

(No Model.)

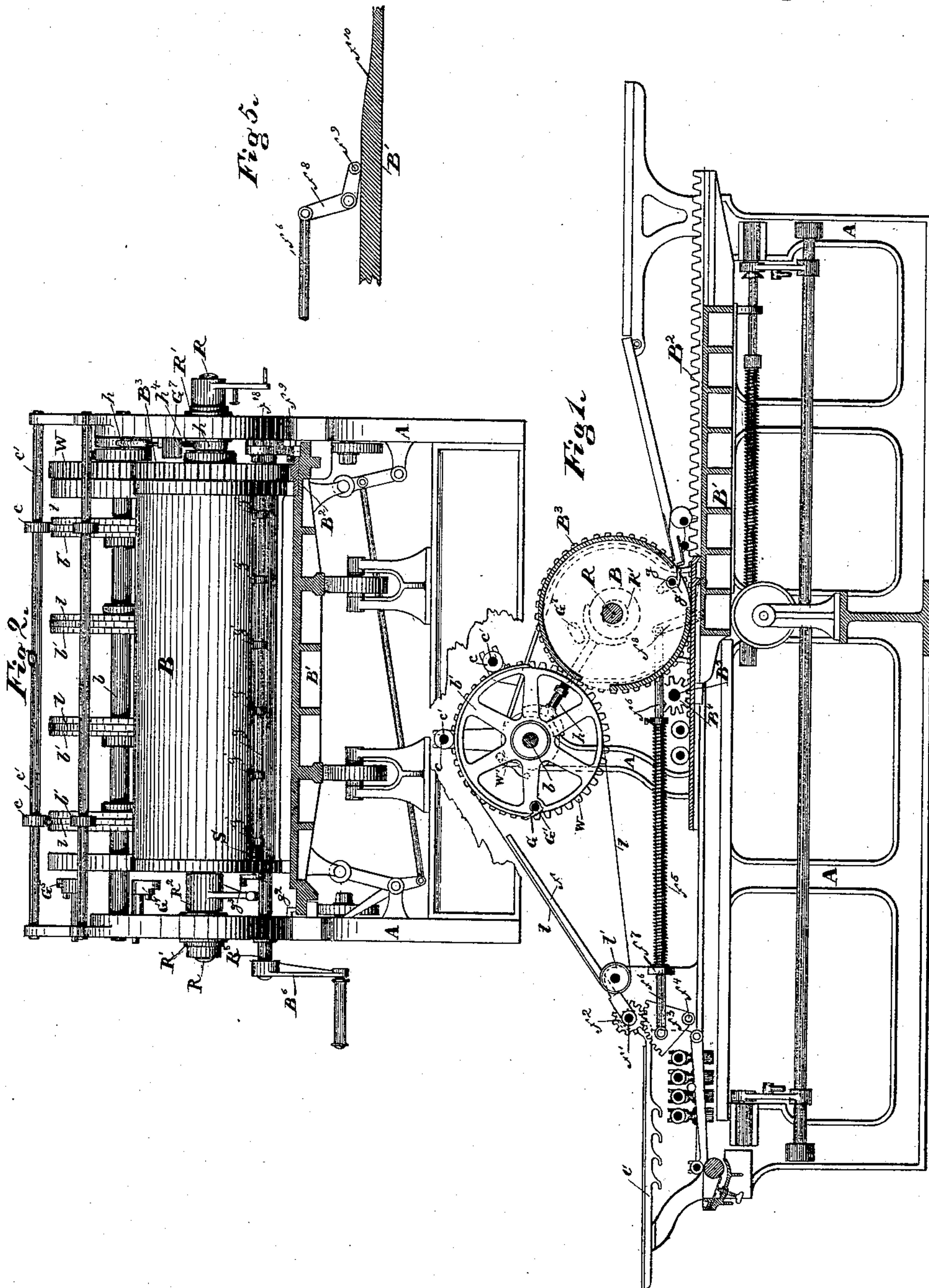
2 Sheets—Sheet 1.

J. T. HAWKINS.

OSCILLATING CYLINDER PRINTING MACHINE.

