

(No Model.)

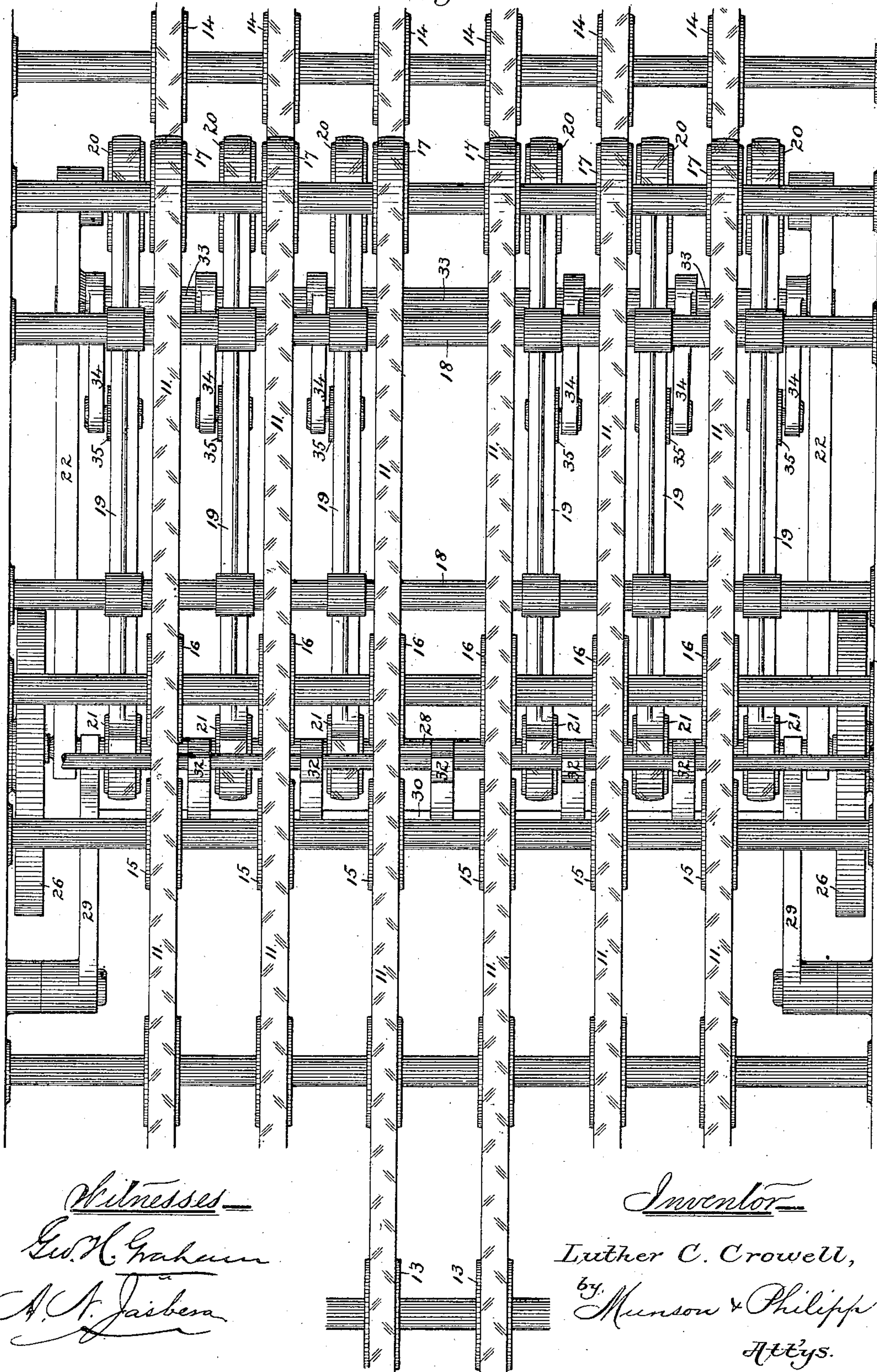
5 Sheets—Sheet 1.

L. C. CROWELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 313,475.

Fig. 1. Patented Mar. 10, 1885.



