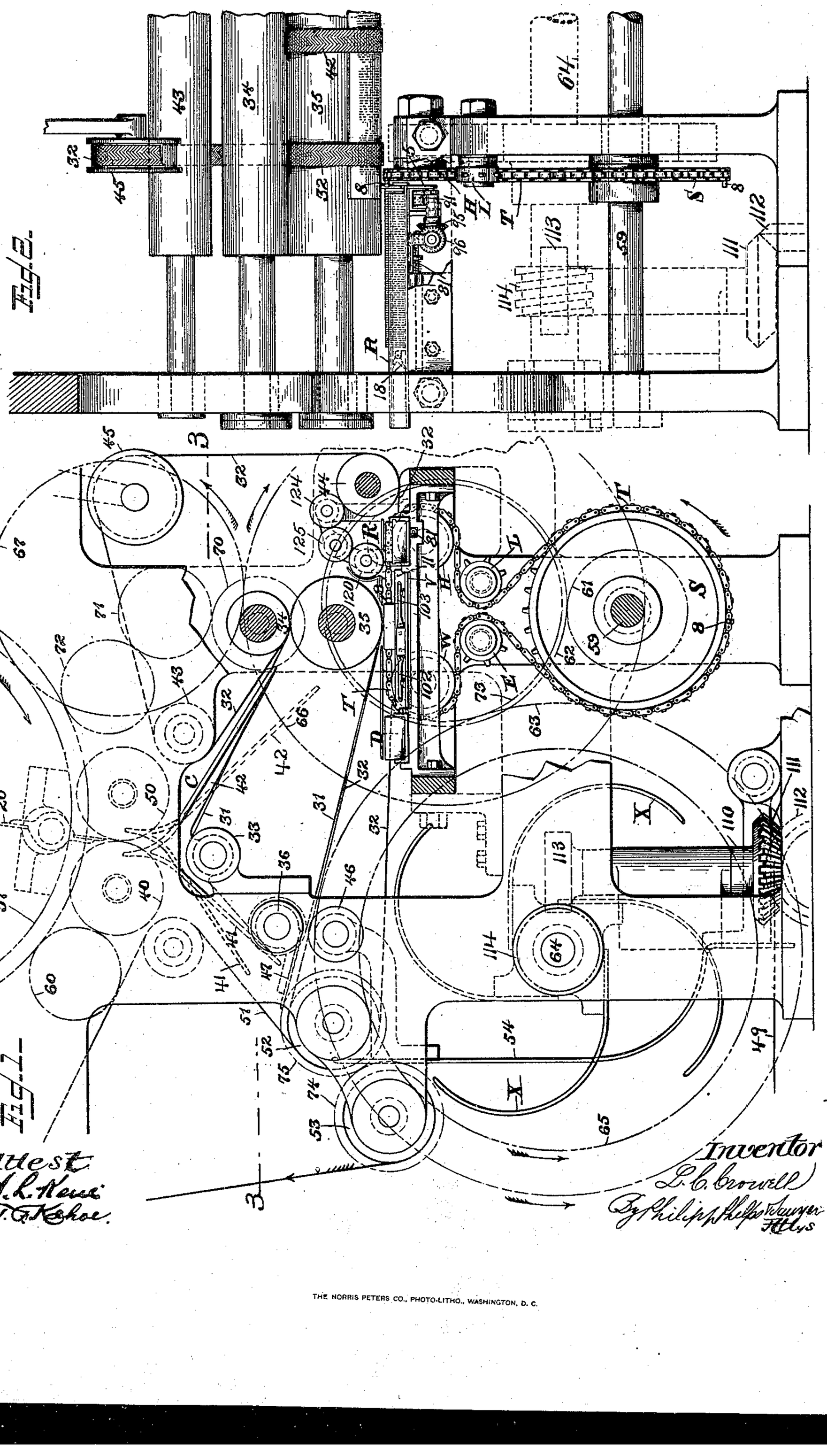
No. 646,957. Patented Apr. 10, 1900.

L. C. CROWELL.

ADDRESSING MACHINE.

(Application filed Dec. 1, 1897.)

(No Model.) 7 Sheets—Sheet 1.



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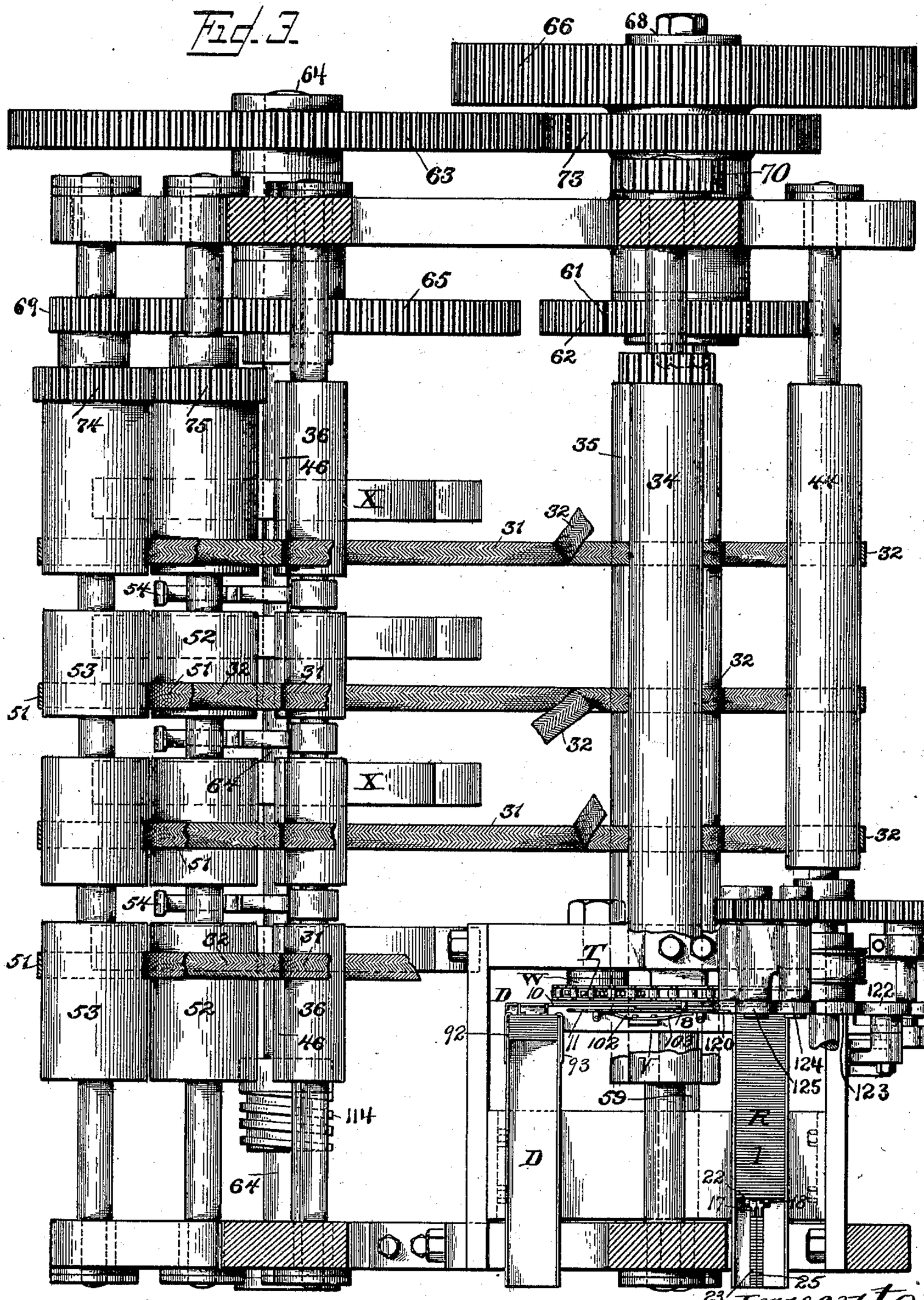
(No Model.) 7 Sheets—Sheet 2.

