No. 666,484.

Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

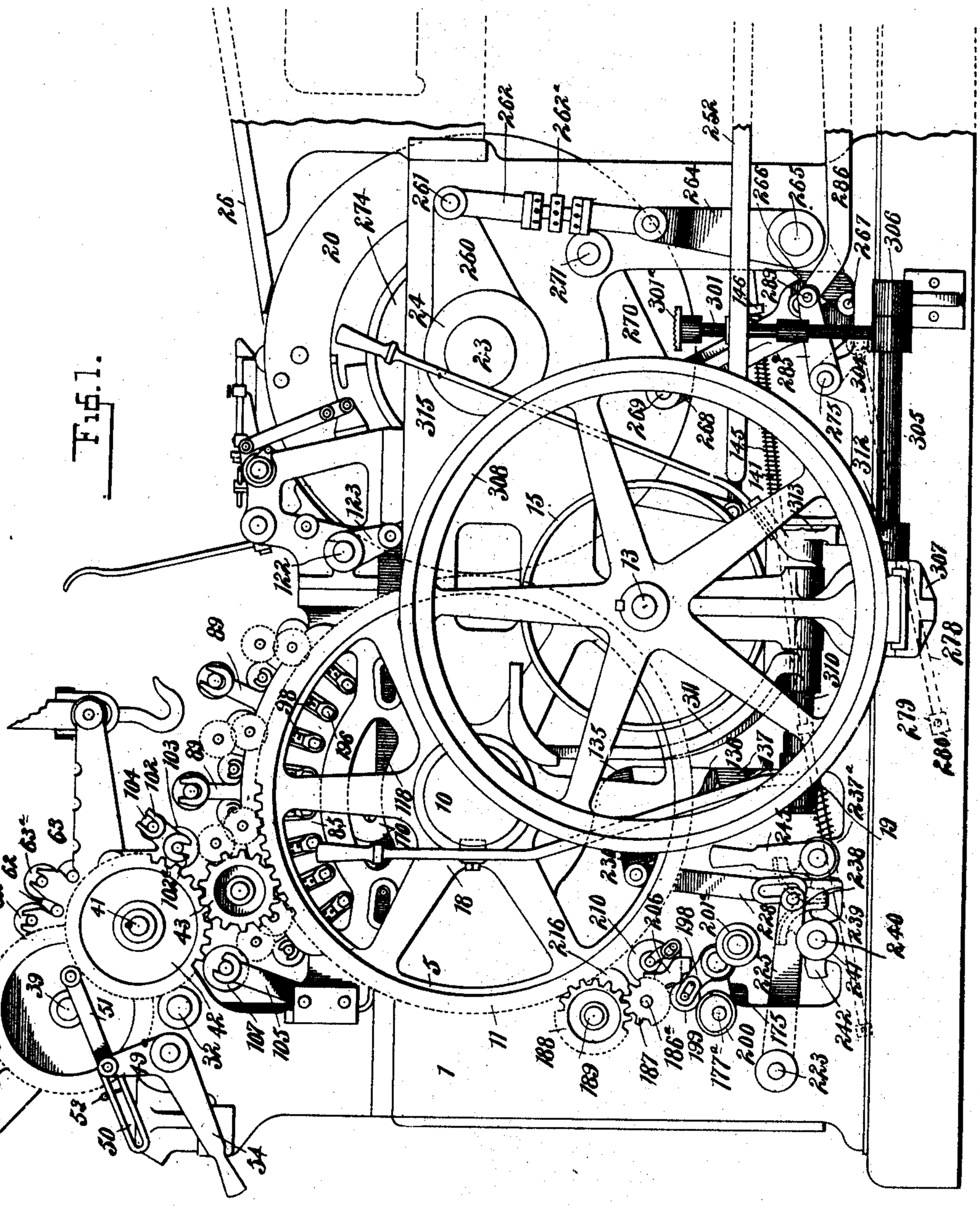
PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.)

24 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

Wm. a. Countland

Jr. V. Bidgood

INVENTORS.

John Brooks and

Winfield S. Huson

BY

ATTORNEYS.

No. 666,484. Patented Jan. 22, 1901.

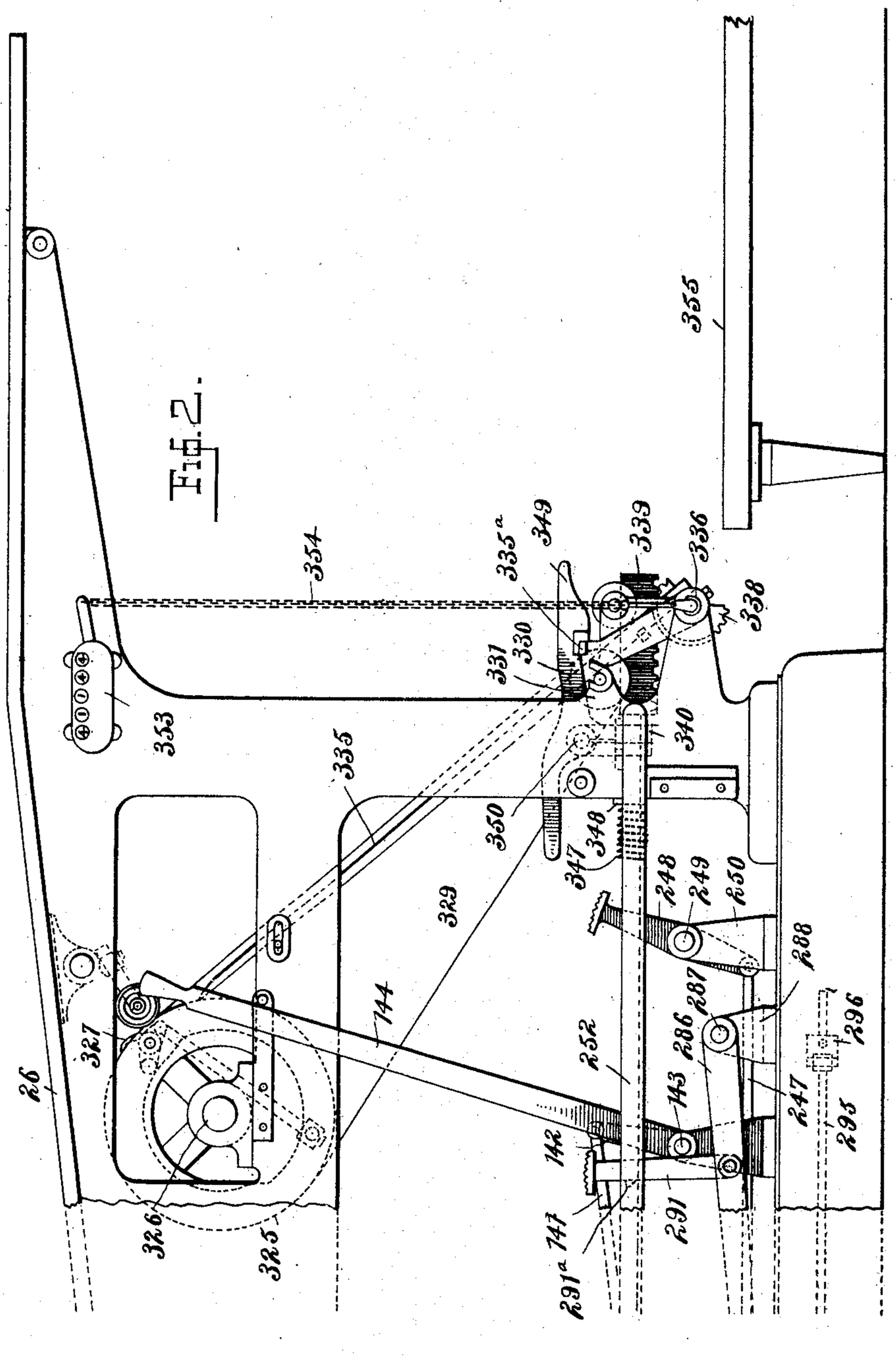
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 2.

FIG. 2.



WITNESSES

Wm. A. Countland

Jr. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

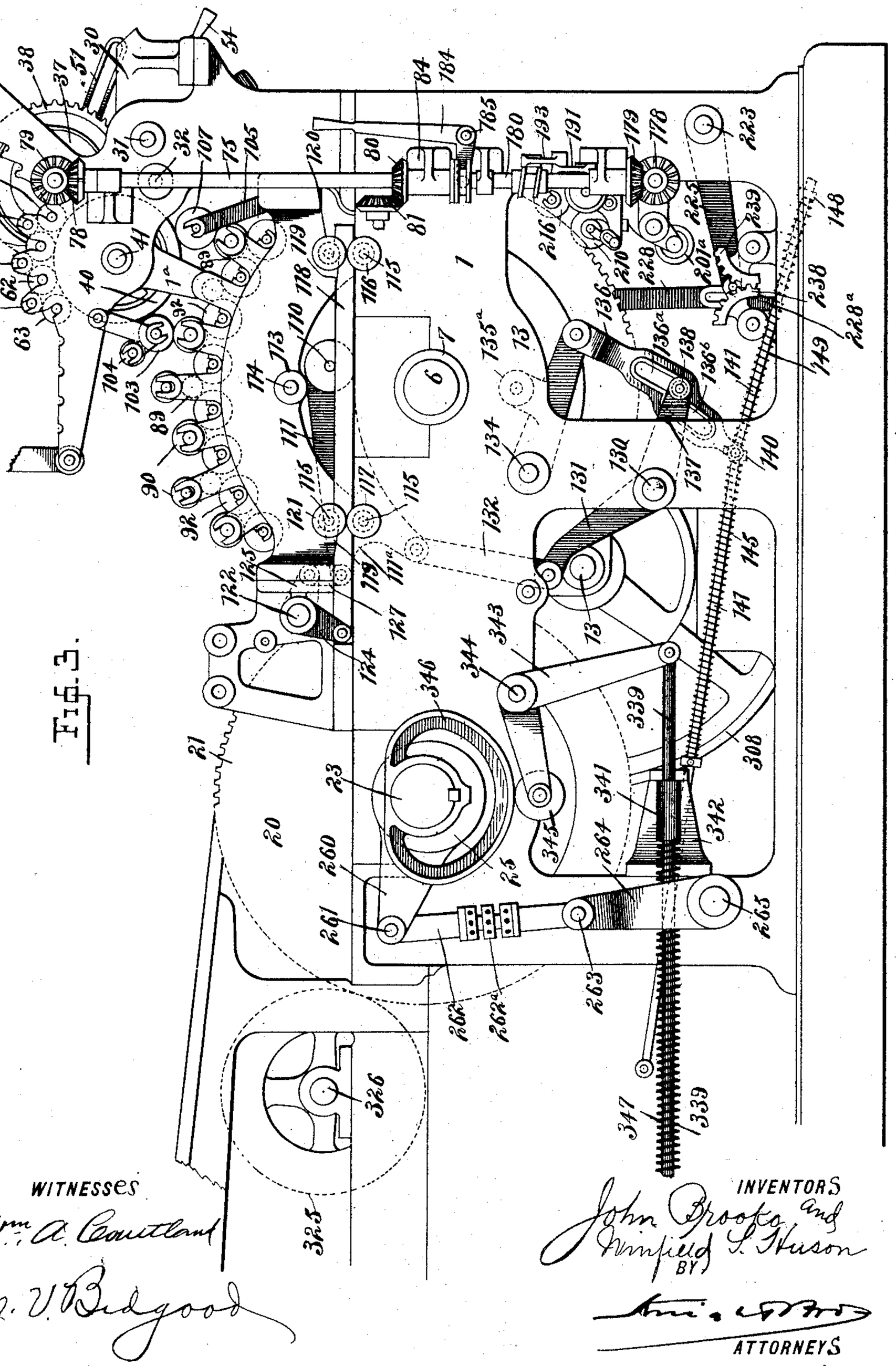
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 3.

FIG. 3.



WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and
Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

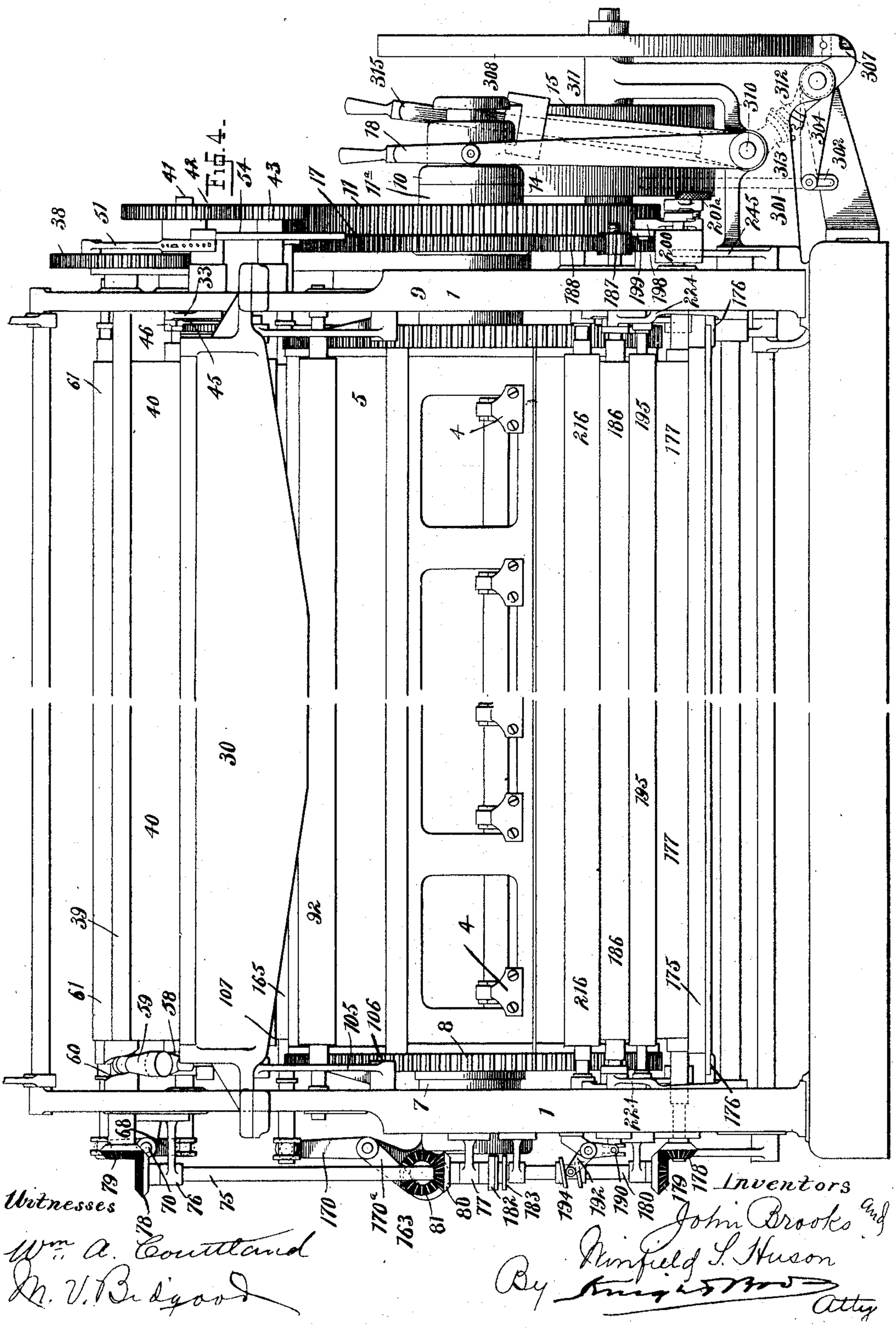
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 4.

FIG. 4.



Witnesses

Wm. A. Countland

M. V. Bridgood

Inventors

John Brooks and

Winfield S. Huson

By Knight Bros Atty

No. 666,484. Patented Jan. 22, 1901.

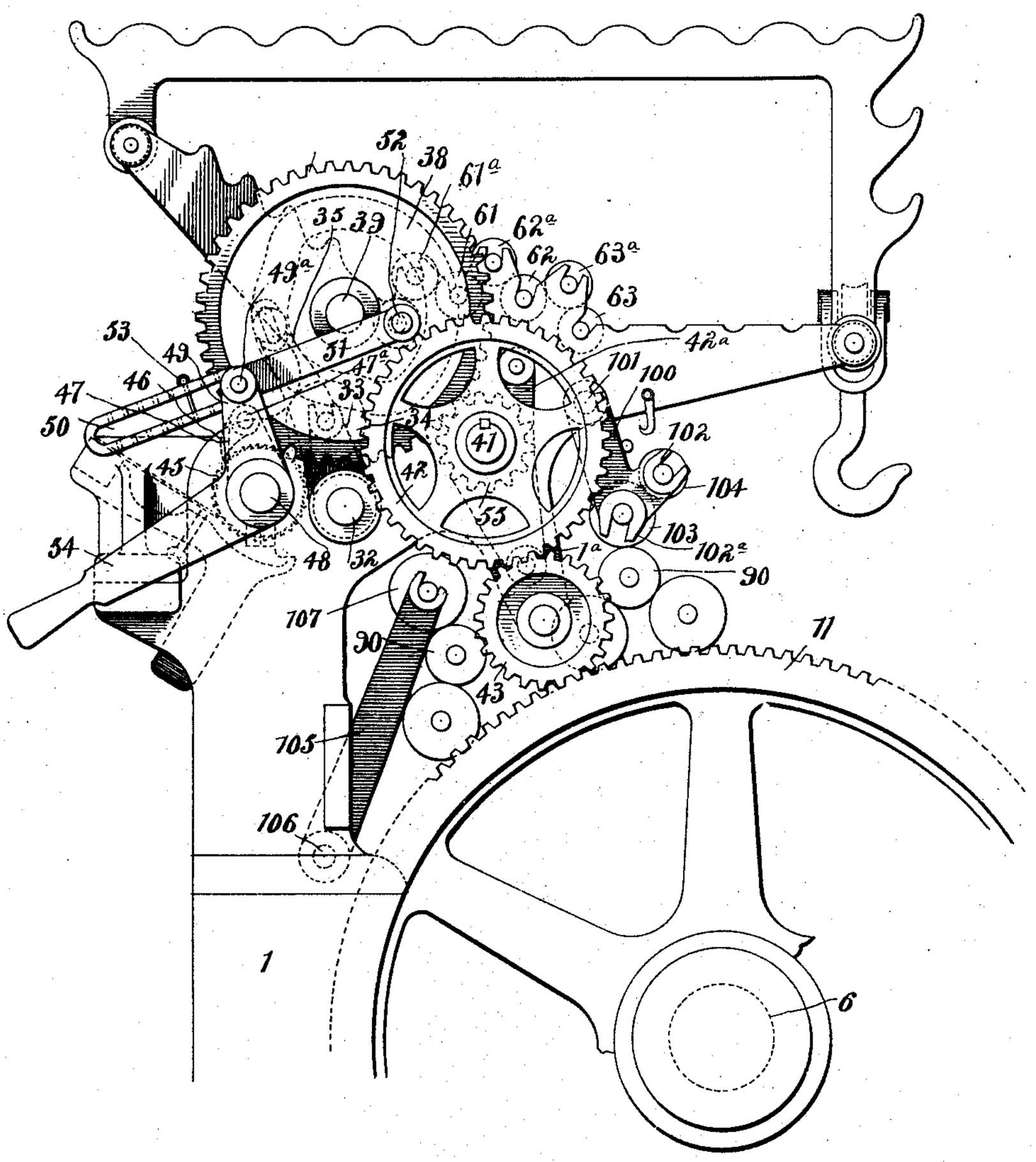
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 5.

Fig. 5.



WITNESSES

Wm. A. Countland

M. V. Bidgood

INVENTORS and

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

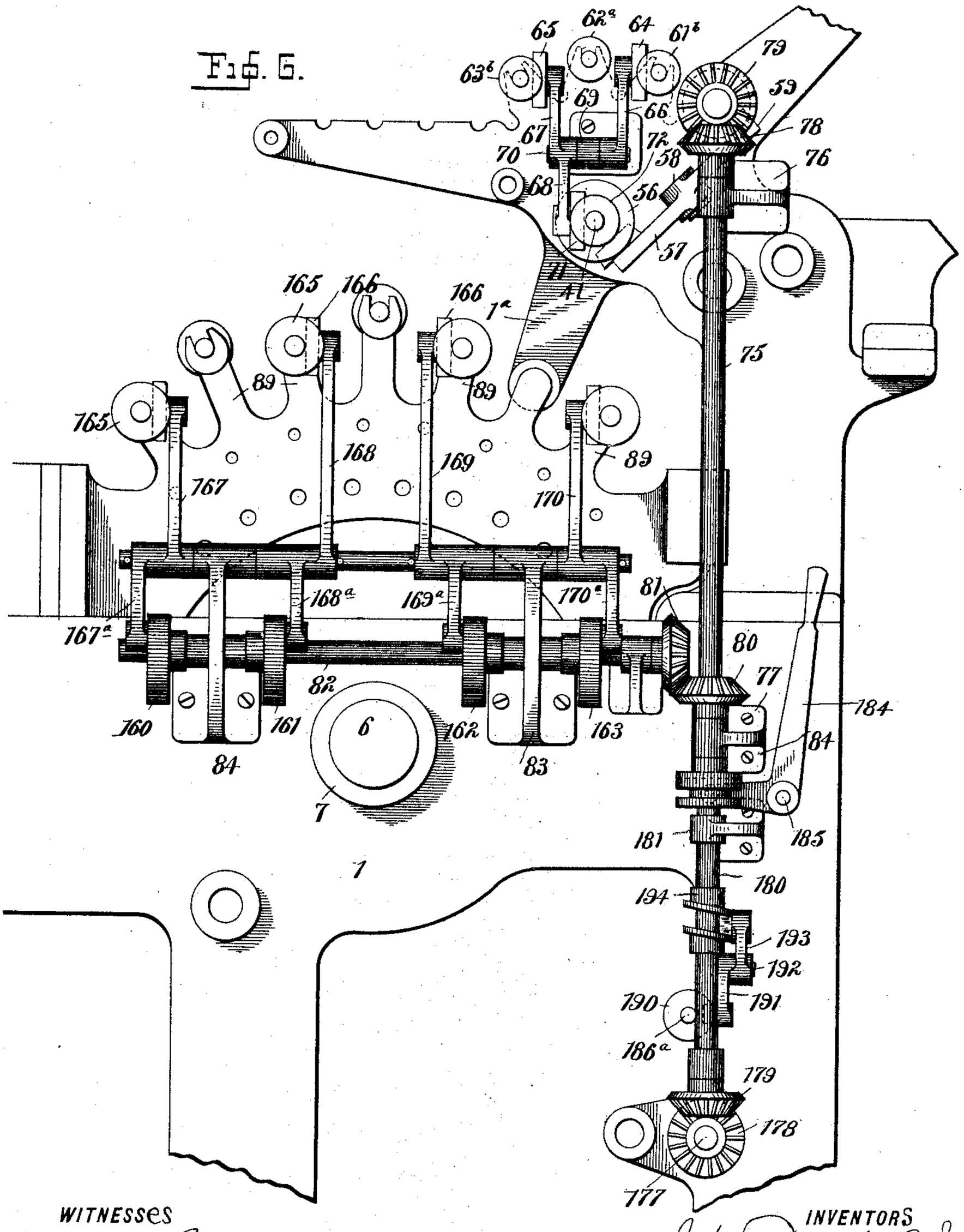
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 6.

