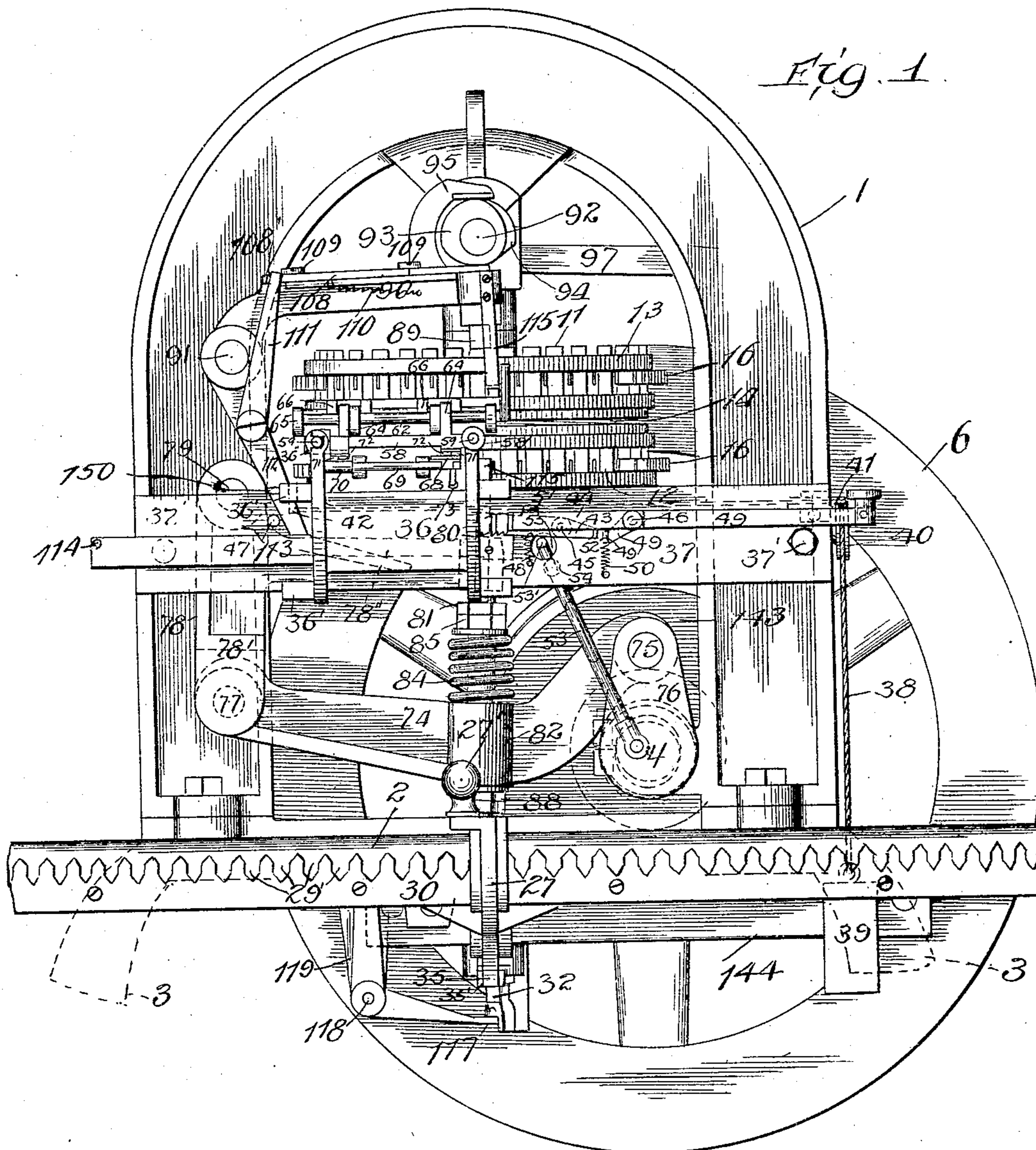


J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
APPLICATION FILED AUG. 12, 1907.

955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 1.



Witnesses
Harry R. L. White
M. A. Kiddie

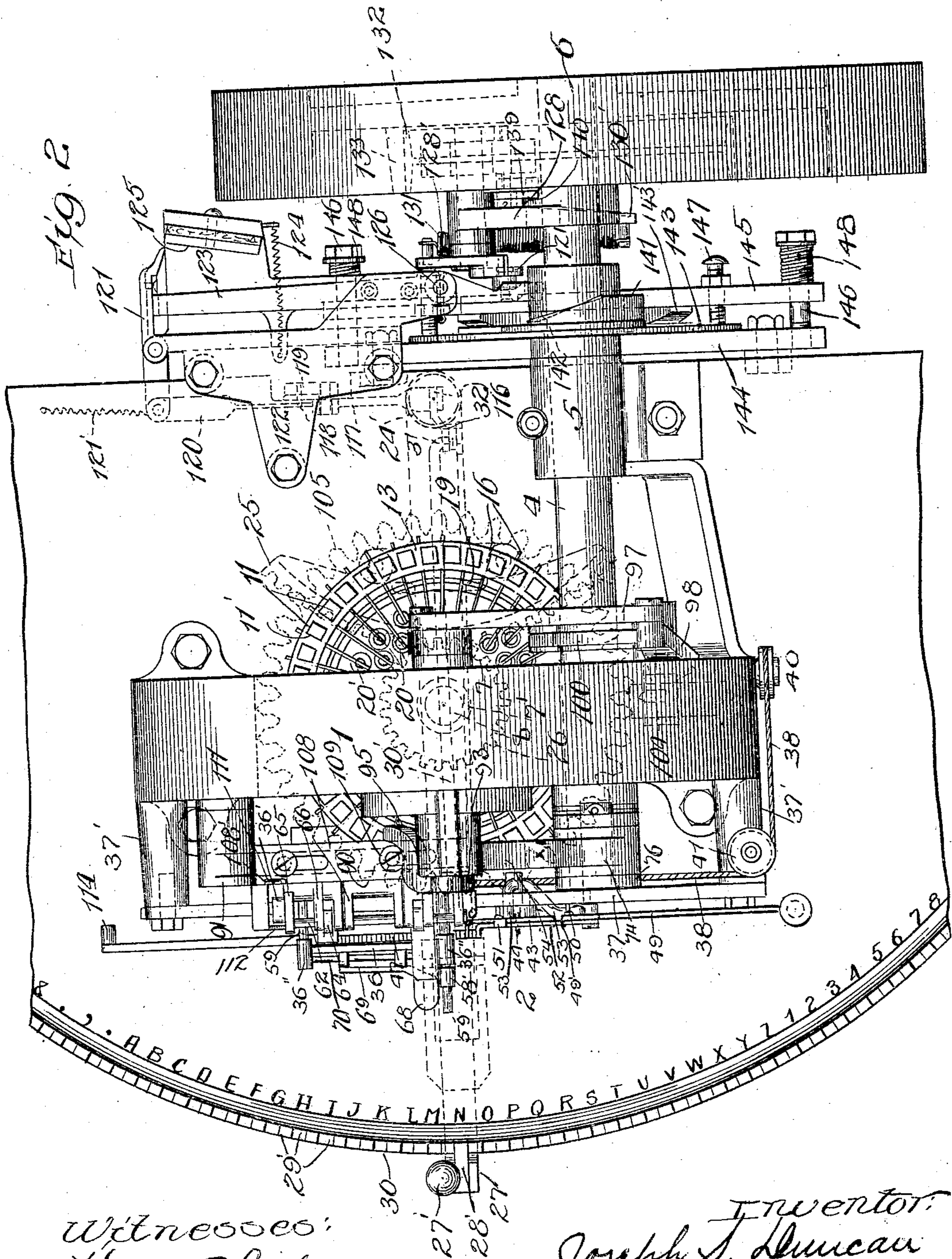
Inventor:
Joseph S. Duncan
By *Wm. F. Belk* Atty.

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11 SHEETS—SHEET 2.

