(No Model.) 10 Sheets—Sheet 1.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

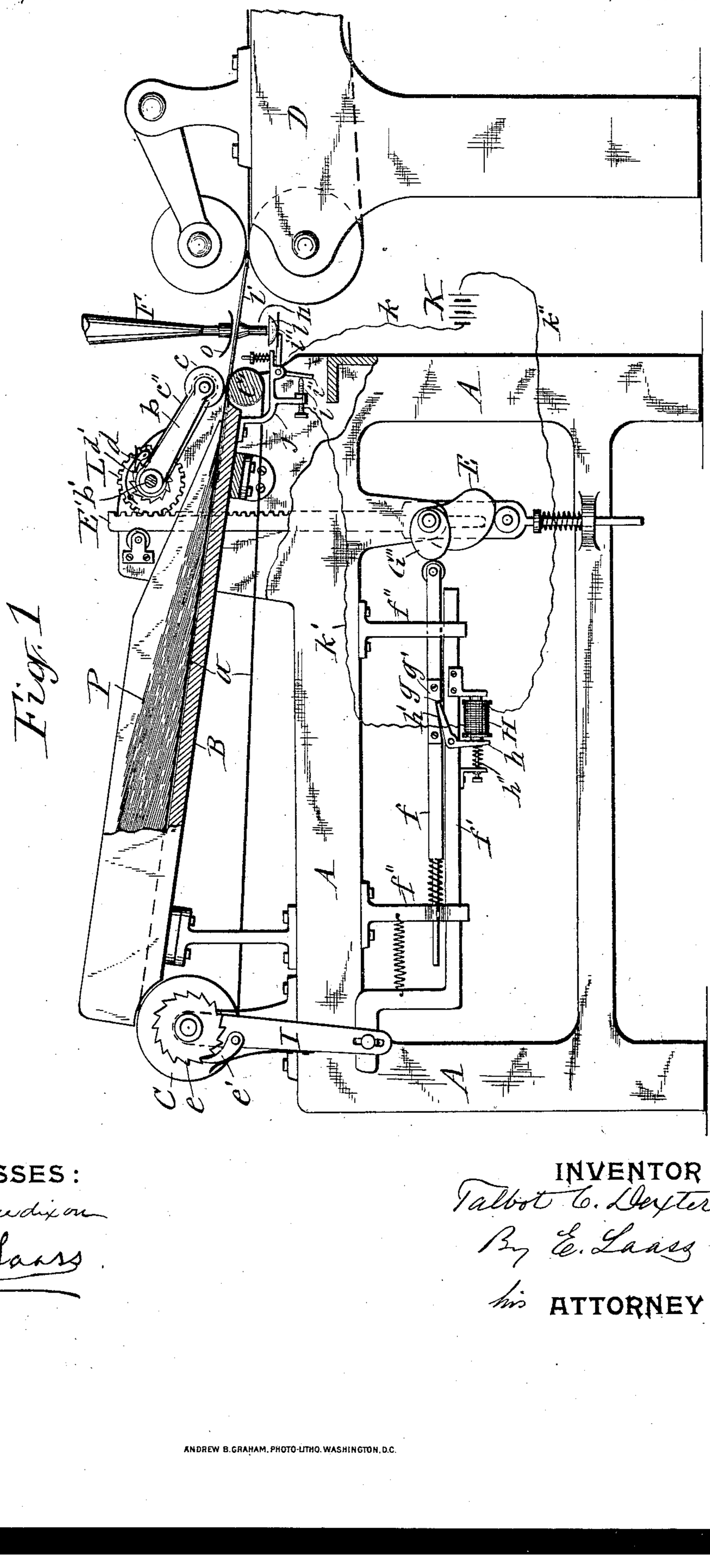

Fig. 1.

WITNESSES:

C. L. Bendixon

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INVENTOR:

Talbot C. Dexter

By E. Sass

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(No Model.)

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T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

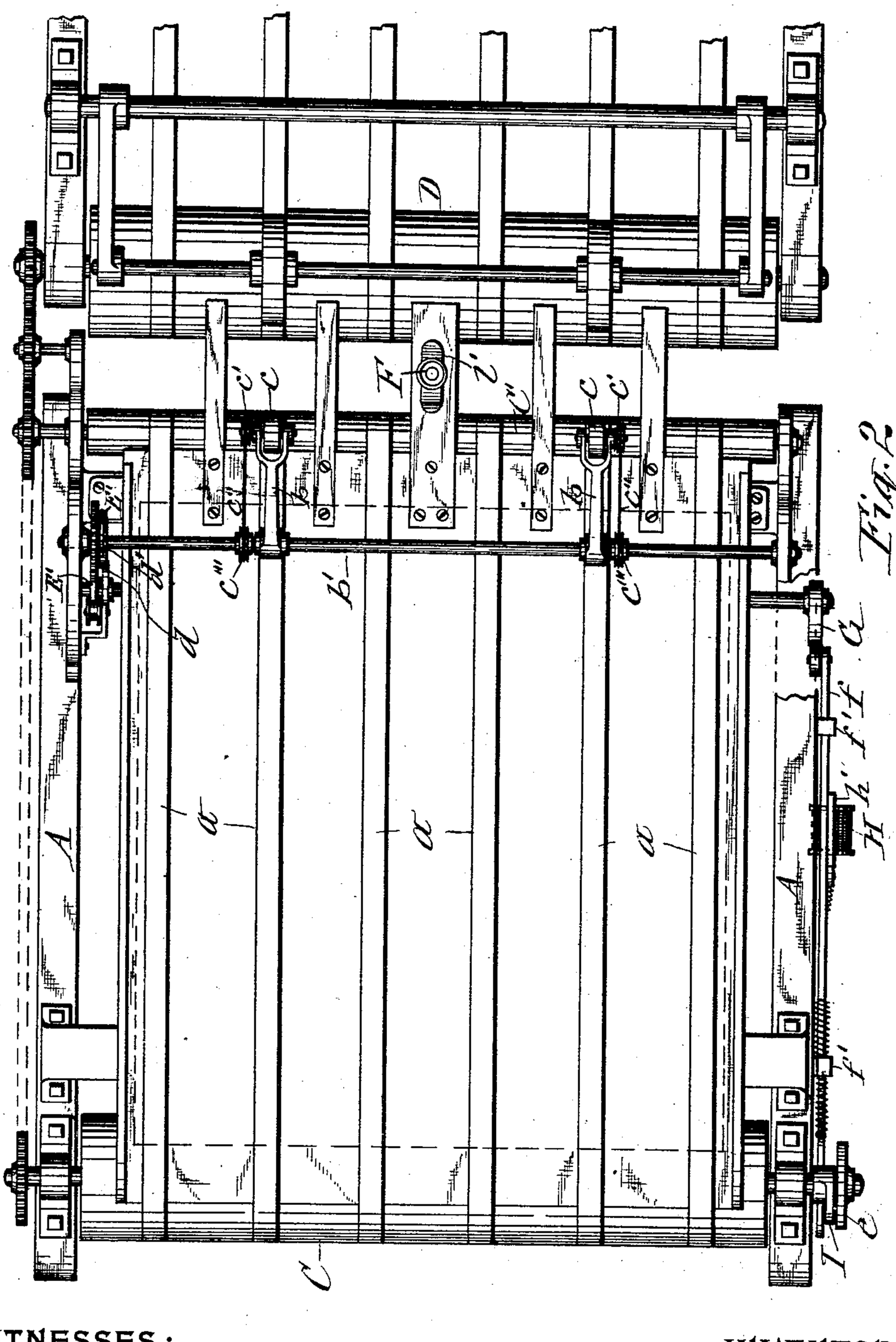

Fig. 2.

