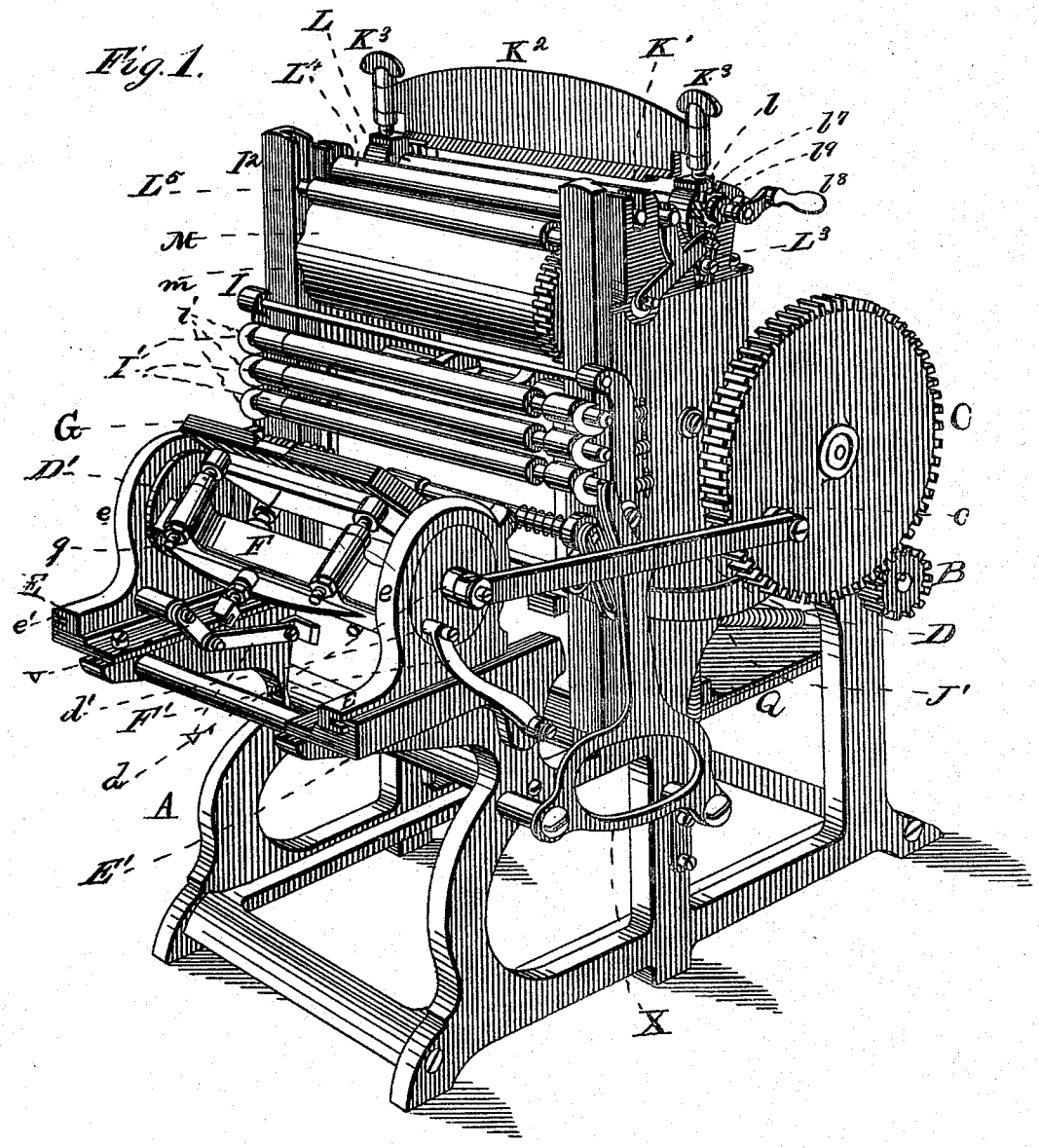
4 Sheets—Sheet 1.

J. E. BRAUNSDORF & C. KAISER.

PRINTING-PRESS.

No. 187,806. Patented Feb. 27, 1877.

Fig. 1.



WITNESSES

Robert Everett

George E. Upham.

INVENTORS.

Julius E. Braunsdorf.

Charles Kaiser.

Gilmore, Smith & Co.

