

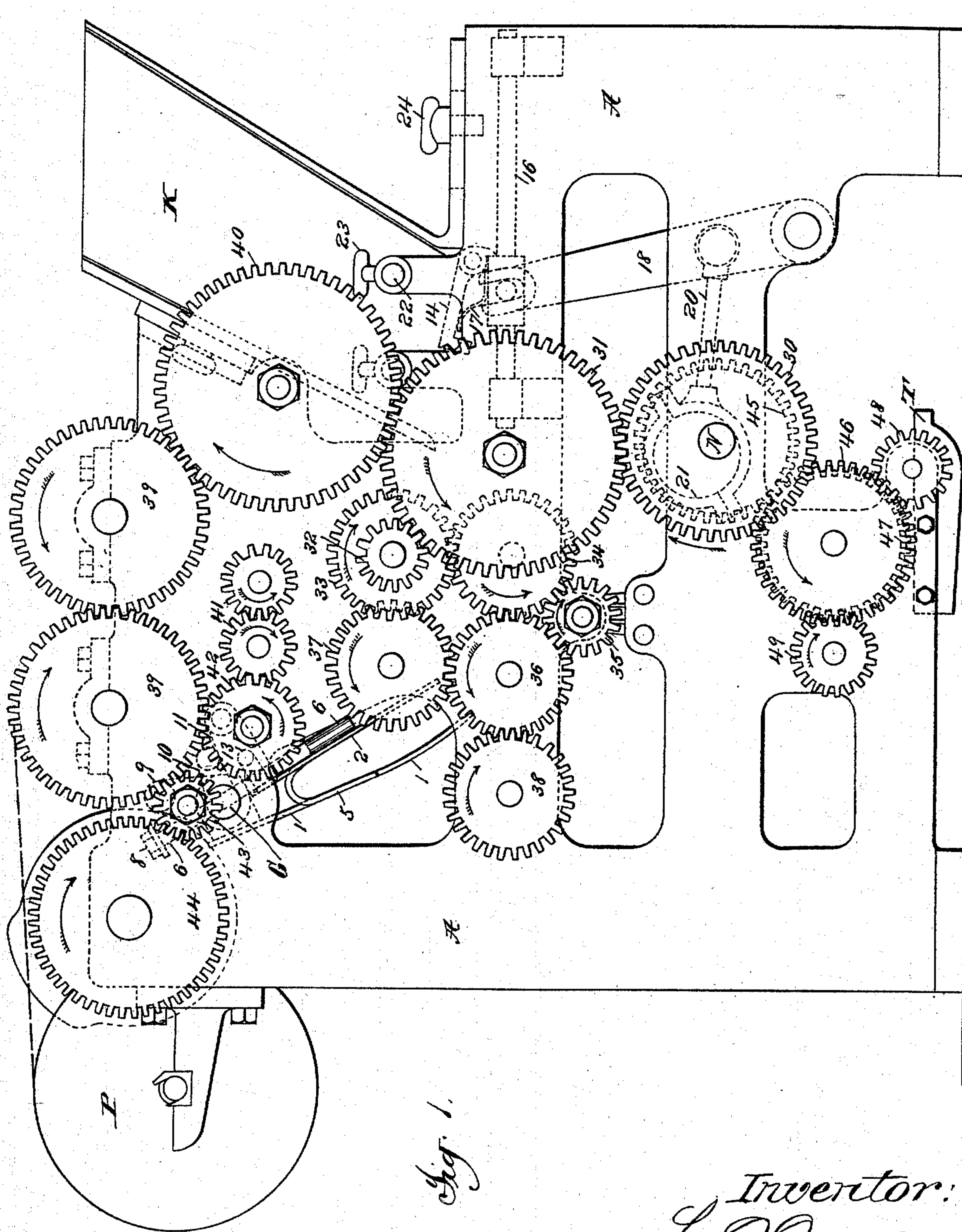
(No Model.)

5 Sheets—Sheet 1.

L. C. CROWELL.
MACHINE FOR WRAPPING NEWSPAPERS, &c.

No. 527,521.

Patented Oct. 16, 1894.



Attest:
Geo. H. Botto.
C. J. Sawyer

Inventor:
L. C. Crowell
by
Philip Munson & Phelps
Attys

(No Model.)

5 Sheets—Sheet 2.

L. C. CROWELL.
MACHINE FOR WRAPPING NEWSPAPERS, &c.

No. 527,521.

Patented Oct. 16, 1894.

