

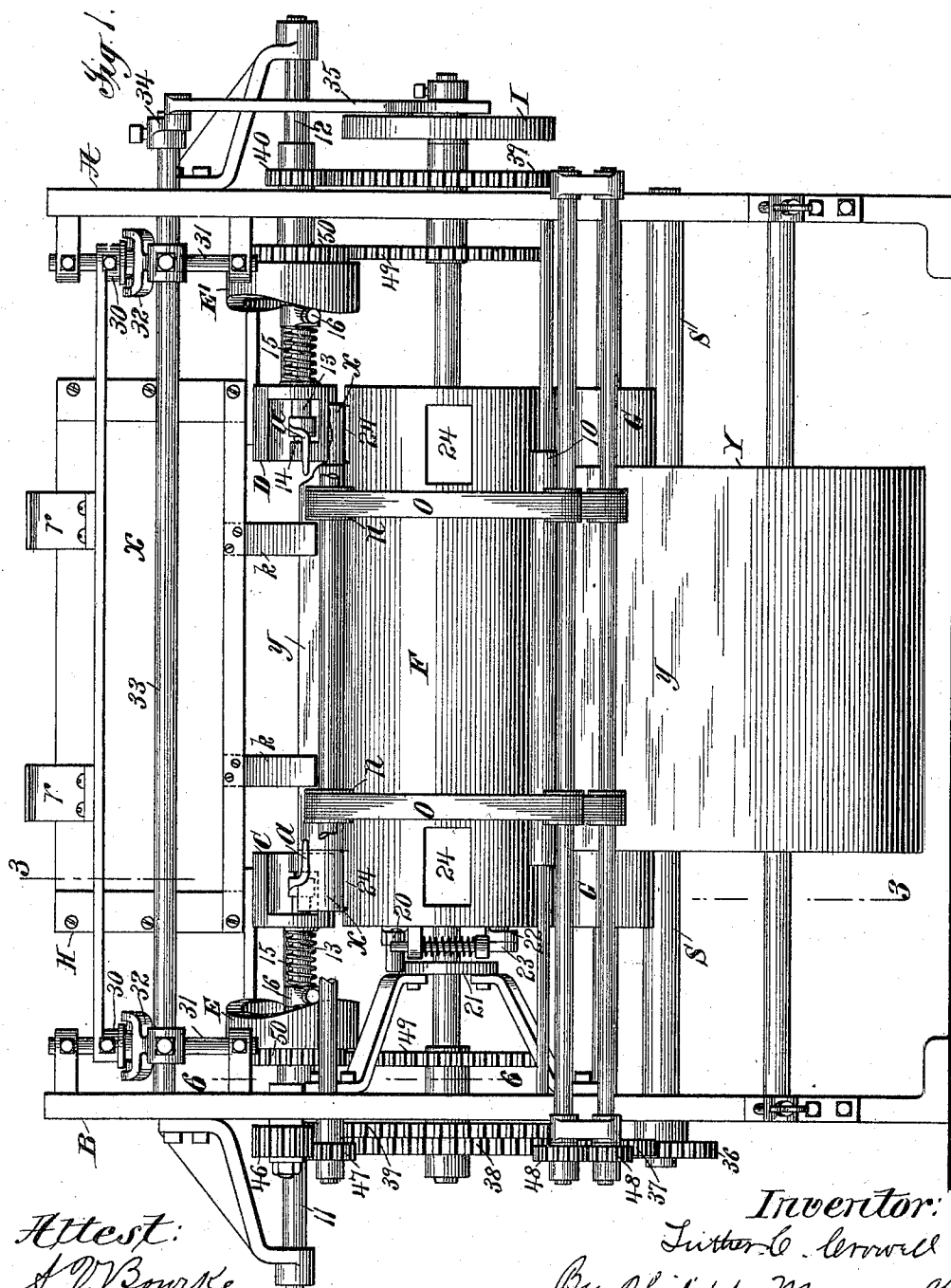
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8 Sheets—Sheet 1.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 582,008.

Patented May 4, 1897.