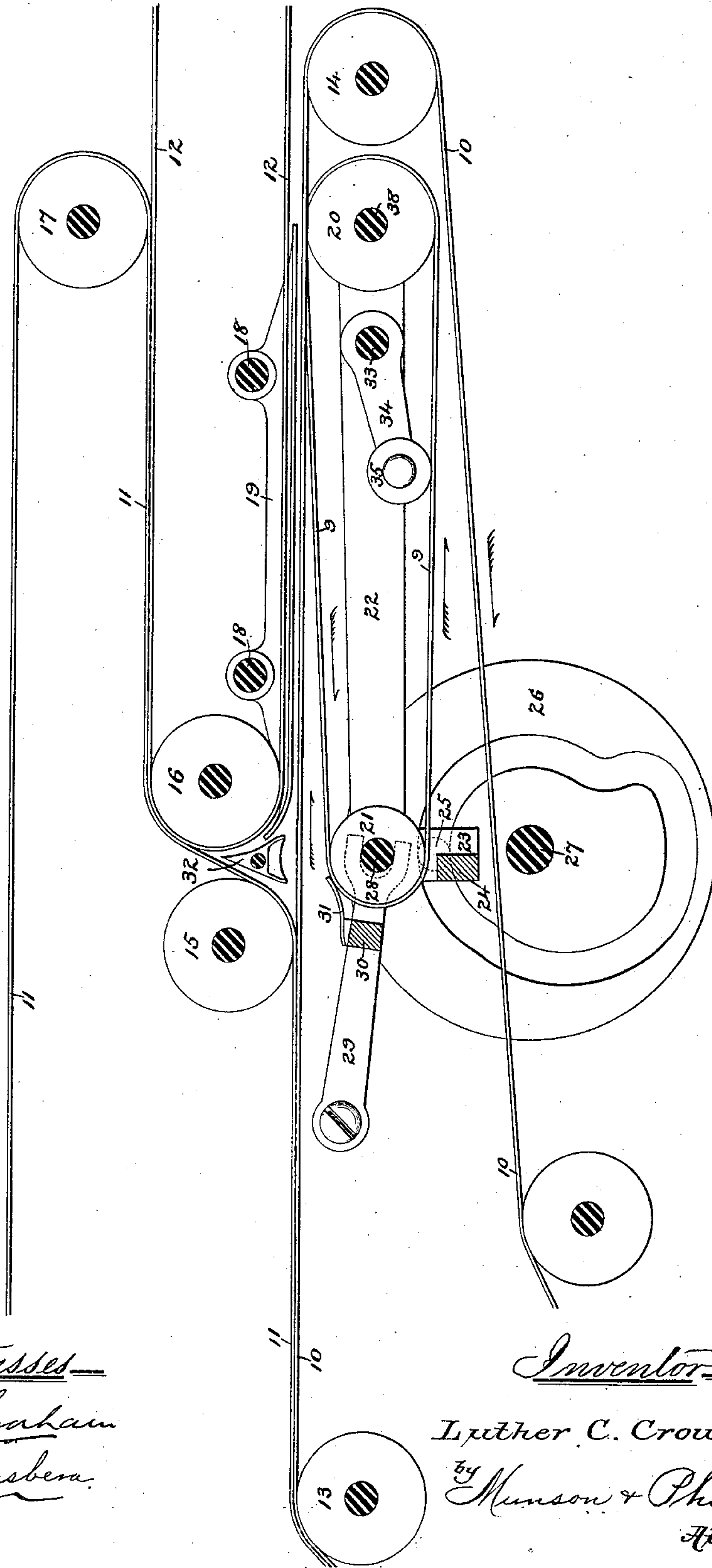
(No Model.)

5 Sheets—Sheet 2.

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SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.
No. 313,475. Patented Mar. 10, 1885.

Fig. 2.



Witnesses—
Geo. H. Graham
A. St. Jasbera.

Inventor—
Luther C. Crowell,
by Munson & Philipp
Attys.

(No Model.)

