(No Model.) 4 Sheets—Sheet 1.

R. W. WATERS.

NEWSPAPER FOLDING, WRAPPING, AND ADDRESSING MACHINE.

No. 264,380. Patented Sept. 12, 1882.

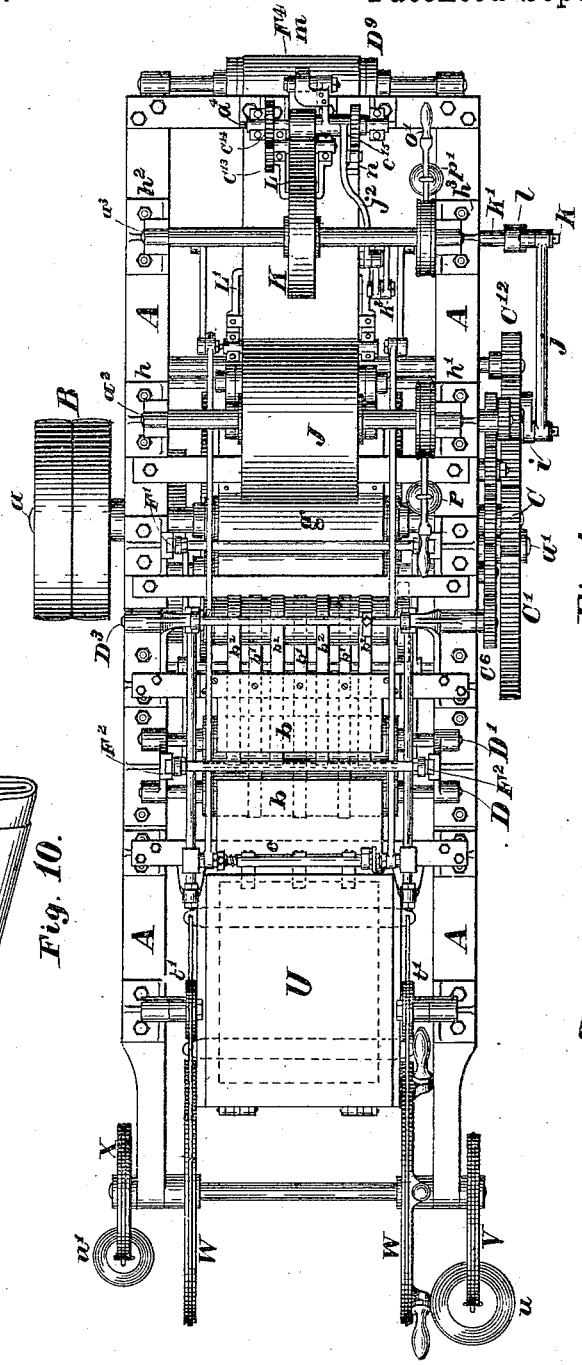

Fig. 1.

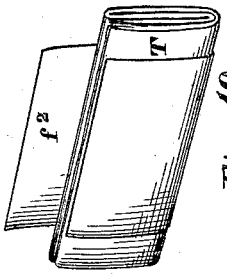

Fig. 10.

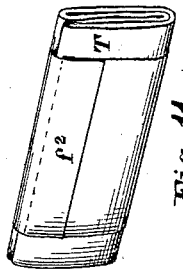

Fig. 11.

Witnesses:
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Inventor:
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by W. P. Preble Jr
his attorney

(No Model.) 4 Sheets—Sheet 2.

R. W. WATERS.

NEWSPAPER FOLDING, WRAPPING, AND ADDRESSING MACHINE.