Attest:
J. V. Bourke
Lucas White

Inventor:
Luther C. Crowell
By Philipp Munson Phelps
Attys

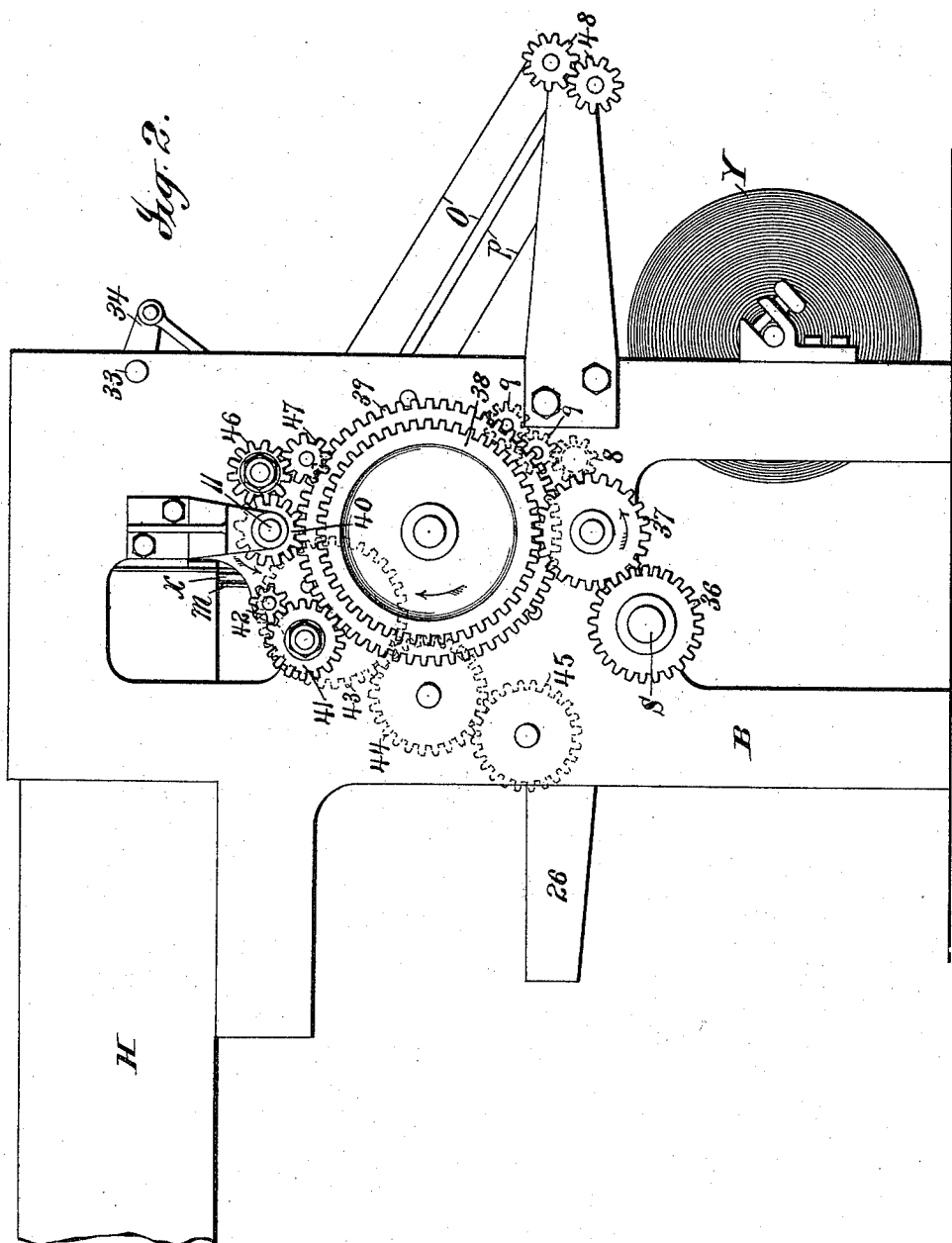
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L. C. CROWELL.
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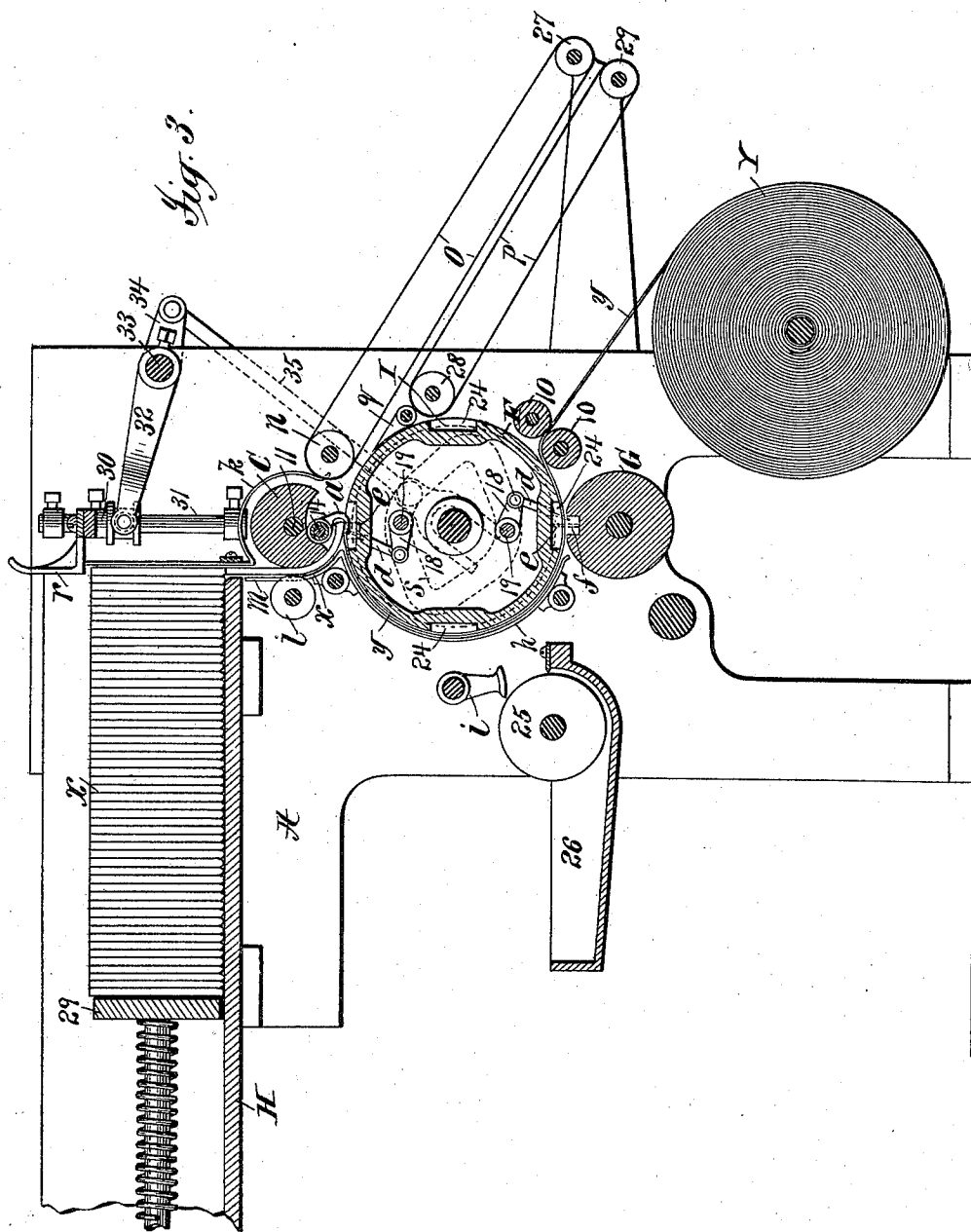
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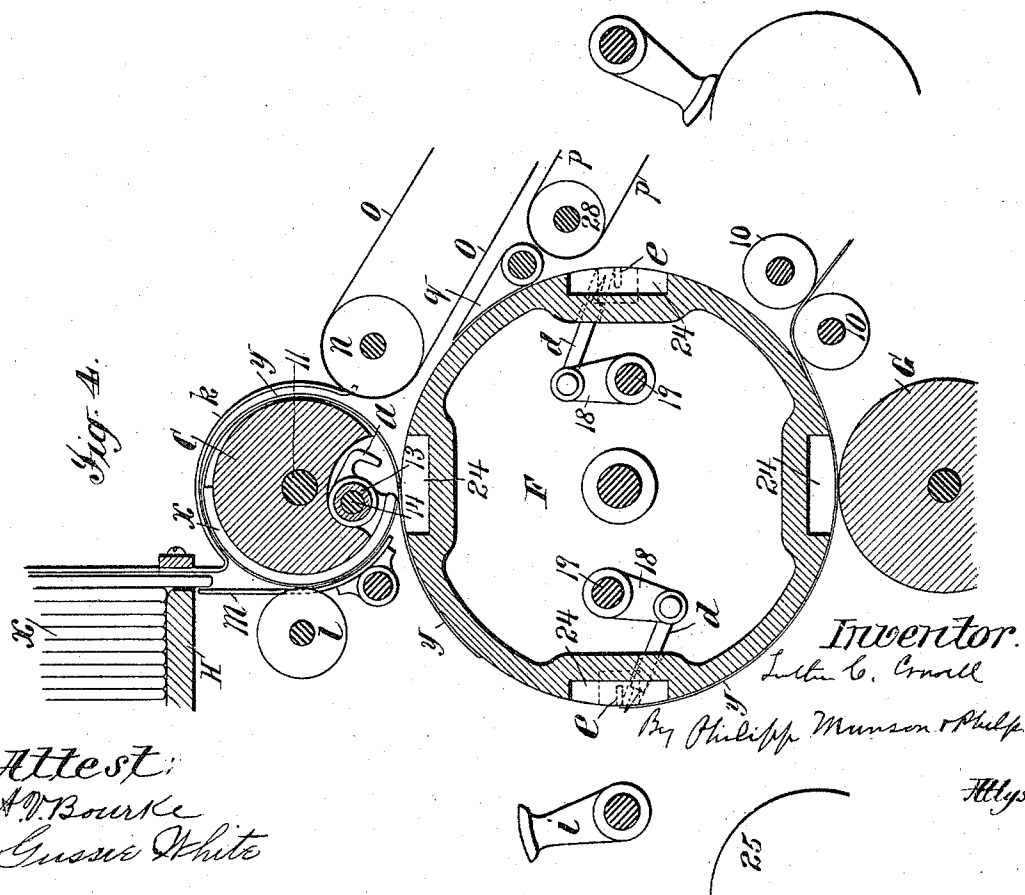
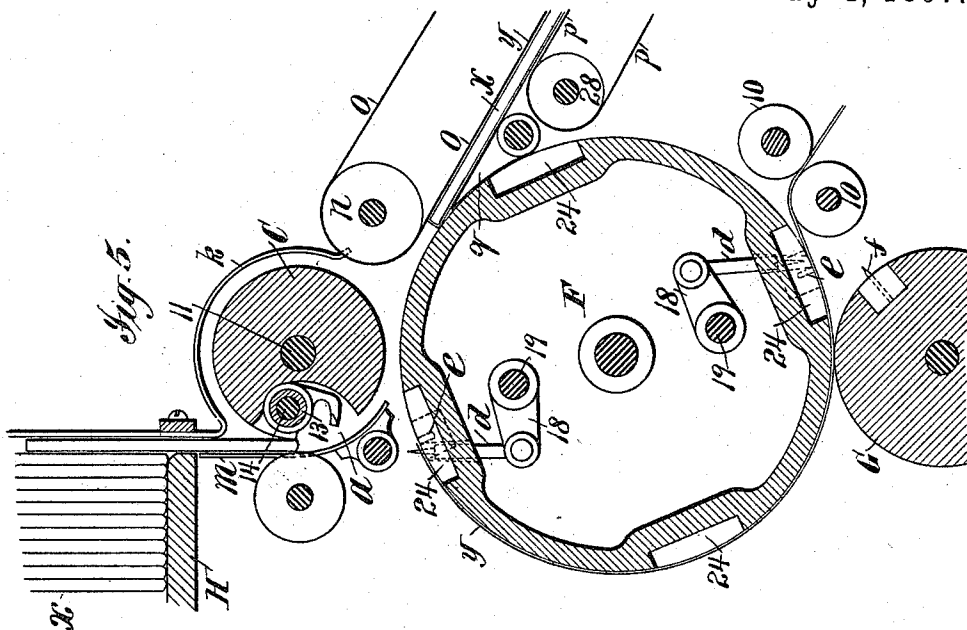
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Fig. 7.

