(No Model.) 2 Sheets—Sheet 1.

B. W. CHILD.

AUTOMATIC STOP MECHANISM FOR PAPER FEEDING OR OTHER MACHINES.

No. 567,262. Patented Sept. 8, 1896.

Fig. 1.

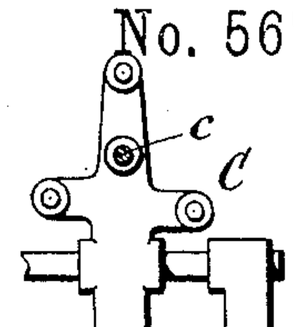
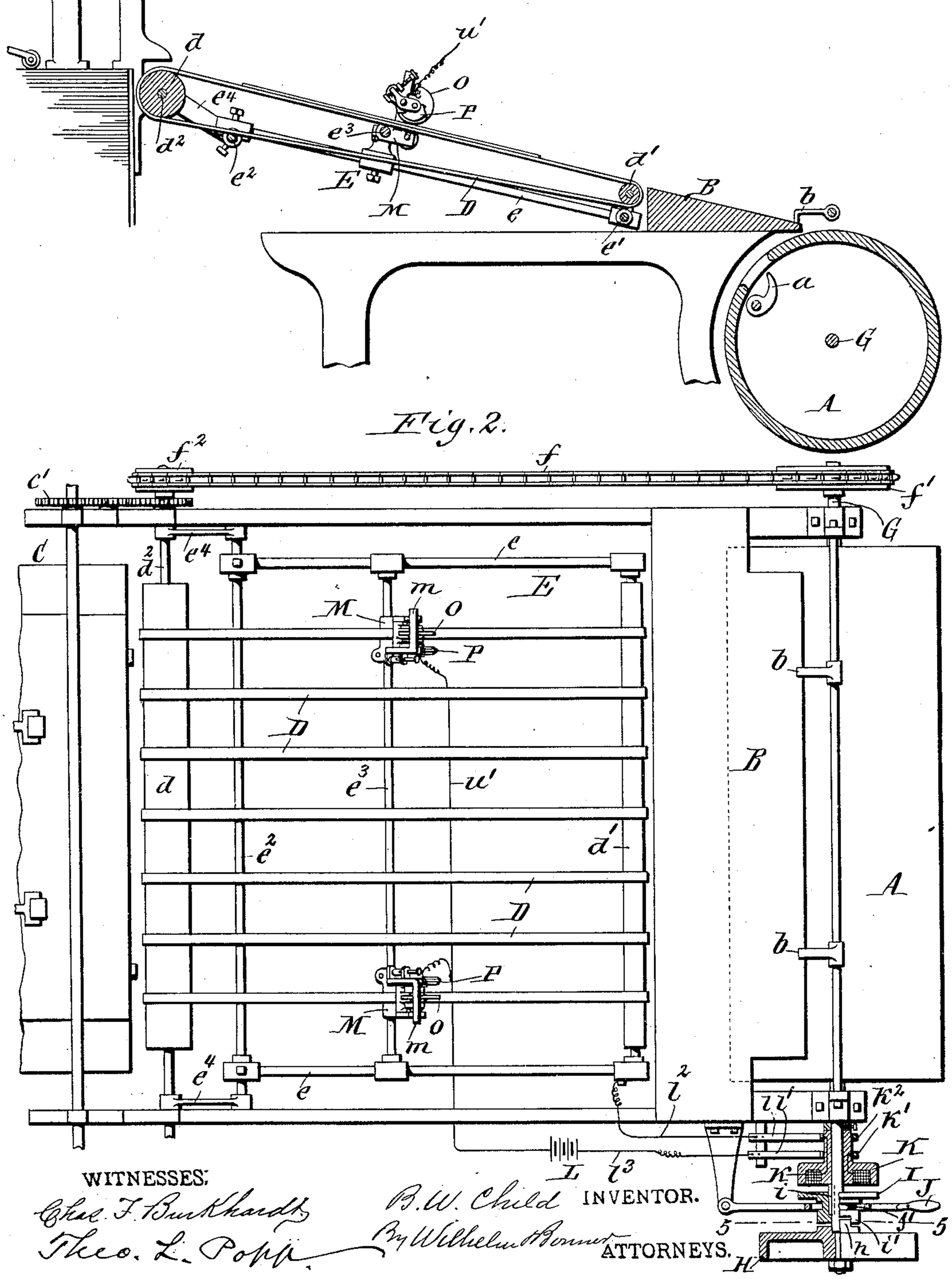


Fig. 2.



