

No. 615,257.

Patented Dec. 6, 1898.

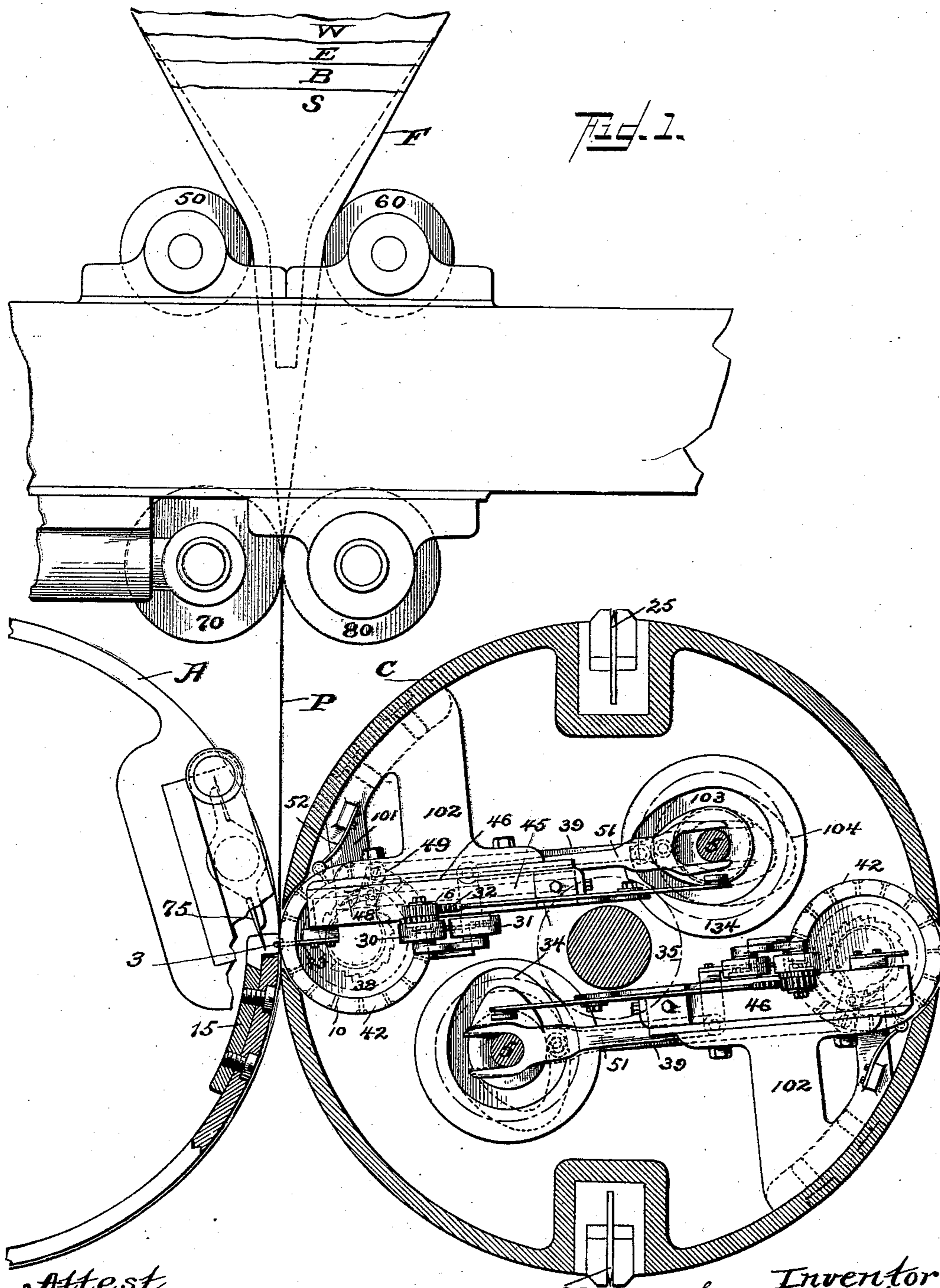
L. C. CROWELL.

STAPLE BINDING DELIVERY MECHANISM FOR PRINTING MACHINES.

(Application filed Dec. 31, 1897.)

(No Model.)