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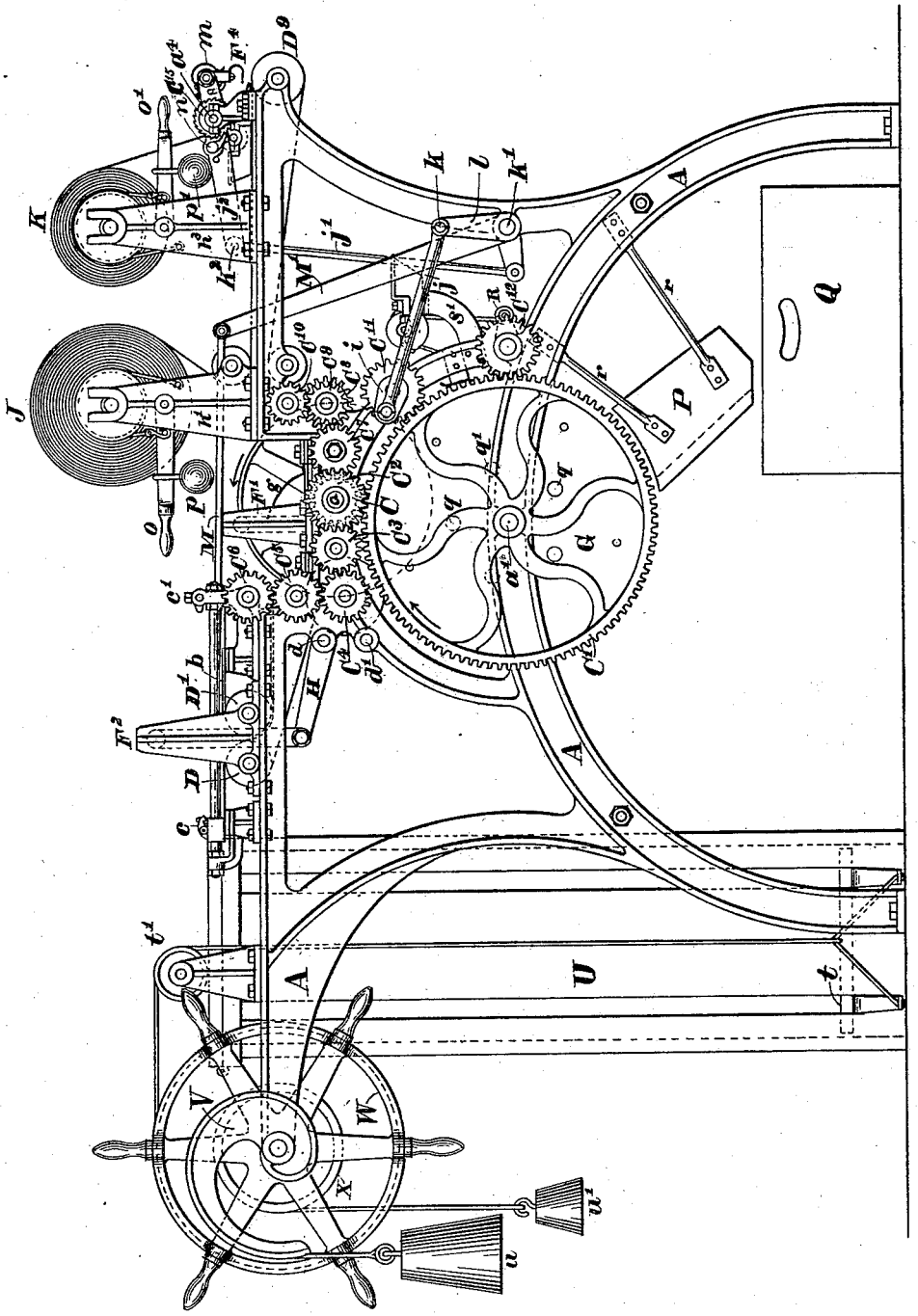

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

R. W. WATERS.

NEWSPAPER FOLDING, WRAPPING, AND ADDRESSING MACHINE.

No. 264,380. Patented Sept. 12, 1882.

