

921,600.

9 SHEETS—SHEET 1.

FIG. 1.



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ATTY.

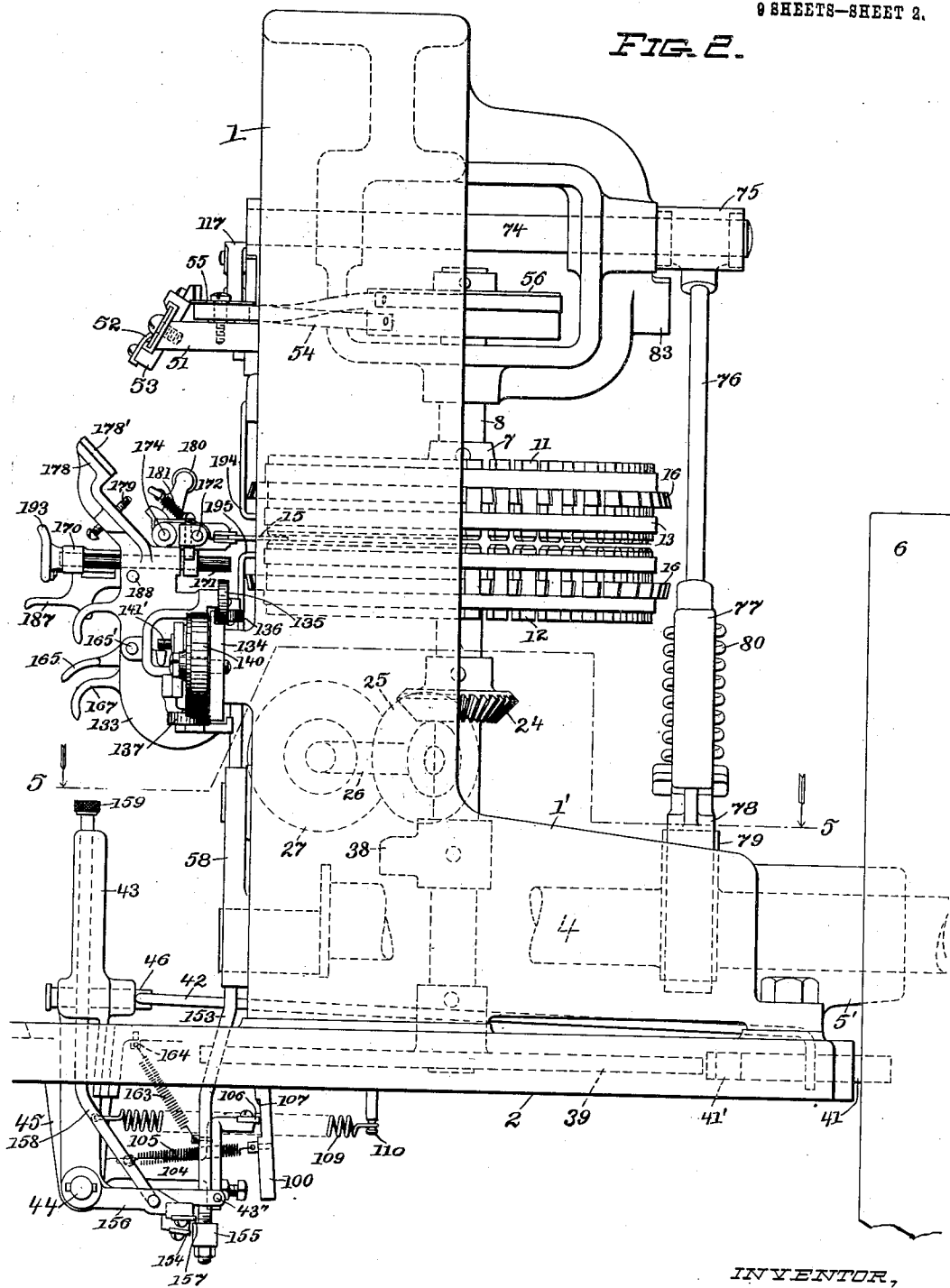
J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
APPLICATION FILED JUNE 15, 1908.

921,600.

Patented May 11, 1909.

9 SHEETS—SHEET 2.

FIG. 2.



WITNESSES.

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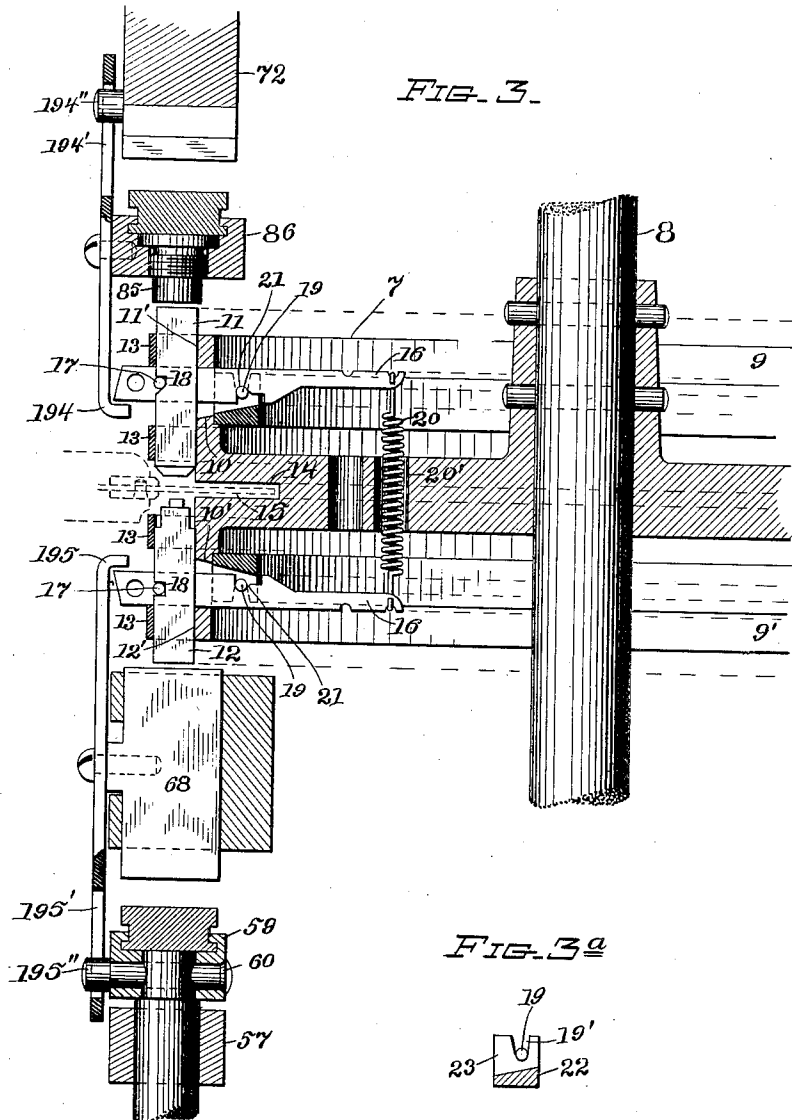
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WITNESSES.

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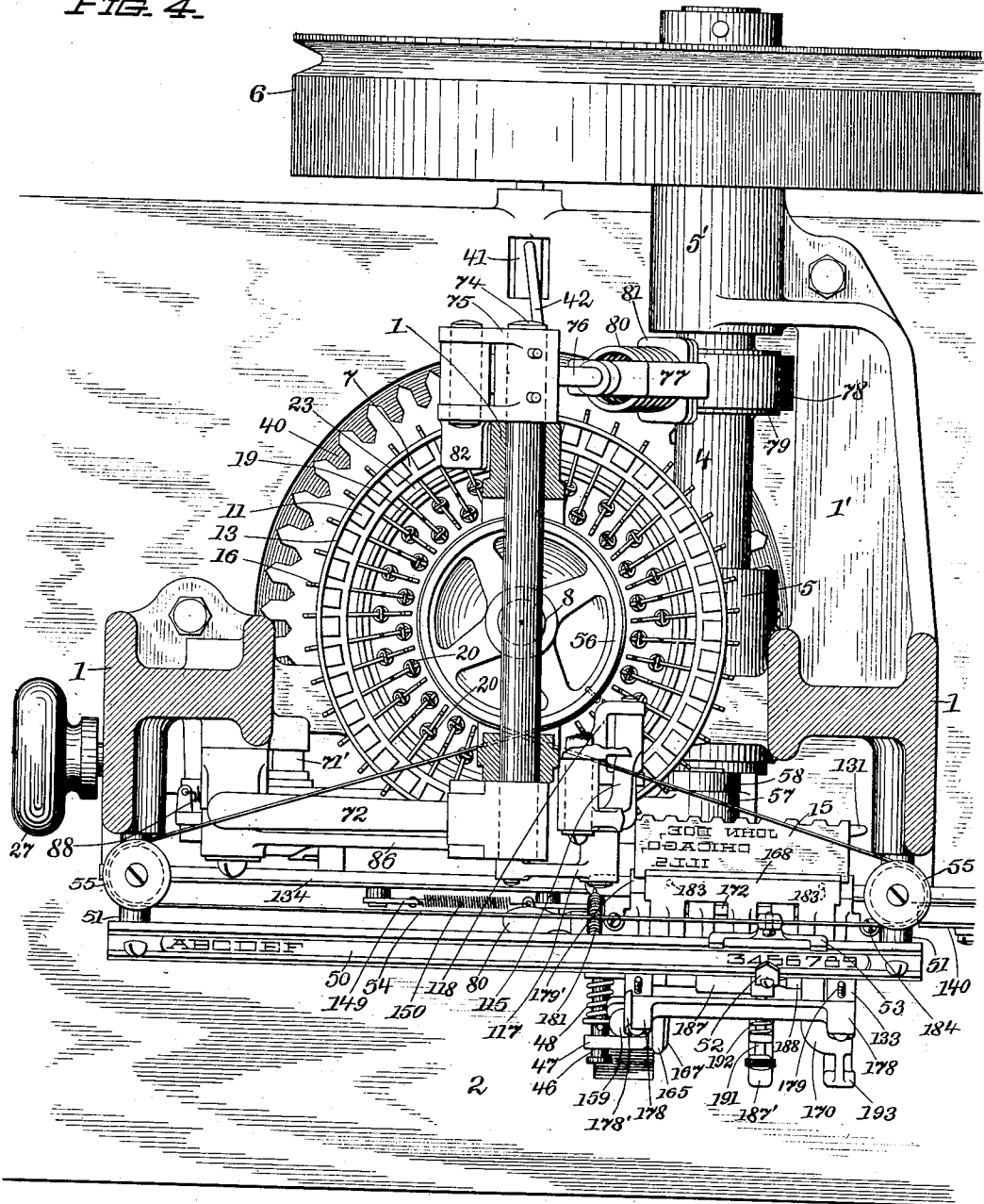
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FIG. 4.



