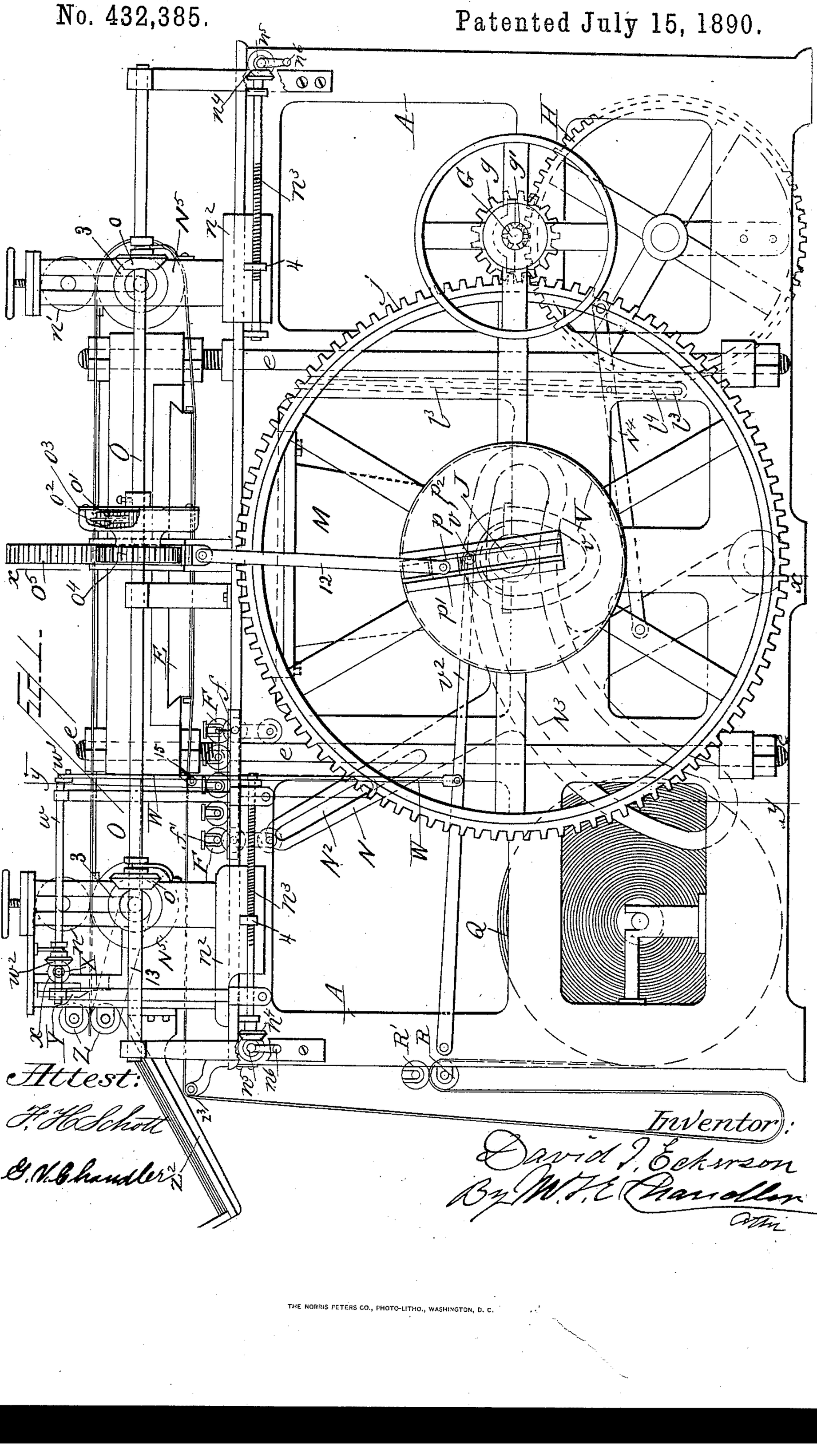
(No Model.)

7 Sheets—Sheet 1.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.



Attest:
F. H. Schott
G. W. Chandlee

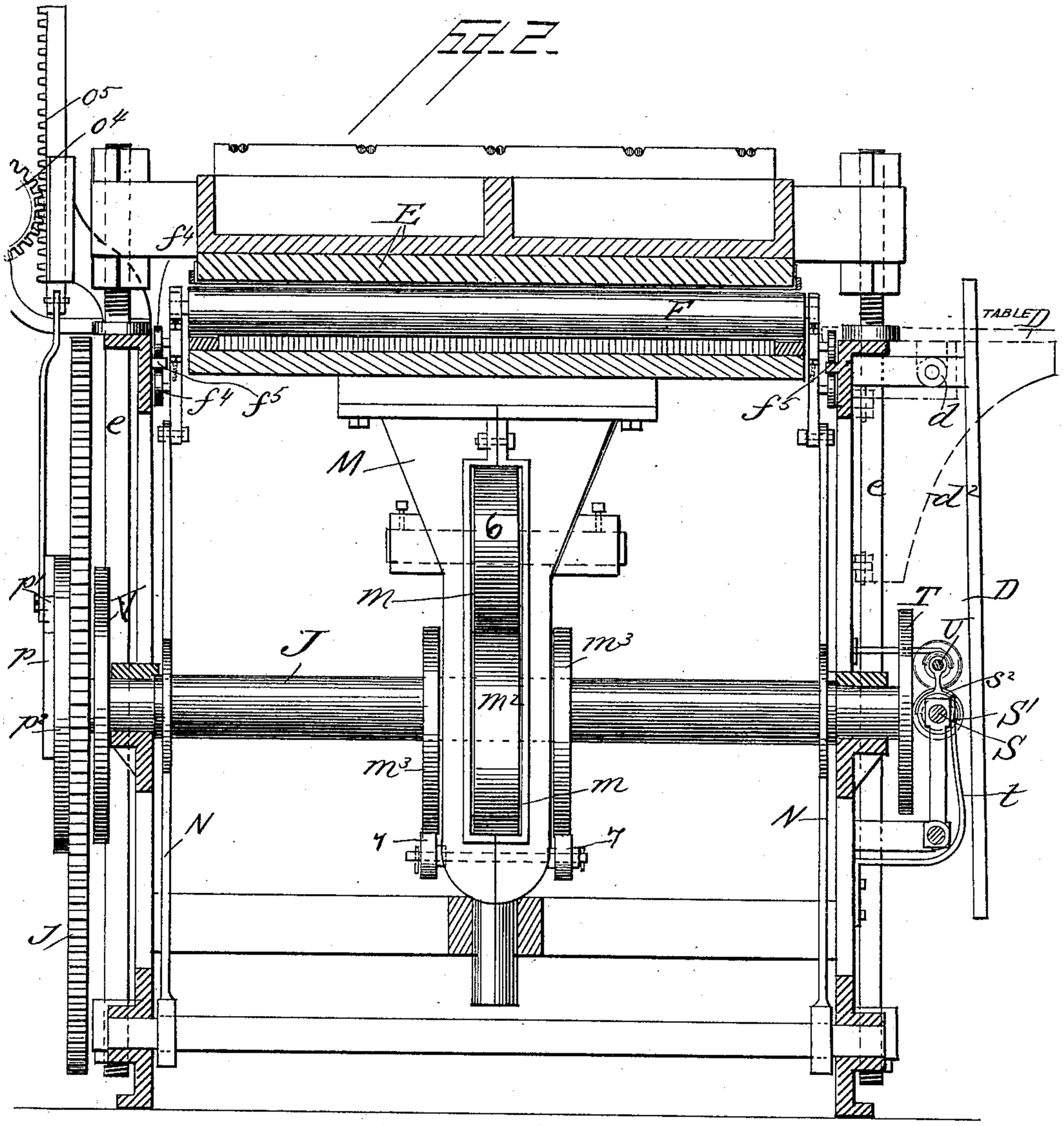
Inventor:
David I. Eckerson
By W. T. E. Chandlee
Attn

