

(No Model.)

3 Sheets—Sheet 1.

L. C. CROWELL.  
SHEET DELIVERY APPARATUS.

No. 299,115.

Patented May 27, 1884.

Fig. 4.

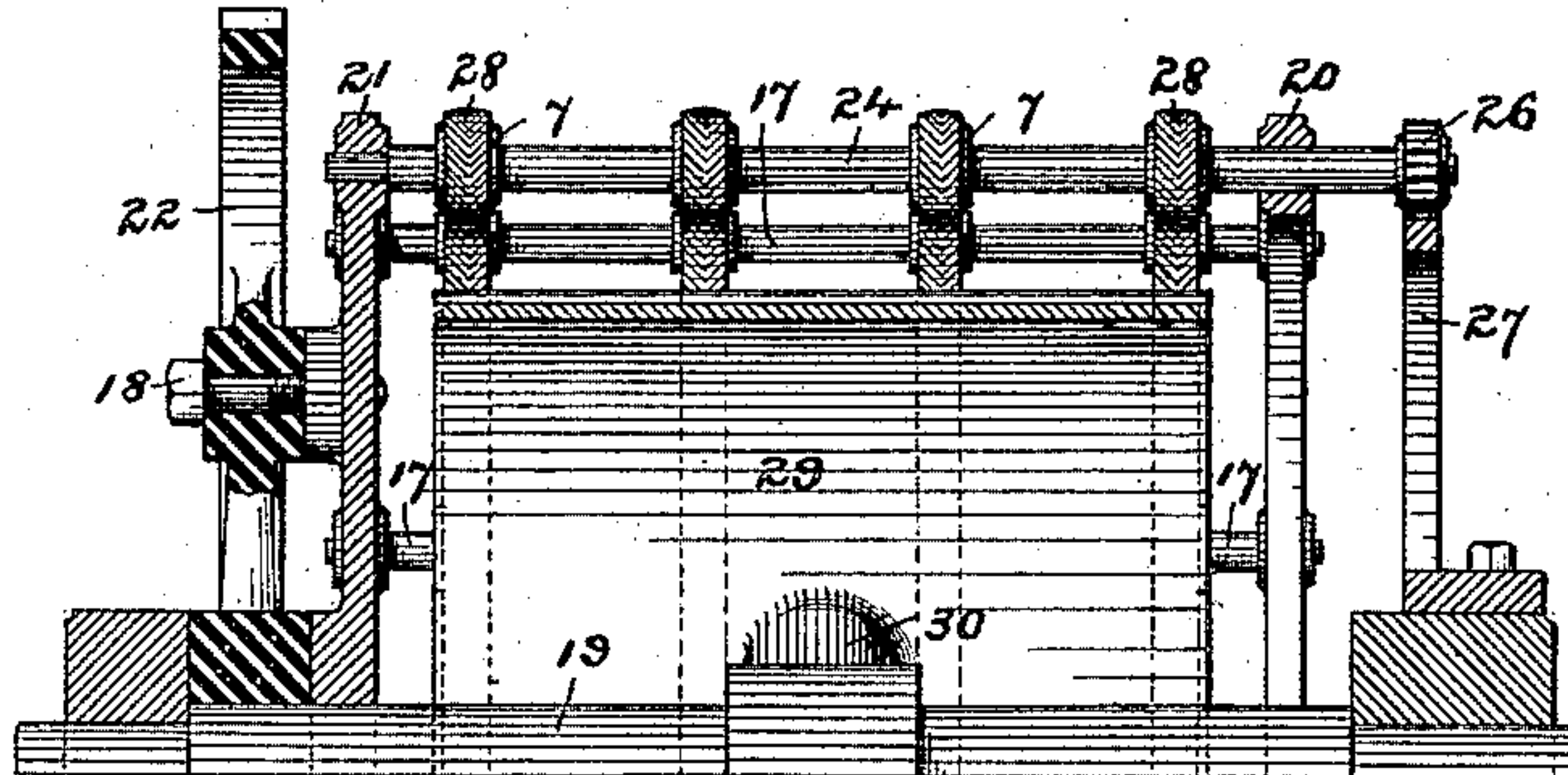
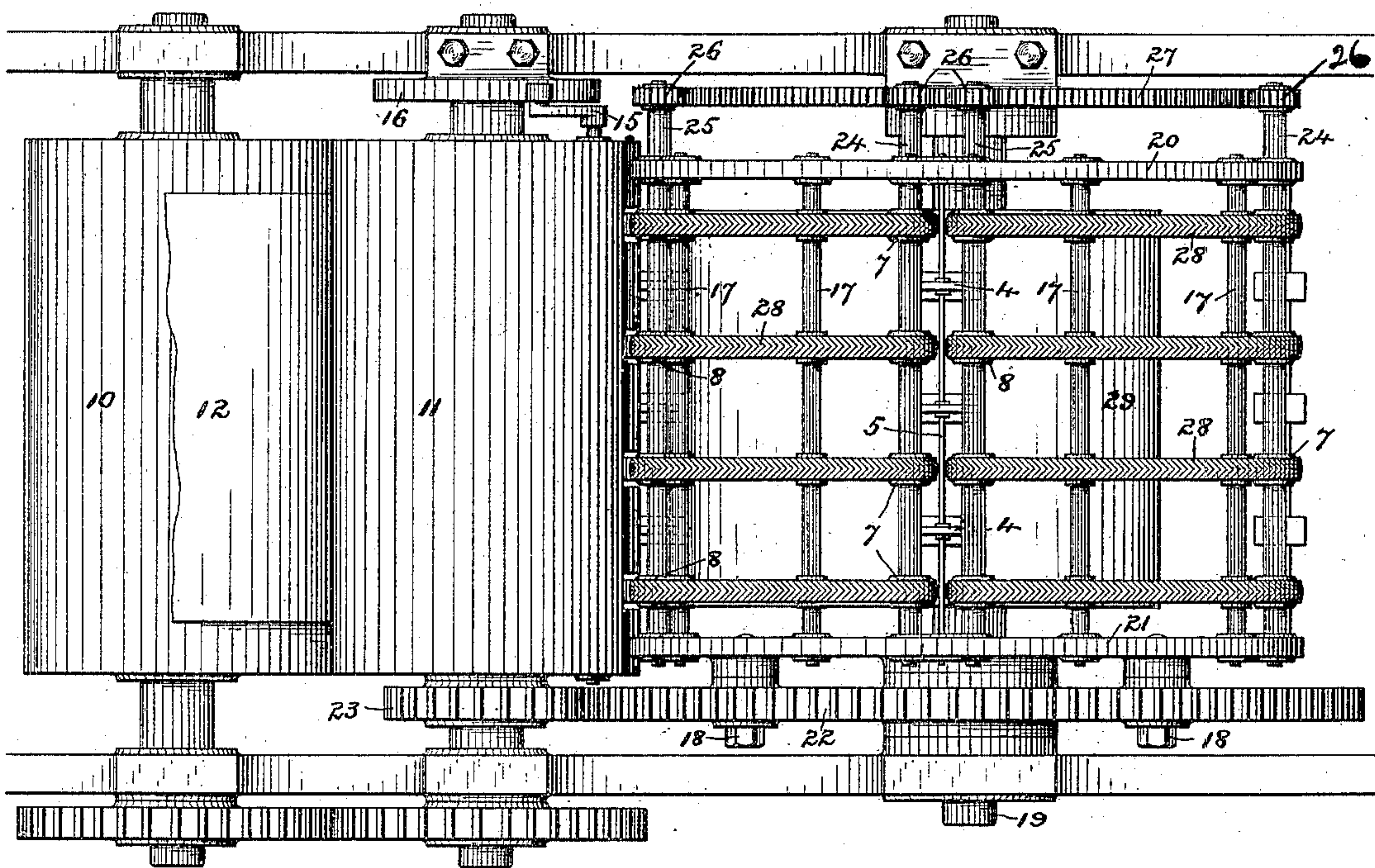


