(No Model.) 3 Sheets—Sheet 1.

J. McADAMS.

FEEDING APPARATUS FOR RULING AND PRINTING MACHINES.

No. 476,476. Patented June 7, 1892.

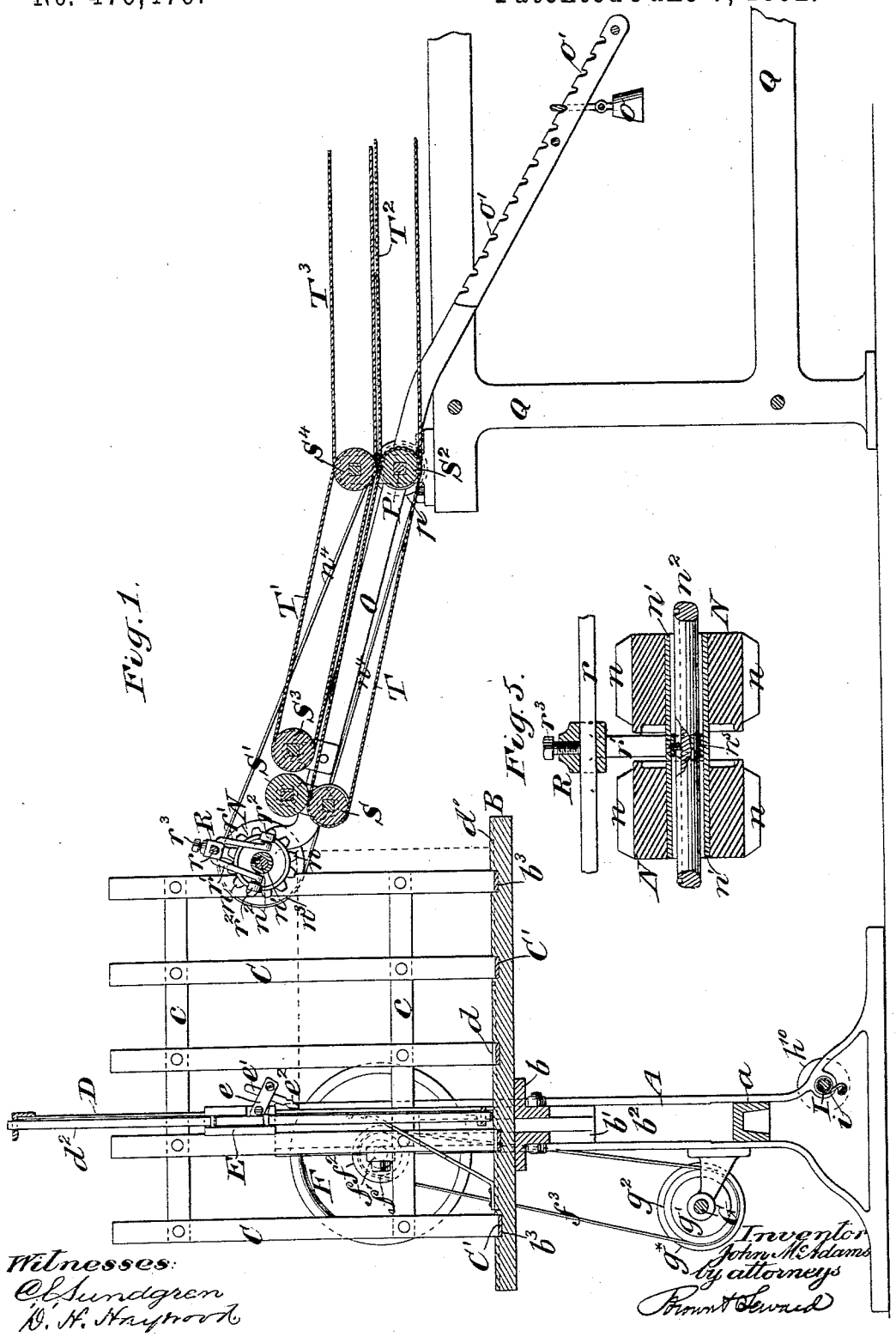

Fig. 1.

Fig. 5.

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(No Model.) 3 Sheets—Sheet 2.

