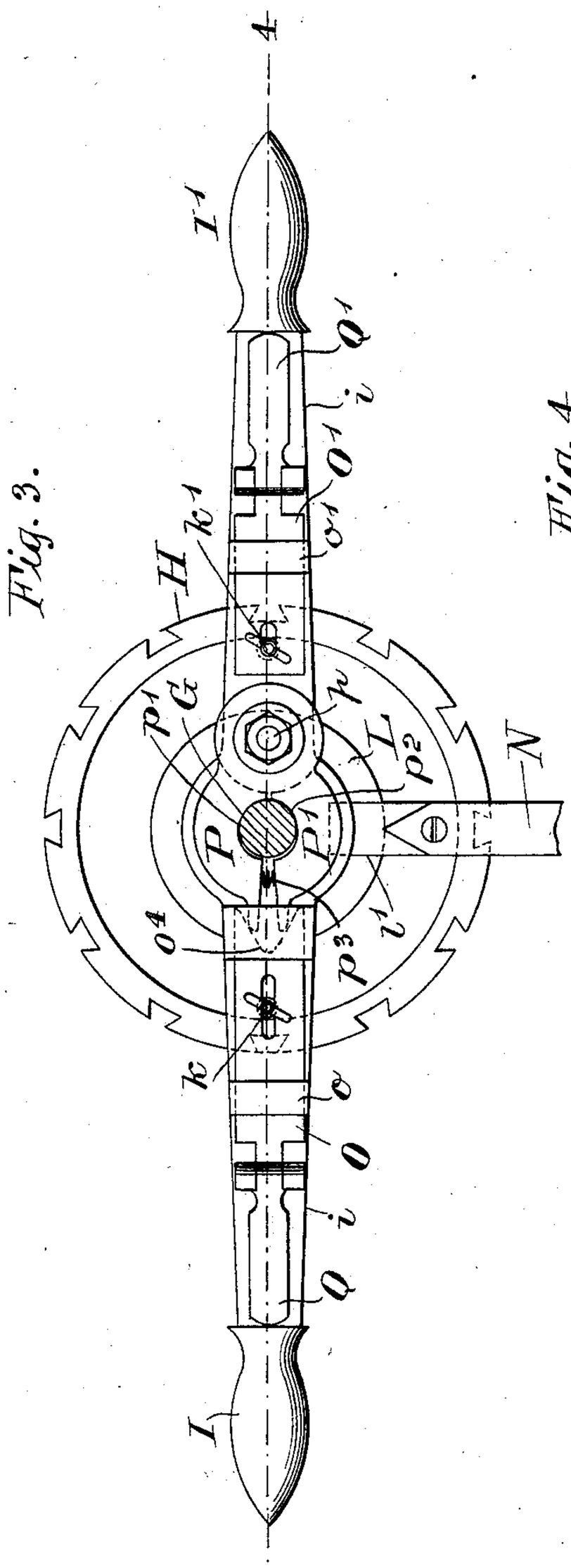
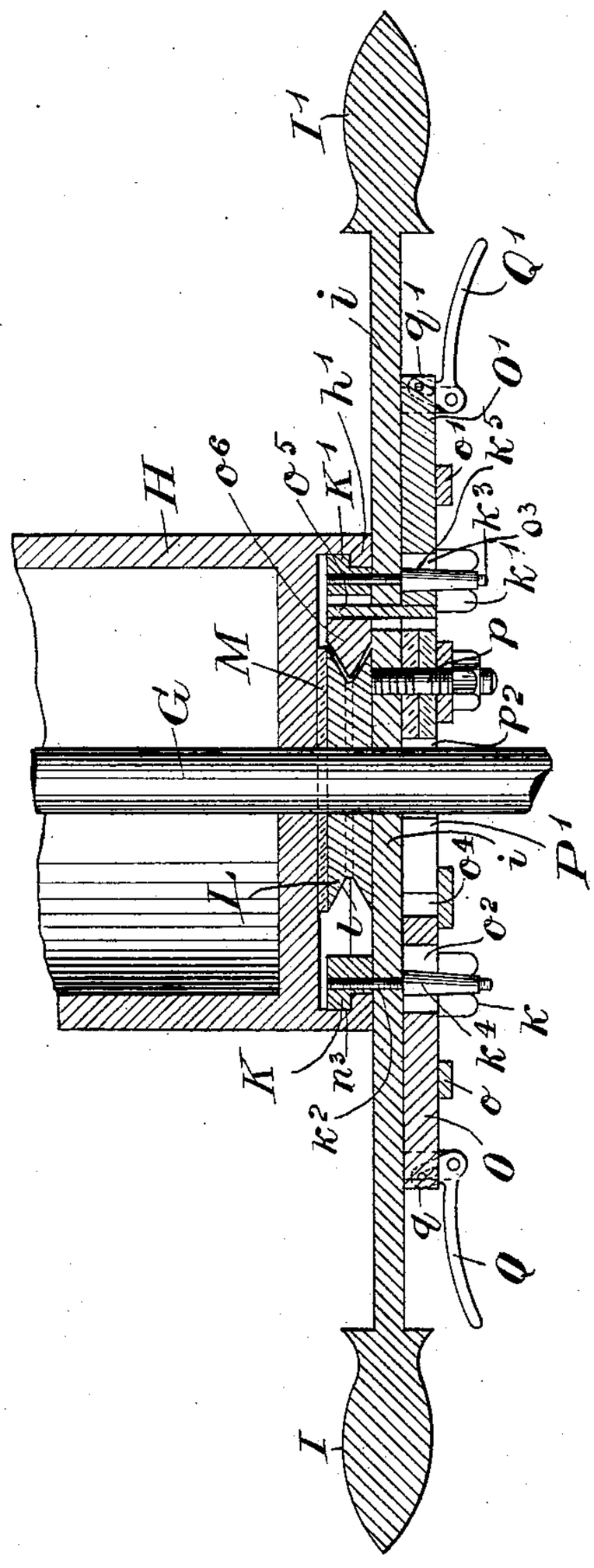


