No. 637,374. Patented Nov. 21, 1899.

L. C. CROWELL.

WRAPPING MACHINE.

(Application filed May 11, 1897.)

(No Model.) 6 Sheets—Sheet 1.

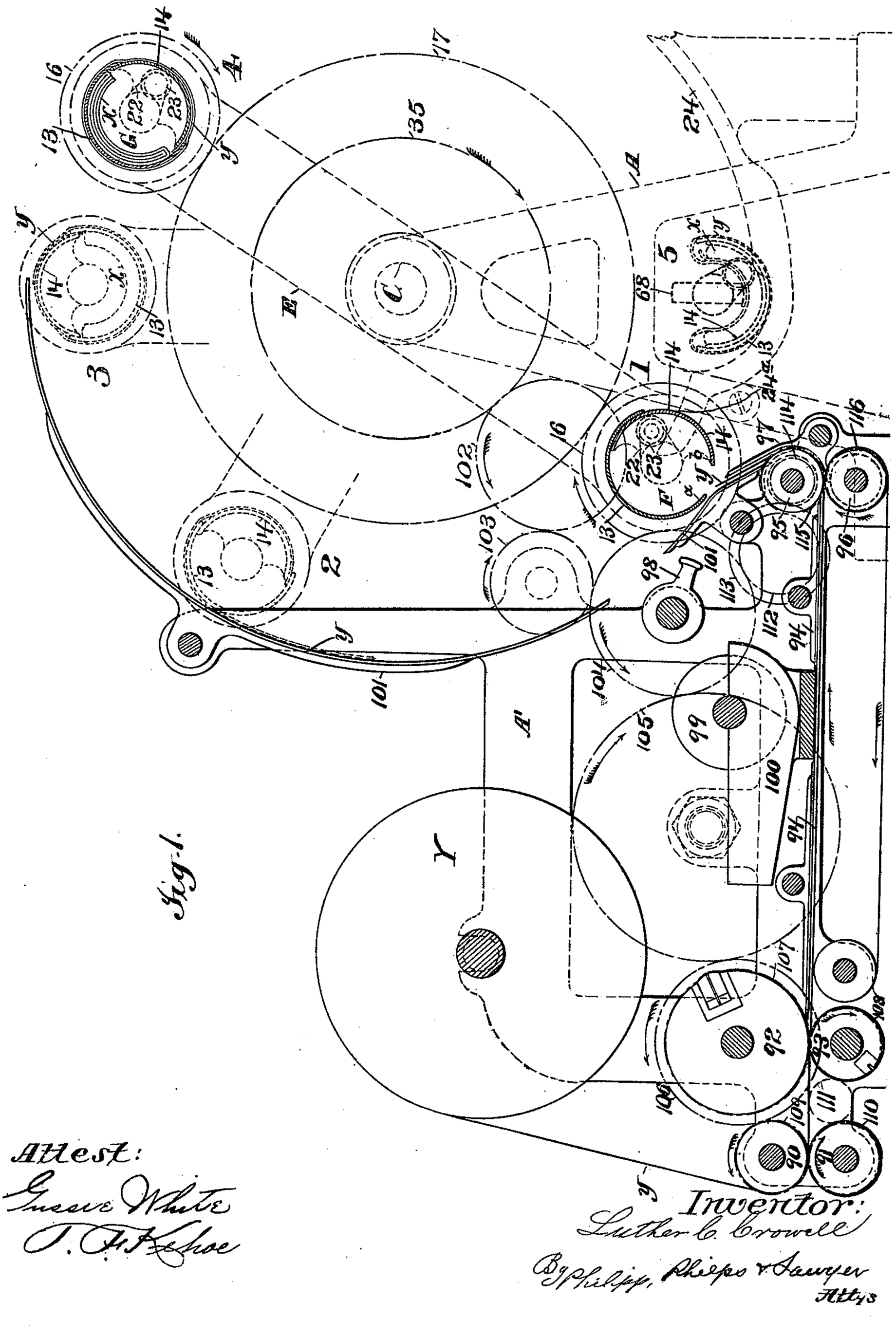

Fig. 1.

Attest:
Geneve White
T. A. Fehoe

Inventor:
Luther C. Crowell
By Philipp, Phipps & Sawyer
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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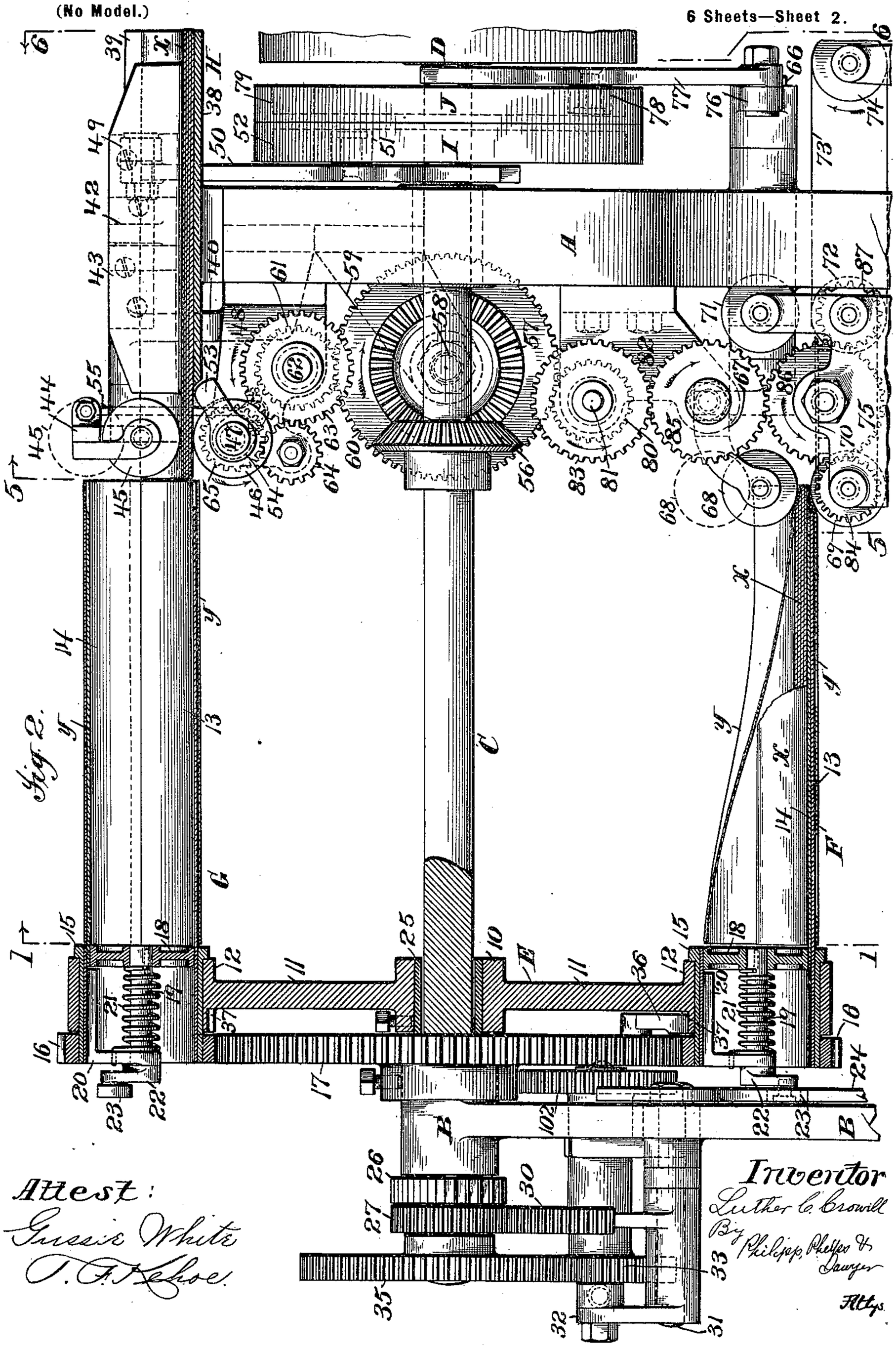

Fig. 2.