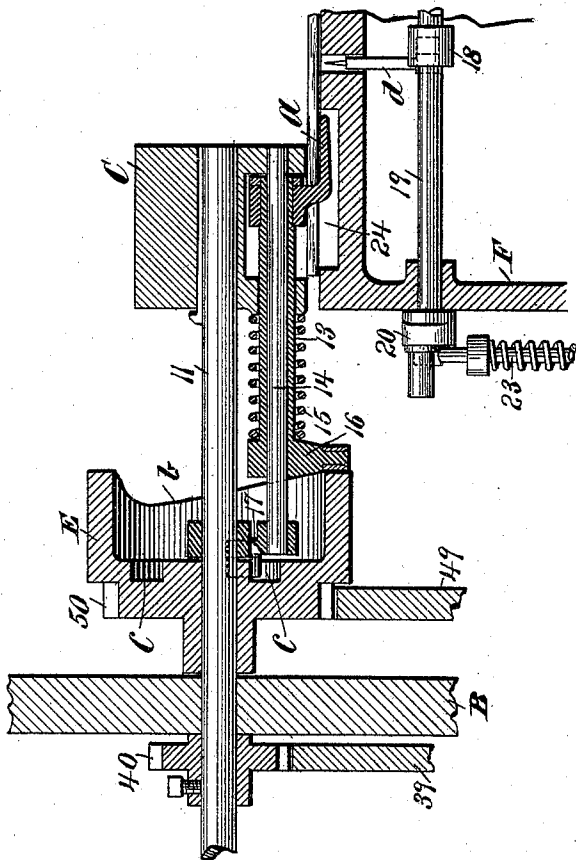
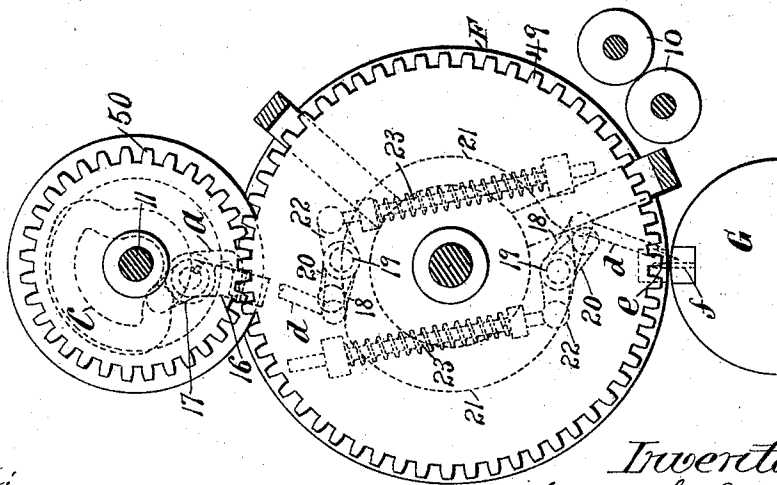


Fig. 6.



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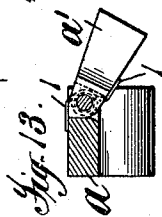
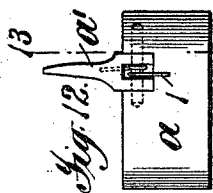
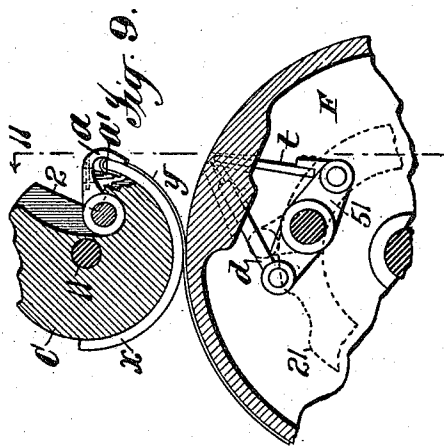


Fig. 11.

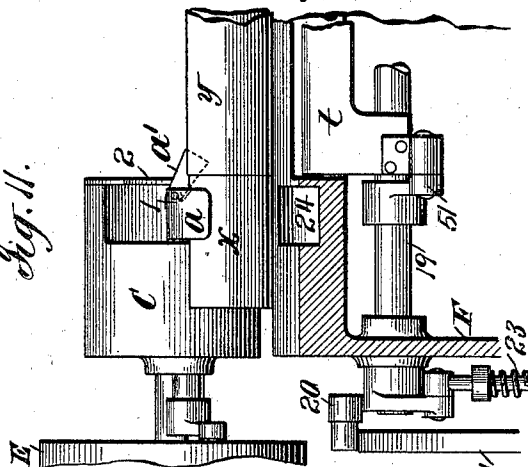
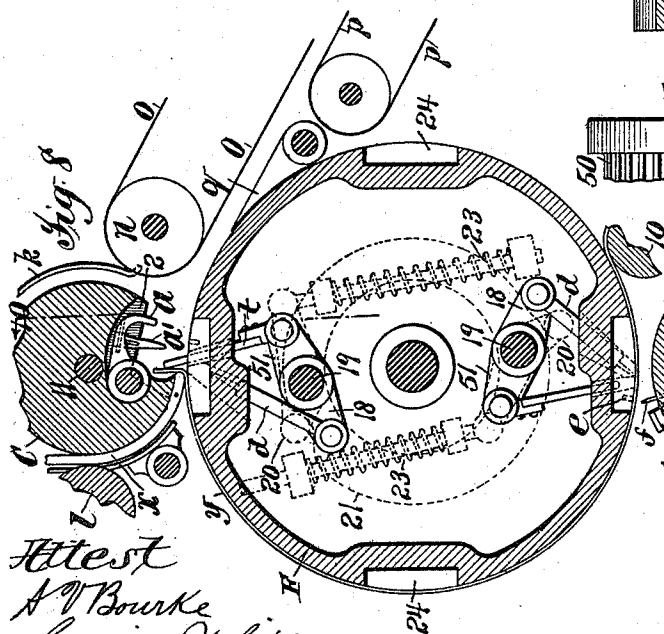
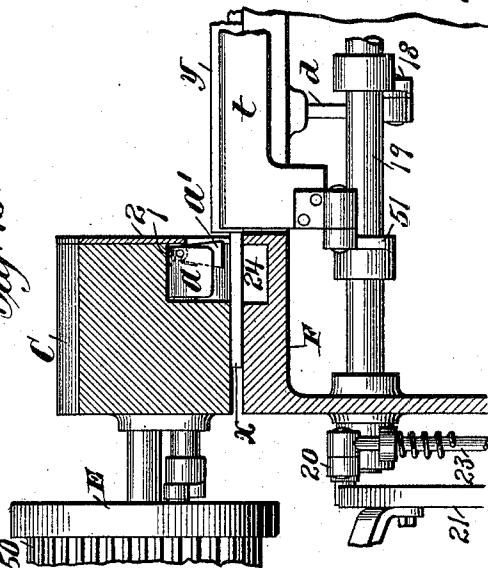


Fig. 10.