WITNESSES:

Chas. F. Burkhardt

Theo. L. Popp

B. W. Child INVENTOR.

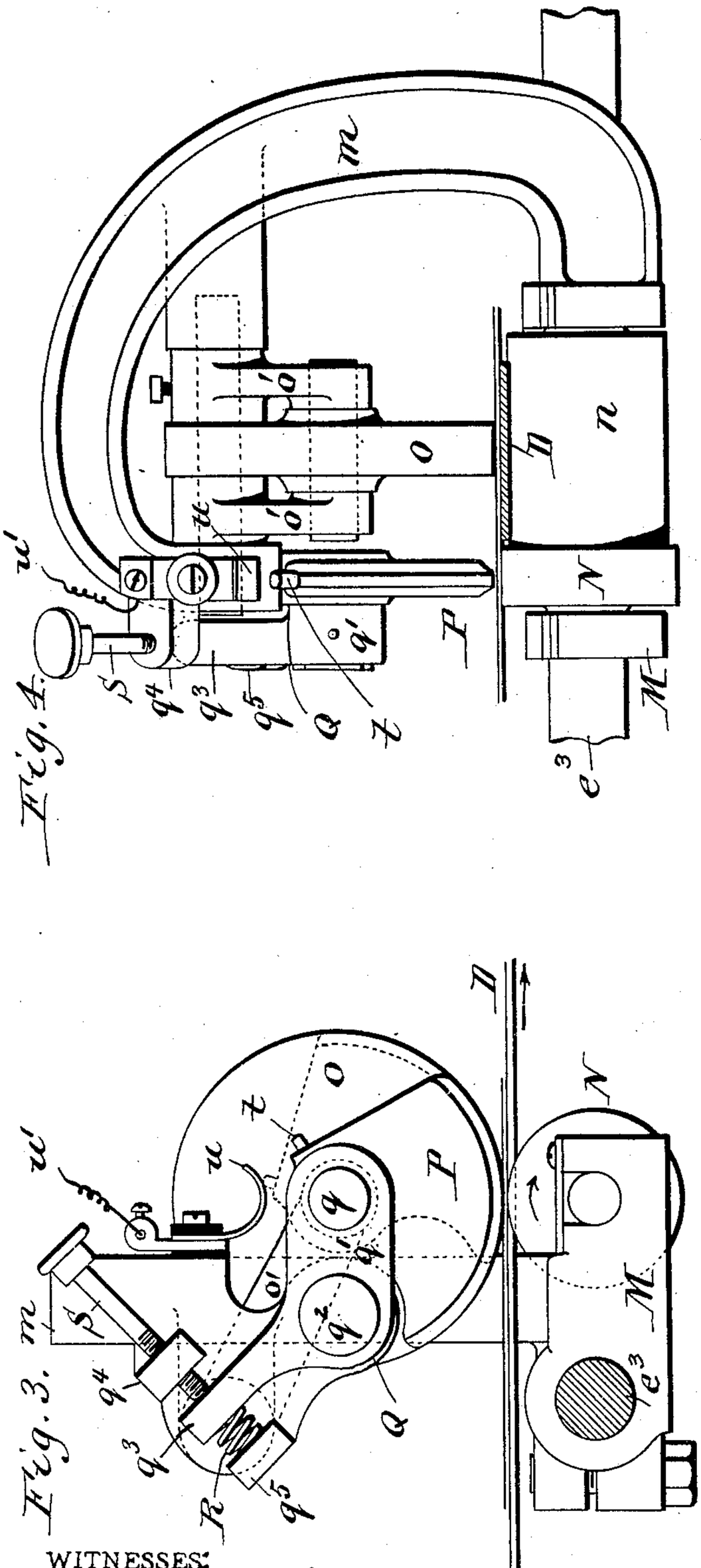
By Wilhelm Bonner ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

B. W. CHILD.

AUTOMATIC STOP MECHANISM FOR PAPER FEEDING OR OTHER MACHINES.

No. 567,262. Patented Sept. 8, 1896.



WITNESSES:
Chas. F. Burkhardt
Theo. L. Popp.

B. W. Child INVENTOR.
By Wilhelm & Bonner.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

BRAINERD W. CHILD, OF NEW YORK, N. Y., ASSIGNOR TO THE ECONOMIC MACHINE COMPANY, OF SAME PLACE.

AUTOMATIC STOP MECHANISM FOR PAPER-FEEDING OR OTHER MACHINES.

SPECIFICATION forming part of Letters Patent No. 567,262, dated September 8, 1896.

Application filed November 18, 1895. Serial No. 569,263. (No model.)

