No. 768,673. PATENTED AUG. 30, 1904.

A. H. MORTON & L. P. SHERMAN.

PAPER FEEDING MECHANISM.

APPLICATION FILED SEPT. 26, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

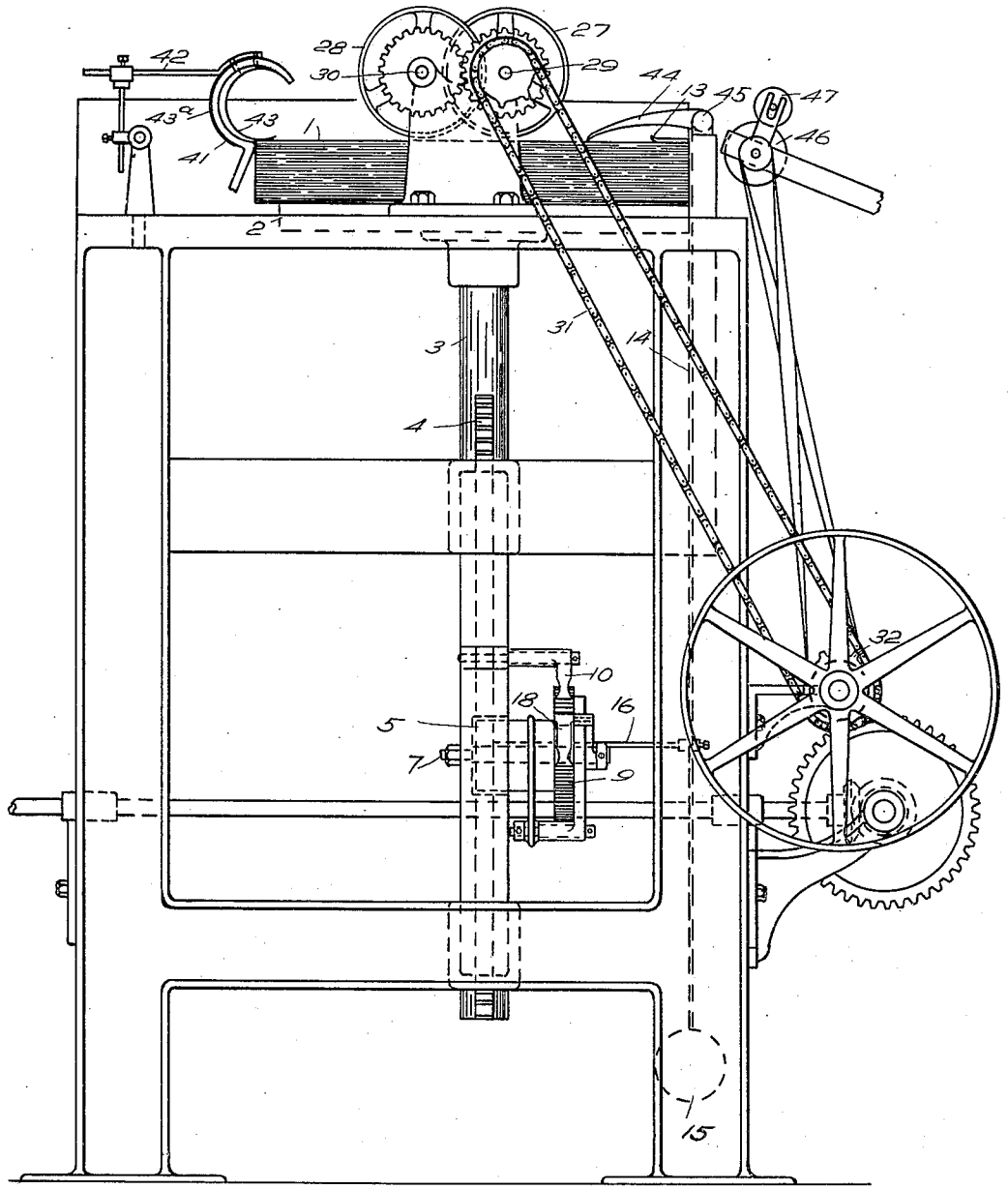


FIG. 1.

