

No. 610,344.

Patented Sept. 6, 1898.

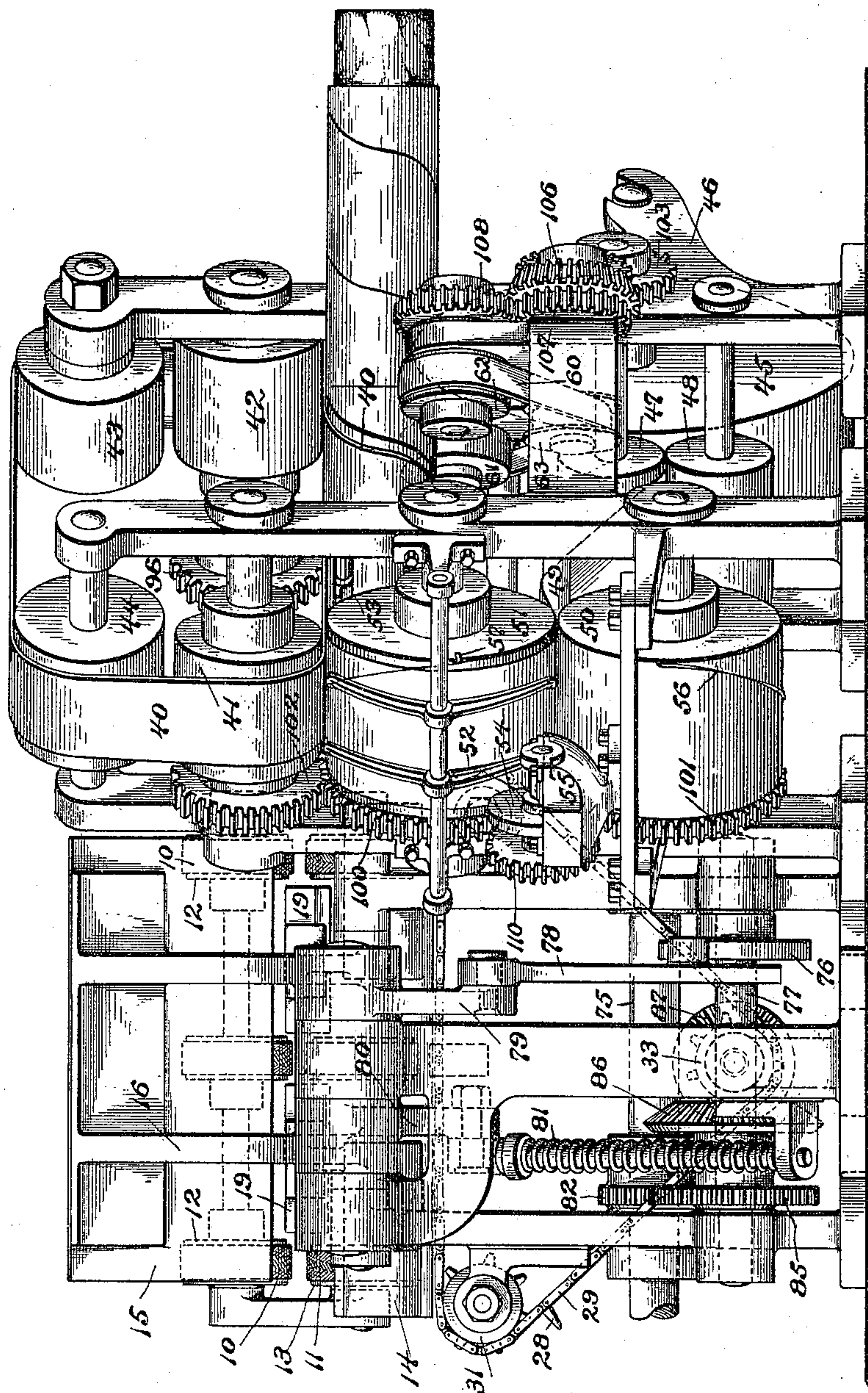
L. C. CROWELL.  
WRAPPING MACHINE.

(Application filed Dec. 31, 1897.)

(No Model.)

6 Sheets—Sheet 1.

Fig. 1.



