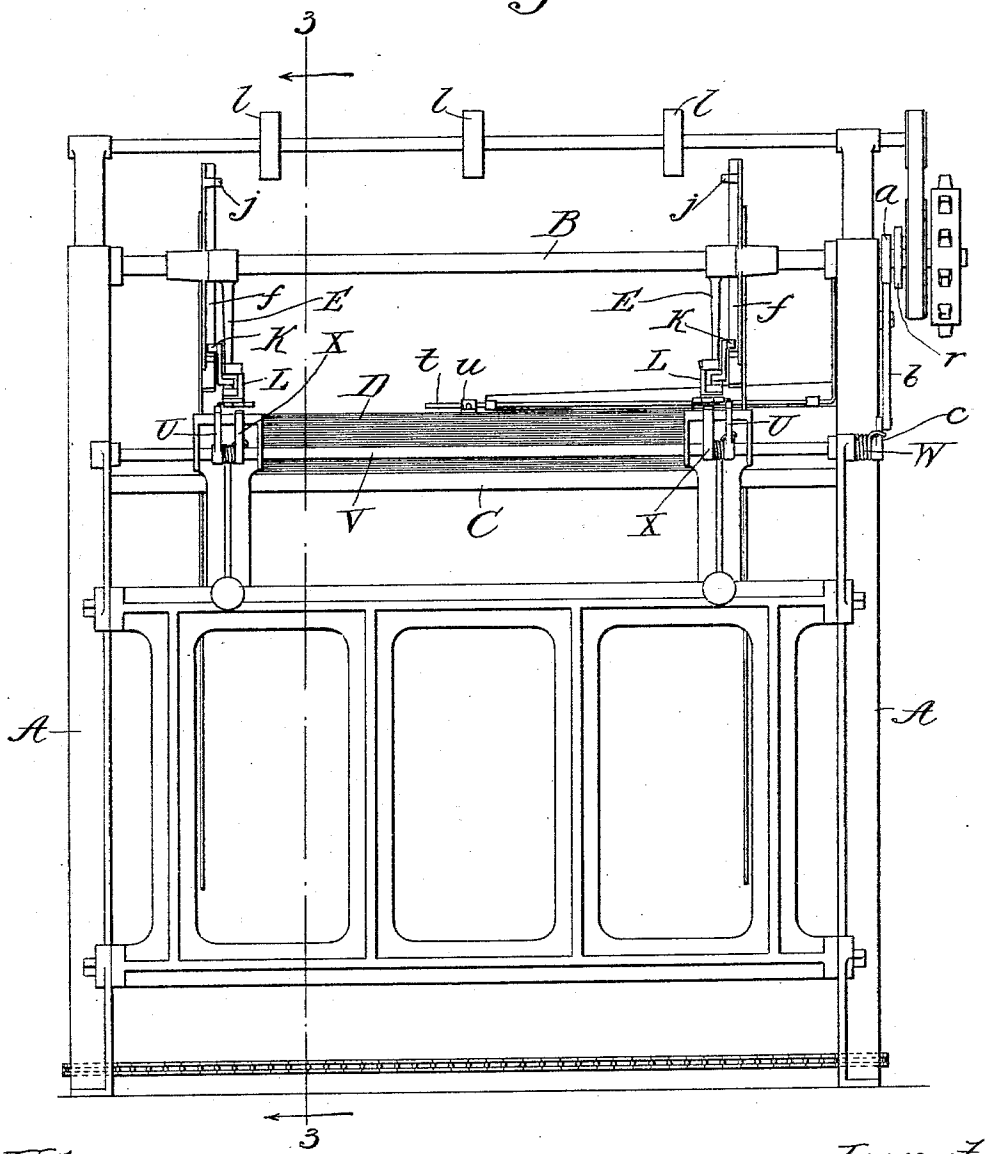
(No Model.) 7 Sheets—Sheet 1.

W. G. TREVETTE.

PAPER FEEDING MACHINE.

No. 562,867. Patented June 30, 1896.

Fig. 1.



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Wm. N. Rheem.

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(No Model.) 7 Sheets—Sheet 2.

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No. 562,867. Patented June 30, 1896.

Fig. 3.

