

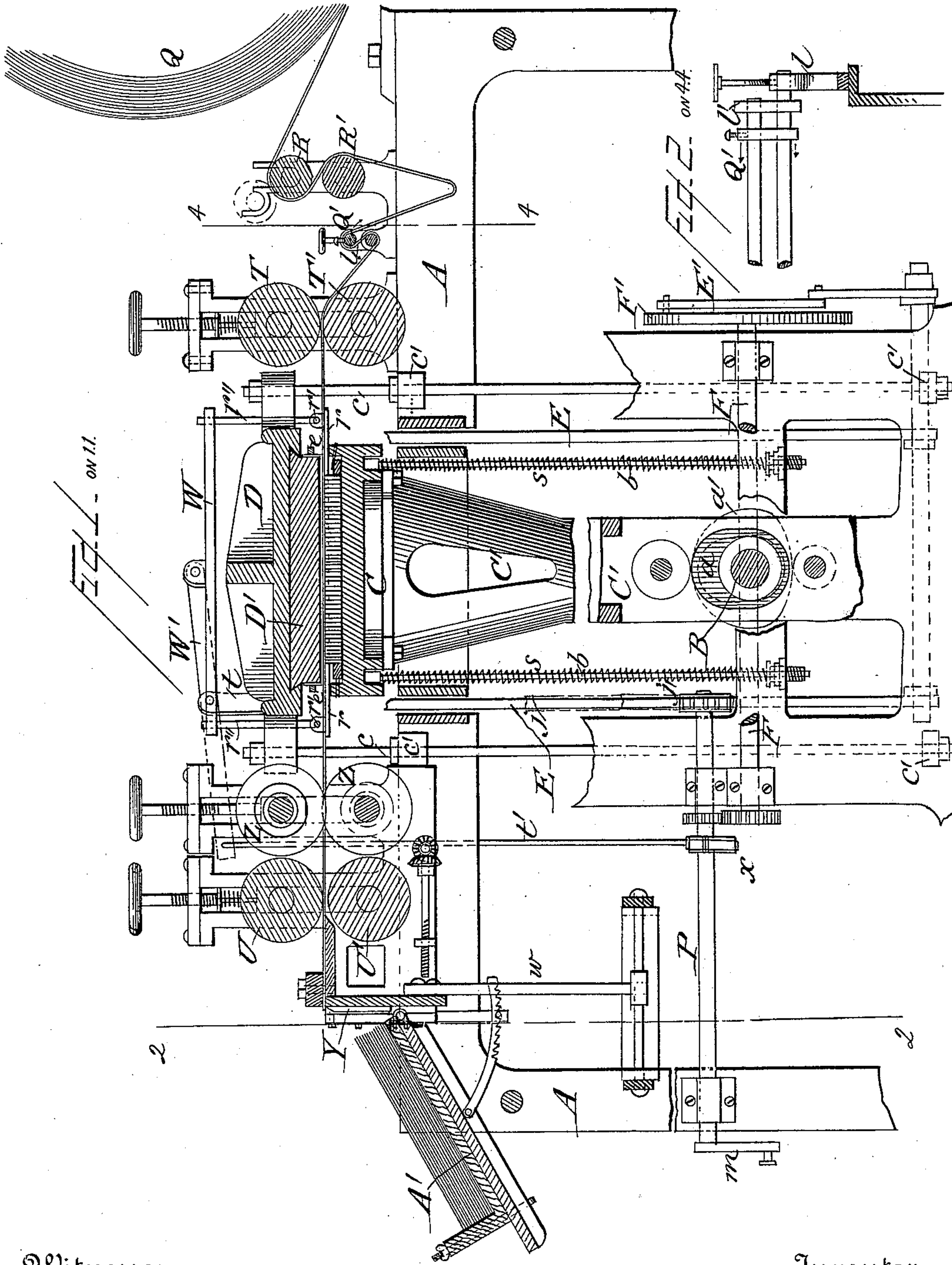
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8 Sheets—Sheet 1.

D. I. ECKERSON.
PRINTING PRESS.

No. 433,776.

Patented Aug. 5, 1890.



Witnesses

H. H. Schott
J. Burroughs.

Inventor

David I. Eckerson
By W. L. Chandler
Attorney

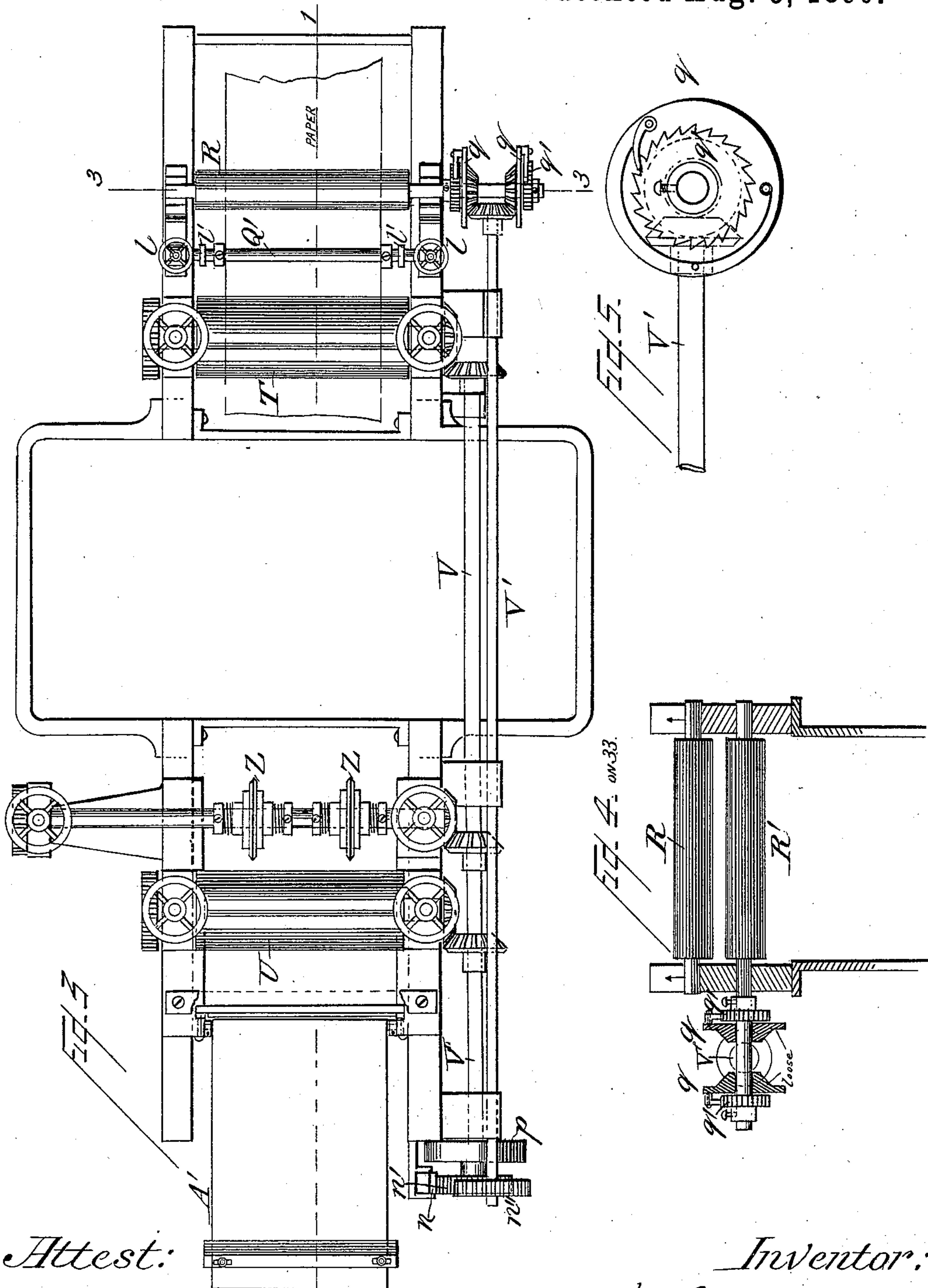
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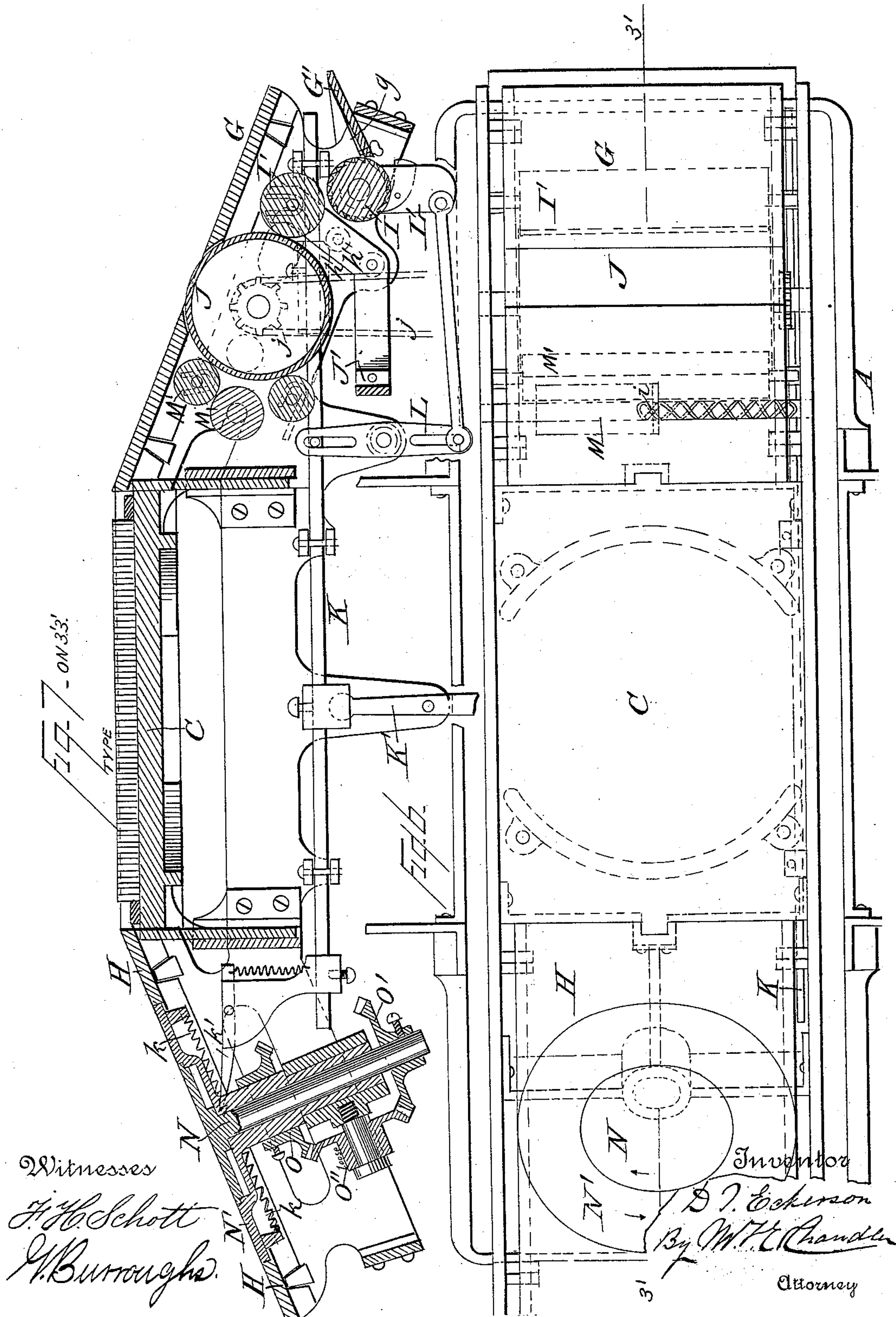
Inventor:

D. I. Eckerson
By W. H. Chandler
Atty

8 Sheets—Sheet 3.

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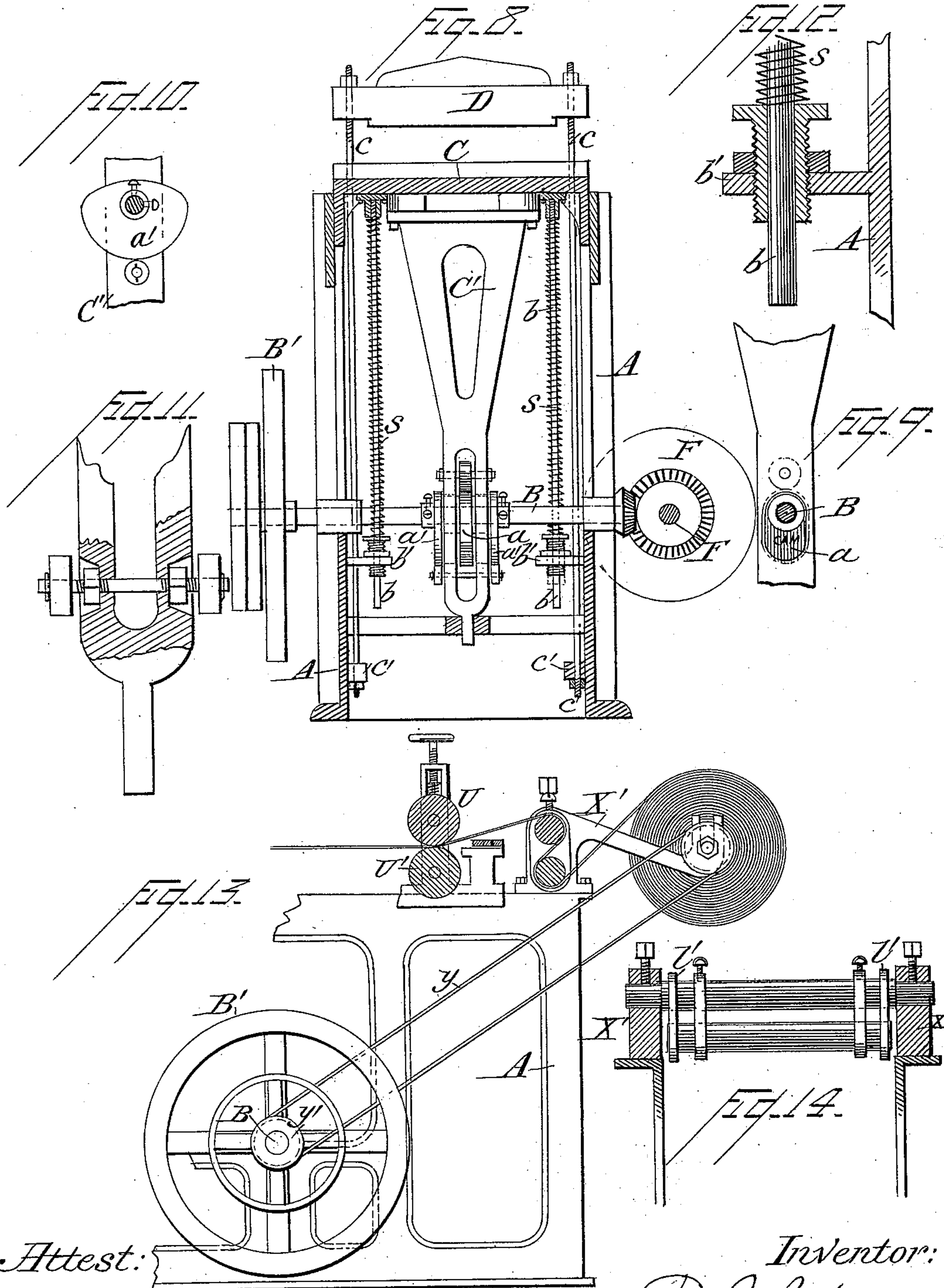
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V. Burroughs.