No. 324,253.

Patented Aug. 11, 1885.



Witnesses

Francis P. Reilly  
Leo Von Rosenberg

Inventor  
John T. Hawkins  
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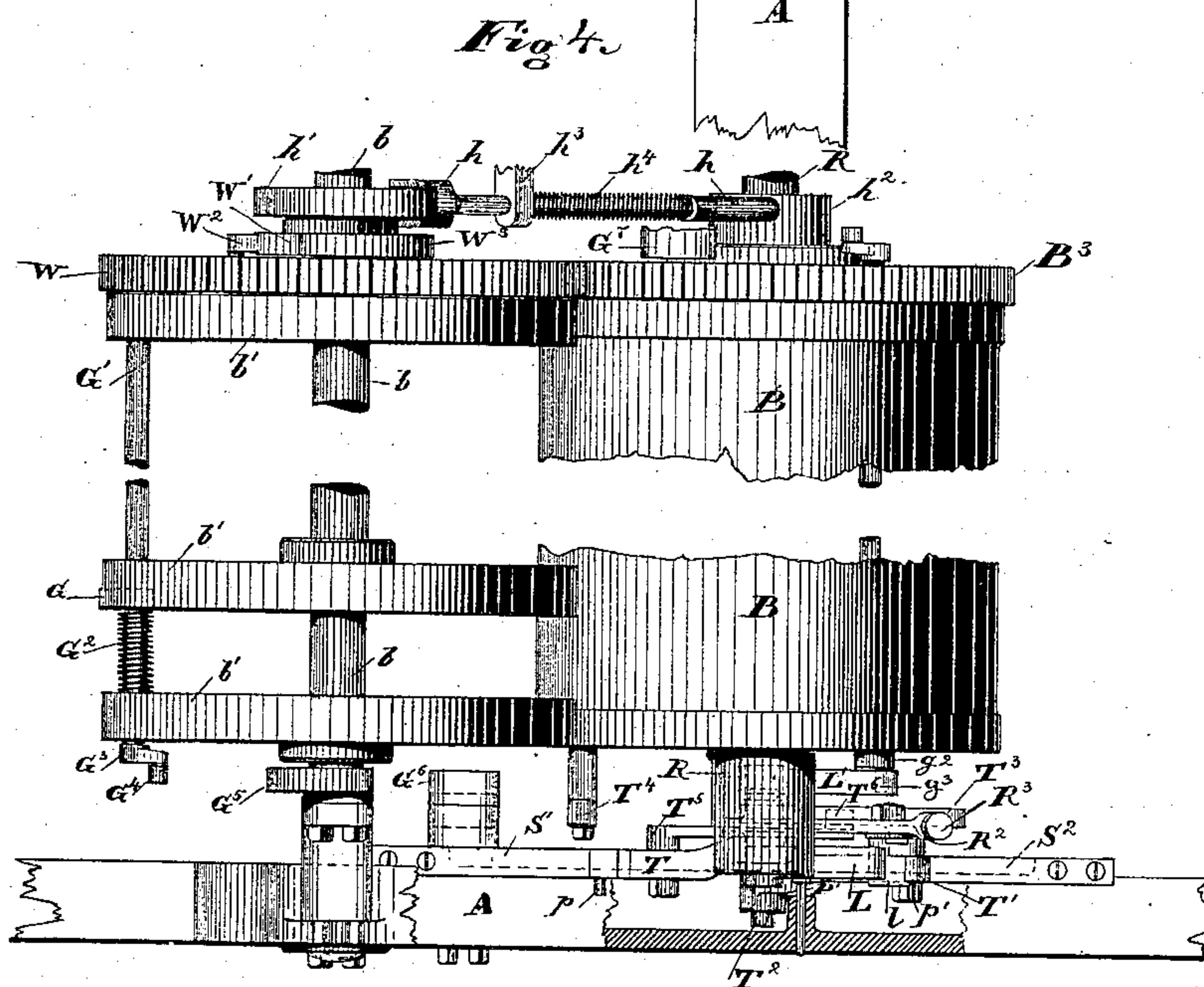
