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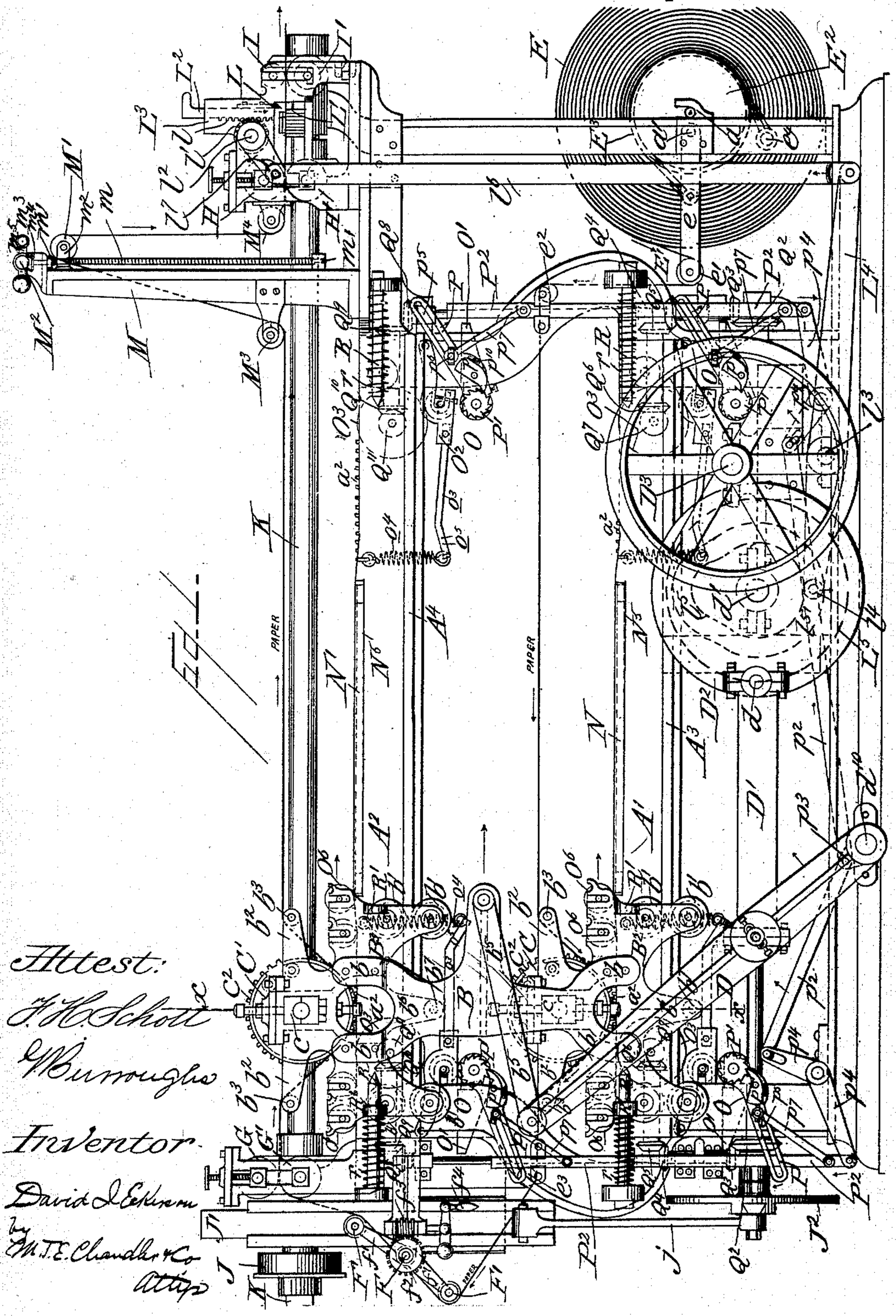
D. I. ECKERSON.

PRINTING PRESS.

No. 483,377. Patented Sept. 27, 1892.



Attest:
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(No Model.)

9 Sheets—Sheet 2.

D. I. ECKERSON.

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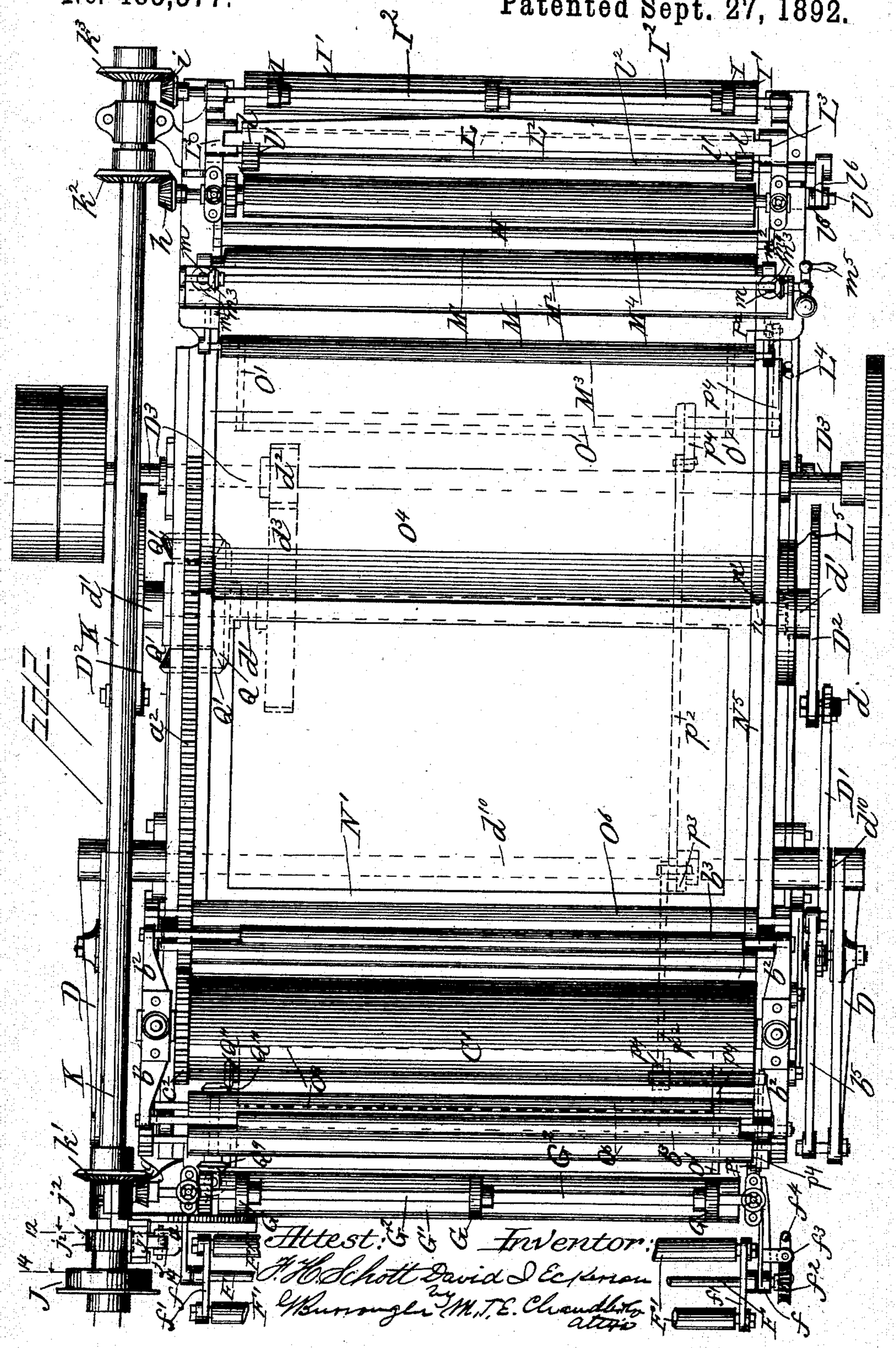