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Witnesses:
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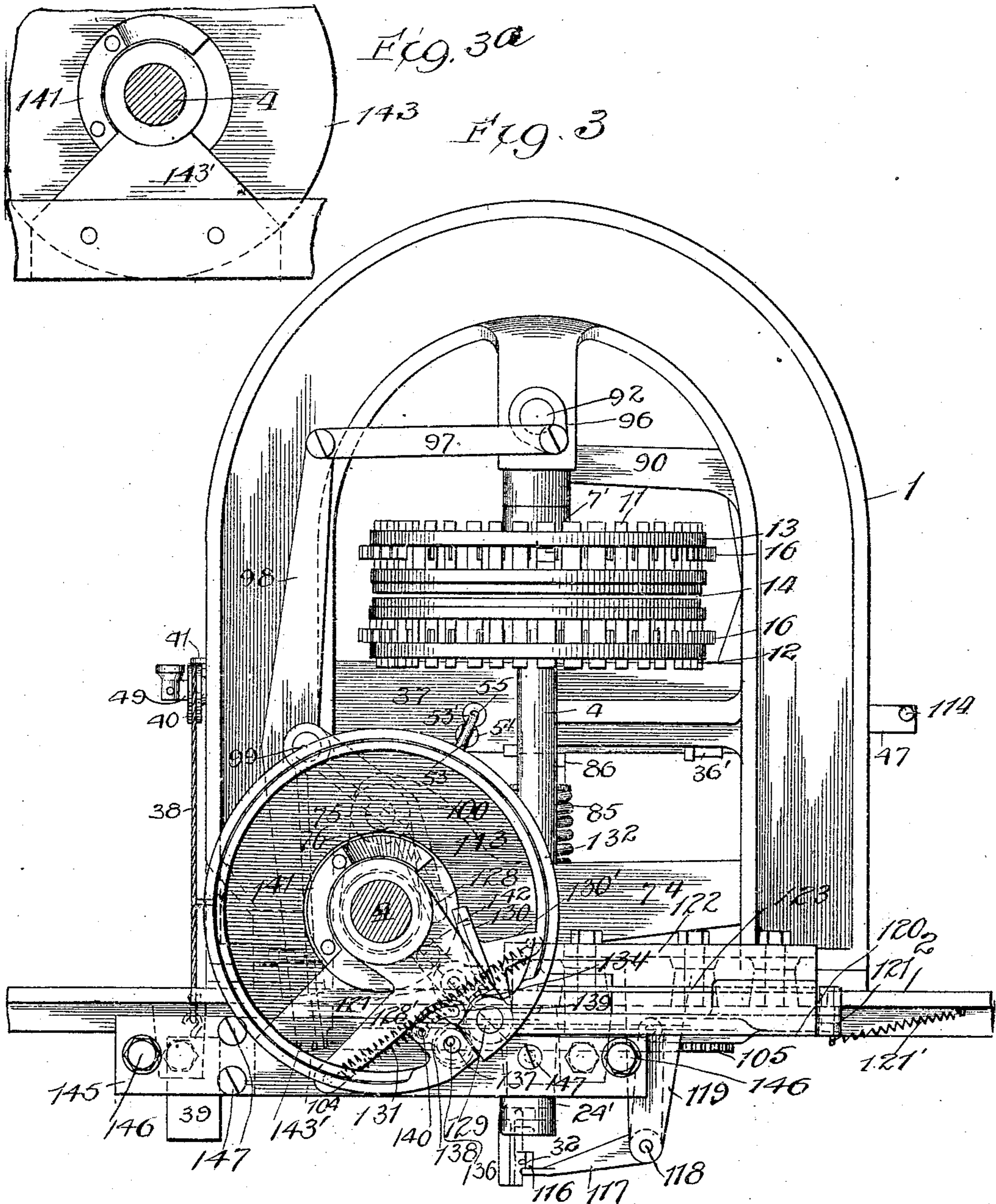
Inventor:
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11 SHEETS—SHEET 3.



Witnesses:

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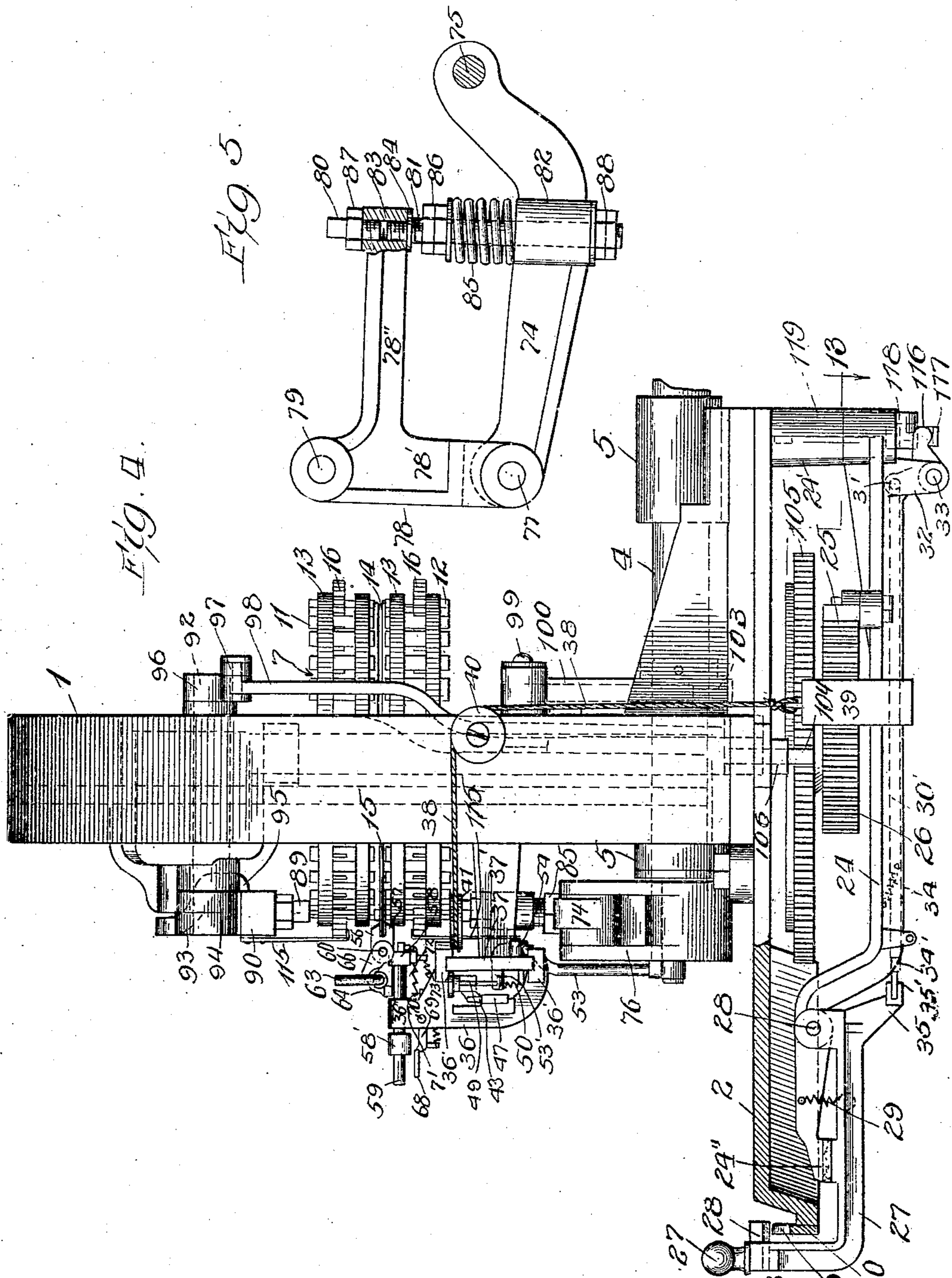
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11 SHEETS—SHEET 4.



Witnesses:
Harry R. L. White.
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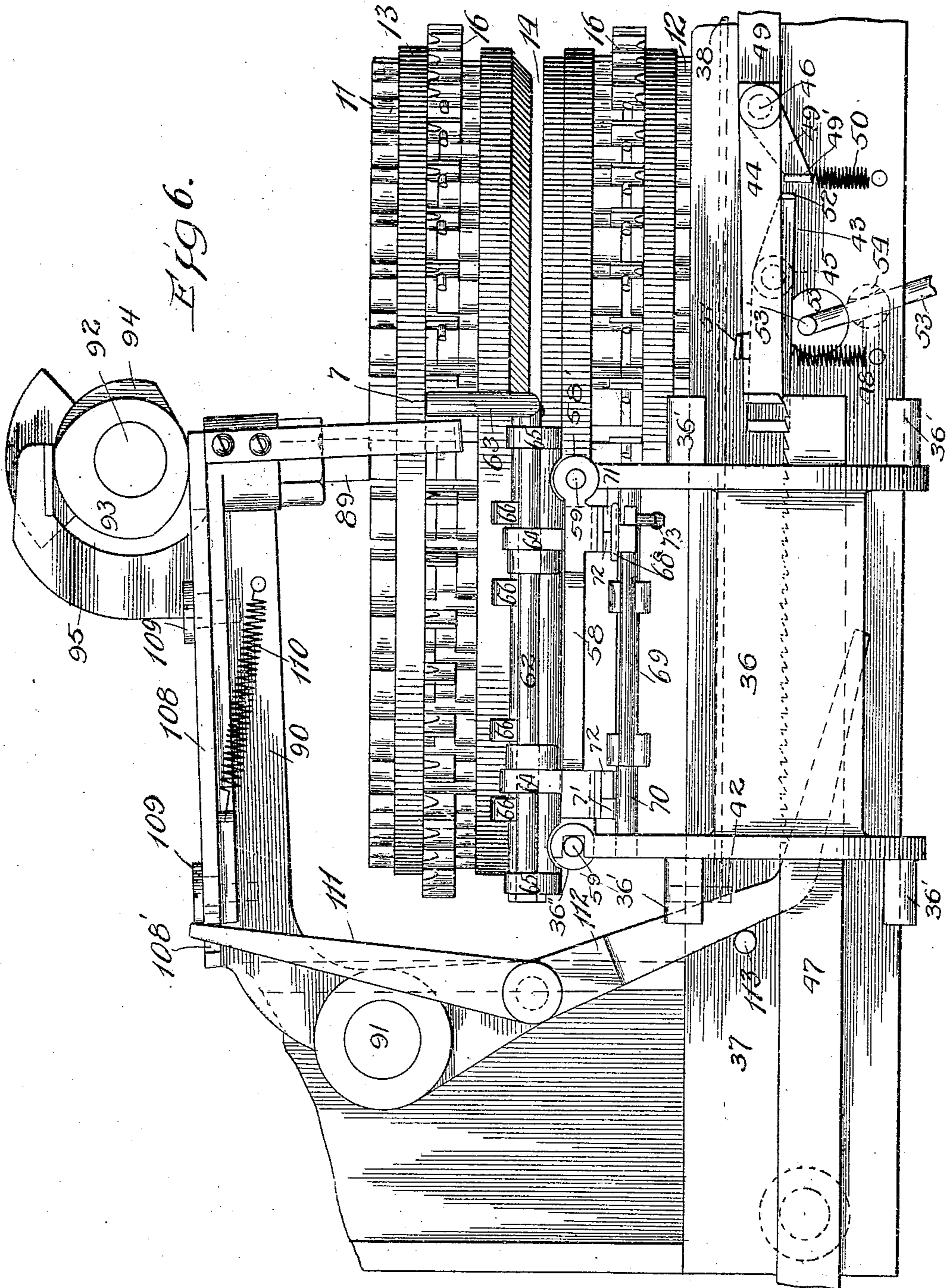
Inventor:
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11 SHEETS—SHEET 5.