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

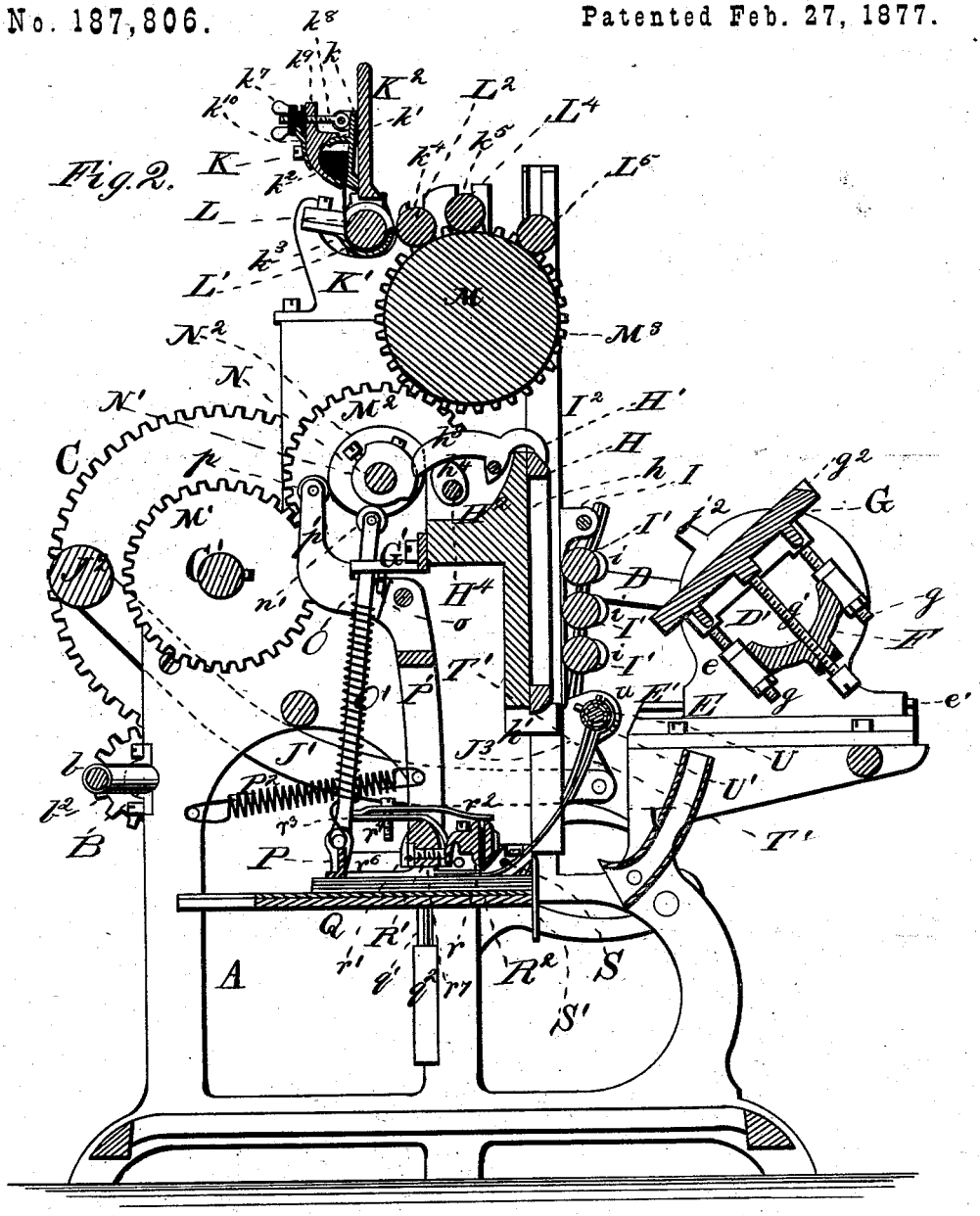
4 Sheets—Sheet 2

J. E. BRAUNSDORF & C. KAISER.

PRINTING-PRESS.

No. 187,806. Patented Feb. 27, 1877.

Fig. 2.



WITNESSES

Robert Everett

George E. Upham.

INVENTORS.

Julius E. Braunsdorf.

Charles Kaiser.

Gilmore & Smith & Co.

ATTORNEYS.

N. PETERS PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

4 Sheets—Sheet 3.

J. E. BRAUNSDORF & C. KAISER.

PRINTING-PRESS.

No. 187,806. Patented Feb. 27, 1877.

Fig. 3.

