

(No Model.)

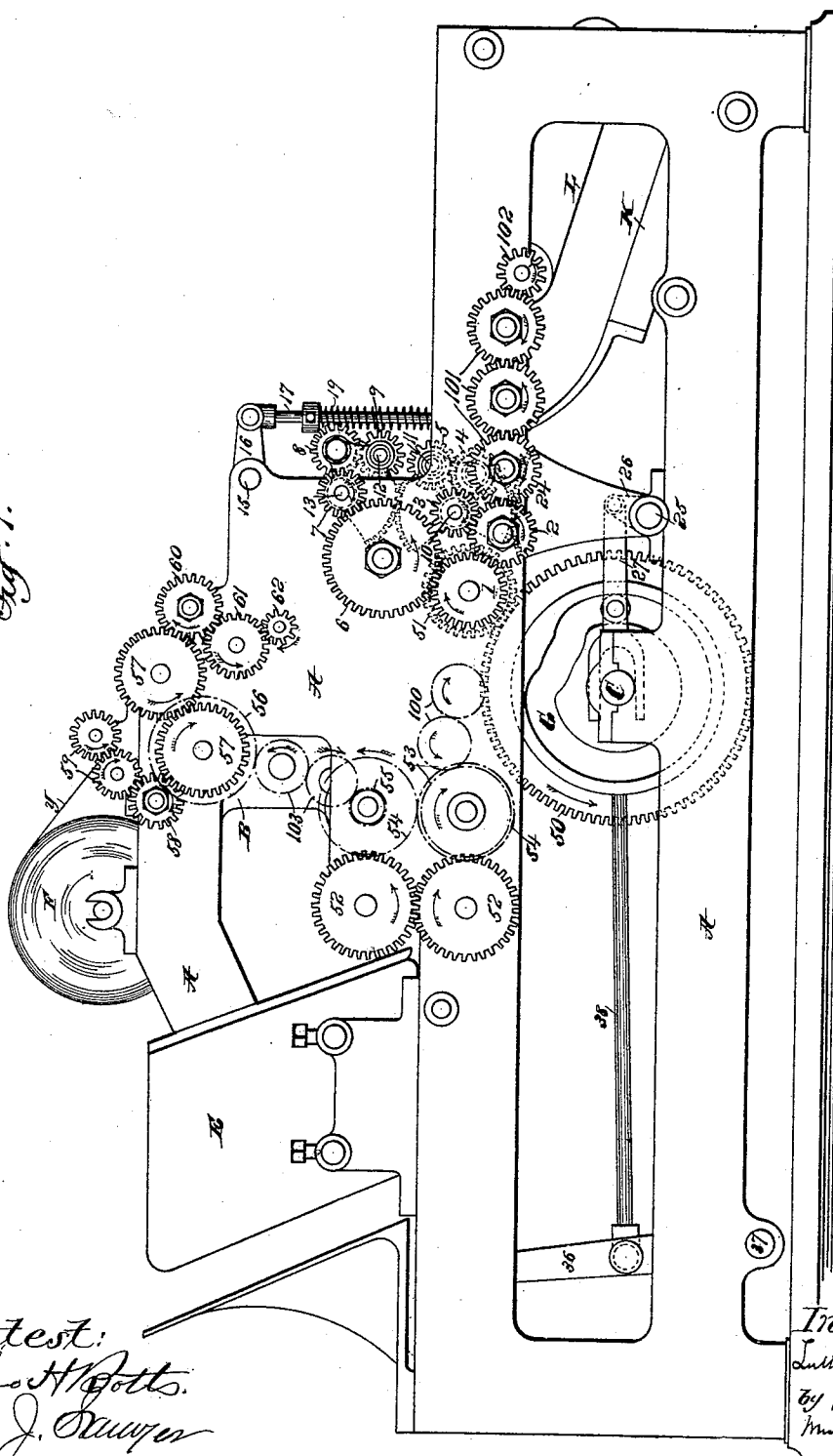
6 Sheets—Sheet 1.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 500,116.

Patented June 27, 1893.

Fig. 1.



Attest:
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(No Model.)

6 Sheets—Sheet 2.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

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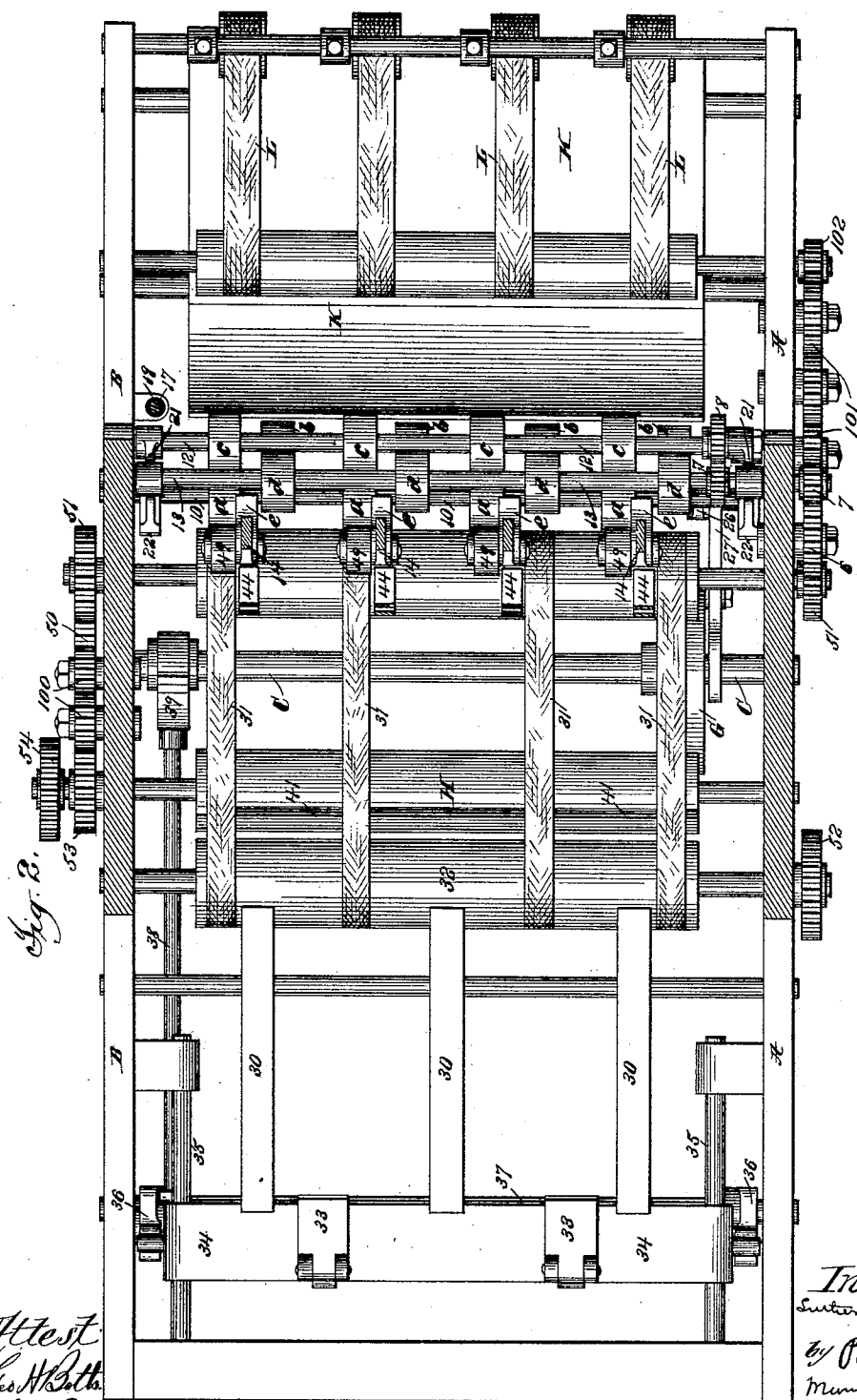


Fig. 2.

