(No Model.)

4 Sheets—Sheet 1.

# L. C. CROWELL.

## WRAPPING MACHINE.

No. 603,585. Patented May 3, 1898.



Fig. 1.



Fig. 2.

Attest:
Geo. Boral
A. L. Kent

Inventor
Luther C. Crowell
By Philipp Phelps
& Sawyer
Attys

(No Model.)

4 Sheets—Sheet 2.

# L. C. CROWELL.

## WRAPPING MACHINE.

No. 603,585. Patented May 3, 1898.

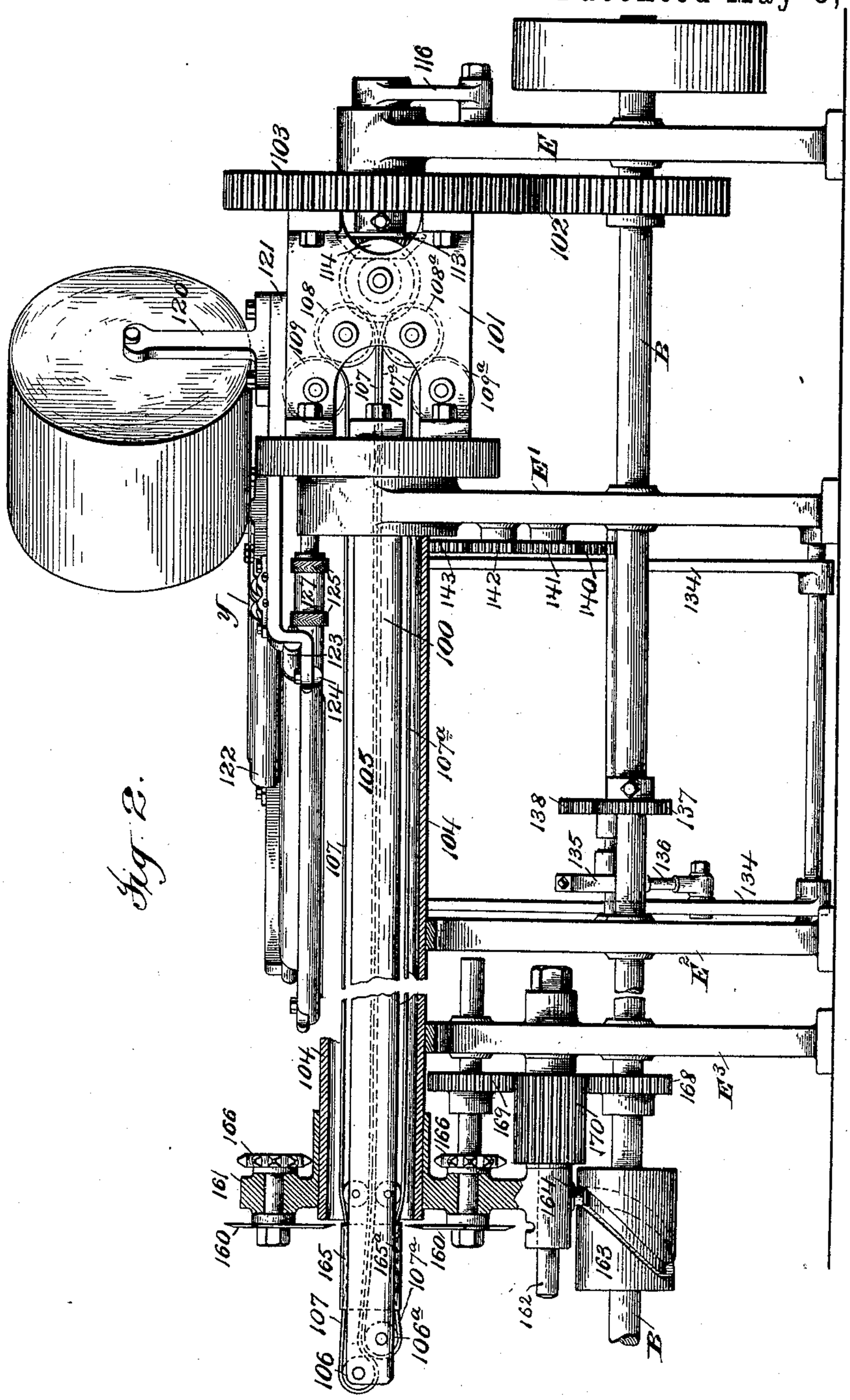


Fig. 2.

Attest:
Geo. Boush
A. L. Kent

Inventor
Luther C Crowell
By
Philipp Phelps Sawyer
Attys

(No Model.) 4 Sheets—Sheet 3.

# L. C. CROWELL.

## WRAPPING MACHINE.

No. 603,585. Patented May 3, 1898.

