No. 798,354. PATENTED AUG. 29, 1905.

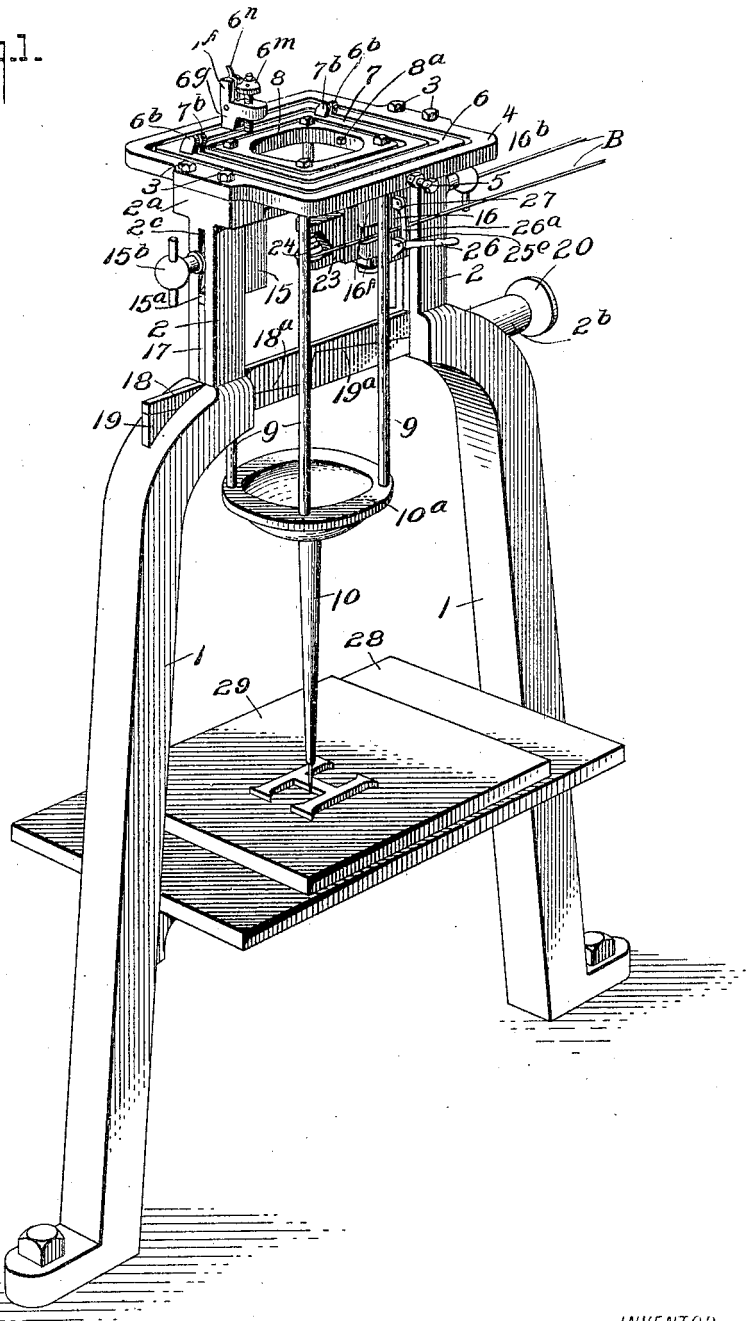
J. W. LEWIS.

PUNCH CUTTING MACHINE.

APPLICATION FILED JUNE 8, 1904.

6 SHEETS—SHEET 1.

Fig. 1.

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6 SHEETS—SHEET 2.

Fig. 2.

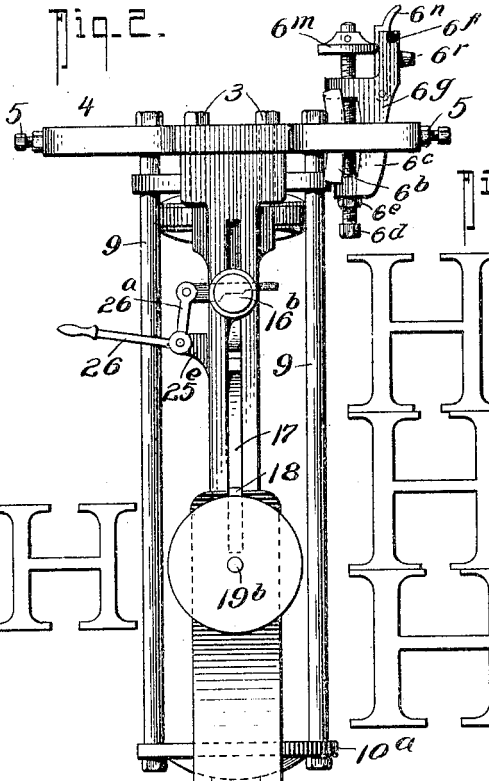



Fig. 15.

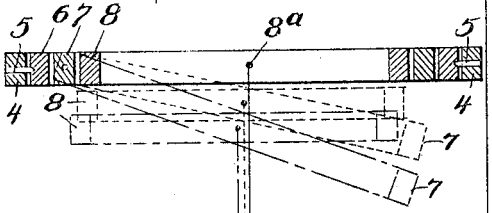



Fig. 16.

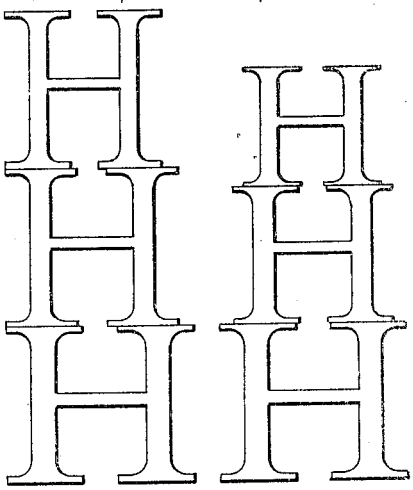


Fig. 17.

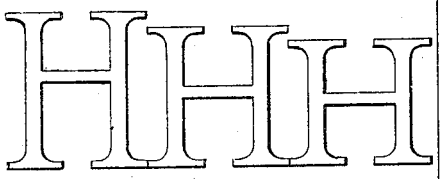


Fig. 18.



