

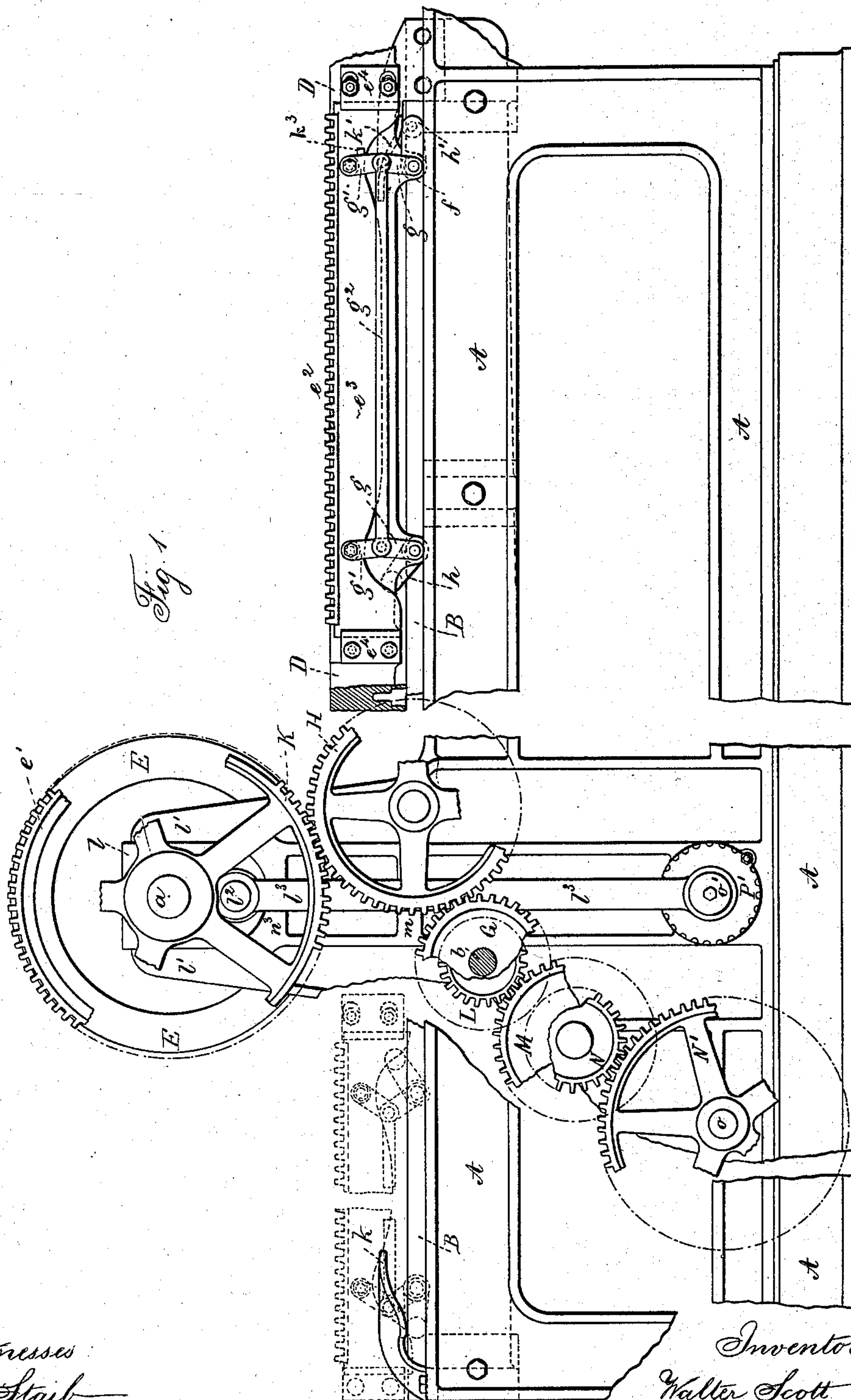
(No Model.)

3 Sheets—Sheet 1.

W. SCOTT.
CYLINDER PRINTING MACHINE.

No. 322,132.

Patented July 14, 1885.



Witnesses
J. Staib
Chas. H. Smith

Inventor
Walter Scott
per Lemuel W. Ferrill atty

(No Model.)