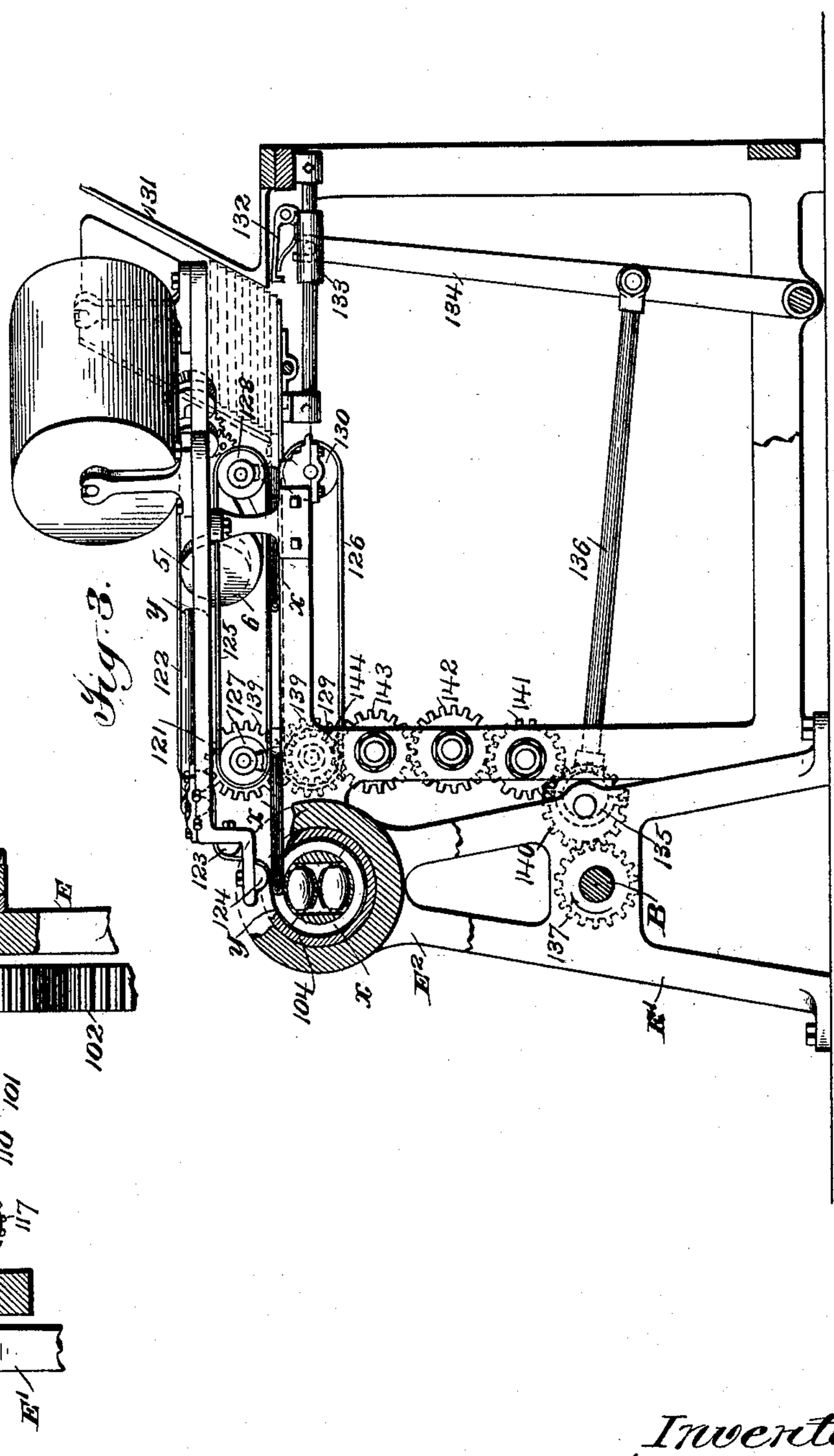



Fig. 3.