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. FERGUSON, OF NEW YORK, N. Y., ASSIGNOR TO THE LOVEJOY COMPANY, OF SAME PLACE.

ROUTING-MACHINE FOR ELECTROTYPE-PLATES.

SPECIFICATION forming part of Letters Patent No. 608,550, dated August 2, 1898.

Application filed November 12, 1896. Serial No. 611,796. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. FERGUSON, of New York, (Brooklyn,) in the county of Kings and State of New York, have invented a new and useful Improvement in Routing-Machines for Electrotype-Plates, of which the following is a specification.

My invention relates to an improvement in routing-machines for electrotype-plates in which provision is made for imparting to the plate a movement forward and back, sidewise, and up and down in order to bring any point of the plate into position to be operated upon by the cutting-tool while the latter remains mounted in stationary bearings.

The particular form of machine which I have chosen to illustrate my invention is adapted to use in connection with curved electrotype-plates, the sidewise or lateral movement being in a curved path beneath the cutting-tool.

In the accompanying drawings, Figure 1 is a view of the machine in front elevation, partly in section, the view being taken in the plane of line 1 1 of Fig. 2. Fig. 2 is a vertical longitudinal section taken through the machine from front to rear, the section being taken in the plane of the line 2 2 of Fig. 1. Fig. 3 is an enlarged partial front view showing the front end of the cylinder and the connection of the operating-handles therewith, and Fig. 4 is a horizontal section in the plane of line 4 4 of Fig. 3.

A convenient form of supporting-frame consists of a pedestal A, provided with suitable flanges *a* at its base for attaching it to the floor or giving it stability, the said pedestal A being surmounted by an arched upper frame B, on top of which is supported a bracket C, carrying at its front the chuck-spindle *c*, provided with a drive-pulley *c'* and a pair of guide-pulleys c^2 c^3 for directing the driving-belt c^4 to and across the front of the spindle-driving pulley *c'*. The cutting-tool carried by the spindle *c* is denoted by c^5.

At the front of the pedestal A there is located a vertical dovetailed guide D, along which a carriage E is fitted to slide to carry the work toward and away from the cutting-tool, as will be hereinafter more particularly described.

The carriage E is provided at its upper end with a bed-piece *e*, having formed therein a dovetailed grove *e'*, extending from front to rear, for the reception of a work-supporting frame, consisting of a base-plate F and uprights *f f'* at its front and rear ends. The base-plate F is provided with bevel-faced legs f^2 f^3, fitted to engaged the opposite beveled faces of the dovetail groove *e'* to guide the work-supporting frame as it is adjusted bodily forward and backward. The said work-supporting frame may be locked in its forward and backward adjustments by means of a set-screw f^4, extending through the side wall of the bed-piece *e* into engagement with one of the legs—in the present instance the leg f^3 of the base-plate F.

