(No Model.) 3 Sheets—Sheet 1.

A. O. NASH.

CYLINDER PRINTING MACHINE.

No. 387,249. Patented Aug. 7, 1888.

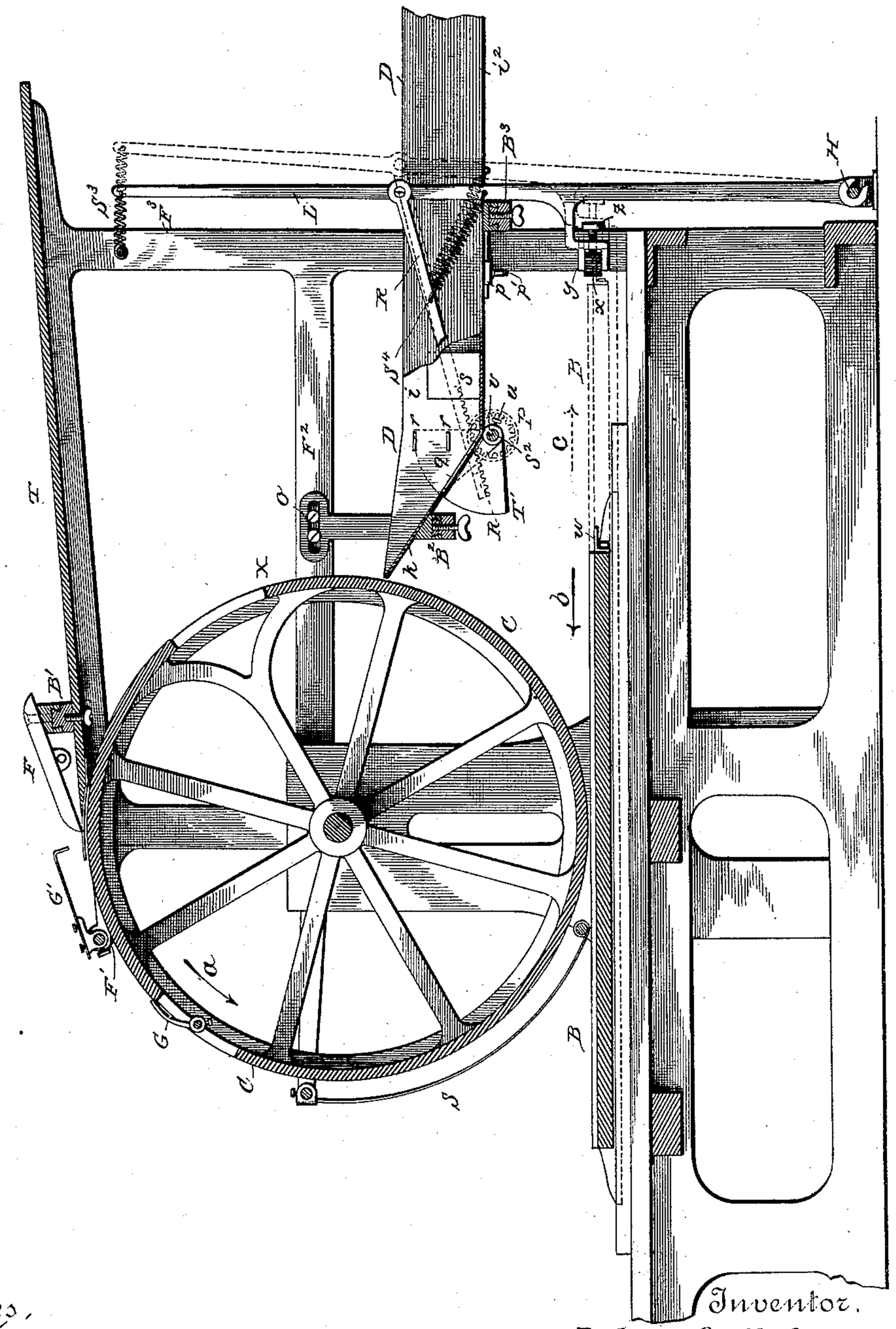