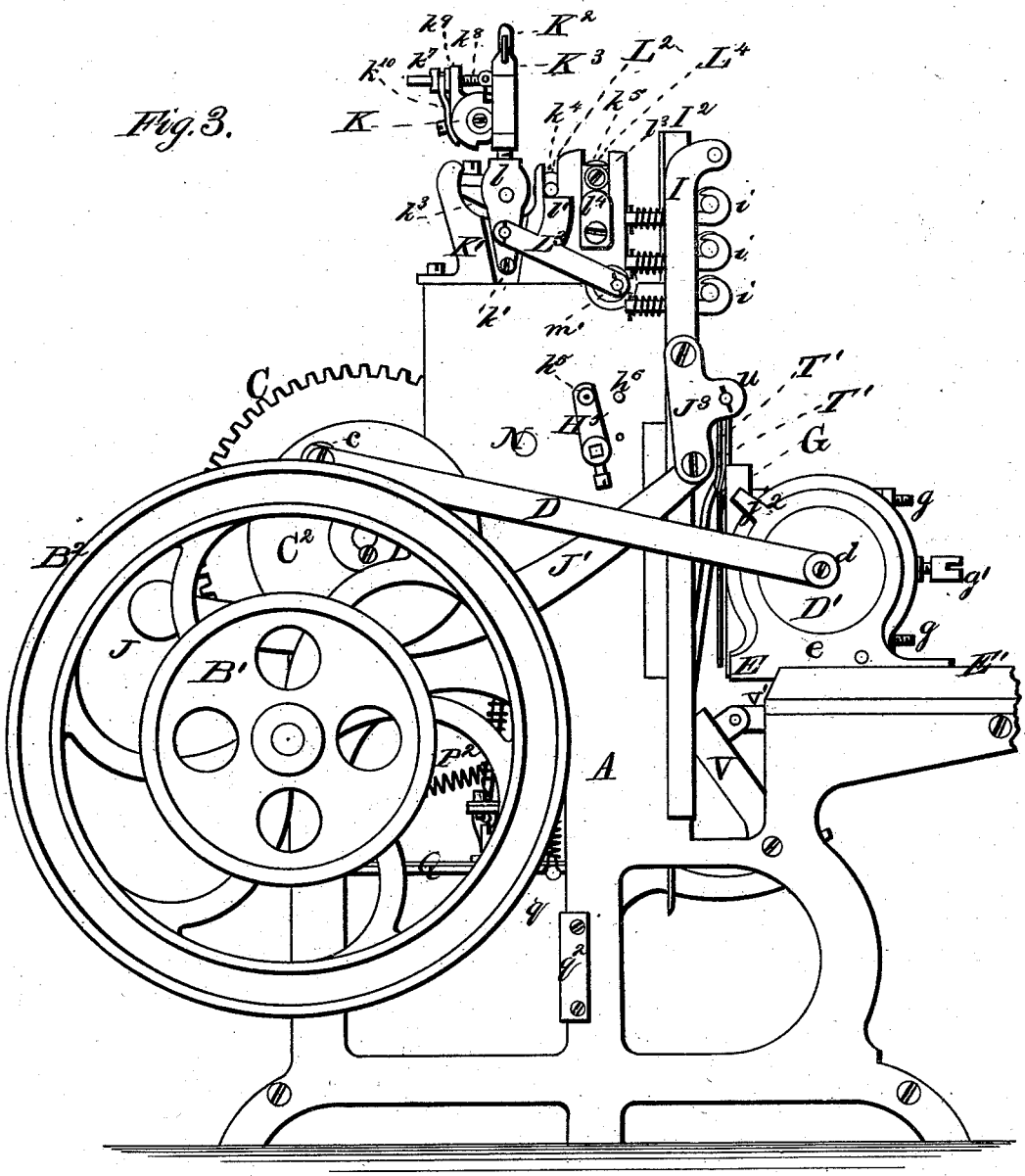


Fig. 4.

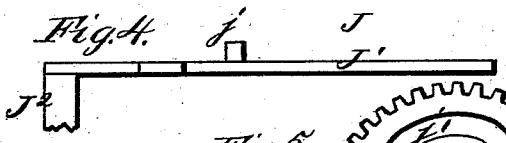
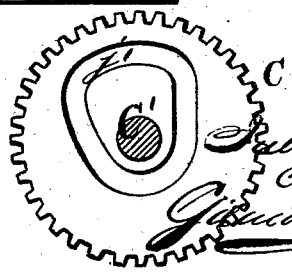


Fig. 5.



WITNESSES

Robert Everett

George E. Upham.

INVENTORS.

Julius E. Braunsdorf.

Charles Kaiser.

Gibbons Smith & Co.

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

4 Sheets—Sheet 4.

J. E. BRAUNSDORF & C. KAISER.

PRINTING-PRESS.

No. 187,806. Patented Feb. 27, 1877.

Fig. 6.

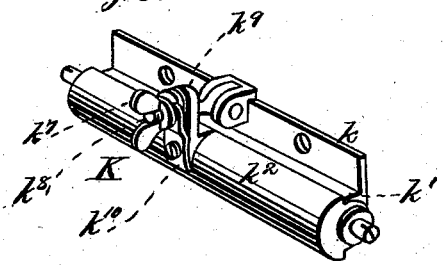


Fig. 7.

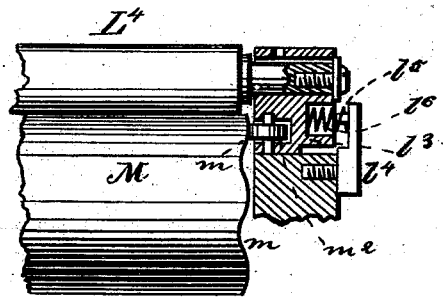


Fig. 8.

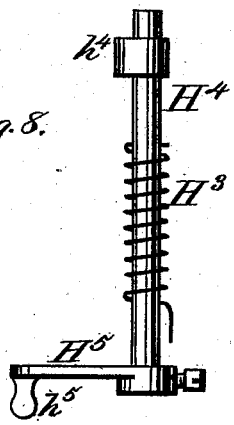


Fig. 9

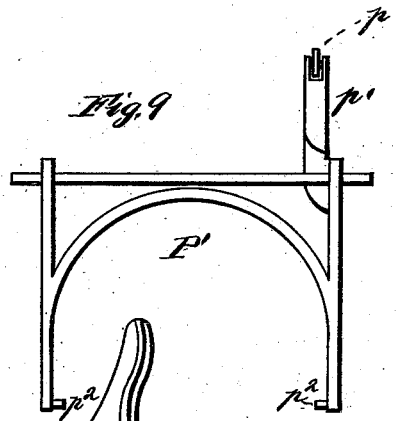


Fig. 10.