Attest:
Jessie White
J. A. Kehoe.

Inventor
Luther C. Crowell
By Philipp, Phelps & Dawyer
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 8.

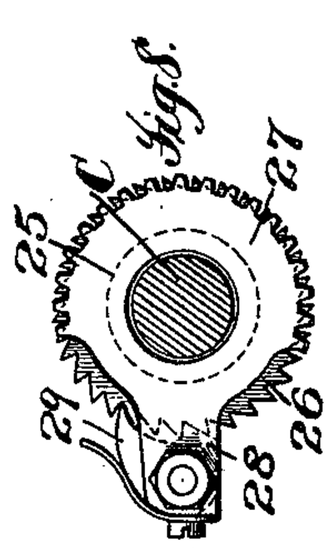

Fig. 9.

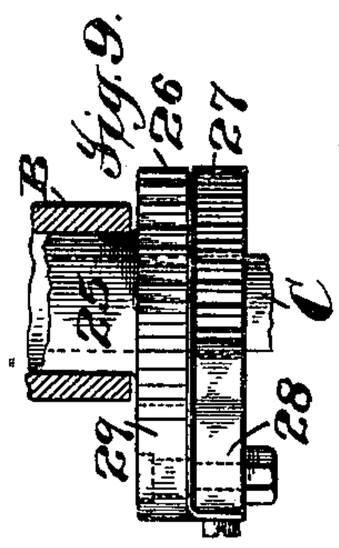

Fig. 10.

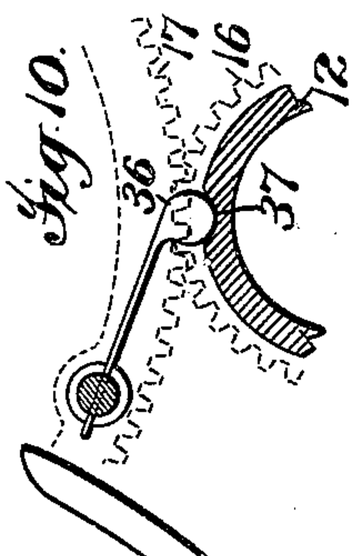

Fig. 3.

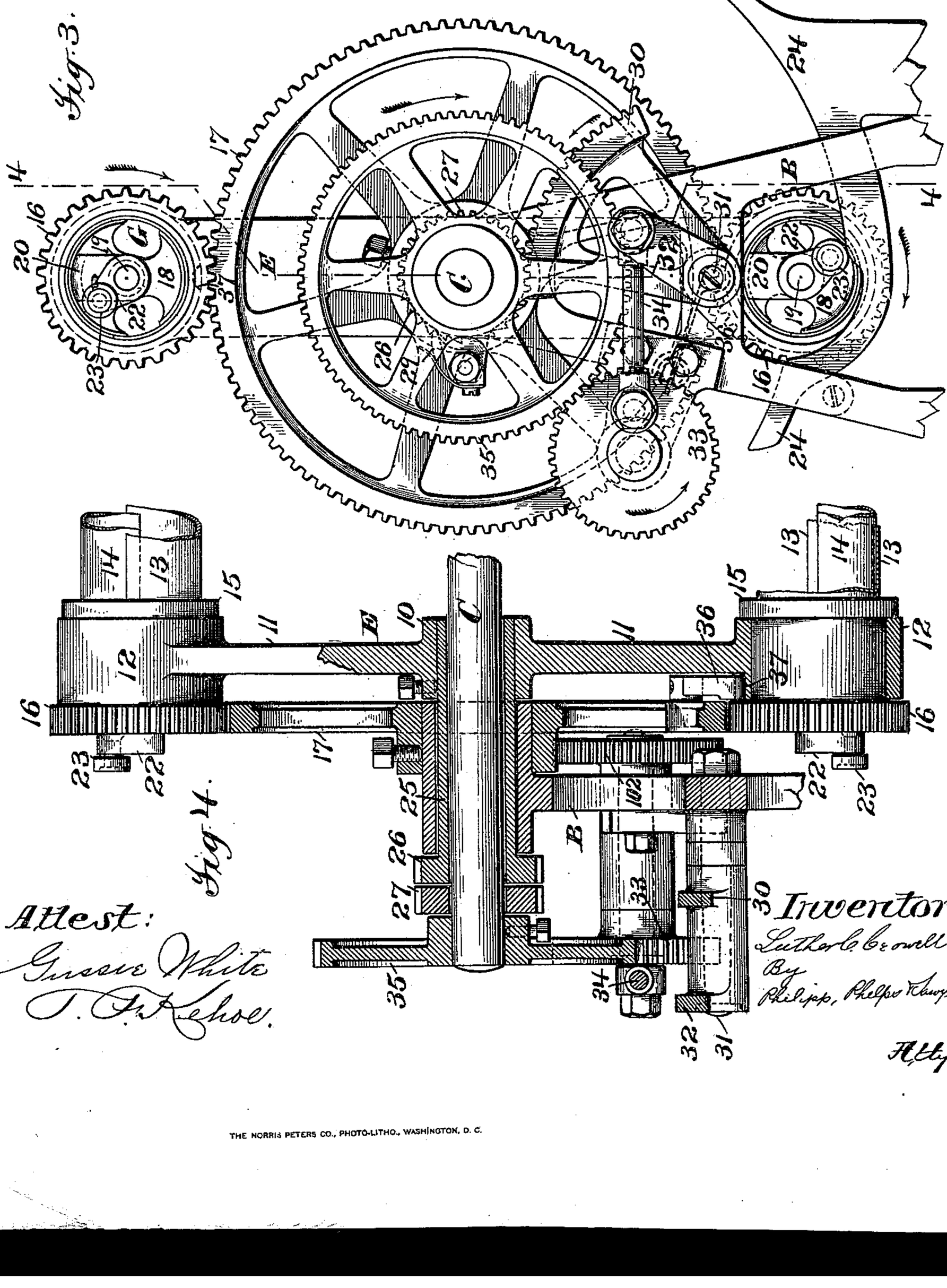

Fig. 4.

Attest:
Grosvenor White
T. G. Kehoe.

Inventor
Luther C. Crowell
By
Philipp, Phelps & Lawyer
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 6 Sheets—Sheet 4.

Fig. 11.

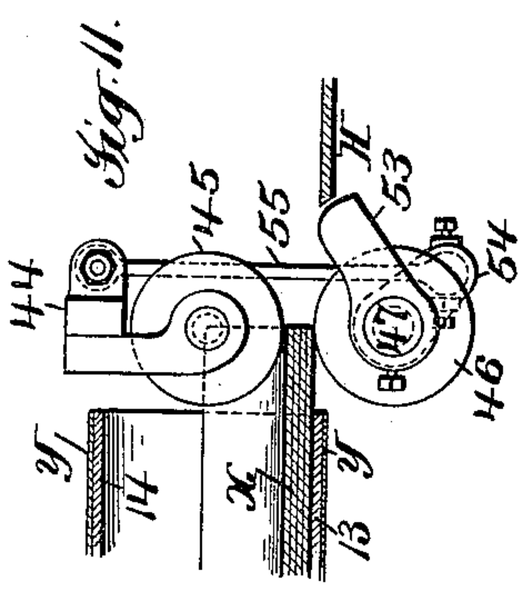


Fig. 12.