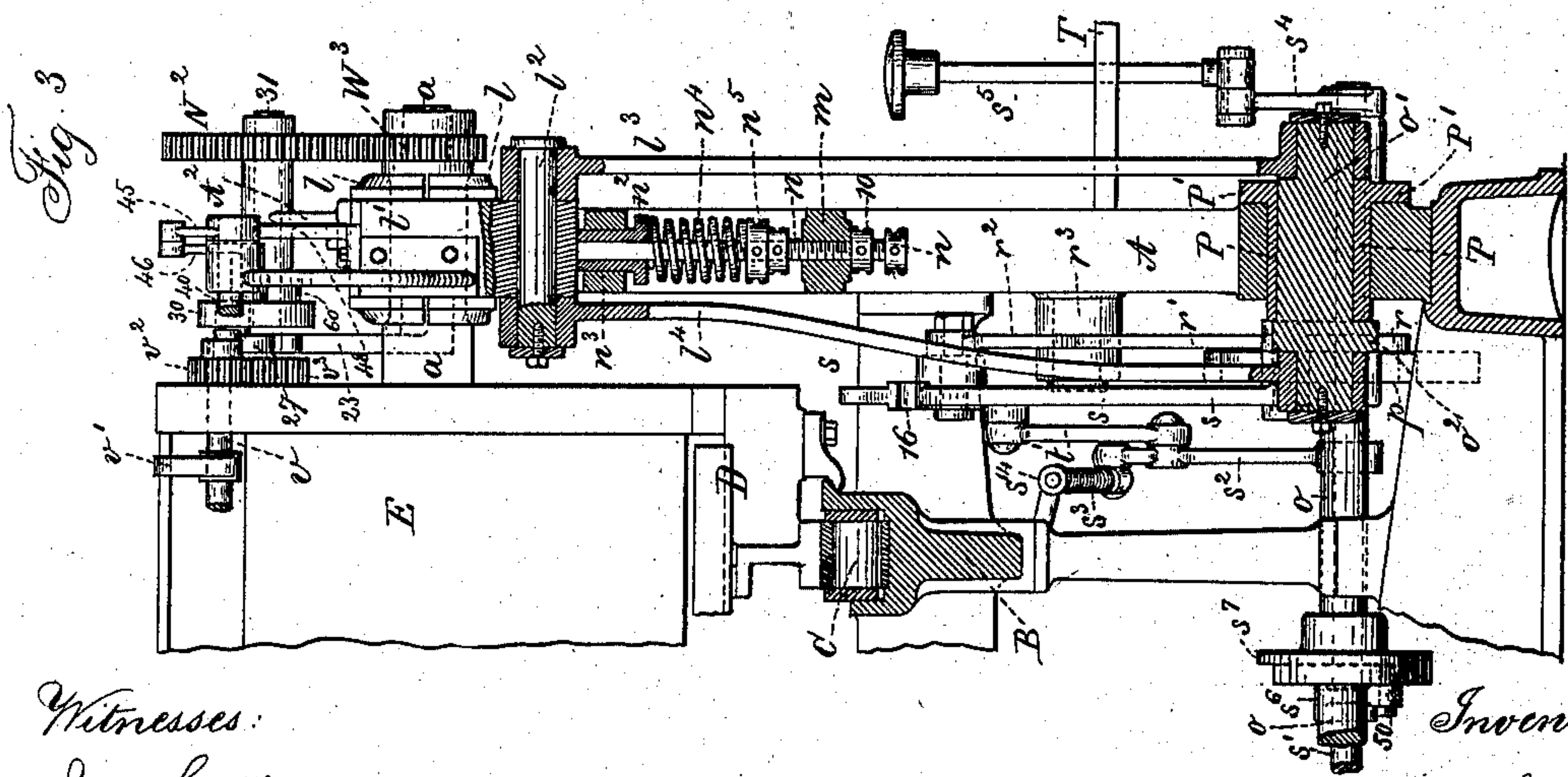
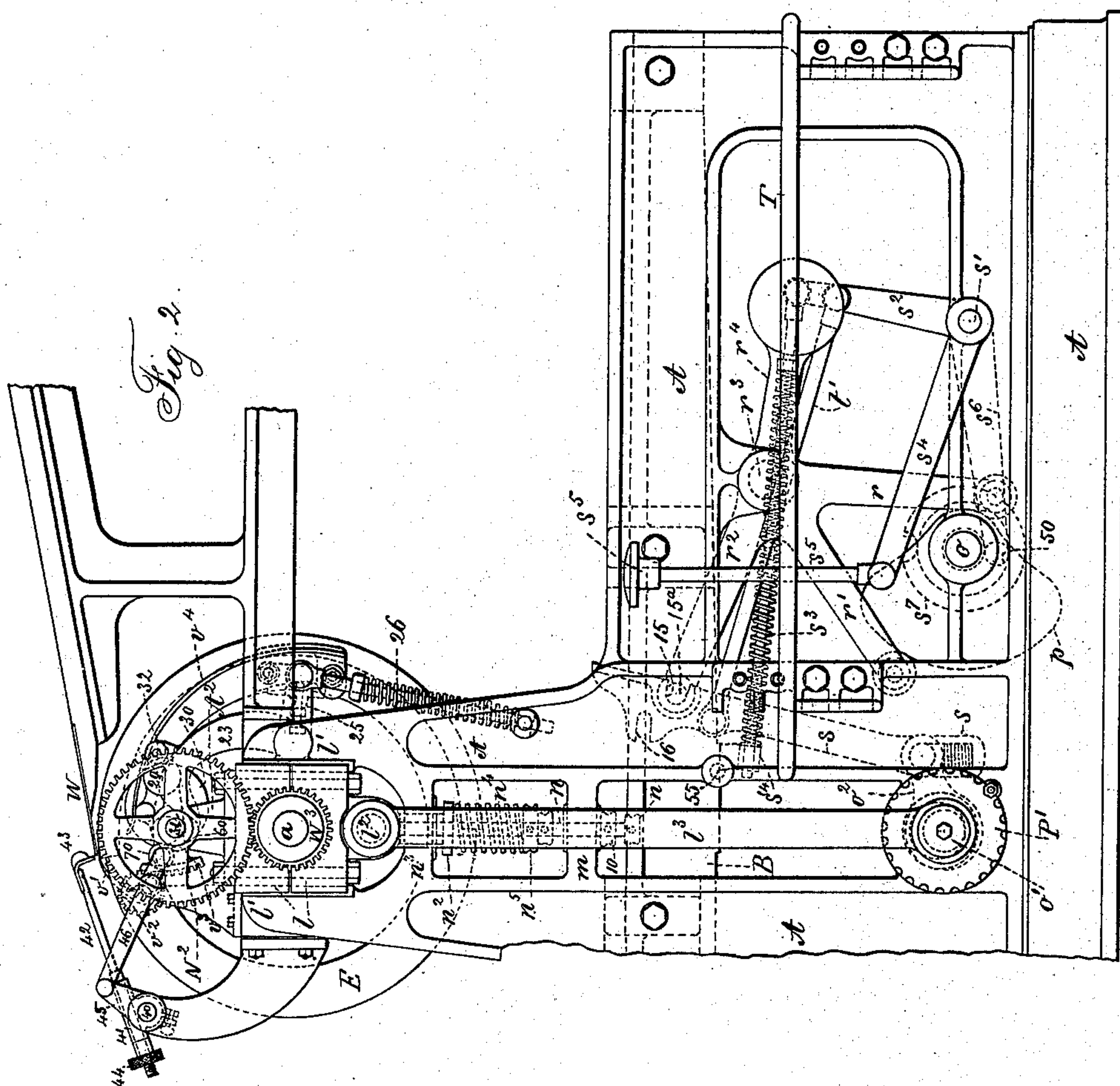
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I Stait
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Inventor:

