

(No Model.)

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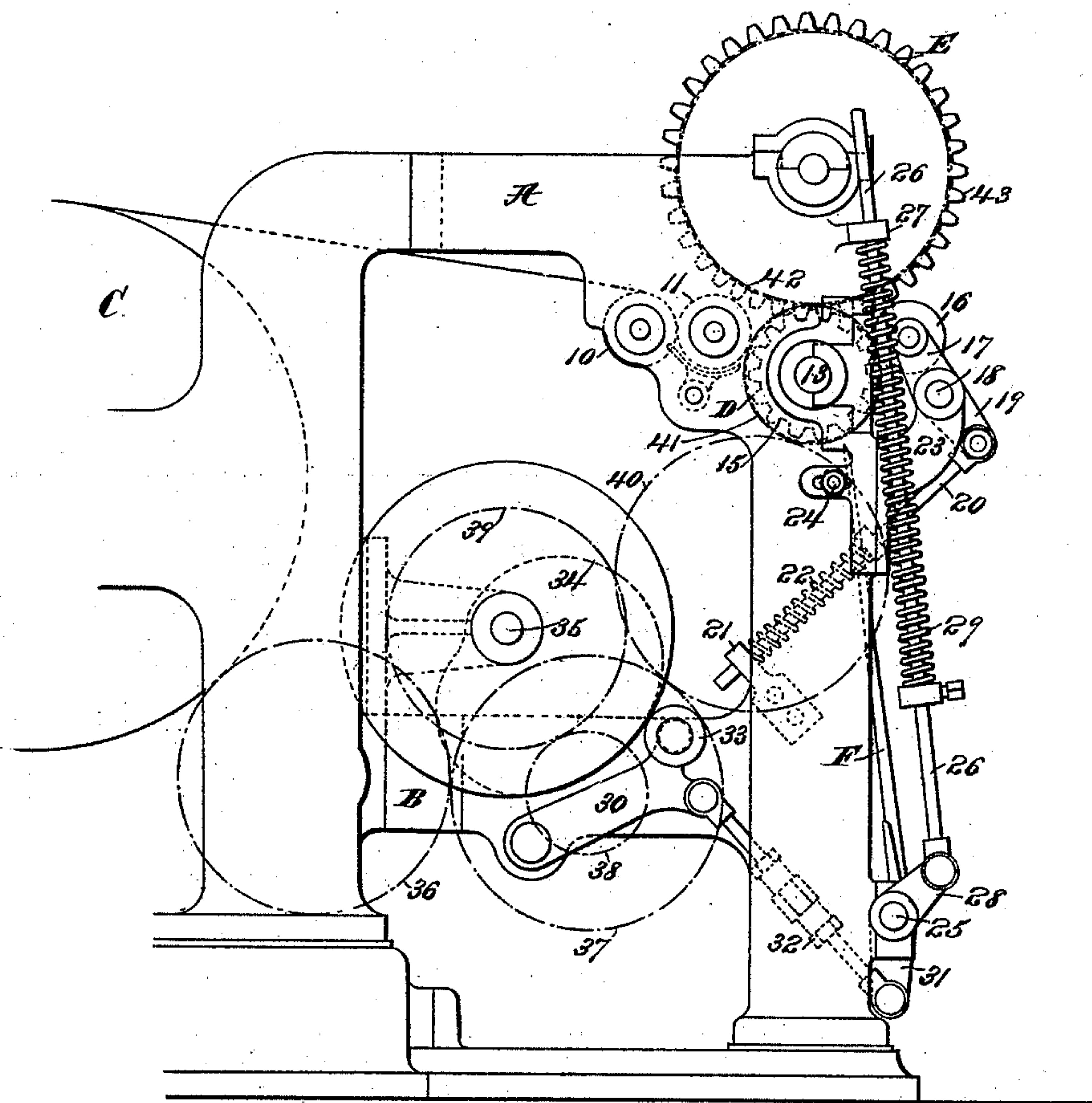
L. C. CROWELL.

SHEET COLLECTING AND DELIVERY MECHANISM.

No. 505,442.

Patented Sept. 26, 1893.

Fig. 1.



Attest:

Geo H Botts
C. J. Sawyer

Inventor:

Luther C. Crowell

Chief Patent Clerk

Atty's

(No Model.)

5 Sheets—Sheet 2.

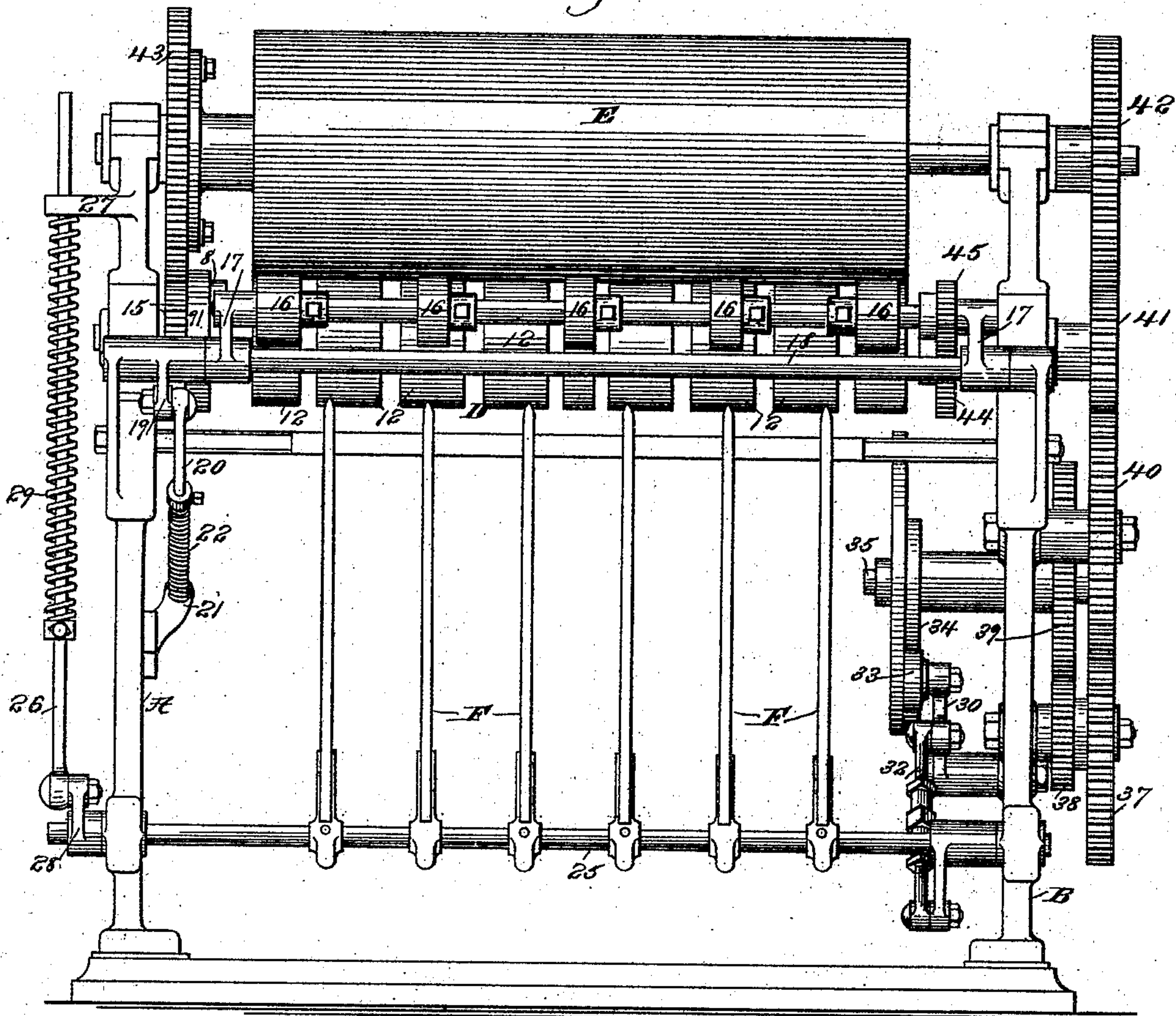
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Fig. 2.