Fig. 6.



WITNESSES

Wm. A. Countland

Jas. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

Munn & Co

ATTORNEYS.

No. 666,484. Patented Jan. 22, 1901.

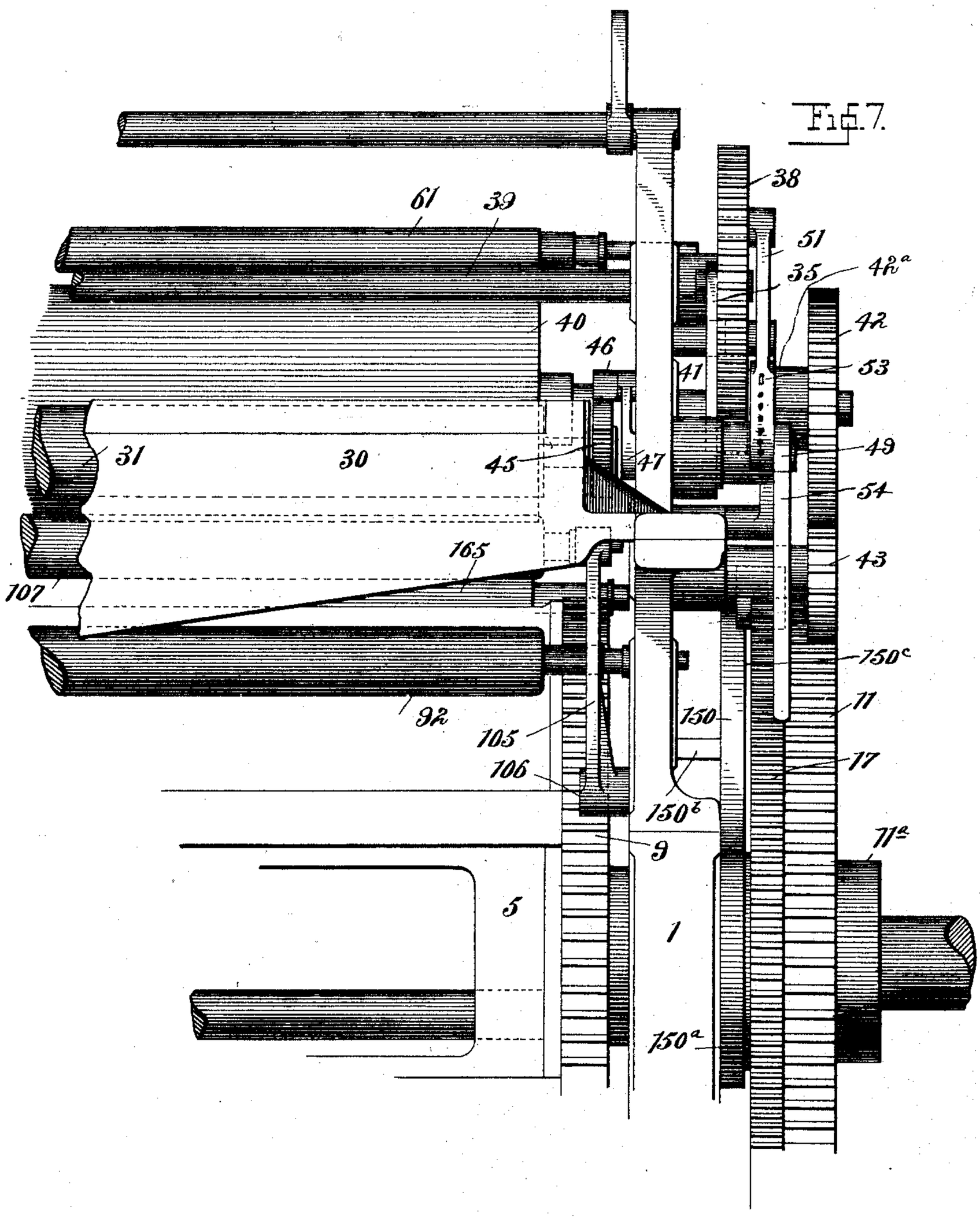
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 7.

FIG. 7.



WITNESSES

Wm. A. Courtland

Jn. V. Bidgood

INVENTORS

John Brooks and
Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

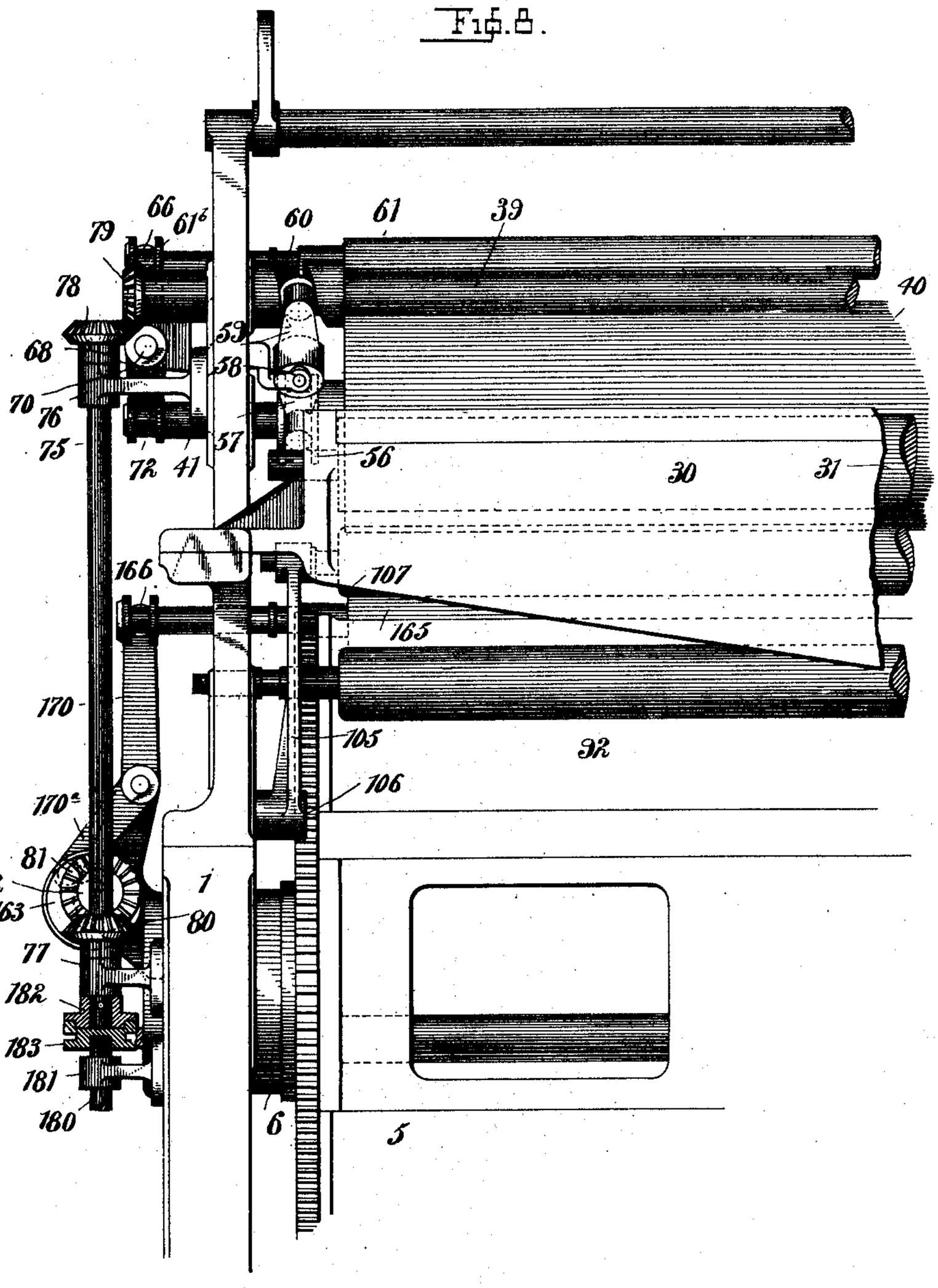
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 8.

Fig. 8.



WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and
Winfield S. Huson.

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

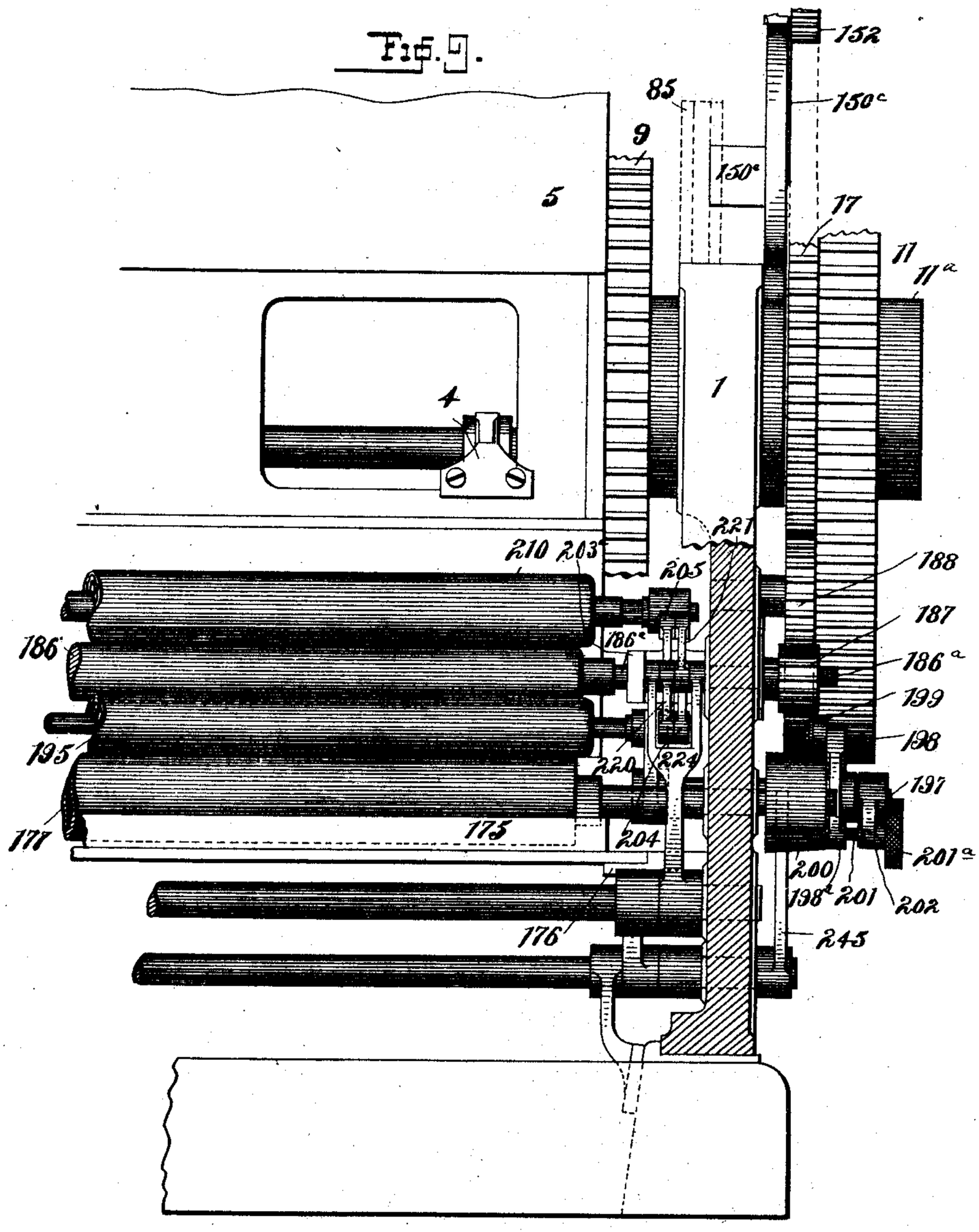
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 9.

Fig. 9.



WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS.

No. 666,484. Patented Jan. 22, 1901.

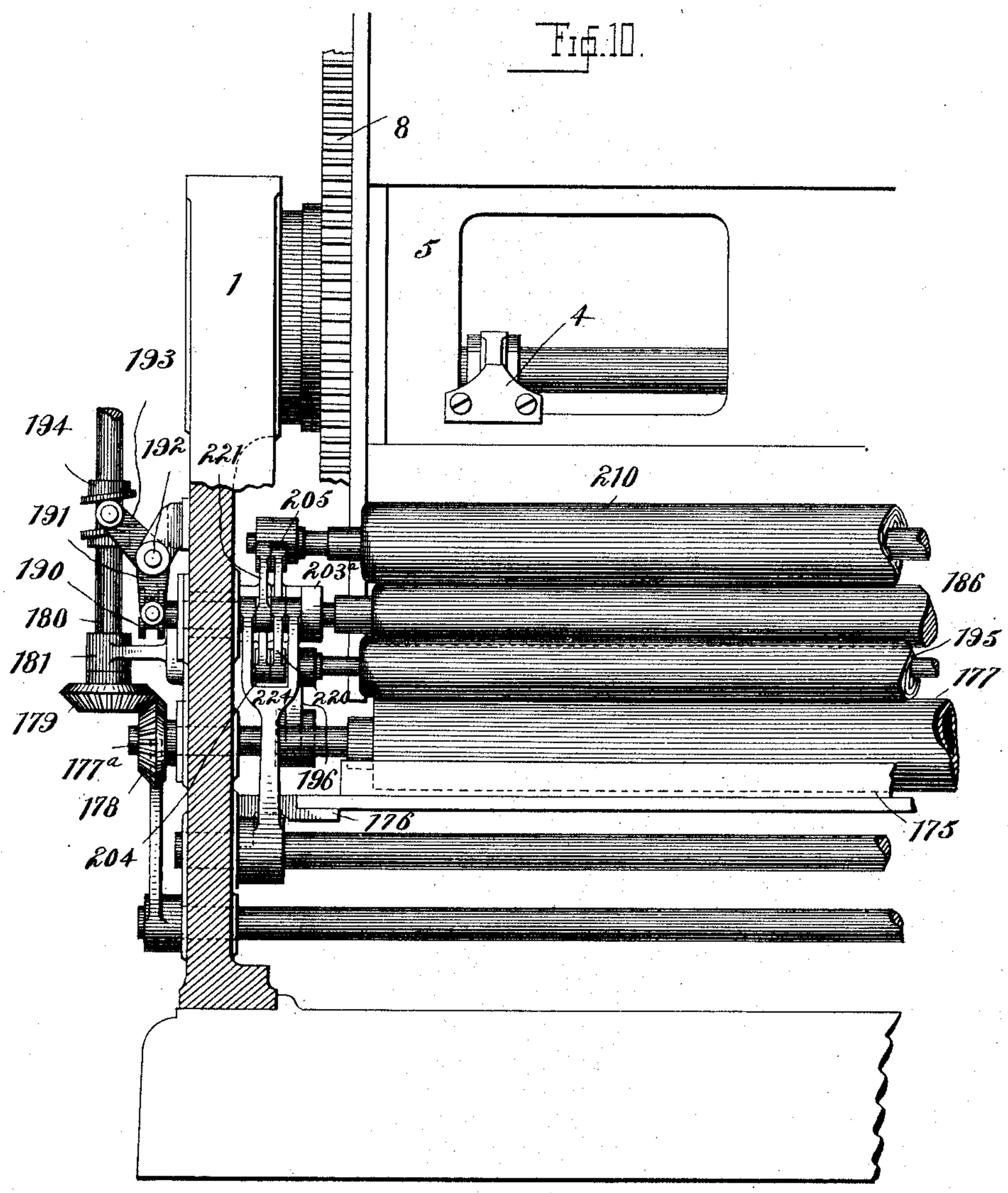
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 10.

Fig. 10.



WITNESSES

Wm. A. Courtland

Jas. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

Munn & Co

ATTORNEYS

No. 666,484.

Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

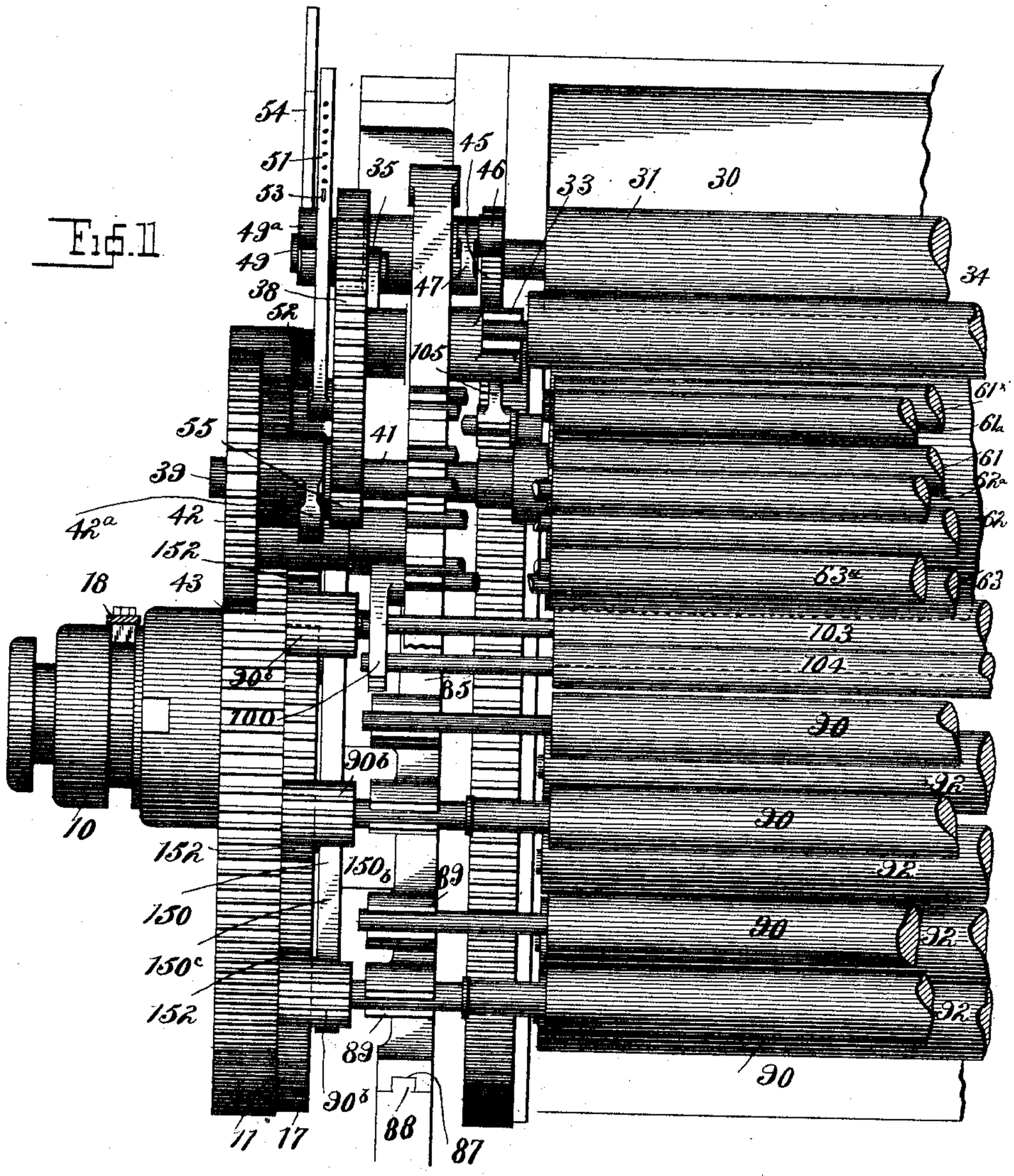
PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.)

24 Sheets—Sheet 11.

Fig. 11



WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

Munn & Co

ATTORNEYS.