5 Sheets—Sheet 3.

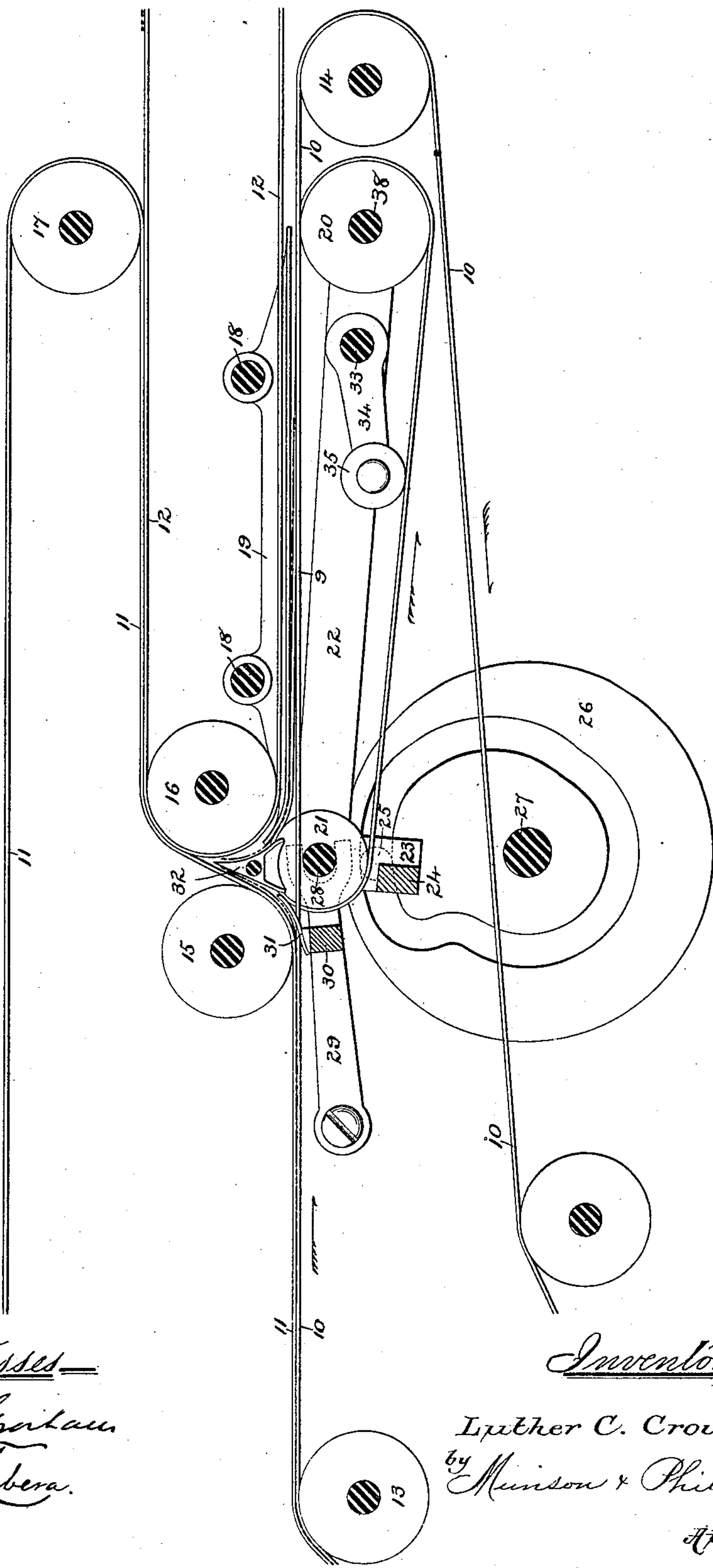
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SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

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Fig. 3.



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5 Sheets—Sheet 4.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.
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Fig. 4.