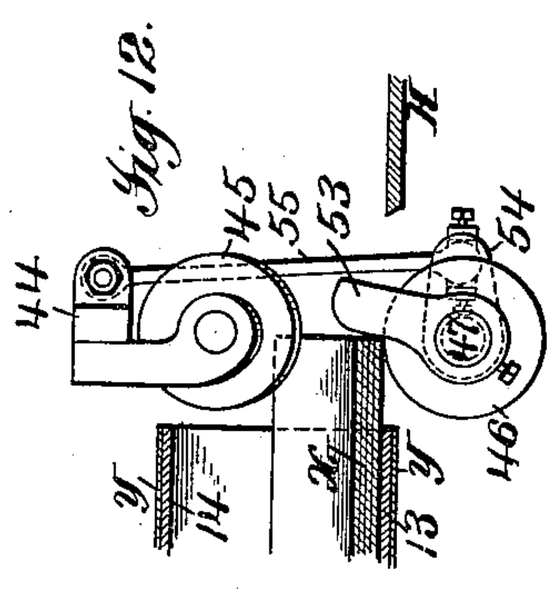


Fig. 13.

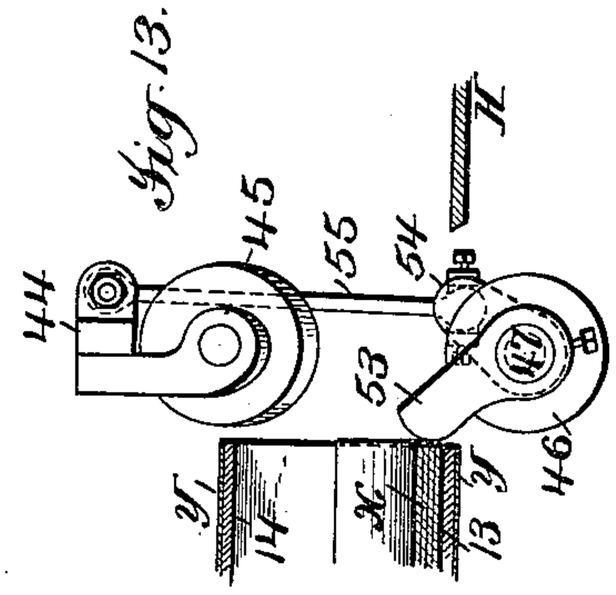
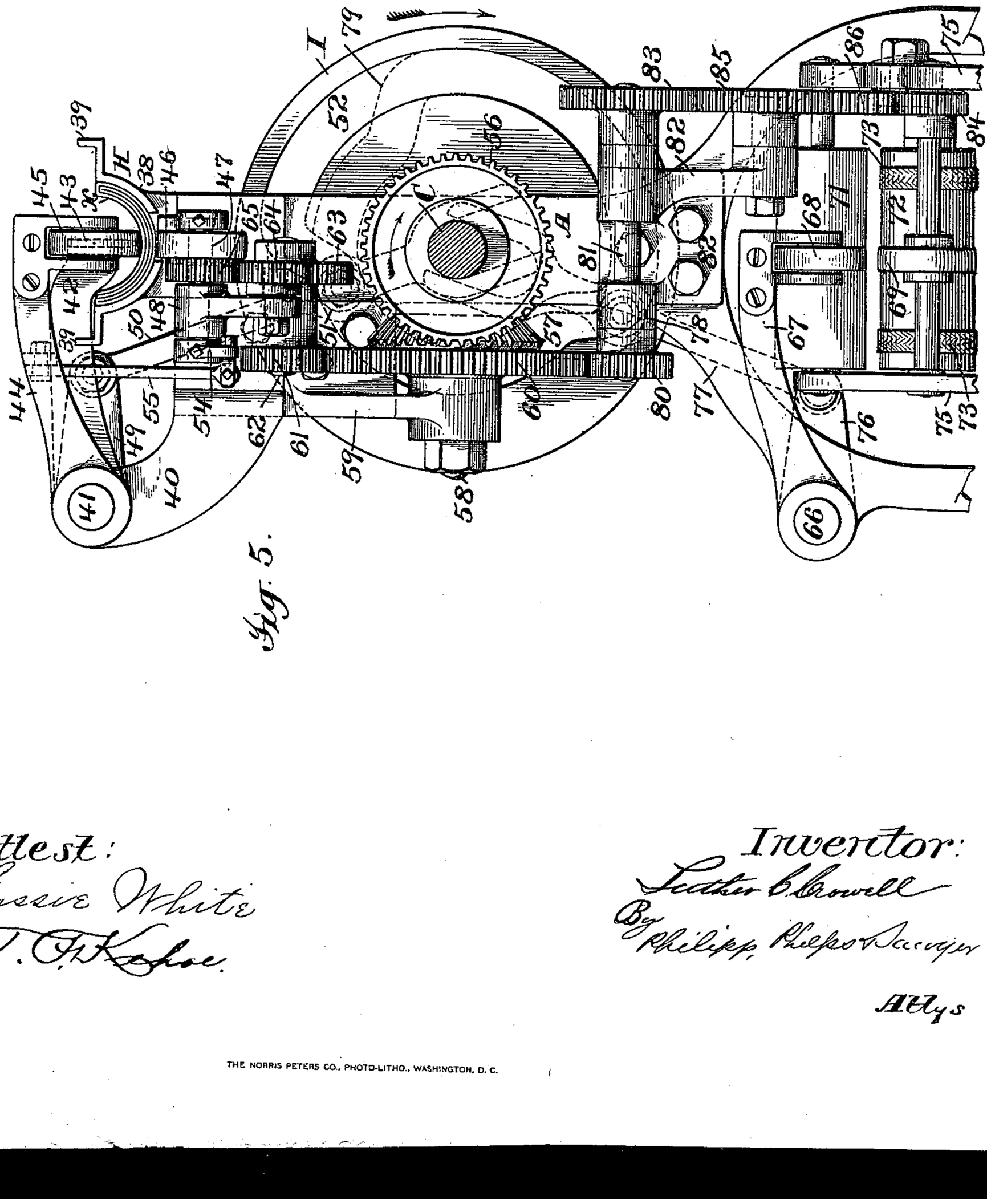


Fig. 5.



Attest:
Eugene White
T. G. Hoge.

Inventor:
Lester C. Crowell
By Philipp, Phelps & Sawyer
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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L. C. CROWELL.

WRAPPING MACHINE.

(Application filed May 11, 1897.)

(No Model.) 6 Sheets—Sheet 5.