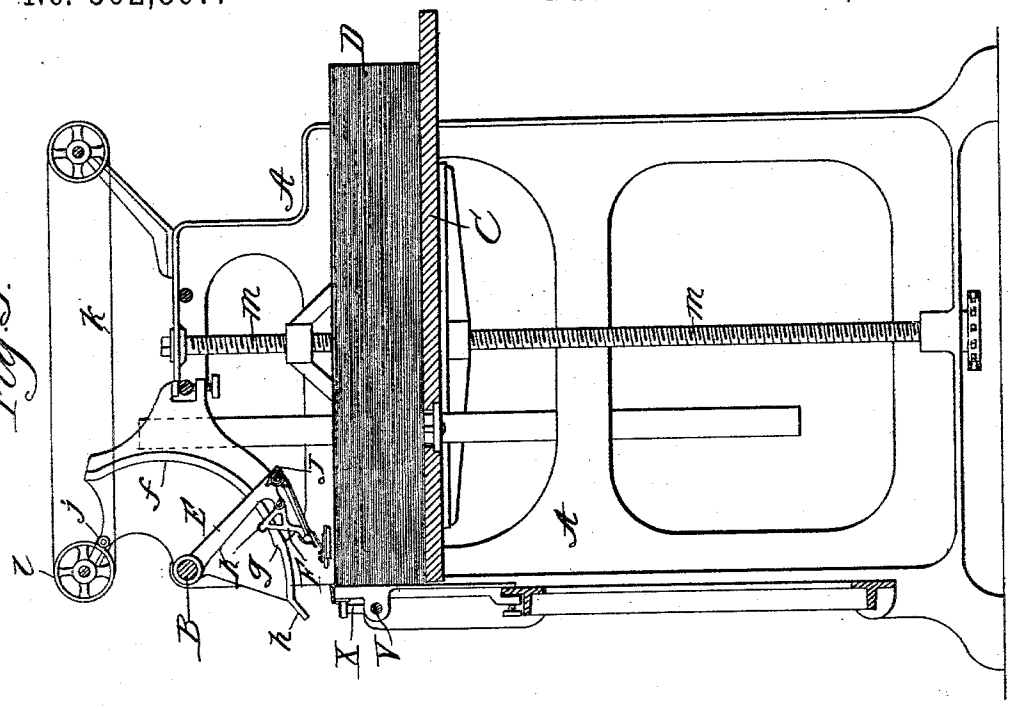
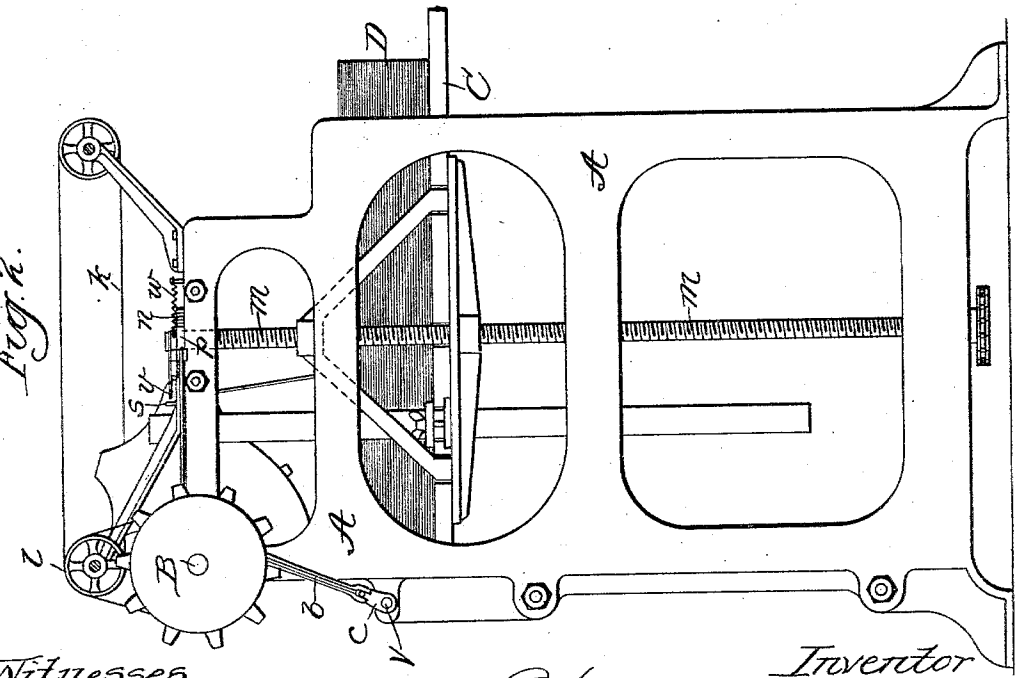


Fig. 2.



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W. G. TREVETTE.

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Fig. 4.

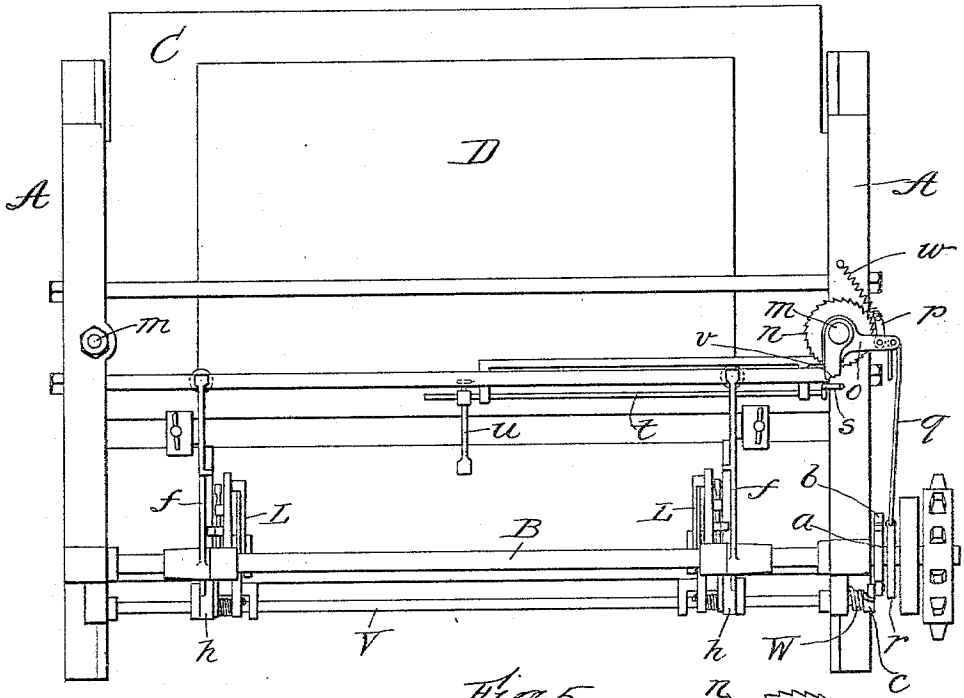


Fig. 5.

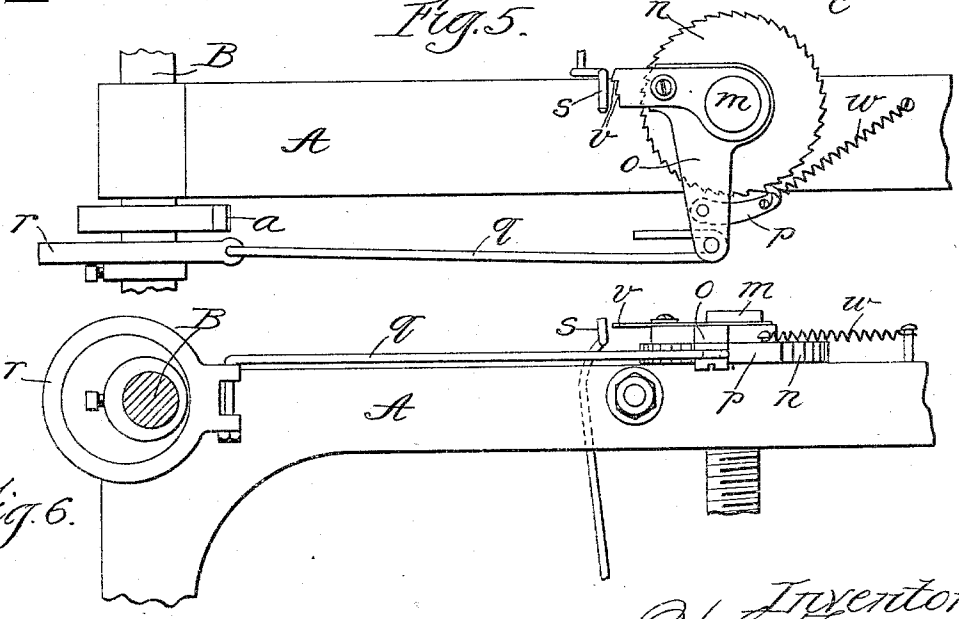
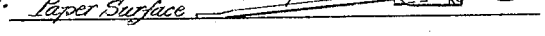


Fig. 6.



