(No Model.) 4 Sheets—Sheet 1.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

No. 572,154. Patented Dec. 1, 1896.

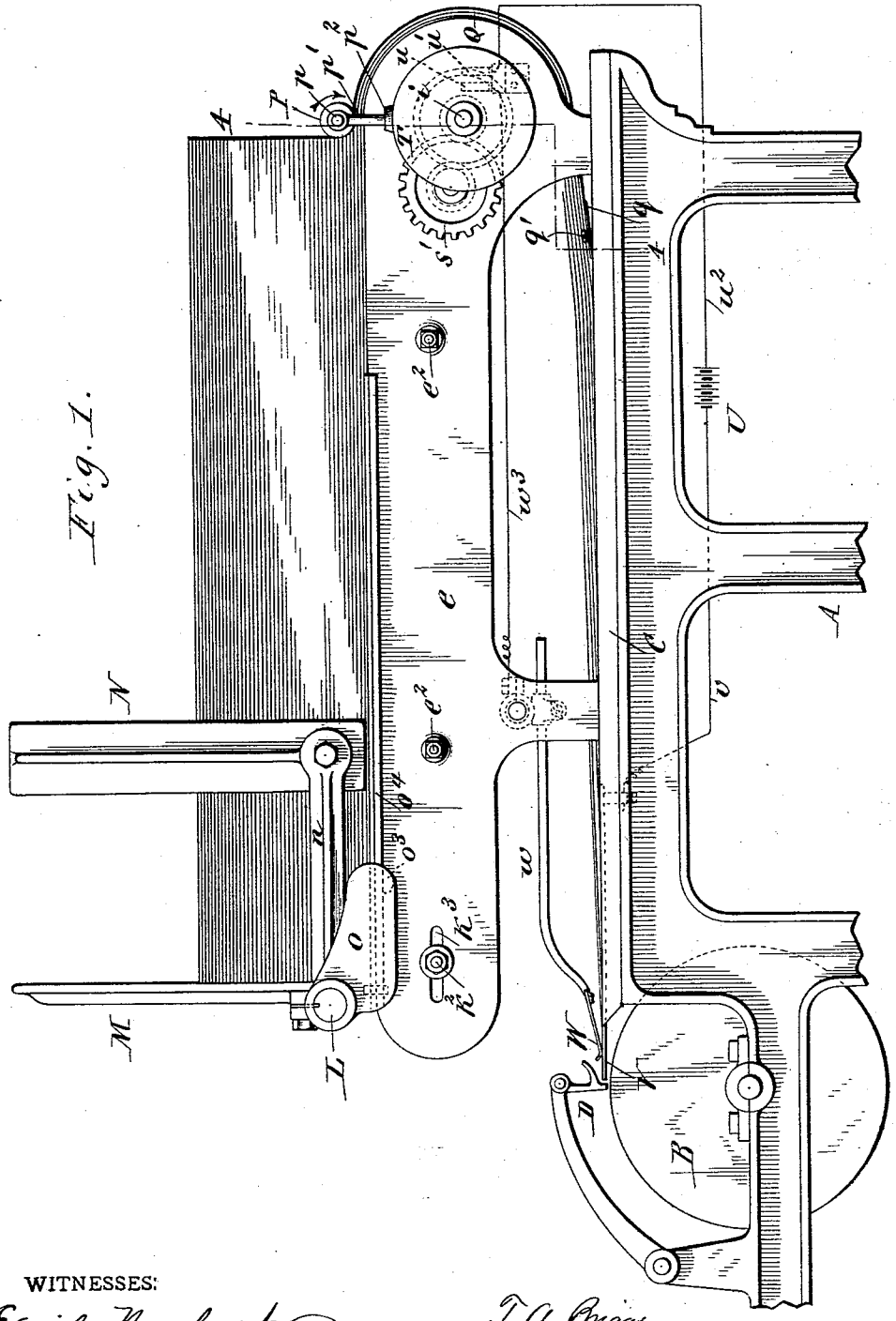

Fig. 1.