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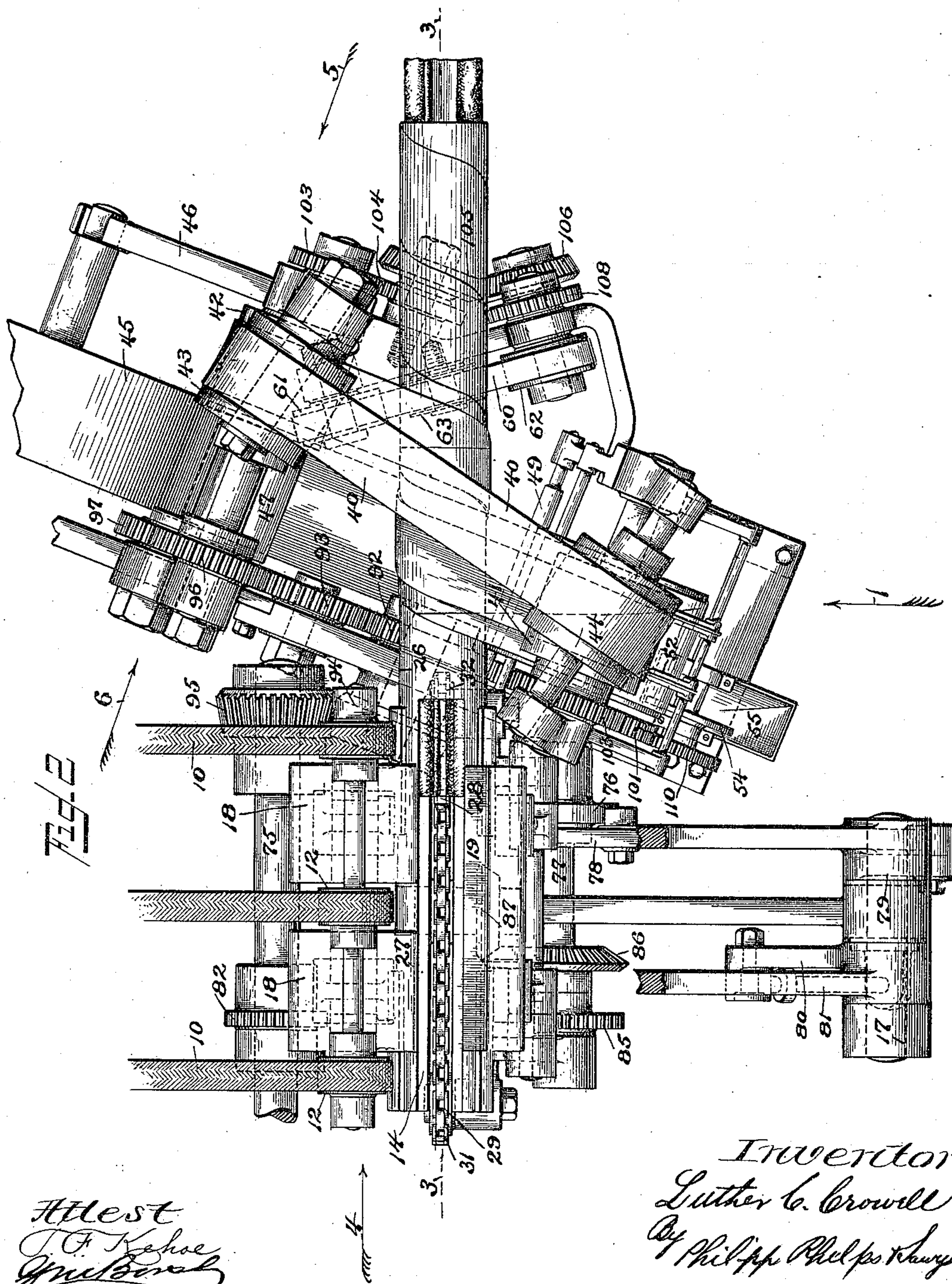
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6 Sheets—Sheet 2.



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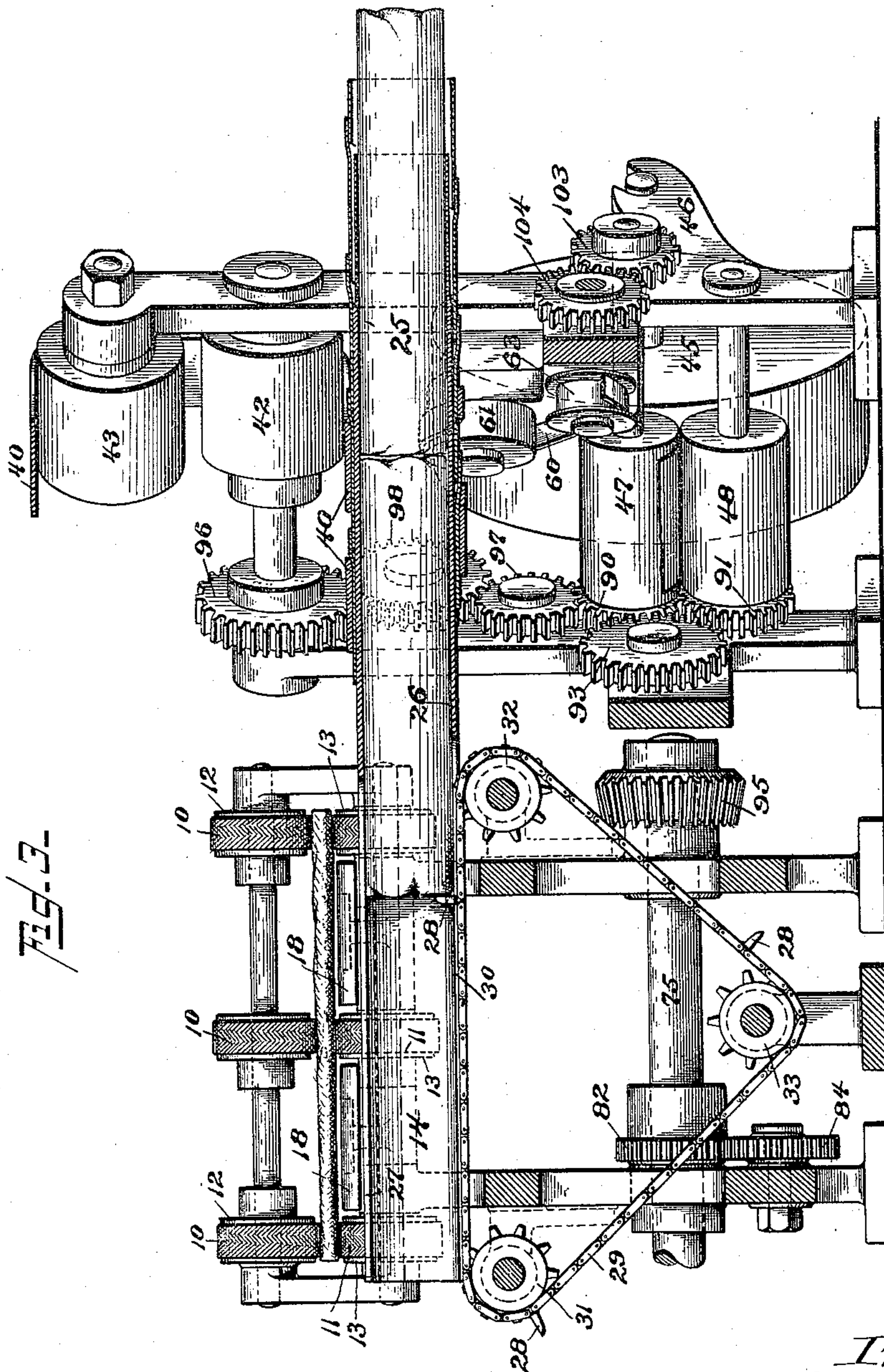


Fig. 3.