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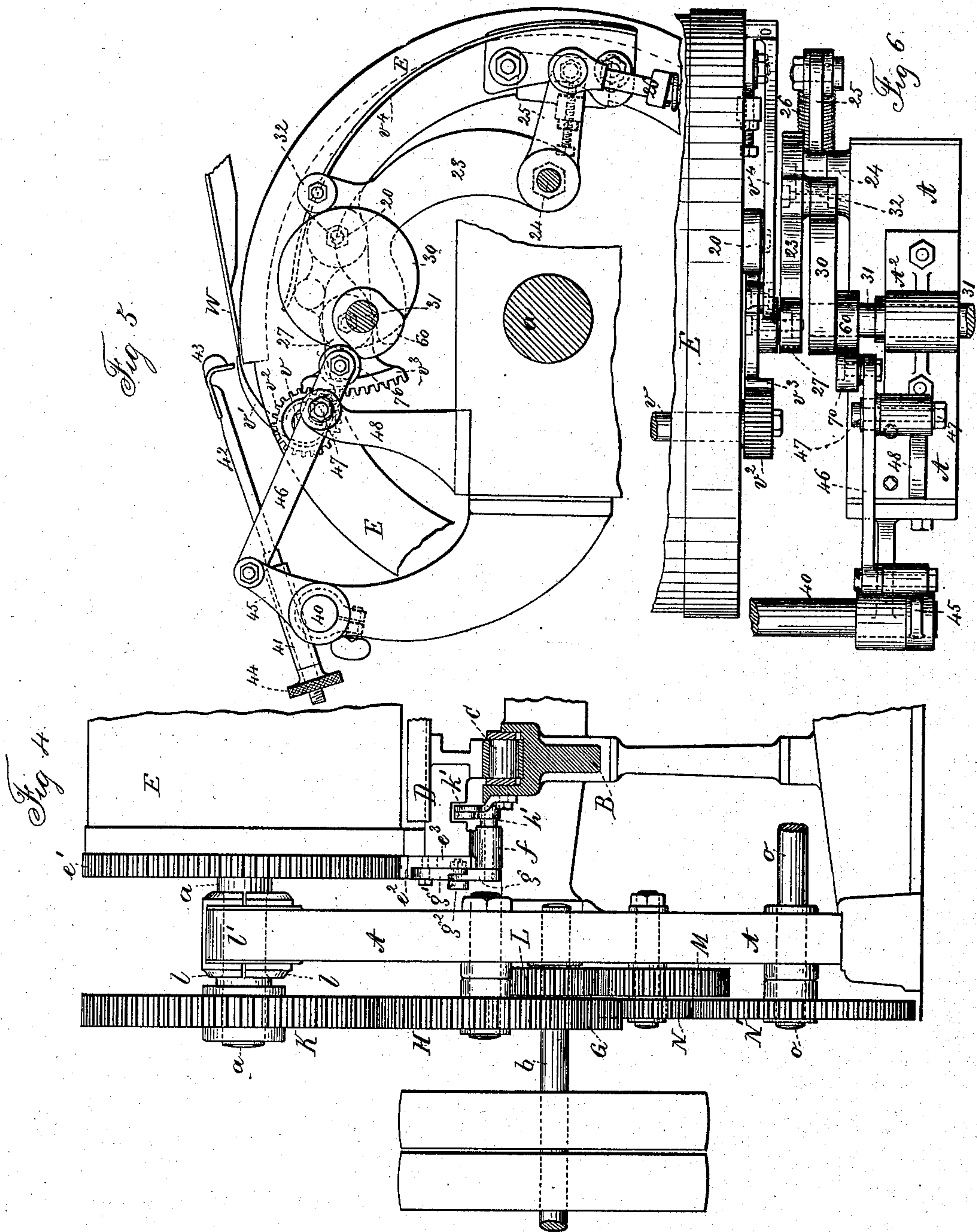
3 Sheets—Sheet 3.

