

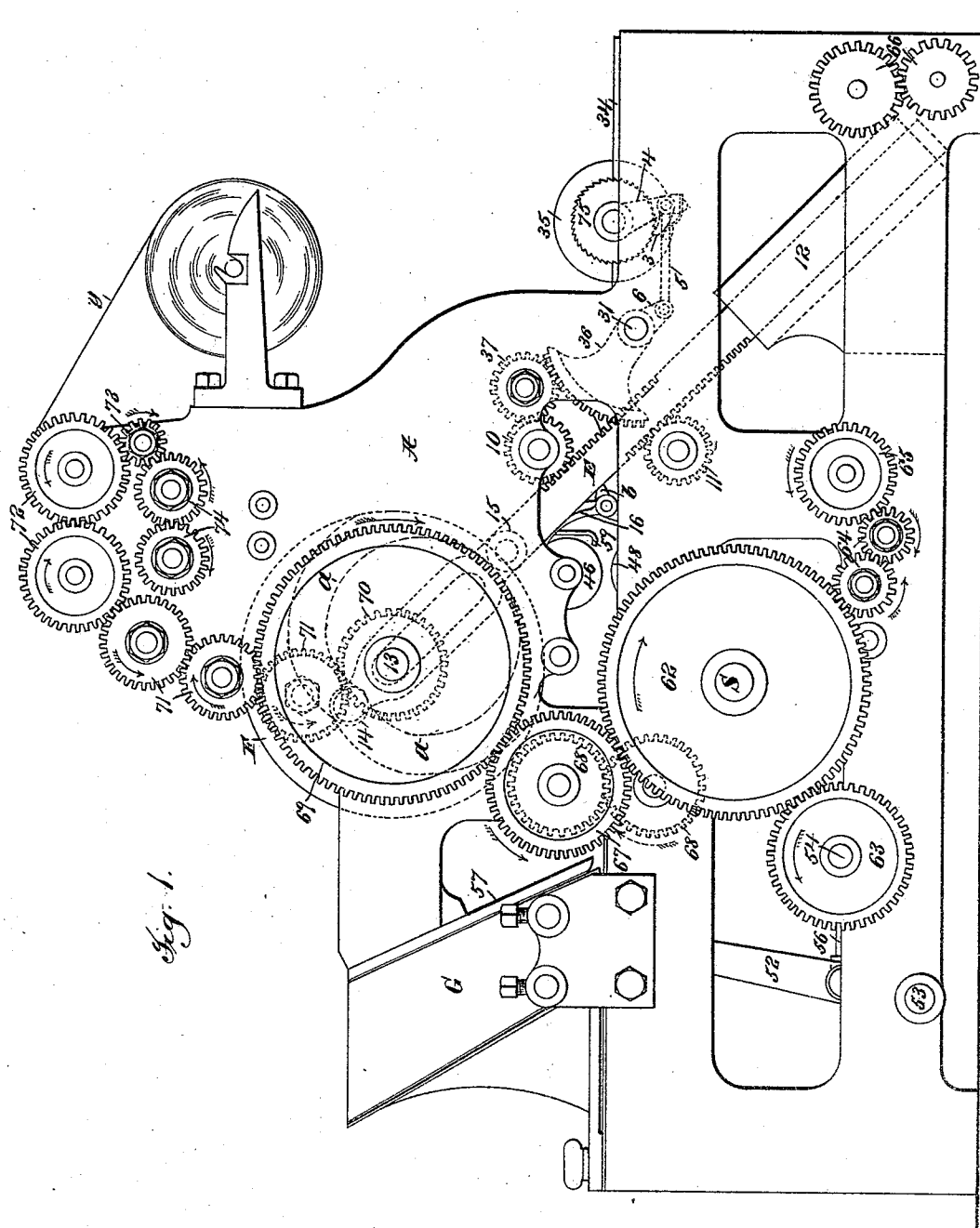
(No Model.)

9 Sheets—Sheet 1.

L. C. CROWELL.
WRAPPING MACHINE.

No. 517,440.

Patented Apr. 3, 1894.



Attest:
G. H. Batts.
T. F. Kehoe.

Inventor.
Lucius C. Crowell

Philip Munroe Phelps
Attys.

(No Model.)

9 Sheets—Sheet 2.

L. C. CROWELL.
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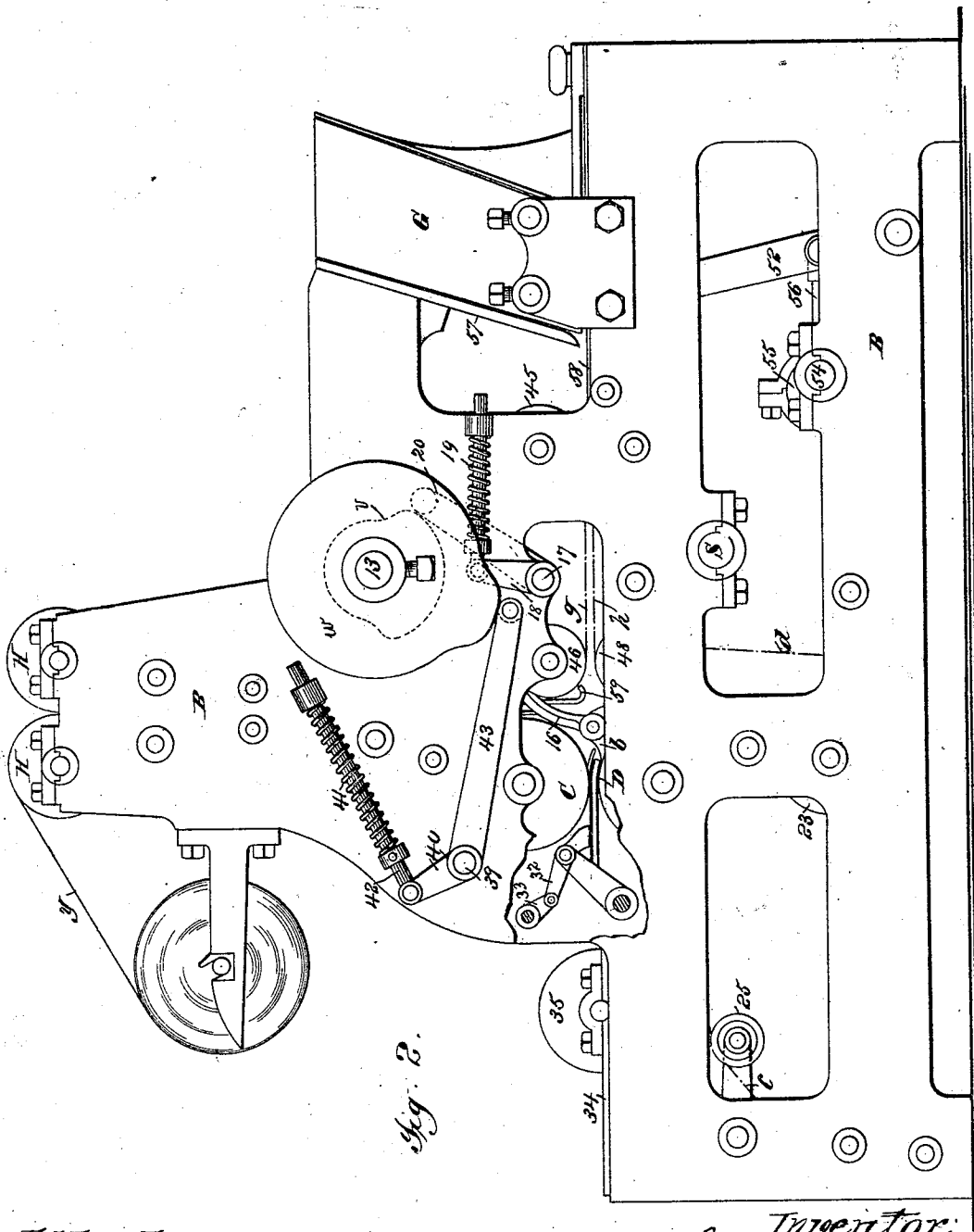


Fig. 2.

Attest
Geo. H. Dotto.
T. F. Kehoe

Inventor:
Luther C. Crowell
by
Sheff Munn & Sheff
Attys

(No Model.)

