(No Model.) 7 Sheets—Sheet 1.

C. L. REDFIELD.

MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

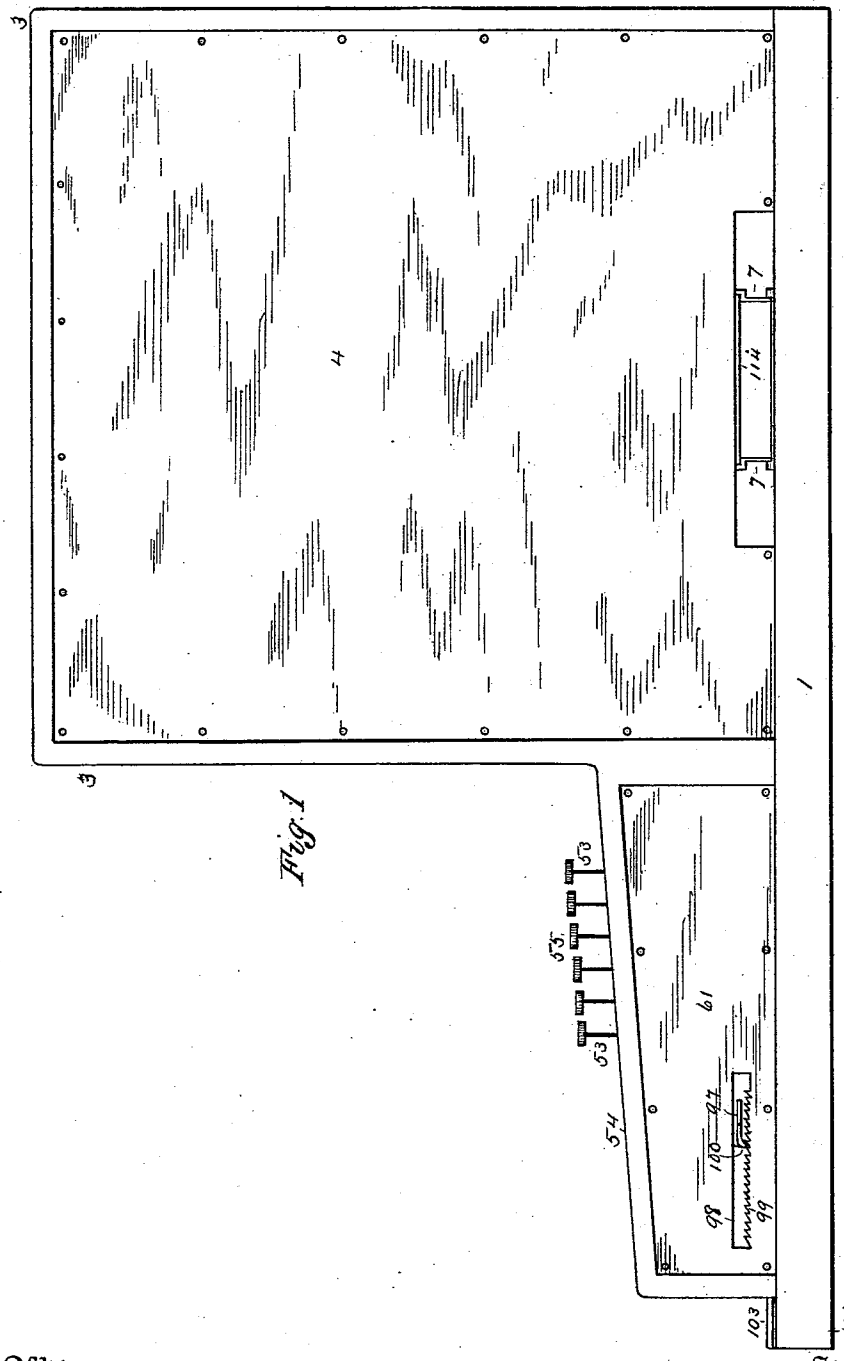

Fig. 1.

Witnesses
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E. M. Schumann.

Inventor
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By his Attorney
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(No Model.) 7 Sheets—Sheet 2.