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

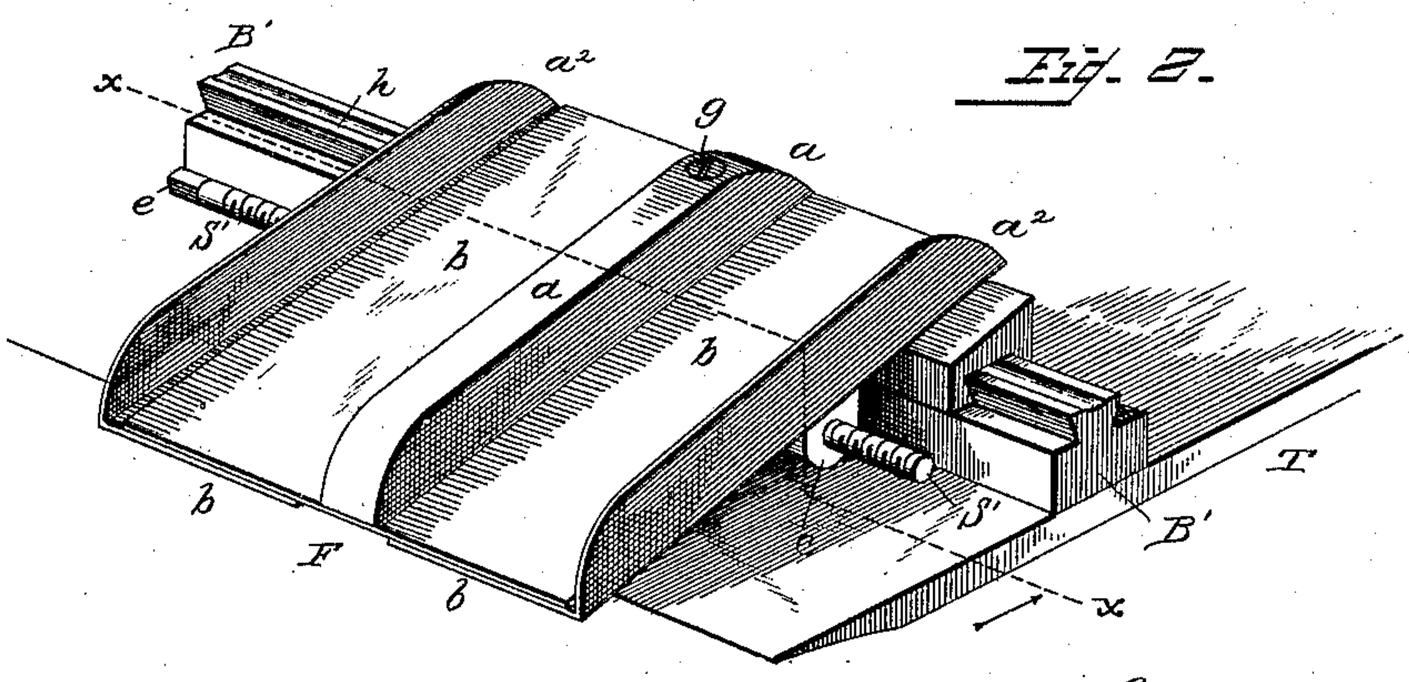


Fig. 3.

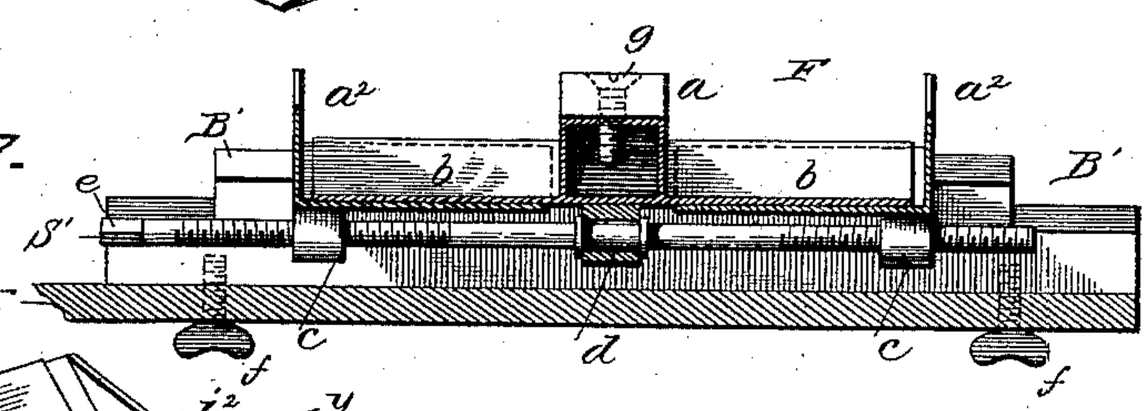


Fig. 4.

