No. 645,164. Patented Mar. 13, 1900.

N. DEDRICK.

ENGRAVING MACHINE TABLE.

(Application filed Jan. 16, 1899.)

(No Model.) 6 Sheets—Sheet 1.

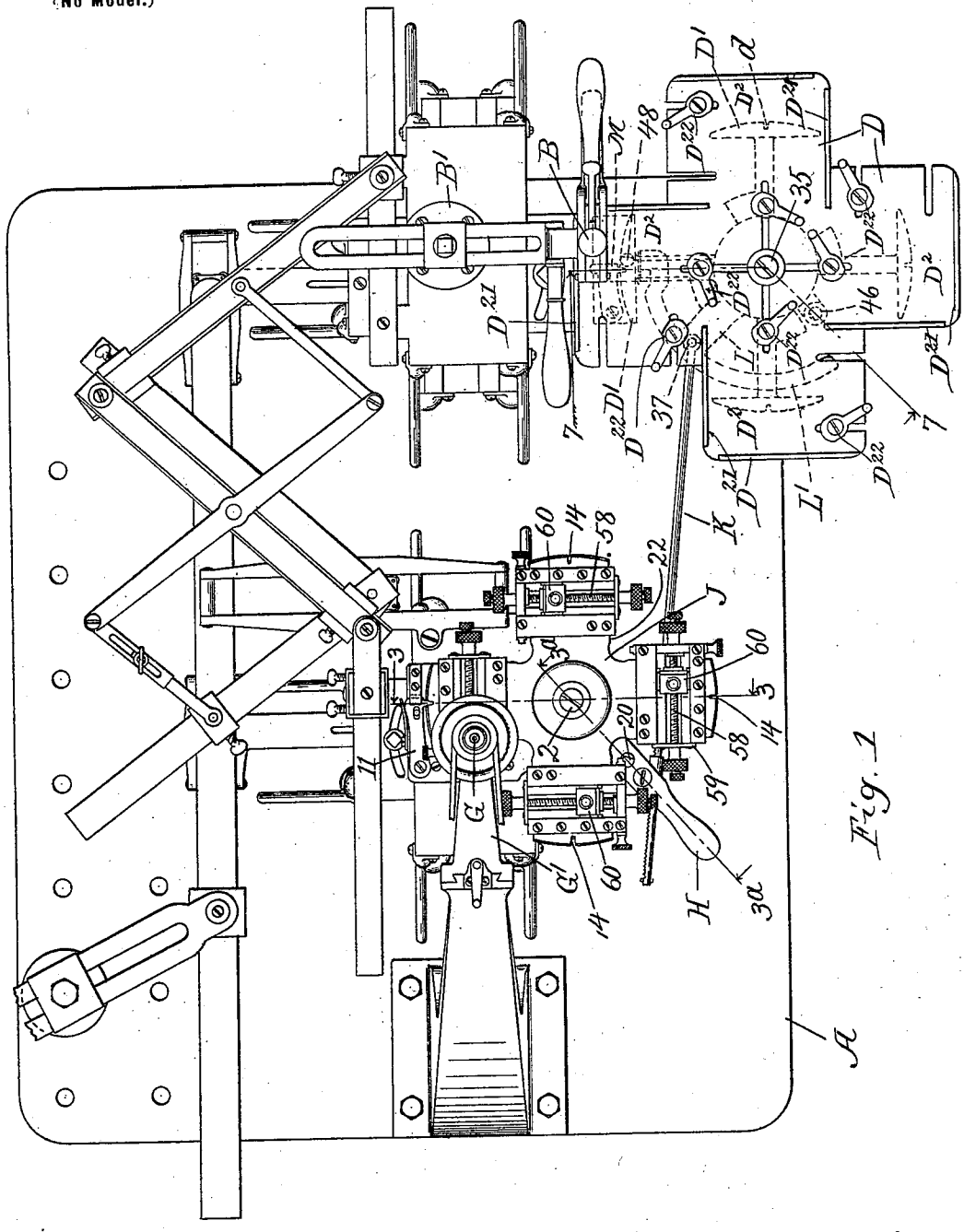


Fig. 1

Witnesses.
Edward T. Wray.
Jean Elliott.

Inventor.
Nicholas Dedrick
by Burton Burton
his attys.

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No. 645,164. Patented Mar. 13, 1900.

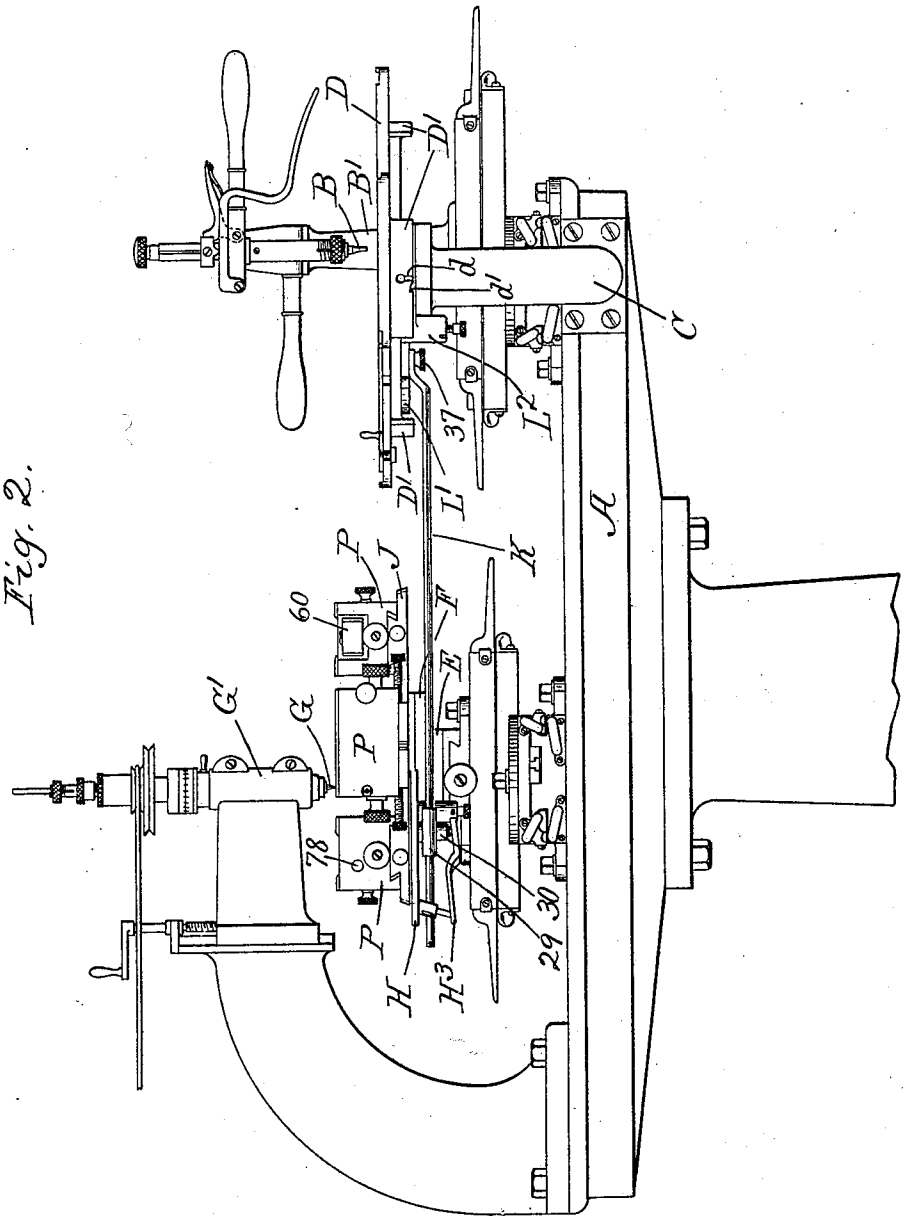
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(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



Witnesses.
Edward T. Wray.
Jean Elliott

Inventor.
Nicholas Dedrick
by Burton & Burton
his attys

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(No Model.) 6 Sheets—Sheet 3.