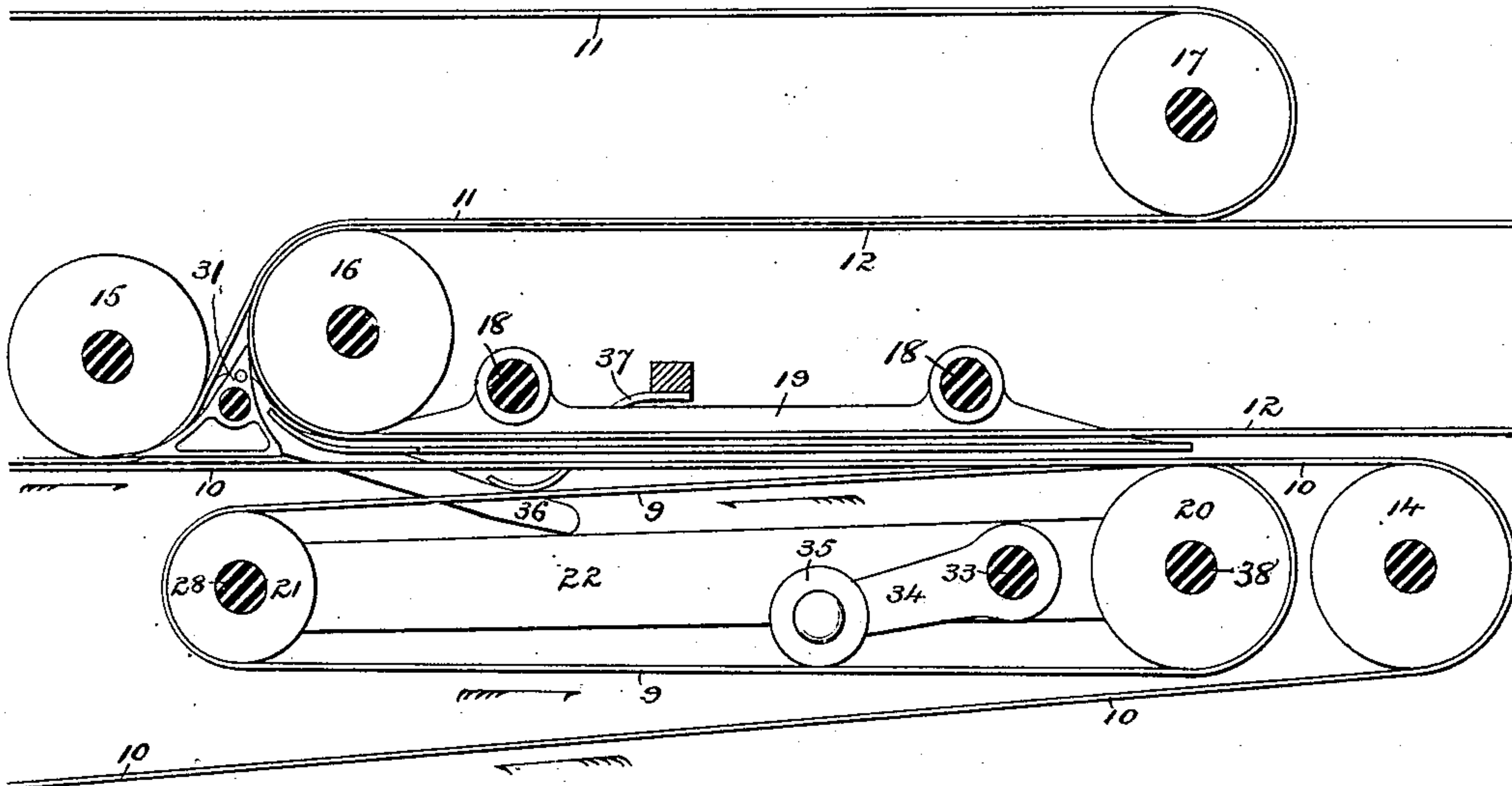
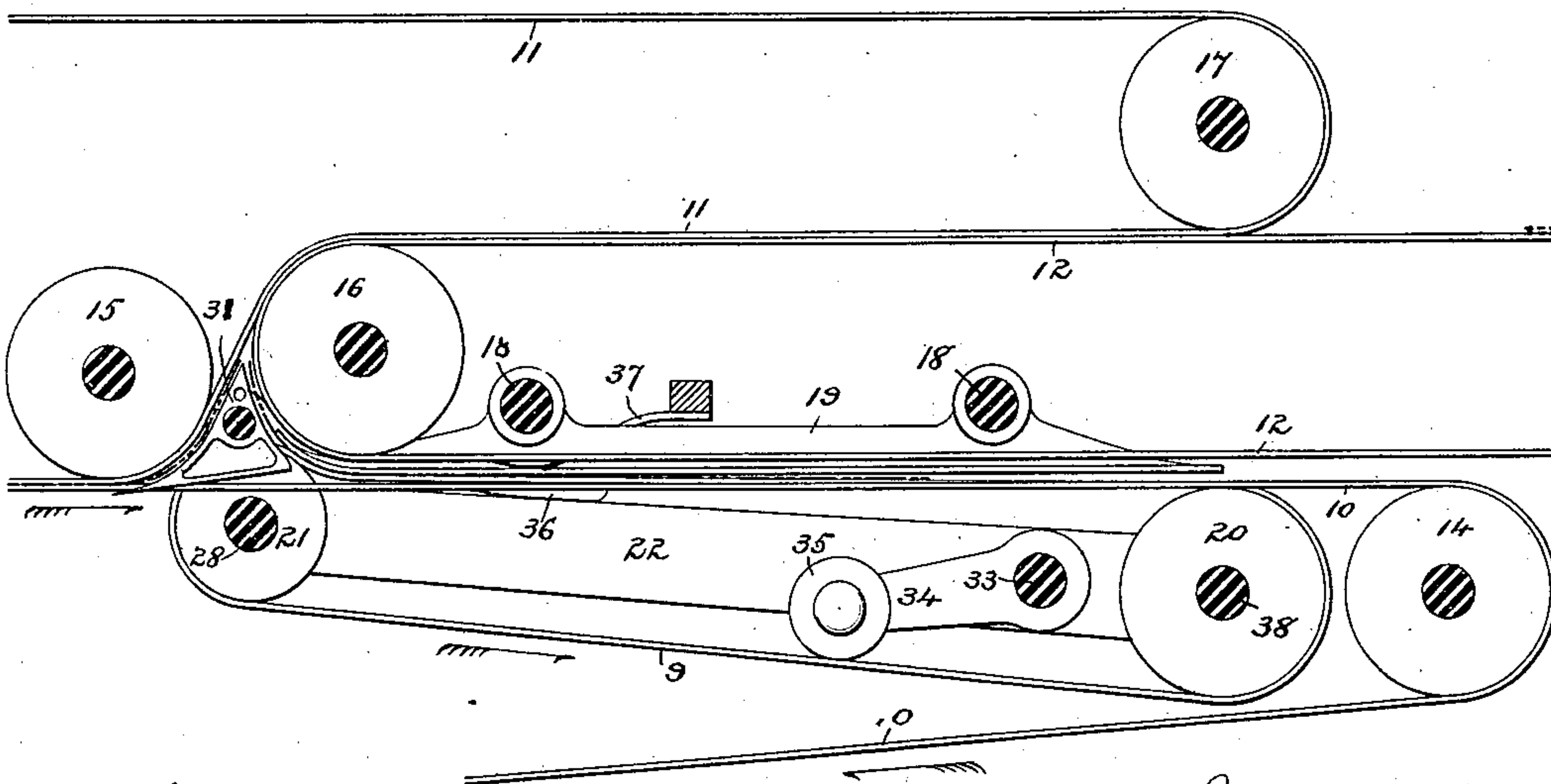


Fig. 5.