Attest: F. H. Schott G. Burroughs

Inventor: David I. Eckerson

by M. T. E. Chandlee atty

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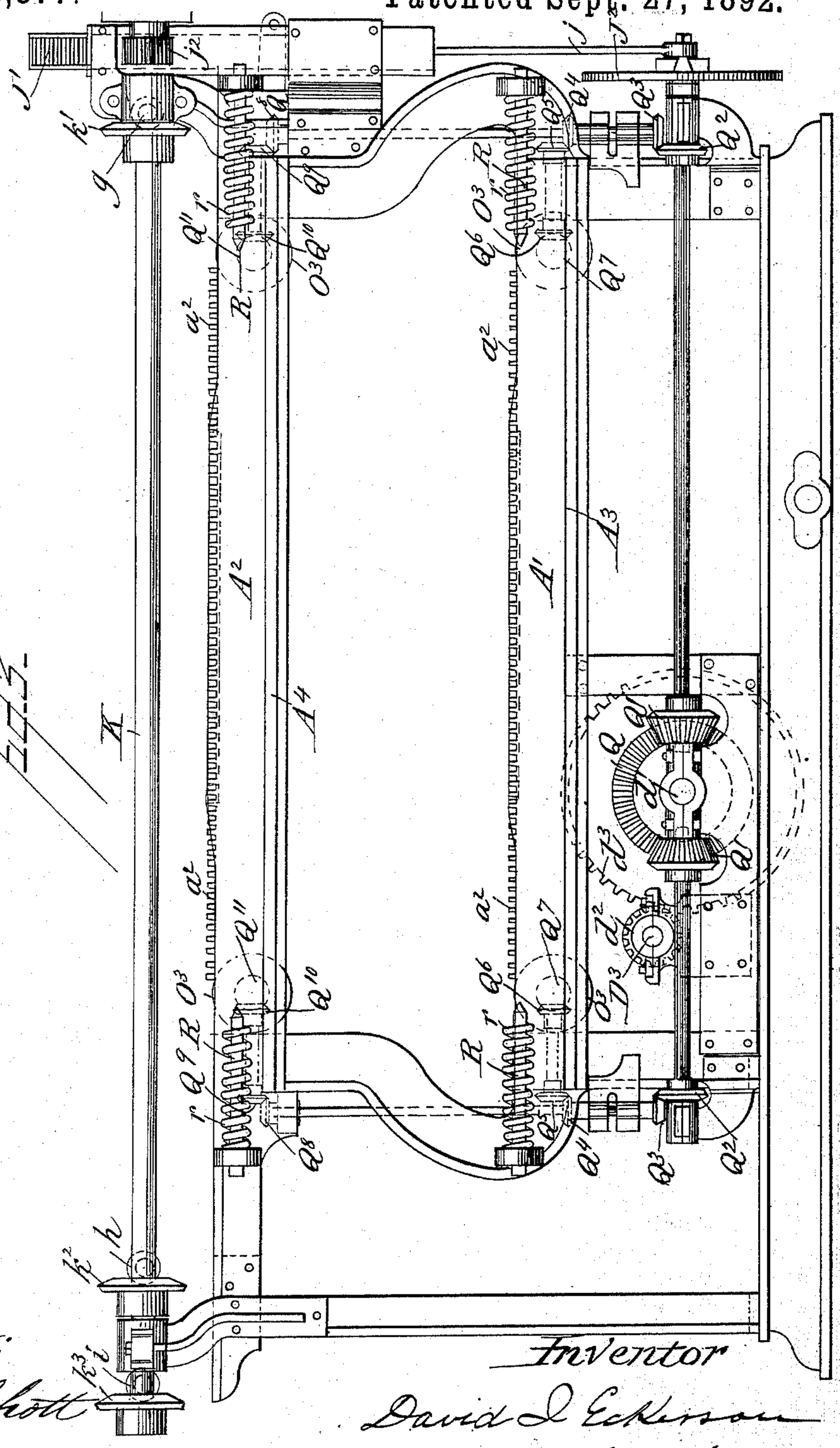

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(No Model.) 9 Sheets—Sheet 4.

D. I. ECKERSON.

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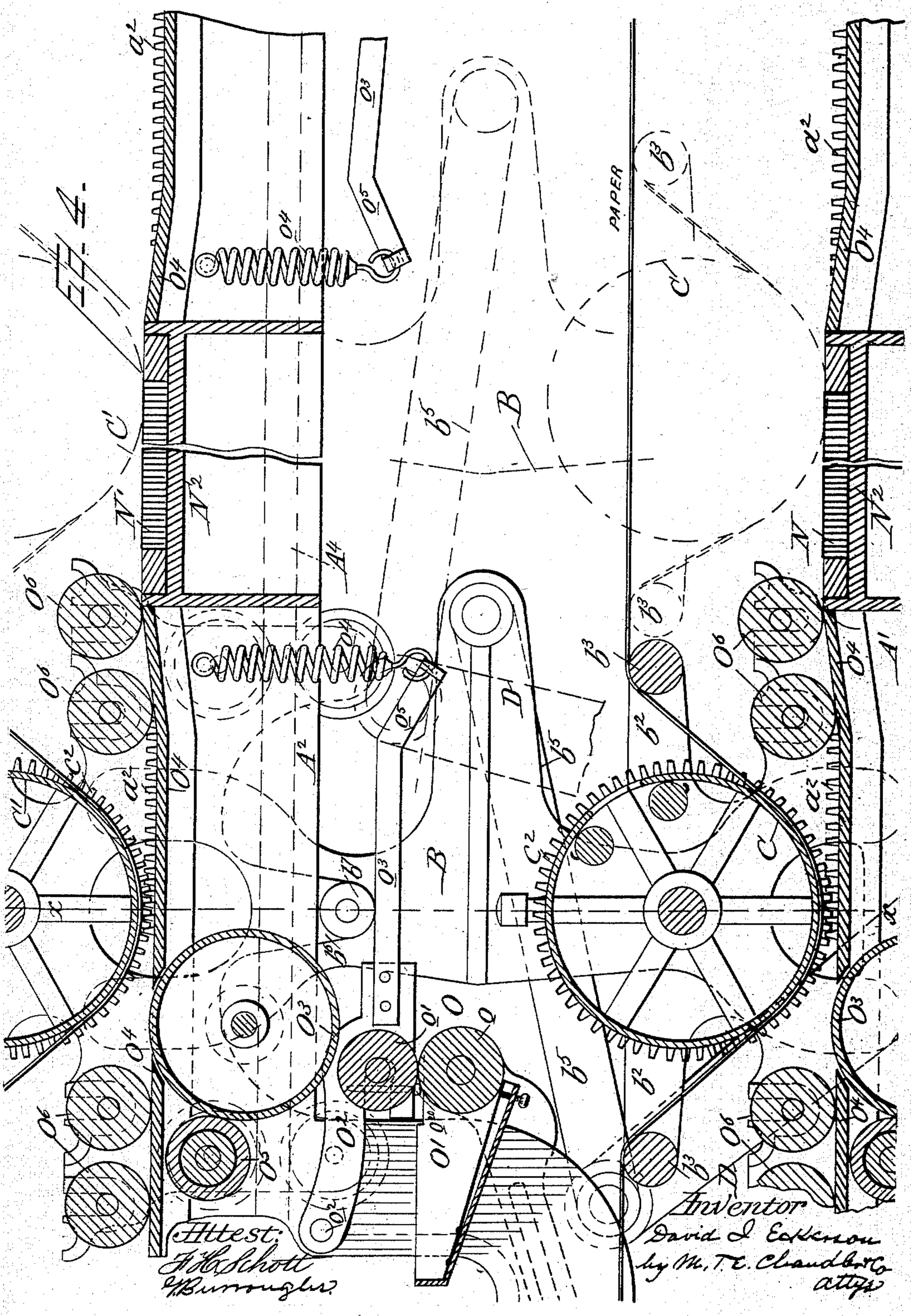