WITNESSES:

Emil Neuhart

Theo. L. Popp.

T. A. Briggs
W. A. Philpott Jr.
INVENTORS

By Wilkins & Bonner
ATTORNEYS

(No Model.) 4 Sheets—Sheet 2.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

No. 572,154. Patented Dec. 1, 1896.

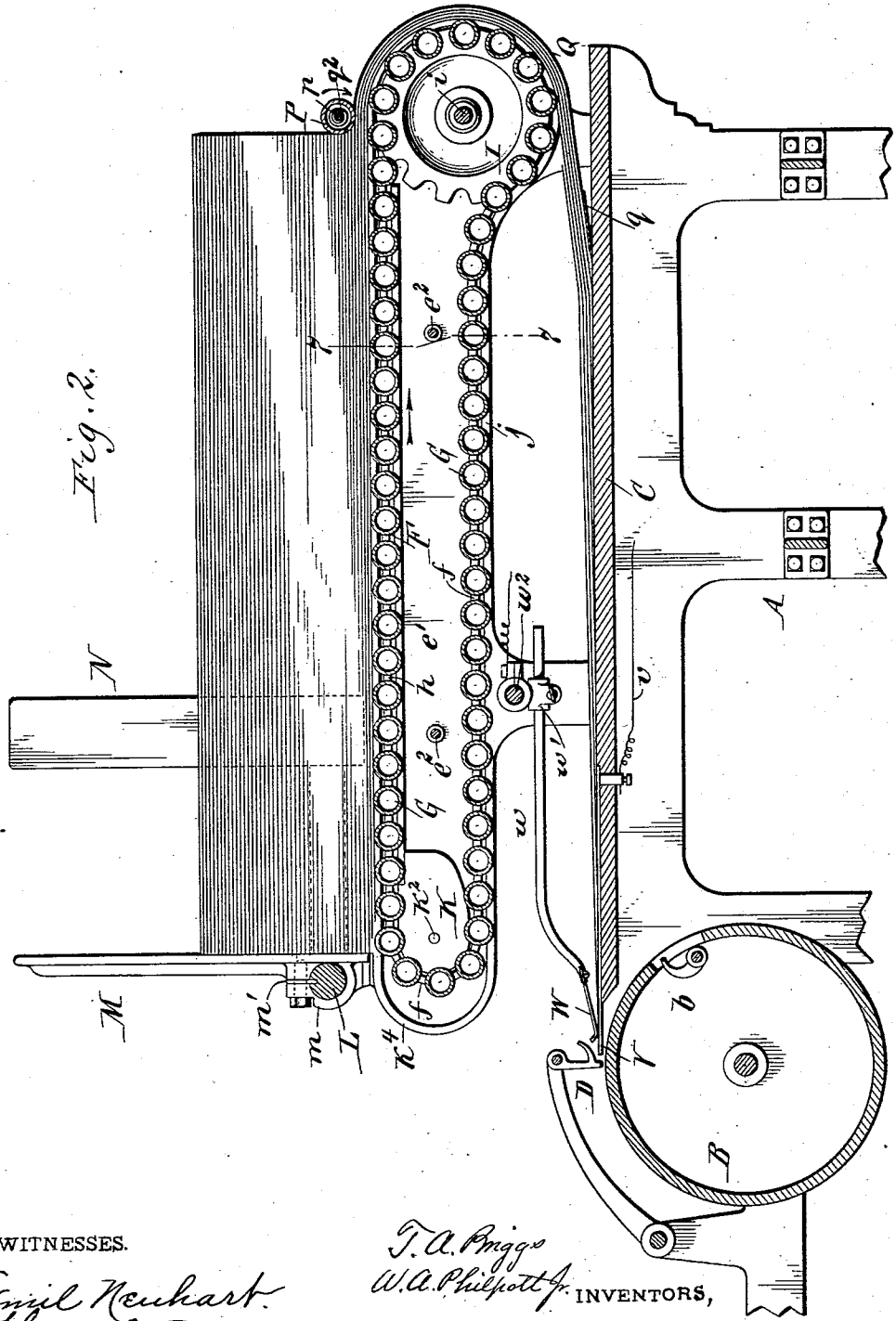

Fig. 2.

