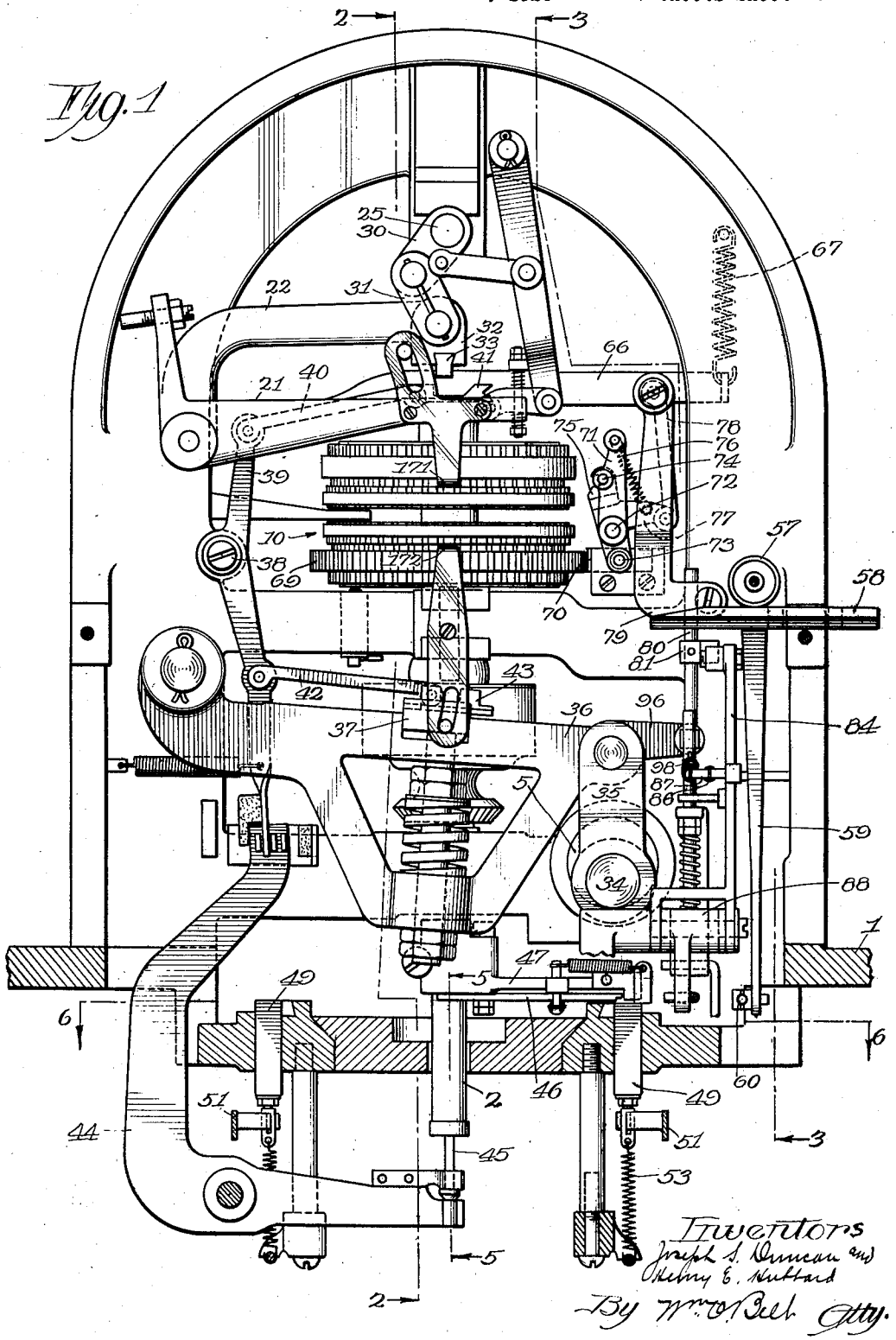
Nov. 10, 1931. J. S. DUNCAN ET AL 1,831,103

MACHINE FOR MAKING PRINTING PLATES

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Fig. 1

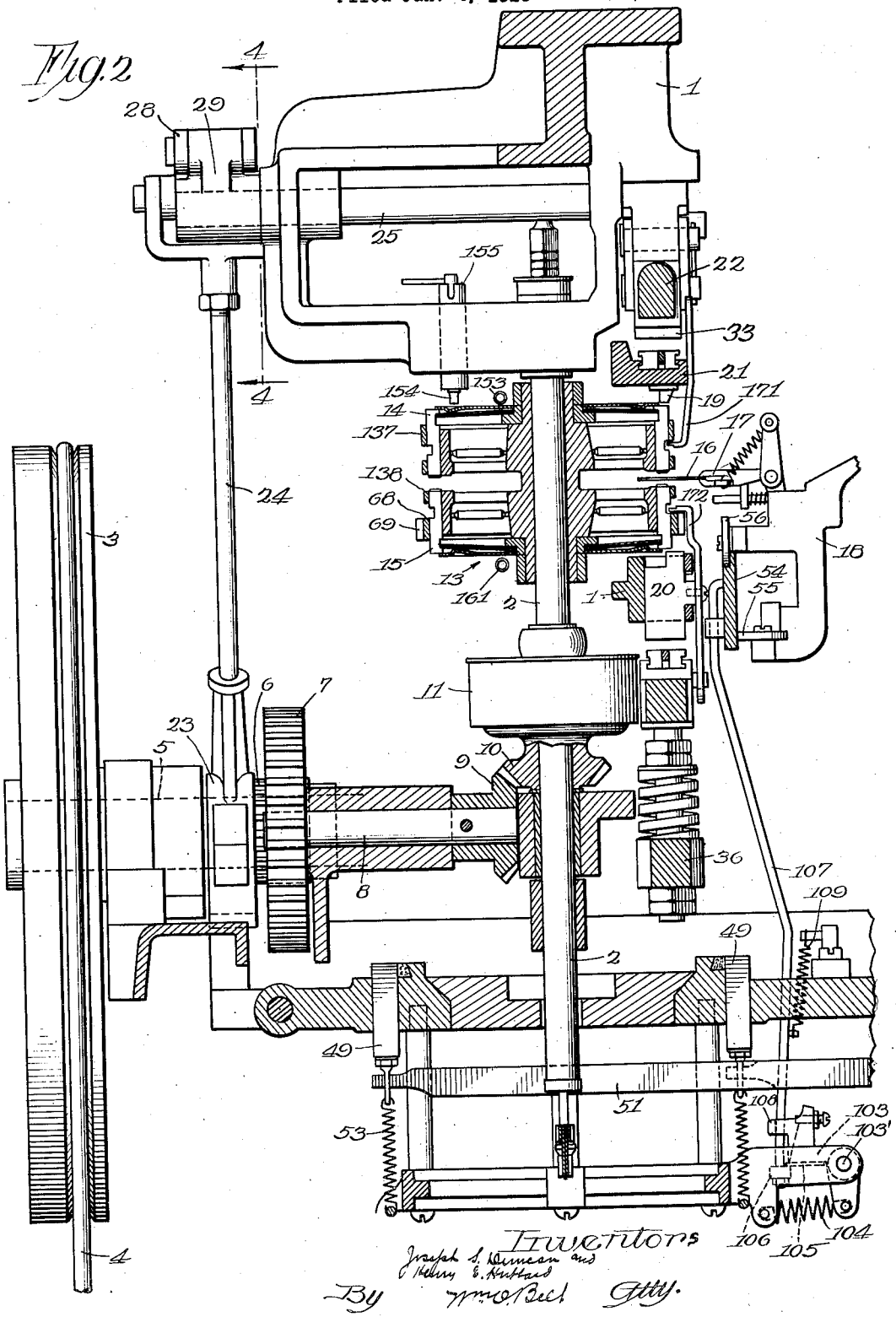


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MACHINE FOR MAKING PRINTING PLATES

