(No Model.) 3 Sheets—Sheet 1.

C. H. BEELER, Jr.

COMBINED ROUTING, RULING, AND TINTING MACHINE.

No. 506,089. Patented Oct. 3, 1893.

FIG. 1.

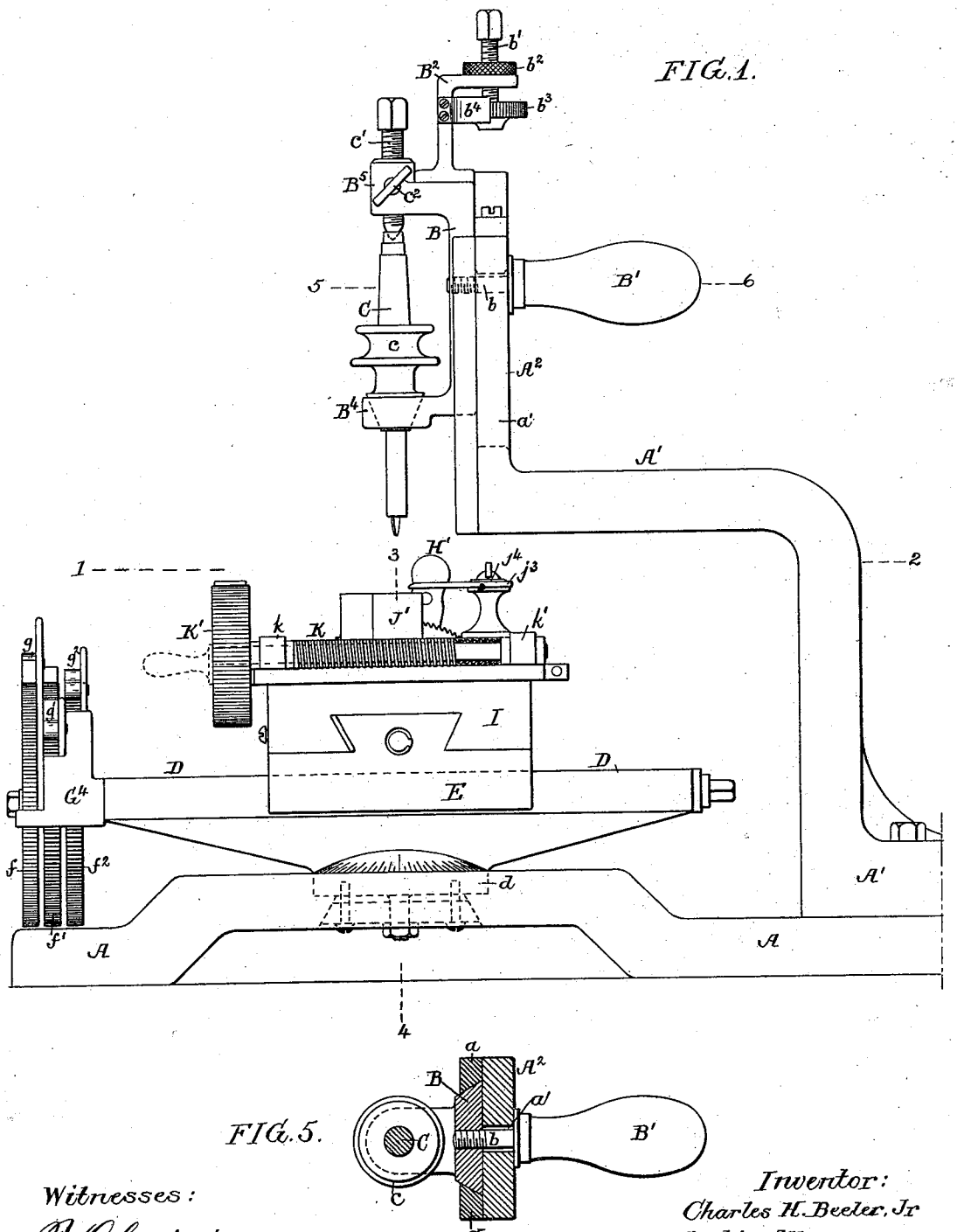

FIG. 5.

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R. Schleicher

Inventor:
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Howson & Howson

(No Model.) 3 Sheets—Sheet 2.