WITNESSES.

Emil Neuhart.
Theo. L. Popp.

T. A. Briggs
W. A. Philpott Jr. INVENTORS,
By Wilhelm & Bonner ATTORNEYS.

(No Model.) 4 Sheets—Sheet 3.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

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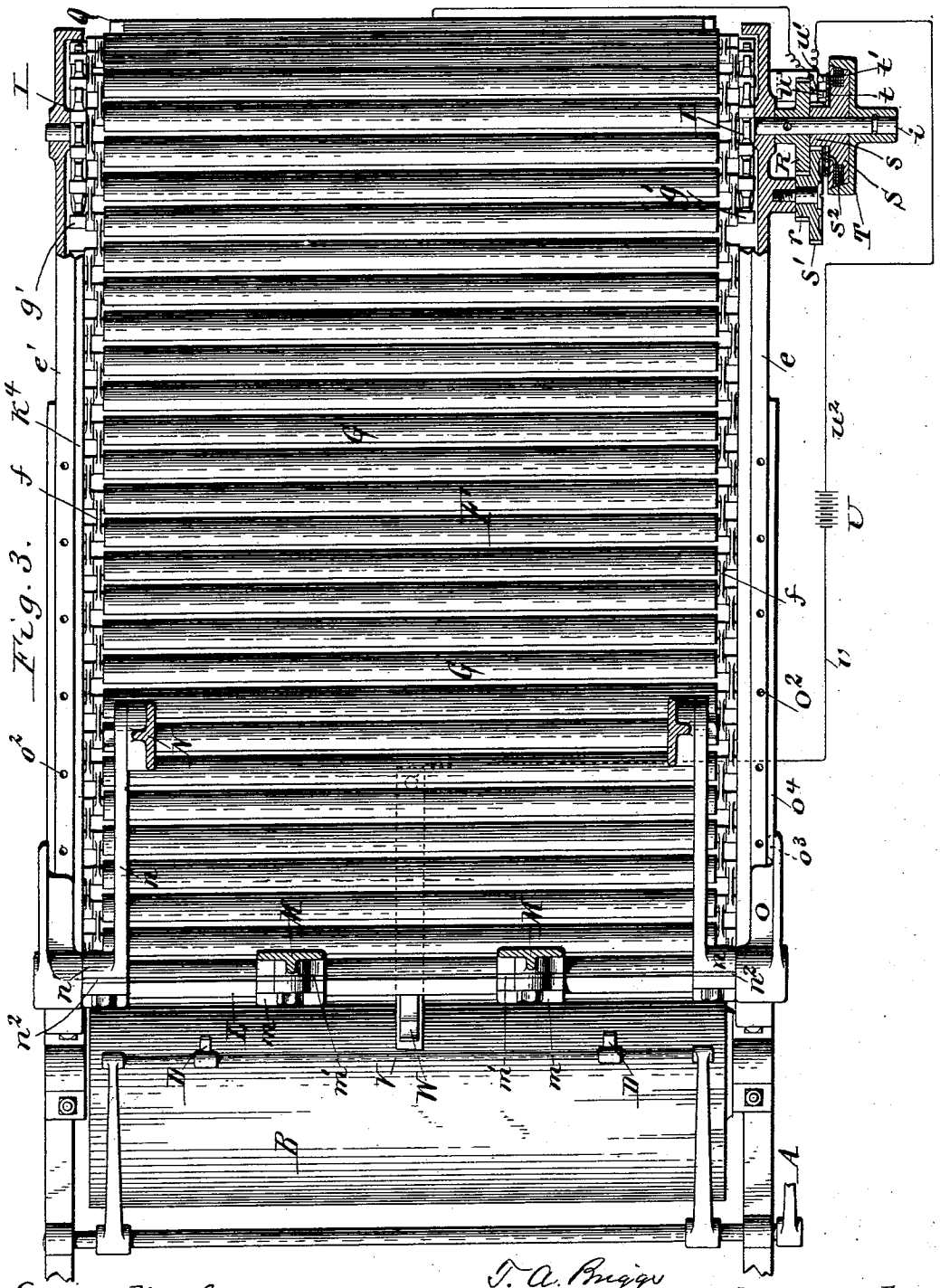

Fig. 3.