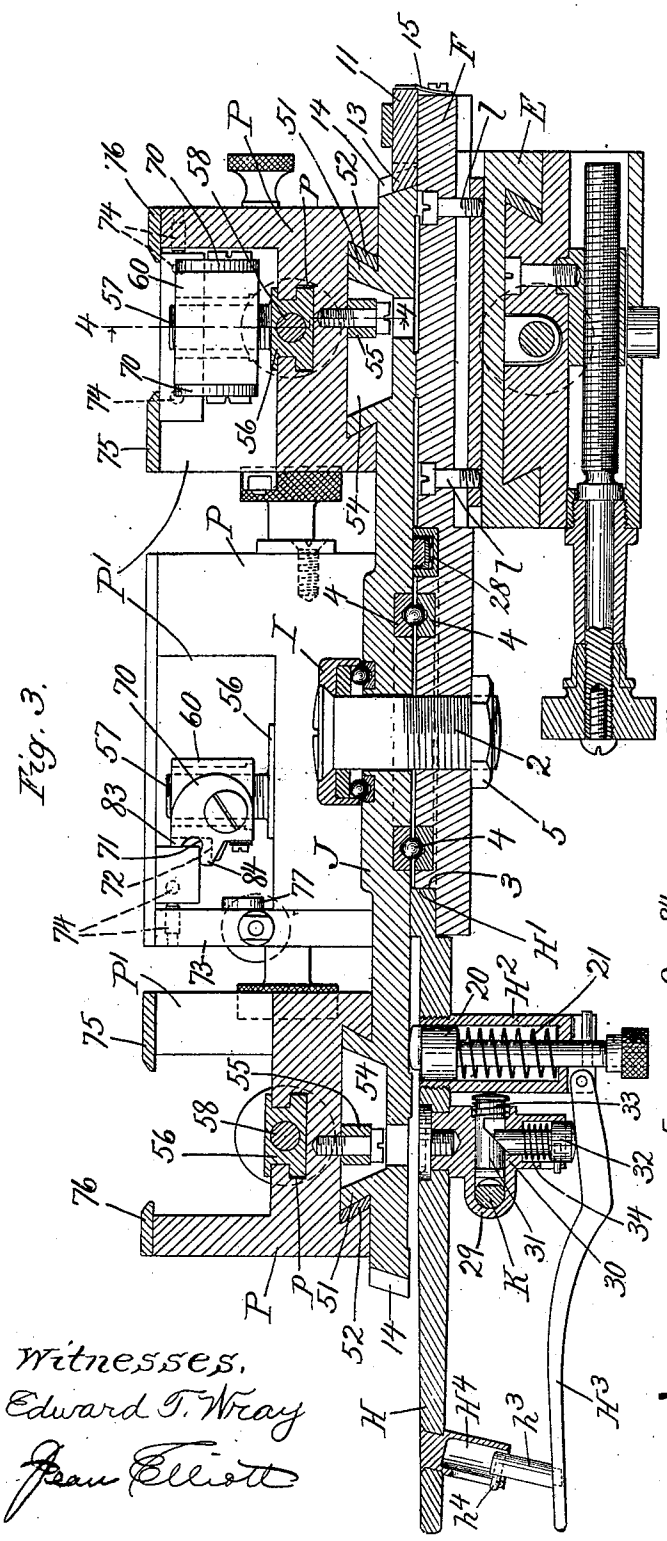


Fig. 3.

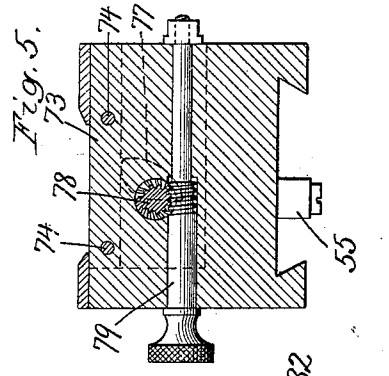


Fig. 5.

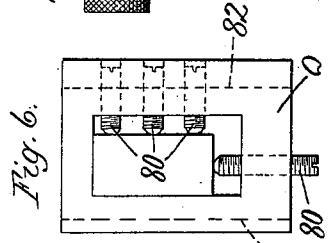


Fig. 6.

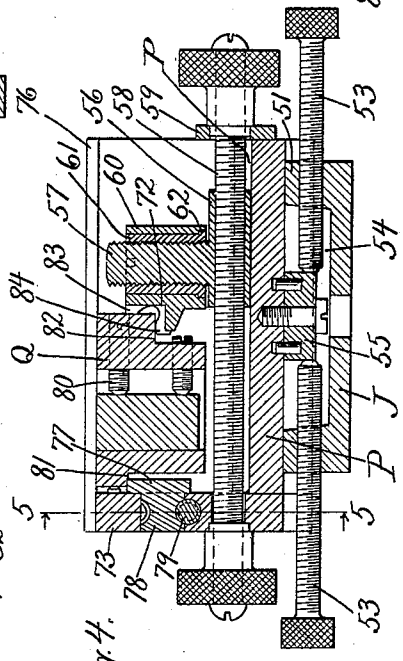


Fig. 4.

Witnesses.
Edward T. Wray
Jean Elliott

Inventor.
Nicholas Dedrick
by Burton W. Burton
his Attys

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(No Model.) 6 Sheets—Sheet 4.

Fig. 7.