(No Model.) 7 Sheets—Sheet 2.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.



Attest:

F. H. Schott

G. W. Chandlee

Inventor:

David I. Eckerson

By W. W. Chandlee

Atty

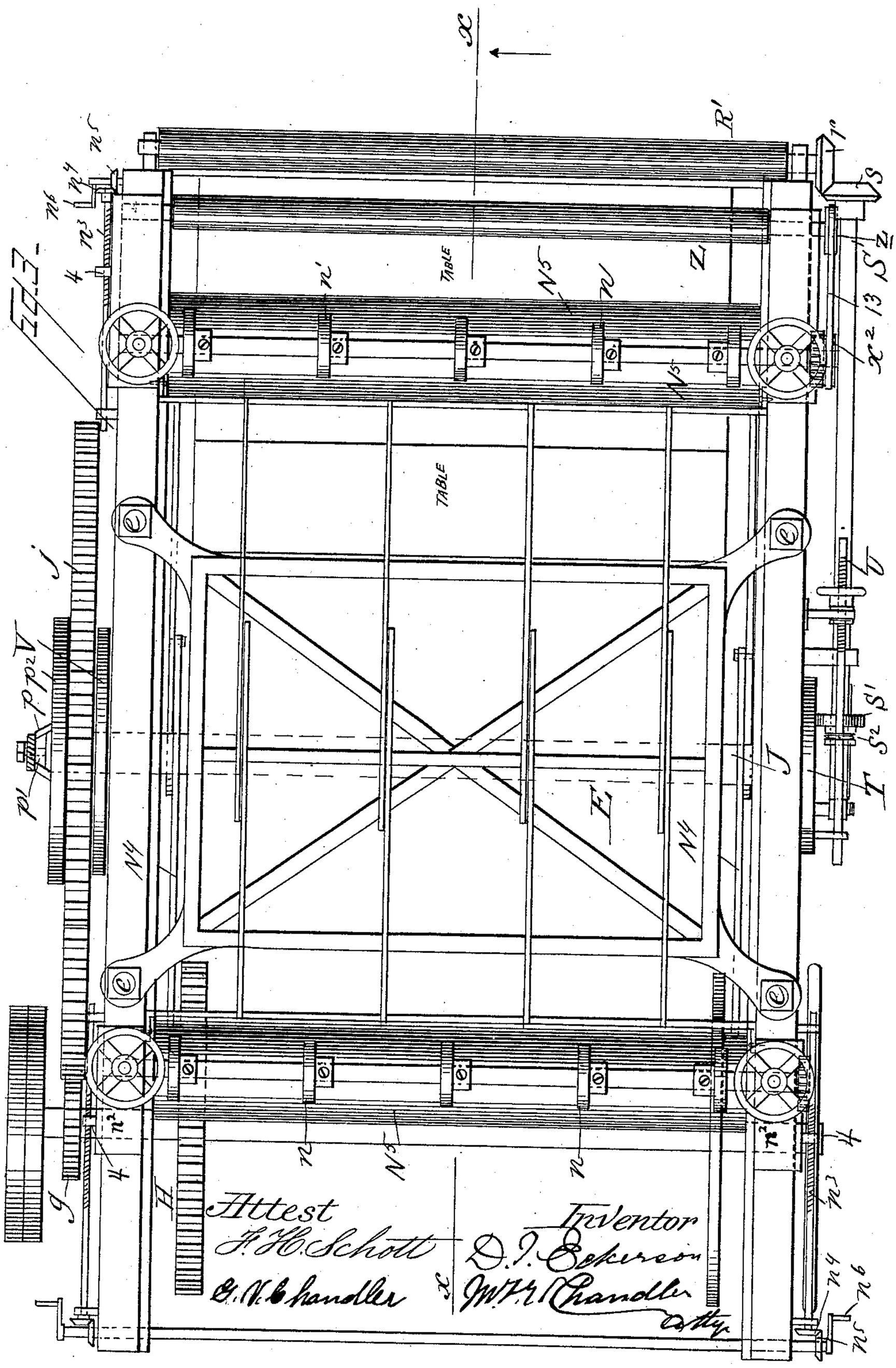
(No Model.)

