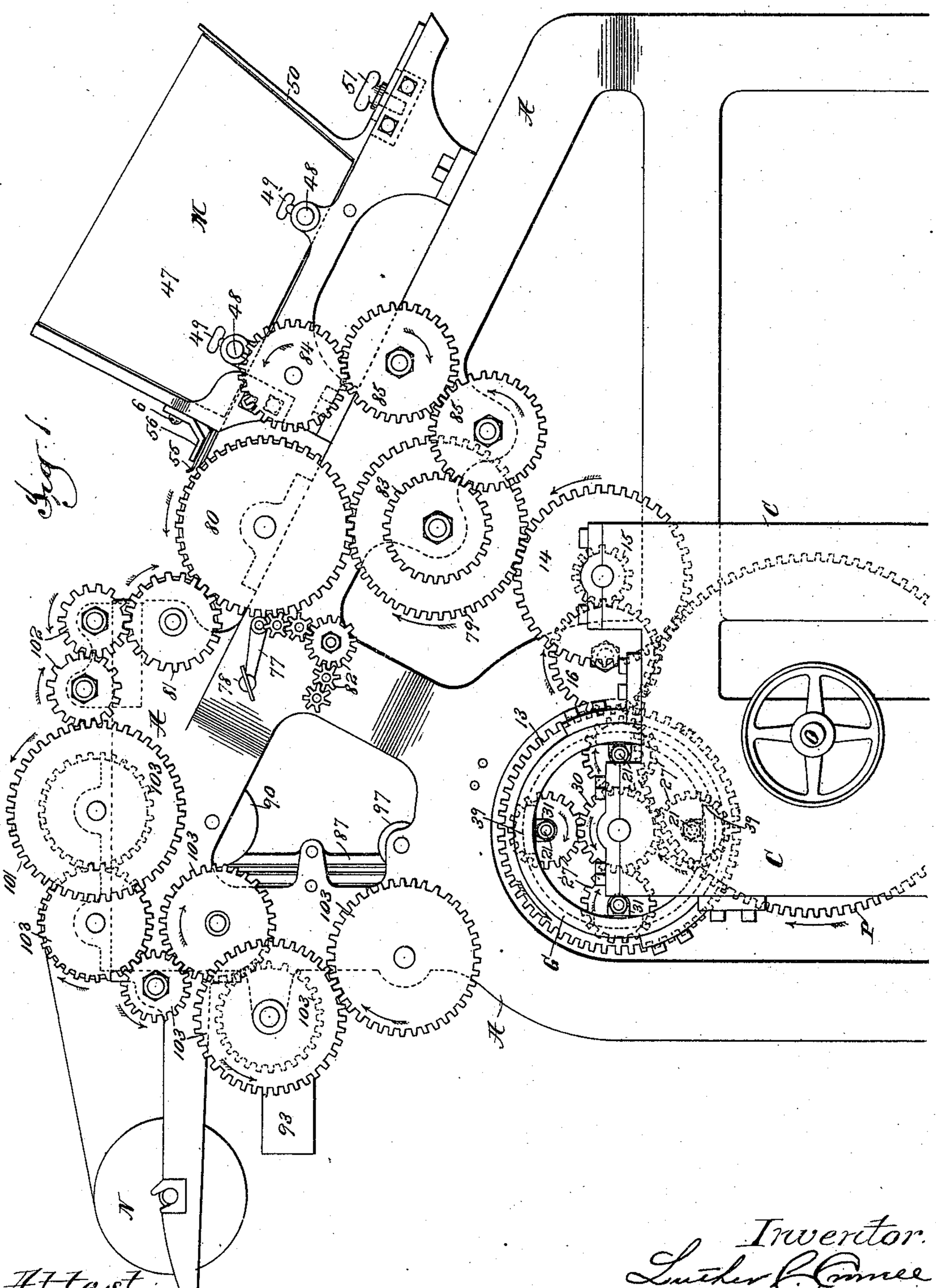
(No Model.) 13 Sheets—Sheet 1.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.



Attest:
Geo. H. Bottz.
F. F. Lehoe.

Inventor.
Luther C. Crowell
by Philipp Kirkpatrick Chapin & Hovey
Attys

(No Model.) 13 Sheets—Sheet 2.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

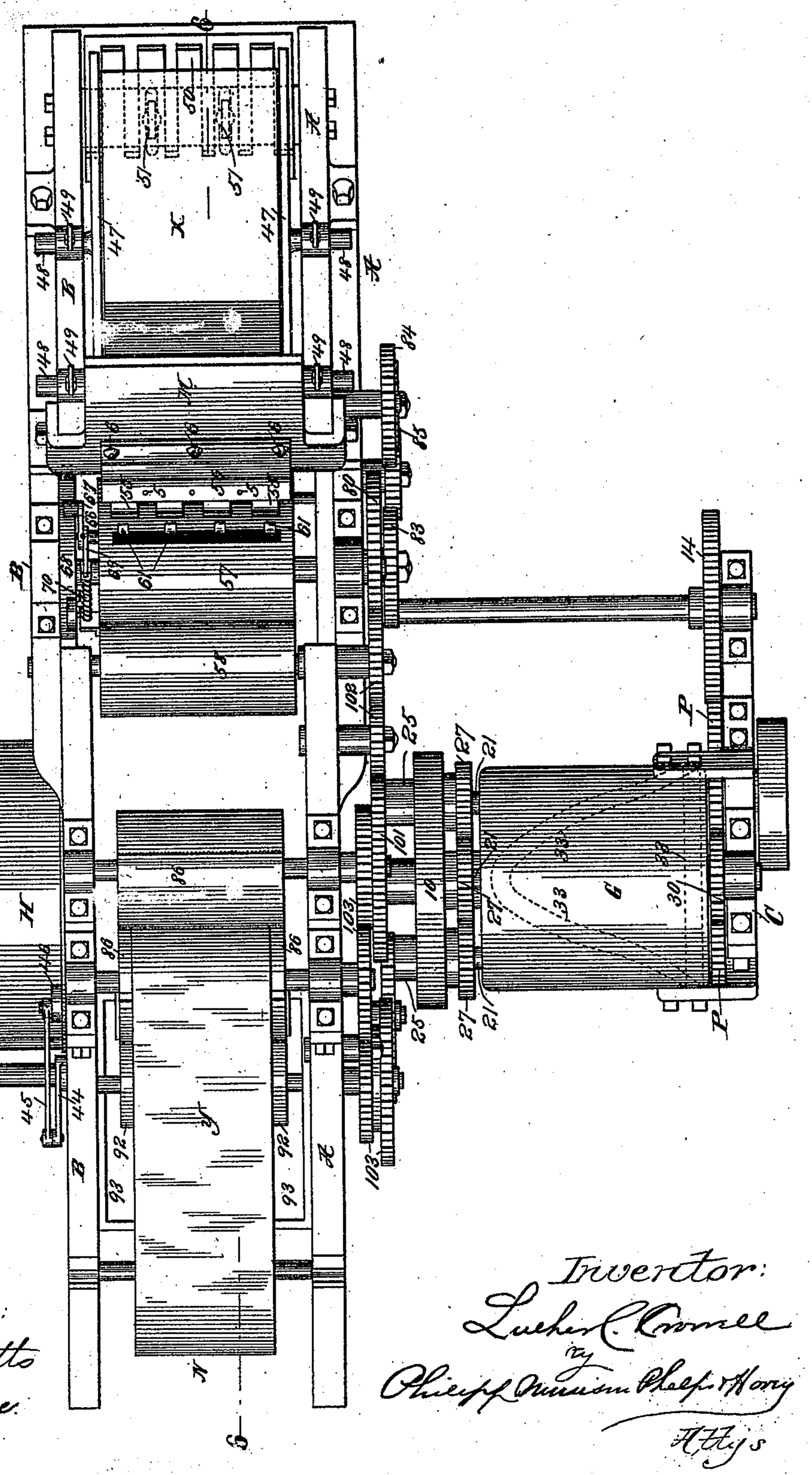


Fig. 2.

Attest:
Geo. H. Potts
J. F. Kehoe.

Inventor:
Lucius C. Crowell
by
Philipp Munson Church & Hong
Attys

(No Model.) 13 Sheets—Sheet 3.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

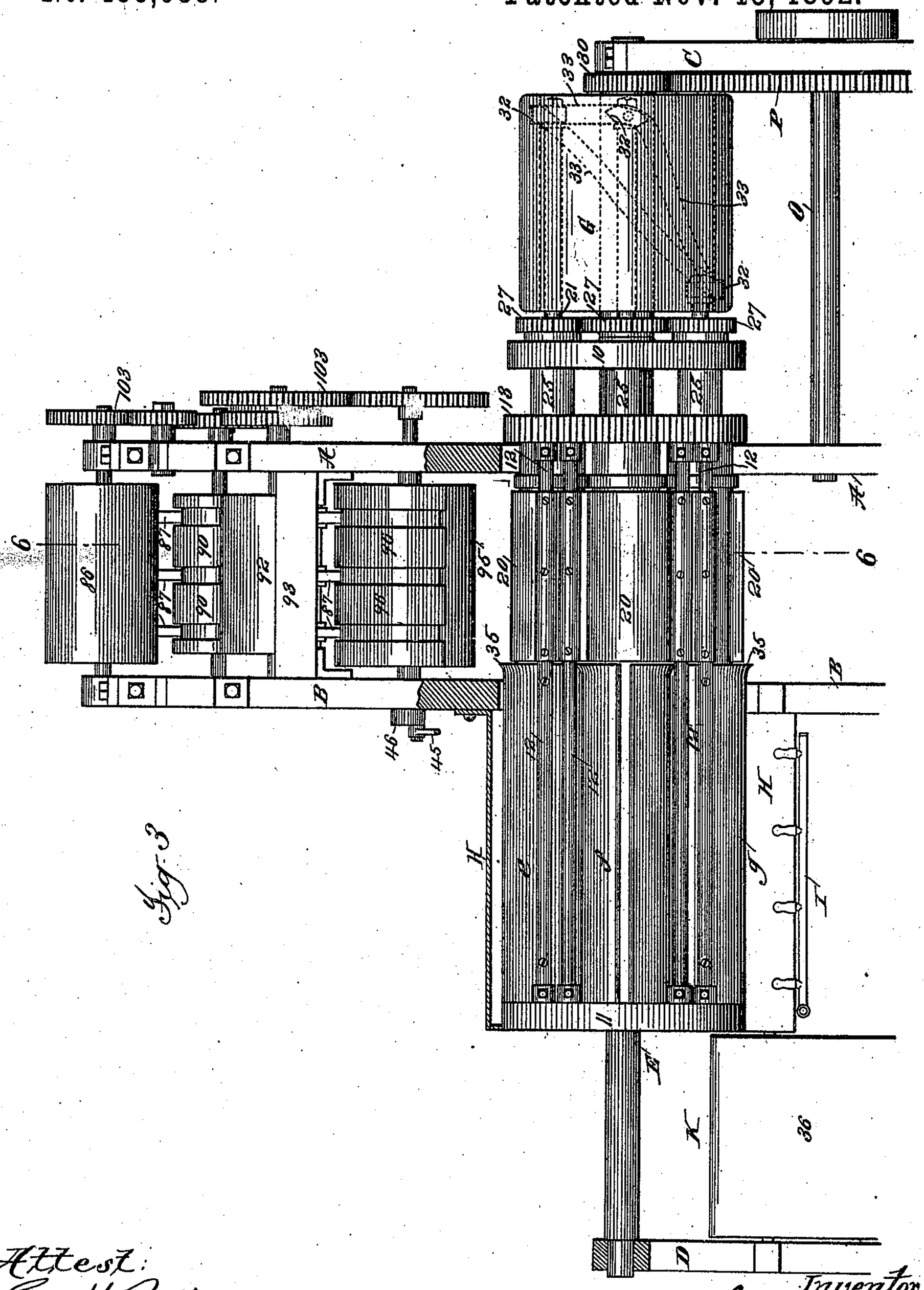


Fig. 3

Attest:
Geo. H. Botts.
J. F. Kehoe.

Inventor
Luther C. Crowell
by
Thiell & Thurston & Thiell & Story
Attys

(No Model.) 13 Sheets—Sheet 4.

L. O. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

Fig. 4.

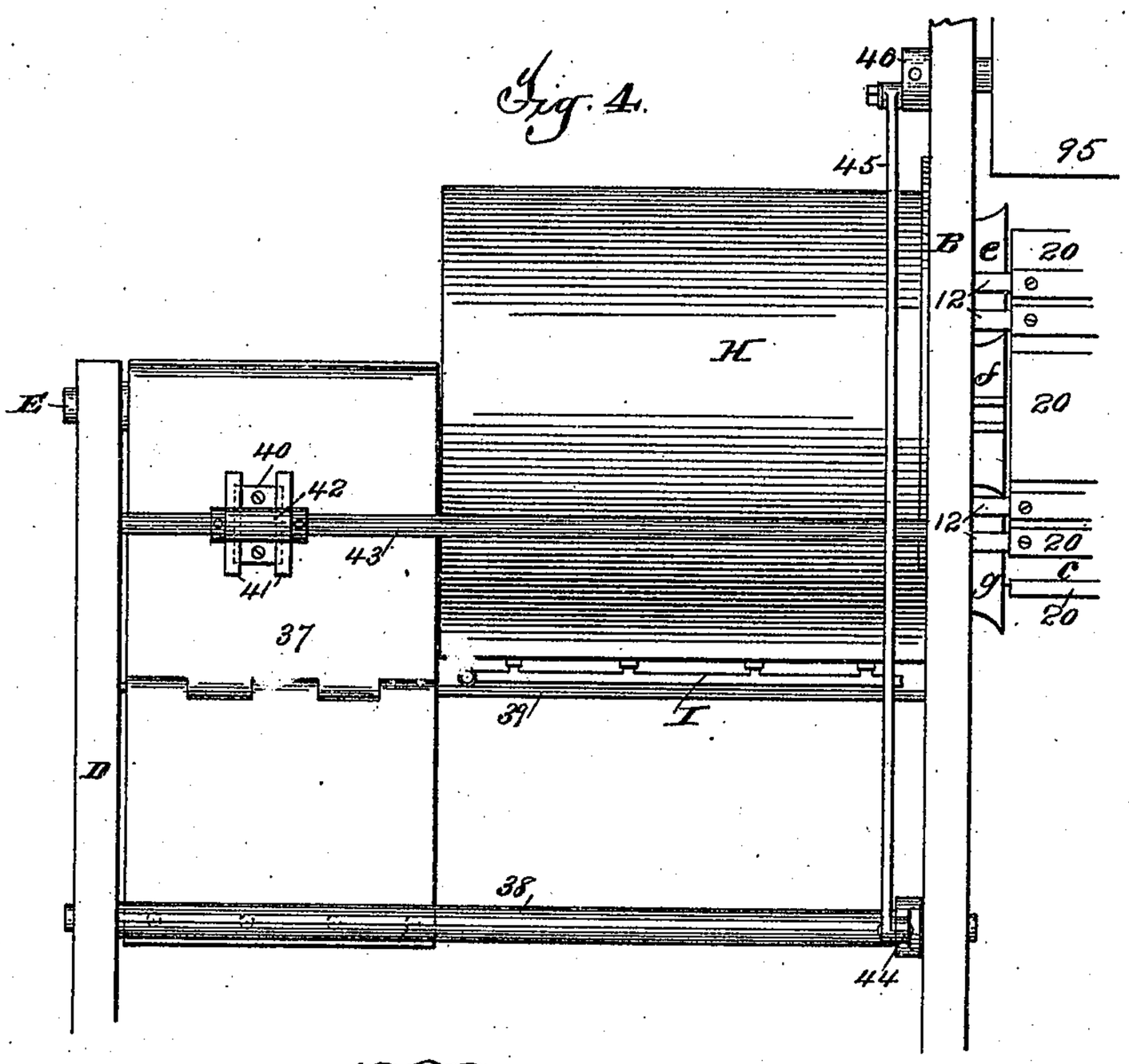
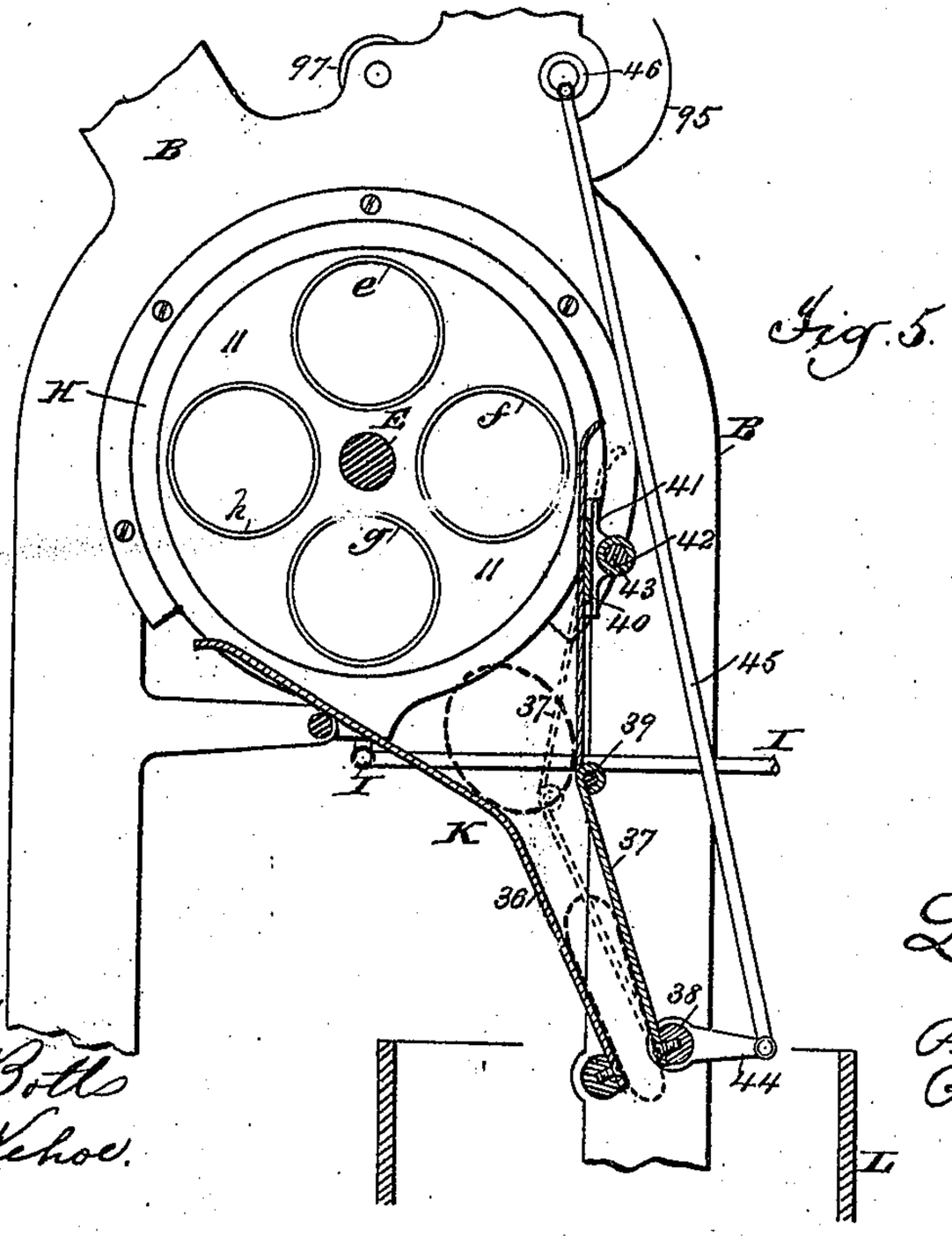


Fig. 5.