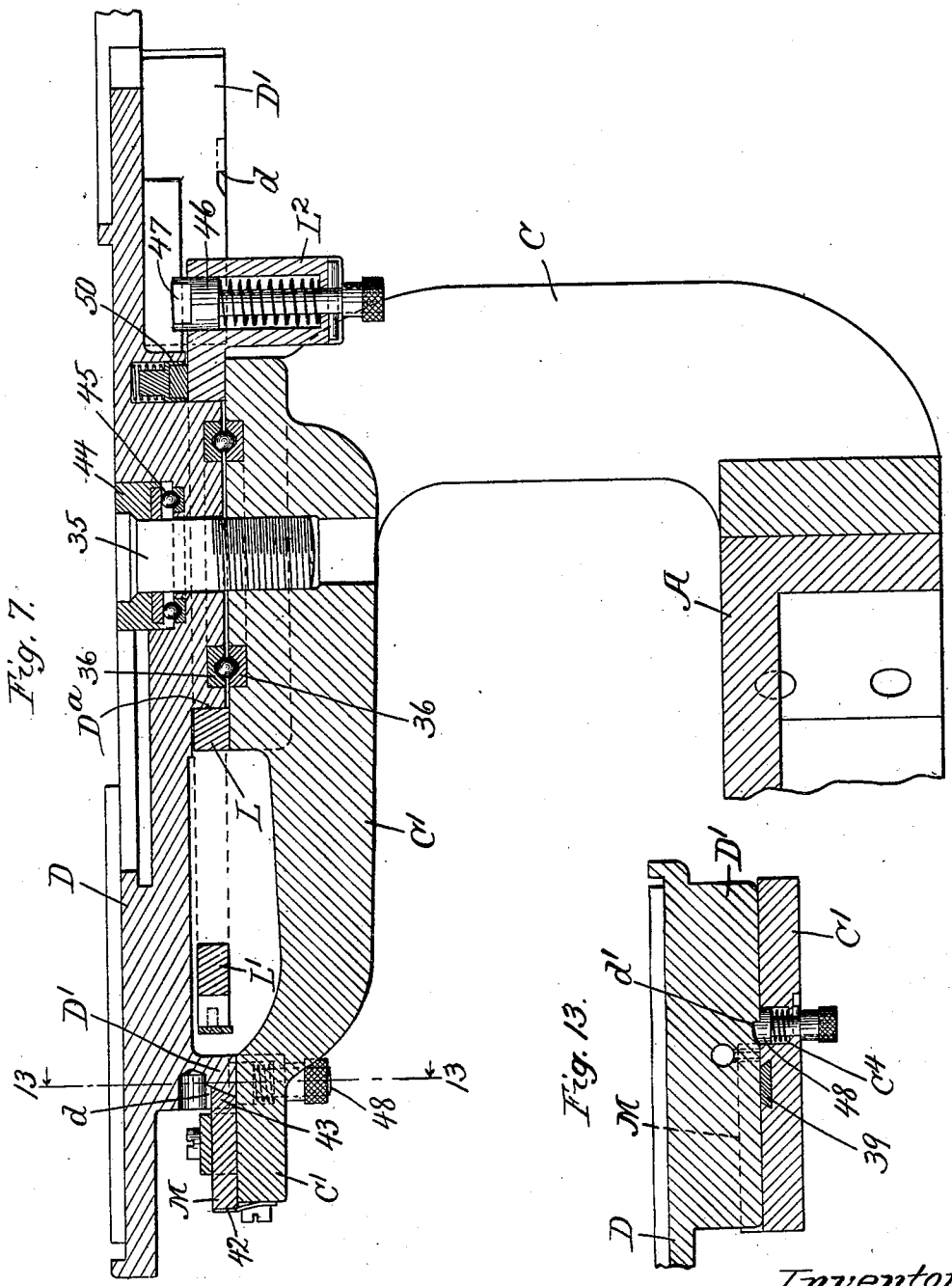


Fig. 13.

Witnesses.
Edward T. Wray.
Jean Elliott.

Inventor.
Nicholas Dedrick
by Burton & Burton
his attys

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(No Model.) 6 Sheets—Sheet 5.

Fig. 9.

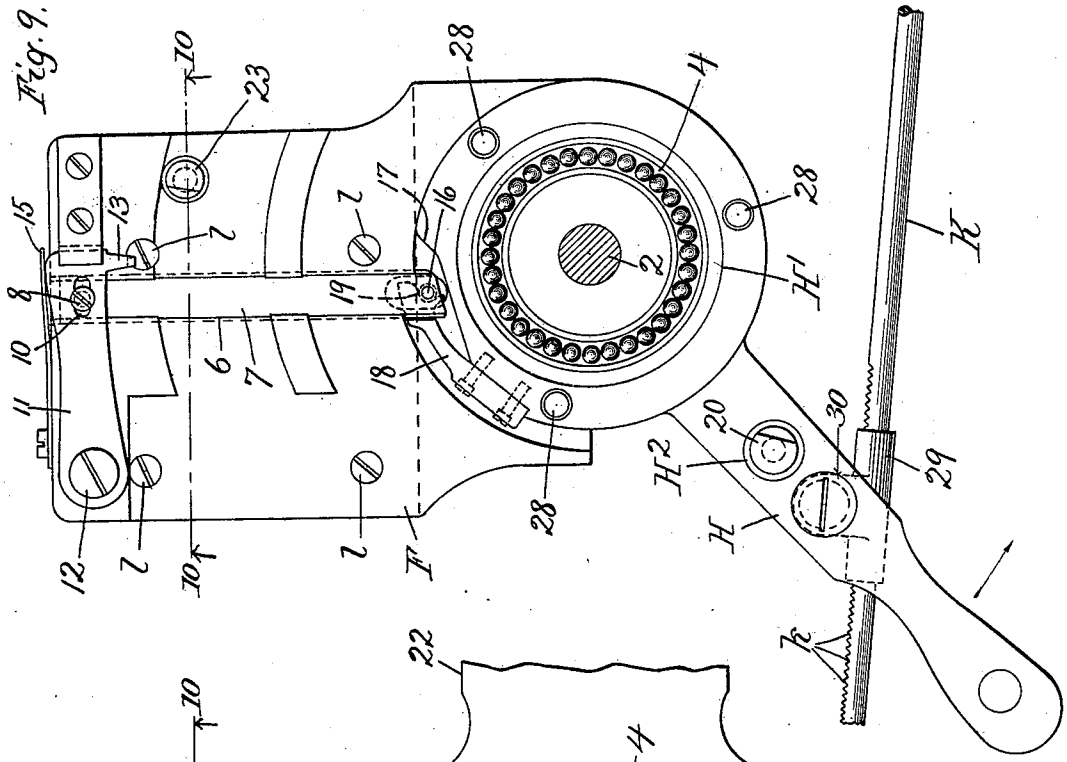


Fig. 8.