Witnesses

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5 Sheets—Sheet 5.

L. C. CROWELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

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Fig. 6.

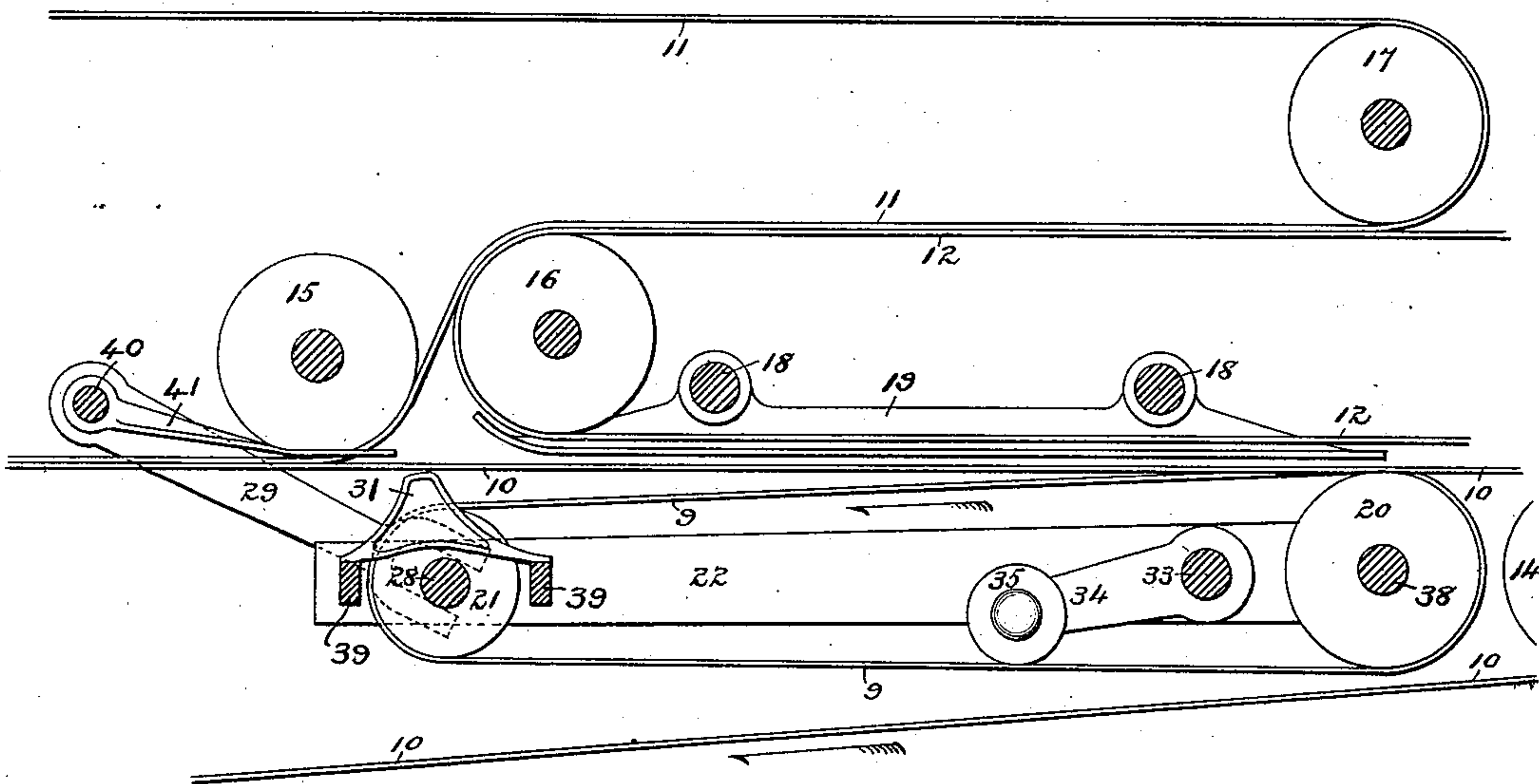
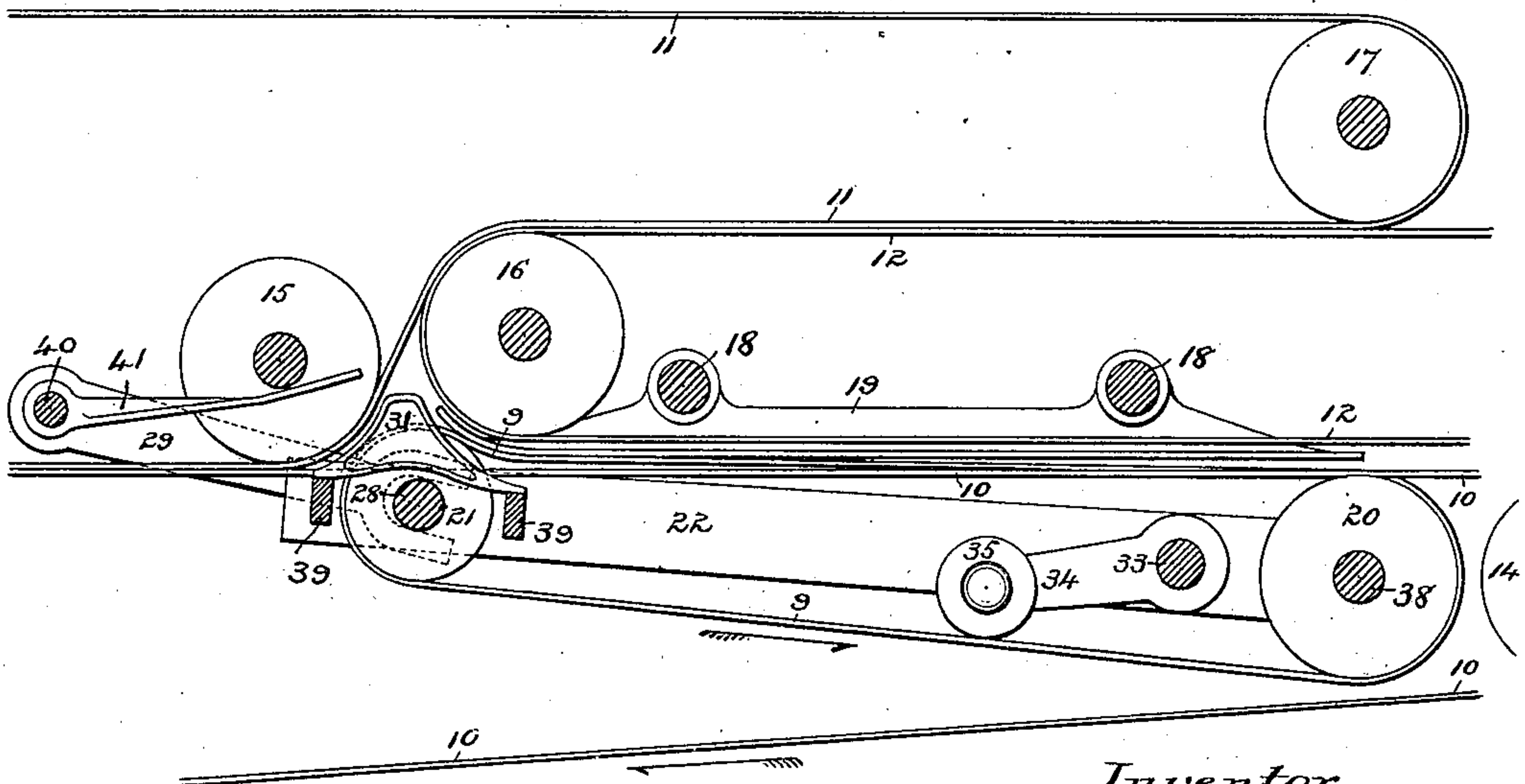