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Fig. 2



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MACHINE FOR MAKING PRINTING PLATES

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Fig. 3

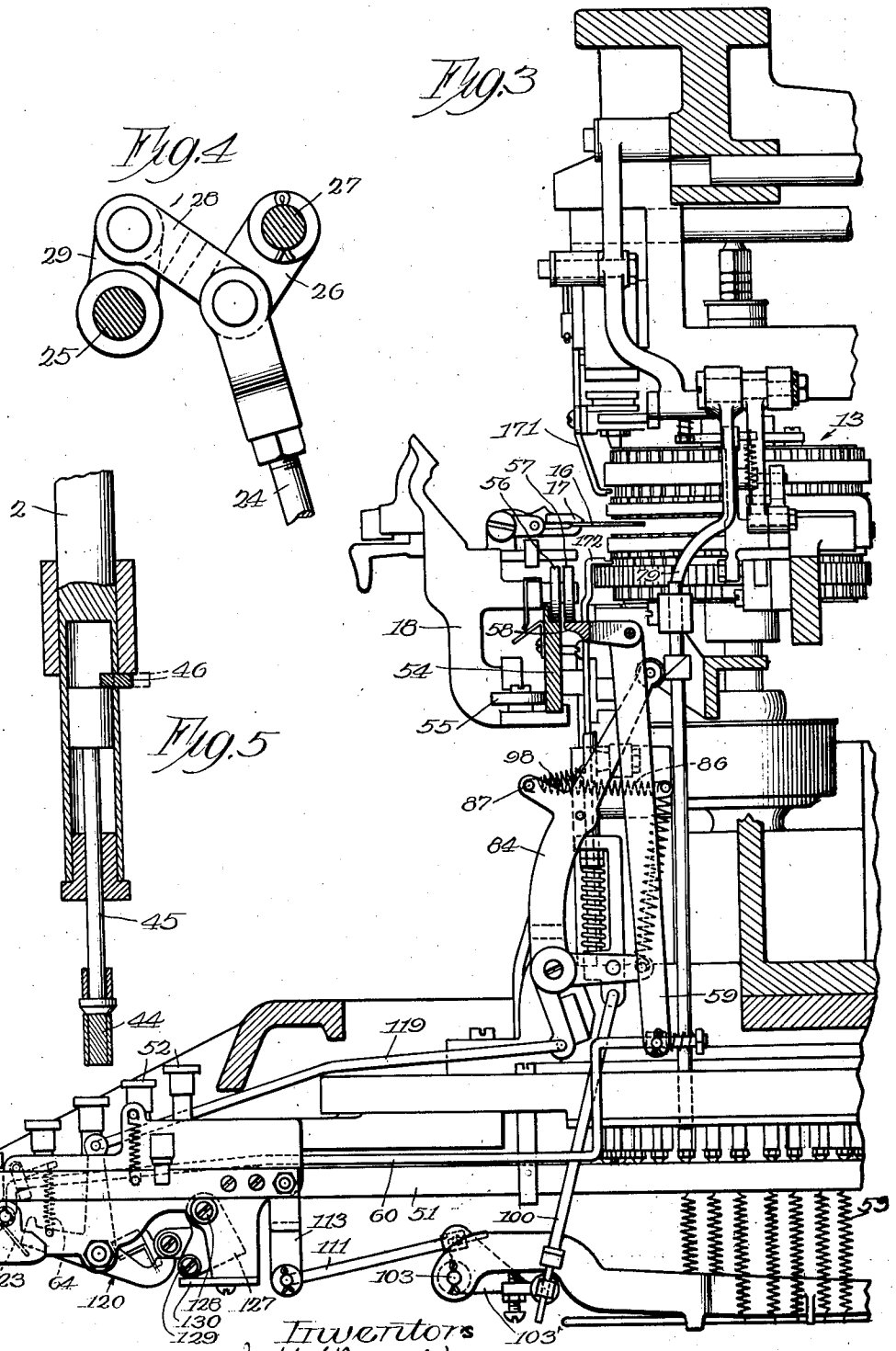


Fig. 4

Fig. 5

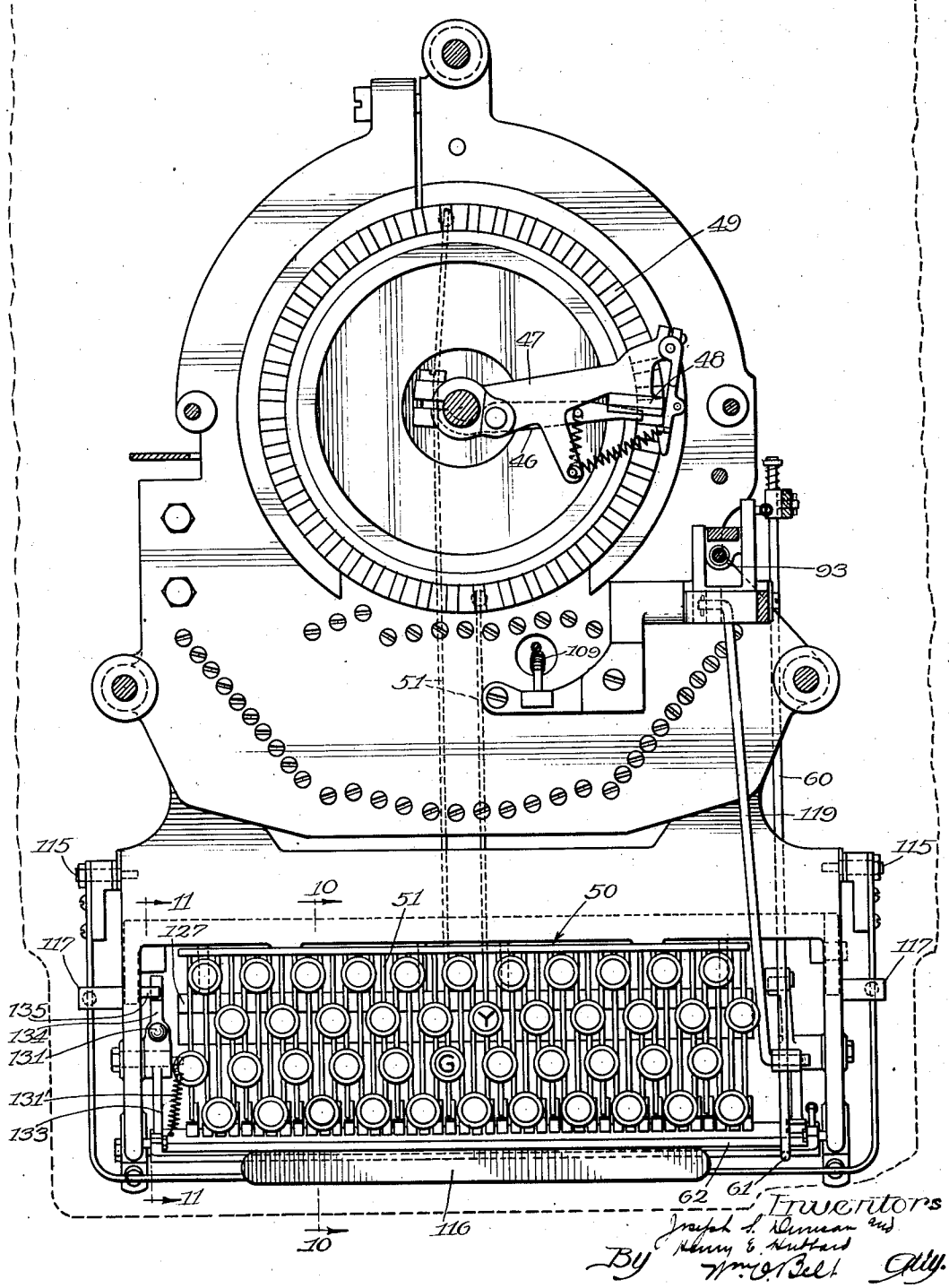
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Fig. 6