Witnesses
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955,116.

11 SHEETS—SHEET 6.



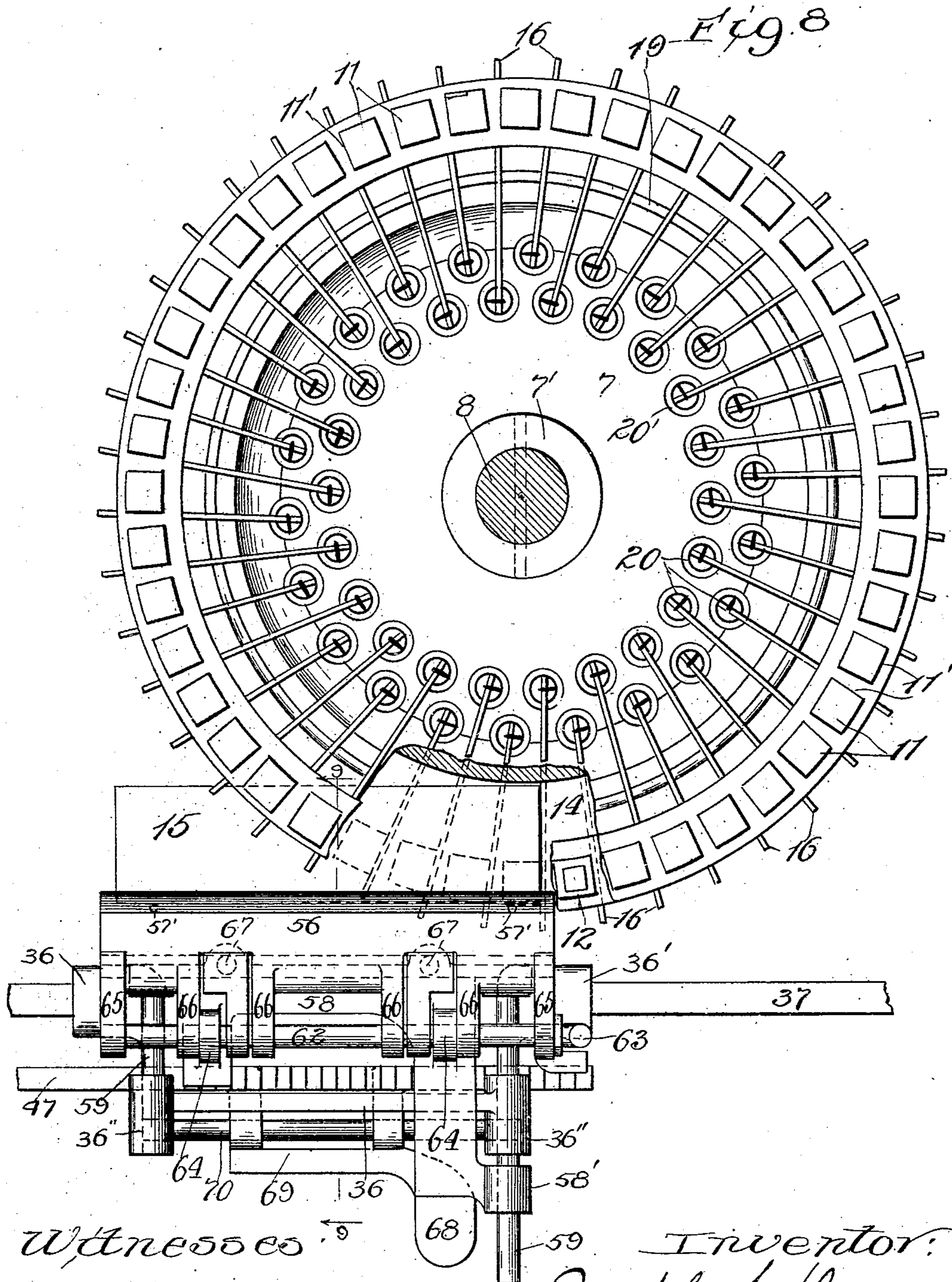
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J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
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955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 7.



Witnesses
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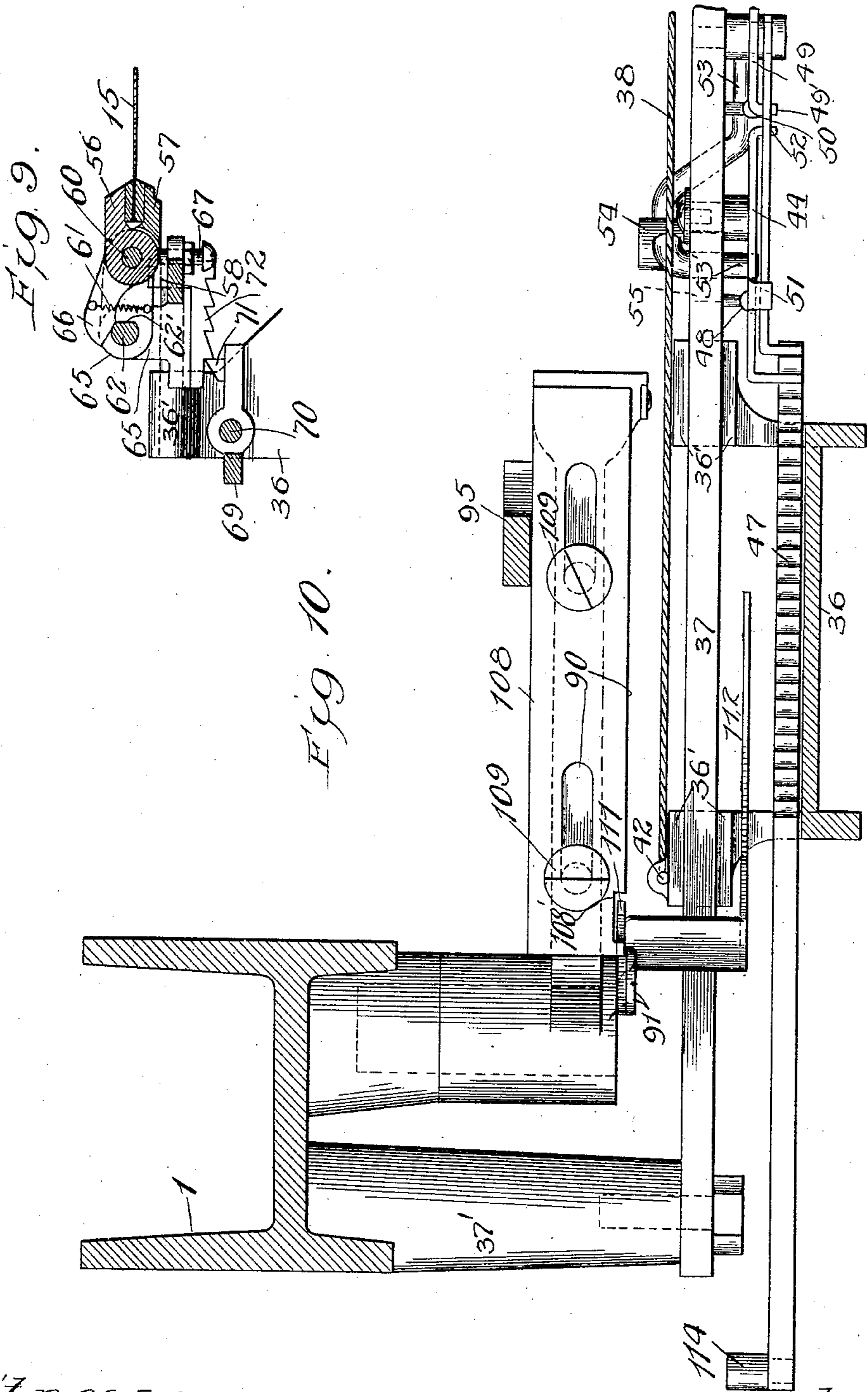
J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.

APPLICATION FILED AUG. 12, 1907.

955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 8.