Fig. 1.



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(No Model.)

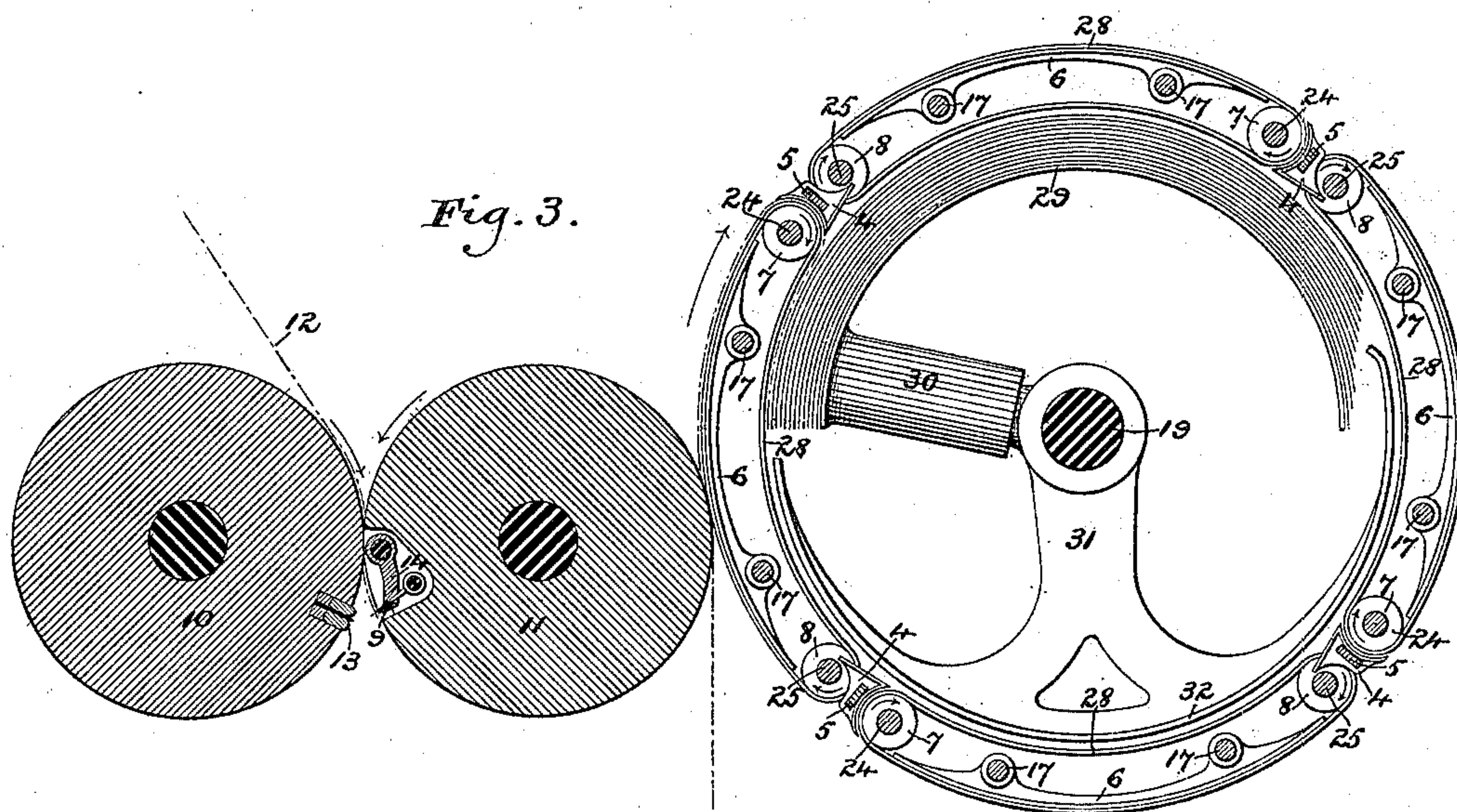
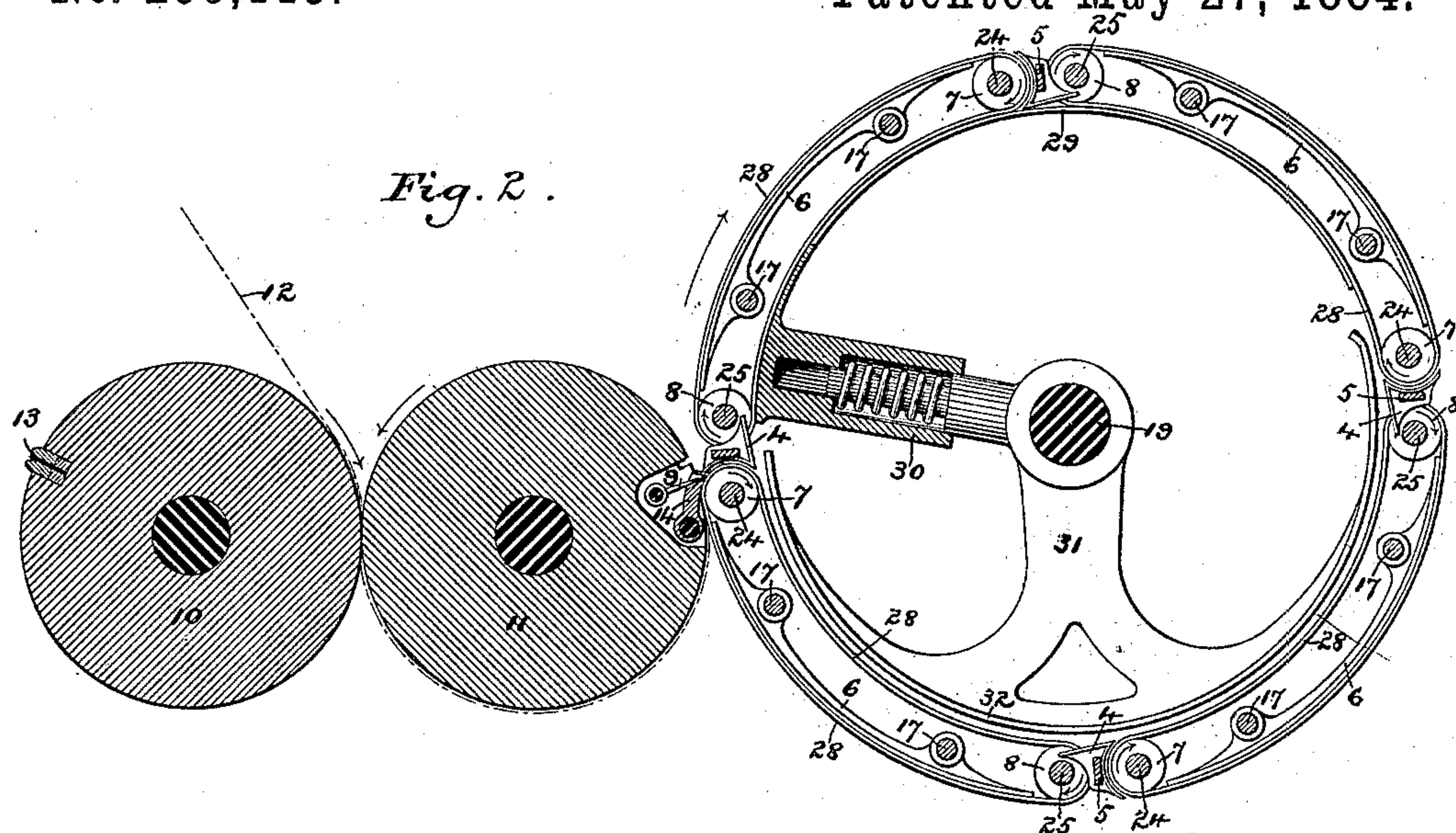
3 Sheets—Sheet 2.