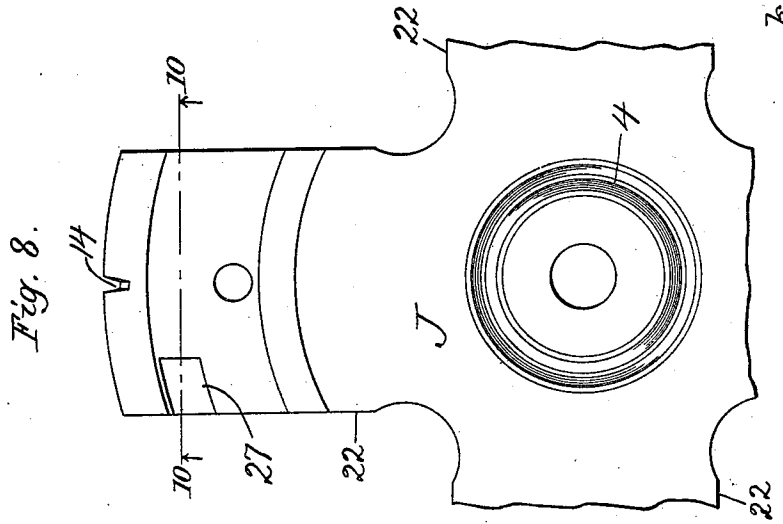
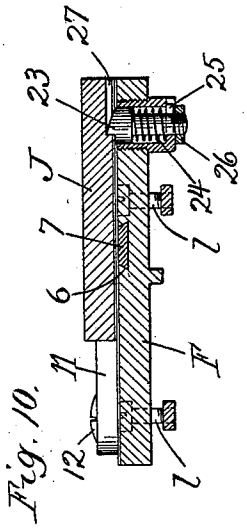


Fig. 10.



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Jean Elliott.

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Nicholas Dedrick.
by Burton & Burton
his Attys

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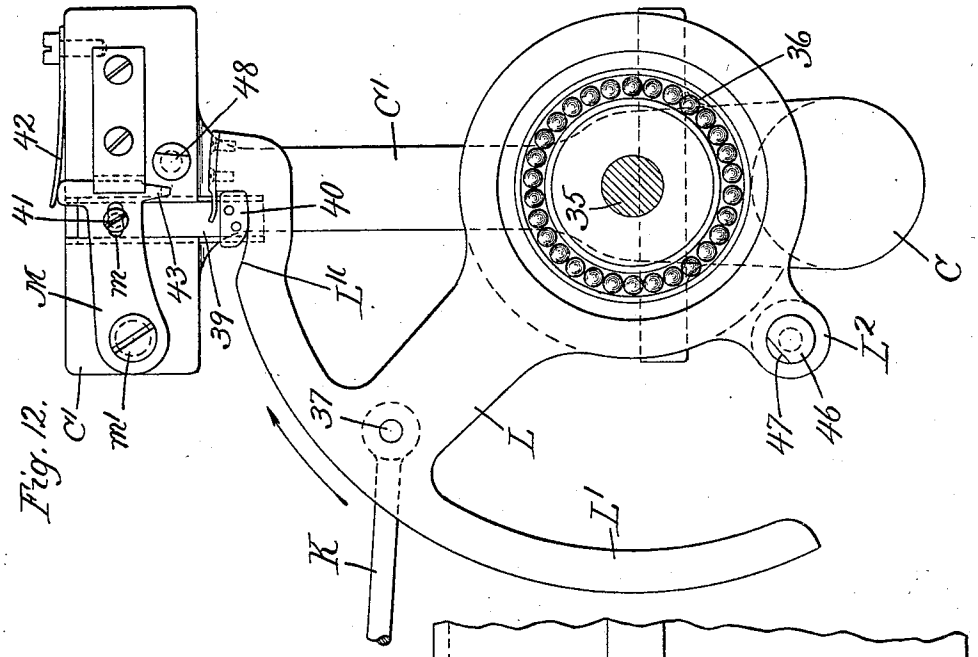


Fig. 12.

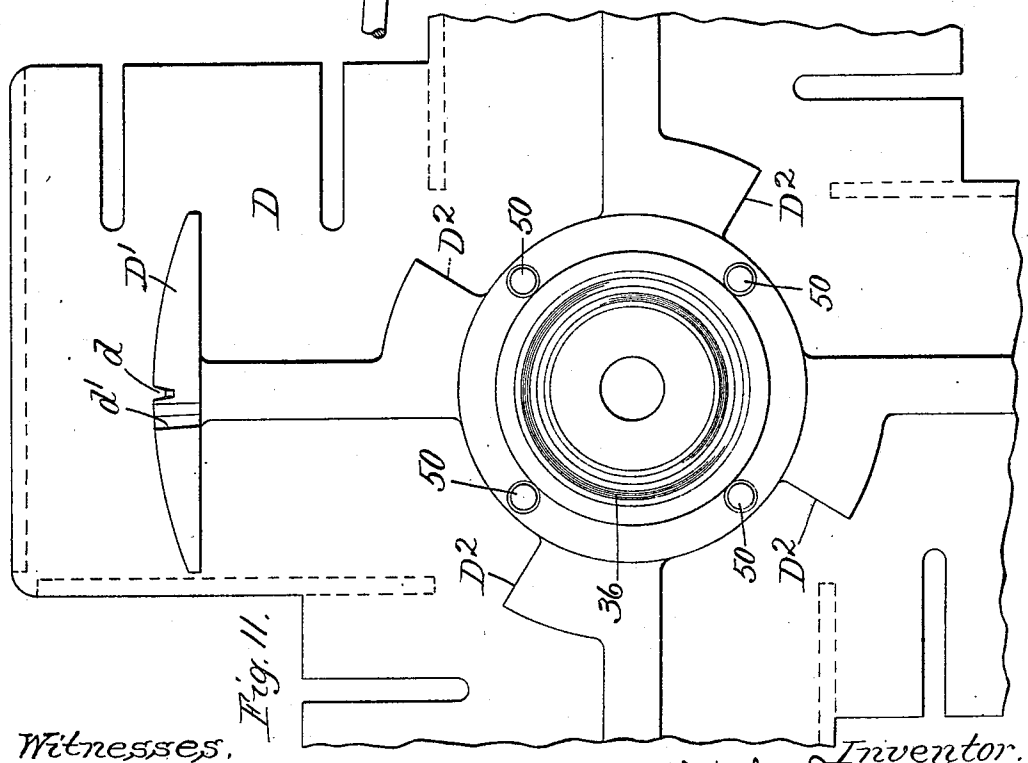


Fig. 11.

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Edward T. Wray.
Jean Elliott.

Inventor.
Nicholas Dedrick
by Burton and Burton
his attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NICHOLAS DEDRICK, OF MANITOWOC, WISCONSIN.

ENGRAVING-MACHINE TABLE.

SPECIFICATION forming part of Letters Patent No. 645,164, dated March 13, 1900.

Application filed January 16, 1899. Serial No. 702,323. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS DEDRICK, a citizen of the United States, residing at Manitowoc, county of Manitowoc, State of Wisconsin, have invented certain new and useful Improvements in Engraving-Machine Tables, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings, Figure 1 is a plan showing a portion of an engraving-machine having my improved pattern-table and chuck-table. Fig. 2 is a forward elevation of the same, the parts not pertaining to this invention being omitted, except in so far as necessary to show the relation of the pattern-table and chuck to the machine as a whole. Fig. 3 is a vertical section fore and aft through the chuck-table, as at the line 3 3 on Fig. 1, the operating-handle being shown in section, as at the line 3^a 3^a on the same figure. Fig. 4 is a detail section at the line 4 4 on Fig. 3. Fig. 5 is a section at the line 5 5 on Fig. 4. Fig. 6 is a plan of a punch-holder adapted to be used in a matrix-chuck. Fig. 7 is a section at the line 7 7 on Fig. 1 upon an enlarged scale. Fig. 8 is an inverted detail plan of a portion comprising one arm of the chuck-table stripped of mechanism. Fig. 9 is a plan of the plate upon which the chuck-table is mounted, the operating-lever for operating the table and connecting-rod therefrom to the pattern-table being shown in locked position on the plate. Fig. 10 is a detail section at the line 10 10 on Figs. 8 and 9, showing these parts assembled in working relation. Fig. 11 is an inverted detail plan of a portion of the pattern-table stripped of mechanism. Fig. 12 is a plan of the bracket which supports the pattern-table, showing the operating-lever and locking-dog in position thereon. Fig. 13 is a detail section at the line 13 13 on Fig. 7.