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5 Sheets—Sheet 3.

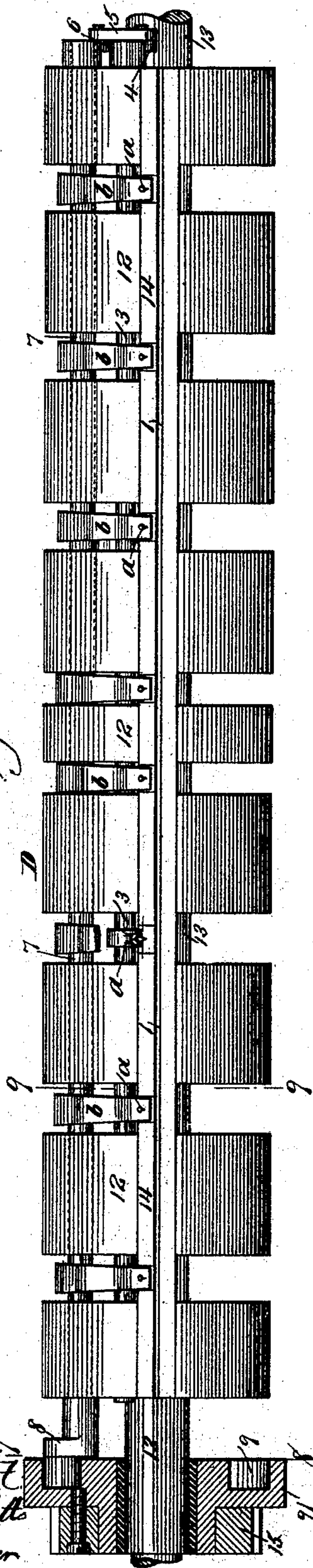
L. C. CROWELL.

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Fig. 3.



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Fig. 10.

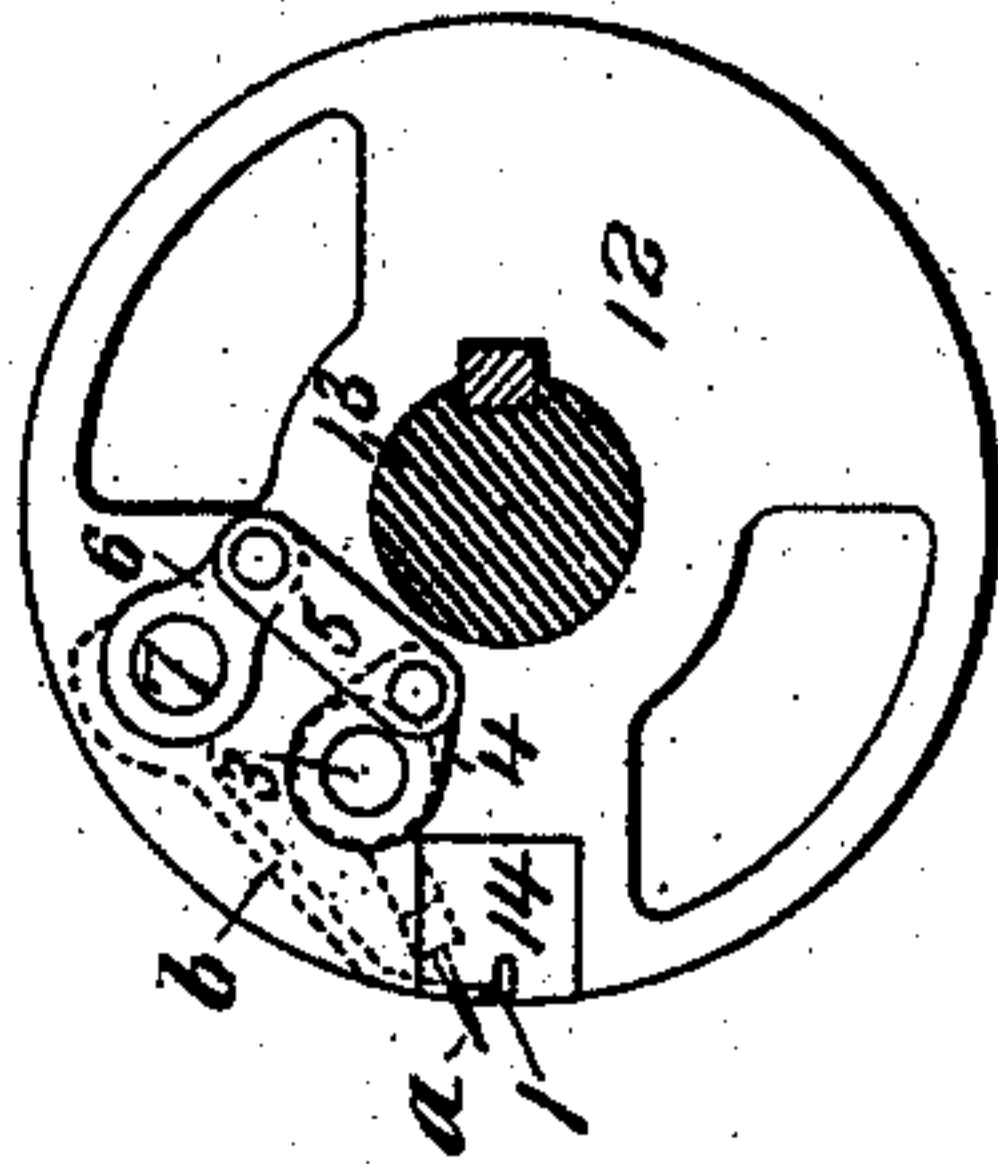


Fig. 9.