In the uprights *f f'* there is mounted a shaft G, held against endwise movement by suitable nuts *g g'* at its ends, but free to rock in its bearings in the upright. On the shaft G there is mounted a cylinder H to form a support for the curved plate which is to be operated upon, the surface of the cylinder H being provided with dovetail grooves *h*, extending longitudinally thereof to receive binding-clamps for holding the plates in position on the cylinder, as is usual. The said binding-clamps are not shown herein, but may be of any well-known or approved form. The plate-supporting cylinder H is so mounted on the shaft G that it may be slid along the shaft or rocked on the shaft at pleasure, and provision is made for locking it to the shaft G to prevent its longitudinal movement, while at the same time it is permitted to rock together with the shaft, and further provision is made for locking it against a rotary movement while permitting it to slide longitudinally along the shaft.

The particular means which I employ for locking the cylinder against a rotary movement while permitting a longitudinal movement and for locking it against a longitudinal movement while permitting a rotary movement is shown, described, and claimed in a companion application of Lewis Herrick, filed of even date herewith, entitled "Clamping device for routing-machines." These locking means will be described in connection with my present application as fully as may

be necessary to complete the operativeness of the machine as a whole.

For the purpose of manipulating the plate-supporting cylinder II, I provide a pair of handles I I′, having a common shank or stock *i*, which embraces the shaft G at its central portion, as shown in Fig. 2, the said handles being locked to the end of the cylinder by means of angle-pieces K K′, which engage the inner face of an inwardly-extending flange *h′* on the end of the supporting-cylinder II. The said angle-pieces are arranged to be drawn toward the said flange *h′* by means of thumb-nuts *k k′*, which engage screw-threaded pins k^2 k^3, projecting from the angle-pieces K K′ through the handle-stock *i*, the said thumb-nuts *k k′* being provided with reduced projections k^4 k^5 the inner or rear ends of which bear against the front face of the handle-stock.

On the shaft G, at the front end of the cylinder II and between the handle-stock *i* and the end of the cylinder, there is loosely mounted a disk L, provided with a V-shaped groove *l* in its periphery and preferably spaced from the end of the cylinder by means of a glass disk M to reduce friction. The disk L is positively held against a rotary movement by means of a stop N, the upper end of which enters a socket *l′* in the periphery of the disk L and the lower end of which is provided with a foot-piece *n′*, adapted to travel longitudinally along a groove f^5 in the base-plate F of the cylinder-supporting frame. The stop N is further secured in its upright position to travel forward and backward together with the cylinder II and the disk L, while permitting the cylinder II to rotate relatively to it by means of a shoe n^2, adapted to slide loosely in an annular groove n^3, formed at the end of the cylinder between the inwardly-extending flange *h′* and the end of the cylinder, the said shoe being spaced from the stop N the width of the flange *h′* by means of a spacing-piece n^4, and the said spacing-piece and shoe n^2 being locked to the stop by means of a screw n^5.

At the front of the handle-stock *i* there are located two sliding bars, the one on the left, as the drawing is held, being denoted by O and the one on the right being denoted by O′. The said sliding bars are held in position by means of straps *o o′*, which are fixed to the stock *i* and embrace three sides of each of the sliding bars, and they are further held in position by means of elongated slots o^2 and o^3, which embrace the reduced extensions k^4 k^5, and the thumb-nuts *k k′*, hereinabove referred to.

The sliding bar O has a V-shaped recess o^4 at its end, the walls of which recess are adapted to engage the ends of a pair of clamping-jaws P P′, hinged at *p* to the handle-stock *i* and provided with curved recesses *p′* p^2, adapted to engage the opposite sides of the shaft G, and thereby lock the handle-stock, and hence the cylinder II, to the shaft G against a longitudinally-sliding movement thereon. The jaws P P′ are held normally apart and out of clamping engagement with the shaft G by means of a spring p^3, interposed between their free ends.

The sliding bar O′ is provided at its ends with an inwardly or rearwardly projecting arm o^5, which extends through an elongated slot *i′* in the handle-stock and carries on its end a shoe o^6, provided with a V-shaped edge adapted to engage the V-shaped groove *l* in the periphery of the disk L when the sliding bar O′ is forced toward the shaft G.

The sliding bars O O′ are forced toward the shaft G at pleasure by means of levers Q Q′, mounted in suitable supports at the front of the handle-stock in position to be readily grasped by the fingers when the hands are on the handles I I′, the short arms of said levers Q Q′ being connected at *q q′* with the outer ends of the sliding bars O O′.

The plate-supporting cylinder II, together with its supporting-frame and the bracket E, upon which it rests, may be bodily adjusted toward and away from the cutting-tool c^5 to accommodate the machine to plate-supporting cylinders of various sizes by means of a rotary shaft R, having a screw-threaded engagement with a socket-piece i^* at the front of the pedestal A, and the bearing *r* against the under side of a forwardly-projecting lug e^2 on the bracket E, a reduced portion R′ of the shaft R extending upwardly through a bearing in the lug e^2 and carrying with a feather-and-groove connection a beveled gear-pinion *r′* in position to intermesh with a beveled gear-wheel r^2 on a shaft r^3, mounted in suitable bearings at the front of the bracket E and operated by a hand-wheel r^4.