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# SHEET DELIVERY APPARATUS.

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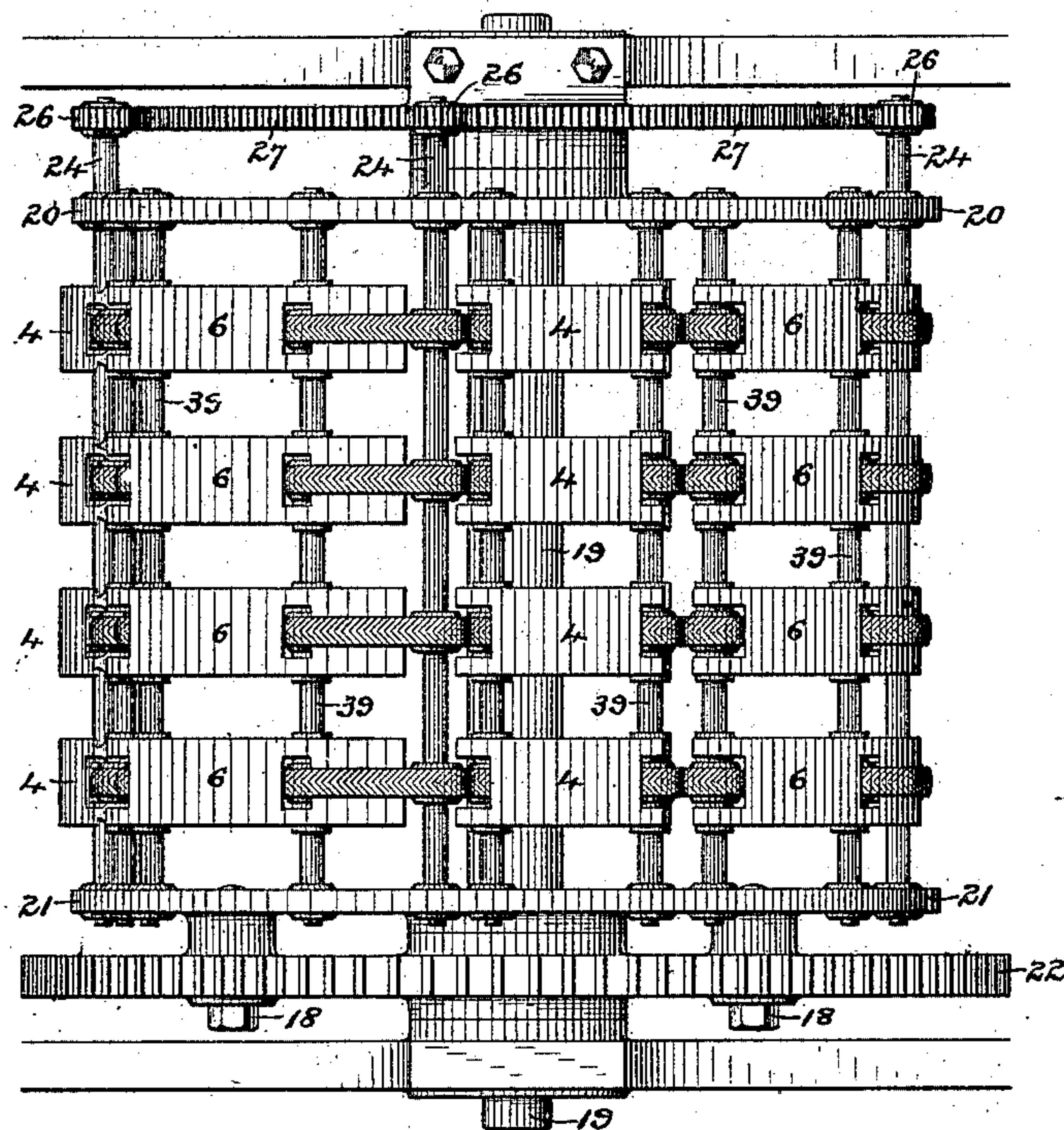
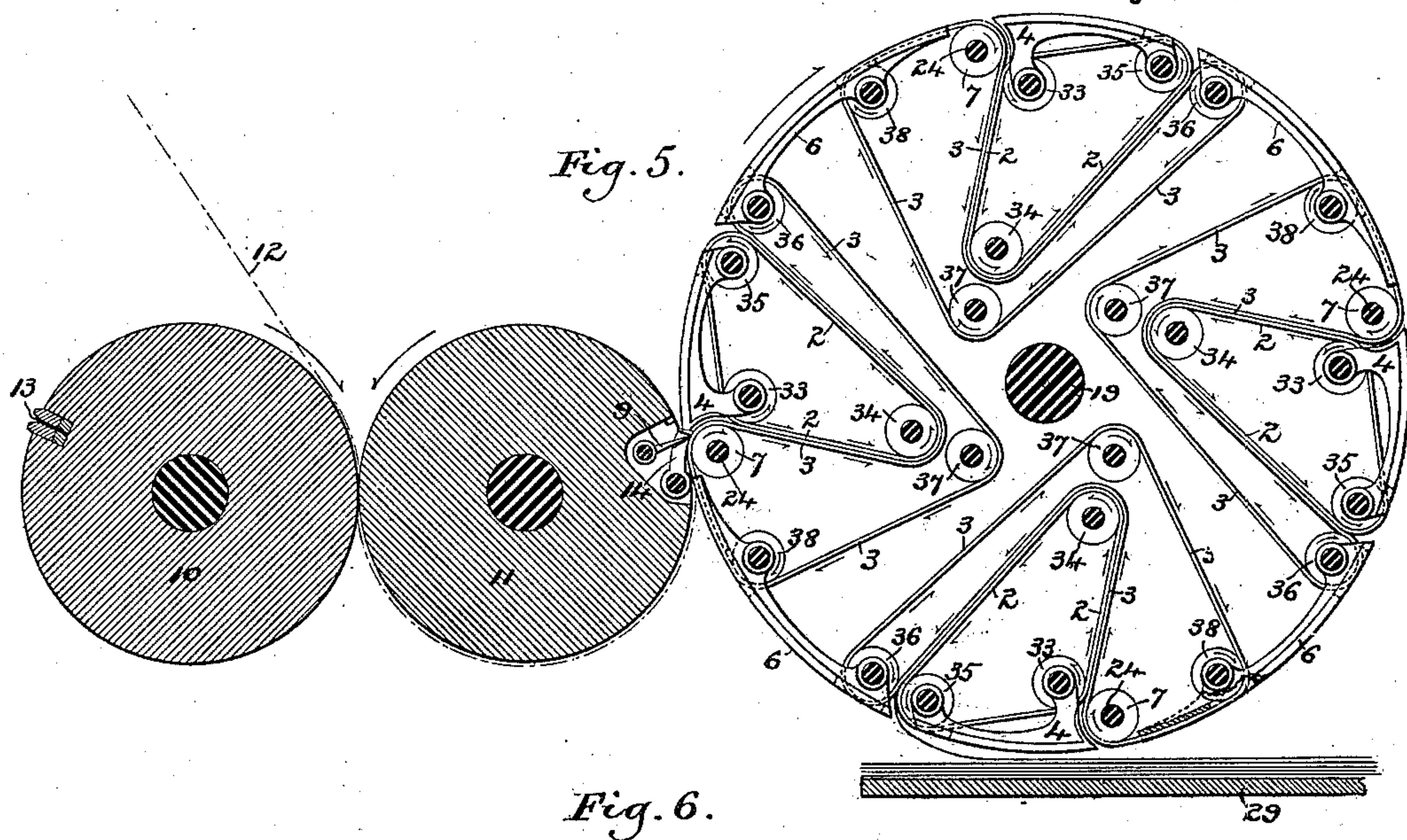
3 Sheets—Sheet 3.