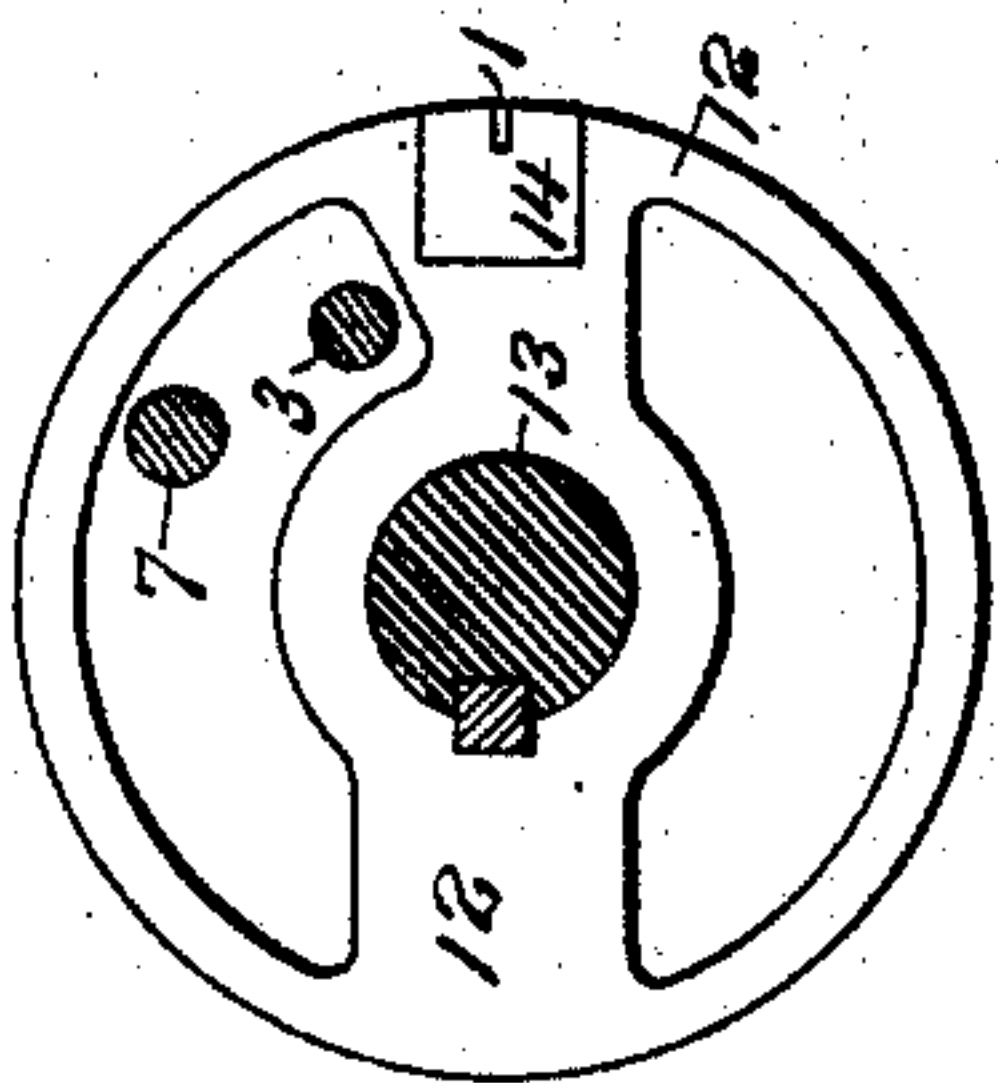


Fig. 8.