WITNESSES.

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FIG. 5.



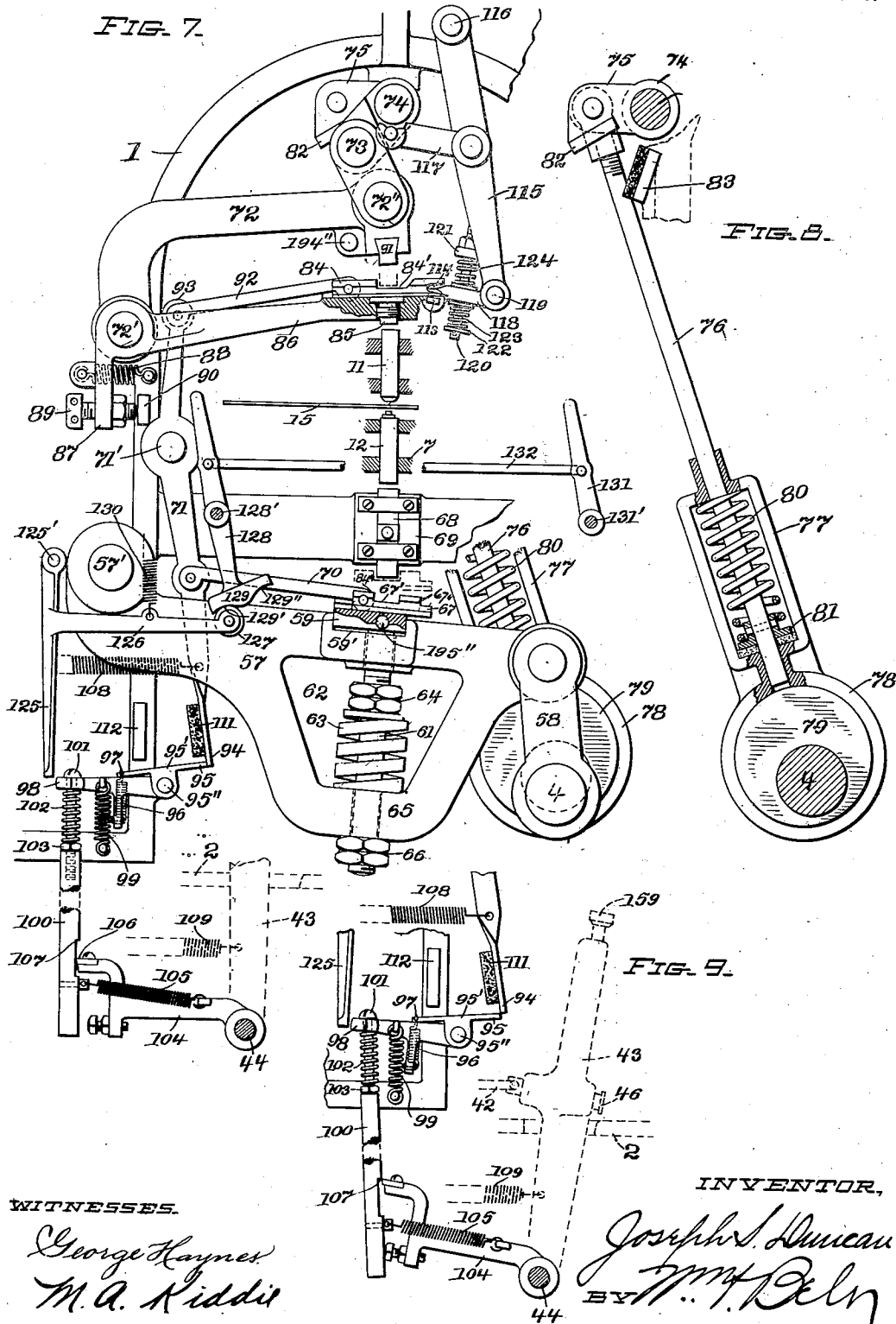
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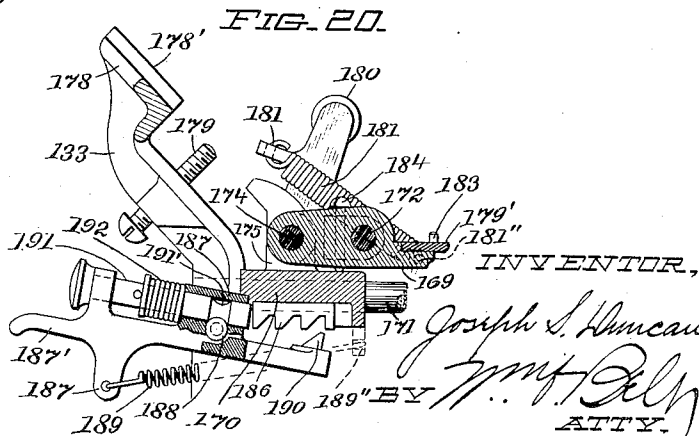
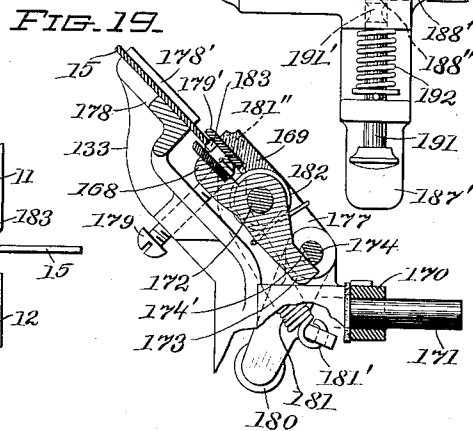
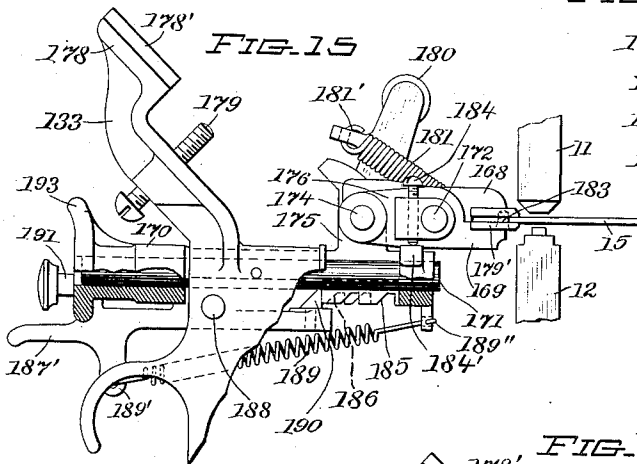
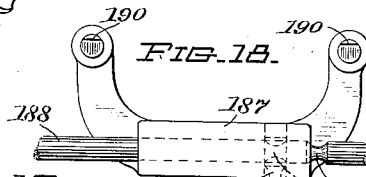
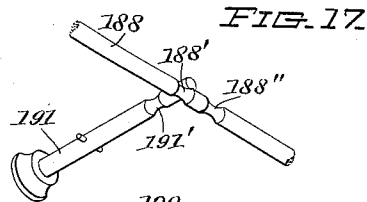
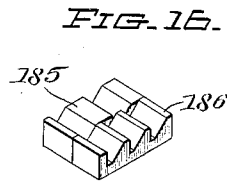
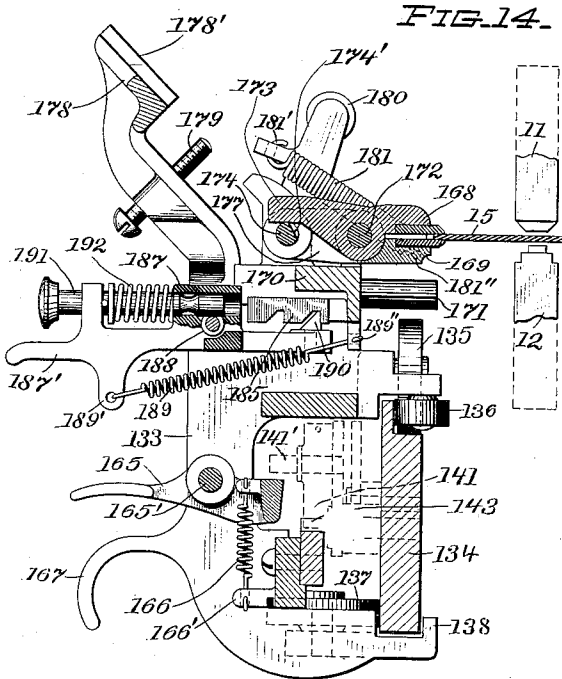
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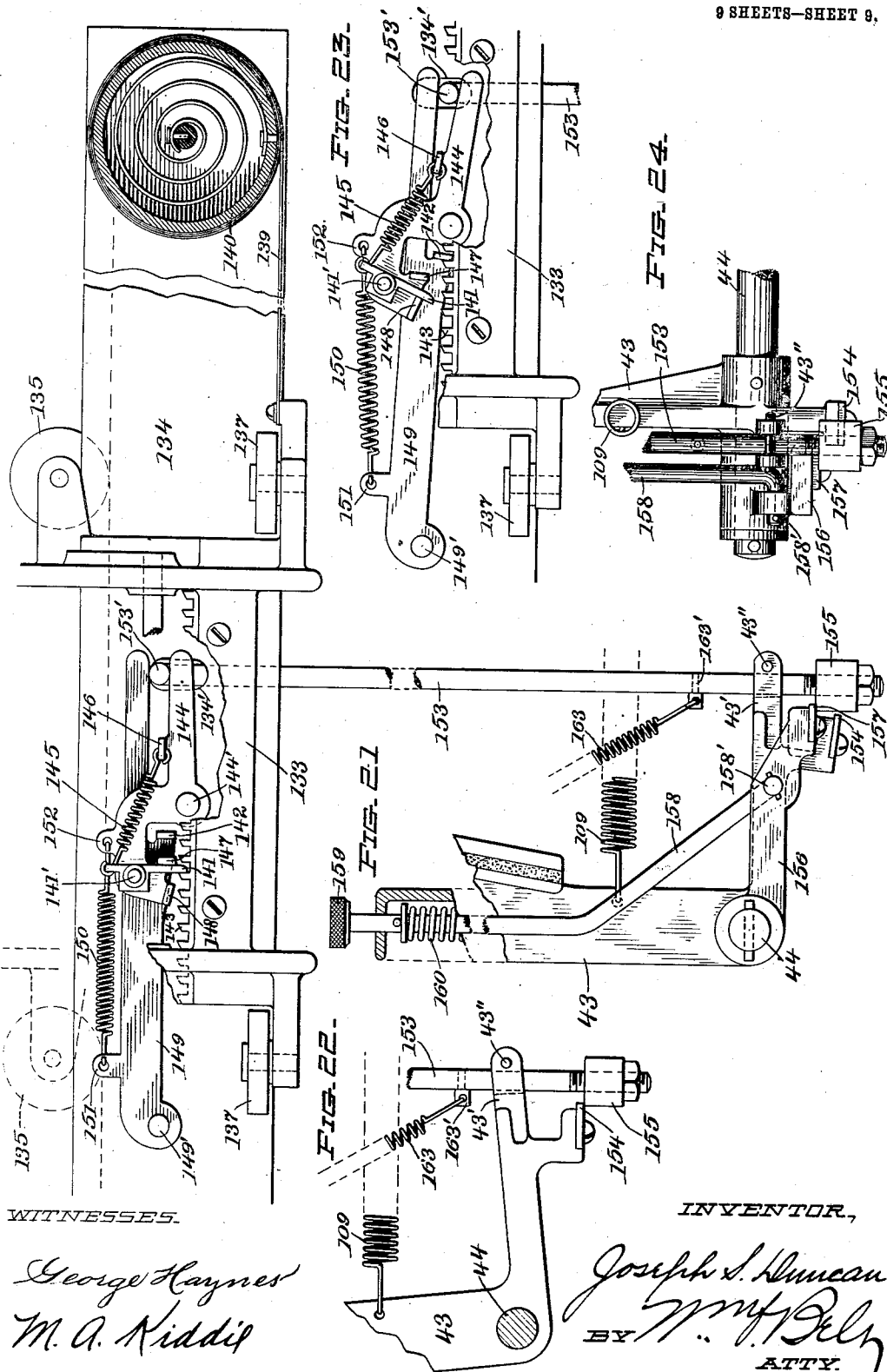
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9 SHEETS—SHEET 9.