W. SCOTT.

CYLINDER PRINTING MACHINE.

No. 322,132.

Patented July 14, 1885.



Witnesses:
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Inventor
Walter Scott
per Samuel W. Serrell atty

UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 322,132, dated July 14, 1885.

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

To all whom it may concern:

Be it known that I, WALTER SCOTT, of Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Cylinder Printing-Machines, of which the following is a specification.

This invention relates to a cylinder printing-press, in which the cylinder makes two revolutions to each impression. I provide a peculiar mechanism for raising, lowering, and adjusting the impression-cylinder. I also arrange the mechanism that operates the gripper in such a manner that the gripper is only closed to grasp the sheet every second revolution. The impression is thrown off and the impression-cylinder held in an elevated position by the attendant, whenever required, and the rack upon the bed that gears into the wheel at the end of the impression-cylinder is raised and lowered automatically, so that the same may be entirely free from the impression-cylinder gear upon the return movement; but while the printing takes place the teeth of the rack and gear are together, and the proper relative movements are insured. This last-named feature of my invention renders it unnecessary to use a segmental gear upon the impression cylinder, lessens the extent of rise-and-fall motion to the impression-cylinder, and allows for the rack-teeth being of a size and pitch corresponding to the other teeth of the gearing, so that inaccuracies resulting from differences in the sizes of the teeth are not likely to arise.