Fig. 19.

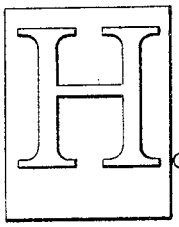


Fig. 20.

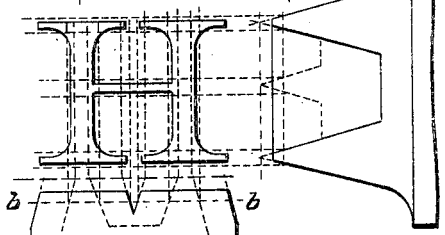
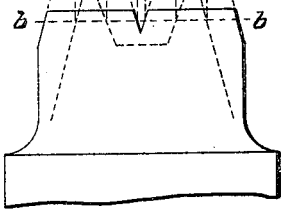



Fig. 21.



Fig. 22.



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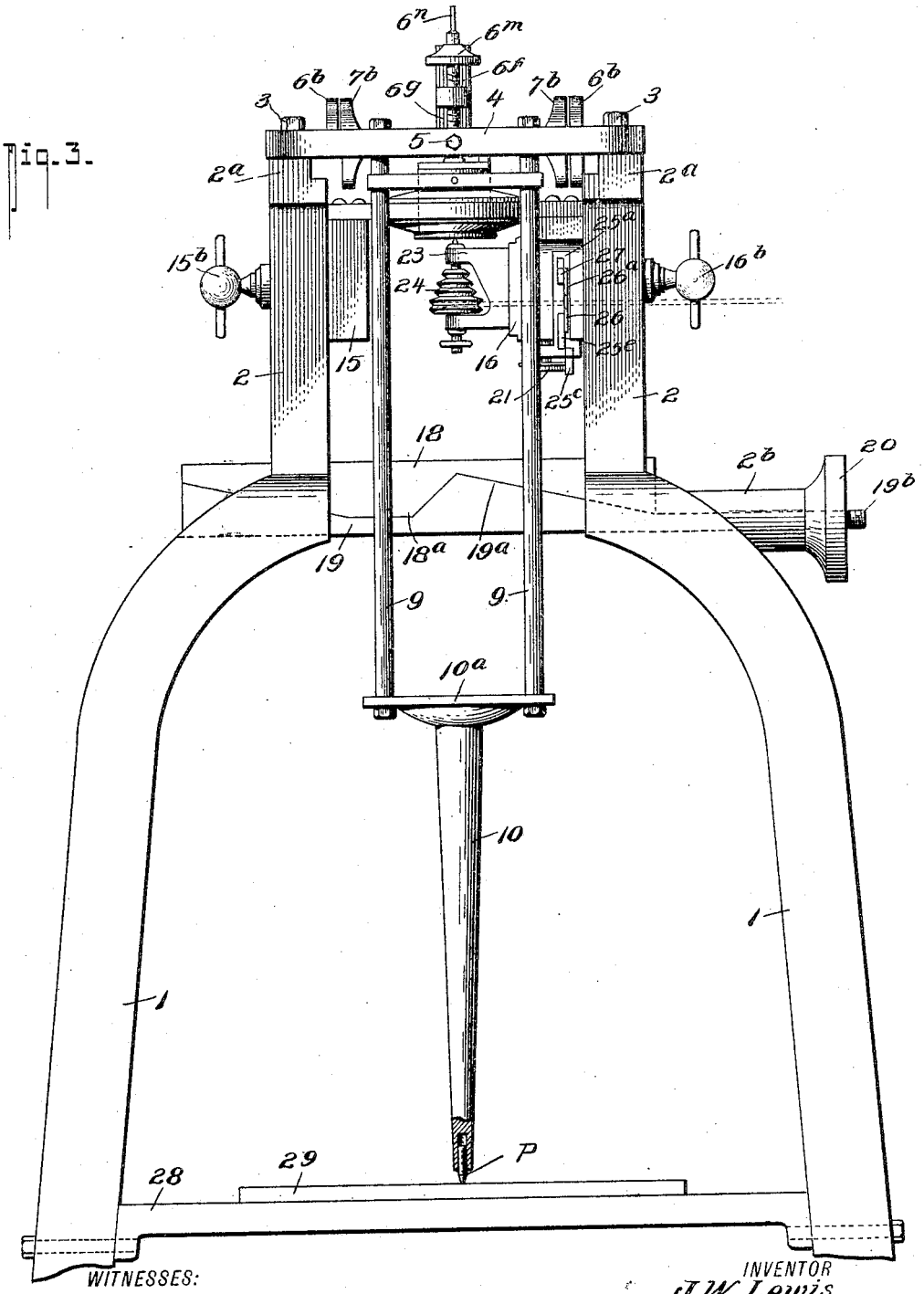
6 SHEETS—SHEET 3.

Fig. 3.

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6 SHEETS—SHEET 4

Fig. 4.