In addition to the permanent adjustment of the bracket E and the parts carried thereby nearer to and farther from the cutting-tool c^5, as may be required to suit plate-supporting cylinders of varying diameters, the bracket E and the parts carried thereby may be temporarily moved toward and away from the cutting-tool c^5 to engage the latter with the surface of the plate to be operated upon by means of a foot-treadle S, pivoted at *s* at the base of the pedestal and having its shorter arm connected by a rod *s′* with the lug e^2 on the bracket.

In order to accommodate the connecting-rod *s* and the shaft R, the one to the permanent vertical adjustment of the bracket and the other to the temporary rise and fall of the bracket, the rod *s′* is made in overlapping sections, which may be released and locked by means of clips s^2 s^3, provided with suitable binding-screws, and the shaft R has its reduced portion R′ arranged to slide with a feather-and-groove connection of well-known or approved form within the bevel-gear *r′*, so that the said shaft R may be raised and lowered without disarranging the geared connection between the bevel-gears *r′* r^2.

In operation, suppose the plate-supporting

cylinder H to have been adjusted by means of the shaft R and hand-wheel r^4 into its permanent position relatively to the cutting-tool c^5 and the cutting-tool c^5 to be actuated by a suitable source of power through the driving-belt c^4, the plate on the cylinder H may be brought into engagement with the cutting-tool c^5 at any point desired by simply grasping the handles I I′, and thereby rocking the cylinder H on its support and sliding it forwardly and backwardly on its support and pressing upon the foot-treadle S. If for any purpose it be desired to cause the cutting-tool to travel along the element of surface without varying its position to the right or left, the work-supporting cylinder H may be temporarily locked against rocking by grasping the lever Q with the fingers and drawing it toward the handle-stock *i*, thereby driving the sliding bar O′ toward the shaft G, and hence the shoe o^6 into engagement with the disk L, which, as hereinabove explained, is locked against a rocking movement by the stop N. The work-supporting cylinder H, so locked against rotary movement, may be slid forwardly and backwardly, thereby causing the cutting-tool c^5 to follow a straight line. If, on the other hand, it be desired to cause the cutting-tool to travel in a curved line transverse to the element of surface, the work-supporting cylinder H may be locked against a forward-and-backward movement on the shaft G by grasping the lever Q with the fingers and drawing it toward the handle-stock, thereby sliding the bar O toward the shaft G, and hence drawing the clamping-jaws P P′ toward each other into engagement with the shaft G. In this position the work-supporting cylinder H may be rocked upon its axis, together with the shaft G, to cause the cutting-tool to follow along the surface of the plate at right angles to an element of surface, while its forward-and-backward movement is prevented. When both the levers Q Q′ are left free, the cylinder itself may be manipulated by means of the handles I I′, either rocked or slid longitudinally, or both, as may be desired. On the other hand, if both of the levers Q Q′ are pressed toward the handle-stock the cylinder will be held rigidly against movement in any direction excepting directly toward and away from the tool.

By shifting the frame which supports the cylinder H forwardly and backwardly along the bracket E the movement of the work-supporting cylinder H backward and forward relatively to the cutting-tool may be varied to accommodate itself to an unusually wide or long plate without increasing the length of the cylinder-supporting frame, as the latter may be adjusted forwardly to work upon one portion of the plate and then rearwardly to work upon another portion of the plate.

The machine as above constructed is compact, and its various adjustments and the manipulation of the plate with respect to the cutter are within ready grasp of the operator.

What I claim is—

1. A routing-machine, comprising a tool-holder, means for operating it, a work-supporting cylinder, a supporting-frame for said cylinder including a shaft on which said cylinder is mounted to rotate and along which it is adapted to slide, means for raising and lowering said supporting-frame to move the work-holding cylinder toward and away from the tool-holder and means for rotating and sliding the work-supporting cylinder at pleasure independent of the means for moving it toward and away from the tool-holder, substantially as set forth.

2. The combination with the support for the work-holder and the vertically-sliding bracket which carries said support, of a shaft for raising and lowering said sliding bracket, one portion of the shaft being provided with gear for rotating the shaft and another portion of the shaft having a screw-threaded engagement with a fixed socket-piece, a treadle for raising and lowering said sliding bracket independently of the said shaft, a sectional connecting-rod between the treadle and sliding bracket and means for clamping the sections of said connecting-rod in different longitudinal adjustments, substantially as set forth.

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