(No Model.) 4 Sheets—Sheet 1.

A. SEDGWICK & J. NAYLOR, Jr.

PAPER FEEDER.

No. 336,071. Patented Feb. 9, 1886.

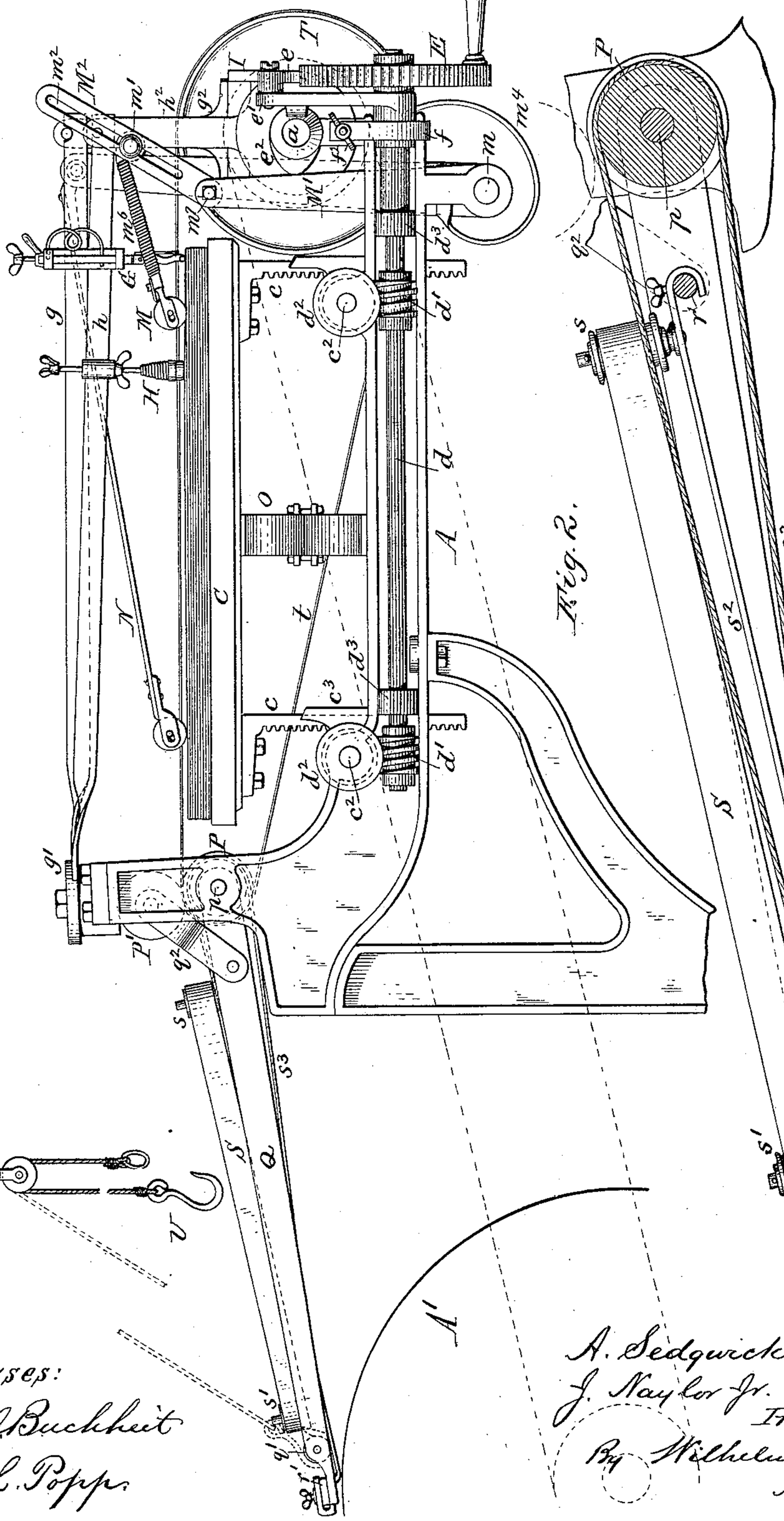

Fig. 1.

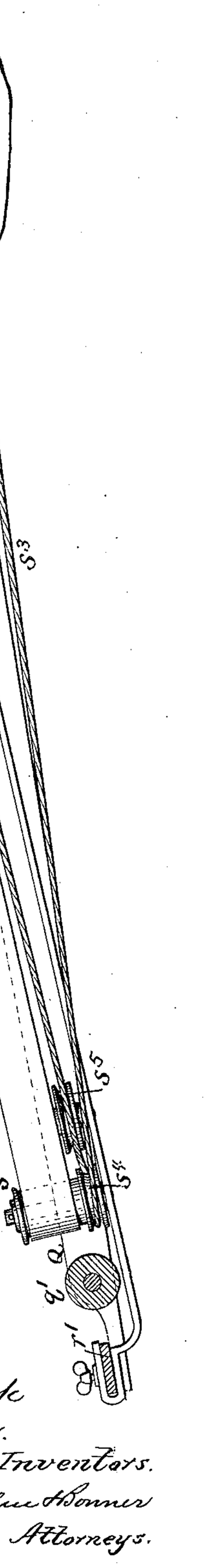

Fig. 2.

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(No Model.)