L. C. CROWELL.

## SHEET DELIVERY APPARATUS.

No. 299,115.

Patented May 27, 1884.



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# UNITED STATES PATENT OFFICE.

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

## SHEET-DELIVERY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 299,115, dated May 27, 1884.

Application filed September 27, 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, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to an apparatus for the delivery of the sheets issuing from a web printing and severing mechanism, and particularly to an apparatus designed for effecting such delivery before the length of the sheets

15 in the direction of their travel has been reduced by cross-folding. In order to deliver the sheets in a flat or unfolded condition and with the rapidity with which they are produced by the improved forms of web-printing mechanism now commonly in use, it has been found

20 necessary either to employ a mechanism by which the sheets were abruptly arrested, or to employ two or more laying mechanisms, each of which received only a portion of the sheets,

25 or to employ an associating mechanism by which the sheets were accumulated into lots before passing to the laying mechanism. The abrupt arresting of the sheets is more or less objectionable when operating at very high

30 speed, while the other methods necessitate the employment of complicated and expensive machinery. It is the object of the present invention to produce a mechanism for this purpose in which the movements shall all be rotary and continuous, and by which a single

35 mechanism shall be capable, without abruptly arresting the sheets, of receiving and piling them as rapidly as they can be produced by a rotary web-printing mechanism.

40 The details of construction and the organization of the apparatus in which the invention is embodied are hereinafter so fully explained and particularly pointed out that further preliminary description is not deemed necessary

45 to a thorough understanding of the invention.

In the accompanying drawings, Figure 1 is a plan view of a mechanism embodying the invention in one of its forms. Fig. 2 is a longitudinal vertical section of the principal parts

of the same. Fig. 3 is a similar view showing 50 the parts in a different position. Fig. 4 is a partial cross-section of the same. Fig. 5 is a vertical section of a mechanism embodying the invention in a different form, and Fig. 6 is a plan view of the same.