7 Sheets—Sheet 3.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.



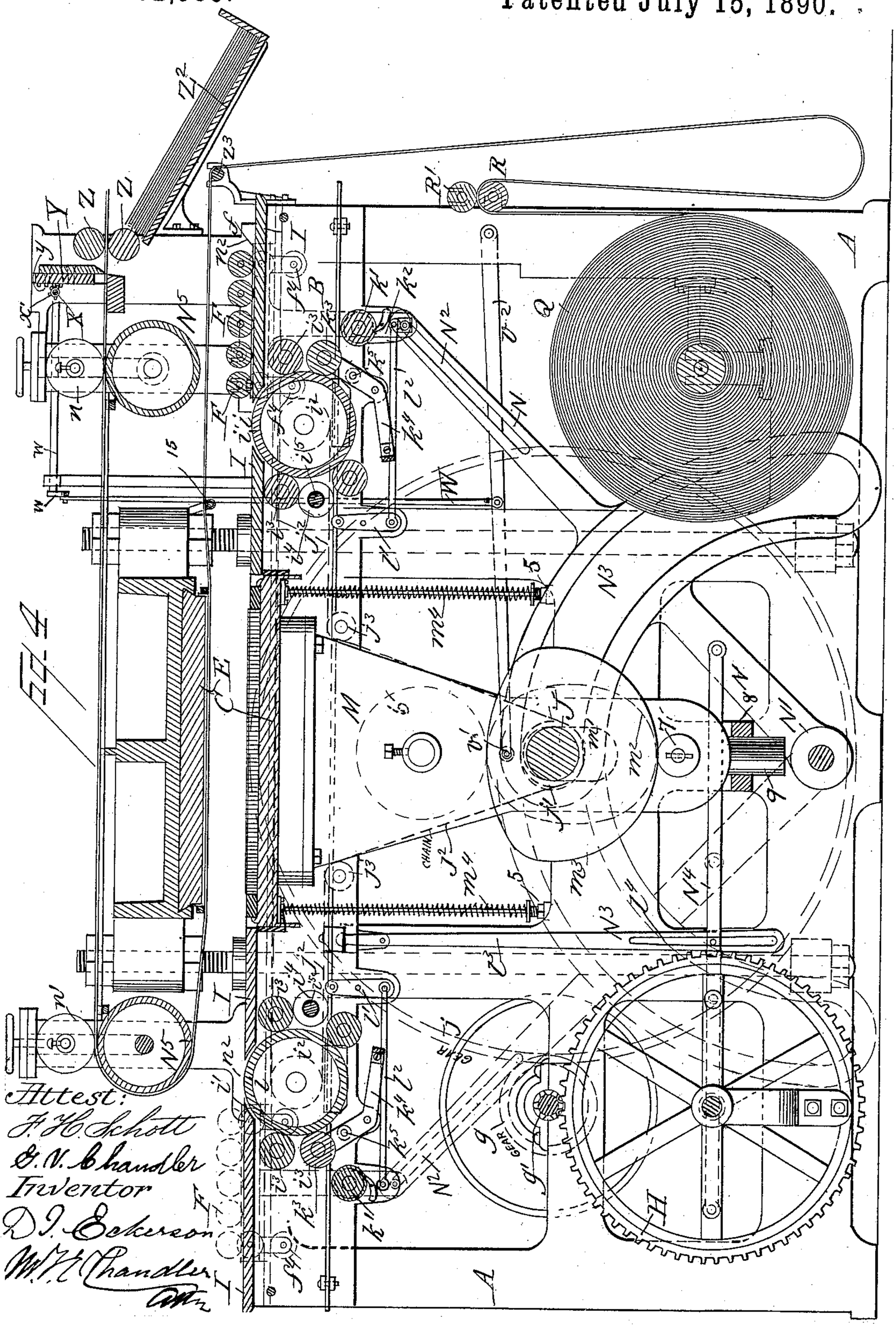
(No Model.)