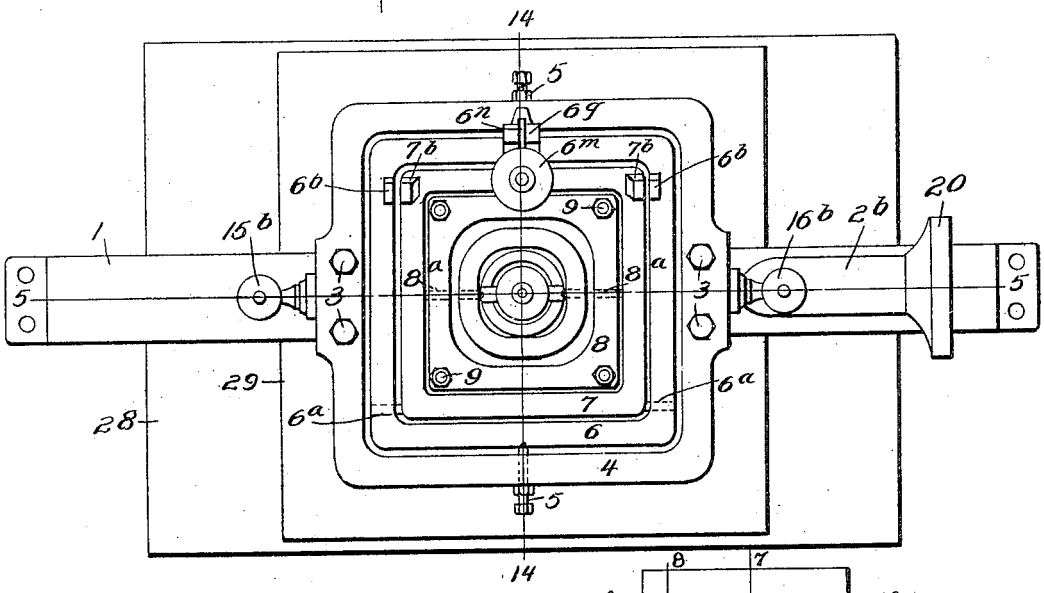
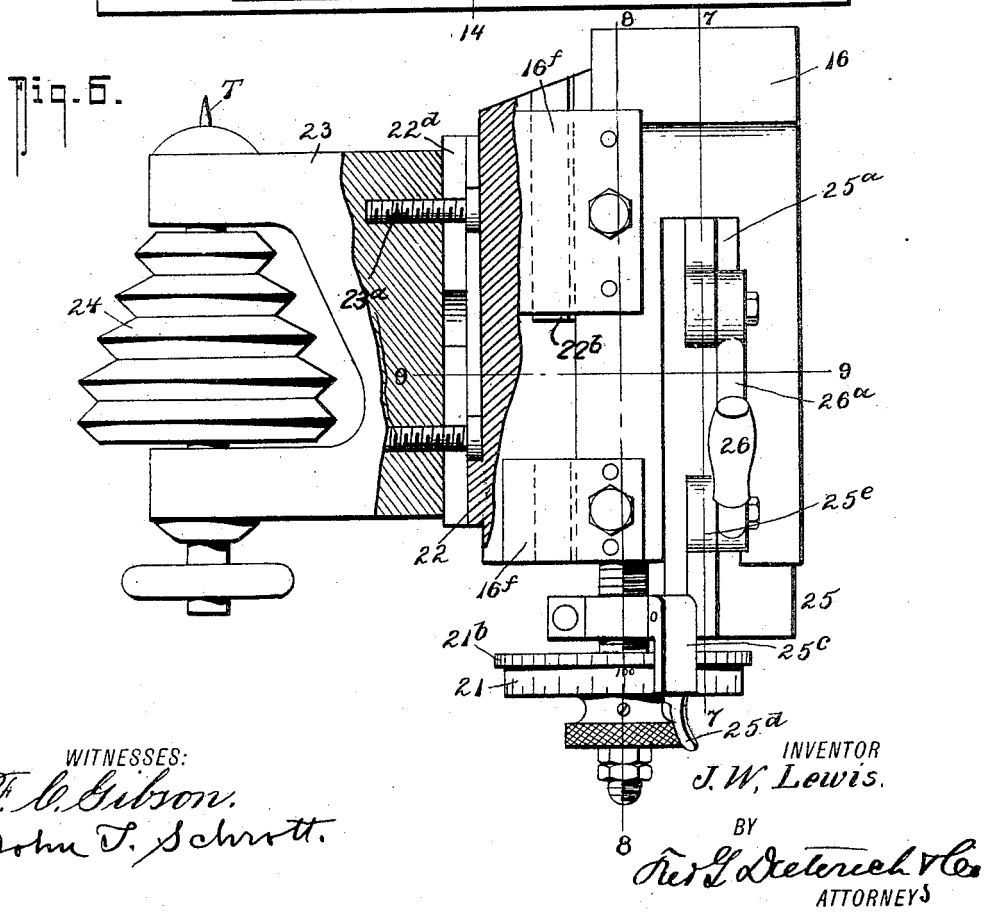



Fig. 6.

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APPLICATION FILED JUNE 8, 1904.

6 SHEETS—SHEET 5.

Fig. 5.

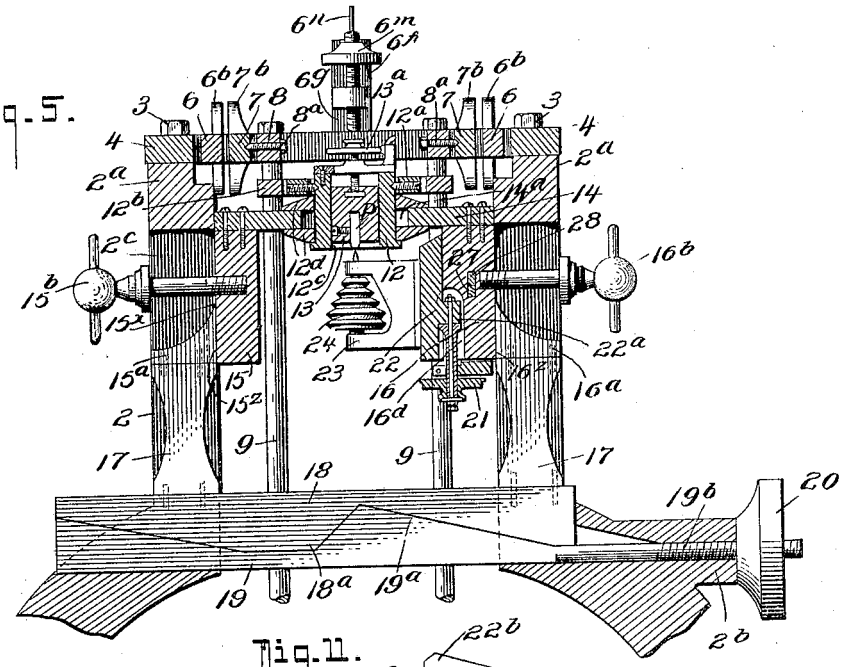


Fig. 10.

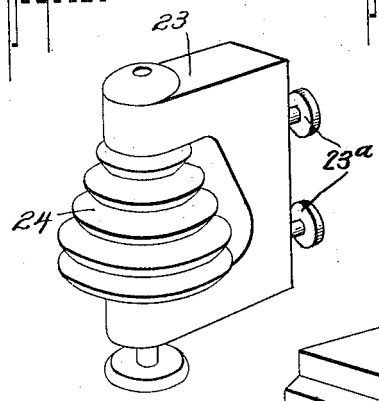


Fig. 11.