4 Sheets—Sheet 2.

A. SEDGWICK & J. NAYLOR, Jr.

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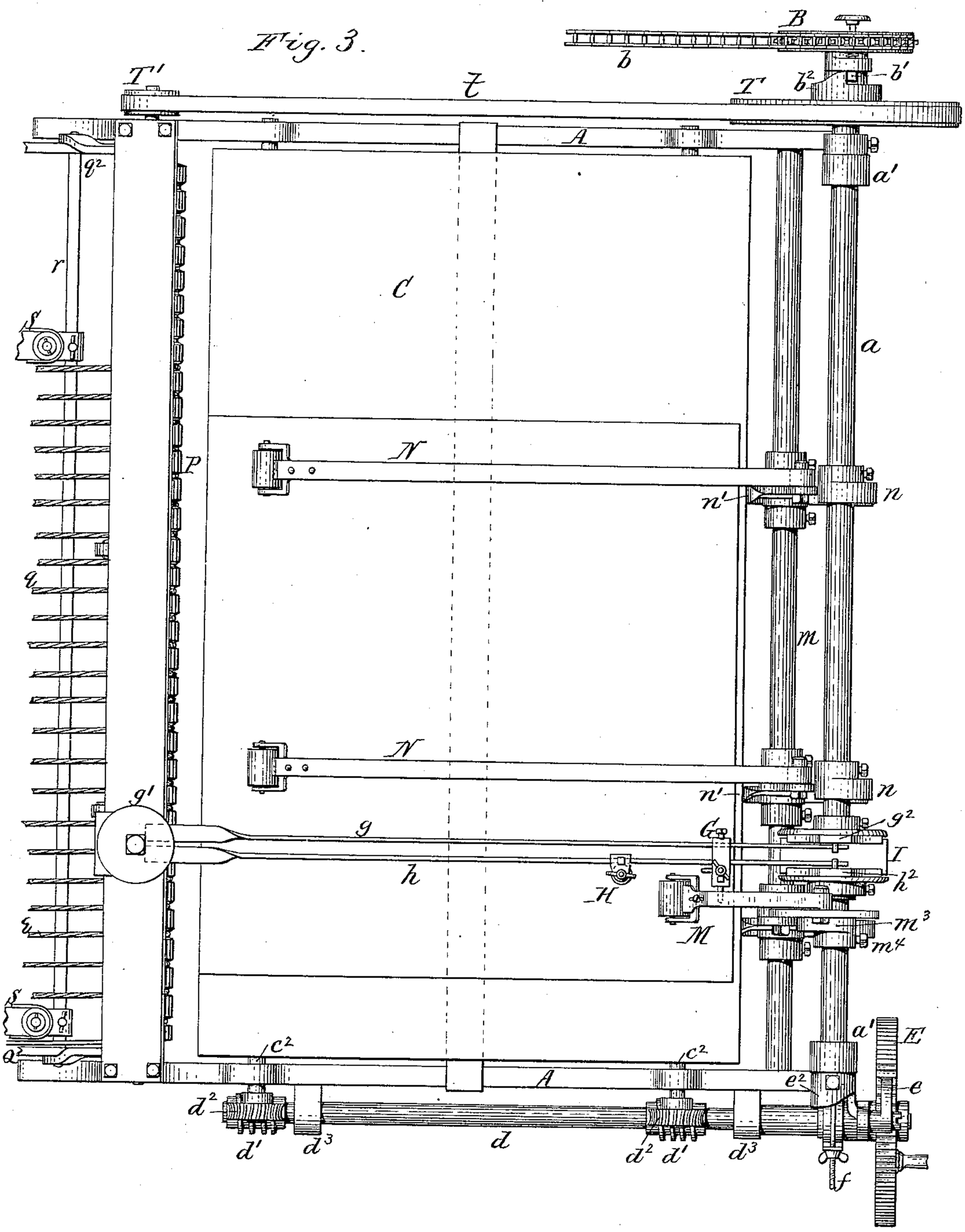
No. 336,071. Patented Feb. 9, 1886.

Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

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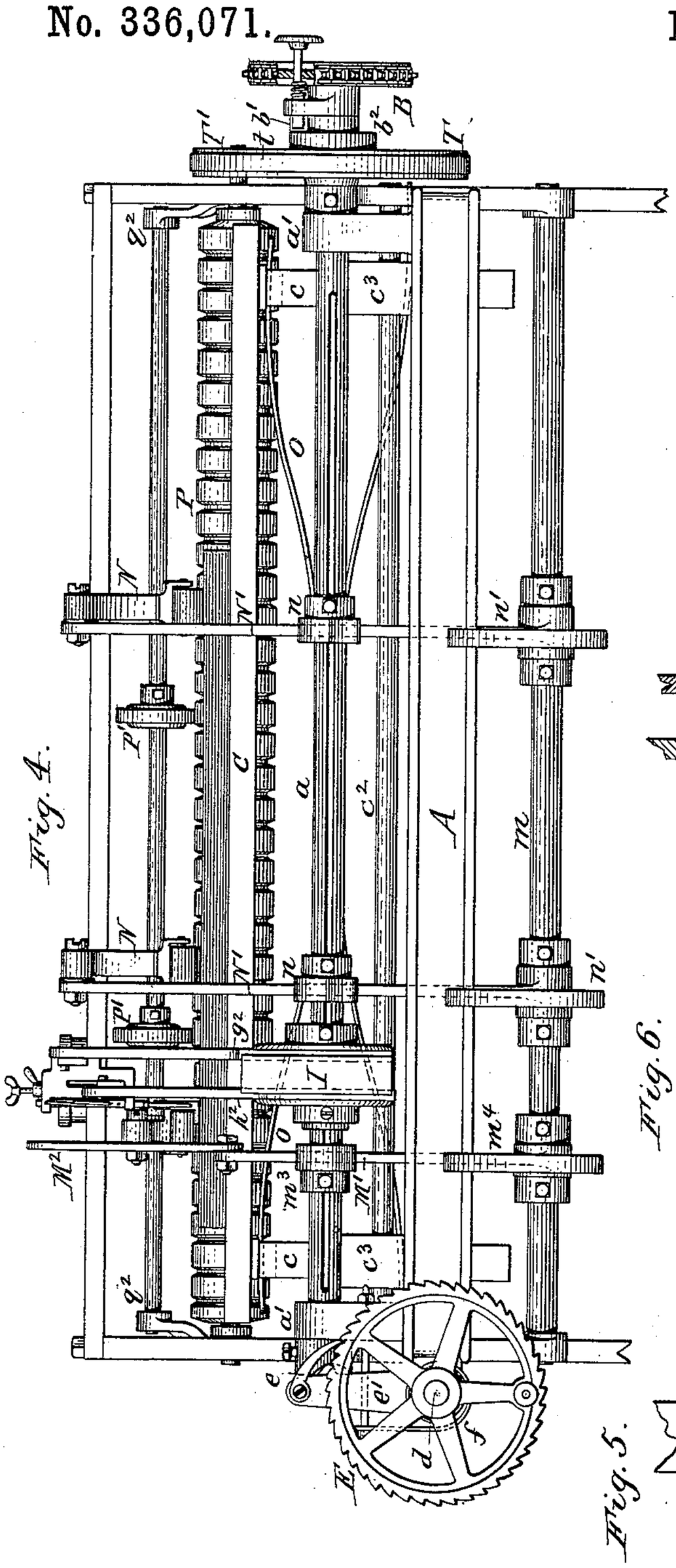

Fig. 4.