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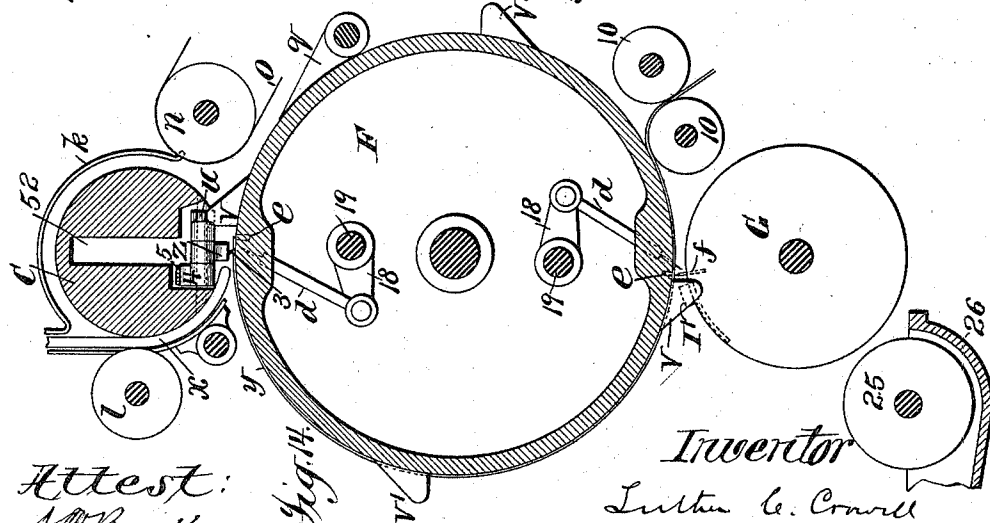
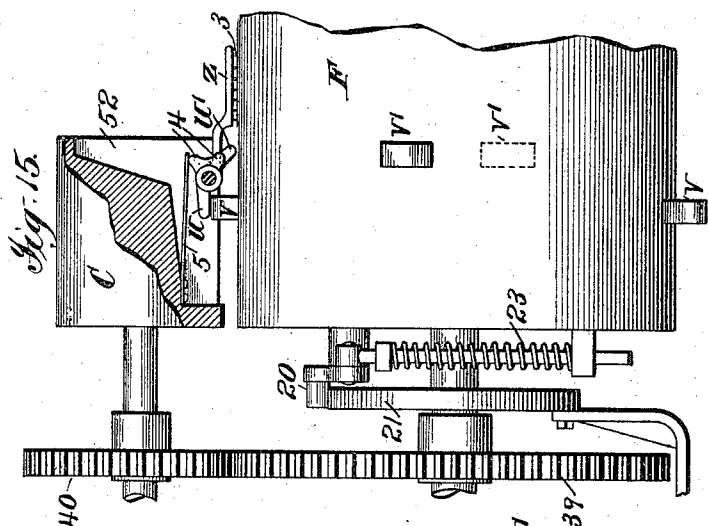
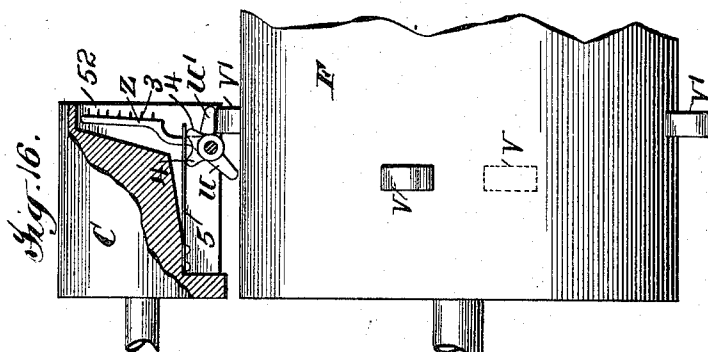
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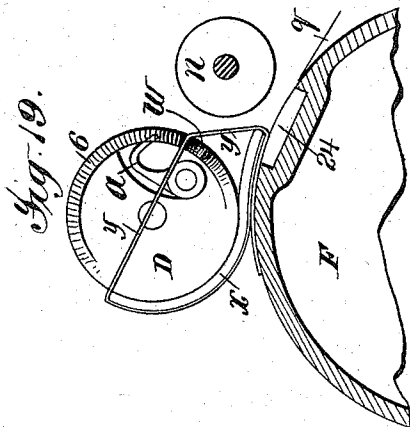
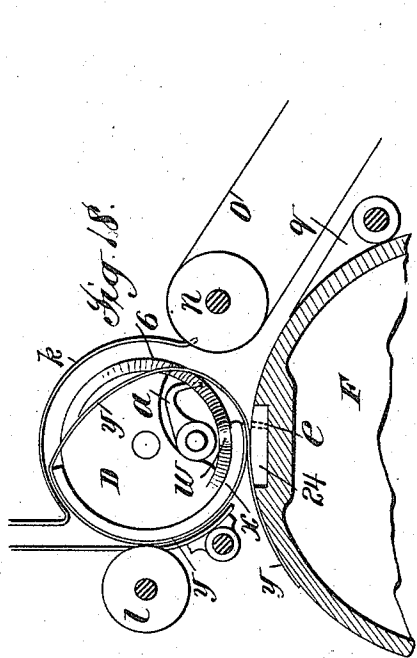
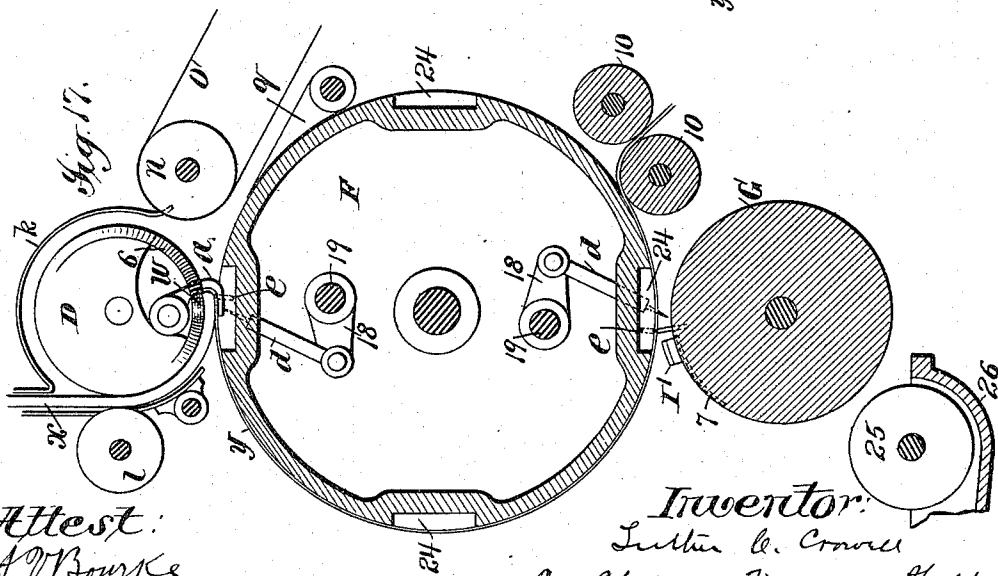
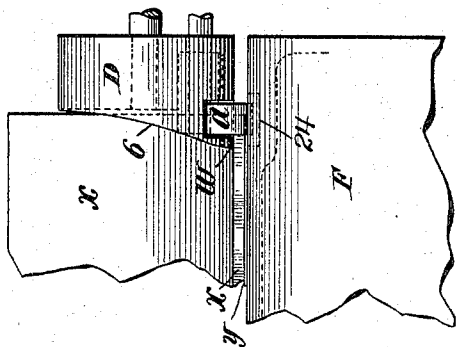


Fig. 20.



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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.

NEWSPAPER-WRAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 582,008, dated May 4, 1897.

Application filed June 15, 1895. Serial No. 552,872. (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.

The object of the present invention is to provide an improved machine of that class used in wrapping newspapers and other publications for mailing, and generally known as "newspaper-wrapping" machines, and especially to provide a simple and efficient machine of high capacity.

One of the main objects of the present invention is to provide a simple, efficient, and high-capacity construction for advancing the wrappers in proper time and associating them with the papers to be wrapped. The method of wrapping employed after the papers and wrappers are associated may be varied, but the invention is especially designed for use in constructions in which the paper and wrapper are rolled together into cylindrical form, and the attainment of the high speed aimed at is best secured by operating on the method described and claimed broadly in my Letters Patent No. 522,197, granted July 3, 1894, in which the paper and wrapper are rolled into cylindrical form with a circumference greater than the length of the paper and the paper and wrapper then led off with the rear end of the wrapper overlapping the first layer of wrapper upon the paper and the overlapping portion of the wrapper pressed down for pasting, the paper thus being carried in a circular path through one rotation and then delivered in flat form on the second rotation, the wrapper being of less width than the paper, so that the loop of the wrapper occupying that part of the circle in excess of the length of the paper may straighten out and lie flat upon the paper as the latter is delivered.

The invention provides also an improved construction of wrapping mechanism operating on this method, which in itself forms part of the invention. One of the important features of this improved construction of wrap-

ping mechanism consists in an arrangement of devices by which the paper and wrapper are held for rotation and which have a movement into and out of the path of the wrapper, so as to withdraw from the wrapper-loop to allow the latter to be closed down for delivery.