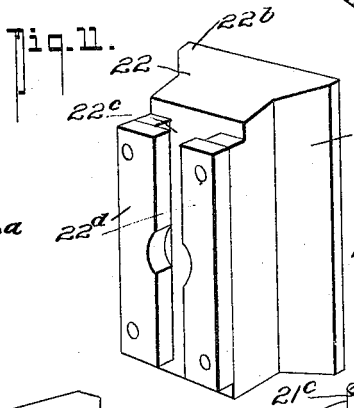


Fig. 12.

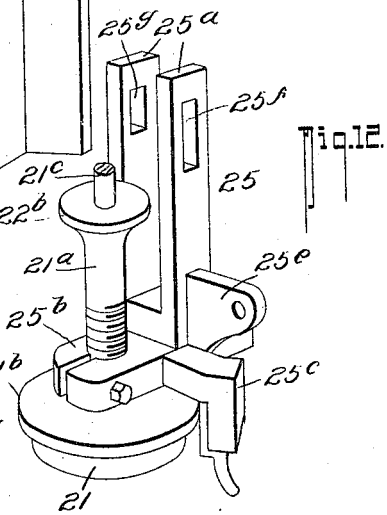
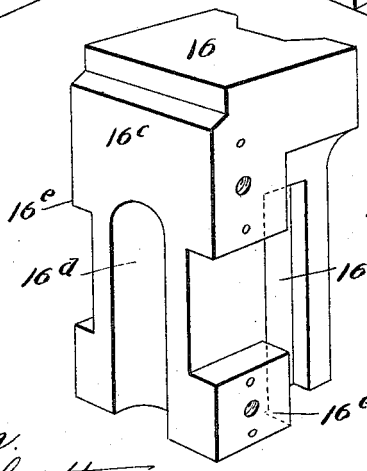


Fig. 13.



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APPLICATION FILED JUNE 8, 1904.

6 SHEETS—SHEET 6.

Fig. 7.

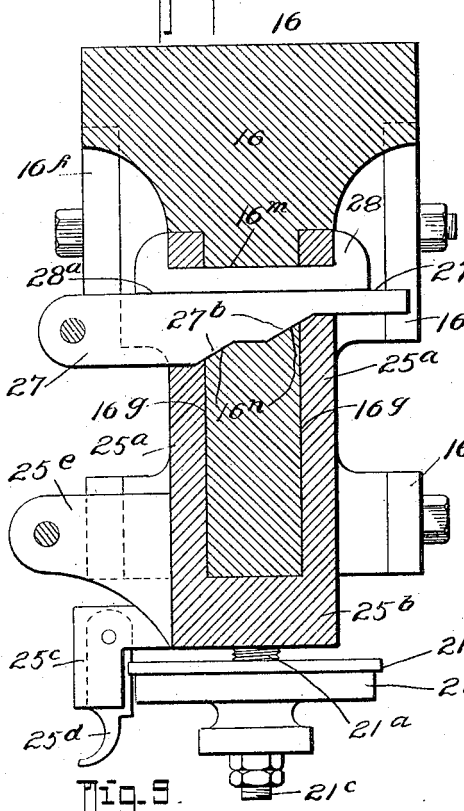



Fig. 8.

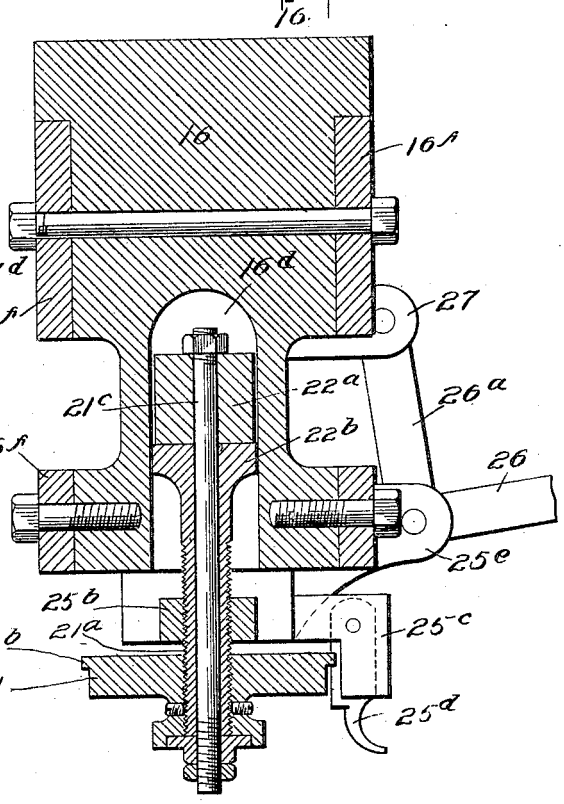



Fig. 9.

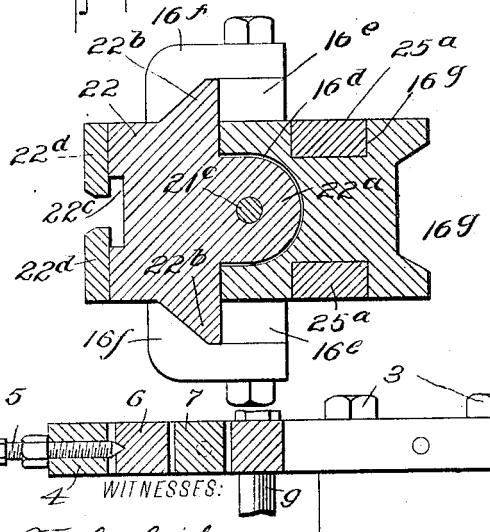
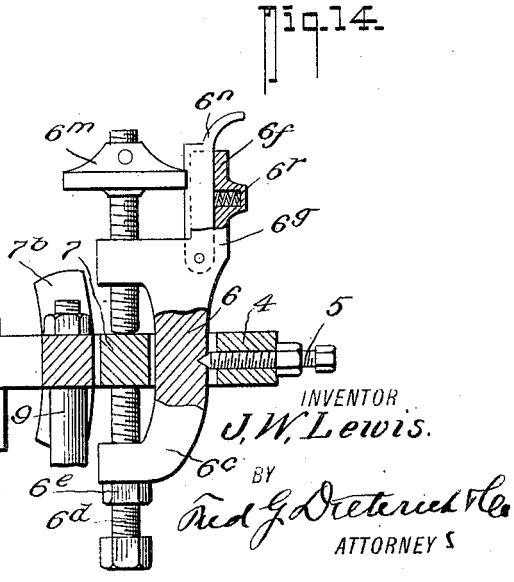



Fig. 14.

