

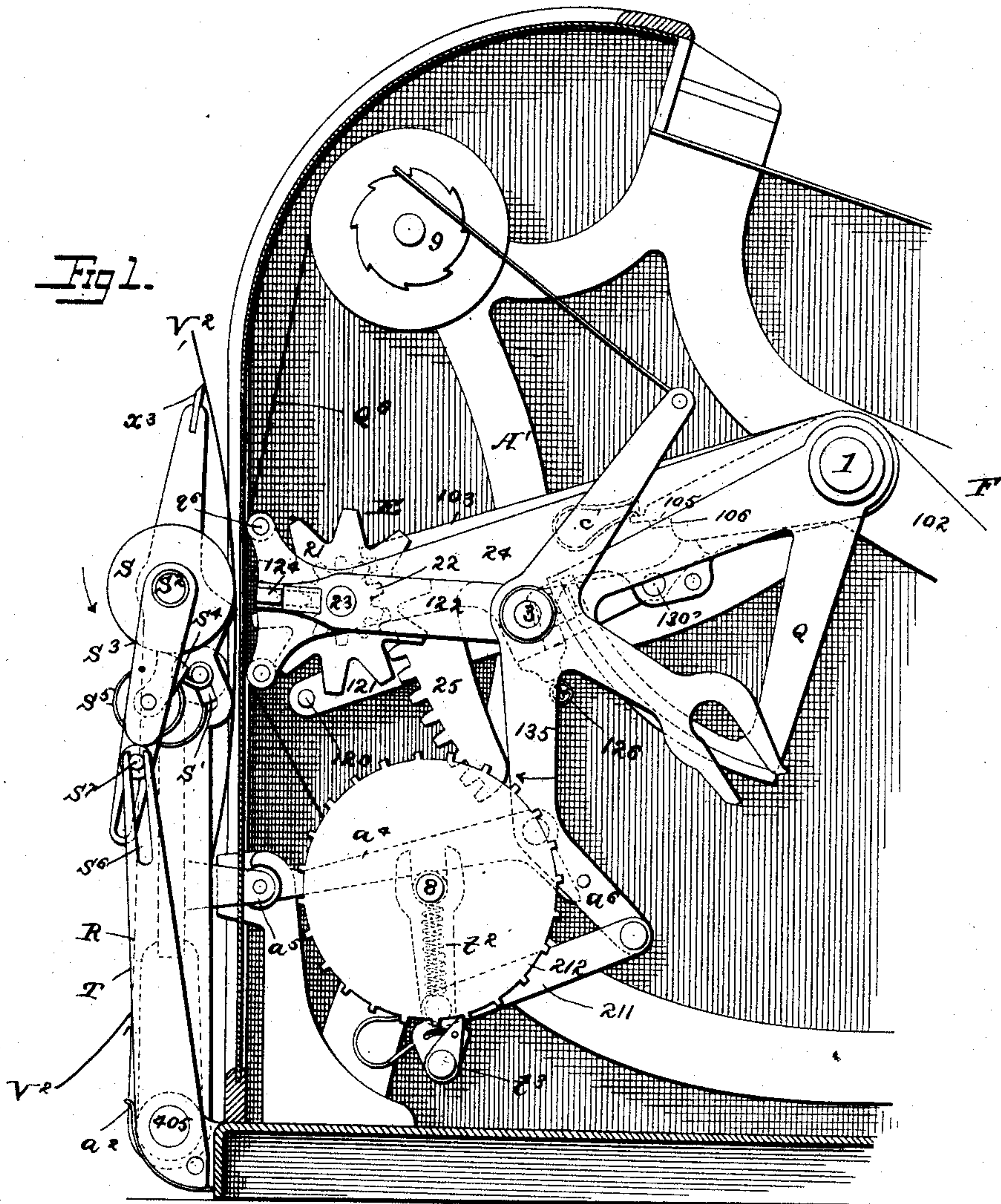
(No Model.)