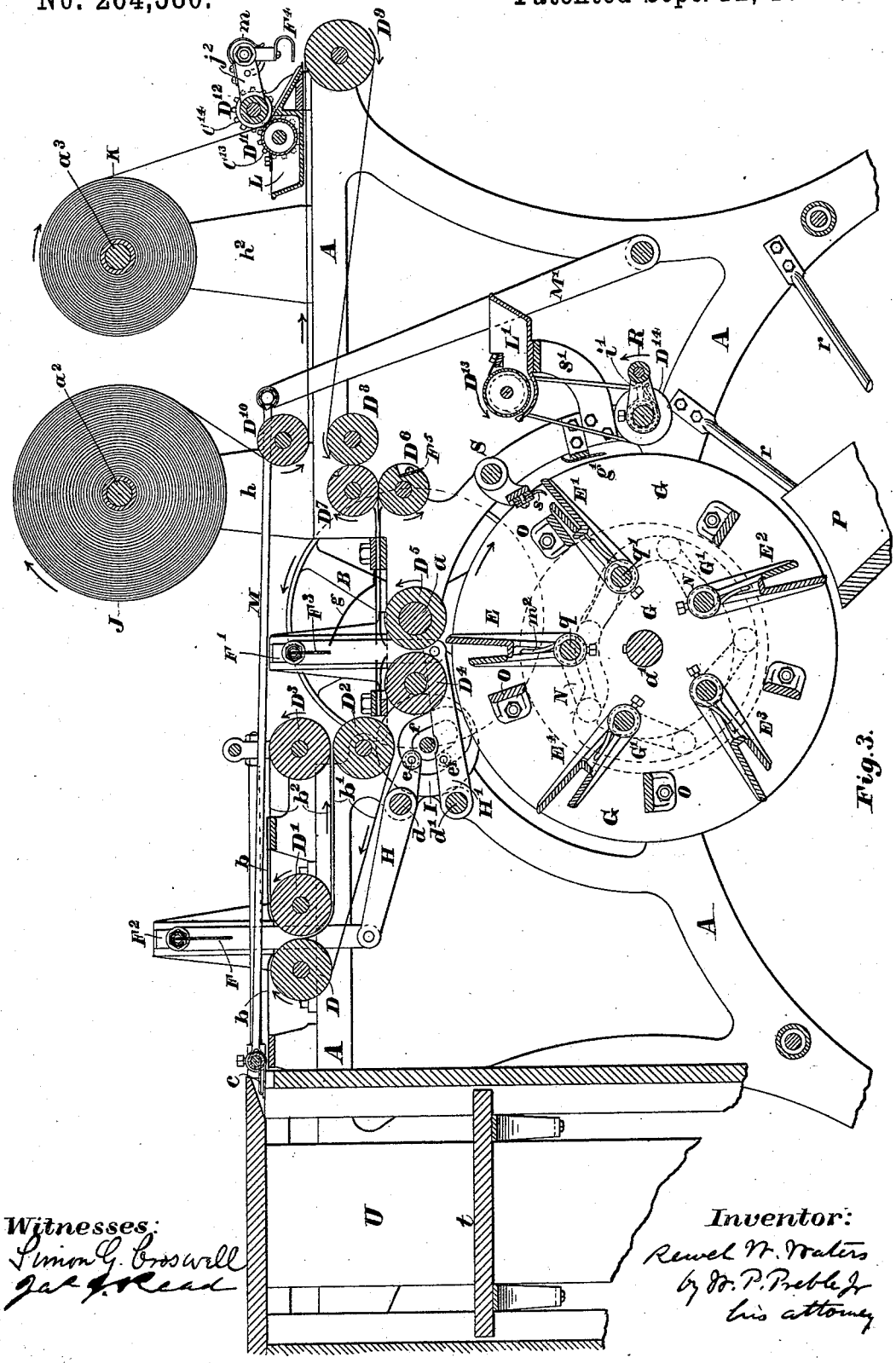

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

R. W. WATERS.

NEWSPAPER FOLDING, WRAPPING, AND ADDRESSING MACHINE.

No. 264,380. Patented Sept. 12, 1882.