For a full understanding of the invention there is shown in the accompanying drawings, forming a part of this specification, a complete automatic wrapping-machine of simple, compact, and convenient form which will be found efficient and is one of the preferred forms of embodiment of the invention, and certain modifications thereof, and a detailed description of the same will now be given in connection with the drawings, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is an elevation of the delivery end of the machine. Fig. 2 is an elevation of the gear side of the machine. Fig. 3 is a vertical longitudinal section on the line 3 of Fig. 1. Figs. 4 and 5 are detail sections similar to Fig. 3, showing the mechanism in different positions. Fig. 6 is a cross-section on the line 6 of Fig. 1. Fig. 7 is a detail central longitudinal section of the gripper construction. Figs. 8 to 13 show a modified form of machine provided with devices for lapping the leading end of the wrapper about the leading end of the paper. Figs. 8 and 9 are sections similar to Figs. 4 and 5, showing the positions of the parts, respectively, just before the paper-carrier seizes the paper and wrapper and during the first revolution. Figs. 10 and 11 are cross-sections on, respectively, the lines 10 11 of Figs. 8 and 9. Fig. 12 is a detail plan view of the gripper closed into the position shown in Fig. 9. Fig. 13 is a section on the line 13 of Fig. 12. Figs. 14 to 16 show a modified construction in which the holding devices do not seize the leading end of the paper, but hold the paper by means of the wrapper. Fig. 14 is a section similar to Figs. 4 and 5, showing the parts in position as the paper-carrier is about to receive a paper. Figs. 15 and 16 are side elevations of a portion of the wrapper and paper carriers, with the latter partly broken away, with the

holding devices in, respectively, the positions of holding and releasing the paper and wrapper. Figs. 17 to 19 show a modified construction employing grippers which have no movement longitudinally of the paper-carrier. Figs. 17, 18, and 19 are sections similar to Figs. 4 and 5, showing the parts in position, respectively, as the paper-carrier is receiving and delivering a paper and as the paper is partially delivered from the paper-carrier. Fig. 20 is a detail side elevation of paper and wrapper carriers, showing the grippers and the projection on the paper-carrier coacting therewith.

Referring now particularly to the construction shown in Figs. 1 to 7, the frame of the machine may be of any suitable form to support the operating parts. As shown, it consists of two side frames A B, in which all the parts of the machine are supported. The paper-carrier in the form shown consists of two short cylinders C D, carried by shafts 11 12, mounted in the opposite side frames A B, the cylinders extending within the frame, so as to engage and support the paper at its opposite side edges, and each carrying an oscillating and longitudinally-sliding gripper *a*. Any suitable method of mounting and actuating these grippers may be used, but the construction shown will be found simple and efficient, in which the grippers are carried by sleeves 13, splined on rock-shafts 14, so as to be free to slide thereon while oscillating therewith, the sleeves 13 being spring-pressed in one direction, preferably so as to tend to withdraw the grippers from between the cylinders, by springs 15, pressing against the outer ends of the short cylinders C D and shoulders at the outer ends of the sleeves, each of the sleeves 14 carrying an arm 16, provided with a bowl which runs upon a cam-surface *b*, formed on rotating cams E E' at opposite ends of the machine.

The means for oscillating the grippers consists of a crank-arm 17 on the end of the rock-shaft 14, carrying a bowl which runs in a cam-groove *c* on the inside of the cam-disks E E', the grippers *a* thus being oscillated and moved longitudinally by a single cam-disk, although it will be understood that separate cam-disks for the two movements may be used, if preferred. The cam-disks E E' are mounted loosely on the shafts 11 12, so as to be driven at a different rate of speed from the shaft, and thus secure the desired operation of the grippers *a*, as presently to be described.

Below the cylinders C D, forming the paper-carrier, is mounted the wrapper-carrier F, which in the form shown consists of a large cylinder arranged to feed two wrappers to each rotation and is provided with two sets of sheet-holding pins *d* and cutting-grooves *e*, the latter coacting with a cutting-blade *f* on a smaller cylinder G below the cylinder F. The pins *d* may be actuated by any suitable means, that shown being one in common use,

consisting of crank-arms 18 on rock-shafts 19, the crank-arms carrying the pins *d* and the rock-shafts 19 being actuated in one direction by crank-arms 20, carrying bowls running on a fixed cam 21, mounted outside the cylinder, and in the opposite direction by crank-arms 22 on the opposite side of the rock-shaft from crank-arms 20 and spring-pressed rods 23. The cylinder F is provided on opposite sides with openings 24 to enable the grippers *a* to swing in taking and releasing the paper. The wrapper-web *g* is led from the web-roll Y at the lower part of the machine between the feed-rolls 10 to the cutting-cylinder G and cylinder F, and then taken by the pins on the cylinder and carried about inside the curved guides *h*, which are preferably used, to the point where the paper is received and paste is applied to the wrapper between the guides *h* by a rotating paster *i*, receiving paste from a fountain-roll 25, rotating in the paste-fountain 26.

In the construction shown the cylinders C D make four rotations to one of the cylinder F, a paper being wrapped and delivered to each two rotations of the cylinders C D. The cylinders C D, however, are somewhat more than one-fourth the size of the cylinder F, so that the surface speed of these cylinders is in excess of that of the cylinder F, thus securing the separation of the wrapper on the paper from the leading end of the next wrapper and the proper timing of the latter relatively to the next paper, as will be fully described in connection with the operation of the machine.

Between the cylinders C D are preferably mounted curved guides *k*, inside of which the paper and wrapper are carried by the grippers, and on the side of the cylinders C D at which the paper is received are a series of feeding-disks *l*, coacting with cylinders C D to advance the paper to the grippers, these feeding-disks projecting within curved guides *m*, which extend about the cylinders C D to approximately the point where the wrappers are fed in.

From the cylinders C D the paper, when released by the grippers *a* at the end of the second rotation of the cylinders, passes with the wrapper to a feed-roll *n* and feeding-belts *o* *p*, the roll *n* and belts *o* coacting with the surface of cylinder F to advance the paper to the belts *o* *p* over guides *q*, the outer ends of the belts *o* passing over roll 27, and the belts *p* being carried by rolls 28 29, the roll *n* and belts *o* *p* forming pressing and delivery devices by which the pasted flap of the wrapper is pressed down and the paper delivered, the wrapper being held under pressure by the tapes a sufficient length of time to secure the setting of the paste. To this wrapping mechanism the papers to be wrapped may be fed by hand or automatically by any suitable means, and it will be found that this mechanism forms a very simple, efficient, and rapid construction for attachment to the delivery

of a printing-press or other folding-machine, so as to receive the folded papers therefrom, wrap and deliver them.

For the purpose of illustrating a complete machine the papers are shown as delivered to the wrapping mechanism automatically from a packing-box by a means which will be found simple and efficient. In this construction the packing-box H is mounted with its delivery end just above the space between the guides *k m*, the papers being shown as pressed forward in the holder by a spring-pressed plunger 29. The papers are carried downward successively and at the proper time between the guides *k m* and into the grasp of the feeding-disks *l* and cylinders C D, two to each revolution of the cylinder F, by a plunger *r*, carried by sleeves 30, sliding on vertical rods 31 at opposite ends of the machine, these sleeves being actuated by means of crank-arms 32 on a rock-shaft 33, which has a crank-arm 34 outside the machine-frame and a connecting-rod 35, carrying a bowl which travels in a cam-groove *s*, formed inside of a cam-disk I, carried by the shaft of the cylinder F.

The parts of the machine are driven in proper time as follows: The cutting-cylinder G is driven directly from the main driving-shaft S of the machine by gears 36 37 and the cylinder F from gear 37 by a gear 38 on the cylinder-shaft twice the size of gear 37, so that the cylinder G makes one rotation to two of the cylinder F, the cutting-cylinder being one-half the size of the cylinder F, so as to have the same surface speed. The shaft of cylinder F carries outside the frame at opposite ends large gears 39, which mesh with gears 40 of one-fourth the size on the shafts 11 12 of cylinders C D, the latter cylinders making four rotations to one of the cylinder F. The shaft of the feeding-disks *l* is driven from one of the gears 39 through an intermediate 41 and gear 42 on the disk-shaft, and the paster *i* is driven at the same rate of speed with the cylinders C D from one of the gears 40 through an intermediate 43 and gear 44 on the paster-shaft, this gear 44 meshing with gear 45 on the shaft of the fountain-roll, so as to drive the latter at the same speed as the paster. The feed-roll *n* and the tapes *o* are driven from one of the gears 40 through an intermediate 46, meshing with the gear 47 on the shaft of roll *n*, and the two rolls 27 29 are geared together by gears 48, so as to drive the tapes *p*. The cam-disks E are driven at one half the speed of the shafts of the cylinders C D—that is, so as to rotate once to the wrapping of each paper—by large gears 49 at opposite ends of the shaft of cylinder F, meshing with gears 50 of one-half the size on the cam-disks. The feeding-rolls 10 are driven from cylinder G by intermediate 8 and gears 9 on the roll-shafts, as shown in Fig. 2.

The operation of the construction will be understood from a brief description in connection with the drawings, referring especially to Figs. 3, 4, and 5.