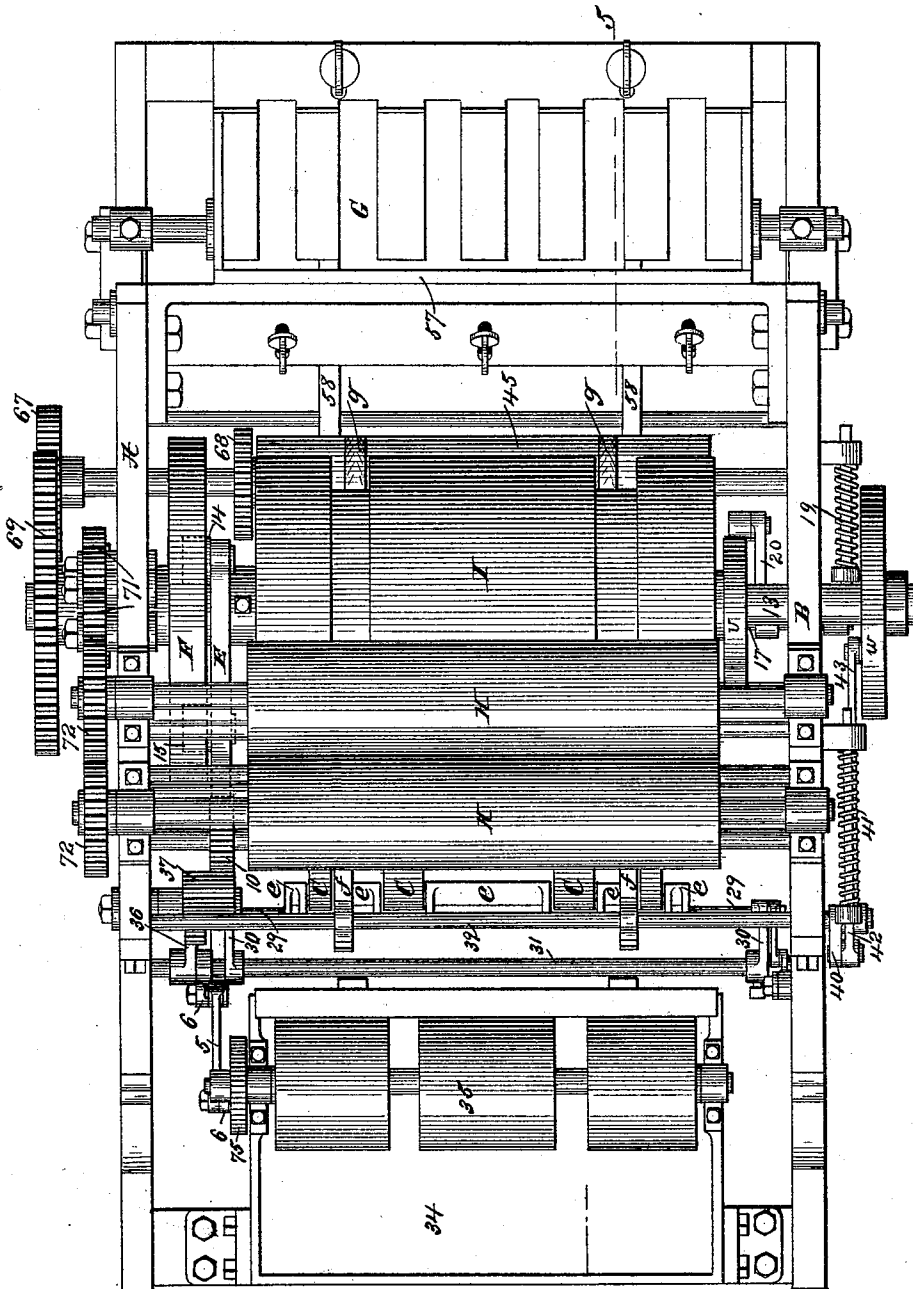
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L. C. CROWELL.
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No. 517,440.

Patented Apr. 3, 1894.

Fig. 3.



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

Inventor:
Luther Crowell
by
Phileas M. Phelps
Attys

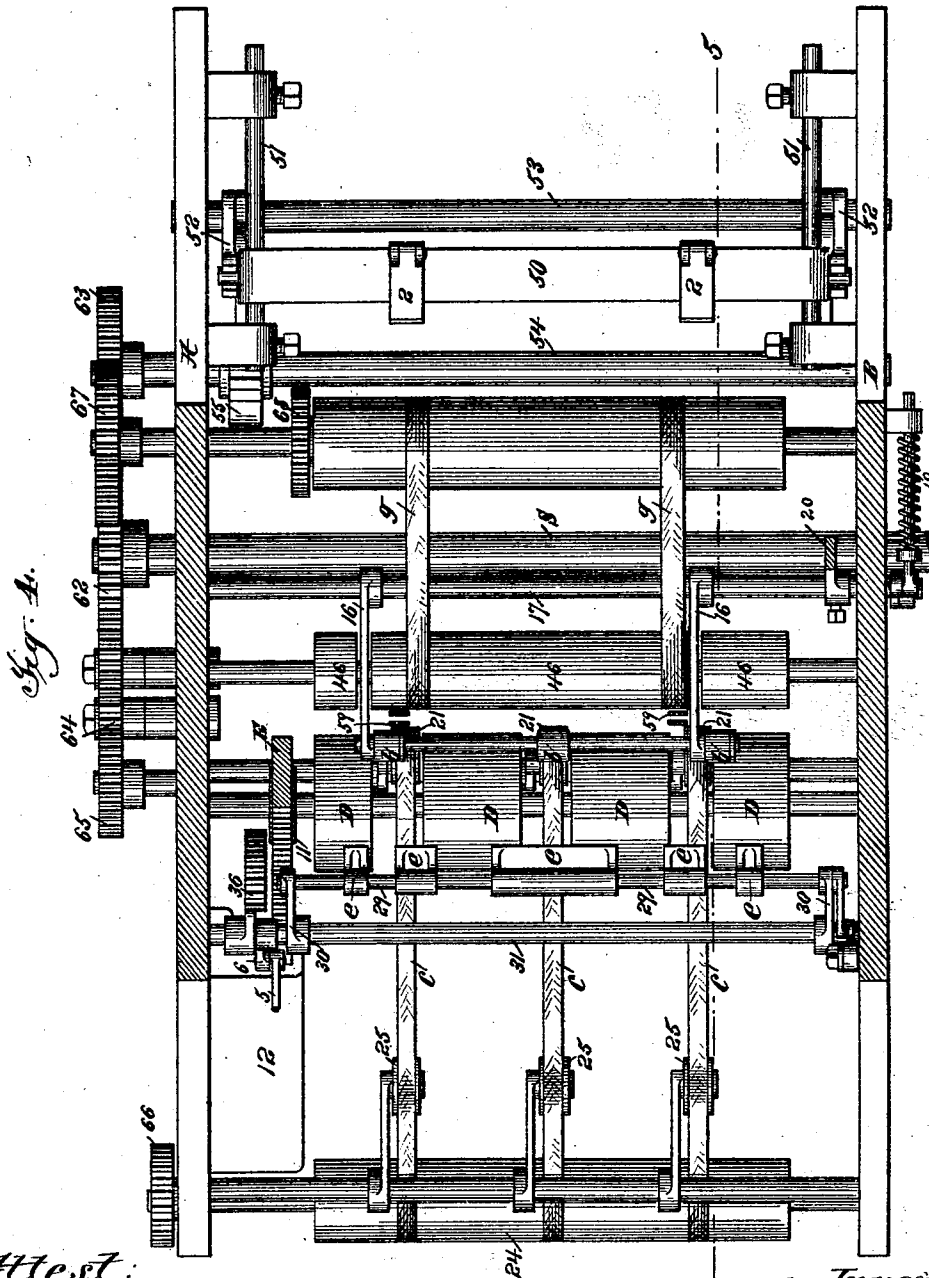
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L. C. CROWELL.
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No. 517,440.

Patented Apr. 3, 1894.



Attest:
Geo H Botte
T. F. Kehoe.

Inventor.
Lucius C. Crowell
by
Phieffmann & Phipps
Attys

(No Model.)

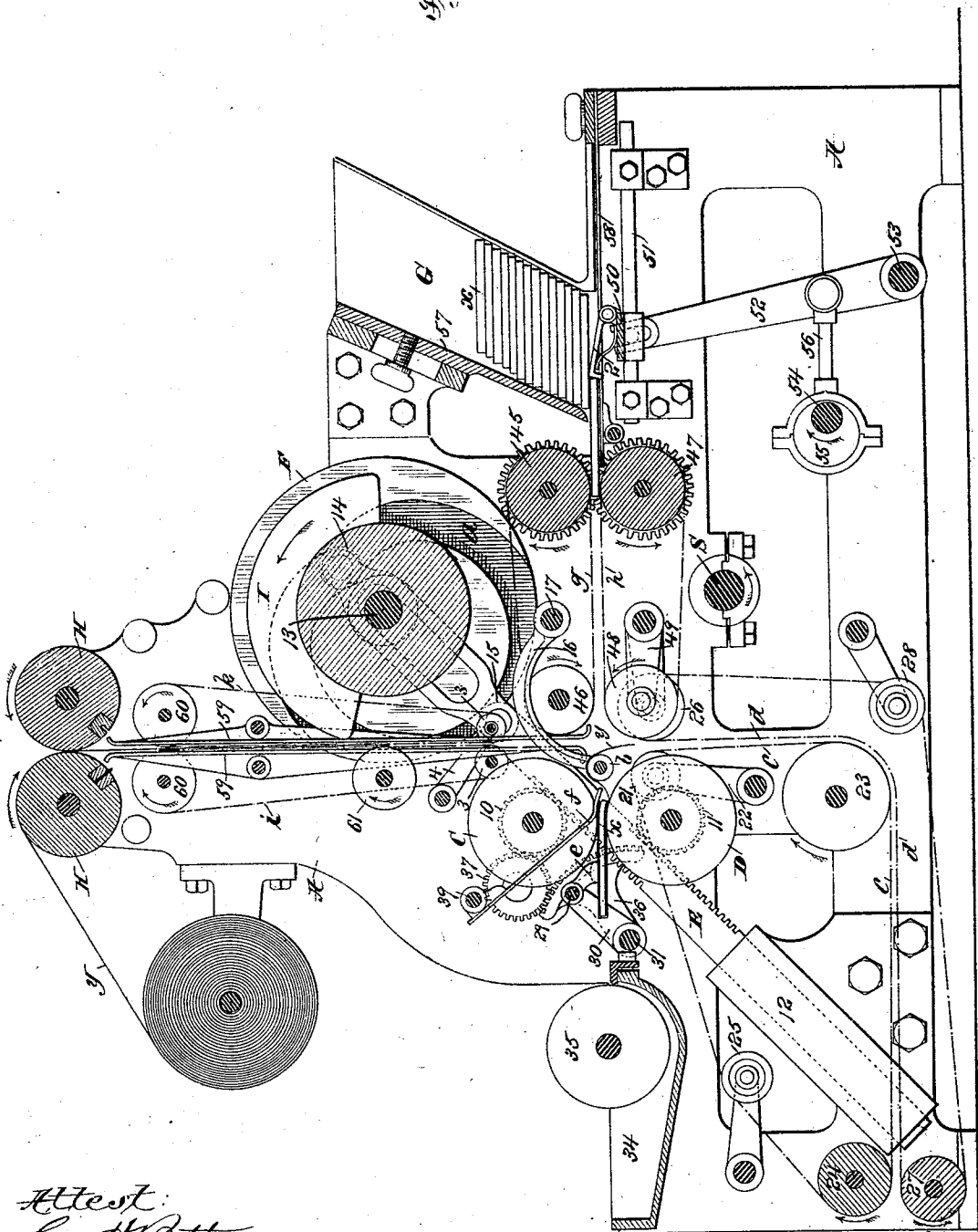
9 Sheets—Sheet 5.