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UNITED STATES PATENT OFFICE.

JOSEPH S. DUNCAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO ADDRESSOGRAPH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MACHINE FOR MAKING PRINTING-PLATES.

No. 921,600.

Specification of Letters Patent.

Patented May 11, 1909.

Application filed June 15, 1908. Serial No. 438,532.

To all whom it may concern:

Be it known that I, JOSEPH S. DUNCAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Machines for Making Printing-Plates, of which the following is a specification.

This invention relates to machines for making printing plates by stamping or pressing printing characters up directly from the plate itself, these plates being preferably made of metal and used more especially in address printing machines.

In my Patents No. 624,764, No. 638,176 and No. 750,831 I have shown and described machines for making printing plates on an extensive scale for the trade, and in my application Serial No. 388,191, filed August 12, 1907 I have shown and described a machine for use on a comparatively small scale by owners of addressing machines. The machines used for making plates for the trade, called "factory" machines, are large, heavy and constructed for hard and continuous work. The machine covered by said application, called an "office" machine, is smaller, lighter and easier to operate than the factory machines. As the latter machine is intended for general use in offices, especially where addressing machines are used, it is desirable to make it as simple in construction and as easy to operate as may be possible so that satisfactory results may be obtained from the use of the machine even though it is operated by an unskilled boy or girl and at irregular intervals.

The invention has for its object, therefore, to provide a machine of simple construction for making printing plates and adapted for use in offices where they will be operated by persons not especially skilled and at more or less irregular intervals.

A further object of the invention is to provide a machine of strong and substantial construction but light in weight and of compact form and size which can be manufactured at a comparatively low cost and operated rapidly.

A further object of the invention is to provide a continuously running machine in which the punch and die to be operated are carried to operative position by one manual movement and then locked in operative po-

sition and caused to operate by another manual movement.

The invention also has other objects in view which will appear hereinafter in the detail description of the embodiment of the invention illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine, the usual supporting legs being omitted and the driving pulley being partly broken away. Fig. 2 is a right side elevation of the machine. Fig. 3 is a detail enlarged vertical sectional view through the die head and devices for operating the punch and die. Fig. 3^a is a detail sectional view. Fig. 4 is a top plan view of the machine, the top of the frame being cut away to more clearly show the working parts. Fig. 5 is a horizontal sectional view taken below the die head to show the register wheel and the means for rotating the die head. Fig. 6 is a detail perspective view of the cushion stop for the vertical shaft. Fig. 7 is a diagrammatic view showing the devices for operating the punch and die in normal position at rest. Fig. 8 is a detail view, partly in section of the connecting rod for operating the die shaft. Fig. 9 is a detail diagrammatic view showing the tripper just about to be tripped. Fig. 10 is a view similar to Fig. 7 but showing the punch and die in operative engagement with the plate. Fig. 11 is a view similar to Fig. 8 but showing the parts in position to correspond with Fig. 10. Fig. 12 is a sectional view on the line 12—12 of Fig. 10. Fig. 13 is a sectional view on the line 13—13 of Fig. 10. Fig. 14 is a vertical sectional view through the carriage on the line 14—14 of Fig. 1. Fig. 15 is a right side view of the carriage, partly broken away and in section. Fig. 16 is an inverted perspective detail view of the toothed line spacing blocks. Figs. 17 and 18 are detail views showing parts of the line spacing mechanism. Fig. 19 is a transverse sectional view through the upper portion of the carriage and showing the plate clamping jaws thrown back and in open position. Fig. 20 is a transverse sectional view through the upper portion of the carriage and showing the line spacing mechanism in a different position. Fig. 21 is an enlarged diagrammatic view showing the carriage feeding or character spacing mech-

anism. Fig. 22 is a detail view showing the foot 154 engaged with the trip block 155. Fig. 23 is a detail view of the feeding mechanism showing the feed dog lifted out of engagement and the locking dog in engagement with the rack. Fig. 24 is a detail front view of the lower portion of Fig. 21.