Witnesses:
Harry R. L. White
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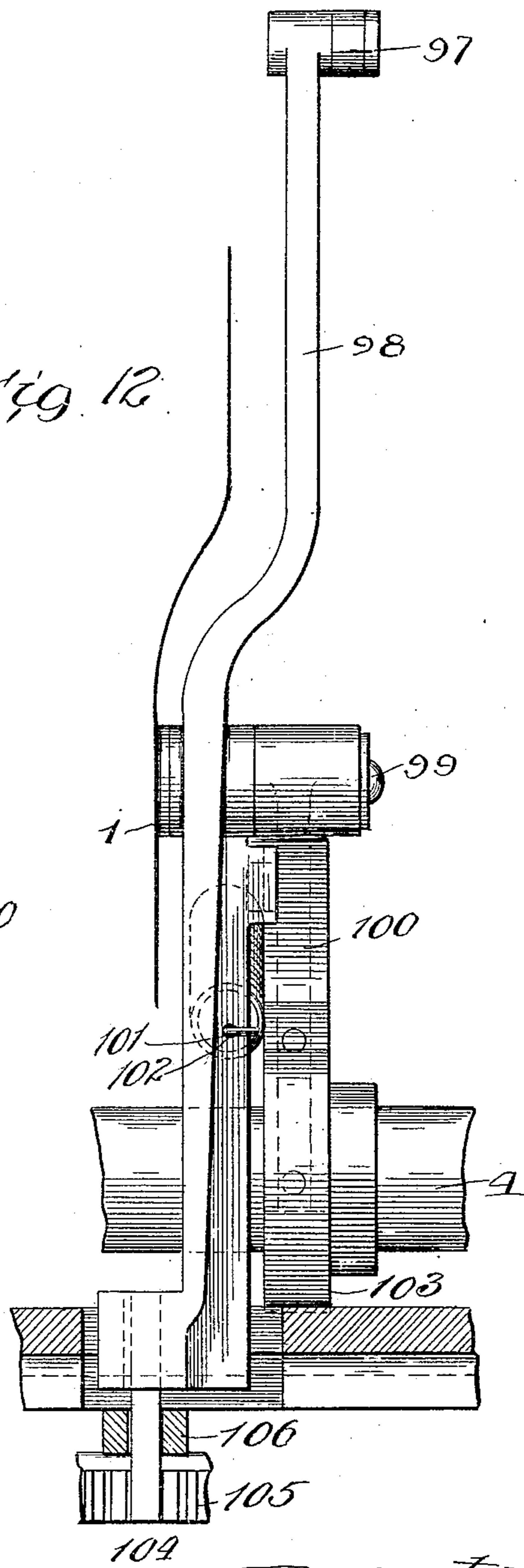
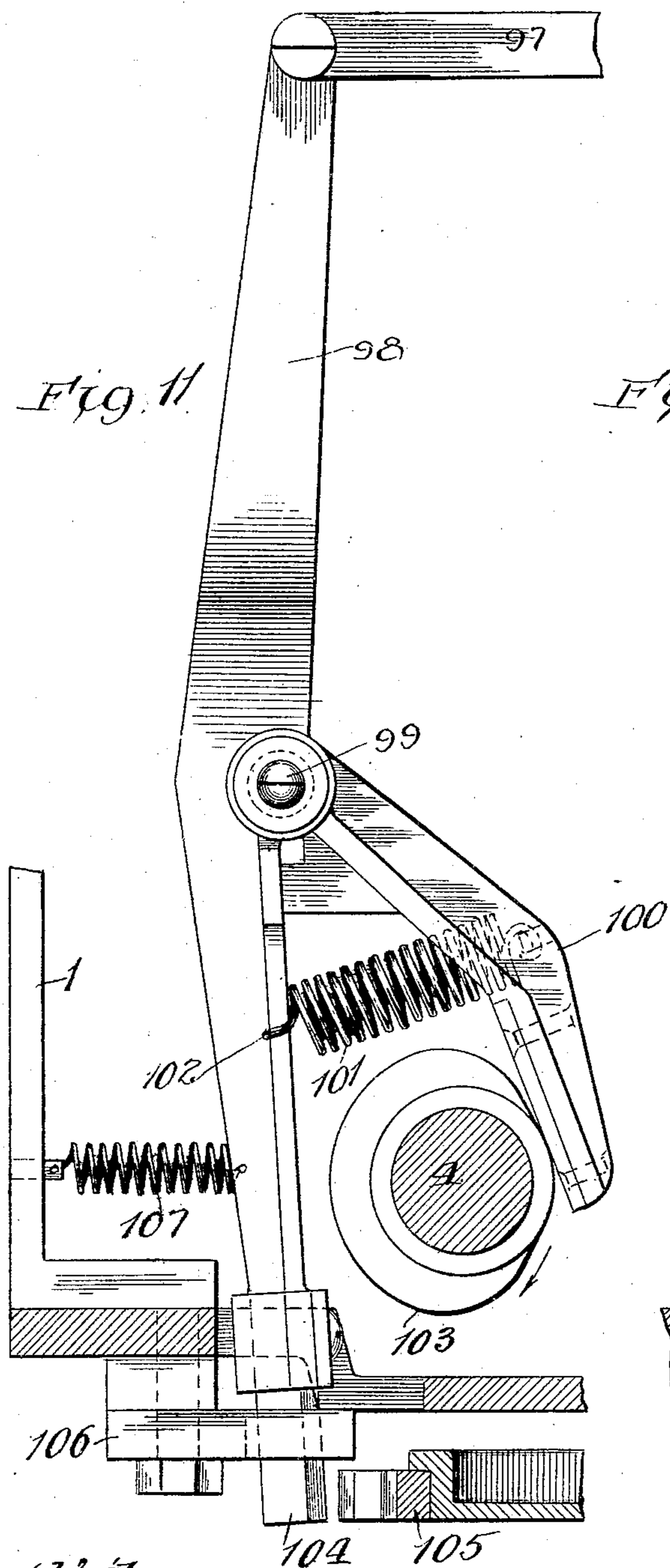
Inventor:
Joseph S. Duncan
By *Wm. J. Belk* Atty.

J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
APPLICATION FILED AUG. 12, 1907.

955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 9.



Witnesses:

Harry R. L. White
M. A. Kiddie

Inventor:
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By *[Signature]* Atty.

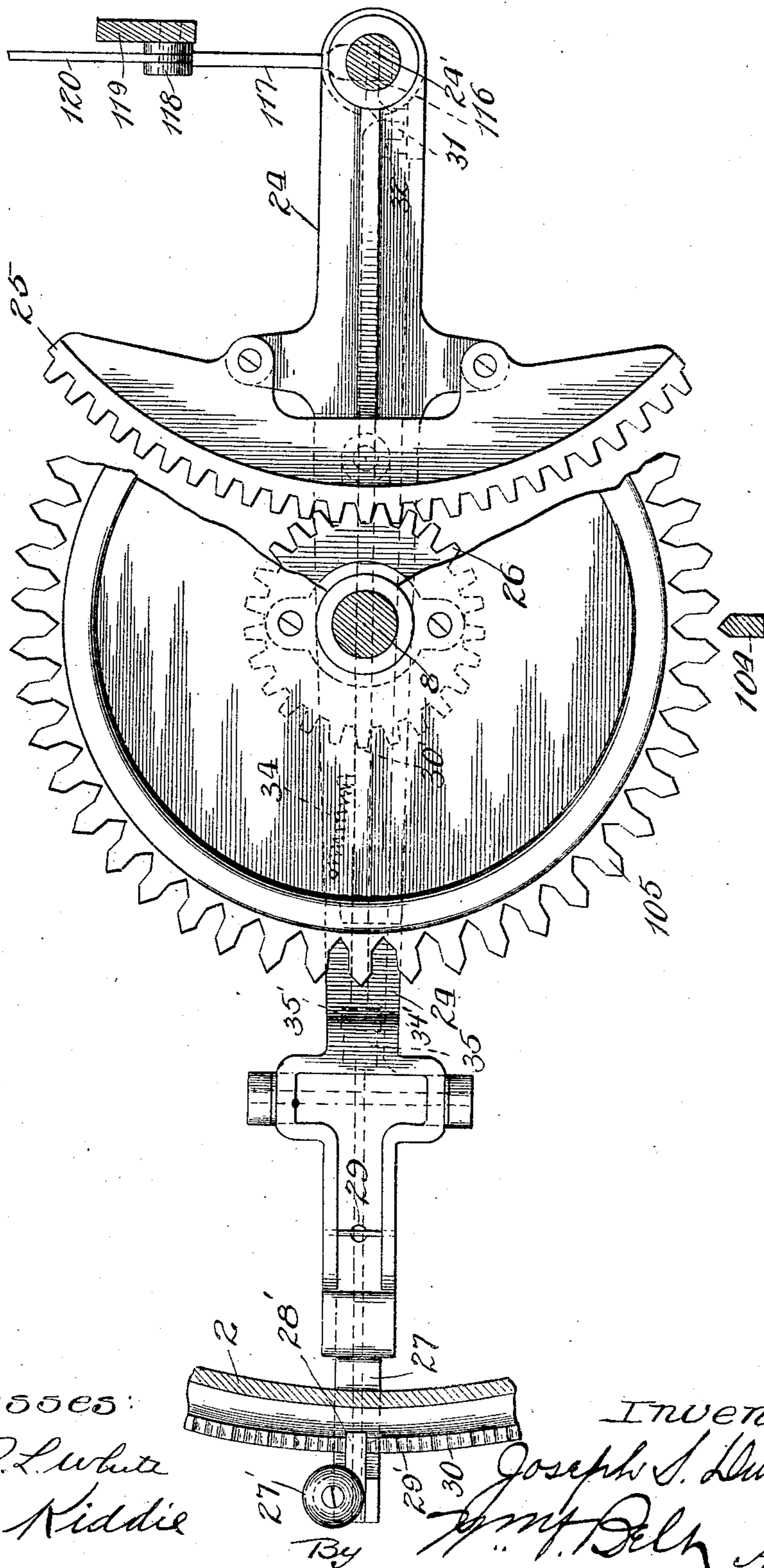
J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
APPLICATION FILED AUG. 12, 1907.

955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 10.