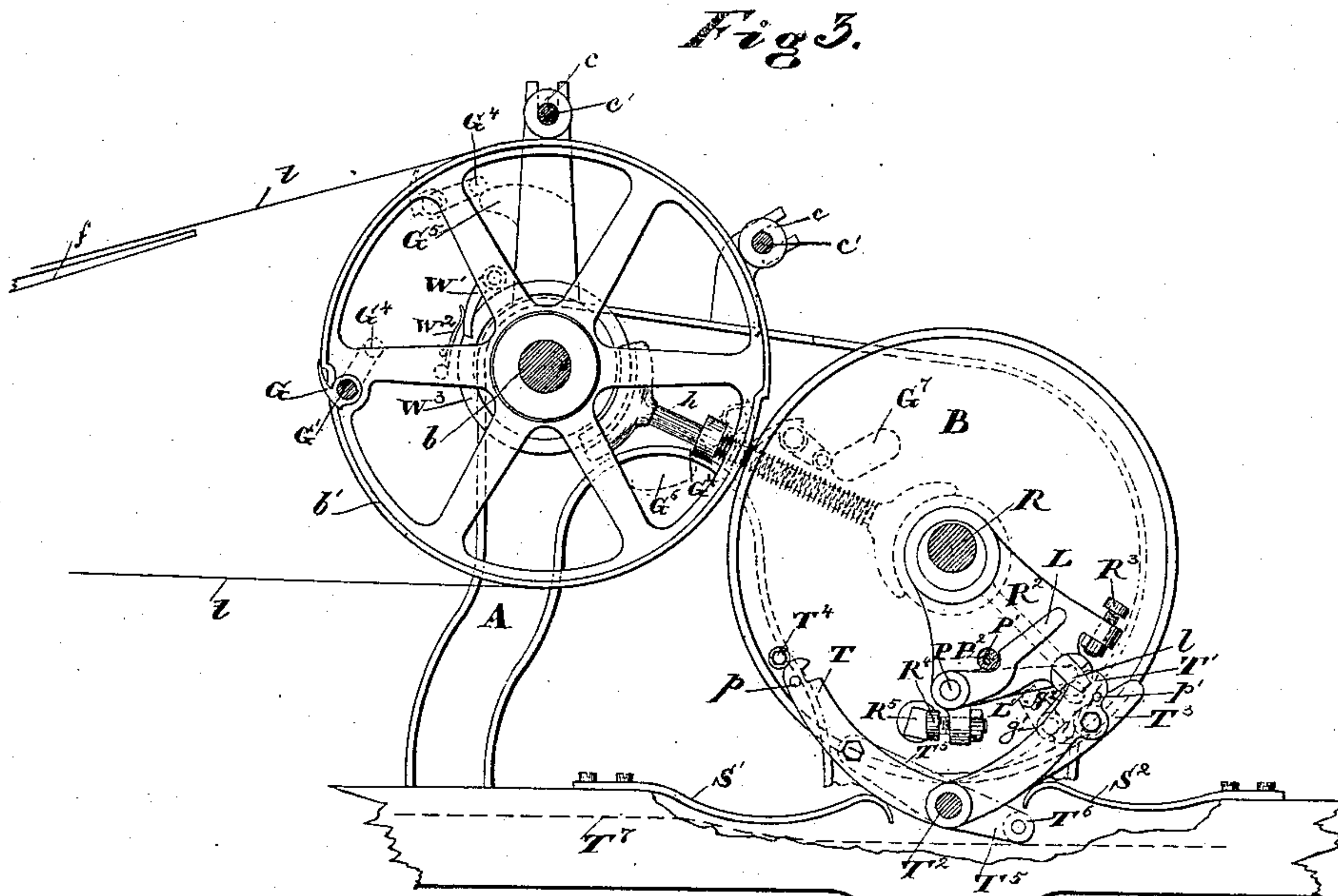
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# UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF TAUNTON, MASSACHUSETTS.