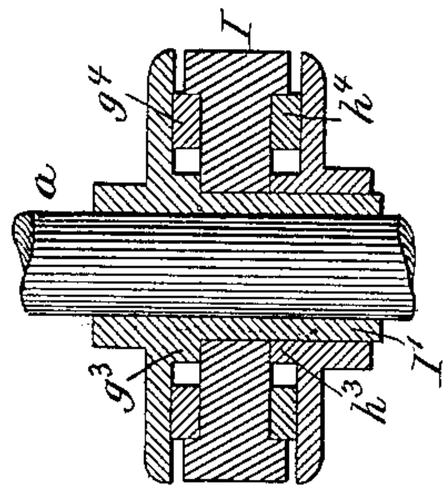

Fig. 8.

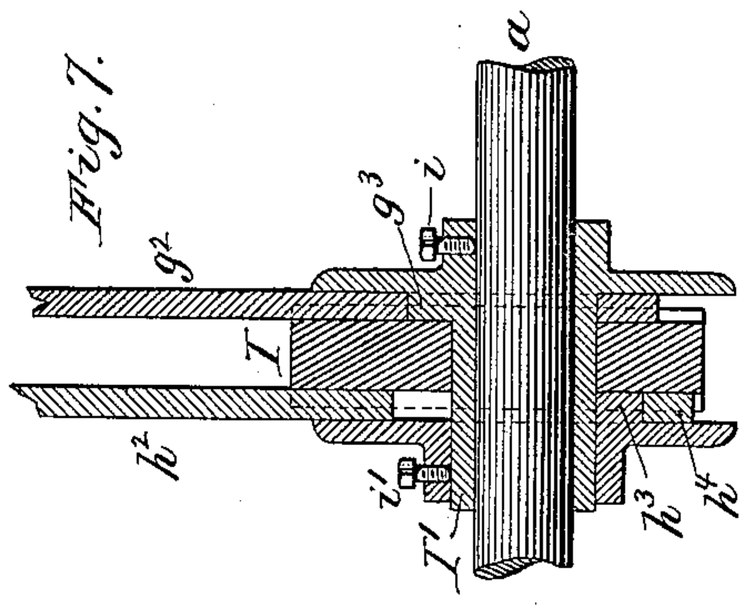

Fig. 7.

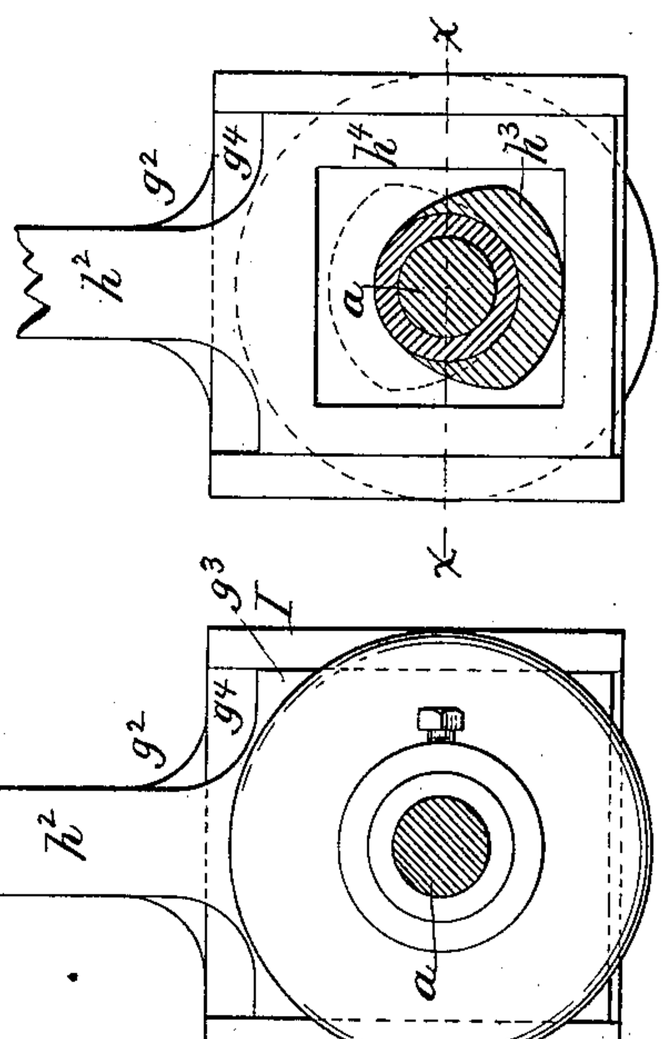

Fig. 6.

Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

A. SEDGWICK & J. NAYLOR, Jr.

PAPER FEEDER.

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Fig. 9.

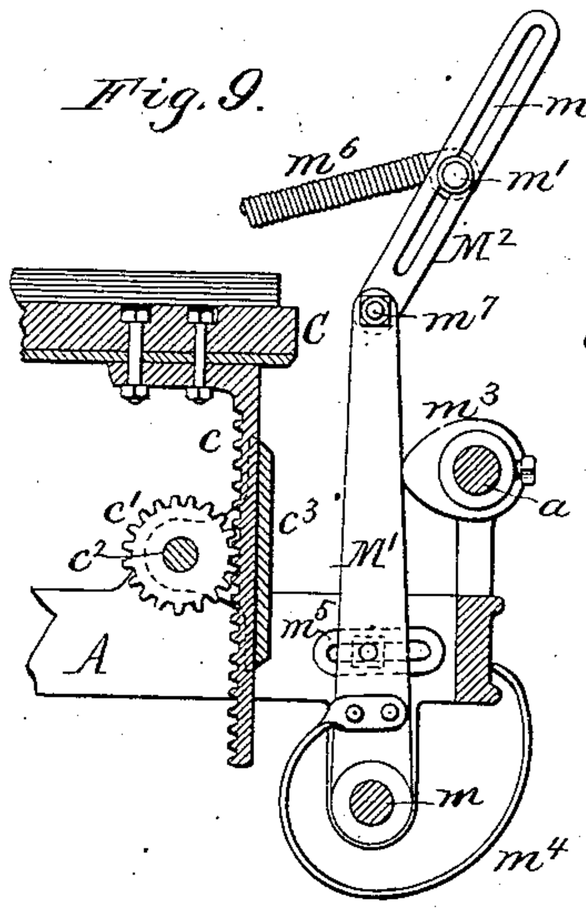


Fig. 10.