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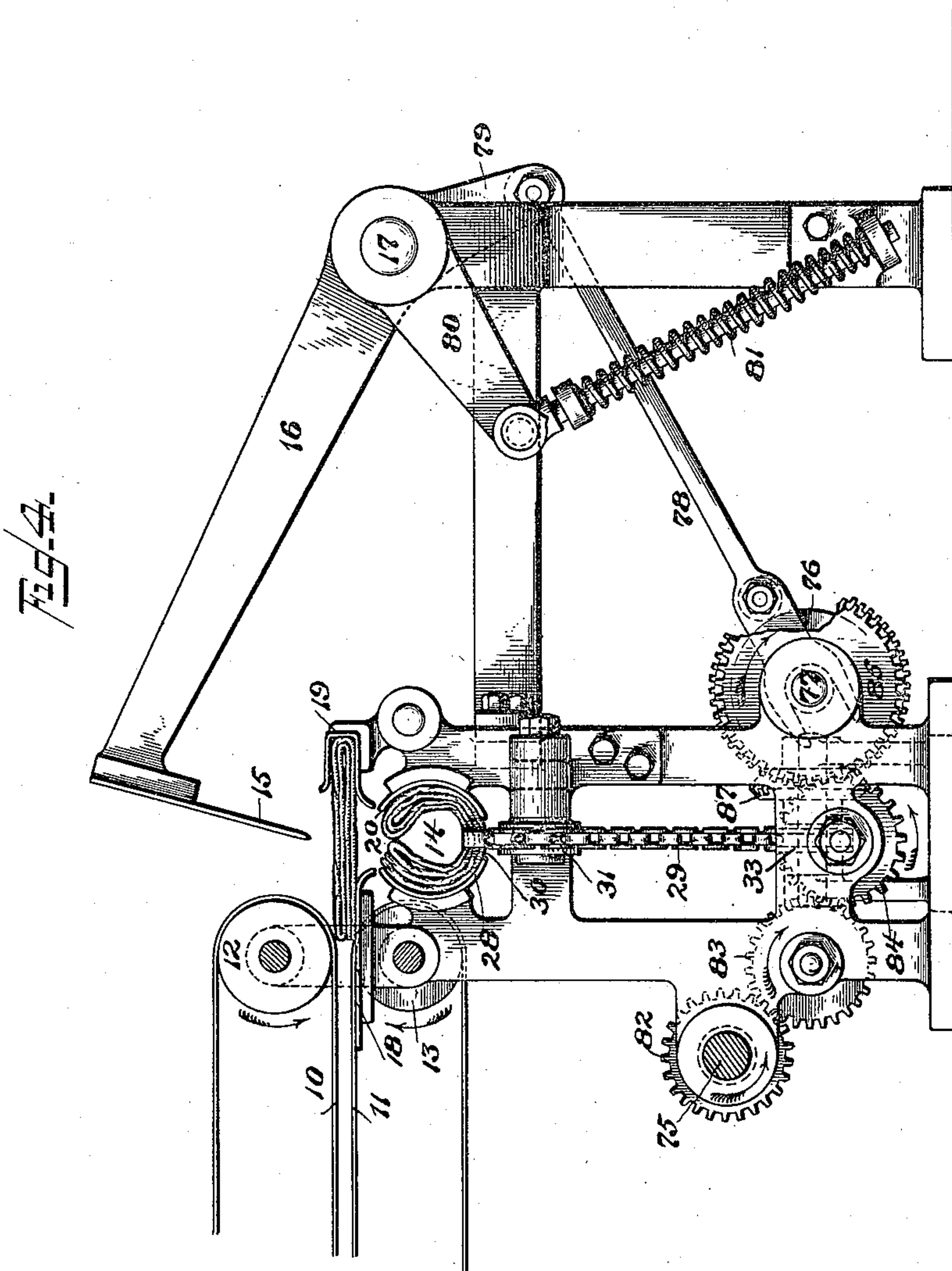
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6 Sheets—Sheet 4.