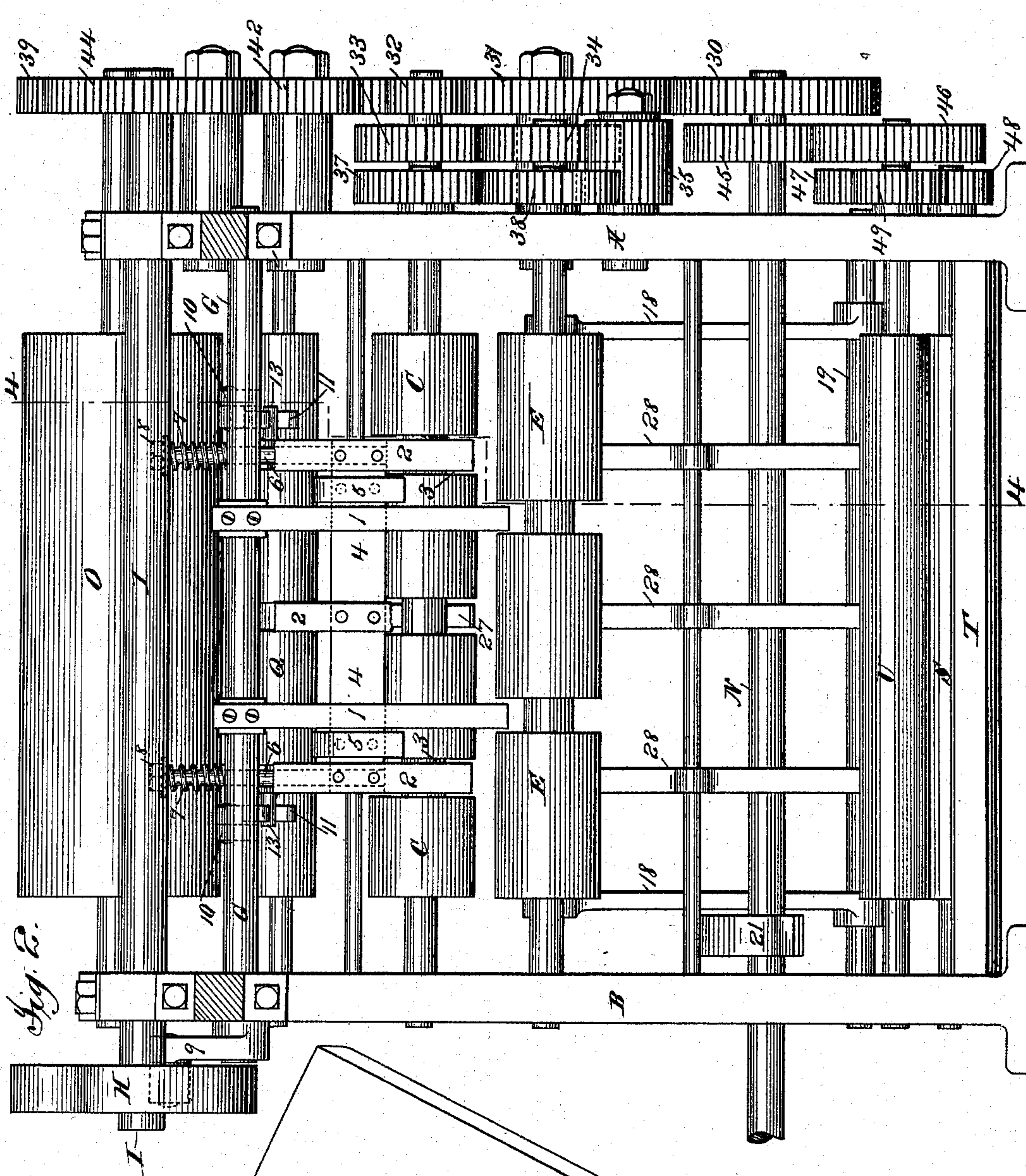
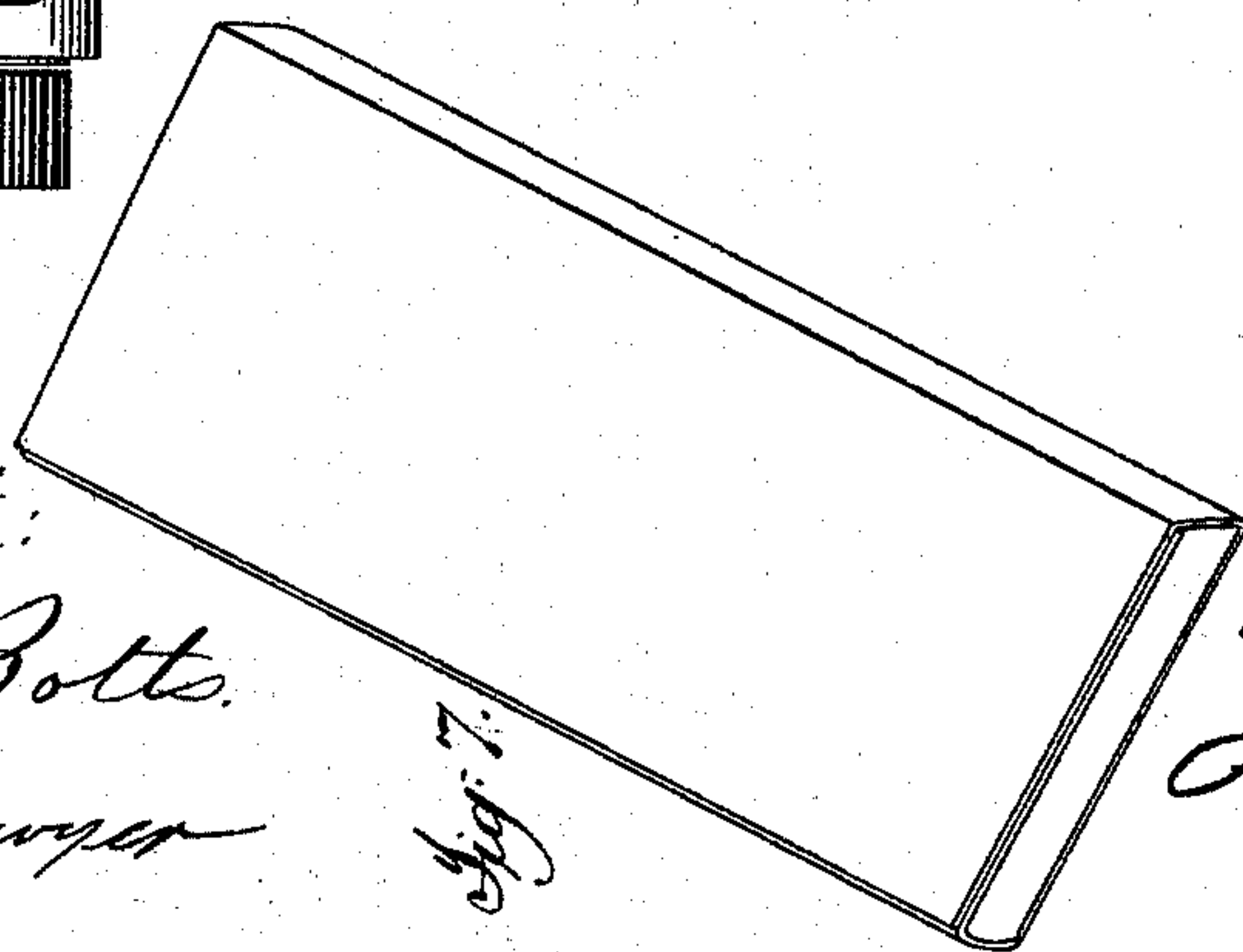


Fig. 6.

Attest:
Geo H Botts.
C. J. Sawyer

Fig. 7.