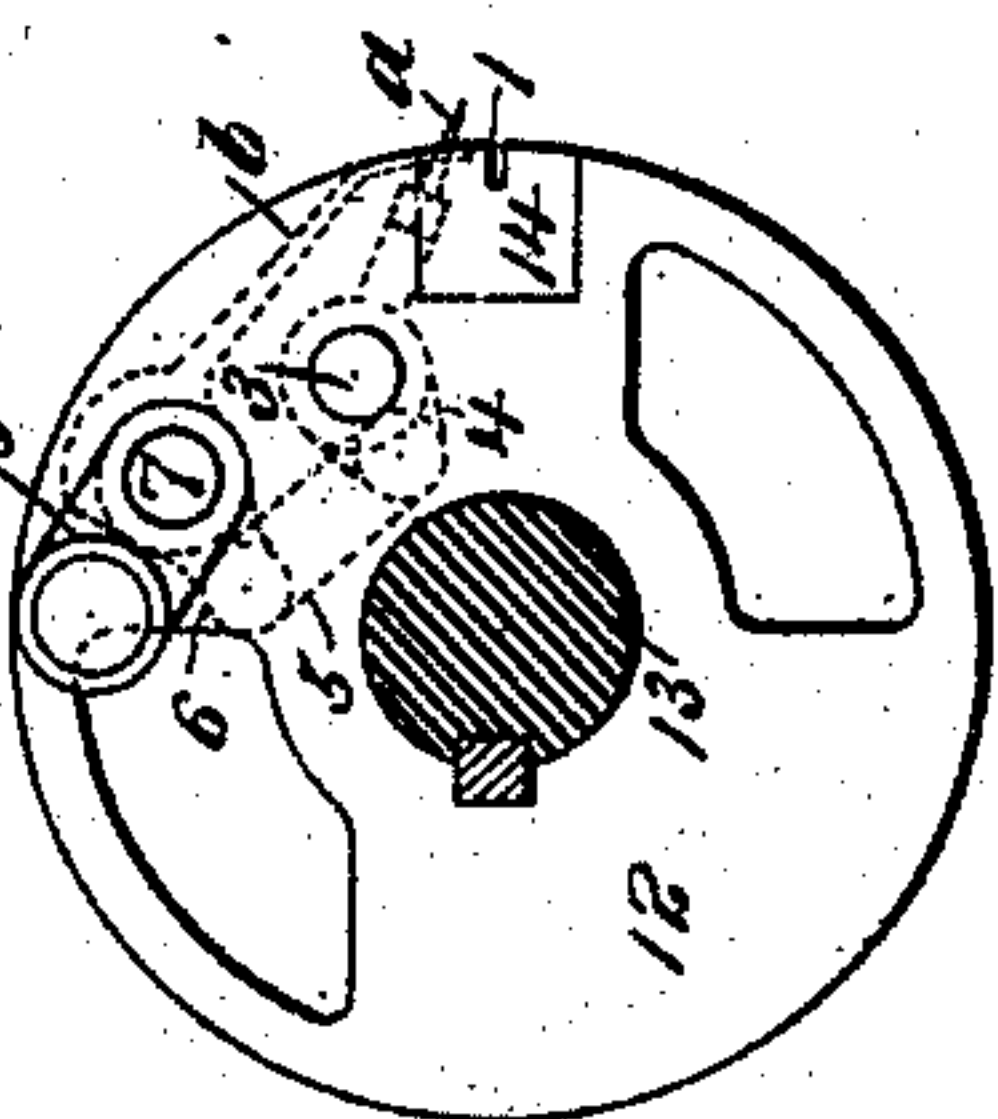
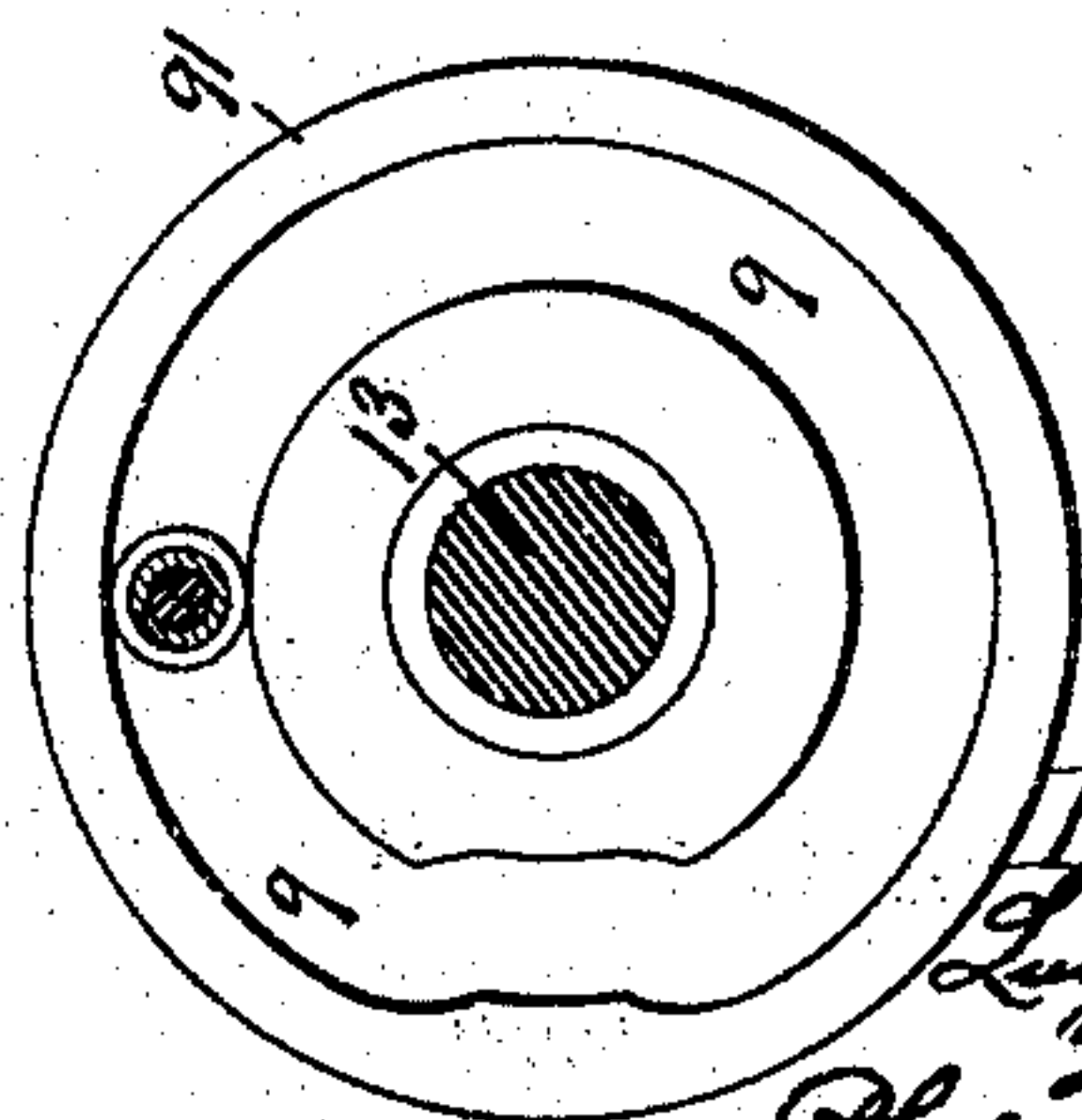


Fig. 7.



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(No Model.)