Fig. 3.



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7 Sheets—Sheet 3.

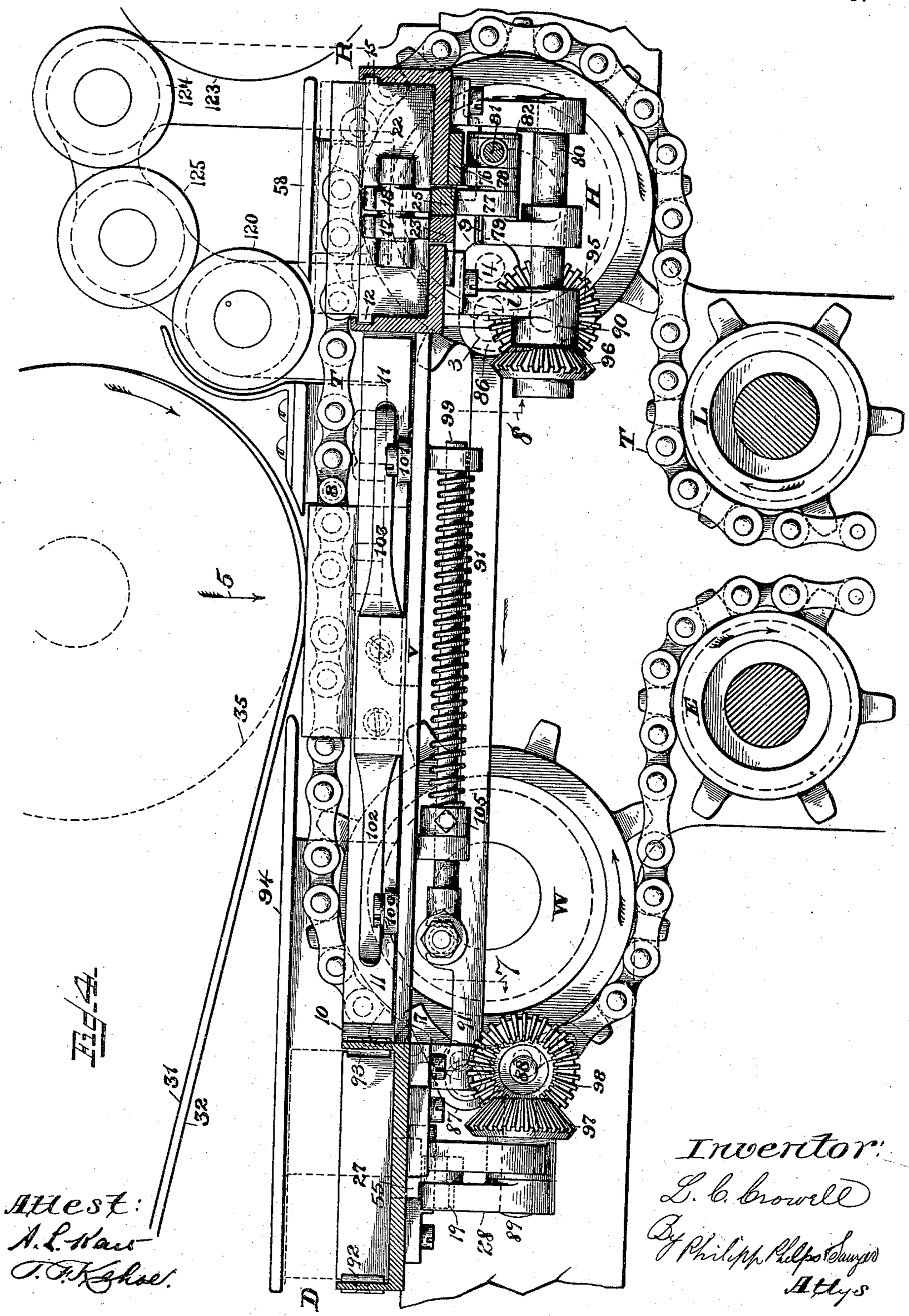

Fig. 4.

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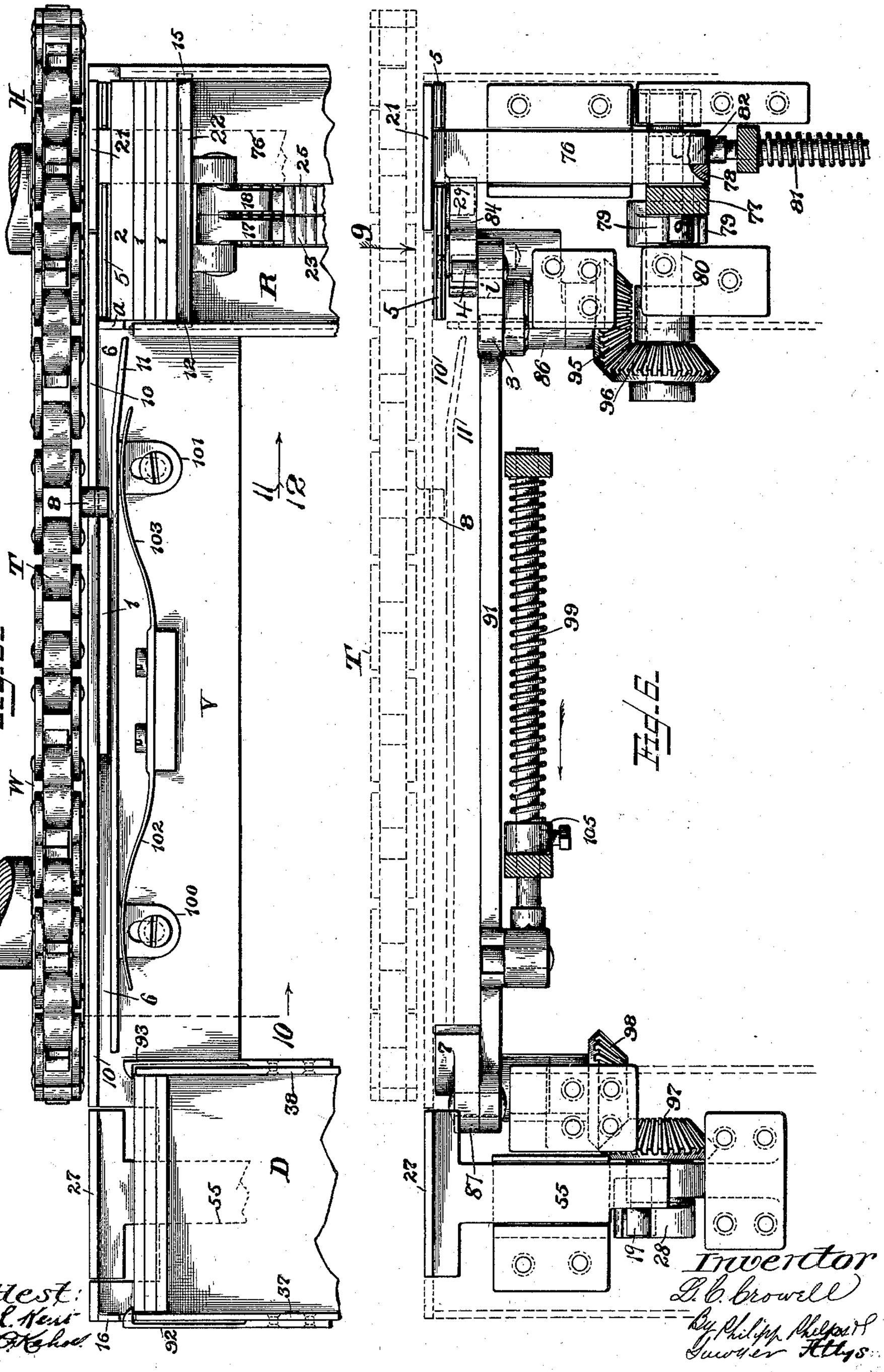
(No Model.) 7 Sheets—Sheet 4.