7 Sheets—Sheet 4.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.

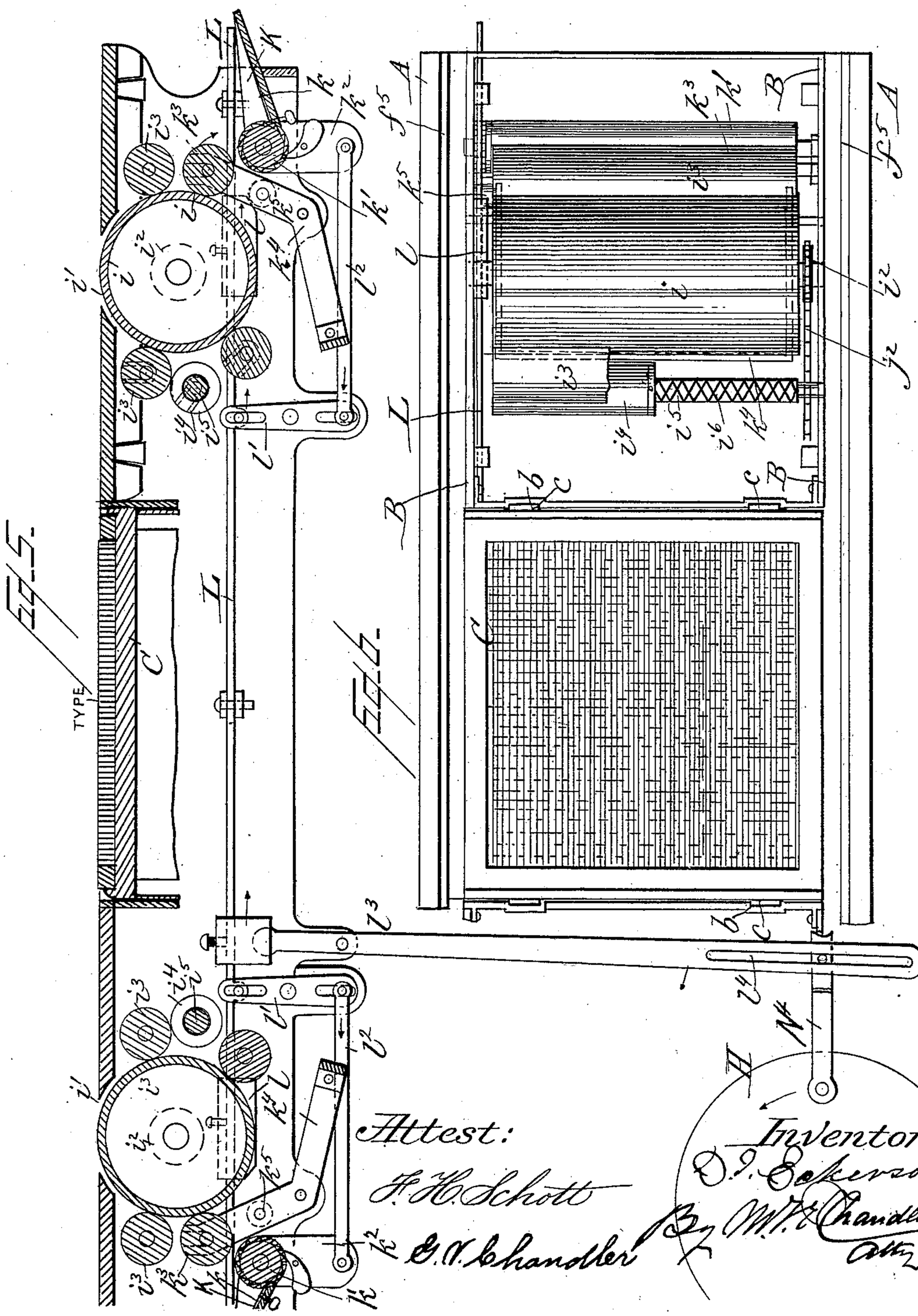


(No Model.) 7 Sheets—Sheet 5.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.



(No Model.) 7 Sheets—Sheet 6.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.

Fig. 7.

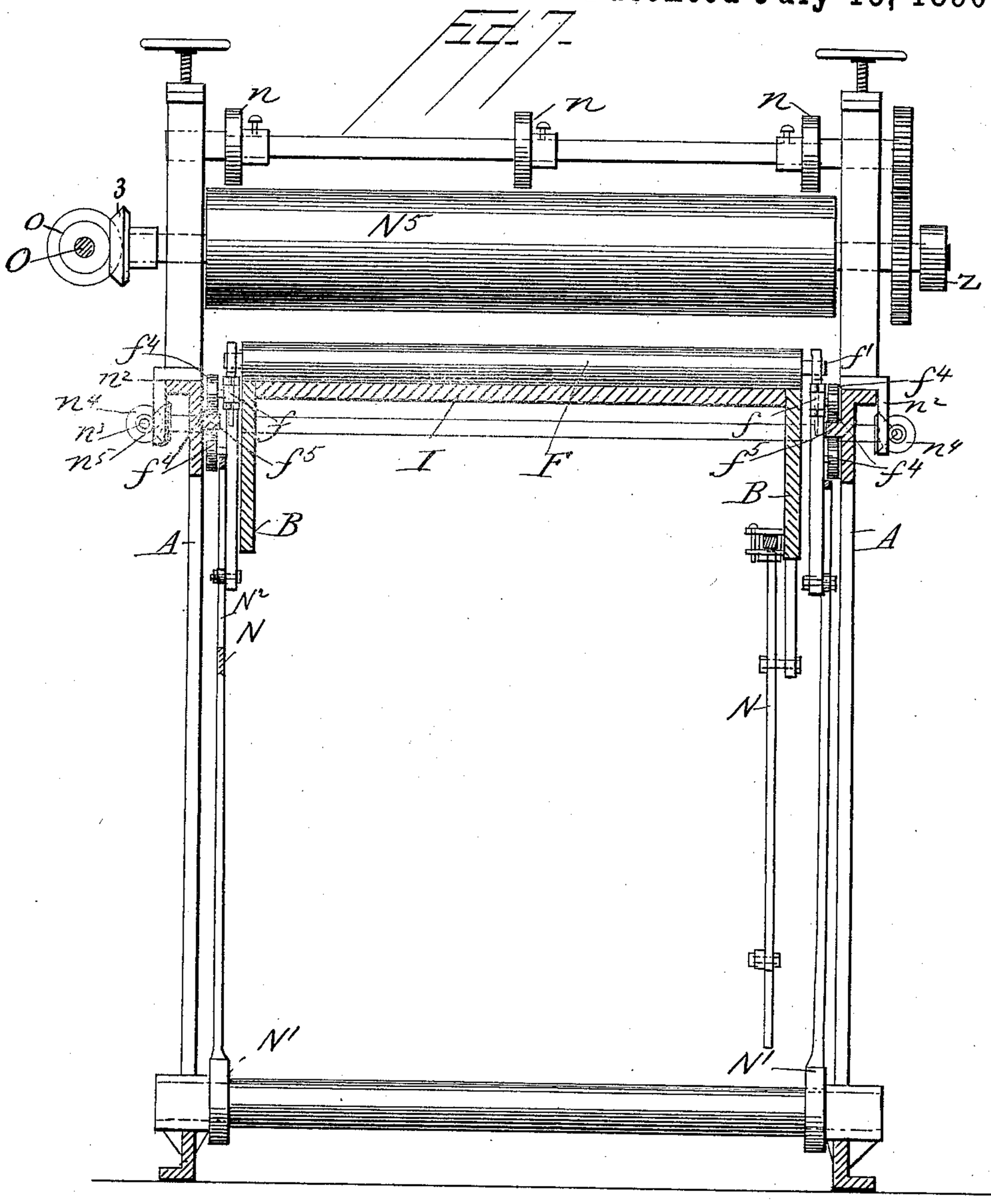


Fig. 8.

Attest:
F. H. Schott.
G. W. Chandler.

Inventor:
David I. Eckerson
By W. T. C. Chandler
Atty

(No Model.)

7 Sheets—Sheet 7.

D. I. ECKERSON.

PRINTING PRESS.

No. 432,385. Patented July 15, 1890.

Fig. 9.