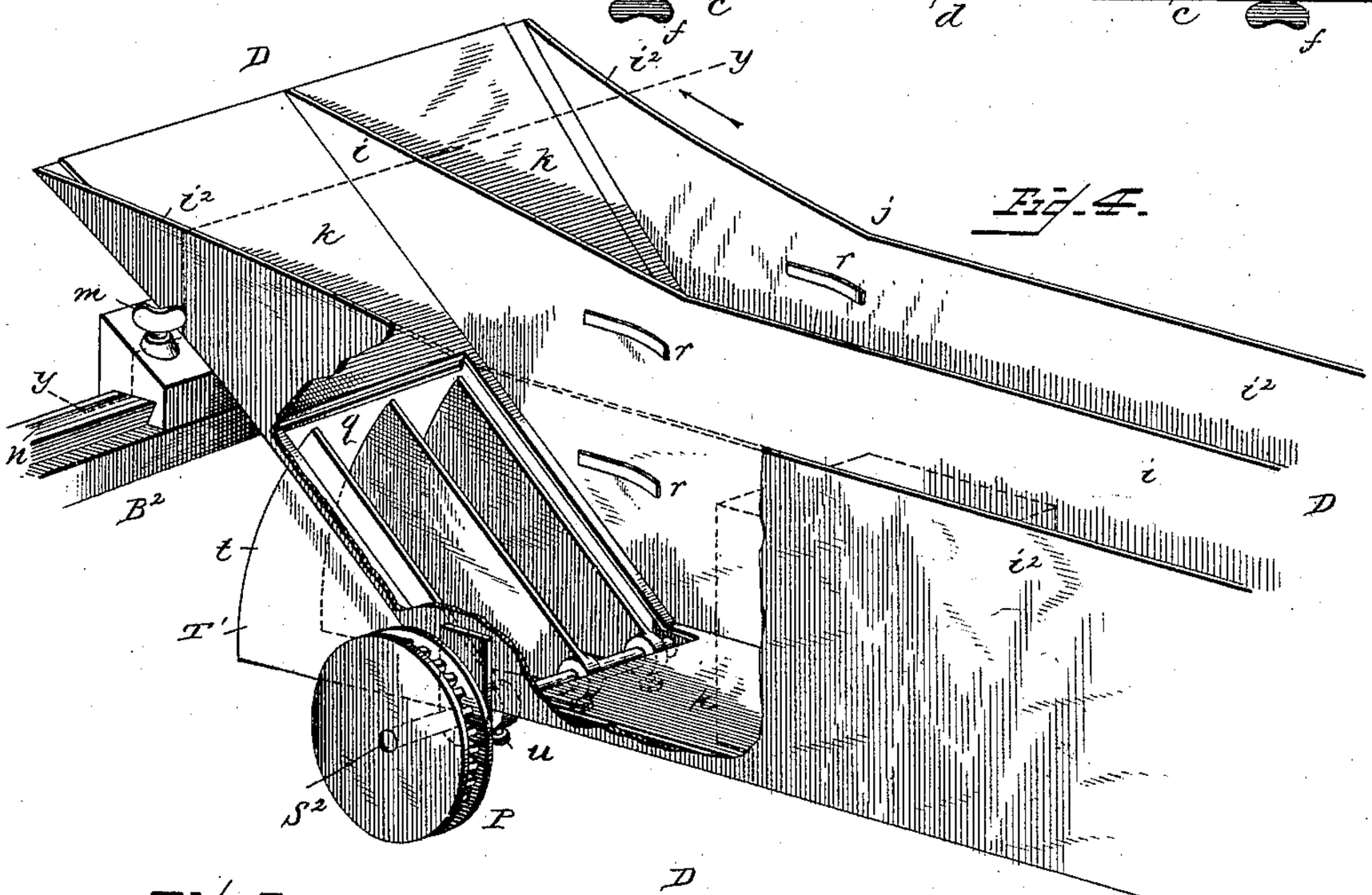
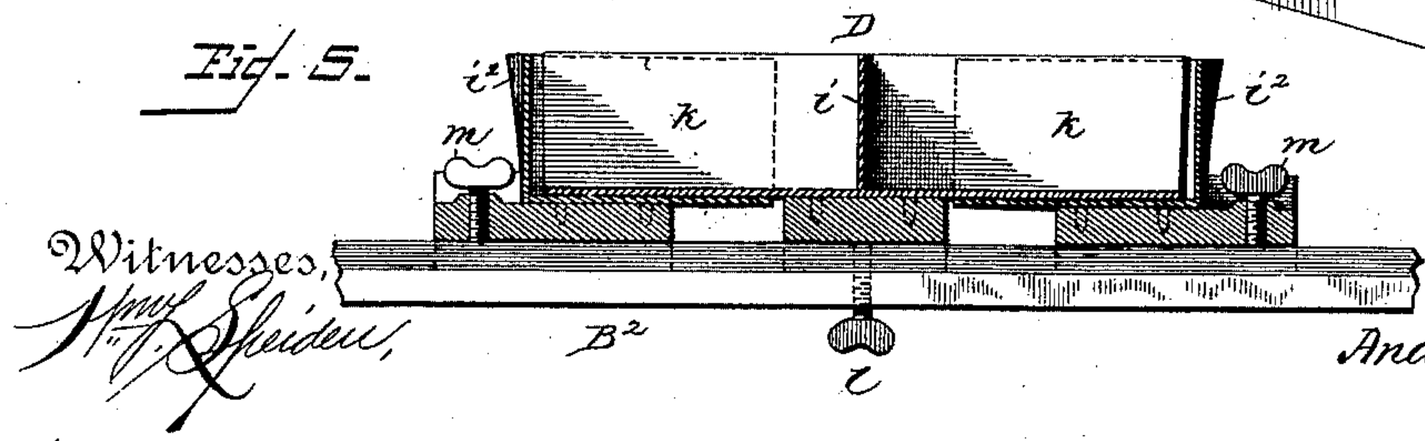


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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CYLINDER PRINTING MACHINE.