WITNESSES:

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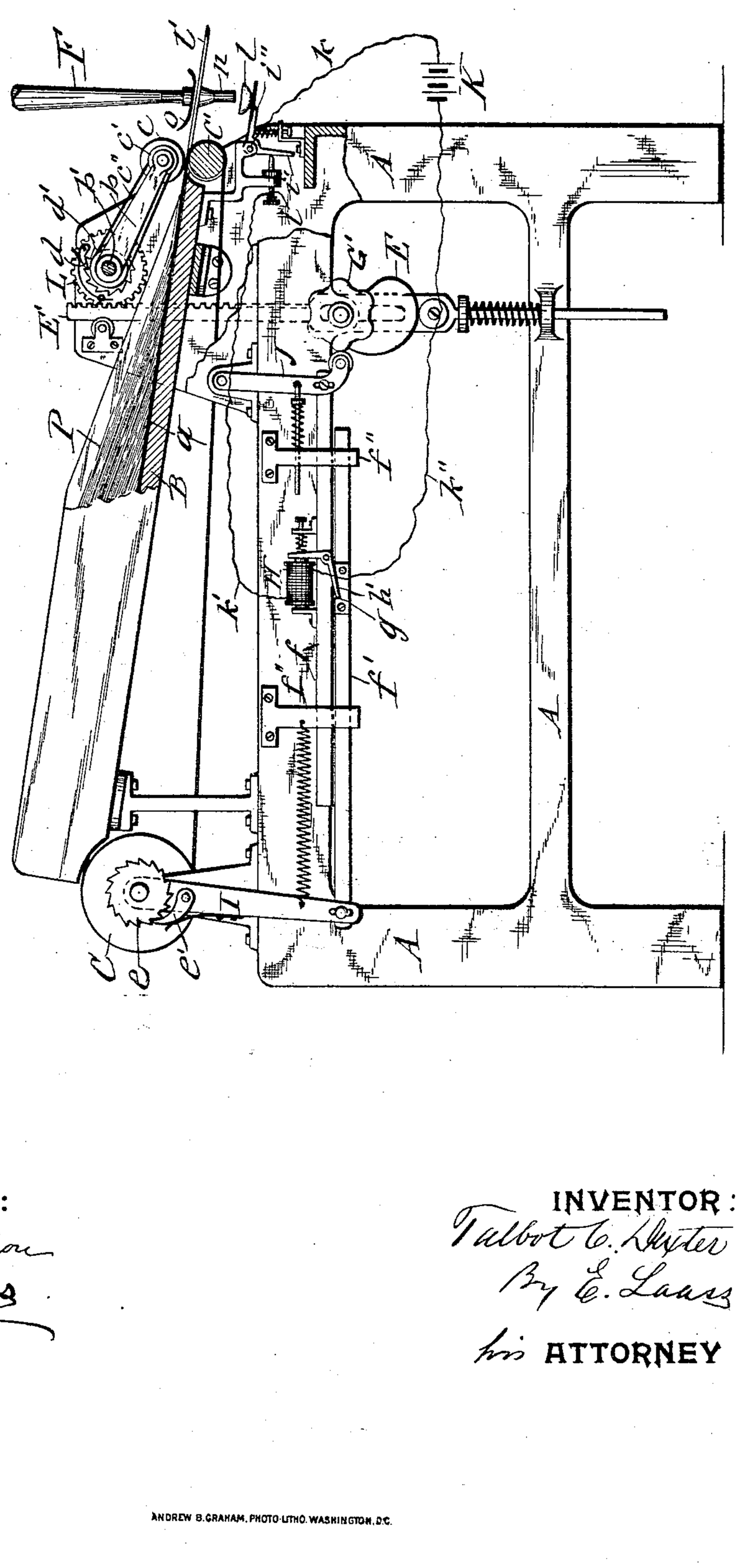
(No Model.) 10 Sheets—Sheet 3.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

Fig. 3



WITNESSES:

C. L. Bendixon

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(No Model.) 10 Sheets—Sheet 4.

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PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

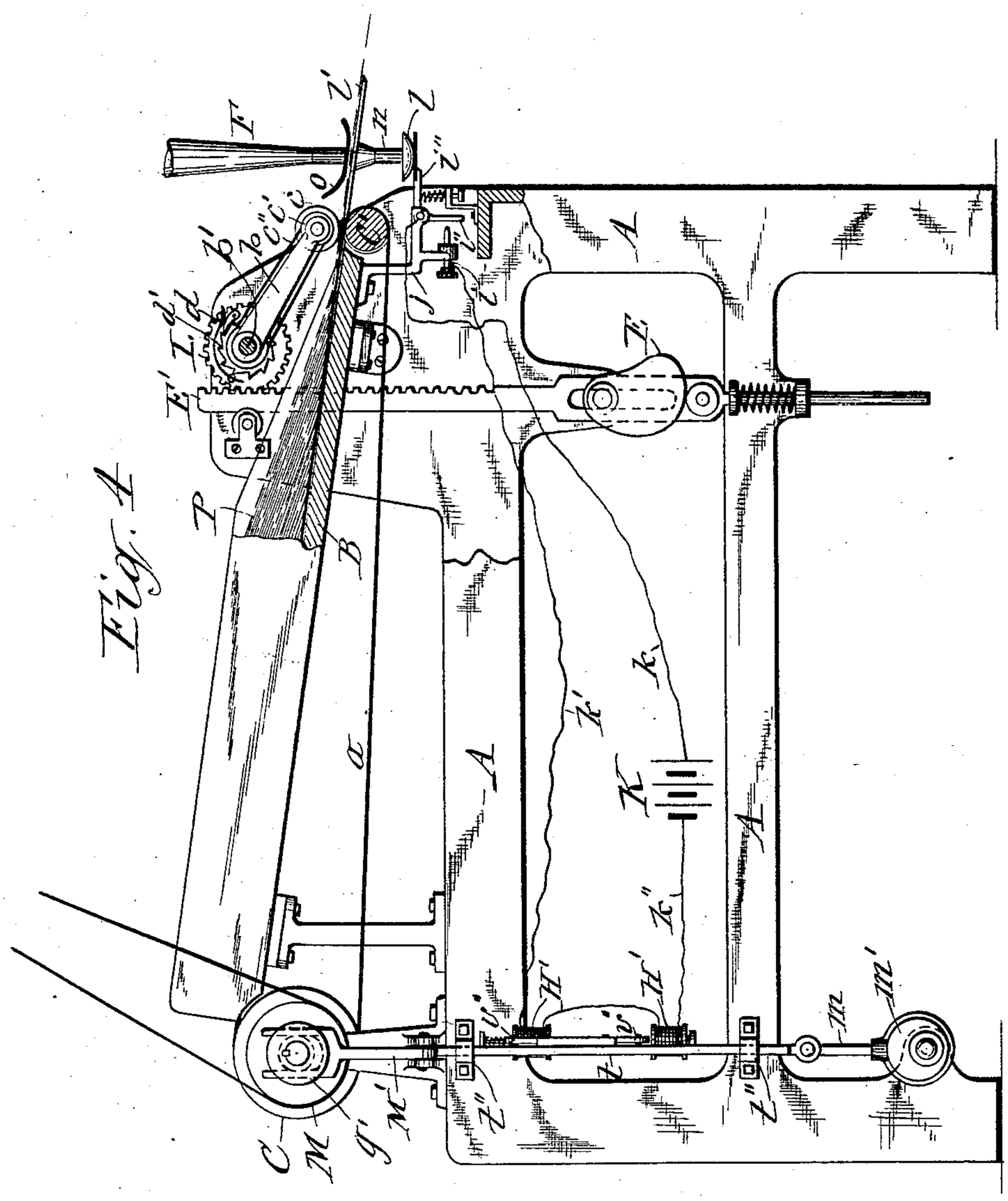

Fig. 4.

WITNESSES:
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(No Model.) 10 Sheets—Sheet 5.

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PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