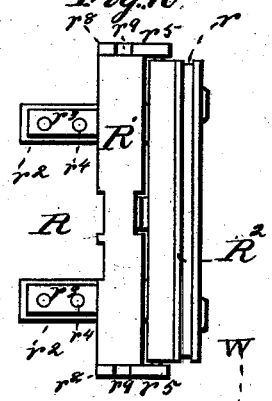


Fig. 14.

Fig. 13.

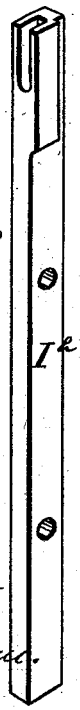


Fig. 12.

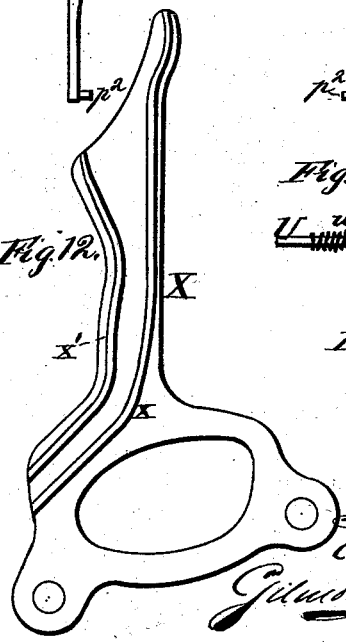


Fig. 11

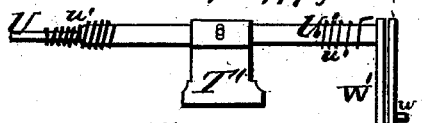
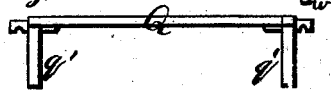


Fig. 15.



WITNESSES

Robert Everett

George E. Upham.

INVENTORS.

Julius E. Braunsdorf.

Charles Kaiser.

Gilmore, Smith & Co.

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JULIUS E. BRAUNSDORF AND CHARLES KAISER, OF PEARL RIVER, NEW YORK, ASSIGNORS TO J. E. BRAUNSDORF & CO.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **187,806**, dated February 27, 1877; application filed October 7, 1876.

To all whom it may concern:

Be it known that we, JULIUS E. BRAUNSDORF and CHAS. KAISER, of Pearl River, in the county of Rockland and State of New York, have invented a new and valuable Improvement in Printing-Presses; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a perspective view of our printing-press; and Fig. 2 is a central vertical sectional view thereof. Fig. 3 is a side elevation of the same. Figs. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 are detail views.

This invention relates to printing-presses; and the nature of said invention consists in certain improvements hereinafter particularly set forth and claimed.

In the annexed drawings, A designates the solid metal frame, which supports the operating parts of our improved printing-press; and B designates a driving-shaft, journaled therein. One end of said shaft, on the outside of said frame, is provided with a belt-wheel, B^1, and a fly-wheel, B^2.

Power may be applied to said driving-shaft either through said belt-wheel B^1, or through a double crank, *b*, which is formed in the said driving-shaft between the sides of frame A.

The other end of said shaft is provided with a fixed pinion, b^2, which meshes with and turns a large cog-wheel, C, keyed on a shaft, C^1, above said driving-shaft B. Said shaft C^1 is also journaled in frame A, and carries at the end opposite to cog-wheel C a crank-wheel, C^2. Near the peripheries of wheels C and C^2 are studs *c c*, secured to the faces of said wheels, from which studs connecting rods D D extend to similar studs *d d* on the axis of circular rocking disks or platen-beam bearings D′ D′. Each of said bearings is held in a circular frame, *e*, which is formed in one piece with a grooved pedestal, E, which slides upon a horizontal track, E′, rigidly secured to frame A. Said track is provided with a guide-tongue, *e′*, which enters a longitudinal groove in said slide or sliding pedestal E. Said slides, tracks, and tongues on the opposite sides of the apparatus exactly correspond to one another, respectively, in shape, size, and operation, so that when said wheels C C^2 are turned, said slides or sliding pedestals E E are simultaneously caused to reciprocate forward and backward for equal distances.

Bearings D′ D′ are connected together by platen-beam F, which is curved in cross-section, and is eccentrically attached at both ends to said rocking bearings D′ D′.

Rocking motion is given to said bearings by means of the devices above described, in combination with a metal link-bar, F′, which is connected at one end to a downward extension of one of the fixed tracks E′, and at the other end to an eccentrically-situated stud, *d′*, on one of said circular disks or bearings D′.