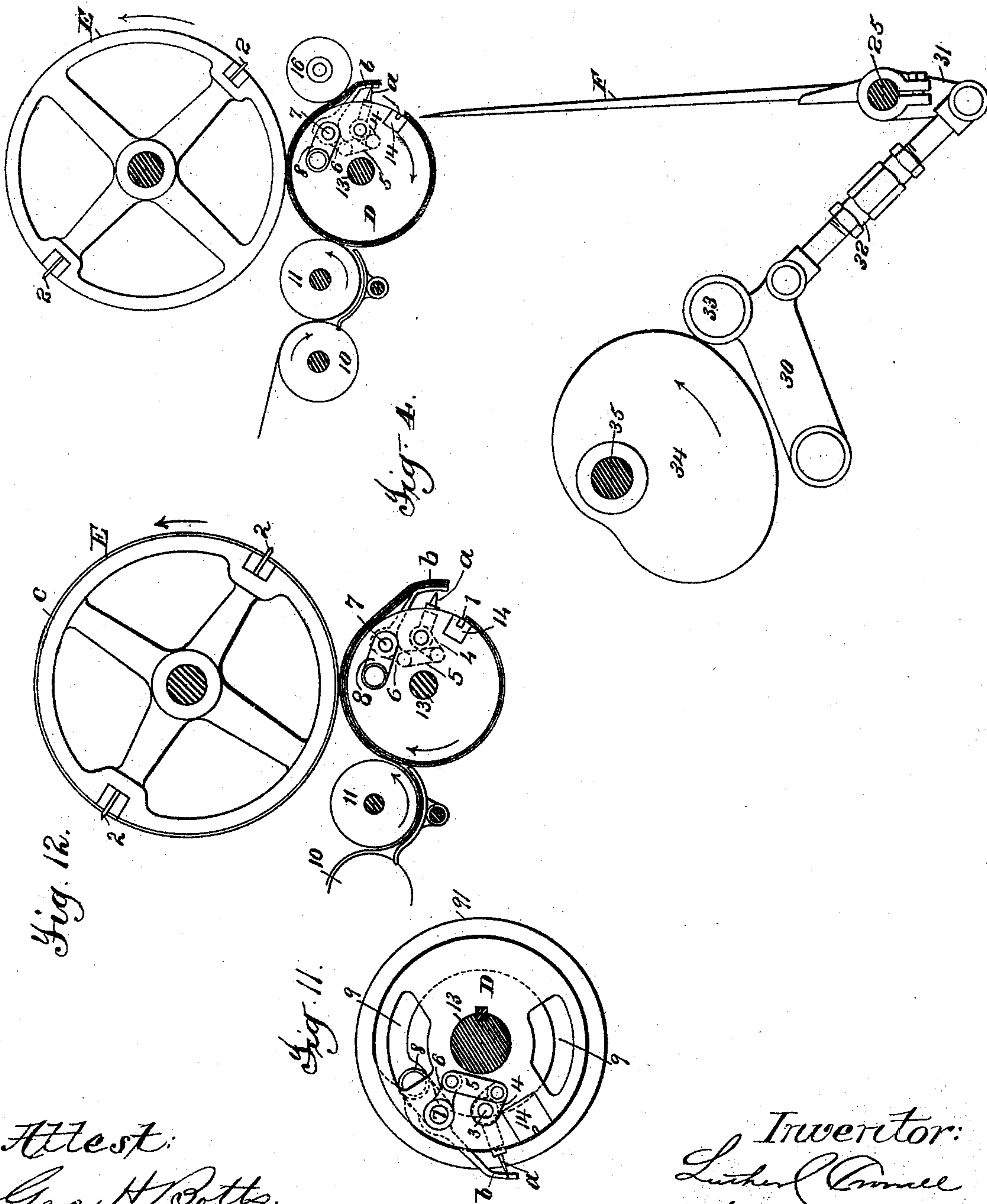
5 Sheets—Sheet 4.

L. C. CROWELL.

SHEET COLLECTING AND DELIVERY MECHANISM.

No. 505,442.

Patented Sept. 26, 1893.



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(No Model.)

5 Sheets—Sheet 5.

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SHEET COLLECTING AND DELIVERY MECHANISM.

No. 505,442.

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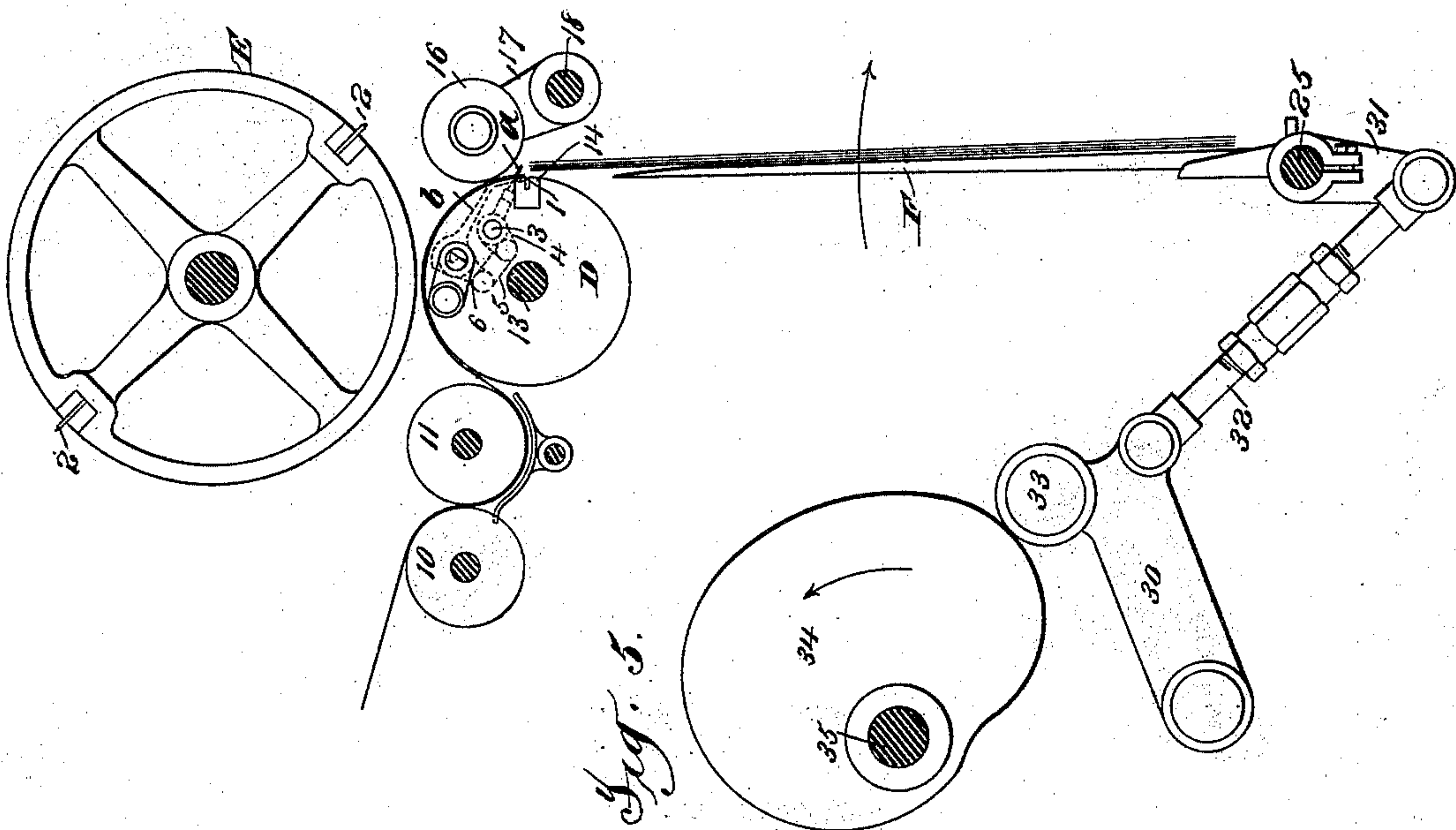


Fig. 5.