Inventor:

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By W. H. Chandler
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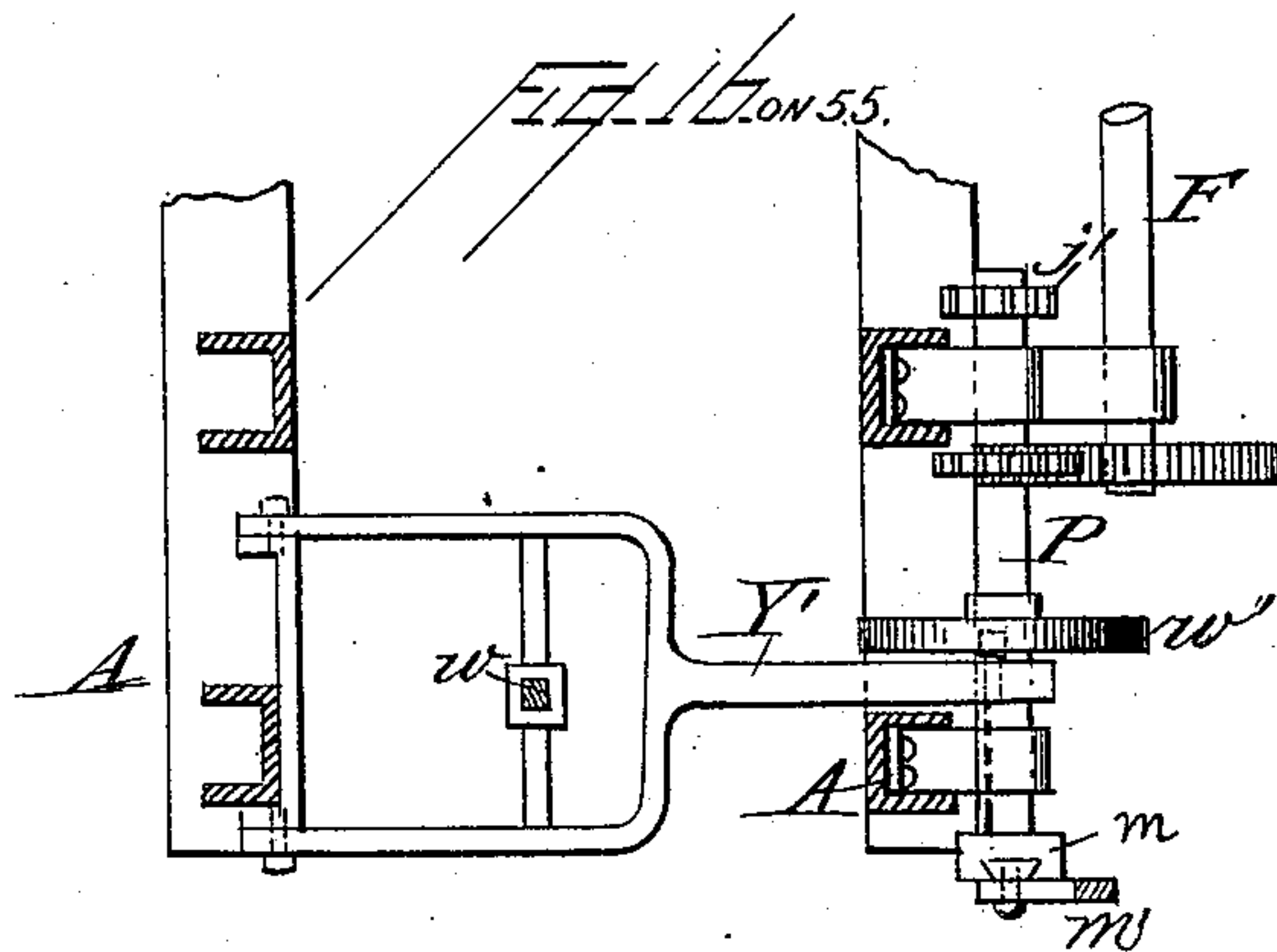
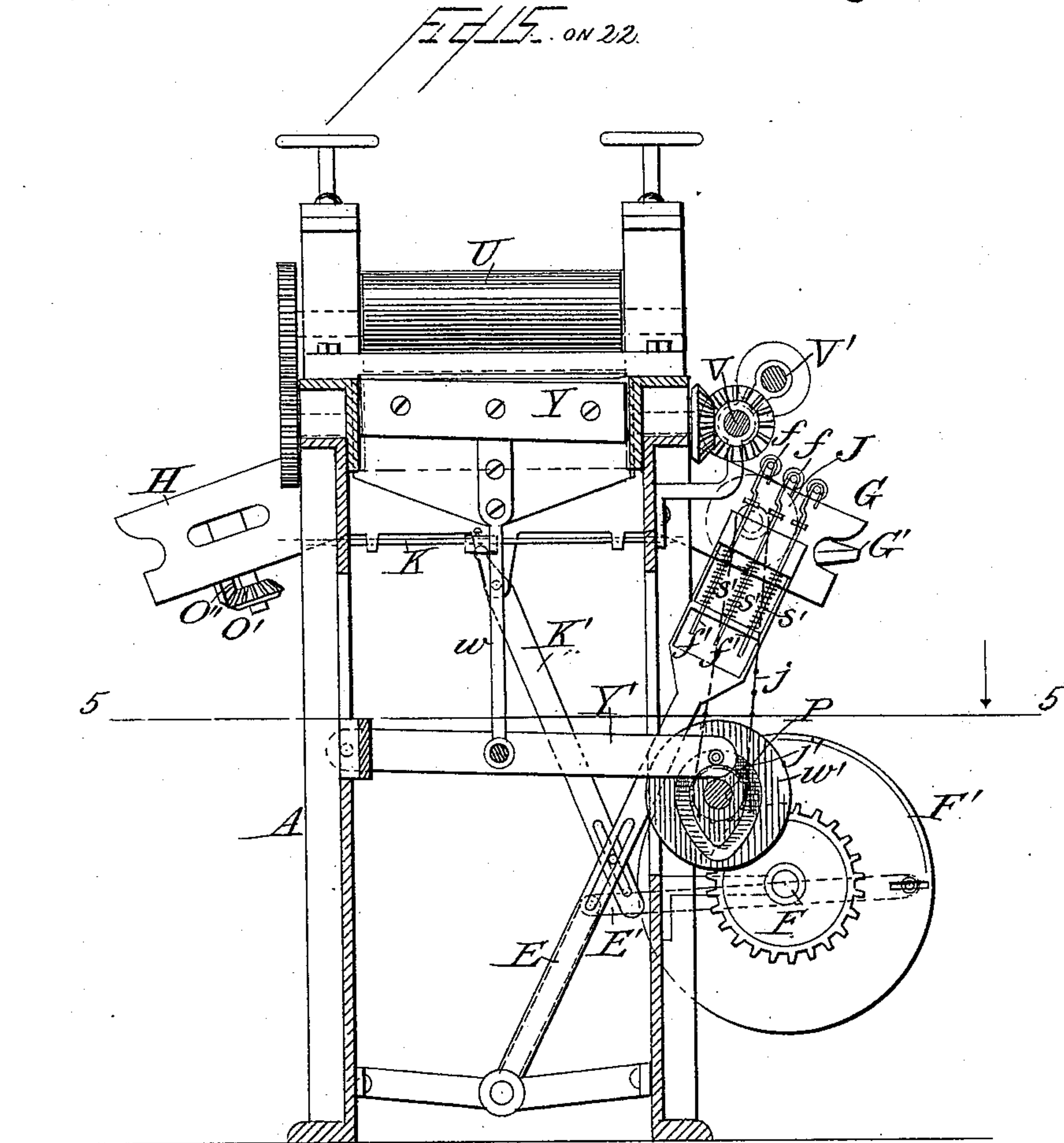
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G. Burroughs.

