(No Model.) 4 Sheets—Sheet 1.

A. SEDGWICK.

RULING MACHINE.

No. 387,111. Patented July 31, 1888.

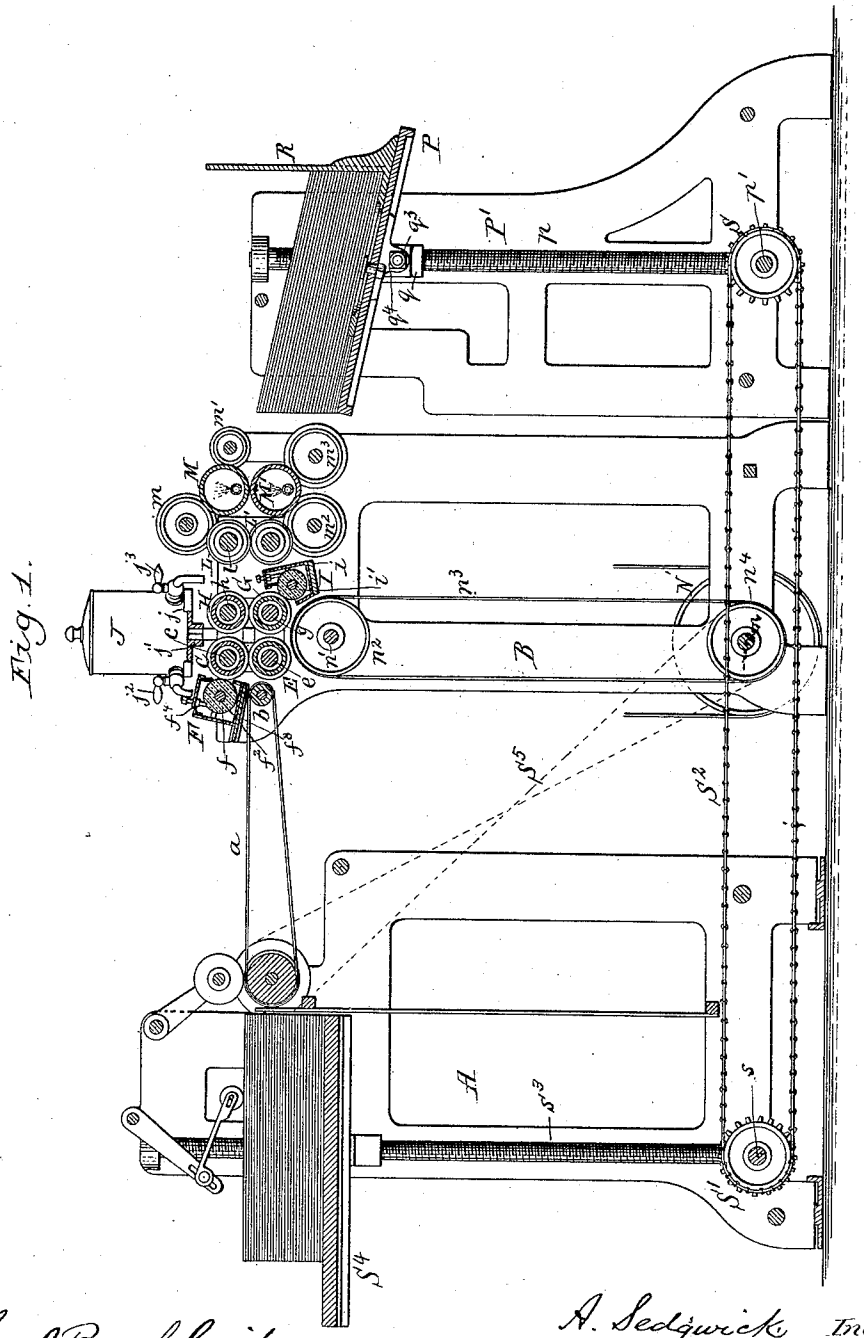

Fig. 1.

Witnesses.
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By Wilhelm & Bonner
Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

A. SEDGWICK.

RULING MACHINE.