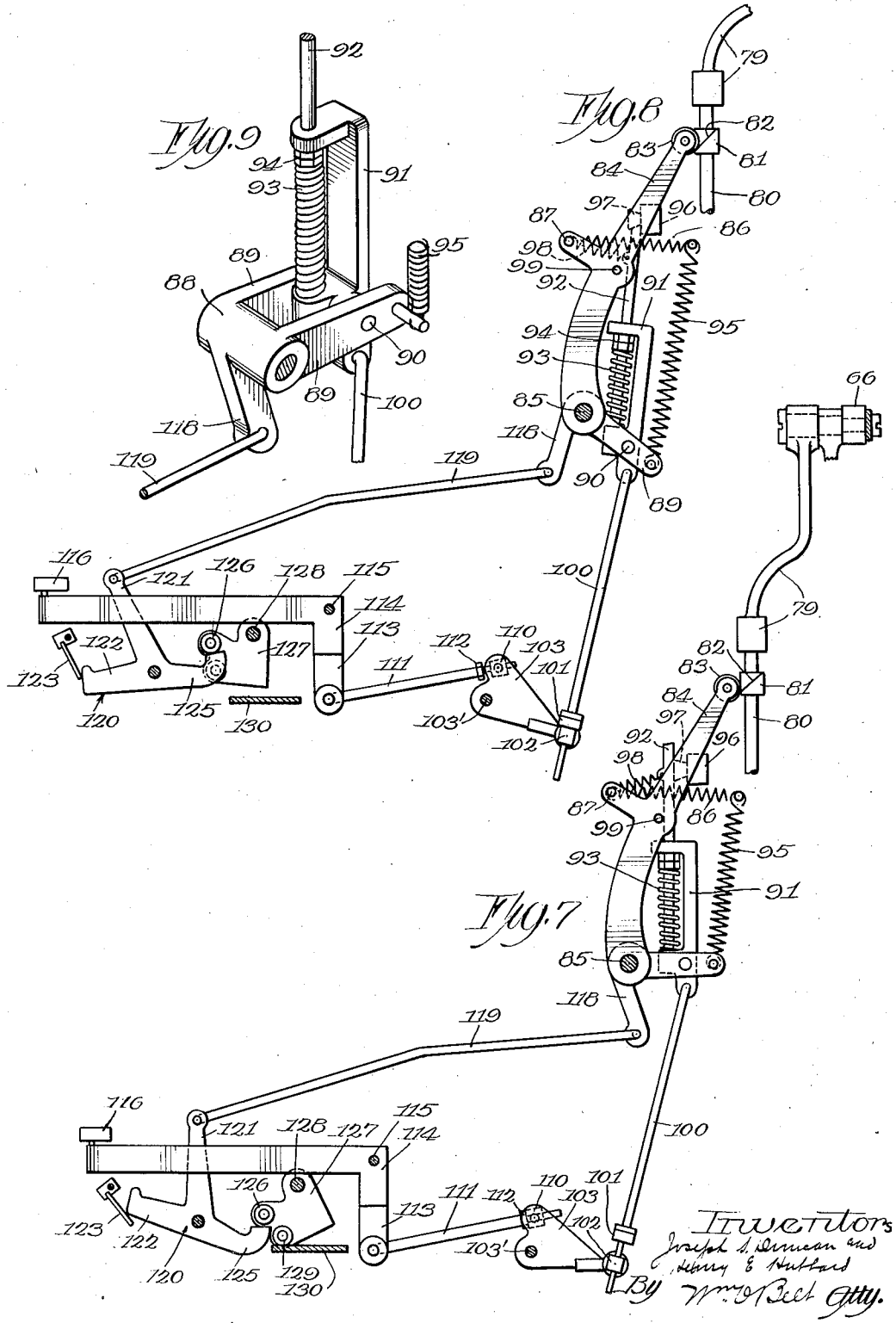


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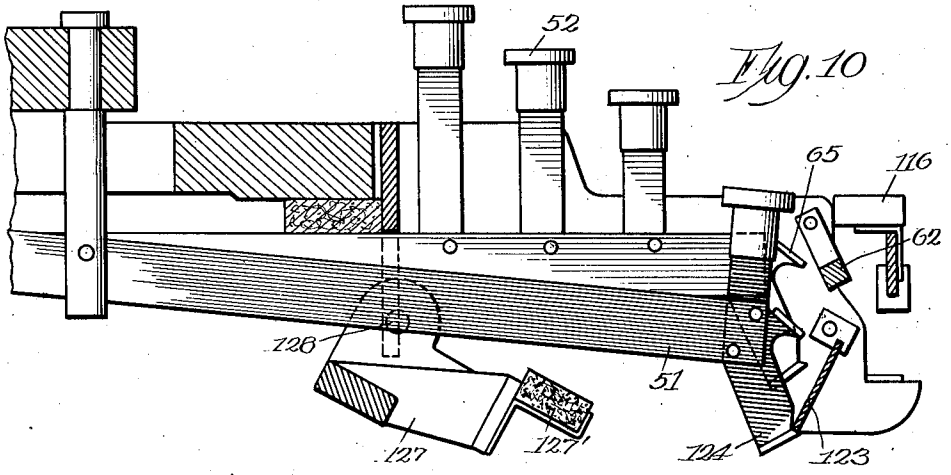