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(No Model.) 7 Sheets—Sheet 5.

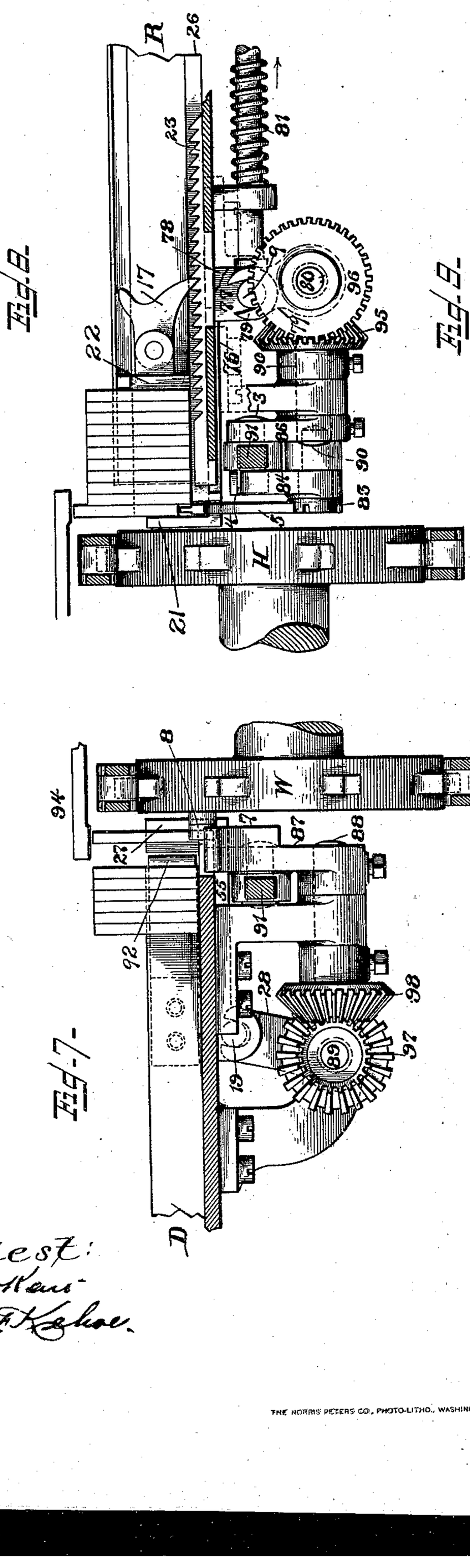

Fig. 2.

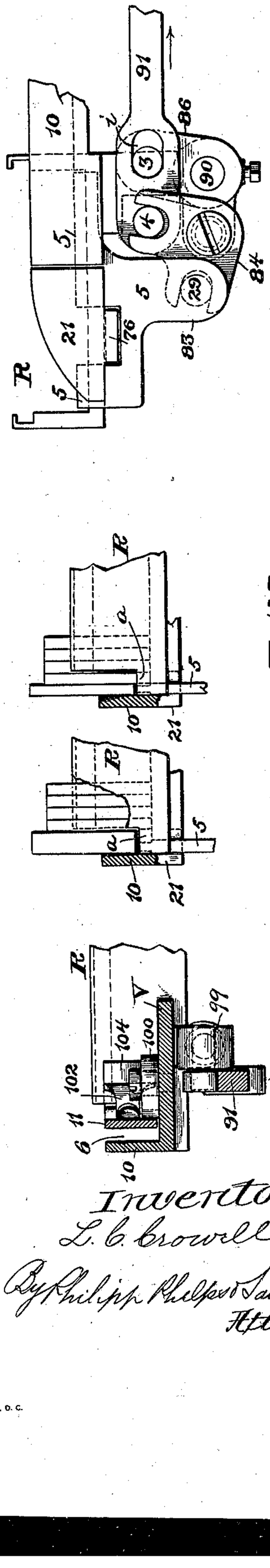

Fig. 5.

Fig. 12.

Fig. 11.

Fig. 7.

Fig. 10.

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(Application filed Dec. 1, 1897.)

(No Model.)

7 Sheets—Sheet 6.

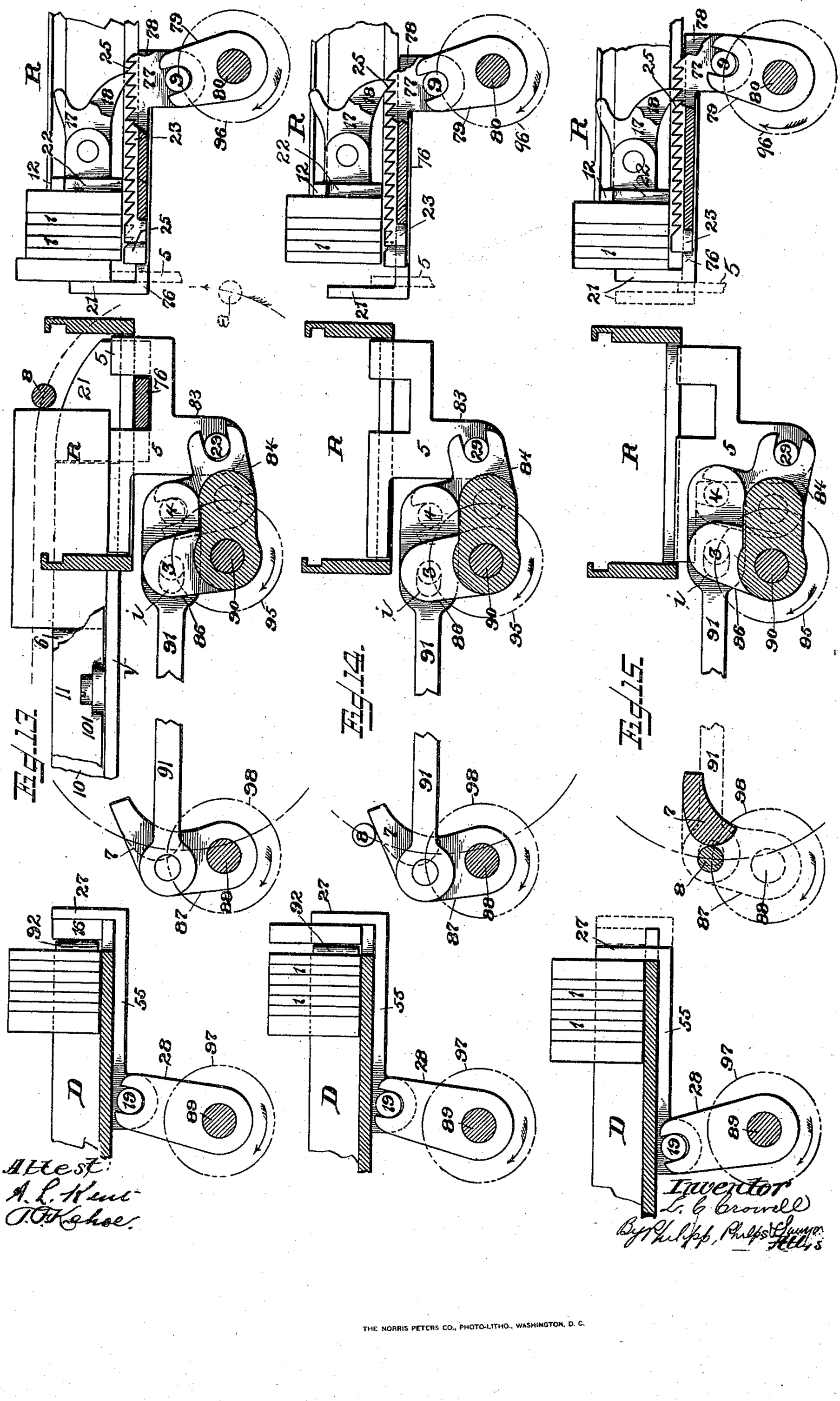

Fig. 13.