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

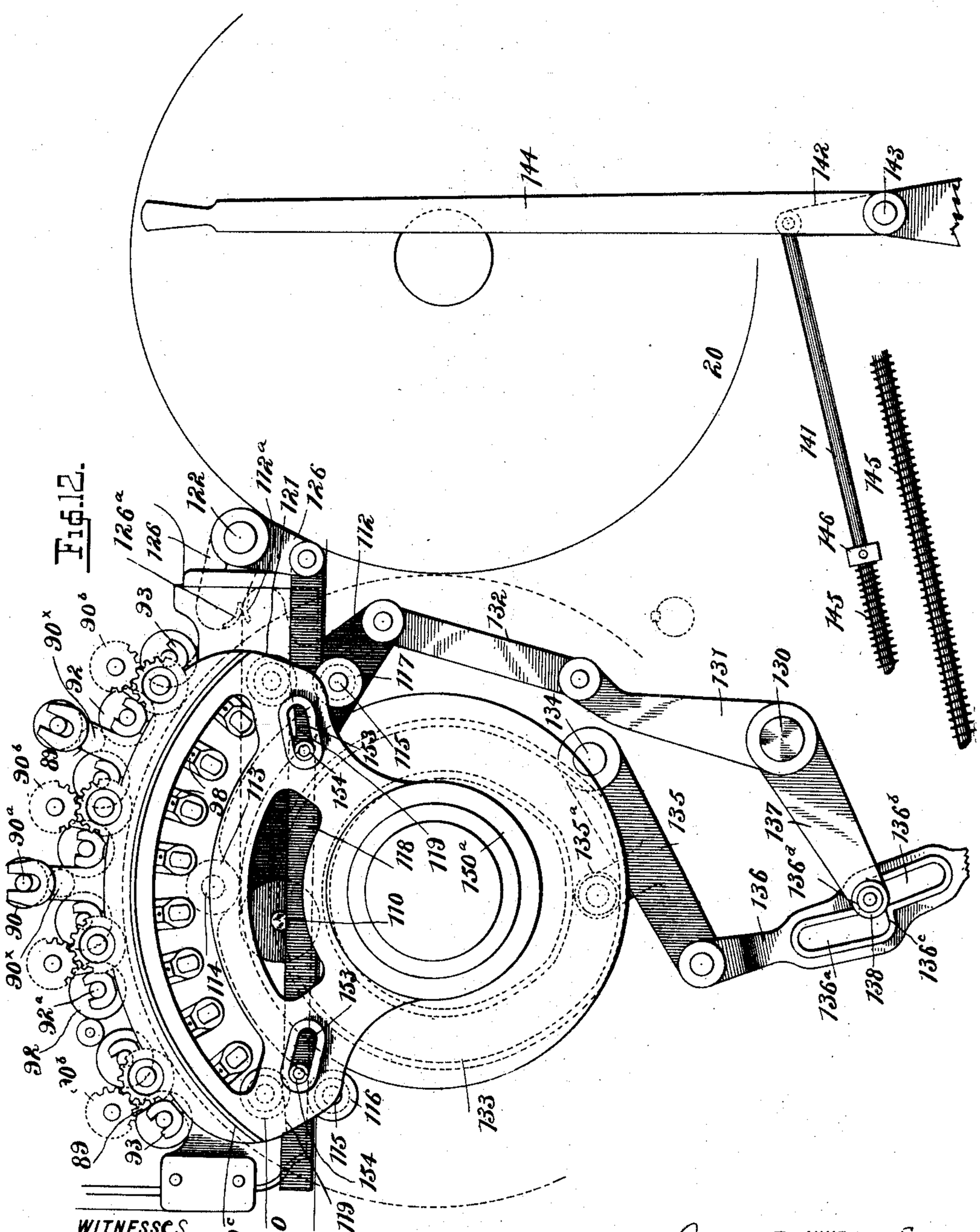
PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.)

24 Sheets—Sheet 12.

Fig. 12.



WITNESSES

Wm. A. Courtland

Jas. V. Bidgood

INVENTORS and

John Brooks

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

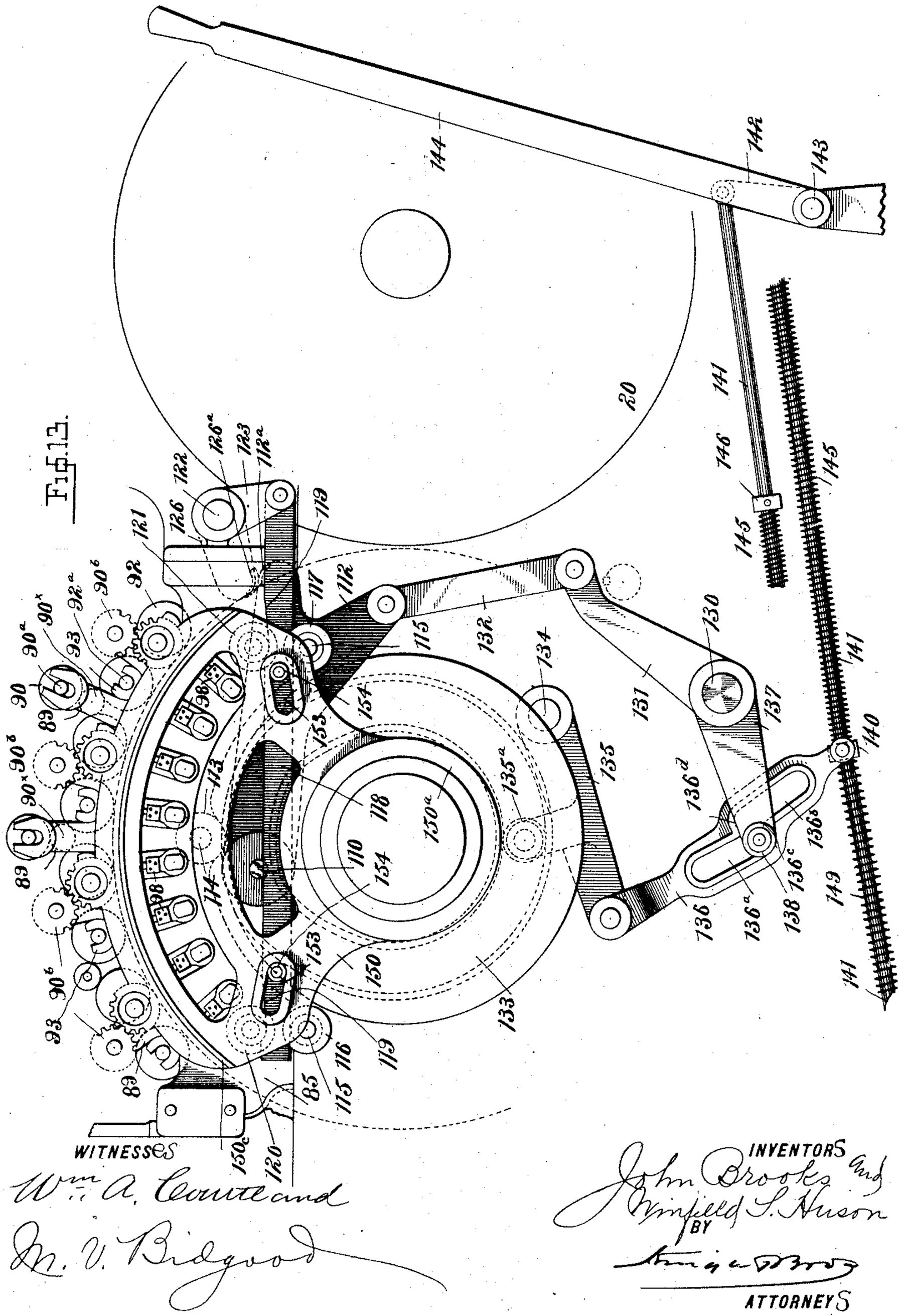
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 13.

FIG. 13.



WITNESSES

Wm. A. Comstead

M. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 14.

Fig. 14.

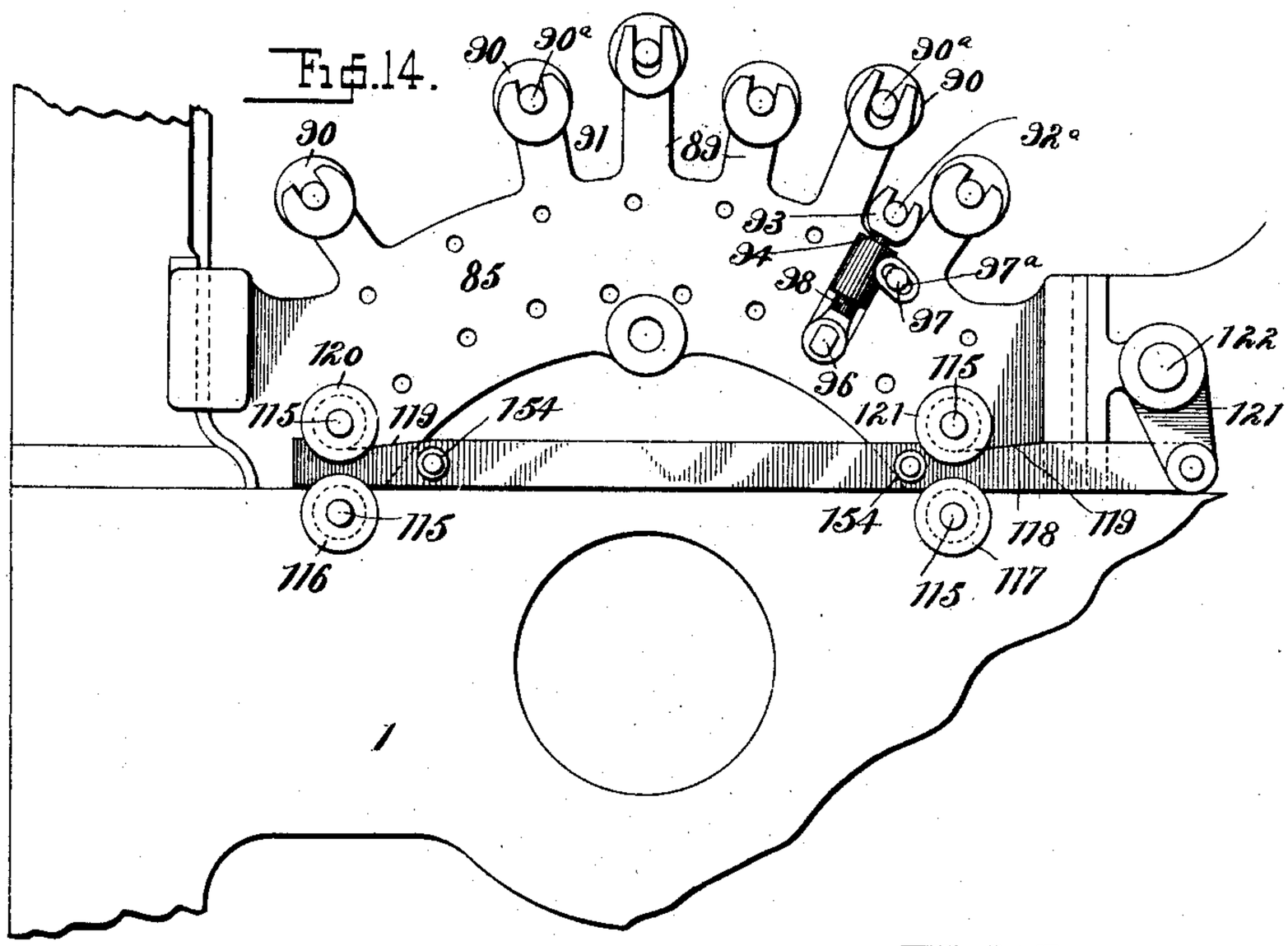
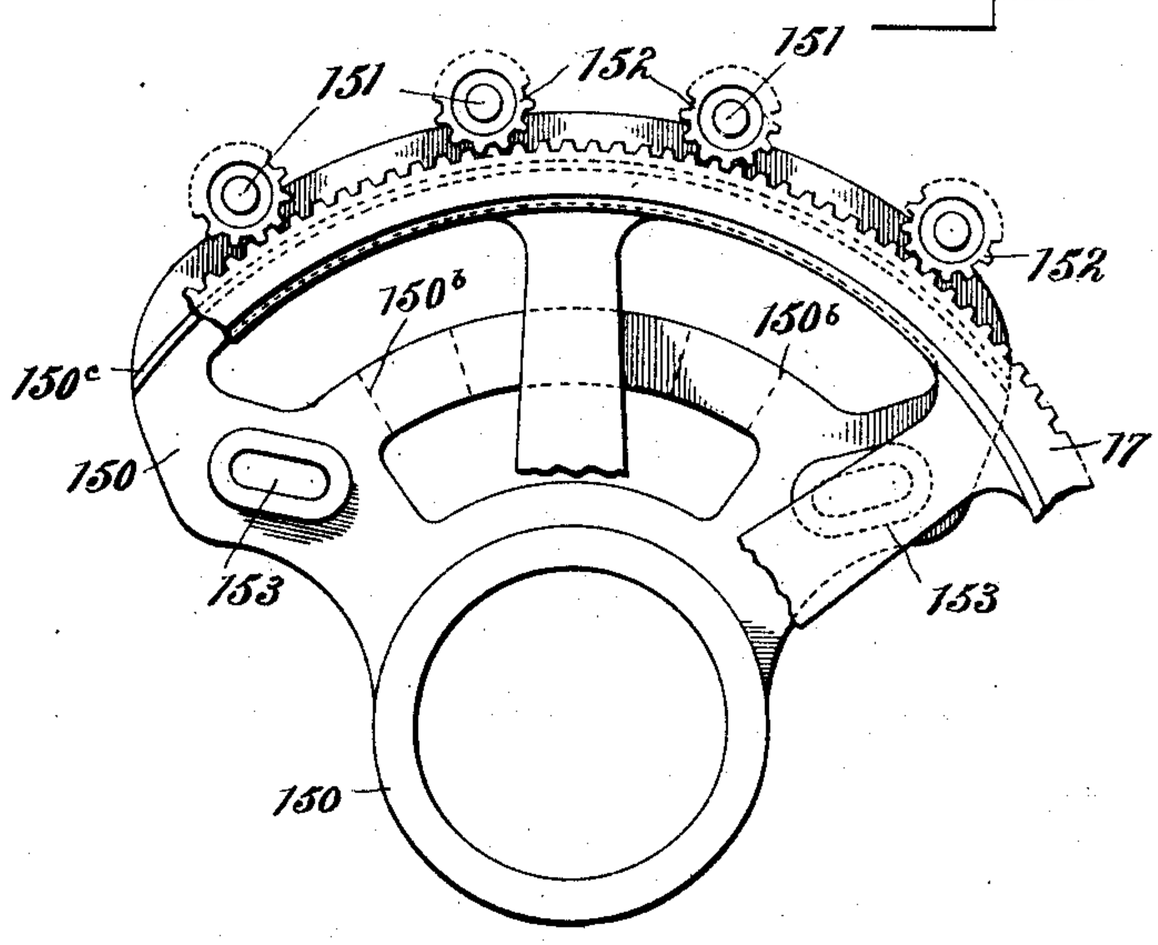


Fig. 15.



WITNESSES

Wm. A. Courtland.

M. V. Bidgood

INVENTORS

John Brooks and
Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

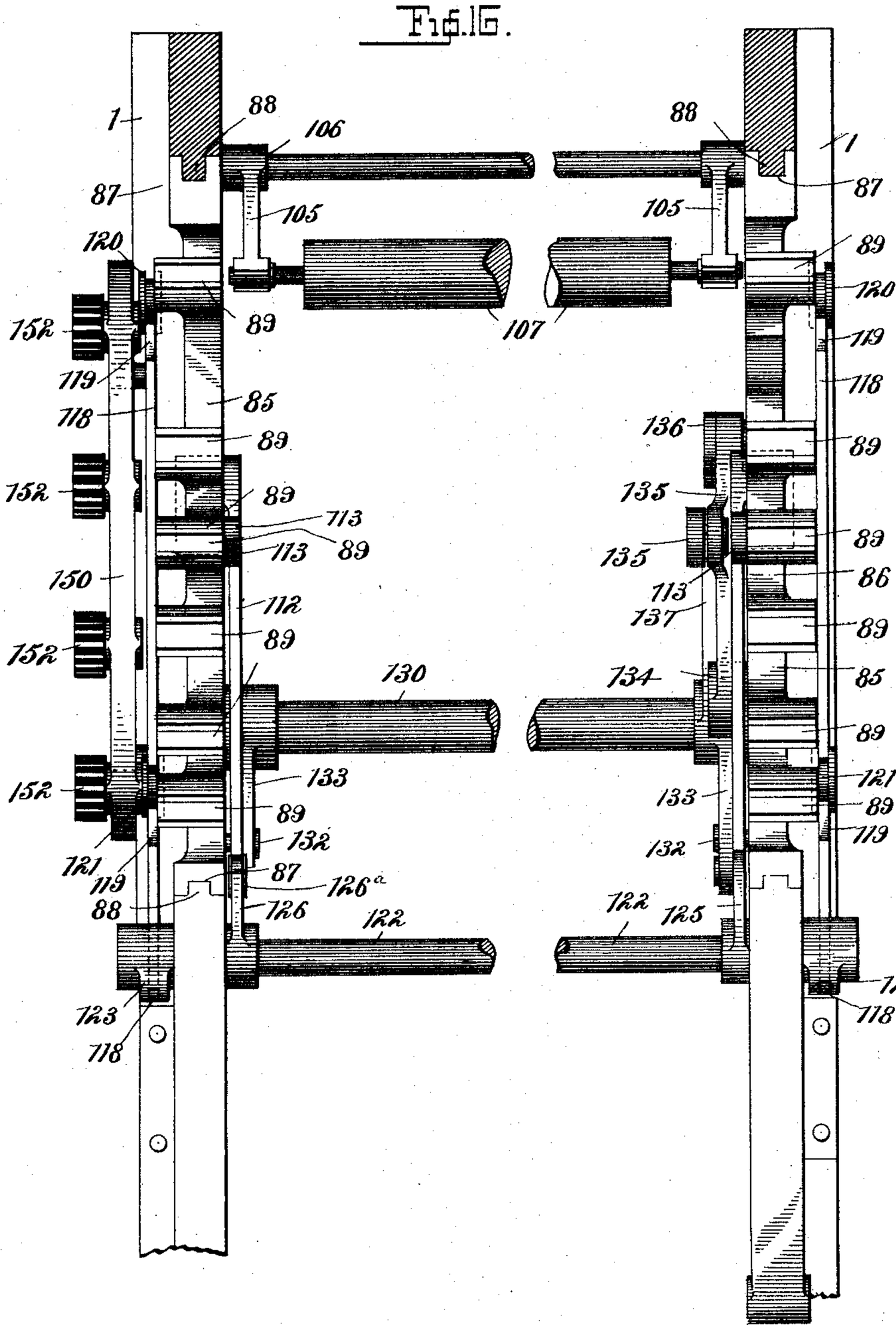
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 15.

Fig. 16.



WITNESSES

Wm. A. Courtland

Jn. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 16.

Fig. 17.

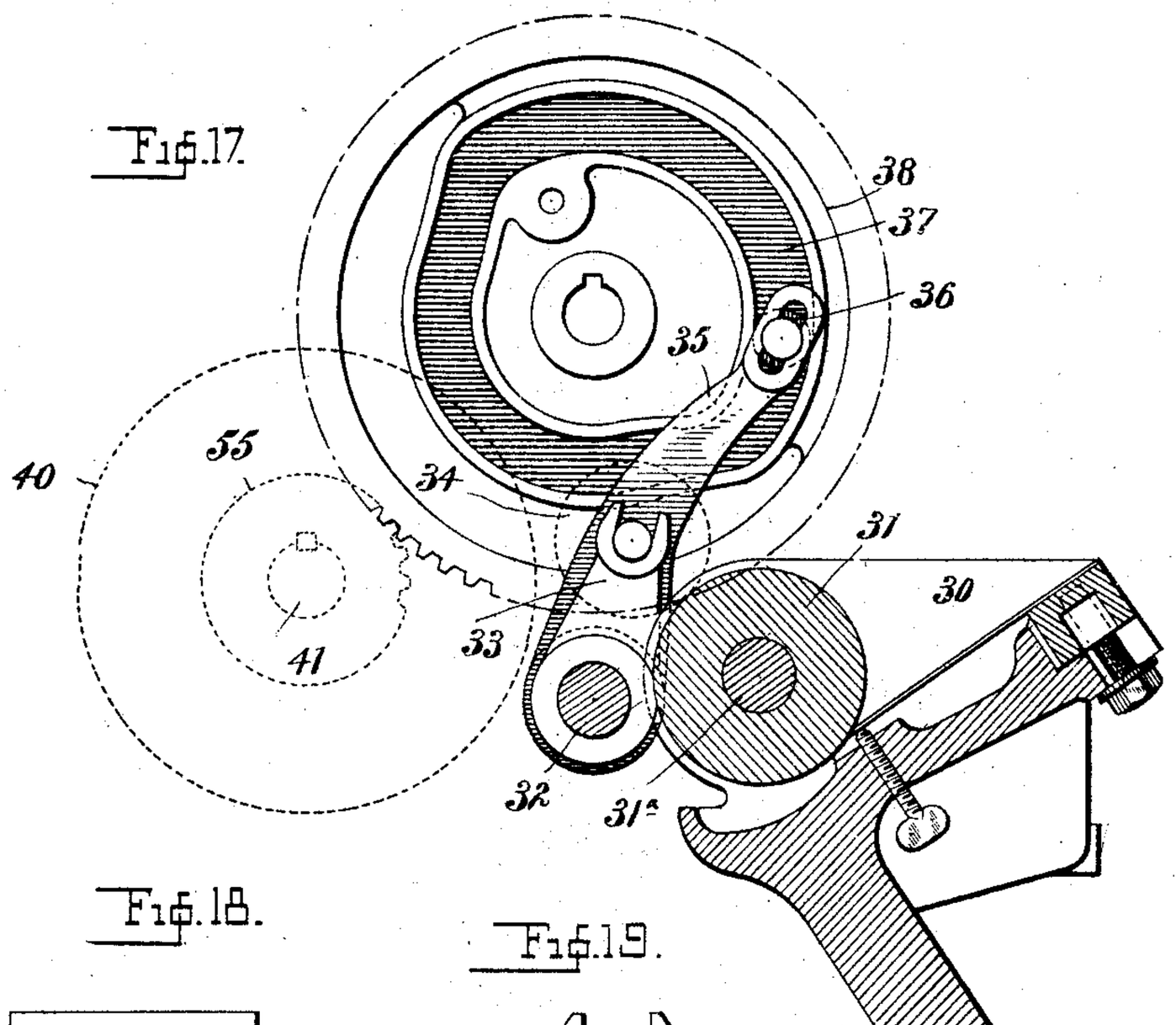


Fig. 18.