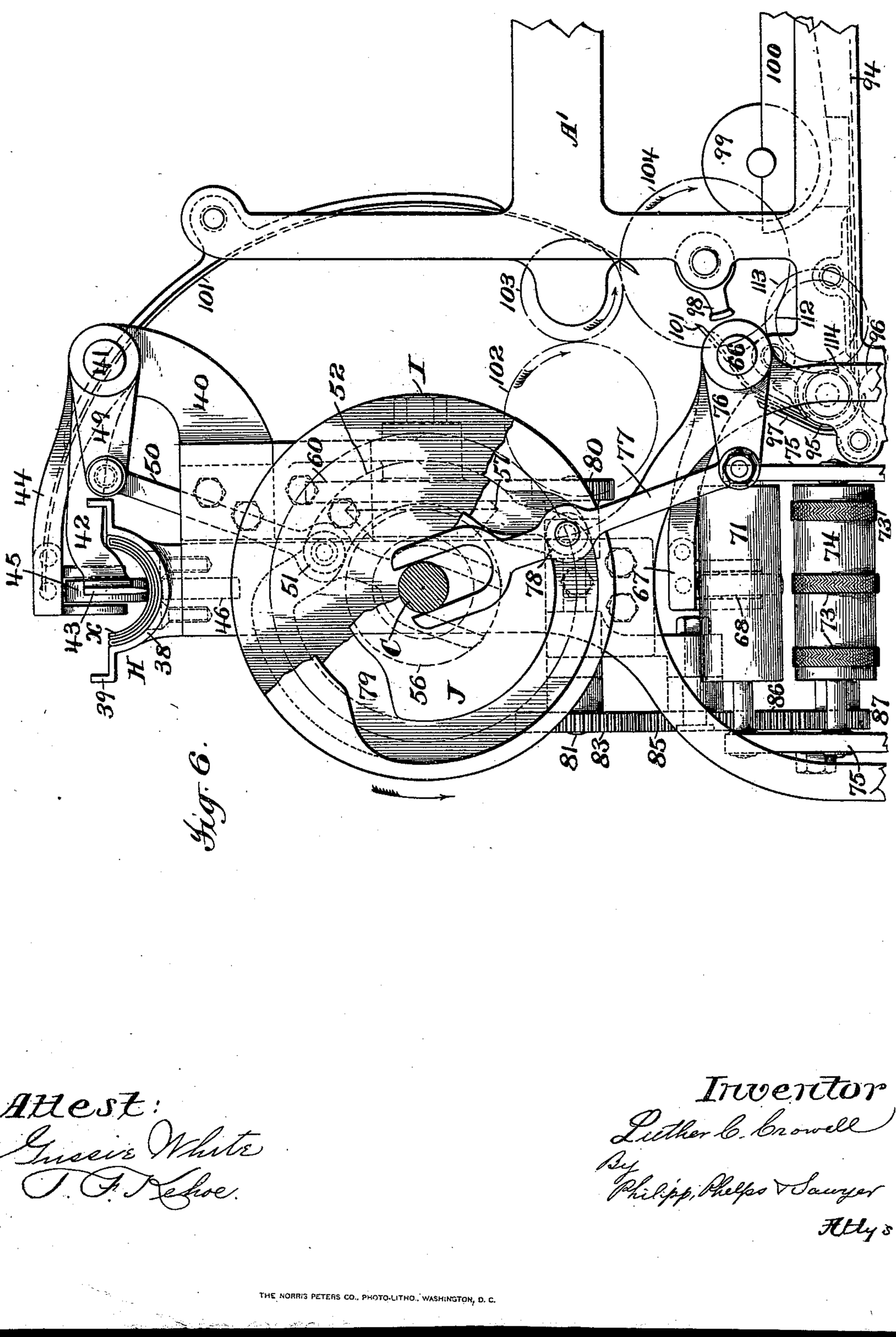

Fig. 6.

Attest:
Grace White
T. F. Kehoe.

Inventor
Luther C. Crowell
By Philipp, Phelps & Sawyer
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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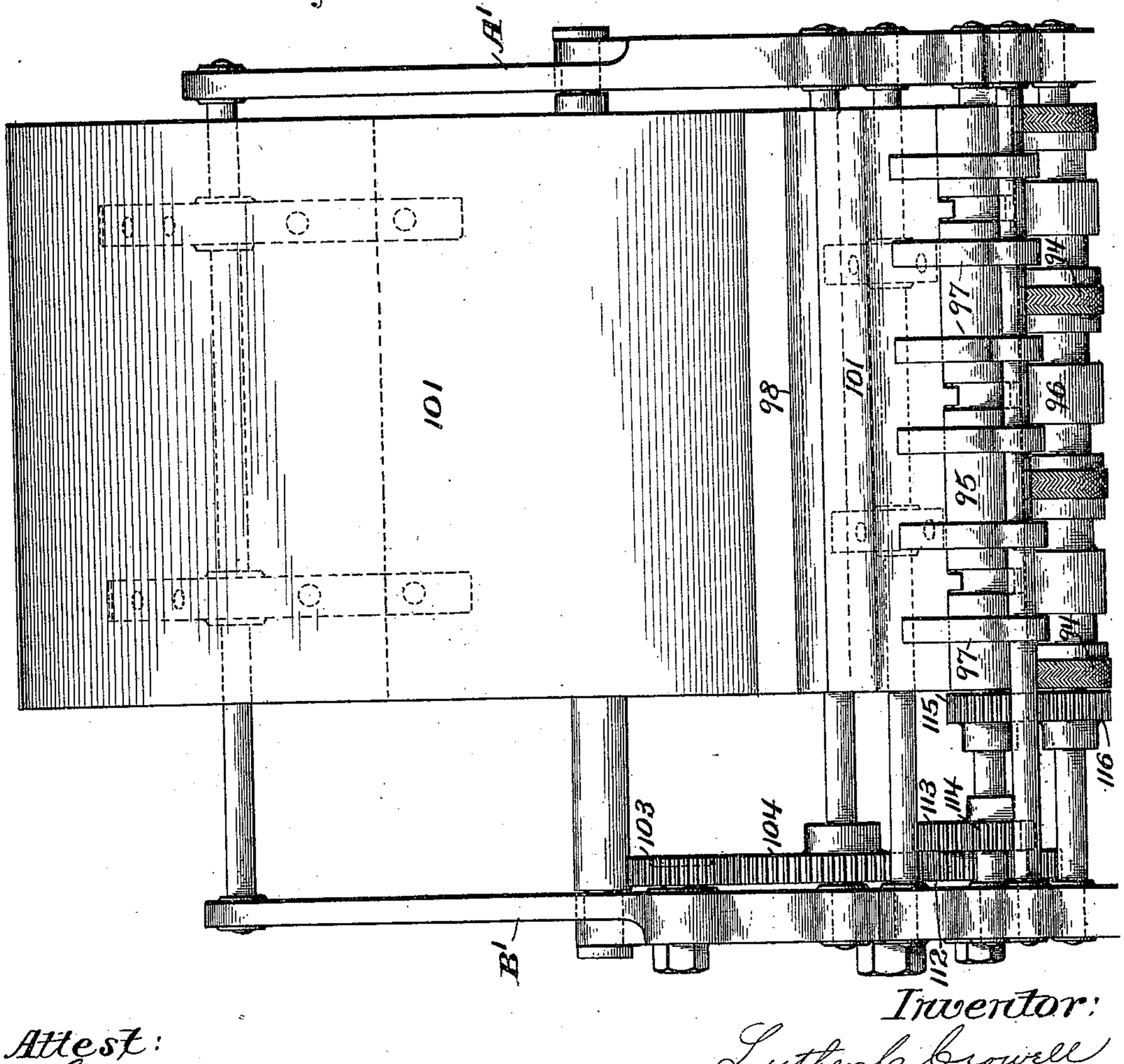
L. C. CROWELL.

WRAPPING MACHINE.

(Application filed May 11, 1897.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 7.



Attest:
Jessie White
T. F. Kehoe

Inventor:
Luther C. Crowell
By Philipp, Philps & Sawyer
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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. 637,374, dated November 21, 1899.

Application filed May 11, 1897. Serial No. 636,049. (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.

The object of the present invention is to provide an improved wrapping-machine and especially to provide an improved machine adapted for use in wrapping newspapers and other publications for mailing.

The method of operation employed in machines embodying the present invention consists in first forming a tube of the wrapper and then inserting into the tube thus formed the paper or other article to be wrapped, the wrapped article then being delivered from the machine in any suitable manner.

Constructions embodying the invention may be of widely-different forms, and the devices for forming the wrappers into tubes and inserting the papers or other articles therein may be of any suitable form and the wrapped paper may be delivered in any suitable manner.

In the preferred form of construction embodying the invention, however, I prefer to use a hollow collapsible core upon which the wrapper is first wound to form a tube and into which the paper is inserted endwise of the tube, the paper being bent or curved longitudinally and being preferably of such a width as to occupy about one-half of the tube, so that when the wrapped paper is delivered flat the portion of the wrapper extending about that part of the core not occupied by the paper will flatten out upon the paper and be drawn tightly upon it. The core is preferably divided longitudinally into two sections, one of which is movable and forms a sufficient part of the periphery of the core, so that when shifted so as to be brought within the other section the core will be collapsed sufficiently to permit the easy removal of the paper and wrapper and will be opened sufficiently for the admission of a feeding-roll, which is preferably used for advancing the wrapped paper endwise from the core in delivery.