Witnesses.
Emil Neuhaus
Theo. L. Popp

Inventors.
T. A. Briggs
W. A. Philpott Jr.
By Wilhelm Bonnet
Attorneys.

(No Model.) 4 Sheets—Sheet 4.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

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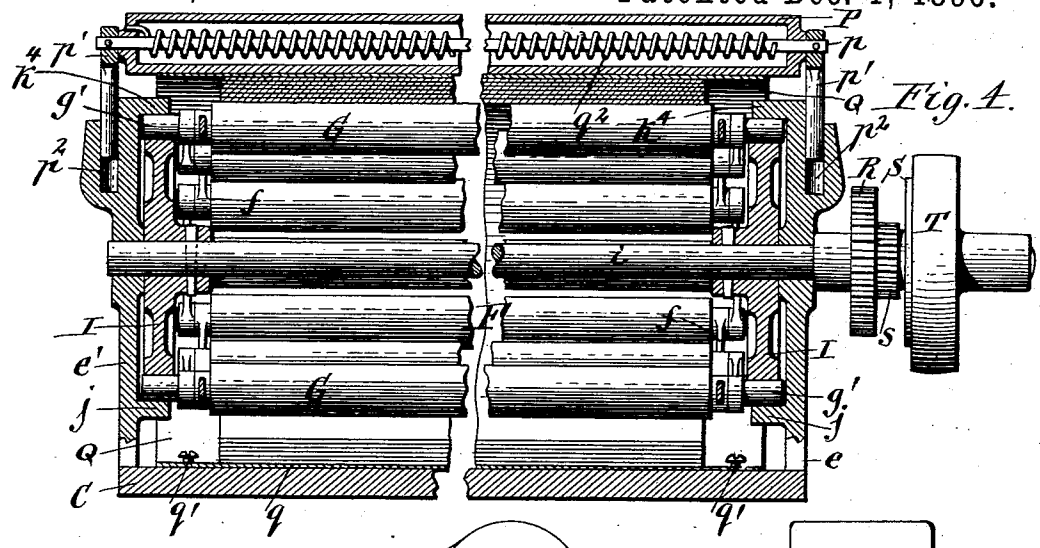

Fig. 4.

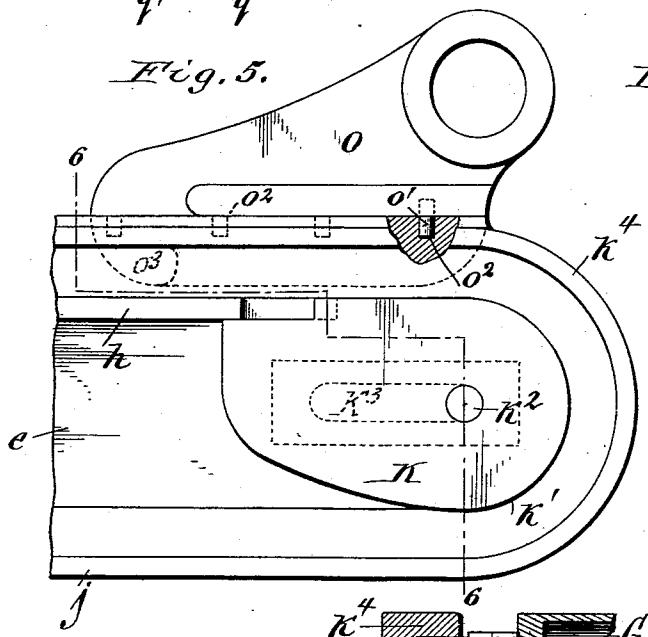

Fig. 5.