Attest:
Geo. H. Bolles
J. F. Kehoe.

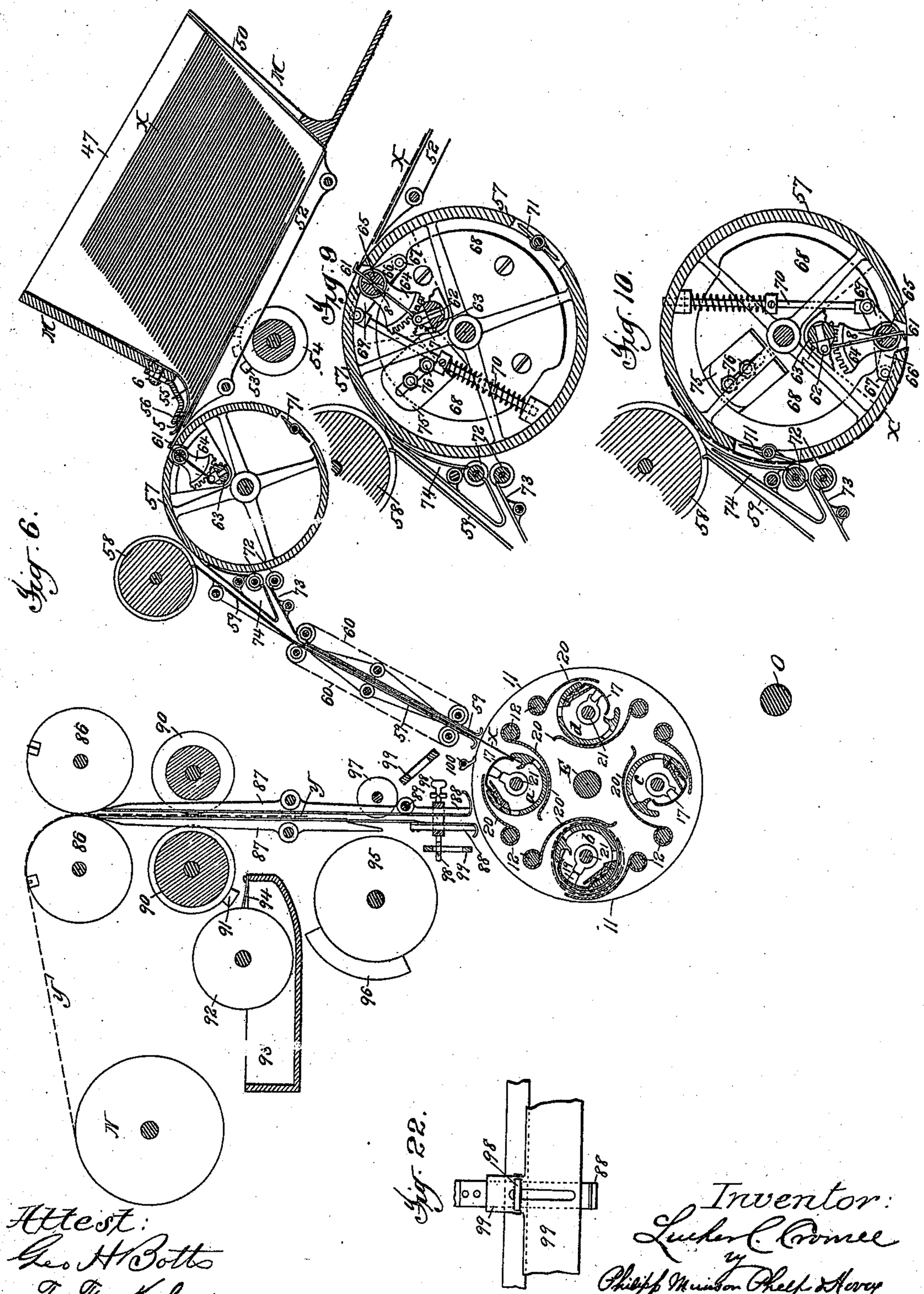
Inventor:
Lucius L. Crowell
by
Phieffs Munson
Phieffs & Hong
Attys.

(No Model.) 13 Sheets—Sheet 5.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.



Attest:
Geo. H. Botts
T. F. Kehoe

Inventor:
Lucius C. Crowell
by
Philipp Munson Rhees & Avery
Attys

(No Model.) 13 Sheets—Sheet 6.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

Fig. 7.

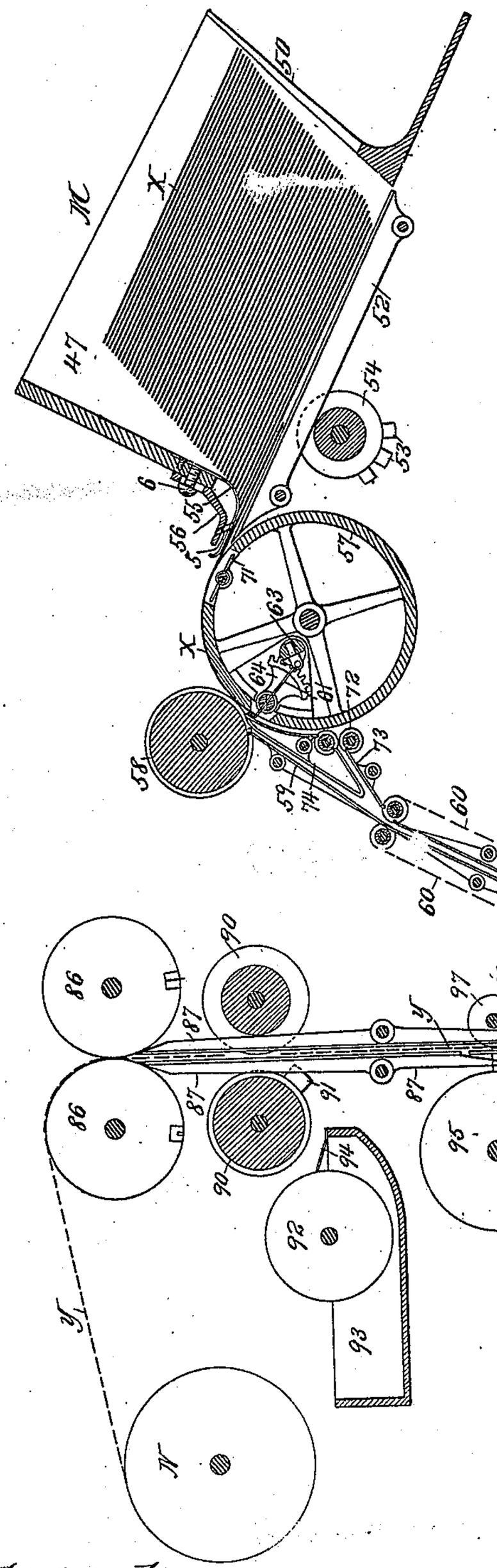
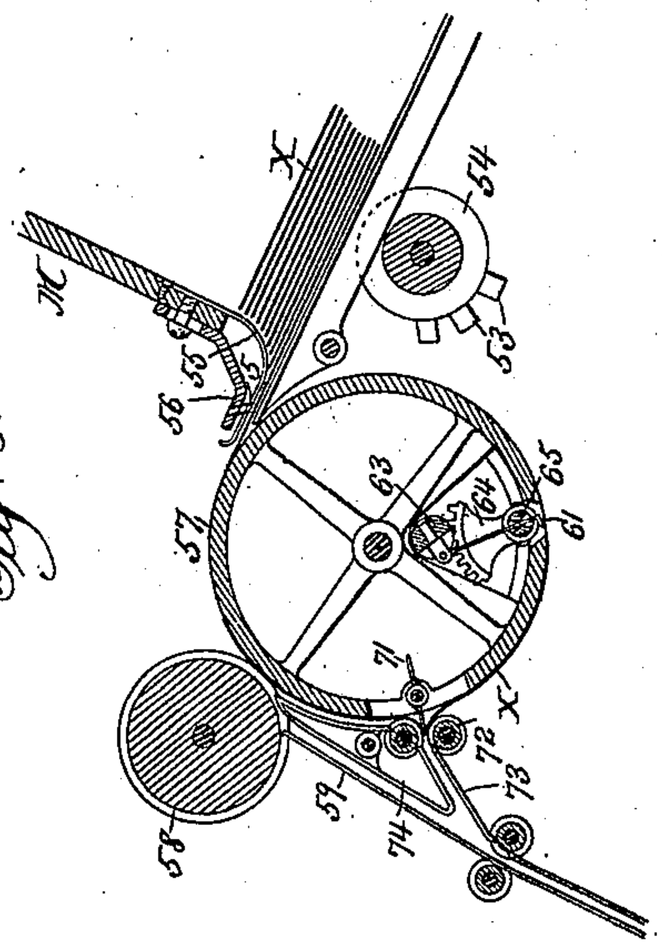


Fig. 8.



Witnesses:
Geo. H. Botts.
J. F. Kehoe.

Inventor:
Luther C. Crowell
by
Phillips Thurston Phelps & Horny
Attys.

(No Model.) 13 Sheets—Sheet 7.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

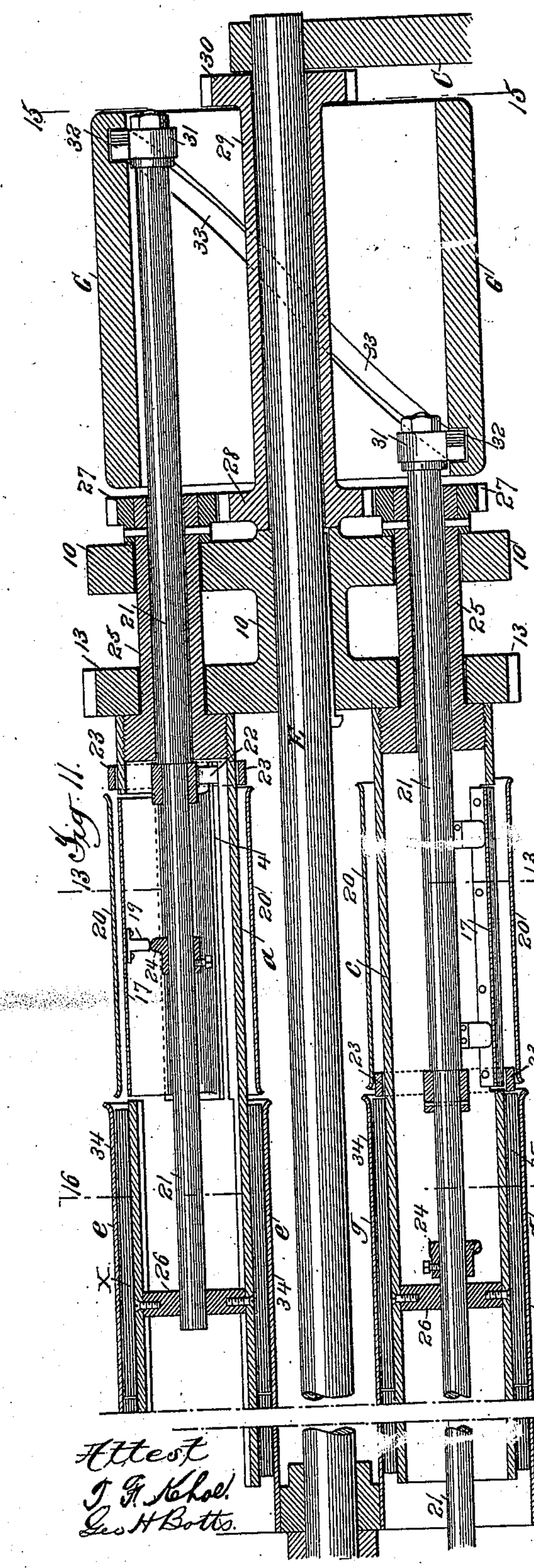


Fig. 11.

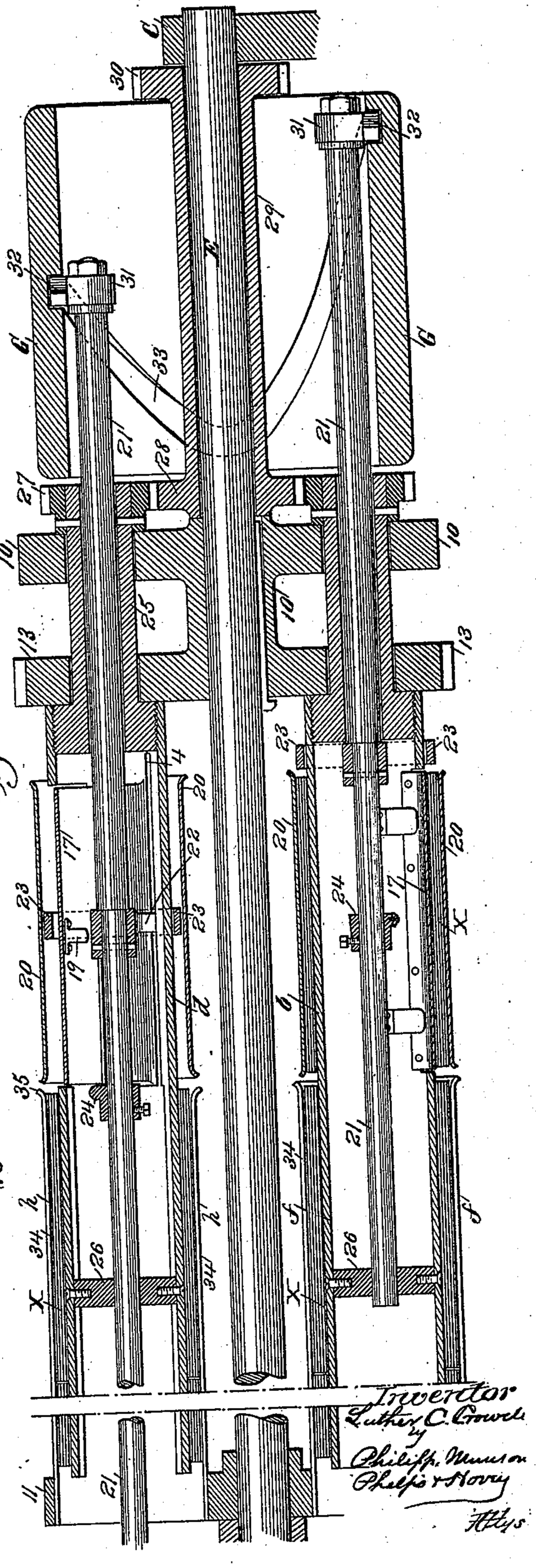


Fig. 12.

Attest
J. F. Kehoe
Geo. H. Botts.

Inventor
Luther C. Crowell
by
Philip P. Munson
Phelps & Dewey
Attys

(No Model.) 13 Sheets—Sheet 8.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

Fig. 15.

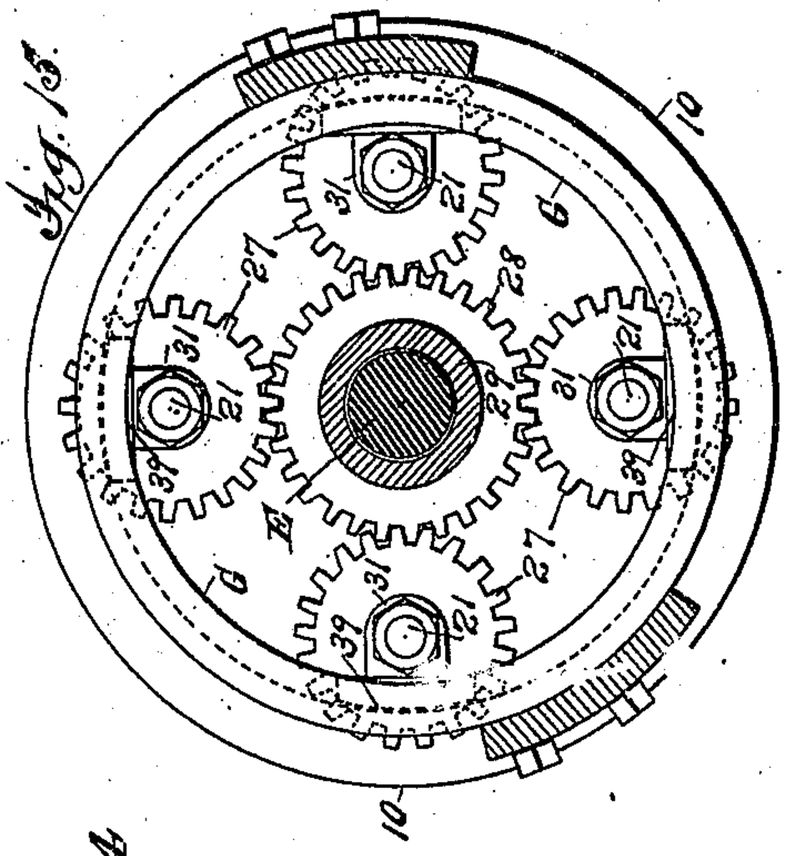


Fig. 19.