Fig. 13



Witnesses:
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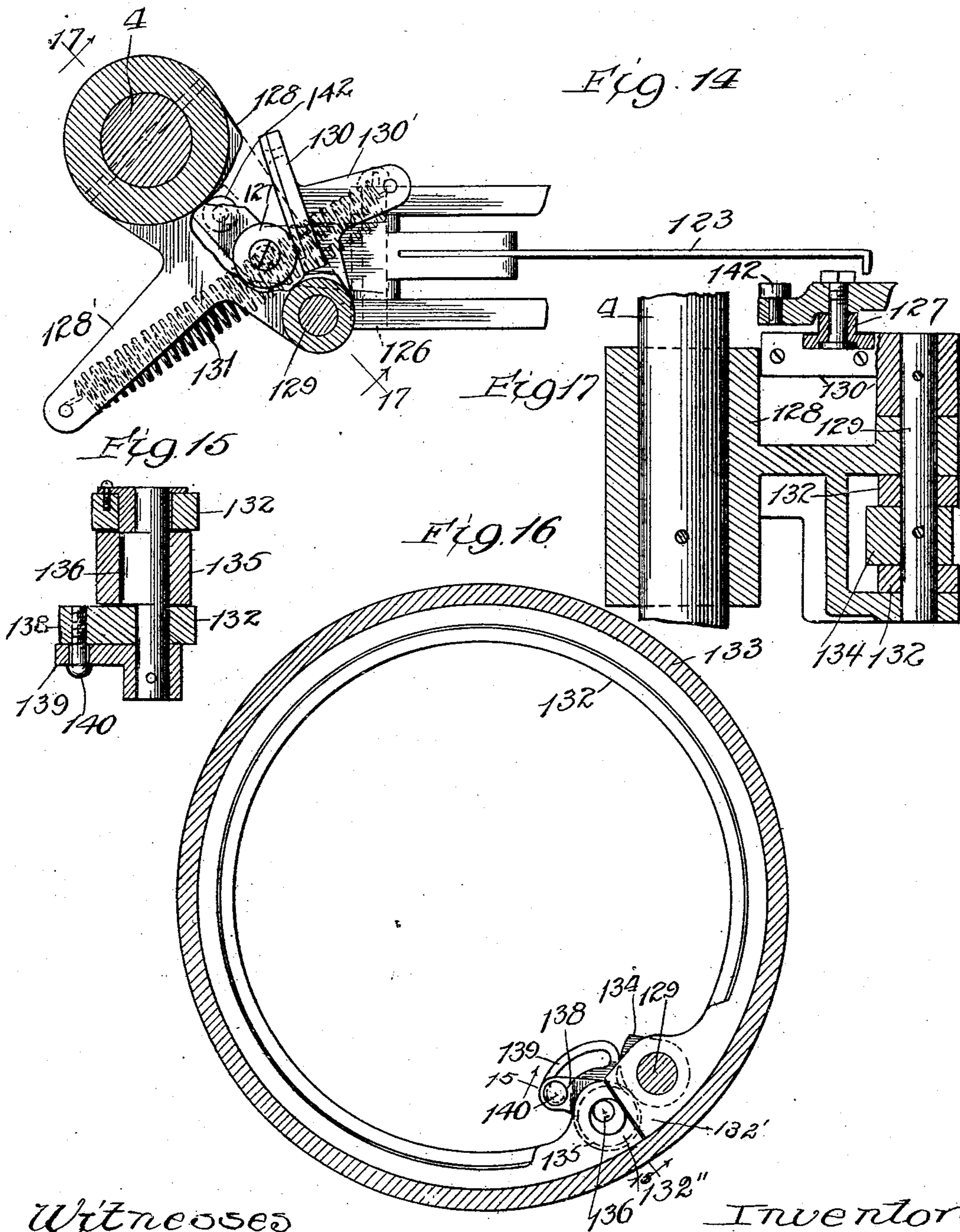
Inventor
Joseph S. Duncan
J. M. Belk Atty.

J. S. DUNCAN.
MACHINE FOR MAKING PRINTING PLATES.
APPLICATION FILED AUG. 12, 1907.

955,116.

Patented Apr. 12, 1910.

11 SHEETS—SHEET 11.



Witnesses
Harry R. L. White
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Inventor
Joseph S. Duncan
By *Wm. F. Bell* Atty.

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.

955,116.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed August 12, 1907. Serial No. 388,191.

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.

I have heretofore invented and patented several machines for making printing plates on an extensive scale for the trade (see Patents Nos. 624,764, 638,176, 750,831), but the present invention has for its object to make a commercial machine of simple construction for use by parties owning and operating addressing machines in which the plates are used.

With this end in view the invention also has for its object to provide a machine of strong and substantial construction which can be made at a comparatively low cost and which can be easily operated without requiring especial skill.

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 supporting legs being indicated in broken lines. Fig. 2 is a top plan view showing the bed partly broken away. Fig. 3 is a rear elevation omitting the belt pulley and showing the main shaft in section. Fig. 3^a is a detail view of the brake disk. Fig. 4 is a right side elevation of the machine showing a portion of the bed in section. Fig. 5 is a detail view. Fig. 6 is an enlarged view showing the head, the devices for operating the die striker, the carriage and the feeding devices. Fig. 7 is an enlarged vertical sectional view showing the head in section and the carriage and punch and die strikers in elevation. Fig. 8 is a detail enlarged plan view of the head and the carriage, the vertical shaft appearing in section and the head being partly broken away and in section. Fig. 9 is a vertical sectional view on the line 9—9 of Fig. 8. Fig. 10 is a detail enlarged

view, partly in section, showing the carriage feeding devices and the sliding plate 108. Figs. 11 and 12 are detail enlarged views, partly in section, showing the registering means and parts associated therewith. Fig. 13 is a horizontal sectional view on the line 13—13 of Fig. 4. Figs. 14 to 17 are detail enlarged sectional views of the clutch mechanism.

Referring to the drawings the frame comprises a yoke 1 mounted on a bed 2 which is supported on legs 3, indicated in broken lines in Fig. 1 only, or in any other suitable manner. A pulley shaft 4 is journaled in bearings 5 on the frame and carries a belt pulley 6.

A die head 7 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' (Fig. 7). A plurality of dies 11 and a plurality of punches 12 are oppositely disposed peripherally on the die head in guide-ways 11', 12'. The die head preferably comprises a casting 7' made of aluminum for lightness and surrounded by rings 13 of a harder metal in which the guide-ways are formed. The die head is provided with a slot 14 to receive the plate 15 in which the characters are to be stamped. The punches and dies are held separated by levers 16 arranged in the slots 10, 10' which extend radially through the ring 13, and these levers are provided with lateral pins 17 which engage sockets 18 in the dies and sockets 18' in the punches. The levers 16 operate on fulcrum pins 19 and a spring 20 is attached to the rear ends of each pair of punch and die levers and extends through an opening 20' in the die head. The springs hold the pins 17 in engagement with the punches and dies and also hold the punches and dies separated to leave the slot 14 free to receive a printing plate and to enable the die head to turn while a printing plate is supported in said slot.

Each die lever is provided with a socket 21 to receive the fulcrum pin 19 and this socket has a straight outer wall 22 and an inclined inner wall 23. The socket 18 in the outer face of each die is extended downwardly and outwardly (Fig. 7) and the outer end of the die lever may be swung downward and pulled outward to carry the pin 17 out of said socket 18 without moving

the die and to permit the die to be removed from the die head. During this movement of the die lever to permit the removal of the die the inner wall 23 of the socket 21 will ride up on the fulcrum pin 19. A new die may be arranged in place and the die lever permitted to resume its normal position with the pin 17 engaged in the socket 18 of the die. I prefer not to make the socket 18' in each punch like the socket 18 in each die for it might permit the punch to fall out of the head but I make the socket 18' rectangular in shape, as shown in Fig. 7. The punch may be removed from the die head by swinging the outer end of the punch lever upward and pulling it out until the pin 17 is removed from the socket 18' during which movement the inner wall 23 of the punch lever rides on the fulcrum pin 19.

A lever 24 is pivotally mounted on the post 24' on the underside of the bed and this lever carries a segment gear 25 which meshes with a pinion 26 on the vertical shaft 8 (Fig. 13). An operating lever 27 is pivoted at 28 to the segment lever 24 and a spring 29 is attached to these two levers to normally hold the operating lever in elevated position and against the forward end 24'' of the segment lever (Fig. 4). The operating lever is provided with a handle 27' and it also has a lug 28' which is arranged to enter notches 29' in the curved indicator plate 30 fastened to the front of the bed. The plate 30 is provided with a notch to correspond with each pair of punches and dies, and the characters to be stamped by the punches and dies are preferably indicated on the bed opposite the proper notches as shown, for example, in Fig. 2. As the operating lever is turned to carry the lug 28' into position above the notch of the character which it is desired to impress upon the plate 15, the vertical shaft will be turned to bring the punch and die for stamping that character into operative position and then the operating lever is depressed to carry the lug into the notch and at the same time throw a clutch to operate the power shaft. The lug engaged with the notch registers the punch and die corresponding to the notch in operative position. A push bar 30' is supported on the segment lever 24 and is connected at its rear end to one end 31 of a bell crank lever 32 pivoted at 33 on a bracket depending from the post 24'. A spring 34 is attached to the push bar and the segment lever and normally holds the push bar in forward position. The operating lever is provided with a toe 35 to engage the forward end of the push bar and push it backward, when the operating lever is depressed, to move the push bar rearward to throw the clutch. I prefer to provide the push bar 34 and the toe 35 with steel tips 34' and 35' to prevent wear.