3 Sheets—Sheet 1.

W. S. BURROUGHS.
PRINTING RECORDER.

No. 420,619.

Patented Feb. 4, 1890.



Witnesses
John Hinkel, Jr.
E. L. Johnson

Inventor
W. S. Burroughs
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Attorneys

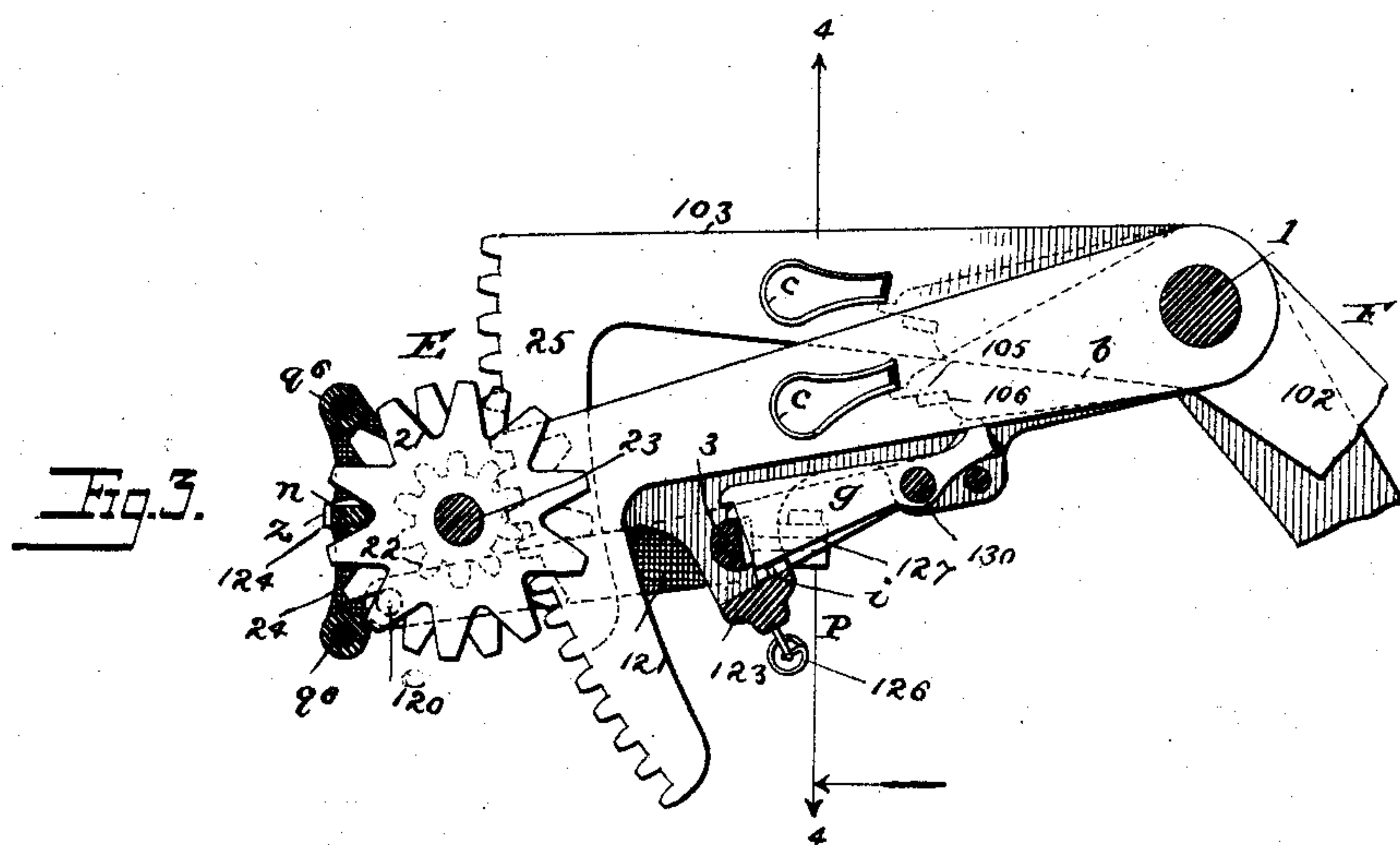
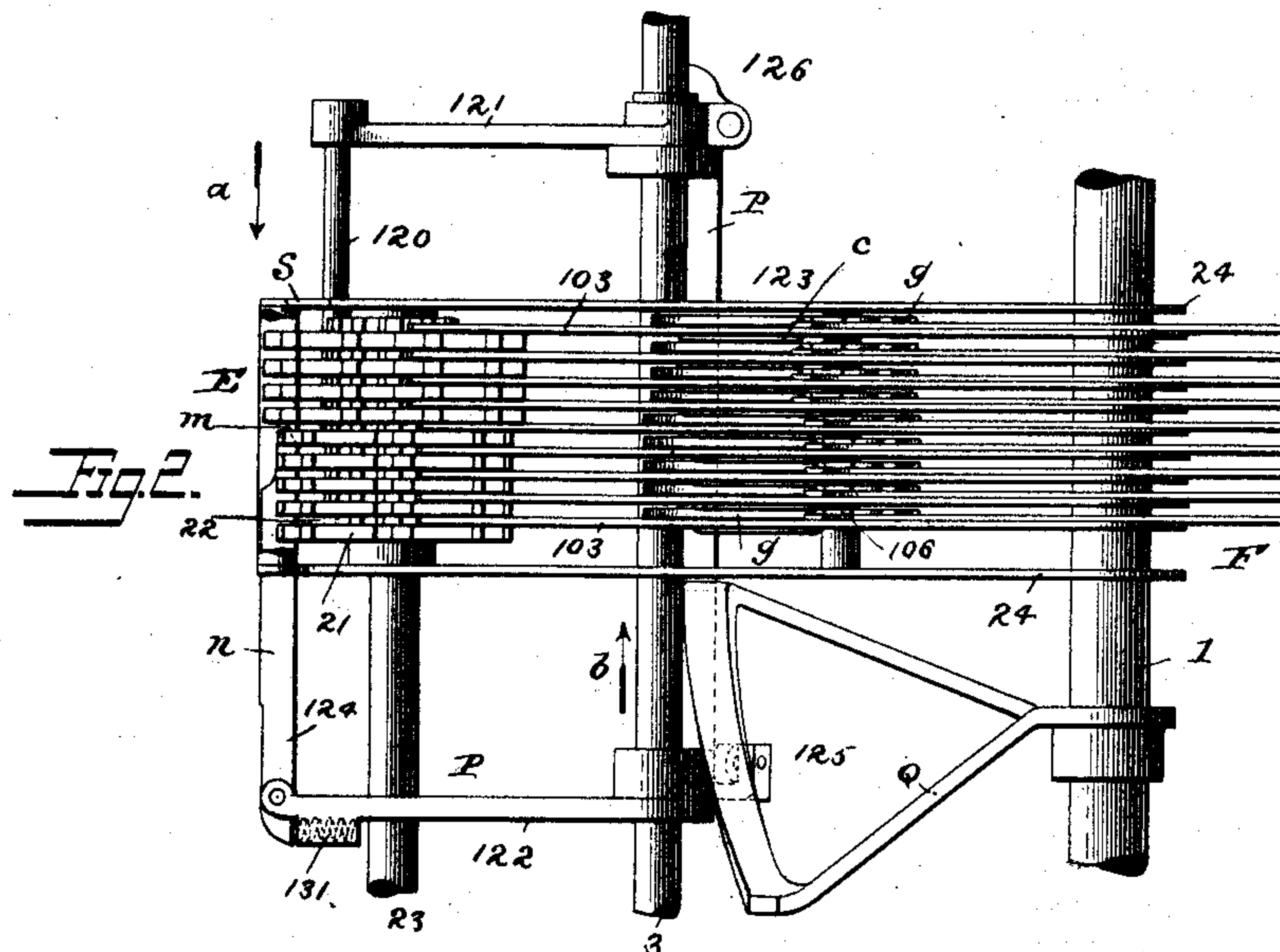
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