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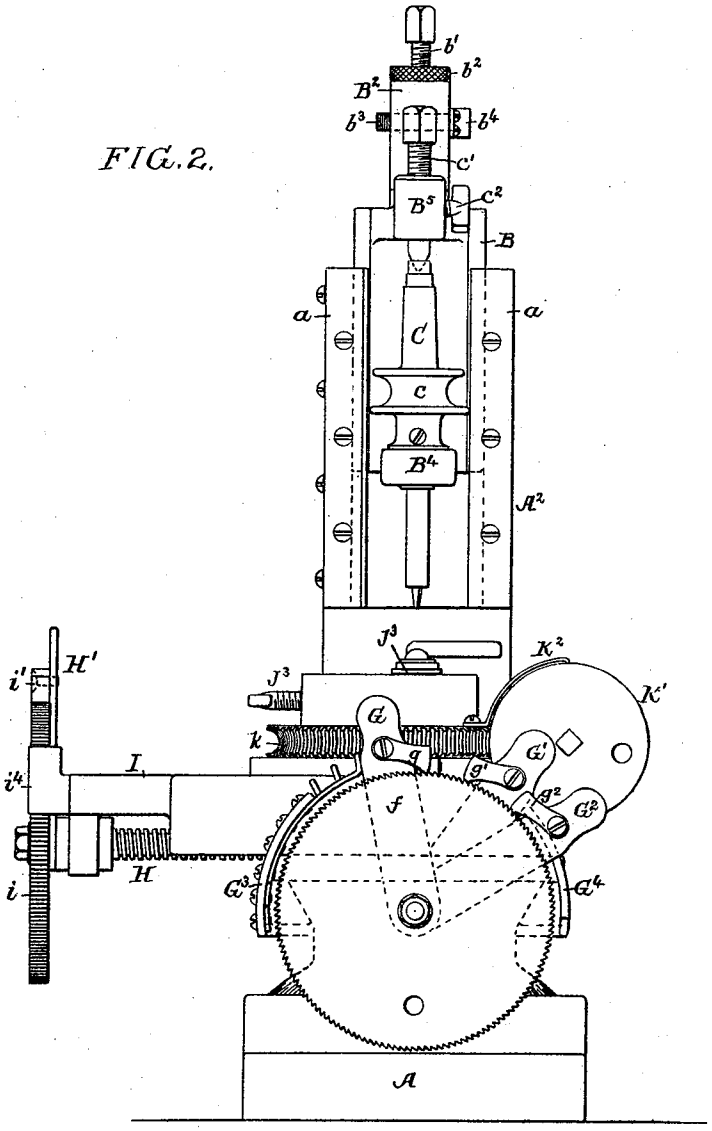
FIG. 2.



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(No Model.)

3 Sheets—Sheet 3.

C. H. BEELER, Jr.

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No. 506,089. Patented Oct. 3, 1893.

FIG. 3.

