

No. 646,958.

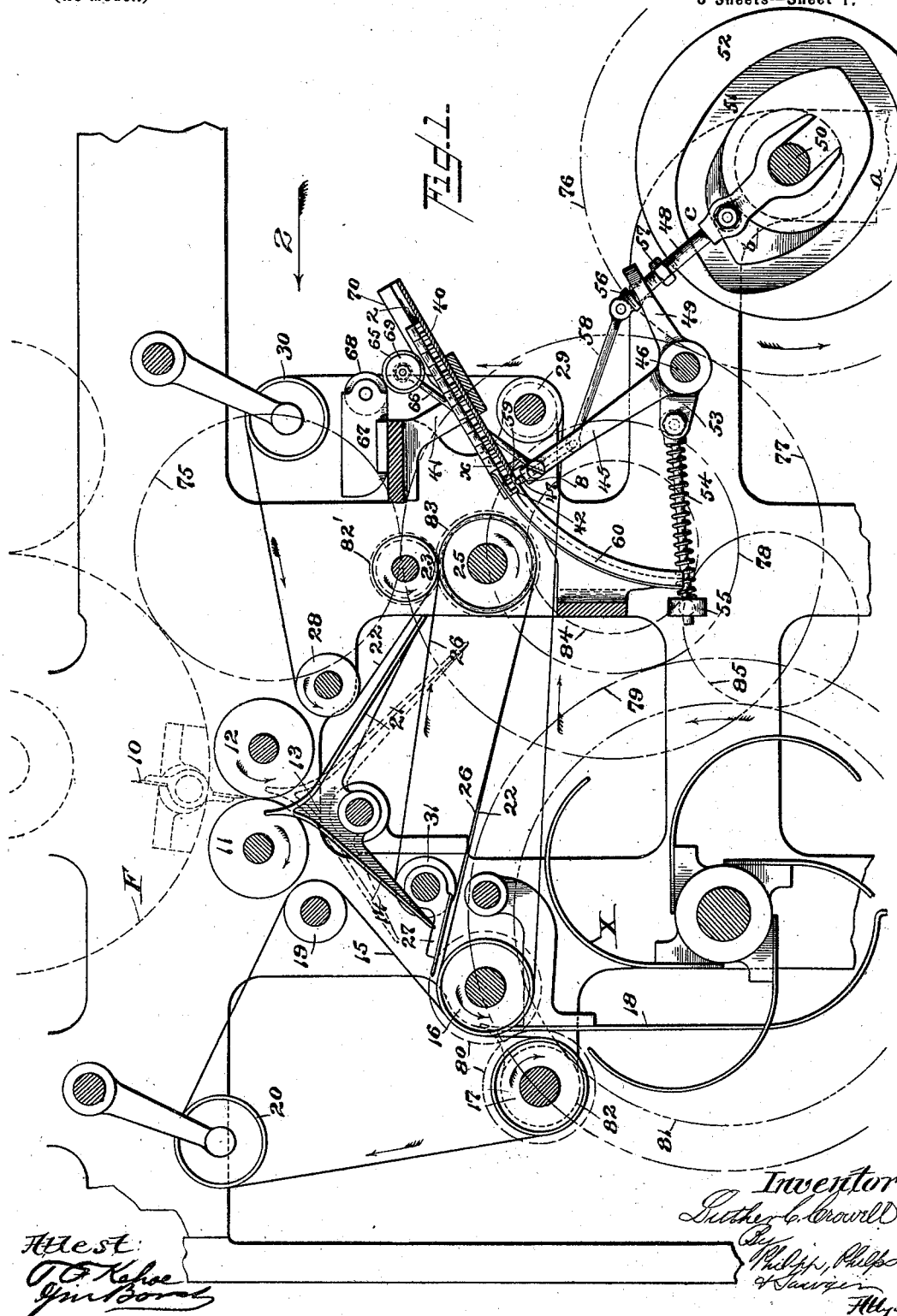
Patented Apr. 10, 1900.

L. C. CROWELL.
ADDRESSING MACHINE.

(Application filed Dec. 31, 1897.)

(No Model.)