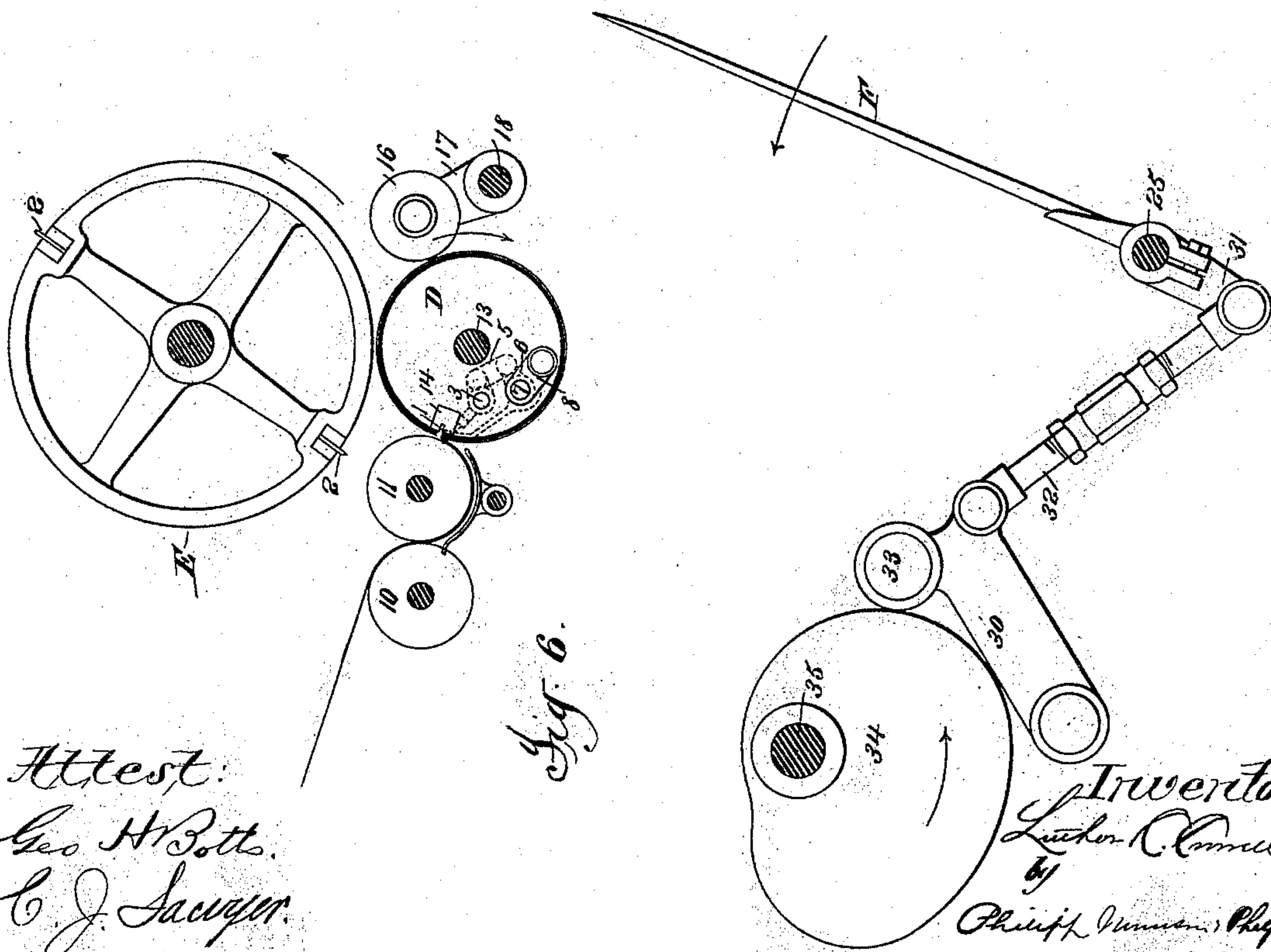


Fig. 6.

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Inventor
Luther C. Crowell
by
Philip M. Munson, Atty

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

SHEET COLLECTING AND DELIVERY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 505,442, dated September 26, 1893.

Application filed March 3, 1892. Serial No. 423,561. (No model.)

To all whom it may concern:

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

The object of the present invention is to provide a simple and efficient delivery mechanism by which a series of sheets may be collected from the web and delivered without folding at a high rate of speed, and further to provide a construction in which the collecting cylinder delivers directly to a fly or equivalent final delivery devices.

In the construction embodying my invention the collecting cylinder forms one of a pair of cutting and collecting cylinders, and the co-operating cutting cylinder may be so constructed and positioned as to co-act with the collecting cylinder to advance the sheets after they are released by the sheet holding pins, but I preferably provide an independent feeding roll for this purpose, and preferably mount this roll so as to yield as successive sheets are collected upon the cylinder, thus securing the proper feed of the sheets irrespective of the increase of surface speed of the sheets as they are collected upon the cylinder.

I secure certainty in the delivery at high rates of speed by providing the collecting cylinder with strippers co-acting with the sheet holding pins to throw the sheets off the pins and away from the cylinder a sufficient distance to insure their reception by the fly or other devices co-operating with the cylinder, and I have devised and preferably use a collecting cylinder of an improved construction employing pins and strippers moving together in delivering the sheets from the cylinder, in which the pins are actuated positively and independent of the engagement of the pins by the strippers, a certain and smooth action of the parts being thus secured at a very high rate of speed and the wear upon the pins and grippers being reduced so that this action may be maintained for a long time.

My invention, therefore, consists broadly in a sheet collecting cylinder and devices co-acting therewith to sever sheets from the web and deliver them directly to a fly or equivalent delivery devices and in various constructions and combinations of parts in a machine embodying this invention, and in various improvements of general application in collecting cylinder constructions whether delivering directly to final delivery devices or not, all of which will be fully described in the following specification and pointed out in the claims.

It is evident that the construction of the other parts of the delivery mechanism with which the parts embodying my invention co-act may be varied widely and that mechanisms of different forms may be used for actuating the pins, strippers, and fly. In the accompanying drawings, however, I have shown the delivery end of a machine embodying my invention, which forms a very simple and efficient construction capable of operating at a very high rate of speed, and the invention will now be described in detail as embodied in this machine.

Referring to the accompanying drawings:—Figure 1 is a side elevation of the delivery end of a printing machine. Fig. 2 is an end elevation of the same the small parts being omitted for clearness in showing the general construction. Fig. 3 is a side elevation of the collecting cylinder, the operating cam being shown in section. Figs. 4, 5, and 6 are diagrammatic sections taken inside the frame, showing the parts in different positions during the operation of collecting and delivering sheets. Figs. 7 and 8 are sections on the line 7—8 of Fig. 3 looking respectively to the left and right in said figure. Fig. 9 is a section on the line 9 of Fig. 3 looking to the right. Fig. 10 is an end view looking to the left in Fig. 3. Fig. 11 is a section taken inside the frame showing the end of the cylinder as in Fig. 10, but with the parts in a different position and showing the cam for operating the pins and strippers. Fig. 12 shows a modification.