WITNESSES:

Alfred N. Hildreth

Farnum B. Dorsey

INVENTORS.

Albert H. Morton

Lewis P. Sherman

BY

Phillips Van Emren & Dick

ATTORNEYS.

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NO MODEL. 3 SHEETS—SHEET 2.

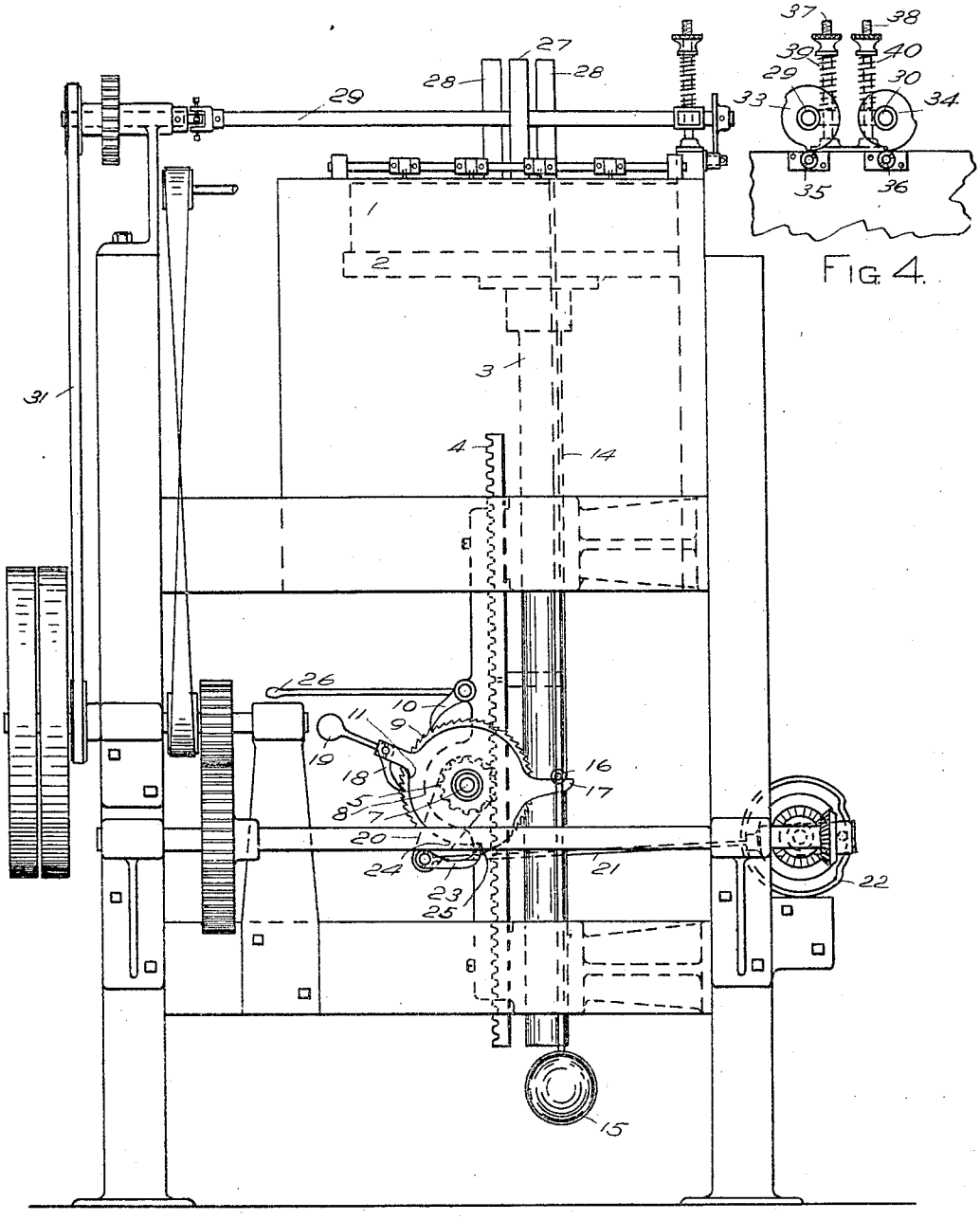


FIG. 2.