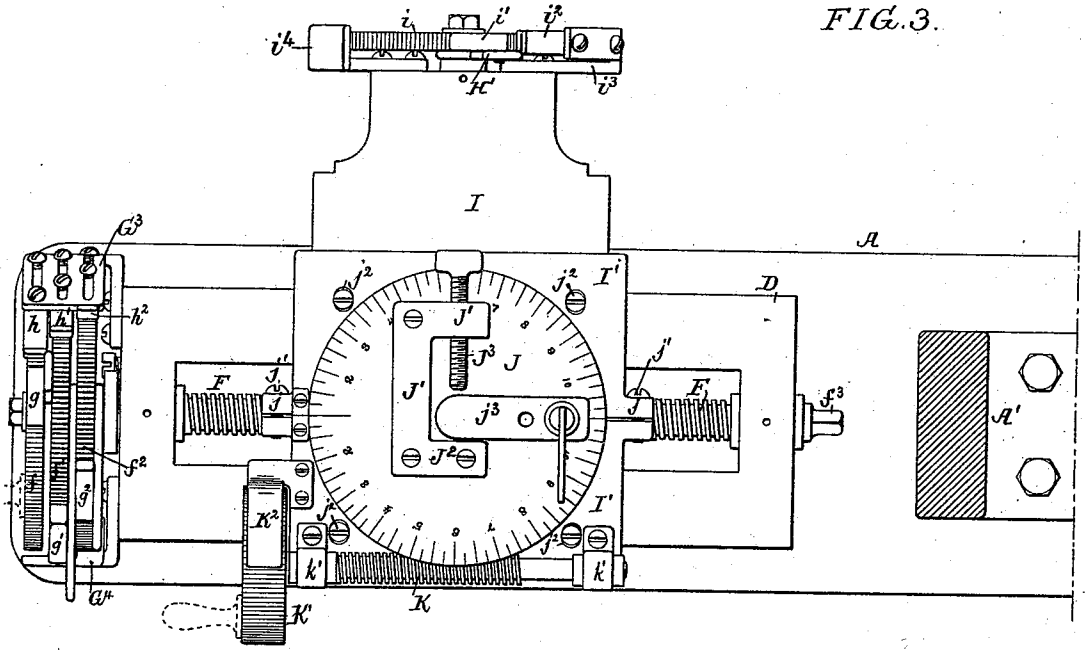


FIG. 4.

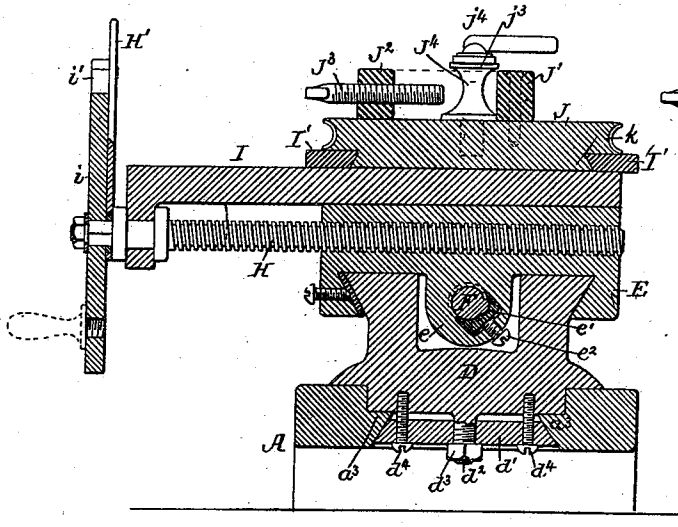
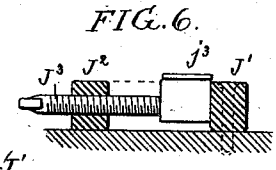


FIG. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES H. BEELER, JR., OF PHILADELPHIA, PENNSYLVANIA.

COMBINED ROUTING, RULING, AND TINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 506,089, dated October 3, 1893.

Application filed March 10, 1893. Serial No. 465,408. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. BEELER, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a Combined Routing, Ruling, and Tinting Machine, of which the following is a specification.

My invention relates to machines for cutting fine metal work such as type, jewelry, and ornamenting precious metals, but it will be understood that my invention can be used for cutting larger work, and for engraving without departing from my invention, the object of the invention being to so construct the machine that the bed can be moved in any direction, and locked in any position, and the tool carrier can be either rotated or held stationary and the depth of the cutting tool can be regulated as fully described hereinafter.

In the accompanying drawings:—Figure 1, is a side view of my improved machine. Fig. 2, is a face view. Fig. 3, is a sectional plan on the line 1—2, Fig. 1. Fig. 4, is a section on the line 3—4, Fig. 1. Fig. 5, is a section on the line 5—6, Fig. 1. Fig. 6, is a diagram view illustrating the manner of setting the article to be cut.

A is the base of the machine to which is rigidly attached the overhanging standard A′, to the upright portion A^2 of which is adapted the slide B. The edges of this slide B are beveled and slide within grooves formed by bevel plates *a*, *a* secured to the standard A^2, so that the slide can be raised and lowered.

B′ is a handle having a screw *b* which passes through a slot *a′* in the upright A^2 and into a screw threaded opening in the slide B, so that on turning this handle the slide can be locked in position, but on reversing the movement, the slide can be released, and raised or lowered by the handle.

Mounted upon the slide B is a bracket B^2 to which is adapted a screw-threaded adjusting bolt *b′*. On this bolt is a lock nut b^2 for locking the bolt to the upright.

Adapted to the screw-thread on the lower end of the bolt, is a head b^3; the head can be turned and raised and lowered. The lower portion of this head rests directly upon the upright A^2 when the tool is in position for cutting, and a spring pawl b^4 engages with the serrated edge of the head b^3, so that the head will be locked in the set position. The adjusting bolt *b′* can be turned to make the coarse adjustments while the head b^3 is moved to make the fine adjustments.