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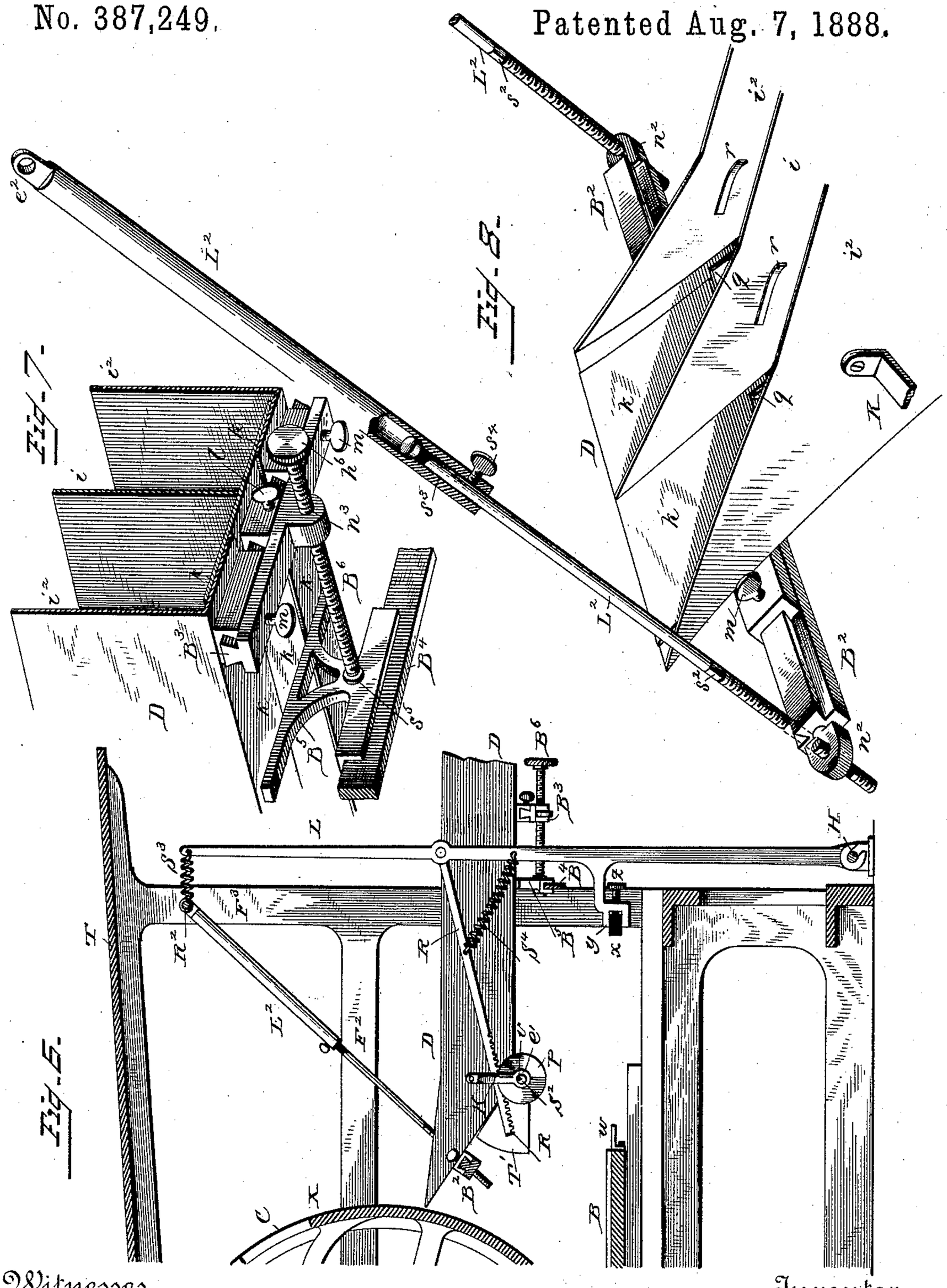

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

ANDREW O. NASH, OF NEWARK, NEW JERSEY.

CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,249, dated August 7, 1888.

Application filed July 19, 1887. Serial No. 244,713. (No model.)

To all whom it may concern:

Be it known that I, ANDREW O. NASH, a citizen of the United States, and a resident of Newark, in the State of New Jersey, have invented a new and useful Improvement in Cylinder Printing-Machines, of which the following is a specification.

This invention relates to means for adapting "cylinder" machines to print envelopes, cards, labels, and the like.

