2 Sheets—Sheet 1.

F. W. GRIFFITH & G. P. BYRNE.

Paper Feeding Machine.

No. 234,469. **Patented Nov. 16, 1880.**

Fig. 1.

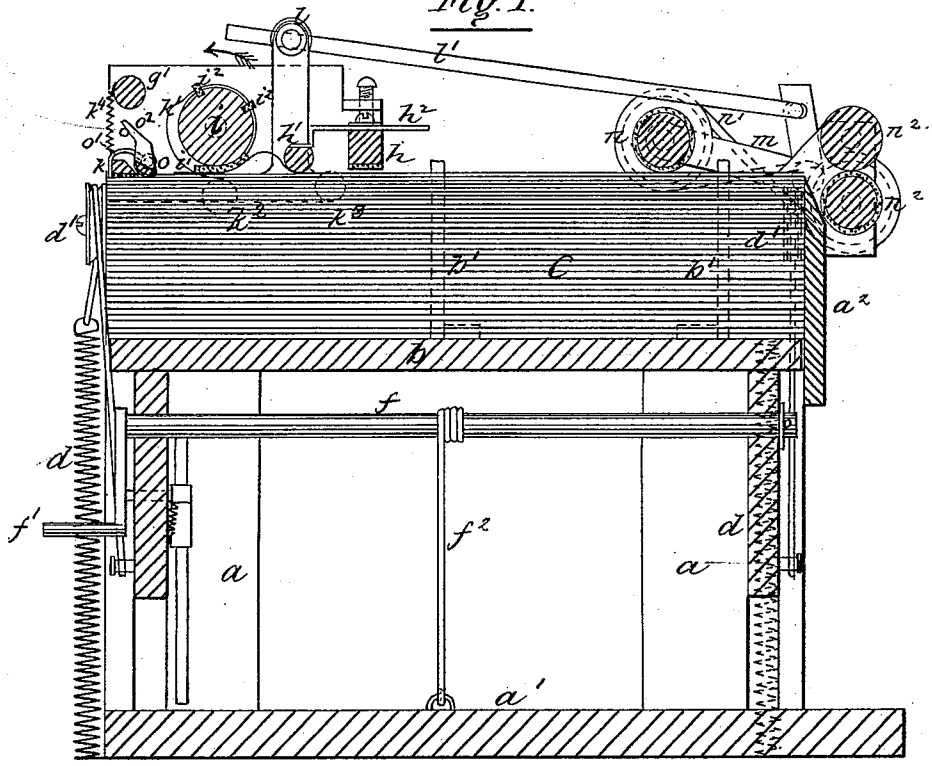
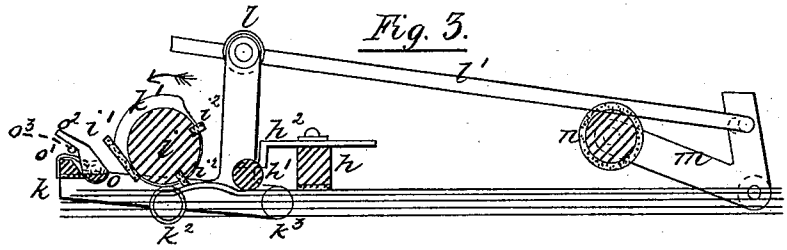


Fig. 3.



Witnesses.
W. Wallbaum
H. D. Williams

Frederick W. Griffith
George P. Byrne
Inventors.
per Alfred Sheelock
Atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

F. W. GRIFFITH & G. P. BYRNE.

Paper Feeding Machine.