In the drawings, Figure 1 is a side view showing portions of the frame of the press and of the actuating-gearing. Fig. 2 is an elevation of part of the frame and the mechanism at the opposite side of the press to Fig. 1. Fig. 3 is a vertical section through the frame and mechanism at one side of the press for raising and lowering the impression-cylinder. Fig. 4 is an elevation of the gearing at one end of the impression-cylinder. Fig. 5 is an elevation, in larger size, of the gripper devices at the end of the impression-cylinder, and Fig. 6 is a plan of the same.

The frames A, the bearers B for the roller-carriages C, the type-bed D, and the cross-girts connecting the frames are to be of any desired character; but they are made with

reference to the reception of the parts hereinafter described.

The impression-cylinder E is upon the shaft *a*, and the power is applied to the shaft *b* and transmitted through the gears G H K to the shaft of the impression-cylinder, and by the gears L M N N' to the shaft *o*. The shaft of the impression-cylinder makes two revolutions to one revolution of the shaft *o*.

The gearing that transmits motion to reciprocate the bed D may be of any desired character, and is not shown in the drawings.

Upon one end of the impression-cylinder is the gear-wheel *e'*, gearing into the rack *e''* upon one side of the bed. This rack *e''* is at the top edge of a vertical plate *e'''*, the ends of which are received into the vertical guide-slides *e''''*, that are bolted to the edge of the bed, so that this plate *e'''* and its rack can be raised and lowered bodily in such guide-slides, and one of these guide-slides is slotted for the reception of the attaching-bolts, so that the slide may be adjusted to compensate wear.

Upon the under edge of the bed D there are bearings *f* for the axes or pivots of the toggle-links *g*, and the links *g* and *g'* are connected by bolts, which also connect the ends of the link *g''*, and the upper ends of the links *g'* are pivoted to the rack-plate *e'''*. The axes or pivots passing through the bearings *f* are provided with crank-arms *h h'*. The arm, axis, and link are made in one or permanently attached together; hence it will be understood that when either arm *h* or *h'* is moved the whole of the toggle-bars are swung and act to either raise or lower the rack-plate and rack.

Near one end of the press I place an incline or compound curved cam, *k*, and near the other end of the press a similar cam, *k'*. The crank-arm *h'* of the forward pair of toggle-links projects forward and runs under the cam *k'*, and in so doing the toggles are swung and the rack lifted into the position shown by full lines in Fig. 1. In this position the rack is adapted to gear into the teeth of the wheel *e'*, and moves with the same while the impression is being made. After the impression has been made and the bed arrives near the end of the stroke, the crank-arm *h*, which had been raised by the depression of the crank-arm *h'*, runs under the incline *k*, and the toggles are swung

into the angular position shown by dotted lines, Fig. 1, and the rack-bar is pulled down, so as to return beneath the wheel e' and without touching the same. It will be seen by the full lines in Fig. 1 that when the crank-arm h' is pressed down by the incline k' the toggles are straightened to raise the rack, and they are moved slightly past the straight line and their further movement is limited by a stop, h^3 ; hence pressure on the rack will not swing the toggle, and the rack is firmly held in an elevated position.

The journal-boxes l of the impression-cylinder are bolted together, and they can be raised or lowered in the slide-bearings l' in the frame A. Below the lower half journal-box there is a downward-projecting knuckle formed with or attached to said box, and through this the joint-bolt l^2 of the links $l^3 l^4$ passes.

There is a cross-piece, m , in the frame A, and through this the vertical screw n passes and extends up to the underside of the knuckle upon the journal-box. There is a screw of this kind at each side frame, and by it the impression-cylinder is adjusted, so that it cannot descend too far and make too heavy an impression.

Each screw n has a lock-nut, 10, to hold it firmly when adjusted, and around each screw is a sleeve, n^2 , sliding through the cross-bar n^3 of the frame, and there is an expansive helical spring, n^4 , around the screw n , the upper end of which rests against the lower end of the sleeve n^2 , and the lower end rests upon a disk, n^5 , that is screwed upon the screw n and provided with a lock-nut.