L. C. CROWELL.
WRAPPING MACHINE.

No. 517,440.

Patented Apr. 3, 1894.

Fig. 5.



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

Inventor:
Luther Crowell
by
Phelps Munroe & Co.
Attys

L. C. CROWELL.
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Fig. 6.

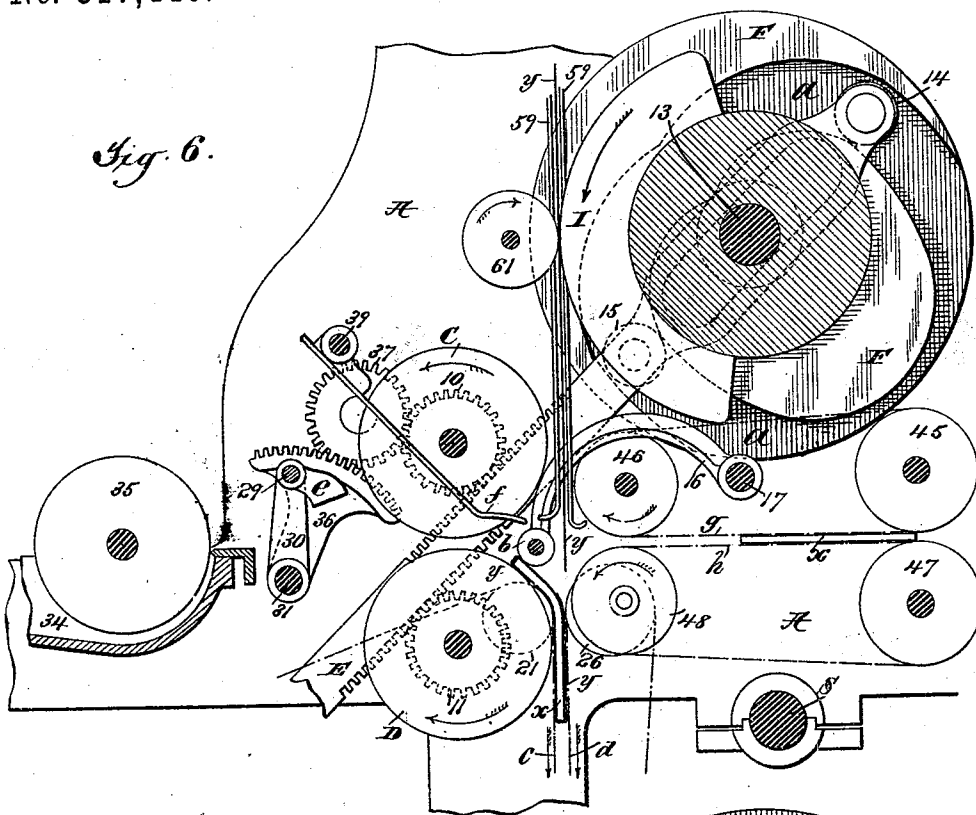
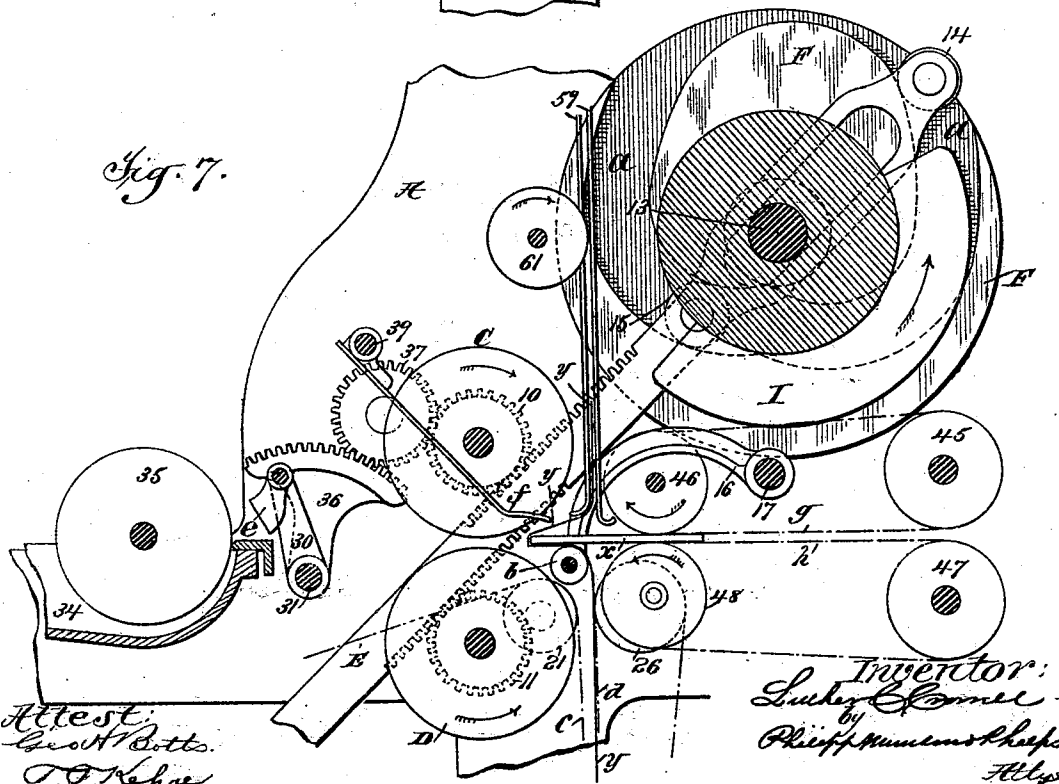


Fig. 7.



Attest:
Geo. H. Botta
T. O. Kahoe

Inventor:
Lucy C. Crowell
By
Philip M. Munsie & Co.
Attys

(No Model.)

9 Sheets—Sheet 7.

L. C. CROWELL.
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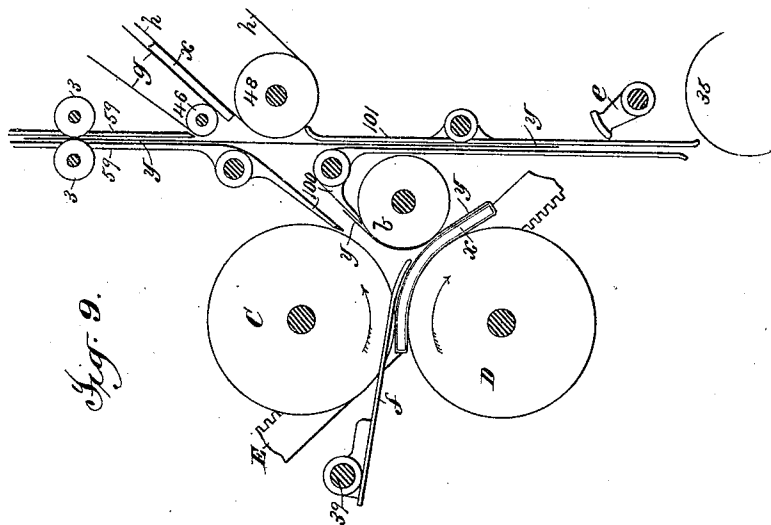


Fig. 9.

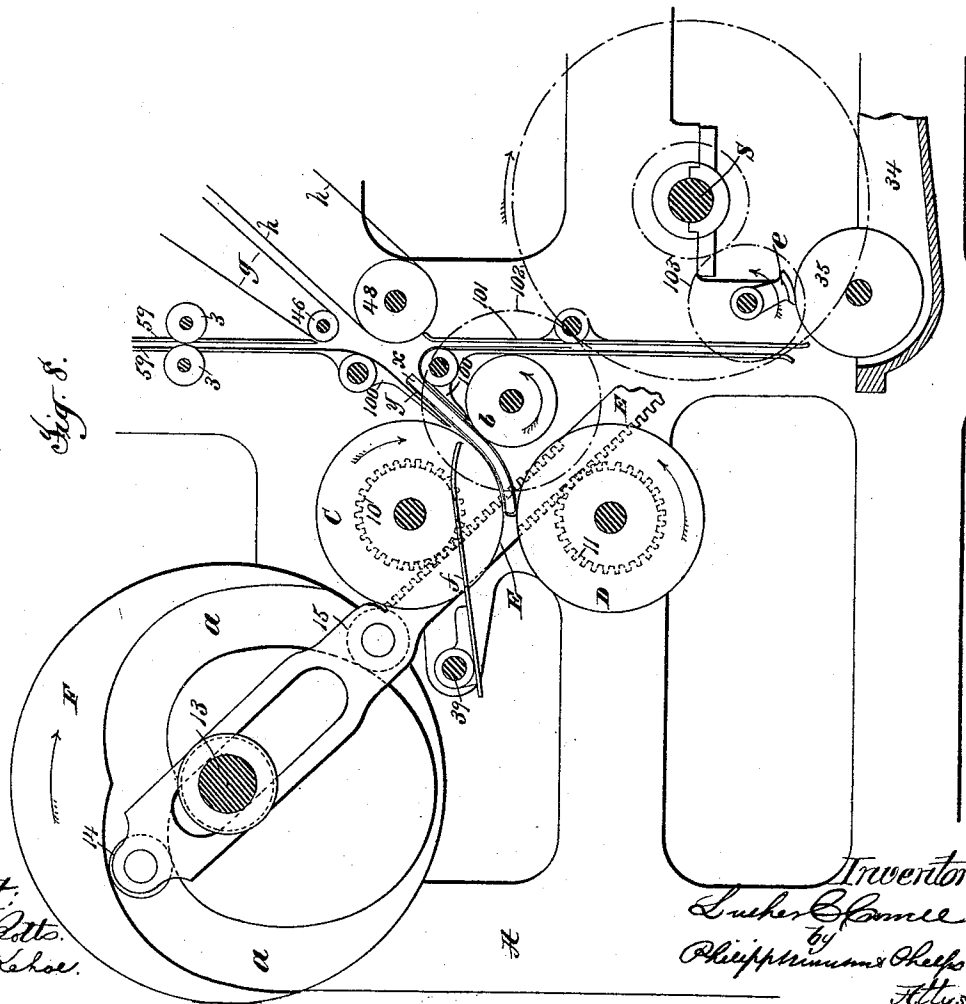


Fig. 8.

