

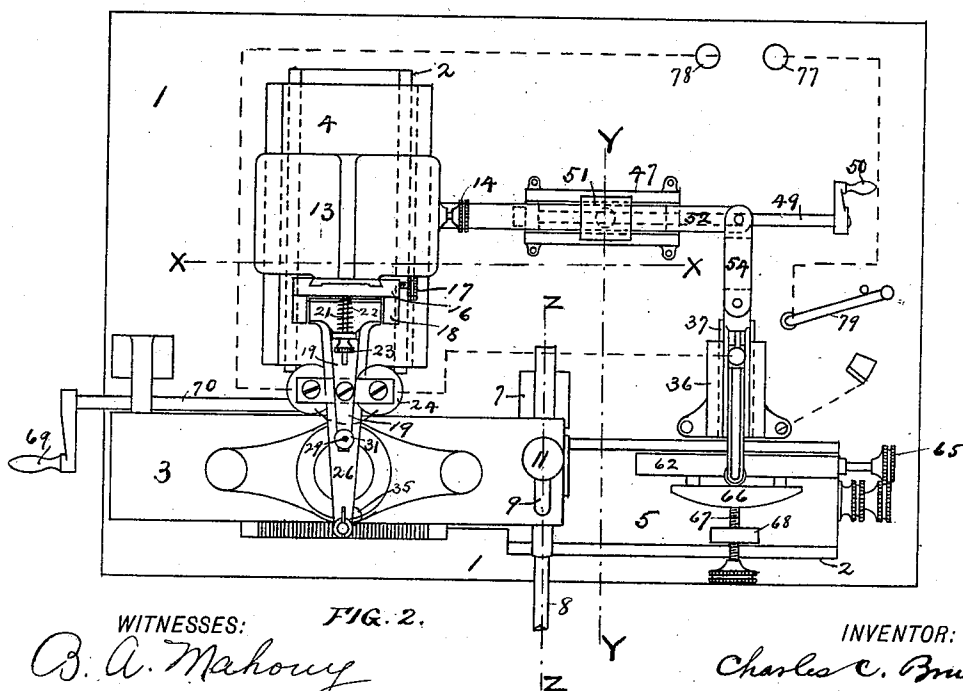
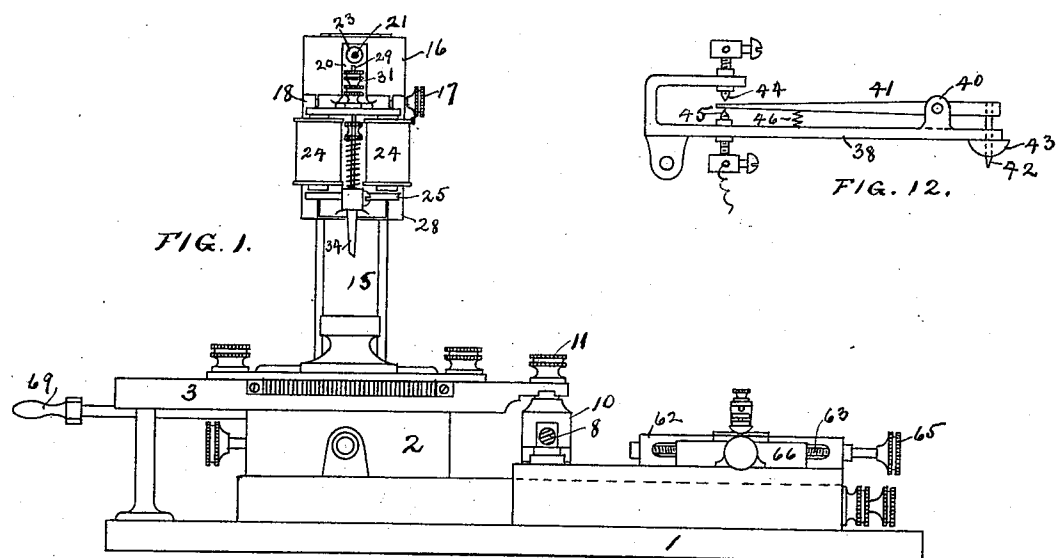
(No Model.)