FIG. 4.

WITNESSES:

Alfred H. Hildreth

Barnum F. Dorsey

INVENTORS.

Albert H. Morton

Lewis P. Sherman

BY

Phillips Van Emren & Fish

ATTORNEYS.

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NO MODEL. 3 SHEETS—SHEET 3.

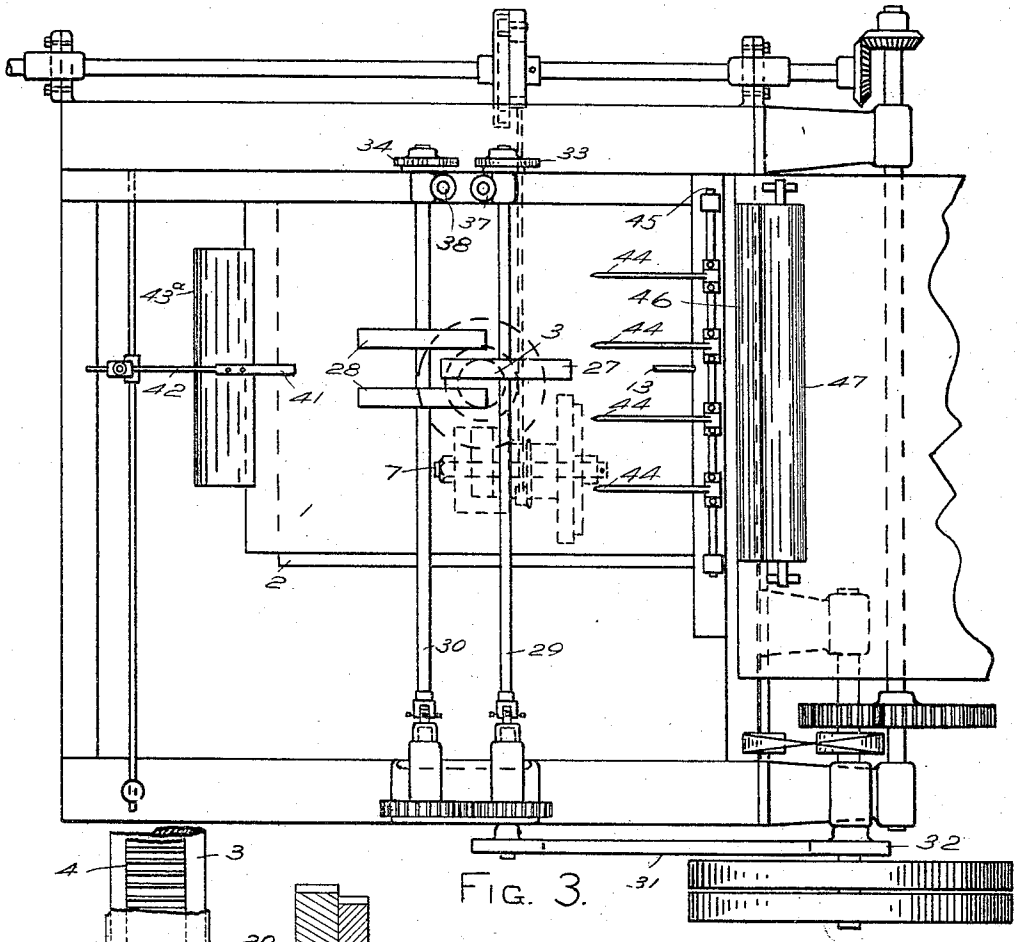


FIG. 3.

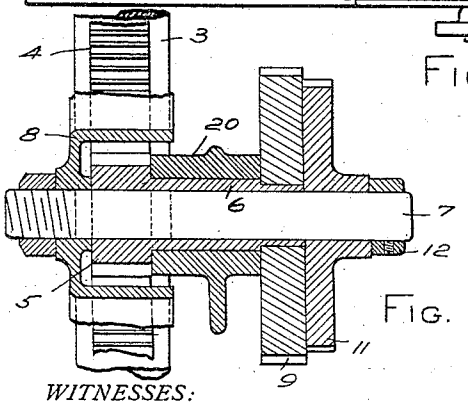


FIG. 5.