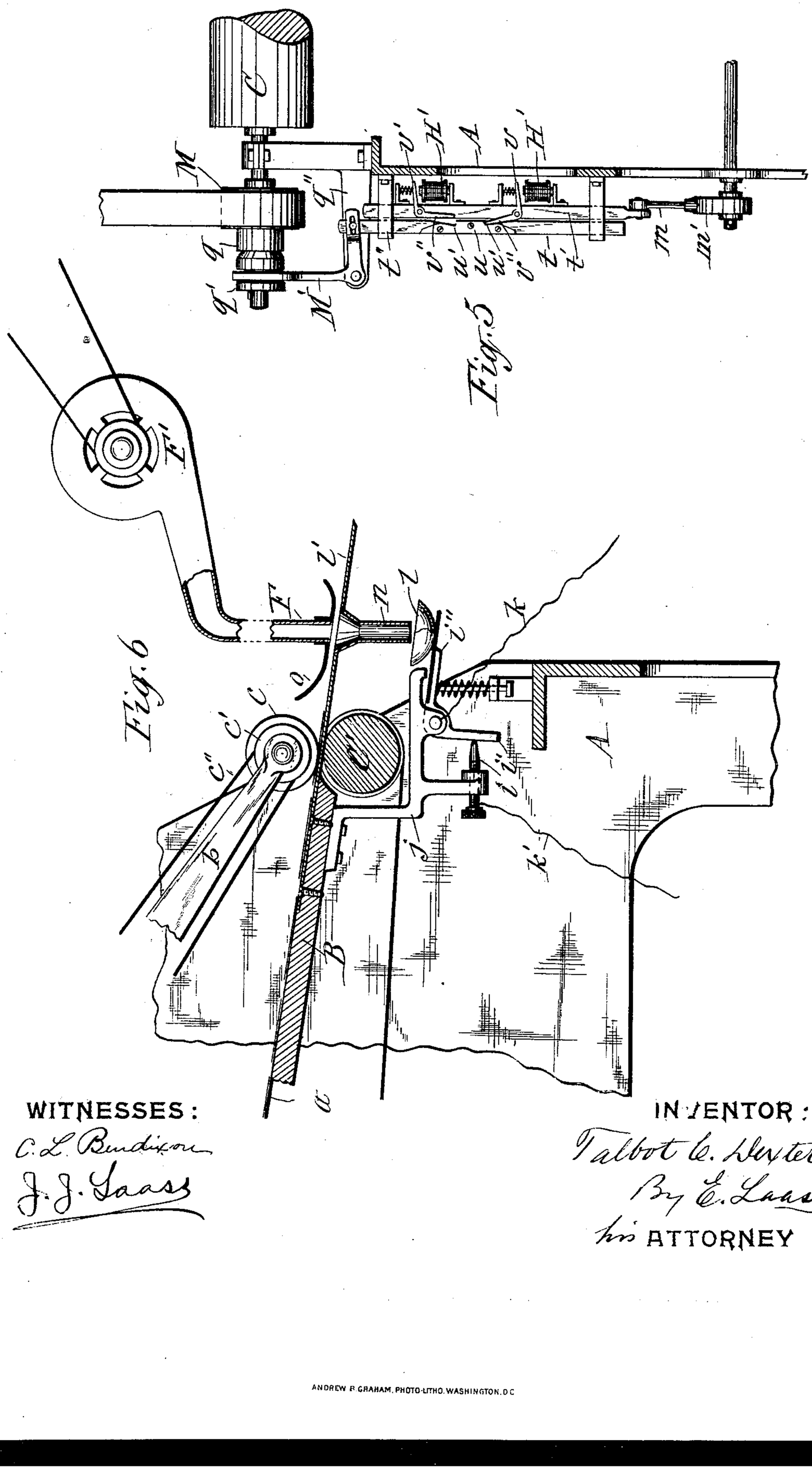

Fig. 5

Fig. 6

WITNESSES:

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(No Model.) 10 Sheets—Sheet 6.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

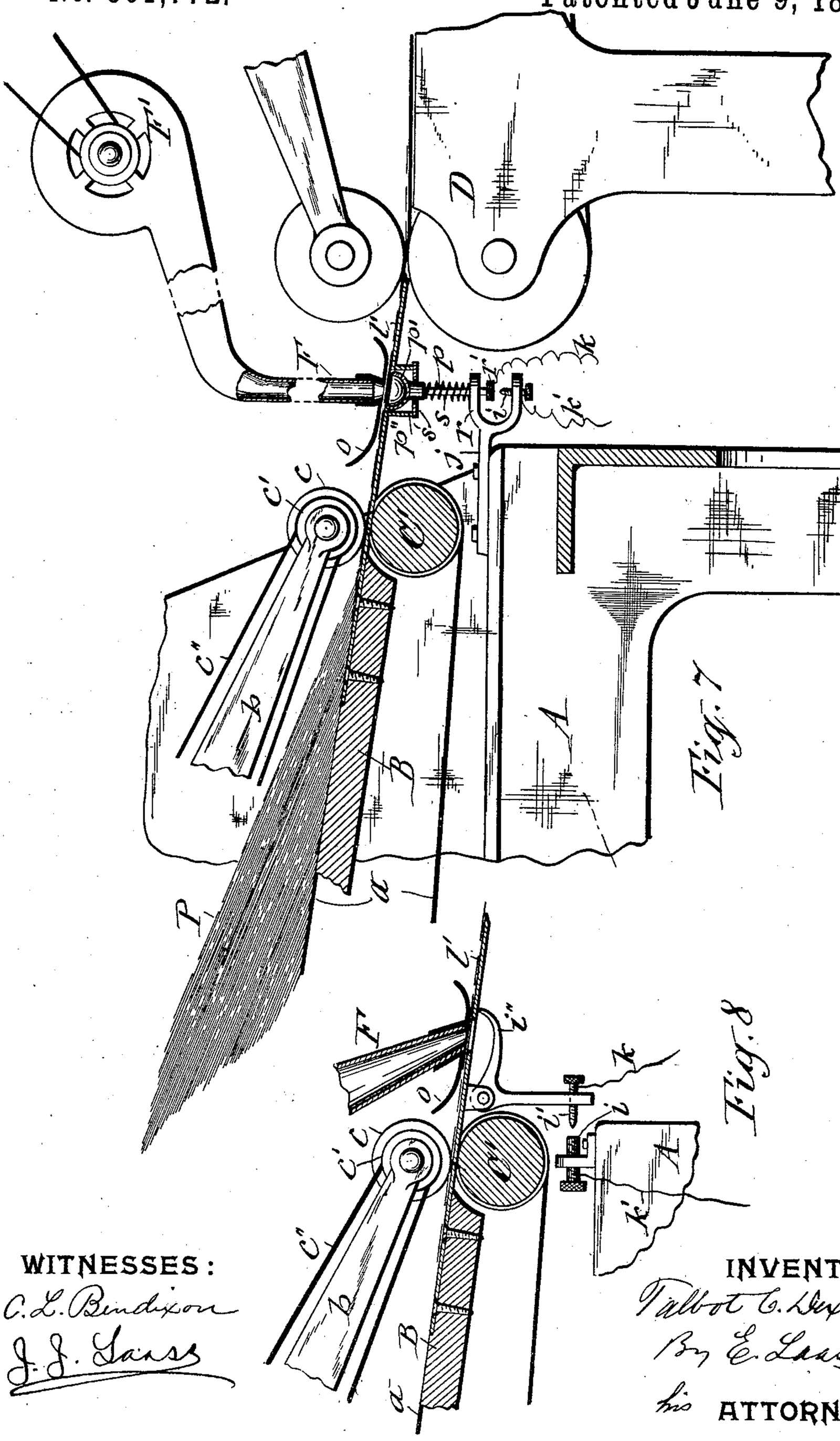

Fig. 7.

Fig. 8.

WITNESSES:

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(No Model.) 10 Sheets—Sheet 7.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