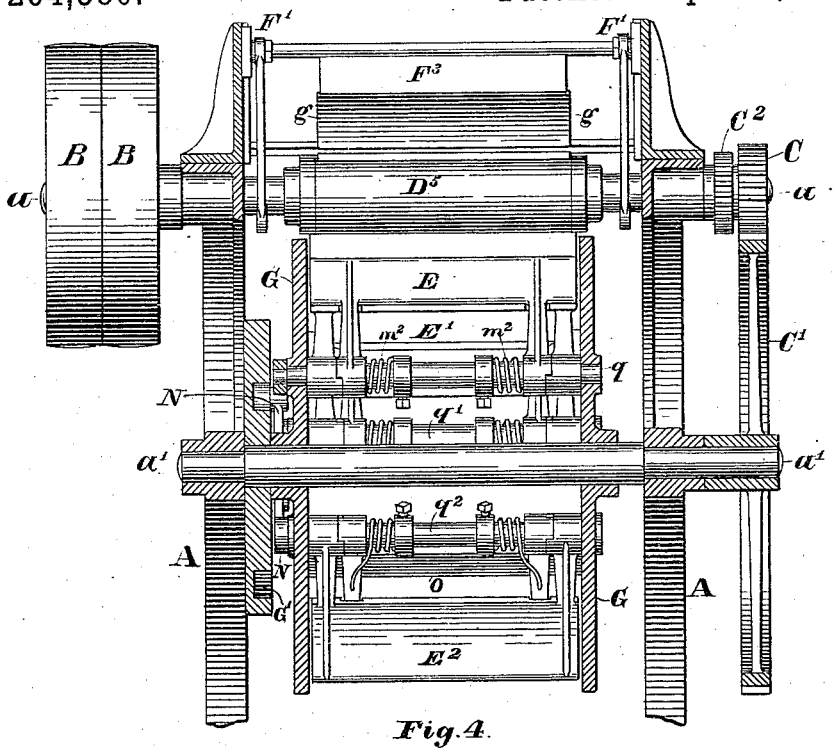

Fig. 4.

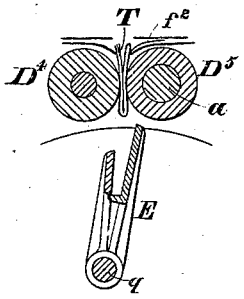

Fig. 5.

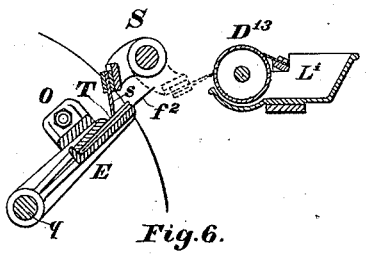

Fig. 6.

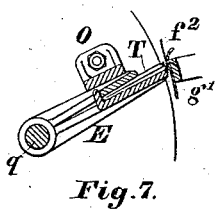

Fig. 7.

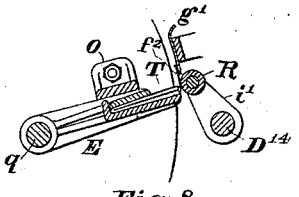

Fig. 8.

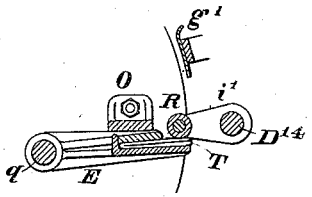

Fig. 9.

Witnesses:
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Inventor:
Rewel W. Waters
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his attorney

UNITED STATES PATENT OFFICE.

REUEL W. WATERS, OF NEWTON CENTRE, MASSACHUSETTS.

NEWSPAPER FOLDING, WRAPPING, AND ADDRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 264,380, dated September 12, 1882.

Application filed January 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, REUEL W. WATERS, of Newton Centre, Middlesex county, Massachusetts, have invented certain new and useful Improvements in Newspaper Folding, Wrapping, and Addressing Machines, of which the following is a specification.

My invention relates to that class of folding and wrapping machines which is designed to aid in the rapid delivery of newspapers and periodicals with the object of lessening, as far as possible, the interval of time consumed between going to press and delivery to the mail; and the points of novelty consist in the means by which I have carried this out, all as will now be more fully set out and explained.