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# UNITED STATES PATENT OFFICE.

JAMES W. LEWIS, OF PHILADELPHIA, PENNSYLVANIA.

## PUNCH-CUTTING MACHINE.

No. 798,354. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed June 8, 1904. Serial No. 211,649.

*To all whom it may concern:*

Be it known that I, JAMES W. LEWIS, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Punch-Cutting Machines, of which the following is a specification.

My present invention relates to certain new and useful improvements in punch engraving or cutting machines of the Benton type, and it more particularly seeks to provide a machine of this character of a very simple nature which can be easily and cheaply manufactured and which will readily and effectively serve its intended purposes.

Again, this invention relates to certain improvements on the machine disclosed in my copending application filed February 21, 1903, Serial No. 144,463, and also to provide means whereby punches of different sizes may be cut by the use of the same pattern without readjusting the position of the pattern.

Again, the invention also seeks to provide means whereby it is possible to cut punches with their cut letters all of the same height, but of different widths, by the use of the same pattern, and whereby it is possible to cut punches with their letters of the same width, but of different height, and by use of the same pattern, thereby necessitating the use of but a single pattern to cut punches either with different-sized letters of the same relative proportions or with letters of different relative proportions.

With other objects in view, which will be hereinafter apparent, the invention generically includes a frame and index-rod suspended from a support by universal joints and a supplemental pivotal connection, so that a universal movement may be imparted to the rod and also movement in a vertical arc of the frame and rod, together with the universal joint, can be had.

Again, the invention includes certain novel construction and arrangement of parts, all of which will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view showing my invention as applied for use. Fig. 2 is a side elevation thereof. Fig. 3 is a front elevation of my invention. Fig. 4 is a top plan view thereof. Fig. 5 is a vertical longitudinal section on the line 5 5 of Fig. 4. Fig. 6 is an enlarged side elevation of the lathe-head, the block upon which it is mounted, and the adjusting mechanism. Fig. 7 is a cross-section on the line 7 7 of Fig. 6. Fig. 8 is a similar view on the line 8 8 of Fig. 6. Fig. 9 is a horizontal section on the line 9 9 of Fig. 6. Fig. 10 is a detail perspective view of the lathe-head. Fig. 11 is a similar view of the head-holding member. Fig. 12 is a similar view of the micrometer-carrying head-holder-adjuster-carrying member. Fig. 13 is a similar view of the coöperating support-engaging block. Fig. 14 is a cross-section on the line 14 14 of Fig. 4. Fig. 15 is a diagrammatic view showing the manner of adjusting the parts to cut punches of different-width letters of the same height from the same pattern. Fig. 16 is a view showing three punches with their letters of the same height, but of different widths, as cut by my machine. Fig. 17 is a similar view showing the letters of different heights, but of the same width, as cut by my machine. Fig. 18 is a view showing three letters of different size, but of the same general relative dimensions. Fig. 19 is a view of the pattern by which all the letters shown in Figs. 16, 17, and 18 may be cut when used in connection with my machine. Figs. 20, 21, and 22 are detail diagrammatic views of a punch cut by my machine, showing how the same may be used to form different-sized letters.

Referring now to the accompanying drawings, in which like numerals and letters of reference indicate like parts in all the figures, it will be seen that mounted upon a suitable base 1 is a pair of standards 2 2, to the upper ends $2^a$ $2^a$ of which is secured by bolts 3 3 or otherwise a ring 4, which is firmly held in a horizontal plane. Mounted on pivots 5 5, which are held in the ring 4 at right angles to the bolts 3 3, is a second ring 6, which carries a pair of pivot-screws $6^a$ $6^a$, near one side thereof and in alinement with each other, by means of which the third ring 7 is pivotally mounted at one side within the ring 6, and the said ring 6 carries a pair of arc members $6^b$ $6^b$, which coöperate with similarly-formed members $7^b$ $7^b$ on the ring 7 and on the sides of the rings 6 and 7 opposite their pivotal connection. (See Fig. 4.) The ring 6 also carries an arm $6^c$, which in turn carries an adjusting-screw $6^d$, having a check-nut $6^e$, for a purpose presently explained. Opposite the arm $6^c$ is a second arm $6^g$, which carries a micrometer-screw $6^m$ in alinement with the screw $6^d$, and the said arm $6^g$ includes a portion $6^f$, in which

a micrometer-screw-head-engaging latch $6^n$ is mounted and held to engage the micrometer-screw head $6^m$ by means of the spring $6^r$, as clearly shown in Figs. 1, 2, and 4 of the drawings. Held within the ring 7 and centrally pivoted thereto at right angles to the pivots 5 5 by means of pivots $8^a$ $8^a$ is a fourth ring 8, to which the downwardly-projecting tracer or index rod frame rod extensions 9 9 are secured, one at each corner of the ring. The pivots 5 5 serve to allow a universal movement of the rods 9 9, which are joined at their free ends to the head $10^n$ of the index or tracer rod 10. (See Fig. 1.) The rings 4 6 7 8 are normally so arranged as to lie in the same horizontal plane.

12 designates the die or work holder which is connected to the swinging frame by the universal joint, consisting of the inner ring $12^a$ and the outer ring $12^b$. The work-holder 12 includes a cylindrical hub having a central bore $12^c$ to receive the punch-holding block 13, which is adjustably held in said bore $12^c$ and is capable of vertical movement or adjustment by means of the micrometer-screw device $13^a$, as shown in Fig. 5.