2 Sheets—Sheet 1.

C. C. BRUCKNER.
ENGRAVING MACHINE.

No. 507,610.

Patented Oct. 31, 1893.



WITNESSES:

B. A. Mahony
Marie L. Jordan.

INVENTOR:

Charles C. Bruckner

BY

Casper L. Redfield

ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

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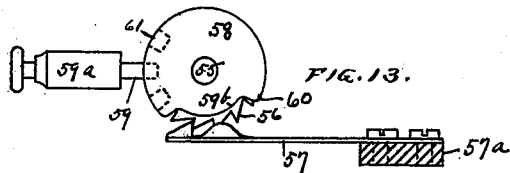


FIG. 13.

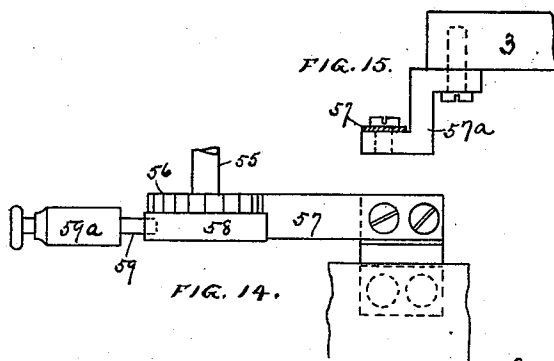


FIG. 14.

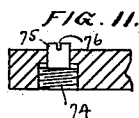


FIG. 11.

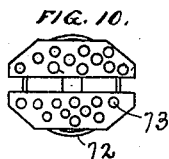


FIG. 10.

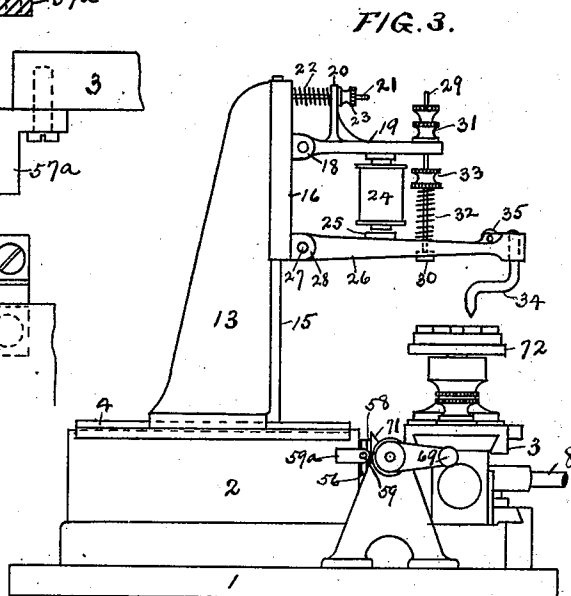


FIG. 3.

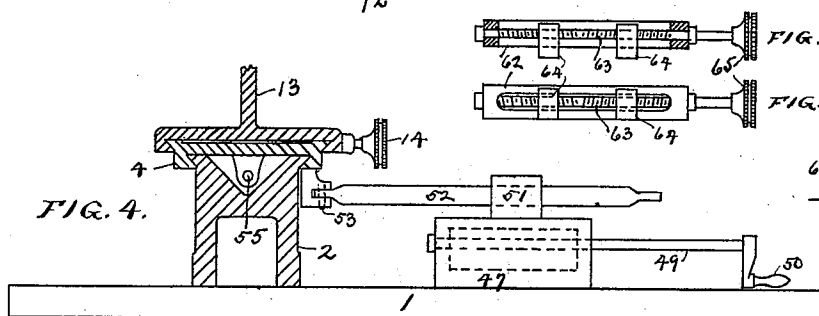


FIG. 4.

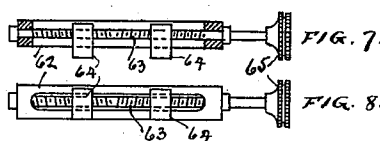


FIG. 7.