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**No. 610,344.**

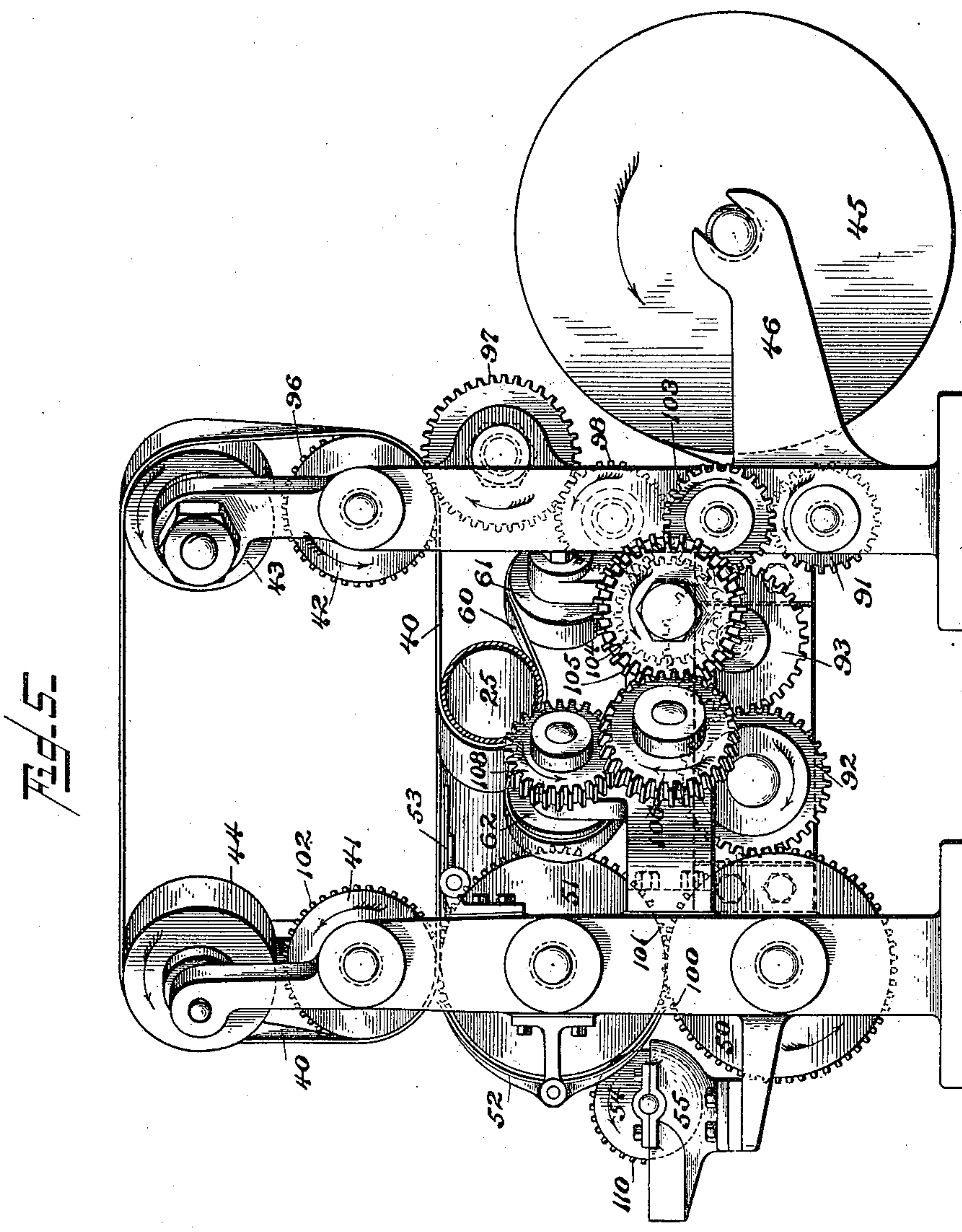
**Patented Sept. 6, 1898.**

**L. C. CROWELL.**  
**WRAPPING MACHINE.**

(Application filed Dec. 31, 1897.)

(No Model.)

**6 Sheets—Sheet 5.**



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Patented Sept. 6, 1898.

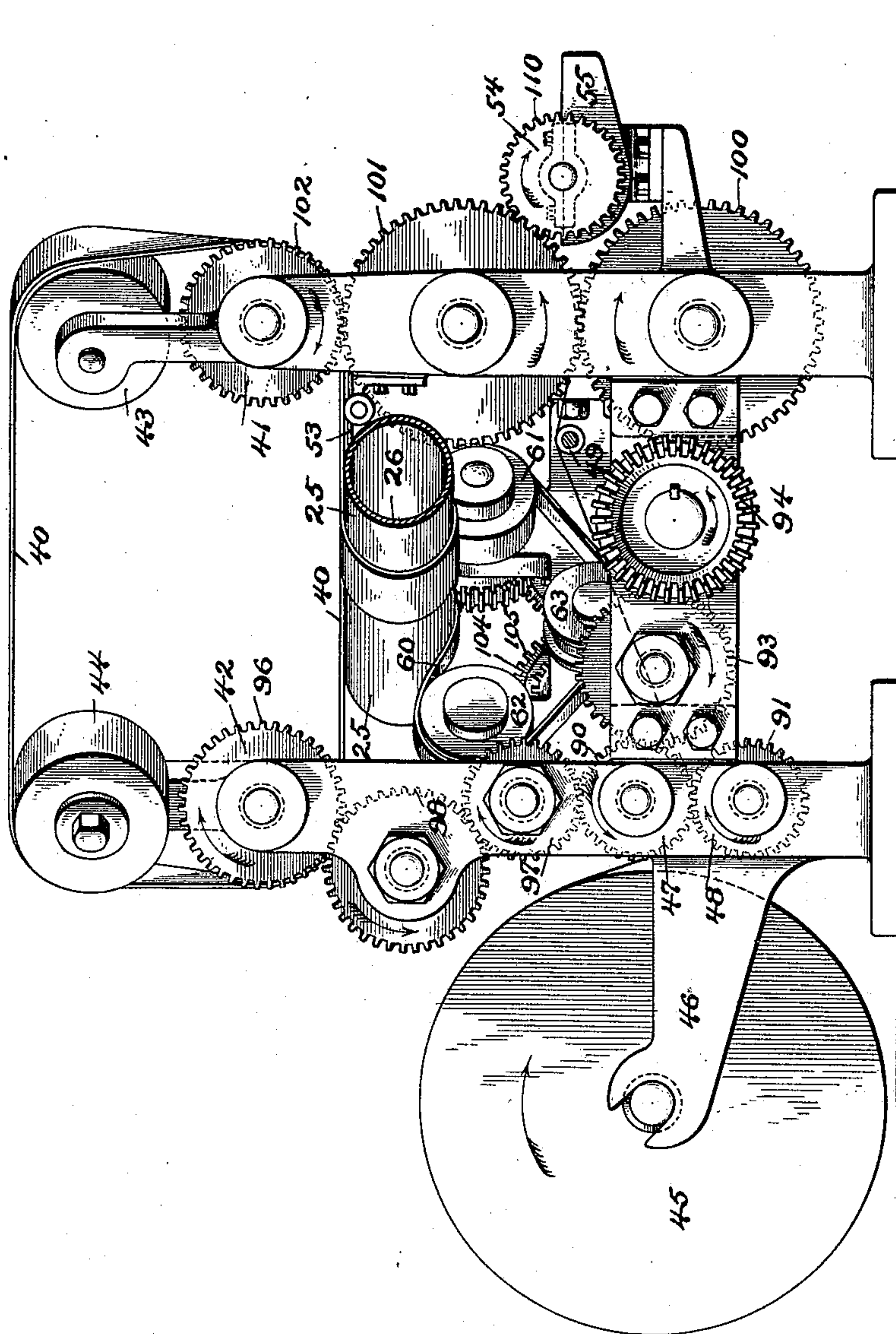
L. C. CROWELL.  
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(No Model.)