By adjusting the disk n^5 the strength of the spring is varied, and the weight of the impression-cylinder sustained to whatever extent desired, so that the cylinder may be raised without undue strain upon the operating parts.

At the lower ends of the links $l^3 l^4$ there are eyes that pass over the cylindrical end portions of the pin o' , and these end portions are in line with each other, but eccentric to the central body portion of such pin o' ; hence, if this pin o' is partially revolved, the eccentric end portions, acting upon the links $l^3 l^4$, will raise and lower the journal-boxes of the impression-cylinder.

It is to be understood that the parts described are duplicated, and that the links and eccentric pin and means for partially rotating the same are provided at both sides of the press.

The shaft o has upon it the cams p , and these are made to oscillate the three-armed levers, one at each side of the press. The arms r r' and r^2 compose each a three-armed lever, and it swings upon a gudgeon or pivot, r^3 , up on the inside of the frame A, and it is preferable to employ a fourth arm, r^4 , with an enlargement or counter-weight. The arms r and r' are provided with rollers, against which the cams p act. These cams are arcs of large and small circles of about one hun-

dred and thirty degrees, with intermediate curved inclines, and hence the three-armed levers are held in the position, shown in Fig. 2 during the larger portion of the travel of the bed in one direction, and when their positions are reversed they are again held in that position during the larger portion of the travel of the bed in the other direction, the changes taking place during the stopping and starting of the bed at the extremes of its movement.

Upon each eccentric-pin o' there is a crank-arm, o^2 , securely attached, and the link s is connected to the crank-arm o^2 by a crank-pin projecting from said arm o^2 , and said crank-pin passes through the upper part of a slot formed in the end of the link s , and in this slot, below said crank-pin, there is a spring, as seen by dotted lines in Fig. 2.

There is a rock-shaft, s' , extending across between the frame A, and upon it is an arm, s^2 , to which is connected a rod, and an expansive helical spring, s^3 , surrounds the same and acts between a nut on said rod and the eye s^{14} to press the arm s^2 away from the eye. The arms s^2 are connected by links t' to the links s , and there is a similar arm and link at each side of the machine. The links s are notched at opposite sides, one notch at, 15, being adapted to receive a pin at the end of the arm r^2 . The other notch, 16, is for holding the parts when the impression is thrown off, as hereinafter explained.

It will now be understood that when the three-armed rocker-levers are moved in one direction a downward end motion is given to the links s , and these, acting upon the cranks o^2 , turn the eccentric-pins o' and raise the links $l^3 l^4$, the journal-boxes, and the impression-cylinder, and this is to be done after the impression has been made and before the return-stroke of the bed. When the motion is given in the other direction, the link s is lifted, and the impression-cylinder is lowered to be in position to give the impression before the bed commences to move in the other direction. In the aforesaid movements, when the links s are being moved downwardly they act directly upon the crank-pins of the arms o^2 to give a positive motion, and when the links s are being moved upwardly, as aforesaid, the springs in the slots at the lower ends of the links s act against the crank-pins of the arms o^2 ; hence if the rotation of the eccentric-pins o' is stopped in consequence of the journal-boxes resting upon the screws n the springs will be compressed if the upward movement of the links s should be continued for a small distance by the action of the levers.

Upon the end of the shaft s' near the platform T, upon which the attendant stands to feed the paper, is a crank-arm, s^4 , and a vertical rod s^5 , and foot-piece.

Upon the shaft s' is a third crank-arm, s^6 , with a roller or stud at the end, and this is adjacent to the shell-cam s^7 on the shaft o . This shell-cam is an arc of a circle of about

three hundred and thirty degrees, and in its normal position the pin 50 of the end of the arm s^6 is inside this shell-cam; hence when the feeder puts his foot upon the foot-piece s^5 he cannot move the same until the end of the shell-cam passes away from under the crank-pin 50 of the arm s^6 . The rocking movement now given to the shaft s' causes the arm s^2 to compress the spring s^3 , and the links t' to carry the links s away from the studs 15^a at the ends of the arms r^2 , and in this manner disconnect the links s from such arms, and allow the arms r^2 to vibrate or oscillate without moving the links s .