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(No Model.)

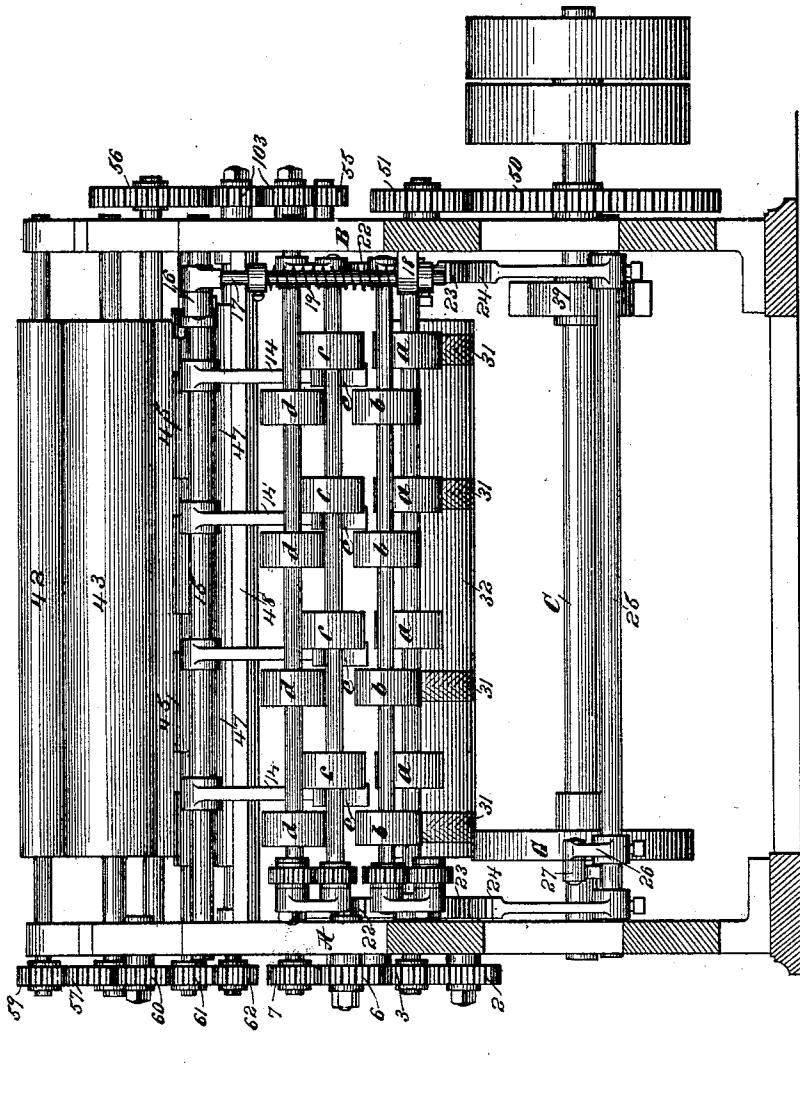
6 Sheets—Sheet 3.

L. C. CROWELL.
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Fig. 3.



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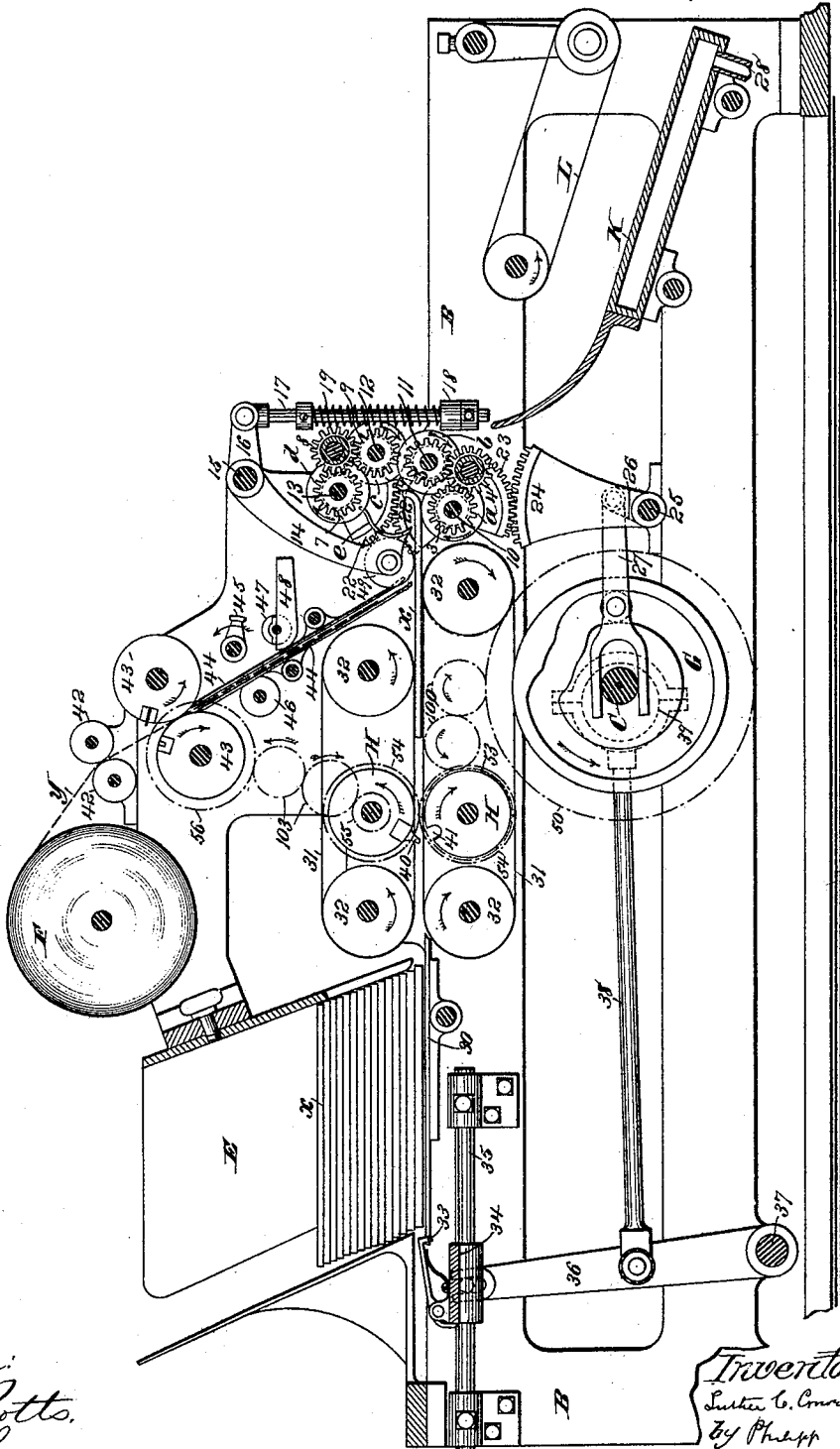
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L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 500,116.

Patented June 27, 1893.