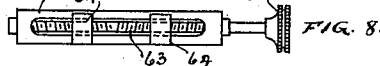


FIG. 8.

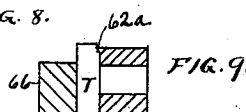


FIG. 9.

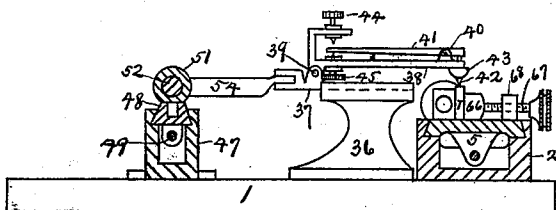


FIG. 5.

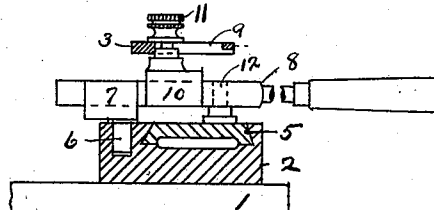


FIG. 6.

WITNESSES:
B. A. Mahony
Marie L. Jordan.

INVENTOR:
Charles C. Bruckner
BY
Casper L. Redfield
ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES C. BRUCKNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NATIONAL
ENGRAVING MACHINE COMPANY, OF SAME PLACE.

ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,610, dated October 31, 1893.

Application filed March 13, 1893. Serial No. 465,731. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. BRUCKNER, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Engraving-Machines, of which the following is a specification.

My invention relates to the class of engraving machines shown and described in Patent No. 425,929, issued April 15, 1890, in which Samuel W. Balch is joint patentee with me, and has for its object improvements in the machine therein set forth and described.

In the accompanying drawings, Figure 1 is a front elevation. Fig. 2 is a plan. Fig. 3 is an end elevation. Figs. 4, 5 and 6 are sections on lines X X, Y Y and Z Z respectively, of Fig. 2. Figs. 7, 8 and 9 are detail views of the type clamp. Fig. 10 is a plan of the chuck. Fig. 11 is an enlarged section of a part of the chuck-plate showing the manner of inserting the pins for holding flat work. Fig. 12 is an enlarged detail of the contacts, and Figs. 13, 14 and 15 are details of the feed mechanism.

On a wooden base 1, is mounted a cast iron frame 2, that supports a sliding engraving table 3, a tool slide 4, and a copy holding slide 5. At the point 6 in the frame 2, is pivoted a block 7, in which operates a lever 8. At one end of the slide 3, is a slot 9, in which is adjustable another pivoted block 10, by means of the screw 11, and in which the lever 8 also works. At one end of the slide 5, is a pin 12, that passes through and serves as a moving fulcrum or pivot for the lever 8. The tool slide 4, is located opposite the center of the engraving table 3, and has a movement at right angles to the slides 3 and 5. Mounted on the slide 4 is a bracket 13, which may be secured to any desired position by means of the screw 14. On the vertical face 15, of the bracket 13, is another slide 16, secured in position by means of screw 17. Near the upper end of slide 16, are lugs 18 in which is pivoted a lever 19 having an arm 20 that receives the end of a stud 21 secured in the slide 16. A spring 22 and a nut 23 serve and hold the lever 19, in the position shown in the drawings or to raise or lower it a limited amount. On the lower face of the lever 19 is supported

a magnet 24 that serves to draw up the armature 25 which is fastened to the arm 26 pivoted at 27 to the lugs 28 on the slide 16. Passing through the arm 26 and lever 19 is a rod 29 having a head 30 and nuts 31 which serves to support the arm 26 and adjust the distance between the magnet 24 and armature 25. A spring 32 and a nut 33 on the rod 29 serve to regulate the resistance to the action of the magnet 24. The outer end of the arm 26 is drilled and split to hold the tool 34 by means of the screw 35. It will thus be seen that an adjustment of the nut 23 will raise or lower the tool 34 a small amount, greater adjustments being made by moving the slide 16 on the bracket 13.