To all whom it may concern:

Be it known that I, BRAINERD W. CHILD, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Improvement in Automatic Stop Mechanisms for Paper-Feeding or other Machines, of which the following is a specification.

This invention relates to an automatic stop mechanism for paper-feeding machines whereby sheets of paper are fed successively from a pile to a machine which operates upon the sheets of paper, or for other machines.

The invention has the object to provide a simple and reliable device whereby the operation of feeding is automatically arrested when more than one sheet is fed or when the thickness of paper is otherwise in excess of the normal.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary longitudinal section showing my improvements applied to a tape mechanism whereby the sheets of paper are carried from an automatic paper-feeder to a printing-press. Fig. 2 is a top plan view thereof. Fig. 3 is a side elevation, on an enlarged scale, of the automatic gage or device for detecting the passage of more than one sheet over the tapes, the supporting-bar being shown in section. Fig. 4 is a front elevation of the same with the carrying-tape shown in section. Fig. 5 is a longitudinal section, on an enlarged scale, of the coupling or clutch, taken in line 5 5, Fig. 2. Fig. 6 is a side elevation, and Fig. 7 is a front elevation, of a modified construction of the upper member of the automatic gage or detector.

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

A represents the cylinder of a printing-press, provided with the usual grippers *a*, a feed-board B, and front guides *b*.

C represents an automatic sheet-feeding mechanism whereby the sheets are fed one at a time from a pile, and which may be of any suitable and well-known construction.

D represents carrying-tapes, of any ordinary or suitable construction, whereby the sheets are carried from the pile in the feeding-machine to the front guides of the press. These tapes, as shown, pass with their receiving portions around a receiving-roller *d*, arranged in front of the pile of paper and with their delivery portions around a delivery-roller *d'*, arranged in rear of the feed-board. The receiving-roller is mounted on a transverse shaft d^2, which is journaled in bearings in the frame of the feeding mechanism.

E is the usual tape-frame, which consists, essentially, of two longitudinal side bars *e e*, rear and front cross-bars e' e^2, an intermediate cross-bar e^3, connecting the middle portions of the side bars, and arms e^4, supporting the front cross-bar e^2 from the shaft of the receiving-roller. The tapes may be driven from any available source, preferably by means of a chain belt *f*, passing around sprocket-wheels f' f^2, secured, respectively, to the shaft G of the printing-cylinder and the shaft of the receiving-tape roller, as represented in Fig. 2. The shaft *c* of the feed mechanism may be driven from the shaft of the receiving-tape roller by gear-wheels *c'*.

The printing and feeding mechanism may be coupled with and uncoupled from the driving mechanism in any suitable and well-known manner, for instance as follows: H represents a constantly-rotating driving-pulley mounted loosely on one end of the cylinder-shaft and held against lengthwise movement thereon. The inner side of the hub of the driving-pulley is provided with two inwardly-projecting clutch teeth or lugs *h*. I represents an iron clutch-collar arranged to slide lengthwise on the cylinder-shaft on the inner side of the driving-wheel, but held against turning on the shaft by a key or spline *i*. The outer side of the clutch-collar is provided with two outwardly-projecting clutch teeth or lugs *i'*, which are adapted to engage with the teeth or lugs of the driving-pulley. Upon moving the clutch-collar outwardly so that its teeth engage with those of the driving-pulley the movement of the latter will be transmitted to the clutch-collar and the operating mechanism connected therewith. Upon moving the clutch-collar inwardly so as to disengage its teeth from those of the driving-pulley the operation of the printing-press and the feeding mechanism will be arrested. This clutch-collar is preferably connected with a

hand-lever J, pivoted on the main frame and provided with radial pins *j*, which engage with an annular groove *j'* in the clutch-collar.

The clutch is automatically uncoupled for the purpose of stopping the operation automatically when more than one sheet passes over the tapes by the following mechanism: K represents an electromagnetic disk secured to the cylinder-shaft adjacent to the inner side of the clutch-collar and provided with an exciting-coil *k*, the ends of which terminate in insulated commutator-rings *k' k²*, arranged on the outer side of the hub of the disk, as represented in Fig. 2. Upon passing an electric current through the electromagnetic disk the latter is energized and the clutch-collar, serving as an armature, will be attracted and moved inwardly for uncoupling the clutch. *l l'* represent insulated brushes which bear against the commutator-rings, one of said brushes being connected by a wire *l²* with the tape-frame, while the other brush is connected by a wire *l³* with one pole of an electric generator L.