C. L. REDFIELD.

MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

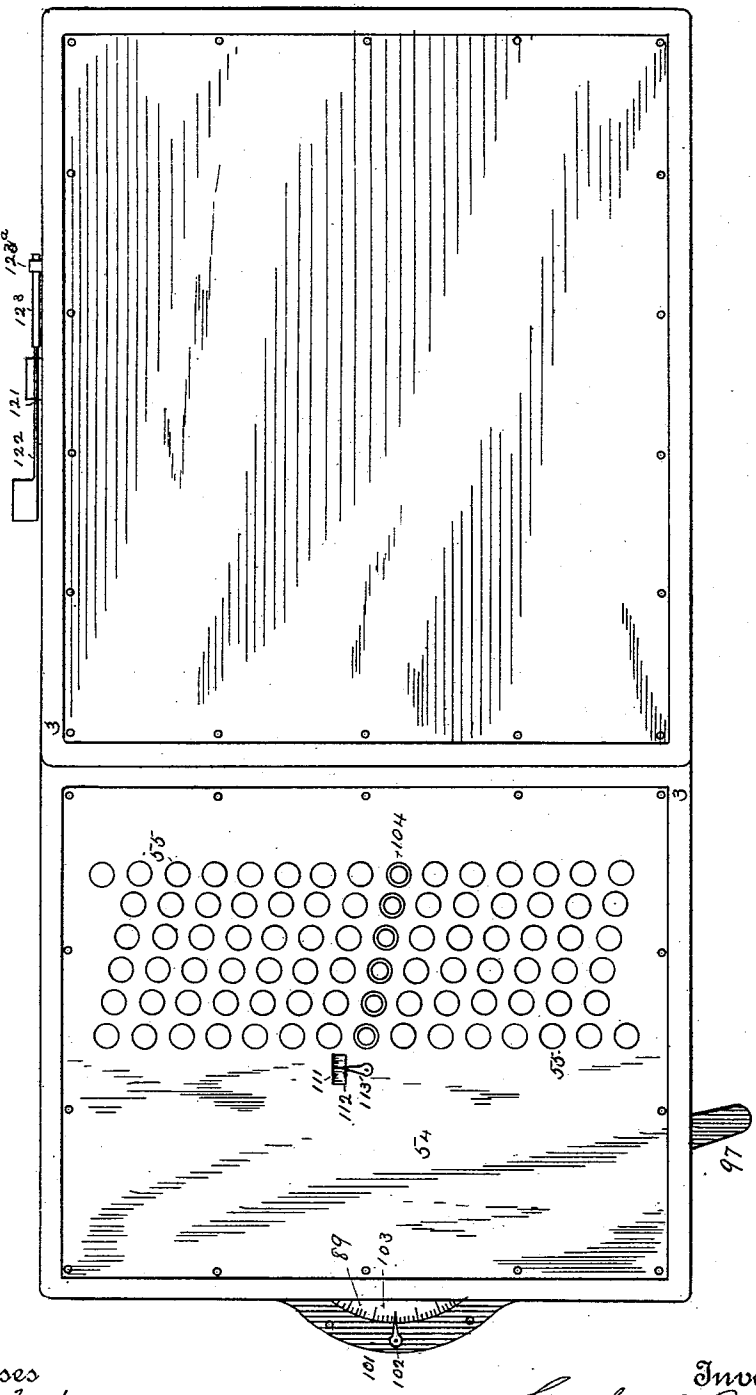

Fig. 2

Witnesses
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(No Model.) 7 Sheets—Sheet 3.

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MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

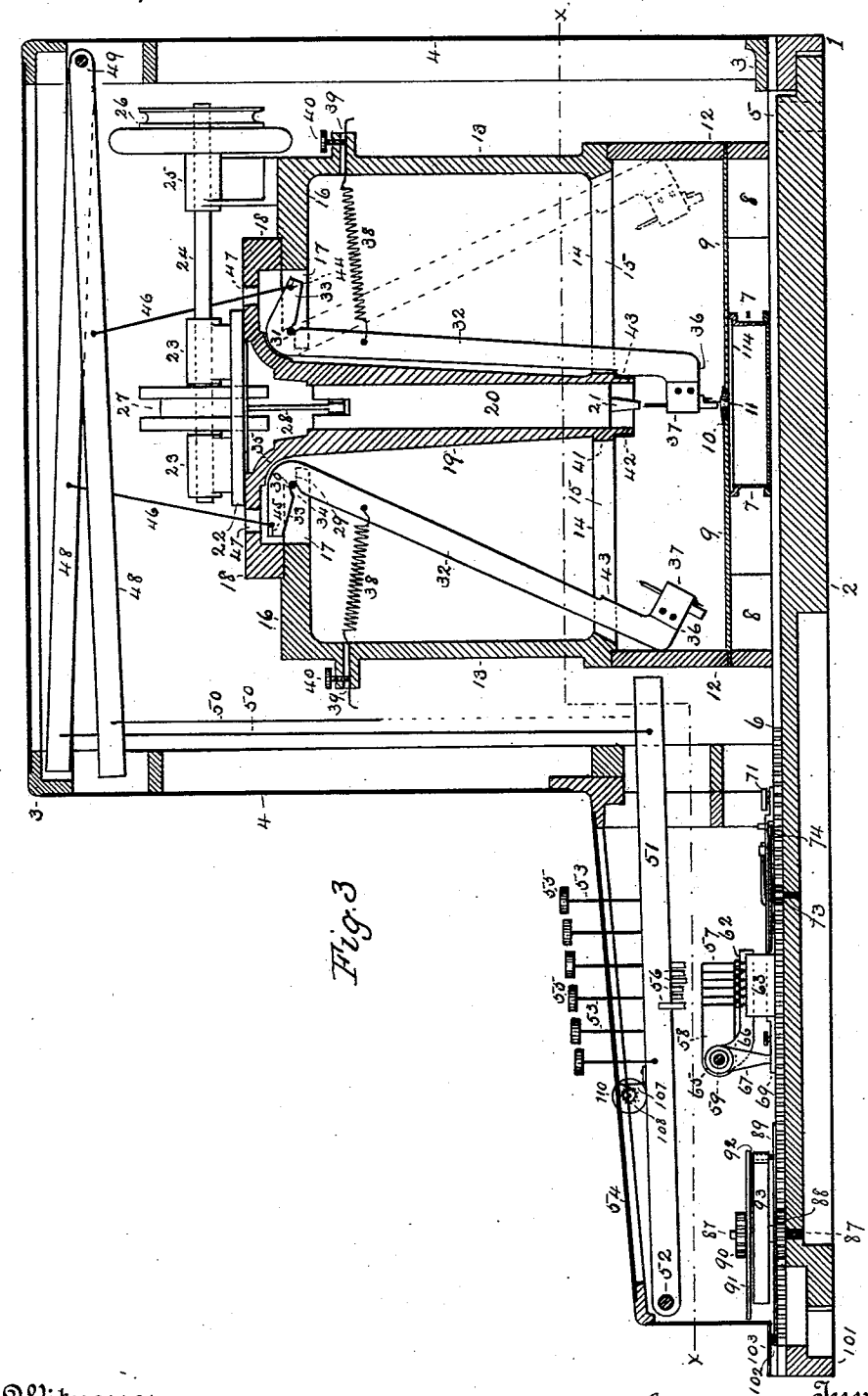

Fig. 3

Witnesses
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(No Model.) 7 Sheets—Sheet 4.

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MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