WITNESSES:

Alfred H. Hildreth

Farnum P. Dorsey

INVENTORS.

Albert H. Morton

Lewis P. Sherman

BY

Phillips Van Everen Dick

ATTORNEYS.

No. 768,673. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

ALBERT H. MORTON AND LEWIS P. SHERMAN, OF LOWELL, MASSACHUSETTS, ASSIGNORS TO SAID MORTON.

PAPER-FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 768,673, dated August 30, 1904.

Application filed September 26, 1902. Serial No. 124,944. (No model.)

To all whom it may concern:

Be it known that we, ALBERT H. MORTON and LEWIS P. SHERMAN, citizens of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Paper-Feeding Mechanism; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to paper-feeding mechanism, the object of which is to reorganize and improve paper-feeding mechanisms, so as to produce a compact and efficient mechanism for feeding one sheet of paper at a time from a pile of paper.

The invention consists in the devices and combinations of devices hereinafter described, and particularly defined in the claims.

In the accompanying drawings, Figure 1 is a side elevation, Fig. 2 a front elevation, and Fig. 3 a plan, of the preferred form of the improved paper-feeding mechanism which forms the subject of this application; and Figs. 4 and 5 are details of part of the mechanism.

Referring to the accompanying drawings, the illustrated embodiment of the invention is described as follows:

A pile of paper 1 is laid upon the platen 2, supported upon the upper end of the rod 3, mounted in suitable guideways in the frame of the machine. Upon one side of the rod 3 is secured a rack 4, which is engaged by a pinion 5, which is fast to a sleeve 6, which is revolubly mounted upon the pin 7, secured in the support 8. To the sleeve 6 is secured the ratchet-wheel 9, which is held from rotation, so as to prevent the rod 3 from descending, by means of the pawl 10, pivoted upon a part of the frame of the machine and which engages the teeth of the ratchet-wheel 9.

Means are employed for actuating the pinion 5 at proper times in order to maintain the upper sheets of the pile of paper 1 at a uniform height. These means consist of the plate 11, which is pivotally and loosely mounted upon the pin 7, being held in place thereon by the collar 12, secured to said pin. A feeler 13 engages the upper surface of the pile 1 of paper and is connected by means of a rod 14, hanging down from the feeler 13 and normally held in contact with the upper surface of the paper by the weight 15, secured to the lower end of the rod 14. The pin 16 is secured to the rod and engages a projection 17 from the side of the plate 11. A pawl 18 is pivotally attached to the plate 11 and normally held in engagement with the teeth of the ratchet-wheel 9 by means of the weight 19, attached to said pawl. As oscillating lever 20 is pivotally mounted upon the sleeve 6, hereinbefore referred to, being actuated by a connecting-rod 21, attached to a cam-follower engaging a cam 22 on a shaft connected with the driving-shaft of the machine, so that at each rotation of the shaft an oscillating movement is imparted to the lever 20. The lever 20 carries at its end a pawl 23, which slides back and forth upon the surface 24 of the plate 11. The surface 24 terminates at a shoulder 25, which when the feeler 13 descends far enough will be brought into position to be engaged by the pawl 23 in its forward movement, which will thereby turn the plate 11 to the left as viewed in Fig. 2, whereby if the feeler 13 has descended far enough, moving the ratchet-wheel 9 to the left, so that the pawl 18 may engage the next successive tooth, thereby rotating the sleeve 6, to which the ratchet-wheel 9 is attached, and in turn rotating the pinion 5 through a small arc, and so lifting the bar 3. When it is desired to allow the bar 3 to drop in order to put additional paper upon the platen 2, the operator will take hold of the hand-lever 26, which is secured to the pawl 10, and lift it and at at the same time will lift the pawl 18, thereby lifting both pawls out of engagement with the ratchet-wheel 9 and permitting the bar 3 to descend by its own weight.