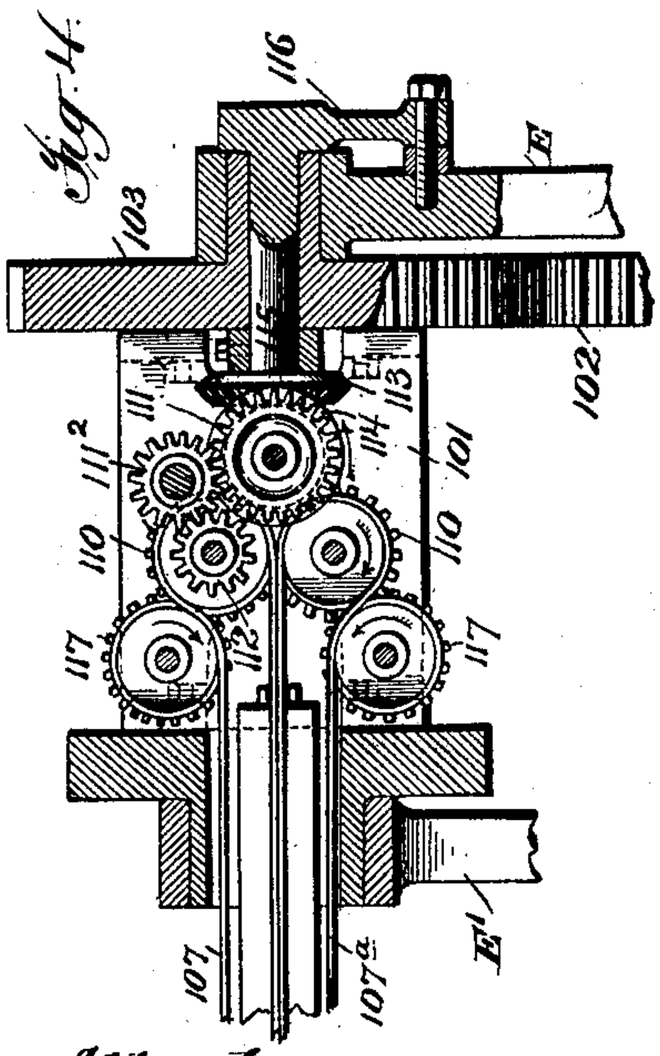



Fig. 4.

Attest:
Geo. Boyd
A. L. Hall

Inventor:
Luther C. Crowell
By Philipp Phelps Sawyer
Attys

(No Model.)

4 Sheets—Sheet 4.

# L. C. CROWELL.

## WRAPPING MACHINE.

No. 603,585. Patented May 3, 1898.

Fig. 6.

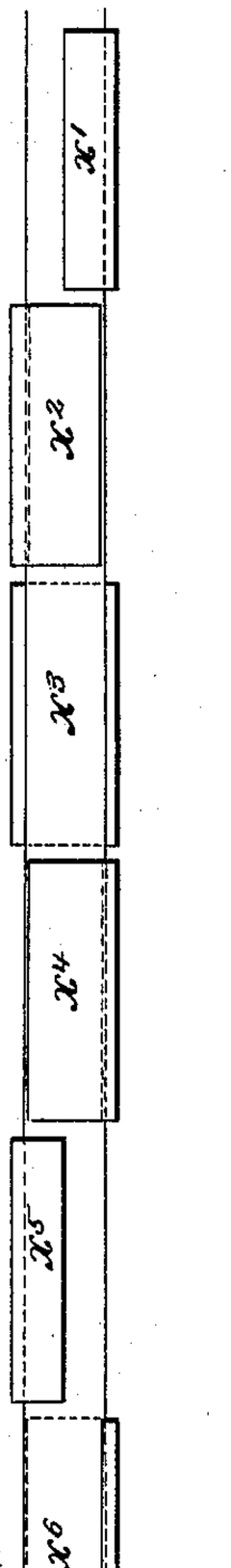



Fig. 7.