No. 234,469. **Patented Nov. 16, 1880.**

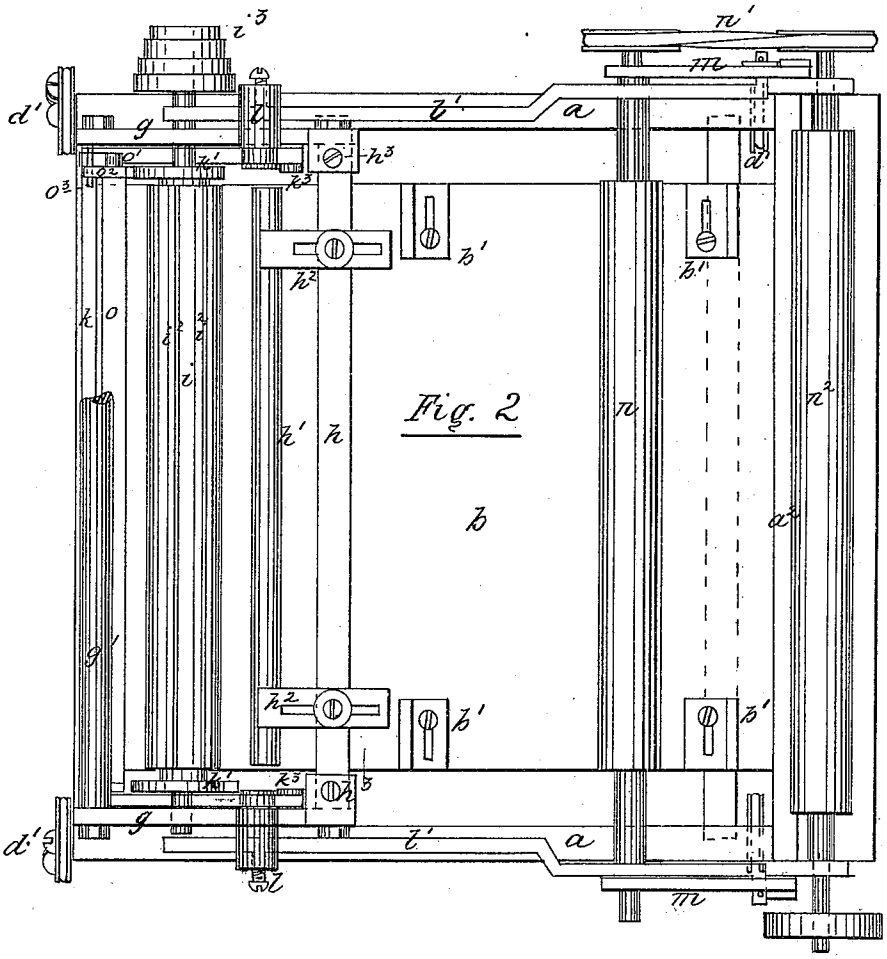
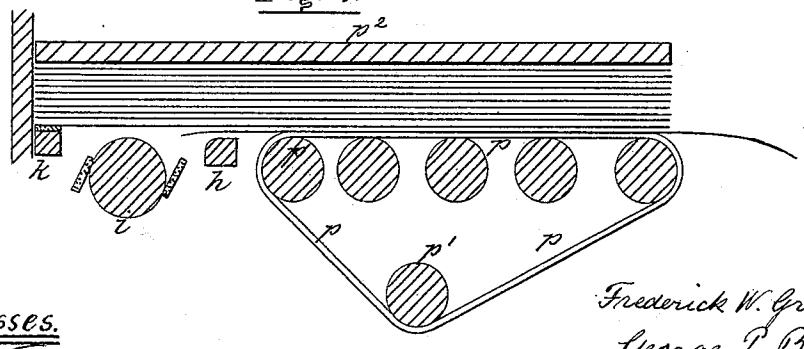


Fig. 2

Fig. 4.



Witnesses.
W. Wallbaum
H. D. Williams

Frederick W. Griffith.
George P. Byrne
per Inventors.
Alfred Shedwick
Atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FREDERICK W. GRIFFITH, OF NEW YORK, AND GEORGE P. BYRNE, OF BROOKLYN, SAID GRIFFITH ASSIGNOR TO JOHN FORSYTHE, OF NEW YORY, N. Y.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 234,469, dated November 16, 1880.

Application filed December 13, 1878.

To all whom it may concern:

Be it known that we, FREDERICK W. GRIFFITH, of the city of New York, county and State of New York, and GEORGE P. BYRNE, of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Paper-Feeding Machines, (Case A,) of which the following is a specification.

This invention relates to paper-feeding machines into which a pile of paper is placed and the sheets automatically separated from the pile and presented to the taking mechanism of the machine being fed; and it consists of such a combination and arrangement of mechanical devices whereby the outside sheet is first separated from the pile at one end and then moved along the pile so as to be presented at the other end to the feeding rollers or gripers of the machine to which the feeder is attached. This we accomplish by placing a resisting and griping bar across the pile a sufficient distance from one end of it to allow the rotating separator to act on the outside sheet, between the end of it and this griping-bar. The rotating separator draws back the end of the sheet a sufficient distance to allow another griping-bar to come in contact with the next sheet without touching the outside sheet and firmly hold the pile of paper and press it away from the inside griping-bar. A rotating discharger is then caused to act on the outside sheet, so as to draw it away from the rotating separator and the inside griping-bar and discharge the sheet entirely clear of the pile or present it to the taking mechanism of the machine being fed at the opposite end of the pile to that at which the rotating separator acts, thus accurately feeding the sheets to fast-running machines, for as soon as the rotating discharger has moved the separated end of the sheet clear of the inside griping-bar this bar again gripes the pile by the end griping-bar moving away from the paper and allowing the pile to move up to it, and the rotating separator commences to act on the next following sheet, it having all the time the first sheet is being moved away from the pile to accomplish the separation of the end of the sheet, and by the time the separated end of the first sheet is passing away clear of the pile the next sheet is ready to be discharged, so that the sheets follow one another in continuous succession without any or very little space between their ends.