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W. G. TREVETTE.

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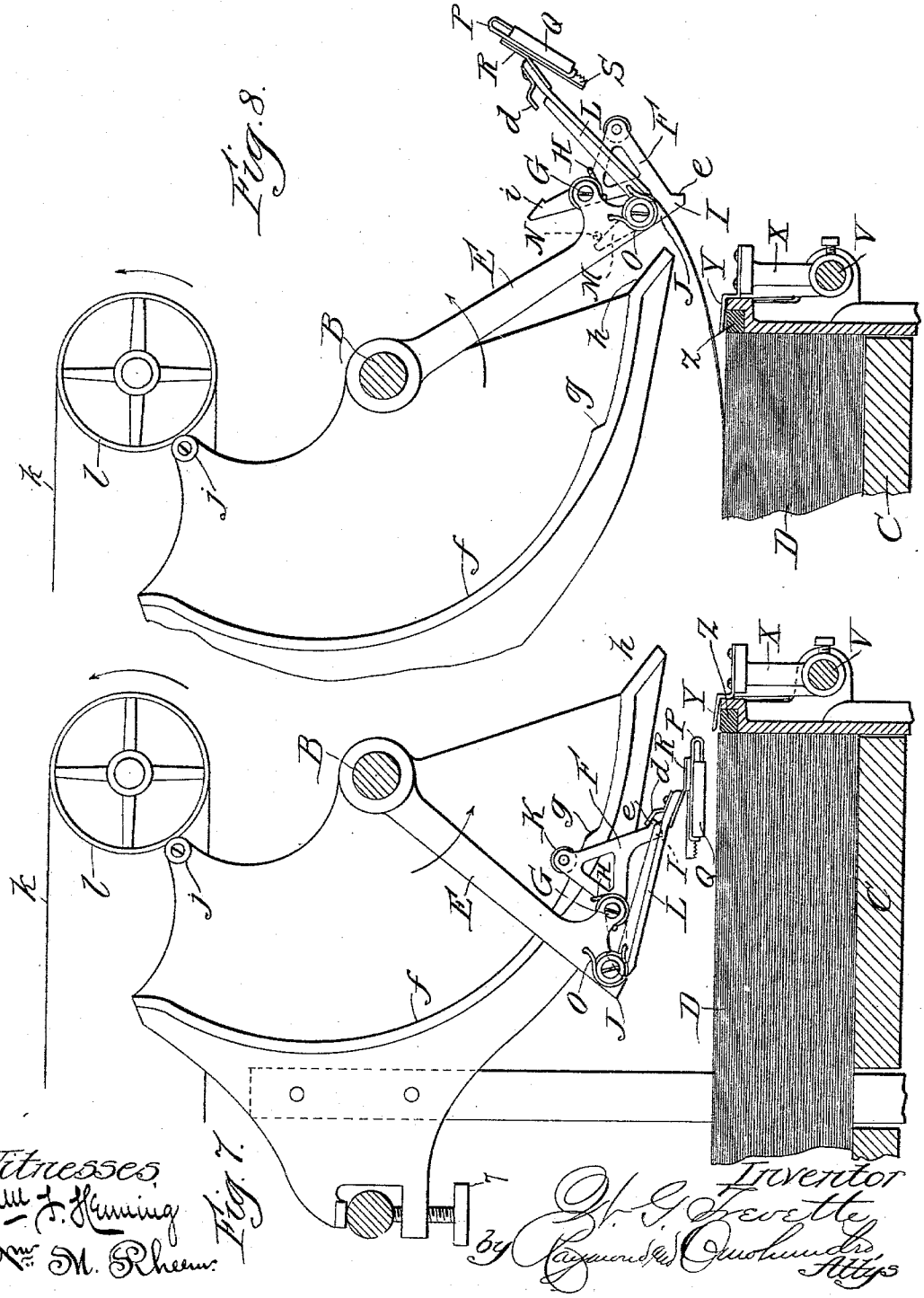

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Fig. 9.

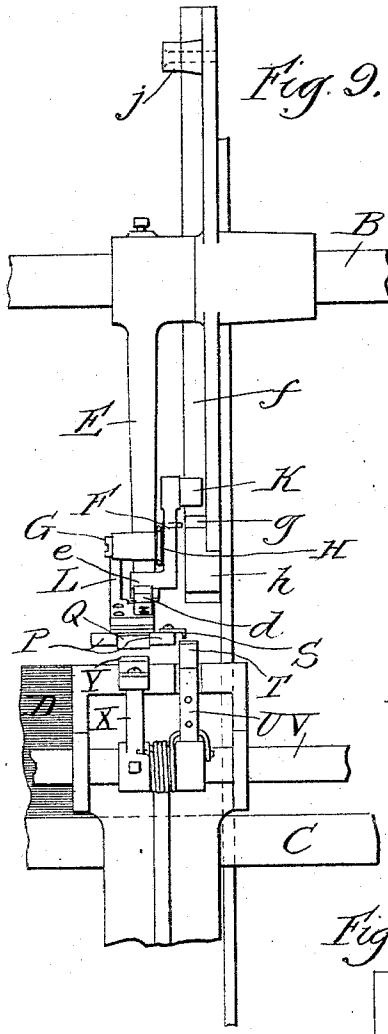


Fig. 10.