3 Sheets—Sheet 1.



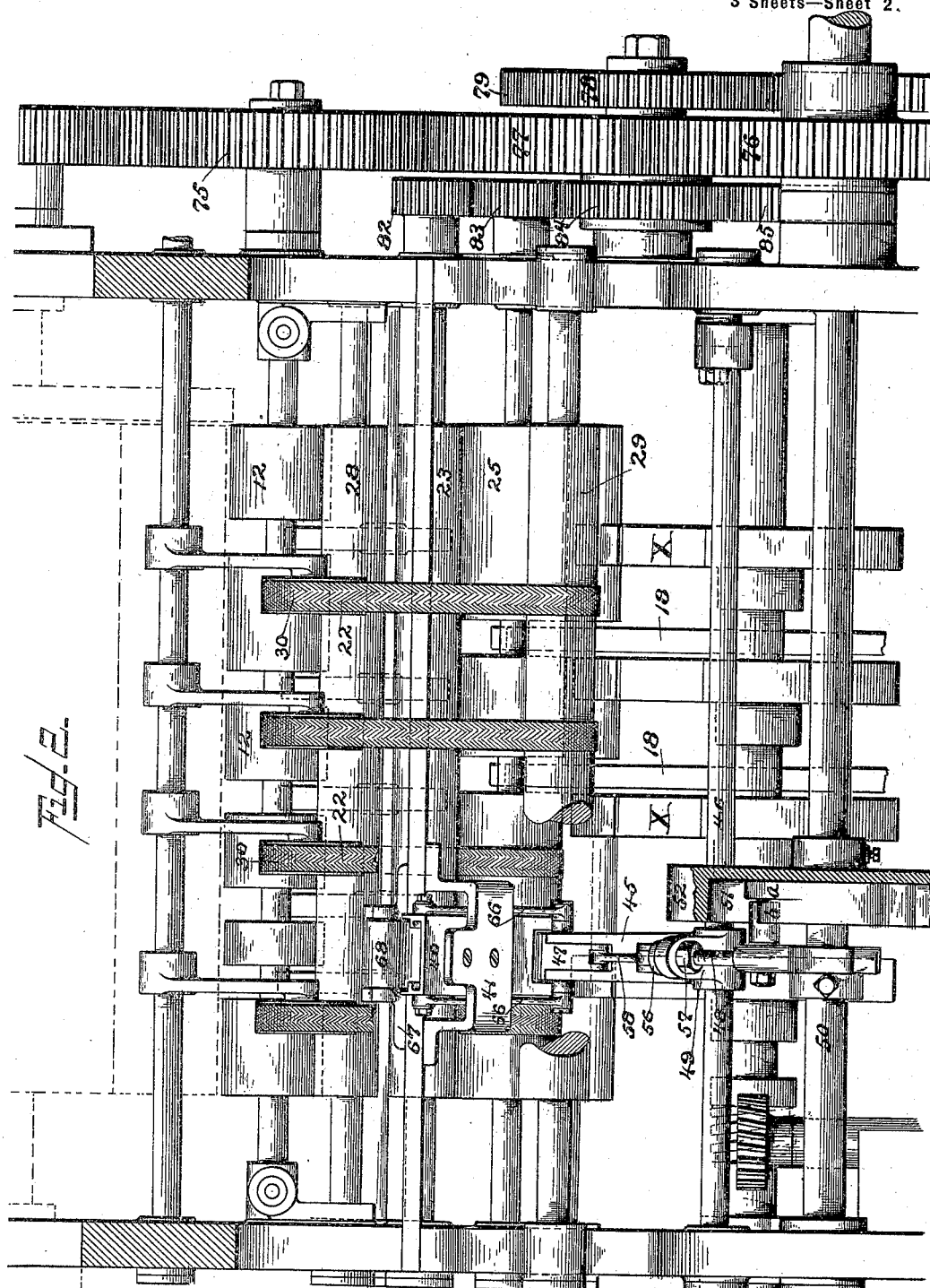
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3 Sheets—Sheet 2.