G is a platen supported by said platen-beam upon four screw-threaded rods, *g g*, near each of its corners, and upon one central adjusting-screw g^1, by means of which its distance from, and position with relation to, said platen-beam may be adjusted at will, so as to compensate for wear. The eccentric attachment of said platen-beam F causes said platen G to assume a horizontal position when it is forced outward by the operation of wheels C C^2, connecting-rods D D, and the other devices above described, and to assume a vertical position when drawn inward by said wheels, rods, and other connecting devices, so as to press evenly and firmly on all parts of a vertically-arranged form of type. Said platen is recessed at g^2 to leave room for the gripers, as hereinafter described. H designates a chase set vertically between standards I^2 I^2 secured to the two sides of frame A and in a bed which is formed by said standards, together with a bed-plate, *h*, and bottom lugs h^1 h^1, said back plate and bottom lugs being secured rigidly to said frame A. Said chase is locked in place by a hook or chase-holder, H^1, which is pivoted to a recessed block, H^2, secured to the back of bed-plate *h* at the top thereof. Said chase-holder is provided with a curved rearward extension, h^3, which rests upon a cam, h^4, carried by a shaft, H^4, which shaft is journaled in said block H^2 behind the pivot of said chase-holder,

and in one side of frame A. Said shaft H^4 is provided, within said frame, with a spring, H^3, which operates to turn said shaft forward, so as to cause cam h^4 to hold up extension h^3, and thereby to clamp chase H between chase-holder H^1 and plate h. Shaft H^4 is also provided, outside of said frame, with a crank, H^5, having handle h^5, which is used for turning said shaft backward, so that cam h^4 will allow extension h^3 to fall by its own weight, thereby raising the forward part of said chase holder or hook, and releasing said chase. A small stud, h^6, secured to the outside of frame A prevents said crank arm and shaft from being turned too far forward. Shaft H^4 may be dispensed with, the said crank being attached to the said cam, and said cam being pivoted to lugs. While platen G is being forced away from chase H, as described, a roller-frame, I, descends through the intervening space, causing composition rollers I^1 I^1 I^1 to pass over and ink the face of the type in said chase; and, as said platen approaches said chase, said roller-frame rises, so as to be out of the way of said platen and chase, and also for the purpose of allowing said composition rollers to receive a fresh supply of ink from devices hereinafter described at the top of frame A. This reciprocating vertical motion of said roller-frame is effected by means of a rocking frame, J, Fig. 3, which consists of two bent side arms, J^1 J^1, and a rear cross-arm, J^2. Said rocking frame is pivoted, by the middle of said side arms, to the outside of main supporting-frame A. One of said bent side arms J^1 is provided with a projecting lug or stud, j, Fig. 4, which sets in a cam-groove, j^1, on the inner side of wheel C, Fig. 5. The operation of said cam-groove and stud or lug is to cause the said frame J to rock alternately up and down upon its pivots with a long pause, caused by the peculiar shape of said cam-groove, (a part of which is concentric with wheel C,) at each end of said vibration. The forward ends of said curved side arms J^1 are pivotally connected to the lower ends of two corresponding link-plates, J^3 J^3, which are pivotally connected by their upper ends to the lower part of reciprocating roller-frame I I. Owing to this connection the rocking motion and pauses of rocking frame J cause said reciprocating roller-frame I I and composition rollers I^1 I^1 to move alternately up and down, as described, and also to pause at the upper and the lower ends of its vibration.

The upper pause is for the purpose of allowing said composition rollers to be sufficiently supplied with ink, as hereinafter described, before being again passed over the type, and also to allow said composition rollers to be out of the way when the platen presses against the form. But cam-groove j^1 is liable to become worn, so as not to cause a sufficiently long pause for said purpose. To obviate this difficulty we provide sliding frames e e, which inclose bearings D′ D′, with lugs j^2 j^2, which press against arms J^1 J^1 under reciprocating roller-frame I at each side when the platen is drawn forward against the chase, and prevent said reciprocating roller-frame from descending until said platen begins to recede. Said composition rollers I^1 are connected to said reciprocating roller-frame I by means of spring-hooks i, which allow said rollers to yield slightly, and thereby to avoid any injury which might otherwise arise from contact with the rollers and cylinders hereinafter described, or with accidental obstacles. Said reciprocating roller-frame is guided in its vertical vibrations by standards I^2 I^2, which are secured to the main frame A. The outer sides and edges of said standards set into vertical recesses or channels in the inside of the side pieces of said reciprocating roller-frame. The devices by which composition rollers I^1 receive their supply of ink are as follows: To the top of frame A, at both sides thereof, are secured bracket-plates K^1 K^1, which are provided on top with recesses k^3, k^4, and k^5, of various depths, to receive the bearings of certain rollers hereinafter specified. Said recesses in each of said bracket-plates correspond, respectively, to those in the other one of said plates. K designates an ink-reservoir, consisting of a fixed flat plate, k, having a curved flange, k^1, and a semi-cylindrical pivoted casing, k^2. Said reservoir is rigidly secured to one side of a rocking bar or frame, K^2, which is supported and made vertically adjustable by means of thumb-screws K^3 K^3, which enter the upper ends of oblong fountain-roller bearings l l. Said ink-reservoir K opens downward, and the degree of said opening, and the consequent supply of ink to the fountain-roller, are regulated by means of a small adjusting-nut, k^7, which works on a screw-threaded rod, k^8, that is secured at one end between two lugs on plate k, and passes through a perforated lug, k^9, on the semi-cylinder k^2, Fig. 6. To said lug k^9 is attached a small bifurcated plate, k^{10}, which catches into a circular groove in the said adjusting-nut k^7. By this construction the semi-cylinder k^2 is operated by the nut to open or close the ink-reservoir to any desired extent. Said ink-reservoir is located immediately over a fountain-roller, L, which has immediately under it a trough, L^1, to prevent waste of the ink. Said fountain-roller is journaled in bearings l l, which are oblong or diamond-like in shape, and which are pivoted by their lower ends to brackets K^1 K^1 at the bottom of deep and broad recesses k^1 k^1. Said recesses allow said bearings l l to rock backward and forward upon their pivots. This rocking is accomplished by means of link-plates L^3 L^3, which extend from bearings l l, at points above their pivots, to disks m^1 m^1 on the gudgeons of inking-cylinder M, said link-plates being eccentrically secured to said disks. Said inking-cylinder is journaled in bracket-plates K^1 K^1 below and in front of the said fountain-roller L; and it derives rotary motion from a shaft, N, which is journaled in said frame A below and behind said inking-