Fig. 14.

Fig. 15.

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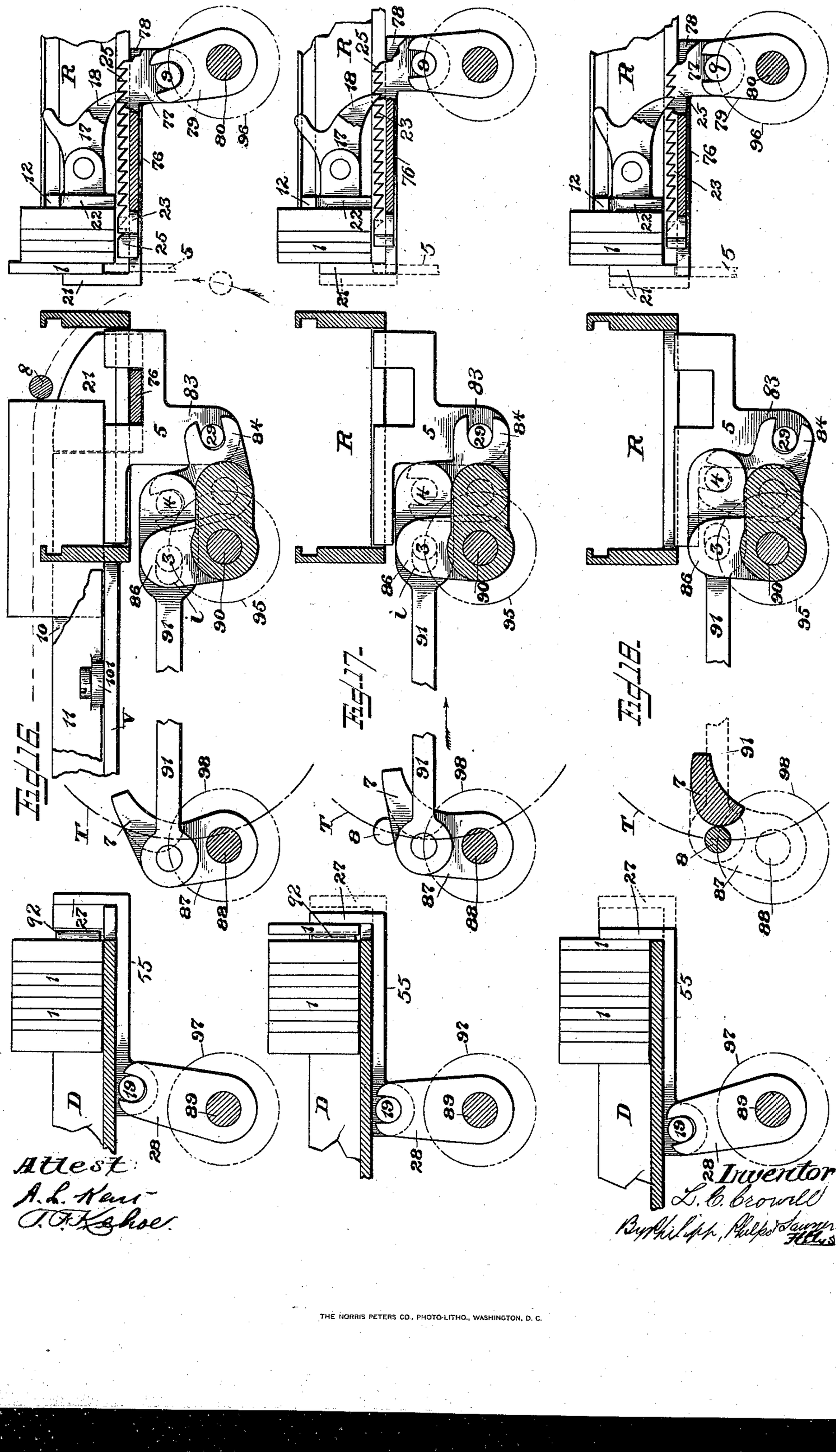
(Application filed Dec. 1, 1897.)

(No Model.) 7 Sheets—Sheet 7.



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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

ADDRESSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 646,957, dated April 10, 1900.

Application filed December 1, 1897. Serial No. 660,354. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing at New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Addressing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to machines for printing on newspapers or other publications or wrappers or other articles addresses or other matter from a succession of printing-surfaces.

More particularly the invention relates to the address or other consecutive printing mechanism proper and also to the combination of an address-printing mechanism or other consecutive-printing mechanism with the delivery mechanism of a printing-press or with other delivery mechanism, as of a folding or wrapping machine.

In the consecutive-printing mechanism I have aimed especially to provide for printing from printing-plates having the printing-faces on the edge thereof and having, preferably, a body of considerable depth relatively to its thickness, although it will be understood that features of the invention may be employed in connection with printing-plates of other forms. I have had particularly in mind and intend the mechanism particularly for handling printing plates or slugs such as are formed by the machines known as "linotype-machines."

In a construction embodying the invention in the preferred form the printing-plates are advanced successively endwise on edge to carry their printing edges or faces in contact with the papers or other articles, the papers and printing-plates preferably moving during the time of printing contact in the same direction and at the same speed, the papers preferably turning about an impression-roll at the point of contact with the printing-plates and the printing-plates advancing in a straight line. For the purpose of thus advancing the printing-plates successively for printing I preferably provide a pusher for engaging the rear end of the printing-plates and advancing them through a suitable guideway. This pusher is preferably a lug carried by an endless sprocket-chain, which may have one or more of such pusher-lugs, according to its length. For the purpose of presenting the printing-plates successively in the path of the pusher the plates are arranged in a column in a plate holder or chute arranged, preferably, at right angles to the direction of movement of the plates by the pusher and provided with means for advancing the column to bring successive plates into position to be advanced endwise from the chute by the pusher. After printing the plates are preferably delivered to a receiving-chute similar to the delivery-chute and preferably arranged parallel thereto and provided with means for advancing the plates flatwise or longitudinally of the chute as they are delivered to it to make room for receiving the succeeding plates.

To provide for the feeding of printing-plates of different thicknesses, the side of the delivery-chute past which the plates are advanced by the pusher is cut away, so as to allow the passage of a thick plate, and the guideway through which the plates are advanced from the delivery to the receiving chute is arranged with a yielding side, so as to accommodate plates of different thicknesses. The side of the delivery-chute being thus cut away to allow the passage of a thick printing-plate when a narrow plate is being advanced from the chute for printing there would be danger of the next-following printing-plate being also moved endwise by friction with the moving plate. To prevent this, the side of the chute is not cut away clear to the bottom thereof, but a portion is left to serve as a retaining-foot to prevent a plate being advanced endwise from the chute until it has been elevated to bring its bottom edge above this retaining-foot, and suitable means are provided whereby the end printing-plate in the receiving-chute is elevated to carry its lower edge above this retaining-foot. When thus elevated, the end plate is free to be advanced from the chute by the pusher, of whatever thickness it may be within the capacity of the mechanism, while the succeeding plate will be held against movement from the chute.

Suitable inking mechanism is preferably provided for inking the printing edges of the plates as they are advanced for printing.

A machine may be constructed to embody the features above described to form an independent address or other consecutive printing machine, suitable feeding mechanism being also preferably provided so that the papers or other articles and the printing-plates shall be advanced at the proper time for causing successive plates to print on successive papers. The address-printing mechanism is, however, preferably combined with the folding-delivery of a printing-press, so that the papers will be addressed as they are delivered folded from the press, the address-printing mechanism being preferably located so as to print the addresses on the papers as they are advanced to the final-delivery mechanism after having received their final fold, and I preferably provide means whereby the papers may be directed from the folding mechanism directly to the final-delivery mechanism or may at will be directed to a path leading to the address-printing mechanism and preferably thence to the final-delivery mechanism. The combination of address-printing mechanism with delivery apparatus and means for guiding the papers forms a feature of the invention. It is evident that the address-printing mechanism may be combined also with folding mechanism to form an independent folding and addressing machine or with wrapping mechanism to form a wrapping and addressing machine.