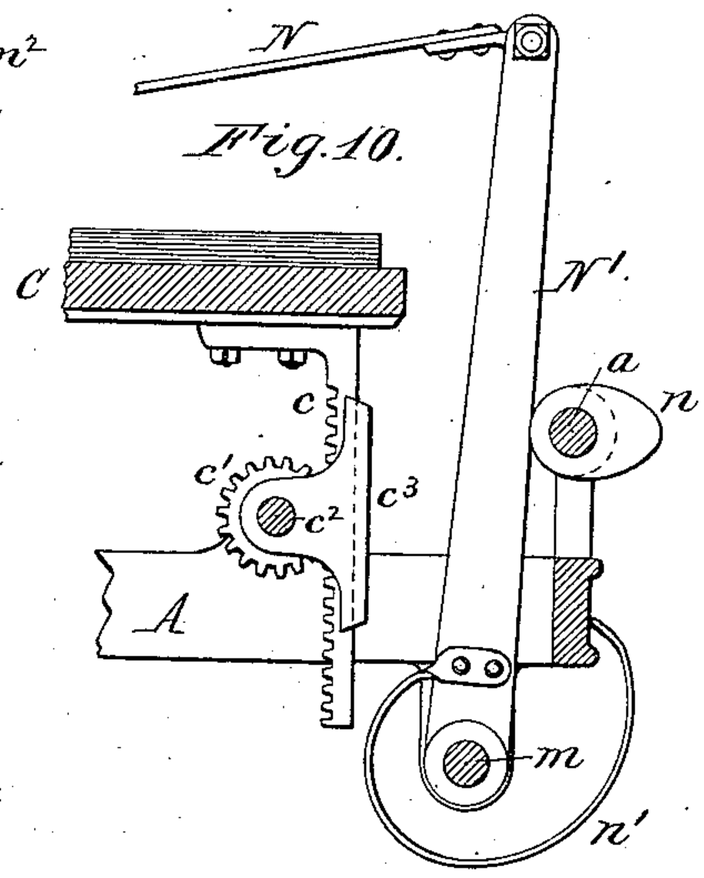


Fig. 11.

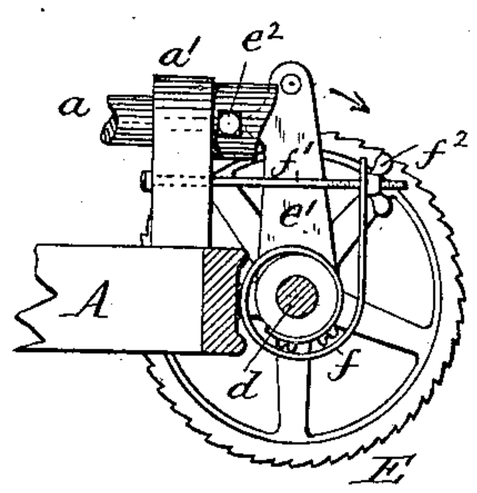


Fig. 12.

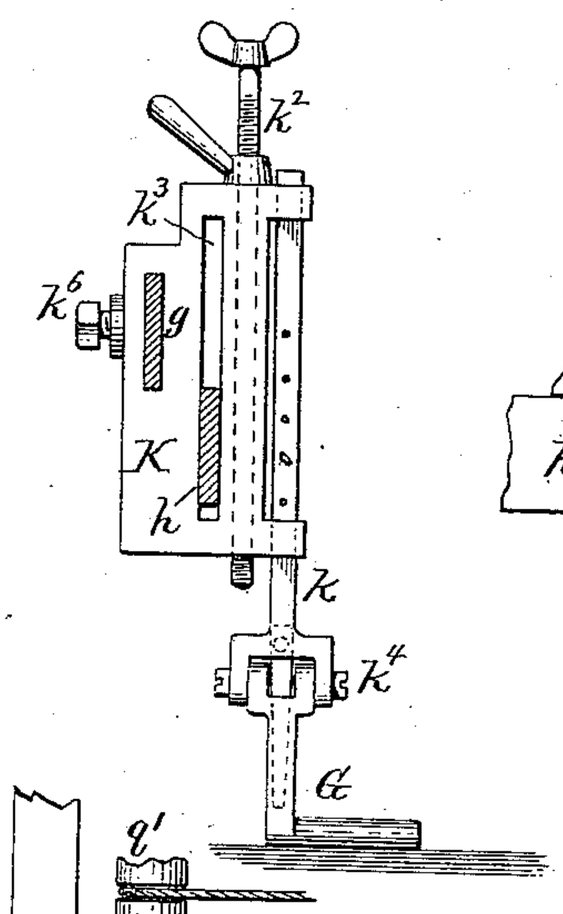


Fig. 13.

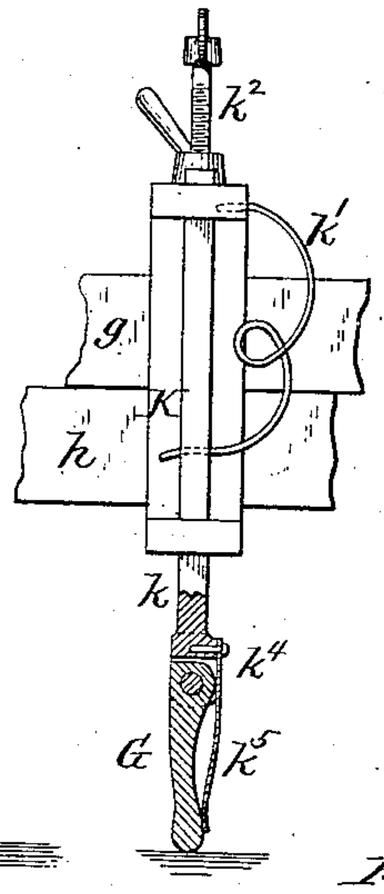


Fig. 14.