Fig. 10

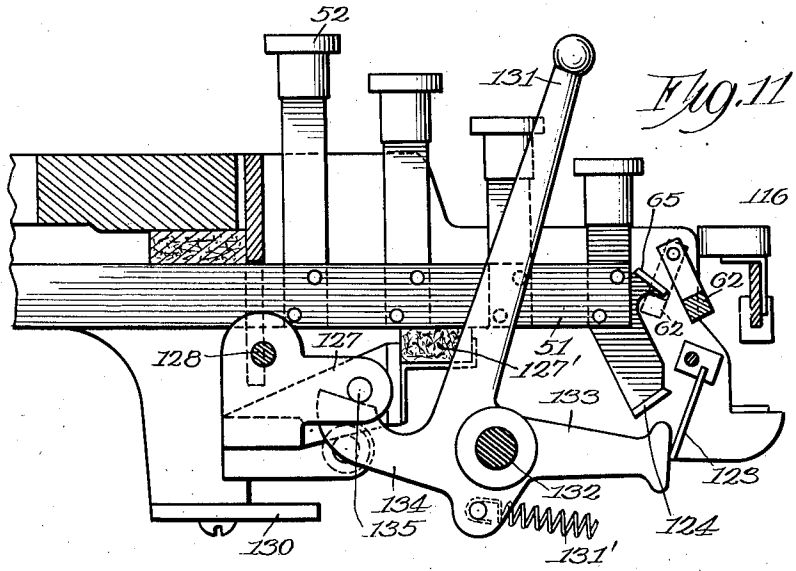


Fig. 11

Fig. 12

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Fig. 14

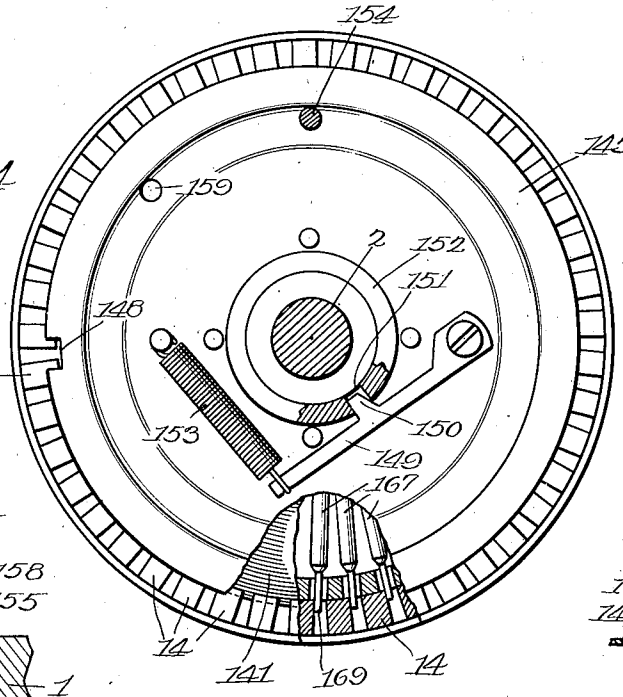


Fig. 15

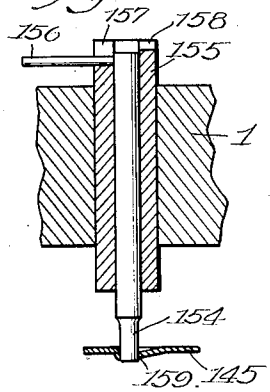


Fig. 16

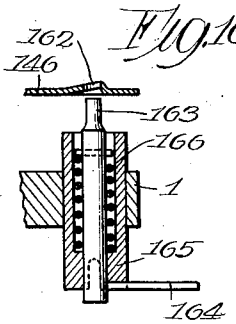
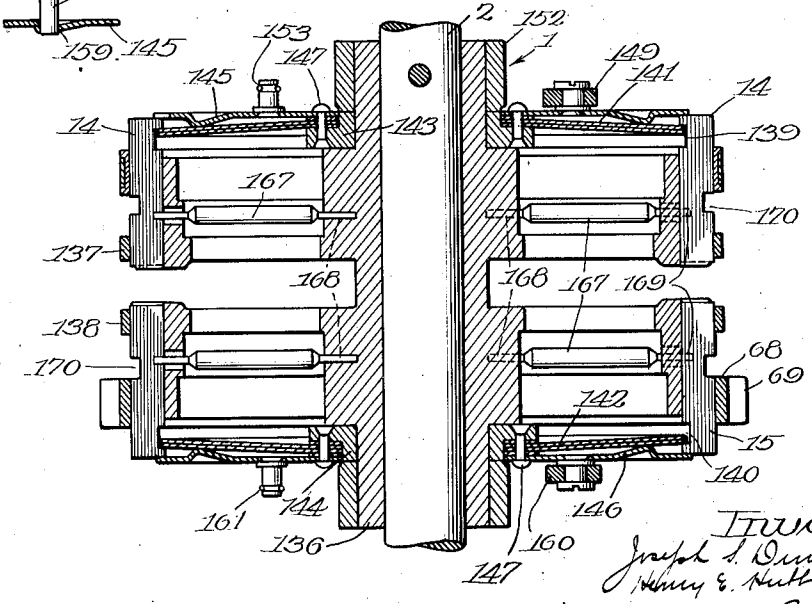


Fig. 13



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Patented Nov. 10, 1931 1,831,103

UNITED STATES PATENT OFFICE

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MACHINE FOR MAKING PRINTING PLATES

Application filed January 4, 1926. Serial No. 79,134.

This invention relates to a machine of the general type disclosed in patents to Joseph S. Duncan Nos. 921,600, 955,116 and 1,518,904. In such machines a plate upon which impressions are to be made is supported on a carriage and disposed between co-operating punches and dies, which punches and dies are usually supported upon a revolving die head. In the type of machines shown in the aforesaid Patent 1,518,904 a key board similar to the ordinary typewriter key board is employed to operate the machine, and the carriage moves in respect to the die head to properly space the characters which are impressed thereon.

One of the principal objects of our invention is to provide novel and improved means for operating the character spacing mechanism and to restore the respective keys to position after operation thereof. The means which we provide applies the power in a superior manner and has other advantages which will become apparent during the progress of the description.

Another object of our invention is to provide novel and improved means for controlling the operation of the keys. This means prevents the actuation of a key when the carriage is not in position to hold a plate in operative relation to the die head. If the carriage is not in this operative relation and the machine is operated without a plate being in position between a punch and die, obviously damage is done to the punch and die. This danger is minimized by the aforesaid means which will prevent operation of any key until the carriage has been brought into the proper position.

Further objects of our invention are to provide means of improved character for stripping the punches and dies, that is, for returning them to normal position after they have made an impression upon the plate; to provide novel and improved means for retaining the dies and punches in position in the die head and for removing individual dies and punches when required.

In the accompanying drawings in which we have shown a selected embodiment of our invention;

Fig. 1 is a front elevation of a machine embodying our invention, parts being omitted and parts being shown in section to better illustrate the invention.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a section on the line 5—5 of Fig. 1.