Attest:
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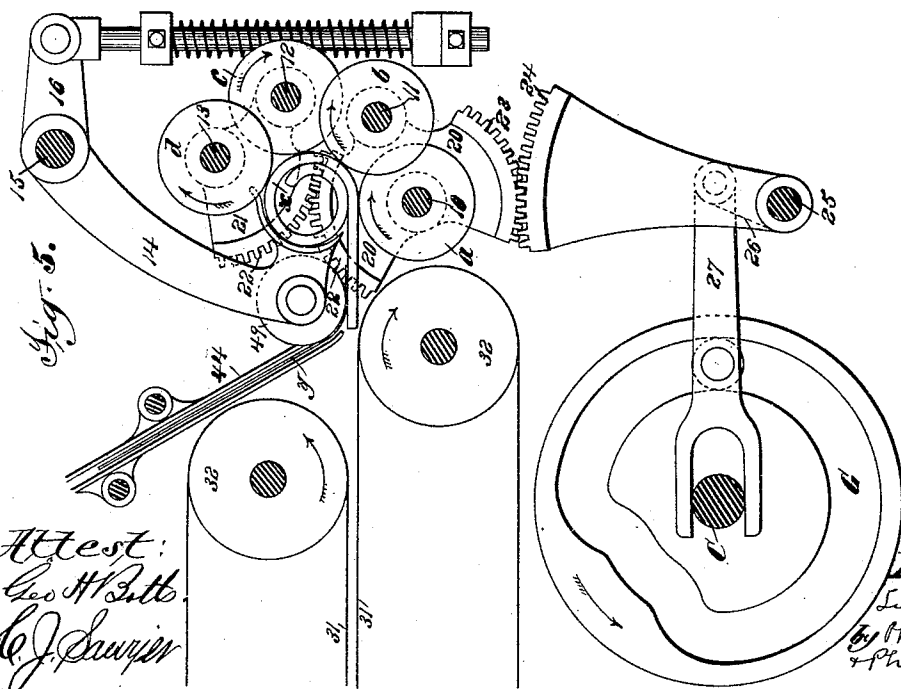
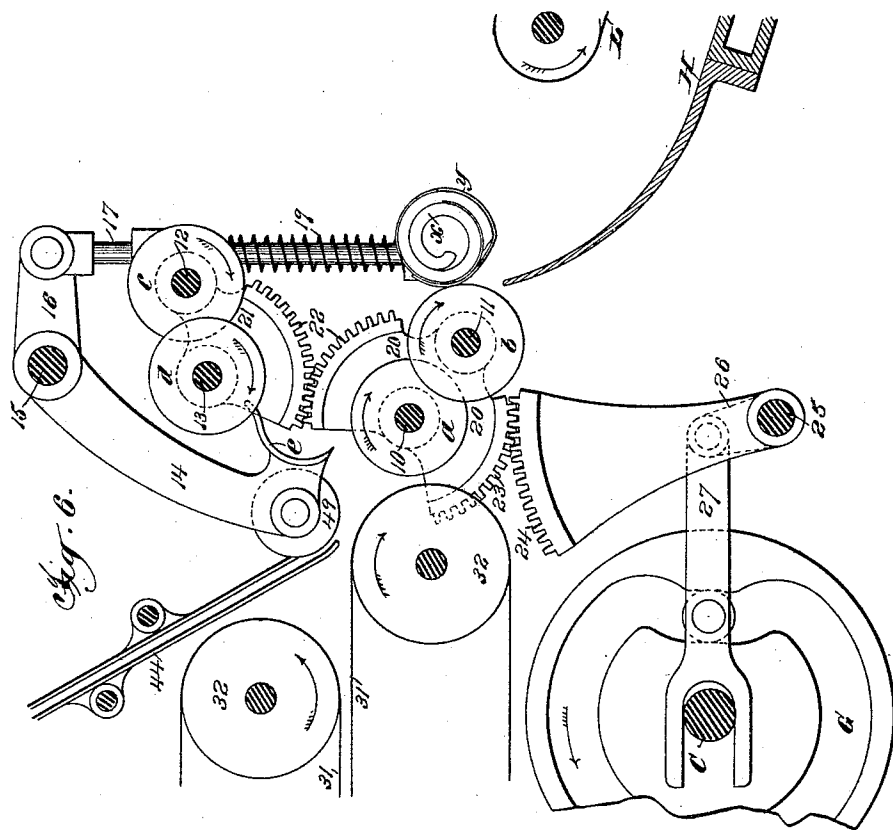
(No Model.)

6 Sheets—Sheet 5.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 500,116.

Patented June 27, 1893.



Attest:
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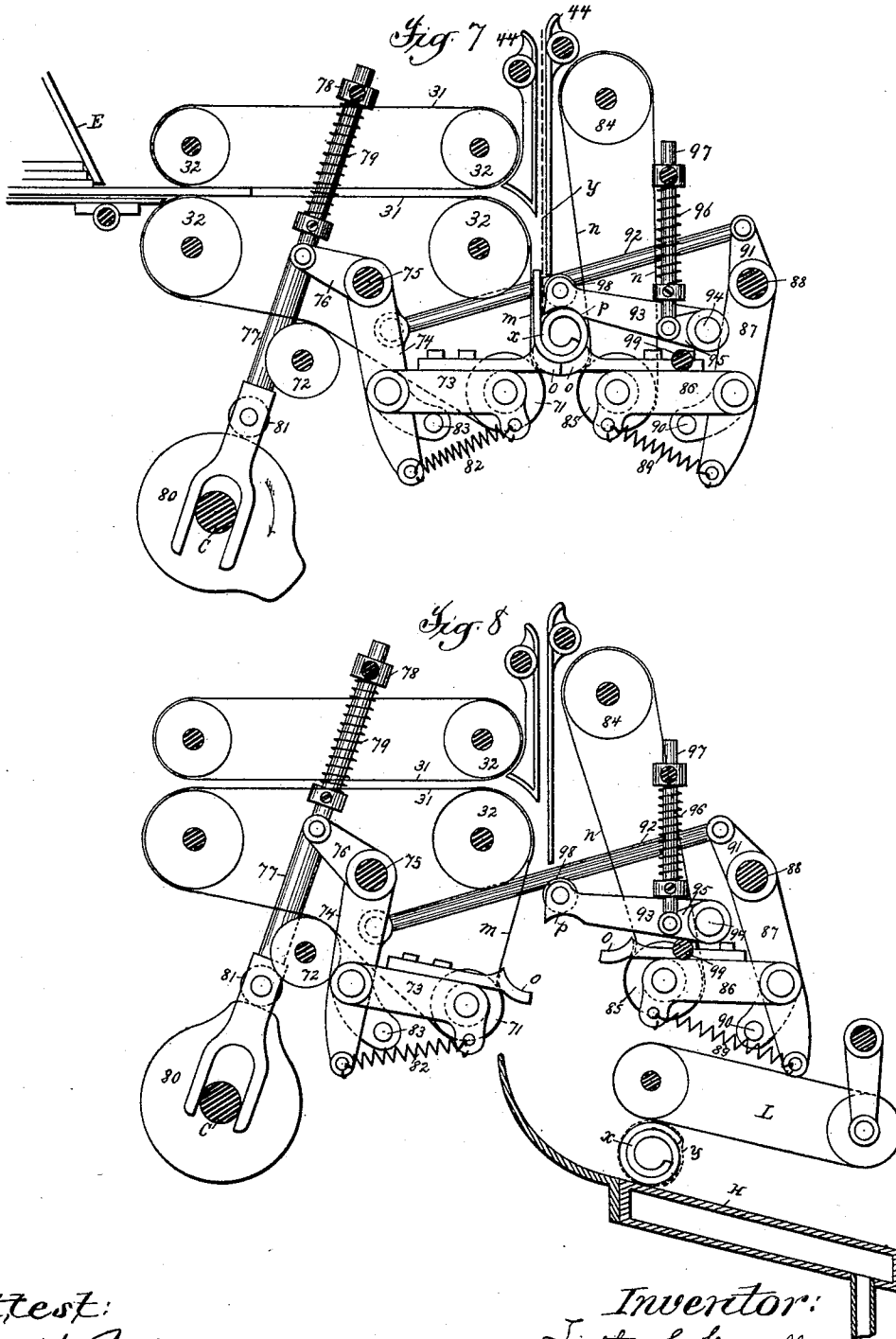
(No Model.)

6 Sheets—Sheet 6.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 500,116.

Patented June 27, 1893.



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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. 500,116, dated June 27, 1893.

Original application filed May 9, 1892, Serial No. 432,363. Divided and this application filed October 15, 1892. Serial No. 448,928. (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 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 wrapping machine of high capacity.