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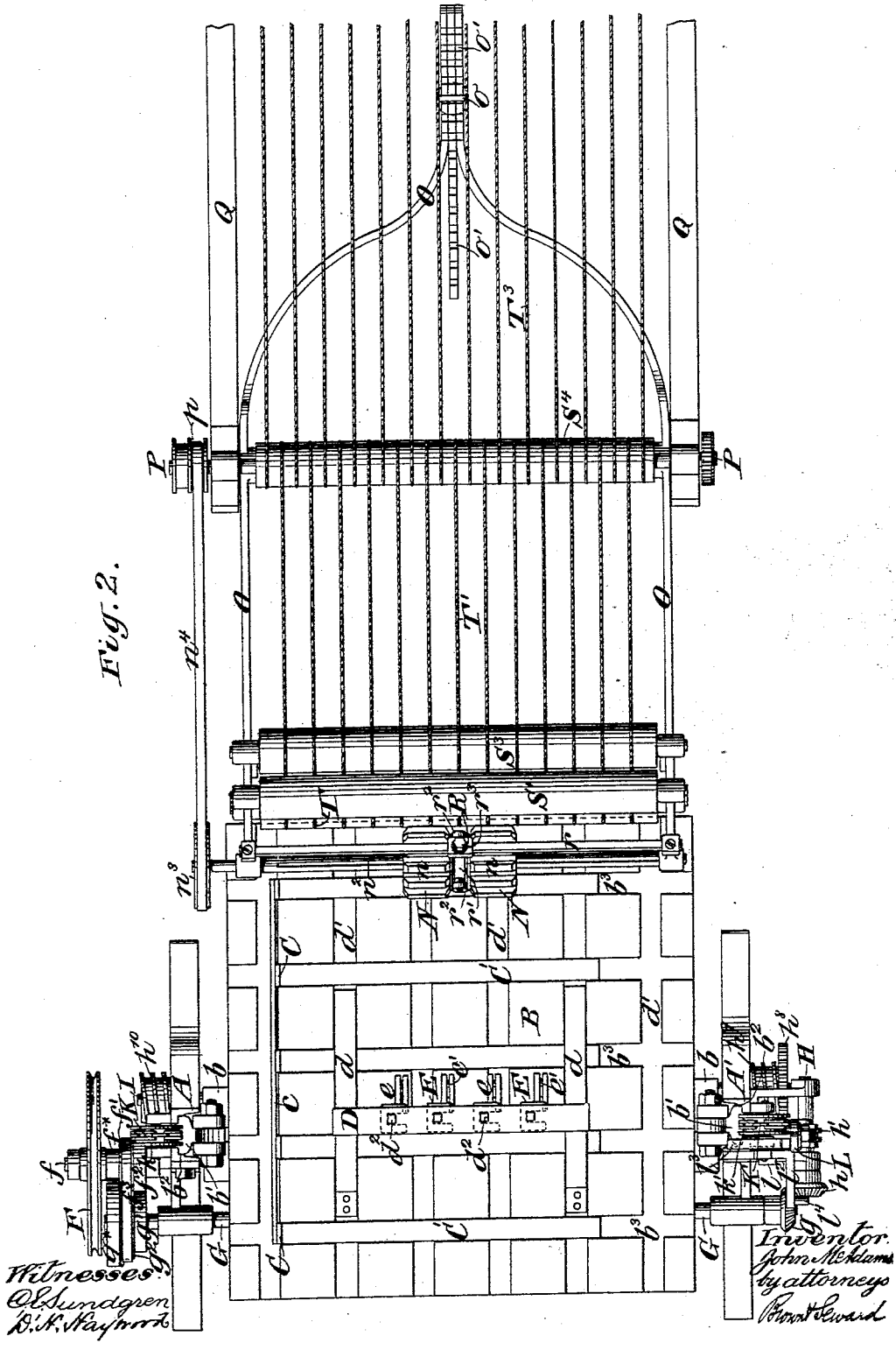