The parts are so made and timed that the separation of the links s from the arms r^2 can only take place at the time the links are depressed by said arms r^2 , and the action of the cams p and impression-cylinder is elevated; hence the impression is thrown off, and although the other movements continue the impression-cylinder is sufficiently above the types to prevent injury to such types from any of the causes arising in printing.

To steady the links s , and to prevent the impression-cylinder descending in consequence of its weight or otherwise, I provide the studs 55 upon the frames A, upon which the links s are hooked. The studs 55 are in such a position that when the impression-cylinder has been raised and the links s have been moved downwardly in so doing the notches 16 in the links s are opposite said studs 55; and at this moment the shell-arm s^7 passes from beneath the pin 50 on the arm s^6 , and if the impression is to be thrown off the foot-piece s^5 can now move downwardly and partially rotate the shaft s' by the arm s^4 , and by the lever s^2 and link t' the link s is pushed off the stud 15^a at the end of the arm r^2 , and the slot 16 in the lever s passes upon the stud 55. When the press-feeder removes his foot from the foot-piece s^5 , the spring s^3 presses the arm s^2 , and keeps the pin 50 of the lever-arm s^6 against the outside of the shell-cam s^7 , and as soon as such cam revolves clear of the pin 50 the spring oscillates the rock-shaft s' , and by the arms s^2 and links t' draws the links s off the pins 55, and causes the slots 15 to again receive the pins at the ends of the crank-arms r^2 , and the parts are restored to their normal positions, and all the movements of the press are harmonious.

There is an eccentric sleeve, P, that receives each pin o' , and the flanges P' at the end of the sleeve rest against the surface of the frame, and its edge is notched. By turning this eccentric sleeve the action of the parts will be adjusted so as to raise or lower the impression-cylinder to the desired point, and a screw inserted into the frame through one of the notches holds the sleeve from turning.

Upon the impression-cylinder is the shaft v , carrying the gripper v' , and at the end of the shaft is a pinion, v^2 , that gears into the teeth of the sector v^3 , which is pivoted at 20 to the cylinder, and provided with an adjusta-

ble spring, v^4 , to press upon and move the sector and revolve the gripper-shaft and fingers. These parts are the same as those represented in my application filed January 21, 1884, Serial No. 118,171, and are not herein claimed by me.

I provide the following means for preventing the gripper-fingers being opened and closed on the sheet every revolution of the impression-cylinder: The cam 23 is pivoted at 24, and it has a crank-arm, 25, to which is connected the rod and spring 26, which tend to swing the cam 23 out of the way of the roller 27 upon the sector-arm v^3 ; but the cam 23 near its pivot 24 is sufficiently large to open the grippers slightly every time the roller 27 passes around; hence the grippers of the transfer-cylinder or other delivery apparatus will take off at this time the advancing end of the printed sheet, but the grippers will close and remain closed as they pass beneath the feed-board w , and hence will not take any sheet at this revolution of the impression-cylinder, but at the next revolution of the impression-cylinder the upper end of the cam 23 is lifted and the cam swung into the path of the roller 27, so that it opens and reverses the grippers, and they pass under the feed-board to close as they emerge from beneath the lower edge of the sheet in the usual manner. To effect this swinging movement of the cam 23, I make use of the eccentric 30 upon the shaft 31, acting against the arm and roller 32 projecting at the side of the cam 23, and this shaft 31 is supported upon an auxiliary frame, A², above the frame A, and the gear N² on the shaft 31 is driven by a gear, W³, of half the size upon the shaft a of the impression-cylinder E, so that the eccentric or cam 30 moves the swinging gripper-cam 23 into the path of the roller 27 upon the sector-arm v^3 to operate the gripper every second revolution of the impression-cylinder E; and the spring v^4 forces said cam 23 out of the path of the roller on the sector-arm at the next revolution; or the parts may move by their weight, so that the sheet is taken at one revolution, and the grippers pass by shut at the next revolution.

In order to determine the position of the lower edge of the sheet, I make use of the cross-shaft 40 upon which are two or more tubes, 41, through which pass the gage-rods 42, carrying at their ends the gage 43. This is adjustable by the nuts 44; so as to occupy the proper position for the sheet. At the end of the shaft 40 there is a crank-arm, 45, and a link, 46, sliding on the support 47 on the auxiliary frame 48, and terminating with a roller. The cam 60 on the shaft 31 acts to press back the roller 70 and link 46, and partially revolve the shaft 40 and raise the gage 43 at the moment before the grippers close, so as to lift the gage out of the way of the sheet as it is drawn off the feeding-table.