7 Sheets—Sheet 1.



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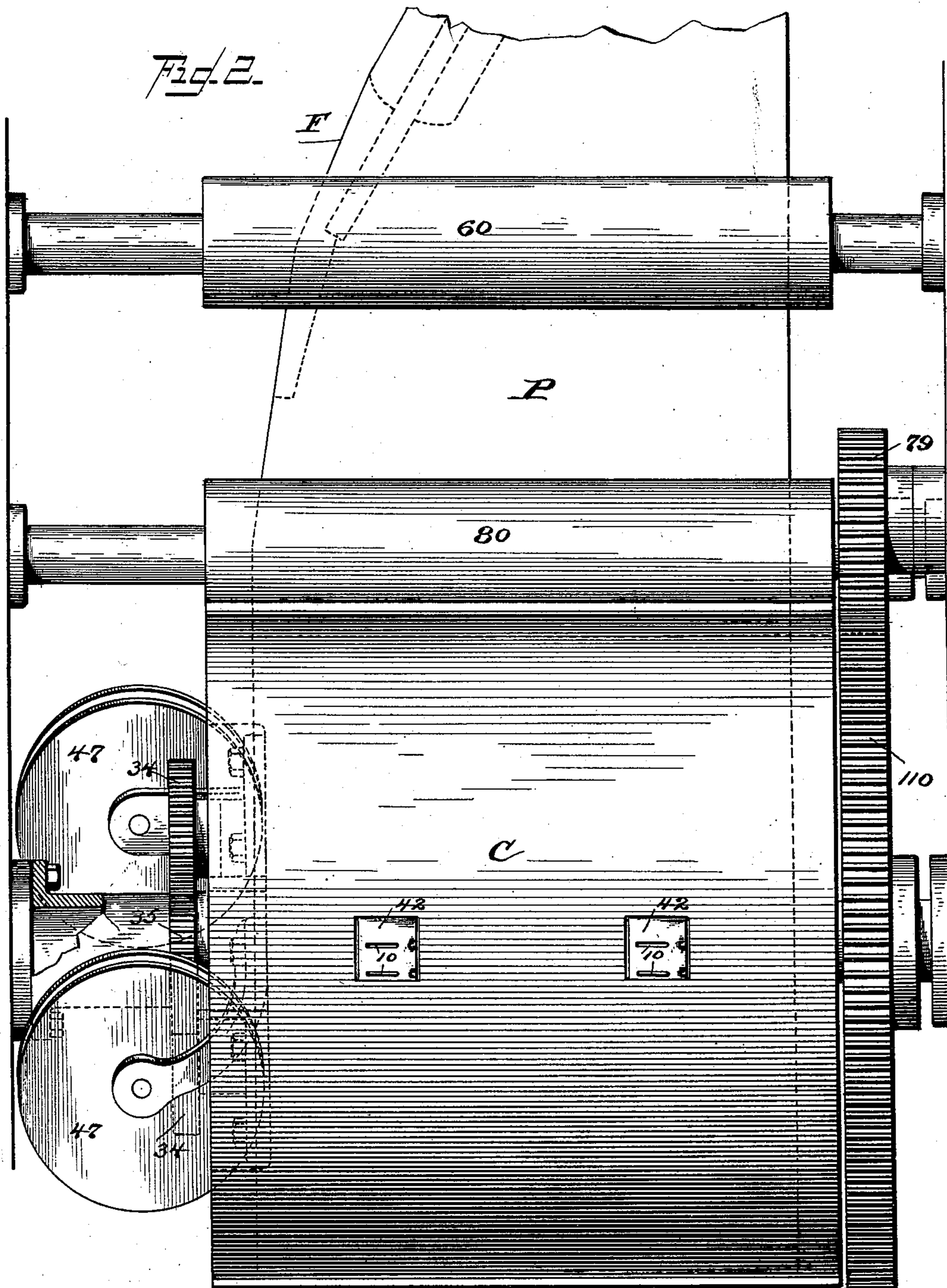
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(No Model.)

7 Sheets—Sheet 2.



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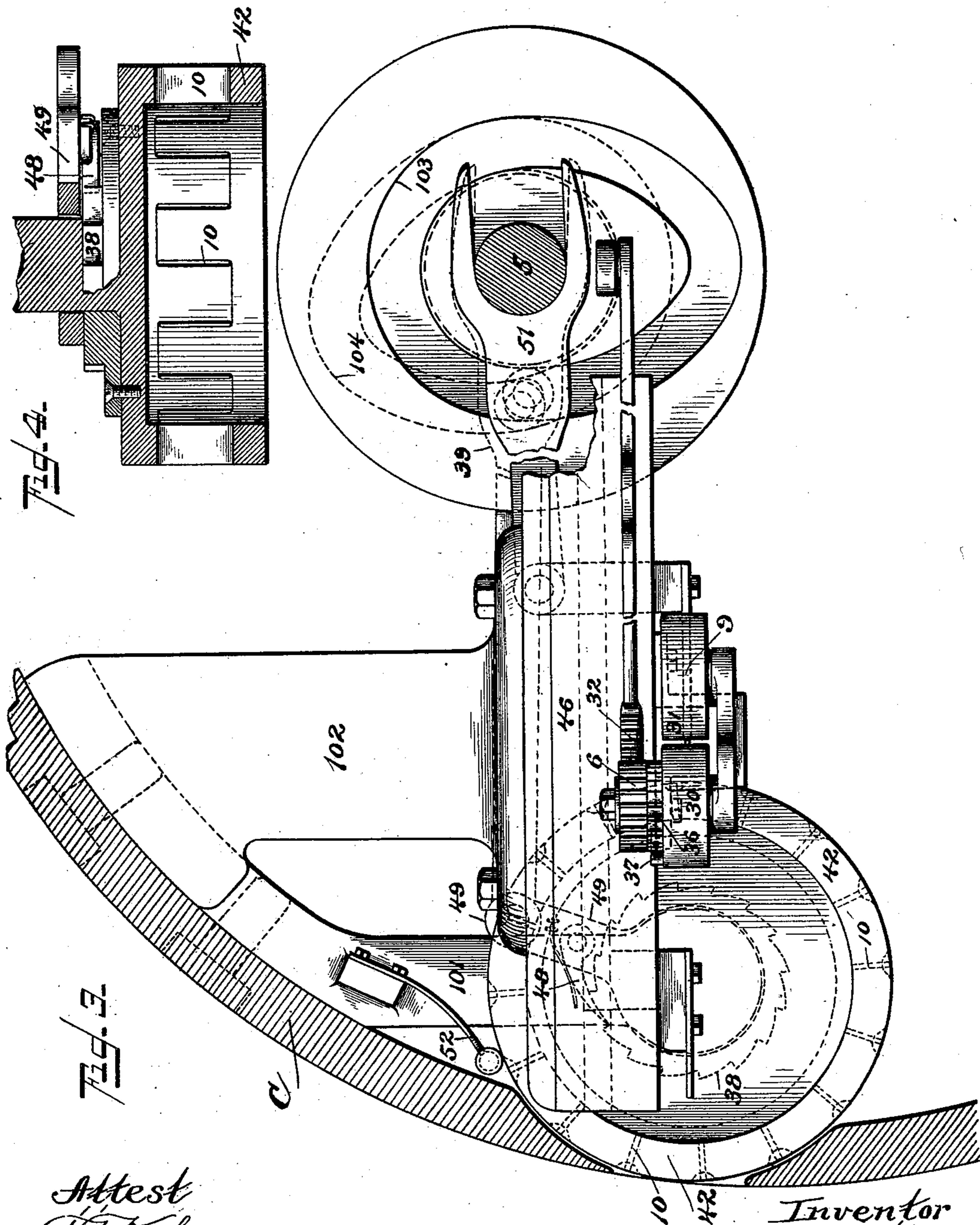
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7 Sheets—Sheet 3.



