No. 624,764. Patented May 9, 1899.

J. S. DUNCAN.

MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 1.

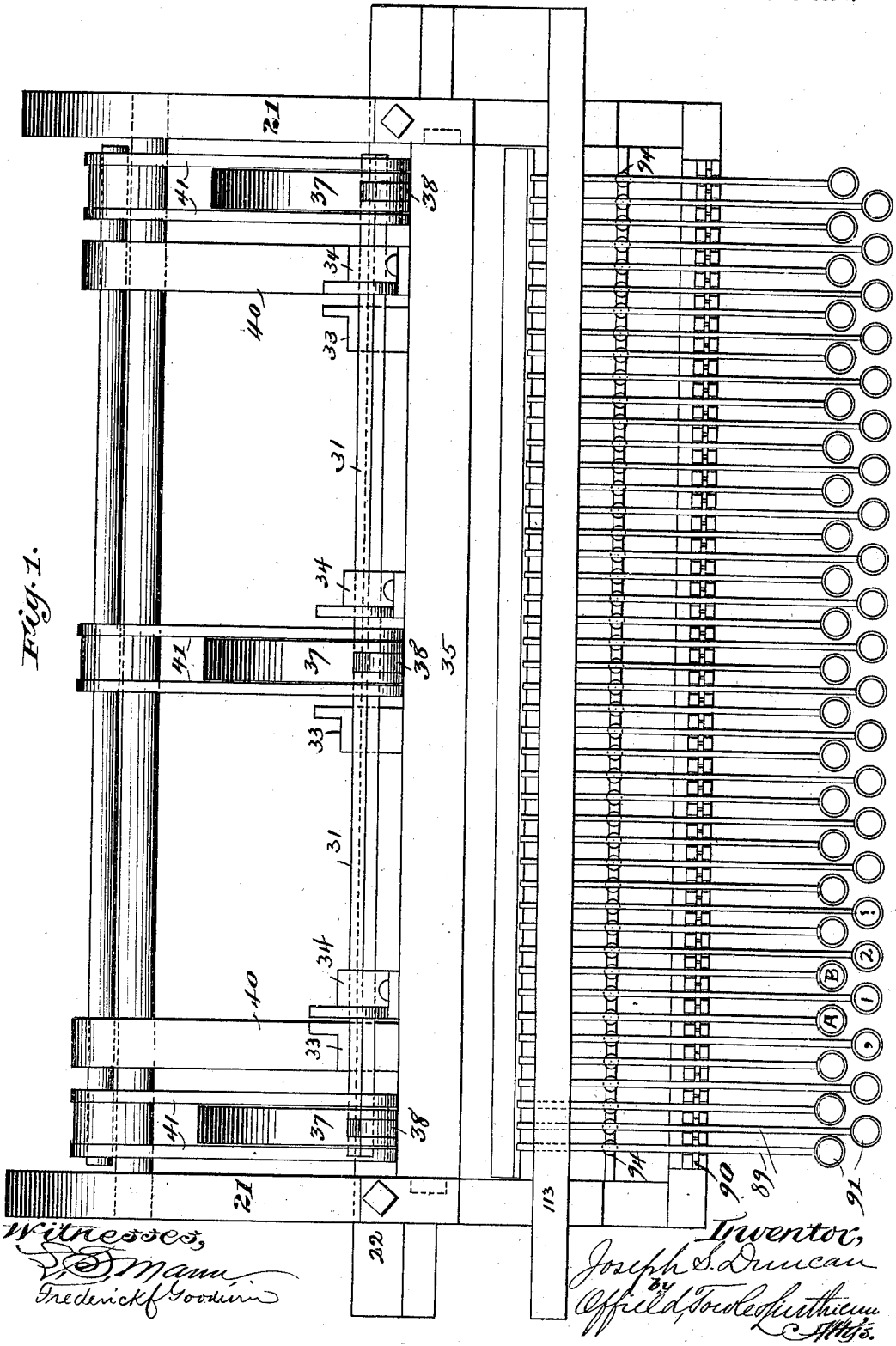


Fig. 1.

Witnesses,
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Frederick P. Goodwin

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by Offield, Towle & Linthicum
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