Referring to said drawings A, B, are the opposite side frames of the machine, C the

last impression cylinder of the printing mechanism, D the collecting cylinder, E the cutting cylinder co-acting therewith to sever the sheets, and F the fly by which the sheets are delivered from collecting cylinder D. The web is shown as led from the impression cylinder C to the collecting cylinder D over and under a pair of feeding rolls 10, 11 so as to secure the proper feed of the web to be seized by the pins of the collecting cylinder, but it will be understood that any other suitable arrangement may be used for this purpose.

The collecting cylinder D is cut away for the pins and strippers, and preferably consists of a series of disks 12 mounted on the shaft 13 with bars 14 extending the full length of the cylinder and between the disks so as to form the cutting groove 1 co-operating with knives 2 of the cutting cylinder E to sever the sheets. The cutting cylinder E is shown as twice the size of the collecting cylinder D and as provided with two knives 2, but it will be understood that the cutting cylinder may be of the same size as the collecting cylinder D, if preferred.

Between the disks 12 are mounted the sheet holding pins *a* and strippers *b* by which the collected sheets are delivered from the pins to the fly. The pins and strippers may be of the usual construction, the pins being set at the proper angle to seize and hold the successive sheets, and the strippers being formed of fingers preferably made of thin rigid metal and provided at their outer ends with openings through which the pins extend. The pins *a* are mounted on a shaft 3 extending through the disks 12 forming the collecting cylinder, which shaft carries at one end a crank arm 4 connected by a link 5 to a crank arm 6 on shaft 7 which carries the strippers *b* and is mounted in the disks 12. The strippers *b* carry at one end a crank arm 8 provided with a bowl which runs in a cam plate 9 mounted to rotate on shaft 13 and provided with a gear 15 by which it is driven. It will be seen that by this construction, as the shaft 7 is rocked to throw the strippers *b* outward and carry the sheets from the pins *a*, the pins are simultaneously rocked upward toward the strippers so as to bring them into position radially to the collecting cylinder D, thus following the motion of the sheets as they are pressed off the cylinder by the strippers *b* and permitting them to be readily removed without danger of tearing the sheets. The movement of the pins and strippers relatively to each other are so timed that the pins are in the same position relatively to the strippers during every portion of their movement and the strippers need not be slotted but simply perforated for the pins, as shown in Fig. 3. It will be understood, however, that the strippers may be slotted and the parts not so accurately adjusted, but the operation of the construction is much better with this accurate timing of the parts. By actuating the pins positively and independently of the engage-

ment of the pins by the strippers, I am enabled to obtain a smooth and uniform movement at very high rates of speed and there is practically no wear between the pins and strippers, so that these parts will stand such speed for a long time without renewal.

In front of the collecting cylinder D and above the fly F a feeding roll is mounted, this roll being cut away opposite the pins *a* and strippers *b* and formed preferably, as shown, by a series of disks 16 mounted in arms 17 carried by the shaft 18 and spring pressed through crank arm 19 by rod 20 sliding in lug 21 on the frame and pressed by spring 22 as usual in such constructions. This feeding roll co-acts with the collecting cylinder D between the pins *a* and strippers *b* to feed the sheets forward after they are received from the pins and thus secure the delivery of the sheets to the fly F. The shaft 18 and parts carried thereby are preferably mounted in brackets 23 adjustably secured to the frame by slot and bolt 24, as shown, or in any other suitable manner, so as to permit the adjustment of these parts to secure the best operation of disks 16 in combination with the collecting cylinder D, and in accordance with the number of sheets to be collected. While this spring pressed feeding roll is preferably used, it will be understood that it may be omitted and the cutting cylinder E be constructed to co-act with the cylinder D in feeding the sheets, as shown in Fig. 12, the cylinder E being preferably provided with rubber bands *c*, as shown, or equivalent devices, to secure the feeding of the sheets, but this construction is not satisfactory when many sheets are collected at a high rate of speed, while the use of the spring pressed feeding roll secures the proper feeding of a large number of sheets, and by adjusting the position of shaft 18 the exact pressure required may be secured with any number of sheets. It is not absolutely essential that the feeding roll should be spring pressed, if the number of sheets is not to be varied, as the roll may be set at just the right distance from cylinder D to secure the feeding of the sheets when released by the pins, but the construction shown is much preferable and aids materially in attaining a high delivery speed. With a series of independent disks 16 forming the feeding roll, and made adjustable on their supporting shaft by set screws, as shown in Fig. 2, or otherwise, it is possible also to adjust the disks so as to bear upon the margins of the paper thus avoiding offset, and as the cylinder E does not touch cylinder D, all offset from the collecting cylinder is avoided even at high rates of speed. The machine is shown as adapted to deliver two series of papers side by side, and the disks 16 as set accordingly to engage the center and side margins.

The fly F consists of the usual series of fingers mounted on a rock shaft 25 actuated to deliver the sheets by a bar 26 sliding in lug 27 on the frame and secured to crank arm 28

on shaft 25, this bar 26 being spring pressed by spring 29, as usual in such constructions. The shaft 25 is rocked in the opposite direction to return the fly F against the tension of spring 29 by a rocking lever 30 connected to crank arm 31 on shaft 25 by an adjustable pitman 32, this lever 30 being provided with a bowl 33 which runs upon a rotating cam 34 carried by shaft 35 mounted in the frame B.

The operating parts of the machine may be driven by any suitable means and from any part of the machine. In the construction shown, the shaft 35 is driven from the impression cylinder C by intermediate 36, and gear 37 and pinion 38 mounted on a stud in frame B, the pinion 38 engaging gear 39 on shaft 35, these parts being so timed that the shaft 35 and cam 34 make rotation for rotation with the cylinder C. The collecting cylinder D is driven from gear 37 by intermediate 40 meshing with gear 41 on shaft 13, and the cutting cylinder E is driven directly from the shaft 13 by gear 42 meshing with gear 41, these parts being so timed that the collecting cylinder D makes four rotations to one of impression cylinder C and shaft 35, so that four sheets are collected upon the cylinder D to each rotation of the fly. It is necessary that the cam 8 be driven at a higher rate of speed than the collecting cylinder D so that the fingers *a* and strippers *b* will be actuated to deliver the sheets once to each four rotations of the collecting cylinder D, and this cam is driven from the shaft of cutting cylinder E by gear 43 on said shaft inside the frame A engaging gear 15 on the cam disk, these gears being so timed that the cam disk makes about five rotations to four of the collecting cylinder. The feeding disks 16 are driven directly from shaft 13 of the collecting cylinder D by gears 44, 35.