Inventor:
L. C. Crowell
By
Philip M. Munsie
Attys

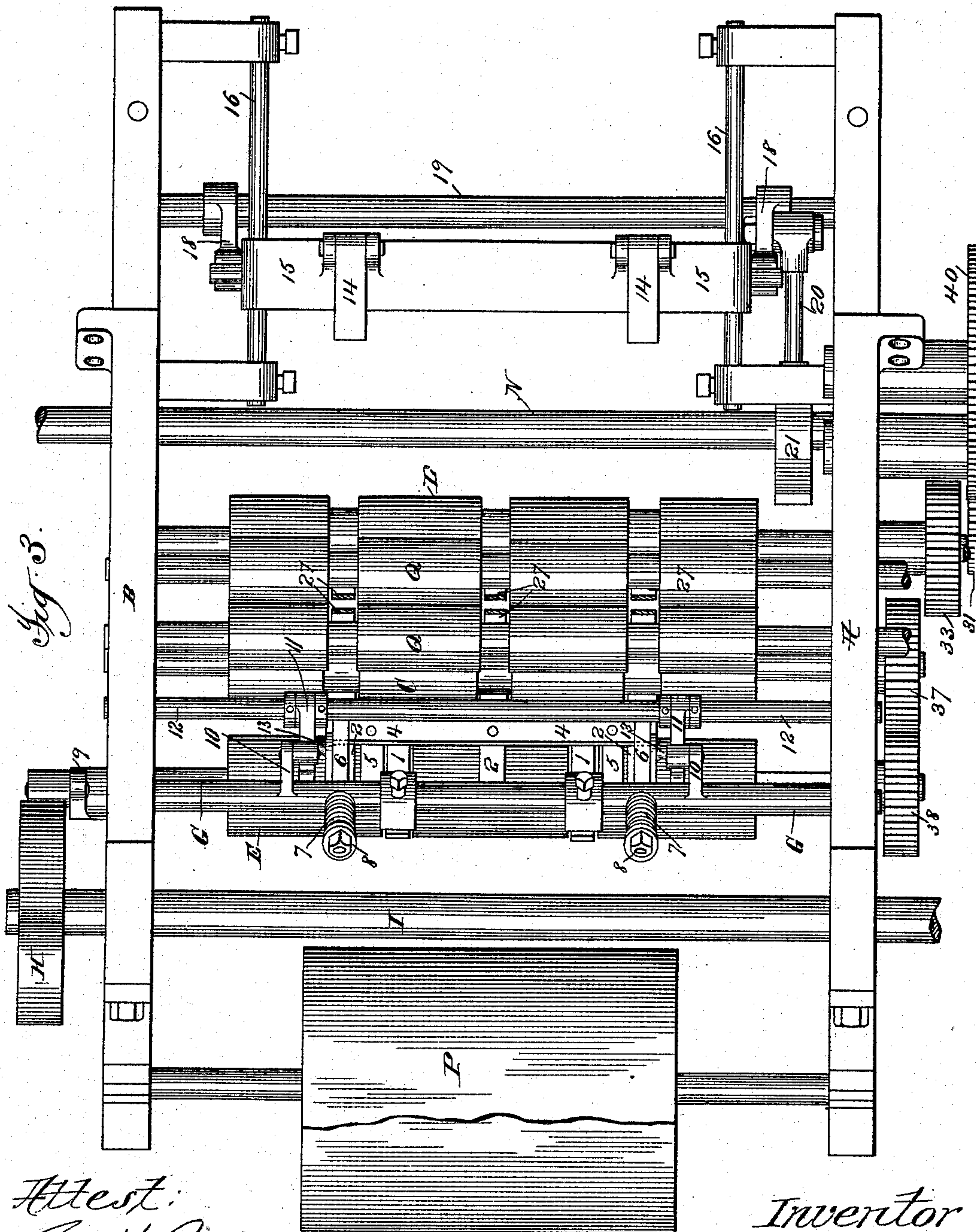
(No Model.)

5 Sheets—Sheet 3.

L. C. CROWELL.
MACHINE FOR WRAPPING NEWSPAPERS, &c.

No. 527,521.

Patented Oct. 16, 1894.



Attest:
Geo H. Botte
C. J. Sawyer

Inventor
L. C. Crowell
by
Phelps Munson Phelps
Attys

(No Model.)

5 Sheets—Sheet 4.

L. C. CROWELL.
MACHINE FOR WRAPPING NEWSPAPERS, &c.

No. 527,521.

Patented Oct. 16, 1894.