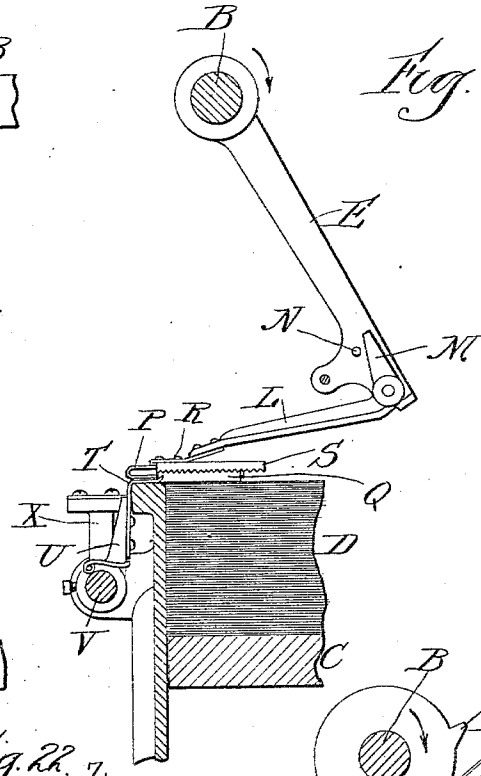


Fig. 22.

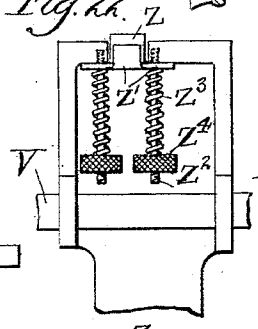


Fig. 12.

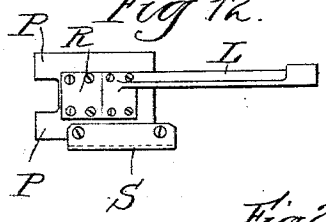


Fig. 23.

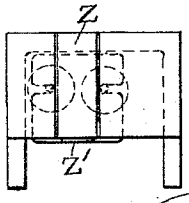
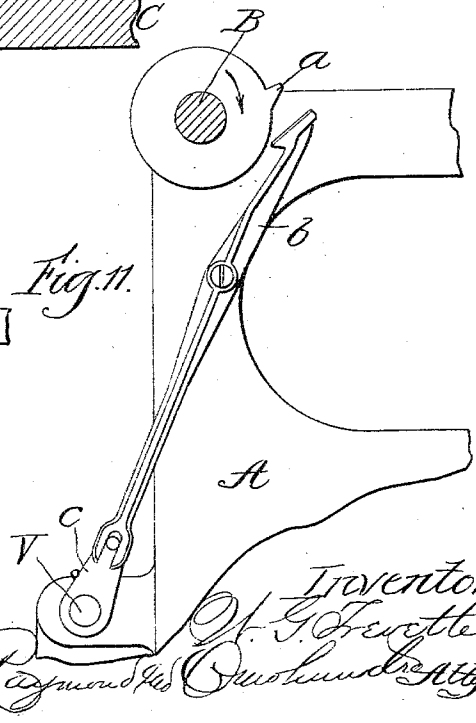


Fig. 11.



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(No Model.) 7 Sheets—Sheet 6.

W. G. TREVETTE.

PAPER FEEDING MACHINE.

No. 562,867. Patented June 30, 1896.

Fig. 13.

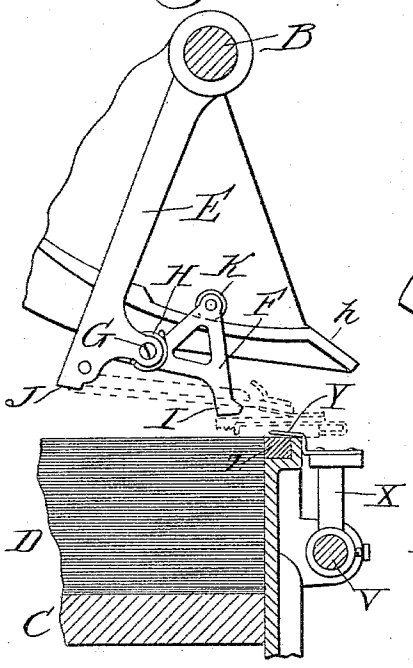


Fig. 14.

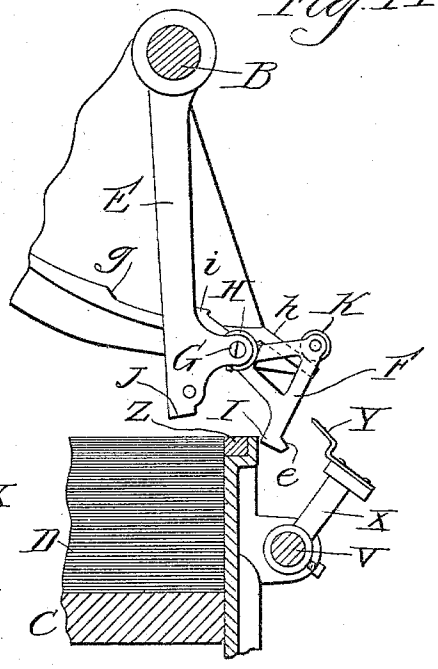


Fig. 15.

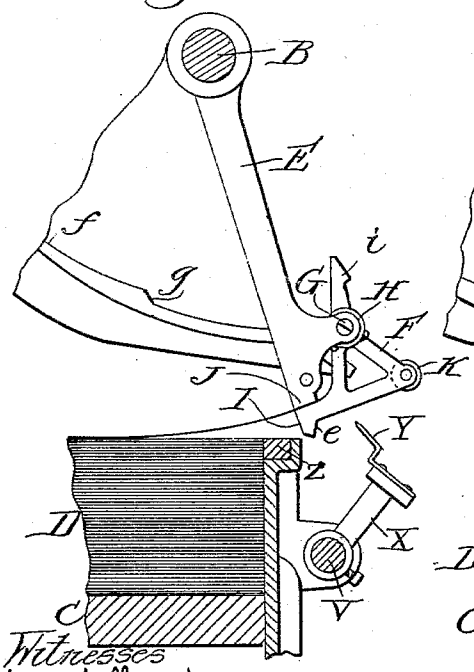
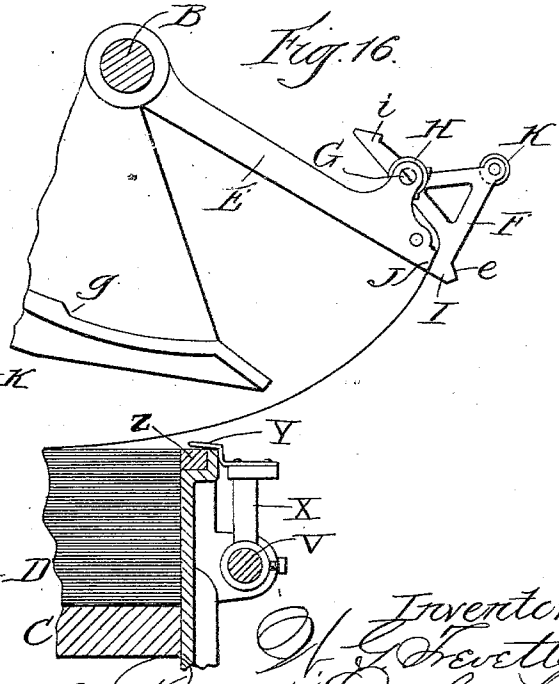


Fig. 16.