Located opposite the center of the copy slide 5, and parallel to the tool slide 4, is a frame 36, having a tracing slide 37 carrying an arm 38 pivoted at 39, and having lugs 40 on which is pivoted a lever 41 having a tracing pin 42 at one end, which passes through the enlarged end 43 of the arm 38. The other end of the lever 41 extends to the rear and terminates between the contact points 44 and 45 which are held in insulating bushings in the arm 38. A small spring 46 acts to keep the lever 41 against contact point 44. The contact points 44 and 45 are screwed into the insulating bushings so as to adjust the amplitude of the vibrations of the lever 41 and also the amount the tracing point 42 projects below the enlarged head 43 of the arm 38. Located between the slides 4 and 37 is a small frame 47 in which slide 48 is reciprocated by means of the screw 49 and handle 50. On the top of slide 48 is pivoted a block 51 in which operates a lever 52 connected at one end to slide 4 at the point 53 and at the other end to slide 37 by means of link 54. The operation of this lever is such that a movement in one direction of slide 4 causes a corresponding movement in the opposite direction of slide 37. The ratio of movement of slides 4 and 37 to each other is determined by the location of the slide 48, and consequently the block 51 on the length of the lever 52. The movement of the slide 4 is obtained by means of the screw 55, the ratchet wheel 56, and a pawl 57 secured to the side of the slide 3. By this means each reciprocation of the slide 3 causes a small

movement of the slide 4. To regulate the amount of this movement a disk 58 is mounted loosely on the screw 55 adjacent to the ratchet wheel 56 (see Figs. 13 and 14) and held from turning by means of a pin 59 held in the lug 59^a which is secured to the frame 2. The disk 58 is slightly larger in diameter than the ratchet wheels, so that the pawl riding upon it is kept from contact with the teeth of the ratchet wheel. One part of the disk 58 is, however, cut away at 59^b to permit engagement between the pawl and ratchet wheel, which engagement is released when the pawl, in its reciprocation, comes in contact with the corner 60 of the disk 58. The location of the corner 60 with respect to the travel of the pawl is regulated by means of a series of holes 61 in the edge of the disk 58 which allows it to be set at any one of several positions thus causing the pawl 57 to move the ratchet wheel 56 one or more teeth as desired. The slide may be rapidly adjusted by hand by means of the handle 69, shaft 70 and bevel gears 71, one of the latter of which is on the screw 55.

Located on the copy table is a block 62 provided with a right and left hand screw 63 and jaws 64, which are operated by means of the knurled head 65. This device is used as a clamp for holding type to be used as a copy. The front edge of the block 62 has a projecting lip 62^a that clamps over the top of the counter of the type T, thus securing the line of type from rising. To keep the type securely in line and under the lip 62^a, a bar 66 is pressed against the opposite side of the type by the screw 67 in the lug 68 on the slide 5.

For the purpose of holding the work a chuck 72 is provided having pins 73 secured in the face of the chuck as shown in Figs. 10 and 11. These pins have a threaded portion 74 and a smooth portion 75, and a screw-driver slot 76. They are put into the face plate of the chuck from below, and by using a small screw-driver may be caused to project above the surface for holding work or screwed down so as to be out of the way.

Located at convenient places on the base 1 are two binding posts 77 and 78 and a switch 79. From binding post 77 a wire runs to the switch 79 and thence to the frame 36. From binding post 78 a wire runs to the magnet 24 and thence to either the contact point 44 or 45.