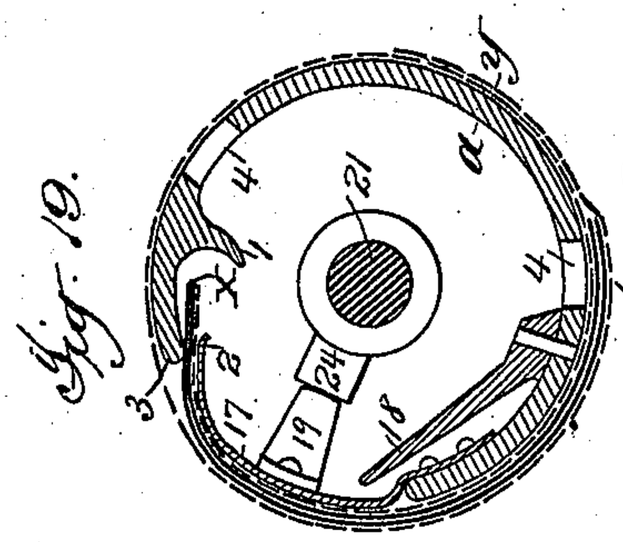


Fig. 20.

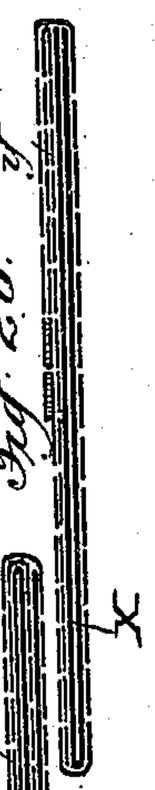


Fig. 14.

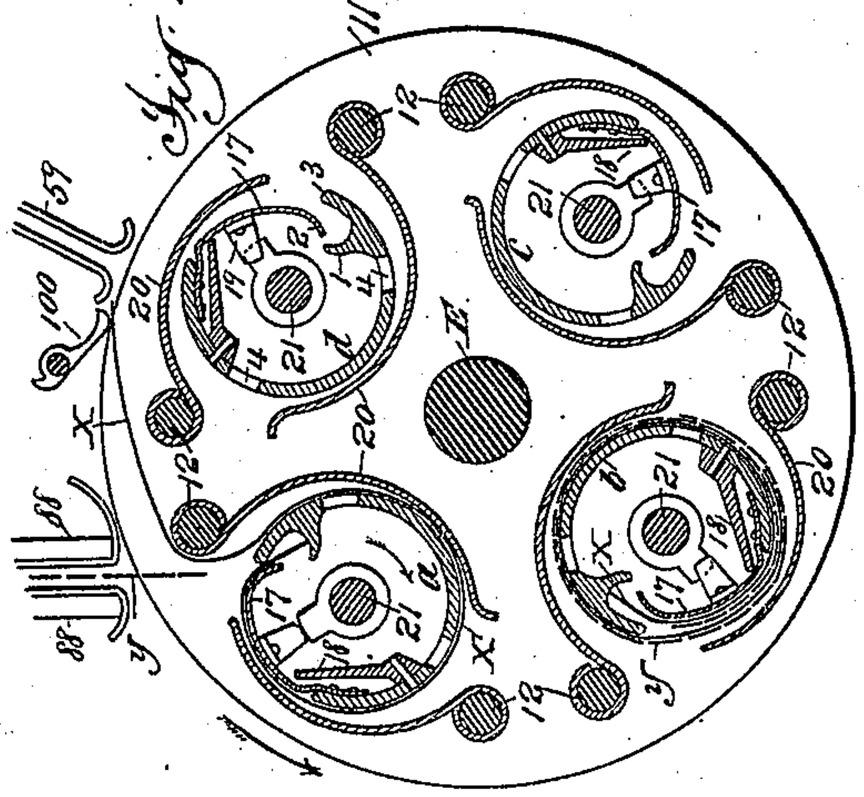


Fig. 17.

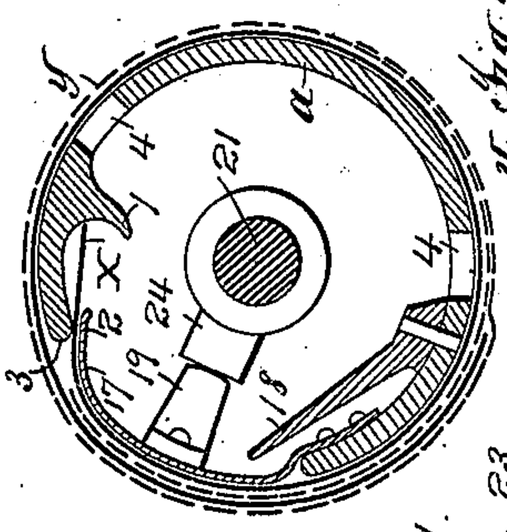


Fig. 18.

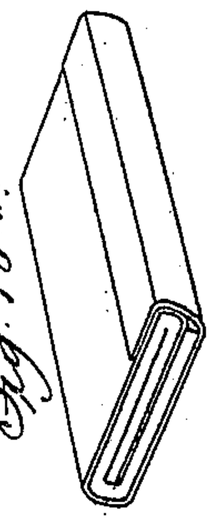


Fig. 21.

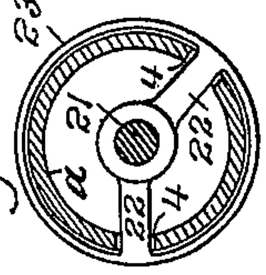
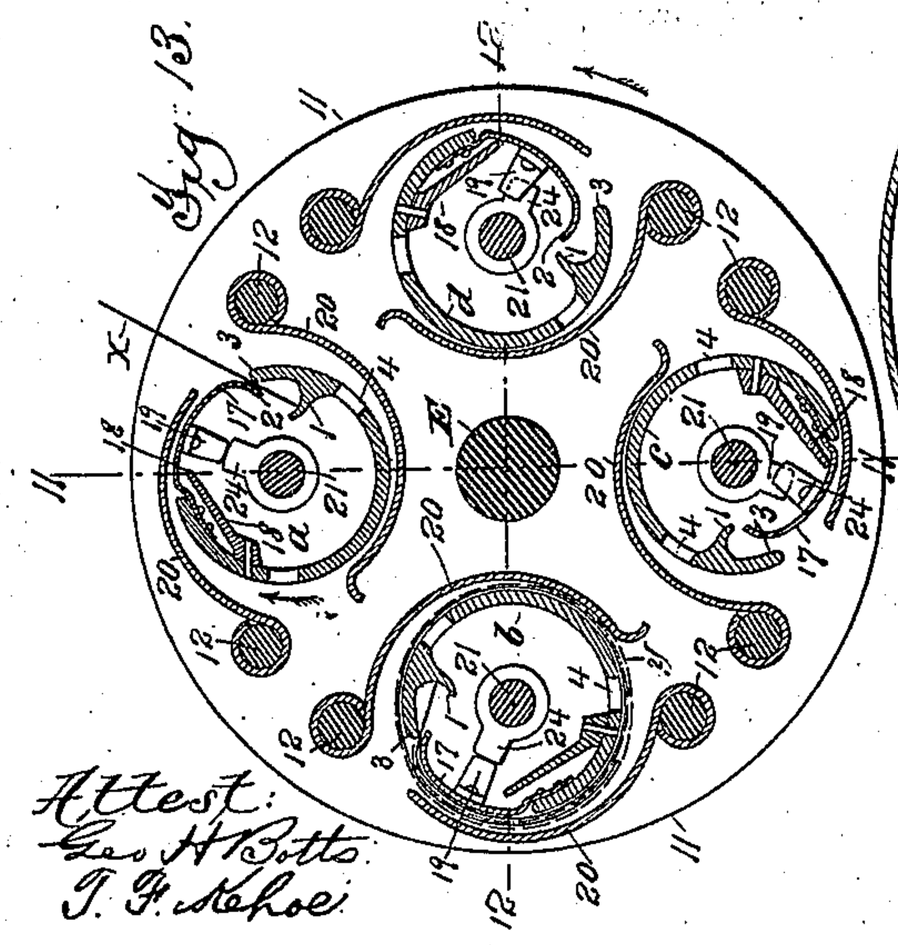


Fig. 13.



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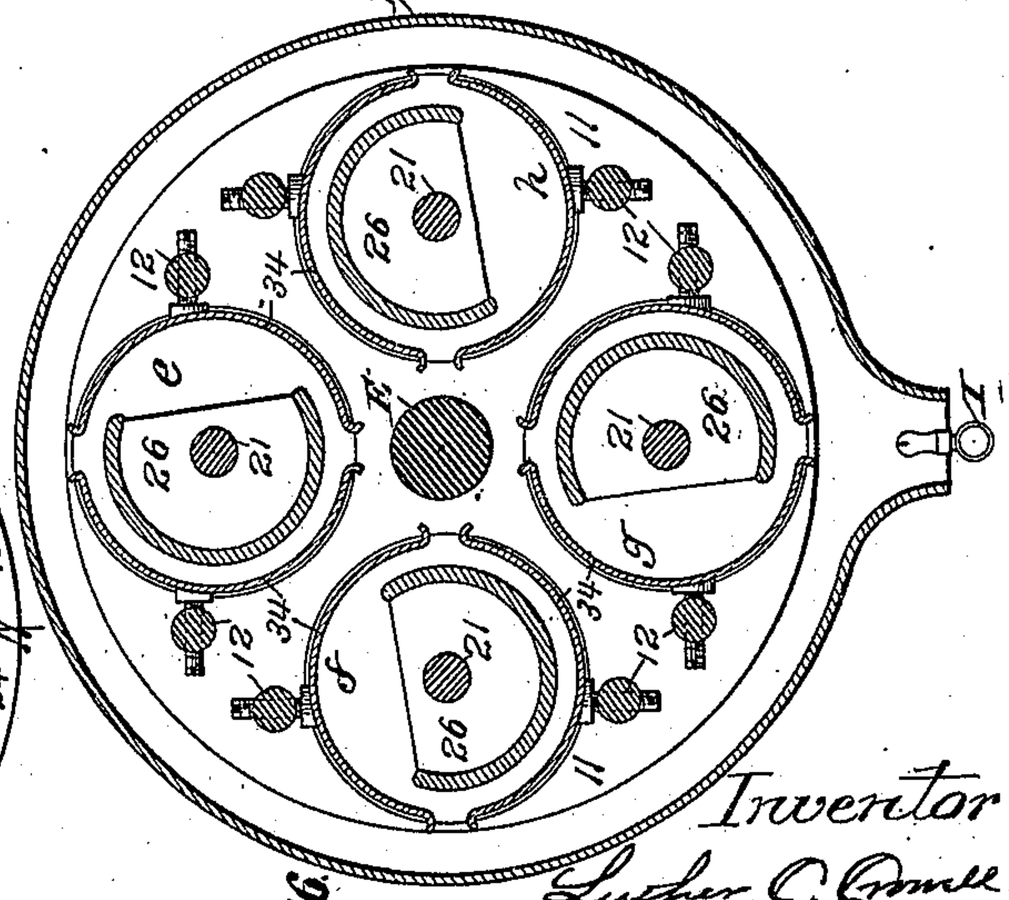

Inventor
Luther C. Crowell
by Thos. Phelps Hovey
Atty's

Attest:
Geo. H. Botts.
T. F. McKee.

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L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

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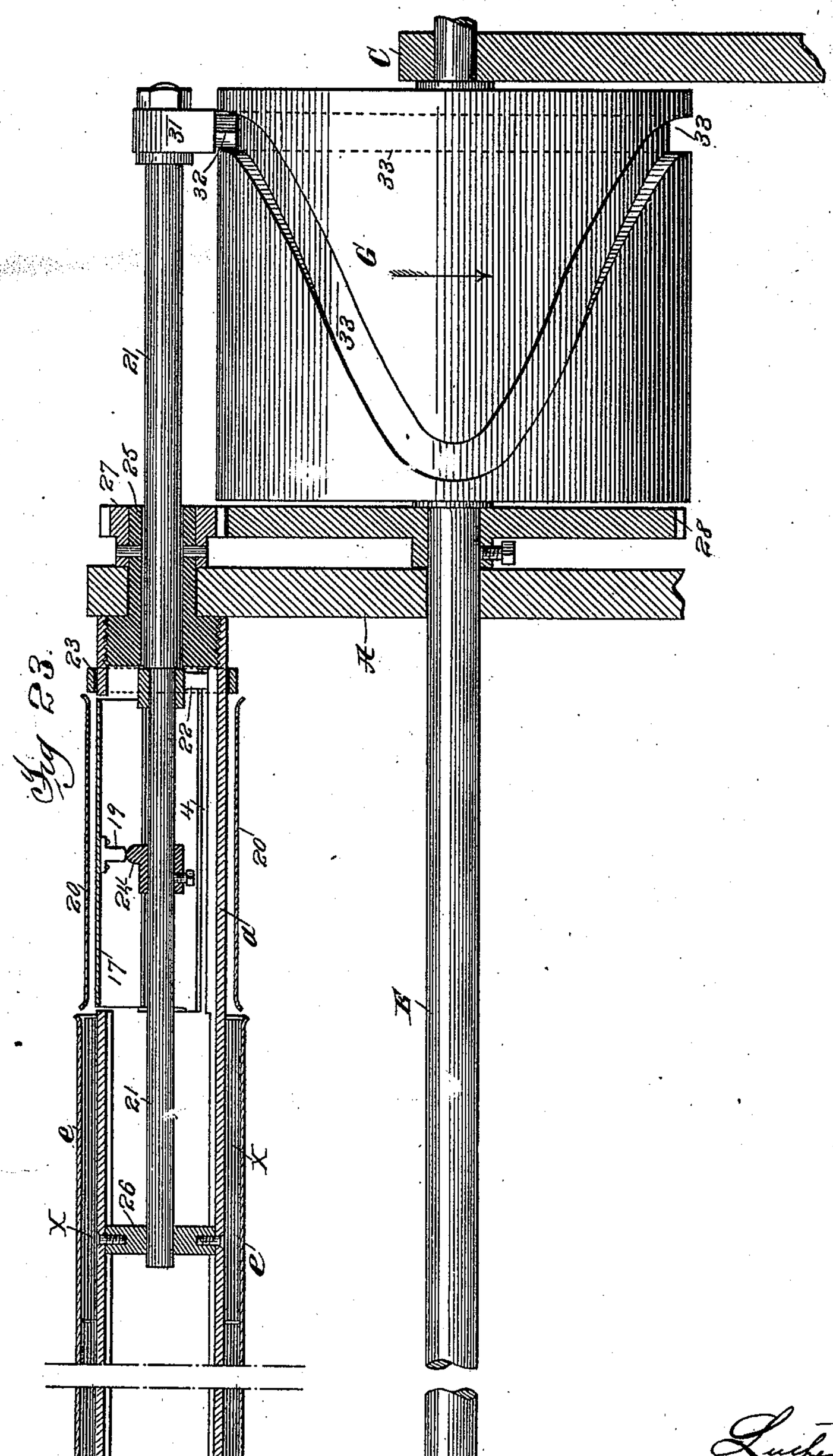


Fig. 2.

Attest:
Geo. H. Botts
J. P. Kehoe.

Inventor:
Lucius C. Crowell
by
Philipp Thurston Philipp & Hazy
Attys

(No Model.) 13 Sheets—Sheet 10.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.

Fig. 25.

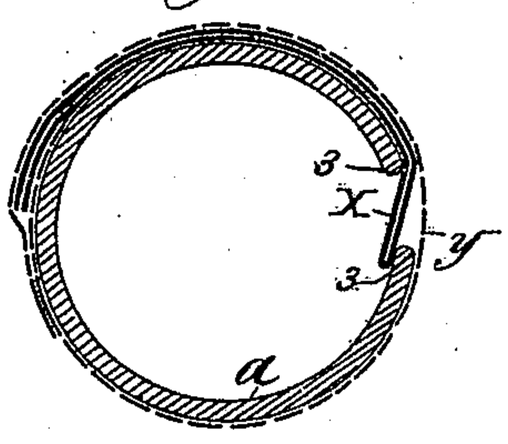


Fig. 24.

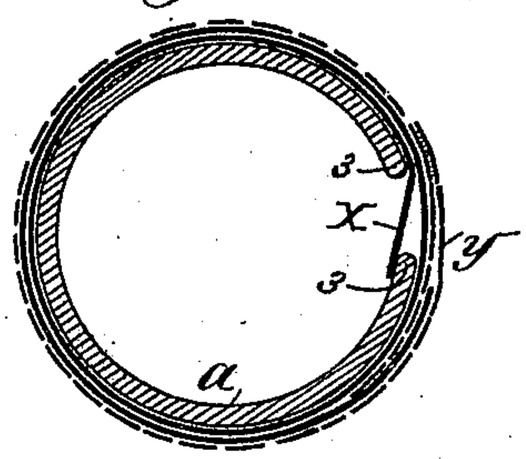


Fig. 26.