The mechanism by which I accomplish these results is shown in the accompanying drawings, in which—

Figure 1 is a top plan. Fig. 2 is a side elevation. Fig. 3 is a linear section. Fig. 4 is a cross-section showing the jaws of the carrier-wheel. Figs. 5, 6, 7, 8, and 9 are details of the different positions of the sealing mechanism. Fig. 10 shows the paper after folding and wrapping, but before sealing. Fig. 11 shows the sealed package.

The same letters indicate similar parts in the different drawings.

Arrows indicate the direction in which the different belts and rollers move. All the gears and rollers turn on shafts journaled in the frame-work when not otherwise specified.

A is the frame or table which supports the moving parts of the machine.

B is the driving-pulley on the shaft *a*, and is connected by belts with a source of power. (Not shown.) At the other end of this shaft is the driving-gear C, rigidly attached to the shaft, and from it motion is imparted to the other parts of the machine by gears and crank-rods, as hereinafter explained.

C′ is a large gear situated below the driving-gear C and turned by it.

C^2 C^3 C^4 C^5 C^6 constitute a train of gears by which motion is conveyed from the main shaft *a* to the mechanism for folding the paper, as hereinafter explained.

C^2 C^7 C^8 C^9 C^{10} constitute a train, by means of which motion is conveyed to the mechanism for feeding the wrapping-web, as hereinafter explained.

C^{11} is a gear-wheel meshing with the gear C′, and by means of crank-rods communicates motion to the addressing mechanism.

C^{12} is a gear which meshes with C′, and by means of pulleys and a belt communicates motion to the tank mechanism, where the paste for sealing the package is stored.

D D′ are pressure-rollers for catching the paper and drawing it away from the folding-blade as it makes the first fold. D is connected with the roller D^2 by an endless belt, *b′*, which, together with endless belt b^2, connecting D′ with the roller D^3, feeds the paper along toward the second folding device. These rollers D^2 and D^3 are placed upon the same shafts as the gears C^5 C^6, and are turned with them. The paper is fed along the bed-plate *b* under the folding-blade by the feeding-nippers *c*, which are of ordinary construction, being opened by means of a pitman and crank-rod and the spur *c′*, as hereinafter explained, and closed by a spring.

D^4 D^5 are pressure-rollers, which co-operate with the second folding-blade and draw the paper and wrapper web, as hereinafter explained, down between them, and drop the package thus made into the jaws E E′ E^2 E^3 E^4 of the carrier-wheel G below. This carrier-wheel turns on the shaft *a′*. These jaws E E′, &c., move in a cam-path, G, as hereinafter explained.

F′ F^2 are the folding devices, and consist of upright sliding arms carrying a folding-blade, F F^3, and operated by the levers H H′, with which said arms are connected. The lever H is pivoted at *d* and the lever H′ at *d′*. Each lever carries a pin, *e e′*, and motion up and down is imparted to these levers, and through them to the sliding upright arms and folding-blades by the pins *e e′*, being forced to follow the irregular track or cam-path *f*, upon the surface of the wheel I. This wheel I is fastened upon the same shaft as the gear C^4, and therefore is turned with it, as before described. As shown in Fig. 3, the folding-blades are in their up position. When the wheel I, in its revolution, forces the pin *e* into its highest position, which will obviously be when that part of the

cam-path nearest the edge of the wheel comes uppermost, the pin end of the lever H is raised, the other end lowered, and with it the folding-blade F, which folds the paper and forces it down between the rollers D D′, where it is caught between the two belts before described and carried along until it is discharged from between the rollers D^2 D^3 and falls in a flat and smooth condition over the guides D^4 D^5. When the pin e' upon the lever H′ occupies its highest position, as shown in the drawings, Fig. 3, the folding-blade F^3 being up, it is obvious that as soon as the dead or circular part of the cam-path passes the pin it is depressed by the irregular or active part of the path, and with it the lever H′, thus drawing down the folding-blade F^3 and forcing the paper to fold a second time and pass between the rollers D^4 D^5 into the jaw E, as before explained. The pins e e' are a quarter-revolution of the wheel I distant from each other, and somewhat more than half the motion of the cam-path is what is called "dead" or "lost" motion, it being drawn on an arc concentric with the wheel I, so that no effect is produced upon the pins. It is evident that when the pins are arranged as shown in the drawings the cam-path will not begin to act upon e' until the pin e begins to fall and the folding-blade F to rise. This arrangement allows time for the folding-blade F^3 to rise out of the way before the paper which is being fed by the belts b' b^2 falls under it. In this way one paper is being folded at F, another at F^3, while a third is being fed from F to F^3 by the belts b' b^2. The guard g is used to prevent the paper, as it comes from between D^2 D^3 passing out of line or being thrown too far, which would cause it to fall badly under the folding-blade.