On each side of the tape mechanism there is arranged an automatic gage or sheet-detecting device, whereby the passage of more than one sheet is detected and whereby the uncoupling of the clutch is controlled, each of said automatic gages or detecting devices being constructed as follows: M represents a bracket arranged underneath the outer or side tape and secured to the intermediate cross-bar, so as to be capable of transverse adjustment thereon to suit the width of the tape mechanism. This bracket is provided on its outer side with an upwardly and inwardly projecting arm *m*, which overhangs the outer or side tape.

N represents a roller which is arranged below the path of the sheets, preferably on the inner side of the side tape, and which forms the lower member of the automatic gage or detector. This gage-roller is provided on its outer side with a driving-roller *n*, of slightly smaller diameter, and upon which the outer tape runs for driving it. The gage and driving rollers are journaled transversely in bearings formed in the front portion of the bracket and are constantly rotated by the tape in the direction in which the sheets move, as indicated by the arrow in Fig. 3. For the purpose of giving the tape a better hold upon the driving-roller the latter is pressed against the driving-roller by a pressure-roller *o*, arranged above the tape. The gage-roller is of such diameter that its uppermost portion is in line with the top of the tape, thereby forming a level support for the sheets which pass over the same. This pressure-roller is journaled in a bifurcated arm *o'*, which is mounted on the overhanging arm of the bracket, which arm is provided with a transverse pin, (shown in dotted lines in Fig. 4,) to which the arm *o'* is secured by a set-screw.

P represents a movable detecting device which forms the upper member of the automatic gage and is arranged with its face over the lower gage-roller at such a height that only one sheet can pass between these two members without moving the upper member. The latter, as shown, has the form of a pendent segment and is journaled transversely with its upper portion by a pin *q* on the front arm *q'* of an adjusting-lever Q. This lever is pivoted transversely on the inner end of the overhanging arm of the bracket by a pin *q²*, and its rear arm *q³* is arranged between an upper and a lower lug *q⁴ q⁵*, formed on the inner end of the overhanging arm. Upon turning the rock-lever the segment can be raised or lowered for adjusting the space between the same and the gage-roller to suit the thickness of the sheets of paper.

R represents a spring whereby the segment is yieldingly held in a depressed position and which is arranged between the lower lug *q⁵* and the rear arm of the adjusting-lever. The latter is turned for raising the segment by means of an adjusting-screw S, arranged in the upper lug *q⁴* and engaging against the rear arm of the lever. In the normal position of the segment the latter depends from its supporting-pin *q* by gravity and has about the central portion of its face arranged over the gage-roller, as shown in full lines in Fig. 3. The space between the segment and the roller is so adjusted that only a single sheet can pass freely between these parts without moving the segment. If two or more sheets are carried between the roller and segment, the increased thickness of paper causes the paper to bind against the faces of the gage-roller and segment with sufficient friction to turn the segment on its pivot by the continuing forward movement of the sheets. This movement of the segment is utilized for closing the electric circuit, thereby uncoupling the clutch and stopping the operation of the machine.

t is a movable contact secured to the upper portion of the segment and forming one of the terminals of the generator, the connection being made with the brush *l* by the wire *l²*, the tape-frame, bracket, overhanging arm, adjusting-lever, and other metallic parts of the machine.

u represents an insulated stationary contact connected with the other pole of the generator by a wire *u'* and secured to the overhanging arm, so as to project into the path of the movable contact.

In the normal depending position of the segment its contact is out of engagement with the upper contact, as shown in full lines in Fig. 3, and it remains in this position as long as only one sheet is carried forward by the tapes between the gage-roller and the segment. In this position of the parts the circuit is broken and the electromagnetic disk is deënergized, thereby permitting the clutch-collar to remain in engagement with the driving-pulley for driving the feeding mechanism and the printing-press. When two or

more sheets of paper are carried by the tapes between the roller and segment, the latter is turned until its contact comes into engagement with the upper stationary contact, as shown in dotted lines in Fig. 3. This closes the electric circuit, which causes the electromagnetic disk to become energized and attract the clutch-collar, thereby uncoupling the clutch and arresting the operation of the mechanism. The sheets of paper continue in their course while turning the segment until the feeder and press are stopped, which prevents the next following sheet which is fed by the feeding-machine upon the tapes from coming in conflict with the previous sheets and injuring the same.

The parts of the detecting device and the clutch are so organized that the clutch is uncoupled before the sheets have reached the front guides of the press, thereby preventing the sheets from being drawn partly around the cylinder and spoiled. When the surplus sheet or sheets have been removed, the segment drops back to its normal position by gravity and the machine is again started by coupling the clutch by hand.