The above-described arrangement will, it will be understood from the foregoing description, operate whenever the upper sheet of the pile of paper supported by the platen 2 descends far enough to permit the ratchet-wheel 9 to be rotated by the means described through an arc equal to one tooth of its sur-

face, and the upper surface of the pile of paper will be thus maintained very accurately at a certain level determined by the feeler 13. The platen 2 will only be raised whenever the pile of paper upon it has been lowered to the extent corresponding to one tooth of the ratchet-wheel 9. The upper sheet of the pile of paper 1 is adapted to be engaged by sandpaper-wheels 27 and 28, mounted, respectively, upon the shafts 29 and 30, which are geared together as shown and continuously rotated in opposite directions by the sprocket-chain 31, running from a sprocket-wheel 32 on the main shaft of the machine. The sandpaper-wheels 27 and 28 are alternately lowered into contact with the upper sheet of paper upon the pile 1 by any suitable means, such as the cams 33 and 34, mounted upon the ends of the shafts 29 and 30, respectively, which rest upon rollers 35 and 36. The shafts 29 and 30 are both provided with universal joints connected so that the rolls 27 and 28 may be raised and lowered. The bearings for the movable ends of the shafts 29 and 30 are supported upon pins 37 and 38 and normally held in their lowermost positions by springs 39 and 40. The pressure of the springs may be regulated to vary the pressure of the sandpaper-wheels on the paper as may be necessary.

A paper-separator 41 is mounted at the rear end of the pile 1 of the paper, being supported by the support 42. The paper-separator 41 is curved, as shown, and its inner surface is roughened or file-toothed for a purpose which will be presently described. A spring 43, secured at the end of the separator 41, normally rests upon the upper surface of the pile of paper and guides the edges of the sheets into contact with the paper-separator 41. A paper-guide 43^a, consisting of a piece of sheet metal secured to the back of the separator 41, acts to support and guide the paper into the separator. At the front edge of the pile are arranged a series of pivotally-mounted fingers 44, which are supported by a rod 45 adjacent to the paper pile. The loose ends of these fingers rest lightly upon the upper surface of the paper. These fingers have sharp ends and operate in a manner presently to be described. Feed-rollers 46 and 47, of which the former is driven by a cross-belt from the main shaft of the machine, serve to carry the sheet from the stack after it has been separated therefrom and presented to such rollers. The upper feed-roller 47 is loosely mounted in open bearings and presses lightly on the upper surface of the paper, coöperating with the lower feed-roller 46, which is provided with a sandpaper surface, to feed the paper therethrough.

The separation of a piece of paper from the pile 1 is accomplished in the following manner by the mechanism just described: The sandpaper-rolls 28 are first brought into engagement with the upper surface of the top sheet of the pile by a drop of the shaft 30 through the cam 34 upon its end. The engagement of the rolls 28 with the upper surface of the top piece of paper upon the pile moves the top piece of paper rearwardly, and the friction between the sandpaper-roll 28 and this piece of paper is sufficient to overcome the resistance offered by the rough surface of the paper-separator 41, and this sheet is slid up into the paper-separator. The next sheet of paper, being the piece of paper immediately underneath the top sheet, may also be slid rearwardly at the same time; but the roughened surface of the separator 41 is sufficient to resist the tendency of this second sheet of paper to move into the separator 41, because the friction between the two top sheets of paper is not as great as the friction between the sandpaper-rolls 28 and the top piece of paper, as a result of which the top piece of paper will be moved rearwardly, being curled up in the separator 41 until its front end is moved rearwardly beyond the ends of the fingers 44. Then the shaft 30 will be lifted by its cam, and the shaft 29 will be permitted to descend by its cam, and rotating in the opposite direction it will engage the top sheet of paper and slide it forwardly out of the separator 41, its forward edge sliding up over the fingers 44 and entering between the rollers 46 and 47. These fingers 44 guide the front end of the sheet upward and direct its course to the rollers 46 and 47, and thus constitute guides to assist in discharging the sheet. The action of the roll 27 on the paper is continued until the front edge of the top sheet of paper has been entered between the feed-rollers 46 and 47, whereupon the roll 27 will be lifted by its cam, and the feed-rolls 46 and 47, which conveniently rotate at a considerably faster speed than the roll 27, will carry the paper forward and deliver it. The rollers 46 and 47 may or may not be used, as desired, as the mechanism may present the sheet directly to the machine to be fed without the use of these rollers.