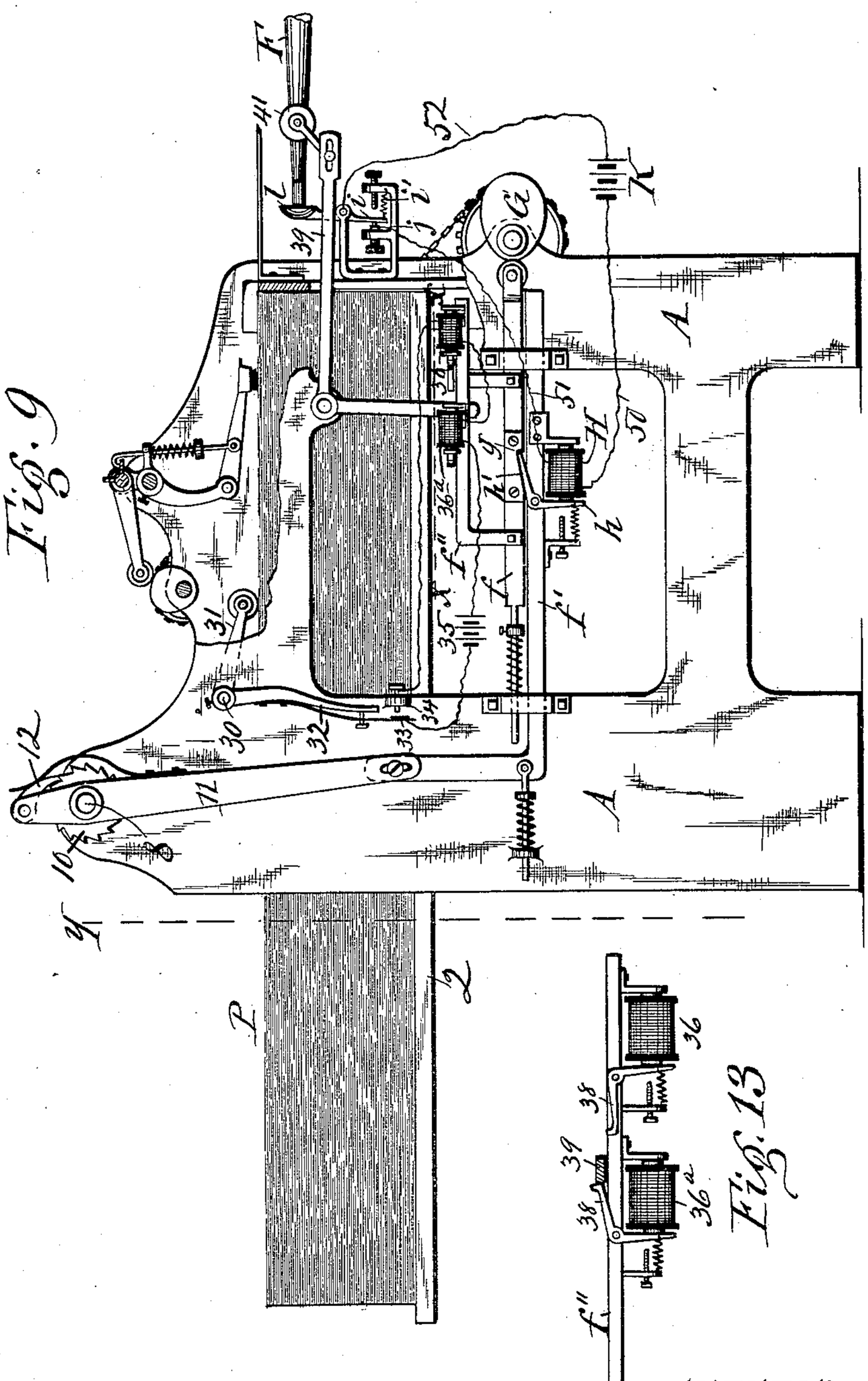

Fig. 9

Fig. 13

WITNESSES:

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(No Model.)

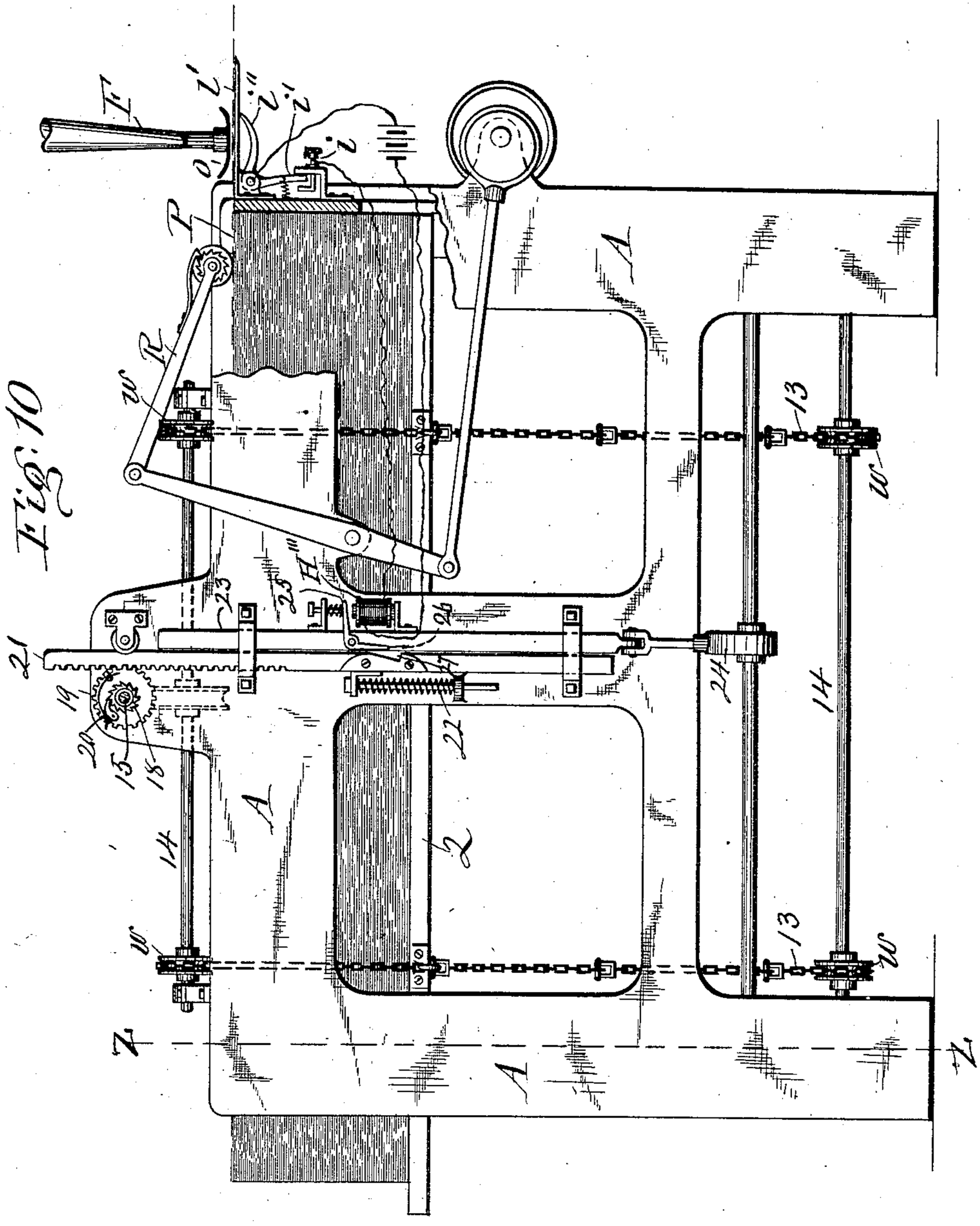
10 Sheets—Sheet 8.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

Fig. 10



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T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.