The distance between the two contacts is such that when a sheet of paper having a lump or thickened portion passes between the roller and segment the latter will be turned, but not sufficiently to bring the contacts into engagement, and the segment will drop back into its normal position after the lump in the sheet has passed, thereby preventing the clutch from being uncoupled when the abnormal thickness in the sheet does not extend over a considerable portion of the sheet.

When the advancing sheet has a turned-over edge, the same action takes place, that is to say, the abnormal or double thickness of paper sets the segment in motion, but the extent of movement is not ordinarily enough to bring the contacts together and call the stop mechanism into action, so that in this case, ordinarily, the sheet is allowed to pass on to the press. When, however, the abnormal thickness of paper entering between the two members of the automatic gage is of such length that the segment is not released before the contacts are brought together, then the stop mechanism is called into action and the machine is stopped. By "abnormal thickness" in this connection I have reference to more than one sheet of paper or other material operated upon, and also to a single sheet having a lump or other portion of abnormal thickness, and to any other condition of thickness greater than that, for the passage of which the gage has been constructed or adjusted.

The spring R, which bears against the supporting-lever of the segment, renders the latter slightly yielding away from the gage-roller, so that the segment can rise slightly when more than one sheet or a sheet with thickened portions passes between the roller and segment.

It is obvious that the automatic feeding-machine can be arrested by this stop mechanism independently of the printing-press by arranging the clutch mechanism on the driving-shaft of the feeding-machine instead of on the shaft of the printing-cylinder, as shown.

It is not necessary that the upper member of the automatic detector or gage should be a segment or that it should be returned to its normal position by gravity. For instance, as shown in Figs. 6 and 7, the upper member may be a roller P′, which is returned to its normal position by a spring p, which holds the roller in its normal position against a stop p' on the supporting-bracket, the roller being provided with a projection p^2, which bears against said stop.

The herein-described clutch mechanism and the electromagnetic devices whereby it is connected with the automatic detector may be varied in many respects without departing from my invention, and are intended simply as an illustration of one means whereby the desired result can be effected, but I do not desire to limit myself to the same.

While my automatic stop mechanism is designed more particularly for use in connection with paper-feeding machines and printing-presses, I do not wish to limit myself to such use.

I claim as my invention—

1. The combination with a gage having a member which is capable of rotative movement with its peripheral face in the direction in which the material moves past the gage and which is normally at rest but is rotated by an abnormal thickness of material, for instance more than one sheet of paper, and moves at its face with the passing material, of an electric stop mechanism having contacts which are engaged by such rotative movement of said member, substantially as set forth.

2. The combination with a gage-roller arranged below the path of the passing material, of a pivoted segment which is arranged with its peripheral face above the path of the material and which faces said roller, said segment being normally at rest but rotated by an abnormal thickness of material to move at its peripheral face with the passing material, and an electric stop mechanism having contacts which are engaged by said rotative movement of said segment, substantially as set forth.

3. The combination with a gage-roller, of a movable gage member which is capable of rotative movement with its peripheral face in the direction in which the material moves past the gage and which is normally at rest but is rotated by an abnormal thickness of material and moves at its peripheral face with the passing material, a contact carried by said rotative member, a supporting-bracket carrying another contact, and an electric stop mechanism connected with said contacts, substantially as set forth.

4. The combination with the gage-roller ar-

ranged below the path of the passing material, a pivoted segment arranged above the path of the passing material in line with said roller and adapted to be turned by the passage of an abnormal thickness of material, for instance, more than one sheet of paper, between the roller and segment, and an adjustable support carrying said segment and capable of moving the segment toward or from said roller, of an electric stop motion having contacts which are engaged by the rotative movement of said segment, substantially as set forth.

5. The combination with a gage-roller adapted to support a sheet of paper, of a driving-roller connected with said gage-roller and adapted to be rotated by one of the carrying-tapes, and a gage member facing said gage-roller and capable of rotative movement, substantially as set forth.

6. The combination with a gage-roller adapted to support a sheet of paper, of a driving-roller connected with said gage-roller and adapted to be rotated by one of the carrying-tapes, a gage member facing said gage-rollers and capable of rotative movement, and a presser-roller facing said driving-roller, substantially as set forth.

7. The combination with a gage-roller having a driving-roller adapted to be rotated by one of the carrying-tapes, and a gage member facing said gage-roller and capable of rotative movement, of an electric stop mechanism having contacts which are engaged by the movement of said rotative member, substantially as set forth.

Witness my hand this 14th day of November, 1895.

BRAINERD W. CHILD.

Witnesses:
GEO. W. PARDEE,
GEORGE ILLMENSEE.