Attest:
Geo. H. Edto.
O. F. Kahoe.

Inventor
Lucas B. Crowell
by
Philip H. H. Phelps
Attys

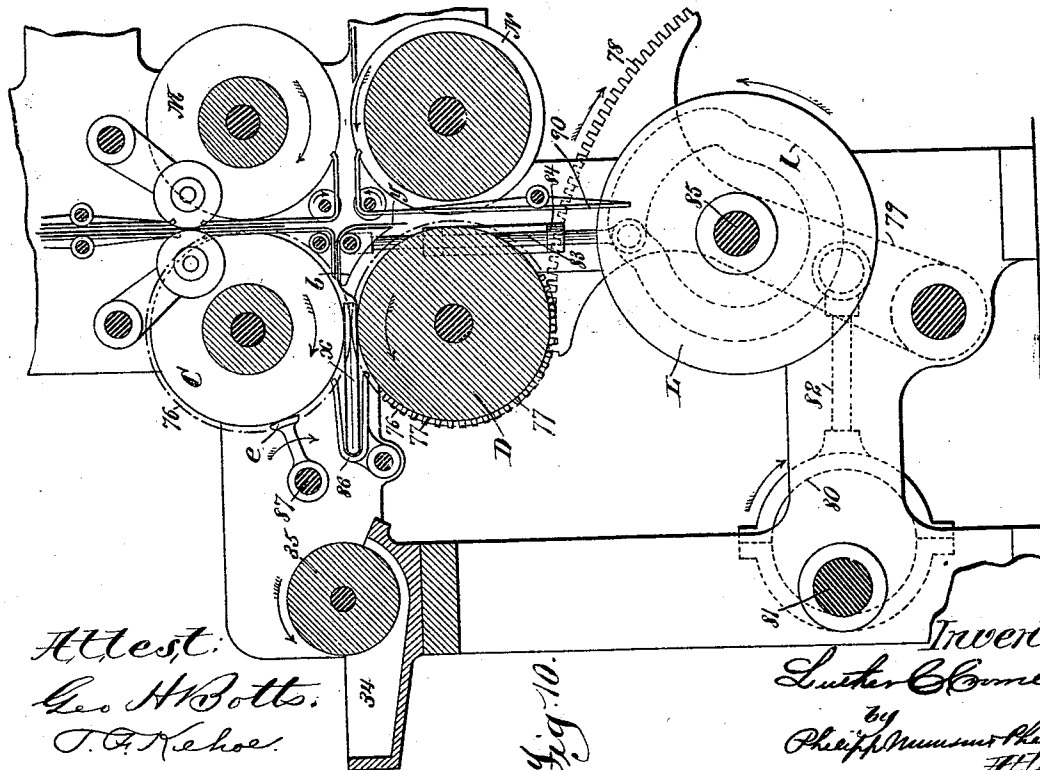
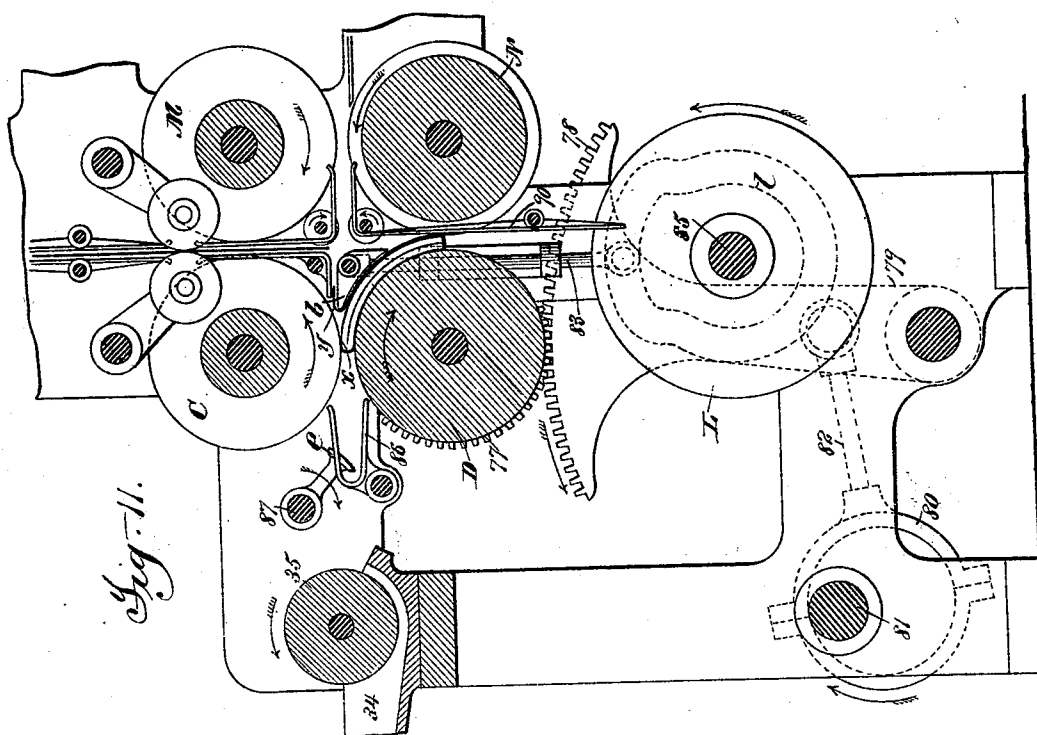
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L. C. CROWELL.
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No. 517,440.

Patented Apr. 3, 1894.



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

Inventor
Luther Clumee
by
Philip Mumford Phelps
Attys

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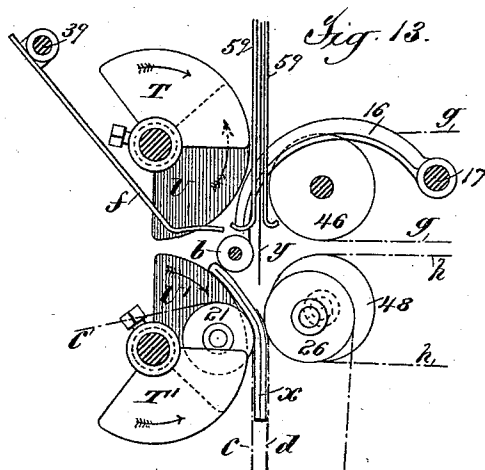
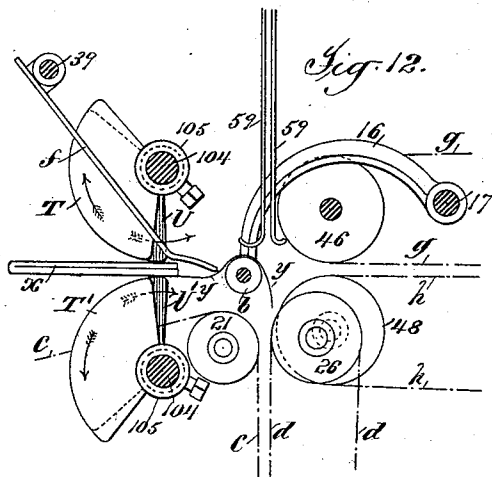
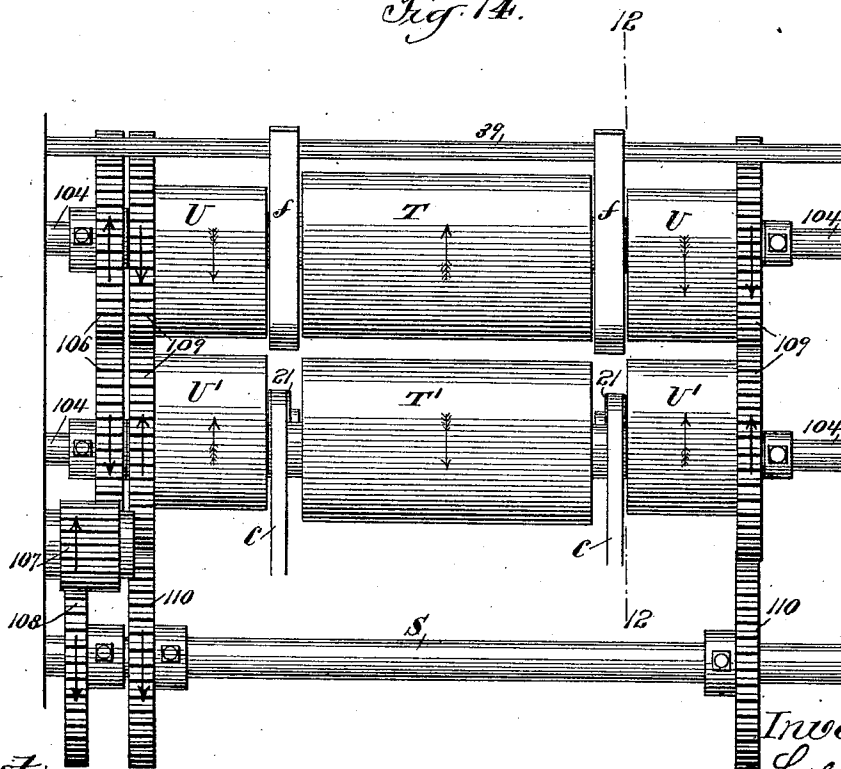


Fig. 14.