This invention is designed to provide an improved table for holding the pattern and a correspondingly constructed and operated bed or table having chucks for holding the work—that is, the block or plate to be operated upon—in a machine of the class known as a "punch" or matrix "cutting" or "engraving" machine, in which a tracer which follows a pattern controls the movement of the work with respect to the tool which operates upon it for the purpose of reproducing in the work the form of the pattern usually upon a reduced scale.

The structure shown in this application is in detail adapted to be used with and is illustrated in connection with a punch and matrix cutting and engraving machine of the general character shown in my Patent No. 614,845, dated November 29, 1898. Details of construction of that machine will necessarily be referred to to some extent; but the present invention is not limited in its application to that identical structure.

My present invention comprises a pattern-table which is provided with similarly-situated seats adapted to be adjusted about a fixed vertical axis and secured at a plurality of positions corresponding to a like plurality of sections or areas of the pattern-table, each of which is adapted to hold a pattern, so that such patterns may be brought one at a time in identical position with respect to the tracer in order that they may be traced by the latter with identically-resulting movement of the work-carrier, and associated with such pattern-table in the same engraving-machine a chuck-table similarly adjustable about a vertical axis and having a corresponding plurality of chucks constituting seats for holding the work—that is, the blanks of material to be operated upon—in position corresponding to the several pattern-holding seats of the pattern-table, said adjustable tables being provided with mechanism for mounting upon them, respectively, the patterns and blocks to be worked upon in positions corresponding each to each, all the patterns on the pattern-table and all the chucks on the chuck-table being in the same position relatively to corresponding lines or locking-points of the several areas or sections of said tables.

It comprises, further, mechanism for communicating the adjustment of the pattern-table to the work automatically and detail features of construction for the purpose of contributing to the accuracy of the movements and adjustments, such details, as well as the general structure, constituting the leading point of the invention, being more particularly set out in the claims.

A brief preliminary reference to the general structure of the machine in connection with which my invention is illustrated will assist the understanding of the details as they may be further described. Such machine comprises a base or foundation-table upon which there are mounted a tracer-carrying mechanism and a work-carrying mechanism, each comprising a transverse carrier and a fore-and-aft carrier, the former being guided in fore-and-aft ways on the fixed base and the latter being guided in transverse ways upon the former, the tracer-carrying arm being mounted upon the upper or transverse carrier of one of the mechanisms and the work-carrying bed or table being mounted upon the upper or transversely-moving carrier of the other mechanism, these two mechanisms having their corresponding parts connected by suitable lever systems adapted to transmit said movements respectively from the moving parts of the tracer-carrying mechanism to the corresponding moving parts of the work-carrying mechanism, so that when the tracer is caused to follow a pattern, which is mounted fixedly with respect to the bed, the work will take a corresponding course with respect to a tool which is mounted fixedly with respect to the bed, and thus reproduce in the work the form of the pattern, modified only as to proportions, as determined by the adjustment of the connecting-lever systems.

A is the base or foundation-table.

B is the tracer, which is carried by a suitable holder supported by the standard B', which is carried, as described, upon the upper of the transversely-moving carriers, which are shown in part in the drawings, but whose structure need not be further explained.

C is the pattern-table standard or bracket arm, rigid with the base A and having the pattern-table D, hereinafter described more particularly, mounted at its upper end.

E is the upper member of the work-bed, mounted upon the upper of the two transversely-moving carriers referred to and which require no more specific description for the purpose of this application.

G is the tool, mounted in the head of the bracket G'.

It will be understood that without regard to the mechanism employed for the purpose the relations of the parts referred to are, as above stated in general terms, namely, such that as the tracer is moved to follow a pattern on the pattern-table the work-holding bed receives a corresponding but reduced movement by means of the mechanical connections between the two parts of the machine and that as the position of the pattern-table is fixed so the position of the tool is fixed during such transmission of the tracer's movement to the work.

I will first describe the structure of my improved work-holding table and chucks. To the upper side of the upper member E of the work-bed a plate F is secured by means of the bolts 1 1 1 1. This plate overhangs—that is, extends beyond—the work-bed E and is provided with a ball-bearing seat or track about a center bolt 2. Upon the plate F there is seated in a rabbeted seat 3, concentric about the center bolt, a lever-handle H, having an annular eye H', suitably proportioned to lodge in said rabbet, the upright shoulder of which becomes thereby the bearing upon which said lever is adapted to swing about the center bolt. Above the lever there is pivoted on the center bolt the chuck-table J. This chuck-table is in the form of a right-angle cross, with arms of equal length, and is arranged to carry a chuck on each arm. Ball-bearings are interposed at 4 4 between the plate F and the chuck-table J and also between the said chuck-table and the recessed washer or cup I, which is engaged under the head of the center bolt 2 and operates as the means of binding the chuck-table in place on the plate F, a nut 5 on the lower end of the center bolt below the plate F being employed to hold the parts properly together without binding them so tightly as to prevent the rotation of the chuck-table on the plate.

The lever-handle H is designed to serve as the means for rotating the chuck-table about its center, and the detail mechanism associated with the parts for that purpose will now be described. In the plate F there is formed the dovetailed seat or slideway 6 for the slide-bar 7, which extends beyond the right-hand edge of the plate and is provided with an abutment in the form of a stud-screw 8, set into the upper side of the slide-bar at the projecting end. This stud-screw engages a slightly-elongated slot 10 in the dog 11, which is fulcrumed on the stud-screw 12, which is set into the plate F, and at the end opposite this fulcrum it has the tapering tooth 13, adapted to engage notches 14 14 14 14 at the middle point of the end of each of the four arms of the chuck-table J. A spring 15 is suitably attached to bear on the dog with a tendency to hold its nose or tooth 13 inward toward the notched edge of the table. At the inner end of the slide-bar 7 it has another abutment 16, formed by a similar stud-screw, and projects into the plane of the annular eye H' of the handle H, and this eye is cut away at one side to form an oblique cam slope 17, and it has secured to it a stiff spring arm or dog 18, whose nose projects into the recess by which the cam slope 17 is produced at a little distance from said cam slope. Into this recess the abutment 16 is adapted to protrude when the lever-handle is rotated to proper position to bring said recess in proper position to receive the abutment. The parts are assembled with the abutment in this position, and it will be seen that when thus assembled if the handle is swung around to the right, giving a rotary motion, which is commonly described as to the left—that is, in a reverse direction of the movements of the hands of a clock—the cam

slope 17, acting upon the slide-bar 7, will force the slide-bar 7 outward in its slideway, causing the dog 11 to be forced outward at its toothed end, and that the dog will be held in such outward position during any further movement of the handle in its bearing, while the end of the slide-bar will ride on the concentric periphery of the eye H′, and whenever the handle is reversed to bring the recess back to the end of the bar 7 the spring 15, acting on the dog and through it acting on the slide-bar, will force the latter inward, causing the abutment also to enter the recess. The end of the spring-dog 18 is provided with a seat 19, adapted to lock the stud 16, and requires some force to be applied to the lever to rotate it to the left, as described, in order to dislodge the stud by forcing the spring-dog a little outward. This device is provided to draw the taper nose 13 of the jaw 11 forcibly into the notch 14, and thus procure exactness in the position of the table J, and also to give exactness to the position at which the lever will stand at rest, holding the slide-bar at the extreme inward position.