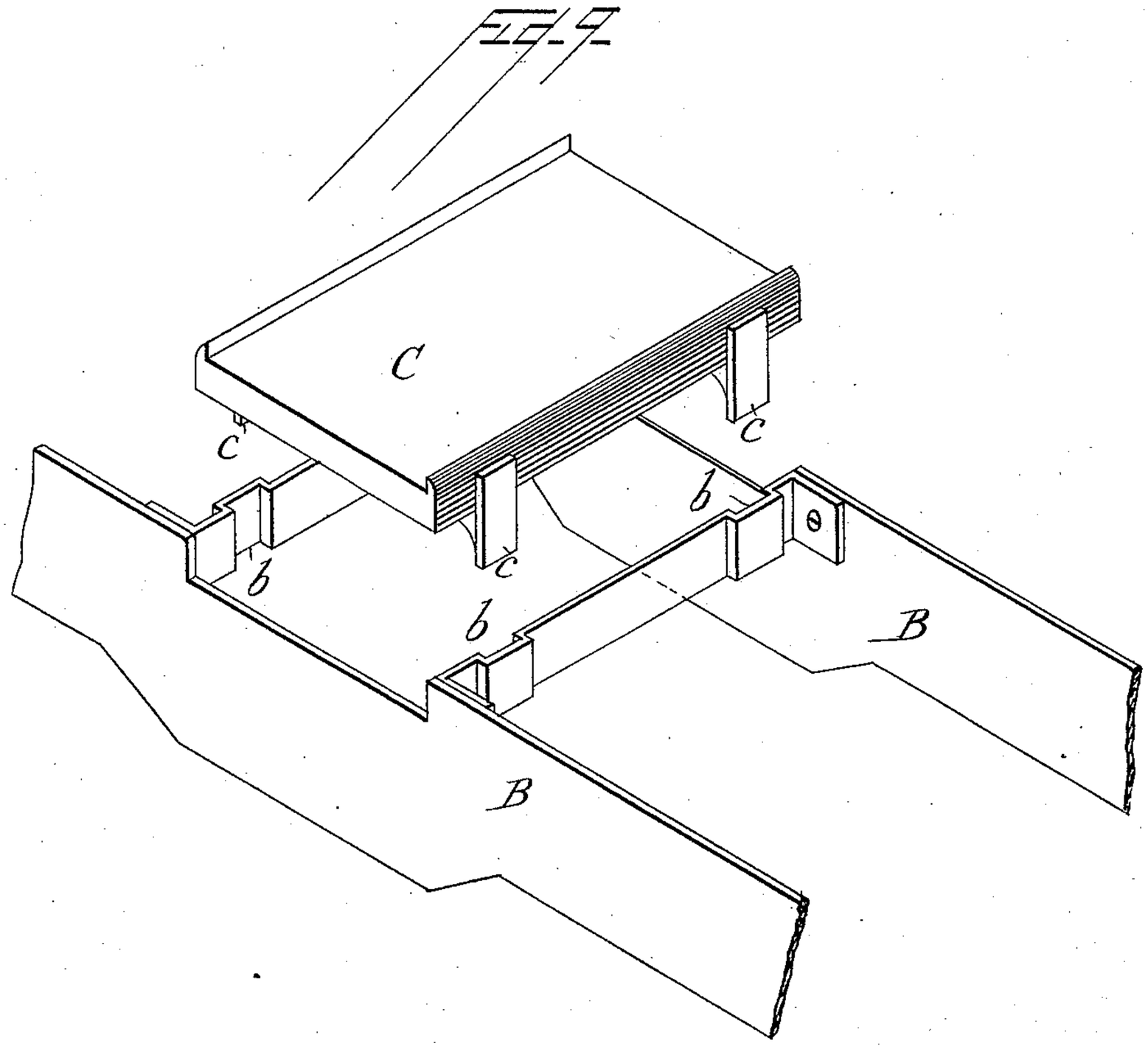
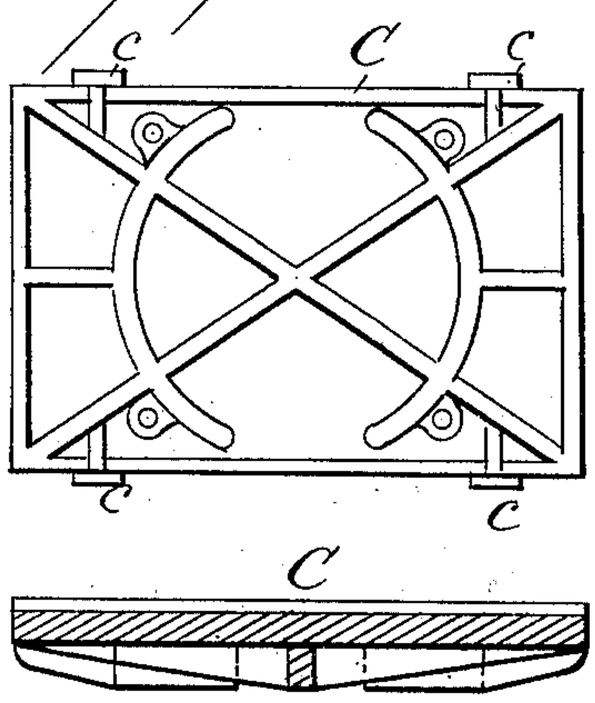


Fig. 10.



Attest:

F. H. Schott

G. W. Chandler.

Inventor:

David I. Eckerson

by M. M. Chandlin

Atty

UNITED STATES PATENT OFFICE.

DAVID I. ECKERSON, OF WORCESTER, NEW YORK.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 432,385, dated July 15, 1890.

Application filed July 3, 1889. Serial No. 316,406. (No model.)

To all whom it may concern:

Be it known that I, DAVID I. ECKERSON, a citizen of the United States, residing at Worcester, in the county of Otsego and State of New York, have invented certain new and useful Improvements in Printing-Presses; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of printing-presses designed to print upon a roll of continuous paper fed into the machine by suitable mechanism, and it is an improvement on a press for which I received Letters Patent of the United States, dated August 7, 1888, No. 387,500.

The object of the invention is to produce a less complicated press than that shown in the patent mentioned, and one in which the various mechanisms will receive power directly or very nearly directly from a shaft located about centrally on the frame; and it consists in the construction and novel combination of parts hereinafter described, illustrated in the drawings, and pointed out in the claims hereto appended.