Fig. 6 is a section on the line 6—6 of Fig. 1.

Figs. 7 and 8 are detached views of the devices for operating the character spacing mechanism and for controlling the operation of the keys, the devices being shown in two positions which they occupy during their operation.

Fig. 9 is a perspective view of a portion of the mechanism shown in Figs. 7 and 8.

Fig. 10 is a section through the key board taken on the line 10—10 of Fig. 6, certain parts being omitted for the sake of clearness.

Fig. 11 is a section taken on the line 11—11 of Fig. 6.

Fig. 12 is a detached view illustrating the means for preventing operation of the keyboard when the carriage is not in proper relation to the die head.

Fig. 13 is a vertical sectional view through the die head.

Fig. 14 is a plan view of the top of the die head.

Fig. 15 is a view showing the means for locking the top plate on the die head in position so as to permit removal of a die.

Fig. 16 is a view similar to Fig. 15 and showing the means for locking the bottom plate of the die head in position to permit removal of one of the punches.

Referring now to the drawings in detail, the machine is supported upon a suitable frame 1 and comprises a vertical shaft 2 operated by any suitable means, here exemplified as a flywheel and pulley 3 over which is trained a belt 4 operated from any suitable source of power, such as an electric motor. The pulley 3 is mounted on a shaft 5 upon which is mounted a gear 6 meshing with a gear 7 upon a stub shaft 8 having a bevel gear 9 meshing with a gear 10 on the shaft 2. The bevel gear 10 drives the shaft 2 through a suitable friction clutch 11 secured

thereto. The shaft 2 carries a die head 13, the details of which will be more fully described later, but which contain vertically movable dies 14 and punches 15 adapted to co-operate to form an impression upon a plate 16 disposed therebetween. The plate 16 is held in suitable jaws 17 on a carriage 18 the general construction of which forms no part of the present invention and need not be described in detail.

The dies and punches may be moved vertically in the die head and for that purpose a die stock 19 and a punch stock 20 are provided. These stocks are slidably mounted in the die shuttle arm 21 and in the frame of the machine respectively, vertical movement thereof being permitted. The stocks are given their movement by reciprocating means now to be described. Pivoted on the machine frame is a rock lever 22 and this lever is rocked by means of an eccentric 23 mounted on the shaft 5, as shown in Fig. 2 and connected to a pitman rod 24 which rocks the shaft 25 by means of a toggle arrangement shown in Fig. 4 and which comprises a link 26 pivoted on the frame at 27 and pivoted at its other end to the link 28, which is pivotally connected to the crank arm 29 fast on the shaft 25.

As best shown in Fig. 2 the shaft 25 extends from the rear to the front of the machine and on its front end is secured a link 30 pivotally connected to a second link 31 to form a toggle, the other end of the link 31 being pivoted to the end of the rock lever 22. By this means it will be evident that the rock lever is reciprocated on its pivot. The end of the rock lever terminates in a head 32 in which is secured an anvil 33, for a purpose which will presently appear. Secured to the forward end of the shaft 5, which also runs from rear to front of the machine, is a crank pin 34 on which is mounted a link 35 pivoted at its upper end to a rock lever 36. This rock lever carries a head 37, for a purpose which will presently appear.

Pivoted on the frame at 38 is a lever 39 having pivotally connected to its upper end a link 40 connected to a die shuttle 41 slidably mounted on the die shuttle arm. Pivotally connected to the lever 39 below its pivot 38 is a second link 42 carrying at its end the punch shuttle 43, which is slidably mounted on the head 37. As shown in the drawings and as more fully described in aforesaid Patent 1,518,904 these shuttles are provided with recesses so that during the normal operation of the machine and as the rock levers 22 and 36 are operated neither the die or punch will be affected.

The lever 39 is rocked to bring the shuttles into position to be actuated by operation of the rock levers by means of the bell crank lever 44 loosely engaging the lower end of the lever 39 and having its lower end operatively connected to the rod 45 slidably mounted in the hollow lower end of the shaft 2. The actuation of the rod 45 is controlled by means of a latch 46 (Figs. 5 and 6) which is pivoted on the arm 47. This arm carries the striker 48 adapted to co-operate with any one of the stops 49 to stop rotation of the shaft 2, it being obvious that the friction clutch 11 will permit this shaft to stop without injury to the mechanism. The mode of operation has been set forth in the aforesaid Patent 1,518,904 and need not be further described here.

Each stop 49 corresponds to a certain character represented upon the keyboard 50 and is operated by a key bar 51 on which is mounted a key 52. Depression of a key raises a corresponding stop against the action of a spring 53, release of the pressure on a key permitting the spring 53 to return it to position.

The carriage in which the plate 16 is supported travels on a track 54, the carriage being provided with rollers 55 and 56, as best shown in Figs. 2 and 3. At one end of the carriage the roller 56 is mounted on a shaft which extends inwardly towards the machine, as shown in Fig. 3 and carries an additional roller 57 (Figs. 3 and 12). Pivotally mounted on the frame behind the track 54 is a second track 58 adapted to contact with the roller 57 and forming one end of a bell crank lever, the other arm 59 of which extends downwardly, as best shown in Fig. 12. The lower end of the arm 59 is connected with a lost motion arrangement to the rod 60 having at its forward end a hook 61 engaging a safety locking bar 62. This bar extends the entire length of the keyboard, as plainly shown in Fig. 6 and is provided at its ends with upwardly turned arms by means of which it is pivoted to the machine. One of the arms is provided with an extension 63 to which is secured a spring 64 normally holding the bar 62 in the forward position shown in Figs. 6 and 10. The operation of this mechanism will be apparent. When the roller 57 engages the track 58 the rod 60 will be pulled towards the rear and the hook 61 will pull the locking bar 62 to a position beneath the ends 65 on the key bars. Such a position of the locking bar is shown in dotted lines in Fig. 11. The track terminates at a point which will permit the release of the locking bar when the carriage is in a position wherein the plate carried thereby occupies a proper operative relation to the die head. As soon as the roller 57 leaves the track the spring 64 will return the parts to the position shown in full lines in Figs. 10 and 11 so as to permit operation of the keys.

We shall now describe the improved means for returning the keys to inoperative position and for operating the character spacing member. This means is actuated by the die shuttle arm, which as set forth in the aforesaid

Patent 1,518,904, is rocked by contact of the anvil 33 with the shuttle 41 which shuttle is slidably mounted on the shuttle arm. Referring particularly to Figs. 1, 3, 7, 8 and 9, it will be seen that the die shuttle arm 21 is provided with an integral extension 66, best shown in Fig. 1 and to the end of which is secured a spring 67 having its other end secured to the frame and thus normally holding the shuttle arm and its extension in a raised position.