Adapted to a conical bearing B^4 projecting from the slide B is the spindle C having a driving belt wheel *c*. Adapted to the upper end of this spindle is a set screw *c′* having a point adapted to a conical opening in the spindle. This set screw passes through a bearing B^5 projecting from the slide B and is locked by a thumb screw c^2. When it is wished to rotate the spindle, the set screw *c′* is so adjusted that the spindle will revolve freely, but when the spindle is used in a stationary position, for ruling for instance, the set screw *c′* is turned down hard upon the spindle causing it to bind tightly in the conical bearing thus practically locking it to the slide. The tool can be secured to the spindle in any suitable manner by any of the well known chucks.

Mounted upon the base A is a slideway D; this slideway has a circular depending portion *d* adapted to an opening a^2 in the base A. The under portion of the flange portion a^3 is beveled, and adapted to this beveled flange is a circular plate *d′* through which passes a bolt d^2 depending from the slide way D; a nut d^3 is adapted to the bolt and on turning the nut the slide way and plate are drawn upon the flange, locking the slide way rigidly to the base A in any position required. At each side of the central bolt d^2 are confining screws d^4 which prevent the plate *d′* turning upon the center bolt d^2. The upper surface of the portion *d* of the slideway is graduated as shown in Fig. 1, so that the slide can be set to any degree required.

E is a longitudinal slide adapted to the undercut portion of the slide way D, and on the slide is a nut *e* in which works a feed screw F. This feed screw is mounted in bearings in the slide way D, and has three ratchet wheels *f*, *f′*, f^2 secured to it at one end, and has a squared head f^3 at the opposite end.

Within the nut *e* is a take-up block *e′* set up by a set screw e^2 for taking up the wear on the screw threads of the feed screw F.

The ratchet wheels *f′*, f^2 have fine spaced teeth with which engage pawls *g*, *g′*, g^2 respectively, mounted on feed levers G, G′, G^2

pivoted on the shaft The teeth of the wheel f are so cut that the lever G will move the screw shaft in one direction while the wheels f', f^2 are so cut that their levers will move the shaft in the opposite direction.

Mounted on the slotted frame G^3 secured to the slide way D, are adjustable stops h, h', h^2. Screws pass through slots in the plate and into the stops, so that the said stops can be set at different points and fixed by the screws to limit the movement of the levers. On the opposite side of the ratchet wheels is a fixed stop G^4 suitably stepped to limit the movement of the levers in the opposite direction. Thus by operating any one of the levers the longitudinal slide E can be moved on the slide way to any point desired, and the feed can be intermittent, feeding one or more teeth at a time according to the adjustment of the stops.

Mounted on the longitudinal slide E is a transverse slide I undercut to receive the undercut portion of the slide E. A feed screw H is mounted on the transverse slide I and is adapted to a screw threaded opening in the longitudinal slide E, and this screw H has secured to it at one end a ratchet wheel i with which engages a pawl i' on a lever H' pivoted to the shaft. A stop i^2 limits the movement of the lever, and this stop can be adjusted upon a bracket i^3 secured to the slide E. On the opposite side of the wheels is a fixed stop i^4 for the lever; this stop is also secured to the slide E. By operating the lever H' the screw H will move the transverse slide I upon the longitudinal slide E.

Mounted upon the transverse slide I is a rotatable work holder J, in the base of which is cut an annular groove and adapted to this groove are segmental clamp plates I' secured together by clamp screws j' which pass through ears j. The segments are held down upon the slide I by screws j^2 which pass through slots in the segments.

Secured to the work holder J is a fixed block J' and a fixed block J^2, and adapted to a screw threaded opening in the block is a clamp screw J^3 between which and the seat J^2 is clamped the work to be cut. At one side of the block is a post J^4 on which is pivoted an adjustable gage plate j^3 secured to the post by clamp screw j^4. The object of this gage plate is to insure the propel level of the work to be cut. The plate is thrown over above the work, and before the work is clamped by the clamp screw, the face of the work is forced up against the under side of the gage plate and then the work is secured in this position by the clamp screw. The gage plate is then turned to one side clear of the work. It will be understood that the work differs in height but I prefer to keep the faces of the work operated upon at the same level. This clamping of the work is clearly illustrated in the detached view Fig. 6.