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Fig. 2.

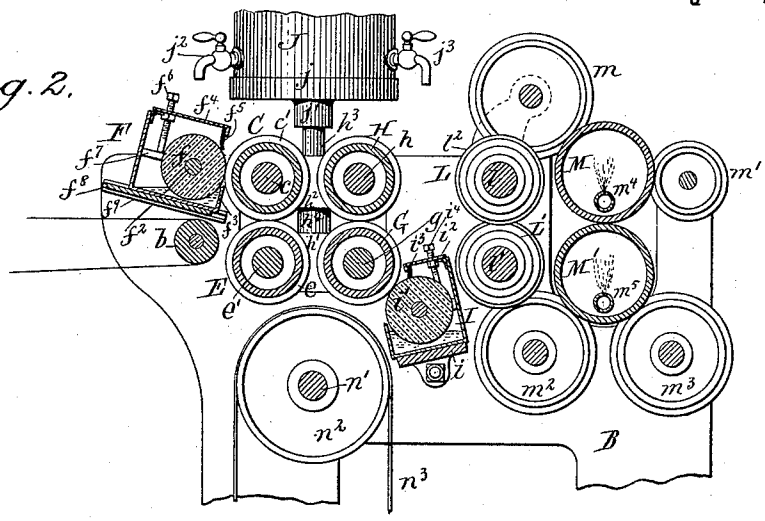
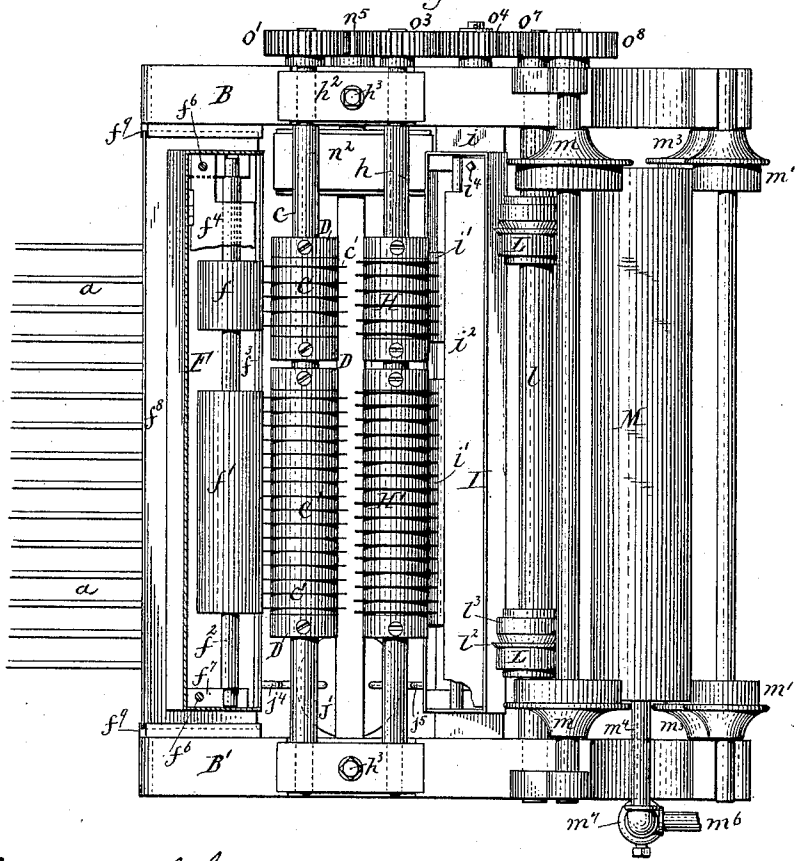


Fig. 3.



Chas. J. Buchheit. Witnesses.
Theodore L. Popp.

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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 3.

A. SEDGWICK.

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Fig. 4.