Referring to the drawings, the frame of the machine comprises a yoke 1 mounted on a bed 2 which may be supported on legs or in any other suitable manner. A driving shaft 4 is journaled in bearings, one of which 5 is on the yoke and the other of which 5' is on a bracket 1' integral with the yoke (Fig. 4). The driving shaft carries a belt pulley 6 which is made heavy to act as a fly wheel. A die head 7 (Fig. 3) is rigidly secured on a vertical shaft 8 mounted to turn in the yoke. This die head is provided at its top and bottom with recesses 9, 9' and with a plurality of radial slots 10, 10'. A plurality of dies 11 and punches 12 are oppositely disposed peripherally on the die head in guide-ways 11', 12'. These guide-ways are formed by peripheral slots in the die head and the punches and dies are held in place in said slots by the rings 13 which are fastened to the die head. The die head has a peripheral slot 14 to receive the plate 15 in which the characters are to be stamped. The punches and dies are held separated by stripper levers 16 arranged in the slots 10, 10' and provided with lateral pins 17 which engage sockets 18 in the dies and sockets 18' in the punches. The levers 16 operate on a fulcrum ring 19 and a spring 20 is attached to the rear end of each pair of punch and die levers and extends through an opening 20' in the die head. The springs operate on the levers 17 to hold the punch and die normally separated to leave the slot 14 free to receive a printing plate, to permit the printing plate to be adjusted and to permit the die head to turn while the printing plate is supported in said slot.

Each stripper lever 16 is provided with a socket 21 to receive the fulcrum ring 19. This ring rests in a recess 19' in the circular support 22 arranged within each recess 9, 9' in the head, and is provided with transverse slots 23 to receive the levers 16 (Fig. 3^a).

The vertical shaft 8 carries a bevel gear 24 which meshes with a similar gear 25 on a die head operating shaft 26 (Fig. 5). This operating shaft is supported in the yoke of the frame and carries a suitable handle 27. In the drawings I have shown this shaft made in two parts with a universal joint 28 but this is not essential and the shaft may be made in one part and otherwise arranged than is shown in Fig. 5, if desired.

The die head can be moved rotatively a complete turn, but not more than one turn, and I provide a cushion stop to limit the rotary movement. This stop is shown clearly in Figs. 5 and 6 and referring thereto it com-

prises a plate 29 provided with a hollow boss 30 to receive the pivot pin 31 on a cross bar 32 integral with the yoke. The plate 29 has two studs 33 and a spring 34 of angular form is arranged between the studs 33 and the boss 30. The ends of the spring project beyond the studs 33, 33' to engage pins 35, 35' on the cross bar 32. The plate 29 also has shoulders 36 which will engage the ends of the spring. A tooth 37 on the cushion plate 29 is arranged to be engaged by a tooth 38 mounted on the shaft 8. When the tooth 38 is carried into engagement with the tooth 37, by turning the vertical shaft 8 in one direction, the stop plate 29 will be swung to the right (Fig. 5) and the stud 33 will engage the adjacent end of the spring 34 while the other end of the spring engages the pin 35'. When the vertical shaft is turned in the other direction the tooth 38 will engage the other side of tooth 37 and swing the stop plate 29 to the left (Fig. 5), carrying the stud 33' against the adjacent end of the spring and the other end of the spring against the pin 35. The engagement of the stud 33 or the stud 33' with the spring, while the latter is bearing against the pin 35', or the pin 35, provides a yielding stop to limit the rotary movement of the die head and prevent the die head from rotating more than a full turn and also relieves the machine of shock and jar.

A register wheel 39 is rigidly mounted on the lower end of the vertical shaft 8 and is provided peripherally with a plurality of notches 40 (Fig. 5) which correspond in number and location to the pairs of punches and dies. A locking bolt 41 is slidably supported in the base and is yieldingly connected by a rod 42 to a handle lever 43 which is rigidly mounted on a handle shaft 44 supported in hangers 45 depending from the base (Fig. 2). The rod 42 is connected to a pin 46 which is arranged to slide in lugs 47 on the handle lever 43 and a spring 48 is arranged on said pin between said lugs. The notches 40 are wedge-shaped and the end 41' of the locking bolt is similarly shaped to fit in the notches. The yielding connection between the handle lever and the rod 42 is provided so that the movement of the handle lever may be continued after the locking bolt has reached its seat in the notch. When the die head has been rotated by operating the handle 27 to bring the desired punch and die into operative position the handle lever 43 is swung to throw the locking bolt into engagement with the register wheel and thus lock the die head with a punch and die in position to stamp upon an interposed plate. The handle is returned to normal position and the locking bolt 41 is retracted from engagement with the register wheel by a spring 109 (Fig. 7).

An indicator bar 50 (Figs. 1, 4) is supported transversely of the machine on projections 51 extending forwardly from the

yoke and the characters to be stamped are printed or otherwise applied to this bar in accordance with the manner in which the punches and dies are arranged in the die head. An indicator 52 is carried by a slide 53 which travels on the bar 50 and is attached to a ribbon 54. The ribbon travels over pulleys 55 mounted on the projections 51 and over a wheel 56 mounted on the vertical shaft 8. The ribbon is crossed in front of the wheel 56 and passes around the wheel once or twice as may be required to give the proper travel of the indicator from end to end of the indicator bar. The ribbon is fastened at one point to the wheel 56, and this point would be located in alinement with the indicator when the latter is midway between the end characters on the indicator bar. It will be readily understood that the indicator 52 will travel along the indicator bar as the die head is turned and that it will register with the character thereon corresponding to the punch and die bearing said character when the latter have been brought into operative relation to the interposed plate 15.

A punch operating lever 57 (Figs. 1, 7) is pivoted at one end to the yoke at 57' and its other end is connected by a link 58 to the crank end of the driving shaft 4. A head 59 is seated in a recess 59' in the lever and is fastened by a pin 60 to a bolt 61 which extends through the lever. The lever 57 is provided with an opening 62, and a spring 63 is arranged on the bolt 61 in said opening between nuts 64 on the bolt and the lower part 65 of the lever. The bolt projects through the part 65 and carries the nuts 66. By adjusting the nuts 66 the bolt can be adjusted lengthwise in the lever and by adjusting the nuts 64 the tension of the spring 63 can be adjusted. A shuttle block 67 having a recess 67' and a shoulder 67 is arranged to slide on the head 59, one part being provided with flanges to fit in grooves in the other part. A punch stock 68 is arranged to slide vertically in a cross bar 69 on the yoke, and its lower end is engaged by the recess or the shoulder of the shuttle. A link 70 connects the shuttle block 67 to an oscillating lever 71 which is pivoted at 71' to the yoke.

A die operating lever 72 (Figs. 1, 7) is pivotally mounted at one end on a stud 72' on the yoke. The other end 72'' of the lever 72 is connected by a toggle joint 73 to the die operating shaft 74 which is supported in the yoke at the top thereof. This shaft carries a crank arm 75 at its rear end (Figs. 4, 8) and a rod 76 is connected to said arm and extends through a skeleton frame 77 on an eccentric strap 78 which is arranged on an eccentric 79 mounted on the main driving shaft 4. A spring 80 is arranged on said rod within said frame and this spring bears against the upper end of the frame and against a collar 81, pinned to the rod 76 at the lower end of the

frame. A lug 82 is made integral with the crank arm 75 and it is arranged to engage a cushion stop 83 on the yoke. If the eccentric strap 78 has not reached the downward limit of its movement when the crank arm 82 comes to rest against the stop 83 further movement will be permitted by the spring 80 which forms a yielding connection between the crank arm 75 and eccentric strap 78.

A shuttle block 84 is arranged to slide above a die stock 85 mounted in an arm 86 which is pivotally mounted on the shaft 72'. The arm 86 has a projection 87 and a spring 88 is connected to this projection and to the yoke 1 to hold the arm in lifted position with the die stock out of engagement with the die. A screw stop 89 is arranged in the projection 87 to engage a lug 90 on the yoke and limit the upward movement of the arm 86. The shuttle block 84 has a recess 84' and a shoulder 84, like the shuttle block 67, to receive the head 91 carried by the lever 72. This shuttle block is connected by a link 92 to the upper end 93 of the oscillating shuttle lever 71.

The lower end 94 of the oscillating lever engages one end 95 of a tripper 95' which is pivoted on a stud 95'' on the yoke. The end 95 of the tripper is normally held up into position to be engaged by said lever by a spring 96 which is fastened to the other end 97 of the tripper and to a tripper arm 98 also pivotally mounted on the stud 95''. The spring 96 pulls the end 97 of the tripper down against the arm 98 and a spring 99 connected to the arm 98 and to the yoke normally holds said arm down (Fig. 7). A tripper rod 100 has a reduced upper end which projects through an opening in the end of arm 98 and is provided with a head 101. A spring 102 is arranged on the reduced end of rod 100 between the arm 98 and a shoulder 103. A lever arm 104 is rigidly mounted on the handle shaft 44 and is connected by a spring 105 to the tripper rod 100. This arm 104 has a lifter projection 106 which is arranged to engage a shoulder 107 on the tripper rod.