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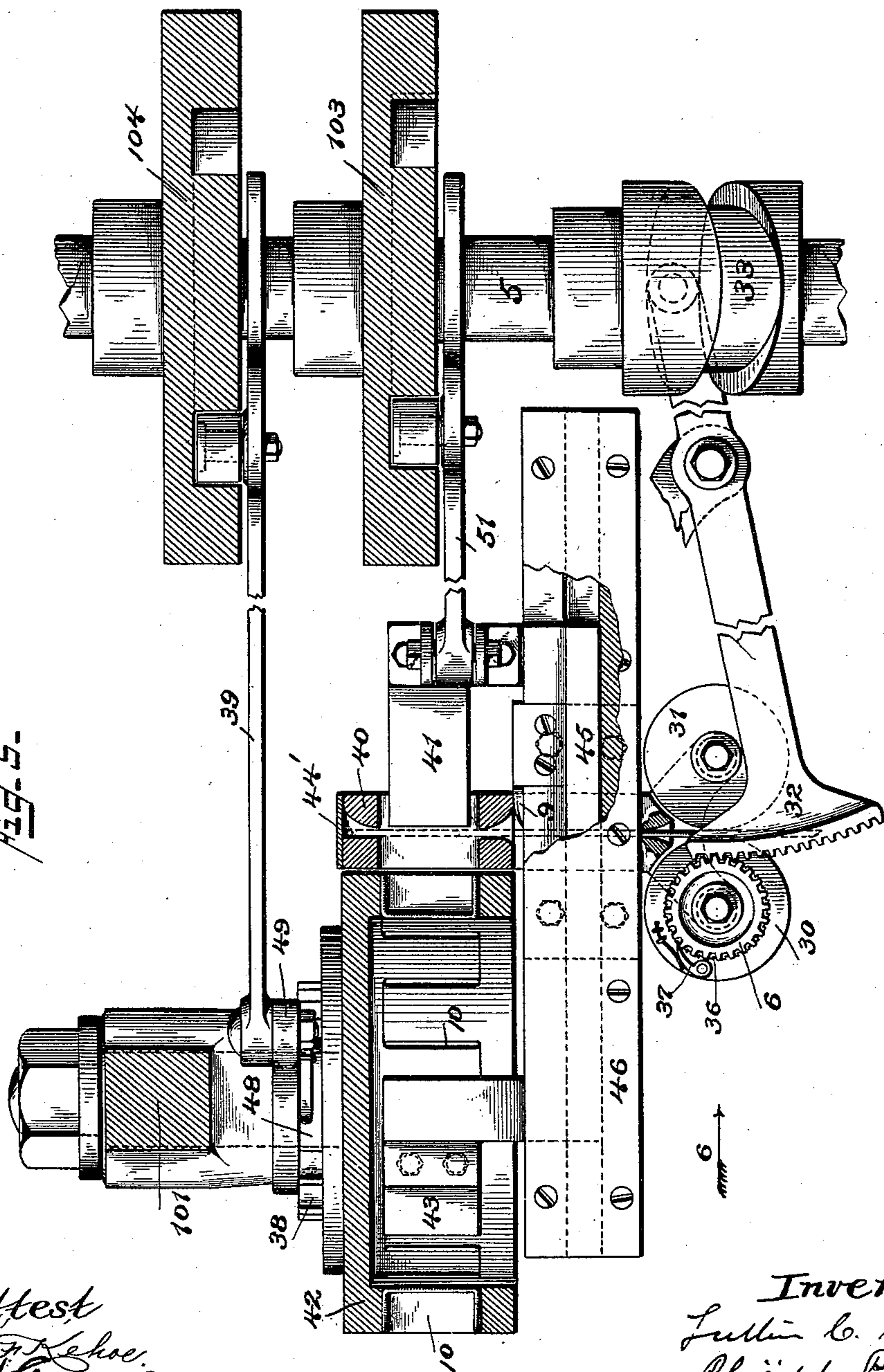
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# STAPLE BINDING DELIVERY MECHANISM FOR PRINTING MACHINES.

(Application filed Dec. 31, 1897.)

(No Model.)

**7 Sheets—Sheet 4.**



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No. 615,257.