In another application I have described and claimed broadly a machine for wrapping newspapers and other publications in which the paper or other publication is rolled into circular form by feeding rollers, tapes or other suitable feeding devices arranged to advance the paper in a circular path by engagement of the outer side of the paper, a wrapper wound about the paper and its pasted end secured, and the wrapped product delivered from between the feeding devices, either endwise, that is, in a direction transverse to the line of movement of the feeding devices, or sidewise, that is, in a direction parallel therewith.

The invention in the present case relates especially to machines operating on this principle in which the wrapped paper is delivered sidewise from between the feeding devices, and the invention consists broadly in the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper sidewise from the wrapping space, and in various constructions and combinations of parts, some of which are applicable in machines not employing the sidewise delivery, all as fully described and claimed hereinafter.

It is evident that the feeding devices and the parts co-operating therewith to roll the

paper and wrapper and secure the wrapper may be varied, and that different means may be used for delivering the wrapped products. I prefer, however, to use a series of rotating rollers or pulleys arranged in a circle or partial circle, so as to advance the paper in a circular path by engagement with the outer side of the paper and thus roll the paper into circular form, and I preferably use a construction in which the rollers do not form a complete circle but instead suitable guides are used to complete the inclosure of the wrapping space. I may, however, employ feeding belts in place of the rotating rollers, these belts being combined with suitable guides so as to advance and roll the paper and wrapper and secure the latter. The rollers may be of any suitable length extending through the whole or any part of the width of the paper but I prefer to use series of comparatively short rollers or pulleys arranged to overlap each other so as to better secure the advance of the paper from one roller to another. With this wrapping mechanism I prefer to use means for creasing or bending the leading end of the wrapper in slightly as it is advanced to the wrapping mechanism, to aid in securing the proper advancement of the paper in a circular path, and this feature in itself forms a part of my invention.

The wrapped product may be delivered sidewise from the feeding devices by any suitable means, the circular space in which the paper is wrapped being opened on one side for that purpose, preferably by separating the rollers or belts forming the feeding devices so that the wrapped product may be allowed to drop or be forced out sidewise. I prefer, however, as stated above, to inclose the wrapping space upon one side by a guide of any suitable form and to hold this guide under spring pressure so as to yield against the pressure of the paper as the latter is rolled up, thus keeping the paper under the proper pressure during rolling and to open the wrapping space by separating the rollers upon the opposite side, so that the paper thus released is pressed out of the wrapping space and delivered by

the pressure of the spring pressed guide, which thus forms an ejector moving transversely to the paper.

The wrapped papers may be delivered directly from the wrapping devices, but I prefer to transfer them from the wrapping devices to heating devices arranged to hold the paper and pasted wrapper in position until the paste has set, thus increasing the speed at which the papers may be wrapped and delivered. Any suitable means may be used for this purpose but I prefer to transfer the wrapped papers to a table made hollow and heated in any suitable manner by steam or otherwise, and advance them by rolling them over the table preferably by means of a series of feeding belts, thus holding the wrapped paper in circular form with the wrapper pressed down during the operation of drying the pasted wrapper. The paper and wrapper, or either of them, may be fed to this wrapping mechanism by hand, but suitable feeding devices for automatically feeding both the papers and wrappers in proper time will preferably be combined therewith to form an automatic high capacity machine. The papers may be previously folded to the size desired, or fed and wrapped open, or folded by mechanism embodied in and forming a part of the machine. The wrappers also may be previously cut to the desired size and fed to the wrapping mechanism as sheets, or fed from the web and severed in the machine.

The wrapping mechanism may be combined with suitable devices to form an independent wrapping, or folding and wrapping machine, or the wrapping mechanism may be combined with the ordinary forms of folding and delivering mechanisms now in use in printing machines, so that the papers may be printed, folded, wrapped, and delivered by a single machine, my improved wrapping mechanism being of sufficient capacity to be applicable to high speed web printing presses.

The feeding devices for advancing the paper to the wrapping mechanism may be of any suitable construction and, if the matter to be wrapped consists of a limited number of leaves or plies, may be arranged to positively grip the paper and advance it by the rear end until the entire paper is rolled by the wrapping mechanism, but I prefer to employ feeding devices having a special function in connection with the rolling and wrapping of matter having many leaves or plies. In rolling such matter it is obvious that the outer and inner surfaces must travel unequally, and in rolling a paper or other publication of many plies into a cylinder of small diameter, this difference of travel is so great as to render it important that the machine should be so constructed that the outer portion of the publication may slip upon the inner to permit this difference of travel during rolling. While the feeding devices by which the papers or other publications are fed to the wrap-

ping devices may be so nicely adjusted as to bind thereon with the required force to insure the prompt and regular feed of the papers and still permit this slip above referred to, it is preferable to provide more positive means for feeding the papers into the control of the rolling devices and provide for relieving the pressure wholly or partially at the proper time, so as to permit the movement of the plies of the paper upon each other as they assume the cylindrical form. In connection with my improved wrapping mechanism, therefore, I preferably employ for advancing the papers to the rolling mechanism, feeding devices constructed to permit the slip of the plies of the paper on each other in rolling, in order that publications consisting of many plies may be wrapped and the papers controlled by the feeding mechanism as long as possible. These feeding devices are preferably constructed and arranged to advance the paper by a positive feed until it has assumed the cylindrical form and then relieve this pressure.

The papers may be fed to the wrapping mechanism flat, as the rolling devices will operate to guide the leading end of the paper into a circular path and insure the rolling and wrapping operation. In some cases, however, as when the paper or publication to be wrapped is very thick or consists of bound and trimmed pamphlets, there is a tendency of the leading end, instead of promptly following the circular path desired, to butt against the rollers on the first rotation, thus interfering with the proper operation of the machine. I prefer, therefore, for greater certainty in the operation of the machine, to provide means by which the leading end of the paper may be creased or slightly curved inward before it enters the control of the wrapping devices, thus insuring the leading edge of the paper making the first circuit of the wrapping space properly.

In the accompanying drawings forming a part of this specification, I have shown for the purpose of illustration a complete independent wrapping machine of the preferred form employing rollers as the feeding devices, which will be found a simple and efficient embodiment of the present invention, and a modified form of the wrapping mechanism employing belts as the feeding devices, and a detailed description of the same will now be given, and the features forming the invention specifically pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of the machine. Fig. 2 is a sectional plan showing the machine with the wrapper feeding and pasting mechanism removed. Fig. 3 is a front or delivery end elevation of the wrapping mechanism. Fig. 4 is a section taken inside the frame looking in the same direction as Fig. 1. Figs. 5 and 6 are detail views similar to Fig. 4 on an enlarged scale, showing the wrapping mechanism in different

positions. Figs. 7 and 8 are sections showing in different positions a wrapping mechanism in which belts are used as the feeding devices.

Referring to said drawings 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 the wrapping mechanism is mounted at the front or delivery end of the machine, the paper feeding mechanism at the rear end of the machine, and the wrapper feeding and pasting mechanism in the upper part of the machine so as to feed the wrapper downward between the paper feeding and wrapping mechanisms.

In the construction shown in Figs. 1 to 6, in which rollers are used as the feeding devices for rolling the paper, the feeding rollers consist of four series of narrow rollers or pulleys *a, b, c, d* mounted respectively on shafts 10, 11, 12, 13 and arranged with relation to each other so as to provide a wrapping space between them within which the paper is wrapped. The feeding rollers rotate in the same direction, as shown by the arrows in Figs. 5 and 6, so that the paper is constantly advanced thereby and the rollers are preferably rubber faced, or roughened, corrugated, or otherwise formed so as to give a better hold upon the paper. The rollers may be arranged without overlapping but preferably are arranged to overlap each other slightly, as shown, less space being thus left between the surfaces of successive series of rollers on the line of engagement with the paper, so that the paper is thus engaged by a greater surface and a better feed secured.