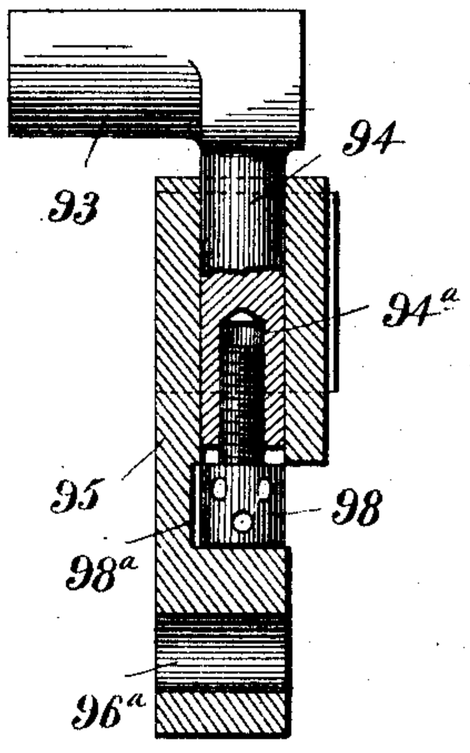
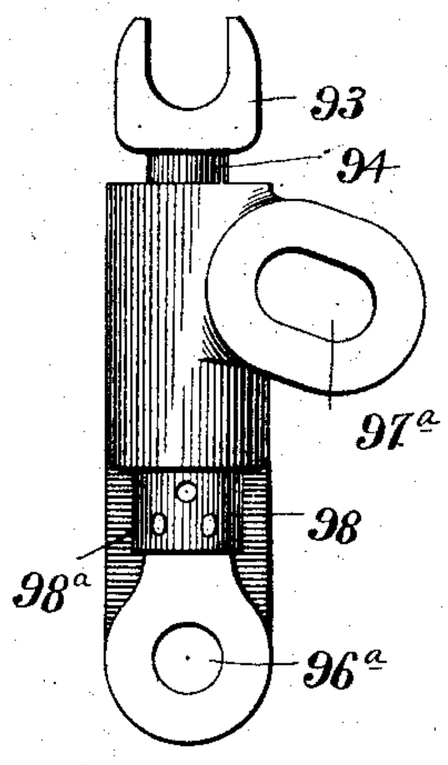


Fig. 19.



WITNESSES

Wm. A. Courtland

Jr. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

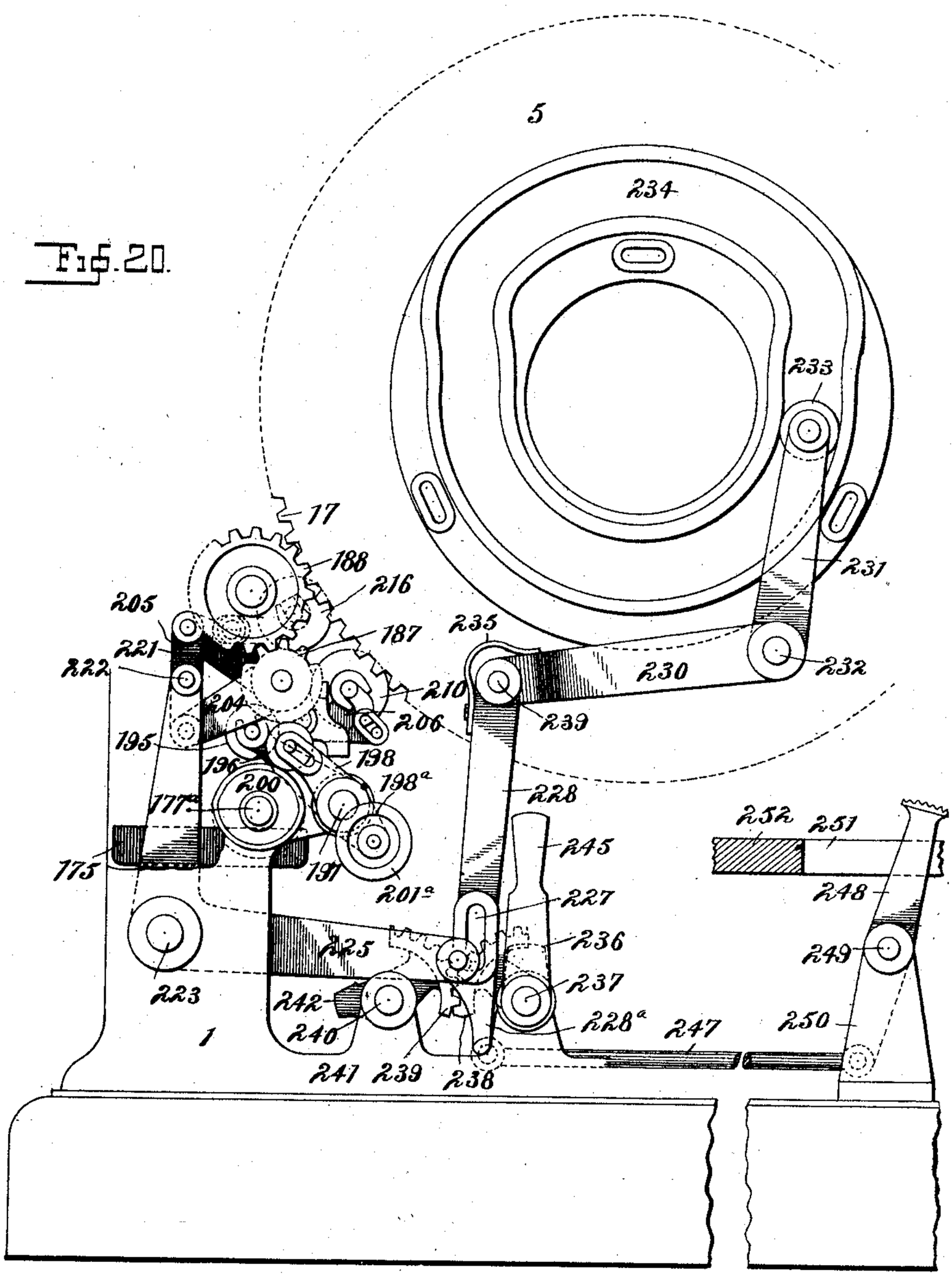
PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.)

24 Sheets—Sheet 17.

Fig. 20.



WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 18.

Fig. 21.

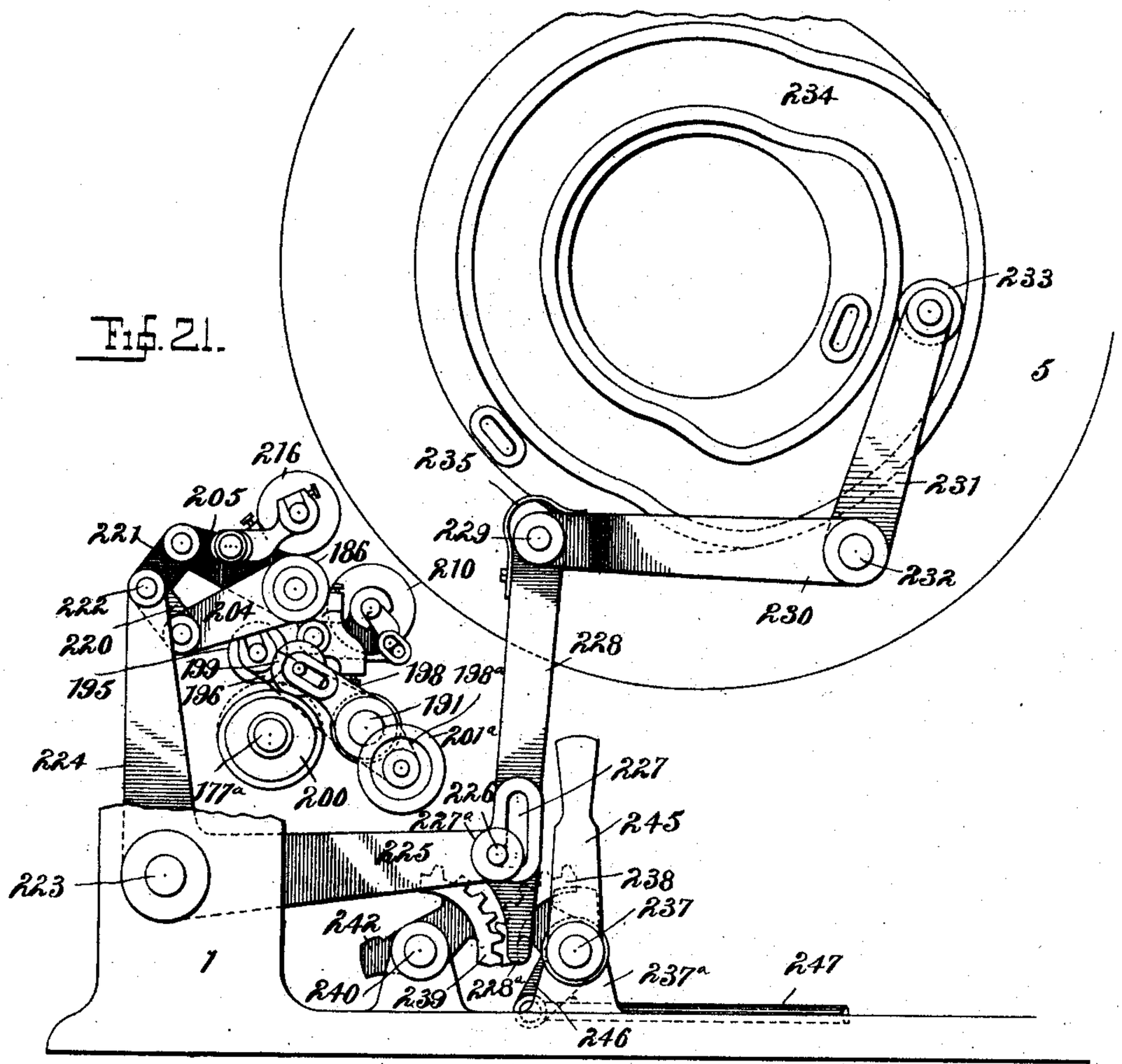
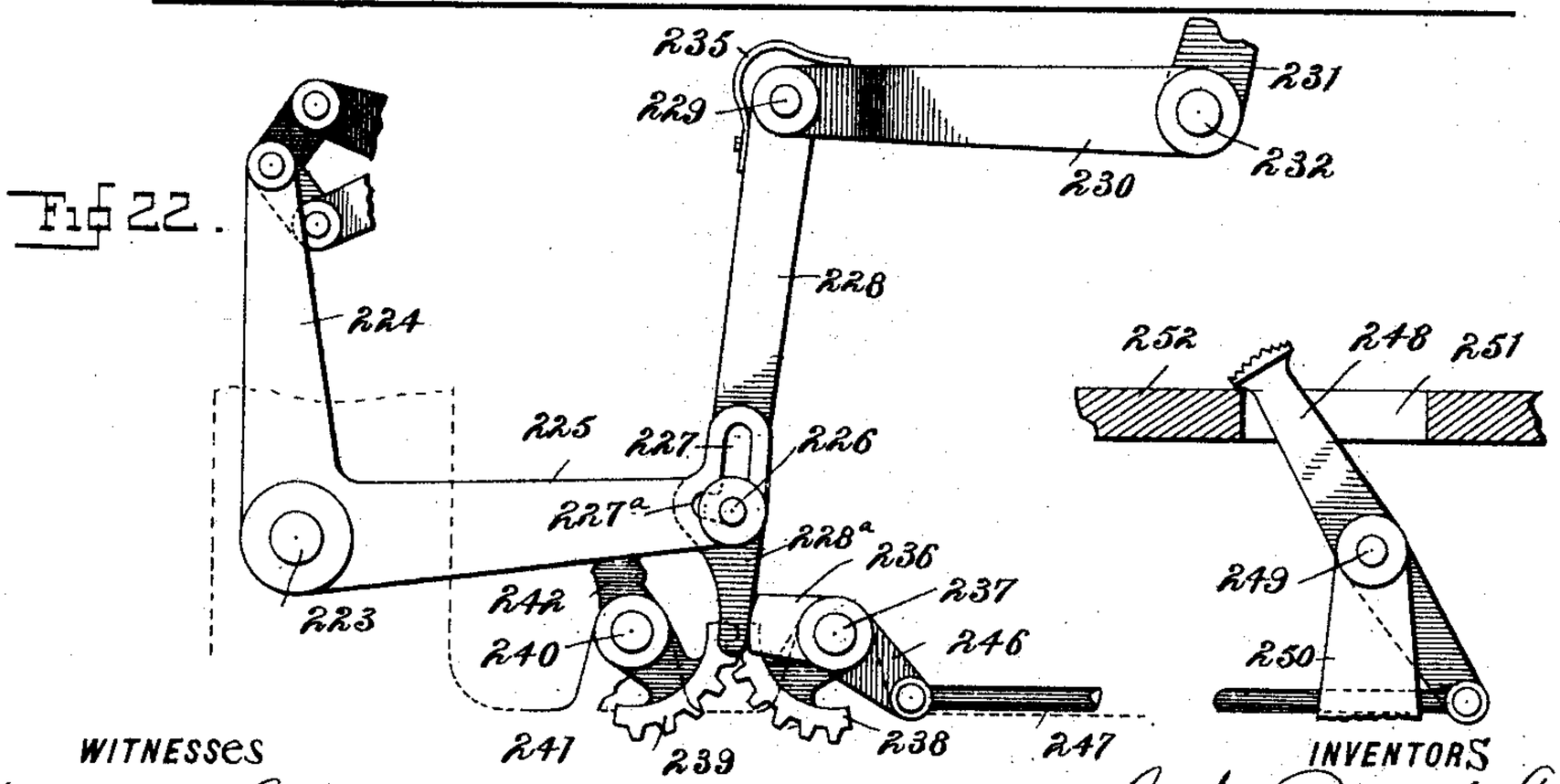


Fig 22.



WITNESSES

Wm. A. Countland

H. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

Thos & D Brooks

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 19.

Fig. 23.

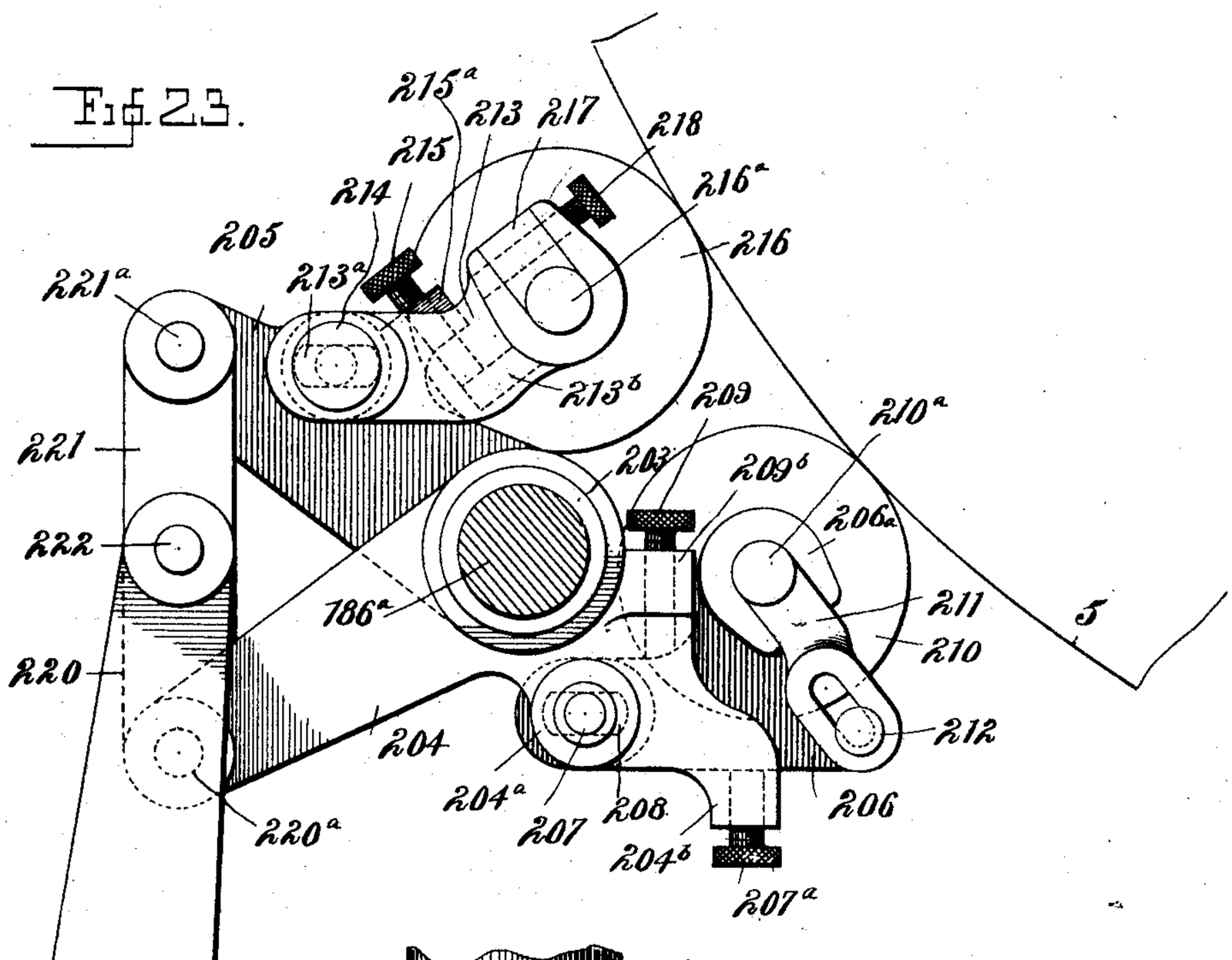
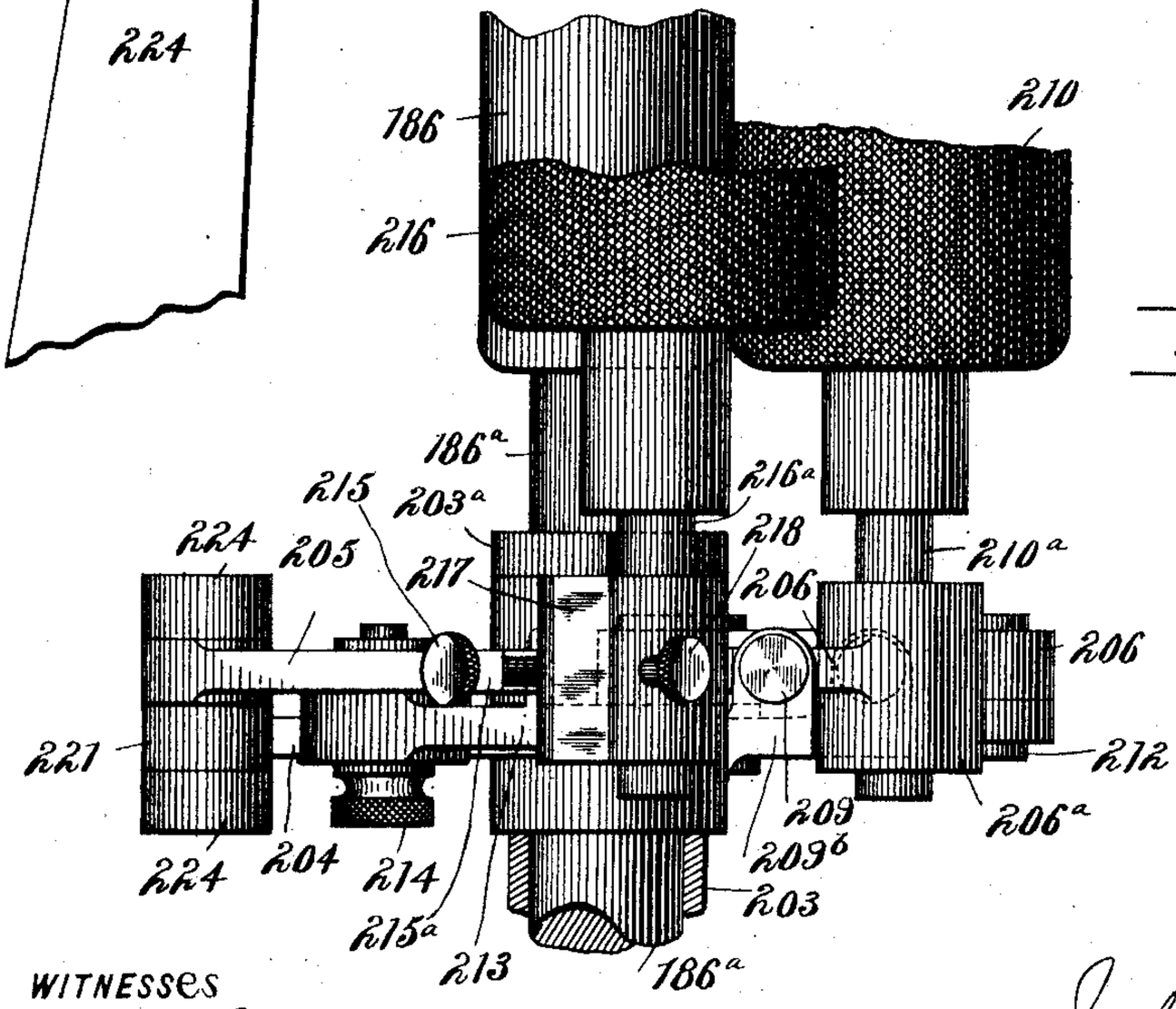


Fig. 24.