Any suitable means may be used for securing the winding of the wrapper upon the core; but preferably the two sections of the core are arranged to seize the leading end of the wrapper as the latter is fed in and the movable section moved into position to complete the periphery of the core and the core is rotated so as to wind the wrapper upon it. The wrapping steps are performed successively, the wrapper first being preferably fed in and wound upon the core to form the wrapper-tube, the paper then inserted into the tube, and the core then collapsed and opened for the delivery of the wrapped paper endwise. The core or cores may be mounted and coact with the paper feeding and delivery mechanism in any suitable manner; but I prefer to employ a construction in which the position of the core is shifted so as to move it successively from the point where the wrapper is taken to a point where the paper is inserted into the tube and then to a third point, where the wrapped paper is delivered and the movement of the core is preferably in a circular path, the core being carried by a rotating support or carrier, although it will be understood that a reciprocating core may be used. This circular movement of the core is preferable, not only on account of simplicity of construction and the high speed secured, but also because it is thus possible to conveniently arrange for a plurality of cores, so that different steps of the process are carried out simultaneously by different cores, thus increasing largely the speed of the machine.

While, as above stated, the special object of the invention is to provide an improved wrapping-machine, certain features of the invention are applicable also in other constructions, such as tube-making machines, in which the tube is formed and delivered without the insertion of an article therein.

For a full understanding of the invention a detailed description of a construction embodying all the features of the invention in their preferred form will now be given in connection with the accompanying drawings, forming a part of this specification, and the

features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a longitudinal diagrammatic sectional elevation of a wrapping-machine on the line 1 of Fig. 2, showing the wrapping devices in several positions. Fig. 2 is a side elevation, partly in section, looking to the left in Fig. 1 and to the right in Fig. 6, with the parts in position for receiving and delivering the article to be wrapped. Fig. 3 is an end view of the mechanism for rotating the wrapper-forming devices, looking to the right in Fig. 2. Fig. 4 is a section on the line 4 of Fig. 3. Fig. 5 is a sectional elevation, taken on the line 5 of Fig. 2, looking to the right and showing the paper-feeding mechanism. Fig. 6 is a similar view on the line 6 of Fig. 2, looking to the left. Fig. 7 is a side view of the wrapper-feeding mechanism and wiper, looking to the right in Fig. 1, the wrapping mechanism being omitted. Figs. 8 and 9 are detail views of part of the mechanism for rotating the wrapper-forming devices. Fig. 10 is a detail view of the mechanism for holding the rotating parts. Figs. 11, 12, and 13 are detail views of the paper-feeding mechanism, similar to Fig. 2, but showing the parts in different positions.

Referring to the drawings, C is a horizontal driving-shaft, shown as driven by a pulley D and journaled in side frames A B. The shaft C supports at one end a rotating carrier E, mounted on said shaft, but arranged to rotate independently thereof. The carrier E consists of a hub 10, having two outwardly-extending arms 11, which terminate in sleeves 12. Carried by the sleeves 12 are two wrapper-cores F and G of the same construction, and which are made in two-part cylindrical sections 13 14, which during the wrapping operation form collapsible two-part cylinders. Each of the sections 13 at its outer end is fixed to a sleeve 15, which is mounted to rotate within the sleeve 12 of the carrier E, and as the carrier revolves is rotated by means of a gear 16, fast to the sleeve 15 and engaging a stationary gear 17, fixed to the frame B. Each of the sections 14 is mounted to rotate within the corresponding section 13, being carried by a disk 18, which is fixed to a short shaft 19, journaled in a bracket 20, which is fast to the section 13 of the core or to sleeve 15, as shown in Fig. 2. This shaft 19 is operated to rotate the section 14 into position so as to complete the cylindrical core for the forming of the wrapper-tube by a coiled spring 21, surrounding the shaft 19, one end of which spring is fast to the shaft 19 and the other end fast to the bracket 20, and the shaft 19 is rotated to rotate the section 14 within the section 13, so as to decrease the circumference of the core and release and loosen the wrapper at the time of delivery by a crank-arm 22, carrying a bowl 23, which engages a stationary cam 24, fixed to the frame B. The bowl 23 is also engaged by another stationary cam 24^a to partially open the core to permit the leading end of the wrapper to be entered between the edges *a b* of the sections of the core. The bowl 23 then leaving the cam 24^a, the section 14 will be rotated by the spring 21 into position to complete the cylindrical core, and the leading end of the wrapper will thus be grasped and held by the edges *a b* of the sections.

The carrier E, in which the cores F G are mounted, is rotated by the following means: Journaled in the frame B and surrounding the shaft C is a sleeve 25, one end of which has the carrier E fast to it and the other end of which is provided with a ratchet-wheel 26. To one side of the ratchet 26 and loosely mounted on the shaft C is a disk 27, having an arm 28, which carries a spring-pressed pawl 29, engaging the ratchet-wheel 26. The disk 27 has peripheral gear-teeth extending over about one-half of its circumference and engaging a segmental gear 30, mounted on a stud 31, fixed to the frame B, which gear 30 is reciprocated by means of a crank-disk 33 through a pitman 34, connected to a crank-arm 32 on the hub of the gear 30. The crank-disk 33 is mounted on a stud in frame B and has teeth on its periphery which mesh with a gear 35, fixed on the end of the driving-shaft C, the crank-disk 33 being so proportioned to the gear 35 that it receives two revolutions to one of the gear 35. When the crank-disk 33 has made one-half a revolution, therefore, it will, through pitman 34, crank-arm 32, segmental gear 30, and disk 27, carrying the pawl 29, have moved the ratchet-wheel 26 on the sleeve 25 one-half a revolution, and thus have caused the carrier E to move through one-half a revolution. During the completion of the full revolution of the crank-disk 33 the segmental gear 30 and the disk 27 will be thrown in the opposite direction, and the pawl 29, moving idly on the ratchet-wheel 26, the carrier E during the return movement of these parts will remain in the position to which it has been rotated, being held stationary by a spring-dog 36, fixed on the stationary gear 17 and engaging one of two notches 37, formed one in each of the sleeves 12 of the carrier.

The wrapper-web *y* is fed from a wrapper-roll Y, supported in two supplemental frames A′ B′ by feeding-rolls 90 and 91, from which it passes between cutting-rolls 92 and 93, which partly sever the wrapper into proper lengths and from which it passes between guides and feeding-tapes 94 to the accelerated feeding-rolls 95 and 96, which break the wrappers on the partly-severed lines and feed them between guides 97 to the wrapper-core, which is then in position to receive the wrapper. The leading end of the wrapper is fed between the edges *a* and *b* of the sections 13 and 14 of the core and is then gripped by the edges *a* and *b* as the section 14 is rotated into position to complete the cylindrical core, as before described. Paste is applied to the wrapper by a paster 98, which receives paste

from a paste-roll 99 in a paste-fountain 100. Mounted in the frames A' B' is a shield or wiper 101, extending concentrically about the shaft C, which acts to hold the wrapper against the core as the core is rotated and moved to position for receiving the paper or other article to be wrapped, whereby the wrapper is wound around the core and the pasted seam pressed. The wiper 101 is cut away a sufficient distance to allow the paster 98 to apply paste to the wrapper through the wiper.