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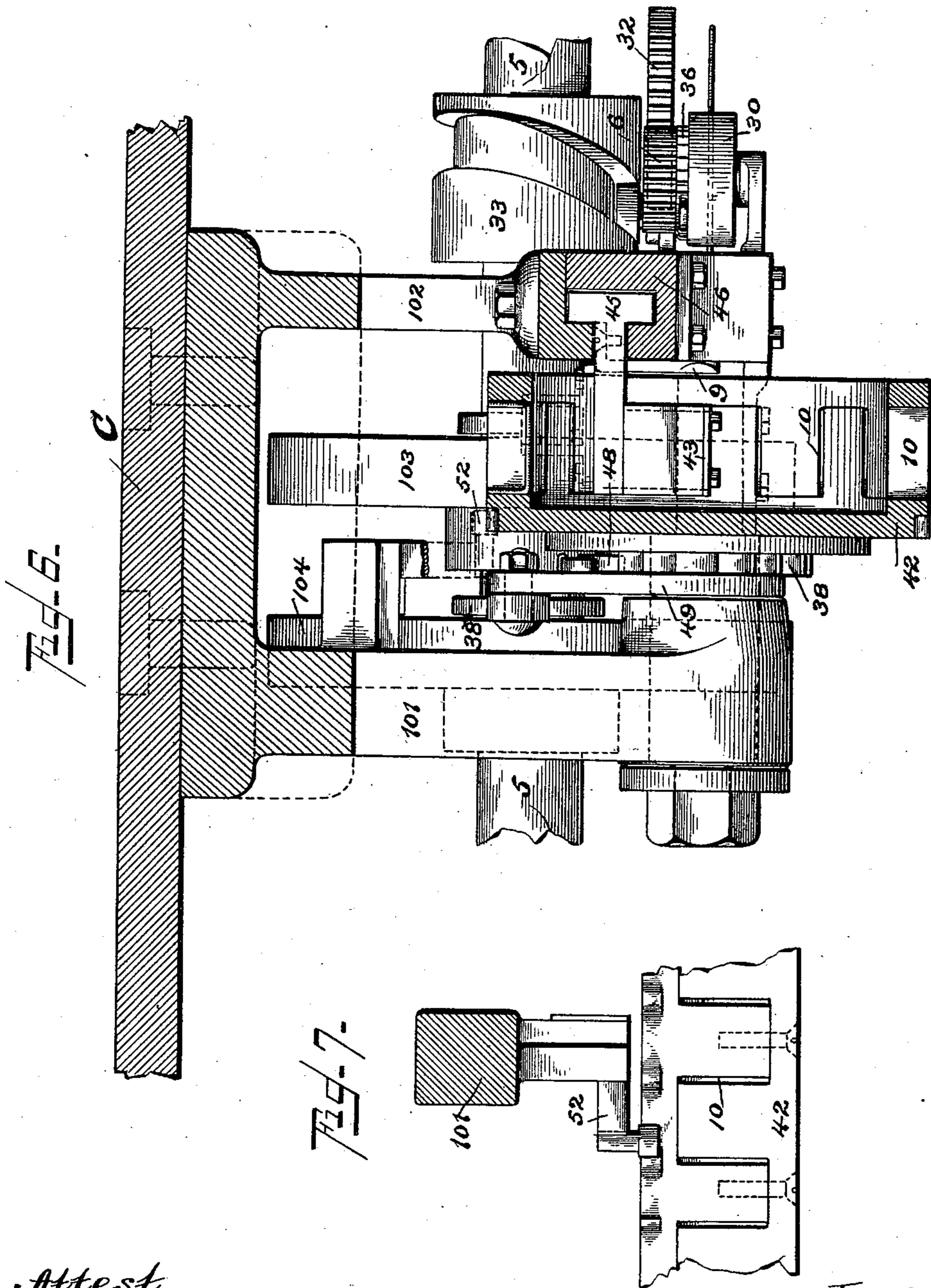
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(Application filed Dec. 31, 1897.)

(No Model.)

7 Sheets—Sheet 5.



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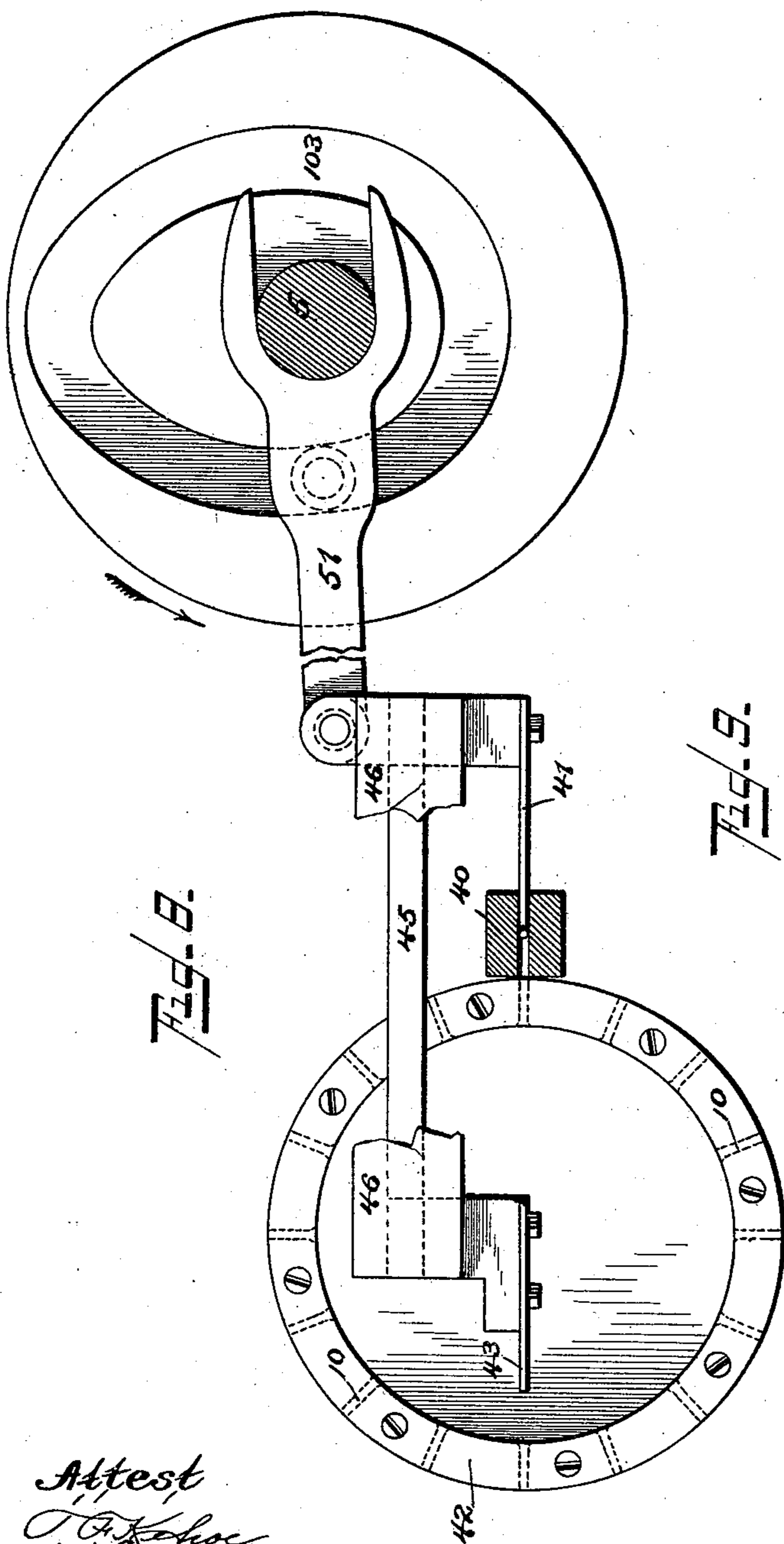
L. C. CROWELL.