Inventor:

D. I. Eckerson
By W. H. Chandler
Att'y

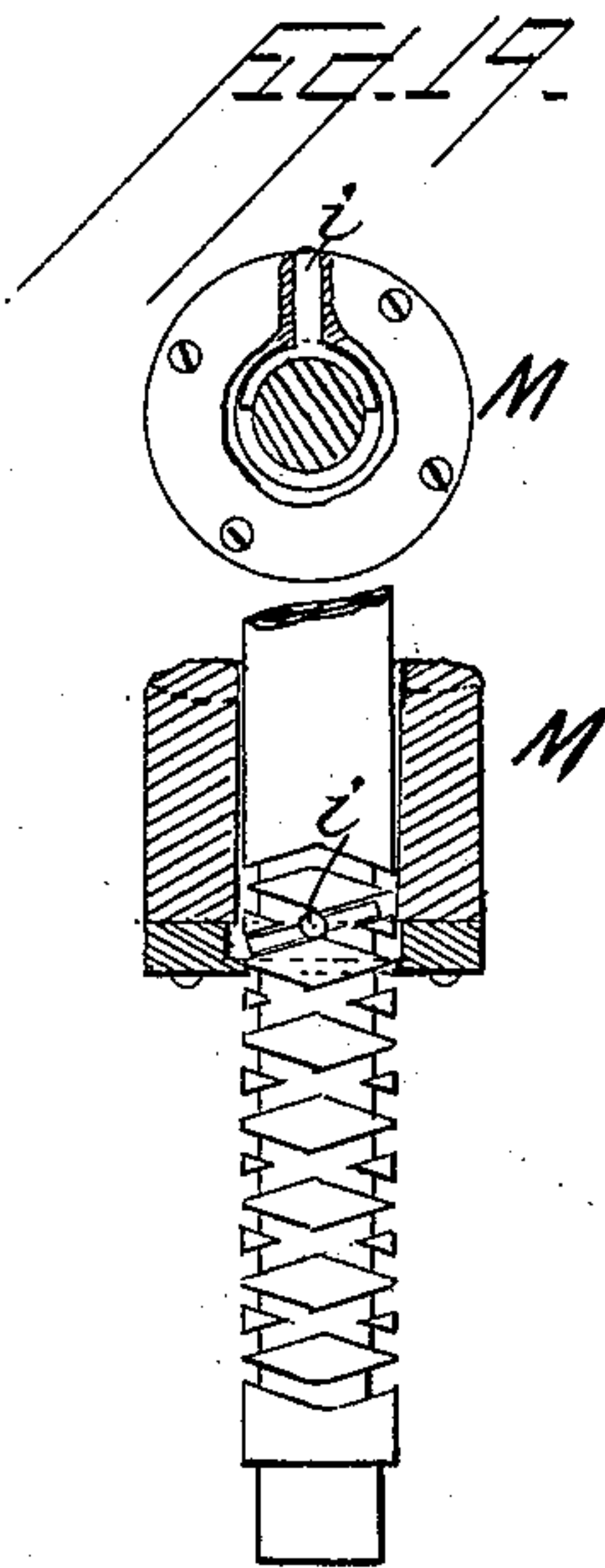
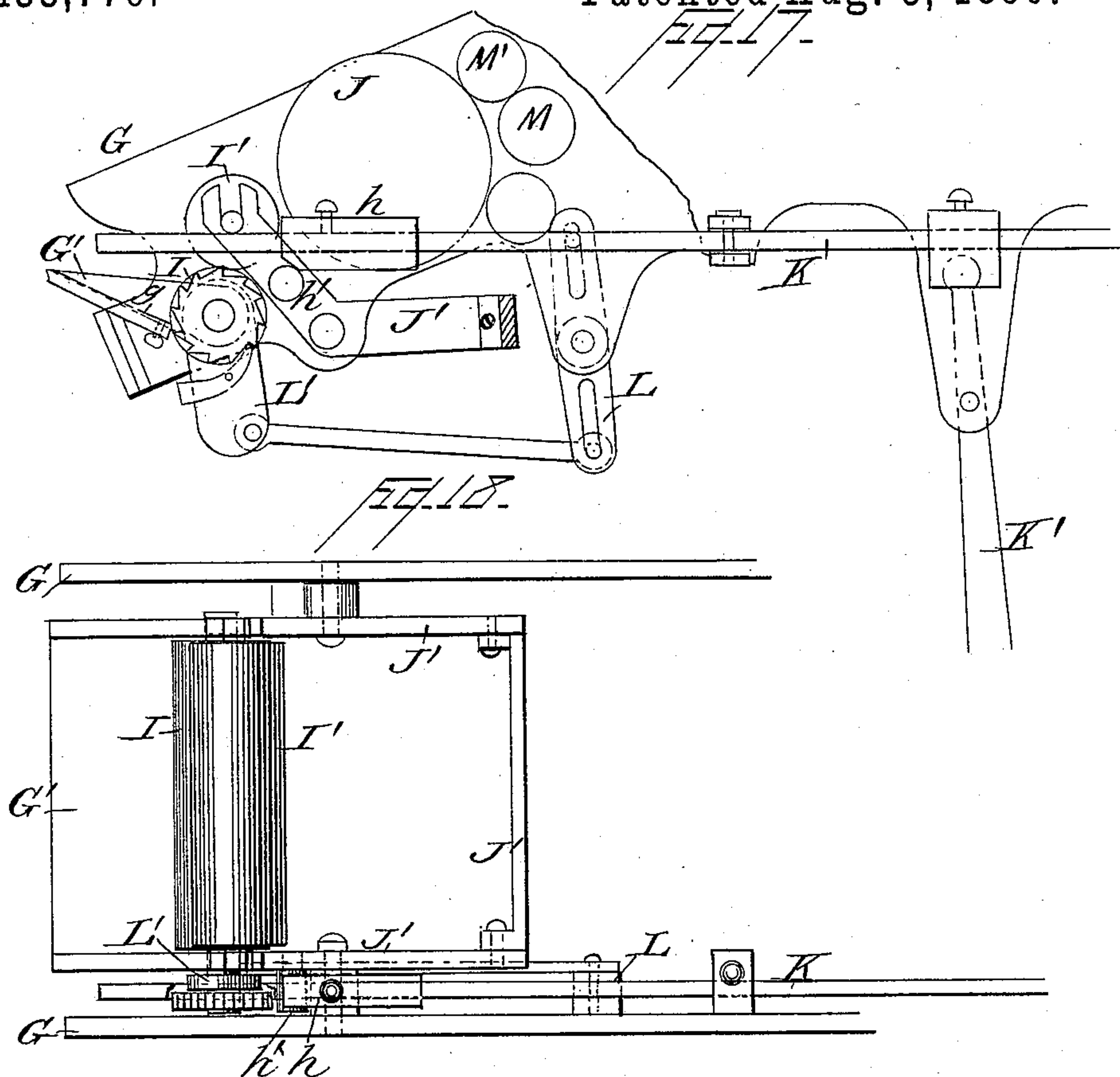
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Witnesses