WITNESSES

Wm. A. Coulland

Jn. V. Ridgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 20.

Fig. 25.

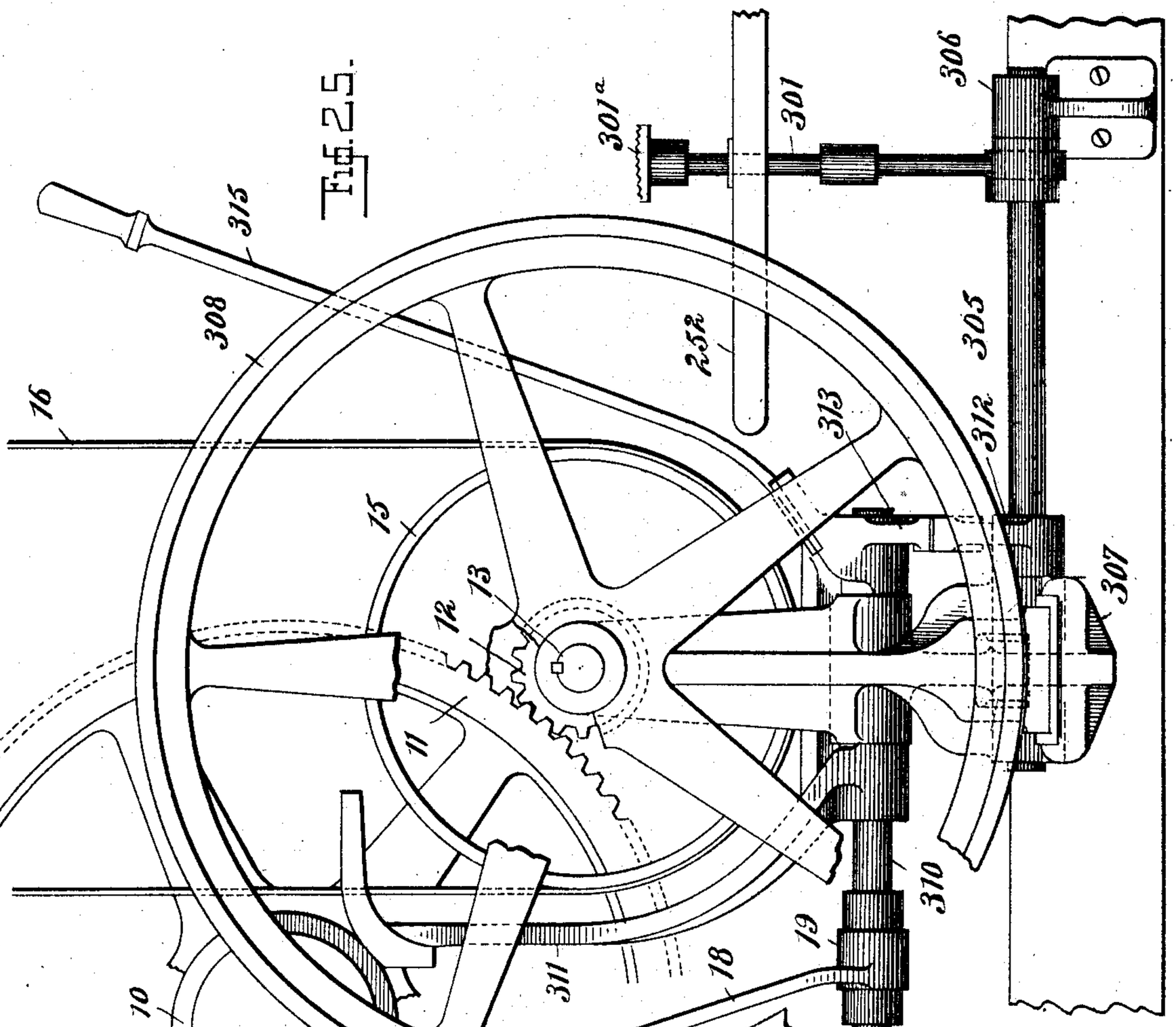
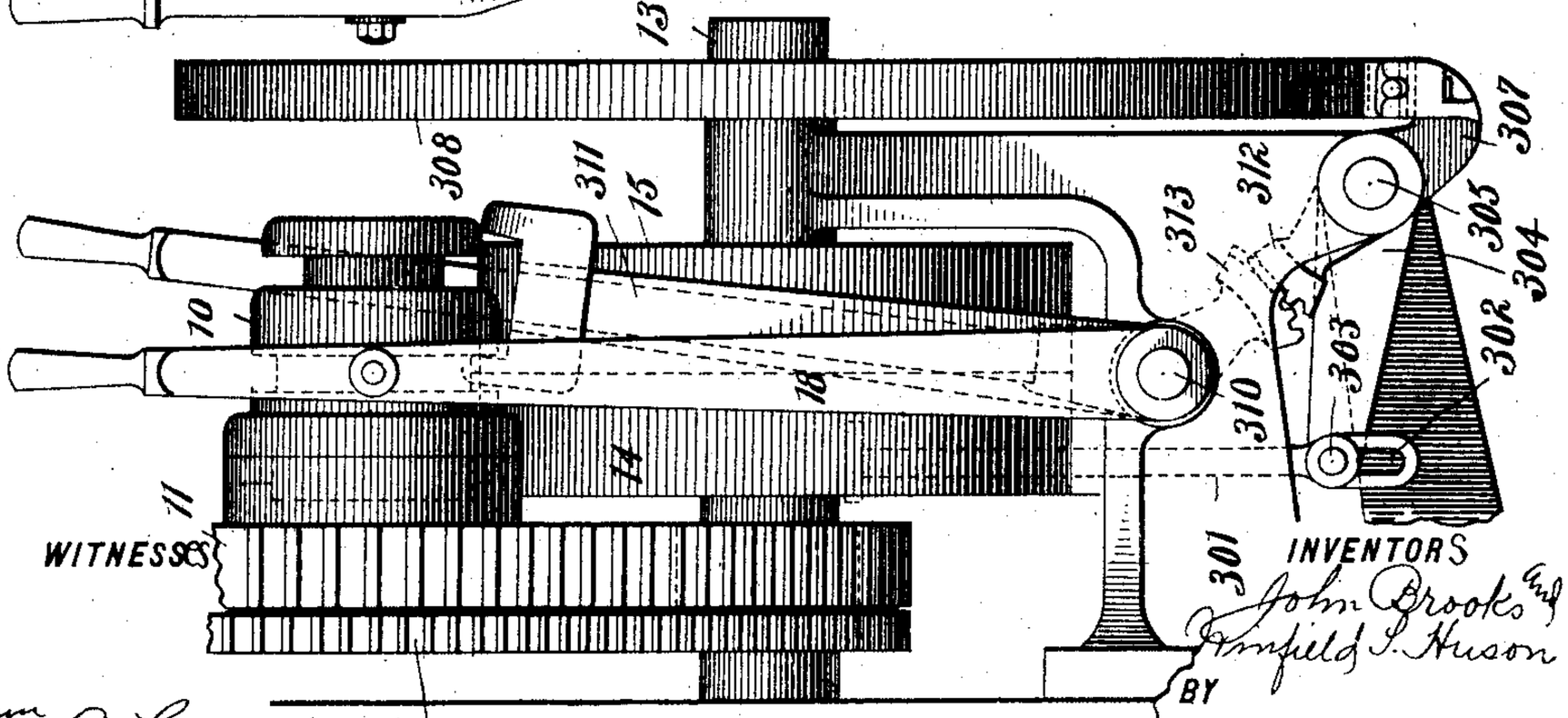


Fig. 26.



WITNESSES

Wm. A. Courtland

Dr. V. Sidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

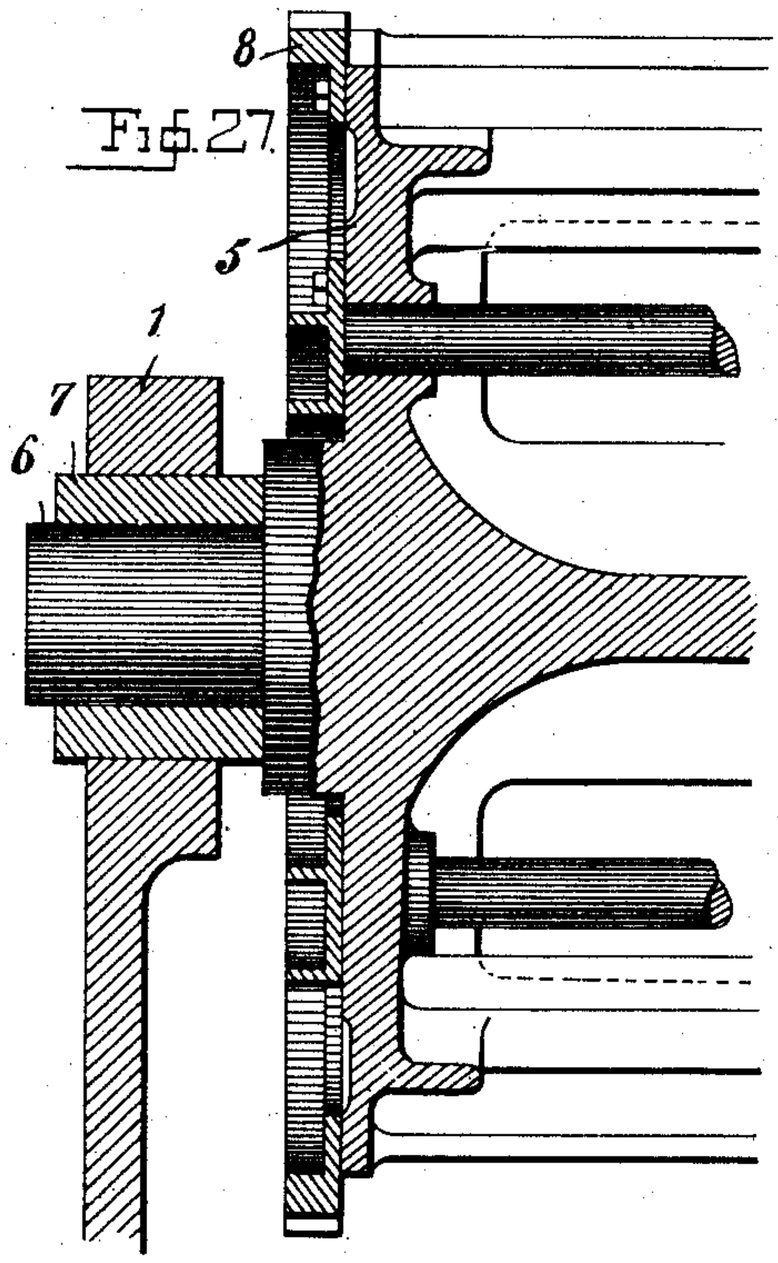
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 21.

Fig. 27.



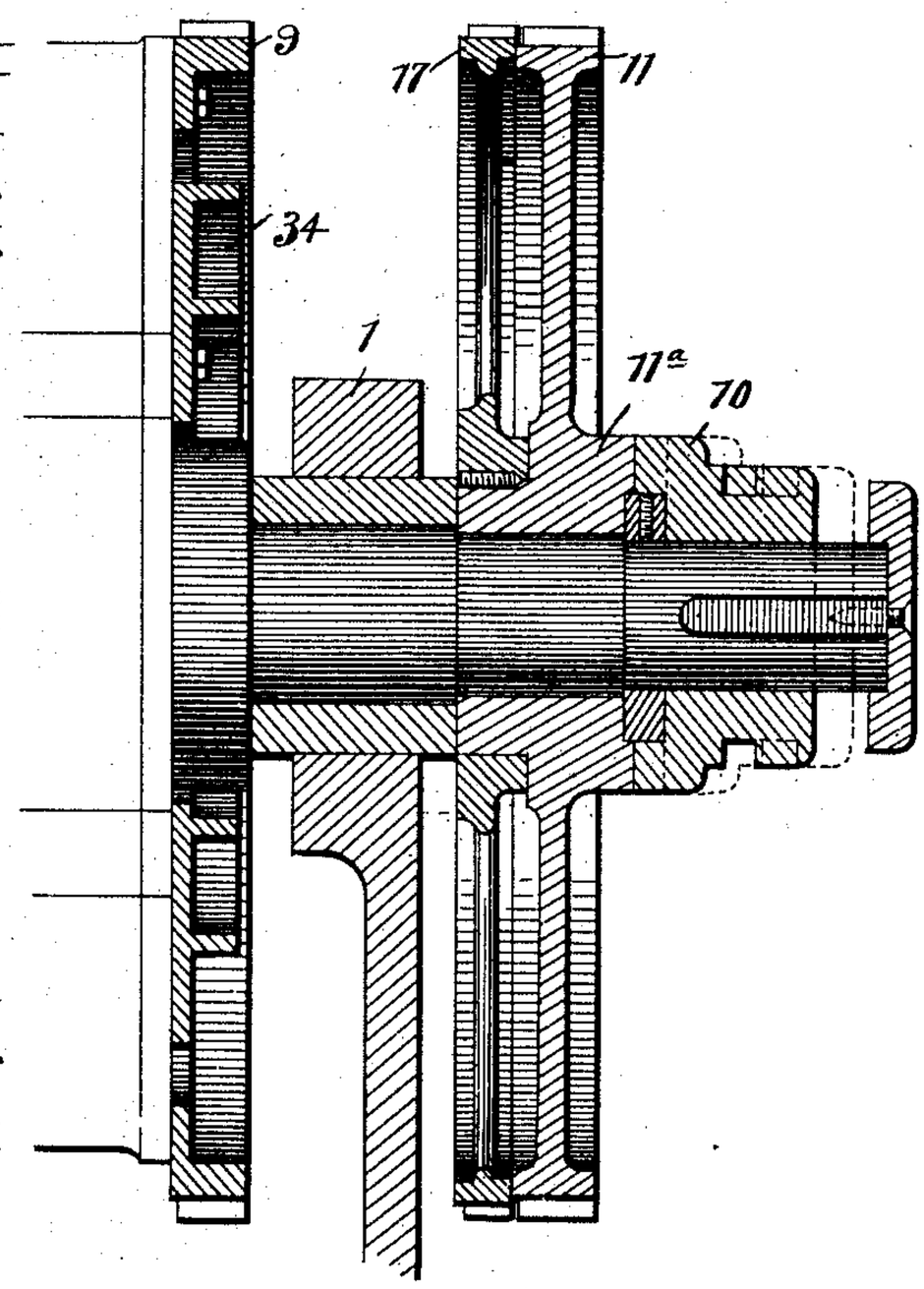
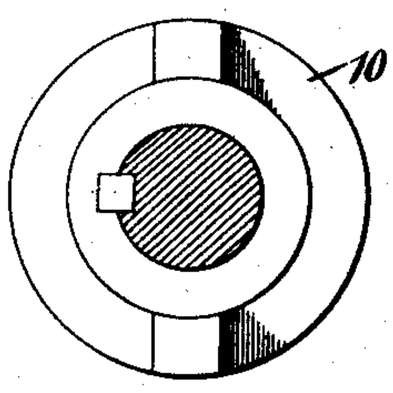
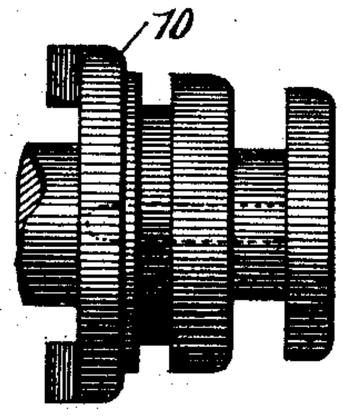


Fig. 28.

Fig. 29.





WITNESSES

Wm. A. Courtland

H. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 22.

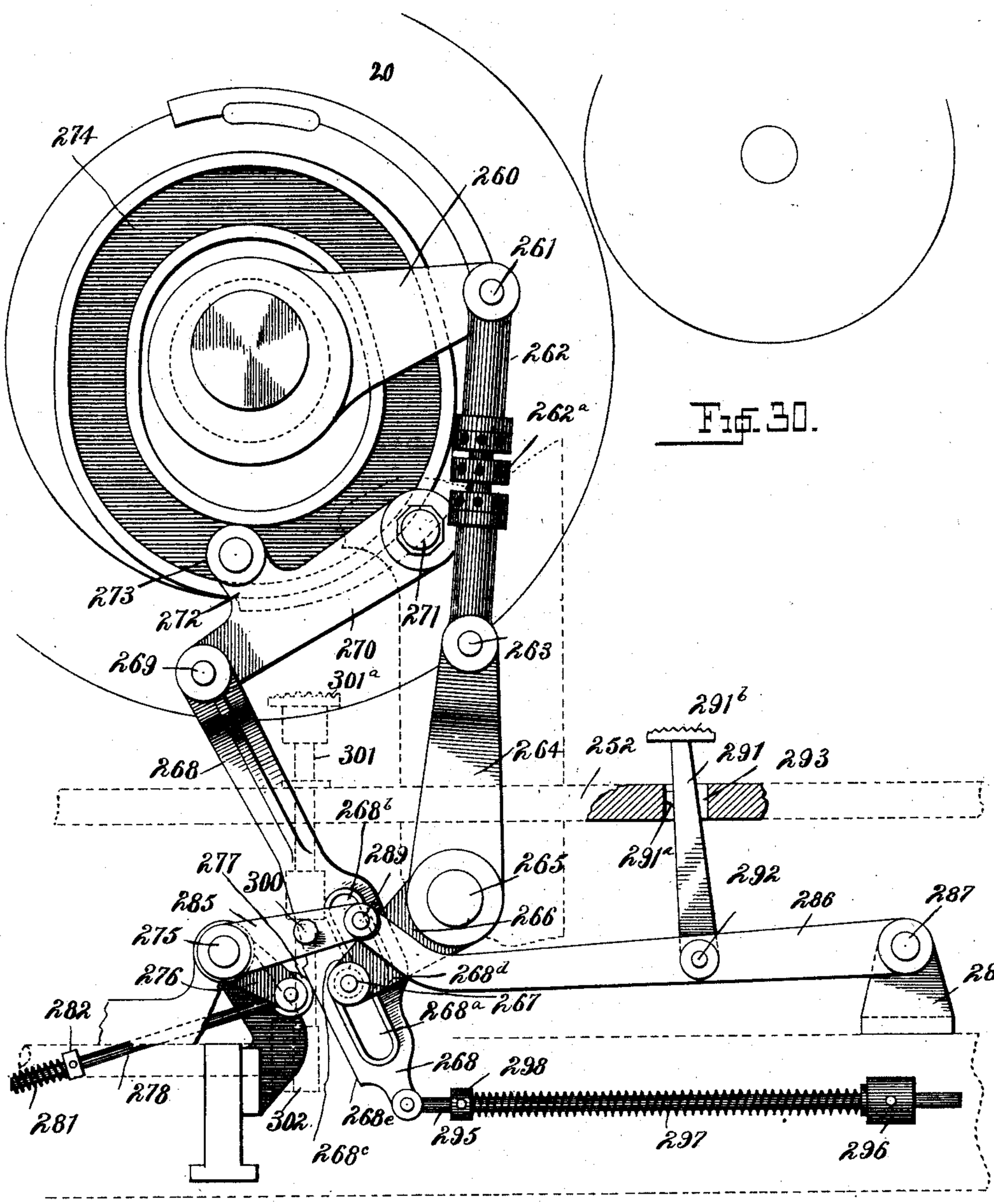


Fig. 30.

WITNESSES
Wm. A. Courtland
H. U. Bidgood

INVENTORS
John Brooks and
Winfield S. Huson
BY
ATTORNEYS.

No. 666,484. Patented Jan. 22, 1901.

J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 23.