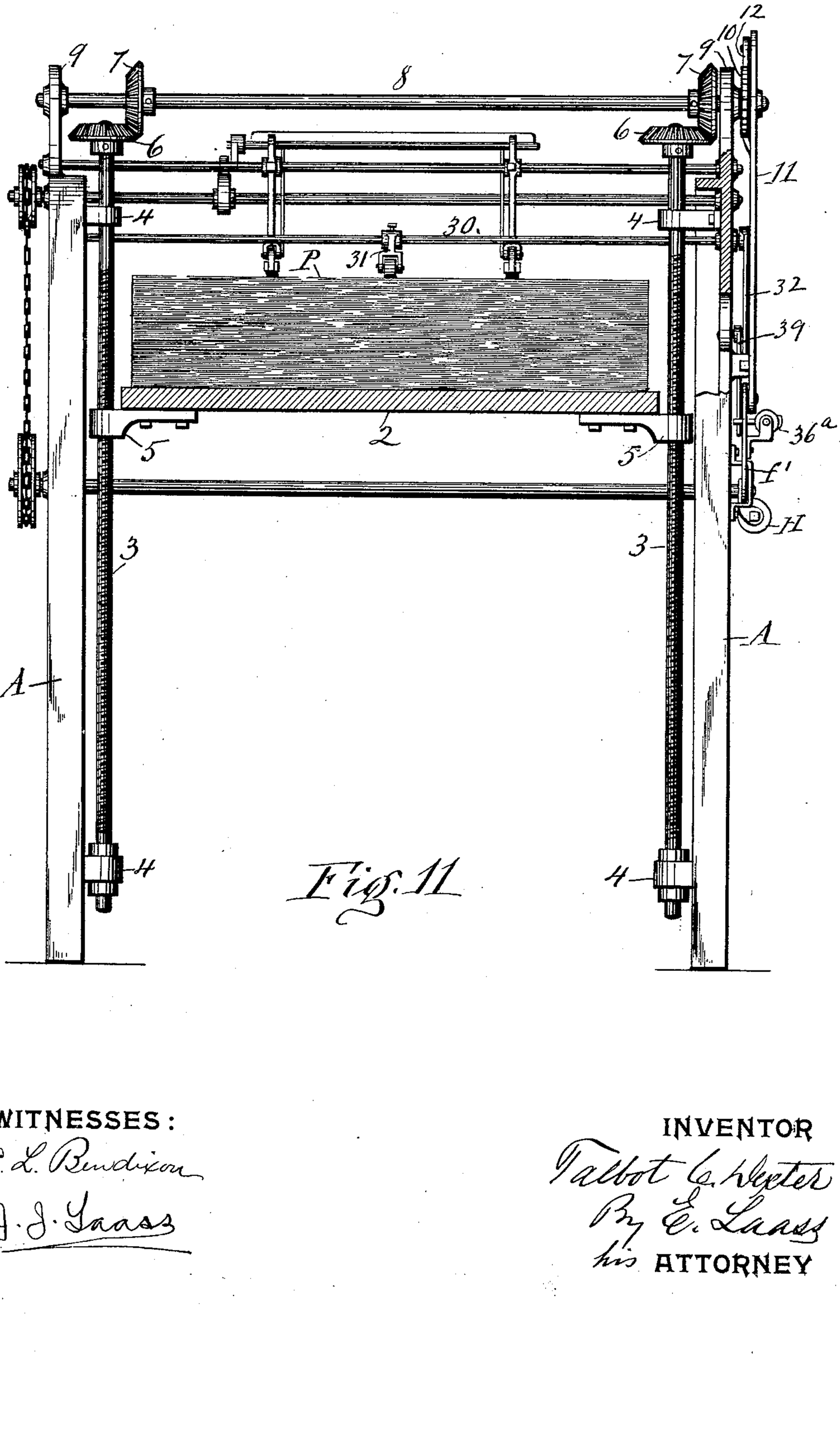

Fig. 11

WITNESSES:

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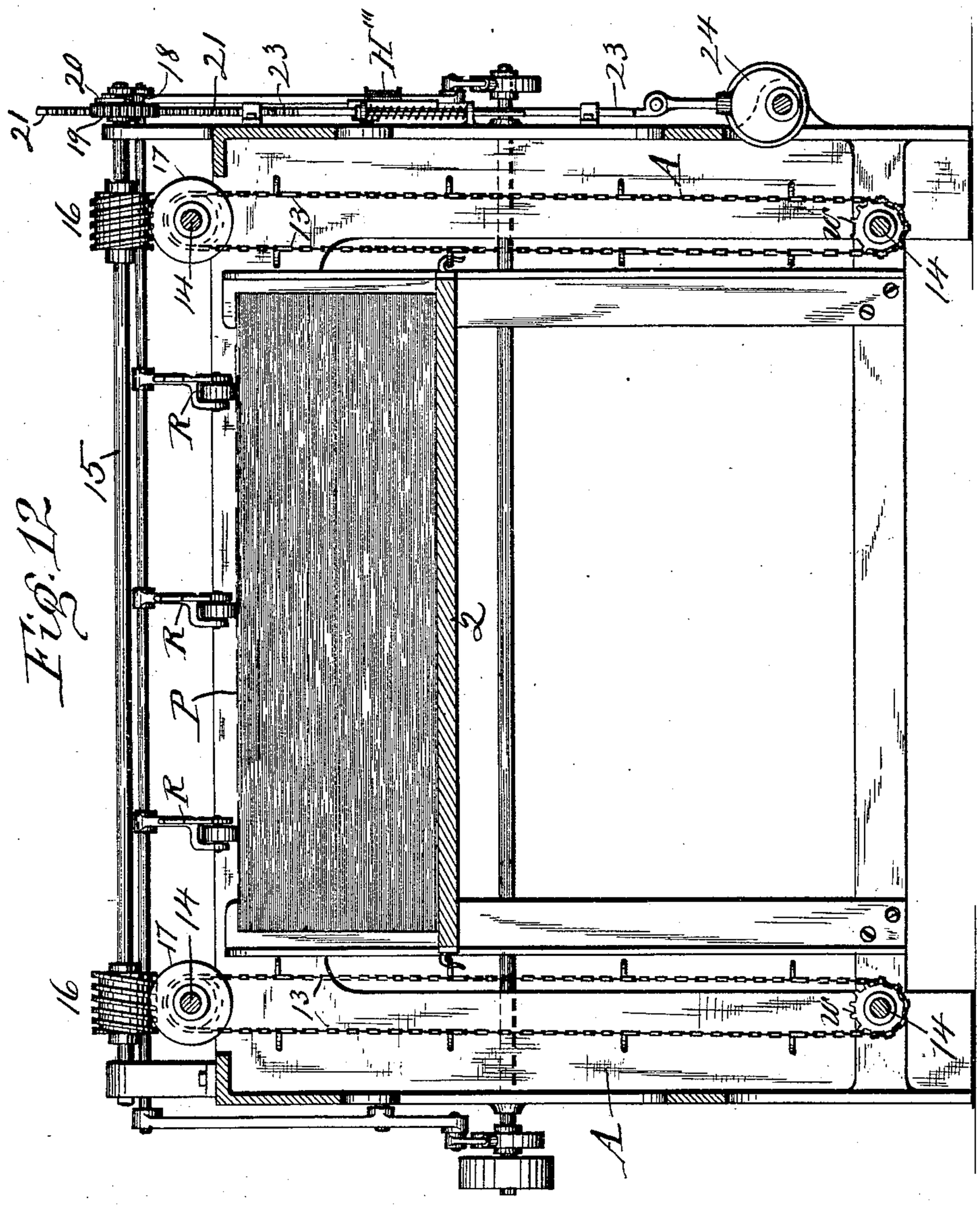
(No Model.) 10 Sheets—Sheet 10.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 561,772. Patented June 9, 1896.



WITNESSES:

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J. J. Laass

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UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 561,772, dated June 9, 1896.

Application filed October 11, 1895. Serial No. 565,316. (No model.)

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, of Pearl River, in the county of Rockland, in the State of New York, have invented new and useful Improvements in Paper-Feeding Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the devices employed on paper-feeding machines for the purpose of automatically adjusting the pile of paper in said machine, so as to enable the feeding devices proper to deliver successively the sheets singly from the top of the pile, and it has special reference to the means required for automatically controlling the actions of the mechanisms which transmit motion to the aforesaid paper-adjusting devices.

The object of the invention is to provide simple and efficient means for obtaining said latter automatic control; and to that end the invention consists, essentially, in the combination, with the mechanisms for adjusting the pile of paper to the action of the feeding devices proper and mechanism transmitting motion to said adjusting mechanism, of shipping mechanism controlling the transmitting mechanism in its action on the adjusting mechanism, an electric circuit, an electromagnet controlling said shipping mechanism, and a circuit maker and breaker controlled by the paper in transit from the feeding-machine; and the invention also consists in certain novel features of the details of the aforesaid devices, all as hereinafter fully described, and set forth in the claims.

My invention is applicable to different types of paper-feeding machines and susceptible of many variations in its detail, construction, and arrangements, as is readily apparent from the annexed drawings, in which—

Figure 1 is a side elevation of my invention as applied to a paper-feeding machine of the class in which the feed-board is stationary and the paper is piled thereon in a combed condition, so that each sheet projects with its front or advance edge beyond that of the next underlying sheet. By means of longitudinally-traveling belts the said pile is carried bodily toward the front or delivery end of the feed-board, as hereinafter more fully described. Fig. 2 is a plan view of said machine. Figs. 3 and 4 are side elevations of the same type of feeding-machines with my invention arranged for operating with different mechanisms for transmitting motion to the main roller upon which the paper-conveying belts run. Fig. 5 is a front view of my invention arranged as represented in Fig. 4. Figs. 6 and 7 are enlarged vertical longitudinal sections of that part of the feeding-machine to which the circuit maker and breaker is attached. Fig. 8 is a sectional view of a modification of the circuit making and breaking devices. Figs. 9 and 10 are side elevations of my invention in connection with feeding-machines which are provided with vertically-movable paper-supporting tables and with different means for raising and lowering said tables. Figs. 11 and 12 are vertical transverse sections of said machines, respectively, on lines Y Y and Z Z; and Fig. 13 is a transverse section on line X X in Fig. 9.

Similar letters and figures of reference indicate corresponding parts.

A represents the main frame of the paper-feeding machine, which frame may be of any suitable shape to accommodate the requisite mechanisms of the machine.

In the style of machines shown in Figs. 1, 2, 3, and 4 of the drawings the paper-supporting table or feed-board B is stationary and usually inclined toward the front or delivery end of the machine. Longitudinally over the top of said feed-board and around rollers C C′ at opposite ends thereof run the endless belts *a a*, which, by intermittent rotary motion of the main roller C, are caused to travel toward the front end of the feed-board and carry with them the paper which is piled thereon in a combed condition, so that each sheet projects with its front edge beyond that of the next subjacent sheet. Upon the top of the front portion of the uppermost sheet operate the feeding devices which push the top sheets singly in succession from the pile to the machine designed to receive the paper, which latter machine is in this case represented as a paper-folding machine, of which the receiving end only is shown at D. Said feeding device may be of any suitable or well-known form.