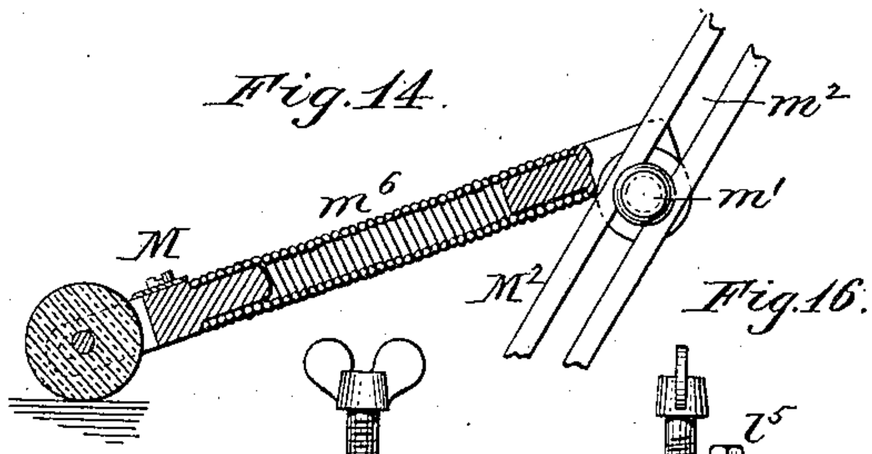
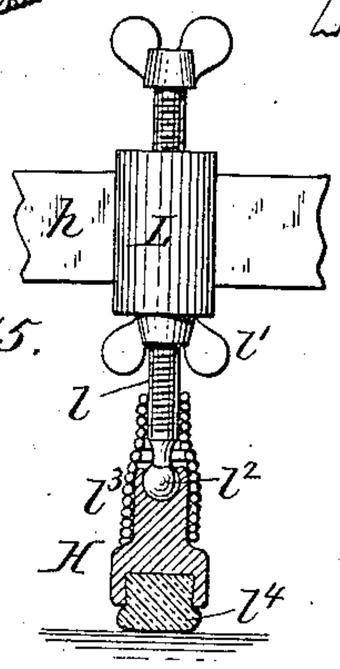


Fig. 16.

Fig. 15.



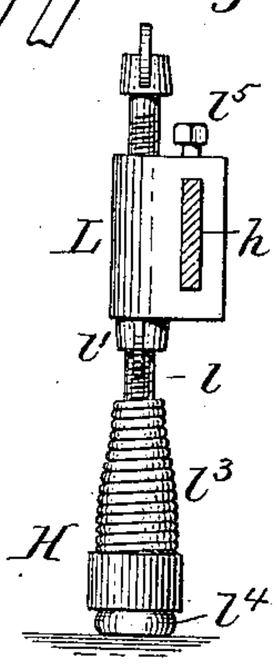
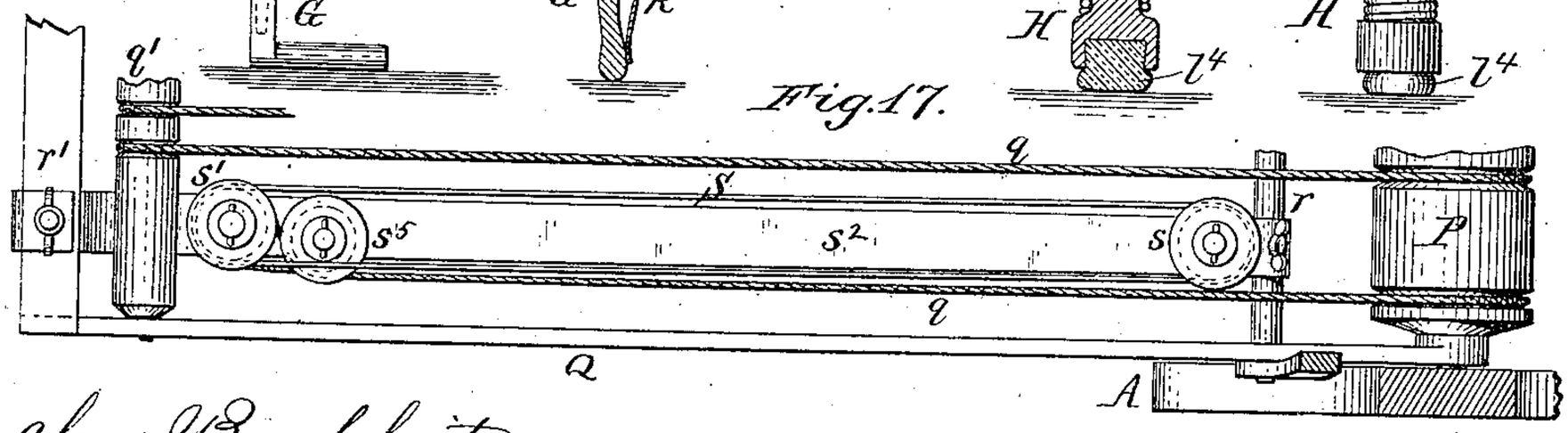


Fig. 17.



Witnesses.
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UNITED STATES PATENT OFFICE.

ALONZO SEDGWICK AND JAMES NAYLOR, JR., OF POUGHKEEPSIE, ASSIGNORS, BY MESNE ASSIGNMENTS, TO DAVID H. BURRELL, OF LITTLE FALLS, NEW YORK.

PAPER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 336,071, dated February 9, 1886.

Application filed February 20, 1885. Serial No. 156,557. (No model.)

To all whom it may concern:

Be it known that we, ALONZO SEDGWICK and JAMES NAYLOR, Jr., both of the city of Poughkeepsie, in the county of Dutchess and State of New York, have invented new and useful Improvements in Paper-Feeders, of which the following is a specification.

This invention relates to an improvement in that class of paper-feeders which feed sheets of paper one after another from the top of a pile to a ruling, folding, or calendering machine, printing-press, or other machine in which sheet-paper is used. These machines consist, essentially, of a pile-supporting bed or table, which is automatically raised as the paper is fed off, feeding-fingers whereby the top sheet is removed, and traveling tapes whereby the removed top sheet is conveyed away.

The object of the present invention is to improve these parts and to better adapt the machine for use in connection with printing-presses; and our invention consists, to these ends, of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of four sheets, Figure 1 is a side elevation of our improved paper-feeder. Fig. 2 is a longitudinal sectional elevation of the tapes and paper-guides on an enlarged scale. Fig. 3 is a top plan view of our improved paper-feeder. Fig. 4 is a rear elevation of the machine. Fig. 5 is a side elevation of the devices whereby the holding-down finger and gage are actuated. Fig. 6 is a sectional elevation of the same. Fig. 7 is a vertical section at right angles to Fig. 6. Fig. 8 is a horizontal section in line *x x*, Fig. 6. Figs. 9 and 10 are sectional elevations of the mechanism whereby the buckling and feeding fingers are actuated. Fig. 11 is a sectional elevation of the mechanism whereby the table is moved. Fig. 12 is a sectional front elevation of the holding-down finger. Fig. 13 is a sectional side elevation of the same. Fig. 14 is a sectional side elevation of the buckling-finger. Fig. 15 is a sectional side elevation of the gage. Fig. 16 is a sectional front elevation of the same. Fig. 17 is a top plan view of one of the paper-guides.