3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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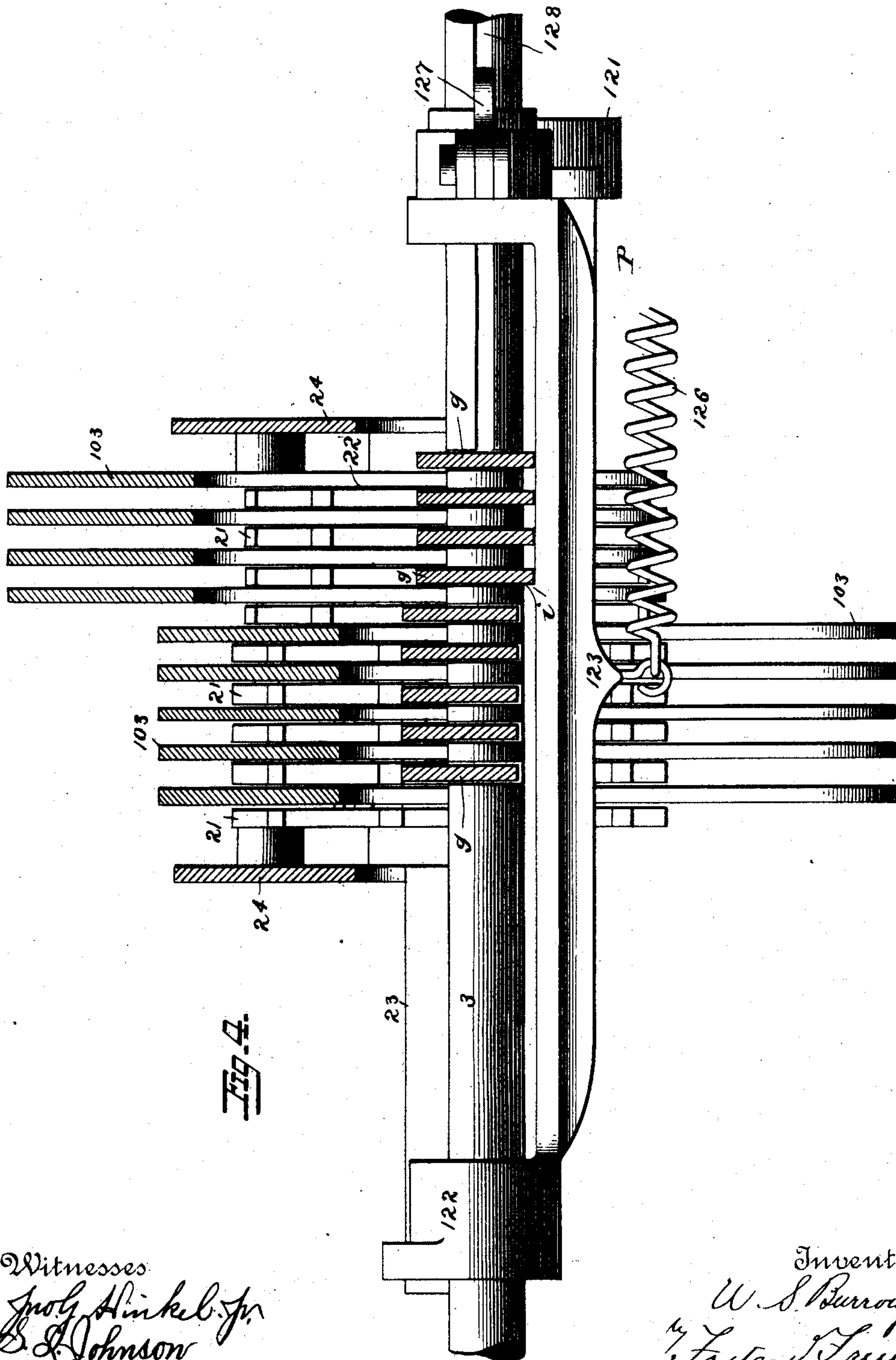