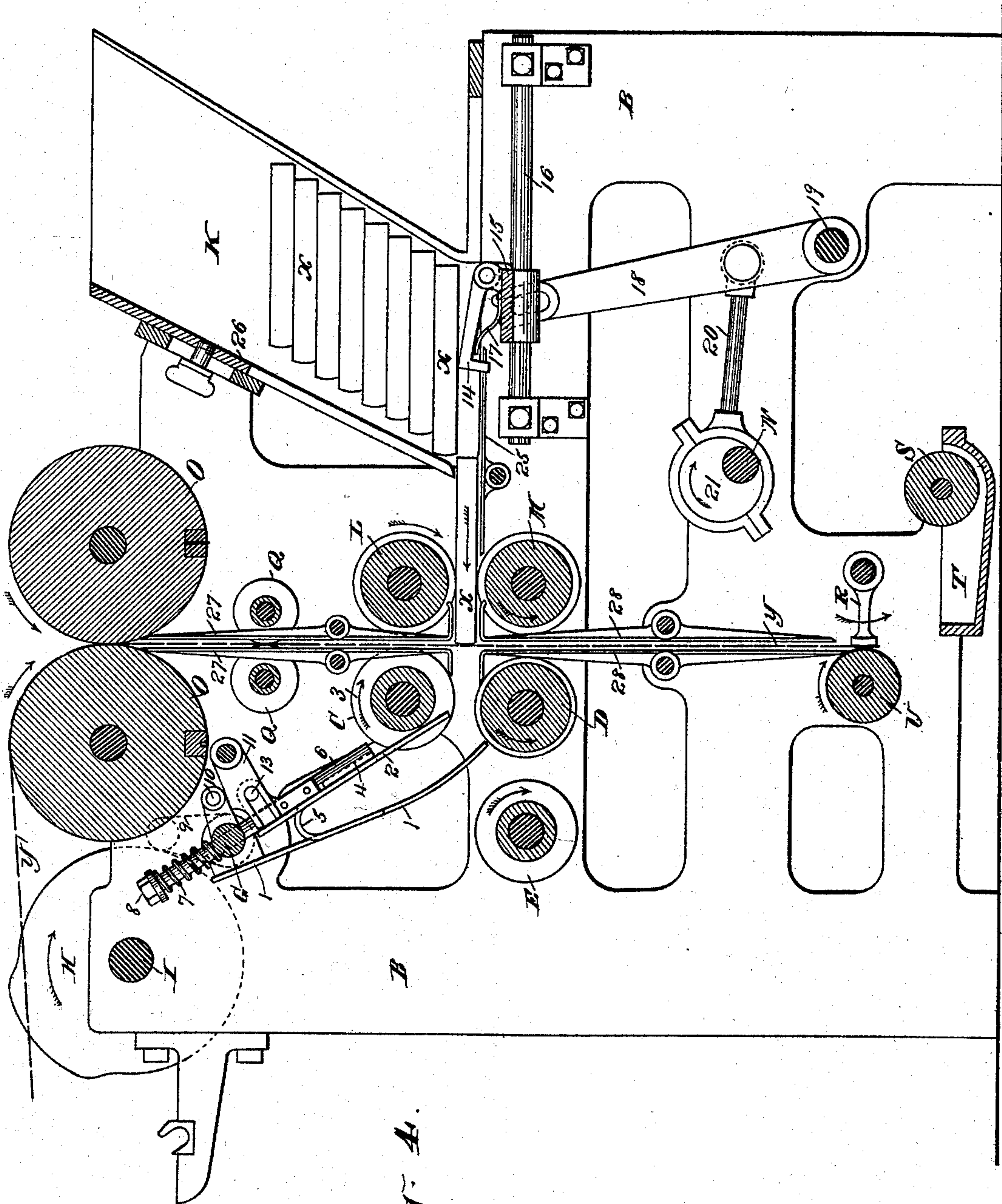


Fig. 4.

Attest:
Geo. H. Botts.
C. J. Sawyer

Inventor
L. C. Crowell
by
Philip Munson Phelps
Attys.

(No Model.)

5 Sheets—Sheet 5.

L. C. CROWELL.
MACHINE FOR WRAPPING NEWSPAPERS, &c.

No. 527,521.

Patented Oct. 16, 1894.