As a full understanding of the invention can best be given by a detailed description of a preferred construction embodying all the features of the same, such a description will now be given in connection with the accompanying drawings, illustrating such a construction, and the features forming the invention will afterward be specifically pointed out in the claims.

In said drawings, Figure 1 is a side elevation of so much of a folding-delivery mechanism of a printing-press embodying an address-printing mechanism according to the present invention as is necessary to give an understanding thereof, the frame being broken away to show the address-printing mechanism, which is inside the frame, in elevation. Fig. 2 is a partial end elevation from the right of Fig. 1. Fig. 3 is a section on the line 3 of Fig. 1. Fig. 4 is an enlarged side elevation of the principal parts of the address-printing apparatus, the delivery and receiving chutes for the printing-plates being, however, shown in section. Fig. 5 is a plan view of the address-printing apparatus looking in the direction of the arrow 5 in Fig. 4. Fig. 6 is a plan view of the mechanisms underlying those shown in Fig. 5, the position of the parts shown in Fig. 5 being indicated by dotted lines. Fig. 7 is a view taken on line 7 of Fig. 4 looking in the direction of the arrow, the receiving-chute being shown, however, in section and the sprocket-wheel for the transferring-chain being shown in elevation. Fig. 8 is a view taken on line 8 of Fig. 4 looking in the direction of the arrow, the delivery-chute being shown, however, in section and the sprocket-wheel for the transferring-chain being shown in elevation. Fig. 9 is a detail of the end of the delivery-chute looking in the direction of the arrow 9 in Fig. 6, showing the parts coöperating with the pushing-lug for the delivery of the printing-plates singly from the chute. Fig. 10 is a detail sectional view taken on line 10 of Fig. 5. Figs. 11 and 12 are detail views looking in the direction of the arrows 11 12 in Fig. 5, showing how the end printing-plate in the delivery-chute is elevated for delivery therefrom. Figs. 13, 14, and 15 are diagrammatic views illustrating the movement of the parts operating for the delivery of a printing-plate from the delivery-chute, its movement for printing, and its delivery to the receiving-chute when the printing-plate is one of double thickness. Figs. 16, 17, and 18 are similar diagrammatic views illustrating the movement of the operating parts for the transferring of a printing-plate of single thickness.

Referring to the drawings there is indicated in Fig. 1 by dotted lines a portion of a folding-cylinder F, having a rotary folding-blade 20 for folding a paper from the cylinder F between fold-laying rollers 40 50. This folding apparatus is of a type now well known and which is shown and described in the patent to S. D. Tucker, No. 171,196, dated December 14, 1875, and may be considered as forming a part of the folding-delivery mechanism of a printing-machine, and in the machine here shown the fold-laying rollers 40 50 form the feeding devices by which the papers are advanced to the consecutive-printing mechanism.

The course of the papers as they are advanced from the fold-laying rollers 40 50 is governed by a pivoted switch C, which when in the position indicated by dotted lines in Fig. 1 directs the papers between the arm 41 of the switch and guiding-tapes 51 to and between final-delivery rolls 52 53, from which they are guided by a vertical conductor 54 to an S-fly X of the usual form to be deposited on a delivery-belt 49. When, however, the switch C is in the position shown in full lines in Fig. 1, the papers will be guided to the address-printing mechanism and thence to the final-delivery rolls 52 53, as follows: Leaving the rolls 40 50 the papers are guided by the arms 42 of the switch C and guiding-tapes 32 between rolls 34 and 35, thence turned about the impression-roll 35 by the tapes 32 and advanced from the roll 35, between the tapes 32 and tapes 31 and beneath a guide 47 to the roll 52, and entered between the roll 52 and the tapes 51 to be delivered from between the rolls 52 and 53 to the fly X, as before. The tapes 32 run from the roll 35 to and around the roll 52, thence back to a roll 44, up to a tension-roll 45, to a roll 43, and thence beneath the roll 34 to the roll 35. The tapes 31 turn

about the roll 35, inside the tapes 32, and also about rolls 36 and 33.

It will be seen that by the arrangement described the papers may be delivered from the folding apparatus directly to the final-delivery apparatus or may at will, suitable means being provided for operating the switch C, be directed to the address-printing mechanism and thence delivered, being in the machine shown directed through a pathway leading to the address-printing mechanism and thence to the same final-delivery mechanism, to which they may be guided directly from the folding apparatus. Any desired number of the newspapers forming the product of the machine may thus be delivered addressed for mailing or other purposes.

The printing-plates are advanced for printing the addresses on the papers as they are advanced about the impression-roll 35 by address-printing mechanism substantially as follows: The printing-plates 1 are advanced for printing from a receptacle or chute R by a pusher engaging the end of the end plates and advancing them endwise on edge to engage the papers as they are advanced about the impression-roll 35 and then delivered to a receiving-chute D. The printing-plates are arranged in the delivery-chute R side by side flatwise and are advanced in the chute flatwise to bring successive plates into position at the end of the chute to be advanced by the pusher for printing, and as the plates are received in the receiving-chute they are advanced flatwise from the receiving end of the chute to make place for succeeding plates.

The delivery and receiving chutes are preferably arranged horizontal and parallel to each other and at right angles to the direction of movement of the papers during the time they receive the addresses, and the plates are advanced from the delivery to the receiving chute for printing preferably in a path forming a right line extending from the delivery end of the delivery-chute to the receiving end of the receiving-chute. The pusher for advancing the printing-plates for printing is preferably formed by a lug 8, carried on an endless sprocket-chain T, turning on sprocket-wheels H and W, between which the chain moves in a right line parallel to the path of the plates from the delivery to the receiving chutes. The sprocket-chain may carry one or more such lugs, according to its length and the timing of other coöperating parts.

The sprocket-chain T is driven at the same speed as that of the papers as they are advanced about the roll 35, so that the printing-plates will be advanced to engage the papers while moving at the same speed therewith, and it is shown as of such a length that, being provided with two of the lugs 8, a printing-plate will be advanced beneath the roll 35 for each paper fed about said roll. The sprocket-chain is shown as turning about a driving sprocket-wheel S, sprocket-wheels E and L also being provided for the purpose of increasing the length of travel of the chain without corresponding increase of space occupied.

The column of printing-plates is advanced in the chute R by means of a follower 22, moving between the side walls of the chute and preferably provided with ears 12 and 15, riding in slots in said side walls, to prevent the displacement of the follower. The follower carries two pawls 17 18, engaging, respectively, racks 23 and 25, arranged in a slot in the bottom plate of the chute, the rack 23 being a stationary holding-rack and the rack 25 being a reciprocating rack operated as hereinafter described for giving the follower its forward movement.

The forward movement of the plates in the chute R is limited by a guard or front plate 21, carried by a slide 76, extending rearwardly beneath the bottom plate of the chute and mounted so as to be capable of reciprocating longitudinally. When this guard 21 is in its normal or outermost position, the printing-plate resting against the guard will be directly over an elevator 5, formed, as shown, by a plate which is cut away beneath the slide 76, so as to permit its being raised to elevate the end plate for delivery, as hereinafter described. This elevator is thus raised and lowered by means of a bell-crank lever 84, engaging a pin 29 on a lug 83, extending downwardly from said elevator, the bell-crank lever being operated by means of a reciprocating rod 91, having a pin 4, engaging the other arm of the bell-crank lever. This operating-rod 91 is spring-pressed in the direction of the arrow in Figs. 4, 6, and 9 by means of a spring-rod 99, its movement under the action of said spring-rod being limited by means of an adjustable collar 105 on said rod. The reciprocating movements of the slide 76, carrying the guard 21, and of the movable rack 25 for the purpose of controlling the feed of the printing-plates in the chute are controlled by means of a rock-shaft 80, carrying a rock-arm 79, which engages a pin 9, extending through downwardly-extending lugs 77 and 78 on said rack and said slide, respectively, as shown best in Fig. 4. A spring-rod 81 is also connected to this pin 9 for the purpose of holding the slide and rack under tension to move backward or in the direction of the arrow in Fig. 8. The rock-shaft 80 carries a beveled gear 96, engaging a beveled gear 95 on a rock-shaft 90, which carries also a rock-arm 86, carrying a pin 3, extending into a slot *i*, near the end of the operating-rod 91, for the purpose of controlling the movement of the slide 76 and the rack 25 by the movement of said operating-rod. The guard 21 is preferably curved about as shown in Fig. 9, so as to permit the passage of the pushing-lugs 8.