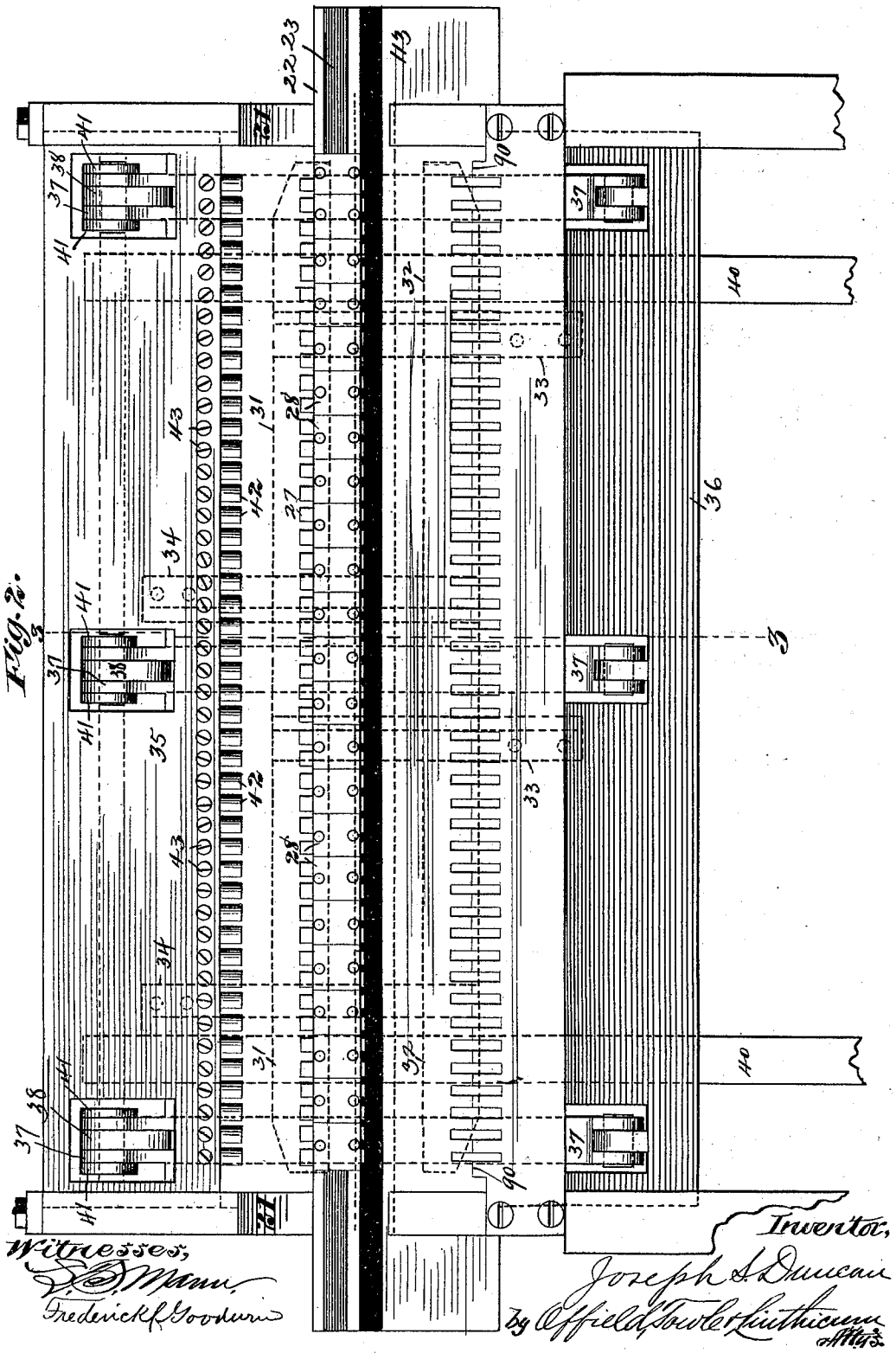
No. 624,764. Patented May 9, 1899.

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MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 2.



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MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 3.

Fig. 20.

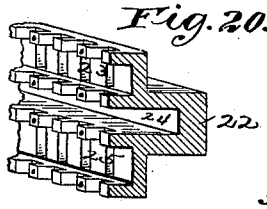


Fig. 3.

Witnesses,

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(No Model.) 7 Sheets—Sheet 4.

Fig. 4.

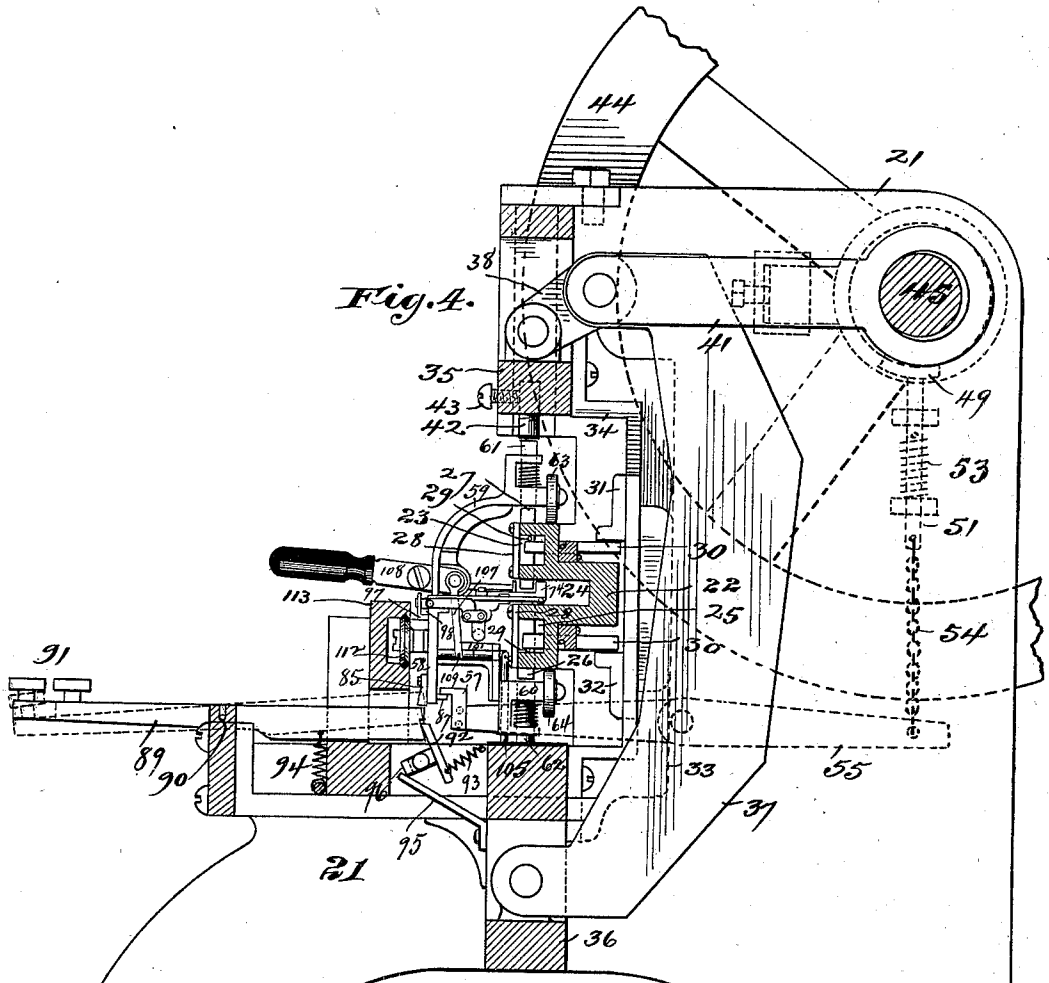


Fig. 10.