The rollers may be arranged so as to form a complete or substantially complete circle and engage the rolled paper on all sides but I preferably inclose the wrapping space by the rollers only sufficiently to secure the proper feeding of the paper, and combine therewith one or more guides by which the paper is properly directed.

In the construction shown I arrange on the side at which the paper is received a series of curved guides *e*, which direct the leading end of the paper onward in a circular path to the body of the paper above rollers *a* as the leading end is advanced to the upper portion of the guides from the rollers *d* for the commencement of the second rotation. These guides may be rigid and mounted in fixed positions and other means used to form an ejector for pushing the wrapped paper out sidewise from between the rollers, or the paper be delivered by being allowed to drop or be carried out by the lower set of rollers *b*, when the rollers are opened for delivery of the wrapped paper, but these guides are preferably spring pressed so as to yield slightly as the paper is rolled up and thus hold the paper under constant pressure, and are preferably so mounted and arranged that the tension of the spring produced by the pressure of the paper in forcing the guides back during the operation of wrapping is utilized in

delivering the paper, by throwing the guides forward as the wrapped paper is released, the guides thus acting as an ejector to force the wrapped paper out sidewise from between the rollers *b, c*, when the latter are separated as presently to be described. It will be understood that rollers may be used with or in place of the plate guides shown, if desired.

As shown the guides *e* are carried by arms 14 on a rock shaft 15 which has upon one side a crank arm 16 connected to a rod 17 sliding in bearings 18 in the frame and spring pressed by a spring 19 so as to keep the shaft 15 under constant spring pressure tending to throw the guides *e* inward toward the rollers, and the shaft is rocked in the opposite direction against the tension of spring 19 by the pressure of the paper as the leading end reaches the guides on the first rotation and as the paper is rolled up, so as to force the guides *e* backward and store up power in the spring 19 to be utilized in delivering the wrapped paper.

In the construction now being described, the rollers *b, c*, are mounted so that they are held in fixed positions relatively to each other during the operation of wrapping, and at the completion of the wrapping operation are then separated for the delivery of the wrapped paper sidewise between them. Any suitable construction may be used for mounting and separating these rollers, but I have shown a simple and efficient construction in which the shafts 11, 12 of belt pulleys *b, c* are mounted in supports formed by plates 20, 21 at opposite sides of the machine loose on shafts 10, 13 of belt pulleys *a, d*, so that shafts 11, 12 and pulleys *b, c* may be moved in opposite directions in arcs concentric with shafts 10, 13 from which respectively they are driven.

The supports 20, 21 are rocked at the proper time by the following means:—The plates forming a part of the supports at the gear side of the machine each carry a segmental gear 22 these gears meshing together so that the two supports are rocked uniformly in opposite directions, and the plate forming a part of support 20 carrying shaft 11 is provided also with a segmental gear 23 which meshes with a similar gear 24 mounted on shaft 25 and actuated by a crank arm 26 and pitman 27, the pitman 27 carrying a bowl which runs in a cam groove in face cam G on the main shaft C, so that at each rotation of the shaft C the supports 20, 21 are rocked and the rollers *b, c* carried from the wrapping position shown in Fig. 5 to the delivering position shown in Fig. 6 for the delivery of the wrapped paper, and returned to normal position for the next wrapping operation.

As above stated the wrapped papers may be delivered directly from the wrapping mechanism but I prefer to combine therewith devices for heating and drying the paste and at the same time holding the wrapper pressed upon the paper so that a higher speed may be attained with certainty in securing the wrapper. Any suitable devices may be used

for this purpose, but I have shown a simple and efficient construction in which the wrapped papers are delivered from the wrapping mechanism upon an inclined table K, preferably made hollow and heated in any suitable manner, by steam admitted through the pipe 28 or otherwise, and over which the wrapped paper is advanced by a series of feeding belts L, the wrapped paper being thus held in form and the wrapper pressed down so that the paste is sufficiently dried before delivery.

With this wrapping mechanism any suitable paper and wrapper feeding devices may be combined to form a high speed automatic wrapping machine, and the wrappers may be previously pasted or a pasting mechanism added to paste the wrappers in the machine. It will be understood, also, that this wrapping mechanism is well adapted to be combined with the final folding devices of a folding machine or printing press of any of the common forms so that the papers are received therefrom by the wrapping mechanism, suitable wrapper feeding and pasting devices being added. For the purpose of illustrating a complete machine, however, I have shown paper and wrapper feeding and wrapper pasting devices of a common form, the previously folded papers being fed from a box or holder and the wrappers fed from the web. In this construction a holder E for the papers or pamphlets is mounted on the rear end of the machine and the bottom paper is fed from the holder over guides 30 to feeding belts 31 carried by rolls 32 and by these belts advanced to the wrapping mechanism. The paper is fed from the holder by a series of pivoted fingers 33 carried by slide 34 moving on rods 35 mounted in the frame of the machine, the fingers being pressed upward by a spring so as to engage the bottom paper when withdrawn. The slide is reciprocated upon the rods 35 to advance the papers in proper time by means of slotted levers 36 carried by rock shaft 37 mounted in the side frames A, B, and operated from the main shaft C by means of a pitman 38 connected to one of the levers 36 and an eccentric 39 on shaft C.

The wrappers are cut from the web pasted and fed to the wrapping mechanism by the following means:—The wrapper web *y* is fed from the web roll F at the top of the machine by a pair of feeding rolls 42 to a pair of cutting and feeding rolls 43 by which the wrappers are severed from the web and advanced downward to the wrapping mechanism between guides 44, a line of paste being applied to the rear end of each wrapper between the guides 44 by paster 45 co-acting with a roll 46, the paster receiving paste from a fountain roll 47 mounted in the fountain 48 in the usual manner. The wrapper *y* is fed downward between the guides 44 so as to reach the paper *x* just above the lower front belt roll 32, and a series of rollers or pulleys 49 carried by the arms 14 co-act with this belt roll to advance

the paper to the first series of rollers *a*, and to secure the advance of the wrapper with the paper until it is securely held between the layers of the partially wrapped paper so as to be drawn forward therewith. It will be seen that the rollers 49 are held against the lower belt roll 32 under yielding spring pressure, and that, when the guides *e* and rollers 49 are pressed backward slightly as the paper is rolled up, as previously described, the rollers 49 are raised slightly so as to relieve the feeding pressure between these rolls and the belt roll 32 and belts 31. It will be seen also that the upper forward belt roll 32 is so located as to press not upon the lower belt roll but upon the lower series of belts 31 some distance from their belt roll, thus giving a yielding or elastic feeding hold upon the paper. While any other suitable construction of feeding devices for advancing the papers to the rolling devices may be used with matter consisting of a limited number of leaves or plies, this construction of feeding mechanism has a special function in connection with the rolling and wrapping of matter having many leaves or plies. In rolling such matter, it is obvious that the outer and inner surfaces must travel unequally, and in rolling a paper or other publication of many plies into a cylinder of small diameter, this difference of travel is so great as to render it important that the machine should be so constructed that the outer portion of the publication may slip upon the inner to permit this difference of travel during rolling. While the feeding devices by which the papers or other publications are fed to the wrapping devices may be so nicely adjusted as to bind thereon with sufficient force to insure the prompt and regular feed of the papers and still permit this slip above referred to, it is preferable to provide more positive means for feeding the papers into the control of the rolling devices, and provide for relieving the pressure, wholly or partially, at the proper time so as to permit the movement of the plies of the paper upon each other as they assume the cylindrical form. This result is attained in the construction shown, in which the rollers 49 co-act as feeding rollers with the belt rolls 32 and belts 31 to advance the paper positively during the first part of the rolling of the paper, but are slightly raised from the belt roll and belts to relieve the feeding pressure, as soon as the leading end of the paper has been curved and directed against the guide *e*, at which time it is desirable that the outside plies should be free to move faster than the inner plies, and thus this raising of the rollers 49 permits the unequal movement of the plies of the paper between them and the rolls 32 and belts 31, while at the same time the yielding pressure between the upper belt roll 32 and belts 31, above referred to, permits this slip also, although they may still engage the rear end of the paper.