The upper portion of that side of the delivery-chute toward the receiving-chute is cut away to permit the printing-plates to be ad-

vanced endwise from the chute; but the lower portion of the side remains to form a foot *a*, by which the plates will be held against movement endwise from the chute until they are raised above the edge of the foot, as shown in Figs. 11 and 12. The opposite side of the chute also is preferably cut away for the passage of the lugs 8, as shown in Fig. 5.

It is desirable to provide for feeding not only printing-plates of the hormal single thickness, but also plates of double thickness, which may be necessary for the printing of longer addresses, and it is desirable that the mechanism be capable of handling such plates indifferently, so that the plates, whether of single or double thickness, may be arranged in the delivery-chute in any desired order. The mechanism shown is adapted to secure this result.

The elevator 5 is formed of a thickness such that if a single-thick plate is to be raised, as shown in Fig. 12, the plate adjacent to it will not be disturbed by the upward movement of the elevator, and the top of the elevator is preferably cut away, as shown in Fig. 8, to a thickness less than that of a single-thick plate, so as to avoid catching the next plate when a single-thick plate is raised. The side of the chute is cut away, however, so that if a plate of double thickness is raised by the elevator, as shown in Fig. 11, it will be free to be moved endwise from the chute by one of the pushing-lugs 8, which lugs are of such a length as to extend into the path of the plates a distance somewhat less than the thickness of a single-thick plate, so that if a single-thick plate is to be advanced the stud will not engage the adjacent plate. When a plate of single thickness is elevated, as shown in Fig. 12, for delivery, the adjacent plate will be prevented by the retaining-foot *a* from moving endwise with the plate being delivered through friction therewith. By the pin-and-slot connection between the rock-arm 86 and the operating-rod 91 provision is made for the movement of the rack 25 and guard 21 a distance equal to the width of a single-thick or of a double-thick printing-plate, as the case may be, and as will be hereinafter described.

As a plate is advanced from the chute R by means of one of the lugs 8 it enters a guideway or passage 6, extending from the delivery end of the chute R beneath the impression-roll 35 and to the receiving end of the chute D, this guideway being formed by a vertical wall 10, extending upward from a base-plate or table V, and a spring-pressed plate 11, mounted to move toward and from the wall 10, as by being secured to the table V by screws extending through slotted ears 100 101 and spring-pressed toward the wall 10 by means of spring-arms 102 103, secured to the table, as shown. The plate 11 will thus be held normally toward the wall 10 to form a narrow guideway for guiding a single-thick printing-plate and will be free to move away from the wall 10 for the purpose of accommodating a printing-plate of double thickness. The end of the guide-plate 11 at the receiving end of the guideway is preferably inclined, as shown in Fig. 5, to provide for the entrance of a double-thick printing-plate. The upper surface of the table V is preferably on a level with the upper edge of the stop *a*, and the inner surface of the wall 10 extends in line with the inner surface of the guard 21 when the guard is in its outermost position, being in the construction shown extended to form a part of the end wall of the chute.

The printing-plate is advanced by the lug 8 through the guideway 6 for printing, and when the lug 8 has moved downward about the sprocket-wheel W, so as to clear the end of the plate, the plate will have been advanced into the end of the receiving-chute D, the forward end of the plate resting against the extended side 16 of the chute. Then in the further operation of the machine the plate is advanced by means of an end plate or packer 27, similar to the guard 21 of the chute R, and carried into the chute and into the grasp of spring-jaws 92 and 93, extending inside the inner faces of the sides of the chute to engage the ends of the plates, as shown best in Fig. 5. The packer 27 is then returned to position for the receiving of the next printing-plate. The packer 27 is carried by a slide 55, mounted to reciprocate beneath the bottom plate of the chute D and operated by means of a rock-arm 28, engaging a stud 19, carried by said slide, said rock-arm being carried by a rock-shaft 89, which carries a beveled gear 97, meshing with a beveled gear 98 on a rock-shaft 88, which is rocked through an arm 87, to which is pivoted the operating-rod 91.

Top guards 58 and 94 are preferably provided over the chutes R and D, respectively, for the purpose of keeping the printing-plates from rising out of position, and said guards are extended to cover, for the most part, the guideway 6.

The rod 91 is preferably operated by means of the lugs 8, the rock-arm 87 being for this purpose provided with a cam 7, which is engaged by said lugs as they move downward about the sprocket-wheel 39, the cam being formed so that the lugs by engagement therewith will throw the arm 87 so as to move the operating-rod 91 in the direction the reverse of that in which the arrow points in Figs. 4, 6, and 9—that is, against the tension of the spring-rod 99.

The operation of the printing-plate-feeding mechanism will be readily understood by reference to Figs. 13 to 18. Fig. 13 represents, diagrammatically, the operating parts of the mechanism in position just after a plate of double thickness has been engaged by one of the lugs 8 and is being advanced from the delivery-chute R into the guideway 6. By the further movement of the sprocket-chain the plate will be advanced through the guideway 6 into contact with the paper beneath the impression-roll 35 and then delivered into the