The objects of the invention are to enable each operator to feed the machine with both hands simultaneously, so as to introduce the envelopes, cards, or sheets of paper two at a time, and at the same time to insure neatly-registered work, and to so deliver the same as to facilitate taking the printed work from the machine. With two operators one machine will thus print four envelopes, cards, or sheets at each operation and deliver one hundred or more per minute.

The invention consists in certain novel combinations of parts, and in special devices for forming the same by attachments to an ordinary cylinder printing-machine, as hereinafter set forth and claimed.

For clearness the following description will be confined to an ordinary machine provided with attachments, as aforesaid, and the work will be mentioned as "envelopes."

Three sheets of drawings accompany this specification as part thereof.

Figure 1 of the drawings represents a vertical longitudinal section of an ordinary cylinder printing-machine provided with my attachments. Fig. 2 represents a perspective view of a portion of the feed-table, showing the attachments thereto. Fig. 3 represents a vertical section on the line *x x*, Fig. 2. Fig. 4 represents a perspective view of the delivery-trough with a portion of the near side broken away to expose parts behind. Fig. 5 represents a vertical section on the line *y y*, Fig. 4. Fig. 6 represents the rear portion of the machine represented by Fig. 1, with certain preferred substitutes in place of some of the devices; and Figs. 7 and 8 are perspective views showing the respective delivery-trough bolsters and their appurtenances, as represented in Fig. 6.

Like letters of reference indicate corresponding parts in the several figures.

T represents the feed-table, C the cylinder, and B the bed, of the machine proper. F' F² F³ represent fixed portions of its frame; G, Fig. 1, one of the grippers carried by the cylinder; G', the ordinary front gage, and S a shield employed on some machines. The ordinary delivery apparatus is detached.

The remainder of the ordinary parts of the machine are omitted in the drawings to avoid obscuring the attachments, which will now be described.

Upon the feed-table T, I mount a double feed-guide, F. (Shown in detail in Figs. 2 and 3.) The guide proper consists of a wide middle gage, *a*, and two side gages, a^2, parallel with each other and with the line of feed, each side having a wide flange and the middle gage a pair of such flanges, which together form in each half of the guide a bottom, *b*, which is adjustable in width. For adjusting the guide to fit envelopes of a given size a right-and-left screw, S', is combined therewith, its nuts *c* being attached to said side gages, a^2, underneath the guide, and its swivel-bearing *d* to said middle gage, *a*, between a pair of flanges on the screw at mid-length. A square, *e*, at one end of the screw provides for turning it by means of a key. Both side gages are thus simultaneously and equally adjusted toward or away from the middle gage with the requisite nicety.

For giving the feed-guide F an inclination greater than that of the table, so that the envelopes shall slide freely therefrom, a bolster, B', is interposed between its rear end and the table T; and to provide for bodily adjusting the guide laterally said bolster is arranged transversely with reference to the guide, and is made in two parts dovetailed together, so that the upper part slides longitudinally of the lower, as clearly shown in Fig. 2. The lower part is affixed to the table by a pair of thumb-screws, *f*, inserted from beneath the table.

The guide F is attached to the upper part of the bolster B' by a screw, *g*, for example, passing downward through the middle gage, *a*, into and through said upper part of the bolster, so that its lower end acts on the lower part to lock the guide in its different positions. A groove, *h*, in the top of said lower part receives the end of the screw *g*, so as to keep it from roughening the frictional sur-

faces of the dovetail. The head of the screw *g* should be sunk to or below the surface of the gage *a*, and the ends of the gages should be rounded, as represented, so that there shall be no cutting-edges for the hands to come in contact with in their rapid movements.

To receive the printed envelopes as they are released in successive pairs by the grippers G at X, Fig. 1, I substitute for the ordinary delivery apparatus a double delivery-trough, D, (shown in detail by Figs. 4, 5, 7, and 8,) and accessories thereof shown in these figures and in Figs. 1 and 6. The trough proper has a thin central partition, *i*, which in working position is in line with the center line of said middle gage, *a*, of the feed-guide F, and sides i^2, which flare somewhat beyond said side gages, a^2, at the receiving end of the trough, so that the envelopes shall be sure to drop between them. The greater width of said middle gage as compared with said partition causes the envelopes to drop clear of the latter. Beyond a point indicated at *j* in Fig. 4 the sides i^2 are parallel with the partition *i*. The bottoms *k* of the respective compartments of the trough, like those of said feed-guide, are formed by overlapping wide flanges integral with said partitions and sides, so as to be adjustable in width, as clearly shown in Figs. 5 and 7.