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(No Model.) 7 Sheets—Sheet 7.

W. G. TREVETTE.

PAPER FEEDING MACHINE.

No. 562,867. Patented June 30, 1896.

Fig. 17.

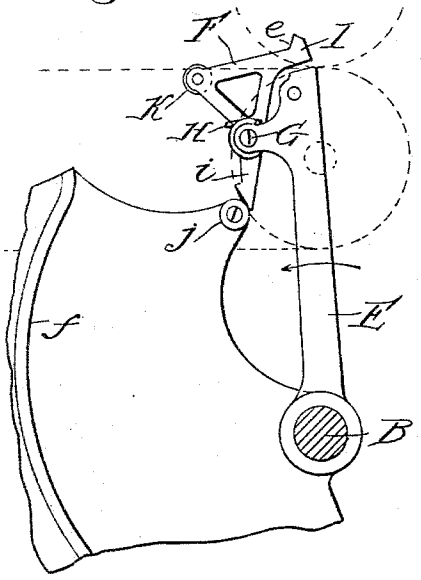


Fig. 18.

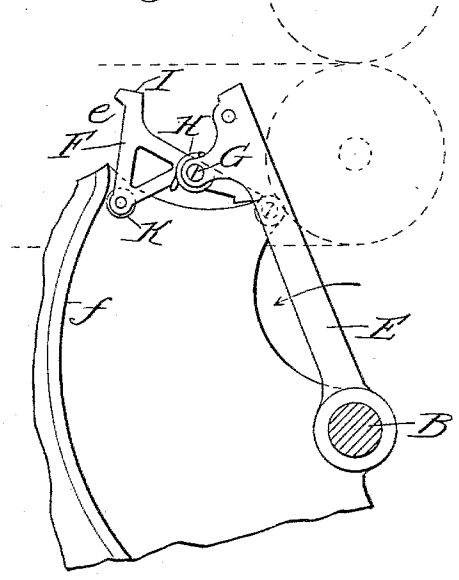


Fig. 19.

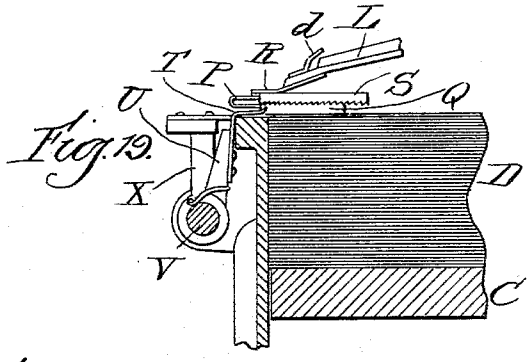


Fig. 20.

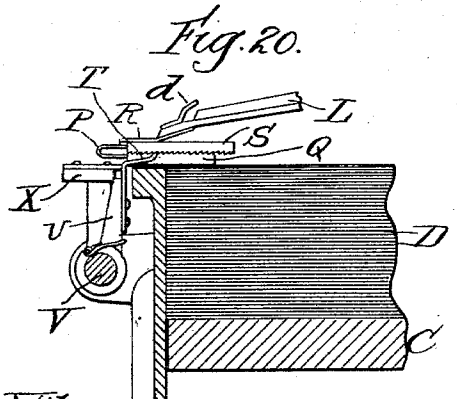
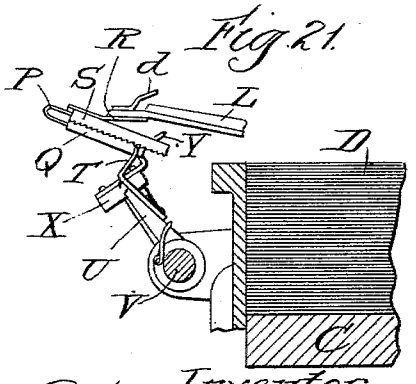


Fig. 21.



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by Raymond & Quackenbush Attys.

UNITED STATES PATENT OFFICE.

WENTWORTH G. TREVETTE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO LUCIUS W. WINCHESTER, OF SAME PLACE.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 562,867, dated June 30, 1896.

Application filed July 8, 1895. Serial No. 555,213. (No model.)

To all whom it may concern:

Be it known that I, WENTWORTH G. TREVETTE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feeding Attachments for Printing-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in feeding attachments for printing-presses designed to feed paper to a press from a pile, sheet by sheet, which class is exemplified in the invention contained in my application for Letters Patent filed on the 4th of February, 1895, Serial No. 537,316, for improvements in mechanism for separating and distributing paper.

The prime object of this invention is simplicity, compactness, and certainty in mechanism for separating the top sheet of paper from a pile, raising and gripping the same, and carrying it to a predetermined point of discharge at each cycle of its operation.

Another object is to insure the advancement of the top sheet from a pile, its arrest in proper position to be gripped, and its release from the advancing and arresting mechanism prior to being gripped preparatory to being carried to the point of discharge.

A further object is to automatically maintain the top of a pile of paper in approximately the same plane at all times, independent of the mechanism for advancing, gripping, and carrying the sheets from the pile.

These, and such other objects as may hereinafter appear, are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a front elevation of a feeding-machine embodying my invention. Fig. 2 represents a side elevation thereof; Fig. 3, a vertical longitudinal section on the line 3 3 of Fig. 1. Fig. 4 represents a top or plan view of the machine. Figs. 5 and 6 are enlarged detail views of the mechanism for operating the supporting-table for the pile of sheets. Figs. 7 and 8 are enlarged details of the advancing, gripping, and carrying mechanism, more clearly showing their mode of operation. Fig. 9 is an enlarged detail front elevation of the advancing, gripping, and carrying mechanism. Fig. 10 is an enlarged detail more especially illustrating the advancing mechanism. Fig. 11 is an enlarged detail of the trip for the stop mechanism. Fig. 12 is a detail plan view of the pusher-finger. Figs. 13, 14, 15, 16, 17, and 18 are detail views illustrating the operation and movement of the gripping and carrying devices, and Figs. 19, 20, and 21 are similar views showing the operation and movement of the advancing mechanism; Figs. 22 and 23, detail views.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, let A represent the main frame of my machine, of any suitable dimensions and character, in which is mounted a power-shaft B, driven from any suitable source of power, and from which shaft the operating parts of my mechanism are actuated.