As shown in the main views and Fig. 3, the paper *x* has been fed downward by plunger *r* between the guides *k m* to the feeding-disks *l* and advanced by the disks *l* over the guides *m* to and between the cylinders C D and cylinder F and the plunger *r* returned to position to feed down the next paper. The leading end of a wrapper *y* has been associated by the cylinder F with the paper, and the grippers *a* have just been actuated to seize the leading end of the paper and wrapper for the wrapping operation, the grippers being in the projected position shown in Fig. 7 and extending between the cylinders C D and overlapping the edge of the wrapper, so as to hold it down upon the paper, the wrapper lying wholly between the cylinders C D, so as not to overlap on either of them. The pins *d* at the bottom of the cylinder F have been projected to seize the leading end of the next wrapper and the wrapper now to be applied to the paper severed by blade *f*. As the operation continues the leading ends of the paper and wrapper are carried within the guides *k* by the cylinders C D and the paper and wrapper thus wound upon the core formed by these cylinders, and during this rotation the grippers *a* are retracted longitudinally, so as to withdraw them outside the edges of the wrapper, just as the paper and wrapper complete the revolution, so as to enable the grippers to oscillate for the release of the paper.

In the position shown in Fig. 4 the first rotation has just been completed and the grippers have just been oscillated to release the leading end of the paper, which is of a length equal to one-half the circumference of the cylinders C and D and is curved about the cylinders within the guides *k m*, the wrapper extending entirely about the space between the cylinders, but not overlapping the cylinders, so that the part that is not supported by the paper is free to be carried between the cylinders as the paper straightens out in delivery. The effect of rotating the cylinders C D at a higher surface speed than the cylinder F will now be clear in connection with Fig. 4, the rear end of the wrapper *y* upon the paper being shown as having been carried away from the leading end of the next wrapper sufficiently to afford space for the delivery of the wrapped paper from the cylinders C D before the next paper and wrapper are to be taken by the grippers. During this first rotation of the cylinders C D the paste has been applied to the rear end of the wrapper and the parts are now in position for the action of the pressing and delivery devices in pressing down and securing the pasted end of the wrapper. As the operation continues and the parts rotate onward from the position shown in Fig. 4 the leading end of the paper, with the wrapper overlapping the same, passes to the roll *n*, and by this roll *n*, coacting with the cylinder F, is advanced over the guides *q* to the grasp of the tapes *o p*. The paper straightens out as it is thus delivered, the portion of the

wrapper which is not supported by the paper being carried in between the cylinders C D, so as to enable the paper to thus straighten out into flat form. As the pasted flap of the wrapper is brought against the layer of wrapper upon the paper it is pressed down and the flap secured first by the pressure between the roll *n* and cylinder F and then by the belts *o p* or other parts of the delivery devices. During this delivery of the paper the cylinders C D make another rotation, the grippers *a* being opened and oscillated so far as to be carried within the cylinders during this rotation, and the time afforded by this action being taken for advancing the grippers longitudinally, so as to project between the cylinders C D, and as the grippers reach the position shown in Fig. 3 and another paper and wrapper are delivered thereto the grippers are closed, so as to seize the leading end of the next paper and wrapper, and thus the operation is repeated.

As stated above, machines of widely different form may be used for carrying out the invention, and some of the possible modifications will now be described.

In Figs. 8 to 13 I have shown a modified construction provided with devices for lapping the end of the wrapper over the head of the paper, so as to secure the wrapper more firmly, and the sliding movement of the gripper is changed to a pivoted movement. In this construction the shafts 19 are provided on the opposite side from the crank-arms 18, carrying the pins *d*, with crank-arms 51, carrying the pivoted fingers *t*, which are projected through the surface of the cylinder F at the proper time to turn the leading end of the wrapper up and carry it between the cylinders C D, as shown in Fig. 8, and these fingers are withdrawn within the surface of the cylinder F by the movement that projects the pins *d*. In order, however, that neither the pins *d* nor fingers *t* shall project from the surface of cylinder F during the rotation of the cylinder F from the cylinders C D to the point where the pins are to be projected to seize the leading end of the next wrapper, sufficient range of movement is given the pins and fingers and the cam 21 is so formed that after the pins *d* have released the leading end of the wrapper and the fingers *t* have been projected so as to lift the leading end of the wrapper, as shown in Fig. 8, shaft 19 is rocked by the cam only sufficiently to carry the fingers *t* within the surface of the cylinder without projecting the pins *d* beyond said surface, as shown in Fig. 9, and this position of the parts continues until the pins are to be projected to seize the next wrapper, when a very slight outward movement of the pins is given by the cam 21.

The fingers *t* for tucking in the leading end of the wrapper may be used with grippers of the form shown in the construction previously described or with grippers of other suitable forms, as it is obvious that the grippers *a*,

(shown in Figs. 8 and 9,) if used alone, will seize and hold the leading end of the paper with the leading end of the wrapper lapped over it. It is desirable, however, that the end of the wrapper should be turned down flat upon the inner side of the leading end of the paper and held in this position, and I provide means for securing this result, and at the same time obtain the movement longitudinally of the cylinders C D, which is necessary for removing the wrapper-holding member from the path of the wrapper in order to allow the loop of the latter to be closed in delivery, and this without cutting away the surface of cylinder F opposite the wrapper, which is necessary in the construction shown in Figs. 1 to 7 in order to permit the grippers to be in open position when opposite the wrapper, so as to close upon the latter, and thus the wrapper in the construction shown in Figs. 8 to 13 may be cut or perforated through its entire width by the knife *f* and groove *e*, which result obviously is not attained with the construction previously described. For this purpose I use a supplementary gripper *a'*, pivoted on the side of each main gripper, so as to swing longitudinally of the cylinders C D, and spring-pressed outward from the gripper and into the plane of the wrapper by springs 1, which are shown as springs coiled upon the pivots of the supplementary grippers. As the main grippers *a* are opened these supplementary grippers *a'* are thrown inward by engagement with the edge of a plate 2, which is secured on the end of the cylinder, so as to form a partially-closed groove within the same, the grippers *a'* thus being brought into the position shown in Figs. 8 and 9; and as the grippers *a* are closed to seize the leading end of the paper these supplementary grippers *a'* are thrown out by the springs 1 into the position shown in Figs. 9 and 11, so as to engage the leading end of the wrapper and lap it down upon the inside of the leading end of the paper and thus hold the wrapper, the main grippers *a* engaging only the paper. This construction not only laps the wrapper about the leading end of the paper, but also secures the result of holding the wrapper during the rolling operation and removing the grippers from the loop of the wrapper for delivery, as in the construction shown in Figs. 1 to 7.

In the construction shown in Figs. 8 to 13 the paster consists of pasting-fingers I', yieldingly mounted on the cylinder G, being shown as carried by flat springs 7, so as to be pressed outward by spring-pressure into contact with the fountain-roll 25 as they pass the roll and to yield inward as the cylinder G passes the cylinder F in the operation of cutting the wrapper and applying paste.

The operation of the construction shown in Figs. 8 to 13 will be understood from the drawings in connection with the description previously given, being substantially the same as that of the construction shown in Figs. 1

to 7, except that the supplementary grippers a' are swung longitudinally of the cylinder in the operation of seizing and releasing the wrapper instead of the entire grippers being shifted longitudinally of the cylinder, as in Figs. 1 to 7, and the fingers t operating, as shown and previously stated, to raise and carry the leading end of the wrapper into position to be turned down and held by the supplementary grippers a' .

In Figs. 14 to 16 I have shown a simple construction operating in the same manner as those previously described, except that the devices holding the paper and wrapper during the rolling operation are pivoted to swing longitudinally of the cylinders C D instead of circumferentially thereof and are preferably made in the form of pins and arranged to engage only the leading end of the wrapper, the head of the paper being held under the latter and thus carried on with the cylinders C D. The construction and operation of the cylinder F and other parts of the construction are the same as those previously described, except that the cylinder F is constructed to actuate the pins forming the paper and wrapper holding devices.

Referring now to Figs. 14 to 16, the pin-carriers z in this construction are mounted to swing in central radial slots 52 in the cylinders C D, being withdrawn within the slots to remove them from the loop of the wrapper and swung outward from the slots to seize the leading end of the wrapper, these carriers being provided with sharp pins 3, which operate to impale the wrapper against the surface of the cylinder F, so as to pick up and carry the wrapper onward with the cylinders C D, the pins being inclined forward relatively to the movement of the cylinders. For the purpose of actuating these pin-carriers the carrier-shafts are provided with two actuating-arms u u' , extending on opposite sides of the shaft, so as to throw the carriers z in opposite directions, and with two short arms 4, engaged by flat springs 5, to aid in completing the movement of the carriers and to hold the carriers in their two extreme positions. The arms u u' are actuated by corresponding lugs v v' , carried by cylinder F, two sets of these lugs being used, as the cylinder F feeds two wrappers to each revolution.