$12^d$ $12^d$ designate a pair of annular wings carried by the cylindrical member 12 to rest and slide on the upper and lower faces of a cross member 14, which has an enlarged aperture $14^a$, through which the cylinder passes and in which the said cylinder has free movement. The cross member 14 is screwed to a supporting-block 15 at one end, and the said supporting-block 15 has a wing $15^a$ for entering the slotway $2^e$ of the standard 2 and is capable of vertical adjustment therein. The said block 15 has its engaging rear face $15^x$ formed with a groove $15^z$ to coöperate with the standard 2, and the said block is secured to the said standard 2 by the screw member $15^b$. The other end of the cross member 14 is secured to a supporting-block 16, which has a similar wing $16^a$, groove $16^z$, and screw-fastening member $16^b$, and these two blocks 15 16 are vertically adjustable in unison by the mechanism hereinafter explained to permit of raising and lowering the work-holder. It should be understood that the ring $12^b$ is freely movable on the rods 9.

By reference to Figs. 1, 3, and 5 of the drawings it will be seen that 17 17 are distance-pieces of precisely the same construction which have dowel connection with the wings $15^a$ $16^a$, as well as with the cross-bar 18, which has its under edge $18^a$ formed with wedge portions to coöperate with correspondingly-formed wedge portions on the edge $19^a$ of a second cross member 19, which cross member 19 includes a threaded portion $19^b$, which passes through the slotted hub $2^b$ in the standard 2 and carries a micrometer-adjusting screw 20, by means of which the wedge 19 is movable laterally to raise or lower the bar 18, which in turn raises or lowers the blocks 15 16. Hence the work-holder is raised or lowered for the purpose presently understood.

The block 16, hereinafter called the "supporting-block of the pulley mechanism," is of substantially T shape in cross-section, (see Fig. 9,) by reference to which and to Figs. 7 and 8 it will be noticed the block 16 has its front face $16^c$ formed with a vertical semicircular groove $16^d$, extending about one-half of the height of the block (see Fig. 8) to receive the micrometer-screw 21 and the hub $22^a$ of the pulley-block-carrying member 22, hereinafter again referred to.

Screwed to side projections $16^e$ of the block 16 are guide-pieces $16^f$ $16^f$, which form a dovetailed vertical groove or passage to receive the dovetailed portion $22^b$ of the pulley-block-carrying member 22, which is held for vertical adjustment with respect to block 16, and the said member 22 has a vertical groove $22^c$ and a pair of guides $22^d$ on its front face to form a T-slot to receive the T-bolts $23^a$ of the carriage 23, (see dotted lines, Fig. 6,) in which the pulley member 24 is mounted.

Reverting again to block 16, (see Figs. 7 and 8,) it will be seen the said block 16 also has a pair of parallel side grooves $16^g$ $16^g$ to receive the U-shaped adjusting member 25, which includes the side arms $25^a$ $25^a$ and the horizontal portion $25^b$, which receives the micrometer-screw 21, and which also includes a projecting member $25^c$, which carries the spring-pressed latch $25^d$ for engaging the head $21^b$ of the micrometer-screw 21. The stem $21^a$ of the micrometer-screw 21 moves in the groove $16^d$ and abuts the hub $22^a$. The micrometer-screw stem $21^a$ is longitudinally centrally bored to receive the screw-bolt $21^c$, which passes therethrough and through the hub $22^a$ of the block 22, the micrometer-screw 21 being loosely mounted on the bolt $21^c$.

$25^e$ designates a bracket on the member 25, to which the L-lever 26 is secured, and the said lever 26 has its short arm $26^a$ projecting upwardly, and the said arm $26^a$ is pivotally secured to the wedge member 27, which passes through rectangular apertures $25^f$ $25^g$ on the arms $25^a$ and through the aperture $16^m$ in the block 16, as does also the U-shaped member 28, whose flat under edge $28^a$ engages with the flat upper edge $27^d$ of the wedge 27. The under edge of the wedge 27 is provided with a plurality of wedge-faces $27^b$, which coöperate with the faces $16^n$ of the aperture $16^m$ of the block 16 for the purpose presently understood.

28 designates a pattern-carrying frame secured to the supports of the machine and in which the pattern 29 is held by suitable clamping devices. (See Fig. 1.)

Operation: Supposing it is desired to cut a punch having the standard letter, (say the middle "H" shown in Fig. 18,) the operator then adjusts the machine so that the rings 4, 6, 7, and 8 lie in substantially the same

plane and adjusts the micrometer 20 so that the work-holder will be in its normal position with respect to the wing and frame. (See Figs. 5 and 6.) He then inserts the blank punch P in the work-holder, sets the lathe in motion by belt B, and then proceeds to trace his pattern by the index or pantograph rod to permit the tool T held in the lathe to cut the desired letter on the blank. Now supposing a larger letter of the same ratio dimensions as the one first cut is desired, (say the third "H" of Fig. 18,) the operator only inserts another blank in the work-holder and adjusts the micrometer 20 to lower the work-holder to permit of greater leverage of the work-holder, when the desired letter may be cut, as before explained. Should a smaller letter be desired, (say first "H," Fig. 18,) the operator adjusts screw 20 to raise the work-holder to decrease the leverage thereof, when a smaller letter can be readily cut in the manner before explained. By adjusting the micrometer 20 any sized letter can be engraved upon the punch between the smallest limit and the largest limit. From the foregoing it will be seen the vertical movement caused by the wedge mechanism 18 19 when the micrometer 20 is operated serves to move the work-holder and the cutter with its coöperating mechanism together as a single unit. The cutter C is adjusted independently with respect to the work-holder to cut the desired letter on the punch or type by means of the micrometer-screw 21, which adjusts the carriage 23 with respect to the work to be operated upon.

In practice it has been found desirable to withdraw the cutter from the work at different times to permit of inspection of the work or for other reasons. In machines now on the market this can only be done by means of the micrometer 21, thereby necessitating a readjustment of the said micrometer after each such withdrawal. As this adjustment must be very accurately made if uniform punches and letters are to be obtained, the disadvantages of such method of withdrawal of the cutter from the work will be readily apparent. To overcome this and allow the cutter or tool to be lowered away from the work as often as may be found desirable or to again replace such parts in the precise position they formerly held, I have provided an auxiliary raising and lowering device before described, which includes the U-shaped frame 25, which carries the micrometer mechanism 21 and in which the lever-operated wedge 27 is held. The wedge 27 when withdrawn by lowering the lever 26 will permit the frame 25 to drop with respect to the block 16 and carry with it the micrometer-screw 21 and the thereto-attached carriage 23 without disturbing the micrometer adjustment. When it is desired to again return the tool and carriage to their primary positions to operate upon the work, it is only necessary to again raise the lever 26, which will again move the wedge 27 to its normal position to raise the frame 25 and its attached parts to their first or normal position.