## OSCILLATING-CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 324,253, dated August 11, 1885.

Application filed June 2, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. HAWKINS, of Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Oscillating-Cylinder Printing-Machines, which improvements or inventions are fully set forth and illustrated in the following specification and accompanying drawings.

10 This object of this invention is to provide an oscillating impression-cylinder having the "under method" of feeding the sheets, with simple automatic means of lowering and raising the cylinder to and from the type bed or  
15 form, and also to provide the same character of means for operating said cylinder-grippers, which grippers take the sheet from the feed-board of the machine.

20 The invention consists of the parts herein particularly described, as set forth in the claims.

The general form of the printing-press illustrated in the accompanying drawings is the same as that illustrated in my application for  
25 Letters Patent filed on the 15th day of March, 1884, (Case A,) bearing the Serial No. 124,297. The invention herein described is, however, not confined to a machine driven by hand-power alone, but may be operated by any suitable power.

30 In the accompanying drawings, Figure 1 is a longitudinal vertical section of the press; and Fig. 2, an end elevation of the same from the right of Fig. 1, partly in section, with the feed-board removed. Fig. 3 is a side elevation of the impression-cylinder and the delivery-cylinder on a larger scale, a portion of the main side frames being broken away to more clearly show the parts. Fig. 4 shows  
35 Fig. 3 in plan, broken away in the central parts to economize space in the drawings. Fig. 5 shows in detail an incline on the type-bed for operating the sheet-flier. (Not elsewhere clearly shown.)

45 All parts of the machine below the level of the type-bed are the same as those fully described in the above-mentioned application. (Serial No. 124,297.)

50 The method of operating the machine by hand-power and the operation of the ink-fountain roller are also fully described in the last-mentioned application, and the general design of this machine is throughout the same

as that described in said application, except so far as said design involves this invention, 55 to which invention the description herein is therefore confined.

In said drawings the several parts are respectively indicated by letters as follows: A are the main side frames. B is the im- 60 pression-cylinder, running freely upon an eccentric rock-shaft, R, journaled in eccentric bushes R', which in turn are adjustably secured to the frames A. B' is the type-bed, and B<sup>2</sup> the rack secured thereto. B<sup>3</sup> is a gear- 65 wheel secured to the impression-cylinder B, engaging rack B<sup>2</sup>, and B<sup>4</sup> is a pinion secured to a shaft, B<sup>5</sup>, journaled in the frames A, engaging the rack B<sup>2</sup>, power being applied to move the parts by the hand-crank B<sup>6</sup>, secured 70 to one end of the shaft B<sup>5</sup>.

In Fig. 2 certain details are omitted as difficult to clearly show on so small a scale.

In the cylinder B is journaled a gripper-shaft, g, carrying a series of grippers, g', in 75 the usual way. On one end of this shaft is secured an arm, g<sup>2</sup>, carrying a roller, g<sup>3</sup>.

Secured to rock-shaft R is an arm, R<sup>2</sup>, and secured in two lugs extending from arm R<sup>2</sup> are two impact screws or bolts R<sup>3</sup> R<sup>4</sup>. 80

R<sup>5</sup> is a stud securely fastened to the end of cylinder B, which, in the operation of the machine, alternately impinges upon the head of the impact screws R<sup>3</sup> R<sup>4</sup>, the latter being so spaced that the stud R<sup>5</sup> will move the arm R<sup>2</sup>, 85 and with it the rock-shaft R, through about one-quarter of a revolution for a complete revolution of the impression-cylinder B in either direction. The eccentricity of the rock-shaft R is so placed that, when downward, the im- 90 pression-cylinder B will be in contact with the type or form, as shown in position in the drawings, and being rotated one-quarter of a revolution to the left, Fig. 3, it raises the cylinder B from contact with the form, and at the 95 same time carries it an equal distance to the left.