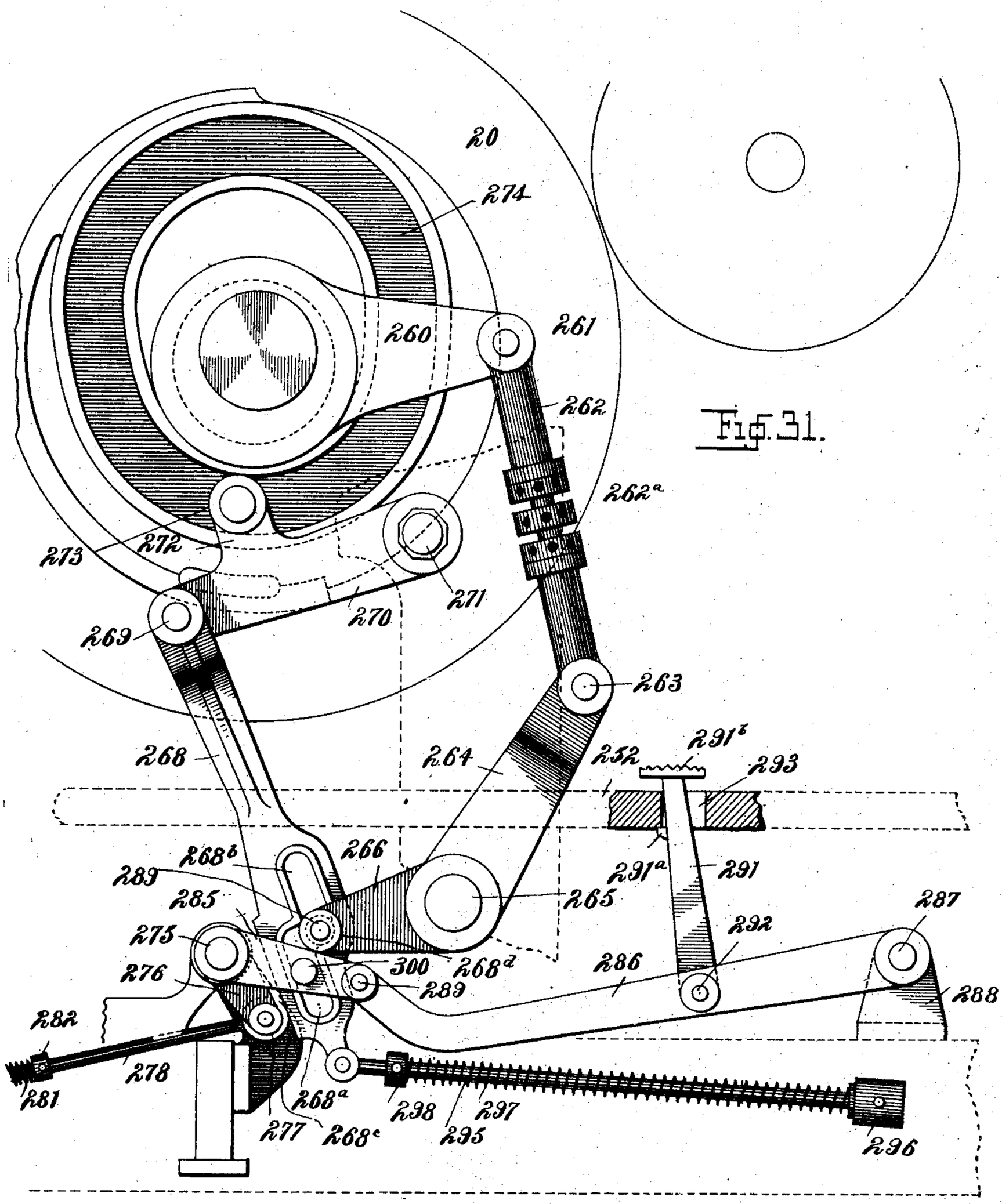


Fig. 31.

WITNESSES

Wm. A. Courtland

M. V. Bridgwood

INVENTORS

John Brooks and

Winfield S. Huson

BY

ATTORNEYS

No. 666,484. Patented Jan. 22, 1901.

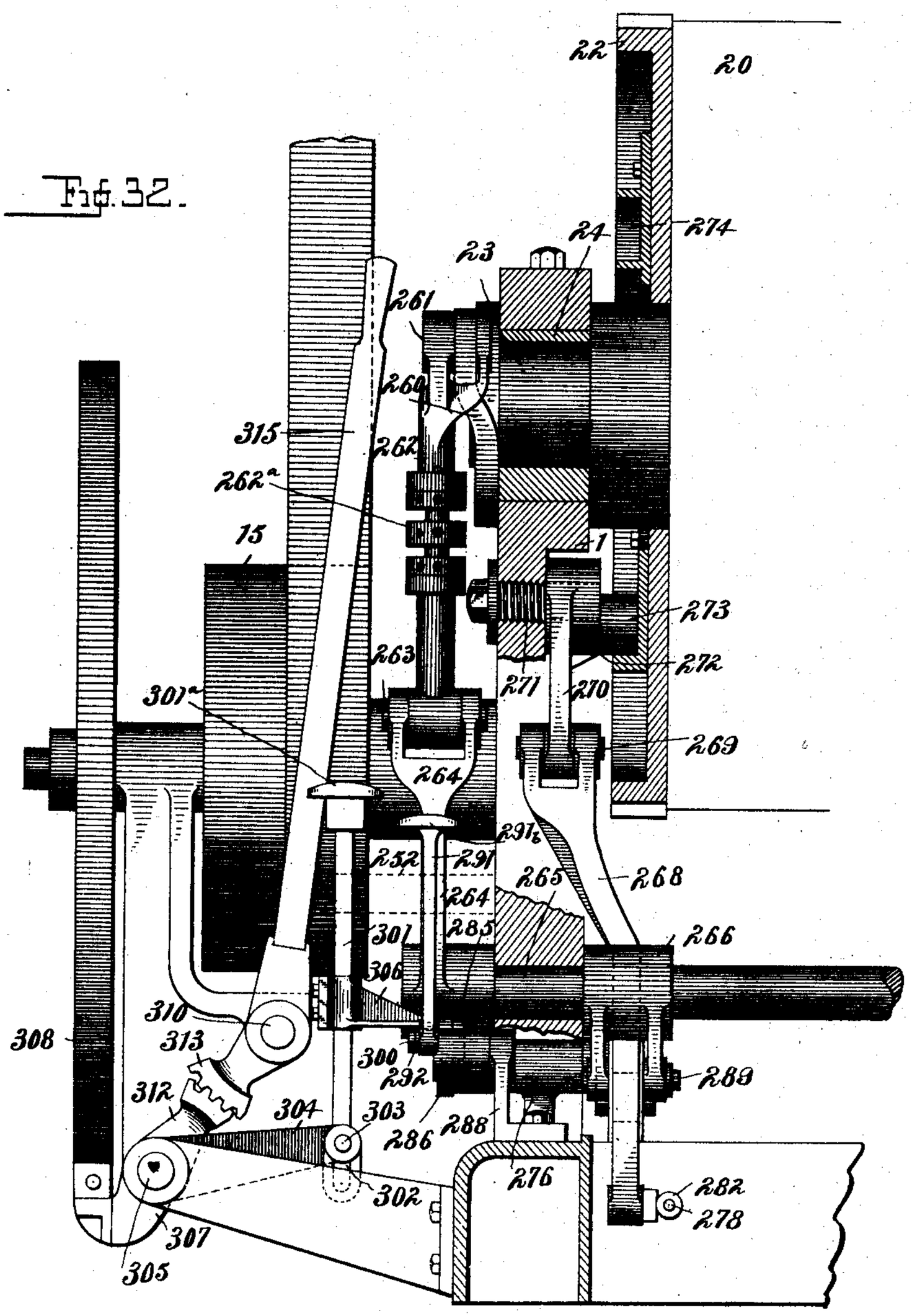
J. BROOKS & W. S. HUSON.

PRINTING PRESS.

(Application filed Oct. 27, 1898.)

(No Model.) 24 Sheets—Sheet 24.

Fig. 32.



WITNESSES

Wm. A. Courtland

Jr. V. Bidgood

INVENTORS

John Brooks and

Winfield S. Huson

BY

Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN BROOKS AND WINFIELD S. HUSON, OF PLAINFIELD, NEW JERSEY, ASSIGNORS TO THE ALUMINUM PLATE AND PRESS COMPANY, OF SAME PLACE AND NEW YORK, N. Y.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 666,484, dated January 22, 1901.

Application filed October 27, 1898. Serial No. 694,682. (No model.)

To all whom it may concern:

Be it known that we, JOHN BROOKS and WINFIELD S. HUSON, citizens of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification.

Our invention relates to improvements in printing-presses, particularly designed to perfect rotary surface-printing presses, such rotary surface-presses being of great importance at the present time in view of the remarkable results attained in aluminographic printing, but also applicable either wholly or in part to other kinds of rotary printing-presses.

Our invention relates, first, to an improved form-inking mechanism which comprises a series of form-inking rollers and ink-distributer rollers journaled in a suitable vertically-movable frame mounted upon the press-frame above the form-cylinder, the ink-distributer rollers being geared to their driving-gear through the medium of a series of intermediate gears which are carried upon a frame or spider which is movable circumferentially to said driving-gear and suitable operating mechanism for automatically and simultaneously raising the vertically-movable frame and shifting the circumferentially-movable frame or spider for the purpose of lifting the form-inking rollers out of contact with the form-cylinder and at the same time moving the intermediate gears circumferentially to keep the distributer-rollers in mesh with their driving-gear. The object of this arrangement is to continuously revolve the form-inking rollers and distributer-rollers whether they are in operative or inoperative relation to the form-cylinder, so as to maintain the ink upon the rollers in proper worked-up condition. The mechanism for operating the vertically-movable frame and the circumferentially-movable frame or spider is preferably actuated through suitable link mechanism connected with said parts and operated by a cam at one end of the form-cylinder. More specifically, the operating mechanism comprises a pair of rock arms or levers centrally engaging two vertically-movable stands or side frames in which the form-rollers and distributer-rollers are mounted, a pair of sliding cam-bars also engaging the vertically-movable side frames and connected with the rock arms or levers, pin-and-slot connections between the sliding cam-bars and the circumferentially-movable frame or spider, two pairs of toggle links or levers connecting the rock arms or levers with a stationary rock-shaft, and a rock-arm projecting from said rock-shaft and engaging a slotted reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, said link being connected with an arm which is actuated by the cam upon the form-cylinder and a manual controlling device adapted to shift the slotted link and cause either its upwardly-engaging shoulder or its downwardly-engaging shoulder to engage the rock-arm and move the inking mechanism into or out of operative relation to the form-cylinder.

Our invention relates, secondly, to a novel arrangement of the form-cylinder driving mechanism and inking-roller driving mechanism whereby the rotation of the form-cylinder may be arrested without interfering with the continuous operation of the inking-roller mechanism. To effect this result, we provide a clutch upon the form-cylinder shaft which couples the main driving-gear and distributer-roller operating-gear to the shaft of the form-cylinder. The main driving-gear is operated by a smaller gear upon the main driving-shaft, by which it is constantly rotated. The inking-drum and ink-mixing rollers are geared to the main driving-gear, and the ink-distributer rollers are geared, through the intermediate gears above referred to, with the distributer-roller driving-gear, which is keyed to and rotates with the main driving-gear. By throwing out the clutch the form-cylinder will be stopped, while the main driving-gear and distributer-roller driving-gear will continue to operate to keep the inking mechanism in operation.

Our invention relates, thirdly, to improvements in the form-dampening devices. This part of our invention comprises the usual water-fountain and water-drum in combina-

tion with a novel arrangement of the vibrating water ductor-roller and operating mechanism and a novel arrangement of the water form-rollers and operating mechanism. The water ductor-roller is mounted upon a rock-arm extending from a rock-shaft which is operated by a conoidal cam engaged by an operating rock-arm mounted upon the ductor-roller rock-shaft and adjustable longitudinally upon the shaft, whereby the oscillation of the water ductor-roller may be regulated to suit the existing requirements. The water form-rollers are adjustably mounted upon the ends of shear-like levers, which levers are connected by toggle-links operated by a bell-crank lever, one arm of which engages a slotted operating-link, the slot of which is formed with an upwardly and downwardly engaging notch, the link being supported and operated by a bell-crank lever actuated by a cam upon the form-cylinder. Manually-controlled mechanism is provided for throwing out of operation the water form-rollers, said mechanism comprising, preferably, a pair of geared arms which are respectively adapted to disengage the slotted operating-link from the toggle-operating bell-crank and move the toggle-operating bell-crank into inoperative position, so as to support the water form-rollers out of contact with the form-cylinder.

Our invention relates, fourthly, to means for automatically throwing the impression-cylinder into and out of operative relation with the form-cylinder. This part of our invention comprises a pair of eccentric bushings in which the impression-cylinder is journaled, toggle links or levers connecting the eccentric bearing-bushings with a stationary rock-shaft, a cam-operated reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, a rock-arm upon a stationary rock-shaft working in the double slot of said reciprocating link, and manually-controlled devices adapted to shift the reciprocating slotted link, so as to throw the upwardly-engaging shoulder or the downwardly-engaging shoulder into engagement with the operating rock-arm for the purpose of straightening or breaking the toggle links or levers, and thereby moving the impression-cylinder into or out of operative relation with the form-cylinder. The manually-controlled device for regulating the automatic throw-out comprises, preferably, a rock-arm operated by a suitable hand or foot lever and engaging one face of the reciprocating slotted link, a spring device holding said manually-controlled rock-arm in engagement with the slotted link and tending to move the link in one direction and a second spring device engaging the slotted link and tending to move it in the opposite direction, the first-named spring device being the stronger of the two, so as to normally hold the reciprocating slotted link in position for moving the impression-cylinder into operative relation with the form-cylinder, said stronger spring device being under the control of the manually-operated lever, so that when said spring-pressed rock-arm is moved away from the reciprocating slotted link the second spring device will move said slotted link to its other position for breaking the toggle links or levers and moving the impression-cylinder into inoperative position. The oppositely-extending slots of the reciprocating link are for the purpose of allowing the continuous reciprocation of the link during either position of the toggle-operating rock-arm, the rock-arm playing in one of the slots when in one position and in the other slot when in the other position. The reciprocating link is operated by a suitable cam upon the impression-cylinder.

Our invention relates, fifthly, to improved controlling devices for the several parts of the press. A suitable brake and belt-shifter are geared to a controlling device which may be operated separately or which may be operated in conjunction with the impression-cylinder throw-out mechanism.

Our invention relates, finally, to numerous features of construction ancillary to the above-noted important features, and in order that our invention may be fully understood we will first describe the same with reference to the accompanying drawings and afterward point out the novelty with more particularity in the annexed claims.

In said drawings, Figure 1 is a side elevation of the main portion of the gear side of our improved printing-press. Fig. 2 is a side elevation of the rear portion of the gear side of the machine. Figs. 1 and 2 taken together represent a complete side elevation of the gear side of the machine. Fig. 3 is a side elevation of the forward portion of the vibrator side of the machine. Fig. 4 is a front end elevation of the machine, the central portions being broken out. Fig. 5 is a detail side elevation of the gear side of the inking mechanism, showing the parts on a larger scale than represented in Fig. 1. Fig. 6 is a detail side elevation of the vibrator side of the inking mechanism, the parts being shown on a larger scale than represented in Fig. 3. Fig. 7 is a detail front elevation of the upper portion of the gear side of the machine, showing the inking mechanism. Fig. 8 is a detail front elevation of the upper portion of the vibrator side of the machine, showing the inking mechanism. Fig. 9 is a detail front elevation of the lower portion of the gear side of the machine, the frame being cut away. Fig. 10 is a detail front elevation of the lower portion of the vibrator side of the machine, the frame being cut away. Fig. 11 is a detail plan view of the forward portion of the gear side of the machine, showing parts of the inking mechanism. Fig. 12 is a detail elevation representing the form-cylinder, the form-inking rollers, ink-distributer rollers, and the operating mech-

anism for throwing the form-inking rollers into and out of engagement with the form-cylinder and maintaining the ink-distributer rollers in constant mesh with their driving-gear. In this figure the form-inking rollers are supported out of engagement with the form-cylinder. Fig. 13 is a view similar to Fig. 12, showing the parts in the opposite position, the form-inking rollers being in engagement with the form-cylinder. Fig. 14 is a detail side elevation of one side of the stand or frame which supports the form-inking rollers and ink-distributer rollers. Fig. 15 is a detail side elevation showing the circumferentially-movable frame or spider supporting the intermediate gears for driving the ink-distributer rollers, a portion of the distributer-rollers' driving-gear being shown. Fig. 16 is a detail sectional plan view of the inking-roller, supporting frame, the intermediate gear-supporting spider, and parts of the press-frame, the inking-rollers and parts of the frame being omitted. Fig. 17 is a sectional elevation showing the ink-fountain and the ink-ductor roller and operating mechanism. Figs. 18 and 19 are detail views of the adjustable journal-brackets for supporting the ink form-rollers. Fig. 20 is a detail side elevation of the form-dampening devices, the water form-rollers being shown in contact with the form-cylinder and the frame being broken away. Fig. 21 is a view similar to Fig. 20, showing the water form-rollers out of contact with the form-cylinder. The parts of the form-dampening devices under the operation of their operating mechanism are successively moved into the positions shown in Figs. 19 and 20, the position of Fig. 19 occurring when the form is being dampened and the position of Fig. 20 occurring when the ink-distributer surface of the form-cylinder passes the dampening devices. Fig. 22 is a detail elevation representing the manually-operated controlling device of the dampening devices, showing the parts in the position they assume when the dampening devices are thrown out of operation. Fig. 23 is an enlarged detail view of the water form-rollers and their shear-like supporting-levers. Fig. 24 is a detail plan view of the parts shown in Fig. 22. Fig. 25 is a detail side elevation representing the fly-wheel, the brake, and the belt-shifting devices. Fig. 26 is a front edge elevation of the same. Fig. 27 is a vertical sectional view of the form-cylinder, the central parts being broken away. Figs. 28 and 29 are detail views of the clutch which couples the main driving-gear to the form-cylinder. Fig. 30 is a detail elevation showing the impression-cylinder and automatic manually-controlled throw-out mechanism, the impression-cylinder being in operative position. Fig. 31 is a view similar to Fig. 30, showing the impression-cylinder in inoperative position. Fig. 32 is a detail transverse sectional view showing the impression-cylinder at the gear side of the machine and also showing in rear elevation the automatic throw-out mechanism, the main driving-shaft, and the belt-shifting and braking devices.

The machine-frame 1 may be of any suitable design to properly support the hereinafter-described operating parts of our improved printing-press.

5 is a form-cylinder provided at its ends with bearing-gudgeons 6, which are journaled in bearing-bushings 7, rigidly supported in the side frames of the machine. At the opposite ends of the form-cylinder 5 are secured the large cog-gears 8 and 9. The form-cylinder is constructed, as usual, with a segmental form-supporting surface and a segmental ink-distributing surface separated by cut-out portions, which are shown, but not specifically described, and is provided with form-clamps 4, of any suitable construction, adapted to engage a flexible form, preferably an aluminium printing-plate. The gudgeon or axle 6 at the gear side of the machine carries a splined sliding clutch member 10, which is adapted to engage the fixed clutch member 11^a, formed upon the hub of the main driving-gear 11, which driving-gear 11 is loosely journaled upon the extension of the axle 6. The gear 11 is driven by a smaller gear 12, keyed to the main driving-shaft 13, which is provided with the usual fast and loose pulleys 14 15, around which the main driving-band 16 operates.

17 is the distributer-rollers' operating-gear of finer pitch than main driving-gear 11 and located inside of main gear 11 and keyed to its hub, so as to rotate and be driven with the main driving-gear.

18 is the clutch-operating lever, journaled at 19 and engaging the movable member 10 of the clutch.

20 is the impression-cylinder, provided with suitable paper-grips. (Not specifically described.) The impression-cylinder 20 is provided at its ends with large cog-gears 21 and 22, which mesh with the cog-gears 8 and 9 of the form-cylinder, whereby the impression-cylinder is driven from the form-cylinder. The impression-cylinder 20 has bearing gudgeons or axles 23, which are supported in eccentric bearing-bushings 24 and 25, which are journaled in rigid bearings in the side frames of the machine and are automatically controlled by mechanism hereinafter described for moving the impression-cylinder into or out of operative relation with the form-cylinder, the movement to and from the form-cylinder being so slight that the gears 21 and 22 always remain in mesh with gears 8 and 9.

26 is the inclined feed board or table upon which the sheets are fed to suitable sheet-guides, which hold the successive sheets in position to be taken by the sheet-grippers of the impression-cylinder.

We will now proceed to describe the form-inking mechanism. At the forward end of the machine the side frames are built up above the impression-cylinder to support the form-inking mechanism.

30 is the ink-fountain, extending across the front of the machine and supported between the upward extensions of the side frames.

31 is the ink-fountain roller, journaled in the ends of the ink-fountain.

32 is the ductor-roller rock-shaft, journaled in suitable bearings and supporting the upwardly-extending forked rock-arms 33, in the forked ends of which is journaled the ductor-roller 34.

35 is a rock-arm keyed to the end of rock-shaft 42 and carrying in its upper slotted end an adjustably-supported antifriction-roll 36, which operates in the groove-cam 37, formed in the face of the large gear-wheel 38, keyed to the end of the shaft 39, which is journaled in the upper extensions of the side frames and extends from side to side of the machine.

40 is the inking-drum, mounted upon shaft 41, which is journaled in the side frames of the machine and has splined to its projecting end at the gear side of the machine a gear-wheel 42, which meshes with the intermediate gear 43, driven by the main driving-gear 11.

By the operation of cam 37 upon rock-arm 35 the ductor-roller 34 is oscillated from the ink-fountain roll 31 to the inking-drum 40 for conveying ink from the former to the latter. Keyed to the projecting end of shaft 31^a of the ink-fountain roll 31 at the gear side of the machine is a ratchet-wheel 45, with which engages a gravity-pawl 46, journaled upon a pin 47^a, carried by a rock-arm 47, which is keyed to a short shaft 48, journaled in the press-frame in line with shaft 31^a. 49 is another rock-arm keyed upon shaft 48 and connected thereby with the rock-arm 47. The upper end of rock-arm 49 carries a pin 49^a, which engages elongated slot 50, formed in the forward free end of a pitman 51, journaled upon a crank-pin 52, projecting from the face of gear 38.

53 is a pin seated in one of a series of openings in the slotted end of pitman 51, which is adapted to engage pin 49^a of rock-arm 49 for moving the pawl 46 rearwardly upon the ratchet-wheel 45. The pawl 46 is moved forwardly intermittently for rotating the ink-fountain roller 31 step by step by the engagement of the upper end of slot 50 of pitman 51 with pin 49^a. By adjusting the pin 53 to the different holes of the series in pitman 51 the stroke of the pawl 46 can be regulated to rotate the fountain-roller 31 more or less.

54 is a hand-lever formed integral with the hub of rock-arm 49, by which the ink-fountain roller 31 can be rotated by hand under certain conditions. The gear-wheel 38 on shaft 39 meshes with a small gear 55, secured to gear 42 and splined (with said gear 42) to shaft 41 and held against endwise movement by a bracket-bearing 42^a, so as to allow shaft 41 to move longitudinally through said gears. The shaft 39 is driven from the main driving-gear 11 through gears 43, 42, 55, and 38. The gear 43 is journaled upon a stud carried by the downwardly-projecting frame-piece 1^a.