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM S. BURROUGHS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE
AMERICAN ARITHMOMETER COMPANY, OF SAME PLACE.

PRINTING-RECORDER.

SPECIFICATION forming part of Letters Patent No. 420,619, dated February 4, 1890.

Application filed July 13, 1888. Serial No. 279,800. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. BURROUGHS, a citizen of the United States, and a resident of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Printing-Recorders, of which the following is a specification.

My invention relates to that class of recorders in which a series of printing-wheels having peripheral type is turned to present said type in line to print numbers therefrom; and my invention consists in the combination of such a series of type-wheels and devices, fully set forth hereinafter, for insuring the printing-contact with the paper of such wheels only as contain figures to be printed, for printing cross-lines upon the paper, and for operating the platen and feeding the paper.

In the accompanying drawings, Figure 1 is an elevation showing part of a mechanical calculator and illustrating a printing-recorder combined therewith and embodying my improvements. Fig. 2 is a plan of the said devices. Fig. 3 is a sectional elevation showing the recorder and connected parts. Fig. 4 is a transverse section on the line 4 4, Fig. 3.

The recorder E consists of a series of independent numbered type-wheels having recesses or notches between the numbered portions and each turning upon a shaft 23, supported by the frame of the machine and actuated by a lever 103, carrying a rack 25, which gears with a pinion 22 at the side of the wheel. The movements of the rack-levers are controlled by operating series of keys in a manner which need not be here described, as it constitutes no essential part of this invention, and as it is fully set forth in my Letters Patent for a mechanical accountant, No. 388,119, dated August 21, 1888.

In many recorders for printing numbers from movable type-wheels it is common to bring all the wheels to a printing position with the cipher-mark in line with the other numbers on those wheels of a higher order than are needed to express the said number. Thus if the number of the wheels is six and the number to be indicated six hundred and twenty-one, the printed matter will be 000621,

the preceding ciphers being unsightly and confusing. To avoid this result I combine with the wheels adjusting appliances whereby only the wheels from which figures are to be printed will occupy a printing position when the printing is to be effected, the other wheels being adjusted to bring blank spaces in alignment with the figures that are in printing position. This may be effected by setting all of the wheels into printing position by means of the wheel-actuating devices and then turning out of printing position the wheels of a higher order than are needed to express the number, or the parts may be so arranged as to set all the wheels out of printing position by the action of the wheel-actuating devices, and then turning into position only those wheels from which the printing is to be effected. The latter arrangement is embodied in the construction illustrated in the drawings, in which the wheel-actuating levers set each wheel with the number to be printed in a position adjacent to the printing-line, but not coinciding therewith.

The movement requisite to turn a wheel sufficiently to carry one number or type to the place occupied by the other number or type I term a "step," and the turning of the wheels back to a printing position requires a movement equal to one-half of the step movement, and this half-step movement is effected by the upward movement of a bar 120, carried by an arm 121, constituting part of a frame or carrier P, which slides on a shaft 3, the said frame consisting of said arm 121, a parallel arm 122, and connecting-bar 123. The frame P slides back and forth upon the shaft 3 under the action of a spring 126, Fig. 3, which carries it in one direction, and of a cam Q, Figs. 1 and 2, which bears upon an anti-friction roller 125 and moves the frame in the opposite direction, said cam Q being secured to a rock-shaft 1. The frame may be reciprocated in any other manner, the means above referred to being shown, as they constitute parts of the mechanical accountant to which I have already referred.