55 The construction shown in Figs. 1 to 4 will be first described. Referring to said figures, it is to be understood that 10 11 represent the cutting-cylinders of any ordinary form of web-printing mechanism, and that the web 12, 60 as it enters between said cylinders, is either in its distended condition or has been folded longitudinally by any of the approved mechanisms for that purpose. The cylinder 10 is provided with the usual severing-blade, 13, and 65 the cylinder 11 with a set of impaling-pins, 9, located just in the rear of the blade 13, so as to impale the leading end of the web after each severance. The cylinder 11 is also provided with a vibrating stripper and switch, 14, which 70 is mounted upon a rock-shaft journaled in the ends of the cylinder and operated by a rock-arm, 15, and stationary cam 16, so as to strip the leading ends of the sheets from the pins 9 and direct them to the laying mechanism, as will be hereinafter explained. 75

The laying or piling mechanism consists, essentially, of a hollow rotating carrier, within which is located a curved yielding piling-table, said carrier being provided with a series 80 of pathways, into which the sheets are successively directed by the stripper and switch, and from which they are delivered and spread upon the piling-table by the movements of the carrier.

85 The carrier consists of two heads, 20 21, rigidly connected by a series of tie-rods, 17, the head 20 being in the form of an annulus or ring, and having the interior left entirely unobstructed, while the head 21 is in the form 90 of a disk, and is rigidly secured by bolts, as 18, to the face of a gear, 22, which is mounted loosely upon a fixed shaft, 19, and receives motion from a gear, 23, upon the shaft of the cutting-cylinder 11. The gears 22 23 are so 95 proportioned that the surface-speed of the sheet laying or piling carrier will be one-half that of the cutting-cylinders; and said carrier



will preferably, as herein shown, be of twice the size of said cylinder; but this dimension is not essential, and may be departed from, if desired. The heads 20 21 are provided with bearings, in which are journaled four pairs of shafts, 24 25, which project beyond the head 20, and are provided with gears 26, which engage with a stationary gear, 27, secured to the frame of the machine. The upper half of the gear 27 is made in the form of an arch, as indicated in Figs. 1 and 4, so that free access is afforded to the piling-table upon the interior of the carrier. The shafts 24 25 are provided with suitable pulleys, 7 8, around which pass series of short tapes 28, the gears 26 27 being so proportioned that the speed of the tapes 28 around their pulleys will be just equal to the speed of the carrier, thereby giving to the outside portions of the tapes a speed just equal to that of the cutting-cylinders. The tie-rods 17 are so arranged that there are two of said rods between each pair of the shafts 24 25, and these rods are provided with a series of rigid guides, 6, which are so proportioned as to lie between the tapes 28, and are curved so as to hold the tapes taut and press them against the cylinder 11, as clearly shown in Figs. 2 and 3. In addition to the tie-rods 17, the heads 20 21 are connected by four small rods or bars, 5, which are situated between the pairs of the shafts 24 25 and support the series of rigid curved guides 4, the purpose of which will presently appear.

The piling-table 29 is curved, as shown, to conform to the inner periphery of the carrier and hold the tapes 28 taut, and is mounted upon a yielding support, 30, which extends from the shaft 19. The table 29 is made of spring metal or other elastic material, so that its curvature may be increased as it is forced inward by the accumulation of the sheets upon it. The shaft 19 is also provided with an arm, 31, which supports a curved plate, 32, which serves to hold the tapes 28 taut around that portion of the inner periphery of the carrier not occupied by the table 29.

The operation of the apparatus just described is as follows: As the leading end of the web passes the bite of the cylinders 10 11 it will be impaled upon the pins 9 and carried around upon the cylinder 11 until it arrives at the position shown in Fig. 2, at which point the cam 16 will operate the stripper and switch 14, so as to strip the end of the web from the pins 9 and direct it into the pathway formed by the guides 4 and the tapes 28, as shown in said figure. As the parts continue to advance from this point the movement of the cylinder 11 and the tapes 28, being faster than that of the carrier, will cause the end of the web to be carried inward, so as to be brought between the tapes and the piling-table. It has already been stated that the speed of the tapes around their pulleys is just equal to that of the carrier around its axis, from which it results that as soon as the end of the web passes in-