For adjusting the delivery-trough and supporting it in effective position, a pair of divided bolsters, B^2 B^3, are attached to the frame of the machine. As regards the adjustment of the trough as to width and lateral position, these bolsters are all substantially of the construction represented at B^2 in Figs. 4 and 5. (See, also, Figs. 7 and 8.) They are divided horizontally, like said bolster B', with a longitudinal dovetail uniting their parts. The upper part of each of these bolsters B^2 B^3 is further subdivided, a section being attached to each part of the trough, as shown in Figs. 5 and 7, and the respective parts are independently clamped in position upon the lower part of the bolster by thumb-screws *l* *m*, inserted in convenient positions. Grooves *n*, Fig. 4, may receive the ends of the screws, as in said bolster B'. Said bolsters B^2 B^3 in the arrangement represented by Figs. 1, 4, and 5, Sheets 1 and 2 of the drawings, are attached, respectively, to fixed parts F^2 F^3 of the frame of the machine, within the same and at its back, as shown in Fig. 1. The receiving end of the trough should be close to the cylinder C, as here represented—that is to say, within about one-quarter of an inch from the periphery of the make-ready. Slots *o* and ordinary tongue-and-keeper connections, *p*, Fig. 1, provide in this arrangement for adjusting the trough toward and away from the cylinder. Said slots *o* are formed in the upturned ends of said bolster B^2 and serve to receive the bolts which attach this bolster to the frame of the machine. The respective parts of said connections *p* are attached to the upper sections of said bolster B^3 and to the bottoms of the trough D, respectively, one set to each section, and each keeper is provided with a set-screw, *p'*.

Preferred devices for adjusting the delivery-trough D toward and away from the cylinder C more readily and with greater nicety constitute the principal modifications illustrated by Figs. 6 to 8, inclusive, Sheet 3.

To coact with and supplement the rear bolster, B^3, Figs. 6 and 7, a horizontal bar, B^4, is attached to the back of the frame of the machine. A saddle, B^5, is fitted to said bar, and an adjusting-screw, B^6, connects the saddle and bolster, which are provided, respectively, with a swivel-connection, s^5, and a screw-nut, n^3, to coact therewith. A suitable hand-wheel or head, h^6, provides for readily turning the screw. The respective upper parts of the bolster are attached directly to the corresponding trough parts, as aforesaid, while the trough is free to slide on said saddle B^5, and is so moved back and forth by turning said screw B^6.

To permit the inner bolster, B^2, Figs. 6 and 8, to move with the trough D when it is so adjusted longitudinally, and to provide by the same means for adjusting the receiving end of the trough vertically to a sufficient extent to keep it correct as to height and angle, said bolster B^2 is supported by a pair of link-rods, L^2, from a horizontal rod or round bar, R^2, at the back and near the top of the frame of the machine, and the lower ends of said link-rods are swiveled, screw-threaded, and provided with wrench-squares s^2, as shown in Fig. 8, to coact with screw-nuts n^2, which are swiveled to the respective ends of the lower part of said bolster B^2. Said link-rods are also connected with said rod R^2 by eyes e^2, Fig. 8, so as to turn freely thereon. The lower ends of said link-rods L^2 turn in their swivels s^3, Fig. 8, when the wrench is applied to said squares s^2 to adjust the receiving end of the trough vertically, as aforesaid, and the link-rods turn on said rod R^2 and the nuts n^2 turn or swivel when the relative angles of the trough and link-rods are changed by so adjusting the trough or otherwise.

To provide for readily supporting the delivery-trough D out of the way in converting the machine for wide work, or when the trough is not required, the upper sections of said link-rods L^2 are made hollow above said swivel s^3 and of sufficient length and diameter to permit the link-rods to "telescope," and are provided with set-screws s^4, Fig. 8, or equivalent devices, by which to fasten the link-rods in compacted shape when the trough is lifted out of the way, so as to retain or aid in retaining the latter in its elevated position.

For arranging the printed envelopes on edge within the delivery-trough, its bottom *k*, at its receiving end, is inclined at an angle of about thirty degrees, as indicated in Figs. 1, 4, 6, and 8. Openings *q* (best seen in Fig. 4) are formed in the respective compartments at this end, and oscillating turners T', pivoted at the angle of the bottom *k*, work through said openings to turn the successive

pairs of envelopes on edge. Detents *r*, attached to the partition *i*, and sides i^2 at said point *j*, Fig. 4, prevent the return of the envelopes with the turners, and with the aid of an opposing sliding support, as *s*, Fig. 1, within each compartment, the envelopes are thus kept in compact ranks ready to be transferred directly to boxes or bundles.