In normal position the spring 108, which is connected to the yoke and to the oscillating shuttle lever 71, holds said lever in the position shown in Fig. 7 with its lower end 94 in engagement with the end 95 of the tripper, and the spring 109, which is attached to the handle lever and to a stud 110 on the base (Fig. 2) holds the handle lever in its retracted position (Fig. 7). The punch and die operating levers are operating continuously but they do not actuate a punch and die for the recesses 67' and 84' of the shuttle blocks are in position to receive the punch stock 68 and the die stock 85. When the handle lever is pulled forward (Fig. 9) the projection 106 engages the shoulder 107 and lifts the rod 100 and the spring 102 on said rod yields more or less to the pressure of said rod and pushes the

arm 98 upward thereby swinging the tripper and carrying its end 95 down below the lower end 94 of the shuttle lever so that the spring 108 can swing said lever and pull its lower end to the left in Figs. 7 and 9 until the cushion 111 on said lever engages the stop 112 on the yoke (Fig. 10). When the handle lever is pulled forward, as just described, the locking bolt 41 is thrown into engagement with the register wheel and the shuttle block 67 is moved to carry the recess 67' therein out of and the shoulder 67'' into alinement with the punch stock so that the latter will be engaged by the shuttle block to actuate the punch which has been locked in operative position. At the same time, the shuttle block 84 is shifted to move the recess 84' out of and the shoulder 84'' into alinement with the head 91 to be engaged thereby and cause the die stock 85 to actuate the die in operative position. After the impression is made the handle lever is pulled back to its normal position by the spring 109 and the lever arm 104 is carried down to the position shown in Fig. 7. When the shuttle lever is swung off the tripper, from the position shown in Fig. 10 to its normal position shown in Fig. 7, the spring 96 will swing the end 95 of the tripper up to engage the lower end 94 of the shuttle lever and the shuttle blocks will again be positioned to receive the punch and die stocks in their recesses.

The shuttle lever is returned to its normal position by a kicker 113 (Figs. 7, 10) arranged to engage a recess 114 in the end of the shuttle block 84 and carried by a kicker arm 115 pivotally mounted at 116 on the yoke and pivotally connected by a link 117 to the toggle 73. The kicker 113 is carried by a bracket 118 (Fig. 13) pivoted to the lower end of the arm 115 by a cross pin 119. A pin 120 (Fig. 10) is fastened in a lug 121 on the arm 115 and it projects down through the bracket 118 and carries a collar 122. A spring 123 is arranged on the pin 120 between the collar 122 and the bracket 118 and a spring 124 is arranged on the pin between the lug 121 and said bracket. These springs serve to hold the kicker in proper position to engage the recess in the shuttle block 84 and at the same time they provide for a yielding movement of the kicker relative to the supporting arm 115 as the latter is swung on its pivot 116 by the operation of the toggle.

The kicker is shown in its normal position in Fig. 7 and when the toggle is straightened (Fig. 10) the kicker is engaged with the recess in the shuttle block 84 preparatory to returning said shuttle block to its initial position (Fig. 7) when the toggle breaks. The die shuttle block 84 is connected to the oscillating lever 71 and the latter is connected also to the punch shuttle block 67 so that when the toggle breaks and the arm 115 is swung on its pivot the kicker pushes the

shuttle block 84 from the position shown in Fig. 10 to the position shown in Fig. 7 and at the same time oscillates the lever 71 and pushes the shuttle block 67 from the position shown in Fig. 10 to the position shown in Fig. 7. In these positions of the shuttle blocks the recesses 67' and 84' are alined, substantially, with the punch stock 68 and the die stock 85 so that even though the latter are operating continually the said punch and die stocks will not engage any punch and die until the shuttle blocks have again been adjusted to carry their recesses out of operative position as shown in Fig. 10. When the oscillating lever 71 is swung to carry the shuttle blocks to normal inoperative position, the lower end 94 of said lever rides over the tripper 95 from the position shown in Fig. 10 to that shown in Fig. 7 where it engages the end 95 of the tripper and is held in this position by the tripper to maintain the shuttle blocks in their inoperative position just described, and as shown in Fig. 7. The parts will remain in this position until the handle lever is again operated to trip the oscillating lever 71 and permit the spring 108 to swing said lever and carry the shuttle blocks to operative position.

It may be desirable to lock the tripping mechanism with the punch and die operating devices in inoperative position and for this purpose I provide a locking arm 125 which is pivoted at 125' on the yoke and is arranged to engage the end of tripper arm 98 (Fig. 7). This locking arm has a lateral extension 126 which carries a roller 127. A lever 128 for operating the locking arm is pivoted at 128' on the carriage rail 134 and this lever carries at its lower end an angularly disposed shoe 129 with two curved bearing surfaces 129', 129'' to engage the roller 127 which is held against the shoe by a spring 130 attached to the extension 126 and to the carriage rail. The bearing surfaces are so constructed and arranged that by shifting the shoe to engage one or the other bearing surface with the roller 127 the locking arm 125 is moved into or out of locking position. Thus when the roller engages the bearing surface 129', as shown in Fig. 7, the locking lever 125 will be held out of engagement with the tripper arm 98 but if the lever 128 is swung to carry the bearing surface 129'' in engagement with the roller 127 the spring 130 will pull up on the extension 126 to swing the locking lever 125 above the end of tripper arm 98 (Fig. 1) thereby locking the tripper arm with the tripper in engagement with the oscillating lever to prevent the shuttle blocks from being moved to operative position.

The shoe lever 128 may be operated by hand or it may be operated automatically by engagement therewith of the carriage or some part thereof. As one way of operating the shoe lever automatically a lever

131 (Fig. 7) may be pivoted at 131' on the carriage rail and it is connected by a link 132 to lever 128. These levers 128 and 131 are arranged to be engaged by the plate 15 on the carriage when the carriage is moved to the limit of its movement in their direction. Therefore, the shoe lever may be operated by the engagement therewith of the plate 15 when the carriage is moved to the left to throw the locking lever 125 into operative engagement with tripper arm 98; and the lever 131 may be operated to throw lever 125 into locking position by moving or allowing the carriage to move to the right and the plate against said lever 131. Thus the shoe 129 may be shifted by throwing lever 128 or lever 131 by hand or by the carriage to operate the locking lever.

A carriage comprising a main frame 133 is arranged to travel back and forth across the machine on a rail 134 supported on the yoke (Figs. 1, 14). Upright rollers 135 and horizontal rollers 136 are mounted on the carriage frame to engage the upper edge of the rail, and horizontal rollers 137 on the carriage frame engage the side of the rail at the lower edge thereof. Guide shoes 138 are provided at the bottom of the carriage to travel adjacent to the lower edge of the rail and prevent the carriage from being displaced from the rail. A strap 139 is fastened at one end to the carriage and at its other end to a spring barrel 140 (Fig. 21) to pull the carriage to the right.

The carriage is fed to the right step by step, a character space at each step, and this movement is effected by a feed dog 141 and a locking dog 142 which are arranged to engage a toothed rack bar 143 on the carriage (Fig. 21). The feed dog is mounted on a pivot pin 141' carried by a lever 144 which is pivoted at 144' on the carriage rail 134. A spring 145 is fastened to the feed dog above its pivot 141' and to a lug 146 on the lever 144. The swinging movement of the feed dog is limited by lugs 147 and 148 on the lever 144. The locking dog 142 is arranged on a lever 149 pivoted at 149' on the carriage rail 134. A spring 150 is fastened at one end to a lug 151 on the locking dog lever 149 and at its other end to a lug 152 on the feed dog lever 144. A rod 153 has its upper end 153' bent angularly to project through an opening 134' in the carriage rail and below the locking dog lever 149 and above the feed dog lever 144, which levers are held in engagement with said bent end 153' by the spring 150. The handle lever 43 is made in angular form with a horizontal member 43' which carries a foot 154 to engage the upper edge of a trip block 155 adjustably mounted on the lower end of the rod 153. An arm 156 is mounted loosely on the shaft 44 and it carries at its forward end a foot 157 which is also arranged to engage the upper edge of

the block 155. A push bar 158 is connected to the arm 156 at 158' and this push bar projects through the handle lever 43 and is provided with a knob 159. A spring 160 is arranged on the push bar to return said bar and the arm 156 to normal position and a spring 109 is connected to the handle lever 43 and to a stud 110 on the base (Fig. 2) to return the handle lever to normal position (Fig. 21). A spring 163 is connected at 163' to the rod 153 and to the base of the machine at 164 (Fig. 2) to pull the rod 153 forward and upward. The end of the horizontal member 43' of the handle lever 43 is made in the form of a yoke to receive the push bar and a pin 43'' (Fig. 24) prevents disengagement of the rod and said handle lever member.