The shaft 41 at the vibrator side of the machine is provided with a grooved collar 56, with which engages a rock-arm 57, journaled at 58 and formed integral with another rock-arm 59, engaging in the groove-cam 60, keyed to the shaft 39 adjacent to the vibrator side of the machine. By the operation of cam 60 through rock-arms 59 57 and collar 56 the inking-drum 40 is caused to continually vibrate longitudinally in its bearings, its shaft 41 sliding in the gears 55 and 42.

61, $61^\times$, 62, and 63 are ink-mixing rollers, and 61^a 62^a 63^a are rider-rollers, all journaled in bearings in the upper extensions of the side frames of the machine, the mixing-rollers being supported in peripheral contact with the ink-drum 40 and the rider-rollers in contact with the mixing-rollers. At the vibrator side of the machine the journals of the rider-rollers 61^a 63^a carry grooved wheels 61^b 63^b, with which engage the bearing-blocks 64 65, mounted upon the upper ends of rock-arms 66 67, which are rigidly connected with a rock-arm 68. The rock-arms 66, 67, and 68 are journaled in a suitable bracket 69 upon a pin 70, and the rock-arm 68 carries a journal-block 71, which engages a grooved collar 72, keyed to the outer end of shaft 41. By this means the ink rider-rollers 61^a and 63^a are vibrated longitudinally in engagement with the mixing-rollers, the rider-rollers moving in one direction when the ink-drum moves in the opposite direction, and vice versa.

75 is a vertically-extending shaft journaled upon the vibrator side of the machine in bracket-bearings 76 77, the upper end of the shaft carrying a bevel-gear 78, which meshes with a similar bevel-gear 79, keyed to the transverse shaft 39.

80 is a bevel-gear keyed to shaft 75 just above bearing 77, and 81 is a similar bevel-gear keyed to the forward end of vibrator-shaft 82, which is journaled in bracket-bearings 83 84 and extends horizontally of the machine. The vibrator-shaft 82 operates the vibrating rock-arms, which are operatively connected with the vibrating distributer-rollers of the form-inking mechanism, which will now be described.

85 and 86 are end frames or stands comprising the vertically-movable frame which supports the form-inking rollers and ink-distributer rollers. The frames 85 86 are of arch shape for supporting the inking-rollers in proper relation to the form-cylinder, the ends of the frames being formed with vertical guide-grooves 87 engaging the vertical guide tongues or flanges 88 of the frame, the stands 85 86 being movable vertically upon said guides. Each of the end frames or stands is formed with forked bearing-arms 89, extending radially from the center of rotation of the form-cylinder for the reception of the journal ends 90^a of the ink-distributer rollers 90. Between the bearing-arms 89 are slots 91 for the reception of the journal ends 92^a of the form-inking rollers 92, the journal ends of

said form-inking rollers being supported in the bracket-bearings 93, formed integral with the pins 94, mounted in sockets formed in brackets 95. The brackets 95 are secured to the face of stand or frame 85 or 86 by means of tap-bolts 96 and 97, which pass through circular opening 96[a] and elongated opening 97[a], respectively, and are seated in suitably-threaded openings in the face of the stand or frame 85 or 86.

90[×] represents intermediate rider-rollers. Each rider-roller 90[×] is supported freely upon the peripheries of two adjacent form-rollers 92 and confined against endwise displacement by the arms 89. One of the ink-distributer rollers 90, journaled in forks of arms 89, rests in peripheral contact with each intermediate rider-roller 90[×].

98 is an adjusting-screw supported in the cavity 98[a] in the face of bracket 95 and engaging the interiorly-threaded bore 94[a] of the bracket-pin 94. The head of adjusting-screw 98 rests upon a shoulder of cavity 98[a], so that by turning the screw 98 the bearing-brackets 93 can be adjusted up or down in the bracket 95, whereby the form-inking rollers can be nicely adjusted with relation to the form-cylinder. By loosening bolt 97 the brackets 95 can be adjusted to the proper radial position upon the side frame or stand 85 or 86 with relation to the center of rotation of the form-cylinder.

100 represents arms journaled to the upper extensions of side frames of the press upon a rock-shaft 101 and formed with upwardly and downwardly extending slotted arms or forks 102 and 102[a], in which are supported the transfer inking-rollers 103 and rider-roller 104. The transfer-roller 103 operates in peripheral engagement with the ink-drum 40 and with one of the ink-distributer rollers 90.

100[a] is a hook upon the press-frame adapted to engage a pin 100[b] on one of the arms 100 to support the arms in elevated position when the rollers 103 and 104 are removed.

105 represents rock-arms journaled at 106 to the side frames of the press and supporting in their upper forked ends the ink-transfer roller 107, which operates in peripheral contact with the ink-drum 40 and with another one of the ink-distributer rollers 90. The rock-arms 105 can be moved forwardly upon their bearings 106 for removing the transfer-roller 107.

Journaled at each side of the machine-frame at 100 is a large rock arm or lever 111 or 112, which engages one of the antifriction-rollers 113, journaled at 114 upon the side frames or stands of the vertically-movable ink-roller-supporting frame. The antifriction-rollers 113 are located perpendicularly above the center of rotation of the form-cylinder, so that the lifting action of the rock arms or levers 111 112 will be exerted in a vertical direction.

Journaled upon pins 115 in each of the machine side frames are grooved antifriction-rollers 116 117, upon which are supported the longitudinally-movable cam-bars 118, having inclined or cam surfaces 119. Upon each of the stands or frames 85 86, above antifriction-rollers 116 117, are journaled the grooved antifriction-rollers 120 121, which rest upon the inclined or cam surfaces 119 of the bar 118. 122 is a rock-shaft extending across the machine, from the opposite ends of which extend the rock-arms 123 124, having loose pivotal connection with the rear ends of the cam-bars 118. 125 and 126 are other rock-arms projecting from rock-shaft 122, adjacent to rock-arms 123 124, respectively, the rock-arm 125 being connected by a link 127 with a lug 111[a], formed on the lever 111, while the rock-arm 126 is formed with a cam-face 126[a], which rests upon a cam-face 112[a] of the rock-arm 112.

130 is a rock-shaft journaled in the machine side frames and extending from side to side.

131 131 are rock-arms keyed to rock-shaft 130 at opposite sides of the machine, extending upwardly therefrom and pivoted to downwardly-extending arms or links 132 132, which are pivotally connected at their upper ends with the rock arms or levers 111 112. The rock arms or levers 131 131 and links 132 132 constitute toggle links or levers at the sides of the machine, by the straightening and breaking of which the stands or frames 85 86, carrying form-inking rollers 92 and ink-distributer rollers 90, are raised and lowered.

At the vibrator side of the machine a groove-cam 133 is secured to the end of the form-cylinder 5, and journaled upon a suitable stud 134 is a rock-arm 135, carrying upon a suitable lug an antifriction-roller 135[a], which operates in the groove-cam 133. Journaled to the lower end of the rock-arm 135 is a link 136, formed with oppositely-extending connected slots 136[a] 136[b], which slots have adjacent to their junction upwardly and downwardly engaging shoulders 136[c] and 136[d]. Depending from the rock-shaft 130, at the vibrator side of the machine, is a rock-arm 137, carrying at its free end an antifriction-roller 138, which plays in the oppositely-extending connected slots 136[a] and 136[b] of the link 136.

Journaled upon the lower end of link 136 is a bearing-block 140, through which loosely passes a slightly-bent rod 141, extending forwardly to a bearing 148 and rearwardly to a rock-arm 142, which is keyed to rock-shaft 143. Extending up from the rock-shaft 143 is a controlling hand-lever 144. The rock-shaft 143 is journaled in bearing-brackets 143[a] and extends from side to side of the machine, the rock-arm 142 being on the vibrator side of the machine inside of the frame, while the controlling hand-lever 144 is at the gear side of the machine outside of the machine-frame. Mounted upon the rod 141 is an expansion-spring 145, which is confined against the bearing-block 140 by a collar 146, secured to the rod 141. The rod 141 passes loosely through

and extends forwardly from the bearing-block 140 to a bearing 148, pivoted on the machine-frame, and a compression-spring 149 is mounted upon the rod 141 and confined between the bearing-block 140 and the bearing 148. When the lever 144 is in its rearmost position, (shown in Fig. 13,) the spring 149 is of sufficient strength to resist the pressure of spring 145 and hold the slotted link 136 in the position shown in Fig. 13, the antifriction-roller 138 of rock-arm 137 playing in the upper slot 136^a when the parts are in this position. By moving the hand-lever 144 forwardly upon its rock-shaft 143 the spring 145 is compressed to a sufficient degree to force the link 136 forwardly against the pressure of spring 149, causing the antifriction-roller 138 to be engaged by the downwardly-engaging shoulder 136^d, the parts then being shifted into the position shown in Fig. 12. The engagement of downwardly-engaging shoulder 136^d with antifriction-roller 138 rocks the rock-arm 137 and straightens the toggle links or levers 131 131 132 132 for lifting the stand or frame carrying the form-inking rollers and ink-distributer rollers. When the link is in the opposite position, the upwardly-engaging shoulder 136^c moves rock-arm 137 upwardly for breaking the said toggle links or levers to allow the frame or stand to move downwardly and throw the form-inking rollers into engagement with the form-cylinder.

Journaled upon the bearing-bushing 7 is a circumferentially-movable frame or spider 150, having a journal-bearing 150^a. The frame or spider 150 is located at the gear side of the machine between the distributer-rollers' operating-gear 17 and the machine side frame 1 and has integral flanges 150^b, arranged to engage and slide upon the face of vertically-movable frame 85, and a curved flange 150^c, which engages the inner face of driving-gear 17. The flanges 150^b, 150^b, and 150^c steady the frame 150 and prevent any transverse vibrations at the opposite sides of the vertical central line. The frame or spider 150 carries a series of studs 151, upon which are journaled the small intermediate gears or pinions 152, which are supported in constant mesh with the driving-gear 17 and with the distributer-roller gears 90^b, keyed to the journal ends 90^a of the distributer-rollers. The circumferentially-movable stand or frame 150 is formed with oppositely-arranged inclined slots 153, in which engage the antifriction-rollers 154, journaled upon pins or studs projecting outwardly from one of the longitudinally-movable cam-bars 118, the longitudinal movement of said cam-bar by the means above described causing the frame or spider 150 to be shifted slightly circumferentially for the purpose of moving the intermediate gears 152 toward or away from the radial lines extending from the center of the form-cylinder through the journals of the distributer-rollers. The frame or spider 150 is shifted simultaneously with the up-and-down movement of the vertically-movable frame 85 86, which supports the form-inking rollers and ink-distributer rollers, the intermediate gears 152 being moved toward said radial lines when the inking-rollers are raised, so as to bridge the increased space between gears 90^b and driving-gear 17 and away from said radial lines when the inking-rollers are lowered toward the form-cylinder to allow for the necessary movement of gears 90^b toward gear 17, and in this way the distributer-rollers are maintained in constant positive gear with their driving-gear 17 in order that the ink upon the rollers will be kept in worked-up condition.

Keyed to the vibrator-shaft 82 above referred to are the groove-cams 160 161 162 163. The alternate ink-distributer rollers 90 at the vibrator side of the machine are provided on their journal ends with grooved collars 165, in which engage the bearing-blocks 166, journaled upon the upper ends of rock-arms 167, 168, 169, and 170. Each of the rock-arms 167, &c., is formed integral with or rigidly secured to a downwardly-projecting rock-arm 167^a, 168^a, 169^a, or 170^a, which engage respectively in the groove-cams 160, 161, 162, and 163, whereby the alternate ink-distributer rollers are vibrated longitudinally in their bearings, said distributer-rollers being in peripheral contact with the form-inking rollers supported beneath them.

We will now describe the form moistening or dampening devices.

175 is the water-fountain, extending from side to side of the machine and supported from the side frames upon suitable brackets 176.

177 is the water-fountain roller, journaled in the machine side frames, the journal 177^a at the vibrator side of the machine projecting beyond the machine side frame and having keyed to it a bevel-gear 178, which meshes with a similar bevel-gear 179, keyed to a short vertically-extending shaft 180, which is journaled in bracket-bearings 181, secured to the machine side frame. The shaft 180 is in line with the shaft 75, a clutch being provided to couple the shafts 75 and 180, said clutch comprising a fixed member 182, secured to the lower end of shaft 75, and a movable member 183, having spline connection with the upper end of shaft 180.

184 is a bell-crank hand-lever journaled at 185 and engaging the movable member 183 of the clutch for throwing the shaft 180 into or out of gear with the shaft 75. By this means the water-fountain roller 177 and water ductor-roller 195 may be temporarily arrested at such times, for instance, when the water form-rollers become charged with too much water and it becomes desirable to work off the surplus. The water-ductor 195 is operated by a cam 200, carried on the journal of fountain-roller 177 at the gear side of the machine, as will be hereinafter explained.

186 is the water-distributer drum, having

elongated gudgeons or axle-bearings 186ª, which are journaled in the bearing-sleeves 203, supported in the side frames of the machine. The axle-bearing 186ª at the gear side of the machine has keyed to it a small gear-wheel 187, which is in constant mesh with an intermediate gear 188, journaled upon a stud 189 and meshing in turn with the distributer-roller driving-gear 17. The journal end 186ª at the vibrator side of the machine has keyed to it a grooved collar 190, which is engaged by a rock-arm 191, journaled upon pin 192, from which projects a second rock-arm 193, integral with arm 191 and engaging in a groove-cam 194, keyed to the short shaft 180. By this means the water-distributer drum 186 is vibrated longitudinally in its bearings, its driving-gear 187 being of sufficient width to maintain its mesh with gear 188.

195 is the water ductor-roller, journaled at its ends in the upper ends of rock-arms 196, keyed to a rock-shaft 197, journaled in the side frames of the machine. The rock-shaft 197 projects beyond the side frame at the gear side of the machine and supports an adjustable rock-arm 198, which has spline-and-groove connection with the shaft 197 and carries in its slotted free end an adjustably-mounted antifriction-roller 199, which runs in peripheral engagement with the conoidal cam 200, keyed to the projecting journal end or shaft 177ª of the water-fountain roller 177. The rock-arm 198 is adjustable upon the rock-shaft 197, the arm 198 having a downwardly-projecting integral lug 198ª, into which is threaded an adjusting-screw 201, journaled in a suitable opening in the arm 202, which is rigidly secured to the end of shaft 197. The screw 201 has a milled hand-wheel 201ª, by which it is operated. By this means the rock-arm 198 may be adjusted axially with relation to its operating-cam 200 for moving it into the path of the extreme low part of the cam or the higher parts to vary the time of contact with the water-fountain roller, and consequently the quantity of water transferred from it to the water form-rollers, which we will now describe.

The sleeves 203 extend inwardly from the side frames, and each supports a pair of shear-like levers 204 and 205, said levers being journaled upon said sleeve and confined in position by a collar 203ª, fixed rigidly to the sleeve 203. The shear-lever 204 supports an adjustable bracket-arm 206 by means of a thumb-screw 207, which passes through a slot 208 in arm 206 and is threaded into an interiorly-threaded opening in boss 204ª. The bracket-arm 206 is adjustably confined in proper position upon the shear-lever 204 by means of the adjusting thumb-screw 207ª and 209, which are threaded in suitable shoulders 204ᵇ and 209ᵇ, respectively, and engage the bracket-arm 206 below and above. The bracket-arm 206 is formed with a forked bearing-socket 206ª, in which rests one of the journals 210ª of the lower water form-roller 210. The journal 210ª is supported in the bearing-socket 206ª by slotted bearing-arm 211, confined upon bracket-arm 206 by the thumb-screw 212, which passes through the slot of bearing-arm 211 and is seated in the threaded opening in bracket-arm 206. By adjusting the several parts just described the position of the bracket-arm 206 upon the shear-like lever 204 can be regulated to a nicety to bring the water form-roller 210 in proper relation with the form-cylinder 5. The upper shear-lever 205 supports a bracket-arm 213 by means of a thumb-screw 214, which passes through a slot 213ª of the bracket-arm 213 and is seated in threaded opening in the shear-lever 205.

215 is a thumb-screw threaded into a lug 215ª of shear-lever 205 and engaging a shoulder 213ᵇ of the arm 213 for adjusting the position of the arm 213 upon the shear-lever 205.

216 is the upper water form-roller, whose journal 216ª is supported in the forked bearing-socket 213ᶜ of bracket-arm 213, the journal 216ª being secured in the bearing-socket by means of the bearing-block 217, secured in place by thumb-screw 218.

It will of course be understood that the shear-like levers 204 205 and their above-described connected parts are duplicated at each side of the machine, the water form-rollers 210 and 216 being supported at their opposite ends by said shear-like levers.

Each pair of shear-like levers 204 and 205 is provided with an operating-toggle comprising links 220 and 221, which are journaled, respectively, to the shear-levers 204 and 205 at points 220ª and 221ª and are journaled to each other at point 222.

223 is a transversely-extending rock-shaft journaled in the side frames of the machine and supporting adjacent to each end a rock-arm 224, which is journaled to the knuckles 222 of the toggle-levers 220 221.

At the gear side of the machine a long rock-arm 225 is keyed to rock-shaft 223 and extends rearwardly therefrom and is provided at its end with stud 226, which operates in a slot 227, formed in the lower end of the reciprocating link 228, journaled at 229 upon a bell-crank rock-arm 230 231, journaled at 232. The bell-crank rock-arm 231 supports an antifriction-roller 233, which operates in a groove-cam 234, secured to the form-cylinder 5 at the gear side of the machine.

235 is a leaf-spring secured to reciprocating slotted arm 228 and engaging the rock-arm 230 for the purpose of giving the reciprocating arm 228 a forward tendency on its supporting-journal 229. At the lower end of the slot 227 in the arm 228 is formed a notch 227ª, having upwardly and downwardly engaging shoulders. The reciprocating arm 228, engaging rock-arm 225, rocks the arms 224 for successively straightening and breaking the toggle-levers 220 221 to rock the shear-levers 204 and 205 and cause the water form-rollers

210 and 216 to be moved intermittently into and out of peripheral engagement with the form-cylinder. The water form-rollers 210 and 216 rotate in peripheral contact with the water-distributing drum 186, which is operated as above described and receives intermittently a charge of water from the water ductor-roller 195 in the manner already described.

When the machine is operating, the water form-rollers 210 and 216 are moved successively into the positions shown in Figs. 19 and 20, the position shown in Fig. 19 being the one assumed when the printing-form is passing the water form-rollers, while the position shown in Fig. 20 is the one assumed when the segmental ink-distributing surface of the form-cylinder is passing the water form-rollers.

The reciprocating slotted arm or link 228 is formed with a downwardly-projecting toe 228^a, with which is adapted to engage an arm 236, keyed to a rock-shaft 237, journaled in bracket-bearing 237^a of the press-frame, the engagement of arm 236 with toe 228^a being for the purpose of moving the arm 228 forwardly upon its journal 229 to disengage the stud 226 from the notch 227^a of slot 227. The rock-shaft 237 has keyed to it a segmental gear 238, which meshes with a similar segmental gear 239, keyed to a rock-shaft 240, journaled in a bracket-bearing 241 of the press-frame. The rock-shaft 240 has rigidly mounted upon it an arm 242, which is adapted to engage the under face of the long rock-arm 225 for moving and supporting it in its raised position, holding the toggle-links 220 221 in broken position with the water form-rollers 210 and 216, supported out of contact with the form-cylinder. When the arm 242 supports rock-arm 225 in raised position, the arm 236 will hold the slotted link 228 in its forward position, these simultaneous movements being insured by the segmental gears 238 and 239, and in this position the slotted link 228 is allowed to reciprocate vertically under the action of its operating-cam 234 without interfering with the inoperative position of the water form-rollers, the stud 226 playing in the vertical slot 227 during this inoperative position of the parts. The throw-out mechanism of the water form-rollers may be operated by a short hand-lever 245, keyed to rock-shaft 237, or by means of rock-arm 246, keyed to rock-shaft 237, and connected by rearwardly-extending rod 247 to a foot-lever 248, journaled at 249 in bracket 250 and extending up through a slot 251 in the platform 252 of the press-frame. The lever 245 is located adjacent to the forward end of the press, while the foot-lever 248 is located adjacent to the rear end of the press.

The impression-cylinder 20 has its gudgeons or axles 23 journaled in eccentric bearing-bushings 24 and 25, supported in the side frames of the machine, as above explained. Each of the bearing-bushings 24 and 25 is provided with a rigid arm 260, which is journaled at 261 to the upper link 262 of the pair of toggle links or levers. The link 262 is journaled at 263 to the lower toggle link or lever 264, which is keyed to a rock-shaft 265, journaled in the side frames of the machine. The upper link 262 is formed in two parts connected by the adjusting-screw 262^a, by which link 262 can be lengthened or shortened.

At the gear side of the machine the rock-shaft 265 is provided with a rock-arm 266, carrying at its end a stud 267, supporting an antifriction-roller which plays in the oppositely-extending connected slots 268^a 268^b, formed in the lower end of the reciprocating link 268. The link 268 is journaled at 269 to rock-arm 270, which is journaled at 271, and supports on the lug 272 an antifriction-roller 273, which operates in the groove-cam 274, secured to the impression-cylinder 20 at the gear side of the machine. The oppositely-extending connected slots 268^a 268^b of the reciprocating link 268 form downwardly-engaging shoulder 268^c and upwardly-engaging shoulder 268^d, which are adapted to engage the antifriction-roller supported on stud 267 for the purpose of straightening and breaking the toggle-links 262 264 for moving the impression-cylinder 20 into and out of operative relation with the form-cylinder 5.