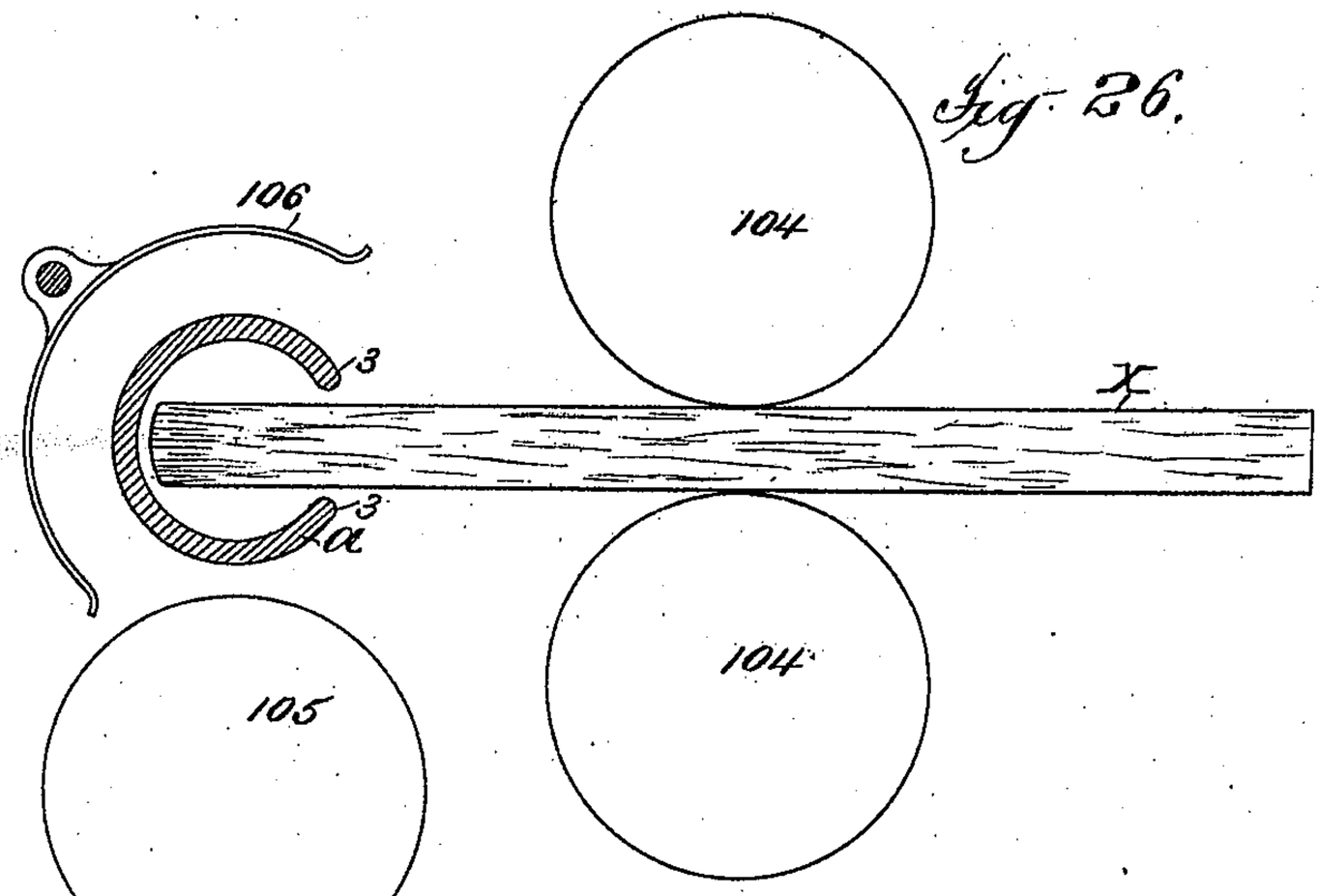


Fig. 27.

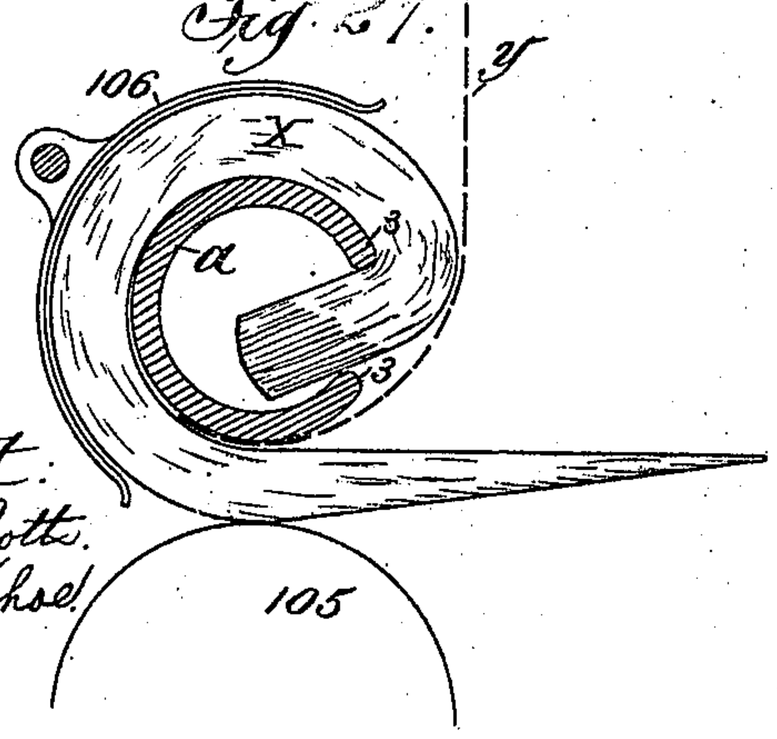
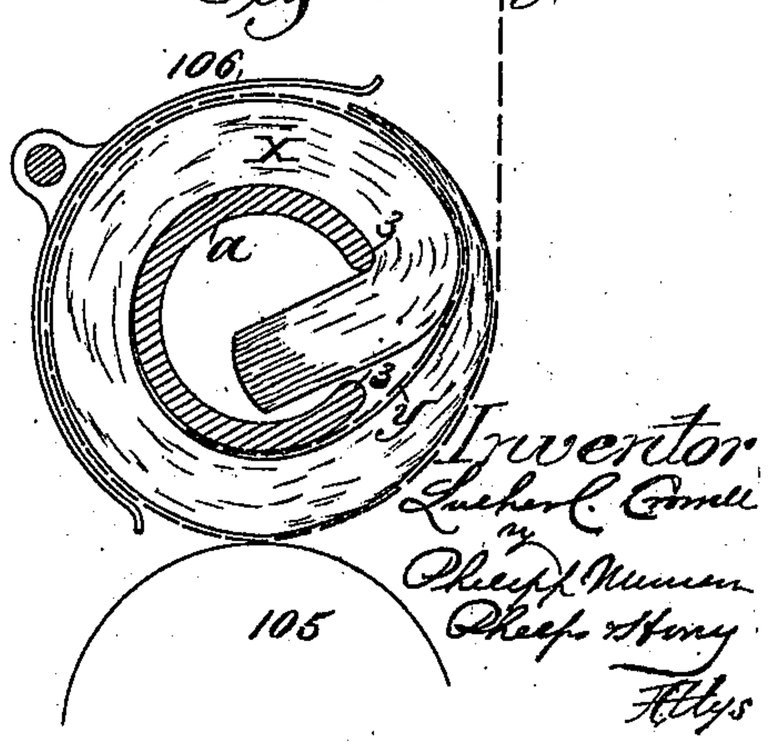


Fig. 28.



Attest:
Geo. H. Botts.
J. F. Kehoe.

Inventor:
Lucher C. Crowell
by
Phelps Munson
Phelps & Henry
Attys

(No Model.) 13 Sheets—Sheet 11.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

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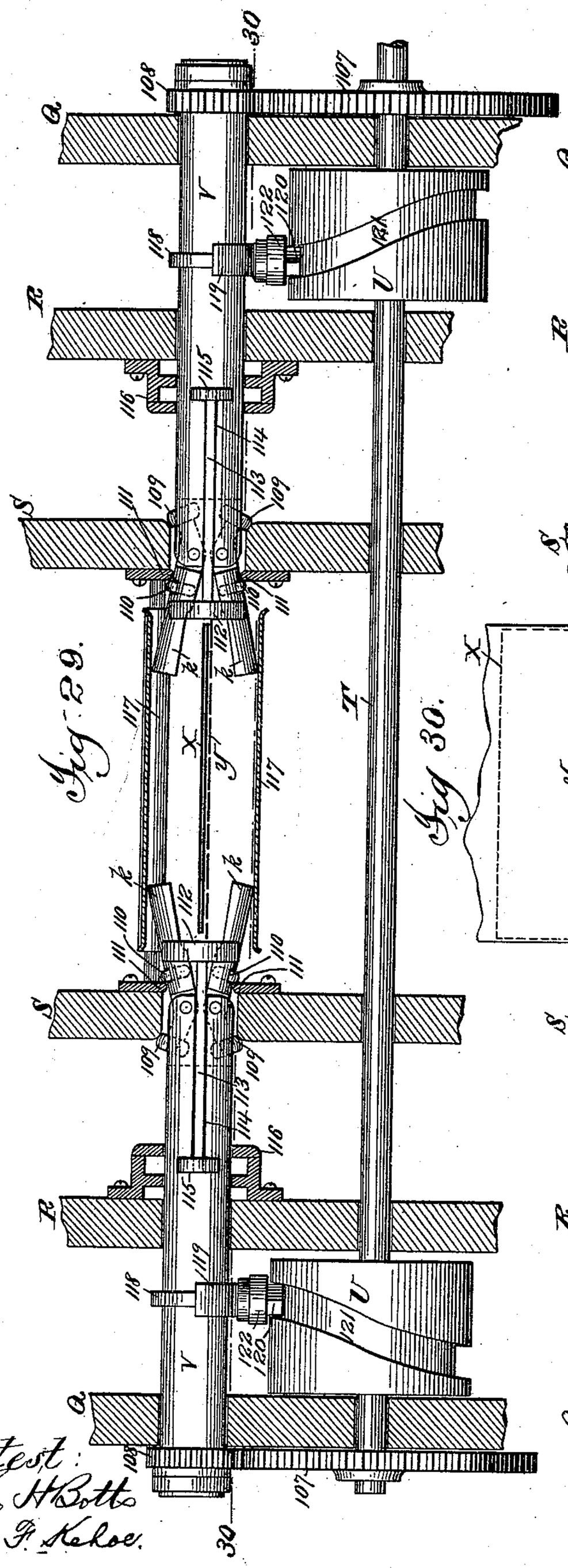


Fig. 29.

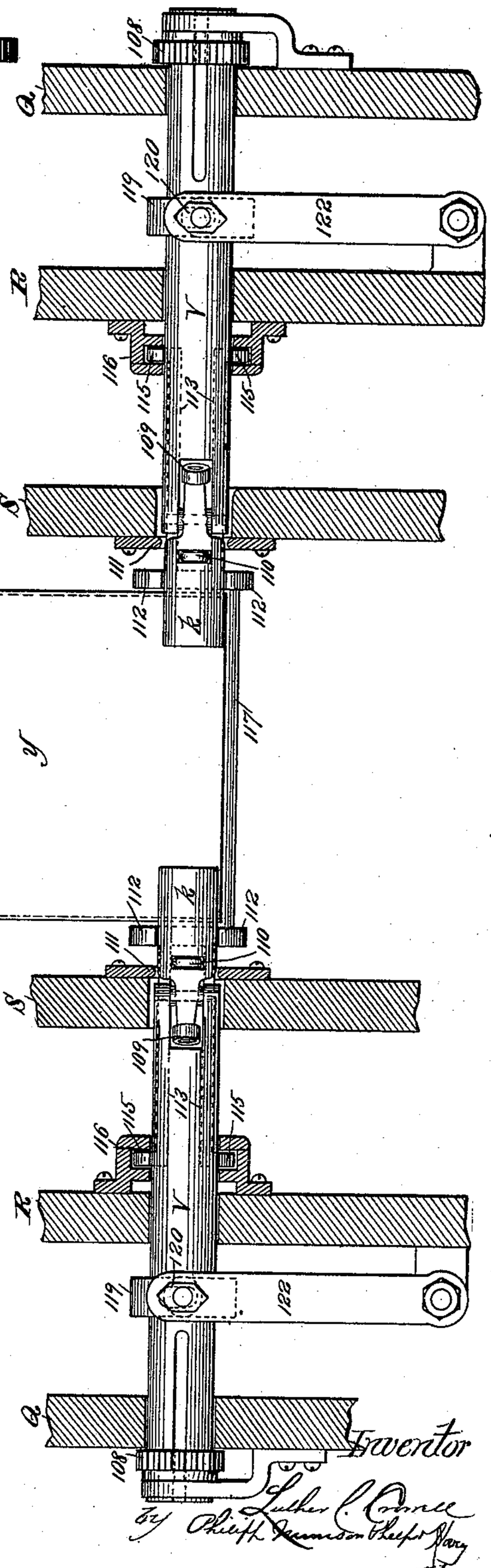


Fig. 30.

Attest:
Geo. H. Botts
J. F. Kehoe.

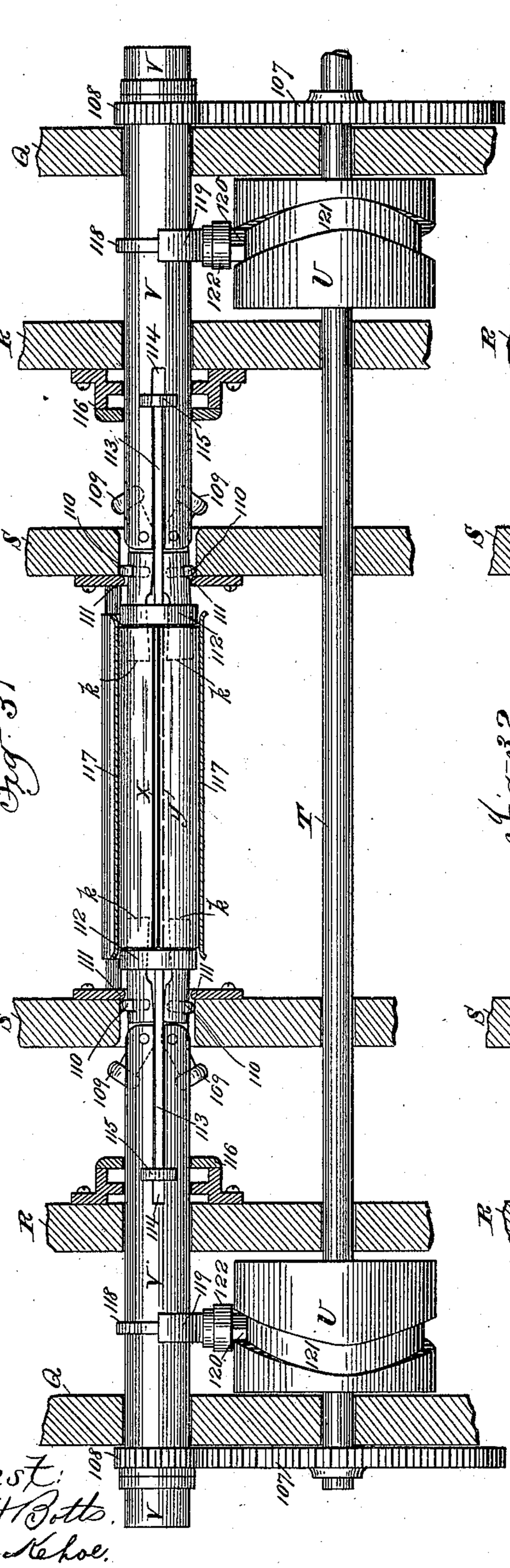
Inventor
Luther C. Crowell
by Church, Sumner & Church
Attys

(No Model.) 13 Sheets—Sheet 12.

L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.