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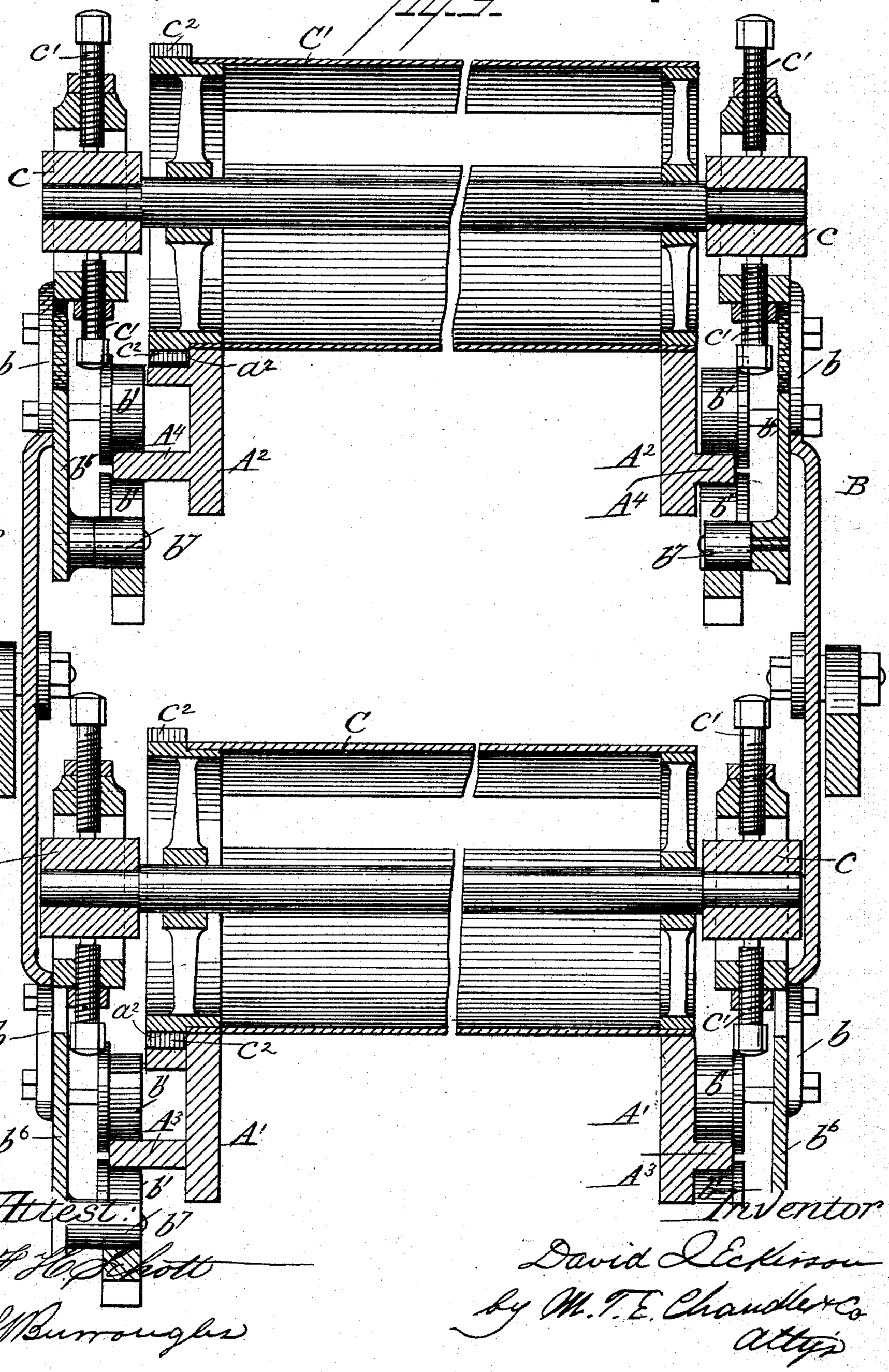
No. 483,377. Patented Sept. 27, 1892.



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(No Model.) 9 Sheets—Sheet 6.

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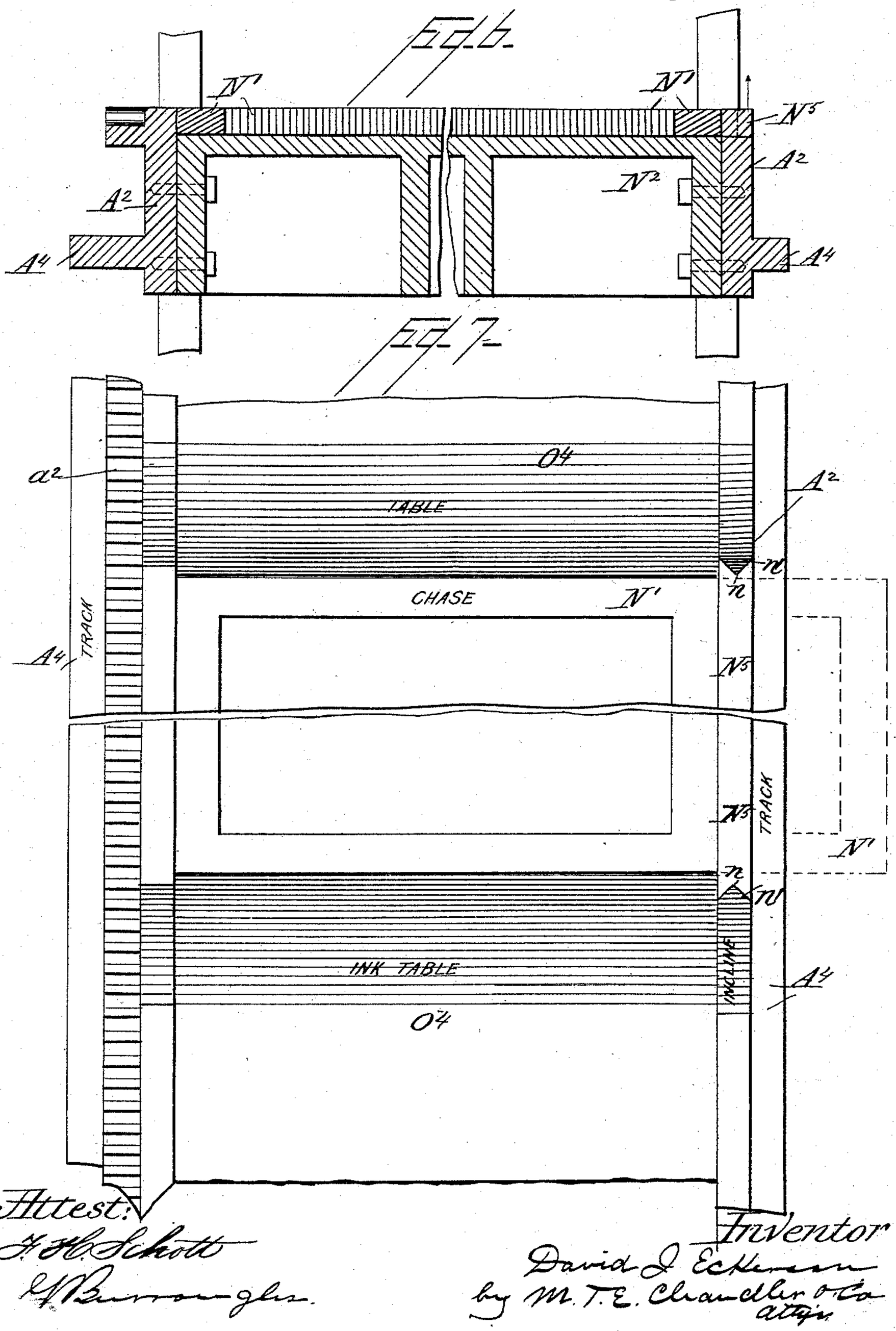
No. 483,377. Patented Sept. 27, 1892.



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(No Model.)

9 Sheets—Sheet 7.

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Fig 8.