J. H. Schott
A. Burroughs.

Inventor

D. I. Eckerson
By M. H. Chandler
Attorney

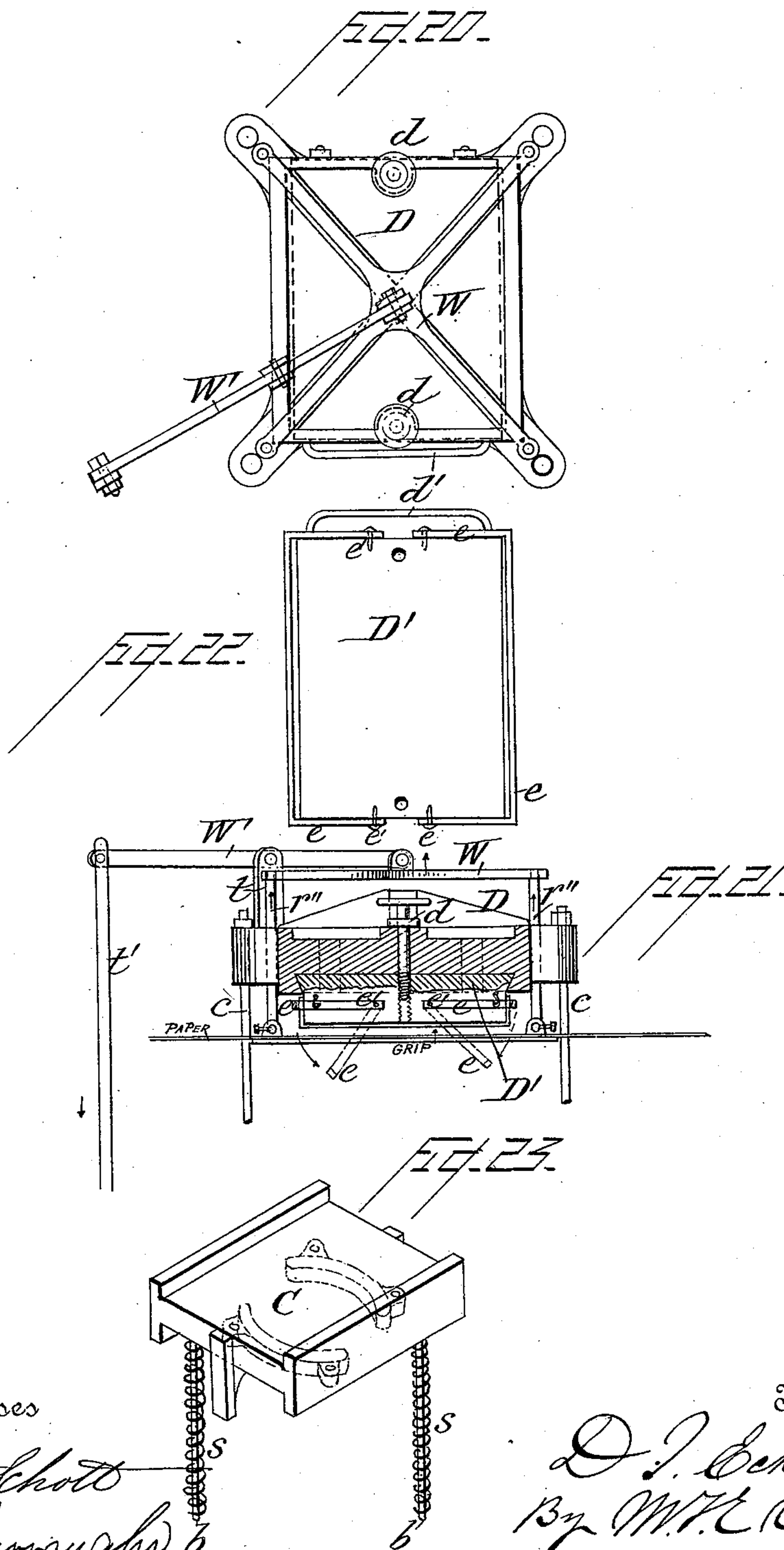
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J. Burroughs

Inventor

D. I. Eckerson
By W. H. Chandler
Attorney

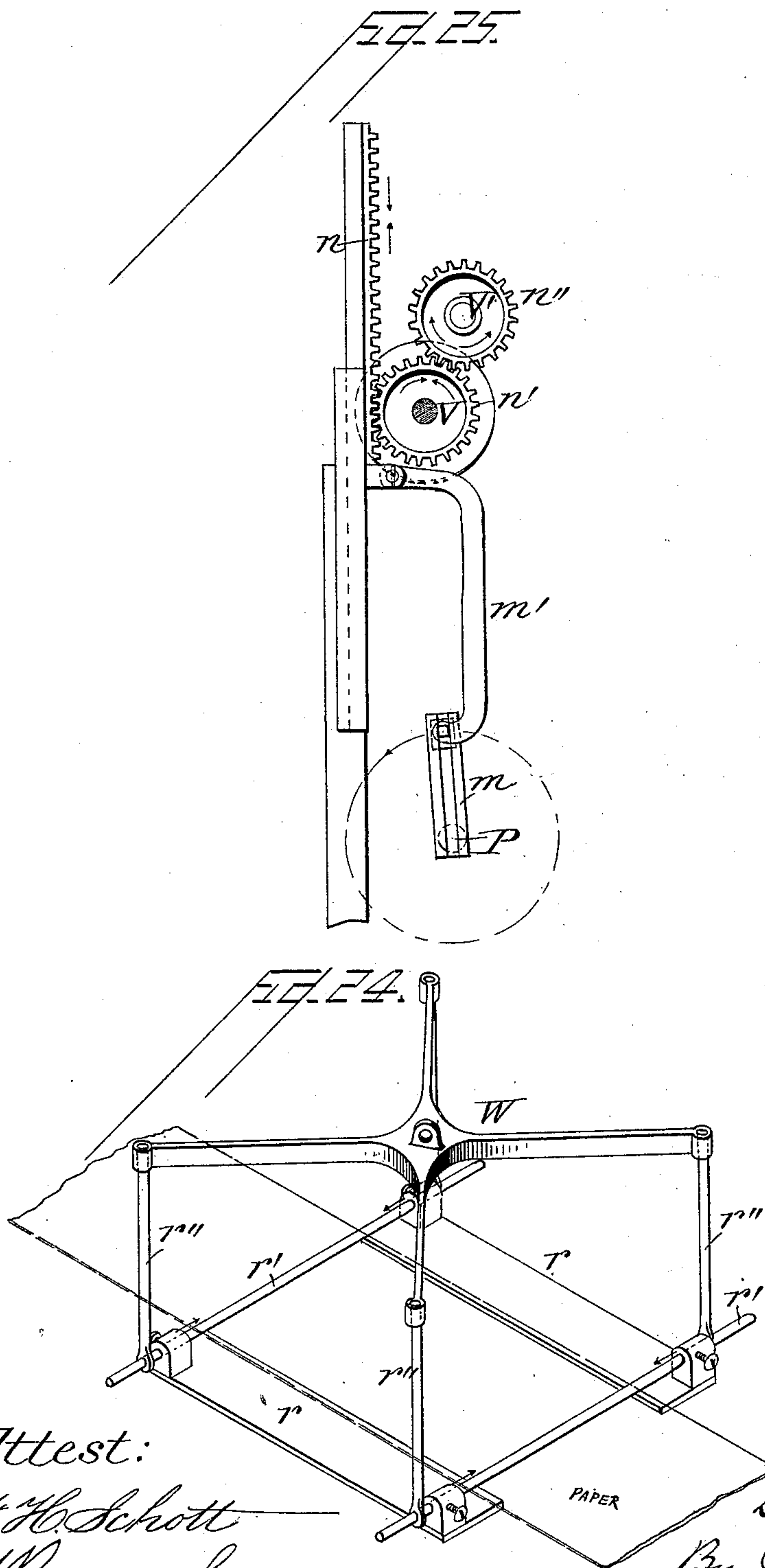
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8 Sheets—Sheet 8.

D. I. ECKERSON.
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H. H. Schott
W. Burroughs

Inventor:

D. I. Eckerson
By M. W. Chandler
Atty

UNITED STATES PATENT OFFICE.

DAVID I. ECKERSON, OF WORCESTER, NEW YORK.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 433,776, dated August 5, 1890.

Application filed September 20, 1888. Renewed June 27, 1890. Serial No. 356,995. (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.

This invention relates to that class of printing-presses designed to print upon a continuous sheet of paper taken from the roll, and which, after being printed, may, if desired, be cut into sheets of any size, all of which operations are performed automatically by the machine, which is an improvement on the printing-machine for which United States Letters Patent No. 387,500 were granted to me on the 7th day of August, 1888.

The especial objects of this improvement are to improve the platen by the introduction of a sliding removable impression-plate; to so arrange the paper-feeding devices that there shall always be a slack loop of paper between the impression-plate and the roll from which the paper is taken; to provide the vertically-moving type-bed with counterbalance-springs, which shall relieve the cam that operates said bed from the greater portion of the weight of the bed and its attachments; to a slotted cam for driving the devices by which the paper is cut after receiving the impression, said slotted cam giving a positive motion to the reciprocating cutting-plate in both directions; to the inking apparatus, in which a revolving cylinder supplies ink to a stationary plate, from which it is taken by the inking-rollers, carried to the type and to a revolving ink-table upon the opposite side of the machine; to the gripping devices attached to the platen for the purpose of holding the paper against the impression-plate, preventing its dropping upon the type-bed as the latter descends, and to the steel rods arranged upon the sides of the machine to retain the platen in position against the pressure of the type-bed.