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

Inventor:
Lucas C. Crowell
by
Philip Munroe & Co.
Attys

UNITED STATES PATENT OFFICE.

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

WRAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 517,440, dated April 3, 1894.

Application filed April 13, 1893. Serial No. 470,167. (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 wrapping machine, and especially to provide a simple and rapid machine of that class used in wrapping newspapers and other publications for mailing, and generally known as newspaper wrapping machines. I attain this object in accordance with the present invention by first advancing the paper or other article to be wrapped to the required point with the wrapper overlapping its leading end, and with the flap of the wrapper projecting behind the paper sufficiently to overlap upon the layer of wrapper on the paper for pasting and then reversing the direction of movement of the paper and turning over and pressing down the flap of the wrapper so as to secure the overlapping and pasting of the flap upon the layer of wrapper on the paper as the reversed paper is advanced.

In order to secure the highest capacity of the machine, it is preferable that the plane of movement of the reversed paper should be changed on or after reversal so as to carry it out of the path by which the paper was advanced to the wrapping mechanism, thus permitting another paper to be fed in while the wrapper is being secured upon the preceding paper and the latter delivered, and there is preferably employed a flap turner past which the reversed paper is fed, and upon opposite sides of which the paper passes during its movement in opposite directions, so that the paper is first advanced past the flap turner upon one side and then reversed and advanced past the flap turner on the opposite side of the latter, the flap thus being turned over as the end of the paper passes from one side of the flap turner to the other on the reversal of the paper.

It is obvious that many different construc-

tions may be devised embodying the invention, that the flap turner and parts co-operating therewith may be of widely different forms, and that different means may be used to secure their proper action. It is preferable, however, to use as the means for advancing and reversing the paper feeding devices actuated alternately in opposite directions, and these feeding devices in their preferred form consist of a pair of reversible feeding rolls. The flap turner combined with the feeding devices may consist of a simple rod or bar, or of a series of guides suitable for the purpose, but there is preferably used a roll which co-acts with one of the feeding rolls to form a feeding device for the reversed paper, so that a feed of the paper independent of the grip between the feeding rolls is secured almost immediately upon the reversal of the paper, and this roll forming the flap turner may be arranged to co-act also with the other feed roll and aid in advancing the paper as it is received by the wrapping mechanism. The reversible feeding rolls may be actuated by any suitable means, but a sliding rack operated by a cam or other suitable means, and geared with one or both of the feeding rolls is preferably used, so that, as this rack is reciprocated, the rolls are positively driven in opposite directions. The roll forming the flap turner may be positively driven, but a roll frictionally driven from the feed roll with which it co-acts forms an efficient construction and is preferable in some respects to a positively driven roll, as it produces a slight drag upon the flap of the wrapper which draws the wrapper tight upon the paper, and insures a closely wrapped product. When the roll co-acts with both feeding rolls so as to advance the paper in both directions, however, a positively driven roll is preferable.

The flap turner may be of any suitable size and form, and may be stationary, but it is preferable to use a small roll or bar, and shift its position for the passage of the paper on opposite sides of the same, as I am thus enabled to place the flap turner closer to the feeding rolls, and thus secure a more compact construction and better feed of the paper, and, when a feeding roll is used as the flap turner, secure a feed of the reversed paper

thereby at a point closer to the feeding rolls. When a roll co-acting with both the feeding rolls is used, however, a larger stationary roll is preferable.

5 It is preferable, although not essential in all constructions, that guides should be used for guiding the end of the reversed paper to the opposite side of the flap turner. These guides may be of any suitable form and any
10 suitable means be used for withdrawing them from the path of the paper as it is advanced to the feeding devices, but I prefer to use a series of fingers so constructed as to form spring fingers exerting a yielding pressure
15 upon the paper only sufficient to secure the movement of the reversed paper in the proper path, and withdrawn positively from the path of the next advancing paper.

The wrapped paper may be delivered directly from the reversible feeding devices and flap turner forming the wrapping mechanism, especially when a roll is used as the flap turner, the flap turner and feeding roll with which it co-acts then operating to positively advance the paper and press down and
25 secure the wrapper after the paper has passed out of the control of the reversible feeding devices, but I prefer to combine with this wrapping mechanism pressing and delivery devices of any suitable construction, such as feeding rolls or tapes, by which the paper is received from the wrapping mechanism and the wrapper held pressed down for some time before final delivery, so as to allow time for
30 the paste to set, the securing of the wrapper thus being assured with machines operating at very high rates of speed. In cases in which the flap turner consists of a bar or plate past which the reversed paper is forced
35 by the reversible feeding devices, these pressing and delivery devices are important and will probably be found practically essential, as otherwise the proper pressure upon the wrapper to secure it cannot be obtained with
40 certainty in the movement of the paper, especially at high rates of speed. The papers and wrappers, or either of them, may be fed to this wrapping mechanism by hand, or any suitable feeding devices for automatically advancing the papers and wrappers to the feeding mechanism in proper time, together or
45 separately, may be combined therewith, and the papers may be previously folded to the size desired or folded, either partially or
50 wholly, by mechanism embodied in and forming a part of the machine.

The wrapping mechanism may be combined with any of the ordinary forms of folding and delivery mechanisms now in use in folding
60 machines, or combined printing and folding machines, so that the papers may be printed, folded, wrapped and delivered by a single machine, the wrapping mechanism herein shown being of sufficient capacity to be applicable to web printing machines.

65 The delivery of the papers and wrappers to the wrapping mechanism in proper position

may be secured in any suitable manner, but I prefer to feed the wrapper downward in the line of movement of and in front of the papers as they are advanced to the wrapping mechanism, so that each advancing paper will engage the wrapper upon the desired line and carry it with it to the wrapping mechanism.

The wrapper may previously be cut to the desired size and fed to the wrapping mechanism as sheets, but it is preferable to feed the wrappers from the web and sever them in the machine.

Pasting devices for the wrapper are preferably added, and the paste may be applied to the first layer of wrapper upon the paper, or to the loose end of the wrapper prior to or at any desired time during the operation of wrapping, but it is preferable to apply the
85 paste to the first layer of wrapper upon the paper, the movement of the wrapper with the paste thus being reduced.

In the accompanying drawings forming a part of this specification, there is shown for the purpose of illustration a complete, independent, newspaper or pamphlet wrapping machine of the general construction above described, which will be found a convenient and efficient embodiment of the present invention, the previously folded papers or the pamphlets being fed from a pile 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 gear side of the machine. Fig. 2 is a similar view of the opposite side of the machine, with the frame broken away to show parts. Fig. 3 is a plan view. Fig. 4 is a horizontal section on the line 4 of Fig. 5. Fig. 5 is a vertical longitudinal section on the line 5 of Figs. 3 and 4. Figs. 6 and 7 are partial views similar to Fig. 5 but on an enlarged scale, showing the wrapping mechanism in different positions during the operation of wrapping. Figs. 8 and 9, 10 and 11, 12 and 13, respectively by pairs, are views similar to Figs. 6 and 7 showing modifications. Fig. 14 is a rear view looking to the right in Fig. 12.

Referring now particularly to Figs. 1 to 7, the frame of the machine may be of any suitable construction for supporting the operating parts. As shown it consists simply of two side frames A, B in which all the parts are mounted.

At the rear or delivery end of the machine are mounted the reversible feeding rolls C, D which, so far as their action upon the paper is concerned, may have continuous surfaces, but are shown as cut away to accommodate other parts of the wrapping mechanism. These rolls are preferably rubber faced, milled, or otherwise roughened, so as to give a good grip upon the paper. The shafts of these rolls C, D, carry inside the frame A gears 10, 11, and are rotated in opposite directions by rack bar E provided with racks at opposite sides engaging said gears, said rack bar sliding at

one end in suitable guides 12 in the frame of the machine, and at its opposite end being provided with a slot threaded on shaft 13, and two bowls 14, 15 running in a cam groove *a* in the face of a cam disk F on shaft 13, so that by rotation of the cam disk F the rack E is reciprocated in the guides 12.