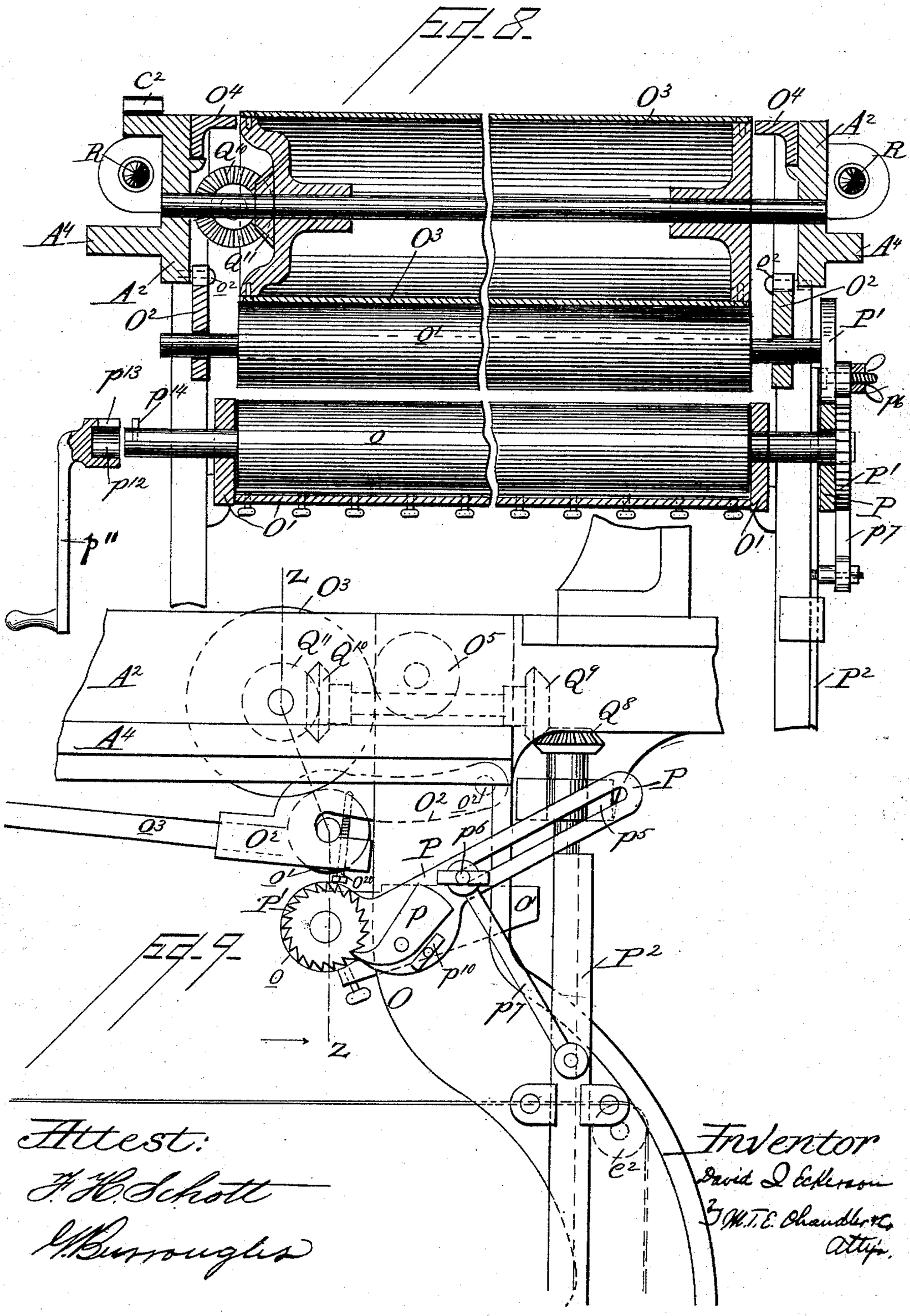

Fig 9.

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FIG. 10.

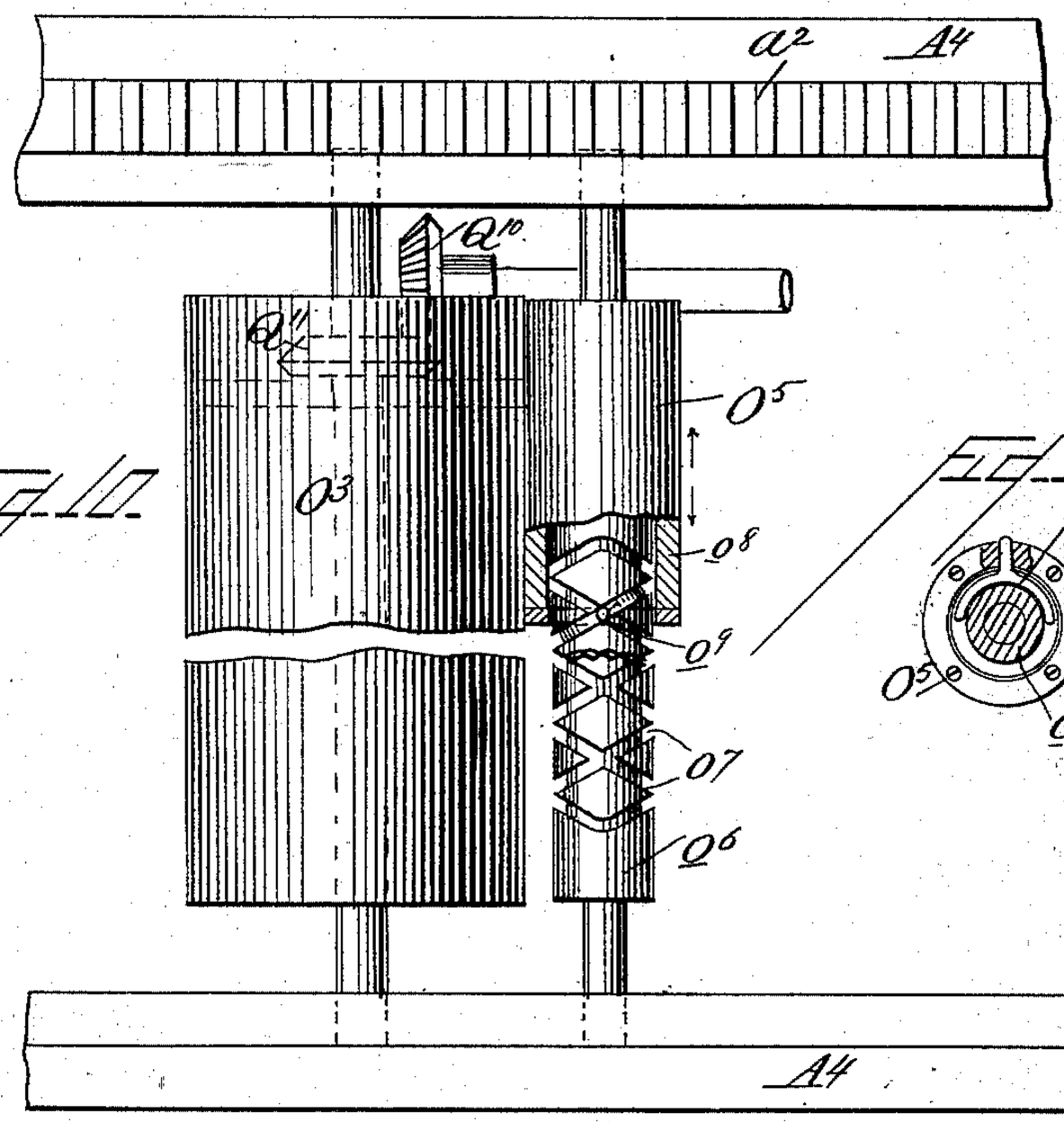


FIG. 11.

FIG. 12.

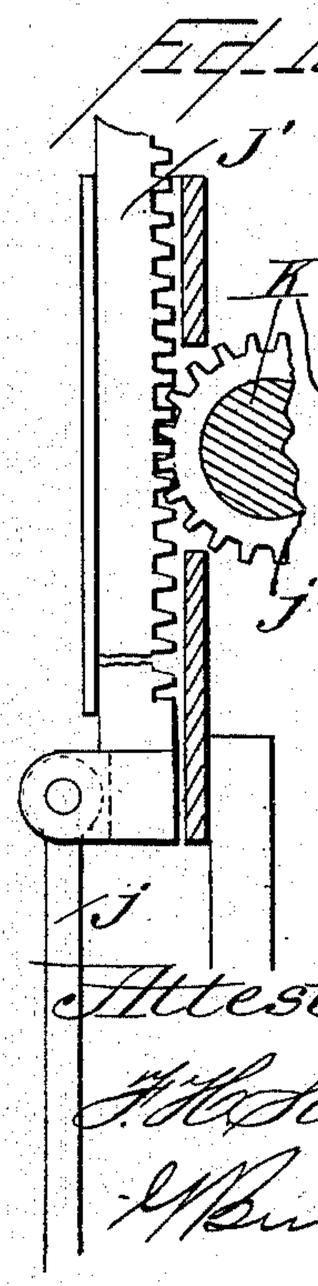


FIG. 13.