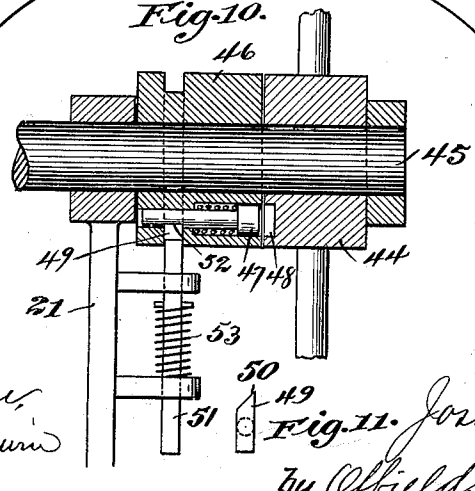


Fig. 11.

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J. S. DUNCAN.

MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 5.

Fig. 5.

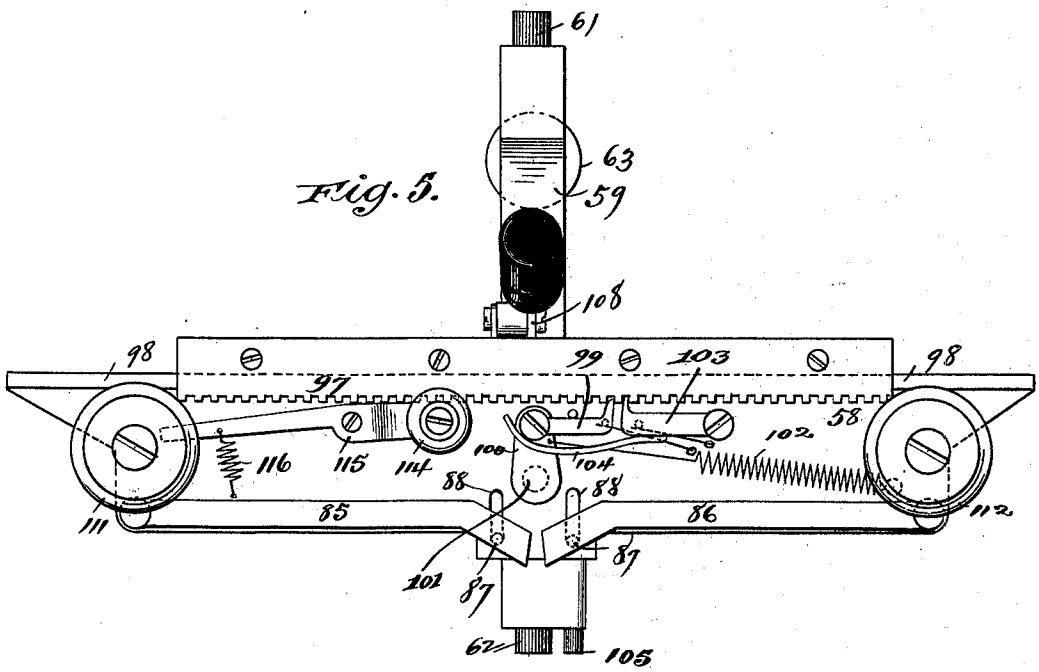
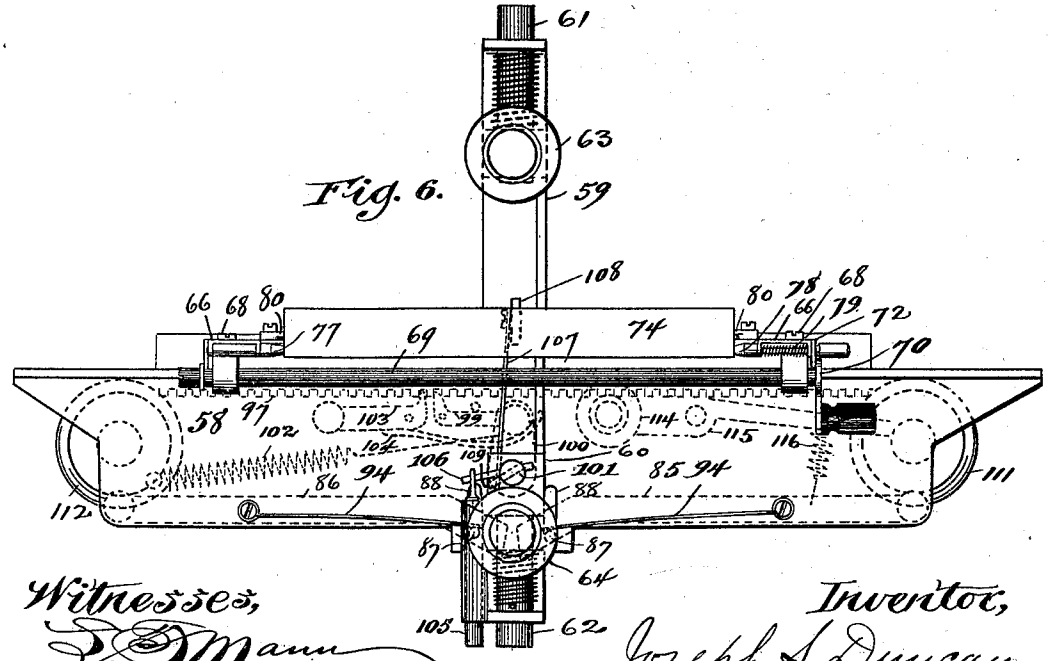


Fig. 6.



Witnesses,
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J. S. DUNCAN.

MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 6.

Fig. 7.