To keep the envelopes from getting beneath the turners T′, should a pair drop before the return of the latter, the turners are made with segmental outer ends, *t*, which, when the turners are up, as shown in dotted lines in Fig. 1, form temporary envelope-supports within the trough. To provide for lifting each envelope from at or near each edge as well as at an intermediate point or points, it is necessary to make the turners T′ adjustable with reference to the width of the respective compartments. Each compartment is consequently provided with three (or, it may be, two or more than three) turners having hubs fitted to a horizontal shaft, S^2, common to all, upon which they are independently adjustable by means of set-screws *u*. To insure their alignment and their simultaneous actuation, the turners are further connected with said shaft by a spline, *v*, Figs. 1 and 6. For actuating said turners, said shaft S^2 is provided with a flanged pinion, P, which is engaged by a rack, R, Figs. 1 and 6, which is coupled to an upright lever, L, at the back of the machine. Said lever is pivoted at its lower end on a hinge-rod, H, attached to the floor. At its upper end it is connected to the frame of the machine by a retracting-spring, S^3, which tends to keep the turners T′ in their lowered position. (Represented by full lines in Fig. 1.) A second spring, S^4, is stretched between the lever L and rack R, so as to keep said rack in mesh with the pinion P between the flanges of the latter, and a keeper, K, Figs. 6 and 8, may preferably be attached to the adjacent side of the trough D, and connected by an eye, *e′*, with the shaft S^2, the latter being made to protrude sufficiently, so that said pinion P may also be attached by said spline *v*, and to preclude the escape of the rack from between the pinion's flanges. For automatically working said lever L to lift the turners T′ at the proper moments, the rear end of the bed B is provided with a tappet, *w*, Fig. 1, and said lever L is provided with an elastic cushion, *x*, as a block of rubber, in line with the tappet *w*, which cushion is held within a socket, *y*, carried by the lever, and is projected more or or less by a screw, *z*. The effective movement of the lever (illustrated by dotted lines in Fig. 1) is varied by this adjustment, so that the motion transmitted therefrom through the rack R, pinion P, and shaft S^2 shall swing the turners T′ to the proper extent to leave the edges of the envelopes behind the detents *r* without increasing the motion of the turners to an unnecessary extent. The return movement of the lever is limited by a suitable stop—the bolster B^3, for example—so that the turners are supported with their upper edges at or immediately below the inclined bottoms of the receiving end of the trough, as indicated in full lines in Fig. 1, so as to support the next envelopes and to turn them without loss of time.

The operation as a whole is as follows: The form being in place on the bed B, the cylinder C made ready and revolving, as represented by the arrow *a* in Fig. 1, and the attachments adjusted as described, each operator takes the blank envelopes from the table T, two at a time, and places them in the respective compartments of his feed-guide F with their lower edges against the front gage, G′. Here they are simultaneously caught by the grippers G and carried into printing contact with the form and away therefrom to the point X, Fig. 1, where they are dropped, as aforesaid, upon the inclined bottoms of the receiving end of the delivery-trough D, whence they slide upon the turners T′. At the end of the next succeeding printing operation the effective motion of the lever L, derived from the bed B, as aforesaid, turns said envelopes on edge behind the detents *r* and against the sliding support *s*. Immediately thereafter another release of envelopes by the grippers G takes place; but before these can reach the turners T′ the latter, at ordinary working speed, have been returned to their lowered position by the return of the bed B and the instantaneous action of the retracting-spring S^3, through the lever L, rack R, pinion P, and shaft S^2. The envelopes last dropped are turned on edge at the end of the next printing operation, and thus the process goes on.

The bed B is shown in full lines in Fig. 1 as if moving outward, as indicated by the arrow *b*, preparatory to a succeeding effective movement in the reverse direction. (Indicated by the arrow *c*.) It is shown at the end of this effective movement in dotted lines.

I have described the respective parts as constructed and attached in the best ways now known to me; but I do not limit my claims, hereinafter stated, except as therein expressly provided, and necessary details which are not specified may be of any approved description. The modifications illustrated by Figs. 6, 7, and 8 are selected as the basis of my specific claims as to the delivery-trough supporting and adjusting devices.

In some cases the side gages of the double feed-guide F may be omitted altogether. The operator would then press the envelopes edgewise against the respective sides of the middle gage, so as to adjust them by this alone in connection with the front gage, G′.

Having thus described my said improvement in cylinder printing-machines, I claim as my invention and desire to patent under this specification—

1. In combination with the front gage of a cylinder printing machine, a double feed-guide for each operator, whereby each operator is enabled to feed the machine with envelopes or

the like two at a time, substantially as herein specified.

2. In combination with a suitable front gage, a double feed-guide having a middle gage with parallel lateral guide-surfaces at right angles to the gage-surface of said front gage, substantially as herein specified, for the purpose set forth.

3. In combination with a suitable front gage, a double feed-guide having a middle gage with parallel lateral guide-surfaces, and side gages parallel with said middle gage, substantially as herein specified, for the purpose set forth.

4. In combination with a suitable front gage, a double feed-guide having a middle gage with parallel lateral guide-surfaces, and a pair of side gages movable toward and away from said middle gage, substantially as herein specified, for the purpose set forth.

5. The double feed-guide F, having parallel middle and side gages, and bottoms formed by overlapping flanges attached to the respective gages, substantially as herein specified.