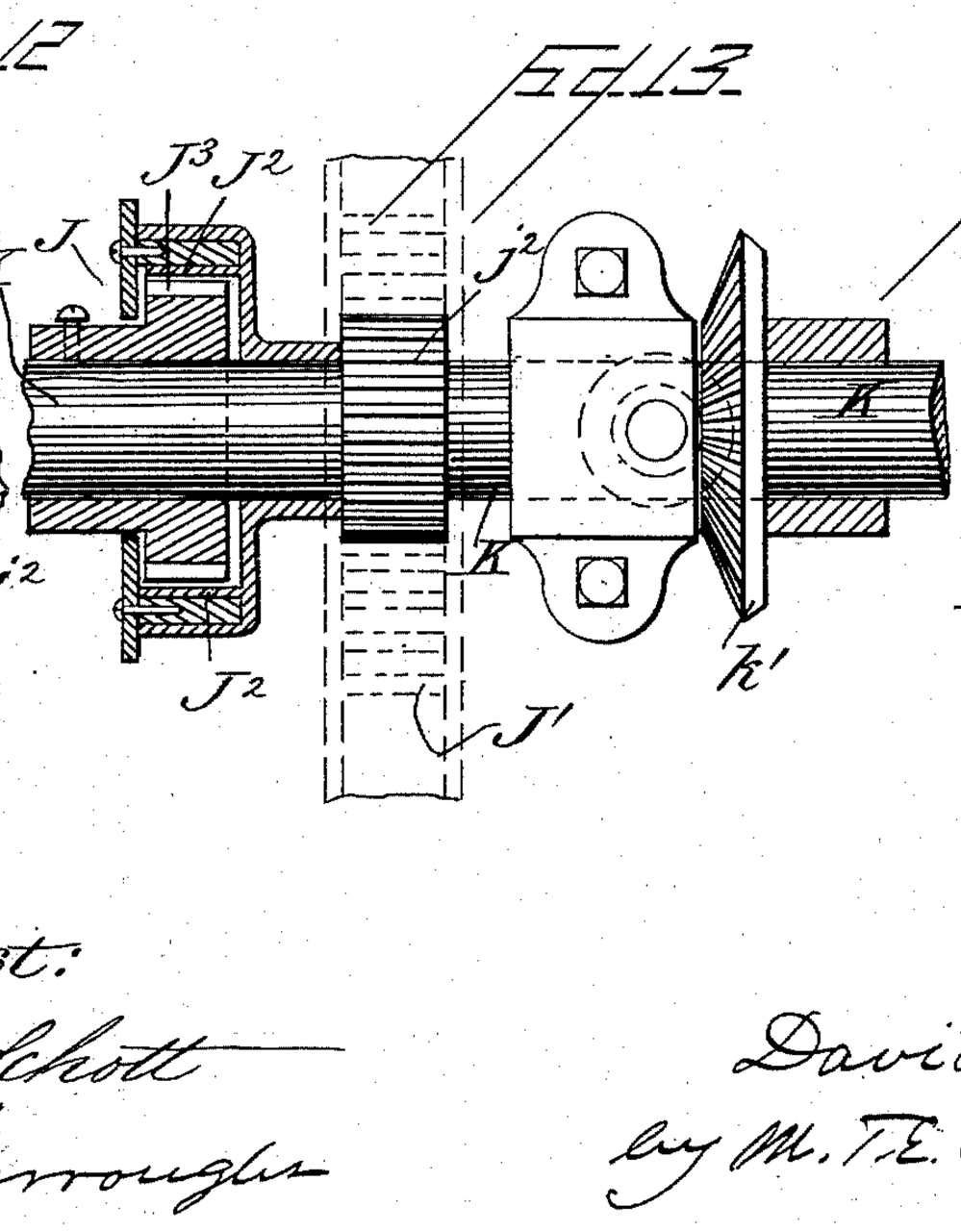
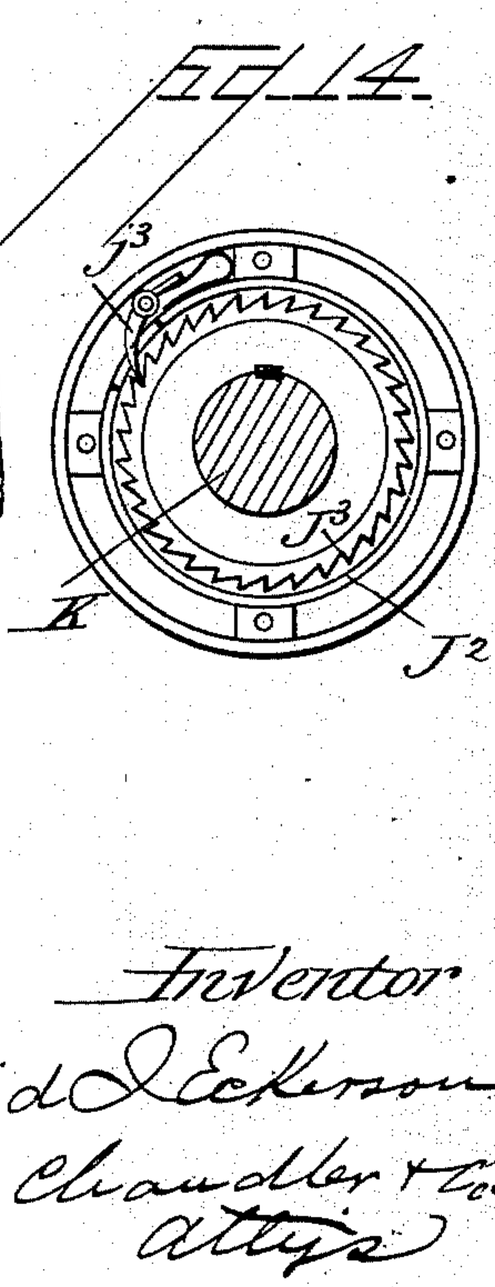


FIG. 14.



Attest:

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(No Model.) 9 Sheets—Sheet 9.

D. I. ECKERSON.

PRINTING PRESS.

No. 483,377. Patented Sept. 27, 1892.

Fig. 15.

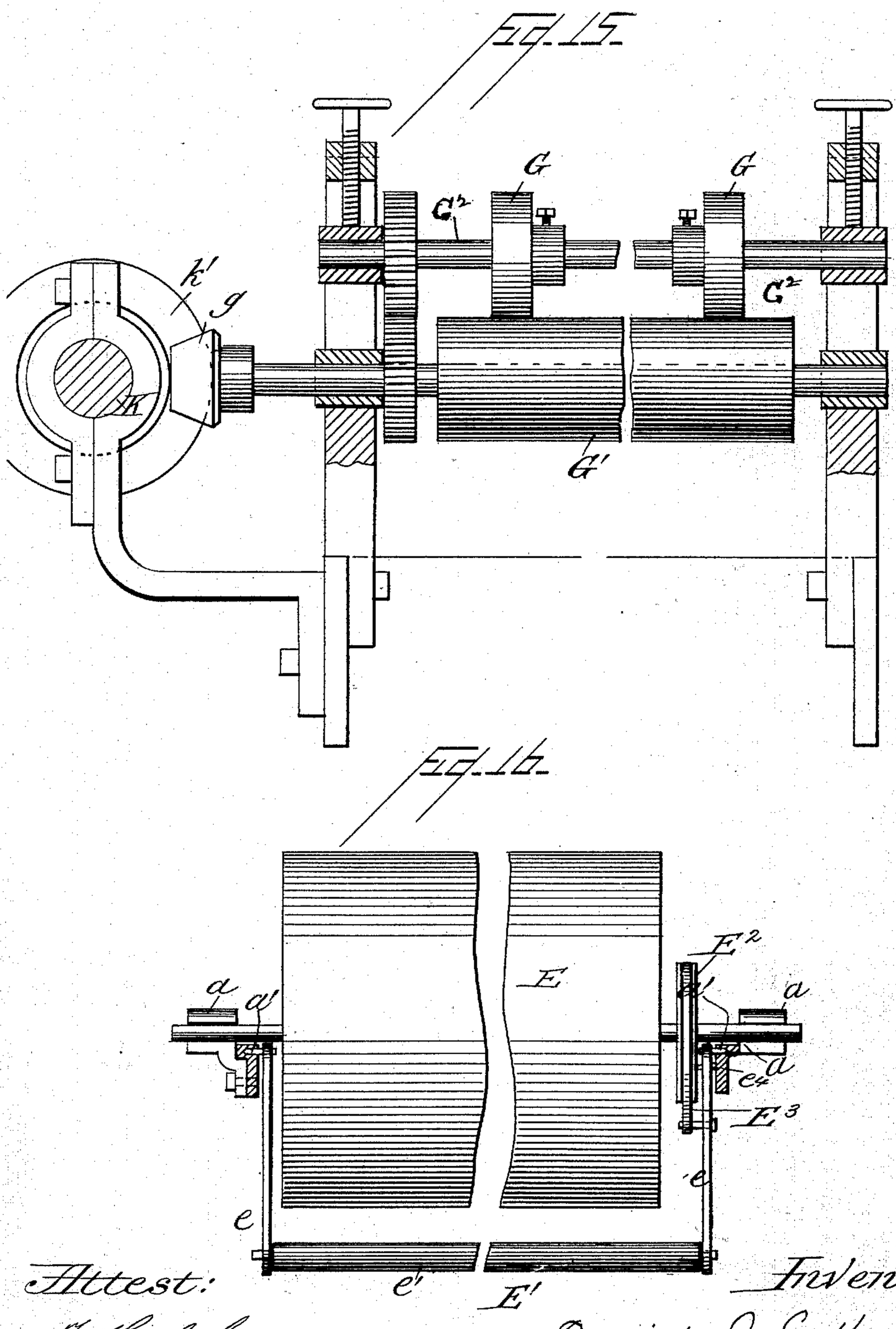

Fig. 16.

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Attys

UNITED STATES PATENT OFFICE.

DAVID I. ECKERSON, OF WORCESTER, NEW YORK.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 483,377, dated September 27, 1892.

Application filed July 28, 1890. Serial No. 360,132. (No model.)