All the novel and patentable devices and combinations herein described and shown are my invention. The following is a summary

of the devices and combinations of devices which I now understand and am advised should be expressed in claims for the protection of the aforesaid invention.

5 I do not claim a press in which the links that raise and lower the impression-cylinder are adjustable in their length and regulate the distance to which the cylinder is lowered to give the impression.

10 I claim as my invention—

1. The combination, with the reciprocating bed, the impression-cylinder and its gear-wheel, of the rack and rack-plate, guides secured upon the bed and in which said rack and plate can be moved vertically, and mechanism, substantially as set forth, for elevating the rack in its relation to the bed at or near the termination of the movement of the bed in one direction, and for depressing it at or near the termination of the movement in the other direction, substantially as set forth.

2. The combination, with the printing-press bed, an impression-cylinder and its gear-wheel, of a rack upon the bed, slides supporting the rack, toggle-bars pivoted together and to the bed and rack, respectively, and means, substantially as specified, for moving the toggle-bars at the ends of the reciprocations of the bed to raise and lower the rack, substantially as set forth.

3. The combination, with the bed and the rack, of the slides for the same, the toggle-bars connected together and to the bed and rack, and the arms and stationary cams for moving the same, substantially as set forth.

4. The combination, with the impression-cylinder and mechanism, substantially as specified, for raising and lowering the same, of adjusting-screws n passing vertically through the frame m , and by which the downward movement of the journal-boxes of the impression-cylinder is arrested, the adjustable springs n^4 , the sleeve n^2 passing through the frame n^3 , and disks n^5 around the screws to adjust the springs for partially counterpoising the impression-cylinder, substantially as set forth.

5. The combination, with the impression-cylinder and its shaft and journal-boxes fitted to slide vertically in the frame, of a pin passing through the lower part of each journal-box, links connected at their upper ends by such pin at the outer and inner sides of such journal-boxes, pins passing through and supported by the frame with eccentric ends to which the links are connected at their lower ends, and cams, arms, and levers for partially rotating the pins and moving said links and raising and lowering the impression-cylinder, substantially as set forth.

6. The combination, with the impression-cylinder, journal-boxes, links l^3 l^4 , eccentric pins o' and the joint-bolts l^2 , of the crank-arms o^2 , notched links s , the rocker-arms r r' r^2 , and the cams p , and cam-shaft o for actuating the same, substantially as set forth.

7. The combination, with the impression-cylinder, and the eccentric pins and links for raising and lowering the same, of the crank-arms o^2 and links s , the three-armed rocker-levers r r' r^2 , the cams p for moving the same, the cross-shaft s' , the arms and connection to the foot-piece, the link t' , between the arm s^2 and the notched link s , and the spring s^3 acting upon the arm and cross-shaft, substantially as set forth.

8. The combination, with the notched link s and the foot-piece, links and arms for disconnecting the same from stud 15^a, of the impression-cylinder, the links l^3 l^4 , the pins with their crank-arms, and the stud 55 for holding the notched link when the impression is thrown off, substantially as set forth.

9. The combination, with the foot-piece and levers for throwing off the impression, of the shell-cam to determine the time when the foot-piece and levers are allowed to operate, and the impression-cylinder and the eccentric pins and links for raising and lowering the same, substantially as set forth.

10. The combination, with the impression-cylinder and its journal-boxes, of the links connected to the journal-boxes, the pins with eccentric ends, and the adjustable eccentric sleeves that receive such pins and by which the impression-cylinder is adjusted, substantially as set forth.

11. The combination, in a printing-machine, with the impression-cylinder and its grippers, and the eccentric pins and links for raising and lowering the cylinder, of a cam, 30, a shaft, 31, for the same, a gear-wheel, N^2 , upon said shaft, and a gear-wheel, W^3 , upon the shaft of the impression-cylinder, whereby the cam 30 is revolved once for every two revolutions of the impression-cylinder, a cam, 23, operated by the cam 30, a sector and pinion for moving the grippers, the same being acted upon by the cam 23 every second revolution of the impression-cylinder, substantially as set forth.

Signed by me this 29th day of May, A. D. 1884.

WALTER SCOTT.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.