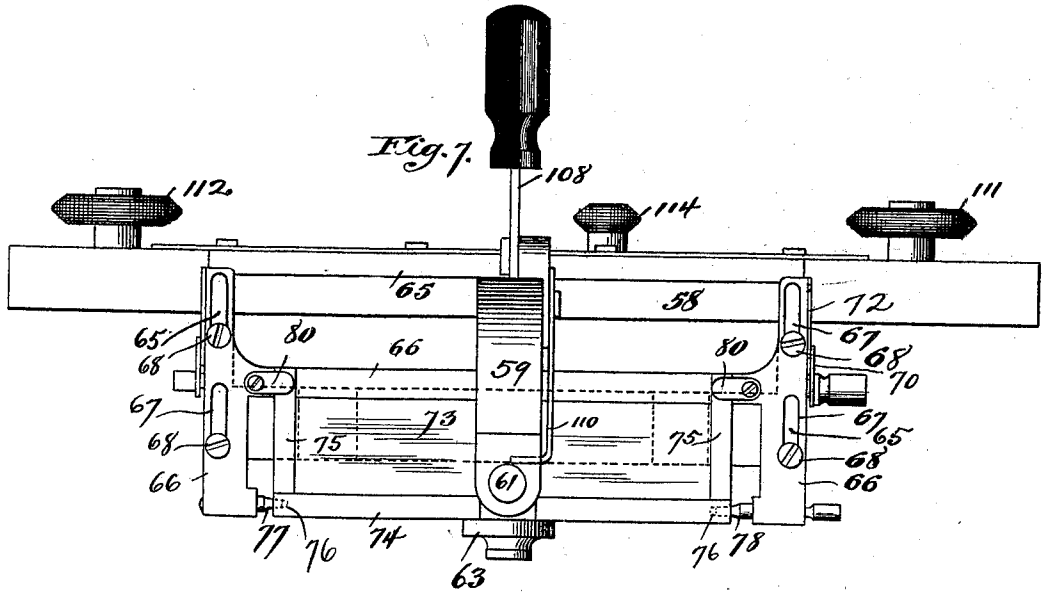


Fig. 8.

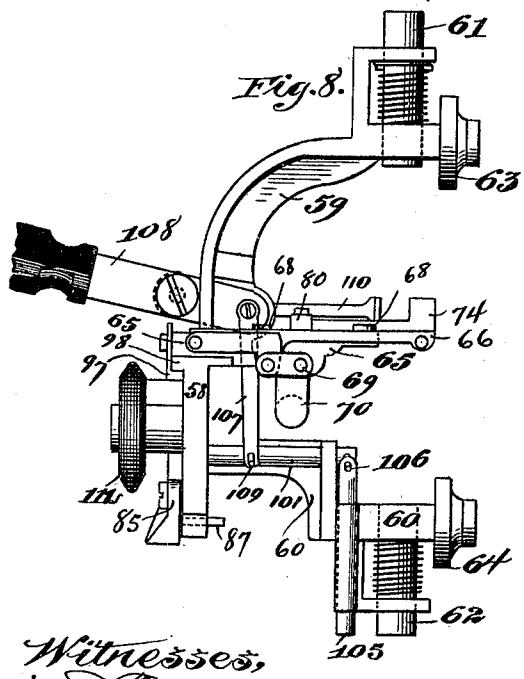
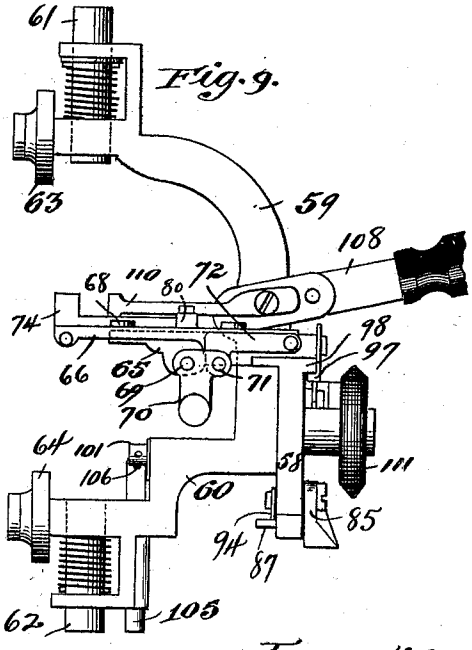


Fig. 9.



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No. 624,764. Patented May 9, 1899.

J. S. DUNCAN.

MACHINE FOR MAKING PRINTING PLATES.

(Application filed Nov. 17, 1896.)

(No Model.) 7 Sheets—Sheet 7.

Fig. 12.

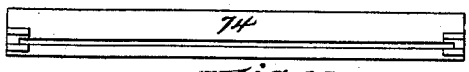


Fig. 13.

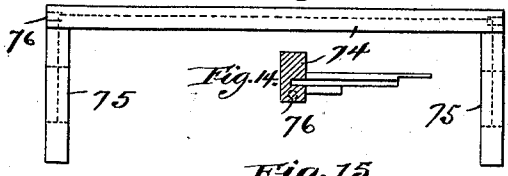


Fig. 14.

Fig. 15

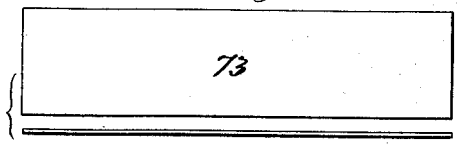


Fig. 16.

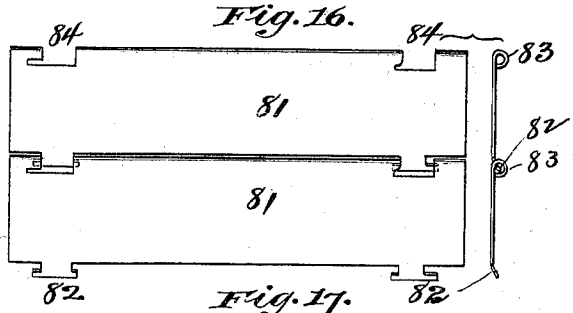
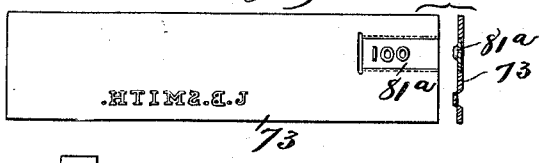


Fig. 17.