The operation of the construction will be understood from a brief description in connection with the drawings. As the web is fed by rolls 10 and 11 to the collecting cylinder D the web is seized by the pins at the leading end of each sheet as the pins pass the feed roll 11, as shown in Fig. 6, and each sheet is severed by one of the knives 2 of the cutting cylinder co-acting with groove 1 of the collecting cylinder all in the usual manner. While the number of sheets for which the parts are adjusted are being collected upon the cylinder D, the pins *a* and strippers *b* remain stationary with the pins projecting forward in the line of movement of the collecting cylinder D at an angle to the radius of the cylinder so as to seize the sheets properly, and the strippers are withdrawn inside the cylinder during this movement, the bowl on crank arm 8 of shaft 7 riding upon the concentric portion of the cam 9 and all the parts being in the position shown in Figs. 3 and 5 to 10. In the present case the number of sheets collected to each delivery are four, but it will be understood that this number may be varied as desired by changing the timing of the parts

as usual in collecting cylinder constructions. When the four sheets are collected and the pins *a* and strippers *b* have passed the feeding roll 16 so that the leading ends of the sheets may be thrown outward from the cylinder, the cam 9 in its more rapid rotation than the cylinder D has caught up with the latter and the bowl on crank arm 8 now passes into the depressed portion of the cam 9 and the strippers *b* are thrown outward from the cylinder so as to force the leading ends of the sheets off the cylinder, and at the same time by the connection between shafts 7 and 3 the latter shaft is rocked to move the pins so as to follow up the strippers as the sheets are forced outward over the pins, the easy delivery of the sheets from the pins *a* being thus secured and all danger of tearing the sheets avoided. This position of the parts is shown in Figs. 4 and 11, the ends of the sheets having been just thrown off from the cylinder so as to be carried outward sufficiently to be received by the fly F. In this position of the parts, the fly has just been returned against the pressure of spring 29 by the action of cam 34 on the bowl 33 and is now in its innermost position, as shown in Fig. 4. The collected sheets released from the pins are now advanced by friction between the collecting cylinder D and the disks 16, and the sheets are fed downward in front of the stationary fly F, as shown in Fig. 5, the leading end of another sheet having been meanwhile seized by the pins *a*. As the sheets pass downward in front of the fly, the bowl 33 is just about to pass off the raised portion of cam 34 so that the spring 20 may operate to throw the fly downward to deliver the collected sheets, this position being shown in Fig. 5. One series of collected sheets having been thus delivered the fly is again returned to position by the action of cam 34 on bowl 33 and meanwhile the collecting cylinder D is collecting another series of sheets, as shown in Fig. 6, and thus the operation is repeated.

It will be understood that short stationary guides may be used between the fly and collecting cylinder if desired, and such a construction is intended to be included under the terms delivering directly to the fly, as the equivalent of the construction shown. Such a guide, however, will generally be found unnecessary. It will be seen that my invention provides a very simple collecting and delivery mechanism, in which the collecting cylinder delivers directly to the fly without the use of a switch or intermediate feeding mechanism, and it is found in practice that this mechanism is operative to collect and deliver a large number of sheets at very high rates of speed and that the wear upon the parts on which the delivery of the sheets depends is slight and the efficiency of the mechanism not substantially impaired thereby, so that great durability is combined with high capacity.

What I claim is—

1. The combination with a fly, of a sheet

collecting cylinder, and devices co-acting therewith to sever sheets from the web and deliver them directly from the cylinder to the fly, substantially as described.

- 5 2. The combination with a fly, of a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins, and means for delivering the sheets from the pins directly to the fly, substantially as described.
- 10 3. The combination with a fly, of a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins and strippers operating to deliver the sheets from the pins directly to the fly, and a feeding roll
- 15 mounted behind the throw off point of said collecting cylinder, and co-acting therewith to advance the sheets when released from the pins, substantially as described.
- 20 4. The combination with a fly, of a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins and strippers operating to deliver the sheets from the pins directly to the fly, and a spring pressed feeding roll mounted behind the throw off
- 25 point of said collecting cylinder, and co-acting therewith to advance the sheets when released from the pins, substantially as described.
- 30 5. The combination with a fly, of a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins and strippers operating to deliver the sheets from the pins directly to the fly, and a spring pressed feeding roll consisting of a series of
- 35 disks adjustable longitudinally of the cylinder mounted behind the throw off point of said collecting cylinder, and coacting therewith to advance the sheets when released from the pins, substantially as described.
- 40 6. The combination with a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins and strippers operating to deliver the sheets from the pins, of a feeding roll mounted behind the throw
- 45 off point of said collecting cylinder and co-acting therewith to advance the sheets when released from the pins, substantially as described.
- 50 7. The combination with a pair of cutting and collecting cylinders, the collecting cylinder having sheet holding pins and strippers

operating to deliver the sheets from the pins, of a spring pressed feeding roll mounted behind the throw off point of said collecting cylinder and co-acting therewith to advance 55 the sheets when released from the pins, substantially as described.

8. The combination with a pair of cutting and collecting cylinders, of a feeding roll co-acting with the collecting cylinder to advance 60 the sheets when released by the cylinder, substantially as described.

9. The combination with a pair of cutting and collecting cylinders, of a spring pressed feeding roll co-acting with the collecting cyl- 65 inder to advance the sheets when released by the cylinder, substantially as described.

10. The combination with a sheet collecting cylinder and its sheet holding pins *a* and strippers *b*, of means independent of the en- 70 gagement of the pins by the strippers for simultaneously actuating the strippers to throw the sheets off the pins and moving the pins with the strippers to permit the sheets to be thrown off, substantially as described. 75

11. The combination with a sheet collecting cylinder and its sheet holding pins *a* and strippers *b* and shafts on which the pins and strippers are carried, of connections between said shafts, and means for rocking one of 80 said shafts, whereby the strippers are actuated to throw the sheets off the pins and the pins are simultaneously rocked to permit the sheets to be thrown off, substantially as described. 85

12. A sheet collecting cylinder having sheet holding pins and strippers mounted on separate shafts connected to move in unison, by means independent of the strippers and pins 90 substantially as described.

13. The combination with cylinder *D* having pins *a* and strippers *b* mounted on shafts 3, 7, therein, of cranks 4, 6 and link 5 connecting said shafts, and a crank and bowl on one of said shafts, substantially as described. 95

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

LUTHER C. CROWELL.

Witnesses:

J. J. KENNEDY,
C. J. SAWYER.