By referring now to Fig. 15 the manner in which punches can be engraved with letters of different widths but of the same height by the use of my machine will be readily understood. Assuming the parts to be in their normal position, as shown in full lines in Fig. 15 and as shown in Figs. 1, 2, 3, and 4, with all the rings 4, 6, 7, and 8 in substantially the same plane and the pattern placed, as shown in Fig. 1, centrally of its holder, now by operating the tool as before described the normal or standard letter is cut—say middle "H" in Fig. 18 or the widest "H" in Fig. 16. Now supposing the middle or narrower "H" in Fig. 16 is desired to be cut by use of the same pattern the operator then by adjusting the micrometer $6^m$ and the stop-bolt $6^d$ swings the ring 7 on its pivot $6^a$ $6^a$ downwardly or upwardly—say to the position shown in dotted lines in Fig. 15. He also lowers the work-holder and lathe by means of the screw 20 to maintain the same distance between the ring 8 and the ring $12^b$ as before. The pointer P of the tracer-rod 10 is adjustably connected with the tracer-rod (see Fig. 3) in any well-known manner, as the same *per se* forms no part of my present invention. This then moves the vertical axis of the work-holder over from the tool, (see dot-and-dash lines, Fig. 15,) and thereby while permitting the same movement of the punch or work as before yet the tool will act on a less width on the punch while acting on the same length and will cut a letter of the same height, but of a less width. By a similar adjustment of parts the narrowest letter—say first letter, Fig. 16—can be cut, it being understood that by combining the adjustments of the ring 7 on its pivots $6^a$ $6^a$ with the adjustments of the work-holder up or down on the rods 9 letters of different sizes can be obtained of different fundamental series. For example, take the smallest letter, Fig. 16. Supposing it is desired to use a letter of the same relative dimensions as this letter as the base of a series, it is only necessary to set the parts to cut this letter and then to adjust the micrometer mechanism 20 to change the leverage of the work-holder, when letters of larger or smaller size, but of the same relative dimensions as the base-letter of the series, may be provided. Again, if letters of a series having the proportions of the widest letter, Fig. 16, is desired the machine is adjusted in all its parts to cut said basic letter of the series—*i. e.*, the widest one in Fig. 16—and then by altering the leverage of the work-holder through the movement of the micrometer 20 letters of larger or smaller size, but of the same relative proportions as the base-letter of this series, may be produced. To cut letters of the same width but of differ-

ent heights, it is only necessary to turn the pattern to a position at right angles to that shown in Fig. 1, when by proceeding as before explained for cutting letters of uniform height but of different widths letters of different heights or uniform widths can be readily cut.

Figs. 20, 21, and 22 disclose a punch cut by the use of my machine. By facing off the punch to the line *b b* the dimensions of the letter are enlarged uniformly.

From the foregoing it will be seen that with my invention letters of different relative dimensions can be readily produced by keeping one dimension the same constant while altering the other dimension, or vice versa. Letters of different size but of the same relative dimension can be made by altering all the dimensions in the same ratio. For example, suppose a standard "H," ten point, ten set, height ninety, stem ten, serif two, is taken as a standard. Now should it be desired to use this on nine set the parts can be adjusted to make height ninety or ninety-eight or ninety-one, stem nine or eight or ten, serif two or one or three, respectively, according to the size of letter desired. Should it be desired to use it on eleven set, dimensions would be: height ninety or ninety-one or eighty-nine, stem eleven or twelve or ten, serif two or three or one.

In machines constructed in accordance with my invention different types of tool-carriages may be used. For instance, six standard types of watchmakers' tool-carriages can be used, three of which are used for milling for the type-body, each having a different taper, depending on the class of work. One may carry a chisel-tool, one a roughener, and the other a finishing or pointing tool. These heads are perfectly interchangeable on the tool-carrying slide and can be readily removed or replaced on the carrier without disturbing any of the other adjustments. The specific construction of lathe-head and tools to be used in connection therewith are not illustrated or described in detail, as the specific form of lathe-head and tool *per se* forms no part of my present invention.

While I have shown the distance-pieces 17 17 as used between the member 18 and the supporting-blocks 15 16, yet I desire it understood that distance-pieces of different lengths may be used or they may be dispensed with entirely, depending upon the amount of leverage to give the desired punch or letter the requisite form or size.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the complete construction, operation, and many advantages of my invention will be readily understood by those skilled in the art to which it appertains, and I desire it understood that numerous slight changes in the detailed construction, arrangement, and design of parts may be readily made without departing from the scope of the invention or that of the appended claims.

Having thus described my invention, what I claim, and desire to obtain by Letters Patent, is—

1. In a punch-cutting machine, supporting-standards, a swinging frame including a pointer, a universal joint connecting said swinging frame to said supporting-standards, a work-holder connected with the swinging frame, a tool-carrier mounted on the standards, said work-holder also being connected with the tool-carrier, a pair of wedge members mounted in the supporting-standards, one of said wedge members being connected with the tool-carrier and the work-holder, to simultaneously raise or lower the work-holder and the tool-carrier, substantially as shown and described.

2. In a punch-cutting machine, supporting-standards, a swinging frame including a pointer, a universal joint joining said swinging frame to said supporting-standards, a work-holder connected with the supporting-standards and the swinging frame and susceptible of longitudinal adjustment thereon, a tool-carrier mounted on said supporting-standards, means for simultaneously raising or lowering said work-holder and said tool-carrier, said means including a pair of wedge members mounted in the supporting-standards, one of said wedge members being connected with said tool-carrier, and means for moving the other wedge member to raise and lower the first wedge member substantially as shown and described.