In front of the rolls C, D, and on the side at which the paper is fed to the rolls, the flap turner *b* is placed, this flap turner consisting in the form shown, of a roll mounted to rotate in arms 16 on a rock shaft 17 spring pressed in one direction by means of a crank arm 18, and spring pressed rod 19, mounted on the outside of the frame B, and actuated in the opposite direction against the spring pressure by crank arm 20 carrying a bowl which runs upon a cam carried by the shaft 13. The flap turner is thus held normally by the spring in the position shown in Fig. 7, so as to allow the paper to pass above it to the rolls C, D, and as the paper is reversed on the reversal of the rolls C, D, it is raised by the action of the cam into the position shown in Figs. 5 and 6, in which the end of the paper passes below it. By this construction, also, the flap turner engages the paper under spring pressure, so as to yield to irregularities in the paper and accommodate papers of different thicknesses, which is desirable although not essential. This result may be secured in the case of a stationary flap turner as is evident, by the use of spring bearings. It will be seen that this flap turner *b* in the position shown in Fig. 6 co-acts with the roll D as a frictionally driven feeding roll and thus not only aids the rolls C, D in advancing the reversed paper, but will operate to advance and deliver the paper after it has left the grip of said rolls, and that the roll *b* presses down the flap of the wrapper with sufficient pressure to secure the wrapper by pasting. The reversible feeding rolls C, D and the flap turning roll *b*, therefore, form a complete wrapping mechanism and the wrapped paper may be finally delivered directly therefrom. In a machine of high capacity, however, it is evident that the pasted portion of the wrapper is pressed between the rolls *b*, D, but a short time, and it is preferable that means should be provided by which the wrapper shall be held pressed down a longer time so as to insure the setting of the paste to properly secure the wrapper. It is preferable, therefore, to combine with this wrapping mechanism pressing and delivering devices to which the paper passes from the rolls *b*, D, and by which the wrapper is held pressed down until the paste has set, and the paper then finally delivered. These pressing and feeding devices may be of any suitable construction, and the roll D may be used as part of said pressing and delivery devices, but in the construction now being described I use devices separate from and independent of the roll D, and I preferably use feeding rolls or tapes by which the flap of the wrapper is held pressed down for

some time so as to secure the setting of the paste before final delivery in a machine operating at a high rate of speed.

In the construction shown, the following means are used:—A series of belts *c* are led about belt rolls or pulleys 21 mounted below the flap turner *b* and carried by adjustable arms 22 so as to be adjustable to vary the position of the belts and secure the proper grip upon papers of different thicknesses. The belts *c* are led from belt rolls or pulleys 21 around roll 23 by which they are driven, thence about roll 24, and returned to the belt rolls or pulleys 21 over adjustable tension pulleys 25. The series of belts *d* are led about belt rolls or pulleys 26 opposite pulleys 21 and mounted in the same manner, then downward with the belts *c* around belt roll 23, then around roll 27 opposite to and driven from roll 24, returning around adjustable tension pulleys 28. The feeding belts *c*, *d*, as shown, are arranged so as to deliver the wrapped papers at the end of the machine, although it will be understood that they may be arranged so as to deliver directly downward from the wrapping mechanism or at any other desired point. Preferably, however, the paper is carried for some time by the belts to give the paste time to set.

As above stated, the paste is preferably applied upon the layer of wrapper upon the paper. For this purpose a paster *e* is used, this paster being cut away to accommodate the disks of the feeding roll C, and being carried by a rod 29 mounted in arms 30 on a rock shaft 31, the rod 29 being mounted to rotate in the arms 30, and being provided with an arm 32 pivotally connected to an arm 33 swinging on a fixed pivot in the frame.

At the rear end of the machine is mounted a paste fountain 34 and paste roll 35, and the rock shaft 31 is actuated to carry the paster between the roll 35 and the paper by means of a crank arm on the shaft carrying a segmental gear 36 which is actuated from gear 10 on the shaft of feeding roll C through an intermediate 37. It will be seen that the rod 29 is rocked by the connection formed by the arms 32, 33, during the movement of the shaft 31, so that the pasting surface of the paster *e* is raised directly from the surface of the wrapper after applying paste and reversed so as to engage the paste roll 35 in its extreme rear position, and then brought downward again to engage the layer of wrapper upon the paper in its forward extreme position, as shown in Figs. 5 to 7, so that the dragging of the paste upon the wrapper is prevented.

It will be found that the construction thus far described is efficient, and that the papers will generally be carried backward properly under the flap turner *b*, especially if the papers be of such thickness as to bend readily and the flap turner lie close to the roll C in its upper position. In order to assure absolute certainty of action, however, there is preferably used, especially with thick, rigid pa-

pers, a series of guides which operate to positively guide the rear end of the reversed paper downward and below the flap turner *b*. These guides may be constructed in any suitable manner, but as shown consist of a series of spring fingers *f* which are carried by a rock shaft 39 actuated to raise the guides out of the path of the paper as it passes to the rolls C, D, by a crank arm 40 carried by the shaft outside frame B and spring pressed by a spring 41 on rod 42 mounted on the frame, the shaft being rocked in the opposite direction to press the guides downward at the proper time to act on the leading end of the reversed paper by a crank arm 43 on the shaft 39 carrying a bowl which runs on a cam *w* carried by the shaft 13 outside frame B. The guides *f* act also to prevent the end of the wrapper coming into engagement with the roll C. As above stated, the paper and wrapper may be fed to this wrapping mechanism by hand, or may be advanced thereto by any suitable means, and the proper relative positions of the paper and wrapper secured in any manner desired. In the machine shown, however, which is especially adapted for wrapping papers previously folded to wrapping size, or magazines, the papers or magazines are piled within a holder G mounted on the front end of the machine, and the bottom paper advanced from the holder to feeding belts *g, h* by which they are carried to the wrapping mechanism. The upper series of belts *g* are led from driven belt rolls 45 forward about belt rolls 46 just in the rear of the feeding rolls C, D, returning directly to rolls 35, and the lower series of belts *h* are led from driven belt rolls 47 forward around belt rolls 48 and returned directly to rolls 47, the rolls or pulleys 48, however, being carried by arms 49 adjustable so as to vary the distance and pressure between the two series of belts.

Any suitable feeding devices may be used for advancing the bottom paper from the holder to the rolls 45, 47 and belts *g, h*. As shown, a series of pivoted fingers 2 are used, these feeding fingers being carried by a slide 50 moving on rods 51 mounted in the frame of the machine, and being pressed upward so as to engage the bottom paper when withdrawn, by means of springs mounted on the slide under the fingers. This slide 50 is reciprocated upon the rods 51 to advance the papers in proper time by means of slotted levers 52 carried by rock shaft 53 mounted in the side frames A, B, and operated from shaft 54 by an eccentric 55 on said shaft and a pitman 56 connecting the said eccentric with one of the arms 52. The holder G is shown as adjustable so as to hold and feed papers of different thicknesses, the rear plate 57 of the box being made adjustable so as to act as a stop to all the papers except the lowest, and permit the passage of papers of different thicknesses, the holder being open at the bottom and papers fed out by the fingers 2 over

guides 58 extending from the box to the rolls 45, 47.

The wrappers are cut and advanced to the wrapping mechanism by the following means: At the top of the machine are mounted two cutting and feeding rolls H to which the wrapper web *y* is advanced from the web roll and by which it is partially severed on the proper line to form a single wrapper. From the cutting and feeding rolls H the partially severed web is fed downward between guides 59 by feeding belts *i, k* extending downward nearly to the wrapping mechanism, these belts being carried and driven by rolls 60 at their upper ends, and carried by rolls 3 at their lower ends, one of the rolls 3 being mounted on arms 4 adjustable so as to secure the requisite pressure between the two series of belts. For the purpose of entirely severing the wrapper at the proper time, a breaking segment I is used, co-acting with a roll 61 on the opposite side of the guides 59, the segment I being carried by shaft 13 and operating to permit the wrapper to be fed downward to the wrapping mechanism, and then to positively grip the wrapper and wholly sever it, the segment I rotating at a higher rate of speed than that at which the wrapper is moving, as usual in such constructions.

The operating parts of the machine are driven from the main driving shaft S by the following means:—The shaft S carries a large gear 62 which drives the shaft 54 through a gear 63 thereon. The belts *c* are driven from the gear 62 through a series of intermediates 64 and gear 65 on the shaft of roll 23, and the other series of belts *d* are driven by gearing together the shafts of belt rolls 24, 27 by gears 66. The gear 62 on shaft S drives the upper belt roll 45 through gear 67 on the shaft of said roll meshing with gear 62, and the two rolls 45, 47 are geared together by gears 68. The shaft 13 carries a large gear 69 meshing with gear 67, and the feeding and cutting rolls H are driven from shaft 13 by gear 70 on said shaft through a series of intermediates 71 and gears 72 on the shaft of the rolls the tapes *i, k* being driven from one of said gears 72 through intermediate 73 and gears 74 on the shafts of the belt rolls. The paste roll 35 is rotated intermittently so as to properly supply paste to the paster *e* by a ratchet wheel 75, carried by the shaft of the roll and actuated by a pawl 3, carried by a swinging arm 4, on the shaft of the roll 35, connected by a pitman 5 to a crank 6 on shaft 31, so that as the shaft 31 is rocked by the segment 36 and gear 37, the roll 35 is intermittently rotated. The parts are so timed, as will be seen from an inspection of the drawings, that the rolls C, D, and the belts *c, d*, are run at a higher rate of speed than the paper and wrapper feeding mechanisms, so as to secure the rapid wrapping of the paper and its removal from the path of the next paper and wrapper as the latter advance.

The operation of the machine is as fol-

lows:—With the parts in the position shown in Figs. 1 to 5, the rack E has been carried into its lowest position by the operation of the cam groove *a* upon the bowls 14, 15, and the feeding rolls C, D have been rotated to carry the paper and wrapper into their extreme rearward positions. The paster *e* is just depositing paste upon the layer of wrapper upon the paper, the roll *b* has just been raised by the action of the cam *v*, and the guides *f* thrown down to press against the rear end of the paper by the cam *w*, and the parts are in position for the commencement of the reverse or rearward movement of the paper, the flap of the wrapper to be overlapped and pressed down for pasting lying upon the top of the roll *b*, so that as the parts are reversed and the rear end of the paper, becoming the leading end, returns below the roll *b*, the flap of the wrapper will be turned down upon the paper, and pressed down upon the layer of wrapper thereon, first by the pressure between the rolls *b*, D, as the paper is fed onward thereby and then by the belt pulleys 21, 26 and belts *c*, *d*, as the wrapped paper is advanced and delivered. As the shaft 13 continues its rotation, then, the cam *a* acts upon the bowls 14, 15 so as to draw the rack bar E upward, thus reversing the rotation of the rolls C, D so as to carry the paper toward the front of the machine, and the paper passes below the roll *b* and into the grasp of belt rolls 21, 26 and belts *c*, *d*, as shown in Fig. 6, the guides *f* being held pressed down by the raised portion of the cam *w* long enough to insure the passage of the end of the paper below the roll *b*, and then being released by the cam and returned by spring 41, and the roll *b* being held down by the longer raised portion of the cam *v* until the rear end of the paper has passed beyond it.