While the illustrated embodiment of the invention constitutes the form of the invention in which it is preferably embodied, still it is distinctly to be understood that the invention is by no means limited to such embodiment, as other means may be employed for carrying out the invention without departure therefrom.

Having thus described the specific form of the invention illustrated in the accompanying drawings, what is claimed is—

1. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, and oppositely-moving frictional surfaces alternately engaging the top sheet of paper and moving it alternately in opposite directions, substantially as described.

2. A paper-feeding mechanism, having, in combination, means for supporting a pile of

paper, and two oppositely-moving roughened surfaces adapted alternately to engage the top sheet of paper, and by contact therewith to move the entire sheet alternately in opposite directions, substantially as described.

3. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, two oppositely-rotating roughened surfaces, and means for alternately bringing such surfaces into contact with the top sheet of paper, substantially as described.

4. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, a paper-separator at one end of the pile, and means for exerting friction upon the top sheet first in the direction of the separator and then in the opposite direction, substantially as described.

5. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, a paper-separator having a roughened surface at one end of the pile, and means for exerting friction upon the top sheet first in the direction of the separator and then in the opposite direction, substantially as described.

6. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, a paper-separator at one end of the pile, a paper-guide resting upon the other end of the pile, and means for exerting friction upon the top sheet, first in the direction of the separator to move the front end of the sheet from under the guide and then in the opposite direction to eject the sheet, substantially as described.

7. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, a paper-separator provided with a paper-guide at one end of the pile, and means for exerting friction upon the top sheet first in the direction of the separator and then in the opposite direction, substantially as described.

8. A paper-feeding mechanism, having, in combination, means for supporting a pile of paper, means for moving in one direction one or more sheets of paper, a separator engaged by the sheets so moved and adapted to resist the motion of the sheets and arrest the motion of all but the top sheet, and means for moving the top sheet in the opposite direction away from the separator, substantially as described.

9. A paper-feeding mechanism, having, in combination, a support for a pile of paper, means for moving the top sheets of the pile, and a separator comprising a frictional member adjustably mounted and a spring connected therewith and engaging the top of the pile to guide the top sheets into contact with the separator, substantially as described.

10. A paper-feeding mechanism, having, in combination, a support for a pile of paper, means for moving the top sheets of the pile, and a concave frictional surface engaged by the edges of the sheets so moved for the purpose of separating the lower sheets from the top sheet, substantially as described.

11. A paper-feeding mechanism, having, in combination, means for supporting and maintaining a pile of paper with its upper surface at a substantially constant level, and oppositely-moving frictional surfaces alternately engaging the top sheet of paper and moving it alternately in opposite directions, substantially as described.

12. A paper-feeding mechanism, having, in combination, means for supporting and maintaining a pile of paper with its upper surface at a substantially constant level, and two oppositely-moving roughened surfaces alternately engaging the top sheet of paper and by contact therewith moving the top sheet alternately and in opposite directions, substantially as described.

13. A paper-feeding mechanism, having, in combination, means for supporting and maintaining a pile of paper with its upper surface at a substantially constant level, two oppositely-rotating roughened surfaces, and means for alternately bringing such surfaces into contact with the top sheet of paper, substantially as described.

14. A paper-feeding mechanism, having, in combination, means for supporting and maintaining a pile of paper with its upper surface at a substantially constant level, a paper-separator at one end of the pile, and means for exerting friction upon the top sheet, first in the direction of the separator and then in the opposite direction, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

ALBERT H. MORTON.
LEWIS P. SHERMAN.

Witnesses:
HORACE VAN EVEREN,
BENJAMIN PHILLIPS.