Pivoted to the arm R<sup>2</sup> at P is a two-armed lever, one arm of which, L, is outside and the other arm, L', inside of the arm R<sup>2</sup>. The in- 100 ner of these arms, L', engages on its under side the roller g<sup>3</sup>, on the gripper-shaft arm g<sup>2</sup>, to open the grippers preparatory to receiving the sheet. The outer arm, L, engages a roller, P<sup>2</sup>, running on a stud, P', extending from the 105 frame A, the roller P<sup>2</sup> running upon the straight



inclined upper surface of lever-arm L to open the grippers  $g'$  as the arm  $R^2$  is moved from left to right by the rotation of the impression-cylinder B. When the cylinder B commences to rotate upon its printing stroke, the roller  $g^3$  leaves the under side of the arm  $L'$ , thus also permitting the arm L to drop clear of the roller  $P^2$  preparatory to the arm  $R^2$  being moved to the left, Fig. 3, by the stud  $R^5$  impinging on the impact screw  $R^3$  through the last quarter of the rotation of the cylinder B. Thus the grippers  $g'$  are opened when approaching the point at which they take the sheet from the feed-board, held slightly open when the impression-cylinder B is at the termination of its non-printing revolution, and allowed to quickly close upon the paper by the action of the spring S, Fig. 2, at the first movement of the impression-cylinder B upon its printing revolution.

Projecting from the arm  $R^2$  is a V-shaped stud,  $l$ , which engages a correspondingly-shaped notch in the end of each of two levers, T and  $T'$ , both oscillating upon a stud,  $T^2$ , secured to the frame A.

Secured to the inner side of the lever  $T'$  is a cam,  $T^3$ , which engages at the proper time a stud and roller,  $T^4$ , projecting from and secured to the cylinder B, both cam and roller being so placed that the impinging of the stud and roller  $T^4$  upon the cam  $T^3$  will unlock the lever  $T'$  from the V-shaped stud  $l$  just previous to the stud  $R^5$  impinging upon the impact-bolt  $R^3$ .

Upon the inside of the notched lever T is secured an arm,  $T^5$ , carrying upon its lower end a roller,  $T^6$ . The roller  $T^6$  engages an inclined surface,  $T^7$ , on the type-bed at the proper time to unlock the notched lever T from the V-shaped stud  $l$  just before the stud  $R^5$  impinges upon the impact-screw  $R^4$  upon the non-printing rotation of the impression-cylinder B. The upward motion of the levers T and  $T'$  is limited by two small pins,  $p$   $p'$ , inserted in them in proper position to come in contact with the edges of the frame A. The levers T  $T'$  are pressed upward by two springs,  $S'$   $S^2$ , secured to the frame A. The upper curved surfaces of the levers T  $T'$  are engaged by the end of the V-shaped stud  $l$ , in passing from one to the other, in such a way as to depress them until the V-shaped stud  $l$  engages the correspondingly-shaped notch in the end of either lever T or  $T'$ .

The common function of the stud  $l$ , notched levers T  $T'$ , cam  $T^3$ , arm  $T^5$ , roller  $T^6$ , inclined surface  $T^7$  upon the type-bed, stud, and roller  $T^4$ , and the springs  $S'$   $S^2$  is to lock the rock-shaft R in the two positions alternately corresponding to the two different positions in and out of contact with the form of the impression-cylinder B when printing and not printing, respectively.

In illustrating the parts shown in the drawings, the cylinder B is shown in its downward position to make contact with the form as the form is run under it.