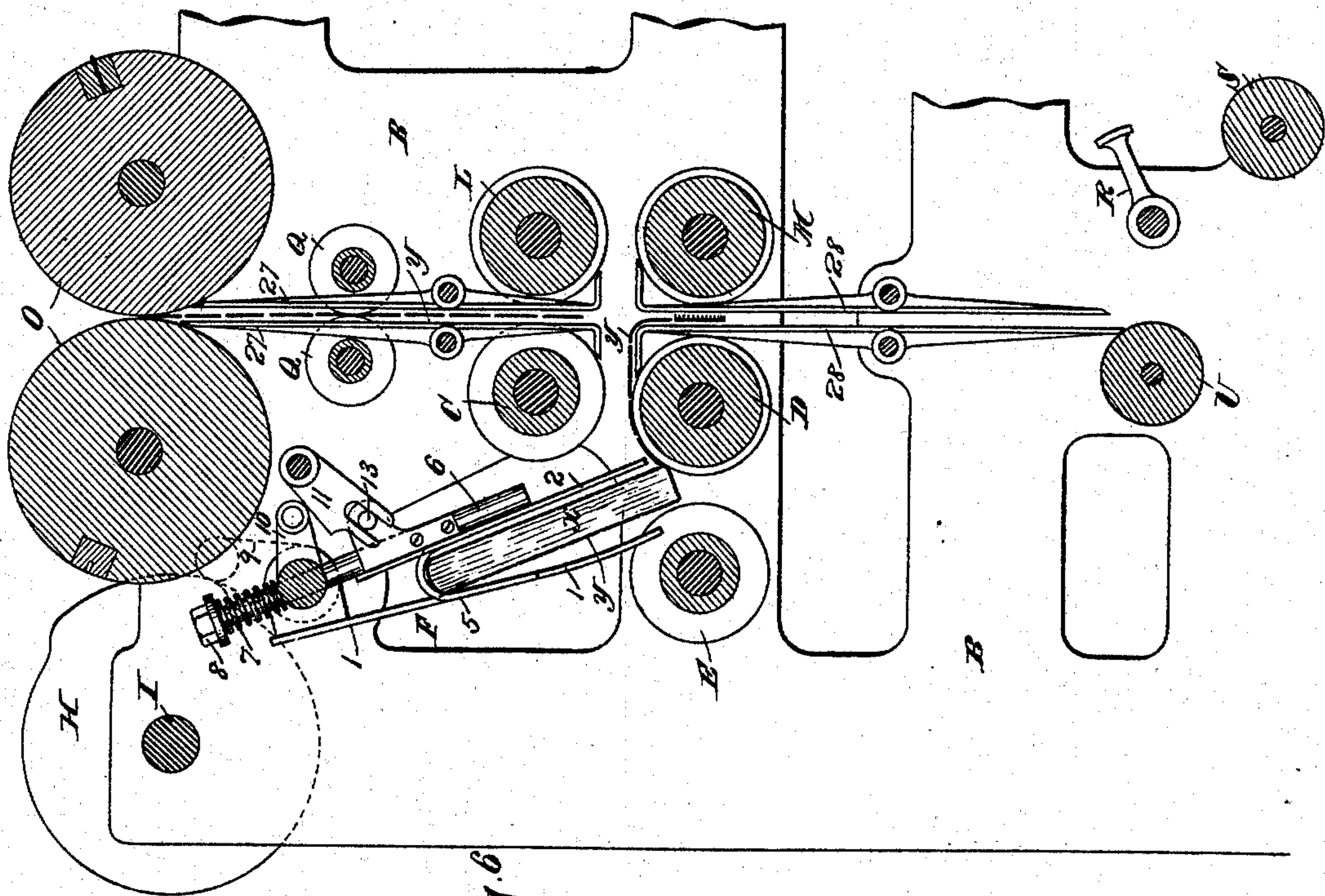


Fig. 6

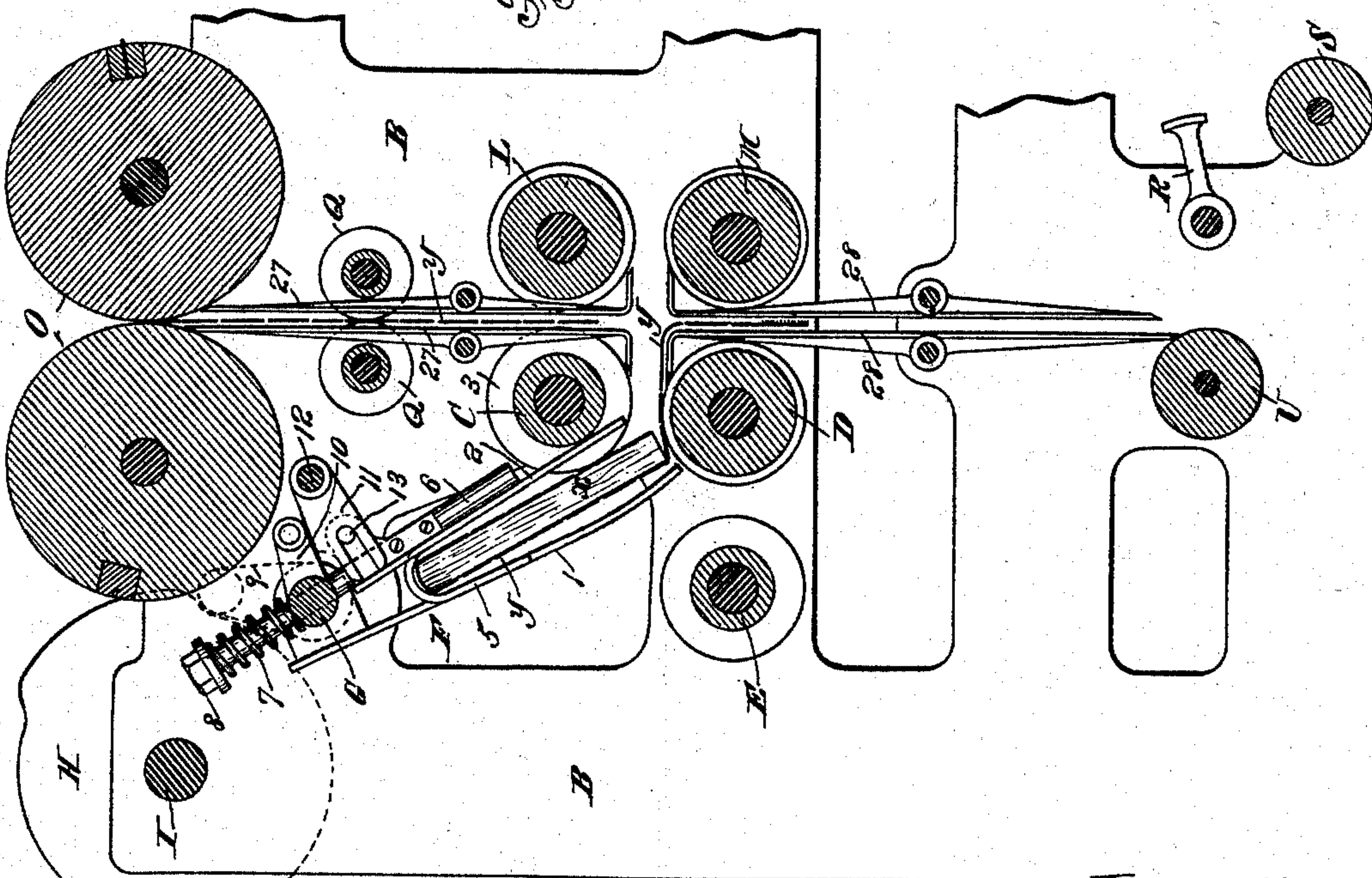


Fig. 5.

Attest:
Geo H Botts
C. J. Sawyer

Inventor.
L. C. Orme
by
Philip Munson & Phelps
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.

MACHINE FOR WRAPPING NEWSPAPERS, &c.

SPECIFICATION forming part of Letters Patent No. 527,521, dated October 16, 1894.

Application filed January 27, 1892. Serial No. 419,391. (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 Machines for Wrapping Newspapers and other Articles, 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 increase the speed at which newspapers and other publications may be wrapped, and to provide a simple and rapid machine of that class used for this purpose and known as newspaper wrapping machines.

In accordance with the present invention, I advance the paper and wrapper with the wrapper lapped over the leading end of the paper sufficiently to provide a surface for pasting the other end of the wrapper thereto, and with the other end of the wrapper projecting behind the paper sufficiently to overlap upon the first layer of wrapper upon the paper, and then reversing the direction of movement of the paper and delivering it between pressing surfaces by which the end of the wrapper is pressed down upon the layer of wrapper upon the paper for pasting, and the wrapped paper thus secured. It is evident that this method may be carried out by machines of widely different construction and employing various devices, it being necessary only to provide feeding devices by which the paper and wrapper shall be advanced in proper relative positions, pressing and delivery devices to which the rear end of the paper is transferred by any suitable means, and by which the reversed paper is advanced for delivery, and devices for applying paste to secure the wrapper, all of which may be of any suitable construction, and of widely different form and movement. I have shown in the present case, however, a very simple, compact and efficient construction of wrapping mechanism embodying my invention, in which three feeding rolls are employed, which co-operate to form two pairs of feeding rolls acting respectively as feeding, and pressing and de-

livery devices, and I employ as the means for transferring the rear end of the paper from the feeding to the pressing and delivery devices a carrier which receives the leading end of the paper and wrapper from the feeding rolls, and delivers the rear end of the paper with the wrapper overlapped thereon to the other pair of rolls forming the pressing and delivery devices by which the paper and wrapper are advanced and the wrapper secured.

While it is possible to carry the paper and wrapper from one pair of rolls to the other by a carrier having only an oscillating or equivalent movement between the rolls, I preferably employ a carrier having in addition to such movement a reciprocating movement toward and from the pressing and delivery rolls, so that the paper is positively carried thereby into the grip of these rolls, thus insuring its proper receipt thereby and increasing largely the rapidity at which the machine may be operated with certainty.

In order that the movement of the carrier in transferring the paper from one pair of rolls to the other may be as small as possible, and that the paper may be positively controlled throughout its entire movement, I preferably form the carrier of fingers between which the paper is received and provide the outer rolls of the feeding and pressing and delivery devices with grooves within which the fingers play, so that the paper is in the positive control of the fingers and supported thereby from the time that its leading end passes between the feeding rolls until it is delivered between and grasped by the pressing and delivery rolls. Any suitable mechanism may be used for mounting and actuating the carrier, but I have devised a simple and efficient construction which is used preferably, and which in itself forms a part of the present invention. This wrapping mechanism may be fed by hand or any suitable feeding devices for automatically advancing papers and wrappers to the wrapping mechanism in proper time, together or independently of each other, may be combined therewith, and the papers may be previously folded to the size desired or folded by mech-

anism embodied in and forming a part of the machine. The wrapper also may previously be cut to the desired size and fed to the wrapping mechanism as sheets, or fed from the web and severed in the machine. I prefer, however, to feed the wrapper from a wrapper web, and a simple form of machine is produced, especially adapted for wrapping thick folded papers or pamphlets, by feeding the papers or pamphlets from a box or holder, in which they are piled. The proper positions of the paper and wrapper when delivered to the wrapping mechanism 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 paste for securing the wrapper 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. When the paste is applied to the loose end of the wrapper, however, I prefer to employ pasting devices by which the paste is applied after the wrapper has been advanced into position to receive the advancing paper, the movement of the wrapper after the paste is applied being thus reduced, and the danger of wiping off the paste on parts of the machine lessened.