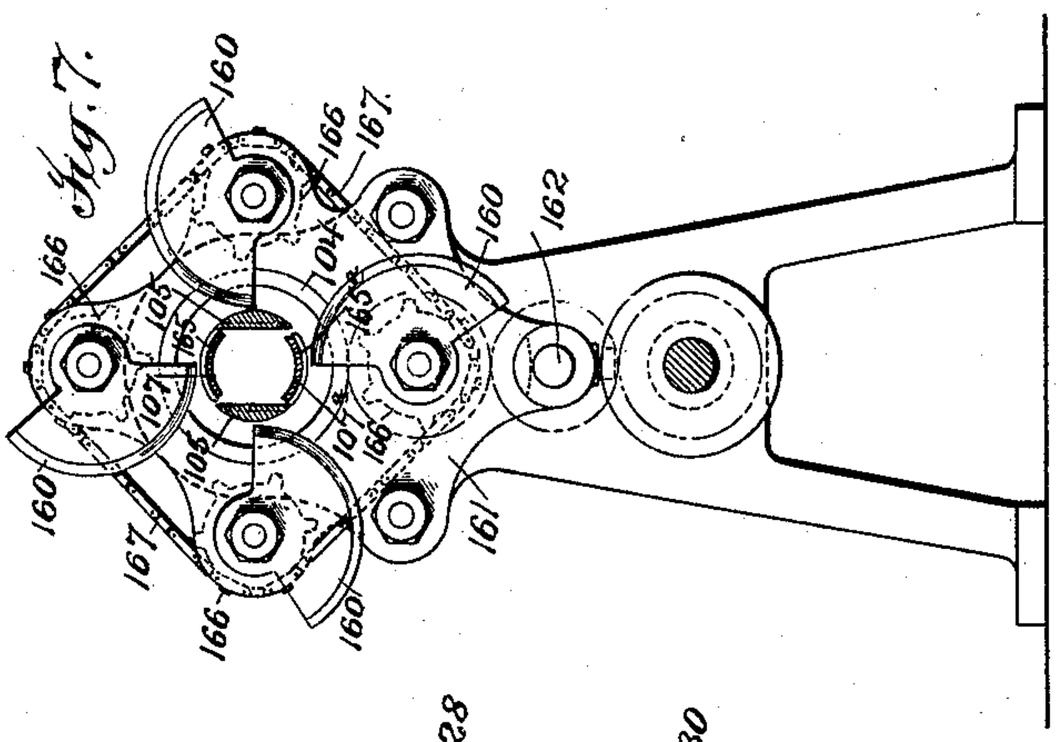
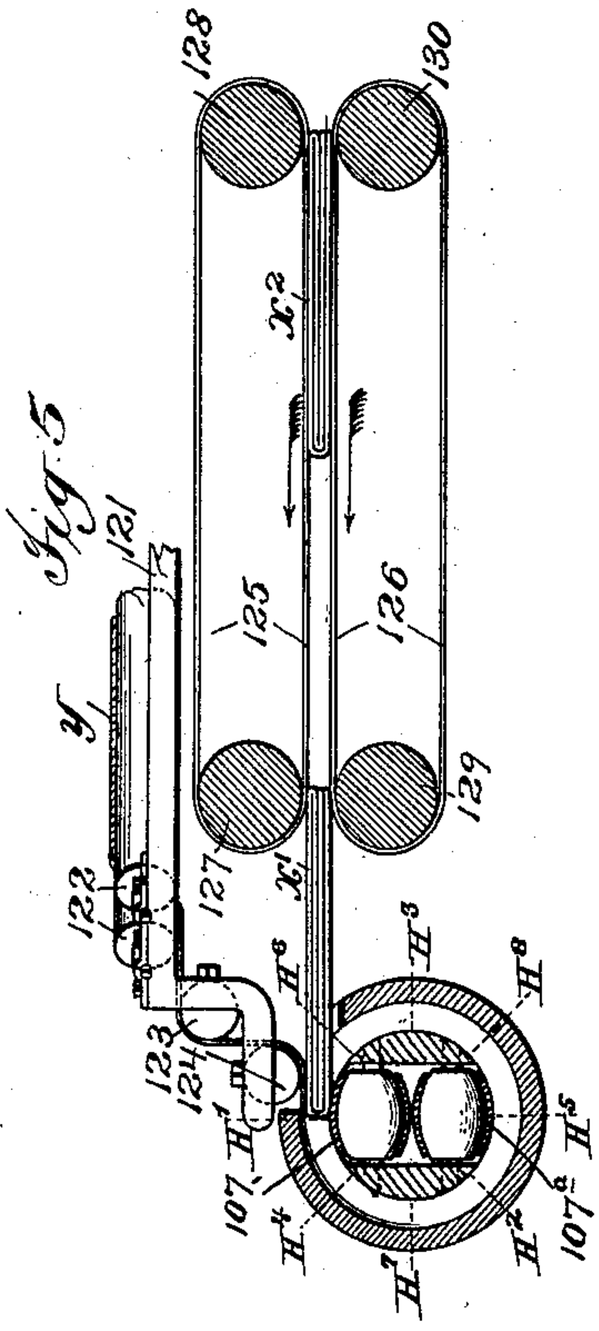



Fig. 5




Attest:
[illegible]

Inventor:
Luther C Crowell
By
Philipp Philipp Sawyer
Attys

# UNITED STATES PATENT OFFICE.

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

## WRAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 603,585, dated May 3, 1898.

Application filed August 4, 1897. Serial No. 647,040. (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 Wrapping-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to machines of that class employed in wrapping newspapers and other publications or similar articles, and more particularly to such machines whereby a succession of independent papers or other articles to be wrapped are advanced and enveloped in wrappers wound spirally about the papers as they are longitudinally advanced, the edges of successive layers or windings of wrapper overlapping and being secured together by a line of paste applied by suitable pasting devices to one edge of the wrapper. A continuous wrapper-web is preferably employed to form a continuous spirally-wound wrapper-tube about the papers, which is afterward severed at or near the junction between the successive papers and the wrapped papers delivered separately from the machine.

According to the present invention the papers are advanced by interior feeding devices, and in the preferred construction embodying the invention the successive papers are bent about a core and advanced longitudinally on the core by belts forming a portion of the surface of the core, a continuous wrapper-web being wound spirally about the core and the papers thereon to form a continuous spirally-wound wrapper-tube inclosing the papers and the core. The core is preferably arranged to rotate, so that the wrapper-web, being guided to the core at an angle, will be drawn forward by the rotary and longitudinal movements of the papers on the core and wound spirally about the papers and the core. The papers are preferably fed to the core by mechanism advancing them successively in a direction transverse to the axis of the core.

The core is preferably of such a size that its circumference is about equal to twice the width of the papers to be wrapped, so that the papers will extend about half-way around the core. The wrapper-tube formed about the paper and the core will thus be of a size that will permit the papers being flattened out after leaving the core and to fit snugly about the papers when they are so flattened out. By the "width" of the papers is meant the dimension of the papers measured circumferentially of the core.

For severing the wrapper-tube at or near the junction between the successive papers, so that the papers may be delivered from the machine completely wrapped and separated one from another, I preferably employ one or more—depending upon the timing of the parts of the machine, but preferably a plurality of—continuously-rotating segmental severing-blades, arranged to move longitudinally of and at the same speed with the wrapper-tube during the time that they are rotating in cutting position, and said blades being returned to their original or normal position during that portion of their rotation in which they are not in position for engaging the wrapper-tube. The rotation of the segmental severing-blades being properly timed and the blades extending through the proper portion of a circle, according to the rate of rotation of the core and the number of said segmental severing-blades employed, the rotating wrapper-tube will be completely severed at the desired points between the papers.