To all whom it may concern:

Be it known that I, DAVID I. ECKERSON, a citizen of the Unted 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 of reference marked thereon, which form a part of this specification.

This invention relates to that class of printing-presses known as "web-perfecting cylinder-presses"—that is to say, presses wherein the paper from a continuous web or paper roll is printed on both sides by the action of an impression cylinder or cylinders, which roll over the paper and thus press it against the flat form.

My improvements relate more particularly to the carriage which carries the impression-rollers and co-ordinate parts and the means for guiding and actuating the same, to the devices for causing the proper register, the means for cutting the web when printed, the inking mechanism, and to various details of construction to be enumerated below and covered in the claims.

The object of my invention is to reduce the size of the machine and make the same more compact by placing the two impression-rollers and co-ordinate parts one above the other in their reciprocating carriages instead of side by side, as heretofore.

It is also my object to provide mechanism whereby an accurate register of the impressions may be obtained--that is to say, whereby the second impression on the reverse side of the sheet by the perfecting-roller will just cover and not lap over the impression on the other side.

It is, moreover, my object to provide means for so adjusting the feed of the paper that the same will be severed at the proper point by the cutter—that is to say, midway between two consecutive impressions.

It is also my object to improve various parts of the inking mechanism.

Finally, it has been my object by various details—such as peculiar spring-buffers, rollers, and tracks for guiding the impression-roller carriage—to make the movement of the carriage light and easy and to remove all jars and shocks, and also to simplify and improve the construction of various details to be pointed out below; but to more fully disclose my invention I will now proceed to give a detailed description thereof, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of a machine embodying said invention. Fig. 2 is a plan thereof. Fig. 3 is a side elevation showing the side of the machine opposite that in Fig. 1, with certain parts removed to more clearly show the fixed parts, the shafts and gearing, and the knife-actuating mechanism. Fig. 4 is a longitudinal vertical section, on an enlarged scale, of the impression mechanism. Fig. 5 is a transverse vertical section of the same on line $x\,x$ of Figs. 1 and 4. Figs. 6 and 7 show a transverse vertical section and a plan, respectively, of the type-bed and chase. Figs. 8 and 9 show a transverse section and a side elevation, respectively, of the inking mechanism. Figs. 10 and 11 show detail views of the mechanism for shifting the vibrating roller. Figs. 12, 13, and 14 are detail views of the feeding mechanism. Fig. 15 is a vertical transverse section showing the feed-rollers and contiguous parts. Fig. 16 is a sectional plan of the web-reel and its tension device.

The same letters of reference denote the same parts throughout the drawings.

My improvements relate to the impression device, the registering device, the cutting device, the inking device, and certain minor details of construction. I will consider these in the order named.

The impression device.—The frame of the machine may be of any suitable construction and material and is provided at its one end with a bearing a for the journals of the reel for the web or paper roll E. Between the standards of this frame are arranged two pairs of longitudinal bars A' A^2, to which are attached, either integrally or by bolts or otherwise, a number of parts, the parts on the bar A^2 being duplicates of those on the bar A'. The forms N and N′ are also mounted, one above the other, upon type-beds N^2 and N^2,

arranged between the bars A′ A′ and A^2 A^2, respectively. Tracks A^3 A^3 and A^4 A^4 are secured to the bars, preferably facing outwardly, and serve to guide the carriage, now to be described. The carriage B, Figs. 1, 4, and 5, consists of a double yoke *b b*, to which are secured the two impression trucks or frames B^2 B^3, each the counterpart of the other. Each of them consists of side frames formed of plates shaped to suitable configurations and attached to the opposite ends, upper or lower, as the case may be, of the double yoke *b b*. To the lower portion of each side frame are attached four bearings or spindles, on which are journaled the rollers *b′ b′*, which are so situated as to grasp either of the tracks A^3 A^3 or A^4 A^4, respectively adjacent. These rollers serve to support the truck upon the tracks in such a manner as to prevent it from being accidentally displaced. Each truck carries one of the two impression-rollers C C′, and each has journaled therein, preferably eight, guiding-rollers, four on each side of the machine-frame. These rollers, it will be noted, grasp the tracks A^3 A^4, and serve to securely guide the carriage in its strokes with as little friction as possible, and also to firmly press the impression-rollers C C′ upon the type-forms N and N′ as they travel over them. These trucks B^2 B^3 are, moreover, provided with the brackets b^2 b^2, in which are journaled the guide-rolls b^3 b^3 for properly guiding the paper web. Inking-rolls O^6 O^6, to be referred to farther on, are also mounted in these trucks, and the double yoke *b b* is provided at an intermediate point with an arm connected by a link b^5 to an oscillating lever D, actuated by means of pitman D′, attached to the crank *d* of a crank-disk D^2, the said crank-disk being secured to a shaft *d′*, deriving its motion from the power-driven shaft D^3 through gearing d^2 d^3. The impression cylinders or rolls C C′, as best shown in Fig. 5, are journaled in blocks *c c*, two for each cylinder, said blocks being mounted in slots in the frame and vertically adjustable by the adjusting-screws *c′ c′*, one above and one below each block. By this arrangement I am enabled to positively adjust the blocks both upwardly and downwardly and hold them firmly in each position, a matter of great consequence in impression-rollers. The impression-cylinders C C′ are provided each at one end with spur-gears c^2 c^2, meshing with the racks a^2 a^2 on the bars A′ A^2 of the frame. The trucks B^2 B^3 are also provided with downwardly-extending arms b^6 b^6, preferably provided with antifriction-rollers b^7 b^7 for bearing against the tilting lever of the inking mechanism, to be referred to farther on. The web of paper E to be printed on is mounted on a reel journaled at *a* in the machine-frame, (see Figs. 1 and 16,) and a tension device E′, consisting, preferably, of two arms *e e*, loosely pivoted in the frame at *a′ a′*, having a roller *e′* journaled in their ends for bearing upon the bend formed in the paper as it passes from the roll into the machine, serves to take up the slack. It might happen that the paper roll would be rotated so fast that more paper than the machine would require would be wound off the same. To obviate this, a pulley E^2 is secured on the shaft carrying the paper roll and has its periphery grooved. A leather belt E^3 passes around this grooved pulley and is secured at one end to the machine-frame at e^4 and at the other end to the arm *e*. Should the loop of the paper passing from the roll into the machine become too long, the arms or frame carrying the roller *e′* would descend, carrying the end of the leather belt with it, and thereby cause it to bind on the pulley E^2 and retard the rotation of the paper roll. When the surplus paper of the loop has been drawn into the machine, the frame carrying the roller *e′* will be raised by the loop and release the pulley from the binding of the belt. The paper passes from the roll E, under the roller *e′*, over the roller e^2, journaled in the frame, thence over the first roller b^3, around the first cylinder C and over the second guide-roller b^3, under guide-roller e^3, thence over the rollers F′ and F′ of the registering device, to be described farther on, to the intermittent feed-rollers and around the second impression-cylinder C′, being guided by the third and fourth guide-rollers b^3 b^3, and thence to the cutting mechanism, to be described. This completes the description of the impression device, whose operation is as follows:

Assuming the parts to be in the position indicated in Fig. 1—that is to say, the carriage occupying the extreme left position—the further rotation of the driving-shaft D^3 will, through the intervening parts, cause the pitman D′ to draw the lever D, and with it the carriage B to the right. This causes the cylinders C C′ to turn positively through the agency of the gears c^2 and racks a^2 and travel over the paper E, pressing the same against the forms N and N′ by virtue of the pressure exerted by the rollers *b′* embracing the tracks A^3 A^4. By this action two impressions are made on the paper, which in passing from one cylinder C to the other cylinder C′, termed the "perfecting" cylinder, is turned so as to present the side opposite to that presented to the form N to the form N′. When the carriage has passed the type-forms, the intermitting feeding-rolls commence to act and feed the paper far enough to present a new portion thereof to the form N, and one of the portions already printed on by the said form N to the form N′, with its printed side away from said form and in position to receive the second impression, or, in terms of the art, "to be perfected." Thus at each stroke of the machine two impressions are made and one sheet is "perfected."

By my arrangement—that is to say, by mounting the impression-cylinders and concomitant parts one above the other—I am enabled to not only greatly reduce the length

of the double-stroke perfecting-press, but also to reduce the general dimensions—that is to say, while I greatly reduce the length I do not add very much to its height—the upper tracks and carriage-cylinder occupying between three and four feet at the most. It is to be noticed, also, that my arrangement of tracks and guide-rollers b^3 forms a very accurate guide for the carriage, and while it serves to exert the great pressure necessary permits the parts to move with very little friction. I am, moreover, enabled thereby to dispense with the arrangement of gears and racks for the cylinders C C′ on one side of the machine, and might dispense with them entirely. However, I consider it preferable to provide the machine with such gears and racks on one side. My arrangement of the impression-carriage also enables me to arrange the inking devices so that each form will be inked at every stroke—that is to say, before each impression. This, as far as I am aware, has not been done in any double-acting perfecting cylinder-press.