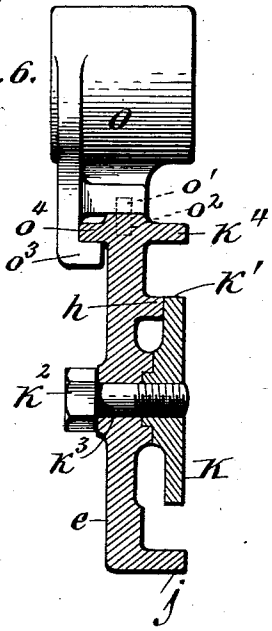

Fig. 6.

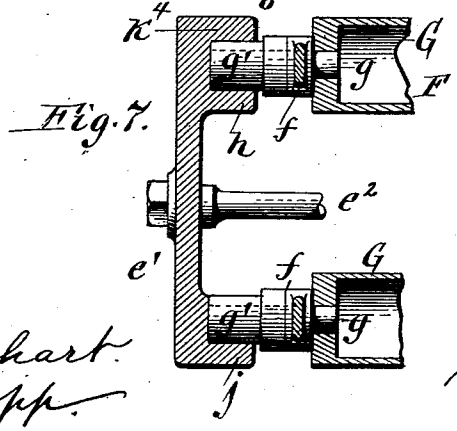

Fig. 7.

WITNESSES.

Emil Neuhart.
Theo. L. Popp.

T. A. Briggs
W. A. Philpott Jr.
INVENTORS
By Wilhelm Bonner
ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS A. BRIGGS, OF NIAGARA, CANADA, AND WILLIAM A. PHILPOTT, JR., OF NIAGARA FALLS, NEW YORK.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 572,154, dated December 1, 1896.

Application filed October 11, 1894. Serial No. 525,567. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. BRIGGS, residing at Niagara Falls South, Province of Ontario, Dominion of Canada, and WILLIAM A. PHILPOTT, Jr., residing at Niagara Falls, in the county of Niagara and State of New York, citizens of the United States, have invented a new and useful Improvement in Paper-Feeding Machines, of which the following is a specification.

This invention relates to a paper-feeding machine whereby sheet-paper is fed automatically from the bottom of the pile to a printing-press, folding, ruling, calendering, or other machine in which sheet-paper is operated upon.

The object of this invention is to produce a paper-feeding machine which is simple in construction and reliable in operation and which can be produced at comparatively small cost.

In the accompanying drawings, consisting of four sheets, Figure 1 is a side elevation of our improved paper-feeding machine applied to a printing-press. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a top plan view thereof, partly in section. Fig. 4 is a fragmentary vertical cross-section, on an enlarged scale, on lines 4 4, Fig. 1. Fig. 5 is a fragmentary inside elevation, on an enlarged scale, of one side piece of the feeder-frame and connecting parts. Fig. 6 is a vertical cross-section in line 6 6, Fig. 5. Fig. 7 is a fragmentary cross-section, on an enlarged scale, in line 7 7, Fig. 2.

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

A represents the frame of the printing-press; B, the impression-cylinder provided with the usual grippers *b;* C, the feed-table arranged with its delivery end over the impression-cylinder, and D the vertically-movable front or registering guides arranged over the cylinder.

The paper-feeding mechanism is supported on a separate frame, which consists, essentially, of two vertical side pieces *e e'*, resting upon the feed-table and connected by suitable devices—for instance, two transverse rods e^2.

F represents an endless feed-roller belt which supports the pile of sheet paper and whereby the sheets are fed successively from the bottom of the pile to the impression-cylinder. This belt is arranged between the side pieces of the feeder-frame and consists of two endless link belts or chains *f f*, arranged on the inner sides of the side pieces *e e*, and a number of transverse feed-rollers G, connecting the two belts, so as to bridge the space between the side pieces.