Attest.
J. C. K. K. K.
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Inventor
Luther C. Crowell
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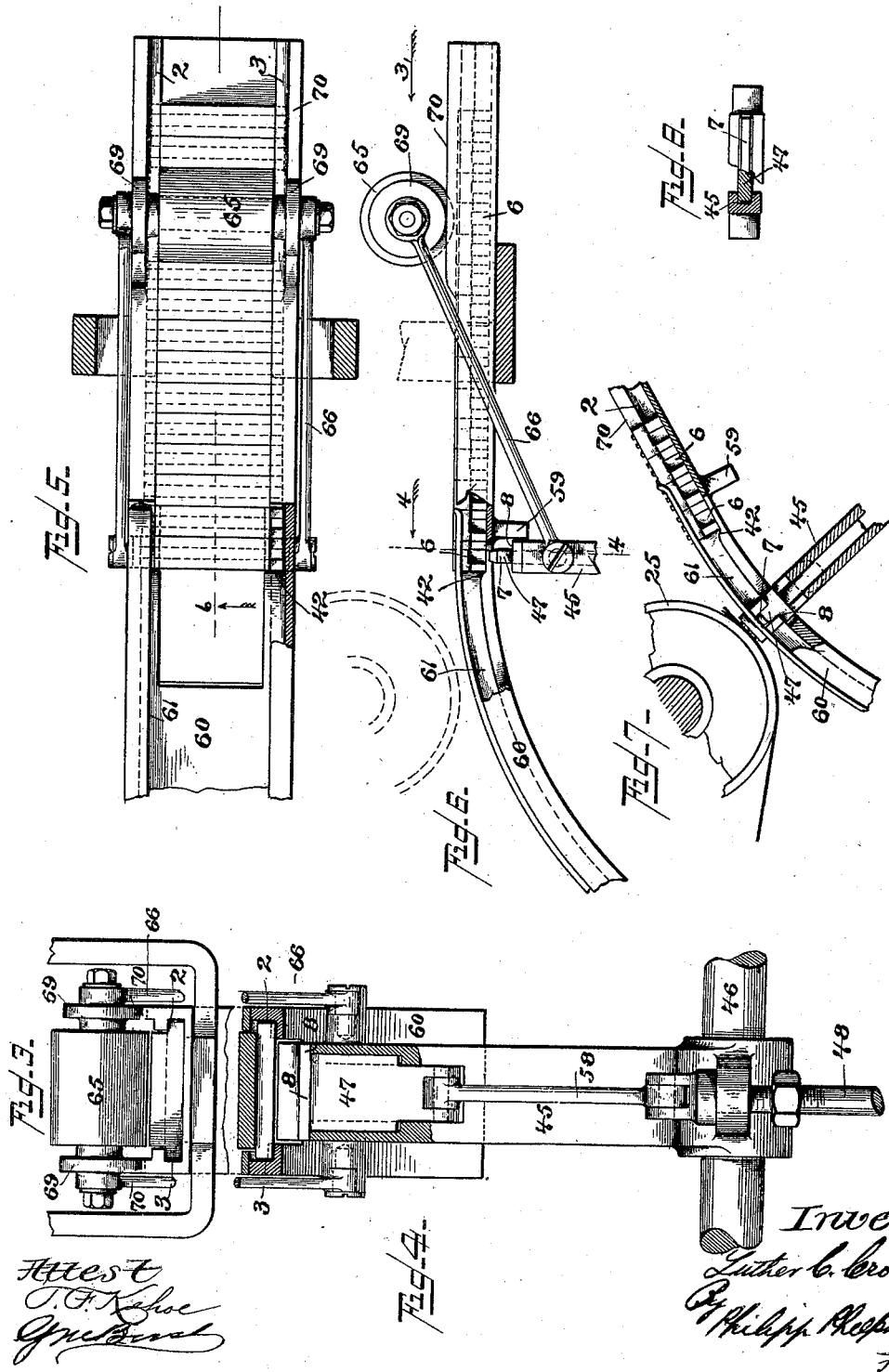
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3 Sheets—Sheet 3.



Attest
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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. 646,958, dated April 10, 1900.

Application filed December 31, 1897. Serial No. 665,161. (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.

10 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.

15 The invention relates more particularly to the address or other consecutive printing mechanism proper.

In a construction embodying the invention in the preferred form the printing-plates are advanced successively to carry their printing-surfaces into contact with the papers or other articles to be printed by means of a reciprocating carrier by which the printing-plates are successively advanced for printing, preferably sidewise, and then released, the carrier returning for the next plate. Some features of the invention, however, are not limited to the use of a reciprocating carrier, as will appear from the claims. The printing contact between the papers and the printing-plates preferably takes place while both are moving, the papers preferably turning about an impression-roll and the movement of the carrier being such as to advance the plates for printing at a speed corresponding to that of the papers as they are advanced about the impression-roll. The plates are preferably arranged side by side in the holder and advanced therefrom by the carrier in the direction of their movement in the holder, and the forward movement of the plates in the holder is preferably limited by means of a suitable stop when the plates have been advanced so as to bring the foremost plate into position to be engaged by the carrier, means being provided for releasing the foremost plate from this stop before it is advanced for printing, preferably by moving the plate transversely to the column of plates in the holder clear of the stop, the plate-engaging part of the carrier preferably being constructed to thus move the plate clear of the stop before advancing it for printing. I

preferably employ a pivoted carrier which advances the plates for printing as it moves about its pivotal point and which also preferably oscillates to form a reciprocating carrier. 55