For a mere exemplification of the arrangement of my present invention in relation to

the feeding devices I have shown the latter of the form of arms b, hung on a transverse shaft b' and having pivoted to their free ends rubber-faced rollers C, to the axles of which are fastened pulleys c', which are connected by driving-belts c'' to pulleys c''' on the shaft b'. Said shaft receives intermittent rotary motion by means of suitable mechanism connected with the general actuating mechanism of the machine. (Not necessary to be shown.)

The means for transmitting the aforesaid motion to the shaft b' are in the present case represented of the form of a rotary cam E, imparting reciprocating motion to a rack E', which engages a pinion L, mounted loosely on the end of the shaft b', and provided with a pawl d, engaging a ratchet-wheel d', fastened to the shaft.

In order to insure prompt successive deliveries of single sheets from the pile, it is necessary to carry the pile of paper with a properly-timed motion toward the delivery end of the feed-board. For this purpose I employ the following devices for automatically controlling the movements of the paper-conveying belts $a\,a$. The large main roller C, which imparts the longitudinal movements to the belts $a\,a$, receives an intermittent rotary motion by mechanisms controlled by electromagnets in a circuit provided with a circuit maker and breaker actuated by an air-blast received from a blow-pipe or blast-tube F, which has its vent or discharge end arranged downward directly over the path of paper in front of the feed-board or beyond the delivery end thereof. One of the sources from which the air-blast may be derived is represented of the form of a fan-blower F' in Figs. 6 and 7 of the drawings.

The aforesaid mechanisms and their arrangements in relation to the electromagnets may be varied in numerous ways without departing from the spirit of my invention. A very simple arrangement of said mechanism is shown in Figs. 1 and 3 of the drawings and consists of a ratchet-wheel e, fastened to the shaft of the roller C, and a lever I, hung loosely on said shaft, so as to allow it to oscillate thereon and having connected to it the dog e' which engages said ratchet-wheel. Said lever receives an intermittent oscillatory motion by means of two longitudinally-movable bars f and f', sustained in suitable guides f'''. One of these bars is held in contact with a rotary cam G, by which it receives a reciprocating motion. This bar is provided with a suitable shoulder g, which may be formed by a notch in a cast-iron or steel plate g', attached to said bar in case the latter is composed of wood. To the other of said longitudinally-movable bars is pivoted a dog h', which is adapted to engage and release the shoulder g. The action of this dog is controlled by an electromagnet H and a circuit-controller or maker and breaker, which latter is actuated automatically, as hereinafter described. The armature h of said magnet is attached to or formed integral with the dog h', and by means of the spring h'', which draws the armature from the magnet, the aforesaid dog is held out of engagement with the shoulder g, and thus the bar f', to which the dog is pivoted, is prevented from partaking motion from the companion bar f, which is actuated by the cam G. In consequence of this the lever I is also dormant and the roller C held stationary. When, however, the magnet H is energized, the attraction of the armature h throws the dog into a position to engage the shoulder g during the reciprocating motion of the bar f, as represented in Fig. 1 of the drawings. Said engagement causes the bar f to push forward along with it the companion bar f', which swings the lever I sufficiently to cause the dog e' to turn the ratchet-wheel e, and thus impart a corresponding motion to the roller C, which latter moves the belts a longitudinally, so as to carry the pile of paper a short distance toward the front or delivery end of the feed-board.

Instead of operating the bar f directly by the cam G, as shown in Fig. 1 of the drawings, said bar may be connected to an oscillatory arm J, which is held in contact with and operated by a cam-wheel G', which may be provided with a plurality of protuberances on its periphery, as illustrated in Fig. 3 of the drawings, which also shows a modification of the arrangement of the magnet H, which in this case is mounted on the reciprocating bar f and has the dog h' of its armature arranged to engage and release the shoulder g on the bar f'.

The circuit maker and breaker employed for controlling the action of the magnet H is arranged to be actuated pneumatically in connection with the paper in transit from the feeding-machine, which paper is made to serve the function of a valve for controlling the current of air designed to actuate said circuit maker and breaker, which is arranged beneath the path of the paper in front of the delivery end of the feed-board B and consists of the stationary terminal i and the movable terminal i', which latter I prefer to pivot to a fixed bracket j, from which it is insulated in any suitable or well-known manner. (Not necessary to be illustrated.) A wire k connects one of said terminals with the battery K, another wire k' connects the other terminal with the magnet H, and a third wire k'' runs from the magnet to the battery K, as shown in Figs. 1 and 3 of the drawings. From the pivoted end of the terminal i' extends nearly or quite horizontally a finger i'', upon the top of which is firmly secured a disk or cup l. From the front end of the feed-board B projects a plate l', which is provided with an opening in which is secured a downwardly-extending funnel n, the top end of which is flush with the top of the plate to obviate interference with the movement of the paper over it, while the lower or discharge end of

said funnel is directly over the center of the aforesaid disk or cup. Over the plate l' is an air-blast tube or blowpipe F, the vent or discharge end of which is in proximity to the said plate and in range with the funnel n. To the lower extremity of the tube F is fastened a rearwardly-extending guard o to prevent the paper in transit from catching on the rear portion of the tube.

The operation of my invention thus far described is as follows: Through the tube F passes constantly an air-current received from the blower F'. Assuming the pile of paper represented at P to be in proper position to allow the roller c or other feeding devices to obtain the requisite hold upon the top sheet to push the same from the pile toward the machine D, said sheet passes between the blast-tube F and funnel n, and thus serves as a valve, which prevents the air-blast from entering the funnel. This leaves the movable terminal i'' in its normal position, by which the electric circuit is broken. In consequence of this the spring h'' is allowed to draw the armature h from the magnet H, and thereby throws the catch or dog h' into a position to prevent it from engaging with the shoulder g during the reciprocating motion imparted to the bar f. The other bar, f', is therefore left undisturbed, and the roller C, which moves the paper-conveying belts a, remains at rest.

As soon as sufficient sheets of paper have been fed from the pile to prevent the roller c or feeding devices to obtain a hold on the top sheet of the pile the upper end of the funnel n becomes uncovered, and thus allows the air-current of the blast-tube F to enter said funnel, and in passing through it the pressure of said air upon the disk l depresses the finger i'', and thereby brings the terminal i' in contact with the terminal i. The circuit being thus closed causes the magnet H to attract the armature h, and thereby throws the dog h' on one of the bars $f f'$ into a position to engage the shoulder g on the other of said bars. Said dog thus serves the function of a catch, which at that time locks the two bars to each other during the forward thrust of the reciprocating bar. This swings the lever I, so as to cause the pawl or dog e' of said lever to impart a partial rotation to the ratchet-wheel e and a corresponding motion to the roller C, which moves the belts a longitudinally and causes the same to carry the pile of paper toward the front or delivery end of the feed-board B. As soon as the pile has been sufficiently advanced to allow the feeding device to push the top sheet between the tube F and funnel n the terminals i i' resume their normal position, in which they break the circuit and deprive the magnet H of its power of locking together the longitudinally-movable bars $f f'$, and thus the motion of the roller C, with the belts a a running thereon, is arrested. To guard against retarding the movement of the paper in passing between the tube F and funnel n, said tube may be inclined to the plane of the travel of the paper, as illustrated in Fig. 8 of the drawings, which position will tend to promote the travel of the paper. In this case the finger i'' of the terminal i' should be terminated with a broad upwardly-curved portion, as shown.

Instead of pivoting the terminal i', it may be formed of a vertical stem p, having affixed to its upper end a cup p', which is sustained in a vertical guide p'', as shown in Fig. 7 of the drawings, the lower end of said stem sliding in a guide r and having on its extremity the contact-point r' directly over the stationary terminal i. A spring s serves to push the stem upward, and a plate s', attached to the stem and coming in contact with the lower end of the guide p'', limits the upward movement of the stem, so as to sustain the top of the cup p' normally flush with the top of the plate l'. The cup p' is directly under the vent or discharge end of the blast-tube F, and in case the feeding-machine fails to pass a sheet of paper between said cup and tube the pressure of the air-blast into the cup depresses the same and thereby brings the terminal r' in contact with the stationary terminal i, and thus closes the circuit.