ward around the pulleys 24 it comes to rest between the tapes and the piling-table, the following portions of the sheet being simply rolled inward and spread upon the table as said pulleys are carried over the table by the revolution of the carrier, as indicated in Fig. 3. When the cylinders 10 11 have completed a revolution, the web will be severed by the blade 13, and the freshly-cut end will be impaled by the pins 9, to be in like manner carried around upon the cylinder 11 and entered between the next succeeding series of guides and tapes and laid upon the table in like manner, and so the operation will continue to be repeated. As the sheets accumulate upon the table 29 it will be gradually pressed inward and bent to a more abrupt curvature to accommodate the increased thickness of the pile, as shown in Fig. 3. The sheets can at any time be readily removed from the table by simply reaching through the open end of the carrier and the arch of the gear 27.

In the construction shown in Figs. 5 and 6 the piling-table, instead of being located upon the inside of the carrier, is placed beneath the same, the pathways in the carrier being formed by two series of slowly-moving tapes, into the bite of which the sheets are directed by the stripper and switch 14, and from which they are finally delivered to be spread upon the piling-table by the movement of the carrier.

The tapes 2 3, which form the pathways of the carrier, are arranged as follows: The first set, 2, pass around the pulleys 33 34 35, the second passing around the pulleys 7 34 36 37 38. The several series of tapes are driven from the pulleys 7, which are mounted upon the shafts 24, the gears 26 of which engage with the stationary gear 27, as in the construction first described. The gears 26 27 are so proportioned that the speed of the tapes around the pulleys is equal to the speed of the carrier around its axis, the latter being in this case, as in the former, equal to one-half the speed of the cutting-cylinders. By this means the speed of the sheet under the combined movement of the tapes and the carrier is just equal to that of the cutting-cylinders. The other pulleys around which the tapes pass are mounted upon shafts 39, journaled in the heads of the carrier.

The operation of the invention when thus embodied is as follows: The leading end of the web, having been taken by the pins 9, will be carried around upon the cylinder 11 until the parts are in the position shown in Fig. 5, at which time it will be stripped from the pins by the stripper and switch 14 and entered into the bite of the tapes 2 3, as shown in said figure. As the carrier continues its revolution from this point the end of the web will be carried inward between the tapes, and when the cutting-cylinders have completed a revolution the sheet will be severed from the web, and the freshly-cut end of the web will be taken by the pins to be in like manner entered into the



bite of the next succeeding series of tapes, 2 3. As the carrier continues its revolution the leading end of the first sheet will be projected from between the pulleys 35 36 and laid upon the piling-table 29, after which, by the combined movement of the tapes and carrier, the whole sheet will be fed outward and spread upon the table. It will be observed that in this case, as in the former, the relative movements of the tapes and carrier are such that the sheet comes to rest as soon as its leading end arrives at the piling-table. The length of the pathways in the carrier will of course be so proportioned as to cause the sheets to be delivered at the proper point.

What I claim is—

1. The combination, with the rotating carrier provided with a number of pathways arranged to receive the sheets from the previous mechanism and deliver them upon the piling-table, of means for directing the leading ends of the sheets into said pathways, all substantially as described.

2. The combination, with a web-severing mechanism, of a rotating carrier provided with a number of pathways arranged to receive the sheets from the previous mechanism and deliver them upon the piling-table as they are carried over the same, of means for directing the leading ends of the sheets into said pathways, all substantially as described.

3. The combination, with the rotating carrier provided with a number of pathways formed of series of tapes, as 2 3, which tapes have a motion independent of that of the car-

rier and are arranged to receive the sheets from the previous mechanism and deliver them upon the piling-table as they are carried over the same, of means for entering the successive sheets into said pathways, and means for driving said carrier at a less speed than said previous mechanism, all substantially as described.

4. The combination, with the cutting-cylinders 10 11, provided with the switch 14, of a sheet-laying mechanism consisting of a rotating carrier provided with a number of pathways, into which the sheets are successively directed by said switch and from which they are delivered to the piling-table as they are carried over the same, all substantially as described.

5. The combination, with the rotating carrier provided with a number of pathways formed of series of tapes, as 2 3, and arranged to receive the sheets from the previous mechanism and deliver them upon the piling-table as they are carried over the same, of means for driving said tapes and carrier, so that their combined speed will be equal to that of the previous mechanism, and means for entering the sheets into said pathways, all substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

JAMES A. HOVEY,  
T. H. PALMER.