6 Sheets—Sheet 6.

Fig. 6.



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# UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,  
THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

## WRAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,344, dated September 6, 1898.

Application filed December 31, 1897. Serial No. 665,163. (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 Wrapping-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to machines of that class employed in wrapping newspapers and other publications or similar articles, and especially to machines whereby a succession of independent papers or other articles to be wrapped are advanced and enveloped in wrappers wound spirally about the successive papers as they are longitudinally advanced, the edges of successive layers or windings of wrapper overlapping and being secured by a line of paste applied by suitable pasting devices to one edge of the wrapper.

One of the objects of the present invention is to provide a mechanism by which wrapper-tubes for enveloping successive papers as they are longitudinally advanced are formed from independent wrappers, and especially to form such independent wrappers into spirally-wound wrapper-tubes about the papers. By thus forming the wrapper-tubes from independent wrappers I avoid the necessity of severing the wrappers between successive papers after wrapping, as is necessary when a continuous wrapper-web is formed into a continuous spirally-wound wrapper-tube about the papers, and I am thus enabled to inclose the papers in wrapper-tubes of considerably less length than the papers. It will be understood, however, that the invention is not to be limited to forming the wrapper-tubes from independent wrappers, but that I may employ a continuous wrapper-web to form a continuous spirally-wound wrapper-tube about the papers, suitable means being provided for afterward severing the wrapper-tube at or near the junction between successive papers.

In a machine constructed to embody the invention in the preferred form the papers are advanced in succession longitudinally through a tubular former, and the wrapper-tubes are formed upon said tubular former

and advanced longitudinally thereon, so that successive wrapper-tubes will be engaged by the successive papers as they are advanced from the end of the tubular former, and thus delivered from the former with and inclosing the papers. The wrappers are advanced for wrapping preferably in the form of a continuous web, which in a machine constructed to carry out that feature of the invention of forming the wrapper-tubes from independent wrappers is severed to form independent wrappers before reaching the former, the wrappers being advanced to the former at an angle and the web being cut to form the independent wrappers on lines extending diagonally of the web and at an angle to the former. The wrappers being thus advanced at an angle to the tubular former are wound spirally about the former and advanced longitudinally thereon, preferably by means of a driven forming-belt which turns spirally about the wrapper-tube former, so that the wrappers, being entered between the forming-belt and the former, will be advanced spirally about the former by the belt to form spirally-wound wrapper-tubes.

The papers may be advanced to and through the tubular former by any suitable mechanism; but I preferably provide a receiving-pocket having a longitudinal slot, through which the papers are successively folded into the pocket by a reciprocating folding-blade, and from which pocket they are advanced into the tubular former, preferably by means of pushers engaging the rear ends of the successive papers. As the papers after having been thus folded and fed through the former are advanced from the end of the former the tendency is for them to unfold or expand as they leave the former. Consequently a wrapper-tube advanced about the former and beyond the end thereof in time with the paper as it is advanced from within the former will be engaged by the paper as it expands after leaving the former and the paper and the wrapper-tube will be delivered together, the paper inclosed by and fitting snugly within the wrapper.

As a full understanding of the invention can best be given by a detailed description of a preferred construction embodying all the



features of the invention, such a description will now be given, in connection with the accompanying drawings, showing such a preferred construction, and the features forming the invention will afterward be specifically pointed out in the claims.

In said drawings, Figure 1 is a side elevation of a wrapping-machine embodying the invention, looking in the direction of arrow 1 of Fig. 2. Fig. 2 is a plan view. Fig. 3 is a section on line 3 of Fig. 2. Fig. 4 is an end view looking in the direction of arrow 4 in Fig. 2. Fig. 5 is an elevation of the other end of the machine, looking in the direction of arrow 5 in Fig. 2; and Fig. 6 is a view looking in the direction of arrow 6 in Fig. 2, showing the opposite side of the mechanism for applying the wrapper from that shown in Fig. 5.

Referring to the drawings, the papers to be wrapped having been folded to the proper size are advanced in succession for wrapping between feeding-tapes 10 and 11, turning on rolls 12 and 13, the papers being advanced from the rolls 12 and 13 over a paper-receiving pocket 14, into which they are folded by means of a reciprocating folding-blade 15, carried by an arm 16 on a rock-shaft 17, and from which pocket they are advanced longitudinally of the pocket for wrapping. A supporting-guide 18 is preferably provided for the papers as they are advanced from the rolls 12 13, having a stop 19 for engaging the papers when they have been advanced in proper position over the pocket 14, and having an opening 20, extending parallel with the folding-blade 15, through which the papers are folded by said blade into the pocket. The folding-blade and pocket preferably extend transversely to the direction in which the papers are advanced by the tapes 10 and 11, so that the papers as they are advanced from the rolls 12 13 will be folded into the pocket and then advanced transversely to the direction in which they are fed by the tapes 10 and 11.