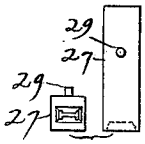


Fig. 18.

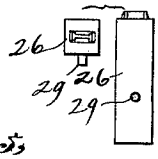


Fig. 19.

Witnesses,
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Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH S. DUNCAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ADDRESSOGRAPH COMPANY, OF SAME PLACE.

MACHINE FOR MAKING PRINTING-PLATES.

SPECIFICATION forming part of Letters Patent No. 624,764, dated May 9, 1899.

Application filed November 17, 1896. Serial No. 612,411. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. DUNCAN, of Chicago, Illinois, have invented certain new and useful Improvements in Machines for Making Printing-Plates, of which the following is a specification.

My invention is adapted to the production of printing-plates having a single line or plates of any desired width and length containing numerous lines. I have found my invention particularly useful in providing printing-plates for addressing-machines, for which purpose such printing-plate contains usually two or three lines disposed in the ordinary address form. Heretofore movable type have been employed in these addressing-machines; but the cost of composition and the skill required in properly setting and adjusting the type make the use of movable type undesirable. By my invention a printing-plate can be produced upon the machine rapidly and a superior printing-surface furnished, which in use will give the characteristic appearance of type-written work, which is particularly desirable for addressing. My invention employs for producing these type-plates two sets of movable dies. The sets of dies are arranged in opposition to each other and are both capable of movement, so as to clear the depression formed by offsetting the body of the material and the printing characters thrown up or appearing in relief on the face of the printing-plate. These two sets of movable dies may be arranged and actuated in various ways; but I prefer to mount each set of dies in suitable ways in stationary supports. I also employ reciprocating cross-heads arranged parallel to the two sets of dies, respectively, and a movable carriage carrying the plate-blank and two movable punch-stocks, which are brought to rest opposite the punches which are to be operated to produce the desired letter in the printing-plate and by means of which pressure is transmitted from the reciprocating cross-heads to the punches. The carriage is manually moved and it is arrested opposite the punch corresponding to the character to be produced by the elevation of one of a series of stop-arms in the path of the carriage, the series of stop-arms being marked to correspond with the series of punches.

There are other novel features of construction in the machine, which will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view with the carriage omitted. Fig. 2 is a front elevation of the machine with the carriage and key-levers omitted. Fig. 3 is a transverse sectional elevation on the lines 3 3 of Fig. 2 with portions of the framework broken away. Fig. 4 is a view similar to that shown in Fig. 3 with means for driving by power applied. Figs. 5 to 9, inclusive, are views of the carriage, said views being respectively front and rear elevations and a plan and end view. Figs. 10 and 11 are details of a clutch for the power mechanism. Figs. 12, 13, and 14 are views of a removable holder for a plain metal blank. Fig. 15 shows such blank in plan and edge view. Fig. 16 shows two articulated blanks of modified construction in plan and end views. Fig. 17 shows in plan and end view a plain blank having an inset portion and showing relief printing characters thereon. Figs. 18 and 19 are views in side elevation and plan of the two members of a pair of punches, the letter "I" being used for the purpose of illustration; and Fig. 20 is a perspective view of a portion of the die-supports.

It will be understood that my invention may be embodied in a machine operated manually or by power, the manually-operated machine being shown in Figs. 1 to 3, inclusive and the power machine in succeeding figures, although most of the parts are common to the two machines.

Upon upright members 21 of the supporting-framework of the machine is secured a holder 22 for the punches. Said punch-holder has three channels in its front face, (marked, respectively, 23, 24, and 25,) the intermediate channel being deeper and forming a way for the table of the sliding carriage. The flanges bounding the channels 23 and 25 are notched to form ways for the vertically-reciprocating punches. These punches are arranged in series and are of the common form of male and female dies, the male dies being disposed in the lower series and marked 26 and the female dies in the upper series and marked

27. The dies or punches are confined against lateral displacement by the removable face-plates 28 and are each provided with pins 29, which prevent the dies or punches from dropping out of their ways. A series of pivoted levers 30 have their forward ends projected through apertures in the back walls of the channels 23 and 25 and are adapted to engage with the pins 29 to withdraw the dies from contact with the blanks after the punching action. The rear ends of the levers 30 are engaged by the movable plates 31 32, which are carried by the brackets 33 34, secured to the upper and lower cross-heads 35 36, respectively. Said cross-heads reciprocate in suitable slideways in the frame of the machine and are connected by the toggle-arms 37 38. As shown, the toggle-arms 37 are much longer than the arms 38. The toggle members may be operated in any convenient way, either manually or by power.

In Fig. 3 I have shown a foot-treadle 39, which is carried by the pivoted lever 40, said lever having a link 41, pivotally connecting its upper end with the toggle members. The swinging of the lever 40 by the application of the foot to the foot-treadle 39 will cause the reciprocation of the cross-heads. The upper cross-head carries a series of screw-threaded adjusting-pins 42, which engage threaded apertures in the cross-heads and which are held in adjusted positions by the binding-screws 43.