The machine, as shown in the drawings, is designed to receive the papers when folded into an eighth of their full size, which is the state in which they are generally delivered to carriers and newsboys; but it is obvious that the papers may readily be received and folded in this way at an earlier stage of the folding process, if desired. This depends, as before explained, upon the quickness with which the edition must be printed. When my machine is thus made to do the whole work of folding it may be used advantageously at agencies, where the papers are received from various sources in an unfolded condition.

J is a roll of wrapping-web wound upon the shaft a^2, which turns in standards h h', attached to the frame. This web is fed along by the rollers D^6 D^7 D^8 D^9 D^{10}, as indicated by the arrows, to the blade F^3, and there receives a paper from D^2 D^3, as before described, and is folded with it down between the rollers D^4 D^5, the tension in folding being enough to sever the wrapper-length, already partly cut by the perforating-knife F^5 upon the roller D^6 and working in a groove on roller D^7.

K is a roll of printed labels or addresses wound upon a shaft, a^3, turning in the standards h^2 h^3, fastened to the frame. This label-roll is fed down between the rollers D^{11} D^{12}, under the knife-blade F^4, which drops and cuts off an address at the proper time by mechanism hereinafter explained. The roller D^{11} turns in a paste-tank, L, and pastes the under side of the addresses as they are fed along. Motion is communicated to this roller D^{11} from D^{12} by means of interlocking gears C^{13} C^{14}, fastened upon the other ends of the roller-shafts, and motion is imparted to the roller D^{12} and the knife-blade from the gear C^{11} by means of a system of crank-rods, levers, and eccentric arms. (Shown in Fig. 2.)

The gear C^{11} is provided with an eccentric arm, i, to which is fastened one end of the crank-rod j, the other end being attached at k to one arm of the elbow-lever l. This lever is pivoted to the frame-work at k', and to its other arm is fastened the crank-rod j', the other end of which is pivoted at k^2 to the lever j^2, hung loosely upon the shaft of D^{12}. It is to the free end of this lever j^2 that the knife-blade F^4 is fastened. It is obvious that every outward throw of the eccentric i and crank-rod j will impart an upward throw to the crank-rod j', and by depressing the inner end of the lever j^2 will depress the knife-blade F^4 upon a knife-edge under the label-roll, and thus cut off an address and press it upon the wrapping-web, which is fed under it. A spring, m, holds the knife-blade F^4 firmly in position. This lever j^2 also carries a pawl, n, which engages the teeth of a ratchet-wheel, C^{15}, fastened rigidly upon the shaft a^4, which carries the roller D^{12}. This pawl is held against the teeth by a small spring. The motion of this lever j^2 is adjusted with reference to the length of wrapper required, and in the case of papers requiring a seven-inch wrapper (the size for which the machine shown is arranged) will cut off one address for every seven inches of wrapper which passes under the knife-blade F^4. To avoid the inconvenience of having the label-roll fed constantly, which would cause the roll to be fed onto the top of the knife-blade F^4 by not allowing the latter time to rise out of the way, I give a motion to the pawl n nearly equal to two teeth of the ratchet-wheel, and thus secure the desired lost motion, the feeding being intermittent. The tension of the rolls J and K is thrown off by lifting the handles o o' and weights p p'. The same gear-wheel C^{11} and rod j are used to impart motion to the feeding-nippers c, before referred to, through the crank-rod M′, pivoted at k', and the pitman M. All the mechanism heretofore described as dependent for its motion upon the driving-gear C is so speeded by the teeth in the respective gear that one revolution of C will cause one operation of each distinct mechanism.