end of the receiving-chute D, the other parts of the mechanism meanwhile remaining stationary. The printing-plate having been delivered into the end of the chute D, the lug 8 will engage the cam 7, as shown in Fig. 14, and by engagement with said cam will rock the arm 87 to the position shown in Fig. 15. This movement of the arm 87 will, through the bevel-gears 98 and 97, the rock-shaft 89, and the rock-arm 28, move the slide 55 and packer 27 inward to carry the printing-plate which has just been delivered to the chute D into the grasp of the spring-jaws 92 and 93. By the movement of the rock-arm 87 also the operating-rod 91 will be moved against the tension of the spring 99 to rock the bell-crank lever 84 to carry the elevator 5 downward from the position shown in Figs. 13 and 14 to that shown in Fig. 15. This movement of the operating-rod 91 will also permit the rearward movement of the slide 76, carrying the guard 21, and of the rack 25 under the tension of the spring-rod 81, such movement of these parts having been before prevented by engagement of the pin 3 on the rock-arm 86, carried by the rock-shaft 90, with the front end of the slot *i* in the end of the rod 91, the rock-shaft 90 being, as before stated, geared with the rock-shaft 80, which carries the arm 79, engaging the pin 9, carried by the lugs 77 and 78 of the rack 25 and the slide 76, respectively. A printing-plate of double thickness having been fed from between the guard 21 and the remaining printing-plates in the chute, the guard 21 will be free to move rearward under the action of the spring-rod 81 a distance equal to the thickness of a double-thick printing-plate, and the rack 25 will move the same distance. The teeth of the rack 25, as also of the stationary rack 23, are spaced so that the distance between two successive teeth shall be equal to the thickness of a printing-plate of single thickness. In the present case therefore the rack will be moved with relation to the pawl 18 of the follower 22 a distance corresponding to two teeth, so that on the return movement of the parts, by which the guard 21 and rack 25 are returned to their outermost positions, (shown in Figs. 13 and 14,) the column of printing-plates will be moved forward in the chute a distance equal to the thickness of a double-thick plate, or so as to advance the end plate into a position in contact with the guard in its outermost position and directly over the elevator 5. When the lug 8 has been carried beyond the cam 7, the operating-rod will be returned to its normal position (shown in Figs. 13 and 14) by the spring-rod 99, whereby the rock-shaft 90 will be rocked back to its position shown in Figs. 13 and 14, thereby rocking the shaft 80 and the rock-arm 79 to return the guard 21 and rack 25 to their outermost positions, the column of printing-plates in the chute R being thereby fed forward, as just described, to bring the next printing-plate into position to be advanced from the chute. This movement of the rod 91 will also, through the bell-crank lever 84, cause the elevator 5 to be raised to elevate the end printing-plate for delivery. The return movement of the operating-rod 91 will also rock the arm 87, and through the rock-shaft 88 and gears 98 and 97 will rock the shaft 89 and the rock-arm 28 to return the packer 27 to its outermost or receiving position. The parts will thus be returned to position for the advancing of another printing-plate for printing and the repetition of the operations just described, the parts being thus again in the positions shown in Fig. 13, but with a printing-plate of single thickness, in the example shown, in position to be engaged by one of the pusher-lugs 8, as shown in Fig. 16. Then as the pusher continues its movement this printing-plate will be advanced for printing and then delivered to the receiving-chute D, as was the preceding plate, and in its further movement the pusher will engage the cam 7 to operate the rock-arm 87 and rod 91 as before. The packer 27 will thus be operated as before to advance the printing-plate into the grasp of the jaws 92 and 93, and the elevator 5 will be again lowered to allow the next printing-plate to be advanced into delivery position. The movement of the rod 91 also permits the shafts 90 and 80 to be rocked by the spring-rod 81, as before, to cause the guard 21 and rack 25 to move inwardly; but as in this instance a printing-plate of only single thickness has been fed from the chute R the guard 21 can move inward only a distance equal to the thickness of a single-thick printing-plate before coming in contact with the succeeding plate, and the movement of the rack 25 being the same as that of the guard 21 it will move only the distance of one tooth. This stopping of the movement of the slide 76, carrying the guard 21, and of the rack 25 when they have moved only half the distance that they moved after the delivery of a double-thick plate, and the consequent stopping of the movement of the rock-shafts 80 and 90 while the movement of the operating-rod 91 continues as before, is made possible by reason of the lost motion between the pin 3 and the operating-rod 91, the pin following in contact with the forward end of the slot *i* under the action of the spring-rod 81 until the parts take the positions shown in Fig. 17 and then remaining stationary while the rod 91 and parts positively moved thereby continue their movements to the positions shown in Fig. 18. The parts being in this position, on the return movement of the operating-rod 91, the movement of the packer 27 of the receiving-chute and of the elevator 5 will be as they were after the feeding of a double-thick printing-plate; but there will be no forward movement of the follower 22 and of the guard 21 until after the rod 91 has returned to the position shown in Fig. 17 to bring the outer end of the slot *i* into engagement with the pin 3. Then by the further movement of the oper-

ating-rod the shafts 90 and 80 will be rocked to move the slide 76 and rack 25 outward against the tension of the spring-rod 81 to move the guard 21 and follower 22 outward a distance equal to the thickness of a single-thick printing-plate to advance the column of plates to bring the end plate into position to be elevated by the elevator 5.

In order to insure the elevator engaging the bottom of the end printing-plate for raising it, the elevator is preferably arranged so that when it has made one-half of its upper movement its upper end will still be slightly below the bottom of the printing-plates.

The various moving parts of the machine receive their movements from gears 56 and 57 on the shaft of the folding-roll F as follows: The fold-laying rolls 40 50 carry intermeshing gears and are driven from the gear 56 through an intermediate 60. The rolls 34 and 35 also carry intermeshing gears and are driven from the gear 56 through intermediates 72 71, the intermediate 71 meshing with a gear 70 on the shaft of the roll 34. The shaft of the sprocket-wheel S carries a gear 61, driven by a gear 62 on a short shaft 68, which also carries a gear 66 and is driven from the gear 57 through an intermediate 67, meshing with the gear 66, the gearing being timed to give the sprocket-wheel S a surface speed the same as that at which the papers are fed about the roll 35. The shaft 68 also carries another gear 73, from which the **S**-fly X is driven through a gear 63 on the fly-shaft 64. The final-delivery rolls 52 and 53 carry intermeshing gears 74 and 75 and are driven by a gear 65 on the fly-shaft 64, meshing with a gear 69 on the shaft of the roll 53. The delivery-tapes 49 are driven from the fly-shaft 64 through a shaft 110, carrying at one end a beveled gear 111, meshing with a beveled gear 112 on the shaft of one of the rolls about which the delivery-tapes turn and having at its other end a worm-wheel 113, gearing with a worm 114 on the fly-shaft.

The printing-plates are preferably inked for printing as they are advanced from the chute R, and for this purpose there is preferably provided an inking-roll 120, properly positioned to engage the printing edge of the plates as they are advanced from the chute R and which receives its ink from a fountain-roll 121 through a series of rolls 122, 123, 124, and 125. The shafts of the fountain-roll, the intermediates, and the inking-roll carry intermeshing gears, as shown in Fig. 3, and are driven by the gear on the shaft of the roll 123, which shaft is also the shaft of the tape-roll 44.

It will be understood that the invention as claimed is not limited to the exact construction shown for the purpose of illustrating the invention, and to which the foregoing description has been mainly confined, but includes changes and modifications thereof within the claims. It is also to be understood that the term "paper" is used in the claims to include all articles for printing on which machines embodying the invention or features thereof as claimed may be used.

What I claim is—

1. The combination with delivery mechanism including feeding devices and a final-delivery mechanism, of a consecutive-printing mechanism, and a switch whereby papers may be directed to the final-delivery mechanism or to the consecutive-printing mechanism, substantially as described.

2. The combination with delivery mechanism including feeding devices and a final-delivery mechanism, of a consecutive-printing mechanism, means for guiding the papers directly to the final-delivery mechanism, means for guiding the papers to the consecutive-printing mechanism and thence to the final-delivery mechanism, and a switch for determining the course of the papers, substantially as described.

3. The combination with paper-folding mechanism and a final-delivery mechanism, of an address-printing mechanism, and a switch whereby the folded papers may be directed to the delivery mechanism or to the address-printing mechanism, substantially as described.

4. The combination with paper-folding mechanism and a final-delivery mechanism, of an address-printing mechanism, means for guiding the papers from the folding mechanism directly to the final-delivery mechanism, means for guiding the papers from the folding mechanism to the address-printing mechanism and thence to the final-delivery mechanism, and a switch for determining the course of the papers, substantially as described.

5. The combination with paper-feeding mechanism, of means for advancing a succession of printing-plates independently endwise on edge to engage successive papers as the papers are advanced by the paper-feeding mechanism, substantially as described.

6. The combination with paper-feeding mechanism, of means for advancing a succession of printing-plates independently endwise on edge to engage successive papers by the printing edges of the plates as the papers are advanced by the paper-feeding mechanism, substantially as described.

7. The combination with paper-feeding mechanism, of chutes for holding printing-plates having edge printing-surfaces, a stationary guideway extending between said chutes to guide the printing-plates into contact with the papers, means for advancing a printing-plate endwise on edge from one of said chutes through the guideway for printing from its edge printing-surface to the other chute, and means for bringing papers into printing contact with the edge printing-surfaces of successive printing-plates while the plates are in their path of endwise movement between the chutes, substantially as described.

8. The combination with paper-feeding

mechanism, of chutes for holding printing-plates, a guideway extending between said chutes to guide the printing-plates into contact with the papers and having a yielding side to adapt it to receive printing-plates of different thicknesses, and means for advancing a printing-plate endwise on edge from one of said chutes through the guideway to the other chute, substantially as described.

9. The combination with paper-feeding mechanism, of chutes for holding printing-plates, means for advancing a printing-plate endwise on edge from one of said chutes into printing contact with a paper and to the other chute, means for feeding the plates flatwise in the chute from which the plates are advanced for printing, and means for moving the end printing-plate in said chute edgewise into position to be advanced therefrom, substantially as described.