Fig. 7.



Attest:
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A. St. Jasbera

Inventor,
Luther C. Crowell,
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Attys.

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF NEW YORK, N. Y.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 313,475, dated March 10, 1885.

Application filed October 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Sheet-Delivery Apparatus for Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to the delivery of sheets issuing from a web printing and severing mechanism, and particularly to that method of delivery by which two or more of the successively-produced sheets are associated before passing to the folding or laying mechanism.

It is the object of the invention to effect this association of the sheets in a rapid and accurate manner and by means of mechanism which operates upon a different principle from those heretofore employed for that purpose.

To that end the invention consists, broadly, in the combination, with means by which the sheets are advanced in a continuous series, of means for arresting and reversing the travel of the advance sheet or sheets, and means for causing the rear (or what after reversal becomes the leading) ends of the advance sheet or sheets and the leading ends of the following sheet or sheets to enter together into a common pathway, so that the sheets will become associated and pass forward together in pairs, all of said means being constructed and combined substantially as hereinafter described and claimed.

The invention also embraces various details of construction and combinations of parts in the mechanism for effecting this result, all of which will be hereinafter so fully explained and particularly pointed out as to render further preliminary description unnecessary.

In the accompanying drawings, Figure 1 is a plan view of a mechanism embodying the invention in a simple form. Figs. 2 and 3 are longitudinal vertical sectional views of the same, showing the parts in different positions. Figs. 4 and 5 are like views, showing a slightly-modified construction; and Figs. 6 and 7 are also like views, showing still another modified construction.

The gears for communicating motion to the

various parts and also many parts of the supporting frame-work have been omitted in the various figures, as such parts can be readily supplied by any ordinarily-skillful mechanic.