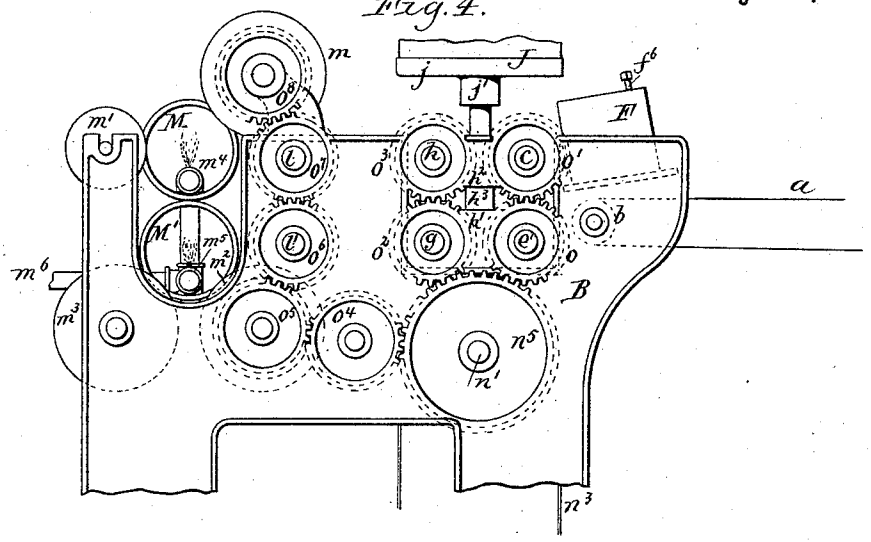


Fig. 5.

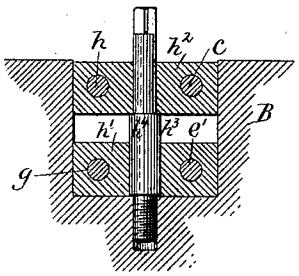


Fig. 6.

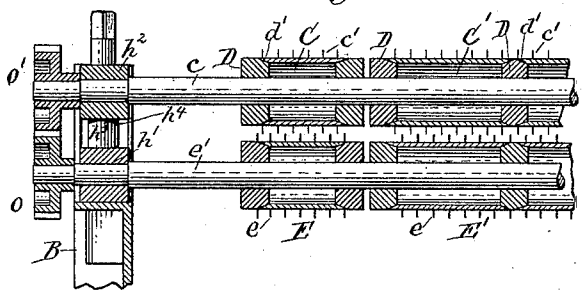


Fig. 7.

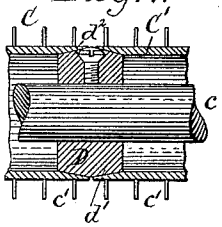


Fig. 8.

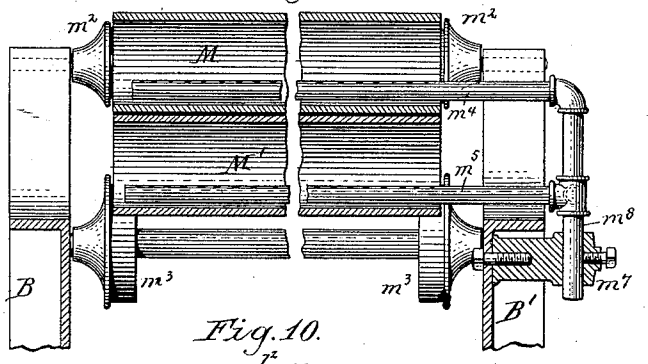


Fig. 9.

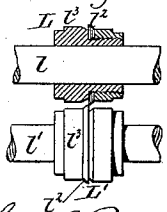
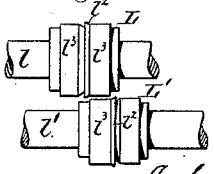


Fig. 10.



Witnesses.
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(No Model.)

4 Sheets—Sheet 4.

A. SEDGWICK.

RULING MACHINE.

No. 387,111. Patented July 31, 1888.

Fig. 11.