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

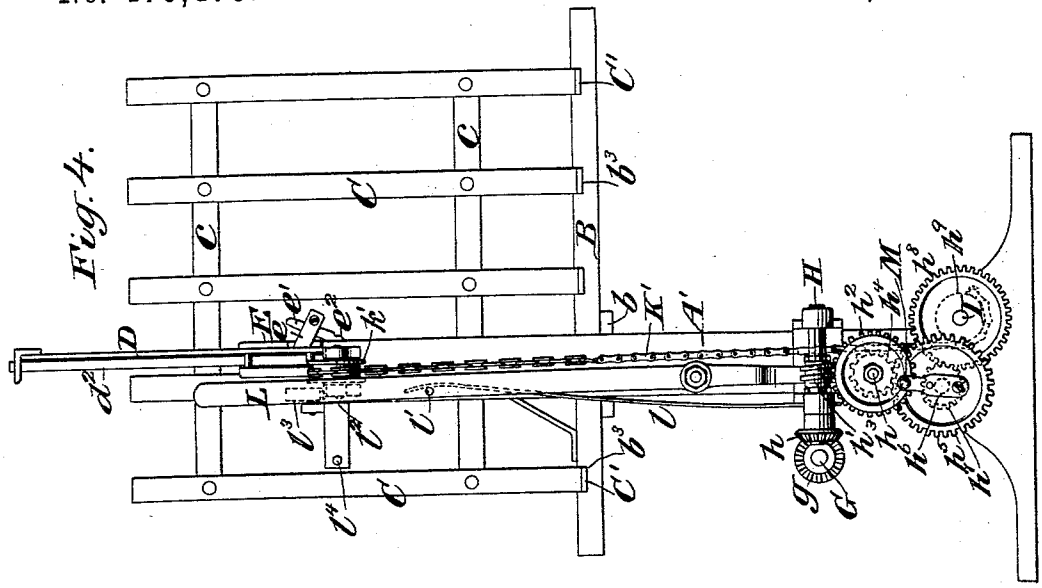
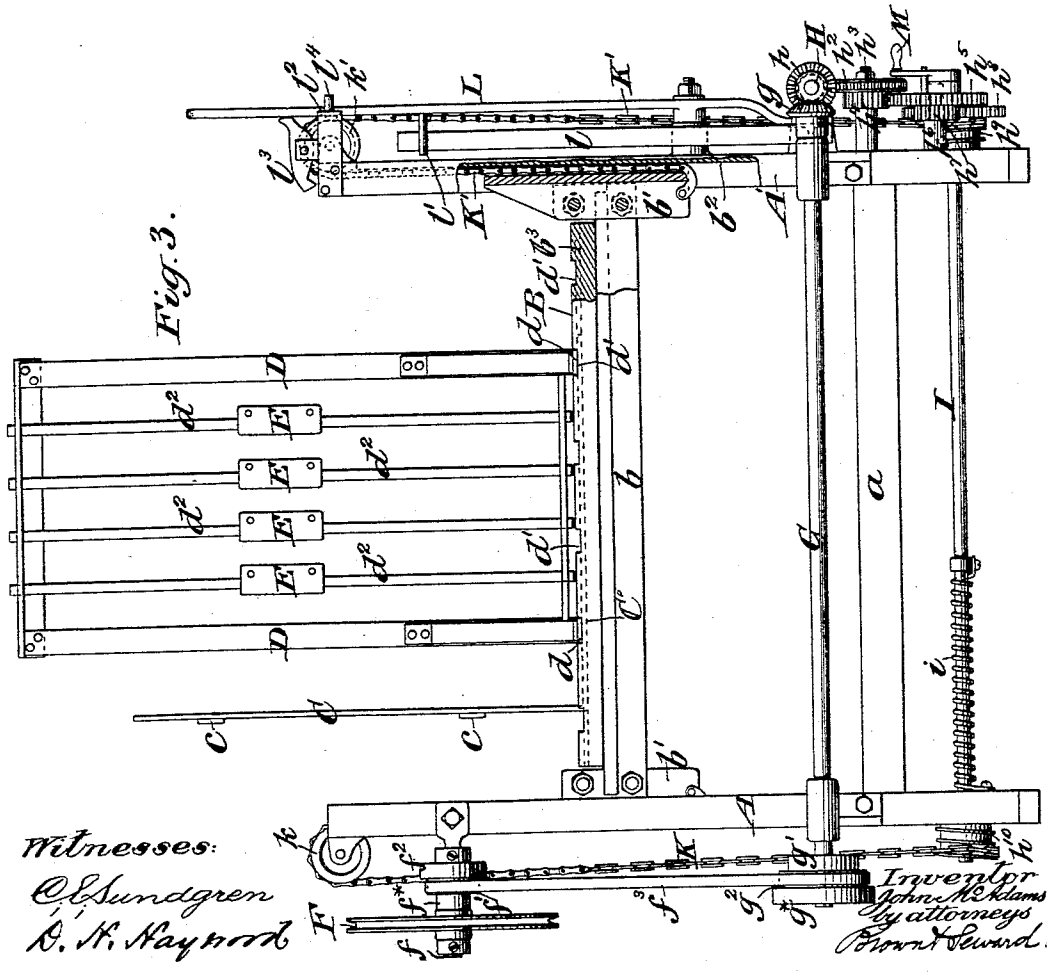