6. The combination, substantially as herein specified, of the middle gage, *a*, and side gages, a^2, provided, respectively, with a swivel-bearing and screw-nuts attached thereto, and a right-and-left screw swiveled in said bearing and fitted to said nuts, for the purpose set forth.

7. The combination of the middle gage, *a*, and side gages, a^2, having overlapping flanges forming bottoms *b*, adjustable in width, and provided, respectively, beneath said bottoms with a swivel-bearing and screw-nuts, and a right-and-left screw swiveled in said bearing and fitted to said nuts, substantially as herein specified.

8. The combination, with an ordinary feed-table, of a superposed double feed-guide, and a bolster beneath the rear end of said guide, giving it a greater inclination than the table, substantially as herein specified.

9. The combination of a divided transverse bolster, one part of which is fixed and the other part movable lengthwise thereon, and a double feed-guide attached to said movable part, substantially as herein specified.

10. The combination of a horizontally-divided transverse bolster having a dovetail joint with a groove in the top of the lower part, a superposed double feed-guide, and a clamp which attaches the latter to the upper part of the bolster and acts within said groove to lock the whole upon said lower part, substantially as herein specified.

11. The combination of a transverse bolster, a superposed double feed-guide adjustable as to width, and independent means, substantially as described, for laterally adjusting said guide as a whole, for the purpose set forth.

12. The combination, with an ordinary cylinder printing-machine, of a double feed-guide for each operator attached to the ordinary feed-table, and an automatic delivery apparatus having an incline or inclines at its receiving end and substituted for the ordinary delivery apparatus, substantially as herein specified.

13. The combination, with an ordinary cylinder printing-machine, of a double feed-guide for each operator attached to the ordinary feed-table, and a double delivery-trough aligned with said guide and substituted for the ordinary delivery apparatus, substantially as herein specified.

14. The combination, in a cylinder printing-machine, of a double feed-guide having a thick middle gage, and a double delivery-trough having a thin central partition in line with said gage, and sides which flare at its receiving end, substantially as shown, for the purpose set forth.

15. The double delivery-trough D, having a central partition and substantially parallel sides provided with overlapping flanges, the latter forming bottoms for its respective compartments, which are adjustable in width, substantially as herein specified.

16. The double delivery-trough D, adjustable in width, in combination with the horizontally-divided bolsters B^2 B^3, and means, substantially as described, for fastening the respective sections of the trough independently of each other upon the lower parts of said bolsters, for the purpose set forth.

17. The combination, with the movable delivery-trough D, of bolsters B^2 B^3, provided, respectively, with devices, substantially as described, for adjusting said trough lengthwise, for the purpose set forth.

18. In combination with the movable delivery-trough D and the frame of the machine, the bolster B^3, bar B^4, saddle B^5, and screw B^6, substantially as specified, for the purpose set forth.

19. In combination with the movable delivery-trough D and the frame of the machine, the bolster B^2, provided at its ends with swiveled screw-nuts, the link-rods L^2, having swiveled and screw-threaded lower ends fitted to said nuts, and the pivotal rod R^2 at the upper ends of said link-rods, substantially as specified.

20. In combination with the receiving end of the movable delivery-trough D, and with the frame of the machine and connecting devices, substantially as described, the link-rods L^2, having swiveled and screw-threaded lower ends provided with wrench-squares, and hollow upper sections, rendering them telescopic, and provided with fastening devices, substantially as described, for the purposes set forth.

21. A delivery-trough having a receiving end constructed with inclined bottoms and with openings in said bottoms adjacent to the inner end of the inclines, in combination with oscillating turners pivoted at said inner end of the inclines and working through said openings, substantially as herein specified.

22. In combination with a delivery-trough having a receiving end constructed with inclined bottoms, the within-described oscillat-

ing turners pivoted at the inner end of the inclines and having segmental outer ends, substantially as herein specified.

23. A delivery-trough adjustable in width, in combination with oscillating turners, two or more to each compartment, a pivotal shaft common to all extending transversely below the bottom of said trough, and means, substantially as described, for adjusting said turners laterally upon said shaft, for the purpose set forth.

24. The combination of the delivery-trough D, oscillating turners T′, pivotal shaft S^2, pulley P, rack R, lever L, and retracting-spring S^3, substantially as specified, for the purpose set forth.

25. The combination of the reciprocating bed B, provided with tappet *w*, and lever L, provided with cushion *x*, the rack R, pinion P, shaft S^2, and oscillating turners T′, substantially as specified, for the purpose set forth.

26. In combination with a reciprocating part provided with a tappet, *w*, the lever L, connected with the delivery apparatus and provided with a cushion, *x*, within a socket, *y*, and with a screw, *z*, which projects said cushion more or less, substantially as specified, for the purpose set forth.

Signed at Washington, in the District of Columbia, this 19th day of July, 1887.

ANDREW O. NASH.

Witnesses:

JAS. L. EWIN,

PHILIP MAURO.