The operation of the construction will be understood from the drawings and the following brief description. The head of the wrapper y is brought into position to be seized by the pins 3, the leading end of the paper being then just behind the pins and the pins being raised and held up by the engagement of the spring 5 with both the arms 4, all as shown in Fig. 16. One of the lugs v on the cylinder F then strikes the arm u on the shaft of each pin-carrier and throws the latter downward from the position shown in Fig. 16 to that shown in Figs. 14 and 15, the spring 5 acting to throw the carrier over, after it is forced so far by the lug u that the spring

5 presses upon the inner side of the arm 4 engaged by it, and the spring thus forces the pins down and through the wrapper with a quick movement and holds and presses them against the surface of the cylinder F. The cylinders C D thus take the leading end of the wrapper, and as the cylinders continue their rotation from the position shown in Fig. 14 and complete the first rotation, so as to be in position for the delivery of the paper and wrapper, one of the lugs v' on the cylinder F strikes arm u' on each carrier-shaft and rocks the latter against the pressure of spring 5, so as to swing the pin-carriers upward, and as the carriers are moved into position so that the spring 5 of each carrier presses down the upper side of the arm 4 engaged by it the pressure of this spring completes the movement of the carrier and throws it quickly into the position shown in Fig. 16, where it is held by engagement of the spring with both the arms 4, and this position of both carriers continues until another wrapper is to be seized.

It will be seen that in the constructions above described the grippers or other sheet-holding devices release the wrapper without being projected from the carrier—that is, outside its surface or the surface of the wrapper—farther than in the position in which they lie while holding the wrapper. This is a desirable feature of my paper-carrier in its preferred form, as the wrapper may thus be applied tightly to the paper and the sheet-holding devices still be withdrawn from the loop of the wrapper without danger of loosening the wrapper or breaking its edge or edges, which might happen in case the sheet-holding devices moved outward from the surface of the carrier in releasing the wrapper. It will be understood, however, that my invention is not limited to the use of such constructions.

It is not absolutely essential, although much preferable, that the grippers or other holding devices should move longitudinally of the cylinders C D, so as to withdraw from the path of the wrapper, but a construction may be used in which the edges of the wrapper are carried inside the grippers in the operation of delivery. Such a construction is shown in Figs. 17 to 20, in which the cylinders are each provided with a projection w , extending slightly into the wrapper-space and provided with an inclined edge 6 on the rear side, off which the edges of the wrapper are drawn so as to carry them inside the grippers. The grippers a in this construction are or may be pivoted grippers of any common form and operate to grip the edges of the wrapper against the projections w on the cylinders C D.

The operation of the construction is clearly shown in Figs. 17 to 20. In the position shown in Fig. 17 the gripper is just seizing the leading end of the paper and wrapper. In Fig. 18 the delivery operation has just commenced and the edges of the loop of the wrapper are being drawn inward by the inclined edges 6

of the projections *w*, so as to pass the projections and the grippers, and in Fig. 19 the wrapper-loop is about to pass the points of the projections, having been carried inside the grippers. The main objection to this construction is that there is some liability of breaking the edges of the wrapper, but with the wrapper overlapping the projections *w* only just sufficiently to be caught by the grippers a fairly good results may be secured.

It will be understood that constructions of many other modified forms may be used to embody the broad features of the invention and that I am not to be limited to the exact form and arrangement of parts in any of the constructions shown, as these constructions may readily be varied by those skilled in the art without departing from the invention.

While the invention has been described as applied in wrapping newspapers and other publications for which the machine shown is especially adapted, the invention is not thus limited, but the machine shown may be applied in wrapping other articles, and the invention may be embodied in machines especially adapted for such other uses. It will be understood, therefore, that the term "paper" has been used to designate the article to be wrapped only for convenience, and that the claims are intended to cover the constructions as applied in wrapping other publications or articles of any character in connection with which the invention may be applied. It will be understood also that certain features of the construction shown herein are applicable also in other classes of machines other than wrapping-machines and in themselves form parts of the invention.

What is claimed is—

1. The combination with a wrapper-carrier provided with sheet-holding devices, of wrapping mechanism receiving the wrapper from said sheet-holding devices and coacting with said wrapper-carrier to associate a paper with the wrapper, and wrap and deliver the paper, substantially as described.
2. The combination with a wrapper-carrier provided with sheet-holding devices, of a rotary wrapping mechanism receiving the wrapper from said sheet-holding devices and coacting with said wrapper-carrier to associate a paper with the wrapper and wrap and deliver the paper, substantially as described.
3. The combination with a wrapper-carrier provided with sheet-holding devices, of a rotary wrapping mechanism moving at a higher speed than the wrapper-carrier and receiving the wrapper from said sheet-holding devices and coacting with said wrapper-carrier to associate a paper with the wrapper and wrap and deliver the paper, substantially as described.
4. The combination with a wrapper-carrier provided with sheet-holding devices, of a rotary wrapping mechanism coacting with the wrapper-carrier to associate a paper with the wrapper and provided with devices for hold-

ing the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution for the delivery of the wrapped paper, substantially as described.

5. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrier coacting with said cylinder to associate a paper with the wrapper and provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the carrier with the rear end of the wrapper overlapping the first layer of wrapper upon the paper, substantially as described.

6. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrier moving at a higher rate of speed than the wrapper-cylinder and provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the carrier with the rear end of the wrapper overlapping the first layer of wrapper upon the paper, substantially as described.

7. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrying cylinder of less length than the width of the paper and provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrying cylinder with the rear end of the wrapper overlapping the first layer of wrapper upon the paper, substantially as described.

8. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrier provided with devices for holding the paper and wrapper at the opposite side edges during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrier with the rear end of the wrapper overlapping the first layer of wrapper upon the paper, substantially as described.

9. The combination with a wrapper-carrying cylinder provided with sheet-retaining devices, of a rotating paper-carrier consisting of two cylinders adapted to support at its opposite side edges the paper to be wrapped and provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrying cylinder with the

rear end of the wrapper overlapping the first layer of wrapper upon the paper, substantially as described.

10. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrier provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrier with the rear end of the wrapper overlapping upon the first layer of wrapper upon the paper, substantially as described.

11. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a rotating paper-carrier provided with devices for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and arranged to move longitudinally of the cylinder and out of the path of the wrapper for delivery, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrier with the rear end of the wrapper overlapping upon the first layer of wrapper upon the paper, substantially as described.

12. The combination with a wrapper-carrying cylinder provided with sheet-holding devices, of a paper-carrying cylinder formed in two parts adapted to support at its opposite sides the paper to be wrapped and provided with devices arranged to move toward and from the surface of the paper-carrying cylinder and longitudinally of said cylinder for holding the paper and wrapper during the first revolution and releasing the paper and wrapper during the second revolution, and pressing and delivery devices to which the paper and wrapper are fed from the paper-carrying cylinder with the rear end of the wrapper overlapping upon the first layer of wrapper upon the paper, substantially as described.

13. The combination with paper-feeding mechanism, of a wrapper-carrying cylinder provided with sheet-holding devices, cutting devices for severing the wrapper-web into sheets, wrapper-pasting devices, and wrapping mechanism receiving the papers and wrappers from the paper-feeding devices and wrapper-carrying cylinder, substantially as described.

14. The combination with paper-feeding mechanism, of a wrapper-carrying cylinder provided with sheet-holding devices, cutting devices for severing the wrapper-web into sheets, wrapper-pasting devices, and rotary wrapping mechanism receiving the papers and wrappers from the paper-feeding devices and wrapper-carrying cylinder, substantially as described.

15. The combination with paper-feeding mechanism, of a wrapper-carrying cylinder provided with sheet-holding devices, cutting

devices for severing the wrapper-web into sheets, and rotary wrapping mechanism moving at a higher speed than the wrapper-carrying cylinder and receiving the papers and wrappers from the paper-feeding devices and wrapper-carrying cylinder, substantially as described.

16. The combination with paper-feeding mechanism, of a wrapper-carrying cylinder provided with sheet-holding devices, cutting devices for severing the wrapper-web into sheets, wrapper-pasting devices, and rotary wrapping mechanism receiving a paper and wrapper from the paper-feeding devices and wrapper-carrying cylinder and provided with devices for holding the paper and wrapper during the first revolution and releasing them during the second revolution for the delivery of the wrapped paper, substantially as described.