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

A represents the stationary frame of the machine, which may be attached to the frame of a printing-press in such manner that the machine takes the place of the ordinary feed-board, as illustrated in Fig. 1, in which A′ represents the cylinder of the press. *a* represents the horizontal driving-shaft of the machine, arranged transversely at the rear end of the frame A and journaled in bearings *a′*, secured thereto.

B is a sprocket or chain wheel mounted loosely on one end of the driving-shaft *a*, and connected with a similar wheel on the shaft of the press-cylinder or other shaft, from which power is derived by the drive-chain *b*. The chain-wheel B is connected with the shaft *a* by a sliding bolt, *b′*, which is attached to the wheel B, and engages with a ratchet-wheel, b^2, secured to the shaft *a*. This ratchet-wheel is provided with a single tooth, so that when the feeder is connected with a printing-press the feeder will always start at a given point with reference to the press.

C represents the table upon which the pile of paper is placed, and which is supported by downwardly-extending rack-bars *c*, which engage with pinions *c′*. The latter are mounted on horizontal shafts c^2, arranged underneath the table parallel with the driving-shaft *a*, and journaled in bearings secured to the main frame A. The rack-bars *c* are held in contact with the wheels *c′* by guide-caps c^3, which are hung on the shafts c^2, and bear against the rear sides of the rack-bars, as represented in Figs. 9 and 10.

d represents a counter-shaft arranged on one side of the main frame A at right angles to the shafts c^2 and below the same.

d′ represents worms secured to the shaft *d* and engaging with worm-wheels d^2, secured to the ends of the shafts c^2, whereby motion is transmitted from the shaft *d* to the shafts c^2. The shaft *d* is journaled in bearings d^3, secured to the main frame.

E represents a ratchet-wheel secured to the rear end of the shaft *d*, and *e* represents an actuating-pawl, which engages with the ratchet-wheel E. The pawl *e* is attached to the end

of an arm, e', which is mounted loosely on the shaft d near the driving-shaft a, and which is actuated by a cam, e^2, mounted on the end of the shaft a. The arm e' is provided with a nose or projection, which engages against the face of the cam e^2, as represented in Figs. 3 and 11, so that the arm e' is moved by the cam e^2 in the direction in which the pawl e slides over the ratchets of the wheel E, and gives no motion to the same, as represented by the arrow in Fig. 11.

f represents a spiral spring, which is secured with one end to the hub of the arm e', and attached with its other end to an adjusting-rod, f', on which it is adjustably held by a thumb-nut, f^2, by which the pressure of the spring can be regulated. The rod f' is secured to one of the bearings a' or to some other part of the machine. The spring f presses the arm e' against the cam e^2, and causes the arm e' to swing toward the cam as the arm is released by the cam, so that a rocking movement is imparted to the arm e' in one direction by the cam e^2 and in the other direction by the spring f. The movement of the arm e', produced by the spring f, takes place in the direction in which the pawl e engages with the ratchets of the wheel E and turns the latter, so that the motion of the wheel E and of the shaft d and shafts c^2 is produced by the pressure of the spring f, while the cam e^2 merely serves to swing the arm e' backward and place the pawl e in position to begin its operative movement. The motion which is produced by the spring f in the shafts c^2 causes an upward movement of the rack-bars c and table C.

G represents the holding-down finger, arranged near one corner of the pile of paper and attached to a spring-bar, g, which is secured with its forward end to a cross piece, g', of the main frame.

H represents the gage-finger, arranged to bear upon the paper in front of the holding-down finger G, and attached to a spring-bar, h, which is secured with its front end to the cross-piece g'. The rear ends of the spring-bars g and h are connected, respectively, by rods g^2 and h^2 with cams g^3 and h^3, secured to the driving-shaft a. The lower ends of the rods h^2 and g^2 are constructed in the form of open frames or heads g^4 and h^4, which inclose the cams g^3 h^3. The spring-arms g h hold the frames g^4 h^4 against the under sides of the cams g^3 h^3, so that the downward movement of the spring-bars is produced by the cams, while their upward movement is produced by their elasticity, which causes the frames g^4 h^4 to follow the cams during their upward movement. The frames g^4 h^4 are guided in a block, I, which is arranged between the frames and provided with upright ways, in which the frames move. The cam g^3 is formed on a sleeve, I', which is secured to the shaft a by a set-screw, i, and the cam h^3 is secured to the sleeve I' by a set-screw, i', as clearly represented in Fig. 7, so that these cams and the parts connected therewith can be adjusted on the shaft a by simply releasing the set-screw i. The cams g^3 and h^3 are so formed as to alternately raise and lower the holding-down finger G and the gage-finger H, both fingers being down on the paper an instant before either rises. The front ends of the arms g h are laterally adjustable on the cross-piece g', in order to adapt the fingers and their actuating parts to the width of the pile of paper.

The holding-down finger G performs the double function of holding the pile with a strong pressure when the gage-finger is raised, and also holding the top sheet with a light pressure in separating the top sheet from the pile. In order to accomplish this, the finger G is attached to the lower end of a rod, k, which slides vertically in the lugs of a carrier, K, which latter is secured to the spring-bar g, as represented in Figs. 12 and 13. The rod k is pressed downwardly by a light spring, k', which is attached with one end to the carrier K and with its other end to the rod k.

k^2 is a vertical set-screw which is attached to the carrier K and terminates a short distance above the finger G. When the spring-bar g is lowered by the cam g^3, the lower end of the set-screw k^2 strikes upon the finger G and presses the latter downwardly against the paper, thus securely holding the pile with a strong pressure. When the spring-bar g is raised, so that the set-screw k^2 is raised from the finger G, the latter is lightly held down upon the paper by the spring k'. By adjusting the set-screw k^2 the precise point at which the strong pressure is applied to the finger G is nicely regulated. The carrier K is provided with a vertical slot, k^3, through which the spring-bar h passes. The finger G is attached to the rod k by a pivotal joint, k^4, the pivots standing at right angles to the length of the bar g, the lower end of the rod k being bifurcated to straddle the upper end of the finger G. The upper pivoted end of the finger G is provided at its front side with a shoulder which bears against the rod k when the finger G is in an upright position, and which prevents the finger G from swinging forwardly beyond its upright position, while the finger is free to swing backwardly.