The registering device.—This is shown in Figs. 1 and 2. At a point in the path of the paper between the upper and lower forms N and N′, I journal a shaft F in bearings *f f* of the machine-frame. Arms *f′ f′ f′ f′*, extending in substantially opposite directions at both ends of the roller, carry the stretching or registering bars F′ F′, preferably in form of rollers, as shown, to diminish friction. The shaft F has keyed or otherwise secured to it at one end a worm-wheel f^2, which meshes with a worm f^3, provided with a hand wheel or crank f^4 for turning the same when it is desired to adjust the register in the course of printing. The operation of this registering device is as follows: The paper passes from the roll e^3 over the first or lower stretching-roll F′, and thence under the second stretching-roll, and thence to the feeding-rolls already referred to. When it is found that the impression upon the reverse side of the sheet, the second impression made by the form N′, does not exactly register with the first impression on its first side of the sheet, all that is necessary to correct the discrepancy will be to turn the hand-wheel f^4 in one or the other direction, whereby through the intermediate devices described the stretching bars or rolls F′ F′ will also be turned. The length of the paper between the two printing-forms will thus be increased or diminished, whereby, as will be readily seen, an accurate register of the first and second impressions can be readily attained. The intermittent feeding device takes hold of the paper after it has left the registering mechanism and at points in front of and behind the perfecting-cylinder C′. It is constructed substantially like the feeding device set forth in my Letters Patent No. 387,500, dated August 7, 1888, and therefore forms no part of my present invention. It consists, briefly, of three sets of pairs of rollers G G′, H H′, and I I′, which are mounted, respectively, in front of the perfecting-cylinder C′ in front of the cutter L L′, and behind said cutter. These feeding-rollers have an intermitting motion communicated to them from the pawl-clutch J, through the shaft K, on which said clutch is mounted, and the bevel-gears k' k^2 k^3, meshing, respectively, with the bevel-gears *g h i* on the shafts of the feed-rolls G′, H′, and I′. (See Figs. 2 and 3.) The intermittent motion is produced by the mechanism shown best in Figs. 12, 13, and 14, showing a vertical transverse section on the line 12 12, Fig. 2, a partial longitudinal section, and a transverse section on the line 14 14, Fig. 2, looking in the direction of the arrow. This mechanism consists of a rack-bar J′, to which a reciprocating motion is imparted from disk J^2, deriving its motion from the driving-shaft through suitable connections by a pitman *j*, a pinion j^2, loose on the shaft K and carrying a hub J^2, which in turn carries a pawl j^3, engaging with a ratchet-wheel J^3, keyed to the shaft K. The upper rolls G and I may preferably consist of disks adapted to be shifted and secured to the shafts G^2 I^2, as shown in Figs. 2 and 15. The feeding-rolls I and I′ deliver the printed sheets from the machine or to any suitable delivering and piling mechanism.

The cutting device.—The cutter which I have devised consists of the reciprocating knife L, which acts against the cutter-block L′ to sever the web into sheets. The reciprocation is imparted to the knife L by the following mechanism: The said knife is bolted or otherwise secured to a block L^2, running in suitable guides L^3, and provided at its back with a rack or racks *l l*, meshing with pinions *l′ l′*, fixed to a vibratory shaft l^2, to which an oscillating motion is imparted from the oscillating lever L^4, pivoted at l^3 and having a friction roller or stud l^4, engaging the cam-groove l^5 of disk L^5, secured to shaft *d′*, already described, through the link l^6 and arm l^7, secured to said vibratory shaft l^2. The parts are so timed that the cutter descends after every stop of the intermittent feed.

In order to adjust the parts so as to sever the sheets at the proper point—that is to say, midway between two consecutive impressions—and also to adjust the cutter when the length of the sheet is varied, I have devised the following mechanism: At a point between the perfecting-cylinder and the cutter, preferably just in front of the feed-rolls H H′, I mount a bracket M for carrying a vertically-adjustable guide-roller M′, which in the present instance is adjusted by the following mechanism, though other mechanism may be readily devised for the same purpose: Two vertical screws *m m* are journaled in ears *m′ m′* of the bracket and pass through the blocks m^2 m^2, in which the guide-roller M′ is journaled. Rotary motion is imparted to these screws by any desirable means—for example, that shown in Figs. 1 and 2 of the drawings and which consists of a horizontal shaft M^2, mounted in

the bracket M and provided with bevel-gears m^3 m^3, meshing with similar gears m^4 m^4 on the screws m m. A crank m^5 is attached to the shaft M^2 for turning the same. I prefer to use in conjunction with roller M′ two guide-rolls M^3 and M^4, attached to the bracket M and in front of feed-rolls H and H′, respectively, to more effectually guide the paper. It will be readily seen that by turning the handle m^5 in one or the other direction, causing the roller M′ to be raised or lowered, I increase or diminish the length of paper between the form N′ and the cutter L, or, in other words, adjust the cutting-point.

The inking mechanism.—The inking mechanism is constructed as follows: Four inking devices O O O O, each the counterpart of the other, are arranged on both sides of the forms N N′, so that the inking-rollers O^6 O^6 of the carriage B, which are arranged on both sides of the impression-rollers C C′, as shown, will be supplied with ink at both the front and back stroke of the carriage and the forms will be inked before each impression. By referring particularly to Figs. 4, 8, and 9, it will be noted that each of the three inking mechanisms consists of the ordinary ink-fountains O′, provided with the usual doctor-roller o, the ink from which is conveyed to the ink-distributing rollers and devices by a transfer-roller o'.

I have made several improvements in the means for actuating the transfer-roller and the ink-distributing devices, which I will now describe. Each transfer-roller o' is mounted and secured removably by a screw o^{20} in slotted bearings in tilting arms O^2, pivoted at o^2 and having tails o^3, connected by a spring o^4 to the frame and movably held upward thereby against the distributing-roller O^3 and pressed downward against the stress of said spring at each stroke of the carriage B when the rollers b^7, already described, travel over the incline o^5 on the tail o^3 of the tilting arms. The transfer-roller o' conveys the ink to the distributing-roller O^3, which projects through an inking-table O^4, one of which is arranged on each side of each of the forms N N′, somewhat below the level of said forms, so that the paper E will not come in contact with the ink. In order to "break up" the ink, a shifting-roller O^5 is arranged to contact with the distributing-roller. The construction of this roller is best shown in Figs. 10 and 11, where it will be seen that this roller consists of a shaft o^6, fixed against rotation and having a double screw-thread o^7, encircling said shaft and provided with a switch-pin o^9, swiveled therein and engaging the double screw-thread. The ink is taken from the distributing-roll O^3 and spread over the inking-table O^4, and the forms are inked in the usual way by the inking-rolls O^6, two of which are preferably arranged on each side of each impression-roll in slotted bearings in frame B, as shown. The doctor-roller receives its slow and step-by-step movement from an oscillating lever P, loosely pivoted on the shaft of roller o and carrying a pawl p, pivoted therein and engaging with a ratchet-wheel P′, fixed to the shaft of the doctor-roller o outside of the fountain. Motion is imparted to the four oscillating levers P P from the oscillating shaft d^{10}, to which the oscillating lever is attached by links p^2, connecting an ear p^3 on said shaft d^{10} with the bell-cranks p^4 p^4, which in turn are connected to the reciprocating rods P^2 P^2, suitably guided in the frame and connected to the oscillating levers P P. This connection is an adjustable one in order to be able to regulate with nicety the supply of ink to the forms. For this purpose I provide the levers P with slots p^5, provided with set-screws p^6 for connecting the oscillating levers to the rods at various distances from the centers of oscillation by means of the links p^7. It will be noted that the lever P is provided with a thumb screw or bolt p^{10} behind the pawl p, having ears which, when the thumb screw or bolt is turned to occupy a position at right angles to that shown in Fig. 9, will throw the pawl out of engagement with the ratchet P′ and allow the doctor-roller to be turned by hand, preferably by means of a removable crank p^{11}, having a socket p^{12}, and a slot p^{13} to fit over the end of the shaft of the doctor-roller and the pin p^{14} thereon, as seen in Fig. 8. This arrangement is for the purpose of supplying the necessary amount of ink when the machine is started and to obviate the delay and useless expenditure of power which would be occasioned if the initial inking were to be performed through the normal action of the doctor-roller, which is exceedingly slow. The distributing-rollers derive their motion from the main shaft D^3 through the bevel-gears Q Q′ Q′ Q^2 Q^2 Q^{11} Q^{11}, whose arrangement and operation is perfectly plain from Figs. 1, 2, 3, 8, and 9, and need not be further described. The shifting rolls O^5 may derive their motion by the frictional contact with the distributing-rolls O^3 or otherwise, and the movement is so timed that the doctor-rollers o of each side are turned when the carriage B passes to that side of the machine, and the transfer-roll o' is consequently in contact therewith.