The upper supporting and feeding portion of the roller-belt is arranged horizontally and supports the pile of sheets in an upright position. The receiving portion of the roller-belt is arranged over the delivery end of the feed-table and its delivery portion over the receiving end of the feed-table. The roller-belt passes at the front end of the machine around sprocket-wheels I, by which the belt is driven, and then horizontally to the rear end of the feeder-frame. The roller-belt is supported at its edges by suitable guides and antifriction-rollers running in contact therewith, which parts may be constructed as follows: Each of the transverse rollers of the roller-belt is provided at each end with a pin or trunnion *g*, which extends through the eyes in the adjacent ends of two links of the chain belt and which is provided at its outer end with an antifriction or guide roller *g'*, which latter is free to turn on its pin.

The guide-rollers of the upper horizontal portion of each chain belt *f* are supported on a horizontal guide rail or flange *h*, formed on the inner upper portion of the adjacent side piece of the feeder-frame, and the guide-rollers of the lower horizontal portion of each chain belt are supported on a horizontal guide rail or flange formed on the lower inner portion of the adjacent side piece. The sprocket-wheels are secured to a transverse driving-shaft *i*, which is journaled in bearings in the side pieces of the feeder-frame.

K represents transfer-blocks, each of which is provided with a guide-face *k'*, which extends from the vicinity of the adjacent lower rail upwardly in a curve and then horizontally in line with the tread of upper guide-rail *h*, whereby the guide-rollers in passing around these blocks are transferred from the lower rail to the upper rail. Each transfer-

block is adjustably secured to the inner side of the adjacent side piece by means of a bolt k^2, passing through a horizontal slot k^3 in the side piece. The slack in the chain belts can be taken up by shifting the transfer-blocks lengthwise toward the receiving end of the feeder-frame. The delivery portion of each transfer-block overlaps the receiving portion of the upper rail, so as to permit the transfer-block to be shifted lengthwise within certain limits without destroying the continuity of the bearing-surface on which the guide-rollers run.

Each of the side pieces of the feeder-frame is preferably provided with a guard-rail k^4, which extends upwardly in a curve from the rear end of the lower guide-rail j, thence horizontally forward over the rollers on the top rail h, and thence downwardly in a curve along the outer sides of the rollers on the sprocket-wheels to the front end of the lower rail, thereby holding the carrying portions of the chain belt in position as they pass over the upper rail and around the sprocket-wheels.

L represents a supporting-rod which is arranged transversely over the rear portion of the feed-belt and which supports the vertical rear guides M, against which the rear side of the pile of sheets is placed, and the vertical side guides N, which confine the pile on both sides. This rod is secured with its ends to sliding supports O, which rest upon the side pieces of the feeder-frame and are capable of adjustment thereon lengthwise of said frame. Each of these sliding supports is provided on the under side of its rear portion with a depending pin o', which is adapted to enter one of a longitudinal row of openings o^2, formed in the top of the adjacent side piece, thereby holding the support against sliding thereon after adjustment. The under side of the front portion of each support is provided with a hook or lug o^3, which projects underneath a horizontal flange o^4 on the outer side of the side piece and prevents the front end of the support from being lifted. When it is desired to shift the rear guides to support sheets of a different length, the rear ends of the supports are lifted until their depending pins are free from the openings in the side pieces. The supports are now moved lengthwise upon the side pieces to the desired position and then dropped with their pins into the proper openings. Each of the rear guides is secured to the transverse supporting-rod, so as to be capable of sliding thereon, but not turning thereon, by means of a split clamping-sleeve m and feather m'. Each of the side guides N is supported from the transverse rod L by a horizontal arm n, secured at its front end to the outer side of the side guide and provided at its rear end with a split clamping-sleeve n', which is capable of lengthwise movement on said rod for adjusting the side guide to the longitudinal side of the pile, and with a feather n^2, which prevents said arm from turning on said rod.