Referring to Figs. 1, 2, and 3, it is to be understood that the sheets, after being severed from the web and separated from each other in the usual manner, so as to provide working spaces between them in their line of travel, are caused to enter between the series of tapes 10 11. If it is desired to associate the sheets immediately after they are severed from the web, then the end of the partially-severed web may be entered between the tapes 10 11, these tapes being suitably accelerated so as to complete the severance of the sheets and provide the working spaces just referred to.

The tapes 10 11 are provided with a co-operating series of tapes, 12, and the three series are arranged as follows: The series 10 pass around a series of pulleys, 13, thence around a second series of pulleys, 14, located at the opposite end of the apparatus, returning either directly or around a series of pulleys (not shown) located near the cutting-cylinders. The series 11 pass above the pulleys 13, thence forward around a series of pulleys, 15, and upward over a like series of pulleys, 16, thence forward around a series of pulleys, 17, returning around a like series of pulleys. (Not shown.) The series 12 pass around the pulleys 16, thence around a corresponding series, (not shown,) returning directly. From this it will be seen that the tapes are so arranged as to form two pathways, the first or main one of which extends forward past the pulleys 15 16 and beneath the guides 19, while the second branches from the first and leads between the pulleys 15 16. The purpose of this arrangement will be made clear when the operation of the apparatus is explained.

Just in advance of the pulleys 16 are located a pair of cross rods or shafts, 18, to which are secured a series of smooth guides, 19, which are so arranged as to lie just at the sides of the tapes 10 and slightly above the plane in which they travel.

Arranged directly beneath the guides 19, and corresponding in number therewith, are a series of short tapes, 9, which pass around a series of pulleys, 20, mounted upon a shaft,

38, journaled in the frame-work of the machine, and a second series of pulleys, 21, which are mounted upon a shaft, 28, journaled in the ends of a pair of swinging arms, 22, extending from the shaft of the pulleys 20. The pulleys 20 are so driven that the tapes 9 move in the direction opposite to that of the tapes 10, as indicated by the arrows. The arms 22 are provided with downward projections 23, which are connected by a cross-bar, 24, and carry studs or bowls 25, which rest in the grooves of a pair of cams, 26, which are mounted upon the transverse shaft 27, the grooves of said cams being so shaped as to periodically raise the pulleys 21 and press the tapes 9 against the guides 19. The arms 22 are also connected by a cross shaft or rod, 33, from which extends a series of adjustable arms, 34, the ends of which carry a series of pulleys, 35, which bear upon the tapes 9, and are so adjusted as to keep said tapes at the proper tension. The arms 34 may, if preferred, be loosely mounted upon the shaft 33 and provided with springs, which will act to hold the pulleys 35 against the tapes 9 with a yielding pressure. The ends of the shaft 28 are embraced by the bifurcated ends of a pair of swinging arms, 29, which are pivoted to the frame-work a short distance in the rear of said shaft, and are connected by a cross-bar, 30, which is located just in the rear of the pulleys 21, and is provided with a series of curved switches, 31, which, as the bar 30 is carried upward by the cams 26, press against or come into close proximity to the tapes 11.

Located between the pulleys 15 16 are a series of stationary guides, 32, which, together with the switches 31 and tapes 9, serve to direct the sheets into the bite of the tapes 11 12 at the proper times, as will presently appear.

It is of course to be understood that the shaft 27 and the shafts which drive the various series of tapes are connected with each other and with the printing mechanism or other suitable source of power by suitable gearing or otherwise, so as to receive uniform and appropriate motion.

The operation of the apparatus just described is as follows: The sheets having been severed from the web and separated from each other, so as to provide suitable working spaces between them in their line of travel, pass forward in the main pathway between the tapes 10 11 and beneath the guides 19, as shown in Fig. 2, until the rear end of the advance sheet has passed beyond the stationary guides 32. The parts will be so timed that when the advance sheet has arrived in this position the cams 26 will raise the pulleys 21 and bar 30, so as to press the tapes 9 against the guides 19 and carry the switches 31 into close proximity to the tapes 11, as shown in Fig. 3. The second sheet, instead of passing forward beneath the guides 19, will be directed between the tapes 11 and the guides 32, and at the same time the first sheet will be lifted off the tapes 10 and caught

between the tapes 9 and the guides 19. As soon as this takes place the first sheet will pass out of the control of the tapes 10 and into the control of the tapes 9, so that its movement will be reversed and its rear end, now its leading end, directed between the stationary guides 32 and the tapes 12, thus causing the two sheets to be associated and pass forward together between the tapes 11 12 into the branch pathway, from which they will pass to a folding or piling mechanism. After the two sheets thus brought together have passed into the control of the tapes 11 12, the continued movement of the cams 26 will cause the pulleys 21 and the bar 30 to pass back to their first position, so as to permit the third sheet to pass forward beneath the guides 19 until its rear end has passed the guides 32, when the operation just described will be repeated. It is of course obvious that the parts may be so timed that the tapes 9 will not be raised until two or more sheets have passed forward beneath the guides 19, and that the tapes, when raised, will remain for a longer time in their raised position. By this arrangement, instead of associating the first sheet with the second, the second will be associated with the third, and the first with the fourth, or the third with the fourth, the second with the fifth, and so on. This arrangement will not, however, be usually found desirable, as it will greatly increase the size of the apparatus.