I do not limit myself specifically to the hereinbefore-described mechanism for transmitting motion to the main roller C of the paper-conveying belts a, as said motion may be derived from other sources and controlled automatically by my invention. An exemplification of this latter arrangement is illustrated in Figs. 4 and 5 of the drawings, in which M represents a driving-pulley mounted loosely on the shaft of the roller C and having one end of its hub formed with a suitable clutch-face q, at the side of which is a clutch-collar q', which is adapted to slide longitudinally on the shaft and locked circumferentially thereon by a spline or groove connection. To a suitable support q'' is pivoted a bell-crank lever M', which is actuated by my automatic controlling devices, consisting, preferably, of the two bars t and t', disposed parallel side by side and sliding in guides t''', attached to the frame A. The bar t is connected to one of the arms of the lever M', the other arm of which is bifurcated and straddles the neck of the clutch-collar q'. The same bar has attached to it the metal plate u, which is provided with reversely-arranged notches, forming two shoulders u' u'. To the companion bar t' are secured two electromagnets H', which are also arranged reverse to each other. The armatures v and v' of these respective magnets are pivoted to the bar t' and are each formed with a dog v'', which is adapted to engage and release the adjacent shoulder u'. The bar t' is connected to the pitman m of a rotary eccentric m', by means of which said bar receives a reciprocating motion. The magnets H' are in circuit with a circuit controller or maker and breaker arranged in relation to the feed-board B, air-blast tube F,

and funnel n in substantially the same position and operated in substantially the same manner as hereinbefore described.

The operation of the last-described arrangement is as follows: As long as the circuit is broken by the continuation of the passage of paper between the tube F and funnel n the dog v'' of the armature v is caused to engage the adjacent shoulder u' by force of the usual spring which draws the armature from the magnet, while the reversely-disposed dog v'' of the armature v' is drawn out of engagement with the shoulder u', adjacent thereto, as shown in Fig. 5 of the drawings. In this condition the reciprocating bar t' is caused to push up the bar t, which actuates the lever M', so as throw the clutch-collar q' out of engagement with the hub q of the revolving pulley M, and consequently the roller C remains stationary. The moment the feeding-machine fails to pass a sheet of paper between the blast-tube F and funnel n the circuit is closed in the manner hereinbefore described. This causes the two magnets to attract their armatures, and thus the actions of the two dogs v'' is reversed from the actions before described and the reciprocating bar t' is caused to push down the bar t, which, by means of the lever M', throws the clutch-collar q' into engagement with the hub q of the rotary pulley M and thus imparts rotary motion to the roller C.

My invention, however, is not limited to its before-described connection with paper-feeding machines in which the paper-supporting table or feed-board is stationary and the pile of paper is carried bodily to the front or delivery end of said feed-board by endless belts traveling over the feed-board.

Said invention is also applicable to paper-feeding machines in which the paper-supporting table is moved vertically to lift the pile of paper, so as to compensate for its reduction by the feeding of the sheets therefrom.

I have shown in Figs. 9, 10, 11, and 12 of the annexed drawings two exemplifications of such machines equipped with my invention.

In Figs. 9 and 11 the paper-supporting table 2 receives vertical movement from vertical screws 3 3, journaled in bearings 4 4, secured to the sides of the frame A and working in nuts 5 5, fastened to the table 2. To the upper end of each of these screws is fastened a miter-pinion 6, meshing with one of a pair of corresponding pinions 7, attached to a shaft 8, which extends across the top of the machine and is mounted in bearings 9, secured to the sides of the frame A. To one end of the shaft 8 is fastened a ratchet-wheel 10, and at the side thereof is a lever 11, pivoted to the shaft and provided with a pawl 12, which engages the aforesaid ratchet-wheel. By properly-timed oscillatory motion of the lever 11 the screws 3 3 are turned to raise the table 2, so as to lift the superimposed pile of paper to the proper plane of feeding. Said timing of the aforesaid mechanisms is effected automatically by my invention in connection with other auxiliary devices for controlling the air-blast automatically by the elevation of the top of the pile of paper on the table 2. The lever 11 is connected to the longitudinally-movable bar f', to which is secured the magnet H, the armature h of which is formed with the dog h', which is caused to engage the shoulder g on the pitman f when the armature is attracted by the magnet. Said pitman receives a reciprocating motion from the rotary cam G, and when the dog h' is engaged as aforesaid the bar f' partakes motion from the pitman f during its movement in one direction. Said motion of the bar f' swings the lever 11 and causes the pawl 12 to turn the ratchet-wheel 10, which imparts a rotary motion to the pinions 7 7, which by means of the pinions 6 6 turn the screws 3 3. The working of these screws in the nuts 5 5 raises the table 2.

The magnet H is connected by wires 50 and 51, respectively, with the battery K and with the terminal j of the circuit maker and breaker. Another wire 52 connects the other terminal, i, with the said battery. The circuit is normally closed by the usual spring i', and said closed circuit causes the pitman f to impart motion to the table-elevation mechanism. The terminal i is formed with an upward extension and has affixed to the end thereof the disk l, which is in front of the discharge end of the air-blast tube F, arranged in this case in a horizontal position beneath the plane of the feeding of the paper. Said pipe is provided with a suitable valve 41 for controlling the air-blast, and this valve is controlled automatically by the variations of the heights of the pile of paper on the table 2 through the following electrically-operated devices: To the pitman f is fastened the bar f'', on which are mounted two magnets 36 and 36^a, whose armatures are each formed with a dog 38. At the side of the bar f'' is the free end of a bell-crank 39, pivoted to the frame and having its opposite end connected to a crank attached to the valve 41. The magnets 36 and 36^a are in the same circuit derived from a battery 35 and are controlled by a circuit maker and breaker consisting of a terminal 34, secured to the frame A, and a companion terminal 33, attached to the free end of an arm 32, secured to the end of a shaft 30, which extends across the machine above the pile of paper and has fastened to its central portion another arm 31, the free end of which rests upon the top of the pile of paper, preferably by means of a roller pivoted to the said arm. The arm 31 is thus caused to rise and fall with the variations of the height of the pile of paper, which motion is transmitted to the arm 32. The terminals 33 and 34 are so arranged as to cause them to be thrown into contact by the arm 32 when the pile of paper has been raised to its requisite elevation for properly feeding the paper therefrom. The closing of said cir-

cuit causes the magnet 36ª to throw the dog 38 into a position to engage one side of the lower end of the bell-crank 39 during the reciprocating motion of the bar f'', and at the same time the other magnet, 36, draws its dog 38 out of the way of said bell-crank. The aforesaid engagement with the bell-crank causes the latter to open the valve 41. The resultant air-blast from the tube F against the disk l throws the terminal i out of contact with the terminal j and thus breaks the circuit from the battery K. This causes the dog h' to be thrown out of engagement with the pitman f and leaves the bar f' at rest.

When the elevation of the pile of paper has been reduced to a certain degree by the paper-feeding devices, the descended arm 31 throws the terminals 33 and 34 out of contact and the resultant breaking of the circuit from the battery 35 causes the magnet 36ª to release its armature and allows the dog 38 thereof to be drawn by the usual spring out of engagement with the bell-crank 39, while the other dog on the armature of the other magnet is thrown by its spring into engagement with the opposite side of the bell-crank, and by the reciprocation of the bar f'' the latter dog pushes the bell-crank 39 into a position to close the valve 41. This allows the circuit from the battery K to close and thus cause the magnet H to again throw the dog h' into a position to transmit motion from the pitman f to the bar f', which actuates the table-elevating mechanism.

In other paper-feeding machines the table 2 is connected to and raised and lowered by endless chains 13 13, running on sprocket-wheels w, secured to shafts 14 14, extending along the tops and lower portion of the sides of the frame A and journaled in suitable bearings thereon, as shown in Figs. 10 and 12 of the drawings. A shaft 15, extending across the top of the machine and mounted in bearings on top of the frame A, has secured to it two spiral gears 16 16, which mesh with worm-wheels 17 17, attached to the shafts 14 14. By properly-timed rotary motion of the shaft 15 the chains 13 13 are moved to raise the table 2, so as to carry the pile of paper P to a position to allow the feeding devices R to operate thereon to push the top sheet forward from the pile.

The specific construction of the feeding devices R is immaterial to my present invention and is shown in the different forms in the annexed drawings.