The printing operation is as follows: At the commencement of the printing stroke the stud  $R^5$  leaves the impact screw  $R^4$ , and, after the cylinder B has made about three-quarters of a revolution, said stud comes in contact with the impact screw  $R^3$ , the roller  $T^4$  having just previously engaged the cam  $T^3$ , and depressed the lever  $T'$  sufficiently to release it from the V-shaped stud  $l$ . By this time the form has passed completely under the cylinder B, and the remainder of the stroke is performed while the last part of the form runs under the ink-rollers. During this remaining part of the revolution of the cylinder B the stud  $R^5$  carries the arm  $R^2$  into such position that the V-shaped stud  $l$  engages the corresponding slot in the lever T. At the first movement of the cylinder B, on the above-mentioned revolution, the roller  $g^3$  leaves the arm  $L'$ , and thus permits the arm L to drop so as to become disengaged from the stud and roller  $P^2$ . For the retrograde revolution the stud  $R^5$  in like manner makes about three-quarters of a revolution, when it impinges again upon the impact screw  $R^4$ , the incline  $T^7$  having previously acted upon the roller  $T^6$ , so as to disengage the lever T from the V-shaped stud  $l$ . During the last quarter of this revolution of cylinder B the arm L engages the stud and roller  $P^2$ , thereby depressing the arm  $L'$ , which arm, operating upon the rollers  $g^3$ , opens the grippers  $g'$  and allows them to nearly close again by the time the cylinder B arrives at the termination of this revolution, the parts again taking their respective positions just as shown in the drawings, the grippers  $g'$  being nearly closed, and completely closed at the first movement again of the cylinder B upon its printing revolution. The shaft  $b$  has secured to it a cylinder or series of short cylinders,  $b'$ , having a portion of their respective circumferences made to a smaller radius in order to clear the cylinder B during its retrograde or non-printing revolution, which cylinder at that time is carried nearer to the cylinder or cylinders  $b'$  by the action of the eccentric rock-shaft R. The cylinder or cylinders  $b'$  are provided with grippers G, carried upon a shaft,  $G'$ , journaled in the cylinder or cylinders  $b'$ . The grippers G are kept closed by the action of a spring,  $G^2$ , surrounding the gripper-shaft  $G'$ .

Upon one end of the gripper-shaft  $G'$  is secured an arm,  $G^3$ , carrying a roller,  $G^4$ . (Shown in dotted lines in three different positions in Fig. 3.)

$G^5$   $G^6$  are cams for operating the grippers G by engaging the roller  $G^4$  at the proper times. Cams  $G^5$   $G^6$  are also shown, but in dotted lines only, in Fig. 3.

$G^7$  is a cam for opening the grippers  $g'$  of the cylinder B. Running loosely on shaft  $b$  is a gear-wheel, W, engaging the gear-wheel  $B^3$ , the motion of cylinder B and its gear-wheel  $B^3$  to and from gear-wheel W not being sufficient to entirely disengage them.

On a stud in one of the arms of the gear-



wheel W is secured a pawl, W', held in place by a spring, W<sup>2</sup>.

Secured to the shaft *b* is a one-toothed ratchet, W<sup>3</sup>, which is engaged by the pawl W'.

5 The respective diameters of the wheels W and B<sup>3</sup> are such that the wheel W makes exactly one turn for the printing revolution of the cylinder B, whether the latter cylinder makes more or less than a complete revolution, 10 if so proportioned for other reasons. The brake *h* has one end partly encircling a disk, *h'*, secured to the shaft *b*, and similarly its other end encircles in part a hub, *h*<sup>2</sup>, of the wheel B<sup>3</sup>, the rod connecting the said two ends 15 sliding in the lug *h*<sup>3</sup>, projecting from one of the frames A. The brake *h* is kept in contact with hub *h*<sup>2</sup> by a spring, *h*<sup>4</sup>. This brake is operated at the proper time to press upon the disk *h'* by the action of the eccentric rock- 20 shaft R, so as to absorb the momentum of the cylinder or cylinders *b'* and bring them to rest at the termination of the printing revolution of the cylinder B, and thus insure the pawl W', dropping into the single notch of 25 the ratchet W<sup>3</sup> at the termination of the retrograde revolution of the cylinder B, during which time the cylinder or cylinders *b'* remain at rest. A series of tapes or cords, run upon the cylinder or cylinders *b'*, and a series of 30 pulleys are carried on a shaft journaled in the frames A. A series of fly-fingers is secured to a rock-shaft, *f'*, one operated by the pinion *f*<sup>2</sup>, secured to shaft *f'*, the sector *f*<sup>3</sup> oscillating upon a stud, *f*<sup>4</sup>, secured in one of the frames 35 A. The sector *f*<sup>3</sup> is operated in one direction by the spring *f*<sup>5</sup>, surrounding a connecting-rod, *f*<sup>6</sup>, which is slid in a lug, *f*<sup>7</sup>, projecting from one of the frames A, and the bell-crank *f*<sup>8</sup>, carrying the roller *f*<sup>9</sup>, which latter engages 40 an incline, *f*<sup>10</sup>, on the type-bed B'.