cylinder M, which shaft N is rotated by shaft C^1, already described. Said motion is transmitted through cog-wheel M^1 on shaft C^1, cog-wheel M^2 on shaft N, and cog-wheel M^3 on inking-cylinder M.

By means of the above-described connections, whenever the driving-shaft B is rotated the ink-reservoir K and the fountain-roller L are rocked backward and forward. Every time said fountain-roller is rocked forward it comes in contact with a transmitting-roller, L^2, which transfers the ink from fountain-roller L to inking-cylinder M. The gudgeons of said transmitting-roller turn in shallow recesses k^4 k^4, already described, and extend outward on each side far enough to be engaged by beveled lugs l^1 l^1 on link-plates L^3 L^3, whereby said transmitting-roller L^2 is slightly elevated and lowered at each rotation of the driving-shaft and consequent backward and forward motion of said link-plates L^3. In front of roller L^2 is an ink-spreading roller, L^4, which reciprocates longitudinally upon the cylinder M, for the purpose of spreading the ink evenly thereon.

This motion is effected by the following means: The end of inking-cylinder M, away from cog-wheel M^3, is scalloped so as to present a series of projections and depressions, m m, Fig. 7, which bear against a small friction-roller, m^2, which turns in a bearing-block, l^3, to which one of the gudgeons of ink-spreading roller L^4 is attached, and in which said gudgeon is journaled. Said bearing-block l^3 is set in one of the recesses k^5 k^5, the other gudgeon of said spreading-roller being journaled in the other one of said recesses. Said bearing-block l^3 moves inward and outward with said roller, but is prevented from moving outward too far by a stop-block, l^4. On the inside of said stop-block is an inwardly-extending stud, l^5, to which is attached a helical spring, l^6, which operates to force said bearing-block l^3 and spreading-roller L^4 inward as soon as the scallops m m allow such motion.

By the combined operation of said projections and depressions m m, and said springs, an endwise-reciprocating motion of said ink-spreading roller L^4 is produced at every rotation of said inking-cylinder M. Above the front of said inking-cylinder, and in contact therewith, is a small supplemental roller or cylinder, L^5, which is journaled in the upper ends of standards I^2 I^2. Said supplemental roller L^5 compels the ink to pass in a very thin and even film from said inking cylinder M to the vertically-reciprocating set of inking-rollers I^1 in frame I. Said roller L^5 also directly transfers the ink from said cylinder to the uppermost one of said rollers I^1. Rollers L^2, L^4, and L^5 are all capable of yielding in a vertical direction, in order to avoid injury from any foreign substance which might accidentally be inserted between said rollers and inking-cylinder M. Fountain-roller L is provided at one end with a ratchet-wheel, l^7, Fig. 1, and a crank-handle, l^8. A pivoted dog, l^9, prevents said ratchet-wheel and fountain-roller from being turned backward. But when said dog is thrown back out of the way said crank-handle may be turned so as to rotate said fountain-roller backward in its trough, thereby securing a redistribution of the ink upon its surface.

The devices for feeding the paper to the gripers are as follows: To shaft N we secure two eccentrics, N^1 N^2, which turn therewith. Cam or eccentric N^1 operates against a small friction-roller, n', at the top of a vertical rod, O. the lower end of which rod is pivotally connected to the rear cross-bar of a small horizontal rocking frame, P, which is rectangular in shape and pivoted by the middle of its side bars to the inside of supporting-frame A. Said rocking frame P presses upon the pile of sheets of paper, which pile is supported by a table or platform, Q. Said table or platform is suspended from frame A by helical retracting-springs q q, so as to be self-adjusting as the pile of paper diminishes. Said table is covered with a sheet of india-rubber or similar material. The operation of eccentric N is to force rod O vertically downward; but as soon as the pressure of said cam ceases, the said rod is drawn upward by the action of a spring, O', which is coiled around said rod. Said spring O' is attached at its upper end to a lug, o, secured directly or indirectly to fixed plate G'; and said spring is attached at its lower end to the rear cross-bar of rocking frame P. Rod O passes through a perforation in lug o on plate G', and is both guided and braced thereby. The combined operation of cam N^1 and spring O' is to rock said frame P so as to transfer the pressure upon the paper alternately from the front to the rear of the sheets, and vice versa.