For the purpose of inking the printing-faces of the plates before printing I preferably provide an inking-roll moving with the carrier and in contact with the printing-surfaces of the plates in the holder before they are advanced by the carrier for printing. 60

My improved consecutive-printing mechanism may be embodied in 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 will be advanced in proper time for causing successive plates to print on successive papers. Printing mechanism constructed in accordance with the invention is also especially well adapted to be combined with the folding delivery mechanism of a printing-press or with other delivery mechanism, so that the papers may be addressed as they are delivered. I have shown in the drawings a construction for so combining the address-printing mechanism with the folding delivery mechanism which I have claimed in a prior application Serial No. 660,353. 70 75 80

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. 85 90

In said drawings, Figure 1 is a view taken just inside the frame of a folding delivery mechanism embodying an address-printing mechanism constructed according to the present invention, only so much of the delivery mechanism being shown as is necessary for an understanding of the same. Fig. 2 is an end view looking in the direction of the arrow 2 in Fig. 1. Fig. 3 is a detail view looking in the direction of the arrow 3 in Fig. 1 and showing the rear end of the plate-holder and the inking-roller. Fig. 4 is a detail view 95 100

taken on line 4 of Fig. 6, showing the carrier and guideway through which the plates are advanced for printing. Fig. 5 is a plan view of the plate-holder and guideway. Fig. 6 is a side view of the same, partly in section, on the line 6 of Fig. 5. Fig. 7 is a detail view, partly in section, showing a printing-plate carried by the carrier in printing position. Fig. 8 is an end view, partly broken away, of the carrier.

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 10 for folding the papers from the cylinder F between fold-laying rolls 11 and 12. This folding apparatus is of a type well known and shown and described in the patent to S. D. Tucker, No. 171,196, dated December 14, 1875. As the papers are advanced from the fold-laying rolls 11 12 their course is determined by a pivoted switch 13, which when in the position indicated by dotted lines in Fig. 1 directs the papers between the arm 14 of the switch and guiding-tapes 15 to and between delivery-rolls 16 and 17, from which they are guided by a vertical conductor 18 to an S-fly X, by which they may be deposited on delivery-belts, as usual. The guiding-tapes 15 run from a roll 19, near the folding-roll 11, over the delivery-roll 16, thence beneath the delivery-roll 17, then around a tension-roll 20, and back to the roll 19. When, however, the switch is rocked to 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 16 17, as follows: Leaving the rolls 11 12, the papers are guided by the arm 21 of the switch and guiding-tapes 22 between rolls 23 and 25, then turned about the roll 25, which is the impression-roll, by the tapes 22, and advanced from the roll 25, between the tapes 22 and tapes 26 and beneath a guide 27, to the delivery-roll 16, and entered between the roll 16 and the tapes 15 to be delivered from the rolls 16 and 17 to the fly X, as before. The tapes 22 run from the roll 28 to the roll 23, then between the rolls 23 and 25 and around the roll 25, thence to and around the roll 16 and to a roll 29, and then up to and around a tension-roll 30 and back to the roll 28. The tapes 26 turn about the roll 25 inside the tapes 22 and also about a roll 31. 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 13, be directed to the address-printing mechanism, from which, in the machine shown, they are directed to the same final-delivery mechanism to which they may be guided directly from the folding apparatus. Such arrangement for combining an address-printing mechanism with a delivery mechanism is claimed in my said application, Serial No. 660,353.

The mechanism whereby the printing-plates are advanced in succession for printing con-

tact with the papers as the latter are advanced about the impression-roll 25 will now be described.

The printing-plates α are arranged side by side in a chute or holder 40, carried by a bracket 41, in which they are fed forward to bring the plates successively into position to be engaged by the carrier and advanced for printing, the holder being, preferably, inclined, as shown, so that the plates will be thus fed forward therein by gravity. The sides of the holder 40 are preferably formed with guiding-shoulders 2 and 3, by which the plates are prevented from becoming displaced as they are advanced to be taken by the carrier, and the printing-plates are preferably of the form shown, having their base portions extended at the ends, so as to enter beneath the shoulders 2 3. The forward movement of the plates in the holder is limited by means of stops 42, with which the foremost or end plate comes in contact when the plates are advanced, so as to bring the foremost plate into position to be engaged by the carrier.