3. In a punch-cutting machine, supporting-standards, a swinging frame including a pointer, a universal joint joining said swinging frame to said supporting-standards, a work-holder connected to said swinging frame and mounted for longitudinal adjustment on the standards, a tool-carrier mounted on said supporting-standards, means for simultaneously raising or lowering said work-holder and said tool-carrier, said means including a pair of wedge members mounted in the supporting-standards, one of said wedge members being connected with said tool-carrier and means for moving the other wedge member to raise and lower the first wedge member, said means including a threaded rod secured to the second wedge member and passing through said supporting-standards and a nut carried by said rod to engage said supporting-standards, substantially as shown and described.

4. In a machine of the character stated, supporting-standards, a swinging frame having a universal and a hinged connection at one end with said standards, a work-holder adjustably connected with the supporting-standards and the swinging frame, a supporting member on one of said standards, a carrying-block mount-

ed on the supporting member, a tool-carriage mounted on the carrying-block, micrometer-screw means for adjusting said tool-carriage with respect to its carrying-block, and lever-operated wedge devices for adjusting said tool-carriage and said carrying-block in unison on the supporting member substantially as shown and described.

5. In a machine of the character stated, supporting-standards, a swinging frame having a hinge and a universal connection with said standards, a work-holder adjustably connected with said supporting-standards and said swinging frame, a supporting member mounted on one of said standards, a carrying-block adjustably mounted on said supporting member, a tool-carriage adjustably mounted on said carrying-block, wedge devices for adjusting said work-holder, said supporting member, said carrying member, and said tool-carriage, in unison on the supporting-standards, substantially as shown and described.

6. In a machine of the character stated, supporting-standards, a swinging frame having a universal connection with said standards, a work-holder adjustably connected with said supporting-standards and said swinging frame, a supporting member mounted on one of said standards, a carrying-block adjustably mounted on said supporting member, a tool-carriage adjustably mounted on said carrying-block, means for adjusting said work-holder, said supporting member, said carrying member, and said tool-carriage, in unison on the supporting-standards, said means including a pair of wedge members coöperatively held in slots in the standards, and means for adjusting said wedge members with respect to each other.

7. In a machine of the character stated, supporting-standards, a swinging frame having a universal connection with said standards, a work-holder adjustably connected with said supporting-standards and said swinging frame, a supporting member mounted on one of said standards, a carrying-block mounted on said supporting member, a tool-carriage mounted on said carrying-block, a second supporting member mounted on the other standard, a cross member joining said first and second supporting members to move in unison, said work-holder being engaged by said cross member, and a wedge member below said supporting members and connected therewith, a second wedge member coöperating with said first wedge member for raising and lowering said supporting-blocks, and means for maintaining said second wedge member in its various positions, substantially as shown and described.

8. In a machine of the character described, supporting-standards, a swinging frame, said swinging frame being connected at one end to said supporting-standards by a universal connection and a supplemental hinge connection, substantially as shown and described.

9. A punch-engraving machine comprising in combination with a support, a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring centrally pivoted within said first ring, a third ring within and at one side pivoted to the said second ring on an axis at right angles to the pivot-axis of said second ring, and a fourth ring centrally pivoted to and within said third ring and on an axis parallel to the pivot-axis of the third ring, and means for normally holding said second and third rings to move in unison, said swinging frame being secured to said fourth ring, substantially as shown and described.

10. A punch-engraving machine comprising in combination with a support, a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring centrally pivoted within said first ring, a third ring within and at one side pivoted to the said second ring on an axis at right angles to the pivot-axis of said second ring, a fourth ring centrally pivoted to and within said third ring and on an axis parallel to the pivot-axis of the third ring, means for normally holding said second and third rings to move in unison and for adjusting said third ring on its pivotal axis with respect to said second ring, said swinging frame being secured to said fourth ring, substantially as shown and described.

11. A punch-engraving machine comprising in combination with a support, a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring centrally pivoted within said first ring, a third ring within and at one side pivoted to the said second ring on an axis at right angles to the pivot-axis of said second ring, a fourth ring centrally pivoted to and within said third ring and on an axis parallel to the pivot-axis of the third ring, means for normally holding said second and third rings to move in unison and for adjusting said third ring on its pivot-axis with respect to said second ring, said means including adjusting-screws carried by said second ring to engage said third ring, said swinging frame being secured to said fourth ring substantially as shown and described.

12. A punch-engraving machine comprising in combination with a support, a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring centrally pivoted within said first ring, a third ring within and at one side pivoted to the said second ring on an axis at right angles to the pivot-axis of said second ring, a fourth ring centrally pivoted to and within said third ring

and on an axis parallel to the pivot-axis of the third ring, means for normally holding said second and third rings to move in unison and for adjusting said third ring on its pivot-axis with respect to said second ring, said means including adjusting-screws carried by said second ring to engage said third ring, and means for locking said adjusting-screws to their adjusted positions, said swinging frame being secured to said fourth ring substantially as shown and described.

13. A punch-engraving machine comprising in combination with a support, a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring centrally pivoted within said first ring, a third ring within and at one side pivoted to the said second ring on an axis at right angles to the pivot-axis of said second ring, a fourth ring centrally pivoted to and within said third ring and on an axis parallel to the pivot-axis of the third ring, means for normally holding said second and third rings to move in unison and for adjusting said third ring on its pivoted axis with respect to the said third ring, said means including adjusting-screws carried by said second ring to engage said third ring, and means for locking said adjusting-screws to their adjusting positions and adjacent guide members carried by said second and third rings opposite their pivot-axis, said swinging frame being secured to said fourth ring, substantially as shown and described.

14. A punch-engraving machine comprising in combination with a support, and a cutting-tool carried thereby, a swinging frame, a work-holder connected therewith, a ring fixedly secured to said support, a second ring pivotally secured to said first ring, a third ring pivotally secured to the said second ring, a fourth ring pivotally secured to said third ring, said swinging frame being secured to said fourth ring, means for normally holding said second and third rings to move in unison, and said rings and said swinging frame being connected with each other, means for adjusting said cutting-tool to or from the work-holder, and means for moving said work-holder and said cutting-tool in unison toward or from said ring, substantially as shown and described.

JAMES W. LEWIS.

Witnesses:
FRANK H. BENHAM,
EDWIN T. OBERHOLTZER.