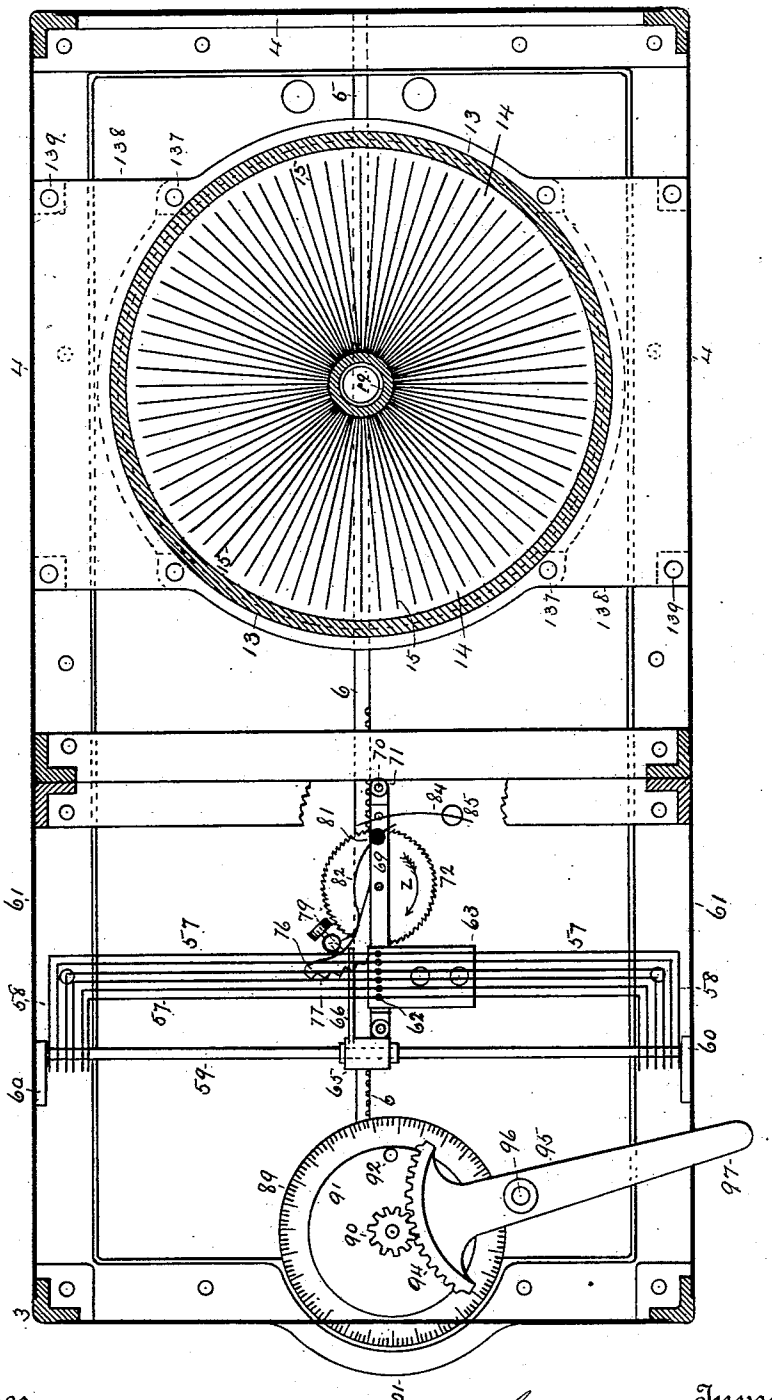

Fig. 4.

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(No Model.) 7 Sheets—Sheet 5.

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MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

Fig. 6

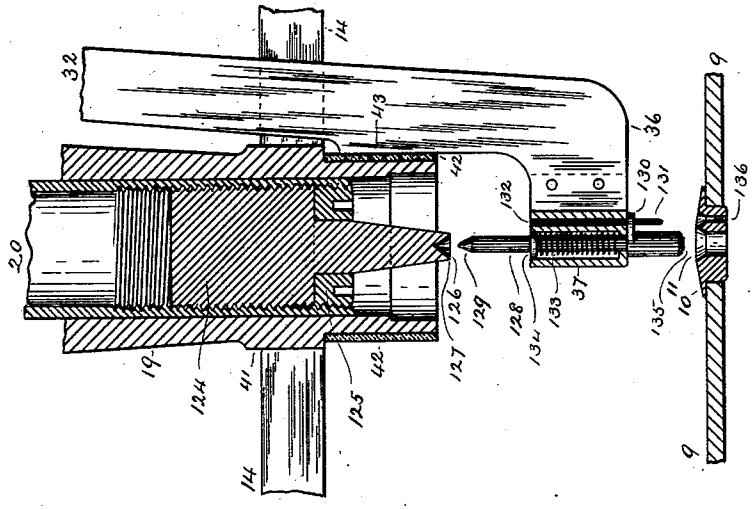


Fig. 7

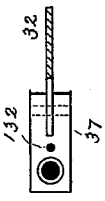
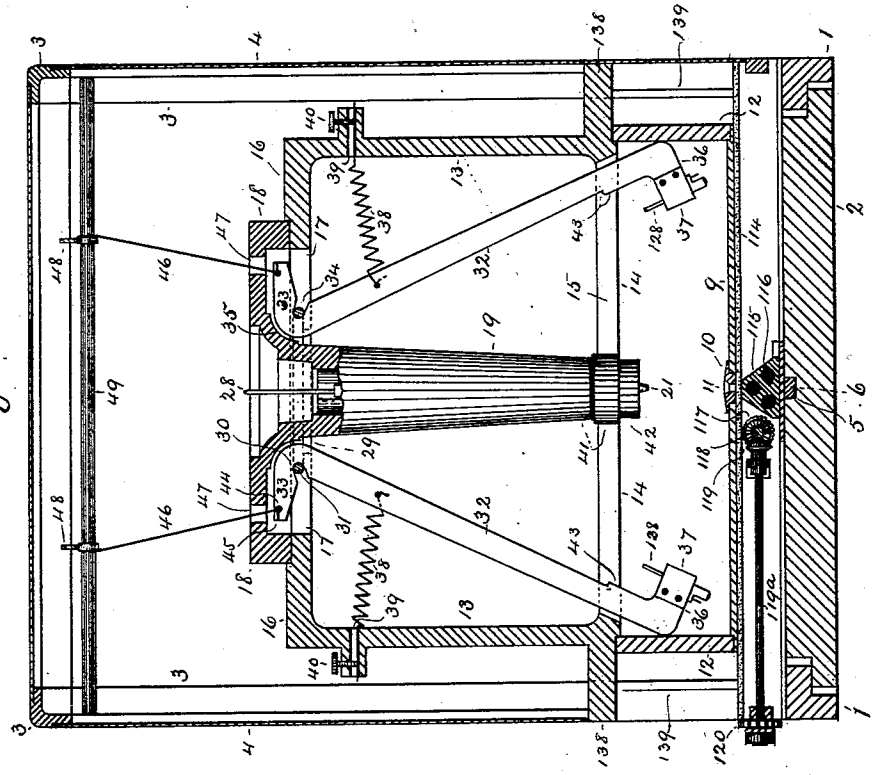


Fig. 5



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(No Model.) 7 Sheets—Sheet 6.