The die head is provided with an annular flange 68 having teeth 69 formed thereon and between which is adapted to be received a locking block 70. This block is slidably mounted in suitable guideways on the frame of the machine and actuated by means of a lever 71 pivoted at 72 on the frame and pivotally connected at 73 to the block. The lever 71 is provided with a pin 74 contacting with a rocker 75 on the same pivot 72 as the lever, the pin being urged into engagement with the rocker by means of the spring 76. The rocker is provided with a laterally extending arm 77 to the end of which is connected the link 78 pivoted to the extension 66. By this means it will be seen that as the die shuttle arm is lowered to actuate a die the locking block will be moved into position between two of the teeth 69, it being understood that these teeth are so spaced that the locking block will register with a space between two teeth whenever the die head is held stationary.

Pivoted on the extension 66 of the shuttle arm is a depending link 79 carrying at its lower end a vertical rod 80. Secured on the rod 80 is a cam block 81 having an inclined surface 82 contacting with a roller 83 on the upper end of a rocker 84 pivoted at 85 on the frame. The roller is normally held in engagement with the surface 82 by means of the spring 86 having one end fixed to the frame and the other end to a pin 87 on the rocket 84. Mounted on the same pivot 85 as is the lever 84 is a member, best shown in Fig. 9, and comprising a bearing 88 surrounding the pivot. The bearing is provided with a pair of rearwardly extending arms 89 carrying a pivot 90 upon which is mounted the bracket 91 in which is slidably supported the rod 92. This rod 92 is urged upwardly by means of the spring 93 engaging an adjustable shoulder which may be in the form of a nut 94 threaded on the rod 92. The other end of the spring 93 engages a projection on the lower end of the bracket, as will be apparent from the drawings. Secured to the rear of one of the arms 89 is a spring 95 normally tending to rotate the bearing 88 in a counterclockwise direction, as viewed in Figs. 7, 8 and 9.

The rock lever 36 is provided with an extension 96 upon which is disposed an undercut projection 97, as best shown in Figs. 7 and 8. The rod 92 has the upper end thereof beveled to fit beneath the lower edge of the undercut projection 97, but it is normally held forwardly so as not to contact with said projection, by means of the spring 98, which is secured to the rod and also to the pin 87, forward movement of the rod being limited by engagement thereof by a stop 99 on the rocker 84. The rock lever 36 as it reciprocates will not affect the rod 92 in any way, the projection 97 passing above the end of the rod but out of line therewith, the projection 97 reciprocating in the vertical plane in which it is shown in Figs. 7 and 8 and the rod 92 being retained in the plane in which it is shown in Fig. 7. However, when a key on the keyboard is actuated and the die shuttle arm is consequently operated the rod 80 will be lowered due to its connection to the die shuttle arm through the extension 66 of said arm. The roller 83 will then pass along the surface 82 from the position shown in Fig. 7 to and beyond the position shown in Fig. 8, thus permitting the rocker 84 to move to position wherein the end of the rod 92 will be engaged by the undercut projection 97 upon the next downward movement of the rocking lever 36. Fig. 8 shows the various parts in the positions they occupy during the actuation of the rod 92.

We employ the actuation of the rod 92 to operate the key controlling mechanism. The bracket 91 has pivoted thereto a link 100 having adjacent one end thereof a block 101 adapted to engage a block 102 swiveled upon rocker 103 pivoted at 103′ and which extends transversely of the machine and is held in its normal position by means of the spring 104 (Fig. 2). Referring for a moment to Fig. 2, it will be seen that the rocker is provided with a dog 105 adapted to engage a block 106 upon the lower end of the spacing rod 107, this rod being slidably received between lugs 108 on the rocker. The spacing rod 107 is normally held in raised position by means of the spring 109 and actuates the spacing mechanism for moving the carriage 18, as in the manner disclosed in the aforesaid Patent 921,600. Swivelled on the rocker 103 is the block 110 in which slides the rod 111 provided with the stop 112 thereon by means of which the block 110 will actuate the rod 111. The other end of the rod 111 is pivoted to the arm 113 on a transverse rocker 114 which is pivoted at 115 on the sides of the frame, and which carries at its forward end the spacer bar 116. Upward movement of the spacer bar is limited by suitable stops 117 on the sides of the frame (Fig. 6).

The bearing 88 is provided with still another integral arm 118 to the end of which is pivoted a rod 119 pivotally connected at its other end to an operating member 120 in the form of a three armed lever. The rod 119 is pivoted to one arm 121 and a second arm 122 extends forwardly and is adapted to

engage and actuate the locking bar 123, which extends transversely of the keyboard, and as plainly shown in Figs. 10 and 11 is adapted to engage the lug 124 upon the end of any one of the key bars. A third arm 125 is adapted to engage a roller 126 upon the key replacer 127. This replacer is pivotally mounted at 128 and comprises a suitable pad 127′ adapted to engage the underside of any key bar which is depressed and to lift the same, it being understood that the replacer extends longitudinally beneath the entire keyboard. The weight of the replacer causes it to naturally assume the position shown in Fig. 7, as will be obvious, downward movement being limited by engagement of a roller 129 with a stop 130 on the frame.

When the rod 92 is actuated by the projection 97, it will be obvious that not only will the spacing rod 107 be actuated by rotation of the rocker 103 but the rod 119 will also actuate the operating member 120, moving the same from the position shown in Fig. 7 to that shown in Fig. 8. This movement releasing the locking bar 123 from engagement with any key which it may be holding depressed and also actuating the key replacer by rocking the same about its pivot 128. This rocking will raise the replacer from the position shown in Fig. 10 to that shown in Fig. 11.

Either one of the operations described above may be performed by hand if desired. The spacer bar 116 may be depressed and when this is done the rocker 103 will be actuated. The lost motion connection exemplified by the swivel block 110 and the stop 112 on the rod 111 permits the automatic operation without actuation of the spacer bar, while the lost motion connection exemplified by the swivel block 102 and the stop 101 on the rod 100 permits actuation of the spacing mechanism through the spacer bar manually without actuating the automatic means. Similarly we provide means exemplified by the construction shown in Fig. 11 to manually operate the key replacer. This means comprises a handle 131 forming one arm of a three armed member pivoted at 132 on the frame, and normally held in inoperative position by means of the spring 131′. When this member is rocked to the position shown in Fig. 11 one arm 133 contacts with the locking bar 123 to release any key bar which may be held in depressed position thereby, and the third arm 134 contacts with a pin 135 on the end of the replacer 127. This causes the replacer to be lifted to the position shown in Fig. 11 carrying with it any key bars which are depressed.

We shall now describe the improved construction of the die head together with the means for stripping the punches and dies and for permitting removal of individual punches and dies. This construction is best shown in Figs. 1, 2, 3, 13, 14, 15 and 16 and referring thereto it will be seen that the die head 13 comprises a hub 136 secured to the shaft 2 and provided with a pair of rings 137 and 138 in which are slidably mounted the dies 14 and punches 15. In the past it has been customary to mount these dies and punches upon levers and to actuate them by engagement of the stocks with the levers. The levers had to be held in position by individual springs. We have greatly improved this structure and simplified the same by providing the dies and punches with notches 139 and 140 respectively in which are received the ends of plate springs 141 and 142. These springs are in the form of disks mounted upon collars 143 and 144, loosely mounted upon the hub 136. The outer edges of the disks as shown engage within the recesses in the dies and punches respectively and normally urge them apart. The disks may be in any number found desirable, although for the purposes of illustration we have selected two superimposed disks for each spring.