At each side of the machine, and at intermediate points, if desired, is located the mechanism for advancing the sheets of paper, gripping the same, and delivering them to a predetermined point of discharge, while centrally of the machine is located a table or support C, upon which rests the pile D, composed of sheets of paper of the desired size.

The mechanism for operating the supporting-table will be described farther on, and as the mechanism for advancing, gripping, and carrying the sheets is duplicated at opposite sides of the machine it will only be necessary to describe a single group of such mechanism.

Upon the power-shaft B is mounted a jointed arm composed of two sections E and F, the former being attached directly to the shaft and the latter pivotally connected at G to the section E, where a coil-spring H, or spring of other suitable form, is provided for maintaining the two sections of the jointed arm yieldingly in their normal relative positions, with the projection I upon the section F, which constitutes one gripping-jaw, in contact with the end J of the section E, which constitutes the other gripping-jaw of the

jointed arm, which I will hereinafter refer to as a whole as the "gripper-arm."

It will be noted that the section E of the gripper-arm is substantially a straight bar with a lateral projection to receive the pivot connecting it with the section F, and that the latter section is substantially triangular in shape, being pivoted to the section E at one corner of the triangle, carrying an anti-friction-roller or other projection K at another corner of the triangle and having the projection I extending from the third corner of the triangle to form a gripping-jaw. I desire it understood, however, that my invention is not limited to the precise shape and arrangement of these parts, but that any other shape and arrangement may be substituted therefor that will accomplish the desired purpose, without departing from the spirit of my invention.

Pivoted to the section E of the gripper-arm is a pusher-finger comprising, preferably, a bell-crank lever, one arm, L, of which extends, normally, at substantially a right angle to the section E, and the other arm, M, of which extends substantially parallel with said arm when the parts are in their normal position, being maintained in this position, with the arm M resting against a shoulder or stop-pin N, by means of a spring O, coiled upon the pivot of the pusher-finger, or by a spring of any other suitable character. The purpose of having the pusher-finger in the form of a bell-crank lever is simply to provide a stop through the instrumentality of the arm M, but obviously the same result could be obtained by a simple arm instead of a lever, and the arm M might be dispensed with and the stop N arranged to engage directly with the arm L. Such mechanical details are used only to illustrate a simple embodiment of my invention.

Upon the outer free end of the arm L is yieldingly mounted a block P, faced with or carrying a rubber plate Q for direct contact with the sheets of paper, the block P being shown in the drawings as secured to the arm L by a flat spring R.

Attached to the block P is a toothed or serrated bar S, adapted to engage with a detent T, carried upon the end of an arm U, mounted upon a shaft V, loosely journaled upon the main frame at the front side of the machine, but yieldingly held by a spring W against rotation in a direction that would carry the arm U away from the edge of the main frame of the machine; or, in other words, the tension of the spring serves to yieldingly hold the arm up against the main frame, and, consequently, holds the detent in normal position, overlapping the upper edge of the frame, from which its upturned end slightly projects. On the shaft V, and adjacent to the arm U, is another arm X, which carries a stop-plate Y, that abuts against the forward edge of the frame and overlaps the upper edge of the frame, the overlapping portion of the stop-plate extending at an oblique angle to the upper face of the edge of the frame, so as to form, in conjunction with the upper edge of the frame, a tapering or contracted crotch to receive the forward edge of a sheet of paper, which, by reason of the oblique arrangement of the stop-plate, can pass under the same, although the dimensions and arrangement of the parts are intended to be such that but a single sheet can pass under the stop-plate. For greater certainty in securing this result, the frame has countersunk therein a small block of rubber Z, underlying the stop-plate Y, so that, if two sheets be advanced simultaneously by the finger, the friction of this rubber block will be enough greater than the friction between the two sheets of paper to detain the under sheet. This block may, of course, be made depressible by setting it upon a weak coil-spring socketed in the frame.

The operation of the parts just described will be best understood by reference to Figs. 7, 8, 10, 19, 20, and 21. As the gripper-arm revolves and comes substantially to a position midway that illustrated in Figs. 7 and 13, the rubber Q of the pusher-finger comes in contact with the top sheet of the pile, and, as the arm continues its movement, this sheet is forced forward over the frame and under the stop-plate Y, until it strikes against the shoulder formed by said plate, when the said plate and the arm X will be forced backward slightly away from the edge of the table, as illustrated in Fig. 20. This movement of the arm X is communicated through the shaft V to the arm U, carrying the detent T, which latter is thus thrown up into engagement with the toothed or serrated bar S upon the block P, but an exceedingly slight movement being necessary to produce such engagement. The further movement of the gripper-arm carrying the pusher-finger causes the latter to ride upon the detent and to be thereby instantly lifted from contact with the sheet of paper, the pusher-finger then passing on over the detent in its elevated position, as illustrated in Fig. 21, leaving the top sheet of paper advanced thereby projecting beyond the lower sheets of the pile. The sheet is now in position to be gripped, and immediately before being gripped a cam *a* upon the power-shaft B comes into engagement with one end of a trip-lever *b*, the opposite end of which has a pin-and-slot connection with a crank-arm *c* upon the shaft V, thereby serving to positively and quickly turn the shaft further in the direction of movement already imparted to it, thereby throwing down both the arms U and X, and, consequently, the detent and stop-plate out of the path of the sheet of paper, which may then be picked up and carried by the gripping-arm during its further movement. These devices for advancing and arresting the top sheet of paper are of great importance in a machine of this character, because it is essential to the successful practical operation of a machine of this character

that but a single sheet of paper should be advanced for each operation of the gripping mechanism; that the sheet so advanced shall stop in a proper and predetermined position to be engaged by the gripper-jaws, and that the sheet should not be rumpled or torn by the advancing mechanism after the sheet has moved to the desired point and engaged the stop devices or guides.