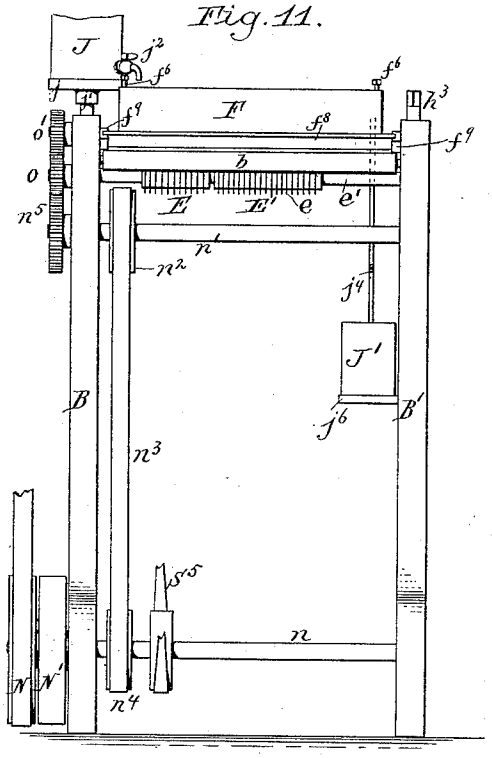


Fig. 12.

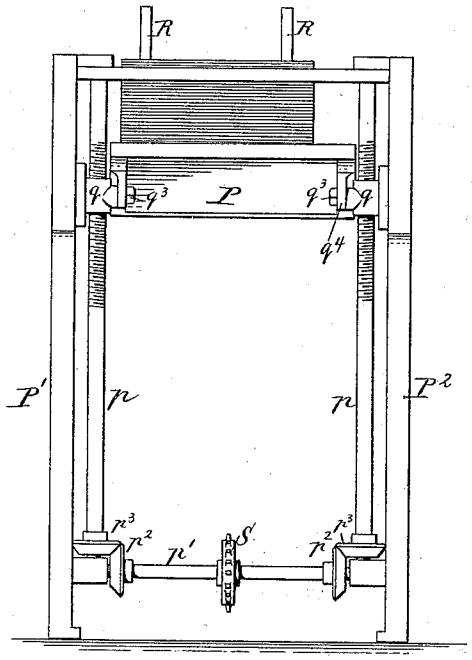


Fig. 13.

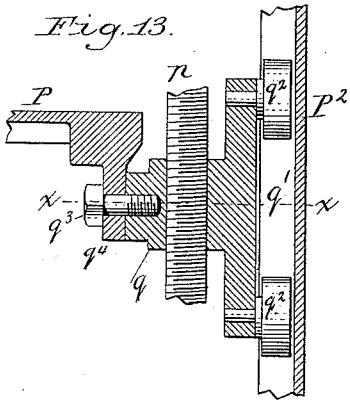
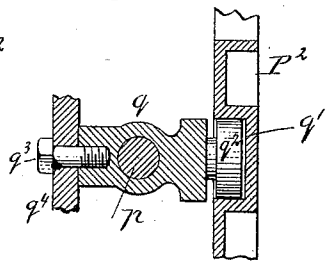


Fig. 14.



Witnesses.
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Theodore L. Popp.

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By Wilhelm Bonner
Attorneys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ALONZO SEDGWICK, OF POUGHKEEPSIE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO D. H. BURRELL & CO., OF LITTLE FALLS, NEW YORK.

RULING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,111, dated July 31, 1888.

Application filed October 18, 1886. Serial No. 216,476. (No model.)

To all whom it may concern:

Be it known that I, ALONZO SEDGWICK, of the city of Poughkeepsie, in the county of Dutchess and State of New York, have invented new and useful Improvements in Ruling-Machines, of which the following is a specification.

This invention relates to a ruling-machine in which the ruling is effected by revolving disks, and has for its object to produce a machine in which the ruling-disks are easily adjusted to the requirements of the work which is desired to be produced, and by which the operations of ruling and moving the paper are effected more conveniently and with greater accuracy than heretofore.