In the accompanying drawings, in which similar letters and numerals of reference in the various figures represent corresponding parts, Figure 1 represents a side view of a press embodying the invention. Fig. 2 represents a vertical transverse section on the line *x x* of Fig. 1, certain portions of the mechanism being omitted for the sake of clearness. Fig. 3 represents a general plan view of the machine. Fig. 4 represents a vertical longitudinal section on the line *x x* of Fig. 3. Fig. 5 represents a vertical longitudinal section of the roller-inking mechanism. Fig. 6 represents a plan view of part of said mechanism. Fig. 7 represents a vertical transverse section on the line *y y* of Fig. 1. Fig. 8 represents detail views of the inking-rollers. Fig. 9 represents perspective views of the type-bed and inner frame of the machine. Fig. 10 represents a reversed plan and a section of the type-bed.

In the following description the different mechanisms will, as far as possible, be described separately, for the sake of clearness and to enable the complete machine to be more easily understood.

Referring to the drawings by letter, A designates the main frame of the machine, of general rectangular shape and having various transverse and longitudinal portions for the support or formation of the bearings of the various shafts of the machine.

B is an inner frame, similar to that in my patent referred to, and having on its transverse plates recesses or grooves *b*, Fig. 9, for the reception of the vertical lugs *c* of the type-bed C. The said bed is re-enforced by ribs on its lower surface, as shown in Fig. 10.

D, Fig. 2, is a chase table or platform having on its lower or inner surface, near its upper or inner end, the lugs *d*, pivoted by a rod upon lugs standing out from the adjacent side of the main frame, and d^2 is a vertical bracket hinged to the side of the main frame at a proper point to permit it to be turned under the chase-table when the latter has been turned into a horizontal position and flush with the type-bed when depressed, the said table then resting on the straight horizontal edge of the bracket. By means of the table and bracket the chase may be slid from the table D immediately upon the type-plate, which the table adjoins, and between the vertical flanges thereon. The bracket may then be turned inward and the table falls into a vertical position out of the way.

E is the platen, having preferably a removable impression-plate attached to it and sliding in dovetailed grooves in its inner surface. The plate is held above the type-bed by the vertical bars *e*, that pass through openings in its corner-arms, Fig. 3, and in lugs on the main frame, the ends of said rods being threaded and engaging suitable nuts above and below said lugs, Fig. 1.

F F are the inking-rollers supported upon a carriage *f*, having central depending arms provided at their lower ends, Fig. 8, with anti-friction rollers, as shown. The said rollers are journaled in forked bearings *f'*, rounded within to receive the journals of the rollers, and having depending threaded central arms

which pass through suitable vertical openings in the floors of the carriages and engage nuts above and below said floors, by means of which nuts the rollers can be adjusted to proper heights above the carriages in the usual well-known manner.

f^2 f^2 are blocks which fit in the forks above the journals of the rollers, having concave lower ends to fit upon said journals and flanged at their upper ends to abut against the upper ends of the forks, and f^3 f^3 are eye-screws that pass through the arms of the forks and the blocks and serve to hold the blocks in place and take up wear between the journals and bearings.

f^4 f^4 are wheels or rollers mounted on arbors standing outward from the edge of the carriages f and from short arms depending therefrom, Fig. 7. The said wheels are arranged in pairs, the members of which rest, respectively, above and below the horizontal way-flanges f^5, standing inward from the main frame between the same and the inner frame B.

The mechanism by means of which the inking carriage and rollers are reciprocated between the inking-tables over the type in the bed is constructed as follows: G is the transverse driving-shaft journaled in bearings on the main frame toward one end thereof and carrying a suitable driving-pulley and the pinions g g', respectively. The smaller pinion g' meshes with a gear-wheel H, that has its shaft journaled at a proper point upon the main frame, the large pinion g meshing with a large gear-wheel j, mounted on a shaft J, hereinafter described, from which the intermittent feed mechanism and the cutting mechanism take motion. N N are levers with their lower ends secured to the ends of a sleeve N′, Fig. 7, that turns upon a bar connecting the sides of the main frame at the central lower part thereof. The upper portions of the said levers or arms are provided with long longitudinal slots N^2, into which enter the anti-friction rollers of the depending arms of the inking-carriage. The levers N are provided at proper points with segmental portions concentric with their pivoted points on the sleeve N′ and provided with the concentric slots N^3, through which passes the shaft J, so that said shaft will not prevent the levers from vibrating. N^4 is a pitman connecting the gear-wheel H at a point a suitable distance from its center with the lever N on the same side of the main frame below its segmental part, so that the rotation of said gear-wheel will cause the levers to vibrate and the inking or roller carriage to reciprocate between the inking-tables over the type in the bed.

The roller-inking mechanism is constructed as follows: I I are the inking-tables secured to the main frame—one each side of the type-bed and preferably aligned therewith—and i i are transverse inking-cylinders journaled in the main frame below said tables, which are provided with transverse slots i', through which the circumferences of the corresponding inking-cylinders i protrude, in order to come in contact with the inking-rollers when passing over the tables. Upon the shaft of each inking-cylinder, between the end thereof and the adjacent bearing, is mounted a sprocket-wheel i^2, Fig. 6. J is a transverse shaft journaled in the central part of the main frame above the sleeve N′, and j' is a sprocket-wheel mounted on said shaft below and in the same vertical plane as the sprocket-wheels i^2. j^2 is a chain passing around the sprocket-wheel j' and over the directing sprocket-wheels j^3, journaled upon the main frame at suitable points. It is evident that when the shaft J is rotated by means of the gear-wheel j and intermeshing pinion g on the driving-shaft the chain j^2 will be caused to travel and will rotate the inking-cylinders. i^3 i^3 are any number of small transverse inking-cylinders journaled in the main frame in contact with the inking-cylinders i and rotated thereby, in order to distribute the ink thereon, and i^4 i^4 are inking-cylinders about half as long as the inking-cylinders i or i^3, mounted on the shaft i^5, provided with the oppositely-threaded continuous grooves i^6, Fig. 6. The cylinders i^4 are in contact with adjacent cylinders i^3 and thereby are caused to rotate, and by means of pins or anti-friction rollers projecting from them into the grooves i^6 are caused to reciprocate back and forth on the shaft i^5 and more perfectly distribute the ink on the cylinders I.