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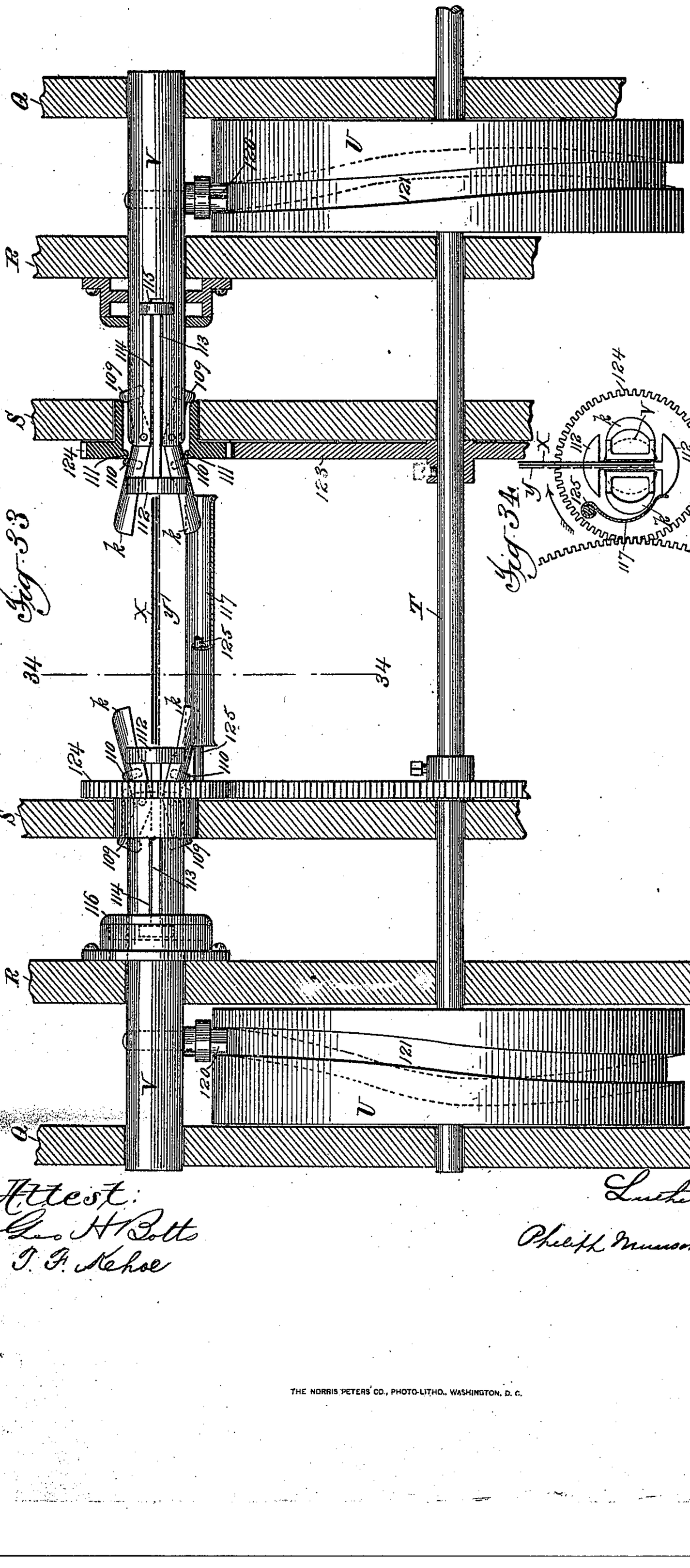
L. C. CROWELL.

NEWSPAPER WRAPPING MACHINE.

No. 486,088. Patented Nov. 15, 1892.



Attest:
Geo. H. Bolt
T. F. Mehoe

Inventor
Luther C. Crowell
Philipp Munson Philipp & Kerry
Attys

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, STEPHEN D. TUCKER, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

NEWSPAPER-WRAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 486,088, dated November 15, 1892.

Application filed August 6, 1891. Serial No. 401,842. (No model.)

To all whom it may concern:

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

The desirability of a simple machine which will automatically fold papers and other publications to the size suitable for mailing and apply a wrapper thereto, and which is adapted to wrap publications of different sizes and thicknesses, has long been recognized, and machines of various constructions have been devised for this purpose. The principle upon which all of these machines have operated, however, has been that of folding the papers and wrapper together by means of folding blades or jaws or other similar folding devices, the wrapper being of sufficient length to overlap and seal upon the last fold. The machines constructed upon this principle have not been found satisfactory, especially because they are not well adapted to wrap thick publications nor readily applicable to wrapping publications of different sizes or thicknesses.

I employ the method of winding or rolling in place of folding, as above described, and in carrying out my invention I use a central core, upon which the paper and wrapper are wound or rolled, the wrapper being of sufficient length to extend entirely about the core and paper thereon and overlap upon itself for gumming, so as to seal and secure the paper. The core may be stationary during the wrapping operation and the paper wound upon the core by carrying the paper and wrapper about the core; but I prefer to wind the paper upon the core by rotating the latter, and in order to cause the paper to wind tightly and within a small compass I preferably employ outside the core an abutment or wiper, by which the paper and wrapper are pressed during the operation of winding. I preferably make this wiper stationary and of such a construction as to yield and adapt itself to successive layers upon the core and to publications of different thicknesses. For this purpose the wiper may be of spring metal or mounted in spring-bearings. The core may be constructed of any suitable form to hold the paper and wrapper during the process of winding, and it is evident that a very simple construction may be used and prove efficient for this purpose, and that the best form of core will depend largely upon the character of the publication to be wrapped. The core which I consider preferable for general use, however, is adapted to hold the paper at one end during the operation of wrapping, and in one of its preferred forms consists of a cylinder having an opening on one side to receive the paper. This form of core is efficient with no means for seizing the paper other than that of the edges of the opening, as the paper is bent by wrapping about the core, which thus form grippers; but I prefer to use, especially for thin publications, such as newspapers of a few pages, some form of movable grippers to seize the paper as it is received within the cylinder, these grippers being automatically operated, so as to seize the paper at the proper time during or before the winding process and to release it after the wrapper is applied and sealed, so as to permit the removal of the wrapped paper from the core.

The wrapper may be applied in either of two ways, both satisfactory, and one or the other of which may be used, according to the length or character of the paper to be wrapped. With a paper of such length that a convenient product may be formed by winding the paper about the core, so as to superpose the whole or a part of a second or third layer thereon, I preferably apply the wrapper by placing its leading end inside the rear end of the paper as the latter is about to be closed down upon the previous layer or layers upon the core, so that the end of the wrapper will be closed in between the layers of the paper and held as it is wrapped about the previously-wound paper. This method will be found to economize in the wrapper material by reducing the length of the wrapper in all cases to a little more than one circumference of the wound paper, although the paper is long and wound to a small size. I may, how-

ever, present the leading ends of the paper and wrapper to the core together, so that the two are wound together upon the core. It is evident that when the length of the paper is greater than the circumference of the core this method involves the use of a longer wrapper than the method above described. When, however, the length of the paper is less than one circumference of the core, this method of applying the wrapper is preferably used, the paper thus extending over a portion of the core and the wrapper completing the circuit and securing the paper in the same manner as before, except that the wrapped paper on being removed frem the core will spring out, forming a flat product. This method, employing a large core, may be found desirable in wrapping art-magazines and other publications which require to be wrapped flat full size. After the paper has been wound and wrapped it may be removed from the core either by pushing it endwise off the core or by withdrawing the core, permitting the paper to fall. In carrying out the former method I provide a movable ejector which acts against the end of the paper, and is preferably carried by arms upon a plunger mounted to slide within the core, the ejector pushing the paper before it during the advance movement of the plunger. To enable the paper to be more easily removed if the paper be wound closely upon the core, I prefer to use a collapsible core. In my preferred construction I mount a portion of the core-wall in such a manner that it may be withdrawn within the core, and I preferably make this collapsible section of spring metal and use it also as the movable gripper above referred to, by which the paper is seized, being held in position to close the gripper during the winding of the paper and automatically withdrawn to open the gripper when the paper is to be removed from the core.

While it is possible to deliver the wrapped papers directly from the core, I prefer to combine with the core a drying-chamber, to which the wrapped papers pass from the core and in which they remain a sufficient length of time to permit the paste or other adhesive material by which the wrappers are secured to set, and I prefer to heat this drying-chamber to hasten this setting. The drying-chamber will be so formed as to hold the wrapped paper in form until the paste has set, or provided with suitable means for this purpose. A simple and convenient construction which I have found effective for this purpose is that of a cylinder or partial cylinder forming a continuation of the core, into which the papers are successively pushed from the core by the ejector, this cylinder being preferably made of sufficient length to hold two papers, so that each paper remains in the drying-chamber during the operation of wrapping the two next papers.

The papers may be delivered in circular form, but in many cases a flat form is preferable, and for the purpose of producing this form of product I preferably deliver the papers from the core or drying-chamber to flattening mechanism, which may be of any suitable construction. I prefer to use two flat surfaces, between which the papers are delivered, these surfaces moving toward and from each other, so that the papers as they pass to the final delivery are pressed one or more times between the surfaces and flattened.

The simplest form of machine embodying my invention has but a single core, and it is evident that such a machine may be of very simple construction and may be operated at a comparatively-high rate of speed. I increase the capacity of the machine largely, however, by using a plurality of cores, receiving and wrapping papers successively. These cores may be arranged and operated in any suitable manner; but I prefer to mount them in a rotating carrier, so that the cores have two movements, one a movement of rotation, by which the paper and wrapper are wound, and the other a movement of revolution about the axis of the carrier, by which the cores are successively brought into position to receive a paper and wrapper and to deliver a wrapped paper to the drying-chamber above described, or to a delivery of such other form as may be employed.

While it is evident that the principle of my invention may be used in a machine by which either or both the paper to be wrapped and wrapper are fed to the machine by hand, and a practical machine may thus be constructed, especially for wrapping magazines and similar publications, I prefer to make the machine perfectly automatic by combining with the construction previously described, by which the papers are automatically taken by the wrapping mechanism and automatically delivered therefrom, feeding mechanisms for both the papers to be wrapped and wrappers. The papers may be taken directly from the last folding devices of a folding-machine or the delivery mechanism of a printing-press; but where the papers are previously printed and the wrapping-machine is an independent machine they will preferably be placed folded or unfolded in a feeding box or holder and fed mechanically to the core, either with or without folding, as preferred. The wrappers also may be previously cut and placed in a feeding box or holder in the machine from which they are fed to the core by suitable feeding mechanism; but I prefer to use a wrapper-web and sever wrappers of the desired length in the machine, and I provide, also, a pasting mechanism, by which a portion of the wrapper is rendered adhesive for securing the wrapped paper.

It is evident that the machine thus briefly outlined may be varied widely in construction and that the form and arrangement of the different feeding, pasting, wrapping, and delivering devices will depend largely upon

the size and character of the publication to be wrapped and the form of product desired. For the purpose of illustration, however, I have shown in the accompanying drawings a complete automatic machine embodying my invention in one of the preferred forms and certain modified forms of construction, and a full description thereof will now be given, reference being had to the drawings, in which—

Figure 1 is a side elevation of the complete machine. Fig. 2 is a plan view. Fig. 3 is a front elevation, the shell of the heating-chamber being sectioned. Fig. 4 is a front elevation of the delivery end of the machine. Fig. 5 is an elevation of the delivery end. Fig. 6 is a sectional diagram, the section being taken on the lines 6 6 of Figs. 2 and 3, showing the feeding mechanism as feeding without folding and the wrapper as received by the core after the paper is partly wound. Fig. 7 is a similar view showing the paper-feeding mechanism as operating to impart a fold to the paper before delivering it to the core and the paper and wrapper as received by the core simultaneously. Fig. 8 shows the operation of folding. Fig. 9 is a detail of the gripper-cylinders adjusted as in Fig. 6. Fig. 10 is a similar view showing the parts in a different position and adjusted for folding, as in Fig. 7. Fig. 11 is a longitudinal section through the cores and drying-cylinders, taken on the line 11 11 of Fig. 13. Fig. 12 is a similar section on the line 12 12 of Fig. 13. Fig. 13 is a cross-section of the carrier and cores on the line 13 13 of Fig. 11, showing the parts in the position they occupy as the core is taking a paper. Fig. 14 is a similar view showing the parts as the core is taking a wrapper. Fig. 15 is a section on the line 15 15 of Fig. 11. Fig. 16 is a section on the line 16 16 of Fig. 11. Figs. 17 and 18 and 19 and 20, respectively, by pairs, are details of the core and diagrams of the products on a much enlarged scale, showing the two methods of wrapping. Fig. 18[a] is a perspective of the product shown in Fig. 18 on the same scale as the main views. Figs. 21 and 22 are details hereinafter referred to. Fig. 23 shows a machine using a single core. Figs. 24 and 25 are views similar to Figs. 17 and 19, showing a modified form of core. Figs. 26, 27, and 28 show the same form of core applied to wrapping a magazine, the parts being shown in three different positions during the operation of wrapping. Figs. 29 to 32 show a modified form of machine in which the core consists of grippers, the paper and wrapper being seized at their edges by the grippers and removed from the cores by withdrawing the latter from the wrapped paper. Fig. 29 is a sectional plan showing the parts in the position they occupy while receiving a paper and wrapper. Fig. 30 is a sectional elevation of the same, the section being taken on the line 30 30 of Fig. 29. Fig. 31 is a view similar to Fig. 29, showing the paper partially wrapped. Fig. 32 is a similar view showing the cores withdrawn for the delivery of the wrapped paper. Fig. 33 is a view similar to Fig. 29, showing a modified form of machine in which a stationary core and rotating wiper are used, one end of the wrapping devices being shown in plan and the other in section. Fig. 34 is a cross-section on the line 34 of Fig. 33.

Referring now to Figs. 1 to 22, the complete machine shown therein will first be described. The frame may be of any suitable form for supporting the operative parts of the machine. As shown, it consists of two main interior side frames A B, in the upper part of which are supported the paper and wrapper feeding mechanisms, and the two exterior side frames C D at the lower part of the machine, in which are supported the wrapping and delivering mechanisms. In the lower front part of the machine a shaft E is mounted in side frames C D, and upon this shaft is mounted to rotate therewith a carrier carrying four wrapping-cores *a b c d* and four drying-chambers *e f g h*, the cores lying between frames A B. At the right hand of the machine, outside frame A, the shaft E is surrounded by a fixed cam-cylinder G, by which the ejector for removing the wrapped papers is operated. The carrier and drying-chambers extend outside the inner main frame B at the left side of the machine and are surrounded by a shell H, forming a large drying-chamber, which is heated by a burner I, placed below the shell. Outside the drying-chambers is placed the flattening mechanism K, by which the papers are received from the drying-chambers and delivered to the receptacle L, which may be of any suitable form. In the upper part of the machine at the rear side are mounted the paper holding and feeding devices, the latter consisting of a box M for holding the papers *x* to be wrapped and feeding mechanism for advancing one paper at a time from the box to the core. In the upper part of the machine at the front side are mounted the wrapper-roll N and devices for cutting and pasting the wrappers *y* and feeding them to the core. The wrapping and delivering mechanisms and the paper and wrapper feeding devices are driven from the main shaft O through the main driving-gear P and suitable gearing, all of which will be described hereinafter in connection with the various parts.

The wrapping and delivering mechanisms will first be described in detail and then the paper and wrapper feeding devices.

The carrier may be of any suitable construction to support and carry with it in its rotation the wrapping-cores and drying-cylinders. As shown, it consists of two heads 10 11, which are connected by suitable tie-rods 12 and secured to the shaft E by a spline, as shown, or in any other suitable manner. The shaft E is driven from the main driving-gear P through gear 14, pinion 15, and intermediate 16. As the cores *a b c d* are identical in construction and operation, a descrip-

tion of one and its operating mechanism will suffice, and the same references will be used for corresponding parts of the four cores. The core *a* in its preferred form, as shown, consists of a hollow cylinder, which is open at one side to receive the paper and wrapper, and is preferably provided on its inner side, just at the rear of the opening, with a stop 1, against which the paper is received. The opening is preferably made of a length substantially as shown, extending through a considerable arc of the circumference of the core, and a plate 17, preferably of spring metal, is mounted in said opening, so that when in its outer position it fills out the circumference of the core and when withdrawn within the core against stop 18 reduces the circumference of the latter, so as to loosen the wrapped paper and allow it to be readily removed from the core in cases in which the paper is wound closely upon the core. This plate 17 is preferably constructed to act, also, as a movable gripper, the loose end 2 pressing the paper against the edge 3 of the core next the stop 1 and holding the paper firmly when the plate is in its outer position. The plate 17 carries upon its inner side a projection or lug 19, by which it is pressed outward to complete the circumference of the core and grip the paper, and the core is provided with slots 4 for arms carrying the ejector, as hereinafter described.

For winding the paper closely upon the core when the rear end is released it is preferable that an abutment or wiper should be provided outside the core, by which the paper is pressed during the operation of wrapping. These wipers consist in the construction shown of spring-plates 20, supported by the tie-rods 12, to which they are secured in any suitable manner. Two of these wipers 20 are preferably used with each core, being mounted upon opposite sides of the same, so as to approximately surround the core, except at the point where the paper is received. It is evident, however, that while the form of wiper shown gives a free spring movement and is adapted for papers of widely-different thicknesses the wiper may consist of a single plate surrounding any suitable portion of the core, or be of any other suitable construction.

In the construction now being described, in which the wrapped paper is pushed from the core, I provide a movable ejector, which consists of a thin ring 23, which moves over the outer surface of the core inside the wipers 20, so as to carry the wrapped paper with it from the core. This ejector is carried by a rod or plunger 21, mounted inside the core and moving longitudinally therein, this rod 21 having arms 22, moving in slots 4 in the core, as previously described, and attached to the ejector, as shown in Fig. 21. This plunger 21 carries, also, a cam projection or lug 24, preferably adjustably secured thereon, as shown, which lug is adapted to engage the lug 19 upon the spring-plate 17 and force the latter outward to complete the circumference of the core and grip the paper when the plunger is in its position with the ejector withdrawn from the core and to pass out of engagement with the lug 19 and allow the plate to spring inwardly when the ejector is actuated for the purpose of removing the wrapped paper from the core.

The portion of the core *a* upon which the paper is wrapped is of a length to accommodate papers of the greatest width to be wrapped by the machine. The core, however, is extended through the drying-chamber *e* to the head 11 of the carrier, and at its opposite end is provided with a sleeve 25, which passes freely through the gear 13 and head 10 of the carrier. The plunger 21 slides freely in this sleeve, and is freely supported at its opposite end in a vertical support 26, mounted inside the core within the drying-chamber, which support serves, also, as a bearing for the end of the core on the shaft. The core and ejector rotate together, and this movement of rotation is imparted by a pinion 27, mounted upon the outer end of the sleeve 25 on the core and engaging a pinion 28, carried by a sleeve 29, loose on the shaft E, and extending through the center of the cam-cylinder G to the inside of the frame C, where it is provided with a pinion 30, actuated directly from the main driving-gear P.

The driving connections are shown clearly in Figs. 1, 3, 11, 12, and 15, the pinion 28 upon the sleeve 29 being mounted centrally of the carrier and engaging the four pinions 27, which operate, respectively, the cores *a b c d*, the cores thus rotating on their own axes, driven from pinion 28 and having, also, a movement of revolution with the carrier through the connections of shaft E, previously described. The timing of the gears will be described hereinafter in connection with the operation of the machine.