The operation of the feeding or character spacing mechanism is as follows: When the handle lever is pulled to operate the tripper and lock the register wheel, as heretofore described, the foot 154 is carried up until it engages the top of block 155 (Fig. 22). As the handle is returned to normal position (Fig. 21) the foot 154 will move the block 155 and rod 153 downward and cause the bent end 153' of said rod to swing the feed dog lever 144 and lift the feed dog out of engagement with rack 143. (Fig. 23). The spring 150, which is connected to the feed dog lever 144 and the locking dog lever 149, causes the latter lever to swing downward as the rod 153 moves down, and the locking dog on said lever will engage the rack 143 before the feed dog is lifted out of engagement with the rack to prevent the carriage from feeding when the feed dog is disengaged. When the foot 154 slips off the block 155 (Fig. 21) the rod 153 is raised and returned to normal position by the spring 163. At the same time the levers 144 and 149 swing to carry the feed dog into engagement with the rack 143, one tooth in advance, and to lift the locking dog out of engagement with the rack. When the feed dog is in elevated position (Fig. 23) the spring 145 swings it against the stop 148 so that said feed dog will engage a tooth in advance when it is again moved into engagement with the rack. The barrel spring 140 is stronger than spring 145 so that when the feed dog is again engaged with the rack and the locking dog is lifted out of engagement with the rack the carriage will be fed one step, and this movement is limited by the engagement of the feed dog with stop 147.

The operation of the feeding or character spacing mechanism just described is the usual automatic operation thereof incidental to the operation of the main operating handle lever 43. To enable the carriage to be fed without operating the handle lever 43 I provide the push bar 158 (Fig. 21) which carries a foot 157 to engage and operate the trip block 155 in the same manner heretofore

described and producing the same effect on the feeding mechanism. To enable the carriage to be moved freely on the rail a release lever 165 pivoted at 165' on the carriage frame (Fig. 14) may be operated to engage the pivot pin 141' and lift the feed dog out of engagement with the rack. As the locking dog is normally out of engagement with the rack the carriage will then be free to travel on the rail. The release lever is normally held out of engagement with pivot pin 141' by a spring 166 attached to said lever and a lug 166' on the carriage frame. When a line of character impressions has been made in the plate the carriage must be moved to the left to position the plate for the first character impression of the next line and to accomplish this the release lever is operated to lift the feed dog from the rack so that the carriage can be freely moved on the rail. A hook 167 is provided on the carriage, below the lever 165, to be grasped by the hand to facilitate the operation of said lever. This hook also serves as a handle for moving the carriage on the rail and for holding it against the pull of the barrel spring.

The printing plate 15 is held by jaws 168, 169 mounted on a plate frame 170 which is arranged to slide on guide rods 171 secured in the carriage frame 133 (Figs. 14-20). The upper jaw 168 is pivotally mounted on the rod 172 and it has rearwardly extending lugs 173 which bear upon a rod 174 mounted to turn in bearings 175 on the sliding frame 170 and in lugs 176 at the ends of the lower jaw 169 (Fig. 15). The lower jaw carries the rod 172 and is provided with lugs 177 through which the rod 174 passes (Fig. 19). Thus the jaws are connected by the rod 172 and are pivotally mounted to swing on the rod 174 from the position shown in Fig. 14 to the position shown in Fig. 19. This swinging movement of the jaws and the plate carried thereby can only take place when the carriage has been adjusted to move the plate out of the slot 14 in the die head. A guide 178 is arranged on the carriage frame in an inclined position and adjustable stops 179 on this guide limit the swinging movement of the jaws to position (Fig. 19) to receive or discharge the plate. A handle 180 (Figs. 1, 14) is fast on one end of the rod 174 and a spring 181 is connected to said handle at 181' (Fig. 19) and to the lower jaw at 181'' (Fig. 20). The rod 174 is recessed to provide flat faced recesses 174' (Figs. 14, 19) adjacent to the ends of the lugs 173 on the upper jaw. The rod 174 turns freely in its bearings 175 when operated by handle 180 to swing the jaws against guide 178. The lower jaw 169 comes to rest against stops 179, which engage said jaw at 179' (Fig. 15) and then by pushing down on the handle 180 against spring 181 the upper jaw may be moved farther (and relative to the lower jaw) to open

said jaws to receive or discharge a plate. This movement of the upper jaw relative to the lower jaw is made possible by the recesses 174' in rod 174 which receive the ends of the lugs 173 on the upper jaw (Figs. 14, 19) as the turning of rod 174 is continued. A spring 182 is attached to the lower jaw and to one of the lugs 173 on the upper jaw to pull said lugs 173 into the recesses, as the rod 174 is turned and thereby open the jaws. When the pressure on the handle 180 is released the spring 181 will turn the rod 174 to swing the upper jaw back against the lower jaw or against a plate inserted between the jaws to clamp the plate in place. Thus the jaws are normally held in locked position, that is to say, clamped together or upon a plate, by the spring 181 which, being attached to the lower jaw and to the handle rigid on rod 174, normally pulls the rod into the position shown in Fig. 14 with the recesses 174' below the lugs 173. The printing plate is readily slipped into place between the jaws, when the latter are open as shown in Fig. 19, by guiding it against the guide 178, the latter having an end guide 178' which is arranged to position the plate lengthwise. The lower jaw has stops 183 (Fig. 20) against which the plate is pushed when inserting it between the jaws and the upper jaw has recesses 183' (Fig. 15) to receive said stops 183. The plate is inserted between the jaws when the latter are arranged in the position shown in Fig. 19 and then the jaws are swung to the horizontal position shown in Fig. 14 and the carriage is moved on the rail to carry the plate into position to receive the first impression. An adjustable stop 184 is arranged at each end of the lower jaw to engage a lug 184' on the plate frame 175 to position the jaws to hold the plate properly in the die head slot 14.

The plate frame 170, as before stated, is adapted to slide on the guide rods 171 at a right angle to the general direction of movement of the carriage, and line spacing mechanism is provided on the carriage whereby the plate frame can be adjusted to move the plate into position to receive more than one line of characters. This line spacing mechanism may be constructed to provide for any number of lines of characters but for the purpose of this application I have shown it made to provide for three or four lines. Two racks 185, 186 (Fig. 16) are arranged on the underside of the sliding plate frame 170 (Fig. 14) preferably at each end thereof and these racks may be formed on blocks as shown and secured to the frame in any suitable manner, or they may be made integral with the frame, as desired. The rack 185 is designed to provide for three line spacing and the rack 186 is designed for four line spacing of the plate frame. Both pairs of racks are located between the guide rods 171

and in one pair the rack 185 is located on the outside of rack 186 and in the other pair the rack 185 is located on the inside of rack 186. A bifurcated locking lever 187 (Fig. 18) is pivotally supported on a rod 188 mounted in the carriage frame 113 and this lever is provided with a handle 187'. A spring 189 is fastened to this locking lever at 189' and to the plate frame 170 at 189'' (Fig. 14). This locking lever is provided with teeth 190 (Fig. 18) which engage, at one time, both of the racks 185 or both of the racks 186. The locking lever is arranged to swing as shown in Fig. 20 and it can be adjusted laterally on the rod 188 to position the teeth 190 for engagement with both racks 185 or both racks 186.

To hold the locking lever rigidly in place on its supporting rod 188, when adjusted for engagement with one or the other set of racks, I provide a push bar 191 which is slidably arranged in the locking lever and normally held in position to lock the locking lever by a spring 192. This push bar has a peripheral groove 191' and the supporting rod 188 has two peripheral grooves 188' and 188'' (Fig. 17). When the end of the push rod rests in one of the grooves 188' or 188'' the locking lever will be secured against lateral movement but will be free to swing as shown in Fig. 20. The grooves 188' and 188'' are properly positioned so that when the push rod is engaged with one groove, as 188', the teeth 190 will be positioned to engage the two racks 186, and when the push rod engages the other groove, as 188'', the teeth will be positioned to engage the racks 185. When the push bar is pushed in to register its groove 191' with the rod 188 the locking lever 187 can be adjusted laterally on the rod. By swinging the locking lever to the position shown in Fig. 20, thereby disengaging the teeth 190 from the racks on the plate frame, the latter can be adjusted forward or backward to position the plate as required for successive lines of characters, and this movement of the plate frame may be effected by pressure applied to the handle 180 or to the handle 193 on the plate frame.