17. The combination with a rotating paper-carrier of less length than the width of the paper and provided with devices for holding the wrapper applied to that part of the paper not supported by the carrier, of means for moving said devices longitudinally of the carrier to seize the wrapper and to withdraw from the loop of the wrapper for the delivery of the wrapped paper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

18. The combination with a rotating paper-carrier of less length than the width of the paper and provided with devices for holding the paper and wrapper with the wrapper applied to that part of the paper not supported by the carrier, of means for moving said devices toward and from and longitudinally of the carrier to seize the paper and wrapper for the wrapping operation and to release the paper and withdraw from the loop of the wrapper for the delivery of the wrapped paper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

19. The combination with a rotating paper-carrier formed in two parts and provided with devices for holding the paper and wrapper at their side edges with the wrapper lying between the two parts of the carrier, of means for moving said devices toward and from and longitudinally of the carrier to seize the paper and wrapper for the wrapping operation and to release the paper and withdraw from the loop of the wrapper for the delivery of the wrapped paper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

20. The combination with a rotating paper-carrier of less length than the width of the paper, of grippers carried thereby and arranged to move toward and from the surface of the carrier and longitudinally of said carrier, and means for actuating said grippers to seize the paper and wrapper for the wrap-

ping operation with the wrapper applied to that part of the paper not supported by the carrier and to release the paper and withdraw from the loop of the wrapper for the delivery of the wrapped paper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

21. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped, of grippers carried thereby and arranged to move toward and from the surface of the carrier and longitudinally of said carrier, and means for actuating said grippers to seize the paper and wrapper for the wrapping operation with the wrapper applied to that part of the paper not supported by the carrier and to release the paper and withdraw from the loop of the wrapper for the delivery of the wrapped paper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

22. The combination with a rotating paper-carrier of less length than the width of the paper and provided with devices coacting with the carrier to seize the paper, of devices arranged to move longitudinally of the carrier for holding the wrapper applied to that part of the paper not supported by the carrier, and means for actuating said wrapper-holding devices to hold the paper and wrapper during the first revolution and to release the paper and wrapper and withdraw the wrapper-holding devices from the loop of the wrapper on the second revolution without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

23. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped and provided with devices coacting with the carrier to seize the paper, of devices arranged to move longitudinally of the carrier for holding the wrapper between the two parts of the carrier, and means for actuating said wrapper-holding devices to hold the paper and wrapper during the first revolution and to release the paper and wrapper and withdraw the wrapper-holding devices from the loop of the wrapper on the second revolution without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

24. The combination with a rotating paper-carrying cylinder formed in two parts arranged to support at its side edges the paper to be wrapped and provided with grippers coacting with the carrier to hold the paper, of supplementary grippers pivoted on said main grippers to swing longitudinally of the carrier into and out of the plane of the wrapper, and means for actuating said main and supplementary grippers to seize and release

the paper and wrapper, substantially as described.

25. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped and provided with grippers coacting with the carrier to hold the paper, of supplementary grippers pivoted on the main grippers to swing longitudinally of the carrier and acting to hold the wrapper against the inner side of the paper, and means for actuating said main and supplementary grippers to seize and release the paper and wrapper, substantially as described.

26. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped and provided with grippers coacting with the carrier to hold the paper, of supplementary grippers pivoted on the main grippers to swing longitudinally of the carrier and acting to hold the wrapper against the inner side of the paper, means for actuating said main and supplementary grippers to seize and release the paper and wrapper, and means for bringing a wrapper into position to be held by the supplementary grippers, substantially as described.

27. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped and provided with grippers coacting with the carrier, of supplementary grippers pivoted on the main grippers to swing longitudinally of the carrier and acting to hold the wrapper against the inner side of the cylinder, means for actuating said main and supplementary grippers to seize and release the paper and wrapper, a rotating wrapper-carrier provided with sheet-holding devices for feeding a wrapper to the paper-carrier, and fingers carried by said wrapper-carrier for lapping the leading end of the wrapper over the head of the paper and into the path of the supplementary grippers, substantially as described.

28. The combination with a rotating paper-carrier formed in two parts arranged to support at its side edges the paper to be wrapped and provided with grippers coacting with the carrier to hold the paper, of supplementary grippers pivoted on the main grippers to swing longitudinally of the carrier and acting to hold the wrapper against the inner side of the paper, means for actuating said main and supplementary grippers to seize and release the paper and wrapper, a rotating wrapper-carrier provided with sheet-holding pins for feeding a wrapper to the paper-carrier, and fingers carried by said wrapper-carrier for lapping the leading end of the wrapper over the head of the paper and into the path of the supplementary grippers, and means for simultaneously withdrawing said pins and projecting said fingers, substantially as described.

29. A paper-carrier of less length than the

width of the paper provided with sheet-holding devices acting to hold the edge of a wrapper applied to that part of the paper not supported by the carrier and arranged to move longitudinally of the carrier to release the wrapper without being projected from the carrier substantially farther than in the position of holding the wrapper, substantially as described.

30. A rotating paper-carrier of less length than the width of the paper provided with sheet-holding devices acting to hold the edge of a wrapper applied to that part of the paper not supported by the carrier and arranged to swing inwardly and longitudinally of the carrier to withdraw from the loop of the wrapper for the delivery of the wrapped paper, substantially as described.

31. The combination with a wrapping mechanism provided with devices for holding the leading end of the paper and wrapper, of wrapper-feeding mechanism including means for lapping the leading end of the wrapper over the head of the paper, substantially as described.

32. The combination with a rotating paper-carrier provided with devices for holding the leading end of the paper and wrapper, of wrapper-feeding mechanism including means for lapping the leading end of the wrapper over the head of the paper, substantially as described.

33. The combination with a wrapping mechanism, of a rotating wrapper-carrier provided with sheet-holding devices for delivering a wrapper to the wrapping mechanism and means for lapping the leading end of the wrapper over the head of the paper, substantially as described.

34. The combination with the cylinders C, D having sheet-holding devices movable longitudinally of the cylinders, of cylinder F having sheet-holding devices, substantially as described.

35. The combination with the cylinders C, D having sheet-holding grippers movable toward and from the surface of the cylinders and longitudinally of the cylinders, of cylinder F having sheet-holding devices, substantially as described.

36. The combination with the cylinders C, D, and their sheet-holding devices, of cylinder F provided with sheet-holding devices, substantially as described.

37. The combination with the cylinders C, D, and their sheet-holding devices, of cylinder F provided with sheet-holding devices, cutting-cylinder G, and a wrapper-paster, substantially as described.

38. The combination with the cylinders C, D and their sheet-holding devices, of cylinder F provided with sheet-holding devices, and fingers *t* for moving the end of the sheet between the cylinders C, D, substantially as described.

39. The combination with the cylinders C, D, having grippers *a*, and supplementary grippers *a'* mounted to move longitudinally of the cylinder, of the cylinder F provided with sheet-holding devices, and fingers *t* for moving the end of the sheet into position to be taken by the supplementary grippers, substantially as described.

40. The combination with the cylinders C, D having grippers *a* and supplementary grippers *a'* pivoted thereon to swing longitudinally of the cylinder, of the cylinder F provided with sheet-holding devices, and fingers *t* for moving the end of the sheet into position to be taken by the supplementary grippers, substantially as described.

41. The combination with the cylinders C, D having grippers *a* and supplementary grippers *a'* pivoted thereon to swing longitudinally of the cylinder and spring-pressed in one direction and actuated in the opposite direction by engagement with the wall of the cylinder-recess as the main grippers are moved, of the cylinder F provided with sheet-holding devices, and fingers *t* for moving the end of the sheet into position to be taken by the supplementary grippers, substantially as described.

42. The combination with the cylinder C, of the main gripper *a* and supplementary gripper *a'* pivoted thereon to swing longitudinally of the cylinder, substantially as described.

43. The combination with the cylinder C, of the main gripper *a* and supplementary gripper *a'* pivoted thereon to swing longitudinally of the cylinder, and cylinder F provided with sheet-holding devices, substantially as described.

44. The combination with the cylinder C, of the main gripper *a* and supplementary gripper *a'* pivoted thereon to swing longitudinally of the cylinder, a spring pressing said supplementary gripper in one direction, and plate 2 forming an abutment by which the gripper *a'* is actuated in the opposite direction as the gripper *a* is moved, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

C. J. SAWYER,
A. L. KENT.