The carrier 45 is carried by a rock-shaft 46 and is provided with a plunger 47 for engaging the printing-plates, which plunger is mounted to move radially of the shaft 46 and so as to project a greater or less distance. The shaft 46 is rocked for causing the carrier to oscillate by means of a pitman 48, engaging a rock-arm 49 on the shaft and having its other end forked to extend over and be guided by a cam-shaft 50 and having a cam-roll which runs in a cam-groove 51 in a cam-disk 52. The shaft 46 also carries an arm 53, against which bears a spring 54, coiled about and guided by a rod pivoted to the arm 53 and having its other end guided by a collar 55 on the frame, the position of the arm 53 circumferentially of the shaft 46 being such that the pressure of the spring 54 will tend to hold the carrier at rest when it is at either extremity of its movement. When the carrier is in the position shown in Fig. 1, therefore, the pressure of the spring 54 on the arm 53 tends to hold it in this position.

The pitman 48 passes freely through an opening in the arm 49 and has on either side of said arm a collar 56 and 57, respectively adapted to bear on the arm, said collars being separated a distance greater than the thickness of the arm, so as to allow of lost motion in the connection between the pitman and the arm, and the collar 57 being, preferably, adjustable to adjust the amount of such lost motion and the movement of the plunger 47. Pivotaly connected to the end of the pitman is a connecting-rod 58, the other end of which is pivoted to the plunger 47, as shown in Figs. 1 and 4. When the pitman 48 commences to move outward from the position shown in Fig. 1, therefore, there will be no movement of the carrier until the collar 57 has moved into contact with the arm 49; but the movement of the pitman before the collar 57 engages the arm 49 will cause the plunger 47

to be projected from the end of the carrier for engaging the end printing-plate in the plate-holder, as hereinafter described. Then by the further movement of the pitman after the collar 57 has come into contact with the arm 49 the carrier will be swung about the shaft 46 to carry the printing-plate past the impression-roll 25 for contact with a paper being advanced about the impression-roll. As the pitman 48 reaches the end of its outward movement the pressure of the spring 54 on the arm 53, which has been moved so as to carry the center of its pivotal connection with the spring-rod to the opposite side of a line extending between the center of the shaft 46 and the collar 55 from that shown in Fig. 1, will cause the movement of the carrier to continue, and during this continued movement of the carrier the arm 49 will move on the pitman between the collars 56 and 57, so as to cause the plunger 47 to be retracted to release the plate from which the impression has just been taken. Then by the inward movement of the pitman the carrier will be caused to make its return oscillation by engagement of the collar 56 with the arm 49, and the carrier will be thus returned to the position shown in Fig. 1, further movement of the carrier under the action of the spring 53 being then prevented by a stop 59 and the plunger 47 thus held in its retracted position, as shown in said figure.

A guideway 60, formed by side guides 61, is preferably provided for guiding the plates as they are advanced by the carrier for printing, this guideway being curved in an arc about the center of the shaft 46, so as to extend concentrically with the direction of movement of the end of the carrier.

The printing-plates preferably have their bases formed with a recess 6 to receive the correspondingly-shaped end 7 of the plunger 47 as it is projected for engaging the plate. The plunger 47 is also preferably provided with a shoulder 8 for engaging the bases of the printing-plates, so as to provide a steadier support for the plate during printing.

The parts being in the position shown in Fig. 1, with the end printing-plate in the holder resting against the stops 42, as the plunger 47 moves outward preparatory to the oscillating movement of the carrier the end 7 of the plunger will enter the recess 6 in the end printing-plate, and as the shoulder 8 comes in contact with the base of the printing-plate the printing-plate will be raised from the position shown in Figs. 1 and 4, so as to clear the stops 42 as it is advanced for printing by the oscillation of the carrier. After printing, as the carrier reaches the end of its forward movement, the plunger 47 being again retracted, as before explained, and its end 7 being withdrawn from the recess 6 of the printing-plate, the plate will be released and allowed to fall through the guideway 60 to a suitable receiver. (Not shown.) After the end plate has been thus advanced from

the holder the remaining plates in the holder are advanced to bring the next plate into position to be engaged by the carrier after its return to the position shown in Fig. 1 and before its next forward movement.

For inking the plates before printing I preferably provide an ink-roller 65, arranged to run in contact with the printing-surfaces of the plates as they lie in the holder and having its shaft connected by arms 66 with the carrier, so that by the oscillating movements of the carrier the inking-roll will be caused to travel forward and backward over the faces of the printing-plates in the holder. The inking-roll preferably receives ink from a fountain 67 through a fountain-roll 68, positioned, preferably, so as to be engaged by the inking-roll 65 when the carrier is at the end of its return movement, as shown in Figs. 1 and 6.