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN McADAMS, OF BROOKLYN, NEW YORK.

FEEDING APPARATUS FOR RULING AND PRINTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 476,476, dated June 7, 1892.

Application filed June 27, 1891. Serial No. 397,691. (No model.)

To all whom it may concern:

Be it known that I, JOHN McADAMS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Feeding Apparatus for Ruling and Printing Machines, of which the following is a specification.

My invention relates to an improvement in feeding apparatus for ruling and printing machines, in which the sheets of paper are automatically fed from a pile to receiving-rollers, which conduct them between carrying-belts to be transferred to the ruling or printing mechanism.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the feeding apparatus in longitudinal section. Fig. 2 is a top plan view. Fig. 3 is a front elevation partially broken away to show certain parts more clearly. Fig. 4 is a partial side elevation; and Fig. 5 is a sectional view in detail, showing the connection of the feed-roller with its shaft.

My invention comprises mechanism for supporting and gradually elevating the pile of sheets and mechanism adapted to sustain a constant relation to the top of the pile of sheets for advancing them successively to the ruling or printing machine.

A A′ represent a pair of uprights secured to each other at the proper distances apart by one or more suitable girders *a*. A table B rests upon a vertically-sliding frame *b*, the frame *b* being provided with end guides *b′*, fitted to move up and down in ways b^2, provided for them in the adjacent faces of the uprights A A′. The table B is surmounted by an upright frame consisting of a series of slats C, connected by cross-pieces *c* and having its base formed by turning the slats C at right angles and locating the said base-slats C′ in transverse grooves b^3, formed in the table B. The frame composed of the slats C may be slid laterally across the table B in the grooves b^3 to adjust itself to the pile of paper which is to rest upon the table. An upright frame D has a base portion *d*, adapted to move forward and backward in grooves *d′*, extending lengthwise of the machine and formed in the table B, the location of the base *d* being above the position of the base-slats C′ of the transversely-sliding frame.

The frame D is provided with several upright bars d^2, (in the present instance four,) which have fixed thereto supports E—one to each—to which holders *e* are secured, the latter having adjusted therein the shanks *e′* of retaining barbs or blades e^2. It is intended that the barbs or blades e^2 shall rest upon the edge of the pile of sheets opposite the edge which advances first to the receiving-rollers and thereby prevent the sliding of more than one sheet at a time. The barb or blade *e′* is intended to adjust itself at all times to the top of the pile by the sliding movement of its support E upon the bars d^2 under the influence of gravity. The barb or blade e^2 is so adjusted as to slit the extreme edge of the upper sheet, while its point engages the next succeeding sheet below. By sliding the transversely and longitudinally movable upright frames upon the table B the pile of sheets may be squared and held in the desired position to be fed.