C. L. REDFIELD.

MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

Fig. 8

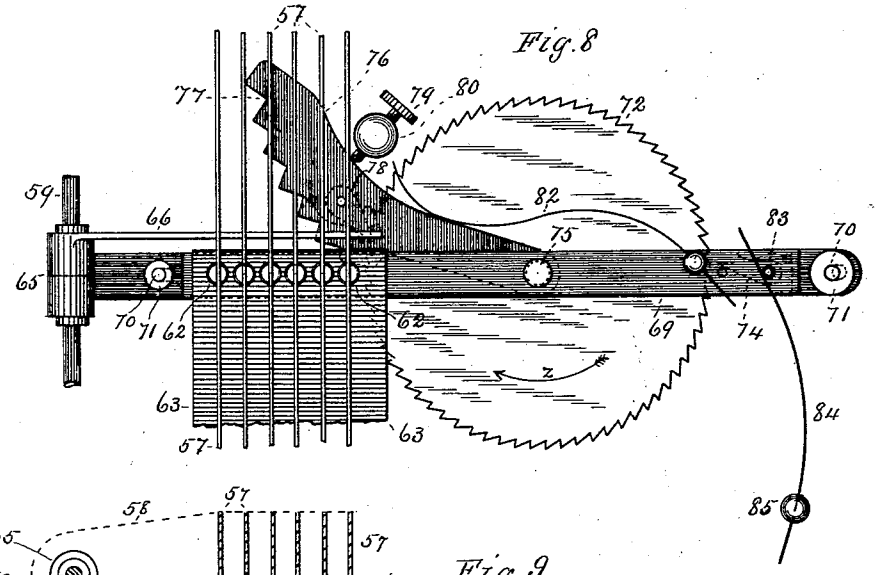


Fig. 9

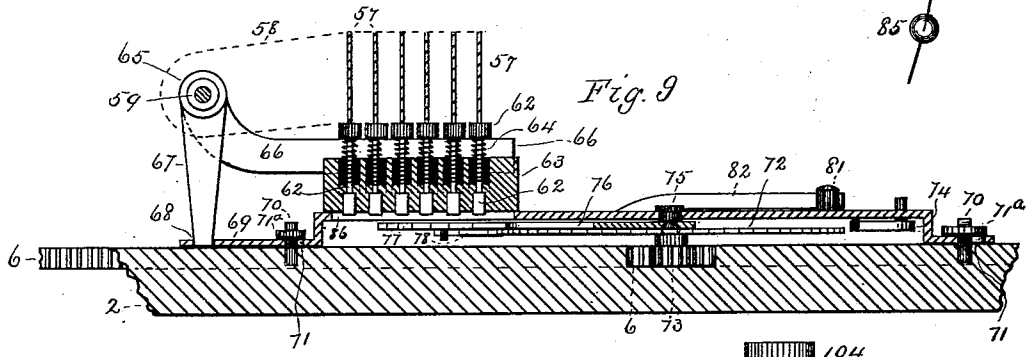
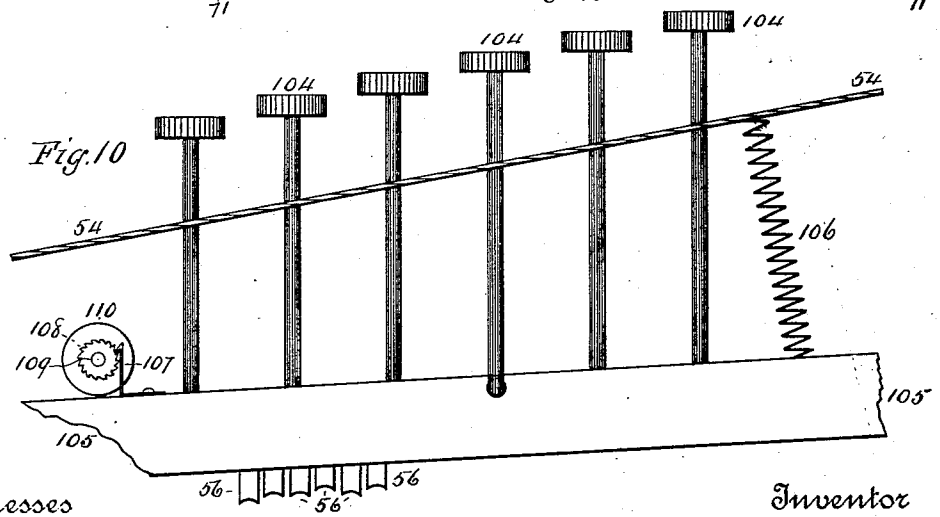


Fig. 10



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(No Model.) 7 Sheets—Sheet 7.

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MATRIX MAKING MACHINE.

No. 468,973. Patented Feb. 16, 1892.

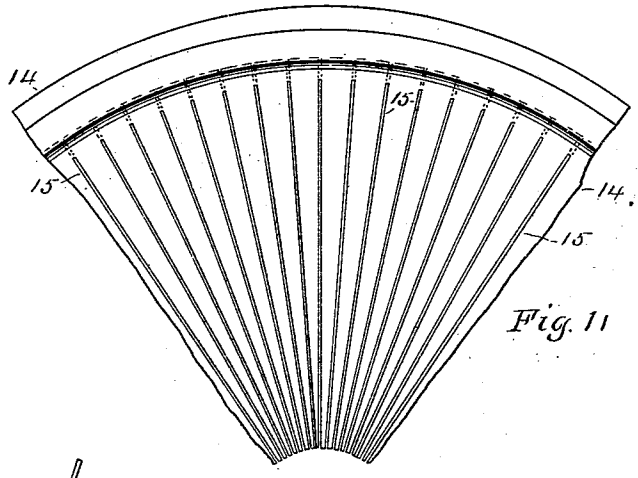


Fig. 11

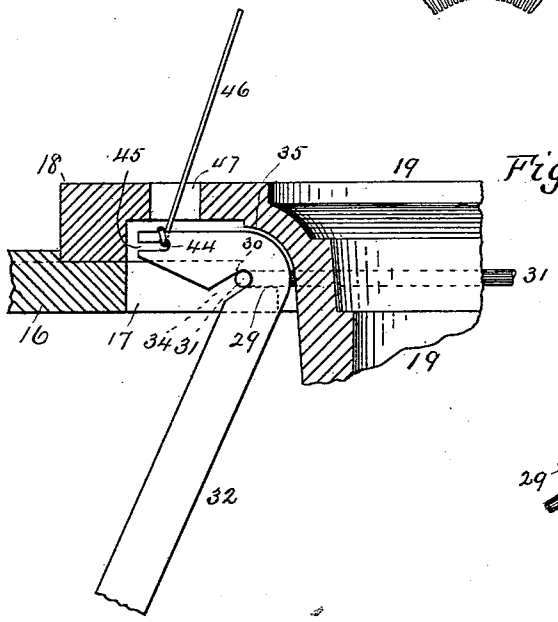
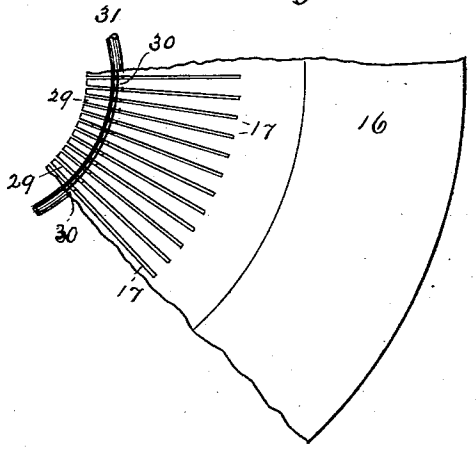


Fig. 13

Fig. 12



Witnesses

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UNITED STATES PATENT OFFICE.