10. The combination of a chute for holding printing-plates having edge printing-surfaces, and means for feeding the printing-plates successively from the chute and advancing them endwise on edge for printing from the edge printing-surfaces while being so advanced, substantially as described.

11. The combination of a chute for holding printing-plates, and means for feeding the printing-plates successively from the chute and advancing them endwise on edge to engage moving papers while being so advanced, substantially as described.

12. The combination of a chute for holding printing-plates having edge printing-surfaces and arranged side by side flatwise, and means for advancing the printing-plates successively endwise from the chute and into position for printing from the edge printing-surfaces, substantially as described.

13. The combination of a chute for holding printing-plates having edge printing-surfaces and arranged side by side flatwise, means for feeding the printing-plates flatwise in the chute, and means for advancing the printing-plates successively endwise from the chute and into position for printing from the edge printing-surfaces, substantially as described.

14. The combination of a chute for holding printing-plates having edge printing-surfaces and arranged side by side flatwise, means for feeding the printing-plates flatwise in the chute, means for advancing the printing-plates successively endwise from the chute and into position for printing from the edge printing-surfaces, a second chute, and means for feeding the printing-plates flatwise in said second chute, substantially as described.

15. The combination of a delivery-chute and a receiving-chute for holding printing-plates having edge printing-surfaces and arranged side by side flatwise, means for feeding the printing-plates successively endwise from the delivery-chute into position for printing and to the receiving-chute, and means for bringing papers into printing contact with the edge printing-surfaces of successive printing-plates while the plates are in the path of their endwise movement between the chutes, substantially as described.

16. The combination of a delivery-chute and a receiving-chute for holding printing-plates having edge printing-surfaces and arranged on edge side by side, means for transferring the printing-plates successively from the delivery-chute into position for printing and to the receiving-chute endwise on edge, and means for feeding papers in contact with the edge printing-surfaces of the plates while the plates are in the path of their endwise movement between the chutes, substantially as described.

17. The combination in a consecutive-printing mechanism, of parallel chutes for holding printing-plates arranged side by side flatwise, and means for transferring the printing-plates successively endwise from one of said chutes into position for printing and to the other of said chutes, and means for bringing papers into printing contact with the printing-surfaces of successive printing-plates while the plates are in the path of their endwise movement between the chutes, substantially as described.

18. The combination in a consecutive-printing mechanism, of parallel chutes for holding printing-plates on edge side by side, a guideway extending between said chutes at right angles thereto, and a pusher for engaging the end printing-plate in one chute to advance it endwise on edge through the guideway and to the other chute, substantially as described.

19. The combination of a chute for holding printing-plates on edge side by side, a guideway extending from the end of the chute at right angles thereto, a pusher for engaging the end printing-plate in the chute to advance it endwise on edge from the chute and through the guideway, and means for feeding a paper in contact with the printing-plate as it is advanced through the guideway, substantially as described.

20. The combination of a chute for holding printing-plates on edge side by side, a guideway extending from the end of the chute at right angles thereto, a pusher for engaging the end printing-plate in the chute to advance it endwise on edge from the chute and through the guideway, and paper-feeding devices including an impression-roll positioned above said guideway, substantially as described.

21. The combination of a chute for holding printing-plates on edge side by side, means for elevating the end printing-plate in the chute for delivery, and means for advancing the end printing-plate from the chute endwise on edge for printing, substantially as described.

22. The combination of a chute for holding printing-plates on edge side by side, a guideway extending from the end of the chute at right angles thereto having a yielding side to adapt it to receive printing-plates of different thicknesses, means for elevating the end plate in the chute for delivery, a pusher for

engaging the elevated printing-plate to advance it endwise on edge from the chute and through the guideway, and means for feeding a paper in contact with the printing-plate as it is advanced through the guideway, substantially as described.

23. The combination of a chute for holding printing-plates on edge side by side having one side cut away to permit a printing-plate to be fed endwise therefrom and having a retaining-foot *a*, means for elevating successive printing-plates above said retaining-foot for delivery from the chute, and a pusher for engaging the elevated printing-plates to advance them endwise on edge from the chute, substantially as described.

24. The combination of a chute for holding printing-plates on edge side by side, a guideway extending from said chute at right angles thereto having a yielding side to adapt it to receive printing-plates of different thicknesses, a pusher for engaging successive printing-plates to advance them endwise on edge from the chute and through the guideway, and means for feeding papers in contact with the printing-plates as they are advanced through the guideway, substantially as described.

25. The combination with a chute for holding printing-plates on edge side by side, of the reciprocating guard 21, follower 22, means for feeding the end printing-plate from the chute, and means for advancing the follower as the reciprocating guard 21 moves outward, substantially as described.

26. The combination with the chute R, of the guard 21 carried by a slide 76, follower 22, racks 23, 25, pawls 17, 18 carried by the follower and engaging said racks respectively, and means for reciprocating the slide 76 and rack 25, substantially as described.

27. The combination with the chute R, of the elevator 5, means for feeding the plates forward flatwise in the chute to bring successive plates in position over the elevator, and means for advancing the elevated plates endwise from the chute, substantially as described.

28. The combination with the chute R having the retaining-foot *a*, of the elevator 5, and a pusher for engaging a plate which has been elevated by the elevator 5 to advance it endwise over the foot *a* from the chute, substantially as described.

29. The combination of a chute for holding printing-plates, a guideway extending from said chute, a pusher for engaging successive printing-plates to advance them from the chute and through the guideway, feeding devices for feeding the printing-plates forward in the chute, and a member operated by said pusher for controlling said feeding devices, substantially as described.

30. The combination of a chute for holding printing-plates, guideway 6, impression-roll 35, and a pusher for advancing a printing-plate from the chute and through the guideway endwise on edge past the impression-roll 35, substantially as described.

31. The combination of a chute for holding printing-plates, a guideway having a yielding side, and means for advancing a printing-plate from the chute through the guideway, substantially as described.

32. The combination of a chute for holding printing-plates on edge side by side, a guideway 6 extending at right angles to the chute, sprocket-chain T having a pusher-lug 8 for engaging a printing-plate to advance it endwise on edge from the chute through the guideway, and means for feeding a paper in contact with the printing-plate as it is advanced through the guideway, substantially as described.

33. The combination of the chutes R and D, guideway 6 extending at right angles to and between said chutes, and sprocket-chain T having pusher-lug 8, substantially as described.

34. The combination of a chute, means for feeding printing-plates flatwise in the chute, a pusher for advancing plates edgewise from the chute, and means for controlling by said pusher the feeding of the plates in the chute, substantially as described.

35. The combination of the chute R, means for feeding printing-plates forward flatwise in the chute, elevator 5, a pusher for advancing the plates from the chute, cam 7 actuated by said pusher, and means operated by said cam for controlling the movements of the elevator 5 and the means for feeding the plates in the chute, substantially as described.

36. The combination of the chute R, reciprocating guard 21, follower 22 moving with said guard on its outward movement for feeding the printing-plates forward flatwise in the chute, a pusher for advancing the end printing-plate from the chute, a member actuated by said pusher, and connections between said member and the guard 21 and follower 22 providing for lost motion to permit the length of reciprocation of the guard and the movement of the follower to vary according to the thickness of the printing-plate which has been last fed from the chute, substantially as described.

37. The combination of the chute R, follower 22 for feeding the printing-plates forward flatwise in the chute, a reciprocating member for controlling the forward movement of the follower spring-pressed in one direction, a pusher for advancing the end printing-plate from the chute, a member actuated by the pusher, and connections between said member and the reciprocating member providing for lost motion to permit the movement of the follower to vary according to the thickness of the printing-plate which has been last fed from the chute, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LUTHER C. CROWELL.

Witnesses:
C. J. SAWYER,
T. F. KEHOE.