For the purpose of moving the ejector and plunger longitudinally of the core and at the same time permitting their free rotation with the core the plunger 21 carries at its outer end a collar 31, secured in position longitudinally of the rod, but loose thereon, this collar 31 carrying a bowl 32, pivoted thereto, to oscillate freely longitudinally of the rod and moving in a cam-groove 33 in the interior of the cam-cylinder G. This cam, as shown in Figs. 2, 3, 11, and 12, actuates the plunger longitudinally, and is timed to withdraw the ejector from the core for the receipt of the paper and bring the cam-lug 24 into position to close the gripper 17 as the paper is received, holding it in this position during a portion of the rotation of the carrier while the paper is being wrapped, and then by a quick movement advance the ejector longitudinally of the core to push the wrapped paper into the drying-chamber, the ejector then being returned to position for another wrapping operation.

The drying-chamber *e* is arranged opposite the end of the core *a*, and may be of any suit-

able form or provided with any suitable devices to hold the wrapped paper in form until the paste has set. It will preferably be constructed, as shown, of two curved plates of metal arranged opposite each other, so as to form a partial cylinder open on opposite sides, thus permitting the free entrance of the heated air to the paper for the purpose of drying the paste. These plates 34 are preferably mounted upon the tie-rods 12 by means of screw-threaded studs carried by the plates, so that they may be adjusted for varying slightly the size of the drying-chamber, as shown clearly in Fig. 16. The chamber is preferably made of a length equal to that of two of the papers of the greatest width to be wrapped by the machine, so that each wrapped paper will remain within the drying-chamber during the wrapping of the next two papers. The edges of the plates 34 next the core will preferably be flanged outward, as shown at 35, so that the wrapped papers may readily be forced from the core into the drying-chamber by the ejector.

The four drying-chambers *e f g h*, as previously stated, correspond to the cores *a b c d* and are moved with the cores and carrier in the rotation of the latter. The length of time during which the wrapped papers remain in the drying-chambers may be depended upon for drying the paste; but I prefer to provide means for heating the drying-chambers and papers, and for this purpose I secure to the frame B the shell H, previously referred to, which incloses the drying-chambers *e f g h* and forms a larger drying-chamber, this chamber having a narrow longitudinal opening at the base, below which is supported the burner I, by which the drying heat is furnished. The wrapped papers may be finally delivered directly from the drying-chambers and either flattened by independent mechanism or mailed in circular form. I prefer, however, to provide the machine with a flattening mechanism, a simple and convenient form of which is shown in Figs. 4 and 5. This mechanism consists of two plates 36 37, arranged in position to receive the papers from the core and mounted at their lower ends at a distance apart equal to the thickness desired for the product, and bent outward at their upper ends to form a funnel-shaped guide, through which the papers are guided from the drying-chambers. The plate 36 on one side is stationary and mounted in any suitable manner in the machine. The plate 37 is pivoted in the frame of the machine at 38, so as to oscillate to and from the plate 36, and is preferably formed in two parts pivoted together at 39, as shown in Fig. 5, the upper part of which forms, together with the upper part of plate 36, the funnel-shaped guide previously referred to, being guided during the oscillation of the plate by a slide 40, secured thereto and moving in guides 41, carried by a sleeve 42, mounted loosely on a bar 43, supported in the frame of the machine. The shaft 38 is rocked to oscillate the plate 37 by means of a crank-arm 44, connecting-rod 45, and crank-disk 46, carried by one of the shafts of the wrapper-feeding mechanism. Any other suitable means, however, may be used for this purpose. Below the lower ends of the plates 36 37 is placed the receptacle L, to which the papers are delivered.

It is evident that the mechanisms thus far described form a complete machine for wrapping and delivering papers and similar publications and that the papers and wrappers may be fed thereto by hand or mechanically by any suitable devices. The operation of wrapping and delivering a paper by this machine will now be described in detail, therefore, the papers and wrapper being assumed to be fed thereto by hand and otherwise.

In Figs. 1 to 13 the machine is shown after a series of papers have been wrapped and with the core *a* just after receiving and gripping a paper. In this position of the parts the core *b* has just completed wrapping a paper and its ejector is about to be operated to force the wrapped paper from the core, a wrapped paper has just been removed from the core *c* and the ejector is about to be withdrawn, and the ejector has been partially withdrawn from the core *d*, so that the latter as the carrier reaches the end of its next quarter-revolution will be in position and ready to receive the next paper, which is just in advance of the position shown in Fig. 14. Each of the drying-chambers *e f g h* contains two papers, and a paper has just been delivered from the drying-cylinder *g* and is passing to the flattening mechanism, while the paper previously delivered from the drying-cylinder *h* is passing through the flattening mechanism to the receptacle L. The relative positions of the different cores, drying-chambers, ejectors, and the operating devices are shown clearly in Figs. 11, 12, and 13, and these figures therefore will illustrate the position which the core *a* and parts co-operating therewith will successively assume in the operation of wrapping and delivering a paper, as now to be described. In the construction shown the gears by which the carrier is driven and the cores rotated are so timed relatively to each other that the cores rotate twice to each quarter-revolution of the carrier. With the method of folding shown in Fig. 6 and the main views, therefore, in which the paper is first wrapped about the cylinder and then the wrapper introduced between the rear end of the paper and the first layer, the core *a* receives the paper just before reaching the position shown in Figs. 11 and 13, while the ejector 23 and plunger 21 are still on the return movement and the cam-lug 24 about to engage the lug 19 within the core. The paper having been received against the stop 1, the lug 24 engages the lug 19 and forces out the spring-plate 17 to complete the circumference of the cylinder and grip the paper

between the gripper 2 and the edge 3 of the core. The paper having been gripped, as shown in Figs. 6 and 13, the carrier continues its forward movement, and at the same time the core rotates inside the carrier in the opposite direction, both as shown by the arrows in Fig. 13. As the core rotates the paper is wound tightly about it, pressing against the wipers 20, and at the end of the first rotation of the core, when the paper has been wound about it once and its end is about to be closed down upon the first layer by the continued rotation of the core, the latter is brought into position by the movement of the carrier to receive the wrapper, this position being shown in Fig. 14. The wrapper is of sufficient length to go once around the wrapped paper and overlap upon itself sufficiently for pasting, and paste or other suitable adhesive material is applied to the rear end of this wrapper. As the carrier moves onward, therefore and the core completes its second and commences its third rotation, the pasted end of the wrapper is pressed down upon the previous wrapper-layer by the wipers 20 and the wrapped paper secured thereby. The core *a* has now reached the position of core *b* in Figs. 11 and 13. During the operation thus far described the bowl 32 on the plunger 21 has been moving through that portion of the cam-groove 33 which is parallel with its line of rotation and the plunger is held in its withdrawn position, with the ejector 23 withdrawn from the core and the lug 24 engaging the lug 19 and holding the spring-plate 17 in position to grip and hold the paper. When the paper is fully wrapped, however, the bowl 33 has reached the position shown in connection with the plunger of the core *b* in Figs. 3 and 11 and is now about to enter upon the part of the cam-groove 33 by which the plunger is actuated to eject the wrapped paper from the core. As the carrier moves forward from this position, therefore, the plunger is moved longitudinally through the core with a quick movement, as shown by the form of the cam. The lug 24 is first moved out of engagement with the lug 19 on the inside of the spring-plate 17, and the latter springs inward against the stop 18, opening the gripper and collapsing the core, so as to loosen the wrapped paper, and as the paper is loosened the ejector 23 strikes the edge of the wrapped paper and pushes it from the core *a* into the drying-chamber *e*. As it advances into the drying-chamber it pushes before it the previously-wrapped papers contained therein, and the outer paper, upon which the paste is now set, is pushed from the core and delivered to the funnel formed by the upper part of the plates 36 37 and passes downward between them to the receptacle L, the paper being flattened somewhat as it passes through the funnel and the flattening being completed as it passes downward by the oscillation of the plate 37 toward the plate 36 as the shaft 38 is rocked by the crank-disk 46, all as shown in Fig. 5. The discharge movement of the ejector just described commences during the second quarter of the revolution of the carrier, and, as shown in Figs. 3, 11, and 13, the ejector reaches its inner position and the wrapped paper is fully discharged from the core as the carrier completes its second quarter-revolution, the position of the parts being that shown in connection with the core *c* in the figures referred to. The plunger is now withdrawn as the carrier moves onward, the cam-surface of the groove 33, by which the ejector is returned, being so timed that at the end of the third quarter the ejector is about half returned, as shown in connection with the core *d* in Fig. 12, and the ejector is fully withdrawn to permit the passage of the next paper to the core as the latter reaches the proper position, when the lug 24 engages the lug 19 of the spring-plate 17 and completes the circumference of the core, gripping the paper just as it is taken by the core, as shown in Figs. 6 and 13. The operation thus described in connection with the core *a* is repeated in connection with the cores *b c d*, the cores successively seizing the papers and wrappers and wrapping and delivering the same. The use of a number of cores in a single carrier increases the capacity of the machine by giving time for the action of the ejector on one core and its return while papers are being wrapped by the other cores and permits the use of cams of easy movement.

The operation thus far described is that in which the wrapper is taken after the first rotation of the core and received between the rear end of the paper and the first layer of the paper upon the core. The relative positions of the paper and wrapper upon the core when the paper is fully wrapped is shown clearly in the enlarged view, Fig. 17, and the product after the flattening operation in diagram in Fig. 18, the paper being shown in full and the wrapper in broken lines. In Fig. 18[a] the product is shown in perspective on the same scale as the main views.

The operation of the machine when the paper and wrapper are fed to the core together, as shown in Fig. 7, is exactly the same, except that when this method is employed for papers of a length equal to or less than one circumference of the core of course the winding of the paper and wrapper about the core is completed before the core completes its second rotation and reaches the position of the carrier in which the paper is ejected, a part of the second rotation of the core therefore having no function in the wrapping process. The position of the paper and wrapper upon the core when the paper is fully wrapped by this method is shown in Fig. 19 and the product after the flattening operation in diagram in Fig. 20, the paper being shown as of a length equal to half the circumference of the core.

In the drawings the paper is shown as wound about the core but once or less; but it is evi-

dent that this will depend upon the length of the paper and size of the core employed. In the construction shown the core is designed to be about seven inches in circumference, so that the papers wrapped by the first method are previously folded to a length of about nine or ten inches and the product is about three and one-half inches wide. These relative sizes of core and paper will be found to produce a product of convenient form, as shown in Fig. 18ª. It is evident, however, that with a core of this size papers of any desired length may be wrapped by increasing the number of rotations of the core before the wrapper is applied by the first method or increasing the number of rotations of the core before delivery and lengthening the wrapper in the second method, the construction being modified in an obvious manner for this purpose. While this size of core will be found convenient, it is evident that if a smaller and more-closely-wrapped product be desired the size of the core may be reduced to any extent desired, and that, on the other hand, the size of the core may be increased, so as to form products of larger size, this depending upon the size, thickness, and character of the publications to be wrapped. As above stated, the flattening mechanism may be omitted, if desired, and the papers be delivered in circular form directly from the cores or drying-chambers. The form of product in this case is obvious from Figs. 17 and 19. With a light newspaper and core of considerable size this construction would not be desirable; but with a smaller core, so that the paper is wrapped closely, such a form is practical, and with thick magazines and similar publications it will be found the preferred form of product, as will be evident from Figs. 25 to 27, which show a simple form of wrapping mechanism for such publications.

While the wrapping and delivering devices thus far described form a complete wrapping-machine, to which the newspapers and wrappers, or either of them, may be fed by hand, it is desirable for rapid work that the machine should be made automatic by combining therewith paper and wrapper feeding devices. These devices may be of any suitable form and will be varied to some extent in accordance with the size and character of the publications to be wrapped. The machine, with the feeding devices, moreover, may be a complete independent machine or form an attachment to a printing-press or folding-machine and the papers be received therefrom.

In the drawings I have shown my invention embodied in a complete independent machine of a preferred form, in which the papers are previously folded to a convenient size and then fed from a box or holder to the wrapping devices either with or without another fold. It is evident that the wrappers may be previously formed and fed to the machine from a holder in a similar manner; but I prefer to feed the wrappers from a wrapper-web and combine with the feeding devices cutting and pasting devices, by which wrappers of the desired length are severed and pasted, the machine thus being made automatic and capable of very rapid operation.

The paper-feeding devices will now be described in detail.

The holder M, in which the papers *x* to be wrapped are placed, is mounted in any suitable manner at the top of the side frames A B, and is preferably constructed with its sides 47, carried by bars 48, sliding in the frame of the machine, and held in position by set-screws 49, so that they may be adjusted to accommodate papers of different widths and the papers still be held centrally of the box and in proper position relatively to the feeding devices and cores. The rear end of the box 50 is also made adjustable by means of set-screws 51 to accommodate papers of different lengths and hold the papers forward in the box in proper position. The bottom of the box is formed of slats 52, placed at suitable distances apart to allow the passage between them of feeding-fingers 53, carried by a feeding-cylinder 54 below the box for the purpose of feeding forward the bottom paper, the fingers 53 being preferably made of rubber or roughened for this purpose. The feeding-fingers preferably extend within the box a sufficient distance to raise the body of papers during the feeding movement, and one or more curved spring-fingers 55 are mounted upon the front end of the box, so as to bear upon the paper as it is advanced by the feeding-fingers, the lifting of the papers tending to loosen and separate them, so as to allow the bottom paper to be fed forward, and the curved spring-fingers, in combination with this lifting feature, operating to prevent more than a single paper being fed out. To aid in securing this result, a series of pins 5 are provided, which are carried by a plate 56, mounted on the front end of the box over the spring-fingers, and point downward between the fingers. The spring-fingers 55 are so arranged relatively to the papers and pins 5 that the passage of a single sheet does not press the spring-fingers upward sufficiently to uncover the pins 5; but upon the passage of two or more papers below the spring-fingers they are raised sufficiently to uncover the pins 5 between them, which thus engage the front edge of all the papers except the lower one and hold them against movement from the box, the lower paper being allowed to pass forward. To secure the accurate positioning of the pins 5 relatively to the papers and spring-fingers, the plate 56, carrying the pins, is preferably slotted, as shown, and secured to the box by means of the set-screws 6, so that it may be adjusted vertically toward and from the spring-fingers. The spring-fingers and pins are shown as extending in series across the full width of the paper; but this is not necessary. A single finger and pin may be sufficient in some cases, this depending

iewhat on the thickness of the papers. ;se devices for feeding papers from a pile n no part of the present invention, but are med in my application, Serial No. 410,636, l November 2, 1891.

he feeding mechanism for the papers after ing the holder consists of a gripper-cylin- 57, by which the papers are received from holder, a feeding-roll 58, co-operating ewith, guides 59, extending from the grip- cylinder and roll to the core and between :h the papers are advanced, and feeding- s 60, by which papers are fed after leav- :he gripper-cylinder 57 and roll 58.

ıy suitable construction may be used for gripper-cylinder 57; but I prefer to use shown, in which the grippers 61 are piv- y mounted in carriers 62, so as to oscil- freely transversely to the cylinder, these ers 62 being carried by a rock-shaft 63, ıted in the heads of the cylinder and ded with a segmental gear 7, by which haft is oscillated by a segmental gear 64, ed by a second rock-shaft 65, also mount- the heads of the cylinder and provided le one of the heads with a crank-arm 66, ing a bowl 67, operated by a cam 68, se- to the frame of the machine, the shaft ing rotated in the opposite direction by s of a crank-arm 69 and spring-pressed). For the purpose of guiding the grip- l during the rocking movement of shaft shaft 65 is slotted and the stems of the ers 61 passed through these slots, which pered inwardly from both sides of the 65, as shown at 8 in Figs. 8 and 9, so he grippers are guided only upon a nar- ne and are free to oscillate therein in irections, the shaft 65 rocking with the rs, so as to permit free movement of ipper-stems while guiding them posi-

This special construction of grippers tuating mechanism, therefore, forms no the present invention, but is claimed application, Serial No. 401,652, filed t 4, 1891.

s simplest form the machine is adapted papers without folding, and the mech- thus far described is complete for this e. It is desirable, however, that the ıism should wrap papers of different ıd in connection therewith it is fre- desirable to fold the paper after it :he holder, and, as previously stated, :hine shown is thus constructed. For rpose the gripper-cylinder 57 carries olding-blade 71, which may be of any vell-known constructions. The fold- le 71 acts to fold the papers to fold- s 72, from which they pass between anch guides 73 to the guides 59 and , and are then advanced to the core, e case of the unfolded papers, a piv- tch 74 being provided to guide the l sheets to the guides 59 or permit pass on with the cylinder for folding. own in Figs. 9 and 10, the fixed cam 68 is constructed so as to open the grippers against the spring-pressure at the point at which the papers must be released for folding, as in Fig. 10, the gripper then remaining open until the gripper-cylinder reaches the position shown in Fig. 9, when the paper is received from the box and the gripper released by the cam, so as to be closed by the spring-pressed rod 70, the paper then being advanced by the gripper-cylinder. This operation of the grippers is the same, whether the paper be folded or not. It is evident, however, that the grippers must be operated to release the paper at a different point when the paper is not to be folded, and for the purpose of opening the grippers in this case and permitting them to remain closed when the paper is to be folded I provide an auxiliary cam 75, mounted upon the face of the main cam and made adjustable, preferably, by the construction shown, in which the cam is slotted and secured in position by bolts 76, so that the cam may be moved outward into position to engage the bowl 67 on crank-arm 66, as shown, and open the grippers to release the sheet or withdrawn within the line of the cam 68, so as not to engage the bowl, but permit the grippers to pass the cam unopened. The pivoted switch 74 is adjusted by means of an arm 77 and set-screw 78 into position to guide the released unfolded paper from the gripper-cylinder through the guides 59 or to permit the gripped paper to pass onward with the cylinder for folding, the first position of the switch being shown in Figs. 6 and 9 and the second position in Figs. 7, 8, and 10.