The inking-roll is preferably provided with running wheels or disks 69, which run on tracks 70, formed to raise the inking-roll out of contact with the plates during a part of its movement, including that part in which it is in contact with the fountain-roll.

In order to provide for a change in the interval between successive printing movements of the carrier, the cam-disk 52 is preferably adjustable longitudinally on its shaft 50, and the cam-groove 51 is formed so that with the disk in different positions it will cause the carrier to make its printing movements at different intervals. As shown, when the cam-disk is adjusted longitudinally of its shaft to the position shown the carrier will be caused to make one complete oscillation for each revolution of the cam-disk, the cam-roll on the pitman 48 running in the part *a* of the cam groove during half a revolution of the cam-disk to move the carrier forward for printing and back again and the cam-roll during the next half-revolution of the cam-disk following a concentric face *b*, against which it is held by the spring 54, the cam-disk being cut away to a depth less than the depth of the cam-groove to form this concentric face. When, however, the cam-disk is moved so as to cause the cam-roll to extend into the cam-groove to a greater depth than the cam-disk is cut away to form the face *b*, the roll will run through the part *c* of the cam-groove instead of following the concentric face *b*, so that the carrier after making one complete oscillation while the roll runs through the part *a* of the cam-groove, as before, will then make another complete oscillation while the roll runs through the part *c*, thus making two complete oscillations for each revolution of the cam-disk and advancing the printing-plates at the same speed for printing as when making only one reciprocation for each revolution of the cam-disk. By thus providing for changing the interval between successive printing movements of the carrier the address-printing mechanism is capacitated to address successive papers fed thereto at correspondingly-differing intervals. Thus in the machine

shown the folding-cylinder F may be constructed to fold at each revolution either one or two papers, as desired, between the folding rolls 11 12, constructions accomplishing this result being well known in the art, and then the address-printing mechanism may be made to operate correspondingly by merely adjusting the cam-disk 52, the cam-disk being positioned as shown, when the folding-cylinder delivers one paper to the rolls 11 12 at each revolution and being moved to cause the carrier to operate twice for each revolution of the cam-disk when the folding-cylinder delivers two papers to the rolls 11 12 at each revolution.

The various moving parts of the machine are driven from a gear on the folding-cylinder F through an intermediate 75. The cam-shaft 50 carries a gear 76 and is driven by a gear 77, meshing with the intermediate 75, to make one revolution to each revolution of the folding-cylinder. The shaft of the gear 77 also carries a smaller gear 78, from which the fly X is driven through a gear 79 on its shaft to make one revolution to two revolutions of the folding-cylinder. The delivery-rolls 16 and 17 carry intermeshing gears 80 and are driven from a gear 81 on the fly-shaft which meshes with a gear 82 on the shaft of the roll 17. The rolls 23 and 25 carry intermeshing gears 82 and 83 and are driven from the gear 81 through intermediates 84 and 85, the gear 85 running freely on the shaft of the gears 77 and 78 and meshing with the gear 83.

It will be understood that I am not to be limited to the exact construction shown for the purpose of illustrating the invention and to which the foregoing description has been mainly confined, but that the invention includes various changes and modifications therein within the claims.

The term "paper" is used in the claims to include all articles for printing on which the invention may be found applicable.

By the term "sidewise" as applied herein to the movement of the printing-plates is meant that the plates are moved in the plane of the printing-surface of the plates and transversely to the line or lines of characters forming the printing-surface.

What I claim is—

1. The combination with a printing-plate holder, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations from the holder in the direction of the movement of the plates in the holder and into printing position, substantially as described.

2. The combination with a printing-plate holder, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations from the holder for printing, and means for advancing papers in contact with the printing-plates as the plates are advanced by the carrier, substantially as described.

3. The combination with a printing-plate holder, of a reciprocating carrier for carrying

successive printing-plates at successive reciprocations from the holder in the direction of the movement of the plates in the holder and into printing position, and a guideway through which the plates are advanced by the carrier, substantially as described.

4. The combination with a printing-plate holder, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations sidewise from the holder and into printing position, substantially as described.

5. The combination with a printing-plate holder in which the printing-plates are advanced to bring the plates successively into position to be taken by the carrier, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations from the holder and into printing position in the direction of the movement of the plates in the holder, substantially as described.

6. The combination with a holder for holding printing-plates arranged side by side, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations from the holder sidewise and into printing position, substantially as described.