CASPER L. REDFIELD, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CHICAGO MATRIX MACHINE COMPANY.

MATRIX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,973, dated February 16, 1892.

Application filed September 16, 1890. Serial No. 365,176. (No model.)

To all whom it may concern:

Be it known that I, CASPER L. REDFIELD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Matrix-Making Machines, of which the following is a specification.

My invention relates to machines operating to impress type-dies in succession into a matrix material from which plates may be cast for printing; and the object is the production of a rapid and accurately working machine that employs a separate key for each type-die. This object is accomplished by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the machine; Fig. 2, a plan; Fig. 3, a central longitudinal section showing certain interior parts in elevation. Fig. 4 is a horizontal section on the zigzag line *x x* of Fig. 3. Fig. 5 is a transverse section through the type-carrying frame, some parts being omitted. Fig. 6 is an enlarged detail of the type-die and co-operating parts; Fig. 7, a detail of the die-socket attached to the die-carrier. Fig. 8 is a plan of the feed-escapement. Fig. 9 is a central longitudinal section of the same; and Fig. 10, a sectional elevation, enlarged, showing the spacing-keys and levers. Fig. 11 is a plan view of a portion of the lower drum-head, showing the lower guide-slots for the key-levers. Fig. 12 is a plan view of a portion of the upper drum-head, showing the upper guide-slots and the pivot for the upper portion of the key-levers; and Fig. 13 is an enlarged view of the pivotal portion of one of the die-levers and connections.

The bed-plate of the machine consists of an outer shell (designated 1) and an interior removable portion 2. To the bed-plate 1 is attached a frame-work 3, having panels 4. In the interior part 2 is a longitudinal slot 5, in which is a rack 6, attached to the matrix-carriage 7, for moving it horizontally under the printing-point of the machine. At the extremes of the space in which the carriage travels are two pieces 8, which support a plate 9, that is provided with a bushing 10, having a countersunk guide-hole 11 at the printing-point for centering the dies.

On the plate 9, over the pieces 8, is mounted a ring 12, and supported on the latter is a drum-like shell 13, having in its lower head 14 radial slots 15, and in its upper head 16 similar but shorter slots 17 in the same vertical planes as the slots 15. These slots are for admitting and guiding the die-carrying levers. On the upper head 16 is seated a circular frame 18, having a tubular central part 19 extending downward through both heads of the drum 13 to form a guide for the piston 20, which carries the impressing-plunger 21, and on the top of the frame 18 is mounted another frame 22, having boxes 23 for a shaft 24. The outer end of this shaft is supported in a box 25, mounted on the drum-head 16, and is driven by means of a combined pulley and fly-wheel 26. The shaft carries an eccentric 27, which is connected to the piston 20 by a connecting-rod 28 for reciprocating it. When the machine is in use, the shaft 24 is constantly rotated, so as to keep the piston and plunger continuously reciprocating, and the die-levers are separately operated to carry the dies successively to the center to receive the thrust of the plunger for making the matrix-impressions.

The upper head 16 of the drum is recessed on top around its central opening to form a shelf 29, having an inclined shoulder or backing 30, and on this shelf and in contact with the shoulder is a ring 31, of round wire, on which are hung the type-carrying levers 32, that depend through the slots 15 and 17. The upper ends of the levers 32 are bent outward at acute angles to form arms 33, and the angles between the arms and the lever-bars are slotted, as shown at 34, to form bearings for the ring 31. By these means the levers hang loose and independent on the ring and can be separately lifted off without disturbing remaining levers on the ring. To prevent the possibility of the levers becoming displaced in operation, they are rounded at the bend, and the part of the frame 18 at which it turns into the downward extension 19 is curved, as shown at 35, so as to conform to the bend in the levers and present smooth bearings for the levers in case they are shifted slightly inward. The lower ends of the levers 32 are bent in the same planes, but in direction op-

posite the upper ends and at right angles to the straight portions to form arms 36, to which are riveted or otherwise connected the die-carrying sockets 37. In normal position the levers 32 have their lower ends resting against the ring 12, and they are held to this position by means of spiral springs 38. The springs may be given any desired tension by drawing their outer ends through holes 39 in the sides of the drum 13 and securing them in their positions of adjustment by means of set-screws 40.

The tubular piston-guide 19 has a collar 41, that fits in a central opening in the lower-drum head 14, and immediately below this collar is a band of leather or other suitable material 42, serving as a buffer or cushion for receiving the strokes of the die-carrying levers when operated and for stopping them in proper position by contact of their shoulders 43 with the buffer.

Near the outer ends of the arms 33 are holes 44 and slots 45, in which are secured the lower ends of rods 46, that extend upward through holes 47 in the frame 18 and connect the die-carrying levers 32 with horizontal levers 48, that have their ends pivoted on a shaft 49, that is secured in the frame 3. The free ends of the levers 48 are connected by wires 50 to the free ends of another set of levers 51, that are pivoted on a shaft 52 in the lower front portion of the machine. Each of these levers 51 is connected by a stem 53, which passes through the front cover-plate 54 to an operating-key 55, suitably marked to indicate the character it controls. Each lever 51 has an adjustable clip 56 attached to it and extending below and directly over one of six transverse levers 57. The levers 57 have their ends 58 bent at right angles and pivoted on a shaft 59, that is supported in brackets 60, attached to the side panels 61 of the machine-case. The levers 57 rest on the heads of pins 62, that are supported in a block 63 by springs 64.