The invention includes also, broadly, a wrapping-machine having a core, preferably a rotating core, upon and longitudinally of which the papers to be wrapped are advanced and simultaneously enveloped in wrappers applied about the papers and core in any suitable manner, although the method of spiral winding is preferably employed.

A full understanding of the invention can best be given by a detailed description of a preferred construction embodying all the features of the invention, and such a description will now be given in connection with the accompanying drawings, showing such a construction, and the features forming the invention will then be specifically pointed out in the claims.

In said drawings, Figure 1 is a plan view of such a machine, partly in section. Fig. 2 is a front elevation, partly in section, on line 2 of Fig. 1. Fig. 3 is a view taken on line 3 of

Fig. 1, showing the paper-feeding and wrapper guiding and supporting mechanisms in elevation. Fig. 4 is a section on line 4 of Fig. 1. Fig. 5 is a section on line 5 of Fig. 1. Fig. 6 is a diagram showing the relative positions of successive papers on the core. Fig. 7 is a view taken on line 7 of Fig. 1, showing the wrapper-severing mechanism in elevation.

Referring to the drawings, the rotating core 100, about which the papers are bent while being inclosed in the spirally-wound wrapper-tube, is carried by a rotary frame 101, mounted to rotate in bearings in standards E E′ and rotated from the main driving-shaft B by means of a gear 102 on said shaft, meshing with a gear 103, carried by the frame. The core is inclosed in a cylindrical casing 104, supported by the standard E′ and by standards $E^2$ and $E^3$, in the space between which casing and the core the papers are advanced spirally and inclosed within the wrapper, as hereinafter described.

The core 100 is formed with a portion of its surface arranged to move longitudinally from the frame 101 for the purpose of advancing the papers longitudinally of the core within the casing. This longitudinal movement of a portion of the surface of the core is preferably secured by forming the core of a supporting-frame 105, which preferably itself forms a portion of the surface of the core and which carries at its outer end rolls 106 and $106^a$, about which turn feeding-belts 107 and $107^a$, which extend longitudinally of the core and turn also about rolls 108 and $108^a$, supported in the frame 101 and on guide-rolls 109 and $109^a$, also supported in the frame 101. The rolls 106 and $106^a$ are preferably formed with their peripheries curved convexly, so as to cause the outside portions of the belts forming a portion of the periphery of the core to take a corresponding form. The guide-rolls 109 and $109^a$ and the rolls 108 and $108^a$ also have their peripheries curved for the same purpose, the peripheries of the guide-rolls 109 and $109^a$, however, being curved concavely instead of convexly. The rolls 108 and $108^a$ are geared together by gears 110 and are driven to drive the belts 107 and $107^a$, so that their outer portions shall move in a direction away from the frame 101 by means of a gear 111, through an intermediate $111^2$, meshing with a gear 112 on the shaft of one of said rolls, said gear 111 being driven from a bevel-gear 113, meshing with a bevel-gear 114, turning with the gear 111, said gear 113 being carried by a stud 115, extending through the end of the frame 101 in the line of the axis about which the frame rotates and carrying an arm 116, which is secured to the standard E. The gear 113 will thus be held stationary while the frame 101 rotates, and the gear 114, moving with the frame, will be rotated by engagement with the stationary gear 113, thus driving the belts as desired. The guide-rolls 109 and $109^a$ are also preferably driven rolls, being driven from the gears 110, which mesh with gears 117 on the shafts of said guide-rolls.

The casing 104 is cut away, so as to form an opening 4, as shown best in Figs. 1 and 5, through which the wrappers and the papers to be wrapped are advanced to the core. The wrappers *y*, which in the machine shown are wound about the papers in the form of a continuous or unbroken web to form a continuous wrapper-tube about the core and the papers thereon, are guided to the space between the core and the casing at an angle to the core from a web-roll suitably supported, as by supports 120, carried by a frame 121, passing, preferably, between guide-rolls 122 and then turning downward over a guide-bar 123 and then beneath a guide-bar 124, said guide-bars being supported by the frame 121 and extending longitudinally of the core. The guide-bar 124 lies preferably in position to guide the papers as they are advanced to the core, as hereinafter described, and to hold the papers in contact with the core, as shown in Fig. 5. As the wrapper-web advances to the core it receives a line of paste at one edge from a paste-roll 5, rotating in a fountain 6.