Eccentric N^2 operates against a small friction-roller, p, on the upper end of a curved arm, p^1, which is rigidly connected to the top of a vertical or nearly vertical rocking-frame, P, (shown in Fig. 9,) at one side thereof. Said vertical rocking frame is detachably fastened at the bottom to the weighted rear part R^1 of a paper-feeding device, R, shown in detail in Fig. 10. The under side of the front part or rubber clamp R^2 of this device is provided with a rubber feeding-pad, r, and the weighted rear part R^1 is provided with a set-screw, r^1, for regulating the angle which said hinged parts R^1 R^2 make with one another, and thereby adjusting the degree of pressure by said feeding-pad r upon the upper sheet of paper. Plate-springs r^2 r^2 act in conjunction with the screws to attain this end. Said plate-springs r^2 at one end bear against the front part of R^2 of feeding device R, and are connected to plates r^3 r^3 on the rear part R^2 of said feeding devices by means of set-screws r^4 r^4, which effect the adjustment described. P^2 designates a retracting-spring, which operates to draw the lower end of vertical vibrating frame P^1 backward, as soon as cam N^2 has ceased to force said lower end of said frame forward.

The combined operation of said cam and said spring is to give a reciprocating forward and backward motion to said feeding device R over and within said horizontal rocking frame P. Said feeding device R is provided at both ends between its parts R^1 R^2 with bearing-blocks r^5, which slide in guideways or tracks r^6 in the top of the side bars of horizontal rocking-frame P. Said guideways are provided with doubly-inclined lugs r^7. The weighted rear part R^1 of said feeding device R is extended at both ends at r^8, so as to engage with said doubly-inclined lugs r^7, and said extensions r^8 are beveled so as to be raised when they engage with said doubly-inclined lugs.

The operation of the above-described paper-feeding apparatus is as follows: The arrangement of cams N^1 N^2 is such that when horizontal rocking frame P is raised in front, relieving the pressure at that point upon the sheets of paper below, the weighted clamping device R is in its most forward position with rubber pad r resting upon the front part of the upper sheet. Simultaneously with the raising of said front part of said rocking frame P, the device R is withdrawn, taking with it the front part of the upper sheet. The front of rocking frame P then closes tightly on the front of the remaining sheets, while the rear end of said frame releases the rear part of said upper sheet, and at the same time the rubber feeding-pad r carries the said upper sheet forward to the gripers, hereinafter described. As soon as the gripers grasp said paper the weight of said feeding device R is taken off from said sheet by beveled extensions r^8 coming into contact with beveled lugs r^7, so that said paper may be easily withdrawn. This is further facilitated by a cross rod, S, (shown in cross-section in Fig. 2,) which extends across the front of frame P, a little above the same. The use of said rod is to interpose between rubber r and the sheet of paper while the gripers are withdrawing the latter, so as to prevent unnecessary friction. S′ S′ designate two vertical guard plates or bars, which extend downward from the front of rocking frame P, and prevent the sheets of paper from being pushed or otherwise moved over the front of table or platform Q. T′ T′ designate two griping-jaws, one of which is attached to a shaft, U, and the other to a tubular shaft or sleeve, U′, on said shaft U. Said shaft is journaled in projections u u on link-plates J^3 J^3, and is connected to said sleeve U′ by helical springs u' u', which operate to turn said shaft and sleeve in opposite directions, closing said griping-jaws or gripers T′ T′. The operation of curved side arms J^1 J^1, heretofore described, causes griping-jaws (as well as the shaft which carries them, and the link-plates in which said shaft is journaled) to turn inward toward the chase H at the upper end of its vertical vibration, and pause for a moment while the platen G forces said griper or griping-jaws against said chase. As said platen withdraws from said chase the said griping-jaws descend vertically, opening as they approach the lower part of their vibration, and turning inward and closing upon the upper sheet of paper as they reach the lowest point of said vibration. Said vibration is prolonged some distance below chase H, in order to enable said gripers to seize said paper. After said paper is seized the said gripers turn slightly outward again, and then rise vertically, turning inward at the upper end of their vibration, and there pausing, as described, but remaining closed until the downward motion begins and continues for a certain space, when said gripers open, as above described, and the sheet of paper (which has been printed by the pressure of platen G against the type in chase H) drops into an oscillating paper-carrier or guide-casing, V, which is open at top and bottom, and pivoted at the sides to frame A. Said guide-casing is rocked backward and forward by links or toggle-arms v v', which connect the upper part of said guide-casing to one of the sliding pedestals E, which carry the bearings of the platen-beam. Said guide-casing operates to lay the sheets of paper evenly, one by one, with their printed sides uppermost in a receptacle placed under the printing-press.