When the feed mechanism is in operation, the upper portion of the roller-belt moves toward the front end of the machine in the direction of the arrow in Fig. 2. The rollers exert a rubbing action against the bottom of the pile of sheets resting thereon and comb or carry the sheets successively from the bottom of the pile forwardly, thence downwardly around the sprocket-wheels, and thence rearwardly over the feed-table to the front registering-guides, whereby the position of the sheets is reversed and their lower sides are placed uppermost as they pass over the feed-table. In being drawn along the under side of the pile by the chain belts the feed-rollers are retarded on their upper portions by contact with the paper and therefore turn backwardly with their upper portions, while the antifriction-rollers mounted on their trunnions turn forwardly with their upper portions as they run with their lower sides in contact with the guide-rails. The feed-rollers do not run on the guide-rails, but are free to turn in a direction opposite to that in which they would turn if they ran directly on the guide-rails.

P represents a pile-retaining roller which is arranged transversely in front of the lower portion of the pile of sheets, and which prevents the bulk of the pile of paper from being affected by the combing-rollers. That portion of the pile which lies below the retaining-roller is free to pass underneath the roller, while that portion of the pile which lies above the roller is prevented from being combed or tipped by the feeding action of the roller-belt. The retaining-roller is preferably hollow and journaled with its ends on a stationary rod p, which passes through the retaining-roller. This rod is secured with its ends to vertical pins p', which are loosely arranged in vertical sockets p^2, formed in the side pieces, and whereby the retaining-roller is permitted to adjust itself to the variations in the thickness of the paper which is fed from under the pile.

Q represents a tension-apron whereby the sheets are held firmly in contact with the combing-rollers as they pass from the pile around the sprocket-wheels to the feed-table. This apron is secured with its upper ends to the retaining-roller and with its lower end to a transverse plate q, which is attached to the front portion of the feed-table by pins or screws q', so as to be capable of a slight movement on said pins. The tension-apron is held taut and pressed firmly against the paper by means of a coil-spring q^2, surrounding the supporting-rod p and secured with its ends, respectively, to said rod and the retaining-roller in such manner that the spring tends to turn the roller in the direction of the arrow in Fig. 1, whereby the roller has a constant tendency to wind up the apron and tighten the same.

The roller belt or apron may be driven by the following mechanism:

R represents a gear-wheel secured to the driving-shaft adjacent to the outer side of one of the side pieces and meshing with a pinion r, turning on a stud secured to the adjacent portion of the side piece.

S represents a conical coupling-head mounted loosely on the driving-shaft outside of the gear-wheel R and capable of a minute longitudinal movement thereon, which is so small in extent that the clearance between the coupling-head S and the adjacent part is not shown in the drawings. The conical head is provided on its inner side with a pinion s, which meshes with a gear-wheel s', secured to the pinion r. The rotary motion of the coupling-head is transmitted by the intermediate gear-wheels and pinions to the driving-shaft, sprocket-wheels, and roller-feed belt. The coupling-head is provided in its conical face with an annular groove which contains a coil of insulated wire s^2. Upon conducting a current of electricity to this coil the coupling-head is converted into an electromagnet. The ends of the coil are connected with insulated commutator-rings $t\,t'$, mounted on the head, and the current is conducted to the same by means of brushes $u\,u'$, bearing, respectively, against the rings.

T represents a driving-pulley which is driven constantly from any source and which is mounted outside of the coupling-head on the driving-shaft so as to turn thereon, but prevented from sliding lengthwise.

The driving-pulley is made of iron and provided with a conical socket, which receives the coupling-head. Upon energizing the electromagnet of the coupling-head it attracts the driving-pulley in the manner of an armature, thereby coupling the conical head and driving-pulley and setting the feed-roller belt in motion for feeding the sheets toward the front registering-guides of the printing-press. The instant the coupling-head is deënergized the armature driving-pulley is liberated, thereby arresting the movement of the driving-shaft and stopping the feeding action of the roller-belt. The intermediate gears interposed between the coupling-head and the driving-shaft serve to reduce the speed of the latter below that of the driving-pulley when the latter runs at a very high speed; but when the driving-pulley is run at a slow speed the coupling-head may be secured directly to the driving-shaft.

U represents an electric generator of any suitable construction, having one pole connected with the brush u' by a wire u^2.

V represents the lower contact-finger, which is secured to the rear end of the feed-table, but insulated therefrom, and which is connected by a wire v with the opposite pole of the electric generator.