It will readily be seen that the mechanism herein shown may be modified in many of its details without departing from the principle or losing the advantages of the invention.

Two of the many modifications which may readily be made are shown in Figs. 4, 5, 6, and 7. In the construction shown in Figs. 4 and 5 the swinging arms 29, bar 30, and guides 32 are dispensed with, the switches 31 being permanently located above the tapes 10, and so formed as to also perform the function of the guides 32.

In order to effect the proper movement of the switches 31, to enable them to perform these functions, the shaft upon which they are mounted is provided with an arm, 36, which extends forward and rests upon one of the arms, 22, so that when said arm is raised by the cams 26 the switches will be rocked to the position shown in Fig. 5, so as to direct the incoming sheet into the branch pathway. The return movement of the arm 36 and the restoration of the switches to their first position is effected by any suitable means—as, for example, by a spring, 37, arranged to bear upon the arm, as shown in said figures, or by connecting the arm 36 to the arm 22, so that it will be moved positively in both directions by said arm. The operation of the apparatus when thus constructed is the same as already described.

In the construction shown in Figs. 6 and 7 the guides 32 and bar 30 are also dispensed with, the switches 31, which also perform the

function of the guides 32, being mounted upon cross-bars 39, secured to the ends of the arms 22, upon opposite sides of the pulleys 21. In this case, also, the arms 29, instead of being pivoted below the tapes 10 11, are secured to a rock-shaft, 40, which is journaled in the frame-work just above said tapes, and is provided with a series of fingers, 41, which extend forward between the pulleys 15, with their forward ends just above the plane of the tapes 10.

The operation of the apparatus when thus constructed is as follows: As the leading end of the first sheet passes the pulleys 15 it will be directed away from the tapes 11 by the fingers 41, so as to remain in the main pathway and be carried forward beneath the guides 19. As soon as the rear end of this sheet has passed the switches 31, and the advance end of the second sheet has arrived at or near the pulleys 15, the cams 26 will raise the arms 22, as already described, thereby carrying the tapes 9 and switches 31 into the position shown in Fig. 7, so as to arrest and reverse the advance sheet and direct its rear (now its leading) end, and also the leading end of the second sheet, into the bite of the tapes 11 12, thereby associating the two sheets, as already described.

The switches 31, as shown in Figs. 1, 2, and 3, may, if preferred, be dispensed with, and small rolls or pulleys mounted in supports extending from the bar 30 may be used instead of these rigid switches to direct the leading end of the sheet into the bite of the tapes 11 12, and such rolls are to be considered as the equivalent of the switches 31 for this purpose.

Many other modified mechanisms for arresting and reversing the advance sheets and for causing their rear (now leading) end to enter the branch pathway, so as to accomplish the same result, will readily be suggested by those familiar with the art; but those shown and described are deemed sufficient to impart a full knowledge of the invention.

What I claim is—

1. The combination, with means for advancing a series of sheets, of means for arresting and reversing the movement of alternate sheets

of said series, and means for causing the rear (now leading) ends of said reversed sheets and the advance ends of the following sheets to enter together into a common pathway, whereby the sheets become associated and pass forward in pairs, all substantially as described.

2. The combination, with a main pathway in which the sheets follow each other in succession, of a second or branch pathway leading therefrom, and means for causing the rear end of one sheet and the advance end of the following sheet to pass from said main pathway into said branch pathway, so that the two sheets will be associated and pass forward together, all substantially as described.

3. The combination, with a main pathway in which the sheets follow each other in succession, of a second or branch pathway leading therefrom, means for arresting, reversing, and causing the rear (now leading) end of one sheet to enter said branch pathway, and means operating simultaneously therewith to direct the leading end of a following sheet into said branch pathway, whereby the two sheets will be associated and pass forward together, all substantially as described.

4. The combination, with the tapes 10 11 12, arranged to form one main and one branch pathway, of the pulleys 15 16, switches 31, and the oscillating tapes 9, substantially as described.

5. The combination, with the tapes 10 11 12, arranged to form one main and one branch pathway, of the pulleys 15 16, the oscillating tapes 9, and the switches 31, arranged to move with said tapes, substantially as described.

6. The combination, with the tapes 10 11 12, arranged to form one main and one branch pathway, of the pulleys 15 16, the oscillating tapes 9, the switches 31, arranged to move with said tapes, and the oscillating fingers 41, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LUTHER C. CROWELL.

Witnesses:

T. H. PALMER,

GEO. H. GRAHAM.