The devices which I have illustrated I have found, by practical embodiment and demonstration, to perfectly attain the desired objects with all the rapidity and certainty essential to the practical success of a machine of this kind.

In order to hold the pusher-finger clear of the sheet until immediately above the forward edge thereof, I provide an engagement between the arm L and the section F of the gripper-arm, and during a portion of the revolution of the gripper-arm, through the medium of the section F, positively suspend the pusher-finger against the depressing influence of its actuating-spring O, until the pusher-finger reaches the proper point for engagement with the paper. In the drawings, and in the embodiment I have made of my invention, I provide a projecting lip *d* on the arm L, which engages a shoulder *e* upon the projection I of the section F during a portion of the revolution of the gripper-arm, and during such portion of the revolution of said arm the anti-friction-roller or other projection K on the section F is in engagement with the cam *f*, adjustably secured in proper position to the framework of the machine by means of an adjusting-screw 7, which cam is cut away at the proper point, as at *g*, so as to allow the section F and, consequently, the pusher-finger to drop sufficiently to bring the pusher-block Q in contact with the top sheet of the pile of paper. As the roller travels down the cam *f*, the shoulder *e* upon the projection I of section F is caused to become engaged again with the lip *d*.

As the gripper-arm continues its revolution, the projection K runs down the sharply-inclined end *h* of the cam, and as soon as it becomes disengaged from the cam it is turned upon its pivot under the influence of its spring H, thus causing the jaw I, which has dropped down underneath the projecting edge of the top sheet of paper, to lift the edge of the sheet up and grip the same against the jaw J on the end of the section E of the gripper-arm. The lifting action serves to admit air under the top sheets, thus permitting the ready separation thereof from the next sheet below, so that it may be drawn off of the pile by the continued movement of the gripper-arm in the same direction as illustrated in Figs. 15 and 16.

At a predetermined point an arm *i* on the section F (preferably proceeding from the pivoted corner of the triangular-shaped section, as shown in the drawings) comes into contact with a stud or projection *j*, as shown in Fig. 17, which causes the section F to turn upon its pivot against its actuating-spring, so as to open the jaws I and J and release the paper, which is received by any suitable mechanism for conveying it to the desired point of delivery, such as the tapes *k*, illustrated in the drawings, which are shown trained around pulleys *l*, driven by suitable belting from the power-shaft.

The arm *i* remains in engagement with the stud *j* during the continued movement of the gripper-arm, thereby causing the continued turning of the section F upon its pivot until the projection K thereon engages the upper end of the cam *f*, as illustrated in Fig. 18, when the arm *i* leaves the stud and the cam takes control of the section F during a part of its next cycle of operation, which is a repetition of that just described.

It is important in a machine of this character, and operated as herein described, that the top of the pile of paper should be maintained at a substantially uniform height or plane at all times, because the advancing, gripping, and carrying mechanism come to the same points each time for the performance of their functions, and the sheet must be there for their service, and it is also important that the top of the pile should be maintained in substantially the same plane at all times, regardless of the kind or thickness of the sheets of paper. To this end, I propose to automatically control the elevation of the pile by the pile itself in such manner that the feed will automatically vary with the demands of the advancing and carrying devices, and with the thickness of the sheets of paper. This is accomplished by having the table C, carrying the pile of sheets D, supported upon a pair of upright screw-threaded shafts *m*, the nuts of which are attached to the table. Upon the upper end of one of these shafts, as illustrated in Fig. 4, is secured a ratchet-wheel *n*, and loosely mounted upon the shaft, adjacent to the ratchet-wheel, is a bell-crank lever *o*. This lever carries a spring-actuated pawl P, designed to engage with the ratchet-wheel, and also has one arm connected by a pitman *q* with an eccentric *r* upon the power-shaft B. The connection between the pitman *q* and the arm of the bell-crank *o* may be a pin-and-slot connection, or the pitman may be bent around a pin on the arm, or any other connection may be provided that will permit a lost motion between these parts when the arm is held stationary, while the pitman continues its operation. This result is attained by means of an arm *s*, constituting a detent, upon one end of a shaft *t*, suitably journaled in the frame of the machine, which shaft has adjustably mounted upon its opposite end an arm *u*, adapted to rest upon the surface of the paper, as illustrated in Figs. 4, 5, and 6. The detent *s* is adapted to engage notches *v*, formed in the free arm of the bell-crank lever *o*.

It will be readily understood that as long

as the detent is disengaged from the notches and the bell-crank lever is free to vibrate, the pawl carried thereby will engage the ratchet-wheel and cause the screw-shaft *m*, to which it is applied, to make a partial rotation, and, as this shaft is geared to the companion shaft by sprocket wheels and chains, or any other suitable connection, the table C will be intermittently elevated; but whenever the elevation of the table is more rapid than the demands of the advancing and gripping mechanism, and the top of the pile rises above the predetermined level, the detent, through the medium of the arm *u* and shaft *t*, will be thrown into engagement with notches *v* on the bell-crank lever and thus hold the latter against vibration and, consequently, the elevation of the table will be arrested and the table will remain at rest until the detent is disengaged from the bell-crank lever. While the bell-crank lever is held against vibration, the pitman makes its stroke; but, by reason of the lost motion between it and the bell-crank gained by the pin-and-slot or equivalent connection, it has no effect upon the bell-crank or the table. Obviously, however, as soon as the top of the pile falls below the predetermined plane the weight of the arm *u*, which follows the pile down, will cause the detent *s* to release the notches *v* on the bell-crank lever, and permit the latter to swing upon its pivot under the influence of the spring *w*, which also holds the pawl *p* in engagement with the ratchet-wheel, into position to be actuated by the pitman, it being understood that the spring causes the movement of the bell-crank lever in one direction and the pitman the movement in the opposite direction.