In the edge of the work holder is cut a worm wheel k meshing with a worm K mounted in bearings k' on the work holder, and on the spindle of this worm K is a ratchet wheel K', with which engages a spring pawl k^2 of such tension that it will hold the worm in the position adjusted but the operator, however, can readily turn the worm by grasping the wheel. Thus it will be seen that the work can be turned in a circular path by moving the worm K, it can be moved laterally by moving the slide I, and can be moved longitudinally by moving the slide E, and the above described mechanism can be turned bodily by turning the slide way D. The slideway and the several slides can be locked in any position and the feed of the slide or work holder can be regulated as desired.

By the above described mechanism original type dies can be cut and engine turning can be produced, and in fact any delicate work requiring minute adjustments can be done upon this machine.

In operating the machine I preferably use a magnifying glass so as to see that the fine work is properly done, and I use very small cutters, and so shape them that a clean cut will be made without a burr at the edge, and as mentioned above, the spindle C can be driven or can be locked as desired for ruling or engraving.

It will be understood that the machine can be built so as to cut large work which requires the delicate adjustments and the universal movements found in this machine.

I claim as my invention—

1. The combination in a combined routing, ruling and tinting machine, of the work table, mechanism for universally moving said table and locking it in its adjusted position, with a tool spindle mounted above the table, and means for adjusting said spindle whereby it is adapted to cut the work thereon to the proper depth, substantially as described.

2. The combination of the base A, the slide way D, mounted on said base, a longitudinal slide and a transverse slide, a work holder mounted on said transverse slide, mechanism for rotating the said holder thereon, and a tool spindle mounted above the work holder, substantially as described.

3. The combination of the base, the slide way having a projection adapted to said base, so that the slide way can revolve on the base, longitudinal and transverse slides, and a rotatable tool holder, with mechanism for feeding the slides and work holder, with a tool spindle mounted above the work holder, substantially as described.

4. The combination of the base, slide way mounted thereon, a longitudinal slide mounted on said slide way, a screw adapted to a bearing on the slide way and to a nut upon the longitudinal slide, ratchet wheels on said screw levers and pawls acting on said ratchet wheels, substantially as described.

5. The combination of the frame, the slide way thereon, longitudinal slides adapted to said slide way, a screw mounted in bearings

in said slide way, and adapted to a screw threaded opening in the slide, a ratchet wheel on said tool, pawl for operating said ratchet and an adjustable stop for the pawl so as to regulate the amount of feed at each movement of the pawl, substantially as described.

6. The combination of the base, a slide way, a longitudinal slide mounted thereon, a screw for feeding said slide, ratchet wheels on the screw, pawl levers acting upon the ratchet wheels, a transverse slide, a screw for feeding the transverse slide, a ratchet wheel on said screw, pawl lever for feeding said ratchet wheel, and a work carrier mounted on the slide, substantially as described.

7. The combination of the base, the slide mounted on said base, a work holder, a worm wheel on said work holder, a worm mounted on the slide and engaging with the worm wheel, and a ratchet wheel on said worm, whereby on turning said ratchet wheel the worm will revolve the work holder upon its axis, substantially as described.

8. The combination of the work holder, a post thereon, a confining screw adapted to confine the work between it and the post, and the pivoted gage plate for regulating the height of work, and adapted to pass over the work, and to be thrown to one side thereof, substantially as described.

9. The combination of the universally mounted work holder, the overhanging standard, a slide adapted to said standard, a spindle mounted in said slide and a handle for operating the slide and for locking the slide in position, substantially as described.

10. The combination of the universally mounted work holder, the overhanging standard, a slide adapted to said standard, a spindle carried by said slide, a bracket also mounted on the slide, a set screw therein, and a set nut adapted to the lower portion of the screw for making fine adjustments, substantially as described.

11. The combination in a combined routing, ruling and tinting machine, of the universally mounted work holder, the overhanging slide, a spindle mounted therein, having a lower conical bearing, and a set screw adapted to the upper portion of the spindle, and so arranged that it can be turned down hard upon the spindle preventing it from rotating, so that the said spindle can be used for either routing or ruling, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES H. BEELER, JR.

Witnesses:
WILLIAM D. CONNER,
JOSEPH H. KLEIN.