W represents an upper contact-finger pivoted to the rear end of a longitudinal supporting-rod w and adapted to bear against the lower contact-finger. The longitudinal supporting-rod is secured by an insulated clamp w' to a transverse supporting-rod w^2, which latter is secured with its ends to the side pieces of the feeder-frame. The clamp w' is connected by a wire w^3 with the other brush u, whereby the current of electricity is conducted to the upper contact-finger.

When the upper movable contact-finger comes in contact with the lower fixed finger, the electric circuit is closed and the feed-roller belt is coupled with the driving-pulley by the electric clutch, which causes the belt to carry the sheets from the bottom of the pile to the feed-table, and then feeds the sheets successively forward to the front registering-guides. During the last portion of the forward movement of the front sheet toward the front registering-guides it passes between the contact-fingers and separates the latter. The sheet of paper being an insulating medium breaks the circuit in passing between the contact-fingers, thereby uncoupling the clutch and arresting the movement of the feed-rollers. The latter remain inactive during the entire time that the contact-fingers are separated. After the sheet strikes the front registering-guides the latter are raised to clear the sheet, and the grippers of the impression-cylinder grasp the sheet and carry it off from the feed-table. After the sheet has been carried from the feed-table the front guides are again lowered into their operative position and the upper contact-finger drops upon the lower finger for closing the circuit and starting the feeding of the next sheet.

We claim as our invention—

1. The combination with the feed-table, of a feed-apron provided with transverse feed-rollers and arranged above the table, pile-confining devices arranged above the upper straight portion of the feed-apron and wheels around which the front portion of the feed-apron passes downwardly toward the feed-table, substantially as set forth.

2. The combination with the feed-table, of a feed-apron provided with transverse rollers and arranged above the table, wheels around which the front portion of the feed-apron turns downwardly toward the feed-table, pile-confining devices arranged above the upper straight portion of the feed-apron, and a pile-retaining device arranged above the apron at the foot of the delivery side of the pile, substantially as set forth.

3. The combination with the feeder-frame and the roller belt or apron, of upper and lower guides arranged on said frame and supporting the upper and lower portions of the belt or apron, wheels around which the front portion of the belt or apron passes, transfer blocks or plates whereby the rear portion of the belt or apron is transferred from the lower to the upper guides, and adjusting devices whereby the transfer-blocks can be adjusted for taking up slack in the belt or apron, substantially as set forth.

4. The combination with the roller-belt and

the wheels around which the front portion of the belt or apron passes, of a flexible pressure-apron bearing against the front portion of the belt and secured at one end, and a tension device connected with the opposite end whereby said apron is drawn taut, substantially as set forth.

5. The combination with the feed-table and the feeder-frame, of a roller-belt arranged in the feeder-frame and supporting the pile of sheets, wheels around which the front portion of the belt passes, a flexible pressure-apron surrounding the portion of the belt which passes around the wheels, and a spring-roller whereby the apron is drawn taut, substantially as set forth.

6. The combination with the feed-table and the feeder-frame, of a roller-belt arranged in the feeder-frame and supporting the pile of sheets, wheels around which the front portion of the belt passes, a retaining-roller mounted on the feeder-frame and arranged above the belt at the foot of the delivery side of the pile, a flexible pressure-apron secured with its upper and lower ends to the feed-table and retaining-roller respectively, and a spring whereby the retaining-roller is turned for winding the apron on the retaining-roller and pressing the same against the roller-belt, substantially as set forth.

7. The combination with the feeder-frame having each of its side pieces provided with a longitudinal flange and with a longitudinal row of openings, of a transverse bar provided with upright guides for confining the pile, and slides supporting the transverse bar and provided with pins which engage in said openings and with hooks which engage underneath said flanges, substantially as set forth.

Witness our hands this 5th day of October, 1894.

THOMAS A. BRIGGS.
WILLIAM A. PHILPOTT, JR.

Witnesses:
G. M. TUTTLE,
FREDK. SCUPPIE.