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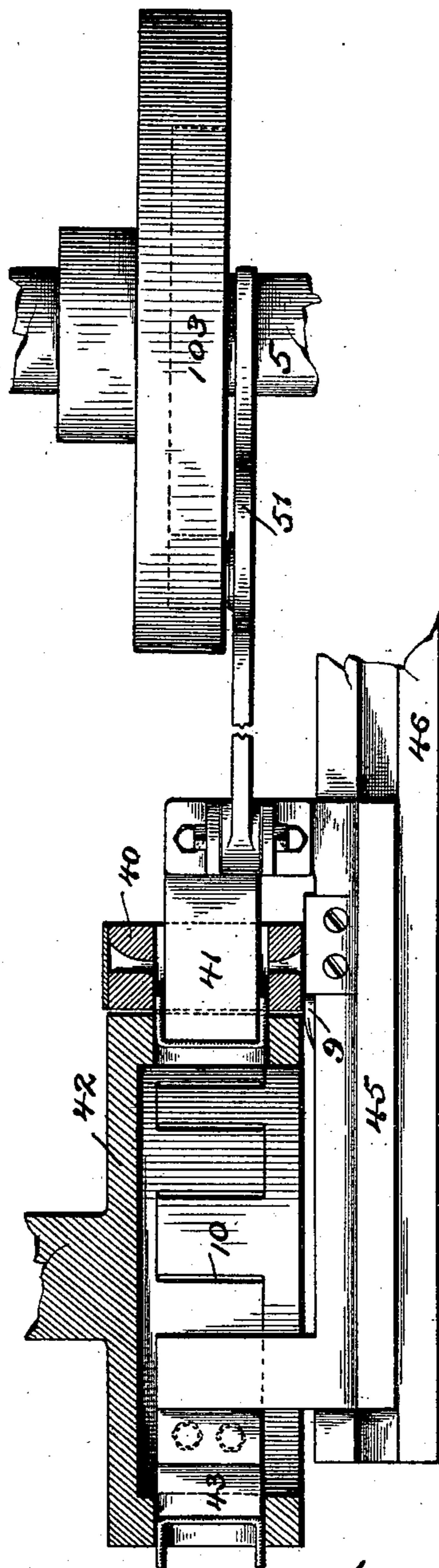
(Application filed Dec. 31, 1897.)

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7 Sheets—Sheet 6.