The above-described movements of the said gripers T′ T′ are produced by means of the following devices: To one end of shaft U is secured an arm, W, provided at its other end with a lateral stud, w. To the corresponding end of sleeve U′ is secured a similar arm, W′, provided likewise with a stud, w'. X designates a guide-plate, which is supported on bolts extending horizontally from frame A. Said plate is provided on its inner side with cam-guide flanges x x', which are arranged so as to engage with said studs w w' as the said studs descend. Said studs pass down through the space intervening between said flanges. Flange x, against which stud w bears, is slightly curved at the top; then nearly vertical; and, finally, inclines backward and downward. Flange x' is nearly vertical in its middle portion, and curves backward both at front and bottom, so as to leave a funnel-shaped space between said flanges at the top, terminating in a narrow curved neck. As said studs pass down said space they are pressed together by said flanges, thereby opening said griping-jaws T′ T′, and so retained until the bottom of said space is reached. Stud w' then passes out from between said flanges, (arm W′ being longer than arm W,) and spring u' operates to close said gripers. The backward inclination of flanges x x' causes said gripers to turn toward the pile of paper, as described, and the said gripers retain that position for a moment after the upper sheet is grasped. As the said arms ascend stud w' passes up outside of said guide-flanges, so as to allow said flanges to remain closed, while stud w passes up between said flanges, causing said gripers to reverse their descending path. When arms

W W′ have reached the upper end of their vertical vibration gravity draws down the ends of said arms, which carry studs *w w′*, so that said arms assume a nearly vertical position above the space between said flanges *x x′*, and studs *w w′* pass down through said space, as before.

Standards I² are made adjustable toward or from the platen, metal sheets *y y* (shown in detail in Fig. 14) being inserted behind said standards to any number required, or withdrawn, if required. In this way said standards are adapted to be used with type of any height, or composition rollers of any diameter.

The operation of the apparatus will be sufficiently clear from the description already given.

The connection between the lower ends of frame P¹ and feeding device R is preferably made by means of studs p^2 on said frame and slots r^9 r^9 in said feeding device.

The vertical movement of the table Q is regulated by means of guide-rods q^1 q^1, which slide in sleeves q^2 q^2, secured to the main frame A.

What we claim as new, and desire to secure by Letters Patent, is—

1. The sliding pedestals E, having frames *e*, provided with lugs j^2, in combination with rocking disks D′, connecting-rods D, fixed guide-tracks E′, link-bar F′, and roller-frame I, substantially as described, and for the purpose set forth.

2. In ink-reservoir K, the combination of flat plate *k*, curved flange k^1, semi-cylindrical casing k^2, screw-threaded rod or stud k^3, and adjusting-nut k^7, substantially as set forth.

3. Inking-cylinder M, having projections and depressions *m m* on one of its ends, in combination with the sliding block l^3, friction-roller m^2, stop-block l^4, spring l^6, and distributing-roller L⁴, substantially as described, and for the purpose set forth.

4. The wheel C, having a cam-groove on its inner face, in combination with the rocking frame J, having a lug engaging in said cam-groove, and provided with link-plates J³, pivoted to the inking-roller frame I, and the griper-shaft U, journaled in lugs of the link-plates, substantially as described, and for the purpose set forth.

5. Side arms J¹ J¹ of rocking frame J, in combination with link-plates J³ J³, ink-roller frame I, and gripers T′ T′, carried by a shaft, pivoted in lugs on link-plates J³ J³, substantially as set forth.

6. Sliding frames *e e*, provided with lugs j^2 j^2, in combination with composition-roller frame I, rocking arms J¹, and link-plates J³ J³, for the purpose of holding the composition-rollers in position to be inked, substantially as set forth.

7. The swinging gripers T′ T′, depending from the shaft U, and sleeve U′, in combination with the platen G, provided with the recess g^2, substantially as described, and for the purpose set forth.

8. Plate X, having cam-guide flanges *x x′*, in combination with studs *w w′* in arms W W′, shaft U, sleeve U′, spring *u′*, and the gripers, substantially as set forth.

9. The combination of horizontal rocking frame P with table Q and a feeding device consisting of weight R¹ and rubber clamp R², substantially as set forth.

10. Horizontal rocking-frame P, provided with tracks r^6 and beveled lugs r^7, in combination with feeding device R, having beveled extensions r^8, said devices being arranged to operate so that frame P frees the forward part of each sheet when device R draws it back, and frame P frees the rear part of said sheet when device R feeds the said sheet forward, substantially as set forth.

11. The combination of frame P and feeding device R with a cross-rod, which is arranged to interpose between rubber feeding-pad *r* and the sheet of paper which is being fed forward, substantially as and for the purpose set forth.

12. The combination of cam N¹ on shaft N with rod O, spring O′, and frame P, substantially as set forth.

13. The combination of cam N¹ in shaft N with vertical vibrating frame P¹, and feeding device R, for the purpose of giving a backward and forward motion to said device, substantially as set forth.

14. The combination of weight R¹ with rubber holding-clamp R² and adjusting-screws and springs for regulating the pressure of rubber feeding-pad *r* upon the paper, substantially as set forth.

15. Oscillating paper carrier or guide casing V, in combination with links *v v′*, and sliding platen-supporting pedestal E, substantially as set forth.

16. Oscillating fountain-roller L, in combination with bearings *l l* and link-plates L³ L³, having beveled lugs l^1 l^1, eccentrically attached to disks m^1 m^1 of the inking-cylinder M, and roller L², substantially as described, and for the purpose set forth.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

JULIUS E. BRAUNSDORF.
CHARLES KAISER.

Witnesses:

JOHN H. BRAUNSDORF,
JAMES SERVEN.