On the shaft 59 at its center is a sleeve 65, to which are fastened two arms 66 and 67, the former extending horizontally under the levers 57 and in position to be engaged by them when they are depressed, and the latter extending downward into a slot 68 in a horizontal bar 69. The bar 69 effects the operation of a variable-feed escapement for the matrix-carriage, and the levers 57 and the pins 62 correspond in number to and determine the extent of the several feed movements. The clips 56 are attached to the respective levers 51 in position to engage the proper lever 57 for effecting the feed proportioned to the character operated by the particular lever 51. The levers 51 for all characters requiring like space have their clips arranged to co-operate with the same lever 57.

In the mechanism illustrated provision is made for six measures of feed movement; but obviously the number of measures of movement may be either increased or diminished by the mere addition or omission of devices similar to those described.

The bar 69 is capable of longitudinal reciprocation when actuated by the arm 67, and is guided in its reciprocations by posts 70, fitting in slots 71 in the bar, and is prevented from rising by nuts 71^a on the posts. The middle portion of this bar is somewhat elevated and spans a scape-wheel 72, that is fastened to the hub of a gear 73, which meshes in the rack 6. The bar 69 carries a free pawl 74 at one side of the scape-wheel, and to a pin 75 in the bar over the center of the scape-wheel is pivoted a swinging lever 76, having retreating steps 77 on its edge and a holding-pawl 78 pivoted to its under surface diametrically opposite the pawl 74. The scape-wheel 72 has an initial tension in the direction of the arrow *z*, and when the pawl 78 is in engagement with the teeth of the scape-wheel the lever 76 is carried around by the wheel until it is stopped by contact with an adjustable screw 79 on a post 80.

On the bar 69 is a post 81, to which is attached a spring 82, with a tension to move the lever 76 in a direction opposite that in which it is moved when engaged by the scape-wheel, so that when the pawl 78 is free from the teeth of the scape-wheel the lever 76 will be moved away from the screw 79 until its movement is arrested by one of the series of stop-pins 62. The bar 69 carries another post 83 on its top, against which a spring 84, that is secured to a post 85, bears and tends to move the bar toward the right, so as to cause disengagement of the pawl 74 and engagement of the pawl 78 with the scape-wheel. The portion of the bar 69 which is under the block 63 is slotted, as shown at 86, so as to permit the pins 62 to pass down through it into the path of movement of the lever 76. These pins 62 are arranged in a line radial to the scape-wheel, and as the steps 77 on the lever 76 are retreating steps the extent of the movement of the lever given it by its spring 82 is determined by the particular stop-pin that has been depressed to engage one of the steps 77 and intercept the lever movement. When one of the character-selecting keys 55 is depressed, the appropriate lever 57 is likewise depressed, projecting the pin 62, which it engages, into the path of the stepped lever, and producing a partial rotation of the arms 66 and 67. The movement of the latter of these arms moves the bar 69 toward the left against the tension of its spring 84, causing the pawl 74, which theretofore was free, to engage the scape-wheel and hold it, and releasing the pawl 78, which theretofore acted as the holding-pawl. The lever 76 is thus free to be swung on its pivot by its spring 82 until the depressed stop-pin is engaged by the corresponding step on the lever. This movement brings the pawl 78 in position to re-engage the wheel in rear of its former hold a distance of one, two, or more teeth, determinable by the location of the particular stop-pin that has been projected, and

when the lever 57 is permitted to rise upon release of the operating-key the bar 69 is retracted to its initial position, causing the pawl 78 to enter and the pawl 74 to retreat from the scape-wheel teeth, and so permitting the wheel to revolve until the lever 76 is restrained by its stop 79. The measure of this escapement is governed by the number of teeth intervening between the first and second engagements of the pawl 78.

Near the front end of the portion 2 of the bed-plate is a post 87, on which is a gear 88, that meshes with and moves the rack 6, and fastened to the gear 88 is a graduated disk 89, and above this disk and loose on the same post 87 is another gear 90, and a disk 91, in which latter is fixed a post 92, to which is attached the end of a coil-spring 93, the other end of which is fastened to the hub of the gear 88, which spring serves as the motor for the feed-escapement devices.

In mesh with the gear 90 is a segmental gear 94, formed on one arm of a lever 95, which is pivoted on a post 96 in the bed 2. The outer arm 97 of the lever passes through a slot 98 in the panel 61 of the machine-case, and the lower edge of the slot has teeth 99, that are engaged by a lip 100 on the lower face of the lever-arm 97. The object of this construction is to permit a change at will of the tension of the spring 93, and consequently the force with which the carriage 7 is moved when released by the escapement. Thus, moving the lever-arm 97 toward the front of the machine will decrease the tension of the spring 93, while moving it in the opposite direction will increase the tension. The outer portion 1 of the bed-plate has a projection 101, the inside of which is cut away to let the graduated disk 89 clear the frame, when the plates 1 and 2 are separated by lifting off the part 1. In this projecting portion 101 is a fixed pointer 102, covered by a glass plate 103. All the movements of the escapement affect the graduated disk 89, and may be read by means of the fixed pointer 102, so that at all times the sum of the feed movements may be ascertained to aid in the justification of the line of impressions.

The middle row of keys shown by the double circles 104 in Fig. 2 are spacing-keys. These are connected to levers 105, pivoted to the shaft 52, and in other respects are the same and have the same connections as the levers 51, except that they are not connected by wires or otherwise to the upper levers 48, and consequently the depression of any one of them does not operate a type-lever. To support the free ends of these levers 105 a spring 106 is provided for each lever. This spring may connect the lever with the machine-frame, or it may be a spring placed around the stem 53 of the spacing-key, as desired.

Each of the spacing-levers is provided with a spring-pawl 107, co-operating with a ratchet-wheel 108 on a transverse shaft 109, that carries a wheel 110, having graduations 111 on its rim. A slot 112 in the cover-plate 54 enables the graduations to be seen, and a fixed pointer 113 indicates the sum of the extra spaces thrown by the spacing-levers.