The lever-handle H has a socket H^2, in which is lodged a bolt 20, which is actuated by a spring 21, tending to hold it outward—that is, upward—to cause it to protrude at the upper end above the upper surface of the handle in the angular interval between the arms of the chuck-table, so that it is adapted to encounter the side of one of the arms between which it may be projecting, and thereby enabling the lever-handle to carry the table with it in its rotation. The bolt 20 is rabbeted at the upper end to seat the angle of the table-arm and protrudes from the lower end of the socket in which it is lodged and has a head by which it may be grasped and withdrawn at will to disengage it from the chuck-table to permit the lever-handle to be rotated without carrying the table with it.

23 is a spring-actuated catch-bolt having a sloping head and flat shoulder, adapting it to engage and stop the table when the latter approaches it in one direction and allowing it to pass over by forcing the bolt inward when it is moving in the opposite direction. This catch-bolt is provided with a suitable spring 24 and feather or guide-pin 25, retaining it in its socket and preventing it rotating therein, and a nut 26, screwed onto the lower end, which projects from the bottom of the socket in which it is lodged in the plate F. Assuming that the chuck-table J is in any given position at which one of its arms has the notch 14 engaged by the nose of the dog 11, the abutment 16 at the inner end of the slide-bar 7 will be lodged in the seat 19 of the spring-dog 18. If now the lever-handle H be moved to the right, the first effect will be that the inclined cam slope 17, encountering the end of the slide-bar, will force the slide-bar outward in its slideway, the stud 16 passing out past the end of the spring-dog 18, and the dog 11 will be disengaged from the table. After sufficient movement of the lever to effect such disengagement the spring-bolt 20 encounters the edge of one arm of the table at the point 22, and the continuance of the movement of the handle in the same direction thus causes the table to partake of its movement, which may be continued until the catch-bolt 23 enters the recess 27. The movement of the handle being now reversed, certain friction-abutments 28 28, &c., consisting of leather buttons lodged in the upper surface of the lever-handle H and spring-pressed upward against the under face of the table, cause the table to be carried back with the handle until it is held firmly against the square shoulder of the catch-bolt 23 and so stopped positively in that direction, while the handle moves on back to its first position, and the abutment 16 on the slide-bar 7 reaches the recess and under the pressure of the spring 15 enters it and follows down the cam slope 17 and becomes engaged in the seat provided for it in the inner face of the spring-dog 18, thereby causing the table to be locked by the engagement of the tooth 13 on the dog 11 in the notch 14 of the table, the taper of the tooth 13 causing it under the pressure of the springs 15 and 18 to render the position of the table exact and taking up any slack that may possibly exist. The spring 15 is only designed to insure that the nose of the jaw 11 enters the notch 14 and that the abutment 16 enters the recess 17, and thus the pressure which the spring-dog 18 exerts for the purpose of drawing the nose of the dog 11 into the notch is avoided, except at the one position where it is necessary for the purpose stated.

C is the standard of the pattern-table, which is bolted rigidly to the forward side of the base A and extends upward and thence horizontally rearward to support the pattern-table and operating mechanism. The pattern-table D, like the chuck-table, is in the form of a right-angled cross and has four pattern-holding seats D^2 D^2 D^2 D^2, corresponding to the four chucks on the chuck-table, which constitute the work-holding seats on said latter table, said seats D^2, &c., being correspondingly bounded at two adjacent sides of each by pattern-stops in the form of flanges or lips D^{21} D^{21}, &c., which correspond to the walls of the chucks, which constitute stops for the work, against which and in whose angles the punch and matrix-blanks constituting such work are clamped in the chucks. The several pattern-seats are provided with clamps D^{22} D^{22}, &c., opposed to the stop-flanges, respectively, for the purpose of clamping the patterns into the right angles between the stop-flanges of the seats. The pattern-table is pivotally mounted at the center on the pivot-bolt 35 upon the horizontal arm C′ of the standard C and retained in close relation thereto, while at the same time adapted to rotate somewhat freely by the cupped washer 44, which forms one member of the case for ball-bearings 45, which are interposed between said cupped washer

and pattern-table concentric about the pivot-bolt, ball-bearings being also provided at 36 between the horizontal arm C and the under side of the pattern-table. An oscillating lever L is journaled on a shoulder D^a on the concentric, with the pivot-bolt 35 on the under side of the pattern-table, and said lever is thus retained between the table and the horizontal arm C′ of the standard C and is free to oscillate about the pivotal axis of the table. The lever L terminates in a segment L′, whose periphery toward one end is cut back to form a cam slope L^{10}, and in the horizontal arm C′ of the standard C there is provided a slideway for a slide-bar 39, which at the outer end has an abutment 40, which projects up in the plane of the segment L′ and is adapted to bear against the periphery thereof and to enter the recess which produces the cam slope L^{10}. A stud-screw 41 in the slide-bar 39 engages in a slot *m* in the dog M, which is pivoted at *m′* on the arm C′ of the standard. A spring 42, attached to the edge of the standard, bears against the dog, tending to force it inward. This dog has a tooth 43, projecting inward and adapted to engage in notches *d d d d*, formed at corresponding positions ninety degrees apart on the segment-bosses D′, which project from the under side of the pattern-table D. The lever L has a socket L^2, in which is a spring-actuated bolt 46, which is held by its spring upward in position to engage by its flat face 47 at the upper end against the edges, respectively, of the bosses D^2 which project outwardly from the table D. When the lever L is rotated to the right—that is, in the direction of movement of the hands of a clock—and in that movement the slide-bar 39 is by the engagement of the abutment 40 with the cam slope L^{10}, forced outward in the arm C′ of the standard and disengages the tooth 43 of the dog M from the notches *d*. Immediately after effecting such disengagement the spring-bolt 46 encounters the edge of a boss D^2 and in the succeeding movement of the lever in the same direction the table is carried with it. Such movement having been continued for a little more than ninety degrees, the spring-actuated stop-bolt 48, lodged in a socket C^4 in the arm C′, springs upward back of the shoulder *d′* on the under side of the boss D′, the direction of movement of the arm and link being thereupon reversed. The table D is carried back by frictional engagement therewith of the leather buttons 50, which are lodged in the lower surface of the table and spring-pressed downward against the upper surface of the lever. The frictional grip of the buttons 50 is sufficient to carry the table back with the lever to the stop-face of the bolt 48 and hold it firmly thereagainst in the further retreating movement of the lever until in said movement the lever reaches its initial position. When it reaches that position, the abutment 40 on the slide-bar 39 reenters the recess in the periphery of the segmental arm of the lever and the dog M reinserts its tooth 43 in the notch *d* of the table, and thereby locks the latter firmly in the position in which it has been held by the frictional engagement described during the backward movement of the link. The taper of the tooth 43 entering the notch *d* gives exactness to the position of the table, taking up any slack that may exist or correcting any slight inaccuracy that may have existed in the position of the stop-face of the bolt 48.