The shaft 3 turns in the arm 122 without rocking the latter; but the arm 121 has a swinging movement independent of the re-

maining portion of the frame imparted by rocking the shaft 3, and the rocking movement being transferred to the arm 121 by a rib 127, Fig. 4, which extends from the arm 121 into a longitudinal slot 128 in the shaft 3. This rocking of the shaft is imparted by hand or from any moving part of the machine with which the recording device is connected, and results in carrying the bar 120 into and out of contact with the adjacent wheels 21.

The sliding of the frame P after the adjustment of the recorder-wheels carries the bar 120 to a position adjacent to the wheels, and the number of wheels that are turned by the reciprocation of the bar depends upon the extent to which the bar is carried inward in the direction of the arrow *b*, Fig. 2. If, for instance, the frame is moved until the bar 120 occupies a position opposite four of the wheels, the reciprocation of the bar will then move these four wheels one-half a step, bringing their type into printing position, the remaining wheels being out of printing position. If the frame P is moved until the bar is opposite only one wheel, that alone will be turned a half a step, or the frame P may be arrested immediately after its movement begins, in which case all the wheels will be set in printing position by the movement of the bar.

It will be evident that different forms of carriers in the shape of frames or otherwise may be employed for carrying and reciprocating the bar.

It is desirable to automatically set the bar in lateral position, according to the number of wheels that are set or operated to record the desired number, and one means of effecting this in the construction of apparatus illustrated is by means of a series of pawls *g* and levers F, arms *b* of which extend over the pawls and between springs *c* and lugs 106, carried by the levers 103, so as to carry said levers 103 with them. Normally the long or heavy end of each pawl *g* is elevated so as to be out of the path of a lug or projection *i* upon the frame P, Figs. 3 and 4, and the said frame is normally in a position with the bar 120 opposite all of the printing-wheels, and its end is in line with said lug.

Upon operating the devices that actuate the wheels, the forward ends of the levers F drop and the rear ends of the arms *b* rise as they begin to move the rack-levers 103, and the initial movement of each arm *b* results in permitting the heavy end of the adjacent pawl to drop downward. After the desired number has been set up upon the recorder, the shaft *l* is rocked to permit the frame P to slide under the action of the spring 126, when it will move to the right, Fig. 4, until it strikes the first of the pawls *g* that is in its path. As only the pawls are dropped that are connected with such type-wheels as are operated to set up the numbers to be printed, and as such pawls determine the position of

the frame P and bar 120, the latter will occupy a position adjacent to only the printing-wheels that have been moved to record a number. I do not here claim a platen carried by a frame movable by a spring toward the type-wheels and thrown from the latter and released by reciprocating devices, as this is the subject of a claim in my application for a patent, Serial No. 278,907, filed July 3, 1888. After the parts have thus been set in position the shaft 3 is rocked by hand or otherwise, thereby bringing the bar 120 against the opposite type-wheels and moving them each one-half a step to bring their type into printing position. After the printing is effected the levers F are moved so that arms *b* are brought in contact with the pawls *g* and lift the latter, while the levers 103 are all carried downward to restore the recorder to zero, after which the frame P may be moved to its first position.

To the arm 122 of the frame P is pivoted a finger 124, the inner end of which is adjacent to that of the bar 120, but on a different horizontal plane, so that the said finger is carried longitudinally by the frame P through the notches of such of the wheels as are not to make a record, and said finger 124 is thrown normally inwardly by a spring 131. The said finger has a rib *n* at its outer edge, and has a beveled end *m*, which, when it contacts with a beveled shoulder *s* on any part of the frame, (as, for instance, one of two side plates 24,) will cause the finger to be thrown outward and bring the rib *n* into position to print a cross-line upon the paper, which receives the impression from the types just below the last number printed by said types.

The movable line-bar or finger may be supported by any movable carrier adapted to carry it back and forth in front of the wheels.