In Fig. 4 I have shown means for driving the cross-heads by power, said means consisting of the belt wheel or pulley 44, running loosely on the shaft 45 and locked thereto by a clutch. (Shown in Figs. 10 and 11.) The clutch consists of the member 46, which is secured upon the shaft 45 and has the spring-actuated bolt 47 engaging an aperture 48 in the hub of pulley 44. The clutch member 46 has a peripheral groove in which a shoe 49, having a beveled end 50, seats. The shoe is carried by a spring-actuated bolt 51, slidably supported upon the framework 21. The lower side of the bolt 47 has a notch 52 therein, in which the shoe will engage when the spring 53 is contracted. To the lower end of the bolt 51 a chain 54 is connected, said chain being made fast at its lower end to a lever 55 and pivoted upon the frame 21 and carrying upon its front end a bar 57, extending longitudinally of the machine, and overlying pins connected with locking-levers on the carriage, as hereinafter described. This clutch will be operated through the instrumentalities above described by certain devices upon the carriage, which will now be described. The carriage is shown in Figs. 5 to 9, inclusive, and comprises a frame 58, having the yoke or bracket arms 59 60, in which are mounted spring-supported punch-stocks 61 62. Said brackets also carry antifriction-rollers 63 64. Upon the carriage-frame 58 is mounted a sliding frame 65 of skeleton form, and upon said sliding frame is mounted an adjustable frame 66, slotted, as at 67, and capable of lateral adjustment upon the sliding frame 65 and guided by the screws 68. A small shaft 69 is mounted in lugs upon the sliding frame 65, and said shaft carries at one end a crank-lever 70, having a pin 71 pivotally connected to the link 72, which in turn is pivoted to the adjustable frame 66. Upon this adjustable frame the blank is mounted. These blanks are shown in two forms. A plain blank (marked 73) is shown in Figs. 15 and 16 and is a rectangular piece of sheet metal—say zinc or copper and say thirty-one one-thousandths of an inch in thickness, although a thinner or thicker plate may be used. When the plain plate is used, it is mounted in a plate-holder, such as shown in Figs. 12, 13, and 14, and consisting of a bar 74, having arms 75, provided with grooves to receive the ends of the plate. The ends of the bar 74 have apertures 76, in which pivot-pins 77 78 of the frame 66 engage. The pin 78 is mounted to slide in the sliding frame 66 and is controlled by the spring 79. The plate or blank 73 when in place in the holder rests with its forward edge upon the sliding frame 65 and in contact with the cross-bar of the sliding frame 66, as clearly shown in Fig. 7, and may be locked in place by the buttons 80.

I have contemplated the manufacture of these printing-plates in such manner that they may be readily articulated to produce a band or chain of printing-forms and of such a construction as shown in Fig. 16. Each of the plates 81 has T-headed links 82 on one of its long sides, while its opposite side is turned over to form seats 83, and these turned-over portions are notched, as at 84, to receive the heads of the links 82 in order to articulate the links. The links may be articulated in various ways, and hence it is not important to enter upon a minute description of this detail of construction. When plates of this form are used, the holder shown in Figs. 12, 13, and 14 need not be employed, as the seats 83 will receive the pivot-pins 77 78.

In Fig. 17 I have shown a printing-plate provided with an inset portion 81^a, said inset portion being a thinner and smaller plate, preferably with beveled edges, adapted to fit into a recess in the body of the plate 81, said recess having its sides dovetailed. Said inset plate may have a printing character thereon and may be of any suitable length. These insets are useful in changing numbers, dates, addresses, or the like, and by such means the discarding of the entire plate may be avoided.

I will now proceed to describe the manner in which the carriage containing the blank is moved and locked opposite any desired pair of punches or dies and also the manner in which the punches or dies are operated to produce the characters. The carriage has two pivoted locking-levers 85 86, whose inner ends are provided with pins 87, moving in slots 88. The ends of these levers are slightly separated, are downturned, and beveled on their lower

sides. The carriage is stopped in any given position by the elevation of the end of one of a series of stop-levers 89, pivoted upon the frame member 90. Said stop-levers carry key-tops or buttons 91 at their outer ends, said buttons being marked with characters corresponding to the characters upon the several pairs of punches or dies. When it is desired to form a certain character upon the plate, the first operation is to depress the outer end of the stop-lever marked with that character, which will correspondingly lift its inner end, as shown in Fig. 4. These stop-levers are maintained in their elevated position by the pivoted supporting-bar 92, controlled by the spring 93, the face edge of said bar 92 bearing against the beveled ends of the stop-levers 89 and in position to engage beneath the stop-levers when the latter are in an elevated position. The series of stop-levers are supported at their rear ends upon the base of the machine when not supported by the bar. The bar 92 is so pivoted that at each actuation of the machine it is caused to rock upon its pivot, thus releasing the bar previously elevated, whereby the carriage will be permitted to move to the new position or until it comes into locking engagement with the stop-lever last elevated. As the carriage moves along one of its locking-levers 85 86 will engage with the elevated end of the stop-lever, and, riding over the same, the stop-lever will engage with the end of the companion locking-lever, while the locking-lever which has passed over the stop-lever will drop back into place, thus locking the carriage in the new position. The stop-levers are normally held down by means of springs 94, and they are released from the support of the bar 92 by means of an arm 95, carried by the lower cross-head 36. The upper end of this arm engages with the projection 96 behind the pivot of bar 92, thus rocking said bar forward at each upward movement of the cross-head. The blank must of course be moved endwise step by step on the carriage as the line of characters are produced, and to permit this the frame 65 is slidably mounted on the frame-plate 58. The sliding frame has a rack-bar 97 on its front edge, the rack-teeth being on the lower edge of said bar and offset to engage beneath the flange 98 of the frame 58. A feed-dog 99 is pivoted on the crank 100 of a crank-shaft 101, supported on the yoke member 60, and a spring 102 is connected to the crank in such manner as to rock the shaft in its bearings and by the engagement of the feed-dog with the rack-bar advance the carriage. A locking-dog 103 is pivoted on the frame-plate 58, and engaging with the rack-teeth locks the sliding frame after each actuation. An arm 104, carried by the locking-dog, extends beneath the crank-pin on which the feed-dog is pivoted and withdraws the feed-dog from the rack and then operates to release the locking-dog. The feed-dog is actuated by the sliding pin or shaft 105, slidably mounted in bearings on the lower yoke 60 and connected to a crank-pin 106 on the forward end of the shaft 101. The sliding pin is engaged by the lower cross-head on its upward movement, and during said movement the pin is raised, the shaft carrying the feed-dog is rocked, the locking-dog is released, and the spiral spring connected to the crank-shaft causes the sliding frame 65 to move one step, and thus presents a fresh portion of the surface of the blank to the action of the punching-dies. In order to enable the blank to be moved independently of the operation of punching, control must be given to the operator over the mechanism just described, so as to release the sliding frame carrying the blank. For this purpose the rock-shaft which controls the feed-dog is connected by a link 107 with a pivoted handle 108. The link engages with a pin 109, secured to the rock-shaft, thus affording an eccentric connection. The carriage is moved bodily by said handle, and then by rocking the handle upon its pivot, depressing its forward end, and elevating its rear end the rock-shaft is turned in its bearings, thus releasing the feeding and locking dogs, and the plate carrying the blank may be moved along the carriage for starting a new line and for making double or greater spaces. A pivoted arm 110 has one end projected beneath the upper row of plates 28 and rests upon the upper surface of the blank, the purpose being to prevent the blank from rising as the punches are withdrawn from the metal. The carriage preferably has carrying-wheels 111 112, journaled on the studs extending from the face of the frame-piece 58, and said wheels have beveled edges and are adapted to travel in a track-rail 113, while the wheels 63 and 64 travel on the upper and lower surfaces of the channel-bar 22. The carriage is thus maintained in proper alinement with reference to the punches, and it can be moved along its ways, the blank-carrying plate moving in the space between opposing faces of the two series of punches, while the movable punch-stocks mounted in the carriage travel in alinement with the cross-heads. In order to further steady the movement of the crank and to take up any lost motion of the parts, I employ traveler 114, journaled in the end of the pivoted arm 115, (see Fig. 5,) a spring 116 normally tending to press said traveler up into contact with the top groove in the track member 113.