My invention consists of the improvements which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, consisting of four sheets, Figure 1 is a longitudinal sectional elevation of my improved ruling-machine in connection with a paper-feeder and receiving-table. Fig. 2 is a longitudinal sectional elevation of the ruling-machine on an enlarged scale. Fig. 3 is a top plan view of the same with the upper ink-fountain in section. Fig. 4 is an elevation of the driving side of the ruling-machine. Fig. 5 is a sectional elevation of the bearings in which the ruling-cylinders are journaled. Fig. 6 is a fragmentary cross-section of the machine taken through the ruling-cylinders. Fig. 7 is a sectional view of the adjacent ends of two ruling-cylinders. Fig. 8 is a cross-section of the machine, taken through the drying-cylinders. Fig. 9 is a sectional elevation of the combined feed-rollers and cutters adjusted for cutting and feeding. Fig. 10 is an elevation of the same parts adjusted for feeding only. Fig. 11 is a front elevation of the ruling-machine. Fig. 12 is a front elevation of the receiving-table. Fig. 13 is a fragmentary vertical cross-section of the receiving-table on an enlarged scale. Fig. 14 is a horizontal section in line *x x*, Fig. 13.

Like letters of reference refer to like parts in the several figures.

A represents an automatic paper-feeder of any suitable construction, whereby the sheets of paper are successively delivered from a pile to the carrying-tapes *a*, which convey the sheets to the ruling-machine. A machine suitable for this purpose is described and shown in Letters Patent of the United States, No. 336,070, dated February 9, 1886.

B B′ represent the side frames of the ruling-machine, rigidly connected by suitable cross-stays.

b represents the tape-roller around which the feed-tapes *a* run in the ruling-machine.

C C′ represent the upper ruling-cylinders, mounted side by side upon a horizontal transverse shaft, *c*, arranged near the feed end of the ruling-machine, above the level on which the sheets are fed into the machine, so as to rule the upper side of the paper. Each ruling-cylinder is provided with a suitable number of projecting rings, *c′*, secured side by side upon the cylinder and adapted to receive the ink upon their edges and deliver it in parallel lines upon the paper which is brought in contact therewith. The rings *c′* are arranged upon the cylinder in accordance with the style of ruling which is desired to be produced, different cylinders being used for different styles. The cylinders are removably secured to their shaft by means of collars D, which are adjustably secured to the shaft by set-screws, as represented in Fig. 7, or other suitable means. The collars D are constructed with beveled or tapering ends *d′*, which fit into the flaring end portions, d^2, of the bore of each cylinder, whereby a snug fit of the collars against the cylinder is secured, which latter are firmly clamped and centered between the two collars applied to opposite ends of the same cylinder, as represented in Fig. 6. When two ruling-cylinders are arranged closely together upon the same shaft, their adjacent ends may be secured by a single collar provided with tapering ends *d′* at opposite sides, as represented in Fig. 7. Upon releasing the collars D the latter and the ruling-cylinders can be removed from the shaft upon which they are mounted, and can be replaced by different cylinders when necessary in order to produce ruling of a different style. In the drawings two cylinders, C C′, are shown side by side upon the same shaft; but a single cylinder will be sufficient in many cases, and in other cases more

than two cylinders may be required in order to produce the desired style of ruling.

E E′ represent the carrying-cylinders by which the paper is supported below the ruling-cylinders C C′. These cylinders correspond in length and arrangement with the ruling-cylinders and are provided with rings *e*, having somewhat blunter edges than the ruling-rings *c′*, for supporting the paper. The rings *e* of the carrying-cylinders are arranged opposite the spaces between the ruling-rings *c′*, so as not to coincide with the ruling-rings, as represented in Fig. 6.

e′ represents the transverse shaft upon which the carrying-cylinders E E′ are mounted and which is arranged below the shaft *c*. The ruling and carrying cylinders are made of light tubing of considerably larger inside diameter than their supporting-shafts and are centered on the shafts by the collars D, whereby light and true cylinders are produced at comparatively small expense.