7. The combination of a reciprocating carrier for carrying successive printing-plates at successive reciprocations sidewise into printing position, and means for bringing papers into contact with the successive printing-plates, substantially as described.

8. The combination with paper-feeding mechanism, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations in the direction of the movement of the papers and into contact with successive papers as the papers are advanced by the paper-feeding mechanism, substantially as described.

9. The combination with paper-feeding mechanism including an impression-roll about which the papers are turned, of a reciprocating carrier for carrying successive printing-plates at successive reciprocations into contact with successive papers as the papers are advanced about the impression-roll, substantially as described.

10. The combination of a printing-plate holder, a stop for limiting the movement of the printing-plates in the holder, and a carrier for advancing the end printing-plate from the holder for printing in the direction of the movement of the plates in the holder, said carrier having means for moving said end printing-plate clear of the stop before advancing it for printing, substantially as described.

11. The combination of a printing-plate holder, a stop for limiting the movement of the printing-plates in the holder, and a reciprocating carrier for advancing the end printing-plate from the holder for printing in the direction of the movement of the plates in the holder, said carrier having means for moving said end printing-plate clear of the stop before advancing it for printing, substantially as described.

12. The combination of a reciprocating carrier for carrying successive printing-plates into printing position at successive reciprocations, and means for moving the plate-engaging part of the carrier transversely to the direction in which the plate is being moved by the carrier for releasing the plate after printing, substantially as described.

13. The combination of a reciprocating carrier for carrying successive printing-plates into printing position at successive reciprocations, means for moving the plate-engaging part of the carrier transversely to the direction in which the plate is being moved by the carrier for releasing the plate after printing, and means for holding the plate against movement with the plate-engaging part of the carrier as the latter moves to release the plate, substantially as described.

14. The combination of a reciprocating carrier for carrying successive printing-plates into printing position at successive reciprocations, means for moving the plate-engaging part of the carrier for releasing the plate after printing, and means for holding the plate against movement with the plate-engaging part of the carrier as the latter moves to release the plate, substantially as described.

15. The combination of a carrier for carrying successive printing-plates into printing position, and means for moving the plate-engaging part of the carrier transversely to the direction in which the plate is being moved by the carrier for releasing the plate after printing, substantially as described.

16. The combination of a carrier for carrying successive printing-plates into printing position, means for moving the plate-engaging part of the carrier for releasing the plate after printing, and means for holding the plate against movement with the plate-engaging part of the carrier as the latter moves to release the plate, substantially as described.

17. The combination of a carrier for carrying printing-plates successively into printing position having a movable plate-engaging part, and means for moving said plate-engaging part transversely to the direction in which the plate is moved by the carrier for engaging a plate when the carrier is in engaging position and for releasing the plate after printing, substantially as described.

18. The combination of a printing-plate holder, a carrier for carrying the printing-plates successively from the holder and into printing position having a movable plate-engaging part, and means for moving said plate-engaging part transversely to the direction in which the plate is moved by the carrier for engaging the end plate in the holder when the carrier is in engaging position, substantially as described.

19. The combination of a printing-plate holder, a carrier for advancing the printing-plates successively from the holder for printing having a movable plate-engaging part

formed to enter an opening in the base of the printing-plates, and means for moving said plate-engaging part to cause it to enter the opening in the end plate in the holder when the carrier is in engaging position, substantially as described.

20. The combination with paper-feeding mechanism, of a pivoted carrier, means for oscillating the carrier to advance successive printing-plates at successive oscillations in the direction of movement of the papers into contact with successive papers, substantially as described.

21. The combination with paper-feeding mechanism, of a pivoted carrier, means for oscillating the carrier to advance successive printing-plates at successive oscillations in the directions of the movement of the papers and into contact with the successive papers as the papers are advanced by the paper-feeding mechanism, substantially as described.

22. The combination of a printing-plate holder, a pivoted carrier, and means for oscillating the carrier to carry successive plates at successive oscillations from the holder and into printing position, substantially as described.

23. The combination of a printing-plate holder, an impression-roll, a pivoted carrier, and means for oscillating the carrier to carry successive printing-plates at successive oscillations from the holder and past the impression-roll for coating therewith, substantially as described.

24. The combination of a holder for holding printing-plates side by side, a pivoted carrier, and means for oscillating the carrier to carry successive printing-plates at successive oscillations from the holder and into printing position sidewise, substantially as described.

25. The combination of a pivoted carrier having a radially-movable plate-engaging member, means for oscillating the carrier to carry successive printing-plates into printing position at successive oscillations, and means for moving said plate-engaging member for releasing the plates after printing, substantially as described.