The mechanism for feeding the paper into the wrapper-tube will now be described. At the top of the frame A is mounted a table H, upon which the papers *x* are fed in proper time by hand or any suitable mechanism, said table having a longitudinal depressed central portion 38, preferably substantially half-cylindrical in form and corresponding substantially to the form and inner diameter of the cores F G, and side guides 39 being provided for holding the papers in position on the table centrally over the depressed portion 38. The upper part of the frame A carries a bracket 40, in which is journaled a rock-shaft 41, carrying an arm 42, having a paper-bender 43, shown as consisting of a blade fixed to the arm, the arm being normally raised to hold the bending-blade above the table H, but actuated at the proper time to lower the blade to cause it to press the paper down and into the depressed portion 38 of the table H, as shown in Figs. 2, 5, and 6. The rock-shaft 41 also carries at its inner end another arm 44, which carries a feeding-roll 45. This arm is also normally raised to hold the roll 45 above the table H in the position shown in dotted lines in Fig. 2 and is rocked to carry the roll into position to feed the paper into the core at the time the bender 43 presses the paper into the depressed portion 38 of the table H, as shown in full lines in Figs. 2, 5, and 6. The feeding-roll 45 coacts with a driven roll 46, loosely mounted on a stud 47 in a bracket 48, to feed the paper into the core. The shaft 41, carrying the arms 42 and 44, is rocked by a crank-arm 49 and pitman 50, having a bowl 51 running in a cam-groove 52 in cam-disk I on the main driving-shaft C.

The feeding-rolls 45 and 46 are mounted beyond the plane of movement of the ends of the cores, so as to allow the cores to pass them as they are carried to the delivery position. In consequence of this the rolls do not feed the full length of the paper into the core, and to complete the feeding of the paper into the core beyond the plane of the rolls the stud 47 carries a finger 53, which extends beyond and preferably projects over the periphery of the roll 47, so that by rocking the stud the finger 53 may be moved to engage the rear edge of the paper between the rolls 45 and 46 and centrally of the depressed portion of the table H and to advance the paper for completing the feeding of the paper into the core. At the other end the stud 47 is provided with a crank-arm 54, connected by a link 55 to arm 44 of the rock-shaft 41. The finger 53 is thus operated to finish the feed of the paper, as the feed-roll is raised out of engagement with the paper. The different positions of these paper-feeding devices are shown in Figs. 2, 11, 12, and 13.

The feeding-roll 46 is driven as follows: Mounted on the driving-shaft C is a bevel-gear 56, meshing with a similar gear 57 on a stud 58, journaled in a bracket 59 on the frame A. This stud 58 carries a gear 60, meshing with a smaller gear 61, mounted on a stud 62, journaled in the bracket 48. The stud 62 carries also a larger gear 63, meshing with an intermediate gear 64, which engages a gear 65, fast on the feeding-roll 46. This train of gearing is timed so as to drive the feeding-roll 46 at a sufficient speed to feed the paper up to the point from which the finger 53 completes the feeding into the core before the roll 45 is moved out of contact with the paper.

The means for delivering the wrapped product is as follows: Journaled in the lower part of the frame A is a rock-shaft 66, which has on its inner end a rock-arm 67, carrying a delivery feeding-roll 68 and normally raised to hold the roll 68 in the position shown in dotted lines in Fig. 2 and operated to move the roll into the position shown in full lines in that figure for the delivery of the wrapped paper.

The delivery-roll 68 acts in conjunction with a driven roll 69 to nip the wrapper and inclosed paper and feed it over guides 70 to feeding-rolls 71 and 72, which also act to press the wrapped paper flat, and from which the paper is then carried off by tapes 73, running around the roll 72 and a roll 74. The rolls 69, 71, and 72 are mounted in a frame 75. The roll 69 engages the paper through openings cut in the ends of the sections 13 14 of the cores F G.

The shaft 66 is rocked to carry the delivery-roll 68 into and out of position to engage the paper by means of a crank-arm 76 on the outer end of the shaft 66 and pitman 77, carrying a bowl 78, running in a cam-groove 79 in a cam-disk J on the driving-shaft C. The roll 69 is driven from the gear 60, with which meshes a small gear 80, mounted on a stud 81, journaled in a bracket 82 on the frame A, which stud 81 also carries a larger gear 83, from which a gear 84 on the end of roll 69 is driven through intermediates 85 and 86. This train of gearing is timed so that the paper is fed out of the core before the roll 68 is moved out of contact with the paper. The feeding and tape roll 72 is driven from intermediate 86 by gear 87 on the end of the roll.

The wrapper feeding and pasting devices are driven as follows: The inner end of the stud carrying the crank-disk 33 carries a gear 102, engaging an intermediate 103, mounted on the frame B' and engaging a gear 104 on the shaft of paster 98. The cutting-rolls 92 93 are driven from gear 104 through an intermediate 105 and a gear 106 on the shaft of cutting-roll 92. The shaft of the cutting-roll

92 also carries another gear 107, which engages a gear 108 to drive the other cutting-roll 93. The feeding-rolls 90 91 carry intermeshing gears 109 and 110 and are driven by an intermediate 11, engaging gear 110 and gear 108 of the cutting-roll 93. The feeding-rolls 95 96 are driven from gear 104 through an intermediate 112, mounted on a stud which carries a larger intermediate 113, engaging a gear 114 on the shaft of roll 95, the rolls 95 and 96 being geared together by gears 115 and 116.

The operation of the machine is as follows: Suppose the core-carrier E, being rotated on the shaft C by means of the gear 35, crank-disk 33, segment 30, and disk 27, carrying the pawl 29, which engages the ratchet-wheel 26, has brought the core F to the position shown at 1 in Fig. 1. As the core F reaches the position shown at 1 the leading end of a wrapper will be entered between the edges *a b* of the sections 13 14 of the core, the section 14 having been moved to the position shown by the cam 24ª engaging bowl 23 of crank-arm 22. As the carrier E continues its movement from the position shown at 1 the bowl 23 will leave the cam 24ª and section 14 of the core will be rotated on its own axis by spring 21 to carry the edge *b* toward and past the edge *a* of the section 13, so as to grip and hold the wrapper between the edges *a b* of the sections. The movement of the carrier continuing, the core will be caused to rotate on its axis in the direction of the arrow in Fig. 1 by the gear 16 on the end of the core meshing with the stationary gear 17, mounted on frame B, and the wrapper being confined by the wiper 101 will be wound on the core to form a wrapper-tube. As indicated in dotted lines in Fig. 1, when the carrier E has moved the core F to position 2, the wrapper-tube has been partially formed, and when position 3 of Fig. 1 is reached the pasted seam has been closed and the wrapper-tube is fully formed upon the core and ready to receive the paper, a line of paste having been applied at the proper point by the paster 98. Position 3 of the parts is that in which the paper is fed into the core and wrapper, and the crank-disk 33 has then completed one-half a revolution and has, through its coöperating parts previously described, moved the carrier E one-half a revolution. The carrier is then held in this position by the dog 36 entering the notch 37 in the sleeve 12, while the crank-disk 33 completes its revolution and returns the segment 30, pawl-carrying disk 27, and pawl 29 to their original positions. While the carrier is thus held stationary, the paper is fed into the core F as follows: The bending-blade 43 and feed-roll 45, which have been in their raised position, are moved down onto the paper on the table H, forcing it into the depressed circular portion 38, and thereby giving to it the form necessary to enter the core, the cam I being so timed as to operate these parts immediately after the core has reached the receiving position. When the roll 45 reaches its lowest position, the paper will be advanced into the core by this roll coacting with the driven feeding-roll 46. When the rolls 45 and 46 have fed the paper as far as they can, the roll 45 and blade 43 will be raised, and the pushing-finger 53 will be moved by means of the crank-arm 54 and link 55 to engage and force the paper beyond the plane of the rolls 45 46 and the required distance within the core and the wrapper-tube. The operation of the carrier-rotating mechanism is now repeated, and the carrier moves another half-revolution, carrying the core, which has received the paper, to the delivery-point, (position 5 in Fig. 1,) when the carrier again stops to allow the paper to be delivered, the core at the other end of the carrier having meanwhile formed another wrapper and having stopped in position to receive another paper. As the core which has received its paper moves from position 3 to the delivery position 5 it is rotated on its axis in the same manner as when the wrapper-tube was being formed, and the bowl 23 of the crank-arm 22 on reaching the cam 24 will engage the cam, and the section 14 of the core will thus be prevented from rotating with the section 13, and as the section 13 continues to rotate this section will move around on the outer periphery of the section 14, carrying the paper and wrapper with it, thereby releasing the end of the wrapper from the edges *a b* and decreasing the circumference of the core, so as to allow the wrapper to collapse and to permit the wrapper and inclosed paper to be easily fed off the core together by the delivery-rolls 68 69, as shown in Figs. 1 and 2, the roll 68 being in its raised position as the core in its collapsed form passes under it and then being moved down into contact with the paper as the core reaches the proper position. The carrier remains stationary until the wrapped paper is fed out and a paper fed into the other core, and then begins another half-revolution, as before, during which the core F grips another wrapper and forms another tube, and the core E, having received a paper at position 3, moves to position for the delivery of the paper by the rolls 68 and 69.