In the position shown in Fig. 6, the paper has been received by the belts *c*, *d* and is being advanced for delivery, the rear end of the paper being still opposite and in contact with roll *b*, and the flap of the wrapper having been turned over and pressed down for pasting, and the paster has been carried upward and backward from the pasting position in its travel toward the fountain roll 45. Another paper has meanwhile been delivered from the holder G and is being advanced by the belts *g*, *h* to the wrapping mechanism, while a wrapper *y* has been fed downward and its leading end is now about opposite the roll *b*. As the operation of the machine continues, the wrapped paper is rapidly carried away by the belts *c*, *d*, which preferably are run at a higher speed than the wrapper feeding mechanism so as to carry the paper out of the path of the wrapper in time for the advance of the latter, and the rack bar E having been carried into its upper position, is returned by cam *a* so as to again reverse the movement of the rolls C, D and rotate them in the proper direction to advance a paper and wrapper to the paster, and the roll *b* is again lowered by

the spring 18 on its release by the raised portion of cam *v*, and brought into position for the advance of the paper over it to the rolls C, D. The wrapper meanwhile has been fed downward between the belts *c*, *d* below the path of the paper *x*, so that the paper will strike the wrapper upon the proper line to secure the proper overlapping of the wrapper upon the leading and rear ends of the paper for pasting.

In the position shown in Fig. 7, the paper with the wrapper overlapping the end thereof has been fed forward by the belts *g*, *h*, over the roll *b* and is just about to be seized by the feed rolls C, D, which are rotating so as to advance the paper toward the rear of the machine, the rack bar E moving upward under the action of cam *a* upon bowls 14, 15. As the paper is advanced from this position by the rolls C, D it is carried into the position shown in Fig. 5, paste supplied by paster *e*, the roll *b* being raised and the finger *f* lowered, and thus the operation continues. In the construction above described the roll forming the flap turner *b* co-acts with the roll D to feed the reversed paper and press down the wrapper, only as it is driven by friction from the roll D, but it is evident that this roll may be positively driven, if desired, as stated above. It is preferable to shift the flap turner to opposite sides of the path of the paper in machines in which the paper is advanced to the wrapping mechanism in the plane of the feeding action of the rolls C, D, as the wrapping mechanism is thus made more compact and the feed of rolls *b*, D, brought closer to rolls C, D, but this is not essential, and the flap turner may be stationary and placed farther away from the line of action between rolls C, D so as to permit the paper *x* to pass above it from the rolls 46, 48 to the rolls C, D although a roll co-acting with the roll D on the reversal of the paper, be used. It is not essential, moreover, that the paper should be advanced to the wrapping mechanism as shown, that is, in the plane of feeding action of the rolls C, D, but the paper may be fed to the wrapping mechanism in any way so as to secure its proper reception by the rolls C, D. By placing the roll *b* in such a position as to co-act with both the rolls C, D in advancing the paper, and feeding in the paper from above at the suitable angle, a very simple and efficient construction may be provided by which the three rolls *b*, C, D form all the feeding devices necessary for wrapping and delivering the paper, and in which the paper is positively fed by two sets of feeding devices during the entire operation of wrapping except just at the point of reversal when the end of the paper is passing roll *b*. In such a construction it is preferable to make the roll *b* much larger than in the construction previously described, and while this roll may be driven by friction from the rolls C, D, as before, it is preferably driven positively. By making the roll *b* of a considerable size,

not only is a better feeding action secured, but the path of the wrapped paper in delivering is brought inside the path of the wrapper, so that the wrapper is free to be fed downward to the desired point at any time after the flap of the preceding wrapper has been drawn in by the wrapping mechanism, thus enabling a machine of high capacity to be made without excessive speed of any of the parts.

In Figs. 8 and 9, showing a machine of this construction in two positions during operation of wrapping, the arrangement of the rolls C, D and fingers *f* and the parts for operating them is the same as previously described, except that the shaft 13 and cams carried thereby are transferred to the opposite side of the wrapping mechanism so as to allow the paper to be fed in at the proper angle. The roll *b* forming the flap turner, instead of being mounted in the swinging arms 16, as in the construction previously described, is mounted in the frame in a fixed position and preferably is larger, as shown. The position of the belts *g*, *h* and rolls 46, 48, by which the paper is fed to the wrapping mechanism, is changed, so that the paper is fed downward thereby past the wrapper guides 59, and between guides 100 to the rolls *b*, C, these belts *g*, *h* receiving the paper from a box, as in the construction previously described, or from other devices, or being fed by hand as desired. Below the path of the paper are preferably arranged wrapper guides 101 between which the wrapper is fed downward, thus avoiding any possible contact of the wrapper with other parts. The paste may be applied to the layer of wrapper on the paper in this construction as in that previously described, but I have shown a construction in which the paste is applied to the flap of the wrapper at the lower end of the guides 101 by a rotating paster *e* which engages the paste roll 35 rotating in the fountain 34, as in the construction previously described. The feeding and flap turning roll *b* is shown as positively driven by a large gear 102 on the main shaft S engaging a gear 102 on the shaft of roll *b*, and the paster *e* as driven from the main shaft S by gears 103 on the main shaft and paster shaft respectively. The operation of this construction is generally the same as that of the construction previously described, and will be understood from a brief description in connection with the drawings.

As shown in Fig. 8, the paper, with the wrapper overlapping its leading end and the flap projecting behind its rear end, is being advanced by the rolls *b*, C between the guides 100 and has just been gripped by the rolls C, D. It will be seen that as the paper is fed onward by the rolls *b*, C, the roll D, which is then rotating in the direction indicated by the arrow in Fig. 8, tends to bend the leading end of the paper upward and carry the paper between the rolls C, D, and this will usu-

ally be found sufficient to insure the proper feeding of the paper, although guides similar to the fingers *f* may be used on the lower side of the paper for this purpose, if desired. During this operation of the mechanism, the guiding fingers *f* are in the position shown in Fig. 8 within the circumference of the roll C, so as to be out of the path of the paper, but when the rear end of the paper has passed roll *b* and the paper is about to be reversed by the reversal of the rack E and rolls C, D, the fingers *f* are thrown down, as in the construction previously described.

In Fig. 9 the parts are shown after the paper has been reversed and is being advanced by the rolls C, D and the rolls *b* D, the flap of the wrapper having been turned over by the roll *b*, and the rolls *b*, D co-acting to press down the flap of the wrapper and secure it and advance the wrapped paper for delivery. In this construction the guides 100 over the roll *b* give sufficient drag upon the wrapper to secure its being drawn taut, although the roll *b* tends to advance it. No feeding mechanism has been shown for receiving the paper from the rolls *b*, D, and this is not necessary, as the paper may be delivered directly from the rolls *b*, D, but it will be understood that suitable feeding devices may be employed for this purpose, there being sufficient space below the roll *b* and between the guides 101 and the roll D for this purpose.

It is obvious that other means may be used for operating the feeding rolls C, D in either of these constructions and for shifting the flap turner *b* in the construction first described. Thus, in Figs. 10 and 11, I have shown a construction in which the feeding rolls C, D are geared together by means of gears 76, and the lower feed roll D carries a segmental gear 77 which is engaged by a segmental gear 78 carried by a swinging arm 79 oscillated by an eccentric 80 carried by shaft 81 and connected to the arm 79 by a pitman 82. The flap turner *b* in this construction consists of a series of guiding fingers carried by bars 83 at opposite sides of the machine sliding in fixed guides 84 and carrying bowls running in cam grooves formed in cam disks L carried by shaft 85, so that the flap turner *b* is raised and lowered as in the construction previously described, except that it moves in straight lines instead of curved. The paper is advanced by the feeding rolls C, D between fixed fingers 86 forming a positive stop for the paper. The guides forming the flap turner *b* are shown as so constructed and positioned in their upper position that the passage of the reversed paper below the same is assured without the fingers *f*, but it will be understood that these may be used if desired. In this construction, the paste may be applied as in the construction shown in Figs. 1 to 7, but it is shown applied to the surface of the upper feed roll C, which in turn applies the paste to the layer of wrapper upon the paper, the paste being

applied upon the surface of roll C during its movement to carry the paper rearward and applied to the wrapper upon the paper during the movement of the roll in the opposite direction, and just before the rear end of the paper passes out of the control of the rolls C, D, the wrapper being of about three times the length of the paper. An ordinary rotating paster *e* is shown, carried by a shaft 87, so that the paster is brought into contact with the fountain roll 35 in fountain 34 in the rearward position of the paster.