A carriage 36 for carrying the plate 15 is

arranged tangentially to the head and is provided with shoes 36' to slide on the rail 37 supported on arms 37' on the yoke 1. A cord 38 carrying a weight 39 travels on pulleys 40, 41 (Fig. 4) and is attached to a pin 42 on the carriage (Figs. 7, 10) to pull the carriage to the right. The movement of the carriage to the right is step by step, a character space at each step, and this is effected by a feed dog 43 and a locking dog 44 pivotally mounted on studs 45, 46 respectively on the rail 37 (Figs. 6, 10). The feed dog 43 is held in engagement with a toothed rack bar 47 on the carriage by a spring 48 attached to the rail and to the feed dog. The locking dog rests by gravity upon the rack bar 47. A lug 51 on the feed dog overlaps the forward end of the locking dog and a lug 52 on the rear end of the feed dog projects beneath the locking dog. The feed dog is operated by a rod 53 eccentrically secured on the end of the power shaft 4 (Figs. 1, 4) and this rod operates in a guide 54 on the rail 37 and has its upper end 53' bent to work in a circular opening 55 in the rail (Fig. 6). The feed dog laps partly over the opening 55 in the path of the bent end 53' of the rod 53. The feed dog is normally engaged with a tooth of the rack bar 47 and the locking dog rests upon a tooth of this rack bar as shown in Fig. 6. When the rod 53 is operated it will move upward, after a punch and die have produced a character on the plate 15, and push the feed dog out of engagement with the rack bar. As the feed dog is lifted out of engagement with the rack bar and the carriage is pulled along by the weight 39 the locking dog moves down into engagement with a tooth of the rack bar to prevent the carriage from moving more than the distance of one tooth. The feed dog is pulled down into engagement with the rack bar by the spring 48 immediately after it has cleared a tooth to permit the feeding of the carriage and after the rod 53 has moved out of engagement with the feed dog. As the feed dog is pulled into engagement with the rack bar the lug 52 raises the locking dog out of operative engagement with the teeth of the rack bar, as shown in Fig. 6.

A release lever 49 is also pivotally mounted on the stud 46 and it is provided at one end with a lateral projection 49' extending beneath the feed dog. A spring 50 is attached to the rail 37 and to the projection 49', (Figs. 2, 6, 10). When it is desired to return the carriage to initial position or to move it backward for any purpose the release lever is operated to cause the projection 49' to lift the locking dog, and, the locking dog engaging the projection 51, will lift the feed dog out of engagement with the rack bar.

The printing plate blank 15 is held by

jaws 56, 57 mounted on a sliding frame 58 having ears 58' in which the guide rods 59 are secured. These guide rods are movably arranged in sleeves 36'' on the carriage (Figs. 6-9). The jaws are pivotally mounted on the rod 60 and a spring 61 is attached to the jaws to pull them open (Fig. 9). A rod 62 having a flat side 62' and a handle 63 is supported in bearings 64 on the sliding frame 58 and operates in lugs 65 on the jaw 57. Lugs 66 on the jaw 56 project over the rod 62 and are held in engagement therewith by the spring 61. When the rod 62 is turned so that its flat side 62' will engage the lug 66 the jaws will be opened by spring 61 to permit the removal of a printing plate and the insertion of a blank plate to receive the printing characters thereon. Then the rod 62 is turned to carry its flat side out of operative engagement with the lug 66 and press the jaws upon the blank plate to hold said plate securely and in position to be operated upon by the punches and dies. The carriage can be moved to the right on rail 37 to carry the jaws clear of the punches and dies and the plate frame can then be swung up on the rod 62, instead of turning the rod, to open the jaws and permit the removal of a stamped plate and the insertion of a blank plate, and then swung down into operative position. It will be readily understood that by the movement of the frame relative to the rod the jaws will be opened and closed in the same manner as when the rod is turned relative to the frame. The jaws are supported with the plate in proper position relative to the punches and dies by a set screw 67 on the sliding frame (Fig. 7). A pin 57' on the jaw 57 enters an opening 56' in the jaw 56 and forms a gage against which the plate is arranged to locate it properly in the jaws.

The line spacing mechanism comprises a lever 68 on a frame 69 pivotally mounted on a shaft 70 in the carriage. This frame carries dogs 71 which engage the teeth of racks 72 on the underside of the plate frame. A spring 73 is attached to the lever 68 and to the plate frame and holds the dogs in engagement with the racks. The racks are provided with teeth corresponding to the lines of type which the plate blank may receive and when the lever 68 is operated to release the dogs from engagement with the racks the spring 73 will pull the plate frame forward to permit the dogs to engage the next teeth on the racks.

A lever 74 is pivotally connected at one end 75 to a crank arm 76 on the shaft 4. The other end of the lever is pivotally connected at 77 to one arm 78' of an angle lever 78. The angle lever is pivoted at 79 on the yoke 1 and its other arm 78'' carries an adjustable punch striker 80 which engages and operates the punch when it is

brought into position above said striker (Figs. 1, 5). A screw bolt 81 extends upward through an enlarged opening 82 in the lever 74 and is screwed into an opening 83 in the lever arm 78'' in which opening the striker 80 is screwed above bolt 81. A shoulder 84 on the bolt 81 engages the underside of lever 78''. A spring 85 is arranged on the bolt between the lever 74 and lock nuts 86 and forms a yielding cushion between the striker and the lever 74. A lock nut 87 is provided on the striker 80 and a lock nut 88 is provided on the bolt 81. When the shaft 4 is thrown into operation the crank arm 75 will carry the lever 74 up and swing the angle lever 87 on its pivot to carry the head 80 into engagement with and to operate the punch. The spring 85 yields sufficiently to enable the proper operation of the punch regardless of variations in the thickness of the printing plate and also regardless of variations in the length of the punches and dies.

The die striker 89 (Fig. 1) is carried by a rock arm 90 pivoted at 91 on the yoke 1. A cam shaft 92 is journaled in bearings in the yoke and is provided with a cam 93, which engages and depresses the rock arm 90, and with another cam 94 which engages a hook 95 on the rock arm and raises the rock arm after it has been moved downward to carry the striker 89 into engagement with and to operate a die. The shaft 92 is provided with a crank arm 96 (Fig. 3) which is connected by a link 97 with the upper end of a lever 98 pivotally mounted at 99 on the yoke. An arm 100 (Figs. 11, 12) is pivoted at 99 to the lever 98 and a spring 101 connected to the lever 98 at 102 and to the arm 100 holds said arm in yielding engagement with an operating cam 103 on the shaft 4.

To register and lock the punch and die head with the punch and die in proper operative position before the strikers operate thereon I provide the lower end of the lever 98 with a registering key 104 (Figs. 11, 12) adapted to engage the teeth of a registering wheel 105 on the vertical shaft 8 (Fig. 13). This registering key is guided in a slotted plate 106 on the bed of the machine and is normally held out of engagement with the registering wheel by a spring 107 attached to the lever 98 on the yoke 1 (Fig. 11).

To prevent the machine from operating after the carriage has carried the printing plate out of punching position I employ a sliding plate 108 (Figs. 6, 10) which is adapted to be moved out of position beneath the cam 93 to prevent it from operating the rock arm. This plate is provided with slot and pin guides 109 and is normally held by a spring 110 between the rock arm 90 and the cam 93. An arm 111 is rigidly mounted

on a tripper arm 112 which is pivoted at 91 on the yoke (Fig. 6). The arm 111 projects upward through a slot 108' in the sliding plate 108 and the arm 112 normally rests on a stop 113 on the rail 37. A projection 114 on the rack bar 47 engages and trips the arm 112 at the proper time to cause the arm 111 to withdraw the sliding plate from its normal position between the rock arm 90 and the cam 93. Then the cam can operate without moving the rock arm and hence the machine is inoperative to stamp a letter in the plate. The tripper projection 114 may be located at any desired position on the rack bar for the purpose of operating the arm 112 and rendering the machine inoperative as before described at any point where it is desired to terminate the line of type.

To prevent the punch and die from sticking in the plate and to disengage or release them from the plate, hooks 115 are fastened to the lever 74 and the rock arm 90 (Fig. 7). These hooks engage the punch and die levers on the return movement of the punch and die operating devices and insure the return of the punch and die to normal position after they have operated to stamp a character in the plate.

After a punch and die have been brought into operative position for stamping a character in the plate supported therebetween a clutch is operated for applying power to the main shaft 4 to revolve said shaft once. Different kinds of clutches may be used for this purpose without materially changing the rest of the machine and for this reason I do not limit the invention to the particular clutch mechanism illustrated in the drawings.

As before stated the push bar 30' operates a bell crank lever 32 (Fig. 4) and the rear end 116 of this lever engages and operates another bell crank lever 117 pivotally mounted at 118 on a bracket 119 depending from the bed of the machine (Fig. 3). A link 120 is connected to the bell crank lever 117 and to a trigger lever 121 mounted on a frame 122 at the rear of the bed (Fig. 2). The trigger lever is held normally in engagement with a clutch lever 123 by a spring 121' attached to the trigger lever and to the bed of the machine (Figs. 2, 3). When the trigger is disengaged from the clutch lever a spring 124 attached to said lever and to the frame 122 will pull the clutch lever to the right in Fig. 2 against the cushioned stop 125. The clutch lever is pivoted at 126 in the frame 122 and it carries at its forward end a roller 127 (Figs. 2, 14). An arm 128 is rigidly mounted on the main shaft 4 (Fig. 12) and a rock shaft 129 is supported therein (Fig. 2). A locking arm 130 is rigidly secured on the rock shaft 129 and is normally held in engagement with the roller 127 by a spring 131

which is attached to a projection 128' on the arm 128 and to a projection 130' on the locking arm 130. A friction band 132 is arranged within the rim of a driven pulley 133 mounted loosely on the main shaft 4 (Fig. 16). One end 132' of this friction band is divided and the rock shaft 129 extends therethrough and carries a cam 134 which engages a roller 135 mounted on an eccentric pin 136 in the other end 132'' of the band. A segment 139 rigid with the pin 136 is adjustable relative to an arm 138 on the band and is secured in adjusted position by a set screw 140, whereby the roller 135 can be adjusted relative to the cam 134 to adjust the band accurately for frictional engagement at the proper time with the pulley rim. When the key lever is depressed to operate the push bar 30' the bell crank lever 32 will operate the bell crank lever 117 and release the trigger lever from engagement with the clutch lever 123. Thereupon the spring 124 will pull the clutch lever back against the stop 125 and at the same time move the roller 127 sidewise and out of engagement with the locking arm 130. The spring 131 will then pull the locking arm downward in Fig. 14 and rock the shaft 129 which will carry the cam 134 into engagement with the roller 135 and expand the band into frictional engagement with the continuously running driven pulley 133 to revolve the main shaft 4 once. It will be observed that the arm 128, the rock shaft 129 and the parts carried by said rock shaft revolve with the main shaft 4, while the clutch lever and its roller 127 remain stationary. To return the clutch lever to its normal position a cam 141 on the main shaft engages a projection 142 on the clutch lever and pushes said lever back to the position shown in Fig. 2 by the time the locking arm is carried down into engagement with the roller 127, and when the locking arm does engage said roller in this manner said arm will rock the shaft 129 backward and carry the high point of the cam 134 away from the roller 135 to permit the friction band to contract away from frictional engagement with the pulley rim.