In the accompanying drawings forming a part of this specification, I have shown a complete machine of the general construction above described, which will be found an efficient and convenient embodiment of the present invention, 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 rear elevation with the wrapper roll omitted. Fig. 3 is a plan view. Fig. 4 is a vertical section on the line 4—4 of Fig. 2, and Figs. 5 and 6 are broken views similar to Fig. 4 showing the different steps in wrapping. Fig. 7 is a perspective view of the product.

Referring to said drawings, the frame of the machine may be of any suitable construction for supporting the operating parts. As shown, it consists simply of two end frames A, B, in which all the parts are mounted. At the rear or delivery side of the frame is mounted the wrapping mechanism proper, which consists of the rolls C, D, forming the feeding rolls by which the paper and wrapper are advanced, the roll E which co-operates with roll D to form a second pair of feeding rolls by which the reversed paper is advanced for delivery and the wrapper pasted down, and a carrier F by which the paper is received from the rolls C, D, and its rear end with the wrapper overlapping it transferred to the rolls D, E.

The carrier may be of any suitable construction and movement. I prefer, however, to employ the construction shown, in which the carrier consists of two sets of fingers 1, 2, which swing between the two rolls C, E, and preferably enter grooves 3 in the same, so that the paper may be positively held and guided thereby throughout its entire movement when out of the positive control of the rolls. The fingers 1, 2 by which the paper is received may be mounted on a single piece so as to move together, and may have only an oscillating or oscillating and reciprocating movement, but I preferably mount the fingers 1 so as to have an oscillating movement between the rolls C, E, while the fingers 2 are mounted so as to have in addition to this movement a reciprocating movement to and from the rolls D, E.

For mounting and actuating the fingers 1, 2, the following construction is provided:—The fingers 1 are mounted rigidly upon a shaft G supported in the side frames A, B and the fingers 2 are connected by a plate 4, which carries the central finger and curved plates 5 which form pushers which reciprocate with the fingers 2 and engage the end of the paper so as to force it downward between the fingers and deliver it positively into the grasp of rolls D, E. The fingers 2 and plates 4, 5 are carried by rods 6 which extend through holes in the shaft G and are mounted to slide therein, being normally held in their withdrawn position as shown in Fig. 4, by springs 7 coiled outside the shaft G and pressing against the shaft and set nuts 8 on the rods.

For the purpose of rocking the shaft G for the oscillating movement of the fingers 1, 2, and for moving the rods 6 through the shaft against the tension of springs 7, the shaft G is provided with a crank arm 9 carrying a bowl which is engaged and actuated by a cam disk H on a shaft I mounted in the frames A, B. The shaft G is also provided with crank arms 10 carrying bowls which engage crank arms 11 on a rock shaft 12 mounted in the frames A, B, these arms 11 being slotted to engage pins 13 carried by bars or rods 6, so that the arms 11 and the rods 6 move together. It will be seen that by this construction the rocking of the shaft G through crank arm 9 and cam H rocks the arms 11 through crank arms 10 and moves the rods 6, fingers 2, and pushers 5 downward against the tension of springs 7, and that upon the release of the crank arm 9 by the cam H the springs 7 return the rods 6 to position through the shaft, and by the engagement of the pins 13 and arms 11 rock the arms 11 back to their normal position and the arms 11, rock the shaft G, and return the crank arm 9 by engagement with the bowls on crank arms 10, all the parts thus being returned to their normal position by the springs 7.

As above stated the paper and wrapper may be advanced to this wrapping mechanism 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 x are placed within a holder K mounted on the front side of the machine and the bottom paper advanced from the holder to the feeding rolls L, M and thereby to the rolls C, D, by a series of pivoted fingers 14 carried by a slide 15 moving on rods 16 mounted in the frame of the machine and being pressed upward so as to engage the bottom paper when withdrawn, by means of springs 17 carried by the slide under the fingers. This slide 15 is reciprocated upon the rods 16 to advance the papers in proper time by means of slotted levers 18 carried by rock shaft 19 mounted in the side frames A, B, and operated from the main shaft of the machine N by means of a pitman 20 connected to one of the arms 18 and an eccentric 21 on the shaft N. The holder K is shown as adjustable so as to hold papers of different widths and lengths, this result being secured by mounting the sides on rods 22 adjustably secured in the frame by means of set screws 23, and the rear end of the box being slotted and made adjustable by set screws 24. The holder K is open at the bottom and the papers are fed out by the fingers 14 over guides 25 between which the fingers play. In order that papers of different thickness may be fed out from the holder, and the delivery of more than one paper at a time be prevented, the front end 26 of the holder K is preferably made adjustable to and from the guides 25 by a set screw as shown. The specific construction of this sheet holding and feeding mechanism, however, forms no part of the present invention and may be varied as desired.

The wrappers may be previously cut and fed from a holder by suitable mechanism, but I prefer to use a wrapper web, and in the construction shown the wrappers are cut, pasted, and advanced into the line of the paper as it is fed to the wrapping mechanism by the following means.

At the top of the machine are mounted two cutting and feeding rolls O to which the wrapper web y is advanced from the wrapper roll P, and by which it is severed in wrapper lengths. From the cutting and feeding rolls O the severed wrapper y is fed downward between guides 27 to feeding rolls Q and by the latter past the feeding rolls L, M, which do not engage the wrapper, and downward between the guides 28 below the rolls M, D. The lower ends of the guides 27 and upper ends of the guides 28 are curved so as to form guides between which the paper passes from rolls L, M to rolls C, D, but it will be understood that these guides may be found not absolutely necessary in all cases, and that they may be formed independently of guides 27, 28 if preferred.

As above stated, the paste may be applied to the wrapper at any desired point, but I preferably place the pasting devices below the rolls M, D so that the pasted end of the wrapper has only the reverse movement between the guides 28 and about the roll D before it is pasted down. These pasting devices may be of any suitable form. As shown, they consist of the revolving paster R, paste fountain roll S from which the paster receives its paste, and which runs in paste fountain T, and roll U on the opposite side of the wrapper from the paster and against which the paster presses in applying paste. The paster R is preferably cut away so as to apply paste only to that part of the wrapper between guides 28, so as to avoid the possibility of the paste striking the guides, as the end of the wrapper is drawn up between them during the operation of wrapping.