The papers *x* are fed to the core transversely and entered between the core and the wrapper-web preferably in a direction at right angles to the length of the core by means of feeding-tapes 125 and 126, turning on rolls 127 and 128 and 129 and 130, respectively, and are advanced to said feeding-tapes at proper intervals from a pile contained in a holder 131 by means of a reciprocating spring-pusher 132, by which the bottom papers are advanced successively beneath the edge of the front side of the holder, as usual in such constructions, the spring-pushers being carried by a sliding bar 133, which is reciprocated by means of rocking arms 134, rocked by an eccentric 135 through a rod 136, the eccentric being driven from a gear 137 on the main driving-shaft B, meshing with a gear 138 on the shaft carrying the eccentric. The rolls 127 and 129 carry intermeshing gears 139 and are driven from a gear 140 on the shaft carrying the eccentric 135 through a train of gears 141 142 143, the gear 143 meshing with a gear 144 on the shaft of the roll 129. The paste-roll 5 is driven from the shaft of the roll 128 as follows: The shaft of the paste-roll carries a belt-pulley 146, which is driven through a belt 147 from a pulley 148, carried by a short shaft, which is driven from a gear 149 on the shaft of the roll 128 through a train of gears 150 and bevel-gears 151.

The operation of the parts thus far described is as follows: As the papers are advanced successively at the proper intervals by the feeding-tapes 125 and 126 the forward edge of each paper is entered between the wrapper-web and the core, as shown in Figs. 2 and 5, and each paper as it is engaged by the core is further advanced by the rotation of the core and its rear edge drawn out of en-

gagement with the tapes 125 and 126, the rolls 127 and 129 being positioned, preferably, at such distance from the core as to retain their grasp on the paper only long enough to insure the paper being fed into engagement properly with the core. Then as each paper is advanced about the core by the rotary movement thereof it will be advanced longitudinally of the core by the feeding-belts, so that it will be caused to follow a spiral course about the axis of the core. Each succeeding paper being similarly advanced spirally about the axis of the core, the wrapper-web will by engagement with the papers be drawn spirally about the papers and the core, so as to form a continuous spirally-wound wrapper-tube inclosing the papers and the core, the edges of each wrapper overlapping and being secured by the paste which has been applied at one edge of the wrapper. The papers as they are advanced to the core are preferably of such a width as to extend substantially halfway around the core when bent about the core, so that when the wrapper-tube and inclosed papers are flattened the papers will substantially fill the flattened wrapper-tube. I prefer to time the rotation of the core and the feeding of the papers to the core relatively, so that a paper will be advanced to the core for each five-eighths of a revolution thereof—that is, in the preferred construction shown the pusher 132 is reciprocated so as to advance a paper from the holder to the feeding-belts 125 and 126 for each five-eighths of a revolution of the core, the papers being thus delivered from the belts to the core one for each five-eighths of a revolution of the core. The relative position of successive papers on the core will be understood from Figs. 5 and 6. Supposing the forward edge of one of the papers to engage the core at H′, as indicated in Fig. 5, then the forward edge of the following paper would engage the core at a point $H^2$ in said figure when the core had made five-eighths of a rotation to bring the point $H^2$ in the position occupied in the figure by the point H′. Similarly the next following paper would engage the core at the point $H^3$, the one following that at the point $H^4$, and so on until eight papers had been advanced to and bent about the core, after which the next paper would again engage the core at the point H′, the core making five complete revolutions for each eight papers advanced to it. Fig. 6 illustrates diagrammatically the position taken on the core by the successive papers as they would appear looking downward upon the core, the core being represented as extended for the purpose of showing papers in all the different positions on the core. The successive papers in this figure marked $x'$ $x^2$ $x^3$, &c., correspond in position with papers whose forward edges engage the core at the points H′ $H^2$ $H^3$, &c., as indicated in Fig. 5. The core-belts 107 and 107ª should be driven at such a speed, depending upon the length of the papers to be wrapped—that is, the dimensions of the paper lengthwise of the core as it is fed to the core—that each paper will be moved longitudinally of the core out of the path of the succeding paper as it is fed to the core, so that the successive papers as they are received on the core will not interfere. As the wrapper-tube is advanced with the inclosed papers beyond the casing 104 it is severed between the papers by a series of continuously-rotating segmental severing-blades 160, arranged about the path of the wrapper-tube and inclosed papers and mounted to rotate in a plane at right angles to the axis of the core. The several segmental blades are rotated together and timed so that their cutting edges move across the path of the wrapper-tube at the same time, and during the time that the blades are moving across the path of the wrapper-tube—that is, during the time in which they are acting to sever the wrapper-tube—the blades are moved in the direction of the movement of and at the same speed as the wrapper-tube, being for this purpose carried by a frame 161, mounted to slide on the casing 104 and on a stud 162. I preferably provide four such segmental blades, and in the construction shown, where the core makes only five-eighths of a rotation for each paper wrapped, each blade will preferably be formed of a segment which forms two-fifths or a trifle more of a circle, and the blades are driven so that each blade makes one complete rotation for every five-eighths of a rotation of the core. The frame 161 is reciprocated to move the cutting-blades longitudinally of the core by means of a cam-groove in a cam-cylinder 163, engaging a stud 164, on the frame, said cam-groove being formed so that when the segmental cutting-blades begin to sever the wrapper-tube they will be moving longitudinally with the wrapper-tube and so that this movement will be continued until the segmental blades have rotated out of the path of the wrapper-tube. Then during the time that the blades continue their rotation and before they again begin to move through the path of the wrapper-tube the frame is moved backward to its original position. The rotating and advancing wrapper-tube will thus be completely severed by the combined action of the several segmental blades moving with the tube and therefore acting to cut the tube in lines at right angles to its length as it rotates and advances, each segmental blade cutting the tube for a portion of its circumference and the several cuts thus made by the different blades meeting to complete the severing of the tube. The core preferably extends beyond the severing-point, as shown, and in order to prevent the feeding-belts 107 and 107ª being cut by the severing-blades they preferably run beneath guards 165 and 165ª, by which they are caused to move in a line out of reach of the severing-blades for a distance corresponding to the travel of the severing-blades longitudinally of the core in severing. The seg-