To insure the main shaft stopping at the completion of one revolution I provide a brake mechanism comprising a disk 143 rigidly mounted on the main shaft and provided with a friction segment 143' on one side thereof (Figs. 2, 3). A plate 144 is rigidly secured to the bed of the machine on one side of the brake device and a plate 145 is movably mounted on the other side of the brake disk on bolts 146 screwed into the plate 144. Check screws 147 carried by said plate 145 engage the plate 144 to adjust said plate 145 relative to the plate 144. Springs 148 on the bolts 146 bear upon the plate 145 and move it forward so that it

will be engaged by the segment of the brake disk, and by frictional engagement between said segment and plate 145 the main shaft 4 is stopped at the completion of one revolution.

The operation of the several parts of the machine has been indicated in the detail description and these operations are all automatic and are timed so that they form one complete operation which commences with the movement of the operating lever. The operation of this operating lever brings about the operations of all of the several groups of mechanism comprising the machine and in this respect the machine is extremely easy to operate and does not require skilled attention. A blank plate having been secured in the jaws and the carriage moved to the left the operating lever is moved to position opposite the notch corresponding to the punch and die of the character which it is desired to stamp on the plate. The operating lever is then depressed to operate the push bar 30' and this releases the trigger from engagement with the clutch lever, whereupon the clutch is thrown and power is applied to the main shaft. The die is first brought to rest upon the plate and then the punch is forced upward by its striker to stamp the character in the plate. The hooks 115 insure the disengagement of the punch and die from the plate. The carriage is fed one tooth on the rack bar to carry the plate into position to receive another impression. Then the clutch is disengaged and the brake stops the main shaft at the completion of one revolution.

The number of teeth on the rack bar 47 corresponds to the number of characters that can be stamped in one line on the plate. After the last character has been stamped the feed dog 43 will rest on the upper edge of the rack bar beyond the teeth so that the weight can pull the rack bar freely until the projection 114 trips the arm 112 to withdraw the slide 108 from beneath the cam 93. If power should then be applied to the machine the die would not operate and the punch would not by itself stamp a character in or injure the plate. When a blank plate has been arranged in the jaws of the carriage the carriage is pushed over to the left against a stop 150 suitably located on the rail 37 (Fig. 1) or on the frame to limit the movement of the carriage and this stop is preferably arranged so that when the carriage is engaged therewith the plate will be in position to have the first character stamped therein.

The machine is simple in construction for the kind of work it is designed to do and, as before stated, it can be easily operated by unskilled girls or boys. For this reason the machine can be sold to and used by parties who have addressing machines in which the

printing plates are used. These addressing machines are as a rule operated at intervals by young girls or boys and it is the object of this invention to provide a machine for making plates for use in those addressing machines and which plate making machine can be operated by the girls or boys who operate the addressing machines to provide printing plates for new addresses as the same are required.

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

1. In a machine for making printing plates, the combination of a normally stationary head, a plurality of punches and dies arranged opposite each other in pairs in the head and movable therewith, a hand lever movable in an arc of a circle and having a geared connection with the head for turning the latter to register any pair of punches and dies, and means operatively associated with said lever for operating the punch and die to move toward each other.

2. In a machine for making printing plates, the combination of a normally stationary head, a plurality of punches and dies slidably arranged in co-acting pairs parallel in said head, the members of each pair having their acting faces separated, hand operated means for turning said head in either direction form a fixed point to register any pair of punches and dies in operative position common to all of said punches and dies on opposite sides of an interposed plate, and means controlled by said lever for operating the punch and die to move toward each other and impress a character in the plate.

3. In a machine for making printing plates, the combination of a normally stationary head, a rotatable shaft for the head, a plurality of punches and dies slidably supported in said head and arranged in co-acting pairs, the members of each pair having their acting faces separated and slidably supported whereby they are capable of being moved toward and from each other, a lever movable in the arc of a circle for turning the head in either direction from a fixed point to register any pair of punches and dies in operative position common to all of the punches and dies, said lever being pivoted adjacent one end to a fixed support and having an operative engagement intermediate its ends with the rotatable shaft, a hand operating arm connected adjacent the opposite end of said lever, and means for moving the punch and dies successively into operative position whereby they may be made to produce a character in relief upon an interposed plate and retracted to permit the turning of said head and the movement of said plate to receive another character.

4. In a machine for making printing plates, the combination of a plurality of

punches and dies arranged in co-acting pairs and the members of each pair being independently movable toward and from each other, a normally stationary head carrying all of said punches and dies, a hand lever movable within fixed limits in the arc of a circle for turning said head in correspondence with the movement of said lever and in either direction from a fixed point to register any pair of punches and dies in operative position common to all of said punches and dies on opposite sides of an interposed plate, and means operatively connected with said lever to operate said punch and die.

5. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies arranged opposite each other in pairs in the head, means for operating a punch and die in operative position relative to an interposed plate, and a lever movable in one direction for turning the head to bring a punch and die into said operative position and movable in another direction for actuating said operating means.

6. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies arranged opposite each other in pairs in the head, and a lever movable in the arc of a circle for turning said head to bring a pair of said devices into operative position and movable vertically for applying power to the mechanism and setting the machine in operation.

7. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, means for turning the head to bring any pair of punches and dies into an operative position common to all of said punches and dies on opposite sides of an interposed plate, and means for moving the die into a position at rest upon the plate and then operating the punch to stamp a character in the plate.

8. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, means for turning the head to bring any pair of punches and dies into an operative position common to all of said punches and dies on opposite sides of an interposed plate, and means for operating said punch and die to stamp a character in the plate, the movement of the die being in advance of the movement of the punch.

9. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs periph-

erally in said head, means for turning the head to bring any pair of punches and dies into an operative position common to all of said punches and dies on opposite sides of an interposed plate, and means for operating said punch and die to stamp a character in the plate, the die being brought into engagement with the plate before the punch.

10. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged opposite each other in co-acting pairs in the head, levers fulcrumed in the head and engaged with said punches and dies, and springs operating on said levers to hold the acting faces of said punches and dies separated.

11. In a machine for making printing plates, the combination of a circularly movable head having a peripheral slot therein to receive the plate in which the characters are to be stamped, a plurality of punches and dies slidably arranged opposite each other in co-acting pairs in the head and on opposite sides of said slot, levers fulcrumed in the head and engaged with said punches and dies, and springs engaged with said levers to hold the acting faces of said punches and dies separated and clear of said slot.

12. In a machine for making printing plates, the combination of a circularly movable head having a plurality of radial slots therein, a plurality of punches and dies slidably arranged opposite each other in pairs in the head, levers fulcrumed in said slots and engaged with said punches and dies, and springs acting on said levers to hold the acting faces of the punches and dies separated.

13. In a machine for making printing plates, the combination of a circularly movable head having a peripheral slot therein to receive the plate in which the characters are to be stamped, and a plurality of radial slots on opposite sides of said peripheral slot, a plurality of punches and dies arranged opposite each other in pairs in the head and on opposite sides of said peripheral slot, levers fulcrumed in said radial slots and engaged with said punches and dies, and springs acting on said levers to hold the acting faces of said punches and dies separated.

14. In a machine for making printing plates, the combination of a circularly movable head having a plurality of radial slots therein, a plurality of punches and dies arranged opposite each other in pairs in the head, a plurality of levers fulcrumed in said slots, pins on said levers engaged with said punches and dies, and springs acting on said levers to hold the acting faces of said punches and dies separated.

15. In a machine for making printing

plates, the combination of a circularly movable head having a plurality of radial slots therein, a plurality of punches and dies slidably arranged opposite each other in pairs in the head, pins in said slots, levers fulcrumed on said pins and engaged with said punches and dies, and springs within the head and acting upon said levers to hold the acting faces of the punches and dies separated.

16. In a machine for making printing plates, the combination of a circularly movable head having a peripheral slot therein to receive the plate in which the punches and dies are to be stamped and a plurality of radial slots on opposite sides of said peripheral slot, a plurality of punches and dies slidably arranged opposite each other in pairs in said head, pins in said radial slots, levers fulcrumed on said pins, pins projecting laterally from said levers and engaged with said punches and dies, and springs acting on said levers to hold the acting faces of said punches and dies separated.

17. In a machine for making printing plates, the combination of a head, an impression device movably arranged in said head, a lever engaged with said impression device and provided with a socket having a straight outer wall and an inclined inner wall, and a fulcrum for said lever engaged with said socket.