k^5 is a light spring, which is secured to the lower end of the rod k and bears with its lower end against the finger G, tending to hold the latter in an upright position, but permitting the finger to yield rearwardly under a pressure. By this means the finger is allowed to yield backwardly as the bar g is lowered, and prevented from assuming a forwardly-inclined position with reference to the surface of the pile of paper, which it would do if the finger G were rigidly attached to the bar g, owing to the curvilinear movement of the finger, by reason of the bar g being substantially a pivoted bar. This slight curvilinear movement would cause a rigid finger to work the pile gradually forward out of place, and this is prevented by rendering the finger backwardly-yielding, as above described, because the joint

in the finger permits the latter to maintain a vertical position on the pile irrespective of the movements of the bar *g*. The carrier K is adjustably secured to the bar *g* by set-screws k^6.

The gage-finger H is attached to a carrier, L, by means of a vertical screw-shank, *l*, which works in a threaded opening in the carrier and is clamped on the same by a thumb-nut, *l'*. The shank *l* is provided at its lower end with a ball, l^2, which engages in a spherical socket in the finger H, thereby rendering the finger yielding in all directions and permitting the finger to adjust itself to the uneven or wavy surface of the pile. The finger H is held in an upright position by an elastic sleeve, l^3, of rubber or coiled wire, which surrounds the finger and the lower portion of the shank *l* and permits the finger to yield, but holds the finger substantially in an upright position in the absence of any disturbing force. The lower end of the finger H is faced with a rubber block, l^4, which affords a firm bearing on the paper. The carrier L is adjustably secured to the bar *h* by a set-screw, l^5. The gage-finger H resists the upward movement of the pile, and this resistance is transmitted through the rack-bars *c*, wheels *c' d² d'*, shaft *d*, ratchet-wheel E, pawl *e*, and arm *e'*, to the spring *f*, which latter tends to feed up the pile against the gage-finger H, so that by increasing or reducing the pressure of the spring *f* the feed is increased or reduced.

M represents the buckling-finger, whereby the top sheet is buckled against the gage-finger H and separated from the pile. The buckling-finger is provided at its front end with a roller which bears upon the paper and a stop device whereby the roller is prevented from rotating during the forward movement of the finger and permitted to rotate during the backward movement of the finger, as fully described in Letters Patent of the United States No. 308,285, granted to A. Sedgwick, November 18, 1884.

M' represents a rock-arm whereby the buckling-finger M is actuated. This arm is mounted loosely upon a horizontal shaft or rod, *m*, which is arranged parallel with the driving-shaft *a* below the main frame A. The upper end of the rock-arm M' is provided with an extension, M^2, to which the buckling-finger M is adjustably attached by a bolt, *m'*, passing through a slot, m^2, in the extension M^2, whereby the throw of the buckling-finger can be increased or reduced. The rock-arm M' is swung forwardly by a cam, m^3, secured to the driving-shaft *a*, and backwardly by a spring, m^4. The throw of the rock-arm M' is regulated by an adjustable stop, m^5, which is secured to the rock-arm and comes in contact with the main frame A, thereby determining the initial position of the rock-arm.

The body of the buckling-finger M is composed of a coiled spring, m^6, which tends to hold the roller of the buckling-finger down upon the paper, and at the same time permits the roller to assume an inclined position laterally in adjusting itself to the uneven surface of the paper. The extension M^2 is attached to the rock-arm M' by a bolt, m^7, on which the extension M^2 can be adjusted so as to regulate the position of the buckling-finger on the paper and the operative length of the rock-arm by which the buckling-finger is moved.

N N represent the feeding-fingers, provided at their front ends with rollers like those described in the above-mentioned patent, and attached with their rear ends to the rock-arm M', which are mounted loosely on the shaft *m* and swung forwardly by cams *n*, secured to the driving-shaft *a*, and backwardly by springs *n'*.

When the buckling-finger M moves forward to separate the top sheet, the holding-down finger G is raised and bears upon the corners of the pile with a slight pressure. When the top sheet has been separated, the holding-down finger is lowered and presses upon the corner of the pile with a heavy pressure, thereby holding the pile in place. The gage-finger H is next raised to release the top sheet, and the feeding-fingers N then move forwardly and remove the top sheet.

O represents a duplex spring, which is arranged between the table C and the stationary frame A, and rests with its lower arms upon the frame A and with its upper arms against the table C, as represented in Figs. 1 and 4. This spring exerts an upward pressure against the table C, which is adjusted sufficiently to compensate for the weight of the pile, and which grows less as the spring becomes expanded in raising the table in the same measure as the weight of the pile is reduced by feeding off the paper. The spring O substantially relieves the parts which feed the table from the weight of the pile of paper, and thereby renders the feeding mechanism more sensitive to the changes which take place in feeding off the paper.

P represents the lower feed-roller, arranged between the front portion of the main frame A, and having its shaft *p* journaled in bearings formed in said frame.

P' represents the upper feed-rollers, which rest upon the lower roller, P. The latter is provided with annular grooves, in which run the feed or carrying tapes *q*, which run around the tail-roller *q'*. The roller *q'* is journaled in a frame, Q, which is hung loosely upon the shaft *p* of the lower feed-roller, so that the frame Q can be turned on the shaft *p* as an axis. The upper feed-rollers, P', are journaled in side bars, q^2, which are pivoted at their lower ends to the frame Q.

r r' are cross-bars which connect the side bars of the frame Q near their front and rear ends.