mental severing-blades are preferably geared to rotate together by means of sprocket-wheels 166, carried by the shafts of the several blades, and a sprocket-chain 167, turning on the several sprockets-wheels, and are driven from a gear 168 on the main driving-shaft B, which gear drives a gear 169 on the shaft of the lowermost of the cutting-blades through an intermediate 170. The intermediate 170 is a broad-faced gear, as shown, so as to engage the gear 169 while the frame carrying the severing-blades reciprocates, the gear 169 in the construction shown being fast on the shaft of the lowermost cutting-blade and moving therewith. As it is necessary that the severing-blades shall extend only a little way into the path of the wrapper-tube, so as not to interfere with each other and so as to clear the core when the core is extended beyond the severing-point, it is necessary for the complete severing of the tube that the blades and the tube have a relative movement of rotation about the axis of the tube. This is provided for in the construction shown by the rotation of the wrapper-tube. It is evident, however, that if the tube did not rotate the same result would be secured by causing the severing-blades to rotate about the axis of the tube. The successive papers are thus delivered from the machine completely wrapped and separated from one another.

It will be understood that I am not to be limited to the construction shown in the drawings as embodying the various features of the invention in the preferred form and to which the foregoing description has been mainly confined, but that the invention includes such changes and modifications in the construction shown as are within the claims.

It will be understood also that parts of the invention as claimed may be used independently of other parts of the invention herein described. For example, the severing mechanism herein claimed may be employed in connection with other coöperating mechanisms or in connection with suitable feeding devices for forming an independent severing-machine.

It will be understood also that the term "paper" as used in the claims is intended to include all articles for wrapping which the invention may be found suitable.

What I claim is—

1. The combination of interior paper-feeding devices for advancing a succession of independent papers, and means for winding a succession of wrappers spirally about the papers as they are advanced, substantially as described.

2. The combination of interior paper-feeding devices for advancing a succession of independent papers, means for delivering the papers successively to said feeding devices transversely to the direction in which they are advanced by the feeding devices, and means for winding a succession of wrappers spirally about the papers as they are advanced, substantially as described.

3. The combination of interior paper-feeding devices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

4. The combination of interior paper-feeding devices for advancing a succession of independent papers, means for delivering the papers successively to said feeding devices, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, pasting devices for applying a line of paste to one edge of the wrapper-web for securing together the successive windings of wrapper forming the wrapper-tube, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

5. The combination of interior paper feeding and rotating devices for advancing a succession of independent papers, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

6. The combination of interior paper feeding and rotating devices for advancing a succession of independent papers, means for guiding a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

7. The combination of interior paper feeding and rotating devices for advancing a succession of independent papers, means for delivering the papers successively to said feeding and rotating devices transversely to the direction in which they are advanced by said feeding and rotating devices, means for guiding a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

8. The combination of a core, means for advancing a paper longitudinally on the core, and means for winding a wrapper about the core and the paper to form a spirally-wound wrapper-tube inclosing the core and the paper thereon, substantially as described.

9. The combination of a core, means for advancing a succession of independent papers longitudinally on the core, means for winding a continuous wrapper-web about the core and the papers on the core to form a continuous

spirally-wound wrapper-tube inclosing the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

10. The combination of a core, means for advancing a succession of independent papers longitudinally on the core, means for feeding the papers successively to the core transversely to the axis of the core, means for winding a continuous wrapper-web about the core and the papers on the core to form a continuous spirally-wound wrapper-tube inclosing the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

11. The combination of a rotating core, means for advancing a paper longitudinally on the core as it rotates, and means for guiding a wrapper to the core at an angle to form a spirally-wound wrapper-tube about the core and the paper thereon, substantially as described.

12. The combination of a rotating core, means for advancing a succession of independent papers longitudinally on said core as it rotates, means for guiding a continuous wrapper-web to the core at an angle to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

13. The combination of a core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a paper on the core, and means for winding a wrapper about the core and the paper to form a spirally-wound wrapper-tube inclosing the core and the paper thereon, substantially as described.

14. The combination of a rotating core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a paper on the core, and means for guiding a wrapper to the core to form a spirally-wound wrapper-tube about the core and the paper thereon, substantially as described.