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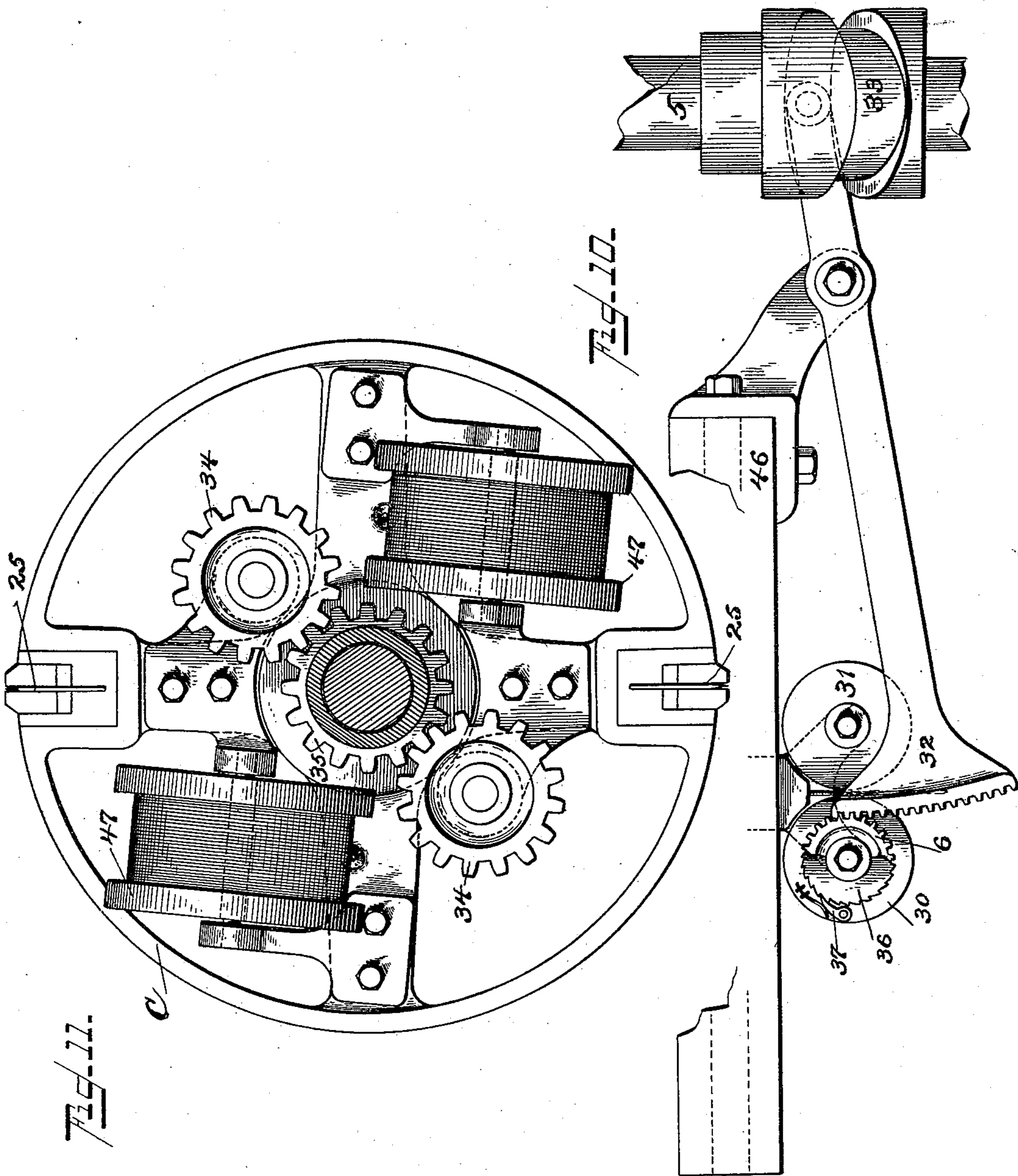
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STAPLE BINDING DELIVERY MECHANISM FOR PRINTING MACHINES.

(Application filed Dec. 31, 1897.)

(No Model.)

7 Sheets—Sheet 7.



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# UNITED STATES PATENT OFFICE.

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## STAPLE-BINDING DELIVERY MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 615,257, dated December 6, 1898.

Application filed December 31, 1897. Serial No. 665,169. (No model.)

*To all whom it may concern:*

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

The present improvements relate in a general sense to that class of stapling mechanisms especially adapted for attachment to a web-printing machine to form a part of the delivery mechanism thereof, whereby the plicated material in the form of webs or sheets may be bound together in packs on the line of ultimate folding thereof by means of staples made and set therein during the onward progress of the said plicated packs for final delivery, and thus form a completed product, such as a pamphlet or newspaper, whose leaves are bound together in the form of a book-like product. In a general sense the type of such machines is comprehended in Patent No. 510,528, and more specifically the improved machine is of the class in which the staple forming, presenting, and inserting mechanisms are contained within the confines of a rotary carrier supporting them, which carrier also supports the wire-length-supplying means delivering material to form the staple, which class has its type disclosed in Patent No. 510,843.

A practical embodiment illustrative of this invention is shown in the accompanying drawings, as follows:

Figure 1 illustrates by an end elevation and Fig. 2 by a side elevation so much of a delivery apparatus of a printing-machine as is necessary for an understanding of the relation of the stapling mechanism thereto. The remaining figures, except 11, are enlarged views. Fig. 3 is a sectional end elevation of a portion of the carrier supporting the stapling mechanisms, in elevation, sufficient being shown to include one of the two sets of stapling mechanisms supported by said carrier. Fig. 4 is a transverse sectional plan view on a part of said stapling mechanism. Fig. 5 is a plan view of one set of said sta-

pling mechanisms. Fig. 6 is a side elevation of the same attached to the carrier-shell, shown in section, as seen looking in the direction of the arrow 6 in Fig. 5. Fig. 7 is a plan view of a detached detail thereof. Fig. 8 is an elevation, and Fig. 9 a sectional plan view, of parts of the stapling mechanism rendered perspicuous by the omission of others. Fig. 10 is a plan view of the wire-feeding mechanism; and Fig. 11, an end elevation of the carrier, showing the relation of the wire-reels thereto.

While the means for supplying the plicated material to the stapling mechanism may be any of those set forth in the above-named patent, illustratively that means is here shown as a longitudinal folder F, having guiding-rollers or external turners 50 60 and nipping or fold-laying rollers 70 80, over which many webs, as W E B S, are shown as traveling, said longitudinal folder being of that construction described in Patent No. 331,280. These nipping-rollers are geared together to run in unison, one of their pinions 79 being shown in Fig. 2.

The plicated material P is so delivered to the stapling mechanism as to pass between the rotating carriers A C, which support the stapling mechanisms, the carrier C being supplied with duplicate sets of stapling mechanisms for feeding wire thereto, cutting the same into staple lengths, forming the said legs into staples, presenting them in setting position, and inserting them through the running material, while the carrier A supports a like number of staple-leg-clenching devices, whereby said staple-legs protruded through the material are bent or clenched down thereon. These carriers might be sufficient only to act as carriers for these stapling mechanisms, but as it is preferable for compactness of machinery, the room for which is often limited, said carriers are also made to support cutting mechanisms for severing the webs into sheet lengths and with folding devices for folding the same, and as these carriers are made double, also, so as to operate upon two sets of sheets in one revolution, these carriers are supplied with double sets of stapling mechanisms and with double sets of cutting and folding mechanisms, circum-

ferentially considered, and for the reason that the stapling mechanisms are so arranged to form a binding-seam transversely to the run of the material the stapling mechanisms are also multiplied in the carriers in a longitudinal direction, two sets being so arranged as the selected number sufficient for the width of the material shown as operated upon.