It is desirable that feeding rolls similar to

rolls 49 and 32 should be used, even in cases in which my invention is embodied in a hand fed machine, as otherwise the paper must be held and fed forward by hand a considerable length of time to insure its proper advance by the rollers *a, b, c, d*, while by the use of the rolls 49, 32 it is necessary only that the leading end of the paper be presented thereto and in such hand fed machines, also, it is evident that this special feature of the release of the pressure of the rollers 49 should be included if thick publications are to be wrapped.

While I have shown only a construction in which the rolls are raised to relieve the feeding pressure by mounting them on a spring pressed support, and raising them by the pressure of the paper, and this will be found a simple and efficient construction, it will be understood that the rolls may be mounted in any other suitable manner, and that any other suitable means may be used for moving the rolls so as to relieve the feeding pressure at the proper time. Thus the rollers 49 may be mounted separately from the guides *e* and raised positively, as by a cam, to secure the relief of the pressure at the proper time, or both the guides and rollers may be thus raised, the guides being released at the proper time to aid in the delivery of the paper, if desired.

While the paper *x* may be fed to the wrapping mechanism flat or without preliminary creasing or curving of its leading end, and the guides *e* and rollers *a, b, c, d* be sufficient to guide the leading end of the paper into a circular path, or guides may be used between the rollers to aid in securing this result, which condition of the paper insures the completion of the rolling and wrapping process, still in some instances, as when the paper or publication to be wrapped is very thick or consists of bound and trimmed pamphlets, there is a tendency of the leading end as it passes under the guide *e* and meets the rollers *b*, to be arrested in its onward movement and instead of promptly following the circular path desired, the thickness of the publication and the limited wrapping space requires such an increased travel of the outer surface of the paper over that of the inner surface as to interfere with the proper onward feeding of the paper and cause the end of the paper to butt against the rollers *b* and not bend upward. When this first curving of the paper or pamphlet upon itself has been accomplished, the full action of all the feeding surfaces and the final wrapping is assured. This curving of the leading end of the paper will be attained with certainty in most and possibly all cases by spring-seated guides *e*, and their accompanying feeding devices. I prefer, however, to provide means by which the leading end of the paper may be creased or slightly curved upward before it enters the wrapping space, to aid in securing certainty in the leading edge of the paper making the

first circuit of the wrapping space correctly. Any suitable means may be used for this purpose, but I have shown a pair of rolls *H* mounted respectively above and below the lower set of feeding tapes 31, the upper roll being provided with a blade 40 and the lower with a groove 41, the blade 40 being cut away opposite the tapes 31. The leading end of the paper is thus pressed into the groove 41 by the blade 40 as the paper is advanced to the wrapping mechanism and thus creased or bent upward slightly so as to break the rigidity of the paper on that line and aid in securing the movement of the paper in a circular path by the action of the rollers *a, b, c, d*. It will be understood that the pressure of the rolls *H* upon the paper is such as not to interfere with the slip of the plies upon each other, above described, in case the rolls are so placed as to engage the rear end of the paper after the paper has assumed a cylindrical form.

The operative parts of the machine with the exception of the fingers for advancing the bottom paper *x* from the holder *E* to the belts 31 are driven from the main shaft *C* as follows:—The shaft *C* carries a large gear 50 which meshes with a gear 51 on the shaft of the forward belt roll 32, and the rear belt rolls are driven from this roll by lower belts 31 and gears 52 on the shafts of these rolls. The forward belt roll carries outside the frame *A* a gear 1 by which the shaft 10 carrying the first series of rollers *a* is driven through an intermediate 2 and a gear 3 on shaft 10. The gear 3 on shaft 10 drives shaft 11 carrying rollers *b* through an intermediate 4 and a gear 5 carried by shaft 11. The shaft 13 carrying rollers *d* is driven from gear 51 through an intermediate 6 and gear 7 on shaft 13 and the shaft 12 carrying roller *c* is driven from gear 7 through an intermediate 8 and gear 9 on shaft 12. By this construction shafts 11, 12 are each driven from the shafts on which their respective supports 20, 21 are mounted, and, the intermediates 5, 8, being carried by said supports, these rollers may be swung concentrically with the shafts 10, 13 and simultaneously driven therefrom. By the train of gears described, the series of rollers *a, b, c, d* are all driven in the same direction and at the same rate of speed. The rollers *H* carrying the blade and groove 40, 41 are driven from the gear 50 through intermediates 100 engaging gear 53 on the shaft of the lower roll and gears 54 on the shafts of the two rolls meshing together. The feeding belts *L* are driven from intermediate 2, previously described, through a series of intermediates 101 and gear 102 on the shaft of one of the belt rolls.

The wrapper feeding, pasting and cutting mechanism is driven as follows:—The upper roll *H* carries a small gear 55 which drives one of the feeding and cutting rolls 43 through intermediates 103 and a gear 56 on the shaft of roll 43 outside the frame *B*, and the two

feeding and cutting rolls 43 are geared together by gears 57 outside frame A. From one of the gears 57 the feeding rolls 42 are driven through intermediate 58 and gears 59 on said rolls, and the other gear 57 drives the pasting mechanism through intermediate 60, gear 61 on the shaft of paster 45, and gear 62 on fountain roll 47.

The operation of the machine will be understood from a brief description in connection with the drawings. The wrapper may be led in with the paper or at any other suitable point in the wrapping, but the parts are preferably timed, as shown, so that the paper *x* is advanced to the wrapping mechanism and partially rolled, and as the rear end of the paper is about to be drawn in, the wrapper *y* is led in beneath the pulleys 49 and held between the layers of paper, the length of the wrapper being such that the rear pasted end of the wrapper overlaps upon the layer of wrapper previously upon the paper for pasting, after the paper and wrapper are fully rolled. The cam G is timed so as to hold the rollers *b*, *c* in wrapping position, as shown in Figs. 1 to 5, until the wrapping operation is substantially completed and then separate these rollers and release the paper for the delivery operation, returning the rollers to normal wrapping position in time for the next paper. As shown, the machine is adapted to roll the paper and wrapper during about three fourths of the rotation of the shaft C, and the cam G is timed to separate the rollers, hold them separated during the delivery of the paper and return the rollers to wrapping position again, during the other quarter rotation of the shaft C. It will be understood, however, that the timing of the parts may readily be varied so as to roll the paper and wrapper during more or less rotations of the rollers. As shown in Fig. 4, the paper *x* is just being advanced to the wrapping mechanism by the feeding belts 31, belt roll 32 and pulleys or rollers 49, the leading end having been creased or turned upward slightly by the blade 40 and groove 41, and the guides *e* are held in the proper position to aid in rolling the paper by the spring 19 acting on the rock shaft 15, the rollers 49 co-acting with the belts 31 and front belt roll 32 to advance the paper. As the leading end of the paper reaches the first series of rollers *a* it is advanced thereby, together with the push of the feeding belts 31, roll 32 and the pulleys 49 co-acting therewith, and the leading end of the paper is fed to and by the successive series of rollers *b*, *c*, *d*, being bent upward about the lower end of guides *e* and advanced in a circular path thereby, and at the end of the first rotation the leading end of the paper is brought into contact with the guides *e* and thereby guided against the body of the paper, and inclosed therein in cylindrical form as shown in Fig. 5, and as the rear end of the paper is about to be drawn in, the leading end of the wrapper *y* is fed in by its feeding mechanism so as to meet the rear end