Provision is made for elevating the table B and its load gradually as the sheets are removed and for returning it to its position to receive a new load as follows: A drive-pulley F is mounted on a short axle *f*, fixed to the side of one of the uprights A, for example, and has fixed to rotate therewith a cone-pulley provided with the steps f^* f' f^2, which are adapted to be connected with corresponding steps g' g^2 g^* of a cone-pulley secured on a transverse shaft G, journaled in suitable bearings attached to the uprights A A′ and carrying upon its end opposite the cone-pulley a bevel gear-pinion *g*. The connecting-belt is denoted by f^3. A short shaft H, extending at right angles to the shaft G, is provided with a bevel-gear *h* on its end, adapted to intermesh with the bevel-gear *g* on the shaft G and is also provided with a worm *h′*, adapted to engage with a worm-wheel h^2, loosely mounted on an axle h^3, and having fixed to rotate therewith a pinion h^4. The pinion h^4 is adapted to intermesh with a gear-wheel h^5, loosely mounted upon an axle h^6 and having fixed to rotate therewith a pinion h^7 in position to intermesh with a gear-wheel h^8, which has fixed to rotate therewith a chain wheel or drum h^9.

The wheels h^8 and h^9 are fixed to a transverse shaft I, mounted in suitable bearings secured to the uprights and carrying upon its opposite end a corresponding chain wheel or drum h^{10}. The shaft I is also provided with a coil-spring i, one end of which is fixed to the shaft and the opposite end to one of the uprights, so that as the shaft I is rotated by the descent of the table the spring will be wound and its tension will tend to cushion the fall of said table. The chain wheels or drums h^9 h^{10} are connected with the opposite sides of the table B by means of chains K and K′, which extend up and over pulleys k k', mounted in the upper ends of the uprights A A′, and thence down to the opposite sides of the table B, to which they are secured. By the rotation of the shaft G, through its connection with the drive-wheel F, the worm-shaft H is rotated and motion is communicated therefrom through the intermeshing gear to the shaft I, carrying the chain wheels or drums upon its ends, and thence through the chains K K′ to the table carrying the pile of paper.

The worm h' has such a connection with the shaft H that it is caused to rotate therewith and at the same time have a longitudinally-sliding movement thereon. For this purpose the well-known feather-and-groove connection may be employed. When it is desired to throw the shaft H out of gear with the wheels which drive the elevating-chains, and hence stop the elevation of the table, the worm h' is slid on the shaft H out of gear with the wheel h^2. The sliding movement of the worm h' is accomplished in the present instance by means of a shifting lever L, pivotally secured to the upright A′ and having a loose connection at its lower end with the sleeve on which the worm h' is located. A bar-spring l, bearing against a stop l' on the lever L, tends at all times to throw the shifting lever L in a direction to disconnect the worm h' from the gear-wheel h^2. The lever L is held against such movement by its engagement with a notch or abutment l^2 near its upper end. A trip-dog l^3 is pivotally secured to a suitable support at the top of the upright A′ in such position that as the table B reaches the upper limit of its travel the guide b' at one side of the table B will engage one end of the trip-dog l^3 and so rock it as to press its opposite end against the shifting lever L and throw it out of engagement with the abutment l^2, and thereby allow it to operate under the tension of the spring l and throw the worm out of gear. The movement of the lever L is limited by a stop l^4.

It is intended that the table B shall travel upward at substantially the same rate that the pile of paper on the table is reduced in height by the passing of the sheets to the receiving-rollers and feed-belt, so that when it reaches a position to trip the lever L and pull the worm out of gear the pile will have been quite or substantially exhausted and the table will be automatically returned to its lowermost position against the tension of the spring i on the shaft I by means of its own weight, the gear h^2 h^4, &c., being free now to turn in the opposite direction, because of the disengagement of the worm h'.

For the purpose of operating the gear to elevate and lower the table by hand I provide a crank M, fixed to the outer face of the wheel h^5, as clearly shown in Figs. 3 and 4. It is obvious that the shifting lever L might be operated by hand instead of by the trip l^3 whenever so desired.