I will now describe the operation of my machine and first as adapted for manual operation, as shown in Figs. 1, 2, and 3. Assuming a blank of either form to be properly secured upon the carriage and that the several parts are in their normal positions, the operator selects the character which he desires to impress upon the blank and depresses the appropriate stop-lever. The elevation of the rear end of the stop-lever slightly rocks the bar 92, which under the influence of its spring will be thrown back, so as to engage beneath

the end of the stop-lever, thus supporting the stop-lever. The carriage is then moved toward the stop-lever thus elevated and is locked thereby. The foot-treadle is then moved through the described connections, the cross-heads are caused to approach each other, the upper cross-head slightly in advance of the lower, and said cross-heads in their movement engaging with the movable punch-stocks mounted upon the carriage and which punch-stocks will strike the ends of the pair of punches corresponding to the key depressed. The punches will be driven into contact with the plate from opposite sides and the metal will be punched up by the male die and driven into the corresponding cavity of the female die, thus producing in relief the characters formed upon the punches. In this operation the metal is slightly drawn and the character is elevated to a height approximating the thickness of the metal itself, the raised character being connected to the body of the metal by a very thin web or ligament, as clearly shown in Fig. 17. When the foot-treadle is released, it will be drawn back by its spring, thus causing the cross-heads to recede toward their normal positions. As the cross-heads separate the bars 31 and 32 act upon the pivoted levers 30, which in turn operate to withdraw the punches from contact with the metal, causing the upper punch to clear the raised character and the lower punch to be withdrawn from the cavity produced in punching up such character. In the ascending movement of the lower cross-head it has operated through the sliding pin and rock-shaft to release the locking-dog, thus freeing the blank-holder on the carriage, and as the cross-head ascends the rock-shaft is returned to its normal position by its controlling-spring, and the blank has fed forward one step and its sliding frame again locked in position. The upward movement of the lower cross-head also operates to release the supporting-bar 92 and the stop-lever drops down, so as to free the carriage; but this is so timed that the punch-stocks are engaged by the cross-head before the carriage is released, and the latter cannot therefore move out of position until the cross-heads are returned. This operation may be repeated until a number of characters are produced in line with each other, the ordinary spacing being used, and the only essential operations being three—the movement of the appropriate stop-lever, the shifting of the carriage, and the movement of the foot-lever. If, however, it be desired to make double or greater spaces, the pivoted handle of the carriage is depressed, thus releasing the feeding and locking dogs, and the frame-plate may be moved step by step for each depression of the handle, or if the latter be held down, thus keeping the dogs out of contact with the rack-bar, the sliding frame may be shifted by the hand longitudinally of the carriage for a greater length of space or to adjust to position for a new line. When a line is completed, the sliding frame is moved to its original position upon the carriage and the blank-holding frame is shifted laterally for the beginning of a new line by the manipulation of the crank 70.

The operation of the power-machine differs only in the fact that as the carriage moves into engagement with the elevated stop-lever the raising of either of the locking-levers 85 or 86 will, through the pins 87, carried thereby, engage with the bar 57, thus rocking the arm 55 upon its pivot and throwing the clutch into engagement with the driving-pulley 44, and through the link 41, having an eccentric connection with the pulley-shaft 45, the toggles will be operated and the cross-heads moved, as in the previously-described construction. This clutch is so constructed that as it completes one revolution the pointed end of shoe 49 will engage the notch 52 of the clutch-bolt 47, and thus release the clutch.

The uses and adaptations of my invention are many, and I will not, therefore, attempt to enumerate all of them.

My invention is particularly adapted for the production of printing-plates for addressing-machines, and for such a use the printing will be done from the faces of the raised characters. Of course these plates may be made of various lengths and widths, and the principle of my invention may be embodied in a machine adapted to produce printing-plates of larger size—as, for example, for printing circulars, catalogues, and the like. These plates may be used also as matrices and stereotype or electrotype plates made therefrom in the usual manner, and the material from which my plates may be formed will vary, of course, with the uses to which such plates are to be put. The chief object of my invention, however, is to provide for forming a printing-surface from metal directly and without the necessity of employing any of the matrix processes.

My invention could also be employed for making slugs, linotype-bars, or other printing-forms.