In carrying out these improvements I construct a frame of metal, to and upon which all the operative parts of the machine are secured. These consist, essentially, of a suitable driving-shaft revolving in bearings attached to the opposite sides of the frame, said shaft carrying cams, one of which forces up the type-bed in making an impression, and the others draw it down away from the impression-plate after the impression has been made. To this shaft is also connected, by suitable gearing, the devices which operate the feeding-rolls, as well as those which give motion to the paper-cutting apparatus. It also operates the inking-rolls, which pass transversely over the type-bed from the inking cylinder and table upon one side of the machine to the revolving inking-disk upon the other side. The inking-cylinder is supplied from a suitably-shaped fountain attached to one side of the machine beneath the cylinder and table. The impression-plate is made removable from the platen, so that its elastic surface may be prepared to fit the inequalities of the type or plates from which the printing is executed, thus avoiding the necessity of raising the heavy platen for this purpose. The roll of paper to be printed from is carried upon a shaft in suitable supports at one end of the machine, the paper passing from said roll between a pair of rollers which are connected with another pair by gearing in such a manner that the paper passing between the two sets of rolls shall always form a loop at least sufficient in quantity to supply the paper needed for one impression, thus preventing the danger of tearing or otherwise injuring the sheet in its passage through the machine, as this slack prevents the sudden jerk which will come upon the paper owing to the intermittent movement of the feed-rolls, which supply it to and take it away from the impression-plate.

In the drawings accompanying this specification, Figure 1 is a vertical longitudinal section of the machine on line 1 1 of Fig. 3, and shows the relative positions of the principal parts of the press. Fig. 2 is a transverse section of Fig. 1 on line 4 4, illustrating the construction of the friction devices for preventing the drawing of more paper into the press by the feeding-rolls than is needed for each

impression. Fig. 3 is a plan view showing the relative arrangement of the feeding-rolls and their operating devices to the frame of the press. Fig. 4 is a transverse section of the press-frame on line 3 3 of Fig. 3, showing the mechanism employed to give motion to the first pair of feeding-rolls. Fig. 5 is an enlarged side elevation of the pawl-and-ratchet devices employed to give motion to said rolls. Fig. 6 is a plan of a portion of the press-frame, the type-bed, and inking-tables. Fig. 7 is a vertical section of the same on line 3' 3' of Fig. 6. Fig. 8 is a transverse vertical section through the press-frame, showing the platen and its holding-rods as well as the type-bed and the mechanism by which it is vertically reciprocated. Fig. 9 is a side elevation of the lower part of the type-bed support with the cam and shaft by which it is raised in making an impression. Fig. 10 is a similar view of one of the cams by which the type-bed is brought down after the impression is made. Fig. 11 is a view, partly in section, of the lower end of the type-bed support, showing the friction-rollers on which the cams that bring down the type-bed act. Fig. 12 is a sectional view of a portion of the press-frame with one of the adjusting devices for the springs which support the type-bed. Fig. 13 is a side elevation of a part of the press, illustrating the manner of winding the paper after once passing through the press. Fig. 14 shows the friction device for regulating the strain upon the paper during the operation of winding. Fig. 15 is a transverse section on line 2 2 of Fig. 1, and shows the means employed for operating the inking devices. Fig. 16 is a horizontal section on line 5 5 of Fig. 15 and further illustrates these means. Fig. 17 is a side view of one of the ink-tables and the means employed for carrying the ink from the fountain thereto. Fig. 18 is a bottom plan further illustrating these devices. Fig. 19 shows the means employed for the purpose of giving an endwise movement to one or more of the ink-distributing rolls. Fig. 20 is a top or plan view of the platen and lever for operating the gripping devices. Fig. 21 is a vertical section of the platen, showing the relative positions of the platen, the gripping devices, and the removable impression-plate. Fig. 22 is a bottom plan of the impression-plate. Fig. 23 is a perspective view of the type-bed and its supporting-springs. Fig. 24 is a perspective view of the gripping devices detached from the platen. Fig. 25 is a side elevation, on an enlarged scale, of the mechanism which operates the feed-rolls.

In the several figures, A represents the frame of the press, consisting, essentially, of two side pieces placed at a suitable distance from each other and firmly united by cross-bars bolted to the side pieces. This frame carries in suitable journal-boxes the shaft B, which crosses the frame, and is provided at one end with a tight and loose pulley upon which the belt runs, through which power is

communicated to the movable parts of the press, and it may also be provided with a fly-wheel B', which equalizes the motion, causing the machine to run steadily.

Midway between the two sides of the frame is secured to the shaft B a cam *a*, which revolves in a slot formed in the standard C', which carries the type-bed C. This cam *a* revolves in contact with an anti-friction roller secured in the slot above it and serves to raise the type-bed for the purpose of making an impression.

At each side of the standard C' is secured upon the shaft B a cam *a'*, which revolves in contact with anti-friction rollers journaled upon the standard beneath said cams, which serve the purpose of drawing down the type-bed after the impression is made. By the use of these separate cams great speed is permitted, as the movement of the standard and type-bed is positive in both directions.

The type-bed C is securely bolted to the top of the standard C', and is guided in its reciprocations by depending guide-pieces, which are allowed a vertical movement in guiding-grooves formed in the cross-bars which connect the side pieces of the frame.

From the under side of the type-bed and attached thereto are two or more rods *b*, which extend downward, their ends passing through lugs *b'*, projecting from the sides of the frame. These rods *b* between the type-bed and lugs *b'* are surrounded by the coiled springs *s*, the tension of which is adjusted by sleeve-nuts passing through the lugs *b'*. These springs are so adjusted as to nearly or quite support the weight of the type-bed and standards, thus relieving the cam *a* of the great weight it would otherwise be forced to carry, avoiding wear of the frictional surfaces, and by the almost perfect balance of the reciprocating parts allowing the type-bed to be operated at a great speed.

Secured in position above the type-bed is the platen D. In order to hold this platen firmly to resist the upward pressure of the type-bed in making the impression, four rods *c*, preferably of steel, pass through its projecting corners downward and engage with the lugs *c'*, projecting inward from the lower part of the frame. Suitable nuts screwed upon these rods are used not only to hold the platen, but also to adjust it to a position parallel with the upper surface of the type-bed.

As the surface which receives the impression from the type-bed must necessarily be of a yielding nature, and owing to the use of different kinds of type and the insertion of cuts to the surface of the type to be printed, it becomes necessary to fit the surface against which the impression is taken to this unevenness, and as the platen is too heavy to be moved readily so as to admit of the adjustment of its lower surface, the difficulty is overcome by providing the platen with a removable impression-plate. In order to afford a ready means of removal, this plate D' is in-

serted in dovetail grooves in the under side of the platen, and is firmly secured when in its proper position by means of screws *d d*, which pass down through the platen and screw into the plate. (See Fig. 21.) A handle *d'* is also attached to the plate, by which it can be drawn out of the grooves of the platen after the securing-screws have been removed. The cloth or other elastic surface covering the under side of the impression-plate is held in place by clamps *e e*, secured to the plate by the pivots *e'*. These clamps can be swung down from the sides of the plate, thus releasing the covering, but when forced back into a horizontal position stretch and secure the covering on the face of the plate.

The apparatus employed for applying and properly distributing ink to the face of the type consists of a swinging lever *E*, pivoted at its lower end to a cross-piece secured to the opposite sides of the frame. This lever carries at its upper end a series of inking-rollers *f f*, two or more in number, that are attached to the lever *E* by sliding rods *f' f'*. These rods are each surrounded by a light spiral spring *s'*, the tension of which keeps the rollers always in contact with the surface of the type and the ink-tables, although said surfaces are not the arc of a circle the radius of which is the length of the lever, but merely approximate to such an arc by inclining the tables at an angle to the surface of the type.

In order to communicate the desired swinging movement to the lever *E*, it is connected by means of the pitman *E'* with an adjustable crank-pin in the crank-wheel *F'*, mounted upon the shaft *F*. This shaft revolves in suitable journal-bearings attached to one side of the frame, and lies at right angles to the main shaft *B*, from which it receives motion through the agency of bevel-gearing, Fig. 8, said gearing being so proportioned that the shaft *F* shall make one revolution to two of the main shaft, thus causing the rollers *f f* to travel once across the face of the type to each revolution of said main shaft.