It is to be understood that the invention as defined in the claims may be embodied in machines differing widely both in details of construction and in general design from the preferred construction shown in the drawings and to which the foregoing description has been mainly confined.

What I claim is—

1. In a machine for wrapping newspapers and other publications or similar articles, the combination with a hollow core and means for forming wrapper-tubes successively about the core, of feeding mechanism for advancing the articles successively into the core, and means for delivering the tubes and inclosed articles from the core, substantially as described.

2. In a machine for wrapping newspapers and other publications or similar articles, the combination with a hollow core and means for winding wrappers successively about the core to form wrapper-tubes, of feeding mechanism for advancing the articles successively into the core, and means for delivering the tubes and inclosed articles from the core, substantially as described.

3. In a machine for wrapping newspapers and other publications or similar articles, the combination with a hollow core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing the article into the core, means for bending the article longitudinally of the core while it is being fed into the core, and means for delivering the tube and inclosed article from the core, substantially as described.

4. In a machine for wrapping newspapers and other publications or similar articles, the combination with a hollow core and means for winding wrappers successively about the core to form tubes, of feeding mechanism for advancing the articles successively into the core, and means for feeding the tubes and inclosed articles longitudinally of the core for delivery, substantially as described.

5. In a machine for wrapping newspapers and other publications or similar articles, the combination with a hollow core and means for rotating said core to wind wrappers successively about the core to form tubes, of feeding mechanism for advancing the articles successively into the core, and means for delivering the tubes and inclosed articles from the core, substantially as described.

6. The combination with a hollow core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for feeding the tube and inclosed article longitudinally of the core for delivery, and means for moving the core between the article-feeding mechanism and the delivery mechanism, substantially as described.

7. The combination with a hollow core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for feeding the tube and inclosed article longitudinally of the core for delivery, and means for moving the core from the point where the wrapper is received to the delivery mechanism, substantially as described.

8. The combination with a hollow rotating core and a wiper coacting therewith to wind a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for feeding the tube and inclosed article longitudinally of the core for delivery, and means for moving said core from the point where the wrapper is received to the article-feeding mechanism and then to the delivery mechanism, substantially as described.

9. The combination with a hollow core, of means for advancing a wrapper to the core, feeding mechanism for advancing an article into the core, means for moving the core from the wrapper-feeding mechanism to the article-feeding mechanism, means for rotating the core as it moves from the wrapper-feeding mechanism to the article-feeding mechanism, a wiper extending between the wrapper-feeding mechanism and the article-feeding mechanism coacting with the rotating core to wind the wrapper about the core to form a tube, and means for delivering the tube and inclosed article from the core, substantially as described.

10. The combination with a hollow core carried by a revolving carrier, means for rotating said core, a wiper extending concentrically to the path of the core and coacting with the rotating core to wind a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, and means for delivering the tube and inclosed article from the core, substantially as described.

11. The combination with a core carried by a revolving carrier, means for rotating said core, a wiper extending concentrically to the path of the core and coacting with the rotating core to wind a wrapper about the core to form a tube, feeding mechanism for advancing an article into the tube, and means for delivering the wrapped article, substantially as described.

12. The combination with a hollow collapsible core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, and means for collapsing the core for delivery, substantially as described.

13. The combination with a hollow collapsible core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for collapsing the core, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

14. The combination with a hollow collapsible core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for bending the article longitudinally of the core while it is being fed into the core, means for collapsing the core, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

15. The combination with a hollow collapsible core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the core, means for bending the article longitudinally of the core while it is being fed into the core, means for collapsing the core, feeding-rolls for delivering the tube and inclosed article longitudinally of the core, and pressing-rolls whereby the wrapped article is flattened, substantially as described.

16. The combination of a hollow cylindrical core formed of two longitudinal sections, one of which may be rotated relatively to the other, means for rotating the core to wind a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, and means for rotating the movable section of the core to permit the tube and inclosed article to be fed longitudinally from the core, substantially as described.

17. The combination of a hollow cylindrical core formed of two longitudinal sections, one of which may be rotated relatively to the other, means for winding a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, and means for rotating the movable section of the core to permit the tube and inclosed article to be fed longitudinally from the core, substantially as described.

18. The combination of a hollow cylindrical core having a movable longitudinal section, means for winding a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

19. The combination of a hollow cylindrical core having a movable longitudinal section, means for winding a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to loosen the wrapper-tube, and feeding-rolls for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

20. The combination with a hollow cylindrical core having a longitudinal section mounted to move concentrically about the axis of the core, means for winding a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

21. The combination with a hollow cylindrical core having a longitudinal section mounted to move concentrically about the axis of the core, means for shifting the movable section to grip the end of a wrapper, means for winding the wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to release and loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

22. The combination with a hollow cylindrical core having a longitudinal section mounted to move concentrically about the axis of the core, means for shifting the movable section to grip the end of a wrapper, means for winding the wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to release the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

23. The combination with a hollow core having a member extending longitudinally thereof, means for shifting said member to grip the end of a wrapper, means for winding the wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting said member to release the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

24. The combination of a hollow cylindrical core having a longitudinal section mounted to move concentrically about the axis of the core, means for rotating the core to wind a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for shifting the movable section of the core to loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

25. The combination of a hollow core journaled in a revolving carrier and having a gear engaging a gear the axis of which coincides with the axis about which the carrier revolves, a wiper extending concentrically to the axis about which the carrier revolves and coacting with the core as it is rotated by said gears to wind a wrapper about the core to form a tube, feeding mechanism advancing an article into the core, and means for delivering the tube and inclosed article from the core, substantially as described.

26. The combination with the revolving carrier, of a plurality of hollow cores journaled in said carrier, a stationary gear the axis of which coincides with the axis about which the carrier revolves, a gear on each of said cores engaging said stationary gear, a wiper extending concentrically to the axis about which the carrier revolves and coacting with the cores as they are rotated by said gears to wind wrappers about said cores to form tubes, feeding mechanism for advancing articles into said cores as they are successively brought into position by the movement of the carrier, and delivery mechanism for feeding the tubes and inclosed articles longitudinally of the cores for delivery, substantially as described.