The operation of the inking devices will be obvious from the above. Whenever the carriage B passes to one side of the machine, the rollers b^7, riding over the incline o^5, depress the transfer-rollers o', which, by being in contact with roller o, are synchronously turned by the pawls p and ratchets P′ and their actuating mechanism. The inking-rollers pass over the distributing-roller O^3, conveying the ink to and spreading the same over the ink-table O^4. The sleeve o^8 of the shifting roller O^5 turns, and by means of the switch-pin o^9 and double screw-thread o^8 slides longitudinally along the distributing-roller in a well-known manner, and thereby break up the ink. Upon the return stroke of the carriage one set of inking-rollers o^6 o^6 first inks the form, while the other set continues to distribute the ink. The rollers O^3 and O^5 con-

tinue their operation, while the transfer-roller *o'* rises into contact with the roller O^3 to supply it anew with ink, the doctor-roller *o* in the meanwhile remaining stationary. When the sleeve o^8 of the shifting roller O^5 has arrived at one end of its longitudinal movement, its motion is reversed automatically by reason of the switch-pin, which now enters the second screw-thread.

Other details.—By referring to Figs. 6 and 7 of the drawings it will be seen that I provide for the removability of the forms N and N' in the following manner: One of each of the pairs of bars A' A' A^2 A^2 is provided just above the type-beds N^2 N^2 with a removable section N^5, which when removed leaves that part of the bars A' A^2 flush with the type-bed and a sufficient opening to remove the chase N or N'. When the chase has been put in place, the section N^5 is again put in position and the chase and form are securely locked and ready for printing. I prefer to provide the section with V-shaped projections *n'*, which will fit in similar-shaped sockets *n* in the bars A', as shown. In Fig. 7 the form N' is shown in dotted lines, partly removed.

In order to prevent jars when the carriage B arrives at the end of its strokes, I provide buffers of a novel construction, which are constructed as follows: Horizontal pins R are secured to the frame A on the upper and lower bars A' A^2 on both ends and preferably on both sides of the frame. To these pins are attached the spiral springs *r*, loose at their forward ends and adapted to slide along the pins and of sufficient strength to counteract and cushion the momentum of the carriage. The carriage is provided at its sides with the ears R', having perforations which engage with the pins R whenever the carriage reaches the end of its stroke, and, bearing upon the springs *r*, cause the momentum to be taken up by these springs and any injurious shocks or jars avoided.

While I consider the machine as described above and illustrated in the drawings as the best embodiment of my invention, still I am aware that the same may be greatly modified without departing from the spirit of my invention. I do not, therefore, desire to be limited to the specified constructions and arrangements set forth.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a cylinder printing-press, the combination of an upper and a lower printing form and tracks, as A^3 A^4, a double reciprocating carriage provided with an upper and a lower cylinder, respectively, and guide-rollers for embracing the tracks, substantially as and for the purpose specified.

2. In a regulating device, the combination of a rotary shaft provided with arms carrying stretching-rollers and a worm-wheel and means for turning the worm in one or the other direction, substantially as and for the purposes set forth.

3. In a printing-press, the combination of a reciprocating cutter provided with racks and an oscillating shaft provided with pinions meshing with the racks, substantially as specified.

4. In an inking device for a printing-press, the combination, with a doctor-roll, a transfer-roller, and a yieldingly-held tilting arm in which it is journaled and provided with a tail having an inclined end, of a reciprocating impression-roller carriage provided with roller for engaging with the tail of the tilting lever, substantially as described.

5. In an inking mechanism for printing-presses, the combination, with a doctor-roller having a ratchet-wheel, of an oscillating lever having a pawl and a thumb-bolt mounted on the oscillating lever for throwing the pawl out of engagement with the ratchet-wheel, substantially as set forth.

6. In an inking mechanism for printing-presses, the combination of a doctor-roller provided with a pin on its shaft, with a removable crank having a socket and slot for engaging the end of the shaft and the pin, substantially as set forth.

7. In a printing-press, a type-bed situated between the side bars of the frame, a portion of one of said side bars being removable to insert or withdraw its chase into or from the machine, substantially as set forth.

8. In a printing-press, the combination, with the side bars and the type-bed located between the side bars, of a removable strip provided with V-shaped grooves, one of the side bars being provided with an opening, and guides corresponding to the V-shaped grooves, substantially as set forth.

9. In a cylinder printing-press, the combination of an upper and a lower printing form and tracks, as A^3 A^4, a reciprocating carriage consisting of the double yoke *b b*, the impression trucks or frames secured to the double yoke, the guide-rollers for embracing the tracks, and the vertically-adjustable impression-cylinders mounted in the said impression trucks or frames, substantially as and for the purpose specified.

10. In a cylinder printing-press, the combination of the two printing-forms, the double reciprocating carriage, the impression trucks or frames mounted in the said carriage, the impression-cylinders mounted in the said trucks or frames, and the means for reciprocating the said carriage, consisting of the oscillating lever D, connected at its upper end to an intermediate arm of the carriage by the link b^5 and secured at its lower end to the shaft d^{10}, the pitman D', attached to the said lever D at one end and at the other end to the crank *d* of the crank-disk D^2, the crank-disk being secured to the shaft *d'*, and the

gearing d^2 d^3 for conveying motion to the said shaft d' from the driving-shaft D^3, substantially as and for the purpose specified.

11. In a printing-press, the combination of a reciprocating cutter provided with racks, the oscillating shaft provided with pinions meshing with the racks, the oscillating lever L^4, pivoted to the frame at l^3 and having a friction roller or stud l^4 engaging the cam-groove l^5 of the disk L^5, secured to the shaft d', the crank l^7, secured to the said vibratory shaft, and the link l^6, connecting the said lever L^4 with the crank l^7, substantially as and for the purpose specified.

12. In a cylinder printing-press, the combination of the two printing-forms, the inking-tables located at both sides of the forms, the double reciprocating carriage consisting of the double yoke b b, the impression trucks or frames carried by said yoke, the impression-cylinders, and the inking-rolls mounted in the said impression trucks or frames, substantially as and for the purpose specified.

13. In a printing-press, the combination of the distributing-rolls, the transfer-rolls, the ink-fountain, and the doctor-roll carried in the said fountain, the oscillating lever P, loosely pivoted on the shaft of the doctor-roll, the pawl p, pivoted on the said lever and engaging with a ratchet-wheel p', fixed to the doctor-roll, the oscillating shaft d^{10}, the link p^2, connecting with an ear on the shaft d^{10} and with the bell-crank p^4, the reciprocating rod P^2, and the links p^7, connecting the lever P with the rod P^2, substantially as and for the purpose specified.

14. In an inking mechanism for printing-presses, the combination of the tilting arms O^2, pivoted at o^2 to the frame, the transfer-roll removably journaled in bearings in the said arms, the tails o^3, attached to the inner ends of the arms O^2 and having an inclined portion o^5, the springs o^4, connecting the ends of the tails with the frame, the reciprocating carrriage provided with rollers for depressing the arms O^2, the doctor-roll, and the distributing-roll, substantially as specified.

15. In a printing-press, the combination of the bracket M, the screws m m, journaled in ears of the said bracket and having bevel-gears on their upper ends, the blocks m^2 m^2, carried on the said screws, the roller M′, journaled in the said blocks, the shaft M^2, having bevel-gears on each end meshing with the similar gears on the upper ends of the screws m m, the guide-rollers M^3 and M^4, mounted one on each side of the roller M′, and the cutting mechanism, substantially as and for the purpose specified.

16. In a cylinder printing-press, a carriage consisting of the double yoke b b and the impression-trucks B^2 B^3, carried by the said yoke, substantially as and for the purpose specified.

17. In a cylinder printing-press, the combination of two printing forms, one located above the other, the inking-tables located at both sides of the forms, the reciprocating carriage provided with two impression-cylinders and with inking-rolls mounted at both sides of the impression-cylinders, and the intermittent feed for supplying the proper length of paper between the strokes of the carriage, substantially as shown and described.

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

DAVID I. ECKERSON.

Witnesses:
MATTHEW B. SMITH, Jr.,
HERMAN WAGONER.