The ink-tables *G* and *H* are secured to the frame at an angle of twenty degrees or thereabout to the face of the type, their inner upper ends approaching the level of the surface of the type when the same is at its lowest point or farthest from the impression-plate above it, so as to leave room between said type and plate for the free passage of the rollers *f*, which deposit a fresh supply of ink on the faces of the type at each passage over them. These rollers *f f* receive their supply of ink from the table *G*, beneath which is an ink-fountain *G'*. This ink-fountain carries the intermittently-revolving roll *I*, close to the surface of which is the edge of the spring-plate *g*, adjusted by means of set-screws passing through the bottom of the fountain. The position of this plate with relation to the roll *I* regulates the flow of ink from the fountain to the roll.

Beneath the plate *G*, and projecting slightly above the surface of the same through a slot formed in said plate for its passage, is the roll *J*, and journaled in an oscillating frame *J'*, between the rolls *I* and *J*, is the transfer-roll *I'*, which takes the ink from the roll *I* and transfers it to the roll *J*. Motion is communicated to roll *I'* and oscillating frame *J'* by the reciprocating rod *K*, which traverses the press transversely and is actuated by the lever *K'*, pivoted to a cross-piece of the frame, its lower end connected by an adjustable pin with the lever *E* and its upper end by a ball-and-socket joint with the rod *K*.

To move the roll *I* intermittently, the rod *K* is connected to the upper end of a swinging lever *L*, and the lower end of this lever by a suitable connection with the lower end of the pawl-lever *L'*, the pawl of which engages with a ratchet-wheel upon one end of the shaft of the roll *I*.

To oscillate the frame *J'*, an adjustable sleeve *h* is placed upon the rod *K* in such a position that when the rod moves in one direction the beveled end of the sleeve strikes an anti-friction roll *h'*, pivoted to the frame, depressing the roll *I'* until it contacts with the surface of roll *I*. Then, as the rod reverses its movement the sleeve releases the friction-roll, and the weight of the rear portion of the frame *J'* elevates the roll *I'* into contact with roll *J*, and consequently transfers a portion of the ink it receives from the roll *I* to said roll *J*. In order to still further equalize the distribution of ink over the surface of this roll *J*, an equalizing-roll *M* is employed. The shaft of this roll is provided for a portion of its length with right and left screw-threads, and the roll, which is shorter than the others, is given a reciprocating motion upon its shaft by means of the swivel-nut *i*, which travels back and forth in said threads, carrying the roll with it. An additional roll *M'* may be so placed as to engage with the equalizing-roll *M*, as may also other rolls in such number as may be found necessary to perfectly distribute the ink. All of these last-named rolls are rotated by contact with the surface of the roll *J*, which in turn receives motion through the pitch-chain *j* from the sprocket-wheel *j'* upon the shaft *P*, connected by spur-gears with the shaft *F* in such a manner that the shaft *P* shall make two revolutions to one of the shaft *F*. As the ink-rollers *f* pass over the type from the table *G* to the table *H* upon the opposite side of the machine, they not only deposit ink upon the faces of the type, but carry a portion to the table *H*, which is provided with two rotating disks—a central one *N* and an annular disk *N'*—that surrounds the central disk, the faces of both being in the same plane as the remainder of the table *H*. The annular disk is provided with a downwardly-projecting sleeve that is journaled in the frame which supports the table. Said disk also carries a downwardly-projecting annular

ratchet k , with which the spring-pawl k' , carried by the reciprocating rod K , engages. The reciprocations of this rod therefore impart a rotary movement to the annular disk N' . This rotary movement is communicated to the inner disk N by means of the miter-gear O , secured to the sleeve of said disk, and from this gear to the gear O' upon the downwardly-projecting shaft of the disk N by an intermediate gear O'' , revolving loosely upon a pin projecting from the journal-bearing which supports both disks. It will therefore be seen that from this arrangement of gearing both disks have a rotary motion, but in opposite directions, causing them to properly mix and distribute the ink deposited on them by the rollers $f f$, or which may be received from any other source.

The paper which supplies the press is taken from a roll Q , carried on suitable supports at one end of the press-frame, and passes over the roll R , thence backward between said roll and the roll R' , dropping downward from the latter and forming a depending loop between it and the friction device Q' . This friction device consists of two smooth bars placed parallel to each other and extending across the frame, the lower bar being longer than the upper and having its ends held adjustably by means of set-screws in the brackets l , which are in turn secured to the press-frame, the upper bar being retained in the desired position with relation to the lower one by the connections l' . From this friction device the paper passes to the first pair of intermittently-rotating feed-rolls T and T' , thence through the press between the type-bed and impression-plate to the rolls U and U' , from which it goes to the receiving-table at the end of the machine.

In order to give the several pairs of feed-rolls their proper motion, a slotted crank m is secured to the outer end of the shaft P . A pitman m' connects a movable pin in the slotted crank with the rack-bar n . This rack-bar engages with a pinion n' , loosely mounted upon one end of the shaft V . This pinion connects with the ratchet-wheel p , attached to said shaft, so that a movement of the rack n in one direction will rotate the shaft V ; but its return or reverse movement acts only on the pinion n' , revolving it upon said shaft. At suitable points on this shaft V are placed bevel or miter gears, which engage corresponding gears on the shafts of the feed-rolls T and U , the corresponding rolls T' and U' being driven by spur-gears attached to the opposite end of the roll-shafts and engaging in the ordinary manner. It will be seen that by this method of operating the feed-rolls their movement is intermittent and that the amount of such movement is determined by the position of the adjustable crank-pin in the slotted crank m . This intermittent motion of these feed-rolls is rendered necessary by the fact that the paper must be stationary during the time it is receiving the impression, and that

its forward movement must occur while the type-bed is lowered and the type being re-inked. It will be observed that the rolls R and R' are but half the diameter of the others. Therefore to allow the same length of paper to pass between them that passes between the large rolls at each movement of the same their motions must be nearly or quite continuous. To accomplish this result, an additional shaft V' is placed above and parallel with the shaft V . This shaft V is provided with a spur-gear n'' and which engages with the gear n' upon the end of the shaft V . As this gear n'' receives an alternate movement in opposite directions from the rack n , the gear n'' and the shaft V' , with which they are connected, partake of the same movement.

In order to convert this into a nearly or quite continuous rotary movement of the rolls $R R'$, the shaft of the latter is extended across the end of the shaft V' and provided with two pawl-carrying miter-gears q , that revolve loosely upon the roll-shaft and engage with a similar gear upon the end of the shaft V' . Secured upon the roll-shaft outside the gears q are the ratchets q' , with which the pawls upon said gears engage. The result of this construction is to rotate the roll R' continuously in one direction at a rate of speed that shall give the same forward movement to its periphery during a revolution of the shafts P as the large rolls make during the same time. Thus paper is continuously passing from the roll Q , falling down beneath the roll R' in a loop which is taken up at each movement of the intermittently-moving feed-rolls. By this means the jerking movement of the feed-rolls upon the roll of paper is obviated and all danger of tearing it from this cause done away with. As the paper would be liable to sag down from the impression-plate when the type-bed recedes, thus getting in the way of the ink-rollers, and as it is also necessary that it should be held firmly in contact with said plate at the time of making the impression, a gripping device is provided, which consists of two parallel plates $r r$, that pass beneath the opposite edges of the sheet of paper, and are (see Fig. 24) retained in the desired position with relation to the paper passing through the press by set-screws that allow of their adjustment upon the rods $r' r'$ to any distance needed to enable said plates to engage the edges of the paper and hold it firmly against the impression-plate while the impression is being made. They then release the paper and allow it to be drawn forward for the next impression. In order to accomplish this, the ends of the rods r' are connected by means of vertical rods r'' with the spider W above the plates. A lever W' is pivotally connected with this spider, having its fulcrum upon a post t , which projects upward from the platen. The rear end of the lever W' is connected by the rod t' with an eccentric x upon the shaft P . The rotation of this shaft corresponds with the number of im-

pressions. Consequently by placing the eccentric in the proper position the gripping device is made to hold the paper against the impression-plate to receive the impression and release it when it is to be drawn forward by the feed-rolls. A suitable cutting-off blade Y is placed at the end of the frame and is operated by the bifurcated lever Y', with which it is connected by a pitman w. The lever Y' is fulcrumed at one side of the frame, and is connected at its opposite end with the grooved cam w' upon the shaft P. It will be observed that the feeding-rolls U and U' are mounted upon an adjustable carriage that may be moved upon the main frame, together with the cutting-blade, by means of screws to suit the distance it is desired to feed forward the paper at each imprint.