27. The combination of a hollow cylindrical core formed of a section 13 and a section 14 mounted to rotate within the section 13, means for rotating the section 14 to grip the wrapper between the edges of the sections 13 and 14, means for winding the wrapper about the core to form a tube, feeding mechanism for

advancing an article into the core, means for rotating the section 14 to release and loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

28. The combination of a hollow cylindrical core formed of a section 13 and a section 14 mounted to rotate within the section 13 and normally held in position under spring tension to complete the cylindrical core, means for rotating the section 14 to open the core to receive the end of a wrapper and for releasing said section to cause the wrapper to be gripped between the edges of the sections 13 and 14, means for winding the wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for rotating the section 14 relatively to the section 13 to release and loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

29. The combination of a hollow cylindrical core formed of a section 13 and a section 14 mounted to rotate within the section 13 and normally held in position under spring tension to complete the cylindrical core, means for rotating the section 14 to open the core to receive the end of a wrapper and for releasing said section to cause the wrapper to be gripped between the edges of the sections 13 and 14, means for rotating the core to wind the wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, means for rotating the section 14 relatively to the section 13 to release and loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

30. The combination of a revolving carrier, a rotary core journaled in said carrier and having a section 13 and a section 14 mounted to rotate within the section 13 and normally held under spring tension in position to complete the cylindrical core, a stationary gear, the axis of which coincides with the axis about which the carrier revolves, a gear on said core engaging said stationary gear, a wiper coacting with the core as it is rotated by said gears during the movement of the carrier to wind a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, a cam by which the section 14 is rotated to open the core to loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

31. The combination of a revolving carrier, a hollow cylindrical core journaled in said carrier having a section 14 carried by a shaft journaled concentrically of said core and normally held under spring tension in position to complete the cylindrical core, means for winding a wrapper about the core to form a tube, feeding mechanism for advancing an article into the core, a cam engaging a crank-arm on the shaft carrying the section 14 of the core to rotate the section 14 to open the core to loosen the wrapper-tube, and means for feeding the tube and inclosed article longitudinally of the core for delivery, substantially as described.

32. The combination of a revolving carrier, a core journaled in said carrier having a section 14 carried by a shaft journaled concentrically of said core and normally held under spring tension in position to complete the core, a gear on said core engaging a gear the axis of which coincides with the axis about which the carrier revolves, and a cam engaging a crank-arm on the shaft carrying the section 14 of the core to rotate the section 14 to open the core, substantially as described.

33. The combination of a moving carrier, a core journaled in said carrier having a section 14 carried by a shaft journaled concentrically of said core, means for rotating the core as it moves with the carrier, and a cam engaging a crank-arm on the shaft carrying the section 14 of the core to control the movement of the section 14 for opening and closing the core, substantially as described.

34. The combination with a revolving carrier, of a plurality of hollow cores journaled in said carrier, means for forming wrapper-tubes about the cores, feeding mechanism for advancing articles into the cores as they are successively brought into position by the movement of the carrier, and delivery mechanism for delivering the tubes and inclosed articles from the cores, substantially as described.

35. The combination with a revolving carrier, of a plurality of hollow cores journaled in said carrier, means for winding wrappers about the cores to form wrapper-tubes, feeding mechanism for advancing articles into the cores as they are successively brought into position by the movement of the carrier, and delivery mechanism for feeding the tubes and inclosed articles longitudinally of the cores for delivery, substantially as described.

36. The combination with a revolving carrier, of a plurality of hollow cores journaled in said carrier, means for rotating the cores, a wiper extending concentrically to the axis about which the carrier revolves and coacting with the cores as they are rotated to wind wrappers about said cores to form tubes, feeding mechanism for advancing articles into the cores as they are successively brought into position by the movement of the carrier, and delivery mechanism for feeding the tubes and inclosed articles longitudinally of the cores for delivery, substantially as described.

37. The combination of a moving carrier, a core journaled in said carrier having a movable longitudinal section, means for rotating the core as it moves with the carrier, a member normally rotating with the core, and a stationary cam engaging said member to move

said section relatively to the core to open the core, substantially as described.

38. The combination of a revolving carrier, a core journaled in said carrier having a movable longitudinal section normally held under spring tension in position to complete the core, a gear on said core engaging a gear the axis of which coincides with the axis about which the carrier revolves, a member normally rotating with the core, and cams 24 and 24^a engaging said member to move the said section relatively to the core to open the core, substantially as described.

39. The combination of a collapsible moving core, means for rotating the core as it moves, a wiper extending in the direction of the bodily movement of the core along which the core moves in its bodily movement and which coacts with the core to wind a sheet about the core to form a tube as the core moves along the wiper, means for collapsing the core, and means for delivering the tube from the collapsed core, substantially as described.

40. The combination of a hollow cylindrical core formed of two longitudinal sections one of which may be rotated relatively to the other, means for rotating the core to wind a sheet about the core to form a tube, and means for rotating the movable section of the core to permit the tube to be fed longitudinally from the core, substantially as described.

41. The combination of a hollow cylindrical core having a longitudinal section mounted to move concentrically about the axis of the core, means for shifting the movable section to grip the end of a sheet, means for winding the sheet about the core to form a tube, means for shifting the movable section of the core to release and loosen the tube, and means for feeding the tube longitudinally from the core, substantially as described.

42. The combination of a cylindrical core having a member extending longitudinally thereof and mounted to move concentrically about the axis of the core, means for shifting said member to grip the end of a sheet, means for winding the sheet about the core to form a tube, means for shifting said member to release the tube, and means for feeding the tube longitudinally from the core, substantially as described.

43. The combination of a core formed of a section 13 and a section 14 mounted to rotate within the section 13 and normally held under spring tension in position to complete the core, means for rotating the section 14 to open the core to receive the end of a sheet and for releasing said section to cause the sheet to be gripped between the edges of the sections 13 and 14, means for rotating the core to wind the sheet about the core to form a tube, and means for rotating the section 14 relatively to the section 13 to release and loosen the tube, substantially as described.

44. The combination with tube-forming mechanism for forming a wrapper into a tube, of feeding mechanism for advancing an article into the tube, means for bending the article longitudinally of the tube while it is being fed into the tube, and means for delivering the wrapped article, substantially as described.

45. The combination with a core and means for winding a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the tube, means for bending the article longitudinally of the tube while it is being fed into the tube, means for feeding the wrapped article longitudinally of the core for delivery, and pressing-rolls whereby the wrapped article is flattened, substantially as described.

46. The combination with a rotating core, and a wiper coacting therewith to wind a wrapper about the core to form a tube, of feeding mechanism for advancing an article into the tube, and means for feeding the wrapped article longitudinally of the core for delivery with the ends of the wrapper-tube open, substantially as described.

47. The combination with tube-forming mechanism for forming a wrapper into a tube, of feeding mechanism for advancing an article into the tube, and a pusher for completing the feeding of the article into the tube, substantially as described.

48. The combination of a hollow core, means for winding a wrapper about the core to form a tube; feeding-rolls for advancing an article into the core, and a pusher for completing the feeding of the article into the core, substantially as described.

49. The combination of the feeding-rolls 45 and 46, pushing-finger 53, means for moving the roll 45 into operative position and back to normal position, and means for actuating the finger 53 as the roll 45 is returned to its normal position, substantially as described.

50. The combination of the feeding-roll 46, the feeding-roll 45 carried by rock-arm 44, pivoted pushing-finger 53, and means for actuating the pushing-finger 53 by the movement of the rock-arm 44, substantially as described.

51. The combination of the table H having depressed portion 38, bender 43, feeding-rolls 45 and 46, and pushing-finger 53, substantially as described.

52. The combination of the feeding-rolls 45 and 46, and the pushing-finger 53 pivoted to move concentrically with the axis of one of said feeding-rolls, substantially as described.

53. The combination of a paper-table having a depressed portion, means for bending the paper into the depressed portion of the table, and means for engaging the upper side of the bent paper to advance the bent paper longitudinally of said depressed portion, substantially as described.

54. The combination with a paper-table having a depressed portion, a bender 43 for

forcing the paper into the depressed portion of the table, a feeding-roll 45 moving with the bender and coacting with the roll 46 to feed the paper longitudinally of the table, substantially as described.

55. The combination in a tube-forming core, of the section 13 carried by a sleeve 15 rotatably mounted, and the section 14 carried by a disk 18 inside the sleeve 15 and fast on a shaft 19 journaled in a bracket 20 carried by sleeve 15, and a crank-arm 22 on shaft 19, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:
C. J. SAWYER,
T. F. KEHOE.