The graduated disk 89 and the graduated wheel 110 are used in conjunction in producing justified print from prepared copy. This conjoint use may be as follows, viz: Assuming each justified line to contain one hundred and thirty-two units of space, then when the last character of each line has been printed the dial 89 should register 132, or if it started at 132 and was run backward it should indicate at the finish 0, to show that the lines are exactly of the required length; but if the characters in words and the normal space between words of any particular line occupy a less number of units of space—as, for instance, one hundred and twenty-five units—and the copy indicates that seven extra units must be thrown in between words to produce a line of one hundred and thirty-two units in length, then the operator, when making the spaces between words, instead of striking the spacing-key controlling the normal space strikes one that controls one or more units in excess of the normal space, and the extra amount of space thus thrown in is indicated by the wheel 110. Upon reaching the last space between words in the line, if the wheel 110 does not already indicate 7, the operator strikes a spacing-key controlling enough extra space to make up the required seven extra units of space, and then finishes the line of printing. If, upon reaching the last space between words, the operator sees by the indication of the wheel 110 that the required extra spaces have already been thrown, he uses the key controlling the normal space. Upon completion of the line of printing the indicators 89 and 110 are examined, and if the former shows the line to be finished at the proper point and the latter that the number of extra units indicated by the copy have been added to the normal space between words it will be apparent that the work is correct and needs no proof-reading or correction. If, on the other hand, the indicator 110 shows the proper amount of extra space as being thrown in, but the indicator 89 shows that the line does not terminate at the proper point, but contains more or less than the required number of units, the operator's attention is thus called to the fact that there is an error somewhere in the last line of print, and by comparing the work with the copy he is enabled to locate and correct the error before proceeding further. Thus it will be seen that by the conjoint use of the indicators 89 and 110, when using prepared copy, the operator is enabled not only to justify the lines of printing, but to accomplish the justification without the work of proof-reading and without loss of time.

The matrix-carriage 7 has a movement lengthwise of the machine only, and is advanced by the rack to space for the impressions in a line. The matrix-body 114 rests

upon an anvil 115, that has holes 116 through it to lighten it. The matrix material is fed to space for lines of impressions by means of the toothed wheels 117 on a shaft 118, which has motion imparted to it by bevel-gears 119, connecting it with a shaft 119^a. At the outer end of the latter shaft is a ratchet-wheel 120, actuated by a pawl 121 on a lever 122, and the lever is retracted by a spring 123, that is attached to a post 123^a on a cross-bar of the carriage 7. The depression of the lever causes the pawl it carries to engage the ratchet-wheel and cause it to turn the shaft 118, thereby causing the toothed wheels to engage the matrix-strip at its under side and advance it the proper distance to space for a line.

The piston 20 is made hollow for the sake of lightness, and the plunger 21 has an enlarged body 124, that screws into the piston and is held in position by a jam-nut 125. The lower end of the plunger has a tapering recess 126 and its face surrounding the recess is reduced to a narrow edge 127. The stem 128 of the type-die has its upper end 129 of conical form to fit in and be engaged by the walls of the plunger-recess 126, so as to bring the axes of the plunger and die in line when in contact. This construction enables a die to be thrown under the impressing device while the latter is rapidly reciprocating and insures that it will either catch in the countersink 126, and thus be accurately depressed at the printing-point, or it will slip outside the plunger and be held there until the next plunger reciprocation.

The die-stem 128 has a flange 130 at one side, in which is secured a pin 131 parallel to the stem, and in the socket-piece 37 is a guide-hole 132 for the pin. The die is supported in its socket by a spring 133, seated on the bottom of the socket and bearing against a collar 134 on the die-stem. The lower end of the die is beveled, as shown at 135, to correspond with the countersunk guide-hole 11 in the plate overlying the matrix material. Adjacent to this countersink is a guide-hole 136 for the pin 131. The die is thus guided at its upper end by means of the recess in the plunger and at its lower end by the countersunk guide-hole and the pin and its guide-holes in the die-socket and plate, so as to insure its exact presentation at the printing-point.

The pieces 8 and the plate 9, the ring 12 and the drum 13 are all secured to the central section 2 of the bed-plate by bolts 137, that pass upward through ears on each of said parts. In addition to this fastening the drum 13 has flanges 138, projecting outward at the sides, and these are supported on the outside section 1 of the bed-plate by the four posts 139. The object of this construction is to enable the parts 1, 8, 9, and 12 to be removed without disturbing the drum 13 or the die-carrying levers 32, and so enabling the dies to be removed and repaired when desired.

In use the operation of the machine is as follows: The plunger 21 being rapidly reciprocated, the operator depresses a selected key 55, which transmits motion to the lever 51 and by the wire 50 to the corresponding lever 48, thence through the rod 46 to the arm 33 of the die-carrying lever 32. The latter lever is thus swung toward the center until its shoulder 43 comes in contact with the buffer 42, and before the die can be withdrawn by releasing the key it is caught by the plunger 21 and is forced down through the guide-hole 11 into the matrix material on the carriage 7. Immediately upon the release of the key and the rising of the plunger 21 the die-carrying lever 32 is drawn back against the ring 12 by the action of its spring 38. The depression of the lever 51 causes its clip 56 to descend upon the lever 57, over which it is located, and depress it. The lever 57 in turn engages and depresses the pin 62, on which it rests, and forces the lower end of the pin down through the slot in the bar 69 and into the path of the stepped lever 76, and this depression of the lever 57 causes it to engage and depress the arm 66, and thus turn the sleeve 65 and with it the arm 67, which serves to slide the bar 69 toward the left. Such movement of the bar 69 frees the pawl 78 from engagement and causes the pawl 74 to engage the scape-wheel and hold it until the operating-key is released and the bar is permitted to be returned toward the right by its retracting-spring 84. The release of the pawl 78 allows the stepped lever 76 to be swung around by its spring 82 until the proper step 77 comes in contact with the particular pin 62 that has been depressed by the operation of the selected character-key. The result of this operation is that the escapement appropriate for the character selected occurs after the impression has been made instead of before. In manipulating the spacing-keys for throwing in extra spaces between words or letters all of the operations follow that occur when a character-key is struck, except that a die is not presented to the printing-point, and the register-wheel 109 is operated to indicate the sum of the spaces thrown.

What I herein claim, and desire to secure by Letters Patent, is—

1. The combination, with the variable escapement mechanism, of the movable stop-pins, the levers for operating them, an oscillating device, one arm of which is moved by said levers to move another arm, and a pawl-carrier arranged to be reciprocated by the movements of the latter arm, substantially as set forth.

2. In a matrix-machine feed-escapement, a sliding bar carrying a temporary holding-pawl at one side of the scape-wheel and a pivoted lever having a pawl at the opposite side, means whereby the reciprocation of said bar will permit variable escapements, a pair of rigidly-connected pivoted arms, one of which engages said bar to reciprocate it, and suitable connections whereby the other arm is moved upon the manipulation of any of the

operating-keys of the machine, substantially as set forth.