F represents the upper ink-fountain, from which ink is supplied to the upper ruling-cylinders. This fountain is arranged transversely between the side frames B B′ in front of the ruling-cylinders, and is provided with one or more ink-rollers by which the ink is conveyed from the fountain to the edges of the ruling-rings *c′*. As shown in Fig. 3, two ink-rollers, *f f′*, are arranged upon the same shaft f^2 and bear against the ruling-cylinders C C′. The ink-rollers are preferably made of rubber and slipped upon the shaft f^2, so that the rollers can be readily applied to and removed from the shaft when required to be exchanged. The rear wall, f^3, of the ink-fountain is made so low that the ink-roller can come in contact with the ruling-cylinder. The ink-fountain is provided with a cover, f^4, which is hinged at its front end to the front wall of the fountain and provided at its rear edge with a flexible wiper, f^5, which rests upon the ink-roller and removes any excessive quantity of ink which may adhere to the same. The wiper f^5 is adjusted toward and from the ink-roller by set-screws f^6, which pass through the cover f^4 and rest upon the bearings f^7 of the ink-roller, as represented in Figs. 2 and 3. The ink-fountain F rests upon a rearwardly-inclined plate, f^8, which is supported in inclined ways f^9, formed on the inner sides of the side frames B B′. This inclined position of the ink-fountain causes the ink to accumulate under the ink-roller and causes the latter to hug the ruling-cylinder.

It is obvious that lines may be dropped by arranging the ink-rollers in such manner on their shafts that no ink is supplied to the ruling-rings which are not desired to produce an impression.

G G′ represent the lower ruling-cylinders arranged immediately in rear of the lower carrying-cylinders E E′, so as to rule the lower side of the paper.

H H′ represent the upper carrying-cylinders arranged above the lower ruling-cylinders, G G′, and in rear of the upper ruling-cylinders, C C′. The lower ruling-cylinders are constructed like the upper ruling-cylinders, C C′, and are adjustably mounted upon a shaft, *g*. The upper carrying-cylinders, H H′, are constructed like the lower carrying-cylinders, E E′, and are adjustably mounted upon a shaft, *h*. The shafts *e′ g* of the lower carrying-cylinders and lower ruling-cylinders are both journaled with their adjacent ends in the same box *h′*, which rests in a recess formed in the side frame of the machine. The adjacent ends of the upper shafts, *c h*, are journaled in a box, h^2, arranged above the box *h′*, as represented in Fig. 5. The box h^2 is supported by a vertical bolt, h^3, which passes loosely through the lower box, *h′*, and screws with its lower end into the side frame. The bolt h^3 is provided with a shoulder, h^4, upon which the upper box rests, so that by turning the bolt h^3 the upper box is raised and lowered, thereby adjusting the upper ruling and carrying cylinders simultaneously toward and from the lower carrying and ruling cylinders.

By lifting the upper boxes, h^2, from the bolts h^3 the upper ruling and carrying cylinders are removed from the machine when it is necessary to exchange cylinders. After the upper boxes have been removed the lower boxes, *h′*, can be lifted from the bolts h^3, thereby removing the lower cylinders also.

I represents the lower ink-fountain, which supplies ink to the lower ruling-cylinders, G G′, and which is arranged in rear of the same. The fountain I is supported in a forwardly-inclined position upon a transverse brace, *i*, which is secured to the side frames B B′. The fountain I is provided with ink-rollers *i′* and a hinged cover, i^2, carrying a wiper, i^3, which is made adjustable by set-screws i^4.

All of these parts are constructed like the corresponding parts of the upper fountain, F.

J represents the ink-reservoir, supported upon the side frame B between the upper shafts, *c* and *h*, preferably upon a plate, *j*, having in its under side a socket, *j′*, which fits over the upper end of the bolt h^3, as represented in Figs. 2 and 11. The reservoir J is provided with two discharge-cocks, $j^2 j^3$, which deliver the ink into the adjacent ends of the ink-fountains F and I. The latter are provided at their opposite ends with overflow-pipes $j^4 j^5$, through which the excess of ink escapes into a receptacle, J′, which is supported on a plate, j^6, secured to the inner side of the side frame B′.