18. In a machine for making printing plates, the combination of a head, an impression device slidably arranged in said head, a lever arranged at right angles to said impression device and engaged therewith, said lever being provided with a socket having a straight outer wall adjacent to the impression device and an inclined inner wall, and a fulcrum pin for said lever engaged with said socket.

19. In a machine for making printing plates, the combination of a head, an impression device slidably arranged in the head and provided with a socket in its outer face, a lever fulcrumed in the head, and a pin projecting laterally from the lever and engaged with said socket in the impression device.

20. In a machine for making printing plates, the combination of a head, an impression device slidably arranged in the head and provided with a socket in its outer face extending downwardly and outwardly, a lever fulcrumed in the head, and a pin extending laterally from said lever and engaged with said socket in the impression device.

21. In a machine for making printing plates, the combination of a head, an impression device slidably arranged in the head and provided with a socket in its outer face, a lever provided with a socket having

a straight outer wall adjacent to the impression device and an inclined inner wall, a fulcrum pin in the head engaged with said socket in the lever, and a pin extending laterally from the lever and engaged with said socket in the impression device.

22. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies arranged opposite each other in pairs in the head, and a lever operatively connected with said head to turn the head and bring any pair of punches and dies into operative position relative to an interposed plate.

23. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, means for operating a pair of said punches and dies, a notched indicator plate on the frame of the machine, and a lever connected with the head to turn the same, said lever comprising a relatively movable part to engage said indicator plate and actuate said operating means.

24. In a machine for making printing plates, the combination of a shaft, a head on the shaft, a plurality of punches and dies arranged opposite each other in pairs in the head, a pinion on said shaft, a toothed segment engaged with said pinion, and a lever for operating said segment to turn the head and bring any pair of punches and dies into operative position relative to an interposed plate.

25. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged opposite each other in pairs in the head, a notched indicator plate on the frame of the machine, a lever operatively engaged with said head to turn the same, and a lug on the lever to enter a notch in the indicator plate.

26. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies arranged opposite each other in pairs in the head, means for operating the punch and die in operative position relative to an interposed plate, a notched indicator plate on the frame of the machine, a lever operatively engaged with said head, and a lug on said lever to enter a notch in said indicator plate, said lever being arranged to actuate said punch and die operating means when depressed to carry the lug into a notch of the indicator plate.

27. In a machine for making printing plates, the combination of a shaft, a head mounted on the shaft, a plurality of punches and dies on the head, a pinion on the shaft, a segment gear meshing with said pinion, a lever carrying said segment gear, a notched indicator plate on the frame of the machine, an operating lever pivotally supported on

the segment lever, and a lug on the lever to enter a notch in said indicator plate.

28. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, means for operating a pair of said punches and dies, a lever connected with the head to turn the same, said lever comprising a relatively movable part, and means adapted to be operated by said relatively movable part to actuate the operating means.

29. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, means for operating a pair of said punches and dies, a lever operatively connected to the head to turn said head and bring any pair of punches and dies into operative position, a push bar carried by said lever and adapted to actuate said operating means, and an operating lever pivotally supported on the push bar lever and adapted to be swung on its pivot to move said push bar.

30. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, means for operating a pair of said punches and dies, a lever operatively connected to said head to turn the same, an operating lever, and means adapted to be actuated by said operating lever to actuate said operating means.

31. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, means for operating a pair of said punches and dies, and an operating lever operatively connected to said head and to the punch and die operating means.

32. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies in the head, means for operating a pair of said punches and dies, a clutch device for setting said operating means in motion, and an operating lever to turn said head and throw said clutch.

33. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies on the head, a lever operatively connected to said head to turn the same, a push bar supported on the lever, means adapted to be operated by said push bar for actuating said punch and die operating means, an operating lever pivotally supported on the push bar lever, and a toe on said operating lever to engage said push bar.

34. In a machine for making printing plates, the combination of a circularly movable head having a peripheral slot therein, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head on opposite sides of the slot therein, a carriage movably mounted at one side

of the head and adapted to support a plate in the slot in said head between the circular paths of travel of the punches and dies, and means for feeding the carriage automatically after each impression.

35. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies arranged in co-acting pairs peripherally in said head, and a movable carriage located tangentially to the head and adapted to carry a plate in a tangential direction to the head between the acting faces of the punches and dies and between their circular paths of travel.

36. In a machine for making printing plates, the combination of a rail, a carriage for carrying the plate and slidably mounted on said rail, a weight connected to said carriage and pulling it in one direction, a rack bar on the carriage, a feed dog and a locking dog operating on said rack bar, a shaft, and a rod eccentrically mounted on said shaft and arranged to disengage the feed dog from said rack bar.

37. In a machine for making printing plates, the combination of a rail, a carriage mounted to slide on said rail, a plate frame mounted on said carriage to slide at a right angle to the movement of said carriage, a pair of jaws on said plate frame to hold the plate, means for opening said jaws, and means for swinging said jaws into upright position.

38. In a machine for making printing plates, the combination of a rail, a carriage slidably mounted on said rail, a plate frame mounted on said carriage to slide at a right angle to the movement of the carriage, a pair of jaws pivotally connected together and pivotally mounted on the plate frame and adapted to carry the plate, and a rod to clamp said jaws on the plate.

39. In a machine for making printing plates, a carriage, a plate frame on the carriage, a pair of jaws pivotally mounted on the plate frame to carry the printing plate, and a pin on one of said jaws to enter an opening in the other jaw and form a gage for the plate.

40. In a machine for making printing plates, the combination of a carriage, means for imparting a step by step movement to said carriage, a plate frame on the carriage movable at a right angle to the movement of the carriage, a pair of jaws on said plate frame to carry the plate, and means for adjusting said plate frame relative to the carriage for line spacing.

41. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, means for turning the head to bring a pair of punches and dies

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into an operative position common to all of the punches and dies, and a yielding striker for operating the punch.

42. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, means for turning the head to bring a pair of punches and dies into an operative position common to all of the punches and dies, a striker for operating the punch, and means for automatically adjusting the striker to permit variations in its movement.

43. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, means for turning the head to bring a pair of punches and dies into an operative position common to all of the punches and dies, a striker for operating the punch, and means for enabling the striker to give the punch its proper operation regardless of variations in thickness of the plates.

44. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, a shaft, a crank arm on said shaft, a lever 74 pivotally connected at one end to said crank arm, an angle lever 78 pivoted on the frame of the machine and having one arm thereof pivotally connected to the other end of said lever 74, and a punch striker carried by the other arm of said angle lever to engage and operate a punch in operative position.

45. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, a shaft, a crank arm on said shaft, a lever 74 pivotally connected at one end to said crank arm, an angle lever pivoted on the frame of the machine and having one arm thereof pivotally connected to said lever 74, a striker carried by the other arm of said angle lever, and yielding means between said striker and said lever 74.

46. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, a die striker, an arm carrying said striker, a hook on said arm, a cam operating on the arm to move the striker against the die, and a cam engaging said hook to lift the arm and striker.

47. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies slidably arranged in co-acting pairs peripherally in said head, a die striker, an arm

carrying said striker, a shaft, a cam on the shaft for operating said striker, a crank arm on said shaft, a lever connected to said crank arm, a main shaft, a cam on said main shaft, and an arm pivoted on said lever and held in engagement with said cam on the main shaft.

48. In a machine for making printing plates, the combination of a head, a plurality of punches and dies slidably arranged in co-acting pairs in said head, a striker for operating the die which has been moved to operative position, and means for preventing the operation of said striker.

49. In a machine for making printing plates, the combination of a head, a plurality of impression devices carried by the head, a striker for operating an impression device after it is brought into operative position, and means for preventing the operation of said striker.

50. In a machine for making printing plates, the combination of a head, a plurality of impression devices carried by the head, a striker for operating the impression device which has been moved to operative position, a cam for operating said striker, a plate normally interposed between the cam and the striker, and means for automatically withdrawing the plate to prevent the cam from operating the striker.

51. In a machine for making printing plates, the combination of a head, a plurality of punches and dies carried by the head, a die striker, a cam for operating said die striker, a plate normally interposed between the cam and the die striker, an arm engaged with said plate, and means for automatically swinging said arm to carry the plate from beneath the cam to prevent the operation of the die striker.

52. In a machine for making printing plates, the combination of a head, a plurality of punches and dies in the head, a die striker, a cam for operating said die striker, a plate normally interposed between the cam and the die striker, a carriage for carrying the plate, a projection on said carriage, and means adapted to be operated by said projection to withdraw the plate from beneath the cam.

53. In a machine for making printing plates, the combination of a head, a plurality of punches and dies in the head, a die striker, a cam for operating said die striker, a plate normally interposed between the cam and the die striker, a carriage for carrying the plate, a projection on said carriage, a tripper arm adapted to be engaged by said projection, and an arm on said tripper arm to withdraw the plate from beneath the cam.

54. In a machine for making printing plates, the combination of a circularly movable head, a plurality of punches and dies

slidably arranged in co-acting pairs periph-
erally in the head, a main shaft, a clutch on
said shaft, an operating lever connected to
the head for turning the head to bring any
5 pair of punches and dies into operative posi-
tion, a notched indicator plate, a lug on said
lever to enter a notch in said plate and reg-
ister the punch and die in operative posi-
tion, and means operated when said lug is
10 carried into the notch to throw said clutch.

55. In a machine for making printing
plates, the combination of a circularly mov-
able head, a plurality of punches and dies on

the head, a notched indicator plate on the
frame of the machine, a lever connected with 15
the head to turn the same, said lever com-
prising a relatively movable part to engage
said indicator plate, a registering wheel
turning in unison with the head, and a reg-
istering key adapted to engage said wheel 20
to lock the head in registered position.

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Witnesses:

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