26. The combination of a printing-plate holder, a pivoted carrier having a radially-movable plate-engaging member, means for projecting said plate-engaging member for engaging the end printing-plate in the holder when the carrier is in engaging position, and means for oscillating the carrier to carry the printing-plate from the holder and into printing position, substantially as described.

27. The combination of a printing-plate holder, a pivoted carrier having a radially-movable plate-engaging member, means for oscillating the carrier to carry the end printing-plate from the holder and into printing position, and means for moving said plate-engaging member for releasing the plate after printing, substantially as described.

28. The combination of a printing-plate holder, and a pivoted carrier for advancing the printing-plates successively from the holder for printing in the direction of the movement of the plates in the holder and having a radially-movable plate-engaging member, substantially as described.

29. The combination with a printing-plate holder, of a reciprocating carrier for advancing the printing-plates successively from the holder for printing, and an inking-roller moving with the carrier and in contact with the printing-surface of the plates in the holder, substantially as described.

30. The combination with a printing-plate holder, of a reciprocating carrier for advancing the printing-plates successively from the holder for printing, an inking-roller moving with the carrier and in contact with the printing-surfaces of the plates in the holder, means for supplying ink to the inking-roller, and means for moving said roller away from the printing-plates during part of its movement with the carrier, substantially as described.

31. The combination of the printing-plate holder 40, means for advancing the printing-plates successively from the holder for printing, an inking-roller 65, means for reciprocating the inking-roller 65 longitudinally of the holder, running wheels 69 carried by the inking-roller 65, and tracks 70 engaging the running wheels 69 to move the inking-roller out of contact with the printing-plates during part of its movement, substantially as described.

32. The combination of the printing-plate holder 40, inking-roller 65, ink-supply roll 68, means for reciprocating the roller 65 longitudinally of the holder, and means for moving the inking-roller 65 out of contact with the printing-plates as it moves in contact with the ink-supply roll 68, substantially as described.

33. The combination of a carrier having a movable plate-engaging member, an actuating member for the carrier, connections between the actuating member and the carrier providing for lost motion, and connections between the actuating member and the plate-engaging member of the carrier for moving the plate-engaging member during the taking up of the lost motion between the actuating member and the carrier, substantially as described.

34. The combination of the pivoted carrier 45 having a radially-movable plate-engaging member, an actuating member for oscillating the carrier, connections between the actuating member and the carrier providing for lost motion, connections between the actuating member and the plate-engaging member of the carrier for moving the plate-engaging member during the taking up of the lost motion between the actuating member and the carrier, and a spring 54 tending to move the carrier in one direction and then

in the other as it oscillates, substantially as described.

35. The combination of the pivoted carrier 45 having a radially-movable plate-engaging member, rock-arm 49, an actuating member, connections between the actuating member and the rock-arm providing for lost motion, and a link 57 connecting the actuating member with the plate-engaging member of the carrier, substantially as described.

36. The combination of the pivoted carrier 45 having a radially-movable plate-engaging member, an actuating member for oscillating the carrier, connections between the actuating member and the carrier providing for lost motion, a link 57 connecting the actuating member with said plate-engaging member of the carrier, and means for holding the carrier in receiving position under yielding tension, substantially as described.

37. The combination of the pivoted carrier 45 having a radially-movable plate-engaging member, a rock-arm 49, an actuating member, connections between the actuating member and the rock-arm providing for lost motion, a link 57 connecting the actuating member with the movable member of the carrier, arm 53, and spring 54 bearing on said arm, substantially as described.

38. The combination of the pivoted carrier 45 having a plate-engaging plunger 47, means for oscillating the carrier, and means for projecting the plunger 47 before the carrier begins its forward movement, substantially as described.

39. The combination of the printing-plate holder 40, impression-roll 25, and pivoted carrier 45 for carrying the printing-plates successively from the holder in the direction of the movement of the plates in the holder and past the impression-roll for coacting therewith, substantially as described.

40. The combination of paper-feeding devices for advancing papers successively for printing, means for advancing printing-plates successively to engage the papers as they are advanced by said feeding devices, and means for varying the interval between the operations of the plate-advancing means, substantially as described.

41. The combination of paper-feeding devices for advancing papers successively for printing, a printing-plate holder, a reciprocating carrier for advancing the printing-plates successively to engage the papers as they are advanced by said feeding devices, and means for varying the interval between successive reciprocations of the carrier, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

A. L. KENT,
T. F. KEHOE.