For the purpose of communicating the adjusting movement of the chuck-table by connections which may be easily and promptly made and disconnected at any position to which the work-table may be moved by the pantograph and other lever connections with the tracer, I provide a connecting-rod K, which is adapted to slide through a sleeve 29 in the cross-fitting 30, which is swiveled to the under side of the handle H and provided with locking-pins 31 and 32, the former adapted to engage notches *k* on the side of the rod and the latter arranged with a tapering point entering a taper-sided notch in the side of the former and adapted thereby when itself forced inward to force the pin 31 into engagement with the notches. The pins 31 and 32 are provided with springs 33 and 34, respectively, which tend to withdraw them, and a lever-arm H^3, which is fulcrumed on the lever H, conveniently at the lower end of the socket H^2, is arranged to force the pin 32 upward, thereby forcing the pin 31 inward into engagement with the notches of the rod. The normal condition of the structure is therefore that the pins are out of engagement and the rod K may slide freely through the sleeve 29, and engagement by which the rod is locked to the handle H occurs only while the operator continues to press the lever H^3 up toward the handle H. The lever H^3 is guided by a stud h^3, near the outer end, which runs in a socket H^4 on the under side of the handle, and is retained by a pin h^4, protruding and moving through a longitudinal slot in the socket H^4. The connecting-rod is pivotally attached to the oscillating lever-arm by the pivot-screw 37, whose distance from the center of the pivot-bolt 35 is equal to the distance of the swivel center of the fitting 30 from the center of oscillation of the handle H, and the angular movement of the two levers necessary for the purpose of giving proper ninety-degree movement to the tables being through arcs which are similarly (but reciprocally and inversely) disposed with respect to the fore-and-aft radii from the locking-points of the tables, respectively, and the line of connection by the rod K between said levers being approximately at right angles to said fore-and-aft line the relatively-slight change of position of the work-table by reason of its movement derived from the tracer during the operation of the machine will not affect the transmission of the angular movement from the work-table to the pattern-table more than can be readily provided for by giving the levers H and L a little more than a

ninety-degree swing at each action, the excess in case of each table, be it more or less and whether equal or unequal, being absorbed or compensated in the slip of the frictional abutments 28 and 50, respectively, in the retracting movement of the levers. The provision above described for securing the rod K at its connection with the lever H is such that it becomes disconnected as soon as the operator releases his hold upon it, thus rendering its normal condition that of disconnection and so avoiding the danger of operating the machine (directing the tracer about the pattern) while the levers are connected.

I will now describe the construction of the chucks themselves, which are mounted on the chuck-table and constitute the seats for holding the work thereon, and also their connection and adjustment on the table. Each arm of the chuck-table has a transverse dovetailed hollow recess or boss 51 and the chuck P, which is substantially a three-sided box, one side being preferably cut out or cut away, as seen at P'. It has in its bottom a dovetailed channel, adapting it to slide on the boss, a jib 52 being provided and arranged to be set up by suitable set-screws against the side of the boss to insure accuracy of position and adjustment of the chuck. Adjusting-screws 53 53 are set through the ends of the boss, extending into the recess 54 thereof and impinged against the abutment or stud 55, which projects outward from the bottom of the chuck into said recess 54, and by means of these two screws the chuck may be adjusted longitudinally with respect to the boss 51 and secured rigidly as adjusted. The bottom of the box, constituting the chuck, has a longitudinal T-shaped channel *p*, and in this channel the correspondingly-shaped rectangular head 56 of a carriage or traveler 57 is arranged to slide. A threaded shaft or adjusting-screw 58, journaled in the plate 59, which, secured across the open end of the chuck and extending through a suitable aperture in the closed end, takes through a threaded aperture in the head 56 of the carriage or traveler, so that by the rotation of said threaded shaft the traveler may be moved longitudinally through the chuck. The said traveler comprises, in addition to the head guided in the T-slot, a threaded stem on which the jaw 60 is mounted by means of a sleeve 61, which is screwed onto the threaded stem and carries the jaw proper by means of a shoulder 62 engaging a suitable rabbet in the lower end of the jaw. The jaw is in general rectangular in plan view, and at the opposite sides there are pivoted to it on suitable pivot-studs screwed into it, the wings 70, having the angular recesses at upper inner corners corresponding in position to an angular seat or rabbet 72, formed upon the inner side of the jaw, such recesses resulting in fingers 83 and 84. Said fingers, however, project slightly beyond the corresponding surfaces of the angular seat in the jaw, and the wings being, in addition, slightly cut out at 71 at the angle between the fingers. The purpose of this winged jaw is identical with that of a similar construction shown in my said patent— namely, that when the jaw is advanced to bind the block or matrix to be cut against the opposed portions of the chuck, as hereinafter more particularly described, the pressure of the upright edge of the angle against the vertical side of the block, as the jaw is advanced against the latter, tending to swing the wing on its pivot, causes the horizontal edge of the angular recess of the wing to act upwardly against the under side of the block, and thereby the block is certain to be held snugly up against the retaining upper lip or flange of the chuck. The end wall 73 of the three-sided box-chuck is preferably an attached plate, and from said end wall and the adjacent side wall there are preferably provided projecting studs 74 74 near the upper edge, against which the matrix-block is clamped by the jaw. The sides of the box-chuck have overhanging lips, preferably formed by attached plates 75 76, against which the matrix-block to be cut is held firmly by the jaw. To insure perfect and positive contact of the upper edge of the block against these lips, in case of wide matrix-blocks upon which the operation of the angle-wings of the jaw might not be fully effective for this purpose, I provide a cam 77, integral with a short worm-gear pinion 78, which is journaled in the end plate of the box, and extending in transverse direction through the end plate I provide a worm-shaft 79, whose worm meshes with the worm-pinion, so that by rotating the same, which may be done by means of a suitably-knurled head, with which the worm-shaft is provided, the cam which projects into the cavity of the box beyond the inner face of the end plate and engages under the edge of the matrix-block is rotated in a direction to force the latter or bind it securely up against the upper stop-lips.