The carrier G is hung upon the shaft a' of the gear C′, and consists of two disks and a set of jaws, E E′, &c., which lie between the disks and are hung loosely upon the arbors q

q', which run from disk to disk. The jaws are carried round by the disks and are made to open and shut at certain times during their revolution by an arm, N, attached to the longer tooth of the jaw, the other end of the arm being forced to follow the cam-path G′. (Shown in dotted lines in Fig. 3.) A spring, m^2, is provided to throw the jaws open whenever this cam-path allows it to be done. The extent to which the jaws may be opened is limited by a joint or clutch in the arbors q q', upon which they are hung. The stop O is fastened to the carrier-disk at a short distance from the jaws, and at the proper time closes them, as hereinafter explained. It is evident that as long as the arm N follows the lower or rounded part of the cam-path G′ the relative positions of the teeth and the stop will remain as shown; but when the upper or flattened part of the path is reached the motion of the jaw relatively to the stop is retarded and the stop is allowed to approach, as shown in the upper jaw in Fig. 3. This stoppage of the jaw is of course only relative to the folding mechanism above it, as the arbor q, on which the jaw turns, continues to move with the carrier-disk, and the only real change is one in the angle of the jaw from the center of the disk, caused by the movement of the arm N in the cam-path G′ of the stationary disk. (Shown in dotted lines in Fig. 3.) This stopping is long enough to allow a folded paper and wrapper to fall into the jaw and be carried on by it. The appearance of the package at this time is shown in Fig. 10. As the disk moves on the motion of the arm in the cam-path is still further retarded until the stop overtakes the jaw and compresses the paper between the teeth, as shown in the jaw E′, Fig. 3, and in Figs. 6, 7, 8, and 9. The paper and wrapper are then sealed and pressed by the mechanism adapted for that purpose, as hereinafter explained. The cam-path now rounds out again, and the jaw, released from the pressure on the arm N, rapidly falls away from the stop, until at E^2 it has regained its normal distance from the stop, and as the jaw is now pointed downward the sealed package is dropped through the funnel P into the receiving-box Q, Fig. 2. This funnel is of ordinary construction, inclined in any desired direction, and supported by braces r r, attached to the frame.

The sealing mechanism, before referred to, consists of a paste-tank, L′, fastened upon the frame-work by the bearing s', and in this tank the paste-roller D^{13} is turned by a belt passing over the roller D^{14} on the shaft of gear C^{12}, as before stated. This shaft also carries a loose arm, i', held in place by a spring, and carrying a roller, R, turned by a belt from the shaft, and serving, as hereinafter explained, to press down the flap of the package upon the glued surface of the wrapper. Paste is taken from the roller D^{13} by a cam, S, on the shaft of C^{11}. This cam is armed with a brush, s, which in in its rotation alternately brushes the surface of D^{13} and of the wrapper, and thus prepares the latter for sealing. The guard g' turns down the flap of the paper to present a horizontal surface to the sealing-roller R. The operation of sealing and fastening will be more easily understood from the detail-figures 5, 6, 7, 8, and 9.

Fig. 5 shows the jaw ready to receive the paper T from the rollers D^4 D^5. This paper, when dropped into the jaw, has the wrapper-flap f^2 extending beyond the edge of the carrier-disk, as shown in Fig. 6. When the jaw reaches the position in Fig. 6 the cam S, having received a charge of paste from the roller when the cam was in the position shown in dotted lines, passes over the surface of the wrapper upon which the flap is to be folded, and the jaw, moving on, passes out of reach of the cam. When it reaches the guard g' the flap is turned down, as shown in Fig. 7.

Fig. 8 shows the flap just leaving the guard g' and coming under control of the sealing-roller R. This roller both presses the flap back upon the pasted surface of the wrapper and holds it there with a constantly-diminishing pressure as the jaw moves away from it. The turning of the roller R upon its axis, the yielding of the spring, before referred to as acting upon the arm i', and the rapid moving away of the jaw effectually prevent the flap being pulled off before the paste has taken effect.