The feed-roller sections are represented by N and are each provided with a series of ribs n, which may be faced with or formed entirely of rubber or other suitable elastic material adapted to take a frictional hold of the face of a sheet. The roller-sections N are separated a short distance from each other and are fixed to a sleeve n', spaced from and adapted to slide longitudinally of a shaft n^2. The sleeve n' is secured to the shaft n^2 by means of a central washer n^5, so as to rotate with it and at the same time have a sliding and vertically-tilting movement thereon, and the connection of the washer therewith may be of the well-known feather-and-groove type. The shaft n^2 is journaled in suitable bearings in the end of a tilting frame O, and carries upon one end a drive-pulley n^3, connected by a belt n^4 with a pulley p, fixed on a shaft P, journaled in suitable bearings supported upon a frame Q. The shaft P is driven from a suitable source of power. (Not shown.) The sleeve n', to which the roller-sections N are fixed, is held in the desired adjustment upon the shaft n^2 by means of a forked arm, the head R of which is adapted to receive a guide-bar r, fixed to the swinging frame O, and the branches r' of which extend downwardly between the adjacent ends of the roller-sections N and are provided on their free ends with anti-friction-rollers r^2. A set-screw r^3, extending through the head R into contact with the bar r, serves to lock the adjusting-arm, and hence the roller-sections, in the desired position with respect to the paper to be fed.

The tilting frame O is pivotally secured to the supporting-frame Q preferably at a point in axial alignment with the shaft P, and is provided at its end opposite that carrying the roller-sections N with a counterbalancing-weight o, adapted to be adjusted in any one of a series of notches o', formed in the extended end of the frame O, so as to partially counterbalance the end carrying the feed-rollers N and the other mechanism to be hereinafter referred to and at the same time allow the roller-sections N to press upon and adjust themselves to the top of the pile of sheets, so as to effectually advance them to the receiving-rollers.

The receiving-rollers are denoted by S and S′. The former is journaled in suitable bearings in the frame O near the feed-rollers N,

and the latter is journaled above the roller S and is allowed to rest on the roller S and to be rotated by its frictional contact therewith. The roller S also forms a support for one end of the lower endless belt T, composed, in the present instance, of a series of ropes or cords, the opposite end of said endless belt being supported upon a roller S^2 in alignment with the shaft P. The upper endless belt T′ is supported at its end nearest the feed-rollers with a roller S^3 and at its opposite end upon a roller S^4, mounted above the roller S^2. The sheets of paper, as they are advanced by the feed-rollers N, are received between the receiving-rollers S and S′ and by them are conducted between the upper and lower endless belts T T′, and thence to a second series of endless belts T^2 and T^3 to be transferred to the ruling or printing mechanism. (Not shown herein.)

What I claim is—

1. The combination, with the support for the pile of paper to be ruled, of a tilting frame mounted independently of said support and carrying feed-roller sections adapted to rest upon the top of the pile, means for adjusting the pressure of the feed-roller sections upon the pile, adjusting devices for shifting the feed-roller sections laterally of the machine, and receiving-rollers in position to receive and advance the paper as it is fed by the feed-roller sections, substantially as set forth.

2. The combination, with the support for the pile of paper to be ruled, of a tilting frame, feed-roller sections mounted at the end of the frame and adapted to rest with their faces on the top of the pile, a sleeve on which the feed-roller sections are mounted, the said sleeve having a sliding movement laterally of the machine, and an adjusting device having a sliding movement upon a bar over the feed-roller sections and having branches extending between the adjacent ends of the feed-roller sections, substantially as set forth.

3. The combination, with the feed-roller sections and means for operating them, of the vertically-movable table as a support for the pile of paper to be fed, the laterally and longitudinally movable upright frames seated upon the table for squaring and adjusting the pile, supports mounted on said frames in sliding adjustment, holders secured to said supports, retaining barbs or blades adjustably held within the holders, elevating-chains engaged with the table, and a train of gear for operating the chains, substantially as set forth.

4. The combination, with the vertically-movable table, the elevating-chains, and the train of gear for operating the chains, of the drive-shaft, means for connecting and disconnecting the train of gear to and from the drive-shaft, and a spring in connection with the train of gear, the said spring being so connected as to be wound when the table is lowered and its tension thus exerted to cushion the table, substantially as set forth.

5. The combination, with the uprights, the vertically-movable table located between the uprights, the elevating-chains connected with the table, and the train of gear for winding the chains to elevate the table, of the drive-shaft, the worm-gear connection between the drive-shaft and the table-actuating gear, the spring-actuated shifting lever in connection with the worm, and the tripping devices in position to be operated by the upward movement of the table to disconnect the drive-shaft from the table-operating gear, substantially as set forth.

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