In ordinary practice the first line of characters will be impressed in the plate adjacent to the edge opposite the jaws (Fig. 4) and the plate will be adjusted for successive lines by moving it step by step toward the operator at the front of the machine. This movement can be readily accomplished by swinging the locking lever 187 to the position shown in Fig. 20 which frees the plate frame and permits it to be properly adjusted. To receive a plate the plate frame is adjusted to its position nearest the operator so that the jaws can be swung as shown in Fig. 19 and when the plate has been clamped between the jaws and swung down to horizontal position it will be arranged, so far as its

back and forth adjustment is concerned, to receive the first line of characters. Then the carriage is adjusted to the left until the plate strikes lever 128 to unlock the tripper mechanism of the machine, as heretofore described. After the several lines of characters have been stamped on the plate the carriage is allowed to travel to the limit of its movement to the right to clear the plate of the die head, and at which time the plate strikes the lever 131 to relock the tripper mechanism, which has also been described heretofore. If it is desired to stamp three lines of type the plate frame locking lever is set to engage the two racks 185 or if it is desired to stamp four lines of type this locking lever is set to engage the two racks 186, and it will be obvious that provision may be made for positioning the plate to receive two lines or more than four. It is desirable, of course, to provide separate racks for the different spacing in order that the lines of characters may be properly separated on the plate.

To disengage the punch and die from the plate if they should happen to stick therein, hooks 194, 195 (Fig. 3) are arranged to engage the punch and die stripper levers on the return movement of the punch and die operating devices. The hook 194 is mounted on the arm 86 and is provided with a slot 194' to receive the stud 194'' on the die operating lever 72. The hook 195 is fastened to the punch stock 68 and is also provided with a slot 195' to receive one end 195'' of the pin 60. On the return movement of the punch and die operating devices these hooks will engage the punch and die stripper levers if the latter stick in the plate and return them to normal position.

While the machine herein described as an embodiment of my invention comprises a number of parts and groups of mechanism designed for various operations it is nevertheless comparatively simple in construction and operation considering the work to be done. It is necessary that the machine should operate rapidly and stamp the characters in the plate to a uniform height and in perfect alinement so that the address, or other matter, when printed, will be neat and attractive in appearance. It is generally desirable to produce a printing plate which will make an impression in imitation of type-writing and this makes it all the more important that the characters shall be stamped in the plate in a uniform manner.

The invention covered by my application aforesaid contemplates a machine which embodies a clutch mechanism whereby it is thrown into and out of operation by the manipulation of the key levers. This involves a more or less complicated clutch mechanism which is dispensed with by the present invention for here the machine is running continu-

ously and requires to be tripped only to effect the impression after the desired punch and die have been properly positioned. I consider this an improvement on my prior invention for it not only enables the machine to be made simpler in construction but it also enables the machine to be operated more rapidly. One of the particularly important features of the invention is the provision for locking the tripper mechanism when the carriage is allowed to travel to the limit of its movement to the right (Fig. 1) for the removal or insertion of a plate, whereby the machine is locked to prevent the operation, accidentally or otherwise, of a punch and die at this time. This is accomplished manually or automatically as heretofore pointed out by the operation of the levers 128, 131. The head 59 may be adjusted by means of the nuts 66 on bolts 61 to adjust the punch shuttle block for printing plates of different thicknesses and also for adjusting this block to regulate the movement of the punch. The tension of spring 63 may be regulated by adjusting the nuts 64 to permit the punch stock to yield when necessary, as for example, when a plate of greater thickness than the parts are adjusted for is used.

What I claim and desire to secure by Letters Patent is:

1. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, means for operating a pair of punches and dies, said means moving continuously but normally inoperative as affecting the punches and dies, and movable devices for communicating the movement of said punch and die operating means to a pair of punches and dies to produce a character upon an interposed plate.

2. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, levers for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, and devices between the levers for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate.

3. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, levers for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, and devices between the levers and movable relatively thereto for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate.

4. In a machine for making printing plates,

the combination of a head, a plurality of punches and dies located opposite each other in pairs in the head, levers for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, devices between the levers and the head and movable relatively to the levers for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate, and means for simultaneously shifting said devices into or out of operative position.

5. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies located opposite each other in pairs peripherally in the head, swinging levers on opposite sides of said head for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, devices arranged between the levers and the head and movable with and relatively to the levers for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate, and means for simultaneously shifting said devices into or out of operative position.

6. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies located opposite each other in pairs peripherally in the head, a pair of swinging levers arranged on opposite sides of the head and tangentially thereto for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, and devices movable with said levers and slidable lengthwise thereof for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate.

7. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies located opposite each other in pairs peripherally in the head, swinging levers arranged on opposite sides of the head and tangentially thereto for operating a pair of punches and dies, said levers moving continuously, shuttle blocks movable with and relatively to said levers, said shuttle blocks having recesses normally arranged in operative position to prevent the levers from operating the punches and dies and shoulders adapted to communicate the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate, and means for simultaneously shifting said shuttle blocks.

8. In a machine for making printing plates, the combination of a head, a plurality of punches and dies located opposite each other in pairs in the head, a punch lever, a punch

stock, a shuttle block slidably mounted on the punch lever, said shuttle block having a recess and a shoulder to engage the punch stock alternately, a die lever, a shuttle block
5 between the die lever and the die in operative position, said die shuttle block having a recess and a shoulder, a head on the die lever to engage the recess or the shoulder of said die shuttle block, and means for simultaneously
10 moving said shuttle blocks.

9. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, a
15 punch stock, and a shuttle block slidably mounted on the punch lever to communicate the movement of said lever to said punch stock and having a recess therein to receive said punch stock.

20 10. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, a head on said punch lever and adjustable
25 transversely thereof, and a device movably arranged on said head for communicating the movement of said lever to a punch when the latter is in operative position relative to a plate.

30 11. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, an adjustable bolt supported by said lever
35 transversely thereof, a head on said bolt, and a shuttle block slidably mounted on said head.

40 12. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, a yielding head on said punch lever, and a shuttle block slidably mounted on said head.

45 13. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, a yielding head adjustably mounted on said lever, and a shuttle block slidably mounted
50 on said head.

14. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever having
55 a recess therein, a head seated in said recess, a bolt adjustably mounted in the lever and carrying said head, said bolt being movable relative to said lever, a spring for cushioning the bolt in said relative movement,
60 and a shuttle block slidably mounted on said head.

15. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each

other in pairs in the head, a punch lever, a
65 shuttle block slidably mounted on the punch lever, means for operating said shuttle block, and a tripper for releasing said operating means.

16. In a machine for making printing
70 plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever, a shuttle block slidably mounted on the punch lever, a lever for operating said shuttle block,
75 a tripper normally engaged with said operating lever, and a spring for swinging said operating lever to operate the shuttle block when the tripper releases the operating lever.

17. In a machine for making printing
80 plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, an arm mounted to move with said die lever, and a shuttle block mounted on said arm and mov-
85 able relatively thereto.

18. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, an arm
90 mounted to move with said die lever, and a shuttle block between said arm and the die lever and slidable lengthwise of the arm.

19. In a machine for making printing plates, the combination of a head, a plurality
95 of punches and dies arranged opposite each other in pairs in the head, a die lever, an arm mounted to move with said die lever, and a shuttle block mounted on the arm adjacent to said die lever to move with the arm and
100 slidable lengthwise of the arm.

20. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, an arm
105 mounted to move with the die lever, a die stock on the arm, and a shuttle block between the arm and die lever and slidable lengthwise of the arm.

21. In a machine for making printing
110 plates, the combination of a circularly movable head, a plurality of punches and dies arranged opposite each other in pairs peripherally in the head, a continuously operated die lever, a movable shuttle block supported
115 independently of the die lever between said lever and the dies, said shuttle block having a recess and a shoulder, a head on the die lever normally engaging said recess, and means for shifting the shuttle block to bring
120 the shoulder thereon into operative relation to the head on the die lever.

22. In a machine for making printing plates, the combination of a head, a plurality
125 of punches and dies arranged opposite each other in pairs in the head, a die lever, a head on said die lever, an arm mounted to move with said lever, a shuttle block slidably

mounted on said arm and provided with a recess to receive said head, and a die stock on said arm.

23. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, an arm mounted to move with said die lever, a shuttle block slidably mounted on said arm and adapted to be engaged by said die lever, a lever for operating said shuttle block, and a tripper normally holding said lever to position the shuttle block so that the die lever will not engage therewith.

24. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever connected to said shuttle blocks, and means for operating said oscillating lever to move said shuttle blocks.

25. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, and a tripper for said oscillating lever.

26. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper normally engaged with said oscillating lever to hold the shuttle blocks in position so that said punch and die levers will not operate a punch and die, means for releasing the tripper, and means for operating the oscillating lever to carry the shuttle blocks into position so that the punch and die levers will operate a punch and die.

27. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, and means for locking the tripper.

28. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, a handle lever, and means intermediate of the handle lever and the tripper for releasing the tripper from engagement with the oscillating lever.

29. In a machine for making printing

plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, a tripper arm for operating said tripper, a rod for operating said arm, and a handle lever for operating said rod.

30. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, an arm to operate said tripper, a rod to operate said arm, a shoulder on said rod, a handle lever, and an arm on said handle lever to engage said shoulder to operate the rod.

31. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, an arm to operate said tripper, a rod to operate said arm and yieldingly engaged therewith, a shoulder on the rod, a handle lever, an arm on the handle lever, a lifter on said lever arm to engage said shoulder, and a spring connecting the rod and lever arm.

32. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, a pivoted locking arm to lock said tripper, and means for swinging said locking arm into or out of locking position.

33. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, means for locking said tripper, and a lever for operating said locking means.

34. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, a locking arm to lock the tripper, a roller on said locking arm, a shoe having two bearing surfaces and arranged to engage said roller, and means for operating said shoe.

35. In a machine for making printing

plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, a locking arm to lock said tripper, a roller on said locking arm, a shoe, two bearing surfaces on said shoe to engage said roller, and a lever carrying said shoe.

36. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, means for locking the tripper, and a traveling carriage carrying the plate to be stamped and adapted to operate said locking means.

37. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, punch and die levers, shuttle blocks adjacent to said levers, an oscillating lever for operating said shuttle blocks, a tripper to engage said oscillating lever, means for locking said tripper, a pair of levers for operating said locking means, and a carriage arranged to travel on the machine and adapted to operate said levers.

38. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, and a kicker for moving said shuttle block so that the movement of the die lever will not be communicated to a die.

39. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, means for operating the die lever, and a kicker operated by said die lever operating means to move the shuttle block so that the die lever will not operate a die.

40. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, means for operating the die lever, and a pivoted arm operated by said die lever op-

erating means, and a kicker on said arm to engage and move said shuttle block so that the die lever will not operate a die.

41. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, and a yielding kicker to engage and move the shuttle block so that the die lever will not operate a die.

42. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, means for operating the die lever, a pivoted arm connected to said die lever operating means, and a yielding kicker carried by said arm and adapted to engage and move the shuttle block so that the die lever will not operate a die.

43. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, said shuttle block having a recess in one end, means for operating the die lever, a pivoted arm connected to said die lever operating means, and a kicker yieldingly supported on said arm and adapted to engage the recess in the shuttle block to move said shuttle block so that the die lever will not engage a die.

44. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever, a slidable shuttle block arranged between the die lever and a die in operative position, means for moving the shuttle block into position to communicate the movement of the die lever to the die, means for operating the die lever, a pivoted arm connected to said die lever operating means, a kicker pivotally mounted on the arm and adapted to engage and move the shuttle block so that the die lever will not operate a die, and springs engaging said kicker on opposite sides thereof.

45. In a machine for making printing plates, the combination of a head, a plurality of punches and dies arranged opposite each other in pairs in the head, a die lever for operating a die in operative position, a toggle lever connected to said die lever, a driving

shaft, an eccentric on said driving shaft, a crank arm for operating the toggle lever, a rod connected to said crank arm, and an eccentric strap on said eccentric and yieldingly connected to said rod.

46. In a machine for making printing plates, the combination of a rotatable head, a plurality of punches and dies arranged opposite each other in co-acting pairs peripherally in said head, means for turning said head to bring any pair of punches and dies into an operative position common to all said punches and dies on opposite sides of an interposed plate, means for operating the punch and die to impress a character in the plate, said means moving continuously but normally inoperative as affecting the punches and dies, and movable devices for communicating the movement of said punch and die operating means to the punch and die.

47. In a machine for making printing plates, the combination of a plurality of punches and dies arranged opposite each other in pairs, levers for operating a pair of punches and dies, said levers moving continuously but normally inoperative as affecting the punches and dies, movable devices between the levers for communicating the movement of said levers to a pair of punches and dies to produce a character upon an interposed plate, a yielding stop, and a head carrying said punches and dies and movable in a circular path on both sides of said stop.

48. In a machine for making printing plates, the combination of a vertical shaft, a head on said shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, means for turning said vertical shaft to rotate the head and position any pair of punches and dies for operation, a tooth on the shaft, and a yielding stop plate on the frame of the machine arranged in the path of said tooth to limit the rotary movement of said head in both directions.

49. In a machine for making printing plates, the combination of a vertical shaft, a head on said shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, means for turning said vertical shaft to rotate the head and position any pair of punches and dies for operation, a tooth on the shaft, a stop plate pivotally mounted on the frame of the machine, a tooth on said stop plate arranged to be engaged by the tooth on the shaft, stop pins on the frame of the machine, and a spring arranged between the stop plate and said pins.

50. In a machine for making printing plates, the combination of a vertical shaft, a head on said shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, means for turning said vertical shaft to rotate the head and position any pair of punches and dies for operation,

a tooth on the shaft, a stop plate pivoted on the frame of the machine, a tooth on said stop plate to engage the tooth on the shaft, stop pins on the frame of the machine, studs on said plate, and a spring on the stop plate engaged with said studs and adapted to engage said pins.

51. In a machine for making printing plates, the combination of a vertical shaft, a head mounted on said shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, means for turning the head to bring any pair of punches and dies into operative position, a register wheel rigid with said vertical shaft, a plurality of wedge-shaped notches on the periphery of said wheel, a wedge-shaped locking bolt to engage said notches, and means for operating said bolt.

52. In a machine for making printing plates, the combination of a vertical shaft, a head mounted on said shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, means for turning the head to bring any pair of punches and dies into operative position, a register wheel rigid with said vertical shaft, a plurality of wedge-shaped notches on the periphery of said wheel, a wedge-shaped locking bolt to engage said notches, a handle lever, and a rod yieldingly connected to said handle lever.

53. In a machine for making printing plates, the combination of a rotatable head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever and a die lever for operating said punches and dies, and means operated by said punch and die levers for disengaging the punch and die from the plate.

54. In a machine for making printing plates, the combination of a rotatable head, a plurality of punches and dies arranged opposite each other in pairs in the head, a punch lever and a die lever for operating said punches and dies, and hooks operated by said punch and die levers to disengage the punch and die from the plate.

55. In a machine for making printing plates, the combination of a rotatable head, a plurality of punches and dies arranged opposite each other in pairs in the head, a stripper lever for each punch and die, a punch lever and a die lever for operating the punches and dies, and hooks operated by said punch and die operating levers and arranged to engage the stripper levers of the punch and die in operative position.

56. In a machine for making printing plates, the combination of a rail, a carriage arranged to travel on the rail, and means for feeding the carriage in one direction comprising a rack on the carriage, a feed dog lever, a locking dog lever, a locking dog rigid on the locking dog lever, a feed dog pivotally mounted on the feed dog lever, a rod for operating

said levers, a block on said rod, a handle lever, and a foot on said handle lever to engage said block to operate said rod.

57. In a machine for making printing plates, the combination of a rail, a carriage arranged to travel on the rail, and means for feeding the carriage in one direction comprising a rack on the carriage, a feed dog lever, a locking dog lever, a locking dog rigid on the locking dog lever, a feed dog pivotally mounted on the feed dog lever, a rod for operating said levers, a block on said rod, a handle lever, a push bar carried by said handle lever, an arm pivoted on the handle lever and connected to said push bar, and a foot on said arm to engage said block to operate said rod.

58. In a machine for making printing plates, the combination of a rail, a carriage arranged to travel on said rail, and means for feeding the carriage in one direction comprising a rack on the carriage, a feed dog lever, a feed dog pivotally mounted on said feed dog lever, stops for limiting the pivotal movement of said feed dog, a locking dog lever, a locking dog rigid on said locking dog lever, a spring connecting the locking dog and feed dog levers, a rod for operating said levers, a block on the rod, a handle lever, and a foot on said handle lever to engage and operate said rod.

59. In a machine for making printing plates, a carriage comprising a frame, a plate guide on the carriage, plate holding jaws pivotally mounted on the carriage and adapted to swing into position to receive a plate from said guide.

60. In a machine for making printing plates, a carriage comprising a frame, a plate frame movable on the carriage and relatively thereto, a pair of clamping jaws pivotally mounted on the plate frame, a guide on the carriage frame, said jaws being adapted to

swing into position relative to said guide to receive or discharge a plate, and means for opening the jaws.

61. In a machine for making printing plates, a carriage comprising a frame, a plate frame movable on the carriage and relatively thereto, and line spacing means comprising a pair of racks on the plate frame, said racks having differently spaced teeth thereon, a lever pivotally mounted on said carriage frame and adapted to be adjusted to engage the teeth on either of said racks.

62. In a machine for making printing plates, a carriage comprising a frame, a plate frame movable on the carriage and relatively thereto, and line spacing means comprising two pairs of racks having differently spaced teeth on said plate frame, a rod on the carriage frame, a lever pivotally mounted on said rod and having a bifurcated end to engage the two similarly toothed racks, said lever being adjustable on said rod to engage either pair of racks.

63. In a machine for making printing plates, a carriage comprising a frame, a plate frame movable on the carriage and relatively thereto, and line spacing means comprising two pair of racks having differently spaced teeth on said plate frame, a rod on the carriage frame, grooves on said rod, a lever pivotally mounted and longitudinally adjustable on said rod, said lever being bifurcated to engage both racks of a pair, and a push bar on said lever arranged to seat in either of said grooves in the rod and provided with a groove to permit the lever to be adjusted on the rod.

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Witnesses:

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