Inasmuch as in the machine last described the motion or adjustment of the paper-supporting table 2 is derived from the single shaft 15, I employ my invention for automatically controlling the motion of said shaft. This may be effected by the construction and combination of elements shown in Figs. 9 and 11 of the drawings; but for a further illustration of the various modifications which my invention is susceptible of I have shown in Figs. 10 and 12 of the drawings another arrangement of the component parts of my invention, which consists of a ratchet-wheel 18, fastened to the end of the shaft 15, and a pinion 19, mounted loosely on said shaft, has connected to it the pawl 20, which engages said ratchet-wheel. A vertically-disposed rack 21 engages the pinion 19 and is moved in one direction by a spring 22, as shown in Fig. 10 of the drawings.

Parallel with and contiguous to the side of the rack 21 is a pitman 23, which receives reciprocating motion from an eccentric 24. To this pitman is firmly secured the electromagnet H‴, the armature 25 of which is pivoted to the pitman and has extending from its pivoted end the dog 26, which is adapted to engage and release the shoulder 27 on the rack 21. Said magnet is controlled by the circuit maker and breaker i i', which is actuated pneumatically by an air-blast from the tube F, arranged directly over the aforesaid path, as hereinbefore described.

Fig. 10 also shows a further modification of the detail construction of the circuit maker and breaker, which consists of the terminal i', pivoted in a suspended position to an ear on the end of the frame A, and the terminal i consists of a screw passing through an upwardly-projecting lip 28 on a bracket attached to the frame A. The end of the screw adjacent to the frame is turned upward to allow the lower end of the terminal i' to come in contact with it. The upper end of the pivoted terminal i' has extending from it the finger i'', the free end of which is disk-shaped and in position to be impinged by the air-blast from the tube F when the discharge end or vent thereof is exposed by the failure of the feeding-machine to pass a sheet between said tube and subjacent finger i''. By the pressure of the air-blast upon said finger the circuit is closed, and thus the magnet H‴ is caused to attract the armature 25, which throws the dog 26 into a position to engage the shoulder 27 on the rack 21 and compel the same to move with the reciprocating pitman 23. Said movement of the rack imparts rotary motion to the pinion 19, which motion is transmitted to the shaft 15 by the pawl 20 and ratchet-wheel 18. The motion of the shaft 15 is transmitted to the two shafts 14 14 of the sprocket-wheels w w by the gears 16 and worm-wheels 17. Said sprocket-wheels move the chains 13 13 and cause the same to lift the table 2 until said table has carried the pile of paper P to a position to allow the feeding devices R to push the top sheet from the pile. Said sheet becoming interposed between the tube F and finger i'' allows the terminal i' to recede from the stationary terminal i and thereby break the circuit. This causes the dog 26 to release the rack 21 and thereby arrests the motion of the shafts 14 14 and leaves the table 2 in its adjusted position in relation to the feeding device R.

What I claim as my invention is—

1. In an electrically-controlled paper-feed-

ing machine; the combination with mechanism for adjusting the pile of paper to delivering position, of an electromagnet controlling said mechanism, an air-blast tube having its vent or discharge end directed downward over and in proximity to the path of the paper in transit from said machine to utilize said paper to serve as a valve for controlling the discharge of the blast from the said tube and a circuit maker and breaker having its movable terminal actuated by said air-blast and controlling the aforesaid magnet.

2. In an electrically-controlled paper-feeding machine, the combination with mechanism for adjusting the pile of paper to delivering position, of an electromagnet controlling said mechanism, an air-blast tube having its discharge end directed downward and directly over the path of the paper in transit from said machine and closed by the paper passing across said discharge end and a circuit maker and breaker having its movable terminal directly under said path of the paper and in range with the blast-tube to be actuated by the pressure of the air-blast and controlling the aforesaid magnet.

3. In an electrically-controlled paper-feeding machine the combination with mechanisms for adjusting the pile of paper to delivering position and an electromagnet controlling said mechanisms, of a circuit maker and breaker having its movable terminal directly under the path of paper in transit from said machine, a disk secured to said terminal and sustained in proximity to the path of the paper, and an air-blast tube directly over the aforesaid path of the paper and in range with the disk of the movable terminal to actuate the latter by the air-blast, all combined and arranged to control the circuit maker and breaker by the interposition of the paper between the blast-tube and disk as set forth.

4. The combination, with the feed-board, paper-conveyers carrying the pile of paper bodily toward the delivery end of said feed-board and mechanism transmitting motion to said conveyers, of an electromagnet controlling said mechanism, an electric circuit, electromagnets controlling said mechanism, an air-blast pipe having its vent controlled by the movement of the paper received from the aforesaid conveyers, and a circuit-controller actuated by the air-blast emitted from the aforesaid pipe as set forth.

5. The combination, with the feed-board, paper-conveyers carrying the pile of papers toward the delivery end of said board, mechanism transmitting motion to said conveyers, and feeding devices delivering the sheets singly from the pile, of an electric circuit, electromagnets controlling said mechanism, an air-blast tube having its vent downward directly over the path of the paper beyond the delivery end of the feed-board, and a circuit maker and breaker under the path of paper and actuated by the blast of air from the aforesaid tube as set forth.

6. In combination, with the feed-board, longitudinal paper-conveyers over said board, mechanism transmitting motion to said conveyers, and feeding devices delivering the sheets singly from the pile on the feed-board, an electric circuit, electromagnets controlling the aforesaid mechanism, an air-blast tube having its vent downward directly over the path of the paper in front of the feed-board, a funnel under said path of the paper and in range with the blast-pipe, and a circuit maker and breaker having its movable terminal extended under the discharge end of the aforesaid funnel to be actuated by the current of air issuing therefrom as set forth.

7. In combination, with the feed-board, longitudinal paper-conveyers over said board, mechanism transmitting motion to said conveyers and feeding devices delivering the sheets singly from the pile on the feed-board, an electric circuit, electromagnets controlling the aforesaid mechanism, an air-blast tube disposed with its vent downward over the path of the paper in front of the feed-board, a guard extending from the lower end of said tube toward the feed-board and a circuit maker and breaker under said path of the paper and actuated by the blast of air from the aforesaid tube as set forth.

8. In combination, with the feed-board, longitudinal paper-conveyers over said board, mechanism transmitting motion to said conveyers and feeding devices delivering the sheets singly from the pile on the feed-board, an electric circuit, electromagnets controlling said mechanism, a paper-supporting plate extending forward from the delivery end of the feed-board and provided with an aperture, a funnel secured in said aperture flush with the top of the plate, an air-blast tube over said funnel, a guard extending from the lower end of said tube toward the feed-board, and a circuit maker and breaker actuated by the current of air issuing from the funnel as set forth.

9. In combination, with the feed-board, rollers extending across opposite ends of said board, paper-conveying belts running on said rollers, two parallel bars disposed in proximity to each other, a rotary cam imparting reciprocating motion to one of said bars, mechanism transmitting motion from the other bar to one of the aforesaid rollers, catches on one of the bars engaging and releasing the other bar, an electric circuit, electromagnets actuating the aforesaid catches, an air-blast tube disposed with its vent downward over the path of the paper in front of the feed-board and a circuit maker and breaker under said path of the paper and actuated by the blast of air from the aforesaid tube as set forth.

10. In combination with the feed-board, longitudinal paper-conveyers over said feed-board, mechanism transmitting motion to said conveyers and feeding devices delivering the sheets singly from the pile on the feed-board, an electric circuit, electromagnets controlling said mechanism, a paper-supporting plate ex-

tending forward from the delivery end of the feed-board and provided with an aperture, a funnel secured in said aperture flush with the top of the plate, an air-blast tube over said funnel, a guard extending from the lower end of said tube toward the feed-board, and a circuit maker and breaker actuated by the current of air issuing from the funnel as set forth.

11. In combination with the feed-board, rollers extending across opposite ends of said board, paper-conveying belts running on said rollers, two parallel bars disposed in proximity to each other, a rotary cam imparting reciprocating motion to one of said bars, mechanism transmitting motion from the other bar to one of the aforesaid rollers, catches on one of the bars engaging and releasing the other bar, an electric circuit, electromagnets actuating the aforesaid catches, an air-blast tube disposed with its vent downward over the path of the paper in front of the feed-board and a circuit maker and breaker under said path of the paper and actuated by the blast of air from the aforesaid tube as set forth.

In testimony whereof I have hereunto signed my name this 2d day of July, 1895.

TALBOT C. DEXTER. [L. S.]

Witnesses:

JAS. A. WHITLOCK,

M. E. MORRISON.