In Figs. 22 and 23 I have illustrated a simple form of spring-support for the rubber block Z, which is designed to give the block a yielding character not derived from the material of which it is composed, consisting of a plate Z′, to which the block Z is cemented, and which is guided upon a pair of rods Z^2, screwed into the frame of the machine at one end, and having coil-springs Z^3 sleeved thereon and confined between thumb-nuts Z^4 on the free ends of said rods and the plate Z′, which latter is slotted laterally for the passage of the rods, as illustrated more clearly in Fig. 23. The plate Z′ abuts against the frame of the machine, which limits the upward movement of the block, but, being supported upon the springs Z^3, the plate and block may be readily depressed and, by reason of the slot connection between the plate and the guide-rods, which is to a certain extent loose, one edge of the plate may be depressed in advance of, and to a greater or less extent than, the other edges. Such an arrangement as this I have found to be of importance in a machine of this character, because the rubber blocks in service become hardened and wear in a very short while if not spring-supported, but with the spring-support therefor the blocks are subjected to less wear, and the operation of the machine is rendered more certain.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a feeding attachment for printing-presses, the combination with a rotating arm composed of two sections pivoted together and provided with jaws normally held yieldingly in contact with each other, one of said sections being the actuated section and carrying the other, of a pusher-finger pivotally connected with the actuated section, substantially as described.

2. In a feeding attachment for printing-presses, the combination with a rotating arm composed of two sections pivoted together and provided with jaws normally held yieldingly in contact with each other, one of said sections being the actuated section and carrying the other section, of a pusher-finger pivotally connected with said actuated section, and arranged to be engaged by the other section during a portion of the revolution of the arm, substantially as described.

3. In a feeding attachment for printing-presses, the combination with a rotating arm composed of two sections, one of said sections being actuated while the other is substantially triangular in form and pivoted at one corner thereof to the said actuated section, of a cam, a jaw on each of said sections, a spring arranged to bring said jaws into contact with each other when the pivoted section is free from engagement with the cam and a projection on one corner of the pivoted section adapted to engage said cam during a portion of the rotation of the said arm and thereby hold the jaw on the pivoted section out of engagement with the jaw on the actuated section, substantially as described.

4. In a feeding attachment for printing-presses, the combination of a rotating arm composed of two sections, one of which is actuated while the other is substantially triangular in form and pivoted at one corner thereof to the actuated section at its free end, a stationary cam, a jaw on each of said sections, a spring adapted to bring said jaws together when the pivoted section is out of engagement with the cam, a stud or projection on one corner of the pivoted section arranged to engage the cam and hold the jaw on said pivoted section out of engagement with the jaw on the actuated section, a projection *j* on the cam and an arm extending out from one corner of said pivoted section and adapted to engage the projection on said cam to disengage the jaw on the pivoted section from the jaw on the actuated section and cause the jaw on said pivoted section to engage the cam, substantially as described.

5. In a feeding attachment for printing-presses, the combination with a rotating arm composed of two sections, one of which is actuated while the other is pivoted to and carried by the first-mentioned section, of a sta-

tionary cam, a projection on the pivoted section arranged to engage said cam, a jaw on each of said sections, a spring adapted to bring said jaws in contact with each other when the pivoted section is out of engagement with the cam, a spring-actuated pusher-finger pivoted to the actuated section, and a projection on the pivoted section arranged to engage the said finger during a portion of the revolution of said arm, substantially as described.

6. In a feeding attachment for printing-presses, the combination with means for advancing, gripping and carrying a sheet of paper, of mechanism for lifting the advancing mechanism from contact with said sheet, and means adapted to be operated by the advancing sheet to throw the lifting mechanism into contact with the advancing mechanism, substantially as described.

7. In a feeding attachment for printing-presses, the combination of means for advancing, gripping and carrying a single sheet of paper from a pile, said advancing means being constructed to press upon the top sheet of the pile, near its front edge, and move the same forward a limited distance, and mechanism actuated by the sheet so advanced to engage the said advancing means and lift the same from contact with the sheet, substantially as described.

8. In a feeding attachment for printing-presses, the combination with mechanism for advancing, gripping and carrying a sheet of paper, of mechanism for guiding and stopping the advanced sheet, and raising the advancing mechanism from contact with the advanced sheet, comprising a pivoted guide and stop plate, and a pivoted detent actuated by said guide-plate, and arranged to engage and lift the advancing mechanism, substantially as described.

9. In a feeding attachment for printing-presses, the combination with mechanism for advancing, gripping and carrying a sheet of paper, of mechanism for guiding and stopping said advanced sheet, and for raising the advancing mechanism from contact with said sheet, comprising a pivoted guide and stop plate, a detent actuated by said guide-plate to engage and lift the advancing mechanism, and means for moving said guide and stop plate and detent out of the path of the advanced sheet, substantially as described.

10. In a feeding attachment for printing-presses, the combination with mechanism for advancing, gripping and carrying a sheet of paper, of mechanism for guiding and stopping said advanced sheet, and for raising the advancing mechanism from contact with said sheet, comprising a pivoted guide and stop plate, a detent actuated by said guide-plate to engage and lift the advancing mechanism, and a trip-lever for moving said guide and stop and the detent out of the path of the advanced sheet, substantially as described.

11. In a feeding mechanism for printing-presses, the combination with mechanism for gripping and carrying a sheet of paper, a pusher-finger carried by such mechanism, and a serrated or toothed rack on said finger, of a spring-actuated rock-shaft, a guide and stop plate secured to an arm on said shaft, a detent secured to another arm on said shaft and arranged to engage the rack on the finger, said shaft being partially turned by the engagement of the advanced sheet with the guide and stop plates, substantially as described.

12. In a feeding mechanism for printing-presses, the combination with mechanism for gripping and carrying a sheet of paper, a pusher-finger carried by such mechanism, and a serrated or toothed rack on said finger, of a spring-actuated rock-shaft, a guide and stop plate secured to an arm on said shaft, a detent secured to another arm on said shaft and arranged to engage the rack on the finger, said shaft being partially turned by the engagement of the advanced sheet with the guide and stop plates, and a trip-lever for causing a further partial rotation of said shaft in the same direction, substantially as described.

13. In a feeding mechanism for printing-presses, the combination with mechanism for advancing, gripping and carrying a sheet of paper from a pile, of a supporting-table for said pile, upright threaded shafts actuating said table, a ratchet-wheel mounted on one of said shafts, a rocking bell-crank lever loosely pivoted on said shaft, an eccentric, a pitman actuated thereby, a pin-and-slot connection, between said pitman and one arm of the bell-crank, a spring-actuated pawl on said arm adapted to engage the ratchet-wheel, a rock-shaft, a detent on said shaft arranged to engage notches provided in the other arm of the bell-crank, and an arm on said shaft arranged to rest upon the pile of sheets, substantially as described.

WENTWORTH G. TREVETTE.

Witnesses:
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