S represents traveling endless guide-belts arranged on the inner sides of the side bars of the frame Q, to guide the paper as it passes over the tapes *q*. Each endless belt S runs around two pulleys or wheels, *s s'*, which turn on studs secured to longitudinal bars s^2. The latter are adjustably secured with their front

ends to the cross-bar r and with their rear ends to the cross-bar r'. Each roller s' is rotated by an endless cord, s^3, which runs around a grooved pulley, s^4, formed at the lower end of the roller s', and around the lower feed-roller, P, from which the endless cord s^5 derives its motion, in such manner that the inner portion of each endless belt S runs in the direction in which the paper moves over the tapes q. The endless cord s^3 is half-twisted, and guided by a grooved roller, s^5, attached to the longitudinal bar s^2, as represented in Fig. 2. The tapes q may be arranged slightly obliquely toward the endless belt S, against which it is desired to feed the paper. The lower feed-roller, P, is driven from the driving-shaft a by an endless belt, t, running around pulleys T T', secured, respectively, to the driving-shaft a and the shaft of the feed-roller P.

It will be seen that all the parts of the feeder are driven from the driving-shaft a. The tail-roller q' delivers the paper to the printing-press or other machine with which the feeder is connected. By engaging a hook, U, with the tail-roller q' or some other part of the movable frame Q, as represented by dotted lines in Fig. 1, the frame Q and the parts supported on the same can be raised up when it is desired to have access to the cylinder of the printing-press for making ready, or to such other machine with which the feeder is connected.

The feeding-fingers N N move forwardly until the front portion of the top sheet is firmly seized by the feed-rollers P P'. The latter then move the sheet forwardly upon the tapes, and the tapes convey the sheet onward and register the sheet against one or the other of the traveling side guides S. The traveling side guides can be adjusted toward or from the sides of the frame Q by adjusting the bars f^2 on the rods r r'.

The buckling finger M and the feed-fingers N have a rectilinear reciprocating movement in the same direction on the pile, whereby the lateral displacement of the top sheet is avoided and the actuating mechanism of the fingers is greatly simplified.

We claim as our invention—

1. In a paper-feeder, the combination, with the movable pile-supporting table, of a gage adapted to rest on the pile and resist its upward movement, a feed mechanism connected with the table, and a feed-spring, which causes the feed mechanism to feed the table with the pile against the gage, and a cam which works against the feed-spring, substantially as set forth.

2. In a paper-feeder, the combination, with the movable pile-supporting table, and the feed-shaft d and connecting mechanism, of the ratchet-wheel E, a pawl and arm, e e', a feed-spring, f, a driving-shaft, a, provided with a cam, e^2, and a gage, H, substantially as set forth.

3. The combination, with the table C, provided with rack-bars c, shafts c^2, provided with gear-wheels c', meshing with said rack-bars, a shaft, d, connected with the shafts c^2 by worms d' and worm-wheels d^2, a ratchet-wheel, E, mounted on the shaft d, a pawl and arm, e e', a feed-spring, f, a driving-shaft, a, provided with a cam, e^2, and a gage, H, substantially as set forth.

4. In a paper-feeder, the combination, with the main frame A, the movable pile-supporting table C, and feed-shaft d, provided with a ratchet-wheel, E, of the pawl e and the arm e', mounted loosely on the shaft d, a feed-spring, f, attached with one end to the arm e', and a supporting rod, f', to which the other end of the feed-spring is adjustably attached, substantially as set forth.

5. The combination, with the main frame A, movable pile-supporting table C, and the feed mechanism, whereby the table is raised, of the compensating-spring O, which supports the table and relieves the latter and the feed mechanism from the weight of the pile, substantially as set forth.

6. The combination, with the holding-down finger G, of a supporting spring-bar, g, which tends to raise the finger, and a cam, g^3, whereby the finger is lowered, substantially as set forth.

7. The combination, with the pile supporting table, of a holding-down finger, G, a support, k, to which the finger is pivoted by a rearwardly-yielding joint, and a supporting-bar, g, substantially as set forth.

8. The combination, with the holding-down finger G, of a carrier, K, bearing upon the finger and applying a heavy pressure to the same, and a movable support, k, which permits the finger to rest on the paper with a light pressure when the carrier K is raised, substantially as set forth.

9. The combination, with the carrier K, provided with a set-screw, k^2, of the finger G, attached to a supporting-rod, k, which is movable in the carrier, and a spring, k', substantially as set forth.

10. The combination, with the gage H, of a supporting spring bar, h, which tends to raise the gage, and a cam, h^3, whereby the gage is lowered, substantially as set forth.

11. In a paper-feeder, the gage H, composed of a shank and a foot connected by a spherical joint, substantially as set forth.

12. In a paper-feeder, the combination, with the shank and foot of the gage H, connected by a spherical joint, of a surrounding flexible sleeve, l^3, substantially as set forth.

13. The combination, with the holding-down finger G, and its supporting-spring bar g, and the gage H, and its supporting-spring bar h, of the driving-shaft a, cams g^3 h^3, connecting-rods g^2 h^2, provided with open heads g^4 h^4, and a guide-block, I, substantially as set forth.

14. In a paper-feeder, a movable finger bearing upon the paper, and having its body composed of a coiled spring, whereby the finger is enabled to adjust itself to the surface of the paper, substantially as set forth.

15. The combination, with the buckling-

finger M, of the actuating rock-arm M′, provided with an adjustable extension, M², to which the buckling-finger is attached, substantially as set forth.

16. The combination, with a movable finger, M, of an actuating rock-arm, M′, adjustable stop m^5, spring m^4, cam m^3, and stationary frame A, substantially as set forth.

17. The combination, with the pile-supporting table and the feed rollers, of a gage and a holding-down finger bearing upon the pile, a buckling-finger, whereby the top sheet is separated, and feed-fingers whereby the separated top sheet is moved between the feed-rollers, said buckling-finger and feed-fingers having a rectilinear reciprocating motion on the paper in the same direction, whereby lateral displacement of the sheet is avoided, substantially as set forth.

18. The combination, with the feeding-machine provided with a roller, P, of a supporting-frame, Q, hung to swing concentric with the roller P, and provided with a tape, *q*, and a tape-roller, *q′*, rollers *s s′*, mounted on the frame Q, an endless side guide, S, running around the rollers *s s′*, and a driving-band, s^3, whereby the endless side guide is driven from the roller P, substantially as set forth.

19. The combination, in a paper-feeder, of the buckling and feed fingers, a driving-shaft, *a*, provided with a ratchet-wheel, b^2, having a single tooth, and a chain-wheel, B, having a spring-bolt, *b′*, substantially as set forth.

Witness our hands this 20th day of January, 1885.

ALONZO SEDGWICK.
JAMES NAYLOR, JR.

Witnesses:
J. S. VAN CLEEF,
WEBSTER D. HASBROUCK.