of the paper below the rolls 49 and is thus advanced and rolled up with the paper on the succeeding rotations, the leading end of the wrapper being held between the layers of paper, and the wrapper is thus wound about the paper and its pasted end pressed down and secured. It will be seen that the guide *e* guides the leading end of the paper under spring pressure, and that the paper is thereby held under spring pressure during the entire rolling operation after the leading end of the paper has reached the guide *e* on its first rotation, the guide *e* being then pressed back slightly by the leading end of the paper so as to put the spring 19 under tension, if the matter being wrapped be of some thickness and rigidity, as in the case of publications having a number of leaves or plies. As the guides *e* are thus pressed back the feeding rollers 49 are raised slightly so as to relieve the feeding pressure upon the body of the paper, thus permitting the slip of the plies upon each other required for the unequal movement of the inner and outer portions of the paper as above described. If the paper be of such length that it is still within the range of action of belt roll 32, the slight yielding grip of this roll and belts 31 upon the rear end of the paper also permits this slip. This position of the parts is shown in Fig. 5, the wrapper just being fed in and the guide *e* having been pressed back by the rolled paper and the spring 19 thus put under tension and the rollers 49 raised, the bowl on pitman 27 being on the concentric portion of the cam G so that the supports 20, 21 and feeding rollers *b*, *c* are held in their normal wrapping position. As the movement continues and the paper is fully wrapped and wrapper secured, the bowl passes onto the inner groove in the cam G, and the shaft 25 is rocked to actuate the segmental gears 22, 23, 24 so as to rock the supports 20, 21 and carry the rollers *b*, *c* apart, and the pressure upon spring 19 being thus released the guides *e* are thrown forward slightly so as to aid in delivering the wrapped paper over rollers *b*, which operation is assisted also by the rotation of the rollers, the position of all the parts in thus delivering the paper being shown in Fig. 6. The paper having been delivered, the bowl on pitman 27 again passes onto the outer concentric part of cam G and the supports 20, 21 and rollers *b*, *c* are returned to and held in position for receiving and wrapping the next paper, and another paper *x* having meanwhile been fed forward from the holder E to the wrapping mechanism is taken thereby, the rollers 49 having been returned to normal feeding position by spring 19, and thus the operation is repeated.

It is evident that many modifications may be made in the constructions shown and described above as embodying my invention, and that other means for rolling the paper and delivering the same may be used. Thus, while I prefer to use rollers as the feeding

devices by which the paper and wrapper are advanced and rolled during the wrapping operation, any other suitable feeding devices may be used for this purpose.

5 In Figs. 7 and 8 I have shown a simple construction in which belts are used as the feeding devices, suitable guides being combined therewith to secure the proper rolling of the paper and wrapper, and the wrapped paper is
10 delivered sidewise between these separated belts, being pressed outward by a guide as in the construction previously described. In this construction, the lower set of feeding belts 31 is carried downward from inner belt roll 32, so as
15 to form a set of feeding belts *m* by which the paper is advanced and rolled in connection with the set of belts *n* running in the opposite direction on the opposite side of the wrapping space. The feeding belts *m* are led from the
20 inner feeding rolls 32 about a roll or series of pulleys 71 and over a series of belt tightening pulleys 72 to the rear belt roll 32. The belt roll 71 is mounted on arms 73 pivoted on and carried by arms 74 on a rock shaft 75 mounted
25 in the side frames of the machine and provided with a crank arm 76 attached to a pitman 77 which slides in brackets 78 on the frame, and is pressed in one direction by a spring 79 and moved in the other direction against the tension of spring 79 by a cam 80 carried by the
30 main shaft C and engaging a bowl 81 on pitman 77. The ends of the arms 73 are connected to the lower ends of crank arms 74 by springs 82 by which the roll 71 is drawn downward so as to hold the belts 31 under tension,
35 and the arms 73 normally rest on stops 83 carried by arms 74, this construction enabling arms 73 to swing against the tension of springs 82 as the shaft 75 is rocked to carry the roll 71 outward, while they are held supported in position by stops 83 when thrown
40 inward into wrapping position by the rock shaft. The arms 73 carry also a bar forming one-half of a guide *o* upon which the paper rests during the wrapping operation and by
45 which it is guided from the first series of belts *m* to the opposite series *n*, this guide *o* being formed also so as to guide the belts *m* in proper position as the roll 71 is withdrawn. The belts *n* are carried by belt rolls or pulleys 84, 85, the lower roll or pulleys 85 being
50 mounted on arms 86 carried by arms 87 on rock shaft 88 and connected to the lower ends of arms 87 by springs 89, the arms 87 having stops 90, and the arms 86 carrying half of the guide *o*, this construction corresponding to that previously described in connection with the roll or pulleys 71. The rock shaft 88 carries a crank arm 91 connected by a connecting
60 rod 92 to one of the arms 74 on rock shaft 75 previously described, so that, as the rock shaft 75 is rocked by cam 80 against the tension of spring 79 to carry the belt roll or pulleys 71 outward, the shaft 88 is rocked in the
65 opposite direction so as to carry the belt roll 85 outward also and thus separate the two parts of the guide *o* and the belts, and per-

mit the wrapped paper to drop or be pressed down from between them. Another series of belts may be used running transversely to
70 the belts *m, n* for advancing the paper from belts *n* to belts *m*, but I have shown and prefer to use a series of guides *p* by which the end of the paper is guided so as to be advanced and rolled properly by the two series
75 of belts *m, n*. These guides *p* are carried by arms 93 on a rock shaft 94 provided with a crank arm 95 spring pressed by a spring 96 on a rod 97 sliding in brackets on the frame and connected to the crank arm, this spring
80 operating to press the guides *p* normally downward against the paper during the process of rolling and wrapping, which results in the guides being pressed upward by the paper on taking the cylindrical form so as to put the
85 spring 96 under tension, enabling these guides to act as an ejector, and the operation being the same as previously described in connection with the corresponding parts in Figs. 9 and 10. The arm 93 also preferably carries
90 a series of rolls 98 corresponding to rolls 49 of the constructions previously described, which co-act with the belts *m* to aid in advancing the paper as well as in feeding the wrapper. A stop 99 is preferably used to stop
95 the crank arm 95 as it is forced downward under the pressure of spring 96 and hold the guides *p* and rollers 98 in proper position for the reception of the paper to be wrapped. The operation of this construction will be understood from a brief description in connection with the figures.

As shown in Fig. 7, the paper is nearly rolled and the rear end of the paper with the wrapper is just about to be drawn in, the guides
105 *p* have been pressed back so as to put the spring 96 under tension and the bowl 81 is on the concentric portion of the cam 80, the two parts of the guides *o* being thus held together to form a guide extending between the belts
110 *m, n* on the lower side of the wrapping space. As the wrapping operation is completed and the pasted end of the wrapper secured, the outer portion of the cam 80 actuates the pitman 77 through bowl 81 so as to rock the shaft
115 75 and through the connecting rod 92 the shaft 88, and carry the belt rolls 71, 85 and the two parts of the guide *o* in opposite directions from the position shown in Fig. 7 to that shown in Fig. 8 so as to separate the belt rolls and
120 two parts of the guide sufficiently to allow the paper to be delivered downward between them. As the wrapped paper is thus released the spring 96 through crank arm 95 rocks the shaft 94 and throws the guides *p* downward
125 so as to force the wrapped paper out onto the table H over which it is carried and delivered by belts 100. The bowl 81 then passes onto the lower concentric portion of cam 80, and the parts are all returned from the position
130 shown in Fig. 8 to that shown in Fig. 7 by the pressure of spring 79 upon pitman 77.

It should be remarked that the machine illustrated in Figs. 7 and 8 is adapted more

especially for wrapping papers or other matter consisting of a limited number of sheets or plies, and no especial provision has been made for relieving the feeding pressure upon the rear end of the paper to permit the unequal movement of the inner and outer surfaces of the paper, in wrapping thick papers or other matter consisting of a considerable number of sheets or plies, as in the constructions previously described. It will be found, however, that the yielding grip of the tapes used in this construction permits sufficient slip on each other to enable the machine to be used quite generally, the positive grip of the rolls 32, being released as the paper assumes a cylindrical form. The attainment of this result of permitting slip is aided, also, by the slight lifting of the rolls 98 and guides *p* against the tension of spring 96, as the leading end of a paper of considerable thickness and consequent rigidity presses against the guides *p* near the completion of the first rotation, and as the paper assumes a cylindrical form. Other devices for the purpose of relieving the feeding pressure may readily be combined with this machine, if desired.