U is an elevator by which the papers are brought into a position to be seized by the feeding-nippers and drawn into the machine. This elevator consists of an upright covered box with a sliding platform, t, on which the papers are placed. This platform is moved upwardly as the papers are drawn off from the top by means of cords passing over the pulleys t' t', the other ends being attached to the wheel W. This wheel turns on a shaft in the frame-work, and is provided with handles, to allow the elevator-platform to be turned back when it is to be refilled with papers. To insure the uniform delivery of the papers to the feeding-nippers until the supply is exhausted this elevator is provided with a counter-balance, V, of ordinary construction, for turning the wheel W, and so arranged that as the number of papers grows smaller the weight engaged in raising the platform t diminishes. The wheel X is provided to preserve the proper tension of the cords upon the pulleys. I have found this elevator-box and counter-balance a convenient way of accomplishing the desired result; but it is obvious that other methods may be employed, if desired, and I do not confine myself to this form of mechanism.

The operation of the machine is as follows: The elevator-box is filled with papers and the machine is started. The feeding-nippers c are thrown forward to catch the topmost paper and draw it under the folding-blade F, which is pulled down by the lever H and produces a fold in the paper and forces it between the

rollers D D′ upon the belt *b*′. The paper thus folded is carried along upon this belt and discharged from between D^2 D^3 upon the wrapper-web, which has been previously addressed at the knife F^4, and fed along by the rollers D^6 D^7 D^8 D^9, &c., under the folding-blade F^3. This blade is now dropped by the lever H′ and folds both paper and wrapper, as shown in Fig. 10, and presses the folded edge between the rollers D^4 D^5. These rollers feed the package thus made into the jaw E, by which it is carried to the cam-brush *s* and there glued. The flap is then turned back by the guard *g*′ and folded upon the glued wrapper by the roller R, which holds it a short time pressed against this glued surface. When released by this roller the sealed package is dropped through the funnel P into the box Q, ready for delivery. As before stated, every revolution of the gear C causes one paper to be folded at F^2, another fed from F^2 to F′, another with wrapper to be folded at F^3, the proper length of wrapper to be fed along under F^3, an address to be cut off and glued to the wrapper at F^4, a third paper to be sealed, and another to be dropped into the box Q. It is obvious that the addressing mechanism may be omitted if unnecessary from the smallness of the circulation or other reasons.

I claim—

1. An automatic folding and wrapping machine, consisting of a series of folding devices consisting of folding-blades F F^3 and pressure-rollers D, D′, D^2, D^3, D^4, and D^5, the mechanism for feeding the wrapper-web to the last of said folding devices, a carrier-wheel, G, provided with automatic jaws E E′ E^2 E^3 E^4 to hold in a position fixed relatively to each other the paper and wrapper and carry them to the mechanism, substantially as described, for sealing said papers, all arranged to receive a paper in an unfolded or partly-folded state, and pass it successively through the process of folding, wrapping, and sealing, as herein shown and described.

2. In an automatic folding and wrapping machine, as described, a labeling and pasting device for addressing the wrapper, combined with mechanism, substantially as described, for applying the wrapper to the paper or periodical, sealing the same and delivering it in a suitable condition for the mail, substantially as set forth.

3. In a machine for folding and wrapping papers for the mail, the combination of the following elements, viz: the mechanism to feed automatically and singly each paper to the folding mechanism, the folding mechanism, the mechanism for preparing the wrapper and placing the paper on the wrapper, the mechanism for associating the paper and wrapper, the mechanism for holding the wrapper and paper in a position fixed relatively to each other, and the mechanism for pasting and sealing the package, all substantially as set forth.

4. In combination with the carrier-wheel G, provided with stops O, the independent holding-jaws, operated by an arm moving in a cam-path, and a spring, whereby the paper or periodical is seized and held in a fixed position while the wrapper is being pasted and released at the proper moment, substantially as set forth.

5. In combination with presser-rollers and a folding-blade giving the final fold to the paper when placed upon the wrapper, perforating mechanism, substantially as described, and a roller, whereby the wrapper is not only separated from the web, but tightened into proper position about the paper, substantially as set forth.

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