L L′ represent feed-rollers, which are arranged in rear of the ruling-cylinders and mounted upon horizontal shafts *l l′*, arranged, respectively, above and below the plane in which the paper moves through the machine. Each roller is provided with a circular cutter, l^2, and cylindrical feeding-faces l^3 on opposite sides of the cutter. When the upper and lower rollers, L L′, are so adjusted on their respective shafts that their cutters l^2 coincide, as represented in Fig. 9, the rollers feed the

paper forward and cut it at the same time. When the rollers are so arranged on their shafts that the cutters are out of register, as represented in Fig. 10, the rollers operate simply as feed-rollers. The rollers L L′ are secured to their shafts by set-screws or other suitable means, so as to be lengthwise adjustable thereon, thereby enabling the operator to merely feed the paper through or trim the edges and cut it lengthwise, as may be desired.

M M′ represent the drying-rollers arranged in rear of the feed-rollers L L′, so that the ruled paper is fed between the rollers M M′ and is dried by contact with the same. The rollers M M′ are hollow cylinders, which run loosely between flanged supporting-rollers m m' m^2 m^3. The lower roller, M′, rests upon the rollers m^2 m^3, and is held against longitudinal displacement by the flanges on said rollers, as represented in Figs. 2 and 3. The upper roller, M, rests upon the lower roller, M′, and is held against displacement by the upper flanged rollers, m m'. The rollers m and m^2, on the front side of the drying-rollers M M′, are driving-rollers which impart motion to the drying-rollers, while the rollers m' m^3 on the rear side of the drying-rollers, are loose guide-rollers. The drying-rollers M M′ are heated by gas-jets issuing from horizontal perforated pipes m^4 m^5, arranged within the drying-rollers and receiving the gas from a supply-pipe, m^6. The gas-pipes m^4 m^5 are supported on one end by a bracket, m^7, secured to the side frame B′, as represented in Fig. 8, and receiving a stem, m^8, extending below the supply-pipe m^6. The two drying-rollers M M′ operate upon both sides of the paper equally and prevent the curling of the paper which occurs when a single drying-roller is employed.

n represents the horizontal driving-shaft, journaled in the lower portions of the side frames B B′, and provided at its outer end with tight and loose pulleys N N′, as represented in Figs. 1 and 11.

n' is a counter-shaft journaled in the side frames below the ruling-cylinders and provided with a pulley, n^2, which receives power by a belt, n^3, from a pulley, n^4, on the driving-shaft n.

n^5 is a gear wheel secured to the counter-shaft n' on the outer side of the side frame B.

o o' o^2 o^3 represent gear-wheels secured to the shafts of the ruling and carrying cylinders and receiving motion from the gear n^5, as represented in Fig. 4.

o^4, o^5, o^6, o^7, and o^8 are gear-wheels whereby motion is transmitted to the feed-rollers L L′ and driving-rollers m m^2 from the gear-wheel n^5. The gear-wheels o^6 and o^7 are mounted upon the shafts of the feed-rollers L L′. The gear-wheels o^5 and o^8 are mounted upon the shafts of the driving-rollers m m^2, and the gear-wheel o^4 is an idler which connects the wheel n^5 with the wheel o^5.

P represents the movable receiving-table, which receives the sheets delivered from the ruling-machine upon which the sheets are piled up. The table P is arranged between side frames P′ P², and descends as the height of the pile of paper increases, thereby maintaining the top of the pile at the same relative position with reference to the delivery devices of the ruling-machine.

p p represent two vertical feed-screws by which the table P is moved, and which are journaled in bearings attached to the inner side of the side frames P′ P². The feed-screws are driven from a horizontal shaft, p', by bevel-wheels p^2 p^3, one of the screws being a right-hand screw and the other a left-hand screw.

q represents the screw-nuts in which the feed-screws p work, and which are raised and lowered by the same. The nuts q are guided in vertical grooves q' formed in the side frames, and are provided with anti-friction rollers q^2, which run in said grooves. The screw-nuts q are attached to opposite ends of the table P by horizontal pivots q^3, which pass through arms q^4, formed on the under side of the table, and on which the table can be tilted or inclined, as may be necessary in order to place it in the most desirable position for receiving the paper.