The operative parts of the machine, independently of the means for feeding the papers x from the holder K to the rolls L, M are driven from the main driving shaft N as follows:—The shaft N carries outside the frame A a large gear 30 which drives the feed roll L through an intermediate 31 and a pinion 32 on the shaft of the roll. The rolls L, M are geared together directly by gears 33, 34. The roll D is driven from the roll M through an intermediate 35 and a gear 36 on the shaft of the roll, D. The rolls C, E, are geared directly to the roll D by gears 37, 38 meshing with gear 36 so that the three rolls of the wrapping mechanism are driven at the same rate of speed.

The wrapper cutting and feeding rolls O are geared together by gears 39 and driven from gear 30 on shaft N through the intermediate 31 and a second intermediate 40, and the feeding rolls Q are geared together by gears 41 and driven from one of the cutting and feeding rolls O through intermediate 42 meshing with gear 39. The cam disk H is driven from the same cutting and feeding roll through an intermediate 43 meshing with the gear 39 and with the gear 44 on shaft I. The shaft N carries a second gear 45 meshing with a gear 46 on the shaft of paster R and the paste fountain roll S and pasting roll U are driven directly from the paster shaft by gears 47, 48, and 49.

The parts are so timed, as will be seen from inspection of the drawings, that the cam H, the wrapper cutting and feeding rolls O, the paster R and the paper feeding fingers 14 operate in unison and make one complete movement to each rotation of the shaft N, so that a paper and wrapper are fed to the wrapping mechanism at each rotation of the shaft, the wrapper being first fed down into the line of movement of the advancing paper and receiving paste from the paster R, and then the advancing paper engaging the wrapper to carry the latter with it to the wrapping mechanism. The feeding rolls L, M and the rolls C, D, E of the wrapping mechanism,

however, are speeded up so that the operation of wrapping is performed at a comparatively high rate of speed, and the paper being wrapped is drawn quickly out of the path of the next wrapper as the latter is advanced by the rolls Q.

The operation of the machine will be understood from the drawings and the following brief description.

When the parts are in the position shown in the main views and Fig. 4, the wrapper y has been fed downward from the wrapper roll by the feeding and cutting rolls O and the wrapper severed thereby has been advanced by these rolls and feeding rolls Q downward between the guides 27, 28 and is in its lowest position with the paster R just applying paste to the leading end. The paper x to be wrapped has been fed forward by the fingers 14 to the feeding rolls L, M, and is just in position to engage the wrapper on the proper line to carry it with it to the wrapping mechanism.

It will be understood that the wrapper may be of any suitable length to overlap upon the paper sufficiently for pasting. As shown, the wrapper is about three times the length of the paper, so as to overlap the full length of the latter, and the paper strikes the wrapper at about one-third of its length from the rear end. The bowl on crank arm 10 is on the lower part of the cam disk H and the carrier is withdrawn by springs 7 and held thereby with the fingers 1, 2, in position to receive the leading end of the paper and wrapper, as they are advanced by feeding rolls C, D.

In the position of the parts shown in Fig. 5, the paper and wrapper have been advanced by the rolls C, D between the fingers 1, 2 and against the pushers 5, and the cam disk H is just about to actuate the carrier through crank arm 9 and against the tension of springs 7 to carry the paper from the rolls C, D and deliver it with its rear end between the rolls D, E, the rear end of the paper having passed the rolls C, D, so as to be free to swing with the carrier. The cam on disk H now rocks the shaft G through the crank arm 9, thus swinging the rods 6 and fingers 1, 2 from the rolls C, D to the rolls D, E, and at the same time the crank arms 10 engage the slotted arms 11 on rock shaft 12 to force them downward so as to carry the rods 6 downward by engagement of the slotted arms with the pins 13, the paper thus being swung into position above the rolls D, E and then positively forced downward by the pushers 5 into the grasp of these rolls. This position of all the parts is shown in Fig. 6. The bowl on crank arm 9 now rides upon the outer face of the cam, H, and the shaft G and carrier are held in the position shown in Fig. 6 a sufficient time to insure the proper grasping of the paper by the rolls D, E, and until the paper has been fed downward between said rolls sufficiently to allow the carrier to return, when the bowl

is released by passing onto the lower part of the cam disk H and the springs 7 return the parts to their normal position, as shown in Fig. 4.

It will be seen that, as the paper is advanced by rolls C, D and transferred by the carrier F to rolls D, E, the leading pasted end of the wrapper y is drawn upward between the guides 28 and that the rear end of the paper is transferred to the rolls D, E with the wrapper lying about the upper surface of roll D, so that the wrapper is overlapped upon the paper as the paper and wrapper are fed downward between rolls D, E, and the pasted end of the wrapper is pressed down upon the layer of paper upon the paper and secured thereto, the wrapped paper being delivered as a product of the form shown in Fig. 7.

During the operation of wrapping, another wrapper has been fed downward between the guides 27, and as the wrapper upon the paper is carried out of the way, the next wrapper is advanced downward between the guides 28 to the paster, and another paper is advanced by the fingers 14 to the rolls L, M, when the operation described is repeated.

It will be understood that many modifications may be made in the construction shown without departing from my invention. Thus while I have shown the wrapping mechanism as consisting of three rolls, one roll being used both in advancing the paper to the carrier and delivering the paper it is evident that the feeding and pressing rolls may be independent pairs of rolls, but the construction shown is simpler and, moreover, reduces the movement of the carrier in transferring the paper. It is evident also that the relative positions of the three rolls may be changed, but I have shown that which I have found most satisfactory. While I prefer to use a carrier which is actuated to carry the paper positively into the grasp of the pressing and delivery rolls, as shown, it will be understood that a construction may be used in which the carrier operates simply to carry the paper into position above the pressing and delivery rolls, the paper then being allowed to drop into the grasp of the latter.

I have applied the term delivery devices to the rolls D, E, but it will be understood that these may not form the final delivery, but that the term is used only to define the devices as advancing the paper from the wrapping mechanism.