As shown in Fig. 6, the lower ends of the guides 59 are in position to deliver a sheet directly to the opening in a core when the latter is in position to receive it, and the driving mechanism for the feeding devices must be timed accurately to the mechanism by which the carrier and cores are actuated, so that successive papers will be delivered to the successive cores at the proper time.

The driving mechanism for the paper-feeding devices is driven from gear 14, previously described, as follows: The gear 14 drives the gripper-cylinder 57 through an intermediate 79, meshing with a gear 80 on the shaft of the gripper-cylinder, and which in turn drives the feeding-roll 58 directly by gear 81 and the feeding-tapes 60 by a train of gears 82. The shaft of the intermediate 79 carries a pinion 83 of half the size of the gear 14, and this pinion drives the feeding-cylinder 54 through gear 84 of the same size as pinion 83 and a series of intermediates 85. The gearing between the main driving-shaft O and the gripper-cylinder 57 and carrier are so timed, as will be seen by an inspection of the drawings, that the gripper-cylinder makes one revolution to a quarter-revolution of the carrier and a paper is taken and one delivered to a core as each of the cores successively reaches the proper position. As the gears rotating the cores are timed accurately with relation to

the carrier, so as to rotate twice to one-quarter revolution of the carrier, the cores and paper-feeding mechanism are necessarily timed so that the cores are in proper position to receive the papers as the latter are delivered. It is evident that the length of time between the delivery of successive papers must be substantially the same, whether the papers are folded or unfolded, in order that the paper to be wrapped may in both cases reach the core while the latter is in proper position and the gripper open to receive it or provision be otherwise made for the proper reception of the papers. In order to secure this, the guides 59 and 73 are so arranged, as shown in Figs. 6 and 7, that the time required for feeding the paper directly from the gripper-cylinder 57 through the guides 59 to the cores is very nearly the same as that required for carrying the leading end of the paper into the position shown in Fig. 8, folding it between the rolls 72, and delivering through the branch guides 73 and main guides 59 to the core, and it is evident that the construction may readily be varied, so as to make the time of movement of the unfolded and folded papers exactly the same. In the construction shown, however, in which the path of the folded sheet is very slightly longer than that of the unfolded papers, the proper reception and gripping of the papers by the core is assured, as the leading end of the unfolded paper is advanced into the core to the stop 1 a greater distance than is necessary for gripping, so that the unfolded paper will be gripped even though not advanced into the core so far, and, moreover, the gripper remains open for a considerable time and is so shaped that the papers will be received by the core even though the time of their arrival at the core be varied slightly. No adjustment of the feeding mechanism beyond the gripper-cylinder is necessary, therefore, for folding a paper except the adjustment of the switch 74, as previously described. When the paper is to be folded, however, it will frequently be necessary to change the time at which the grippers 61 take the paper in order to secure the proper delivery of the papers to the cores. This adjustment may be effected in any other suitable manner; but it will be found a simple and convenient method to break the connection between the gripper-cylinder and the driving mechanism and rotate the cylinder to the desired position. For this purpose the gears 79 and 83 and the first intermediate 85 are made removable, as shown in Fig. 1. This removal of the gears 83 85 also permits the feeding-cylinder 54 to be adjusted so that the feeding-fingers 53 will advance a paper to the grippers 61 at the proper time in accordance with the changed position of the grippers.

Referring now to the wrapper feeding and pasting mechanism, the wrapper-web roll N is mounted upon the front side of the machine, and thence the wrapper Y passes to a pair of feeding and perforating rolls 86, of any suitable construction, by which the wrapper is perforated and fed forward between the guides 87, these guides extending downward to the core and the lower portion 88, next the core, being pivoted at 89, so as to be moved into different positions and form a switch for delivering a wrapper to the core after the paper has been partially wrapped or simultaneously with the paper, according to the method of wrapping employed, as previously described. The wrapper-web may be previously perforated, if desired; but I prefer to perforate in the machine, as shown. Below the feeding and perforating rolls 86 is mounted a pair of pasting-rolls 90, one of which carries the paster 91, by which the paste is applied to the rear end of the wrapper, this paster receiving paste from a fountain-roll 92, rotating in a paste-fountain 93, provided with a doctor 94, as common in this class of construction. The paster 91 may be of any suitable construction and will be made of suitable size to apply a line or lines of paste of the desired width to the wrapper. From the paste-rolls 90 the perforated and pasted wrapper-web passes to a breaking-roll 95, which is provided with a feeding and breaking segment 96, preferably of rubber, which co-operates with a roll 97, engaged thereby, to break or completely sever the wrapper and advance it until it is held by the core, the feeding-segment 96 being made of sufficient length to feed forward the wrapper until it is gripped by the paper or core and then to pass out of engagement with the wrapper, so as not to engage the pasted rear end of the latter. The pivoted guides 88 are held in either of their two positions by thumb-pieces 98 on opposite sides of the guides, which are adapted to pass through slots in bars 99 when the thumb-pieces are turned in one direction and to be held in position by a thumb-piece when the latter is turned in the opposite direction, so that the guides may be held accurately in either position, as shown in Figs. 6 and 7, these holding devices being shown in detail in Fig. 22. An auxiliary guide 100 is provided for guiding the wrapper to the core when the wrapper and paper are taken by the latter simultaneously, as shown in Fig. 7, the wrapper passing directly downward from the guides 88 to the core when the wrapper is taken after one rotation of the core with the paper.

The driving mechanism of the wrapper-feeding devices must be adjusted with relation to the paper-feeding devices and the cores and carrier, so that the successive wrappers will be delivered at the proper time. The wrapper-feeding devices may be driven from any part of the driving mechanism; but it will be found convenient to gear these devices to the paper-feeding mechanism, and I have shown such a construction. The feeding and cutting cylinders 86 are geared together and are driven by a gear 101, which is driven from the gripper-cylinder 57 through the gear 81 of feeding-roll 58 and interme-

liates 102, the cutting-cylinders being timed so as to rotate one to each revolution of the gripper-cylinder. The paste and fountain rolls 90 91 and feeding-cylinder 95 are in turn driven from cutting and feeding cylinders 86 through suitable gears 103, the breaking and feeding cylinder 95 being timed to rotate once to each rotation of the cutting-cylinders.

In changing from the method of folding shown in Figs. 6, 13, 14, in which the paper is taken first and the wrapper fed at the next rotation of the core, to the method shown in Fig. 7, in which the paper and wrapper are taken simultaneously, it is necessary to shift the switch 88. For this the thumb-piece 98 on one side of the guides 88 is turned to release the latter and the guides swing on pivot 89 from the position shown in Fig. 6 to that shown in Fig. 7, where they are secured by means of the thumb-piece on the opposite side of the guides, the wrapper then being fed down past the guide 100 to the core substantially on the same line with the paper.

Upon changing the paper-feeding devices so as to fold the paper once after leaving the holder M, as previously described, no change of the wrapper-feeding devices is necessary, these devices bearing the same relation to the core and carrier, and the distance from the cutting-cylinders to the core being the same in all cases. As the wrapper-feeding devices are driven from the gripper-cylinder, however, it is necessary to disconnect the two paper and wrapper feeding devices before shifting the gripper-cylinder, and for this purpose there must be removed, in addition to the rolls 80 83 85, as previously described, one of the intermediates 102, which are shown as made removable for this purpose.

The operation of the paper and wrapper feeding devices is simple and generally set forth in the foregoing description, so that a brief description of their operation in connection with the wrapping and delivering mechanism will suffice. Assuming that the papers are not to be folded, the bottom paper x is fed from the box M by the feeding-fingers 53 to the grippers 61, the passage of more than one paper being prevented by means previously described, and the paper is seized by the grippers 61 and carried thereby to the feed-rolls 58, where, the cam 75 being in its outer operative position, as shown in Fig. 9, the paper is released, and as it is advanced by cylinder 57 and rolls 58 it is guided by the switch 74 through the guides 59 to the feeding-tapes 60, by which it is advanced to the core a, which is now in position to receive it with the gripper open. The paper is then gripped and wound about the core, as previously described, during one rotation of the core, the carrier being moved forward until the parts are in the position shown in Fig. 14. Meanwhile a wrapper has been partially severed by the feeding and perforating cylinders 86, has received a line of paste from the paster 91, been fully severed by the breaking and feeding cylinders 95 97, and is now in the position shown in Fig. 14, inside the unwrapped rear end of the paper As the rotation of the core and carrier continues the wrapper is closed between the rear end of the paper and the previously-wound layer and gripped, so as to be fed forward thereby as it is wound about the paper and core, the feeding-segment 96 upon the cylinder 95 passing out of engagement with the wrapper, so as not to engage the pasted portion. The operation of wrapping and delivering the paper thus received, with its wrapper, then proceeds, as previously described, and the core d comes into position to receive the next paper as the latter is fed from the holder by the feeding-devices, as before. When the paper is to be folded, the switch 74 and cam 75 are shifted into the position shown in Fig. 9 and secured therein by the means provided for this purpose, the folding-blade also being thrown into operation, and, if necessary, the gripper-cylinder 57 and feeding-fingers 53 are adjusted in proper position relatively to the cores and their carriers, the guides 88 also being shifted from the position shown in Fig. 6 to that shown in Fig. 7, all as previously described. The paper received by the gripper 61 is then carried about the cylinder and folded between the folding-rolls 72, as shown in Figs. 7 and 8, and passes thence through the guides 73 and 59 to the core. The wrapper, advanced as before, reaches the core at the same time as the paper and the two are gripped together by the grippers, as shown in Fig. 7, the wrapping and delivering then proceeding as previously described.

If a single core be used, it is evident that the construction may be simplified greatly. In Fig. 23 I have shown such a construction with core a of the construction just described, the parts being shown as in Fig. 11 and the same references being used for corresponding parts. In this construction the core has only rotary movement, the sleeve 25 being mounted in frame A, and the gears 27 28, by which this movement is given from shaft E, are proportioned to rotate the core four times to each rotation of the shaft, the machine being shown as adapted to take the paper and wrapper simultaneously. The cam-cylinder G is carried by and rotates with shaft E, and the cam 33 is so timed as to remain withdrawn during two rotations of the core while the paper is being wrapped and then be actuated to remove the paper and withdrawn during the following two rotations. The single-core construction will be found sufficiently rapid for ordinary requirements, and it is evident that it may readily be adapted for either method of folding and the construction varied widely.

While I have shown and prefer to use a core provided with a movable gripper and constructed so as to collapse, thus rendering the proper seizure of the paper by the core more certain and the removal of the wrapped paper from the core more easy, I may omit these fea-

tures and employ a core of the general form shown, depending upon the bend in the paper formed by the rotation of the core to hold the paper until it is wrapped, the opposite edges of the paper-receiving opening thus forming stationary grippers. Such a construction is shown in Figs. 24 and 25, which illustrate the two methods of folding, Fig. 24 showing the wrapper taken after the paper is partially wound and Fig. 25 the paper and wrapper taken simultaneously. This construction will be found practical for papers having a considerable number of folds, so as to resist bending sufficiently to be held in position; but this construction is especially adapted for wrapping magazines and similar thick publications.

In Figs. 26 to 28 I have shown a simple arrangement for wrapping magazines with such a core. The core *a* is mounted so as to receive the magazine *x* from feeding-rolls 104 or other suitable feeding devices, or the magazine may be fed to the core by hand. As the core *a* rotates, the magazine is held by grippers 3 and rolled or wound, preferably, first against a wiper consisting of a roll 105, as shown, considerable resistance being required to bend the magazine, and then against a spring-wiper 106, as in the constructions previously described. As the core completes its first rotation the wrapper *y* is received and the pasted end of the wrapper is pasted against the roll 105 on the third rotation for securing the paper.

It is evident that the form of the core and the construction and arrangement of the core and delivery devices may be varied widely without departing from my invention.

In the constructions thus far described I have shown a form of core consisting of a cylinder open at one side to receive the paper and wrapper and around which the paper is wound, this cylinder extending the full length of the paper and the latter being removed by pushing it off the core. Instead of using a hollow cylinder, however, I may use grippers, which may be placed upon the outside of a cylinder receiving the paper or which may consist of two gripping-fingers seizing the paper between them and forming the core upon which the paper is wrapped. The paper, moreover, need not be supported throughout its length, but the grippers may seize only the edges of the paper and extend but a short distance within the wrapped paper. Instead of removing the wrapped paper from the core by pushing it from the latter I may withdraw the core from the product, thus releasing the latter and allowing it to fall or be otherwise carried to the delivery. The core, moreover, may be stationary and the wiper move about the core.

For the purpose of illustrating some of the modifications which may be made in the general construction of the mechanism shown as embodying my invention I have shown in Figs. 29 to 32 a machine differing in the specific construction of core and operating parts from that previously described, the cores in this case being formed by the fingers, which grip the papers at the edges, extending, preferably, but a short distance within the paper, and are withdrawn to release the latter when fully wrapped. Referring to these figures, in which the machine is shown only so far as necessary to illustrate the carrying out of my invention in the modified manner stated, the frame consists, preferably, of the three parts Q R S at each side of the machine, in which is mounted a shaft T, extending the full distance between the outside frames Q and carrying a cam U at each side of the machine, these cams rotating with the shaft T, which is driven from any suitable part of the driving mechanism through gears 107 outside the frame. At each side of the machine is mounted in the frame a shaft V, these shafts being rotated by means of gears 108, meshing with gears 107 on shaft T, and the shafts V being splined in the gears, so as to slide freely through the same, the gears being held in position by brackets, as shown, or in any other suitable manner. The inner frame-pieces S are mounted a sufficient distance apart to permit of wrapping the paper between them, and into the space between these two inner frames project a pair of grippers at each side, which together form the core, these grippers being carried by the shafts V and rotating and moving longitudinally therewith. As the construction of the shafts V, the cores or grippers carried thereby, and the operating mechanism is identical at both sides of the machine, the construction at but one side will be described, this description and reference letters and figures applying to corresponding parts on the other side.

The grippers K are bent at obtuse angles and at their angles are pivoted near the end of the shaft V on opposite sides, so as to form, when closed, a cylindrical core, practically a continuation of the shaft. Each of these grippers carries at its outer end a bowl 109 and on the opposite side of the pivot a bowl 110, these bowls being mounted so as to rotate freely and having a surface rounded longitudinally of the gripper. The opening in the inner frame S, through which the shaft and grippers slide, is made of a size sufficient to permit the passage of bowls 110, but to hold the grippers nearly closed during their passage, and this frame S is provided on its inner side with a ring 111, of less diameter than the opening in the frame, in passing which the bowls 110 are acted upon, so as to press the grippers *k* close together and grip the paper and wrapper tightly as they are received by the grippers. The bows 109 are acted upon by the rounded rear edges of the opening in the frame S to throw the grippers wide open for the reception of the paper and wrapper, this position being shown in Fig. 29. In this construction the ejector is stationary, as it is necessary only to hold the paper while the grippers are withdrawn therefrom, and the following con-

struction is used: The ejector 112 lies between the grippers and extends outside them when closed, so as to engage the body of the paper. The ejector is carried by arms 113, which extend longitudinally of the shaft V, lying in grooves 114 therein, and are provided with projections 115 at their rear ends, which lie outside the surface of the shaft V and rotate within a collar 116, formed by a bracket mounted on the inside of the middle frame R. By this construction the ejector 112 is held in position while the shaft V is withdrawn. The paper is pressed during wrapping and the wrapper secured by spring-wipers 117, similar to wipers 20, previously described, these wipers yielding to permit the grippers to open, as shown in Fig. 29, and returning to position when the grippers close to seize the paper.

The following means are provided for reciprocating the shaft V: A collar 118, formed on or secured to the shaft, rotates in a grooved segmental sleeve 119, which carries a pivoted bowl 120, which runs in a cam-groove 121 in the cam-cylinder U. The sleeve 119 is carried and held in position, with the bowl 120, within the cam-groove 121 by means of an arm 122, pivoted to the frame, as shown in Fig. 30, and slotted, so as to permit the sleeve to move to and fro with the shaft V. The gears 107 108 may be proportioned so as to give any desired number of rotations to the grippers before the latter are withdrawn from the product. As shown, four rotations of the grippers are made for each rotation of the shaft T, the paper being wrapped and grippers withdrawn during the time of two rotations and returned during the following two.

The operation of this machine will be understood from the drawings and a brief description. As shown in Figs. 29 and 30, a wrapper and paper are just being received by the grippers, the wrapper *y* being preferably, as shown, a little wider than the paper in order to overlap and protect the edges of the latter. In this position of the parts the shafts V are in their innermost position, the bowls 109 pressing against the outer sides of the frames S, so as to open the grippers *k* to their fullest extent, and the bowls 110 lie inside the collars 111. As will be seen from Fig. 29, the cams 119 are so formed that the outward movement of the shafts V is now just about to commence. As the cams U and shafts V therefore rotate forward from this position the shafts V are withdrawn slightly, and just as the paper and wrapper reach the position shown in Fig. 30 the bowls 110 on the grippers *k* come in contact with the collars 111 on the frames S, and as these bowls pass the collars the grippers *k* are closed together tightly upon the paper and wrapper and seize the latter as the movement of rotation commences, the paper and wrapper then being wound about the core formed by the closed grippers and against the wipers 117. The shafts V move freely outward, sliding over the bars 113, carrying the ejector 112, which, with the ejector, are held in place by the projections 115 within the collar 116, as previously described. The pivotal slotted connection between the arms 121 and the sleeves 119 permits the latter to move freely with the shafts V while being held in position with the bowls 120 in the cam-grooves 121. As the rotation of the cams and shafts continues and the paper and wrapper are wound about the core the shafts and grippers are withdrawn by the cams, so that the bowls 110 pass the collars 111 and then move along the inner surface of the openings in frames S, the grippers then being opened slightly, as shown clearly in Fig. 31, so as to permit them to be withdrawn from the paper as the shafts move outward. It will be seen from the form of the cams that the shafts are moving outward while the bowls 110 are passing the collars 111 and closed, so as to grip the paper and wrapper. The result is that a slight tension is put upon the side edges of the paper and wrapper, which smooths them out, avoiding wrinkles, and also assists in securing the correct winding of the paper and wrapper about the cores. As shown in Fig. 31, one rotation of the shafts V has been completed and the cores are about midway of their extreme positions. During the second rotation and the completion of the wrapping of the paper the bowls 110 move over the inner surface of the openings in frames S and are held slightly open, as shown. As the paper is fully wrapped and ready to be delivered the shafts have reached their outermost position and the cores are entirely withdrawn from the paper, as shown in Fig. 32. The paper then falls or is carried by any suitable mechanism to the delivery, and upon the further rotation of the cams U and shafts V the latter are returned to the position shown in Fig. 29 and the grippers are opened for receiving another paper and wrapper by the engagement of the bowls 109 with the outer edges of the openings in the frame S.