The pocket 14 registers with a tubular wrapper-former 25, through which the papers after having been folded into the pocket are advanced to be inclosed in wrappers, as hereinafter described. This former 25 is preferably formed of a cylindrical tube 26, which is preferably extended to form the receiving-pocket, the portion forming the receiving-pocket having a longitudinal slot 27 for receiving the papers. The papers after being folded into the receiving-pocket are advanced longitudinally thereof and through the tubular former 25 by pushing-lugs 28, carried by a sprocket-chain 29, which lugs extend through a slot 30 in the part of the tube 26 forming the receiving-pocket to engage the rear ends of the successive papers in the pocket. The sprocket-chain 29 turns on sprocket-wheels 31 and 32, between which the pushing-lugs 28 travel through the slot 30 and about a driving sprocket-wheel 33.

The pushing-lugs 28 are arranged at suitable distances apart and the sprocket-chain is driven at the proper speed for causing the lugs to engage the rear end of successive papers as they are folded into the pocket 14 and to advance them longitudinally of the pocket and into the former 25. Each paper after being advanced by the lug engaging its rear end beyond the path of the lugs rests in that position until engaged by the succeeding paper, by which it is then further advanced through the former 25 and finally delivered from the end of the former inclosed in its wrapper, as hereinafter described.

The wrappers are formed into wrapper-tubes about the tubular former 25 and advanced on the former and from the end thereof in time so that successive wrapper-tubes will meet successive papers as the latter are advanced from within the former. As the folded papers are advanced from the end of the former they tend to unfold or expand as they leave the former, so that when a paper and wrapper-tube are advanced from the former together the paper will expand, so as to engage and fit snugly within the wrapper-tube.

The wrappers are preferably formed about the former 25 substantially as follows: The wrappers are advanced about the former to form wrapper-tubes by means of an endless wrapper-forming belt 40. The belt 40 runs from a driving-roll 41 to the former, about which it is turned spirally and from which it extends on the other side of the former to a second driving-roll 42, turning on said driving-roll, and running to a guiding-roll 43 above the roll 42, thence to a second guiding-roll 44 above the roll 41, and thence back to the driving-roll 41, the axes of the guiding-rolls 43 and 44 being set at an angle relatively to the axes of the rolls 41 and 42 to properly guide the belt in its movement from the roll 42 to the roll 41 and cause it to be maintained in proper position on said rolls to turn spirally about the former in its run from the roll 41 to the roll 42. The wrappers are fed to the former and entered between the former and the forming-belt 40 to be advanced and wound about the former by the forming-belt to form a wrapper-tube, the forming-belt also acting, by reason of its spiral movement, to advance the wrapper and the formed wrapper-tube longitudinally on the former out of the path of the succeeding wrappers as they are advanced to the former to be wound thereabout by the forming-belt. The wrappers are preferably advanced in the form of a continuous web from a web-roll 45, carried by arms 46 on the frame, the web passing between feeding-rolls 47 and 48, over a guide-roll 49, and between feeding-rolls 50 and 51, by which the web is severed into independent wrappers. The wrappers are then turned up around the feeding-roll 51 by means of curved guides 52 and advanced over guides 53 beneath the forming-belt 40 to the former at an angle corresponding to the angle at



which the forming-belt runs to the former, and entered successively between the former and the forming-belt, and then advanced spirally about the former by the forming-belt to form spirally-wound wrapper-tubes, the edges of the wrappers overlapping and being secured by a line of paste applied at one edge of the wrappers, as by means of a paste-roll 54, rotating in a fountain 55. For the purpose of severing the wrapper-web into independent wrapper lengths, the feeding-roll 50 is provided with a diagonal cutting-blade 56, coacting with a corresponding slot 57 in the roll 51 to sever the web as it passes between the rolls 50 and 51 on lines diagonal to the length of the web and at right angles to the former 25. The rolls 50 and 51 are of such diameter that at each rotation a length of the wrapper-web will be advanced sufficient to form a wrapper-tube of the desired length. The successive wrapper-tubes will thus be formed from successive independent wrappers, each of which will be wound spirally about the former to form a spirally-wound wrapper-tube and advanced thereon to make way for the next wrapper. For the purpose of aiding in advancing the formed wrapper-tubes longitudinally on the former after they have been advanced beyond the forming-belt 40 I preferably provide a feeding-belt 60, running from a roll 61, beneath the former, and to a driving-roll 62, from which it returns over a flanged guide-roll 63 to the roll 61, the rolls 61 and 62 being positioned so that the belt will run in feeding contact with the wrapper-tubes as they are advanced from the feeding-belt 40, so as to advance them spirally toward the end of the former after they have been advanced beyond the feeding-belt 40. With the wrapper-forming mechanism thus operating to form wrapper-tubes successively about the former and to advance them longitudinally thereon, and with the paper-feeding devices advancing the papers successively within the former, and in proper time with relation to the operation of the wrapper-forming devices, as each paper is advanced from the end of the former a wrapper-tube will be advanced to be engaged by the paper as the latter expands on leaving the former, and then by the further movement of the paper the wrapper-tube will be advanced with the paper, and the paper with the wrapper enveloping the same will be delivered together from the end of the former.

The former is preferably made slightly smaller outside for a short distance from its end, as shown in Fig. 3, than at the part about which the wrapper-tubes are formed, so that the wrapper-tubes may be more readily drawn off from the former by the papers.