As it is sometimes desirable to use a sheet wide enough for two or more imprints, rotary shears Z are placed in front of the feed-rolls U U'. The shafts upon which these shears are applied extend beyond the frame of the press at one side a sufficient distance to allow of their being moved endwise on the shaft out of the path of the paper when it is desired to have the imprint take up the full width of the same. These rotary shears are driven, like the feed-rolls U and U', by miter-gears from the shaft V, and consequently have the same movement as said rolls.

As it is sometimes desirable to print the paper upon both sides, a means is provided for so doing by removing the adjustable table A' at the end of the machine and substituting in place thereof the devices shown in Figs. 13 and 14 of the drawings. These consist of a friction device similar to that employed at the opposite of the machine to retard the forward motion of the paper before it is taken by the feed-rolls, suitable brackets X' for carrying said friction device, and the shafts upon which the paper is to be rolled, which shaft is revolved by the belt y from a suitable pulley y' upon the driving-shaft B of the machine. After the paper has passed through the press and wound into a roll, said roll is transferred to the supports of the roll Q and allowed to again go through the press, the opposite side of the paper from that which has already been printed being submitted to the action of the type.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. In a printing-press printing from a roll of continuous paper, the combination, with the continuously-rotating rolls R R' to receive the paper, and the intermittently-rotating rolls T T' and U U' to carry the paper over the type-bed and about double the diameter of the rolls R R', of the intermittently-rotating shaft V, connected to the shafts of the rolls U' and T' by bevel-gearing, and the shaft V', connected to the shaft of the roll R' by a fixed

bevel-gear on the end of the shaft V', and the loose ratchet-and-pawl-controlled bevel-gears q on the shaft of the rolls and engaging the fixed gear on opposite sides, substantially as specified.

2. The combination of the continuously-rotating rolls, the intermittently-rotating rolls, and a friction device secured to the frame of the machine between the continuously-rotating and intermittently-rotating rolls, and consisting of the brackets l, secured to the press-frame, the lower transverse bar, with its ends held adjustably in said brackets by set-screws, and the upper transverse bar parallel to the lower bar and attached thereto by the connections l' substantially as specified.

3. In a printing-press, the combination of the vertical reciprocating type-bed, the standard thereof having a suitable longitudinal slot in its lower portion, the main shaft B, passing through said slot, the cam a, mounted on the main shaft in the slot and bearing upward against an anti-friction roller journaled within the slot, and the cams a', mounted on the shaft B and bearing downward against anti-friction rollers mounted on the shaft journaled in the type-bed standards, by means of which cams both the upward and downward movement of the type-bed is rendered positive, substantially as specified.

4. In a printing-press, the combination, with the main frame having the lugs b' provided with threaded perforations, and the standards C' of said bed moving in guides in the main frame and having longitudinal slots in its lower portion, of the main shaft B, the guide-rods b, the externally-threaded nuts engaging the perforations in the lugs b', the spring surrounding the rods b between said nuts and the type-bed, and the cams a', mounted on the main shaft in the slot in the standard and bearing upward against a suitable anti-friction roller, substantially as specified.

5. The combination, with the type-bed and type-bed-guide standards, of the guide-rods b, the externally-threaded nuts sliding on said guide-rods and engaging in threaded perforations of the lugs b' of the main frame, and the coiled springs surrounding the guide-rods between the said nuts and the type-bed, substantially as specified.

6. The combination of the vertically-moving type-bed, its balance-springs, the cams for raising said type-bed and making the impression, and the cams for withdrawing the same arranged as shown and described.

7. In a printing-press, the combination, with the main frame, inking-rollers, and operative mechanism therefor constructed substantially as described, of the slotted table G, the ink-well G', the plate g, secured thereto and set by an adjusting-screw, the rotatory ink-roll I, the rotatory inking-cylinder J, and the

vibratory ink-distributing roller I', all constructed and arranged substantially as and for the purpose specified.

8. In a printing-press, the inking-cylinder and slotted stationary table, in combination with the traveling distributing-rolls, the rotating inking-disks, and stationary table upon the opposite side of the machine, as set forth.

9. In a printing-press, the combination, with the main frame, the operative mechanism, and inking-rollers actuated thereby, all constructed substantially as described, of the cylinder J, the roll I, having a ratchet at one end, the ink-well provided with the adjustable plate *g*, the vibrating roll I', the pivoted vibrating lever K', the reciprocating rod K, the oscillating frame J', upon which the roll I' is mounted, the adjustable sleeve *h*, mounted on the rod K, the anti-friction roller *h'*, mounted on the oscillating frame to engage said sleeve, the swinging lever L, connected to the rod K, the pivoted lever L', provided with pawl to engage the ratchet on the roll I, and a suitable link-rod connecting the levers L L', all constructed and arranged substantially as and for the purpose specified.

10. In a printing-press, the combination, with the platen and impression-plate, of the spider W, the rods r^2 with their upper ends secured in perforations in the ends of the arms of the spider, the rods r' with their end parts inserted in openings in the lower ends of the rods r^2 , the plates *r*, laterally adjustable on the rods r^2 , and mechanism, substantially as described, whereby the spider and its attachments are automatically raised and lowered at the proper times, for the purpose specified.

11. In a printing-press, the platen and its impression-plate, in combination with the parallel gripping-plates engaging opposite sides of the paper, the lever by which said plates are carried, and the eccentric driven by the shaft P, which gives motion to the lever and actuates the gripping-plates, substantially as set forth.

12. In a printing-press, the combination, with the main frame, inking-rollers, and operative mechanism therefor, of the rotating inking-cylinder passing out of a slot in the inking-table C, the inking-roll M', turned by contact with said cylinder and equal in length to the cylinder, and the reciprocating distributing-roll M, about one-half as long as the cylinder, turned by contact with the roll M' and moving back and forth on its shaft by means of the screw-grooves in said shaft, and the swiv-

eled nut or rider z' , traversing said grooves alternately in opposite directions, substantially as specified.

13. In a printing-press, the combination, with the reciprocating rack and shaft V, operating the intermittently-revolving feed-rolls; of the shaft V' and its connecting-gear for operating the continuously-revolving rolls, as set forth.

14. In a printing-press, the vertically-reciprocating type-bed and its slotted standard, in combination with the main shaft passing through said standard, the cams for raising the standard and type-bed, and the cams for drawing down the same, all arranged and operating as shown and described, to give a positive movement to the type-bed, as set forth.

15. In a printing-press, the combination, with the main frame, inking-rollers, and operative mechanism, all constructed substantially as described, of the table H, the central rotating disk having a shank projecting inward from its center, the annular disk having a sleeve that surrounds the shank of the central disk and provided with the annular ratchet *k*, the loose bevel-gear O², the bevel-gears O O', secured, respectively, to the sleeve of the annular disk and to the shank of the central disk, the reciprocating rod K, and the spring-controlled pawl *k'*, pivoted on a bracket adjustably secured to said rod and engaging the ratchet *k*, substantially as specified.

16. The combination of the shaft P, having the slotted crank *m* on one end, the pitman *m'*, having at one end a swiveled block adjustable in the slot of said crank, the rack *n*, attached to the other end of said pitman and moving in suitable guides, the shafts V V', the gear wheel or pinion *n'*, loose on the shaft V' and engaging the rack *n*, so that it is moved thereby alternately in opposite directions as the rack reciprocates, the ratchet moving with the pinion *n'* and moving the shaft V at intervals in one direction only, and the pinion n^2 , meshing with the pinion *n'*, and consequently moving the shaft V', to which it is attached, alternately in opposite directions, substantially as specified.

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

DAVID I. ECKERSON.

Witnesses:

G. BURROUGHS,
N. DUMONT.