In Figs. 33 and 34 I have shown a machine of substantially the same construction as that just described, but in which the grippers forming the core have only the movements necessary for receiving and delivering the paper, the paper and wrapper being wound about the core during the process of wrapping by rotating the wiper around the core. In this construction the gears 107 108, connecting shafts T V, are omitted and gears 123 are carried by the shaft T inside the inner frames S, these gears 123 meshing with gears 124, mounted concentrically with the shafts V and rotating freely in bearings in the inner frames S. These gears 124 may be mounted in any suitable manner, and the collar 111, of the construction previously described, may be formed on the frame S or otherwise, as preferred. A simple construction is shown, in which the gears 124 are carried by sleeves mounted in openings in the frame S, the inner surface of the sleeve forming the surface over which the

bowls 110 move during the longitudinal movement of the grippers, the collars 111 being formed upon the inner sides of the gears 124, as shown. A single wiper will preferably be used, this wiper 117 being carried by a rod 125, secured at opposite ends to the gears 119, so that the gears are thus held in position in the frames S and the rod and wiper are carried by the gears in their rotation. The shafts V are moved longitudinally by means of the bowls 120 and cams 121, as before, the cams, however, being shown as timed so that the paper is wrapped and shafts withdrawn during the time of three rotations of the wiper and the shafts returned to position by a quicker movement during a single rotation. In this construction the pivoted bowls 120 may be secured to the shaft by a stud, as shown, and the collar 119 and arms 122 be omitted. The operation of the construction is substantially the same as that of the machine previously described, and no further description thereof is necessary.

The machine shown in Figs. 29 and 34 is claimed specifically in my application, Serial No. 430,658, filed April 26, 1892.

It will be understood that I have described only some of the preferred constructions of many in which my invention may be embodied and that all the constructions shown may be varied widely without departing from my invention. It will be understood that certain features of the machine shown are applicable generally in such constructions and may be used with wrapping mechanisms not employing the core, and are thus claimed herein.

What I claim is—

1. In a machine for wrapping newspapers and other publications, the combination of a core and means for winding the paper and wrapper upon the core and securing the wrapper about the core, substantially as described.

2. In a machine for wrapping newspapers and other publications, the combination of a core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, and means for removing the wrapped paper from the core, substantially as described.

3. In a machine for wrapping newspapers and other publications, the combination of a core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, a drying-chamber in which the paper is held in form until the paste is set, and means for transferring the wrapped paper from the core to the drying-chamber, substantially as described.

4. In a machine for wrapping newspapers and other publications, the combination of a core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, a drying-chamber in which the paper is held in form until the paste is set, means for transferring the wrapped paper from the core to the drying-chamber, and a flattening mechanism to which the papers are delivered from the drying-chamber, substantially as described.

5. In a machine for wrapping newspapers and other publications, the combination of a core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, and means for removing the wrapped paper from the core by moving one of them longitudinally, substantially as described.

6. In a machine for wrapping newspapers and other publications, the combination of a core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, and an ejector moving longitudinally of the core to remove the wrapped paper from the core, substantially as described.

7. In a machine for wrapping newspapers and other publications, the combination of a core, a wiper outside the core pressing against the paper, and means for rotating one of the members to wind the paper and wrapper upon the core, substantially as described.

8. In a machine for wrapping newspapers and other publications, the combination of a rotating core by which the paper and wrapper are held at one end and a wiper outside the core pressing against the paper during the rotation of the core, substantially as described.

9. In a machine for wrapping newspapers and other publications, the combination of a rotating core by which the paper and wrapper are held at one end and a spring-wiper outside the core pressing against the paper during the rotation of the core, substantially as described.

10. In a machine for wrapping newspapers and other publications, the combination of a rotating core by which the paper and wrapper are held at one end, a wiper outside the core pressing against the paper during the rotation of the core, and means for removing the wrapped paper from the core by moving one of them longitudinally, substantially as described.

11. In a machine for wrapping newspapers and other publications, the combination of a rotating core by which the paper and wrapper are held at one end, a wiper outside the core pressing against the paper during the rotation of the core, and an ejector moving longitudinally of the core to remove the wrapped paper from the core, substantially as described.

12. In a machine for wrapping newspapers and other publications, the combination of a core provided with grippers, a wiper outside the core pressing against the paper, means for rotating one of the members to wind the paper and wrapper upon the core, means for operating the grippers to seize the paper to be wrapped and release the wrapped paper for its delivery, and means for removing the wrapped paper from the core.

13. In a machine for wrapping newspapers and other publications, the combination of a rotating core provided with grippers, a wiper outside the core pressing against the paper during the rotation of the core, means for operating the grippers to seize the paper to be wrapped and release the wrapped paper for its delivery, and means for removing the wrapped paper from the core, substantially as described.

14. In a machine for wrapping newspapers and other publications, the combination of a rotating core provided with grippers, a wiper outside the core pressing against the paper during the rotation of the core, an ejector moving longitudinally of the core to deliver the wrapped paper, and means for operating the grippers to seize the paper as the ejector is withdrawn and release the paper for its removal by the ejector, substantially as described.

15. In a machine for wrapping newspapers and other publications, the combination of a collapsible core, means for winding the paper and wrapper upon the core and securing the wrapper about the core, means for removing the wrapped paper from the core, and means for expanding and contracting the core as the paper is received and delivered, substantially as described.

16. In a machine for wrapping newspapers and other publications, the combination of a collapsible core, a wiper outside the core pressing against the paper, means for rotating one of the members to wind the paper and wrapper upon the core, means for removing the wrapped paper from the core, and means for expanding and contracting the core as the paper is received and delivered, substantially as described.

17. In a machine for wrapping newspapers and other publications, the combination of a collapsible core, a wiper outside the core pressing against the paper, means for rotating one of the members to wind the paper and wrapper upon the core, an ejector moving longitudinally of the core to deliver the wrapped paper, and means whereby the core is expanded and contracted as the paper is received and delivered, substantially as described.

18. In a machine for wrapping newspapers and other publications, the combination of a rotating collapsible core, a wiper outside of the core pressing against the paper during the rotation of the core, an ejector moving longitudinally of the core to deliver the wrapped paper, and means whereby the core is expanded and contracted as the paper is received and delivered, substantially as described.

19. In a machine for wrapping newspapers and other publications, the combination of a rotating collapsible core provided with grippers for seizing the paper, a wiper outside the core pressing against the paper during the rotation of the core, an ejector moving longitudinally of the core to deliver the wrapped paper, and means whereby the grippers are operated to seize the paper and the core is expanded as the ejector is withdrawn and the grippers released and core contracted to release the wrapped paper for its removal by the ejector, substantially as described.

20. In a machine for wrapping newspapers and other publications, the combination of a series of cores, a rotating carrier by which the cores are carried, means for winding the papers and wrappers upon the cores and securing the wrappers about the cores, and means for moving the wrapped papers longitudinally for delivering them from the cores, substantially as described.

21. In a machine for wrapping newspapers and other publications, the combination of a series of rotating cores, a corresponding series of wipers outside the cores, a rotating carrier carrying the cores and wipers, and means for removing the wrapped papers from the cores, substantially as described.

22. In a machine for wrapping newspapers and other publications, the combination of a series of rotating cores, a wiper ou side each core, a series of ejectors moving longitudinally of the cores, and a rotating carrier by which the cores, wipers, and ejectors are carried, substantially as described.

23. The combination, with paper and wrapper feeding mechanisms and pasting devices for the wrapper, of a core to which the papers and wrappers are delivered by the feeding mechanisms and means for winding the paper and wrapper upon the core and securing the pasted wrapper, substantially as described.

24. The combination, with paper and wrapper feeding mechanisms and pasting devices for the wrapper, of a core to which the papers and wrappers are delivered by the feeding mechanism, means for winding the paper and wrapper upon the core and securing the pasted wrapper, and means for removing the wrapped paper from the core, substantially as described.

25. The combination, with paper and wrapper feeding mechanisms and pasting devices for the wrapper, of a core to which the papers and wrappers are delivered by the feeding mechanisms, means for winding the paper and wrapper upon the core and securing the pasted wrapper about the core, and means for removing the wrapped paper from the core by moving one of them longitudinally.

26. The combination, with paper and wrapper feeding mechanisms and pasting devices for the wrapper, of a core to which the papers and wrappers are delivered by the feeding mechanisms, a wiper outside the core pressing against the paper, and means for rotating one of the members to wind the papers and wrappers upon the core, substantially as described.

27. The combination, with paper and wrap-

per feeding mechanisms and pasting devices for the wrapper, of a core provided with grippers to which the papers and wrappers are delivered, a wiper outside the core pressing against the paper, means for rotating one of these members to wind the papers and wrappers upon the core, means for operating the grippers to seize the paper to be wrapped and release the wrapped paper for its delivery, and means for removing the wrapped paper from the core, substantially as described.

28. The combination, with paper and wrapper feeding mechanisms and pasting devices for the wrapper, of a collapsible core to which the papers and wrappers are delivered by the feeding mechanisms, means for winding the papers and wrappers upon the core and securing the pasted wrappers, means for removing the wrapped papers from the core, and means for expanding and contracting the core as the papers are received and delivered, substantially as described.

29. The combination, with paper and wrapper feeding mechanisms, of a series of cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a rotating carrier by which the cores are carried, means for winding the papers and wrappers upon the cores and securing the wrapper about the cores, and means for moving the wrapped papers longitudinally to remove the papers from the cores, substantially as described.

30. The combination, with paper and wrapper feeding mechanisms, of a series of cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a rotating carrier by which the cores are carried, means for winding the papers and wrappers upon the cores and securing the wrappers about the cores, a series of ejectors moving longitudinally of the cores, and a rotating carrier by which the cores and ejectors are carried, substantially as described.

31. The combination, with paper and wrapper feeding mechanisms, of a series of cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a rotating carrier by which the cores are carried, means for winding the papers and wrappers upon the cores and securing the wrappers about the cores, a series of ejectors moving longitudinally of the cores, a series of drying-chambers to which the wrapped papers are delivered by the ejectors, and a rotating carrier by which the cores and ejectors are carried, substantially as described.

32. The combination, with paper and wrapper feeding mechanisms, of a series of cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a rotating carrier by which the cores are carried, means for winding the papers and wrappers upon the cores and securing the wrappers about the cores, a series of ejectors moving longitudinally of the cores, a series of drying-chambers to which the wrapped papers are delivered by the ejectors, a rotating carrier by which the cores and ejectors are carried, and a flattening mechanism to which the wrapped papers are delivered from the drying-chamber, substantially as described.

33. The combination, with paper and wrapper feeding mechanisms, of a series of rotating cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a corresponding series of wipers outside the cores, and a rotating carrier by which the cores and wipers are carried, substantially as described.

34. The combination, with paper and wrapper feeding mechanisms, of a series of rotating cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a wiper outside each core, a series of ejectors moving longitudinally of the cores, and a rotating carrier by which the cores, wipers, and ejectors are carried, substantially as described.

35. The combination, with paper and wrapper feeding mechanisms, of a series of rotating cores to which in turn the papers and wrappers are delivered by the feeding mechanisms, a wiper outside each core, a series of ejectors moving longitudinally of the cores, a series of drying-chambers to which the wrapped papers are delivered by the ejectors, and a carrier by which the cores, wipers, ejectors, and drying-chambers are carried, substantially as described.

36. The combination, with a wrapping mechanism, of a paper-feeding mechanism, a paper-holder, a gripper-cylinder forming a part of said mechanism and receiving papers from the holder, and detachable driving connections for said gripper-cylinder whereby the position of the gripper-cylinder relatively to the wrapping mechanism may be adjusted, substantially as described.

37. The combination of a core, a wiper outside the core, means for rotating one of said members, a paper-feeding mechanism, and a wrapper-feeding mechanism delivering a wrapper between the rear end of the paper and the core, substantially as described.

38. The combination of a core, a wiper outside the core, means for rotating one of said members, a paper-feeding mechanism, a wrapper-feeding mechanism, and means for adjusting said wrapper-feeding mechanism to deliver a wrapper to the core simultaneously with the paper or to deliver a wrapper between the rear end of the paper and the core, substantially as described.

39. The combination of a series of cores, a wiper outside each core, means for rotating one of said members, a rotating carrier by which the cores and wipers are carried, a paper-feeding mechanism delivering papers to the cores successively, and a wrapper-feeding mechanism having a switch constructed

to guide the wrapper to the core simultaneously with the papers or between the rear end of the paper and the core.

40. The combination of a rotating and traveling wrapping-core, a paper-feeding mechanism, and a wrapper-feeding mechanism having an adjustable switch for guiding the wrapper to the core at different points of its travel substantially as described.

41. The combination of a wrapping mechanism, a paper-feeding mechanism, a wrapper-feeding mechanism, and means for adjusting said wrapper-feeding mechanism to deliver a wrapper with the leading end of the paper or beneath the overlapping rear end of the paper, substantially as described.

42. The combination of a wrapping mechanism, a feeding mechanism for advancing a perforated wrapper-web, a pasting mechanism for applying paste to the wrapper, and a breaking and feeding segment, substantially as described.

43. The combination of a web-feeding mechanism for advancing a perforated web, a pasting mechanism for applying paste to the wrapper, and a breaking and feeding segment engaging the unpasted portion of the web, substantially as described.

44. The combination of a paper-wrapping mechanism, a drying-chamber in which the wrapped papers are held in form until the paste has set, and means for transferring the wrapped papers from the wrapping mechanism to the drying-chamber, substantially as described.

45. The combination of a paper-wrapping mechanism, a drying-chamber in which the wrapped papers are held in form until the paste has set, means for transferring the wrapped papers from the wrapping mechanism to the drying-chamber, and a flattening mechanism to which the papers are delivered from the drying-chamber, substantially as described.

46. The combination, with a paper-wrapping core, of a wiper outside said core, means for rotating one of said members, an ejector coacting with said core to remove the wrapped paper, and a cam and connections for moving one of them longitudinally, substantially as described.

47. The combination, with a paper-wrapping core, of a wiper outside said core, an ejector, means for rotating said core, and a cam and connections for operating said ejector, substantially as described.

48. The combination, with a hollow paper-wrapping core having a collapsible section, of a wiper outside said core, an ejector, a plunger inside the core carrying the ejector and engaging and actuating the collapsible section to expand and contract the core, means for rotating the core, and a cam and connections for moving the plunger longitudinally of the core, substantially as described.

49. The combination, with a hollow paper-wrapping core having a movable gripper for seizing the paper, of a wiper outside said core, an ejector, a plunger inside the core, carrying the ejector and actuating said gripper, means for rotating the core, and a cam and connections for moving the plunger longitudinally of the core, substantially as described.

50. The combination of a series of rotating paper-wrapping cores, wipers outside said cores, ejectors, a rotating carrier by which the cores and ejectors are carried, and a cam and connections for actuating said ejectors, substantially as described.

51. The combination of a series of rotating paper-wrapping cores, wipers outside said cores, ejectors, plungers carrying said ejectors and moving longitudinally of said cores, a rotating carrier by which the cores and plungers are carried, and a cam and connections for actuating said plungers, substantially as described.

52. The combination of a series of rotating hollow paper-wrapping cores, wipers outside said cores, ejectors, plungers inside said cores carrying said ejectors, a rotating carrier by which the cores and plungers are carried, and a cam and connections for actuating said plungers, substantially as described.

53. The combination of a series of rotating hollow paper-wrapping cores, wipers outside said cores, ejectors, drying-chambers to which the wrapped papers are delivered by the ejectors, plungers inside said cores carrying said ejectors, a rotating carrier by which the cores, plungers, and drying-chambers are carried, and a cam and connections for actuating said plungers, substantially as described.

54. The combination, with a paper-wrapping core consisting of a hollow cylinder having an opening on one side to receive the end of the paper, of means for winding the paper and wrapper upon the core, substantially as described.

55. The combination, with a paper-wrapping core consisting of a hollow cylinder having an opening on one side to receive the end of the paper and a movable gripper, of means for actuating said gripper to seize and release the paper and means for winding the paper and wrapper about the core, substantially as described.

56. A paper-wrapping core consisting of a hollow cylinder having a collapsible section coacting with the core-body to form a gripper, substantially as described.

57. The combination, with a paper-wrapping core having a collapsible section coacting with the core-body to form a gripper, of means for actuating said collapsible section to seize and release the papers and means for removing the papers from the core, substantially as described.

58. The combination, with a paper-wrapping core having a collapsible section, of an ejector

and a plunger moving inside the core with the ejector and engaging and actuating said collapsible section, substantially as described.

59. The combination, with a paper-wrapping core having a spring collapsible section, of an ejector and a plunger moving inside the core with the ejector and engaging and actuating said collapsible section, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:
M. B. PHILIPP,
A. F. ACTON.