It will be seen that a machine may be constructed according to the invention to wrap papers in wrapper-tubes of any desired length relatively to the papers—as, for example, to wrap the papers in wrapper-tubes of a less length than the papers, as in the machine

shown in the drawings—it being necessary only that successive wrapper-tubes shall be advanced from the end of the tubular former in time to be engaged by the successive papers when the two are in proper relation to each other. When the machine is constructed to inclose the papers in wrapper-tubes of a less length than the papers, as in the drawings, the wrappers will be advanced on the tubular former at a speed less than the average speed of the papers as they are advanced within the tubular former. If, however, it were desired to wrap the papers in wrapper-tubes of greater length relatively to the papers, as of a length equal to that of the papers or greater than that of the papers, this could be accomplished, as will be readily understood, by causing the wrapper-forming devices to operate at a higher relative speed and to form longer wrapper-tubes, the rolls 50 and 51 being for this purpose made of a larger diameter; or, again, the machine shown might be employed for wrapping shorter papers; but for this purpose a sprocket-chain having the pushing-lugs 28 set closer together and driven at a correspondingly slower speed would preferably be used, so as to lessen the intervals between the successive movements of the papers as they are advanced in the former.

The various moving parts of the machine are driven from the driving-shaft 75 as follows: The shaft 17 is rocked for reciprocating the folding-blade 15 by means of a cam 76, carried by a shaft 77, engaging a cam-roll on a pitman 78, pivoted to an arm 79, carried by the shaft 17, and having its other end forked to extend over and be guided by the cam-shaft 77. The shaft 17 also carries an arm 80, to which is connected a spring 81 for rocking the shaft to return the folding-blade after it has been moved on its forward movement by the cam 76. The cam-shaft 77 is driven from a gear 82 on the driving-shaft 75 through intermediates 83 and 84, the intermediate 84 meshing with the gear 85 on the cam-shaft. The driving sprocket-wheel 33 is driven by a bevel-gear 86 on the cam-shaft 77, which meshes with a bevel-gear 87 on the shaft of the sprocket-wheel. The feeding-rolls 47 and 48 carry intermeshing gears 90 and 91, respectively, and are driven from a gear 92 through an intermediate 93, meshing with the gear 90, the gear 92 being carried by a shaft which also carries a bevel-gear 94, which is driven by a bevel-gear 95 on the driving-shaft 75. The shaft of the belt-feeding roll 42 carries a gear 96 and is driven from the gear 90 through intermediates 97 and 98, the latter of which meshes with the gear 96. The feeding and cutting rolls 50 and 51 carry intermeshing gears 100 and 101 and are driven by the gear 92, which meshes with the gear 100. The belt-feeding roll 41 carries a gear 102, which meshes with and is driven by the gear 101. The driving-roll 62 for the auxiliary feeding-belt 60 is driven by a gear 103, car-



ried by the shaft of the feeding-roll 47, through gear 104, bevel-gears 105 and 106, and gear 107, the latter meshing with a gear 108 on the shaft of the driving-roll 62. The shaft of the  
5 pasting-disk carries a gear 110, meshing with the gear 101 of the feeding-roll 51.

It will be understood that I am not to be limited to the exact construction shown for the purpose of illustrating the invention and  
10 to which the foregoing description has been mainly confined, but that the invention includes various changes and modifications therein within the claims.

The term "paper" is used in the claims to  
15 include all articles for wrapping to which the invention may be found applicable.

What I claim is—

1. The combination of means for supporting and advancing a succession of independent  
20 papers, and means for winding a succession of independent wrappers spirally about the papers as they are advanced, substantially as described.

2. The combination of means for supporting and advancing a succession of independent  
25 papers, means for delivering the papers successively to said supporting and advancing means, and means for winding a succession of independent wrappers spirally about  
30 the papers as they are advanced, substantially as described.

3. The combination of means for supporting and advancing a succession of independent  
35 papers, means for winding a succession of independent wrappers spirally about the papers as they are advanced, and pasting devices for applying a line of paste to one edge of the wrappers for securing together the successive windings of the wrappers, substan-  
40 tially as described.

4. The combination of means for supporting and advancing a succession of independent  
45 papers, and means for advancing a succession of wrappers spirally about the advancing papers by engagement with the outer surface of the wrappers, substantially as described.

5. The combination of paper-feeding devices, and means for advancing a wrapper  
50 spirally about a paper by engagement with the outer surface of the wrapper, substantially as described.

6. The combination of paper-feeding devices, and a wrapper-tube-forming belt running  
55 spirally about the path of the papers as they are advanced by the feeding devices, substantially as described.

7. The combination of paper-feeding devices, a wrapper-tube-forming belt running  
60 spirally about the path of the papers as they are advanced by the feeding devices, and means for guiding a wrapper to the forming-belt at an angle to the direction in which the papers are advanced by the feeding devices  
65 to form a spirally-wound wrapper-tube, substantially as described.

8. The combination of paper-feeding de-

vices, means for severing a continuous wrapper-web in lines diagonal to the length of the web, means for advancing the independent  
70 wrappers thus formed at an angle to the direction of movement of the papers with their severed edges at right angles to the direction of movement of the paper, and means for  
75 winding the independent wrappers spirally about the papers, substantially as described.

9. The combination of a tubular former, means for winding a wrapper spirally about the former to form a wrapper-tube and for  
80 advancing the wrapper-tube longitudinally of the former, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are  
85 advanced from the end of the former, substantially as described.

10. The combination of a tubular former, means for winding a succession of wrappers spirally about the former to form wrapper-  
90 tubes and for advancing the wrapper-tubes successively longitudinally of the former, and means for advancing a succession of papers through the former to engage the wrapper-  
95 tubes as the successive papers and wrapper-tubes are advanced from the end of the former, substantially as described.