15. The combination of a core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a succession of independent papers, means for winding a continuous wrapper-web about the core and the papers on the core to form a continuous spirally-wound wrapper-tube inclosing the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

16. The combination of a rotating core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a succession of independent papers, means for guiding a continuous wrapper-web to the core to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

17. The combination of a rotating core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a succession of independent papers, means for feeding the papers successively to the core transversely to the axis of the core, means for guiding a continuous wrapper-web to the core to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

18. The combination of a rotating core, a casing extending about the core, means for advancing a paper longitudinally on the rotating core inside the casing, and means for guiding a wrapper to the core at an angle to form a spirally-wound wrapper-tube about the core and the paper thereon, substantially as described.

19. The combination of a rotating core, a casing extending about the core, means for advancing a succession of independent papers longitudinally on the rotating core inside the casing, means for guiding a continuous wrapper-web to the core at an angle to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

20. The combination of a rotating core, a casing extending about the core, means for advancing a succession of independent papers longitudinally on the rotating core inside the casing, means for feeding the papers successively to the core transversely to the axis of the core through an opening in the casing, means for guiding a continuous wrapper-web through an opening in the casing to the core at an angle to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

21. The combination of a rotating core, feeding-belts forming a portion of the surface of the core and moving longitudinally of the core to advance a succession of independent papers, a casing extending about the core, means for guiding a continuous wrapper-web to the core at an angle to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

22. The combination in a severing device;

of a plurality of segmental rotary severing-blades arranged about the path of the article to be severed and mounted to rotate in a plane transverse to the longitudinal axis of the article to be severed, and means for giving the article to be severed and the severing-blades a relative movement of rotation about the axis of the article, substantially as described.

23. The combination in a severing device, of feeding devices for the article to be severed, a plurality of segmental rotary severing-blades arranged about the path of the article to be severed and mounted to rotate in a plane transverse to the longitudinal axis of the article to be severed, means for giving the article to be severed and the severing-blades a relative movement of rotation about the axis of the article, and means for reciprocating the severing-blades longitudinally of the direction of movement of the article to move with the article when they are rotating in severing position and to return when they are rotating out of severing position, substantially as described.

24. The combination in a severing device, of feeding and rotating devices for the article to be severed, a plurality of segmental rotary severing-blades arranged about the path of the article to be severed and mounted to rotate in a plane at right angles to the longitudinal axis of the article to be severed, and means for reciprocating the severing-blades longitudinally of the direction of movement of the article to move with the article when they are rotating in severing position and to return when they are rotating out of severing position, substantially as described.

25. The combination with paper feeding and rotating devices for advancing a succession of independent papers, and means for guiding a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, of a plurality of segmental rotary severing-blades arranged about the path of the wrapper-tube and inclosed papers and mounted to rotate in a plane at right angles to the axis of the wrapper-tube, and means for reciprocating the severing-blades longitudinally of the direction of movement of the wrapper-tube to move with the wrapper-tube when they are rotating in severing position and to return when they are rotating out of severing position, substantially as described.

26. The combination of the rotating frame 101, core 100 carried by said frame, feeding-belts 107, 107ª forming a portion of the surface of the core and turning on rolls 106, 106ª carried by said core and on driving-rolls 108, 108ª mounted in said frame, means for driving the rolls 103, 108ª as the frame rotates, means for feeding a succession of independent papers to the core, and means for guiding a continuous wrapper-web to the core at an angle to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, substantially as described.

27. The combination of the rotating core 100, feeding-belts 107, 107ª forming a portion of the surface of the core and moving longitudinally of the core to advance a succession of independent papers, means for guiding a continuous wrapper-web to the core to form a continuous spirally-wound wrapper-tube about the core and the papers thereon, means for severing the wrapper-tube between successive papers as the tube and inclosed papers are advanced on the core, and guards 165 and 165ª for depressing the feeding-belts at the point where the wrapper-tube is severed, substantially as described.

28. The combination of the rotating core 100, feeding-belts 107, 107ª forming a portion of the surface of the core and moving longitudinally of the core to advance a paper on the core, and means for guiding a wrapper to the core to form a spirally-wound wrapper-tube about the core and the paper thereon, substantially as described.

29. The combination in a severing device, of feeding devices for the article to be severed, a segmental rotary severing-blade mounted to rotate in a plane transverse to the longitudinal axis of the article to be severed, means for giving the article to be severed and the severing-blade a relative movement of rotation about the axis of the article, and means for reciprocating the severing-blade longitudinally of the direction of movement of the article to move with the article when it is rotating in severing position and to return when it is rotating out of severing position, substantially as described.

30. The combination of a core, and means for advancing a paper longitudinally on the core and simultaneously applying a wrapper about the core and paper to form a wrapper-tube inclosing the core and the paper thereon, substantially as described.

31. The combination of a rotating core, and means for advancing a paper longitudinally on the core as it rotates and simultaneously applying a wrapper about the core and paper to form a wrapper-tube inclosing the core and the paper thereon, substantially as described.

32. The combination of a rotating core, a feeding-belt forming a portion of the surface of the core and moving longitudinally of the core to advance a paper on the core, and means for applying a wrapper about the core and paper to form a wrapper-tube inclosing the core and the paper thereon, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:
THOMAS KEMP,
G. F. READ.