The mechanism for feeding the cylinders i is constructed as follows: K is an ink well or trough secured to the main frame below each inking-table and corresponding cylinder I, and k is a spring-plate secured at its outer edge to the inclined floor of said well, with its free edge rendered adjustable up and down by means of suitable screws passing through threaded openings in said floor. By means of said adjustment the said free edge is brought more or less tightly into contact with the surface of an ink-delivering cylinder k', having a ratchet on one end, which ratchet is engaged by a pawl secured to a swinging bar k^2, pivoted at its upper end to the side of the main frame. As the said delivery-roller rotates, it will carry more or less ink out of the ink-well, according to the adjustment of the spring-plate. k^3 is a cylinder mounted on a pivoted angle-frame k^4, Fig. 5, the lower arm of said frame being heavier than its upper arm, and the cylinder k^3 not being able to come into contact with the cylinders i and k' simultaneously, but being normally in contact with the cylinder I on account of the weight of the lower arm of the frame k^4, upon the upper arm of which is mounted an anti-friction roller k^5. L is a horizontal rod reciprocating in bearings on the main frame and having mounted upon it the horizontally-adjustable sleeves l, beveled at their lower ends to make contact with depressions and pass over the corresponding anti-friction rollers k^5. l' l' are

rods pivoted about centrally to the main frame, having their upper ends connected directly to the rod L and their lower ends connected to the lower ends of the corresponding swinging bars k^2 by the pivoted links l^2. l^3 is a lever, with its upper end forming a ball-and-socket joint, with a sleeve adjustable on the reciprocating rod L, pivoted a suitable distance below said end on the main frame, and provided in its lower end with a longitudinal slot l^4, into which enters a pin on the pitman N^4, so that the rotation of the gear-wheel H will vibrate said lever l^3, and consequently reciprocate the rod L, causing the cylinder k' to rotate intermittently and the cylinder k^3 to alternately make contact with the cylinders k' and I, thereby conveying ink from the former to the latter.

The mechanism for vertically reciprocating the type-bed is constructed as follows: M is a vertically-reciprocating hollow standard beveled to and depending from the type-bed, having an upper reversed conical portion and a lower cylindrical portion, and provided with longitudinal slots m m', respectively, facing the ends and sides of the main frame. The said standard is preferably made in two equal longitudinal sections bolted together for more ready insertion of the interior parts, and has at its lower end a depending cylindrical guide-stem 9, which enters a cross-bar of the main frame. The shaft J passes through the slot m' and has mounted thereon the cam m^2 within the slot m, which cam bears upward against an anti-friction roller 6, Figs. 2 and 4, mounted upon and within the standard, and elevates the standard and type-bed toward the platen. The said shaft has also mounted upon it on each side of the standard the cams m^3, which bear downward on anti-friction rollers 7, journaled on the sides of the standard and thereby depress the latter. This mechanism is similar to that shown and described in my patent before referred to. The combined weights of the standard and type-bed are counterbalanced by the spiral springs m^4, that surround the vertical rods, Fig. 4, descending from the corners of the bed-plate, with their threaded lower ends passing through externally-threaded nuts 5, that engage in threaded openings in lugs on the main frame, and by means of which the tensions of the springs m^4 may be adjusted.

It is well known that in printing upon a continuous roll the feed must be intermittent, the paper necessarily being at rest while the impression is being taken.

The mechanism to produce the intermittent feed is constructed as follows: N^5 N^5 are the lower feed-rollers journaled in fixed bearings in standards rising from carriages n^2, mounted and rendered adjustable on the main frame by means of the screw-rods n^3, the bevel-gears n^4 n^5, the crank-handle n^6 on the shaft of the latter gear, and traveling nuts 4, depending from the carriages n^2 and engaging the corresponding screw-rods respectively in front and in rear of the type-bed, and n n' are the corresponding upper intermittent rollers secured by means of set-screws passing through threaded openings in their hubs upon shafts journaled in adjustable bearings in said standards, the said upper rollers being arranged in sets, as shown in Fig. 7, while the lower rollers are single and extend between opposite bearings. At one side the shafts of the upper and lower rollers are provided with intermeshing gear-wheels, the upper rollers taking motion from the lower rollers. The opposite ends of the shafts of the lower rollers have bevel gear-wheels 3 mounted upon them that mesh with similar bevel gear-wheels o, mounted upon a longitudinal shaft O, journaled in bearings in standards rising from the ends of the main frame on the side bearing the driving-gearing, Figs. 1 and 2. On said shaft O is secured, by a set-screw passing through a threaded opening in its boss, a ratchet-wheel o', engaged by a spring-controlled pawl o^2, pivoted to and within a casing o^3, attached by screws or otherwise to a pinion o^4, turning loosely on the shaft O. The said pinion engages a rack o^5, arranged to reciprocate vertically between guide-strips secured to the side of the main frame. The said rack is pivoted at its lower end to the upper end of a pitman 12, Fig. 1, the lower end of which is provided with a swiveled block p, resting in a longitudinal groove in a radial guide-strip p', secured to a disk p^2 on the corresponding end of the shaft J, so that the rotation of said disk will, by means of the pitman, reciprocate the rack and partially rotate the pinion o^4 alternately in opposite directions, and by means of the ratchet o' and pawl o^2 cause the shaft O to intermittently rotate in one direction, so that the paper from the roll will be alternately moved and brought to rest, the latter happening during the time that the type-bed is moved upward to make the impression. Q is the roll of paper wound on a suitable transverse shaft journaled within the main frame. From the roll the paper passes upward and between the feed-rollers R R', that feed continuously and not intermittently. A bevel gear-wheel r is secured on the end of the lower roller R on the sides of the machine opposite that carrying the gearing. The gear-wheel r meshes with a similar gear-wheel s on the horizontal shaft S, journaled in bearings in brackets standing out from the adjacent side of the main frame. The said shaft carries a friction-roller s', provided with a circumferential groove s^2 in its boss, Fig. 3. The said friction-roller is splined on the shaft S, so that it can be moved lengthwise but not turn thereon, and impinges against the face of a friction-wheel T on the adjacent end of the shaft J, from which the shaft S consequently takes motion, the curved spring t, Fig. 2, which has its lower end secured to the side of the main frame, bearing on the shaft S and keeping the friction-roller s' from losing or breaking contact

with the friction-wheel T. The said roller is moved farther outward or inward from the center of the said wheel to increase or diminish the speed of the shaft S (and consequently the speed of feed of the rollers R R′) by means of the screw-rod U, that is supported in suitable bearings in brackets or lugs secured to the main frame, and has one end bent downward and bifurcated to enter the circumferential groove s^2 in the hub of the friction-roller s. The feed-rollers R R′ are of about one-half the diameter of the sets of rollers N^5 n and N^5 n'. The latter feed intermittently.