The pile is always held firmly by either the inside griping-bar or the end griping-bar, so that it is not disturbed in the least by the action of the rotating separator or the rotating discharger thereon.

But, to describe our invention more particularly, we will refer to the accompanying drawings, forming part of this specification, which show the best and simplest manner of embodying in an operative machine the above-described principle of feeding sheets of paper from a pile at present known to us, and in which—

Figure 1 is a longitudinal sectional elevation of a paper-feeding machine, with the separating and discharging devices, shown operating on the top of a pile of paper. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view similar to the upper part of Fig. 1, but showing the separating and discharging devices in different positions; and Fig. 4 shows the devices as acting on the bottom sheet of a pile of paper.

a a are the side frames, between which the bottom *b* is fitted to slide up and down. The pile of paper *c* is placed on the bottom *b* between the adjustable guides *b' b'*, and the pile is pressed upward against the separating and discharging devices by means of the springs *d d*, attached to cords passing over the pulleys *d' d'*. The bottom *b* is depressed against the action of the springs *d d* by means of the shaft *f*, which is turned by the crank-handle *f'*, and to which is secured the cord or chain f^2, the other end of the cord being fastened to the bottom *a'* of the frame when it is desired to charge the machine with paper.

It will be advantageous in large machines to make the bottom *b* capable of being slid out at the open end of the machine, so as to facilitate putting the pile of paper thereon.

The separating device and griping-bars are carried in the frames *g g*, which are held to-

gether by the inside griping-bar, *h*, and the stay-bolt *g'*, the whole sliding longitudinally on the top of the side main frames, *a a*, so as to adjust the machine to separate different sizes of paper, one end of the paper always being placed against the end board, a^2, which is secured to the ends of the side main frames, *a a*, and when the frame *g g* is properly adjusted for the separator *i* to act on the outside sheet the frame *g g* is securely held in position on the main frames *a a* by means of screws.

The separator *i* consists of a roller, to which is secured at one edge the strip of elastic material *i'*, which stands out from the roller when not in contact with the paper at a tangent thereto, as shown at Fig. 3, and as the roller revolves in the direction indicated by the arrow it strikes the paper flat, presenting considerable adhesive contact-surface thereto, and as it passes under the center of the roller its pressure on the paper is gradually increased on account of its having to assume the circular form of the roller, and thus prevents any slipping on the top sheet as it draws back its end from the end of the pile. On this roller *i* are also secured the longitudinal strips i^2 i^2, arranged so as to act on the paper in advance of the tangent strip *i'*. They pull back the end of the sheet a short distance, and then allow it to spring back by its own elasticity. The object of this is to insure a perfect separation of the top sheet from the one next to it. The roller *i* is driven by means of a belt passing over the speed cone-pulleys i^3, it being placed on the step that will cause the separator to work in harmony with the machine being fed. At the time the separator *i* is acting on the top sheet the pile of paper is held firmly between the bottom *b* and the inside griping-bar, *h*, as shown at Fig. 3. On this bar is secured the resisting-bar *h'* by means of the slotted arms h^2. It is adjusted to and from the separator *i*, and varies the opening between them to accommodate different kinds of paper.

All of the surfaces of the various devices in contact with the paper are covered with india-rubber.

As soon as the separator *i* has drawn the end of the top sheet clear of the end griping-bar, *k*, this bar is caused to descend on the balance of the pile by the action of the cams *k'*, secured to the shaft of the separator *i* on the rollers k^2, pivoted to the arms attached to either end of the bar *k*. These arms rock on the pins k^3, and also project upward to carry at their extreme ends the sockets *l l*, in which are clamped, by means of screws, the rods *l' l'*. The other ends of these rods are attached to one of the arms of a pair of bell-crank levers, *m m*, pivoted at the front end of the side frame, *a a*. The other arms of these bell-crank levers are provided with bearings, in which the discharging-roller *n* works, and it is connected, by the belt *n'*, to the pair of rollers n^2 n^2, so that they all have the same peripheral speed.