It will be understood that other arrangements of the feeding devices for rolling the paper may readily be made by those skilled in the art without departing from my invention, and I am not to be limited to any of the specific arrangements shown.

The construction shown in Figs. 7 and 8 is claimed in my application, Serial No. 446,782, filed September 24, 1892.

This application forms a division of application, Serial No. 432,363, filed May 9, 1892, before referred to.

What I claim is—

1. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper sidewise from the wrapping space, substantially as described.

2. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for opening the wrapping space on one side to deliver the wrapped paper, substantially as described.

3. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for opening the wrapping space on one side, and an ejector moving transversely to the paper, substantially as described.

4. In a machine for wrapping newspapers

and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of a spring pressed guide on one side of the wrapping space forming an ejector, and means for opening the wrapping space on the side opposite the guide, substantially as described.

5. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper sidewise from the rollers, substantially as described.

6. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for separating the rollers on one side of the wrapping space to deliver the wrapped paper, substantially as described.

7. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for separating the rollers on one side of the wrapping space to deliver the wrapped paper, and an ejector moving transversely to the paper, substantially as described.

8. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of a spring pressed guide on one side of the wrapping space, and means for separating the rollers to open the wrapping space on the side opposite the guide to deliver the wrapped paper, substantially as described.

9. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of feeding devices to which the papers and wrappers are fed arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for delivering the wrapped paper sidewise from the wrapping space, substantially as described.

10. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for opening the wrapping space on one side to deliver the wrapped paper, substantially as described.

11. The combination with paper and wrap-

per feeding devices and pasting devices for the wrapper, of feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for opening the wrapping space on one side, and an ejector moving transversely to the paper, substantially as described.

12. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper sidewise from the rollers, substantially as described.

13. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for separating the rollers on one side of the wrapping space to deliver the wrapped paper, substantially as described.

14. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for separating the rollers on one side of the wrapping space to deliver the wrapped paper, and an ejector moving transversely to the paper, substantially as described.

15. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper from the wrapping space, and means for creasing or bending inward the leading end of the paper before it is acted upon by the feeding devices, substantially as described.

16. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper from the rollers and means for creasing or bending inward the leading end of the paper before it is acted upon by the rollers, substantially as described.

17. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll the paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper from the

wrapping space, and heating devices for drying the paste to which the paper is delivered, substantially as described.

18. The combination with a wrapping mechanism by which a paper and wrapper are rolled together and the wrapper secured, of a heated table to which the wrapped paper is delivered from the wrapping mechanism, and feeding devices for advancing the papers over the table, substantially as described.

19. In a machine for wrapping newspapers and other publications, the combination with mechanism for rolling a paper and wrapper into cylindrical form and delivering the paper sidewise, of feeding devices for advancing the papers to the rolling mechanism constructed to permit the slip of the plies of the paper upon each other in rolling, substantially as described.

20. In a machine for wrapping newspapers and other publications, the combination with mechanism for rolling a paper and wrapper into cylindrical form and delivering the paper sidewise, of feeding devices advancing the papers to be wrapped to said mechanism, and means for relieving the pressure of the feeding devices upon the body of the paper to permit the slip of the plies of the paper upon each other, substantially as described.

21. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll a paper and wrapper together within said wrapping space and secure the wrapper, and means for delivering the wrapped paper sidewise from the wrapping space, of wrapper feeding devices and pasting devices for the wrapper, and paper feeding devices constructed to allow the slip of the plies of the paper upon each other in rolling, substantially as described.

22. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll a paper and wrapper together within said wrapping space and secure the wrapper, and means for delivering the wrapped paper sidewise from the wrapping space, of wrapper feeding devices and pasting devices for the wrapper, paper feeding devices, and means for relieving the pressure of said devices upon the paper to permit the slip of the plies of the paper upon each other, substantially as described.

23. In a machine for wrapping newspapers and other publications, the combination with feeding devices arranged to form a wrapping space between them and co-acting to roll a paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper from the wrapping space, feeding devices for advancing the papers to the wrapping mechanism, paper feeding devices constructed to permit the slip of the plies of the paper upon each other, and means for creasing or bending in-

ward the leading end of the paper before it is acted upon by the feeding devices by which the paper and wrapper are rolled together, substantially as described.

5 24. In a machine for wrapping newspapers and other publications, the combination with feeding rollers arranged to form a wrapping space between them and co-acting to roll a paper and wrapper together within said wrap-
10 ping space and secure the wrapper, of means for delivering the wrapped paper from the rollers, paper feeding devices constructed to permit the slip of the plies of the paper upon each other in rolling, and means for creasing
15 or bending inward the leading end of the paper before it is acted upon by the rollers, substantially as described.

25. In a machine for wrapping newspapers and other publications, the combination with
20 feeding rollers arranged to form a wrapping space between them and co-acting to roll a paper and wrapper together within said wrapping space and secure the wrapper, of means for delivering the wrapped paper from the
25 rollers, paper feeding devices, means for relieving the pressure of said devices upon the paper to permit the slip of the plies of the paper upon each other, and means for creasing or bending inward the leading end of the pa-
30 per before it is acted upon by the rollers, substantially as described.

26. The combination with rollers *a, b, c, d*, of means for separating the rollers to open the wrapping space, substantially as described.

35 27. The combination with rollers *a, b, c, d*, of guide *e* forming an ejector, and means for separating the rollers to open the wrapping space, substantially as described.

28. The combination with rollers *a, b, c, d*, of
40 spring pressed guide *e* forming an ejector, and means for separating the rollers to open the wrapping space, substantially as described.

29. The combination with rollers *a, b, c, d*, of
45 means for separating the rollers to open the wrapping space, and an ejector, substantially as described.

30. The combination with rollers *a, d*, of rollers *b, c*, driven from the shafts of rollers *a, d* and means for moving said rollers *b, c*,

in opposite directions concentrically with said 50 shafts, substantially as described.

31. The combination with rollers *a, d*, of rollers *b, c*, and means for simultaneously carrying said rollers in opposite directions and driving them in the same direction, substan- 55 tially as described.

32. The combination with shafts 10, 11, 12, 13, and their rollers *a, b, c, d*, of supports 20, 21 mounted loosely on shafts 10, 13 and carrying shafts 11, 12, and means for driving 60 said shafts and rocking said supports to carry shafts 11, 12 in opposite directions, substantially as described.

33. The combination with shafts 10, 11, 12, 13, and their rollers *a, b, c, d*, of supports 20, 65 21 mounted loosely on shafts 10, 13, and carrying shafts 11, 12, gears 22 connecting said supports and means for driving said shafts and rocking one of said supports, substan- 70 tially as described.

34. The combination with rollers *a, b, c, d*, and means for advancing a paper to said rollers, of rolls H having blade 40 and groove 41, engaging the leading end of the paper be- 75 fore it reaches the rollers, substantially as described.

35. The combination with rollers *a, b, c, d*, guide *e*, spring pressed rolls 49, and roll 32, of rolls H, having blade 40 and groove 41, sub- 80 stantially as described.

36. The combination with rollers *a, b, c, d*, guide *e*, rolls 49 and 32 and means for raising said rolls 49 to relieve the feeding pressure, of rolls H having blade 40 and groove 41, sub- 85 stantially as described.

37. The combination with rollers *a, b, c, d*, spring pressed guide *e* and rolls 49 carried by said guides, and roll 32, of rollers H having blade 40 and groove 41, substantially as de- 90 scribed.

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

LUTHER C. CROWELL.

Witnesses:

C. J. SAWYER,

THOS. F. KEHOE.