The construction shown provides a very simple machine by which papers and pamphlets may be wrapped at a very high speed, but it will be understood that the construction of the parts co-operating with the wrapping mechanism proper may be varied widely, the special construction of wrapper and paper feeding mechanism and arrangement of guides being shown only for the purpose of illustrating a complete machine, and that the wrapping mechanism may be combined with any other suitable mechanisms forming an

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

While I have described my invention as applied in wrapping newspapers and other publications, for which the machine shown is especially adapted, it will be understood that my invention is not to be thus limited, but that the method may be applied in wrapping other articles, and the invention may be carried out and embodied in machines especially adapted for such use.

What I claim is—

1. The combination with paper feeding mechanism, of wrapper feeding mechanism by which a wrapper is advanced transversely to and into the path of movement of the paper, feeding devices by which the paper and wrapper are received from the feeding mechanism with the wrapper overlapping the leading end of the paper and projecting behind the paper sufficiently to overlap upon the layer of wrapper on the paper for pasting, pressing and delivery devices, and a carrier receiving the paper from the feeding devices and transferring the rear end to the pressing and delivery devices, and simultaneously folding the wrapper over the end of the paper, substantially as described.

2. The combination with paper feeding mechanism, of wrapper feeding mechanism by which a wrapper is advanced transversely to and into the path of movement of the paper, feeding devices by which the paper and wrapper are received from the feeding mechanism with the wrapper overlapping the leading end of the paper and projecting behind the paper sufficiently to overlap upon the layer of wrapper on the paper for pasting, pasting devices for applying paste to the wrapper, pressing and delivery devices, and a carrier receiving the paper from the feeding devices and transferring the rear end to the pressing and delivery devices, and simultaneously folding the wrapper over the end of the paper, substantially as described.

3. The combination of feeding devices advancing a paper with a wrapper lapped over its leading end and projecting behind the paper sufficiently to overlap on the layer of wrapper on the paper for pasting, pressing and delivery devices, and a carrier receiving the paper from the feeding devices and transferring the rear end to the pressing and delivery devices and simultaneously folding the wrapper over the end of the paper, substantially as described.

4. The combination of feeding devices advancing a paper with a wrapper lapped over its leading end and projecting behind the

paper sufficiently to overlap on the layer of wrapper on the paper for pasting, pressing and delivery devices, a carrier receiving the paper from the feeding devices, and means for actuating the carrier to transfer the rear end of the paper to the pressing and delivery devices and advance it positively into the grasp of the latter and simultaneously fold the wrapper over the end of the paper, substantially as described.

5. The combination with paper feeding mechanism, of wrapper feeding mechanism by which a wrapper is advanced transversely to and into the line of movement of the paper, pasting devices for applying paste to the wrapper, feeding devices receiving the paper from the paper feeding mechanism with the wrapper overlapping the leading end of the paper and projecting behind the paper sufficiently to overlap on the layer of wrapper on the paper for pasting, pressing and delivery devices, and a carrier receiving the paper from the feeding devices and transferring the rear end of the paper to the pressing and delivery devices, and simultaneously folding the wrapper over the end of the paper, substantially as described.

6. The combination with feeding devices advancing a paper with a wrapper lapped over its leading end and projecting behind the paper sufficiently to overlap upon the layer of wrapper on the paper for pasting, of a pair of pressing and delivery rolls, and a carrier receiving the paper from the feeding devices and transferring the rear end to the pressing and delivery rolls and simultaneously folding the wrapper over the end of the paper, substantially as described.

7. The combination with feeding rolls advancing a paper with a wrapper lapped over its leading end and projecting behind the paper sufficiently to overlap on the layer of wrapper on the paper for pasting, of a pair of pressing and delivery rolls, and a carrier receiving the paper from the feeding rolls and transferring the rear end to the pressing and delivery rolls and simultaneously folding the wrapper over the end of the paper, substantially as described.

8. The combination with a pair of feeding rolls advancing a paper with a wrapper lapped over its leading end and projecting behind the paper sufficiently to overlap on the layer of wrapper on the paper for pasting, of a roll co-operating with one of said rolls to form a pair of pressing and delivery rolls, and a carrier receiving the paper from the feeding rolls and transferring the rear end to the pressing and delivery rolls and simultaneously folding the wrapper over the end of the paper against one of the feeding rolls, substantially as described.

9. The combination with a pair of feeding rolls advancing a paper with a wrapper lapped over its leading end and projecting behind the paper sufficiently to overlap on the layer of wrapper on the paper for pasting, of a roll

co-operating with one of said rolls to form a pair of pressing and delivery rolls, a carrier receiving the paper from the feeding rolls, and means for actuating said carrier to transfer the paper to the pressing and delivery rolls and advance it positively into the grasp of the latter and simultaneously fold the wrapper over the end of the paper against one of the feeding rolls, substantially as described.

10. The combination with the rolls C, D, E, forming two pairs of feeding rolls, of a pivoted carrier receiving a paper from the rolls C, D, and means for oscillating said carrier between the rolls C, E, and advancing it to carry the rear end of the paper positively into the grasp of rolls D, E, substantially as described.

11. The combination with grooved rolls C, E, and roll D co-operating with said rolls to form two pairs of feeding rolls, of a pivoted carrier oscillating between the rolls C, E and having fingers 1, 2 entering said grooves, whereby a paper is received from the rolls C, D and the rear end delivered to the rolls D, E, substantially as described.

12. The combination with rolls C, D, E, forming two pairs of feeding rolls, of a pivoted carrier, having fingers 1, 2, between which the paper is received from the rolls C, D, and pushers 5 engaging the end of the paper, and means for oscillating said carrier and actuating said pushers to carry the paper from the rolls C, D, to the rolls D, E, and ad-

vance the rear end of the paper positively into the grasp of the latter, substantially as described.

13. The combination with rolls C, D, E, of rock shaft G, fingers 1 rigid thereon, fingers 2 and pushers 5 carried thereby but mounted to move transversely to the shaft, and means for rocking said shaft and actuating said pushers, substantially as described.

14. The combination with rock shaft G, of rod 6 sliding through said shaft, spring 7 pressing against said shaft and rod, crank arm 10 on said shaft, slotted rock arm 11 engaging said rod and engaged by said crank arm, and means for rocking said shaft G against the tension of spring 7, substantially as described.

15. The combination with rock shaft G, and finger 1 rigid thereon, of rod 6 sliding through said shaft, and carrying finger 2 and pusher 5, spring 7 pressing against said shaft and rod, crank arm 10 on said shaft, slotted rock arm 11 engaging said rod and engaged by said crank arm, and means for rocking said shaft D against the tension of spring 7, 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.