The rollers n^2 n^2 represent the taking-rollers of the machine being fed, or it may under some circumstances be advantageous to have them attached to the feeder, as shown.

By means of the connecting-rods *l' l'* the roller *n* is caused to bear on the top sheet at the same time the end griping-bar, *k*, closes on the pile, and as this bar forces down the pile away from the bar *h* the top sheet is free to be drawn away from the separator by the roller *n* and presented to the rollers n^2 n^2, as shown at Fig. 1, and when the bar *k* rises, which it does by the action of the springs *k*, the roller *n* also rises away from the paper, as shown at Fig. 3.

Should the separator *i* in drawing back the end of the top sheet disturb the other sheets, these disturbed sheets are restored to their original position by means of the sectional rubber or bar *o*, fitted in bearings on the springs *o' o'*, so that it projects below the face of the griping-bar *k*, to which the springs *o' o'* are fastened, so that as the bar *k* descends the sectional roller *o* comes in contact with the paper first, and it being caused to partly revolve in direction away from the separator *i* by means of the bent arms o^2 o^2 coming in contact with pins o^3 o^3, projecting from the frames *g g*, the end of the next sheet to the separated one is drawn back to the edge of the pile if it has been disturbed by the separator while acting on the top sheet.

The separating-roller *i* may have two or more tangential flexible strips, according to the speed at which the separation of the sheets has to take place, and with some kinds of paper the use of the strips i^2 i^2 may be dispensed with.

The pressure of the separator *i* on the paper is regulated by moving the griping and resisting bar *h* up and down, which is done by loosening the nuts on the ends of the bar and turning the screws h^3 h^3; and to save the excess of motion imparted to the griping-bar *k* to carry the paper away from the bar *h* the bar *h* may be operated by cams on the separator-shaft in a similar manner to the operation of the bar *k*.

To feed sheets of paper from the bottom of the pile, the separator *i*, griping-bars *h* and *k* will be arranged as shown at Fig. 4, and the discharging end of the pile supported on a series of rollers or endless apron, *p*, the slack of which is taken up by the roller *p'*, as the number of supporting-rollers will be varied for different lengths of paper.

The follower p^2 will be controlled and operated in a similar manner to the follower of the paper-feeding machine filed simultaneously with this specification.

It is obvious that the construction and operation of the various devices may be modified in several ways to feed sheets of paper from the pile in the manner described; so we do not wish to confine ourselves to any particular construction of the individual devices; but

What we claim, and desire to secure by Letters Patent, is—

1. In a paper-feeding machine, the combination of the rotating separator *i*, operated as shown, to draw back one end of the outside sheet, with the rotating discharger *n*, to discharge it from the pile or present it to the taking mechanism of the machine, being fed at the opposite end to the end at which the separating device acts, substantially as hereinbefore set forth.

2. In a paper-feeding machine, in combination, the griping-bar *k*, constructed and operated as described, to press on the pile of paper at one end after the end of the top sheet has been withdrawn from thereunder, the griping-bar *h*, and the rotating discharger *n*, arranged and operated as described, to draw the top sheet from under the griping-bar *h* and discharge it from the pile at the opposite end to that on which the griping-bar *k* presses, substantially as hereinbefore set forth.

3. The combination of the rotating separator *i*, griping-bar *h*, provided with the adjustable resisting-bar *h'*, griping-bar *k*, and rotating discharger *n*, constructed and operated substantially as hereinbefore set forth.

4. The combination of the rotating separator *i*, cams k', bell-crank levers k^2 k^3 *l*, rods l', levers *m*, and discharging-roller *n*, substantially as and for the purpose hereinbefore set forth.

5. In a paper-feeding machine, the rotating separator *i*, provided with the longitudinal strips i^2 i^2 and tangental strip i', substantially as hereinbefore set forth.

6. In a paper-feeding machine, in combination with the separator *i*, the spring-pivoted bar *o*, operated substantially as described, to correct any disturbance of the pile after the separator has acted on the outside sheet, as hereinbefore set forth.

FREDERICK WM. GRIFFITH.
GEO. P. BYRNE.

Witnesses:
W. WALBAUCK,
H. D. WILLIAMS.