Mounted on the collars with the disk springs are cover plates 145 and 146, these plates and the disks being secured to the collar by any suitable means, as by rivets 147. The plates overlap the inner edges of the dies and punches, the relation being best shown in Fig. 14 wherein the top of the die head is shown. In order to insure that the dies shall be retained in position and yet shall be capable of removal we provide the edge of the plate 145 with the notch 148. As plainly shown in Fig. 14 the notch 148 is normally held in a position wherein it spans two of the dies 14. Upon rotation of the plate, however, the notch 148 can be brought into position so as to permit removal of any one die, and to permit this removal the following means is employed.

Pivotally mounted on the plate 145 is an arm 149 having a locking detent 150 adapted to be received in a recess 151 in the collar 152 fast on the shaft 2. The locking detent 150 is kept in this recess by means of the spring 153. Mounted on the frame is a locking pin 154 received within a sleeve 155 and having its upper end provided with a capstan bar 156. The upper end of the sleeve is provided with a pair of notches 157 and 158, best shown in Fig. 15. When the bar 156 is received in the notch 158 the pin 154 is held above the plate 145. When, however, it is desired to release one of the dies all that is necessary to do is to lift the bar 156 and rotate the pin until the bar enters the notch 157 when the pin will drop into position to engage the plate 145. As the head is rotated which may conveniently be done by rotating the flywheel 3 by hand the pin 154 will drop into the hole 159 in the plate and thus prevent its further movement. The normal direction of rotation of the head is a clockwise direction, as

viewed in Fig. 14 and therefore as the shaft continues to rotate the locking detent will be forced out of the recess 151, the detent being provided with an inclined surface for that purpose. The head may then be rotated until any desired die is in registry with the notch 148, when it may be removed with the fingers or with any suitable tool such as a pair of pliers. After the die has been replaced the head is again rotated until the detent once more enters the recess 151. The pin 154 is then lifted out of engagement with the plate 145 and the spring 153 will cause a slight rotation of the plate 145 so as to return it to a position in which the notch 148 will be out of registry with any one die.

A similar arrangement is employed in connection with the punches, comprising an arm 160 controlled by a spring 161 and having a locking detent thereon and the plate 146 having an aperture 162 in which a locking pin 163 is adapted to engage. This pin is controlled by a capstan bar 164 co-operating with notches in a sleeve 165 in the same manner as the bar 156 co-operates with notches in the sleeve 155. This pin, however, works upwardly instead of downwardly to engage the plate 146 and therefore the spring 166 is provided to normally urge the pin upwardly.

In order to retain the dies and punches against accidental removal, we provide the friction pins 167, each pin having the inner end 168 thereof secured in the hub and the outer end 169 engaging one side of one of the dies or punches.

The dies and punches are each provided on their outer faces with notches or recesses 170 within which are received the stripping means exemplified by the hooks 171 and 172. The above arrangement exemplifies the means whereby the dies and punches are resiliently held in inoperative position and are positively moved to that position or "stripped", by means having direct engagement therewith.

From the above it will be apparent that we have provided a machine of novel and improved construction which will perform all of the objects set forth in a most efficient manner. The operation of the machine has fully brought out from time to time during the progress of the description and it is not deemed necessary to repeat it here.

We are aware that changes in the form, construction and arrangement of parts may be made without departing from the spirit and without sacrificing the advantages of the invention and we consider ourselves entitled to make all such changes as fairly fall within the scope of the following claims.

We claim:

1. In a machine for making printing plates and comprising a plurality of dies and punches adapted to be selectively operated for embossing printing characters upon a blank plate, the combination of a reciprocable carriage adapted to receive a blank plate in the initial position of the carriage and to carry the plate through embossing position, a plurality of keys for operating the dies and punches, means for locking said keys against movement, means for holding said locking means from locking position, and means for moving the locking means into locking position when the carriage is in its initial position.

2. In a machne for making printing plates and comprising a plurality of dies and punches adapted to be selectively operated for embossing printing characters upon a blank plate, the combination of a reciprocable carriage adapted to receive a blank plate in the initial position of the carriage and to carry the plate through embossing position, a plurality of keys for operating the dies and punches, means for locking said keys against movement, means for holding said locking means from locking position, means for moving the locking means into locking position, and means engageable by said carriage when it is in its initial position for actuating the moving means and for holding said locking means in locking position.

3. In a machine for making printing plates, a carriage adapted to support a plate, means to make impressions on said plate and operated by a plurality of keys, a locking bar adapted to prevent operation of said keys, a track pivotally mounted adjacent the line of travel of said carriage, a hook engaging said bar and connected to said track, a roller on said carriage adapted to roll on said track to operate said hook, said bar being normally inoperative and pulled into operative position by said hook.

4. In a machine for making printing plates, a carriage adapted to support a plate, means vertically arranged around an annular die head to make impressions on said plate and operated by a plurality of keys, a locking bar adapted to prevent operation of said keys, a track pivotally mounted adjacent the line of travel of said carriage, a hook engaging said bar and connected to said track, means on said carriage adapted to engage said track to operate said hook, said bar being normally inoperative and pulled into operative position by said hook, and a spring for returning said bar to inoperative position.

5. In a machine for making printing plates, a carriage adapted to support a plate, means for making impressions on said plate, spacing mechanism adapted to move said carriage to space the impressions on said plate, and means to actuate said spacing mechanism by operation of said impression making means, a plurality of keys to operate said impression making means, said spacing

mechanism normally occupying an inoperative relation to said impression making means and brought into operative relation by actuation of one of said keys.

6. In a machine for making printing plates, a carriage adapted to support a plate, means for making impressions on said plate, spacing mechanism adapted to move said carriage to space the impressions on said plate, means to actuate said spacing mechanism by operation of said impression making means, a spacer bar adapted to actuate said spacing mechanism by hand, and a plurality of keys to operate said impression making means, said spacing mechanism normally occupying an inoperative relation to said impression making means and brought into operative relation by actuation of one of said keys.

7. In a machine for making printing plates, a carriage adapted to support a plate, means for making impressions on said plate, spacing mechanism adapted to move said carriage to space the impressions on said plate, means to actuate said spacing mechanism by operation of said impression making means, a spacer bar adapted to actuate said spacing mechanism by hand, said spacing mechanism being operated independently by said impression making means and by said spacer bar, and a plurality of keys to operate said impression making means, said spacing mechanism normally occupying an inoperative relation to said impression making means and brought into operative relation by actuation of one of said keys.

8. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means. means to bring said rod into operative position upon operation of a key, mechanism to space the impressions on said plate, and means to operate said spacing mechanism by actuation of said rod by said projection.

9. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, means to bring said rod into operative position upon operation of a key, mechanism to space the impressions on said plate, means to operate said spacing mechanism by actuation of said rod by said projection, and a spacer bar adapted to actuate said spacing mechanism by hand.

10. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, means to bring said rod into operative position upon operation of a key, mechanism to space the impressions on said plate, and a spacer bar adapted to actuate said spacing mechanism by hand, said spacing mechanism being operated independently by said impression making means and by said spacer bar.

11. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, a locking bar to retain a key in operative position, means to bring said rod into operative position upon operation of a key, means to move said locking bar to a position where it will release said keys, and connections between said last named means and said rod whereby actuation of said rod will release said keys.

12. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, a locking bar to retain a key in operative position, means to bring said rod into operative position upon operation of a key, means to move said locking bar to a position where it will release said keys, connections between said last named means and said rod whereby actuation of said rod will release said keys, and manually operated means for releasing said keys independently of said other means.

13. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position means to make impressions on a plate, a plurality of keys to operate said means, a locking bar to retain a key in operative position, means to bring said rod into operative position upon operation of a key, means to move said locking bar to a position where it will release said keys, connections between said last named means and said rod whereby actuation of said rod will release said keys, a key replacer, and means to operate said replacer to restore said keys to normal position upon actuation of said rod.

14. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impresisons on a plate, a plurality of

keys to operate said means, a locking bar to retain a key in operative position, means to bring said rod into operative position upon operation of a key, means to move said locking bar to a position where it will release said keys, connections between said last named means and said rod whereby actuation of said rod will release said keys, a key replacer, means to operate said replacer to restore said keys to normal position upon actuation of said rod, and manual means for operating said key releasing means and said key replacer independently of said other means.

15. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, means to bring said rod into operative position upon operation of a key, a key replacer to restore the keys to normal position, and means to operate said key replacer by actuation of said rod by said projection.

16. In a machine for making printing plates, a rock lever having a projection thereon, a rod adapted to be engaged by said projection when in operative position but normally out of operative position, means to make impressions on a plate, a plurality of keys to operate said means, means to bring said rod into operative position upon operation of a key, a key replacer to restore the keys to normal position, means to operate said key replacer by actuation of said rod by said projection, and manual means for operating said key replacer independently of said other means.

17. In a machine for making printing plates, a die head, means for supporting a plate in operative relation to said die head, said die head having a plurality of dies and punches above and below said plate, reciprocating means disposed above and below said plate to operate said dies and punches respectively and normally inoperative, a plurality of keys, the operation of any key making said reciprocating means operative to form an impression on said plate, mechanism to space the impressions on said plate, means to operate said spacing mechanism, said last named means being controlled by one of said reciprocating means and operated by the other.

18. In a machine for making printing plates, a die head, means for supporting a plate in operative relation to said die head, said die head having a plurality of dies and punches above and below said plate, reciprocating means disposed above and below said plate to operate said dies and punches respectively and normally inoperative, a plurality of keys, the operation of any key making said reciprocating means operative to form an impression on said plate, mechanism to space the impressions on said plate, means to operate said spacing mechanism, said last named means being controlled by one of said reciprocating means and operated by the other, and a spacer bar adapted to actuate said spacing mechanism by hand.

19. In a machine for making printing plates, a die head, means for supporting a plate in operative relation to said die head, said die head having a plurality of dies and punches above and below said plate, reciprocating means disposed above and below said plate to operate said dies and punches respectively and normally inoperative, a plurality of keys, the operation of any key making said reciprocating means operative to form an impression on said plate, mechanism to space the impressions on said plate, means to operate said spacing mechanism, said last named means being controlled by one of said reciprocating means and operated by the other, and a spacer bar adapted to actuate said spacing mechanism by hand, said spacing mechanism being operated independently by said impression making means and by said spacer bar.

20. In a machine for making printing plates, a die head, means for supporting a plate in operative relation to said die head, said die head having a plurality of dies and punches above and below said plate, reciprocating means disposed above and below said plate to operate said dies and punches respectively and normally inoperative, a plurality of keys, the operation of any key making said reciprocating means operative to form an impression on said plate, mechanism to space the impressions on said plate, means to operate said spacing mechanism, a locking bar to retain a key in operative position, said spacing mechanism and said locking bar being controlled by one of said reciprocating means and operated by the other.

21. In a machine for making printing plates, a die head, means for supporting a plate in operative relation to said die head, said die head having a plurality of dies and punches above and below said plate, reciprocating means disposed above and below said plate to operate said dies and punches respectively and normally inoperative, a plurality of keys, the operation of any key making said reciprocating means operative to form an impression on said plate, mechanism to space the impressions on said plate, means to operate said spacing mechanism, a locking bar adapted to retain a key in operative position, means to release said locking bar from engagement with a key, a key replacer to return a key to normal position, said spacing mechanism, releasing means and said key replacer being controlled by one of said reciprocating means and operated by the other.

22. In a machine for making printing plates, a die head having upper and lower portions, a plurality of dies and punches mounted in said portions respectively and adapted to make impressions on a plate disposed therebetween, a hub connecting said upper and lower portions, a single resilient means for holding said punches in inoperative position, a single resilient means for holding said dies in inoperative position, and a plurality of friction pins having one end thereof secured in said hub and the other end frictionally engaging said dies or punches for holding the same in place.

23. In a machine for making printing plates, a die head comprising a ring, a plurality of impression forming members slidably mounted in said ring, a hub upon which said ring is mounted, and a plurality of friction pins each pin having one end secured in said hub and the other end frictionally engaging one of said members.

24. In a machine for making printing plates, a die head having a plurality of impression forming members slidably mounted therein, each of said members having a recess and a notch therein, said recess adapted to receive a hook to strip said member from a printing plate and a circular spring disk engaging the notch in each of said members for normally maintaining said members in operative position.

25. In a machine for making printing plates, a die head comprising a ring, a plurality of impression forming members slidably mounted in said ring, a plate for holding said members in position, and means for shifting the plate axially and permitting removal of any one of said members through a notch in said plate.

26. In a machine for making printing plates, a ring, a plurality of impression forming members slidably mounted in said ring, a plate having its edge overlapping the edges of said members to retain them in position, the edge of said plate being provided with a notch, and means for rotating said head in respect to said plate to bring said notch into registry with one of said members.

27. In a machine for making printing plates, a die head comprising a ring, a plurality of impression forming members slidably mounted in said ring, a plate having its edge overlapping the edges of said members to retain them in position, the edge of said plate being provided with a notch, means to secure said plate to said head to rotate therewith, means to release said plate from said head to permit relative rotation between said head and said plate whereby said notch may be brought into registry with any one of said members.

28. In a machine for making printing plates, a frame, a shaft rotatable in said frame, a die head secured on said shaft and comprising a ring, a plurality of impression forming members slidably mounted in said ring, a plate having its edge overlapping the edges of all of said members and provided with a notch therein, an arm pivoted on said plate and having a detent received within a recess on said shaft, a locking pin slidably mounted on said frame and normally out of engagement with said plate, means permitting movement of said pin into engagement with said plate, said plate having an aperture adapted to receive said pin to lock said plate against movement, rotation of said head after said plate is locked causing release of said detent and permitting relative movement between said head and said plate, for the purpose set forth.

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