As the stapling mechanisms are all constructed alike, a description of one set will now be given in detail, it being understood that the description thereof and the letters and figures of reference applied thereto may be read upon any of the other duplicate sets for an understanding thereof.

The stapling mechanism consists in a broad sense, first, of a forming-die, as 40, stationary with respect to the rotating carrier C; second, of a reciprocating former, as 41, whereby a wire length is formed into a staple; third, a rotating staple-transferrer that is provided with a multiplicity of staple-receiving pockets, into which the formed staples are successively delivered, which transferrer transports said staples from the forming-point to the delivery-point, and, fourthly, of a reciprocating setter or driver 43, whereby said formed staples are inserted or driven through the running material when the carrier C has moved the stapling mechanism to the setting-point for the staples. (See Figs. 8 and 9.) This forming-die consists of a block pierced longitudinally with a wire-guide slot for the introduction of the wire and transversely with a recess for the passage of the former 41, said slot being enlarged rearwardly at each end of the die 40 to permit the canting of the ends of the wire length during their formation into staple-legs and said recess being made sufficient to provide at the side of the former spaces for accommodating the staple-legs in their formation. (See Fig. 9.)

The stapling mechanism and supports for its moving parts are held stationary with respect to the carrier C by means of brackets 101 102, secured to the inner face of the shell of the carrier. (See Fig. 3.) The former 41 and setter or driver 43 are connected together, so as to move in unison, by means of a slide 45, from which they project laterally, which slide moves in a way 46, supported by the bracket 102, being driven by an arm 51, connected with it, having a bifurcated end by which it is guided by the shaft 5, and being provided with a friction-bowl laterally extending into a groove of a cam 103.

The wire from which the staples are to be made is carried by a reel 47, (see Fig. 11,) from which reel the wire is led between feeding-rolls 30 31, passes through a guide, and thence to the die 40. The wire is intermittently fed forward a staple's length until its end is arrested by a stop-plate 44 by the rotative movement of the rollers 30 31, accomplished by means of a segment 32, vibrated by a cam 33 on shaft 5, which is rotated by

means of a wheel 34, which is driven by meshing with the toothed wheel 35, encircling the main shaft, fast on a sleeve secured to the side frame, said segment 32 engaging with a pinion 6, which carries a ratchet-wheel 36, with which coöperates a spring-seated pawl 37, that is fast to the feeding-rollers 30, said feeding-rollers operating by frictional contact when driven by the ratchet to properly advance the wire.

The slide 45 also carries a cutter 9, which in coöperation with the receiving end of the die 40 operates by a shearing action to sever the wire and detach a staple length thereof just as or immediately before the former 41 contacts with said wire length in the operation of forming it into a staple. Each staple as formed is by the continued forward movement of the former 41 thrust into and delivered in one of the pockets 10 of the transferrer 42, the transferrer standing still during this operation.

The transferrer 42 turns on an axis supported by the bracket 101, which is in such a position that a portion of its periphery protrudes through the shell of the carrier C and is intermittently rotated through a step-by-step movement accomplished by means of a ratchet-wheel 38 it carries, through which it is driven by a pawl 48, hung to a vibrating arm 49, which arm, journaled on the shaft of the transferrer, is vibrated by an arm 39, that is bifurcated to embrace a shaft and provided laterally with a friction-bowl that runs in the groove of a cam 104. As each step movement is finished its position is maintained by a spring-pawl 52, whose rounded end presses into a suitably-formed recess near one edge of the periphery of the transferrer. At each step-like movement the pockets, one after another, are supplied with made staples, said staples as they are inserted in these pockets having their crowns pointed toward the place for setting the same. This inverted position of the staples is gradually reversed as the transferrer makes its rotation, so that when a pocket loaded with the staples is presented at the periphery of the carrier C it has its legs pointed outward. The rotative movement of this transferrer is so timed that when a loaded pocket is moved by the carrier C to the point for the insertion of said staple the said transferrer will have ceased to rotate and be stationary with respect to the carrier, with said pocket alined with the setter or driver 43, at which time a forward movement of the setter 43 and former 41 will simultaneously be made, the one to thrust a made staple outward through the material and aid in clenching the same and the latter to form a new staple and load a pocket therewith.

The carrier A is provided with an appropriate number of setting or clenching dies, and is geared to the carrier C, so that the two carriers run in unison, one of their connecting-gears 110 being shown in Fig. 2. Each clench-

ing-die in this case is at the end of a bar 15, fastened to the shell of the carrier in the proper position.

From the foregoing it will be understood that these operations of feeding the wire forming the staple and transferring it to the setting position are constantly going on within the carrier C at an appropriate speed, while the carrier is constantly rotating at a higher speed, suited to that in which the material to be stapled is moving, and that when a suitable length of material has passed between the carriers A C one or the other of the staple-transferrers will be presented at the setting point, or where the carriers A C run nearest in contact, the transferrer 42 then being stationary and one of these pockets presenting a made staple in position to be set, and that at the appropriate moment to which the mechanisms are timed the setting-tool or driver 43 will be quickly advanced to make contact with the said staple, drive the same outward, insert it through the passing material, and cause its legs to enter into the die 3 of the carrier A, and thus be clenched onto said material, which material thus stapled will pass onward for delivery.