3. The combination, with a scape-wheel under tension, of a bar having a pawl at one side of the wheel, a lever pivoted on the bar and carrying a pawl opposite the first, an adjustable stop for limiting the lever movement in the direction of the wheel-tension, a spring for moving the lever in opposite direction, movable stops for varying the travel in the latter direction, a spring for moving the bar in one direction, and levers for retracting it and for operating the movable stops, substantially as set forth.

4. In a matrix-machine, a feed-escapement actuated by a rack and pinion, a motor-spring for moving the rack, a gear and connections for varying the tension of the spring, and a pivoted lever operating a toothed segment for turning such gear, substantially as set forth.

5. A drum having upper and lower heads provided with radial slots and central openings, a tubular guide for a piston in the latter openings, and swinging type-carrying levers in said slots, substantially as set forth.

6. A frame having radial slots extending from a central opening, a continuous circular shaft surrounding such opening, angular type-levers in said slots and pivoted on said shaft, and a piston-guide located in the opening and serving to prevent unseating of the levers, substantially as set forth.

7. The combination, with the supporting-frame having the central openings and supporting the die-levers, of the removable piston-guide pendent therein, substantially as set forth.

8. In combination, the frame for supporting the die-levers and providing radial guides therefor, the tubular piston-guide hung centrally therein, the piston, and the devices for reciprocating it mounted on said tubular guide, substantially as set forth.

9. In a variable-feed escapement for a matrix-machine, movable stop-pins, levers for operating them, an oscillating device one arm of which is moved by said levers to move another arm, a pawl-carrier arranged to be reciprocated by the movements of the latter arm, a series of character-keys co-operating with said levers, and a series of spacing-keys also co-operating with said levers, whereby letters and words may be suitably spaced to justify lines of impressions, substantially as set forth.

10. A series of independently-movable carriers having type-dies adapted to slide therein, a continuously-reciprocating impression device, and means for moving the carriers to present the dies in succession to the impression device.

11. A lever pivoted at or near one end, a socket at the other end carrying a sliding type-die, a guide for the lever between the pivot and socket, and a guide for the type-die at the printing-point.

12. A series of carriers movable independently of each other and having type-dies movable axially and independently of their carriers, means for moving any carrier toward a common printing-point, a guiding device, and means for stopping each carrier and its die when adjacent to but slightly removed from the guiding device.

13. A series of carriers, each having a type-die adapted to slide in its carrier, a corresponding series of hand-keys and connections for moving the dies separately to a common printing-point, a common stop for all the carriers, a rigid guiding device at the printing-point, and an independently-operated impression device adapted to thrust the dies through the guiding device.

14. A series of type-die carriers laterally movable toward a common center, a common stop for all of them to present the dies in succession at the center, and means for causing the dies to reciprocate axially in their carriers.

15. Type-carriers, a reciprocating impression device, a guide therefor, and means thereon for stopping the carriers to present the dies at the printing point.

16. A cylindrical support for the die-levers, providing radial slots extending the length of the lever movements to guide them, and a central tubular guide for an impressing device, substantially as set forth.

17. The combination, with an unyielding device at the printing-point for centering a die-head and a reciprocating impression device adapted to center the die-stem while thrusting it, of a type-die arranged to slide in its carrier, and a carrier therefor adapted to present the die between the guiding device and impression device and to permit it to be centered and impressed.

18. A series of independently-movable carriers carrying type-dies adapted to slide therein, a reciprocating impression device, a guiding device for the dies at the printing-point, and means for moving the carriers to present the dies in succession between the impressing and guiding devices.

19. In a matrix-machine, a series of type-dies arranged to slide in their carriers, independent carriers therefor, operating keys and connections for successively presenting the dies at a common point and holding their carriers in fixed position, a variable-feed mechanism controlled by the operating-keys, and an independent automatic impression device operating at the point of presentation of the dies.

20. An unyielding support providing a fixed guiding-aperture at the printing-point, an impression device operating opposite such point, a series of independent carriers having type-dies adapted to engage and be guided by the walls of said aperture, and hand-keys and connections for actuating said carriers.

21. In a matrix-machine, a series of die-carriers pivoted to swing separately to a common center, type-dies carried thereby and arranged to slide axially in their carriers, means

at the printing-point for guiding them, a reciprocating impression device for thrusting them when presented, a matrix-carriage, a variable-feed mechanism therefor, a bank of keys, and operative connections between the keys and die-carriers and feed mechanism, substantially as set forth.

22. In a matrix-machine, an unyielding device adapted to center the head of a type-die, a separate moving device adapted to engage and center the stem of the die and to thrust it, and separately-movable die-carriers for successively interposing the dies between said two guiding devices.

23. An unyielding guiding device at the printing-point, and a series of independently-movable carriers adapted to present the dies in proximity to such device, in combination with an independent device adapted to thrust the dies through the guiding device.

24. An unyielding device adapted to accurately guide the head of a type-die at the printing-point, a series of carriers adapted to successively present and loosely hold dies at such point, and an impression device adapted to thrust the presented dies through the guiding device and to guide the engaged end while making the thrust.

25. A series of levers and pivotal supports therefor, spring-supported type-dies held by and adapted to slide in the levers, an unyielding guiding device for the dies at the printing-point, means for operating the levers to present selected dies in succession in front of the guiding device, and an independently-operating impression device adapted to engage the dies so presented and thrust them to uniform depth through said guiding device.

26. Separately-movable levers carrying sliding type-dies, hand-keys and connections for throwing the levers to present the dies at a common printing-point, a fixed device at such point providing a die-centering aperture, an automatic impression device, and means for stopping the carriers when their dies are between the impression device and centering-aperture and are adjacent to but separate from the centering device.

27. A series of spring-supported type-dies loosely held in a series of independently-movable carriers, a corresponding series of hand-keys and connections for presenting the dies at a printing-point, an unyielding device at the printing-point, adapted to center and guide the dies and prevent them from turning, and an impression device adapted to thrust the dies into and through the guiding device and to center and guide the reverse ends of the dies while making such thrusts.

28. An independent type-carrier socket, a spring-supported type-die loosely held therein and adapted to slide in and be loosely guided by said socket, an impression device adapted to center and guide the upper end of the die while thrusting it to cause it to slide in said socket, and a rigidly-supported device adapted to receive and accurately guide the head of the die while being thrust therein by the impression device.

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Witnesses:
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