The same feeding devices for advancing the paper to the wrapping mechanism and pressing and delivery devices as previously described, may be used in this construction, but I have shown a pair of large feeding rolls M, N which are positively driven and act to advance the paper to the wrapping mechanism in the same plane as the feed belts *g*, *h* of the construction shown in Figs. 1 to 7, and the lower roll N co-acts with the roll D to form the pressing and delivery devices to which the paper is delivered as it is returned below the flap turner *b*. The rolls D, N are set at a considerable distance apart so that the wrapper may be fed downward freely between them, and a series of guides 90 are preferably used next the roll N, which consists of a series of disks projecting between the guides so as to co-act with roll D. The operation of this construction is as follows:—In Fig. 10, the parts are shown in a position corresponding to that of Fig. 5, the reverse movement of the feed rolls C, D and of the paper being just about to commence, and the paster *n* having just applied paste to the surface of the roll C. As the operation continues, the paper is reversed by the rolls C, D, the segment 78 being swung to the left from the position shown in Fig. 10 and the paper is returned by the rolls C, D below the flap turner *b*, and by the latter directed into the grip of feed rolls N, D, by which the paper is fed downward and delivered. In Fig. 11 the parts are shown in the position they occupy with the reversed paper just entering the grip of feed rolls N, D, the roll C having just applied paste to the wrapper. As the paper is delivered, the cam *l* returns the flap turner *b* from its upper position, as shown in the figures to its lower position in which the paper passes above it to the segments, and the segment 78 is again reversed and moves to the right for advancing another paper into the position shown in Fig. 10. In the constructions thus far described the paper is advanced and retracted by the same feeding rolls rotated alternately in opposite directions. In the place of such feeding devices, however, there may be used two sets of feeding devices acting upon the sheet alternately, and moving in opposite directions so as to advance and retract the paper, such feeding devices being of any suitable construction. In Figs. 12 to 14 I have shown a simple construction of this general character in which there are used in place of the feeding rolls C, D and means

for rotating them alternately in opposite directions two pairs of feeding segments mounted upon the same shaft, and rotating constantly in opposite directions, these feeding segments being so arranged that the paper is first advanced by one pair of segments to the proper point, as in the construction previously described, then these feeding segments pass out of engagement with the paper, and the other pair of feeding segments seize the paper and return it in the same manner as the rolls C, D when their movement is reversed.

As the operation of wrapping and movement of the parts independently of the feeding segments is or may be identical with that of the constructions shown in Figs. 1 to 7, the construction and operation will be readily understood from the drawings with a brief description of the construction of the segments, and means for actuating them, it being understood that Figs. 12 and 13 correspond in position of parts to Figs. 5 and 6. The two pairs of segments T, T' and U, U' are mounted upon the two shafts 104, the central segments T, T' being fixed on these shafts, and actuated from the main shaft S by gears 106 connecting the two shafts, pinion 107 and gear 108 on the shaft S, while the end segments U, U' on each side of the central segments are carried by sleeves loose on the shafts 104, which are driven by gears 109 connecting the sleeves on the two shafts and gears 110 on shaft S, so that the two pairs of segments T, T' and U, U' are rotated in opposite directions.

It will be understood that various other modifications may be made in the constructions shown without departing from my invention, and the invention, considered broadly, is not to be limited to the particular form or arrangement of any of the devices.

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.

The constructions shown in Figs. 8 to 14 form the subject-matter of other applications, Serial Nos. 487,502 and 487,504, filed October 7, 1893.

What is claimed is—

1. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, substantially as described.

2. The combination with means for advancing and reversing a paper and wrapper, of a

roll forming a flap turner, substantially as described.

3. The combination with means for advancing and reversing a paper and wrapper, of a roll co-acting therewith to feed the reversed paper, and forming a flap turner, substantially as described.

4. The combination with means for advancing and reversing a paper and wrapper, of a frictionally driven roll coacting therewith to feed the reversed paper and forming a flap turner, substantially as described.

5. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, and means for moving said flap turner to opposite sides of the path of the advanced and reversed paper, substantially as described.

6. The combination with means for advancing and reversing a paper and wrapper, of a flap turner and guides coacting with the flap turner to control the reversed paper, substantially as described.

7. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, and pressing and delivery devices, substantially as described.

8. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, guides co-acting with the flap turner to control the reversed paper, and pressing and delivery devices, substantially as described.

9. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, pressing and delivery devices, and means for moving the flap turner to opposite sides of the path of the advanced and reversed paper, substantially as described.

10. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, guides coacting with the flap turner to control the reversed paper, and means for moving the flap turner to opposite sides of the path of the advanced and reversed paper, substantially as described.

11. The combination with means for advancing and reversing a paper and wrapper, of a flap turner, guides coacting with the flap turner to control the reversed paper, and means for moving said guides into and out of position to engage the paper, substantially as described.

12. The combination of feeding devices, means for actuating said feeding devices in opposite directions, and a flap turner, substantially as described.

13. The combination of feeding devices, means for actuating said feeding devices in opposite directions, and a roll forming a flap turner, substantially as described.

14. The combination of feeding devices, means for actuating said feeding devices in opposite directions, and a roll forming a flap turner and coacting with the feeding devices to feed the reversed paper, substantially as described.

15. The combination of feeding devices, means for actuating said feeding devices in opposite directions, a flap turner, and means for moving said flap turner to opposite sides of the path of the paper, substantially as described.

16. The combination of feeding devices, means for actuating said feeding devices in opposite directions, a flap turner, and guides coacting with the flap turner to control the reversed paper, substantially as described.

17. The combination of feeding devices, means for actuating said feeding devices in opposite directions, a flap turner, pressing and delivery devices, and means for moving the flap turner to opposite sides of the path of the advanced and reversed paper, substantially as described.

18. The combination of feeding rolls, means for rotating said rolls in opposite directions, and a flap turner, substantially as described.

19. The combination of feeding rolls, means for rotating said rolls in opposite directions, and a roll forming a flap turner and coacting with one of the feeding rolls to feed the reversed paper, substantially as described.

20. The combination of feeding rolls, means for rotating said rolls in opposite directions and a frictionally driven roll forming a flap turner and coacting with one of the feeding rolls to feed the reversed paper, substantially as described.

21. The combination of feeding rolls, means for rotating said rolls in opposite directions, a flap turner and pressing and delivery devices, substantially as described.

22. The combination of feeding rolls, means for rotating said rolls in opposite directions, a flap turner, and guides coacting with said flap turner to control the reversed paper, substantially as described.

23. The combination of feeding rolls, means for rotating said rolls in opposite directions, a flap turner, guides coacting with said flap turner to control the reversed paper, and pressing and delivery devices, substantially as described.

24. The combination of feeding rolls, means for rotating said rolls in opposite directions, a roll forming a flap turner and coacting with one of the feeding rolls to feed the reversed paper, and means for moving said roll to opposite sides of the path of the advanced and reversed paper, substantially as described.

25. The combination of feeding rolls, means for rotating said rolls in opposite directions, a roll forming a flap turner and coacting with one of the feeding rolls to feed the reversed paper, means for moving said roll to opposite sides of the path of the advanced and reversed paper, and guides coacting with said roll to control the reversed paper, substantially as described.

26. The combination with paper feeding mechanism, of wrapper feeding mechanism advancing a wrapper transversely to and into the path of movement of the paper, wrapper

pasting devices, means for advancing and reversing the paper and wrapper received from the feeding mechanism, and a flap turner, substantially as described.

5 27. The combination with paper feeding mechanism, of wrapper feeding mechanism advancing a wrapper transversely to and into the path of movement of the paper, wrapper pasting devices, means for advancing and reversing the paper and wrapper received from the feeding mechanism, a flap turner, and guides coacting with the flap turner to control the reversed paper, substantially as described.

15 28. The combination with paper feeding mechanism, of wrapper feeding mechanism advancing a wrapper transversely to and into the path of movement of the paper, wrapper pasting devices, means for advancing and reversing the paper and wrapper received from the feeding mechanism, a flap turner, and pressing and delivery devices, substantially as described.

25 29. The combination with paper and wrapper feeding mechanism, and wrapper pasting devices, of means for advancing and reversing the paper received from the feeding mechanism, and a flap turner, substantially as described.

30 30. The combination with paper and wrapper feeding mechanism, and wrapper pasting devices, of means for advancing and reversing the paper and wrapper received from the feeding mechanism, a flap turner, and guides coacting with the flap turner to control the reversed paper, substantially as described.

35 31. The combination with paper and wrapper feeding mechanism, and wrapper pasting devices, of means for advancing and reversing the paper and wrapper received from the feeding mechanism, a flap turner, and pressing and delivery devices, substantially as described.

45 32. The combination with feeding rolls C, D, and means for rotating said rolls in opposite directions, of flap turning roll *b* coacting with said roll D, and pressing and delivery belts *c*, *d*, substantially as described.

50 33. The combination with feeding rolls C, D, and means for rotating said rolls in opposite directions, of a flap turner, guides *f*, and means for moving said guides into and out of

position to engage the paper, substantially as described.

34. The combination with feeding rolls C, D, and means for rotating said rolls in opposite directions, of a flap turner, means for moving the flap turner to opposite sides of the path of the paper, guides *f*, and means for moving said guides into and out of position to engage the paper, substantially as described.

35. The combination with rolls C, D, and means for rotating said rolls in opposite directions and a flap turner, of feeding mechanism advancing a paper and wrapper to the rolls, and pasting mechanism for the wrapper on the opposite side of the rolls from the feeding mechanism, substantially as described.

36. The combination with feeding rolls C, D, means for rotating said rolls in opposite directions and a flap turner, of paster *e* on the opposite side of the rolls from the feeding mechanism, and means for operating said paster to lay a line of paste upon the layer of wrapper on the paper, substantially as described.

37. The combination with the paster *e* and fountain roll 35, of rock arms 30 in which the paster is pivotally mounted, crank arm 32 on the paster and arm 33 pivoted to said crank arm and to the frame, substantially as described.

38. The combination with rolls C, D, of sliding rack bar E, shaft 13, cam F carried by said shaft and reciprocating said rack bar, flap turner *b* carried by arms 16, and cam *v* on said shaft 13 and connections for moving said flap turner, substantially as described.

39. The combination with rolls C, D, of sliding rack bar E, shaft 13, cam F carried by said shaft and reciprocating said rack bar, flap turner *b* carried by arms 16, cam *v* on said shaft 13 and connections for moving said flap turner, guides *f*, and cam *w* on said shaft 13 and connections for moving said guides, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

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