275 is a rock-shaft, to which is keyed a rock-arm 276, carrying an antifriction-roller 277, which rests normally against a straight face 268^e of the reciprocating link 268.

278 is a rod connected to the rock-arm 276 and extending forwardly through a bracket 279, journaled at 280 to the side frame of the machine.

281 is an expansion-spring surrounding rod 278 and confined between the bracket 279 and an adjusting-collar 282, secured to rod 278. The spring-actuated rod 278, operating through the rock-arm 276, holds the reciprocating slotted link 268 normally in the position shown in Fig. 30, the impression-cylinder being in this position in operative relation to the form-cylinder.

285 is another rock-arm keyed to rock-shaft 275, and 286 is a lever journaled at 287 to bracket 288 and having loose pivoted connection with rock-arm 285 at 289.

291 is an operating-arm journaled to lever 286 at 292 and extending up through an opening 293 in the platform 252 of the press, the operating-arm 291 being provided with an integral locking lug or shoulder 291^a, which is adapted to engage the under face of platform 252 when said arm is depressed, the arm being supported in a slightly-inclined position for the purpose of insuring the engagement of the locking-lug 291^a automatically when the arm 291 is depressed.

291^b is a foot-plate on the upper end of arm 291, by which it is operated.

295 is a rod journaled to the lower end of

slotted link 268 and extending rearwardly through a bracket-bearing 296, journaled to the side frame of the machine.

297 is an expansion-spring supported upon rod 295 and confined between the bracket-bearing 296 and an adjustable collar 298, secured to rod 295. The spring 281 is stronger than the spring 297, so as to insure holding the slotted link 268 in its rearmost position when the operating-arm 291 is released from its engagement with the platform 252.

300 is a pin or lug projecting from the face of the rock-arm 285.

301 is a vertically-movable operating-rod passing through a suitable opening in the platform 252, formed at its lower end with an elongated slot 302, which engages a pin 303, secured to a rock-arm 304, which projects from the rock-shaft 305. The operating-rod 301 is provided at its upper end with a step 301ª.

306 is a foot secured to the operating-rod 301 in position to engage the pin or stud 300.

The rock-shaft 305 is journaled in bracket-bearings 306 of the press-frame and extends forwardly to a point directly beneath the main driving-shaft 13.

307 is a brake-arm keyed to rock-shaft 305 and extending directly beneath the fly-wheel 308, which is keyed to the driving-shaft 13. 310 is another rock-shaft, extending parallel with the rock-shaft 305 and having keyed to it the forked belt-shifting arm 311, which embraces the belt 16 in a manner well understood.

312 and 313 are segment-gears meshing with each other and keyed, respectively, to the rock-shafts 305 and 310, so that when rock-shaft 305 is rocked by depressing the operating-rod 301 the brake 307 will be pressed against the periphery of fly-wheel 308 and the belt-shifting arm 311 will be moved to throw the belt 16 from the fast to the loose driving-pulley.

315 is a long operating-lever keyed to rock-shaft 310 for shifting the belt and applying the brake for stopping the machine.

The operating-rod 301 is only used when it is desired to throw out the impression-cylinder simultaneously with the application of the brake and throwing off of the driving-belt, the foot 306 engaging pin or lug 300, causing the throw-out of the impression-cylinder, as above explained. When the operating-rod 301 is depressed, the toggle link or lever 286 will be forced down and the locking-lug 291ª of arm or lever 291 will engage the under face of platform 252 and hold the parts in this position. After the machine is again started by removing the brake and shifting the belt by the operation of lever 315 the arm or lever 291 is disengaged to allow the spring device 281 to return the parts to their normal positions and effect the throwing in of the impression-cylinder.

325 is the sheet-delivery cylinder, journaled in bearings 326 and provided with sheet-delivery grippers 327, which may be of any suitable construction adapted to take the successive printed sheets from the grippers of the impression-cylinder.

329 represents a series of delivery-bands which pass around the delivery-cylinder 325 and a delivery-roller 330, journaled in bracket-bearings 331.

335 is the delivery-fly, journaled at 336 in the side frames. The delivery-fly 335 is adapted to take the sheets from the supporting delivery-bands 329.

338 is a segment-gear keyed to the rock-shaft of delivery-fly 335, and 339 is a rack-bar engaging the segment-gear 338 and passing forwardly through a bearing 340, attached to rear part of the machine-frame, and a bearing-collar 341, resting in a forked bracket 342, secured to the machine-frame below the impression-cylinder 20. The bar 339 extends through fork of bracket 342, its forward end being journaled to a bell-crank 343, journaled at 344 and carrying an antifriction-roller 345, operating upon the cam 346, keyed to the gudgeon or axle 23 of the impression-cylinder 20.

347 is an expansion-spring supported upon bar 339 and confined between bearing 341 and an adjustable collar 348, secured to the bar 339. The cam 346 draws the bar 339 forwardly for raising the delivery-fly, incidentally compressing the spring 347. The spring 347, when released by the cam 346, throws the delivery-fly over into horizontal position for delivering the sheet received from the delivery-bands.

349 is a gravity-hook journaled at 350 and adapted to engage a lug 335ª on the fly-frame to hold the fly in inoperative position when the delivery mechanism is not operating, the spring 347 being held in compressed position and the bell-crank 343 being prevented from following the cam 346. A crank-arm 352 on rock-shaft 336 of the fly is connected with a sheet-register 353 through chain 354, as usual.

355 is the platform upon which the sheets are delivered by the fly.

From the above-detailed description of the several sets of mechanisms employed in our improved printing-press the operation of the press as a whole will be clear from a brief description, which will now be given.

When the machine is operating, the form-inking mechanism is in the position shown in Fig. 13, the form-inking rollers being in contact with the form-cylinder. The impression-cylinder is in peripheral contact with the form-cylinder, and the water-form-roller mechanism is in the position shown in Fig. 20. Sheets are fed from the table 26 to the impression-cylinder, and the grips carry the sheet around with the impression-cylinder, receiving an impression from the form-cylinder, the form being first moistened by the water-form-roller mechanism and next inked by the inking mechanism. The printed sheet is delivered to the delivery mechanism in the

usual way. If it is desired to throw out the water form mechanism, the lever 245 or lever 248 is moved forward, disengaging rock-arm 225 from the notch 227[a] of slotted link 228 and holding the shear-levers 204 and 205 in inoperative position with the water form-rollers 210 and 216 out of contact with the form-cylinder. If it is desired to throw the form-inking mechanism out of operation, the hand-lever 144 is moved forwardly, compressing the spring 145 against the lower end of slotted link 136, so as to cause the upwardly-engaging shoulder 136[d] to rock the arm 137, straightening the toggle-links 131 132, and moving the inking-roller-supporting frames 85 86 upwardly away from the form-cylinder. Simultaneously with the upward movement of the supporting-frames 85 86 of the inking mechanism the circumferentially-movable frame or spider 150 will be moved by the engagement of antifriction-rollers 154 with slots 153 for the purpose of shifting the intermediate gears 152 toward the radial lines extending from the center of rotation of the form-cylinder through the journal-centers of the distributer-rollers 90, thereby bridging the increased space between the distributer-roller gears 90[b] and their driving-gear 17. When so shifted, the parts assume the position shown in Fig. 12. When it is desired to arrest the rotation of the form-cylinder with the form-inking mechanism out of operative relation thereto, the form-cylinder clutch 10 is thrown out by the operation of clutch-lever 18, the main driving-gear 5 and distributer-rollers' operating-gear 17 being rotated from the main shaft 13 to keep the drum 40, the ink-mixing rollers, ink form-rollers, and ink-distributer rollers in operation for working up the ink or maintaining it in proper worked-up condition. To throw out the impression-cylinder, the foot-lever 291 is depressed, causing the spring-pressed arm 276 to be moved away from the plain face 268[e] of the reciprocating slotted link 268, allowing the spring 297 to force the lower end of link 268 forwardly and cause the rock-arm 266 to be engaged by the upwardly-engaging shoulder 268[d] for breaking the toggle-links 262 264 and rotating the eccentric bushings for moving the impression-cylinder away from the form-cylinder. It will of course be understood that this movement to and from the form-cylinder is very slight, the delivery-cylinder 325 being a sufficient distance in rear of the impression-cylinder to allow for said movement. By disengaging the lug 291[a] of foot-lever 291 from the platform 252 the spring 281 will throw back the arm 276 into engagement with link 268 for causing the reverse movement of the parts.

Fig. 30 shows the impression-cylinder and controlling mechanism in operative position, while Fig. 31 shows the parts in inoperative position.

In the ordinary operation of the machine the hand-lever 144, controlling the inking mechanism, and foot-lever 291, controlling the impression-cylinder throw-out, are utilized. In case of an emergency, however, it is sometimes necessary to immediately stop the whole machine. For this purpose the emergency-stop 301 is provided, which, in the manner above explained, throws out the impression-cylinder, shifts the belt, and applies the brake for immediately arresting the operation of the machine. At the same time the emergency-stop is operated the levers 144 and 248 may also be operated for throwing out the ink mechanism and water form-roller mechanism, respectively. It will be observed that the several controlling-levers of the machine are in convenient position for the operator who stands upon the platform 252 and feeds the sheets from the feed-table 26.

The operations of the several parts are more specifically described in connection with the detailed explanations above given.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In combination with a printing-press, a form-cylinder, the form-inking rollers, geared distributer-rollers, a vertically-movable frame in which the distributer-rollers and inking-rollers are carried, a driving-gear, intermediate gears meshing with the driving-gear and the distributer-roller gears, means for moving the inking-roller frame vertically, and means for shifting the intermediate gears circumferentially of the driving-gear, substantially as set forth.

2. In a printing-press, the combination of a form-cylinder, the form-inking rollers, the geared distributer-rollers, the driving-gear, the intermediate gears meshing with the driving-gear and distributer-roller gears, and means for simultaneously moving the inking-rollers away from the form-cylinder, and shifting the intermediate gears circumferentially with relation to their driving-gear, substantially as set forth.

3. In a printing-press, the combination of the form-cylinder, with a suitable stand or frame movable with relation to the cylinder, the form-inking rollers carried by the stand or frame, means operated by a moving part of the press for raising and lowering the stand or frame with relation to the cylinder, and manually-operated controlling means for throwing the stand raising and lowering means into and out of action, said stand raising and lowering means being constructed and arranged to maintain the stand or frame in its raised or lowered position until shifted by the manual controlling means, substantially as set forth.

4. In a printing-press, the combination of the form-cylinder, with a suitable stand or frame movable with relation to the cylinder, form-inking rollers carried in the stand or frame, a cam on the form-cylinder, operating means operated by said cam for moving the stand or frame toward or away from the form-

cylinder and adapted to maintain the stand or frame in either position, and manually-operated controlling means for throwing the stand-operating means into action, substantially as and for the purpose set forth.

5. In a printing-machine, the combination with a rotating bed, of a series of form-rollers, a cam rotating with the bed, devices intermediate the cam and the form-rollers and adapted when operated by the cam to raise the form-rollers away from the path of the form and maintain them in raised position, and manually-operated means whereby said devices are rendered operative, substantially as described.

6. In a printing-press, the combination of a form-cylinder, the form-inking rollers, the geared distributer-rollers, a movable frame carrying the form-rollers and distributer-rollers, the driving-gear, a spider or frame movable circumferentially with relation to the driving-gear, intermediate gears journaled upon the spider and meshing with the driving-gear and distributer-roller gears, and means for simultaneously moving the ink-roller-supporting frame and gear-supporting spider or frame, substantially as set forth.

7. In a printing-press, the combination of a form-cylinder, with a movable stand or frame, the inking-rollers carried in said stand or frame, a longitudinally-movable cam-bar engaging said stand or frame, an operating-cam, suitable operating connections between the cam and cam-bar whereby the stand or frame may be raised or lowered and maintained in raised or lowered position, and manually-operated controlling means for throwing said operating connections into action, substantially as set forth.

8. In a printing-press, the combination of a form-cylinder, with a vertically-movable stand or frame, the inking-rollers carried in said stand or frame, a rock-arm engaging the stand or frame for moving it vertically, a cam on the form-cylinder, suitable operating connections between said cam and the rock-arm adapted to cause the rock-arm to raise or lower the stand or frame and maintain it in raised or lowered position, and manually-operated controlling means for throwing said operating connections into action, substantially as set forth.

9. In a printing-press, the combination of a form-cylinder, with a movable stand or frame, the inking-rollers carried in the stand or frame, a rock-arm journaled upon the printing-press frame and engaging the movable stand or frame, means for operating said rock-arm adapted to move it into raised or lowered position and maintain it in either position, a longitudinally-movable cam-bar engaging the movable stand or frame, suitable operating connections between the rock-arm and said cam-bar, and manually-operated controlling means adapted to throw said operating means into action, substantially as and for the purpose set forth.

10. In a printing-press, the combination of a form-cylinder, a vertically-movable stand or frame, the inking-rollers carried in said stand or frame, a rock-arm engaging the stand or frame for moving it vertically, a longitudinally-movable cam-bar also engaging the stand or frame, operating connection between the cam-bar and rock-arm, a pair of toggle links or levers engaging the rock-arm, an operating-cam, and suitable operating connections between said cam and the toggle links or levers, substantially as and for the purpose set forth.

11. In a printing-press, the combination of a form-cylinder, with a stand or frame movable with relation to the cylinder, form-inking rollers carried upon said stand or frame, a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, and an operating arm or lever engaging the oppositely-extending slots of said reciprocating link and operatively connected with said stand or frame, substantially as set forth.

12. In a printing-press, the combination of a form-cylinder, with a stand or frame movable with relation to the cylinder, form-inking rollers carried upon said stand or frame, a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, an operating arm or lever engaging the oppositely-extending slots of said reciprocating link and operatively connected with said stand or frame, and means for shifting the slotted link with relation to said operating-arm to throw one of the engaging shoulders into engagement with the operating-arm for moving the stand, or frame, substantially as set forth.

13. In a printing-press, the combination of a movable part of the press, with an operating mechanism comprising an operating-arm suitably connected with the movable part of the press, and a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, said operating-arm working in said connected slots, substantially as and for the purpose set forth.

14. In a printing-press, the combination of a movable part of the press, with an operating mechanism comprising a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, an operating arm or lever suitably connected with the movable part of the press and engaging the oppositely-extending slots of said reciprocating link, and controlling mechanism adapted to shift the link with relation to the operating-arm to throw one of the engaging shoulders into engagement with the operating-link for moving the movable part of the press, substantially as and for the purpose set forth.

15. In a printing-press, the combination of a movable part of the press, with a reciprocating link formed with oppositely-extending

connected slots having upwardly and downwardly engaging shoulders, an operating arm or lever engaging the oppositely-extending slots of said reciprocating link and operatively connected with said movable part of the press, oppositely-operating spring devices engaging said slotted link, one of said spring devices being stronger than the other, and means for compressing the spring of said other spring device against said reciprocating link to shift the link and throw one of the engaging shoulders into engagement with the operating-arm, substantially as and for the purpose set forth.

16. In a printing-press, the combination of a form-cylinder, with a stand or frame movable with relation to the cylinder, form-inking rollers carried upon said stand or frame, a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, an operating arm or lever engaging the oppositely-extending slots of said reciprocating link and operatively connected with said stand or frame, oppositely-operating differential spring devices engaging said reciprocating link, and means for compressing the spring of the weaker spring device against said reciprocating link to shift the link and throw one of the engaging shoulders into engagement with the operating-arm for moving said stand or frame, substantially as set forth.

17. In a printing-press, the combination of a form-cylinder, with a suitable stand or frame movable with relation to the cylinder, form-inking rollers carried upon said stand or frame, a rock-arm engaging said stand or frame, a pair of toggle links or levers connected with said rock-arm, an operating-cam, a reciprocating link formed with oppositely-extending connected slots having upwardly and downwardly engaging shoulders, a toggle-operating arm engaging the oppositely-extending connected slots of said link, and means for operating said link from the cam, substantially as set forth.

18. In a printing-press, the combination of a form-cylinder, the impression-cylinder, the movable eccentric bushings in which the impression-cylinder is journaled, a pair of toggle links or levers connecting the movable eccentric bushings with a stationary part of the machine, an operating-cam, a reciprocating link formed with connected longitudinally-extending slots having upwardly and downwardly engaging shoulders, a toggle-operating arm engaging the slots of said link, and means for reciprocating said link from the operating-cam, substantially as set forth.

19. In a printing-press, the combination of a form and an impression cylinder, eccentric bushings in which the impression-cylinder is journaled, toggle-links connecting the eccentric bushings with a stationary part of the press-frame, a reciprocating slotted link having upwardly and downwardly engaging shoulders, a toggle-operating arm engaging said slotted link and means for shifting the slotted link forward or backward for straightening or breaking the toggles, substantially as set forth.

20. In a printing-press, the combination of the form and impression cylinders, the eccentric bushings in which the impression-cylinder is journaled, the toggle-links connecting the eccentric bushings with a stationary part of the press-frame, a reciprocating link adapted to break or straighten the toggles, a spring forcing said link in one direction, a spring-pressed rock-arm forcing said link in the opposite direction, and a manually-controlled device connected with said spring-pressed rock-arm for moving it out of engagement with the reciprocating link, substantially as set forth.

21. In a printing-press, the combination of the form and impression cylinders, means for throwing the impression-cylinder away from the form-cylinder, a belt-shifting device, a brake, and means for simultaneously throwing out the impression-cylinder and operating the belt-shifter and brake, substantially as set forth.

22. In a printing-press, the combination of the form-cylinder, and suitable inking devices, with the water-distributer roll, arms or levers journaled upon the axis of the water-distributer roll, water form-rollers journaled upon said arms or levers and supported in constant peripheral contact with the distributer-roll, and means for operating said arms or levers to move the water form-rollers circumferentially of the distributer-roll into and out of contact with the form-cylinder, substantially as set forth.

23. In a printing-press, the combination of the form-cylinder, the water-distributer roll, the water form-rollers, the shear-levers upon which the water form-rollers are journaled, toggle-links connecting the ends of the shear-levers, and means for straightening and breaking the toggle-links for moving the water form-rollers into and out of engagement with the form-cylinder, substantially as set forth.

24. In a printing-press, the combination of the form-cylinder, with the water form-rollers, the water-distributer drum journaled in fixed bearings, the oscillatory water ductor-roller, a rock-shaft supporting the ductor-roller, a water-fountain roller carrying a conoidal cam, and a rock-arm adjustably keyed to the ductor-roller-supporting rock-shaft and engaging said conoidal cam, substantially as set forth.

25. In a printing-press, the combination of the form-cylinder, the water form-rollers supported in oscillatory arms, a rock-arm adapted to oscillate said supporting-arm, a reciprocating link formed with an elongated slot having upwardly and downwardly engaging shoulders, a pin on said operating rock-arm engaging the slot of said reciprocating link, means for holding the pin in engagement with the upwardly and downwardly engaging

shoulders, of the slot, whereby the water form-rollers will be intermittently moved into and out of engagement with the form-cylinder, and means for disengaging the pin from said shoulders, substantially as and for the purpose set forth.

26. In a printing-press, the combination of the form-cylinder, the water form-rollers supported in oscillatory arms, a rock-arm adapted to oscillate said supporting-arm, a reciprocating link formed with an elongated slot having upwardly and downwardly engaging shoulders, a pin on said operating rock-arm engaging the slot of said reciprocating link, means for holding the pin in engagement with said shoulders of the slot, whereby the water form-rollers will be intermittently moved into and out of engagement with the form-cylinder, and means for supporting the water form-rollers out of engagement with the form-cylinder, substantially as set forth.

27. In a printing-press, the combination of the form-cylinder, the water form-rollers, the oscillatory arms upon which the water form-rollers are journaled, a rock-arm connected with said oscillatory arms, a reciprocating link formed with an elongated slot having upwardly and downwardly engaging shoulders, a pin upon the operating rock-arm engaging the shoulders of said slot, means for holding said pin in engagement with said shoulders, means for simultaneously moving the pin out of engagement with the shoulders and the water form-rollers into disengaged position, substantially as set forth.

28. In a printing-press, the combination of the form-cylinder, form-inking rollers adapted to be raised from contact with the form-cylinder, geared distributer-rollers upon the form-rollers, a driving-gear for said distributer-gears, a main gear, means for operating said driving-gear and the main gear, and a clutch adapted to key the main gear to the form-cylinder, whereby the form-cylinder may be stopped without interfering with the continuous rotation of the inking-rollers, substantially as set forth.

29. In a printing-press, the combination of the form-cylinder, with the water form-rollers, the oscillatory arms upon which the water form-rollers are carried, a rock-arm suitably connected with said oscillatory arms, a reciprocating slotted link engaging said rock-arm, and a pair of geared rock-shafts supporting rock-arms which are respectively adapted to disengage the reciprocating slotted link from the operating rock-arm, and support said rock-arm and the connected oscillatory arms in inoperative position, substantially as set forth.

30. In a printing-press, the combination of the form-cylinder, with the water form-rollers, the oscillatory arms upon which the water form-rollers are carried, a rock-arm suitably connected with said oscillatory arms, a reciprocating slotted link engaging said rock-arm, a pair of geared rock-shafts supporting rock-arms which are respectively adapted to disengage the reciprocating slotted link from the operating rock-arm and support said rock-arm and the connected oscillatory arms in inoperative position, means for continuously reciprocating said slotted link, and manually-operated controlling means for operating said geared rock-shafts, substantially as set forth.

JOHN BROOKS.
WINFIELD S. HUSON.

Witnesses to signature of John Brooks:
ARTHUR P. KNIGHT,
M. V. BIDGOOD.

Witnesses to signature of Winfield S. Huson:
WM. E. KNIGHT,
M. V. BIDGOOD.