The operation is as follows: The work on which the engraving is to be made is secured in the chuck 72 or on the engraving table 3. A copy consisting of type having the required letters or characters secured in the type clamp on table 5, and the end 43 of the arm 38 is permitted to rest on the face of the copy with the lever 41 so adjusted that when it is in contact with the point 45 the tracing point 42 will be flush with the bottom face of the end 43, and when it is in contact with the point 44 the tracing point 42 will project slightly below the surface of the end 43. This

adjustment is made by screwing in or out the points 44 and 45 in their insulating bushings. The height of the tool 34 is then adjusted so that when the armature 25 is free from the magnet 24, the point of the tool 34 will be in cutting position on the work, while when the armature 25 is drawn up the tool will be free from the work. The operator then grasps the handle 8 and by oscillating it back and forth causes the copy to reciprocate under the tracing point 42 and the work to correspondingly reciprocate under the tool 34. The length of the reciprocation of the copy slide 5 is controlled by any suitable adjustable stops (not shown) and is usually set at something greater than the length of the copy. At the beginning of a reciprocation the point 42 is not in contact with the face of a type and consequently projects below the face of the end 43 by virtue of the action of the spring 46. If the circuit from the magnet 24 is connected to the point 45 the current is broken when the point 42 is down and hence the tool 34 is in a cutting position. As soon, however, as a type face reaches the point 42 the lever 41 is caused to vibrate on its pivot 40 and complete the circuit by coming in contact with the point 45 and hence to raise the tool 34 from the work. As soon as the type face passes the point 42 the circuit is again broken and the tool permitted to drop to cutting position. This making and breaking of the circuit is repeated as often during a single reciprocation as the point 42 comes in contact with or passes from a type face. If we suppose the tool 34 to be set so that a cut is made during a reciprocation toward the left, then a reciprocation toward the right will be utilized to cause the pawl 57 to turn the ratchet wheel 56 one or more teeth and move the tool 34 a small distance across the work at right angle to the cut made, and also to move the tracing point 42 a correspondingly small distance across the copy. The result of this operation is to cause the tracing point 42 and the tool 34 to make parallel adjacent lines on the copy and the work. These reciprocations are repeated until the tracing point 42 has traversed the entire face of the type when it will be found that the letters of the copy have been duplicated on the work and reversed (by means of the action through the lever 52) so as to read properly. Letters cut in the manner just described will be in relief because the tool 34 is cutting when the circuit is broken and the circuit is broken while the tracing point 42 is not in contact with a tight face. If it is desired to make intaglio engraving the wire from the magnet 24 is changed from contact point 45 to contact point 44 which causes the circuit to be made, and consequently the tool to be raised, when the tracing point 42 is free from the type face. Contact between the type face and the tracing point 42 breaks the circuit and drops the tool to cutting position. If the block 51 is adjusted to the middle of the length of the

lever 52 and the block 10 be adjusted so as to be immediately over the center of the pivot 12, then the length of movements of the tool slide 4 and tracing slide 37 will be equal, as will also those of the slides 3 and 5, and consequently the engraving will be a duplicate of the copy in form and size. By adjusting the block 51 toward the slide 4, the tool travel will be less than the travel of the tracing point and consequently the height of the letters of the engraving will be less than that of the copy. By adjusting in the opposite direction the reverse would be true. By adjusting the block 10 toward the block 7 the length of reciprocation of the table 3 will be less than that of the slide 5 and consequently the engraving will be shorter than the copy. By adjusting the other way the engraving will be longer. It will thus be seen that by means of the adjustments of the blocks 10 and 51 engravings of different sizes and proportions may be made from a single copy.

Having described my invention, what I claim is—

1. In an engraving machine, a work table and a copy slide moving on a fixed bed, a pivoting point on each slide and also on the bed, and an operating lever adapted to vibrate about one of said pivots and to slide with respect to the other two pivots.

2. In an engraving machine, a lever pivoted to a fixed support and also to two moving slides, means for permitting the lever to slide with respect to two of these pivots, and means for adjusting at least one of said pivots with respect to the length of said lever.

3. In an engraving machine, a tool slide and tracing slide, a lever connecting said slides and serving to transmit motion from one to the other, a pivot for said lever, and a screw for adjusting said pivot by small degrees.

4. In an engraving machine, a screw for imparting transverse motion to an engraving tool, a ratchet wheel secured to said screw, a moving pawl for turning said ratchet wheel, and an adjustable throw out device adapted to disengage said pawl from said ratchet wheel at a predetermined point.