To show the character of the printing-surfaces produced upon my machine, I may state that the dies are made by using the male dies as a punch to form the female die and that the sides of the punch are only sufficiently beveled to support the projecting parts of the several type characters. By the employment of dies of this character the printing-plates can be struck up, so as to give the characters a relief equal to the thickness of the metal plate, thus producing very sharp clean angles, whereby there will be secured in the printing a corresponding sharpness and clearness of the impression.

I do not limit my invention to the precise combinations of parts or specific features of construction, as the parts described may be combined in a variety of ways and equivalents used for some of the described features. For example, I have shown the two series of

dies or punches arranged in parallelism; but it would be within the scope of my invention to arrange the dies in circular series or in arcs of circles concentric or tangent to each other. In all cases, however, the members of each pair of dies are movable independently and are adapted to operate upon the blank from opposite sides thereof. The means for moving and retracting the dies and for presenting the blank to the successive actions thereof will be varied in accordance with the particular construction and arrangement of the dies themselves.

I claim—

1. In a machine of the class described the combination of male and female dies arranged in 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 with means for moving each pair of dies separately whereby they may be made to produce relief characters upon an interposed plate or blank and retracted to permit the movement of said blank into position between another pair of dies, substantially as described.

2. In a machine of the class described the combination with coacting dies arranged in pairs, the members of each pair of dies being movable slidably mounted and movable toward and from each other independently of each of the other pairs, of means for moving said dies whereby they may be caused to act upon an interposed blank and retracted to permit the movement of said blank into position between another pair of dies, and means for holding and shifting the blank, substantially as described.

3. In a machine of the class described the combination with a series of dies arranged in rows of coacting pairs and the members of each pair being independently movable toward and from each other, of means for moving said dies and means for moving and holding a blank in position between the several pairs of dies, substantially as described.

4. In a machine of the class described the combination with a series of dies arranged in rows of coacting pairs with the acting faces of the pairs normally separated and a movable blank-carrier adapted to support the blank with its faces exposed between the pairs of dies and to be moved so as to bring said blank between any pair of the series, substantially as described.

5. In a machine of the class described the combination with dies arranged in coacting pairs, said pairs being held with their acting faces slightly separated and the members of each pair of dies being slidably mounted and movable toward and from each other, a reciprocating carriage having a blank-holder thereon extending into the space between the acting faces of the dies, means for moving the carriage and means for locking said carriage with the blank in position between any pair of dies, substantially as described.

6. In a machine of the class described the combination with oppositely-movable dies arranged in pairs, of a movable blank-carriage and a series of pivoted stop-levers, one for each pair of dies, said stop-levers being adapted to engage and lock the carriage, with the blank in position between the members of any pair of dies, substantially as described.

7. In a machine of the class described the combination with two series of oppositely-movable dies arranged in pairs and the members of the pairs being movable toward and from each other of a traveling blank-carriage and means for locking said carriage in desired positions, a sliding frame mounted upon said carriage and adapted to support a blank, means for moving and locking the carriage, and means for imparting to said frame a step-by-step movement, substantially as described.

8. In a machine of the class described the combination with movable dies arranged in parallel series of means for moving each pair of dies, a traveling carriage having a sliding frame thereon adapted to support a blank, means for imparting a step-by-step movement to said sliding frame and said means being operatively connected with the means for moving the dies, substantially as described.

9. In a machine of the class described the combination with movable dies, of a traveling carriage having a sliding frame movable in line with the travel of the carriage and a blank-holder mounted upon said frame and capable of being shifted at right angles to the path of movement of the carriage and frame, substantially as described.

10. In a machine of the class described the combination with movable dies arranged in parallel series of a traveling carriage having a plate-holder projected into the plane of the movable dies and between the acting faces thereof and said carriage having sliding stocks thereon arranged also in the plane of the dies and movable cross-heads adapted to impinge said stocks and thereby to move the dies into contact with the blank, substantially as described.

11. In a machine of the class described the combination with two series of movable dies arranged with their acting faces separated, a traveling carriage having a blank-holder moving in the space between the dies stocks carried by the said carriage adapted to impinge the dies, sliding cross-heads adapted to engage said stocks and means for operating said cross-heads, substantially as described.

12. In a machine of the class described the combination with reciprocating dies arranged in pairs of a traveling carriage adapted to support and carry a blank between said pairs of dies, locking-levers pivotally mounted upon said carriage and a series of stop-levers, one for each pair of dies, said stop-levers being adapted to be moved into the path of the locking-levers and to be engaged thereby,

whereby to lock the carriage in position, substantially as described.

13. In a machine of the class described the combination with reciprocating dies of a traveling carriage having locking-levers pivoted thereon with their free ends arranged opposite to but slightly separated from each other and a series of pivoted stop-levers independently movable into the path of the locking-levers and over which one of the locking-levers will ride as the carriage is shifted while the other locking-lever engages the stop-lever and thereby arrests the movement of the carriage, substantially as described.

14. In a machine of the class described the combination with dies arranged in pairs, the members of the pairs being separated from each other, a traveling blank-carriage having a sliding frame mounted thereon, a rack mechanism for sliding said frame step by step and a handle pivoted on the carriage and connected to the rack mechanism whereby the carriage may be moved bodily and the rack mechanism held out of action to permit the movement of the sliding frame, substantially as described.

15. In a machine of the class described the combination with reciprocating punches or dies of cross-heads for moving said dies, a power-driven shaft with connections for moving said cross-heads, a power-controlling clutch, a traveling carriage for holding and presenting the blank to the action of the punches, stop-levers for locking the carriage in position and pivoted locking-levers mounted upon the carriage and adapted to control the clutch, substantially as described.

16. In a machine of the class described the combination with two series of movable dies of a traveling carriage having a blank-holder moving in the spaces between the dies, pivoted levers engaging with the dies, cross-heads adapted to move said dies and means for rocking said levers whereby to return the dies to their normal position, said means being connected to the cross-heads and controlled thereby, substantially as described.

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Witnesses:
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