11. The combination of a tubular former, means for winding a succession of independent  
100 wrappers about the former to form wrapper-tubes and for advancing the wrapper-tubes longitudinally of the former, and means for advancing a succession of papers through the former to engage the wrapper-tubes as the  
105 successive papers and wrapper-tubes are advanced from the end of the former, substantially as described.

12. The combination of a tubular former, means for advancing a succession of independent  
110 wrappers to the former at an angle to the former, means for winding the wrappers spirally about the former to form wrapper-tubes and for advancing the wrapper-tubes successively longitudinally of the former, past-  
115 ing devices for applying a line of paste to the edge of the wrappers as they are advanced to the former, and means for advancing a succession of papers through the former to en-  
120 gage the wrapper-tubes as the successive papers and wrapper-tubes are advanced from the end of the former, substantially as described.

13. The combination of a tubular former, means for advancing a succession of papers  
125 through the former, means for forming a succession of wrapper-tubes on the former of less length than the papers to be wrapped, and for advancing the wrapper-tubes longitudi-  
130 nally of the former at a speed less than that of the papers to engage the papers as the successive papers and wrapper-tubes are advanced from the end of the former, substan-  
tially as described.

14. The combination of a stationary tubular former, means for winding a wrapper spi-  
rally about the former to form a wrapper-tube



and for advancing the wrapper-tube longitudinally of the former, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

15. The combination of a tubular former, means for advancing a wrapper about the former to form a wrapper-tube by engagement with the outer surface of the wrapper and for advancing the wrapper-tube longitudinally of the former, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

16. The combination of a tubular former, means for advancing a wrapper spirally about the former to form a spirally-wound wrapper-tube by engagement with the outer surface of the wrapper, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

17. The combination of a tubular former, a forming-belt running spirally about the former for advancing a wrapper about the former to form a wrapper-tube by engagement with the outer surface of the wrapper and for advancing the wrapper-tube on the former, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

18. The combination of a tubular former, a forming-belt running spirally about the former for advancing a wrapper about the former to form a wrapper-tube by engagement with the outer surface of the wrapper and for advancing the wrapper-tube on the former, means for advancing the wrapper-tube on the former beyond the forming-belt, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

19. The combination of a tubular former, a forming-belt running spirally about the former, means for guiding a wrapper between the former and the forming-belt at an angle to the former to form a spirally-wound wrapper-tube about the former, and means for advancing a paper through the former to engage the wrapper-tube as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

20. The combination of a tubular former, means for applying a succession of wrappers about the former to form wrapper-tubes and for advancing the wrapper-tubes longitudinally of the former, a paper-receiving pocket, means for advancing papers successively into the pocket transversely to the direction in

which they are fed from the pocket, and means for advancing the papers successively from the pocket and through the former to engage the wrapper-tubes as the successive papers and wrapper-tubes are advanced from the former, substantially as described.

21. The combination of a tubular former, a paper-receiving pocket, a folding-blade for folding a paper into the pocket, means for advancing the paper from the pocket and through the former, and means for applying a wrapper about the former to form a wrapper-tube and for advancing the wrapper-tube longitudinally of the former to engage the paper as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

22. The combination of a tubular former, a paper-receiving pocket, a folding-blade for folding a paper into the pocket, means for advancing the paper from the pocket and through the former, and means for advancing a wrapper-tube longitudinally on the former to engage the paper as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

23. The combination of a tubular former, a paper-receiving pocket, a folding-blade for folding a paper into the pocket transversely to the direction in which the paper is fed from the pocket, means for advancing the paper from the pocket and through the former, and means for applying a wrapper about the former to form a wrapper-tube and for advancing the wrapper-tube longitudinally of the former to engage the paper as the paper and wrapper-tube are advanced from the end of the former, substantially as described.

24. The combination of a paper-receiving pocket, a folding-blade for folding a paper into the pocket transversely to the direction in which the paper is fed from the pocket, means for advancing the paper from the pocket, and means for applying a wrapper about the paper as it is advanced from the pocket, substantially as described.

25. The combination of a paper-receiving pocket, means for folding the papers successively into the pocket transversely to the direction in which the papers are fed from the pocket, means for advancing the papers from the pocket, and means for applying a succession of wrappers about the successive papers as they are advanced from the pocket, substantially as described.

26. The combination of the tube 26 having a paper-receiving slot 27, reciprocating folding-blade 15, feeding devices for advancing through the tube papers which have been folded through the slot 27, and a forming-belt 40 running spirally about the tube, substantially as described.

27. The combination of the tube 26 having a paper-receiving slot 27, means for advancing papers successively into the tube 26 through the slot 27, feeding devices for ad-



vancing the papers through the tube, and a forming-belt 40 running spirally about the tube, substantially as described.

28. The combination with a former, of the  
5 forming-belt 40 running spirally about the former and turning on rolls 41 and 42 whose axes are set at an angle to the former and on rolls 44 and 43 whose axes are set at an angle to the axes of the rolls 41 and 42, respectively,  
10 substantially as described.

29. The combination with paper-feeding devices for advancing a succession of papers, of the forming-belt 40 running spirally about the path of the papers as they are advanced  
15 by said feeding devices and turning on rolls 41 and 42 whose axes are set at an angle to the direction of movement of the papers and

on rolls 44 and 43 whose axes are set at an angle to the axes of the rolls 41 and 42 respectively, substantially as described. 20

30. The combination with a former, of the forming-belt 40 running spirally about the former and turning on rolls 41 and 42 whose axes are set at an angle to the former, feeding and cutting rolls 50 and 51 whose axes are parallel with the axes of the roll 41, and guides 25 52, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

A. L. KENT,  
T. F. KEHOE.