C is the fly-table or receiving-board. Pressure-rollers *c c*, carried on shafts *c'* journaled in frames A, run over the margins of the sheet to hold it in contact with the cylinder or cyl- 45 inders *b'*.

The operation of the sheet-delivery mechanism is as follows: During the printing revolution of cylinder B the sheet is carried, as held by the grippers *g'*, to the nearest point of ap- 50 proach of the cylinders B and *b'*, where it is released by them through the action of cam G<sup>7</sup>, and simultaneously grasped by the grippers G by the action of the cam G<sup>6</sup>, the cylinder or cylinders *b'* being rotated by the engagement of the pawl W' with the ratchet W<sup>3</sup>. 55 From this point the grippers G convey the sheet with the printed side in contact with the cylinder or cylinders *b'* until by the action of the cam G<sup>5</sup>, they release it and it runs partly 60 down upon the tapes or cords *t*, the head of the sheet just stopping short of the free ends of the fly-fingers *f*. In this position the sheet, with the cylinder or cylinders *b'*, remains at rest during the retrograde revolution of cylinder B. During the succeeding printing 65 revolution of the cylinder B the succeeding

sheet goes through the operation just described, while the first sheet passes down by the action of tapes *t* and pressure-pulleys *c* over the fly-fingers *f*, which, at the proper 70 time, by the action of the spring *f*<sup>5</sup>, as permitted by the incline *f*<sup>10</sup> on the bed B', throws the fly-fingers *f*, and with them the sheet, over to and upon the fly-board C. During the retrograde revolution of cylinder B the fly- 75 fingers *f* return to the position shown in the drawings, ready to receive the succeeding sheet, and are held in that position by the level run for the roller *f*<sup>9</sup> on the bed B'.

I herein make no claim to the eccentric 80 rock-shaft and bushings for operating the impression-cylinder B, the same being claimed in my pending application, Serial No. 115,603, filed December 26, 1883; nor do I herein claim the brake *h* and its connecting mechanism, 85 the same being claimed in my application, Serial No. 133,775, filed June 4, 1884, and now pending.

Having thus fully described my said improvements as of my invention, I claim— 90

1. In an oscillating-cylinder printing-press in which an impression-cylinder, as B, runs freely on an eccentric rock-shaft, as R, the combination of the following-named parts for automatically operating the grippers of 95 said impression-cylinder, raising and lowering said impression-cylinder and locking it in its raised and lowered positions, respectively, namely: an arm, as R<sup>2</sup>, secured to said eccentric rock-shaft, carrying two lever-arms, as 100 L L', both secured to a rock-shaft carried in said arm, one of said levers, L', engaging a roller, as *g*<sup>3</sup>, on an arm secured to the gripper-shaft, the other lever, L, engaging a stationary stud and roller, as P' P<sup>2</sup>, a V-shaped stud, as 105 *l*, secured in said arm R<sup>2</sup>, engaging two notched levers, as T and T', oscillating on a fixed fulcrum, as T<sup>2</sup>, a stud and roller, as T<sup>4</sup>, carried in said impression-cylinder B, engaging a cam, as T<sup>3</sup>, secured to said lever T', a roller 110 on one end of the said lever T, engaging an inclined surface, as T<sup>7</sup>, on the type-bed, a stud, as R<sup>5</sup>, carried in said impression-cylinder B, engaging two impact-screws, as R<sup>3</sup> R<sup>4</sup>, 115 carried in said arm R<sup>2</sup>, and two springs reacting upon the said two levers T T', all co-acting to automatically raise and lower said impression-cylinder B, to operate said grippers *g'*, and lock the eccentric rock-shaft in either of its two respective positions, sub- 120 stantially as set forth.

2. In an oscillating-cylinder printing-press, in combination with an oscillating impression-cylinder, as B, an intermittently-rotated cylinder or cylinders, as *b'*, provided with grippers, and having their peripheries of two different radii, substantially as and for the purposes set forth.

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