The paper-cutting mechanism of the machine is constructed as follows: V is a cam secured to the shaft J at a proper point, and provided in one side with the eccentric cam-groove v, in which enters a pin or button v' on the inner end of a lever v^2, the outer end of which is pivoted to the main frame, Fig. 1. The lower end of a vertical rod W is pivoted at a proper point on said lever, while its upper end is pivoted to the pin of a crank w' on the adjacent end of a horizontal longitudinal oscillating shaft w, that turns in bearings at the upper ends of standards rising from the front end of the main frame. The shaft w has on its outer end a bevel gear-wheel w^2, that meshes with a similar bevel gear-wheel x on the adjacent end of a transverse oscillating shaft X, supported in bearings in standards rising from the main frame, and carrying on its end opposite the gear-wheel x the segmental gear x', Fig. 4, that meshes with the straight rack y, secured to the inner surface of the vertical knife-blade Y, reciprocating between suitable guides attached to the standards rising from the main frame. When the lever v^2 is vibrated by the rotation of the cam V, the rod W is reciprocated and swings the crank w', thereby oscillating the shaft w, and consequently the shaft X and segmental gear x^2 thereon, the latter reciprocating the knife Y by means of the rack y. Z Z, Fig. 3, are outward delivery-rollers journaled in bearings secured to standards rising from the main frame. The lower of said rollers has on one end of its shaft a pulley z, Fig. 3, which is rotated by a belt 13 from a similar pulley x^2 on the shaft of the lower intermittent roller N at the front of the machine. The rollers Z are outward from the knife Y, and after the lengths of paper have been severed from the strip by the latter deliver said lengths into the outwardly and downwardly inclined receptacle z^2 below said rollers. The strip of paper from the roll Q, after passing between the continuous feed-rollers R R′, forms a depending loop, the upper end of which bends over a small directing-roller z^3, journaled in brackets secured to the main frame, and thence passes between the type in the bed and the impression-plate, being held up and guided by rollers 15, similar to the rollers z^3 on each side of the platen. It then passes behind and around the rear lower intermittent roller N^5 and between said rollers n', whence it passes frontward between the front rollers N^5 n. The lengths are then cut off by the knife Y and are delivered into the receptacle z^2 by the rollers Z, as described.

The parts are so arranged that the knife mechanism acts when the type-bed is raised and the intermittent rollers are at rest, and the inking mechanism acts when said bed is depressed and said rollers are in motion.

In this machine the inking carriage and rollers travel over the type in a direction longitudinal to the machine, and therefore parallel to the direction in which the strip of paper travels.

The parts are so arranged and adjusted that the delivery-rollers are caused to act just after the knife Y has severed a length from the strip of paper, for being operated from the intermediate feed-rollers they start and stop simultaneously. It will be seen by noticing the arrangement in Fig. 1 that the feed stops just before the knife reaches the cutting-point.

Having thus described my invention, I claim—

1. In a printing-press, the combination of a chase table or platform pivoted to the side of the main frame in position to be turned up horizontally and flush with the adjacent edge of the type-bed when depressed, and a suitable support connected to the main frame capable of being moved under said table or platform when so raised, substantially as specified.

2. In a printing-press, the combination, with the main frame and the type-bed, of the horizontally-pivoted chase table or platform, and the vertical hinged bracket capable of being turned under said table or platform when the latter is raised, substantially as specified.

3. In a printing-press, the combination, with the main frame and type-bed, of the chase table or platform D, having the perforated lugs d near its its upper or inner edge pivoted by means of a horizontal rod to similar lugs standing out from the adjacent side of the main frame, and the vertical bracket d', hinged to said side in proper position to be turned under and support the said table or platform when the latter is raised to a horizontal position flush with the depressed type-bed, substantially as specified.

4. In a printing-press, the combination of the ink-well K, secured to the main frame below the inking-table, the adjustable spring-plate secured to the inclined floor of said well, the ink-delivering cylinder k', secured in such a manner as to come in contact with the outlet of said well and having a ratchet attached to one end which engages with a pawl secured to the swinging bar k^2, pivoted at its upper end to the side of the main frame, the lever l', pivoted to the main frame and connected with the swinging bar by the link l^2, the rod L for operating said lever l', and the cylinder k^3, mounted on a pivoted angle-frame

k^4, weighted at its lower end and operated by the sleeve l on the rod L, substantially as and for the purpose specified.

5. In a printing-press, the combination, with the pinion g' on the driving-shaft, and the gear-wheel H, meshing with said pinion, of the inking-carriages having central depending arms provided with pins or anti-friction rollers on their ends, the vibratory levers pivoted at their lower ends upon a cross-bar of the main frame, provided with central slotted segmental portions for the passage of the central shaft J, and having longitudinal slots in their upper portions to receive the pins or anti-friction rollers, and the pitman connecting one of said levers with the gear-wheel H, so that the rotation of said gear-wheel will vibrate the levers, substantially as specified.

6. In a printing-press, the combination, with the reciprocating rod L and the roller-inking mechanism actuated thereby and constructed substantially as described, of the gear-wheel H, rotated by a pinion on the main shaft, the pitman n^4, actuated by said wheel, and the lever l^3, with its upper end loosely connectd to the rod L, pivoted below said end to the main frame and provided in its lower portion with a longitudinal slot, into which a pin or anti-friction roller on the pitman enters, substantially as specified.

7. The combination, with the vertically-reciprocating knife, the straight rack thereon, the oscillating shaft X, the segmental gear x' and bevel gear-wheel x thereon, the oscillating shaft w and the crank w', and bevel-gear w^2 thereon, of the vertical rod W, pivoted at its upper end to said crank, the cam on the shaft J, having an eccentric cam-groove, and the lever v^2, having a pin or button to enter said groove, pivoted at its outer end to the main frame and having the lower end of the rod W pivoted upon it at proper point, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID I. ECKERSON.

Witnesses:
T. W. REYNOLDS,
C. S. JUDD.