For the purpose of holding the punch-blanks or stamp-blanks which by reason of their length or height cannot be engaged under their lower ends by the devices described, designed to clamp upward against the lips, I employ in connection with the same chuck above described. the special stamp-holding chuck Q, which is also of the box type, having, however, all four sides and a rectangular bottomless cavity into which the punch-blank is designed to be set on end and bound tightly into one corner by means of headless screws 80 80, which are set at opposite end and side. This entire box-chuck, with the punch-blank thus bound in it, is mounted and held and adjusted in the box-chuck P in the same manner as the matrix-block might be so held, and since it is deeper than the matrix-block usually is instead of being engaged under the bottom by the wings 70 on the jaws and by the cam 77 it is rabbeted on the opposite sides, so as to form the shoulder 81 at one side in position to be engaged by the cam and

the shoulder 82 at the other side in position to be engaged by the wings.

I claim—

1. In a pattern-controlled machine, a rotatable pattern-table, and a rotatable work-table having a like plurality of pattern-holding and work-holding seats similarly disposed about the axis of rotation of the tables respectively; locking devices constructed and arranged to lock the tables in their paths of rotation, and mechanical connections communicating the angular or fractional rotary motion of one table to the other.

2. In a pattern-controlled machine, a rotatable pattern-table and a rotatable work-table having a like plurality of pattern-holding and work-holding seats each bounded in two directions by fixed stops, said stops being disposed at angular intervals which are respectively equal on the two tables, in combination with locking devices constructed and arranged to lock the tables at a plurality of positions corresponding in number to the number of pattern-holding and work-holding seats on the tables respectively, and at intervals in their rotation corresponding to the angular intervals between the stops.

3. In a machine of the class indicated, a rotatable table, an oscillating lever and devices by which it engages the table to rotate it positively in one direction and yieldingly in the opposite direction; a stop which arrests the table in the last-mentioned direction, and a lock operated by the lever when moving on in the same direction to lock the table positively against movement away from the stop.

4. In a machine of the class indicated, a rotatable table, an oscillating lever and devices by which it engages the table positively to rotate it in one direction and frictionally to rotate it in the opposite direction; a stop which arrests the table in the last-mentioned direction, and a lock operated by the lever when moving on in the same direction to lock the table positively against movement away from the stop.

5. In a pattern-controlled machine, a rotatable pattern-table and a rotatable work-table having a like plurality of pattern-holding and work-holding seats disposed about the axes of rotation of the tables, respectively; levers similarly fulcrumed with respect to the tables respectively and provided with devices for engaging positively in one direction the respective tables at a plurality of points on each table corresponding in number and angular separation to the pattern-holding and work-holding seats, and provided with devices for engaging the table to actuate it yieldingly in the opposite direction; a stop associated with each table arranged to arrest the rotation of the table in the direction in which it is moved yieldingly, and a lock operated by each lever when moving in said last-mentioned direction to lock the table positively against movement in the opposite direction, and a mechanical connection between said levers, whereby the movement of one lever is communicated to the other.

6. In a pattern-controlled machine, a rotatable pattern-table and a rotatable work-table having a like plurality of pattern-holding and work-holding seats disposed about the axes of rotation of the tables, respectively; levers similarly fulcrumed with respect to the tables respectively and provided with devices for engaging positively in one direction the respective tables at a plurality of points on each table corresponding in number and angular separation to the pattern-holding and work-holding seats, and provided with devices for engaging the table frictionally in the opposite direction; a stop associated with each table arranged to arrest the rotation of the table in the direction in which it is moved frictionally, and a lock operated by each lever when moving in said direction, to lock the table positively against movement in the opposite direction, and a mechanical connection between said levers whereby the movement of one lever is communicated to the other.

7. In a pattern-controlled machine, in combination with a rotatable pattern-table; a lever for rotating it, and devices by which the lever engages the table to rotate it yieldingly in one direction and positively in the reverse direction; a stop limiting the rotation of the table in the first-named direction; a lock which engages it positively at the position at which it is so stopped; and connections from the lever to said lock, which release the latter when the lever is moved in the direction for positively engaging the table; the positively-engaging device being constructed and arranged to allow a free movement of the lever sufficient to operate the lock before positively engaging the table.

8. In a machine of the character indicated, in combination with a rotatable table; a lever having devices which engage it frictionally to rotate it in one direction, and having an abutment which engages the table positively to rotate it in the opposite direction; a dog constructed and arranged to lock the table positively when engaged therewith; a connecting-rod extending from the dog, the lever having a cam which engages said connecting-rod and operates to disengage the dog at the initial part of the lever's movement in the direction to positively engage the table and before such engagement occurs.

9. In a pattern-controlled machine, a rotatable pattern-table and a rotatable work-table having a like plurality of pattern-holding and work-holding seats similarly disposed about the axis of rotation; levers and connections therefrom to the tables respectively, adapted to be oscillated to engage and rotate the tables respectively through angular distances corresponding to the angular intervals between their said seats; a rod which connects said levers to cause one lever to transmit movement to the other, said rod being adjustable at its connection with one of said le-

vers; and suitable devices for securing the rod as adjusted.

10. In a pattern-controlled machine, a rotatable pattern-table and a rotatable work-table having a like plurality of pattern-holding and work-holding seats similarly disposed about the axis of rotation; levers, and connections therefrom to the tables respectively adapted to be oscillated to engage and rotate the tables respectively through angular distances corresponding to the angular intervals between their said seats; a rod which connects said levers to cause one lever to transmit movement to the other, said rod being adjustable at its connection with one of said levers; devices for locking the rod as adjusted, said locking devices being provided with springs tending to unlock the rod, and a lever arranged to be operated at will to hold them in locking position, whereby each table is normally free to be moved independently of the other.

11. In combination with the chuck-table, the dog which locks it; the slide-bar which actuates the dog having an abutment 16, the handle-lever having the spring-dog 18 provided with the seat 19 for said abutment constructed and arranged to cause the reaction of the spring-dog against the abutment to move the lever to bring the abutment fully into its said seat, whereby said reaction of the spring-dog brings the table accurately to position when locked.

12. In a punch and matrix-cutting machine, the work-holding chuck having clamping devices adapted to engage under the article to be clamped and operate upwardly, and having suitable stops against which the article thus engaged is clamped, in combination with a punch-holder adapted to occupy the position of the work between such upwardly-operating clamp and the stops, such punch-holder having at one exterior side a downwardly-facing shoulder arranged to afford engagement for said upwardly-operating clamping device of the chuck.

13. In a punch or matrix-cutting machine, a work-holding chuck having at the upper side lips against which the work-block may be set upwardly, the clamping-jaw having bell-crank-lever wings 70; the cam 77; the worm-pinion rigid therewith and the work-shaft for rotating the same.

14. In a punch or matrix-cutting machine, a work-holding chuck having the clamping-jaw provided with the bell-crank-lever wings, and mounted on the wall opposite said jaw a cam 77 and means for operating it, in combination with a punch-holder having suitable means for locking a punch-blank therein, and having upon opposite exterior walls downwardly-facing shoulders adapted to be engaged respectively by the cam and by the bell-crank-lever wings of the clamping-jaw.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Manitowoc, Wisconsin, this 3d day of January, 1899.

NICHOLAS DEDRICK.

Witnesses:
L. DEDRICK,
C. M. DEDRICK.