5. In an engraving machine having a cutting tool controlled by an electro-magnet, a lever adapted to vibrate by the movement of a copy under a tracing point on said lever, two adjustable, insulated contact points between which said lever vibrates and against one of which it is normally held, a conducting wire leading from said electro-magnet, and means for connecting said wire to either of said contact points whereby the same pattern may be used for either relief or intaglio engraving, substantially as set forth.

6. In an electrically controlled engraving machine, a lever adapted to vibrate by the reciprocation of a pattern under a tracing point connected to said lever, two electrical contact points between which said lever vibrates, a conducting wire, and means for connecting said wire so that either relief or in-

taglio engraving may be made from the same pattern.

7. In an electrical engraving machine controlled by the vibration of a tracing point in passing over a copy, a pivoted lever supporting said tracing point, two contact points between which said lever vibrates, a conductor, and means whereby shifting the conductor from one contact point to the other will change the machine from relief to intaglio engraving, or vice versa, without changing the pattern.

8. In an electrical engraving machine adapted to make either relief or intaglio engraving from a single pattern, means for controlling the operation of the cutting tool by vibration caused by the reciprocation of a pattern under a tracing point, a pattern consisting of a series of character faces clamped together, and a clamp for said pattern, said clamp being operated by a right and left hand screw.

9. In an engraving machine, a work table and a copy slide moving on a fixed bed, a lever adapted to give synchronous movements of a fixed ratio to said table and slide, a copy, a tracing point and lever therefor, contact points between which said lever vibrates, and means for causing the electrical contact to occur at either of said contact points, substantially as and for the purpose set forth.

10. In an engraving machine, a work table and copy slide moving on a fixed bed, a lever adapted to give synchronous movements of a fixed ratio to said table and slide, a chuck on said table, said chuck having work holding pins adapted to be screwed below the surface, a copy holding clamp on said copy slide, said clamp being operated by a right and left hand screw.

11. In an electrical engraving machine controlled by the vibration of a tracing point passing over a copy, a copy consisting of a series of movable type, and a clamp for said type, said clamp consisting of jaws operated by a right and left hand screw and supported in a block having a beveled lip adapted to project over the counters of said type.

12. In an engraving machine, a work table and a copy slide on a fixed bed, an adjustable hand lever for giving the said table and slide synchronous and parallel movements in the same direction of any desired ratio, a tool slide and a tracing slide having movements at right angles to said first movements, a lever mounted on an adjustable pivot for giving the said tool slide and tracing slide synchronous and parallel movements in opposite directions of any desired ratio, an electrically operated tool mounted on the tool slide and supported above the work table, a tracing point mounted on the tracing slide and held over a copy on the copy slide, and means, substantially as described, whereby vibrations of the tracing point in passing over the copy will cause corresponding vibrations of the tool in passing over the work held upon the work table.

13. In an electrically operated engraving machine adapted to reproduce on a work table the copy held upon a copy slide, devices consisting of adjustable levers for changing the
5 scale of the reproduction as compared to the copy in regard to length or breadth, or both, and an electric connection adapted to be shifted to either of two contact points between which the lever vibrates, for enabling the op-
10 erator to produce either relief or intaglio engraving from a single copy.

14. In an electrically operated machine adapted to make an engraved reproduction of a copy, independent adjustable levers for
15 adjusting the length of the reproduction independently of the breadth and the breadth independently of the length, and means for shifting the electrical connection to either of two contact points between which a tracing
20 lever vibrates, so as to make the reproduction

either in relief or intaglio, as desired, from a single copy, substantially as described.

15. In an engraving machine, a work table and copy slide having synchronous and parallel movements in the same direction in a
25 horizontal plane, a tool slide and a tracing slide having synchronous and parallel movements in the opposite direction and also in a horizontal plane, an engraving tool and a tracing
30 point mounted upon their respective slides and having synchronous and parallel movements in a vertical plane, and means for causing said last mentioned movements to be
either in the same or in opposite directions,
35 substantially as and for the purpose set forth.

CHARLES C. BRUCKNER.

Witnesses:

RENA B. BROOKER,
CASPER L. REDFIELD.