It is obvious that the delivery-table may be employed in connection with carrying-tapes, instead of receiving the paper from the drying-rollers M M′.

R represents standards placed on the table P for supporting the pile.

S represents a sprocket-wheel secured to the shaft p', and S′ is a similar wheel secured to the horizontal feed-shaft s of the paper-feeder A, as represented in Fig. 1.

S² is an endless chain which runs around the wheels S S′ and whereby the horizontal shafts of the feeder and receiver are geared together, so as to rotate in unison. The threads on the feed-screws p of the receiving-table are arranged in an inverse order to those of the feed-screws S³ of the paper-feeder, whereby the table P is caused to descend in the same measure as the table S⁴ of the feeder rises.

The upright feed-screws S³ of the paper-feeder are connected with the table S⁴ and the horizontal shaft s, as represented in the Letters Patent No. 336,070, hereinbefore referred to, or in any other suitable manner.

S⁵ represents an endless belt whereby the paper-feeder is driven from the driving-shaft n of the ruling-machine.

In my improved ruling-machine the appliances by which the lines are formed are easily adapted to the work in hand. The ruling-rings can be made very thin and produce finer lines than ordinary pens without danger of becoming obstructed or bent. The ruling appliances whereby the paper is ruled on both sides are arranged closely together, thereby preventing the paper from shifting or traveling out of its proper course between said appliances, and insuring an exact register of the ruling on both sides of the paper.

I claim as my invention—

1. In a ruling-machine, the combination, with a supporting-shaft, of a hollow ruling-cylinder and supporting-collars adjustably secured to said shaft, substantially as set forth.

2. The combination, with a supporting-shaft, of collars secured to said shaft and provided with tapering ends, and a hollow ruling-cylinder provided with flaring ends which rest against the tapering ends of said collars, substantially as set forth.

3. The combination, with the ruling-cylinder, of an ink-fountain, a shaft journaled in said ink-fountain, and an ink-roller made lengthwise adjustable upon said shaft, substantially as set forth.

4. The combination, with a ruling-cylinder, of an ink-fountain provided with an ink-roller bearing against the ruling-cylinder, an ink-reservoir supplying ink to the fountain, an overflow-pipe attached to the fountain, and a receiver into which the excess of ink is discharged through the overflow-pipe, substantially as set forth.

5. The combination, with the ruling and supporting rollers and the drying-rollers, of combined feed-rollers and cutters arranged between the ruling-rollers and drying-rollers, substantially as set forth.

6. The combination, with the ruling and supporting cylinders and their shafts, of the lower boxes, h', in which the lower shafts are journaled, the upper boxes, h^2, in which the upper shafts are journaled, and the shouldered vertical adjusting-bolts h^3, upon which the upper boxes rest loosely, substantially as set forth.

7. The combination, with the delivery mechanism of a ruling-machine, of a receiving-table, feed screws whereby the table is raised and lowered, a stationary frame in which the feed-screws are supported, screw-nuts in which the feed-screws work, and horizontal pivots on which said table can be tilted, substantially as set forth.

8. The combination, with a ruling-machine, of a feed-table from which the sheets are fed to the ruling-machine, actuating mechanism by which the feed-table is raised as the sheets are fed off, a receiving-table upon which the sheets are delivered from the ruling mechanism, actuating mechanism by which the receiving-table is lowered as the sheets are received, and a positive gear connecting the actuating mechanism of the feed-table with the actuating mechanism of the receiving-table and whereby the receiving-table is lowered as the feed-table is raised, substantially as set forth.

9. The combination, with a ruling-machine, of a vertically-movable feed-table, S^4, a vertically-movable receiving-table, P, shafts p' and s, provided, respectively, with sprocket-wheels S and S′ and connected with the feed-table and receiving-table by screws, and a drive-chain, S^2, running around the sprocket-wheels S S′, whereby the feed and receiving tables are moved simultaneously in opposite directions, substantially as set forth.

Witness my hand this 14th day of October, 1886.

ALONZO SEDGWICK.

Witnesses:
J. S. VAN CLEEF,
C. W. H. ARNOLD.