The ink-ribbon *Q*⁶ is carried by two spools on shafts 8 9 and across guide-rollers *q*⁶ *q*⁶ between the recorder and the platen, which, as shown in Fig. 1, is in the form of a roller S, and the strip of paper *V*² passes between the platen and the ribbon. In the construction shown the roller S is carried by a swinging frame R, which supports at the upper end a knife *x*³, against which the strip of paper may be drawn to tear off sections as required. The frame R is pivoted upon or carried by a shaft 405 in bearings in the frame of the machine. A spring *a*² bears against the frame and tends to throw it inward, and the outward movement of the frame is effected from the rocking of the shaft 3 through the medium of a pawl *a*⁴, hung to an arm 135, carried by the shaft 3, and socketed at the end to receive a roller *a*⁵, carried by the frame R. The arm 135 is provided with a pin *a*⁶ in position to strike the heel of the pawl *a*⁴, when the arm 135 moves in the direction of the arrow, Fig. 1, so that after the frame R has been thrown outward to a certain extent the outer end of the pawl *a*⁴ is raised from the roller *a*⁵, when the frame R will swing inward suddenly,

bringing the platen forcibly against the paper and the latter forcibly against the ribbon lying upon the type.

The strip of paper may be fed by carrying it between the roller S and an under roller S', and by imparting a feeding movement to one of the rollers. Thus an arm s^3 swings upon the shaft s^2 of the roller S and carries a pawl s^4 , thrown by a spring s^5 against the edge of the roller S, so as to bite thereon, when the arm s^3 swings in the direction of the arrow, Fig. 1.

The swinging movement of the arm is effected after each printing action by any suitable actuating devices. For instance, a stationary slotted arm T is arranged in position for its slot s^6 to receive a stud s^7 , extending from the arm s^3 . When the frame R moves outward, the arm s^3 will swing in the direction of its arrow, and the pawl s^4 will bear on and turn the roller S and feed the paper. When the frame R swings inward, the arm s^3 will swing outward, and the pawl s^4 will slide over the periphery of the roller S without moving the latter.

The movement of the ribbon is effected by each movement of the arm 135, to which is connected a link 211, connected with an arm t^2 , that vibrates upon the shaft 8, and which carries a pawl t^3 , that engages with the teeth of a disk 212, carried by the shaft 8.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with the printing-wheels of a recorder, each having a series of peripheral type and intervening notches, of a reciprocating bar and a vertically and longitudinally moving carrier therefor, whereby said bar may be brought oppositely to one or more of the wheels and vibrated to turn said wheels, substantially as set forth.

2. The combination, with a series of independent recording-wheels and actuating devices by which the wheels are turned to set their type out of printing position, of a bar sup-

ported by a carrier in a position adjacent to the wheels and devices for sliding and vibrating the carrier and the bar to turn the wheels to printing position, substantially as set forth.

3. The combination, with the wheels of a printing-recorder and with a platen, of a sliding and reciprocating bar and carrier therefor, all arranged to insure the contact of said bar with one or more of the printing-wheels to permit only those that are to print to occupy a printing position, substantially as set forth.

4. The combination, with the independently-movable printing-wheels of a recorder and wheel-actuating devices, of appliances for turning the wheels to bring into printing-line only those which are to print, substantially as set forth.

5. The combination, with the printing-wheels, actuating devices, bar 120, and frame carrying said bar and provided with a lug i , of a series of pawls arranged to contact with the wheel-actuating devices and to move into and out of the path of the lug, substantially as set forth.

6. The combination, with the series of printing-wheels of a recorder, of a line-printing finger 124, substantially as set forth.

7. The combination, with the printing-wheels of a recorder, of a carrier, a line-finger supported thereby, and devices for moving the carrier and the line-finger, substantially as set forth.

8. The combination, with the swinging frame R, rollers S S', and arm s^3 , carrying a pawl s^4 , of a stationary arm T, having a slot, and a stud upon the arm s^3 , extending into said slot, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. BURROUGHS.

Witnesses:

EMIL WENGER,
JAMES WEST.