Of course the finished material might pass from the carriers A C to any delivery mechanism or first to a cutting and then to a folding mechanism of any suitable construction; but as it is convenient, as before stated, to combine cutting and folding mechanisms with the carriers which support the stapling mechanisms it will be understood from the state of the art, as set forth in the first-named patent, that the material P will be temporarily held on the periphery of the carrier A and be made to overlap a folding-blade, as 75, and that when said folding-blades arrive over a pair of folding-rollers said folding-blade will be projected to double or fold said stapled product into the nip of said folding-rollers, which folding devices are illustrated in Patent No. 171,186, and which folding operation is fully described in the first before-mentioned patent; also, that when the proper length of the stapled material has passed, a cutting-blade, as 25, will, cooperating with the female cutter on the carrier A, transversely sever the material to divide it into sheets.

What I claim is—

1. The combination, in a staple forming and setting mechanism, of means for forming a staple, a rotating transferrer provided with slots placed radially to its center of rotation for transferring the staple from the staple-forming point to the staple-setting point, and means for forcing the staple into the material to be stapled, substantially as described.

2. The combination, in a staple forming and setting mechanism, of means for forming a staple, a rotating transferrer provided with slots placed radially to its center of rotation

for transferring the staple from the staple-forming point to the staple-setting point, and a plunger for driving the staple, substantially as described.

3. The combination of a rotating transferrer having slots therein placed radially with reference to its center of rotation for receiving staples, means for delivering staples thereto, and means for rotating the transferrer to present the staples at the setting-point, substantially as described.

4. The combination in a staple forming and setting mechanism, of means for forming the staples, a rotating transferrer having slots placed radially with reference to its center of rotation for receiving the staples, means for delivering staples from the forming mechanism to the transferrer, means for rotating the transferrer, and means for forcing the staples out of the slots in the transferrer and into the material to be stapled, substantially as described.

5. The combination with a rotating carrier operating to move the staple-presenting mechanism to and from the staple-setting point, of a staple-forming die, a reciprocating former cooperating to form the staple, a rotating transferrer for transferring the formed staple from the staple-forming point to the staple-setting point, and means for forcing the staple into the material to be stapled, all these parts being supported by the carrier, substantially as described.

6. The combination with a rotating carrier operating to move the staple-presenting mechanism to and from the staple-setting point, of a transferrer having slots therein for receiving staples, means for delivering staples thereto, and means for rotating the transferrer to present the staple at the setting-point, substantially as described.

7. The combination, in a staple forming and setting mechanism, of means for forming staples, wire-feeding mechanism for supplying wire from which the staples are formed, a rotating transferrer provided with slots placed radially with reference to its center of rotation for transferring the staples from the forming to the setting point, said slots serving as means for supporting the staples while being driven, substantially as described.

8. The combination with means for feeding plicated material onward past staple-inserting means, a rotating carrier, a setting mechanism and means for forming a staple mounted thereon, and a transferrer separate from the forming mechanism for transferring the staple from the forming to the setting point, substantially as described.

9. The combination with means for feeding plicated material onward past staple-inserting means, a rotating carrier, mechanism for setting and mechanism for forming a staple mounted therein, a transferrer mounted to rotate in the carrier for transferring the staples from the staple-forming point to the staple-

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setting point, and a plunger for setting the staples, substantially as described.

10. In a staple-setting mechanism, a rotating carrier having mounted therein a rotary transferrer provided with means for engaging a staple to transfer it to the setting-point and to hold and guide it while being driven, substantially as described.

11. The combination with means for feeding plicated material onward past staple-inserting means, mechanism for forming staples, a rotating transferrer having slots placed radially with reference to its center of rotation for receiving the staples and transferring them from the staple-forming point to the staple-setting point, and a plunger for forcing the staples, substantially as set forth.

12. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means supported therein for forming staples, a rotating transferrer mounted in the carrier for transferring the staples from the staple-forming point to the staple-setting point, and means for forcing the staples into the material to be stapled, substantially as described.

13. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means for forming staples supported by the carrier, a transferrer mounted to rotate in the carrier for transferring the staples from the staple-forming point to the staple-setting point, and a plunger for setting the staples, substantially as described.

14. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, a transferrer mounted to rotate in the carrier and having openings therein for receiving staples, means for delivering staples thereto, and means for rotating the transferrer, substantially as described.

15. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means for forming staples mounted in the carrier, a transferrer also mounted in the carrier having openings therein for receiving staples, means for delivering the staples from the forming means to the transferrer, means for rotating the transferrer to present the staples to the setting-point, and means for forcing the staples out of the openings in the transferrer

and into the material to be stapled, substantially as described.

16. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means for forming staples mounted therein, wire-feeding mechanism for supplying the wire from which the staples are formed, a rotating transferrer also mounted in the carrier for transferring the staples from the forming to the setting point, said transferrer serving also to support the staples while being driven, substantially as described.

17. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means for forming staples mounted in said carrier, a rotating transferrer also mounted in the carrier for transferring the staples from the staple-forming point to the staple-setting point, means for forcing the staples into the material to be stapled, and a second rotating carrier provided with means for clenching the staple after it is inserted, substantially as described.

18. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, means for forming staples mounted in said carrier, a rotating transferrer also mounted in the carrier for transferring the staples from the staple-forming to the staple-setting point, a plunger for driving the staples, and a second carrier provided with means for clenching the staples after they are driven, substantially as described.

19. The combination of means for feeding plicated material onward past staple-inserting means, a rotating carrier, a staple-transferrer mounted so as to rotate in the carrier and provided with openings for receiving staples, means for delivering staples thereto, means for rotating the transferrer to present the staples at the setting-point, and a second rotating carrier provided with means for clenching the staples after they are set, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

T. F. KEHOE,

J. A. GRAVES.